naval aviation news

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SIXTY SECOND YEAR OF PUBLICATION

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Wraparound cover by artist John Berkey provides a look into the future. Inside spread is a cockpit view of an A-6 carrier landing.

From the

EDITOR'S NOTEBOOK

There are a thousand exciting and sometimes hairy air stories about aviators who found themselves facing impossible odds but who persevered to carry their flights to successful conclusions. To some, it was simply a matter of survival but others were motivated by a kind of defiance – a refusal to quit no matter what. All demanded the utmost of their aircraft, their aeronautical skills and often their courage. But none that I know of has ever been hampered by the added burden of providing the physical power to keep his aircraft in the air.

At the Oshkosh '80 Air Show in August of this year I had the opportunity to meet and interview a 27-year-old aviator who, like thousands of others, had attended the show with his own aircraft. By the standards of modern, high-performance technology, it was not a very impressive machine, weighing about 75 pounds, developing about .33 horsepower and cruising at a speed of perhaps 12 to 14 miles per hour. This was the Gossamer *Albatross* and the pilot was Brian Allen who had pedaled the flimsy structure across the English Channel the year before.

Allen is a personable young man with a Bachelor's degree in biology who, in 1977, jumped at the chance to work with aeronautical engineer Dr. Paul B. MacCready on the first successful man-powered aircraft, the Gossamer *Condor*. He was an accomplished cyclist, had considerable experience in hang gliders and weighed only about 140 pounds. What's more, he seemed to have the kind of determination required for the project. On August 23 of that same year, Allen pedaled the *Condor* around a figure-eight course to win a £50,000 prize offered by British industrialist Henry Kremer. Sustained man-powered flight was now a reality.

Kremer also offered a prize of £100,000 for the first man-powered aircraft to cross the English Channel. MacCready, Allen and company accepted the challenge. They developed an improved version of the *Condor* which they named the Gossamer *Albatross*. Then they took their unusual machine to England and waited two months for exactly the right conditions. Meanwhile, Brian Allen was already engaged in intensive training, pedaling the equivalent of 40 to 80 miles a day, seven days a week.

Finally, all was ready and the *Albatross* with its 140-pound pilot/engine took off from a masonite pad at Warren, England, and headed out over the Channel. It was 5:51 a.m. local time.

It had been prearranged that if at any time Allen thought he could go no further, he would signal for a hook-up with one of the accompanying boats which would then tow him to shore like a kite. Flying at an altitude of ten feet, and often less, he encountered considerably more turbulence than expected. The fatigue factor soared. "After about one hour and thirty-seven minutes," he said, "I was exhausted and called for a tow." He was now only inches above the water but, using what he thought was his last remaining spurt of energy, he climbed to about 15 feet to receive the towline. There he found much less turbulence and elected to continue on instead.

At this point he was behind schedule and the chances of completing the historic flight had dimmed. In order to keep weight to a minimum, they had put aboard only enough water to last about two hours. Soon he had almost depleted this supply and he began to dehydrate. This he knew would have an adverse affect on energy available to complete the flight. Nevertheless, he kept pumping. By 7:40 a.m. his altimeter and airspeed indicator had ceased to operate and he could only estimate these measurements. Slowly he drifted down to a point where he was again inches from the water. With great effort he pedaled faster and climbed to about five feet.

By this time, it had become clear that he was battling a headwind which the accompanying boats calculated at six miles per hour. Thus, despite all his effort, he was only moving at six miles per hour across the water's surface. He hung grimly on and again the aircraft descended gradually until it skimmed along at an altitude of six inches. Again he pedaled harder to climb and was rewarded by a severe cramp in his right and then his left leg. Still he kept going.

One mile from the French coast he came dangerously close to the water but somehow called forth the necessary power to regain his altitude. Every movement was now painful and Allen does not know where he found the strength to continue. But he kept pedaling and the big 13-foot propeller continued to beat the air. Suddenly he was over the beach at Cap Gris Nez, France. The *Albatross* hung for a moment in midair and then glided to a landing. The time was 8:40 a.m. Brian Allen had completed the first man-powered flight across the English Channel, a distance of 22.5 miles in two hours and forty-nine minutes.

How did this young aviator accomplish what was thought to be beyond human endurance? Allen himself does not know. It seems to have something to do with that mysterious human quality no one can define precisely, but which makes some people go on in the face of almost certain defeat. In any case, this is clearly the only time in aviation history that a world record was set because both the pilot and the engine had "the will to win."

DID YOU KNOW

Aviation Hall of Fame

Five outstanding pioneers have been honored by the Aviation Hall of Fame. The 1980 enshrinement ceremonies were attended by many well-known personalities, including actor Cliff Robertson, who flies his own plane and maintains a stable of vintage aircraft, and Jimmy Stewart, also an aviation enthusiast.

Those honored this year were:

William T. Piper, who helped to bring the private airplane within the financial reach of thousands around the world by producing the famous Piper *Cub*. During WW II, the *Cub* was used to train nearly four out of every five American pilots, and then found a new role in directing field artillery and tactical land warfare from the air. After the war, Piper expanded his line of aircraft to meet the need for an above-the-weather plane. Later, more sophisticated aircraft were added which became part of our modern transportation system.

Anthony H. Fokker, who rose to prominence during the early years of WW I when the Germans used his monoplanes for aerial reconnaissance. Later, his armed aircraft became the scourge of the Allies, after Fokker perfected a forward-directed machine gun synchronized to fire bullets between the rotating propeller blades. This invention revolutionized aerial warfare. Coming to the U.S., he established two factories that produced outstanding commercial aircraft, including the famous Fokker trimotor. His planes set numerous records for endurance, performance and distance in spanning the continent, the oceans and in polar exploration.

Bernard A. Schriever, who has been called the principal architect of the Air Force's ballistic missile and military space program. He was instrumental in the development of the *Atlas* ICBM program and of missile launch facilities and tracking and control stations around the world. Much of his missile technology was later made available to NASA for use in its *Mercury, Gemini, Apollo* and *Skylab* manned space programs.

Robert F. Six, one of a colorful group of airmen who had the pioneering courage and ability necessary to help create and build our nation's primitive airlines into today's efficient transportation system. His entry into commercial aviation came after he bought into an airline operating between Colorado and Texas. It later became Continental Airlines which grew through several stages into today's all-jet international airline.

Charles Conrad, Jr., Naval Aviator and Navy test pilot, who became an astronaut. He served as pilot of the *Gemini 5* earth-orbiting mission, backup commander of *Gemini 8*, and commander of the *Gemini 11* mission. As mission commander of *Apollo 12*, he became the third man on the moon. Conrad's final role as astronaut was as commander of the *Skylab 2* mission, during which he and two fellow astronauts spent 28 days aboard the *Skylab* orbital workshop.

The Aviation Hall of Fame honors air and space pioneers whose contributions and achievements spanned three-quarters of a century, beginning soon after the Wright Brothers' first successful flights and extending into today's space exploration.

Space Shuttle Launch

NASA has confirmed that the first space shuttle will be launched in March 1981. According to Dr. Robert A. Frosch, NASA administrator, plans are continuing for a March launch even though the shuttle program received a potentially serious setback recently when fire damaged a shuttle engine during a test in Mississippi.

Columbia, the shuttle orbiter being prepared for the first flight, is expected to leave the orbiter processing facility at Kennedy Space Center on November 23 after necessary work on the thermal protection system has been completed. A 15-week work schedule then follows, leading to the March launch.

DID YOU KNOW

Sonobuoy Improvements

Two advanced sensors approved by the Navy for service use are the first major improvements in the sonobuoy field in many years. The direction command active sonobuoy system (DICASS) and the vertical line array DIFAR (VLAD) are the results of a seven-year research and development program. These sensors reinforce the sonobuoy's position as the vital link between the search aircraft and the subsurface ocean environment occupied by enemy vessels.

The VLAD sonobuoy is a listening sensor or passive array. It provides increased capability in detecting the newest generation submarines at greatly increased range and depth.

The DICASS sonobuoy is a directional and ranging sensor which transmits signals and receives any resulting echoes. It provides antisubmarine warfare aircraft with an improved capability to measure target range, direction and velocity.

The Naval Air Systems Command is the contracting activity in both programs, which have undergone extensive technical and operational testing to ensure a high degree of operational effectiveness, high reliability and compatibility with fleet ASW aircraft. The DICASS sonobuoy will be ready for fleet use in 1981 and the VLAD sonobuoy in 1982.

Short-Haul Aircraft

NASA's short-haul research aircraft, a four-engine transport-category turbo-fan, has successfully landed on and taken off from an aircraft carrier at sea. The demonstrations, conducted aboard *Kitty Hawk* off San Diego, were part of an intensive Navy/NASA project to evaluate the application of advanced propulsive-lift technology to shipboard environment. The aircraft made a total of 37 touch-and-go landings and 16 full-stop landings during the evaluation.

This followed an intensive six-week program during which 500 simulated carrier landings were made by NASA and Navy pilots at Crows Landing, Calif., a naval auxiliary field near NASA's Ames Research Center.

The aircraft, although a heavy plane by shipboard standards, can make landing approaches at 65 knots, slower than many light aircraft. Relying on its anti-skid braking system, the plane brakes to a stop in about 300 feet, a shorter distance than that required by conventional aircraft which use shipboard arresting gear. The short-haul aircraft made 16 deck-run takeoffs without the aid of catapult gear.

Approaches to the ship were made under a variety of conditions and to both the axial and angle decks of the carrier. Landings were made with winds over the deck of up to 30 knots.

The aircraft demonstrates new technology for quieting jet-engine operations while providing performance for operations from very short runways. Four Lycoming YF-102 turbofan engines are mounted on top of the wing so that the exhaust is directed across the upper surface of the wing and flaps. This flow creates additional lift, particularly at low speeds.

Harpoon

The McDonnell Douglas *Harpoon* antiship missile scored six target hits in seven launches in Atlantic and Pacific Fleet exercises this past summer, bringing its success rate to 58 target hits in 61 launches, with a reliability rate of 95 percent in fleet launches.

In a Pacific Fleet exercise to demonstrate over-the-horizon targeting, the missile launched by the frigate *Badger* hit a moving patrol boat target at long range. In the Atlantic Fleet, all *Harpoons* launched made direct hits on a decommissioned destroyer. A *Harpoon* fired from a P-3C patrol plane missed because of inaccurate targeting but the missile performed without a flaw. Two additional airborne launches were made from an A-6E at the Pacific Missile Test Range, Point Mugu, Calif., and scored direct hits on a destroyer target. These

firings, following carrier suitability trials, certified the *Harpoon* for use by the A-6E aboard carriers.

The missile is now deployed by the U.S. Navy on 82 surface combat vessels, 26 nuclear submarines and 26 P-3 aircraft.

Wind Tunnel Closed

The free world's largest wind tunnel at NASA's Ames Research Center in California will be closed for about one year for modifications, which will greatly increase its research capabilities. The 40-by-80-foot wind tunnel has been in almost continuous use since its completion in 1944 and has made many important contributions to the development of vertical takeoff and landing, powered lift and rotary wing concepts.

The major modification will be the addition of a 600-foot structure to house a new larger test section. The six 6,000-horsepower electric motors which have powered the wind tunnel will be replaced with modern 22,500-horsepower units, raising the maximum wind tunnel drive power from 36,000 to 135,000 horsepower. The additional power will increase the top speed available in the present test section from 230 to 345 mph, and provide a test speed in the new section of 115.

The amount of noise generated by the new facility will be kept to an absolute minimum. Special low-speed fans will be employed and there will be extensive acoustic treatment at both the intake and exit of the new test leg.

The increased capabilities of the new facility will help meet the critical need for testing full-scale aircraft systems under simulated flight conditions. As the trend continues toward developing aircraft and helicopters of increasing size and complexity, it has become increasingly difficult to accommodate them in existing wind tunnels. The facility is expected to be fully operational in early 1982.

Grampaw Pettibone

Sea King – Sea Food

"Helo plane guard is airborne," called the air boss as the SH-3 *Sea King* entered a starboard delta pattern and assumed the day plane guard position. Little did this crew realize that a series of occurrences would later test their knowledge and skills to the point of survival.

The first event occurred 30 minutes after launch with a runaway lateral beeper trim. The helicopter aircraft commander (HAC) took control of the aircraft, analyzed the problem, secured the beeper trim, passed control back to the copilot and the mission continued. Minutes later the #1 fuel boost pump warning light illuminated. The HAC secured the #1 boost pump and activated the #2 boost pump. The #2 warning light also came on but extinguished when the HAC turned the #1 pump back on. With both warning lights now out, the mission continued.

After one hour of flight, 1,000 pounds of fuel had been consumed. Ten minutes later, however, the fuel gauges showed 2,000 pounds of fuel depleted. A crew member reported that he smelled fumes and the HAC ordered a search for leaks. Looking out the cargo hatch, a crewman observed fuel streaming from the tail of the aircraft. Seconds later, the #1 engine flamed out. The HAC again took control of the aircraft, transmitted an emergency call to the ship, and was cleared for an immediate landing. Several aircraft were spotted for launch on the CV fantail, forcing the HAC to plan for a run-on-landing on the angle, crossing the deck in the direction of #2 catapult. Passing the stern of the carrier, the SH-3 was at 150 feet, with air speed at 70-80 knots and rotor speed (NR) established at 98 percent. At one-quarter nm final, the aircraft was at 100 feet, airspeed 70 knots, with NR at 90. Abeam the Fresnel lens, the helo had descended to flight deck level, airspeed now 50 knots with sink rate increasing. The pilot then executed a waveoff to the left. Now below flight deck level with sink rate continuing, the HAC instructed the copilot to dump fuel, jettison sonobuoys and bring on manual throttle. All efforts to regain NR and decrease sink rate were ineffective. Passing through 40 feet with NR at 85, the pilot flared the helo and slowed to 20 knots prior to hitting the water. Upon impact, the nose tucked and a large swell engulfed the aircraft's forward section. The helo rapidly rolled left and flipped inverted.

Grampaw Pettibone says:

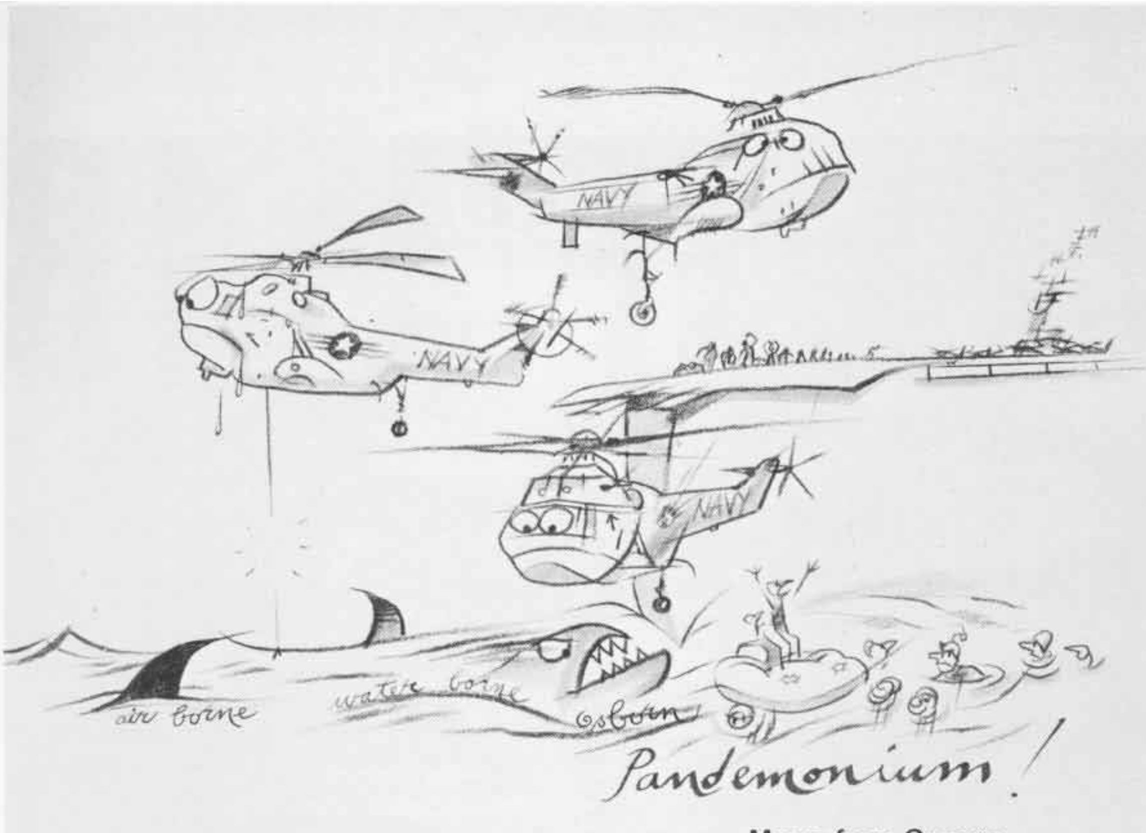
Great sufferin' *Sea Kings*! If this doesn't leave you with a sinking feeling, then you're all wet!

The primary cause of this mishap was attributed to material failure. Unfortunately, the exact cause cannot be determined since the aircraft was not recovered. It is suspected that failure of the starboard fuel filter assembly resulted in sufficient fuel flow interruption to cause engine flameout.

A contributing cause was listed as pilot error in that the HAC took physical control of the aircraft too hastily, attempted an immediate landing without exercising other options, and did not adequately establish maximum single-engine performance parameters. It was felt that the copilot had the aircraft safely under control and that the HAC should have involved himself more in developing a plan that would have conserved sufficient energy (i.e., dump fuel, sonobuoys, etc.) prior to attempting a left-seat, no-hover, roll-on landing. Some doubt exists as to the proper execution of the single-engine emergency checklist, since both the HAC and the copilot reached for the speed controls but each thought the other had or would move them. The copilot did not – the HAC couldn't remember. The SH-3 has rather decent single-engine qualities and does not demand extreme urgency in getting it on deck.

The rescue of this crew proved to be most interesting. A second SAR SH-3 hovered over the sinking helo as soon as the spray of the rotors striking the water subsided. No survivors were visible. Several seconds later, five crewmen appeared on the surface, three of whom were hoisted into the helo. A raft was lowered to the remaining two (copilot and passenger crewman) and the helo returned to the carrier for more fuel. While it was refueling, a third SH-3 was launched to retrieve the other two survivors. This helo was in a down status for SAR to replace

ILLUSTRATED BY Osborn



the rescue hoist cable with no hook attached. The crew effected a quick-splice attachment and checked it for slippage by suspending a heavyweight troubleshooter. SAR helo #3 flew beyond the passenger, who was in the raft, and began a hover to rescue the copilot. A wetcrewman entered the water to assist. The co-pilot and wetcrewman hooked up and were hoisted upward. As they reached the cargo door, the hoist cable separated, plunging the two back into the water, 20-25 feet. A raft was lowered from the helpless, hookless helo and the carrier was notified. SAR helo #2, now airborne following refueling, was hovering to rescue the passenger crewman on the raft when SAR helo #3 asked #2 to hurry as sharks had been spotted 50 yards away. They were heading toward their two unaware intended victims who were struggling to get into the raft. Helo #2 rescued the raft passenger and quickly air-taxied over to pick up the copilot and wetcrewman. The second of the two tumbled into the raft just as Old John Jaws made a lip-smacking pass by the raft. *Sea King* #2 retrieved the two and returned them to the carrier unharmed.

All in a day in the life of a copilot . . . and so to bed.

Memo from Gramps

While digging through some of my earlier flight material, I happened across some copy that you young tigers might enjoy. I cannot vouch for its authenticity, but there's lots of good words here for one short page, particularly paragraph #5, which still applies.

Instructions Issued with the 1911 Glenn Curtiss "Pusher"

First Known Airplane Flight Manual

Rules Governing The Use Of Aeronautical Apparatus

The Aeronaut Should *seat himself in the apparatus, and secure himself firmly to the chair by means of the strap provided. On the attendant crying "Contact," the aeronaut should close the switch which supplies electrical current to the motor, thus enabling the attendant to set the same in motion.*

Opening The Control *valve of the motor, the aeronaut should at the same time firmly grasp the vertical stick or control pole which is to be found directly before the chair. The power from the motor will cause the device to roll gently forward and the aeronaut should govern its direction of motion by use of the rudder bars.*

When The Mechanism *is facing into the wind, the aeronaut should open the control valve of the motor to its fullest extent, at the same time pulling the control pole gently toward his middle anatomy.*

When Sufficient Speed *has been attained the device will leave the ground and assume the position of aeronautical ascent.*

Should The Aeronaut *decide to return to terra firma, he should close the control valve of the motor. This will cause the apparatus to assume what is known as the gliding position, except in the case of those flying machines which are inherently unstable. These latter will assume the position known as involuntary spin and will return to earth without further action on the part of the aeronaut.*

On Approaching Closely *to the chosen field or terrain, the aeronaut should move the control pole gently toward himself, thus causing the mechansim to alight more or less gently on terra firma.*

F/A-18

Development of the most advanced weapon system to join the U.S. Navy inventory, the F/A-18 *Hornet*, is proceeding at a near peak level at the Naval Air Test Center, Patuxent River, Md.

The *Hornet*, a multimission, twin-engine strike fighter, is now in its second year of development testing at NATC. Pilots from McDonnell Douglas, Navy's prime contractor for the F/A-18, and project pilots from the Navy and Marine Corps are busy evaluating and developing the *Hornet* and its advanced systems.

When it enters fleet service in 1982, the *Hornet* will replace both the F-4 *Phantom* fighter and A-7 *Corsair* light attack jet. It is capable of performing the missions of both of its predecessors. Activation of the first squadron of these aircraft, VFA-125, was scheduled to take place at NAS Lemoore in the fall of this year. The first fleet aircraft will be delivered to Lemoore in the spring of 1981.

A recent flight by the fourth development F/A-18 simultaneously logged the 1,500th flight and 2,000th flight hour of the program. Eleven full-scale-development and two production models of the aircraft are currently flying at NATC and St. Louis.

A total of nine pilot production *Hornets* were built from FY 1979 funding appropriations. An additional 25 limited production aircraft have been ordered for FY 1980.

The *Hornet's* low concurrency or initial low-production rate during development will mean lower future cost due to a reduction in significant and costly retrofit programs.

Each of the 11 full-scale-development *Hornets* is performing a specific test program during testing. The first, F-1, had its initial flight in November 1978. Evaluating flying qualities and flutter characteristics, this aircraft recently made its 200th flight with nearly 300 flight hours accumulated. F-2, testing performance and propulsion, has made numerous speed runs testing the capabilities of the *Hornet's* two General Electric F404 low-bypass, turbofan engines, and evaluating overall aircraft performance.

The plane's carrier trials are being referred to by some as "the most successful in Naval Aviation history." *Hornet* No. 3 rendezvoused with the carrier *America* off the coast of Virginia last fall for four days of intensive at-sea testing. A total of 32 catapult launches and arrested landings, plus 17 touch-and-go's, were made as the aircraft found its sea legs. An additional at-sea period is planned next year for the Board of Inspection and Survey trials.

The F/A-18 is considered more carrier suitable than the two aircraft it will replace, the F-4 *Phantom* and A-7 *Corsair*, due to its outstanding visibility over the nose and handling qualities on the carrier glide slope approach.

The fourth *Hornet*, currently involved in envelope expansion and development, recently pushed the greatest F/A-18 load factor experienced to date to over a positive 7 G and a negative 2.8 G. The same aircraft also demonstrated range and endurance capabilities on internal fuel during a three-hour, unrefueled test flight in June. Fuel on board at landing exceeded 1,500 pounds.

High angle-of-attack development has now reached 90 degrees. F-6, painted in an international orange and white paint scheme for ease of visibility and photography, is building up the angle-of-attack envelope to determine the flight characteristics in this region. The aircraft has demonstrated that it is extremely reluctant to spin and is quite stable in extreme attitudes.

Four full-scale-development *Hornets* are participating in weapon system development. The versatility of this aircraft allows reconfiguration of the fighter to attack version in only minutes by simply reloading armament. Software changes, display modifications, etc., are not required. Sophisticated computer technology allows one aircraft to inherently have the mission capability of two aircraft — all the time.

The four aircraft, F-9, TF-1 (the first two-place version), F-7, and F-8, all have made missile separations or fired the *Hornet's* 20mm cannon. Tactical launches of wing-tip-mounted *Sidewinder* and fuselage-carried *Sparrow* missiles against radio-controlled drone targets have a 100-percent kill record with five out of eight shots actually being direct hits on the drone. The radar-guided *Sparrows* have been fired under instrument flight conditions as well.

The *Hornet's* 20mm cannon, mounted in the nose, was first fired on the ground in an NATC gun tunnel. More than 10,000 rounds were fired with excellent results. Subsequently, over 20,000 rounds of in-flight firing, including full-round bursts, have demonstrated the plane's gun integration program to be an unqualified success.

Two TF-18 two-seat trainer versions of the *Hornet* have been built and flown to date. Unlike many two-seat versions of single-place fighter aircraft, the TF-18 remains fully combat capable. Less than six percent of the single-place *Hornet's* internal fuel capacity is sacrificed for the second cockpit. The aft cockpit gives the pilot full flying and weapon system capability with all instrumentation except the head-up display. The second seat is approxi-

mately six inches higher than the front cockpit's, giving the "second-seater" greatly improved visibility. More about the cockpit itself later.

Pilots' initial reactions to the cockpit run generally in the same vein – amazed. The familiar panel of round gauges is gone. Four cathode ray tubes have replaced the multitude of dials that once confronted the pilot. Through directives to the computers from the throttle, stick, and the up front control panel, the pilot can call up whatever information he requires by requesting "MENU," and keying in the code for the information he needs. The information is then displayed on the head-up display or one of the cathode ray tubes. The pilot, looking through the head-up display to the outside world, sees his information, whether it be navigational, target tracking and acquisition, stores inventory or otherwise, and need not take his eyes from the target.

If the target is beyond visual range, the *Hornet's* medium range APG-65 radar becomes the pilot's eyes.

Performance of the APG-65 radar has been exceptional. This multimode system has been 100 percent accurate in its target lock-ons in tactical missile shots on drone targets.

Capable of scanning multiple targets while locked on others, the APG-65 has a raid-assessment mode for greater definition of targets at long range. What formerly appeared as one large target at 50 nautical miles and then suddenly split off into multiple aircraft at shorter range is now defined at long range.

Again modular technology is present in the radar, making repairs when necessary a quick procedure.

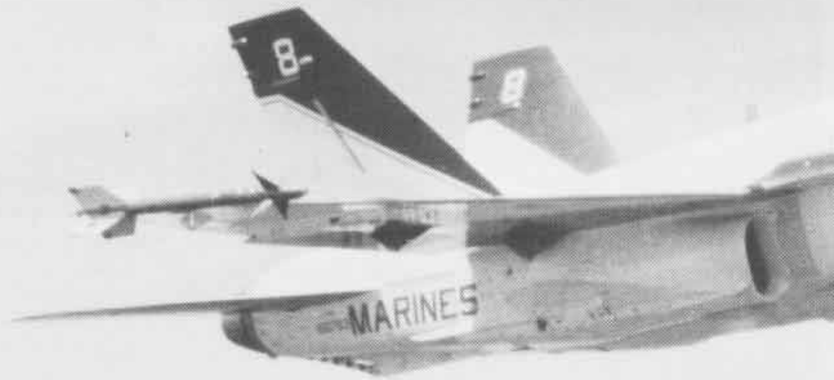
Fighter and attack configurations share the same avionics, radar software and cockpit instrumentation. Attack versions of the *Hornet* will carry forward-looking-infrared and laser-spot-tracker/strike camera tactical pods on the fuselage stations normally occupied by radar-guided *Sparrow* missiles. These sensor packages give the F/A-18 outstanding attack capability.

The *Hornet* weapon system can deliver up to 17,000 pounds of ordnance and the aircraft's potential range could exceed 500 miles on the attack mission. A recent weapons loading demonstration at NATC found the F/A-18 capable of accepting all current conventional and unconventional weaponry required.

The last two development *Hornets* differ from the previous nine not only in test emphasis but appearance as well. While the earlier *Hornets* were a combination of blue, white, gold, or international orange paint, the final two, TF-2 and F-9, have been painted in the Navy's new three-tone gray operational scheme. Low-profile markings have replaced the brighter insignia worn previously.

These two aircraft recently participated in a demonstration of aircraft availability and ease of maintainability, often logging five sorties per day over a two-month trial period. TF-2 continued its evaluation during accelerated service testing, demonstrating the reliability and capabilities of the engines during high-use periods. This particular aircraft also logged its 200th flight recently, less than seven months after its first takeoff in St. Louis.

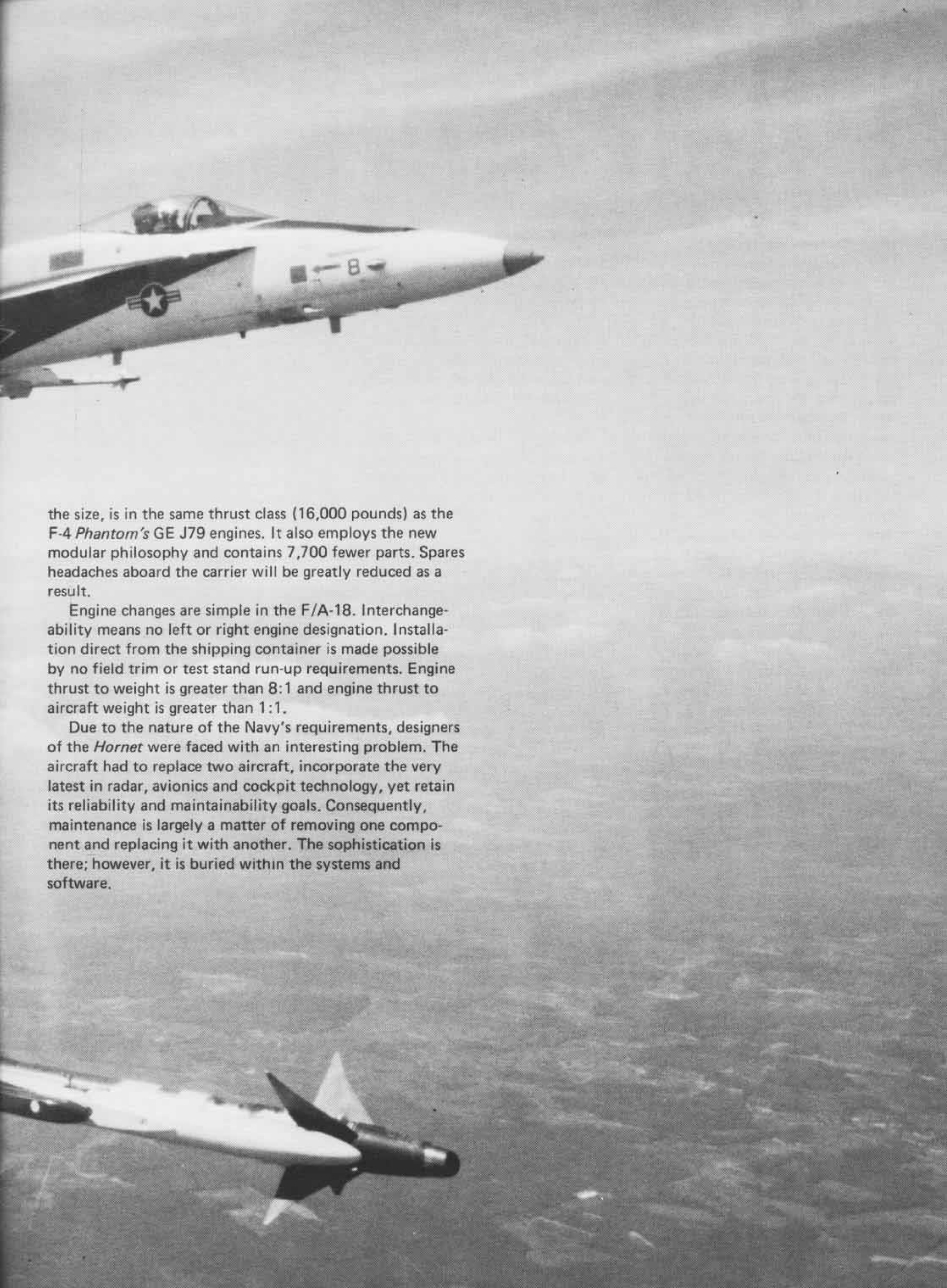
Reliability and maintainability have been designed into the F/A-18. The world's greatest fighter is without value



if it is parked in the hangar for repairs when needed. It was with this premise in mind that Navy and McDonnell Douglas designers set out to make the *Hornet* significantly more reliable and easier to maintain than any previous aircraft. Based on data being gathered at NATC, the F/A-18 is already exhibiting reliability superior to current fleet aircraft. Statistics developed from maintenance records kept at NATC show that it has actually exceeded original requirements in several areas of reliability and maintainability. Modular plug-out, plug-in technology has allowed quick repairs when they have been necessary. "Within-the-shadow-of-the-aircraft" maintenance has eliminated the need for work stands in many cases as well.

Performance of the GE F404 engines has been without parallel in any previous jet aircraft development program. In more than 4,000 hours of engine flight time, there has been but *one* in-flight shutdown. Twin-engine design plus its demonstrated reliability make this a safe, survivable aircraft.

The F404 power plant, although approximately one-half



the size, is in the same thrust class (16,000 pounds) as the F-4 *Phantom's* GE J79 engines. It also employs the new modular philosophy and contains 7,700 fewer parts. Spares headaches aboard the carrier will be greatly reduced as a result.

Engine changes are simple in the F/A-18. Interchangeability means no left or right engine designation. Installation direct from the shipping container is made possible by no field trim or test stand run-up requirements. Engine thrust to weight is greater than 8:1 and engine thrust to aircraft weight is greater than 1:1.

Due to the nature of the Navy's requirements, designers of the *Hornet* were faced with an interesting problem. The aircraft had to replace two aircraft, incorporate the very latest in radar, avionics and cockpit technology, yet retain its reliability and maintainability goals. Consequently, maintenance is largely a matter of removing one component and replacing it with another. The sophistication is there; however, it is buried within the systems and software.

Developing the Flight Crew Simulator

by Tom Huff

Christmas 1945: An unidentified submarine was sighted off the Virginia coast by crewmen of a naval patrol bomber. Combat-weary Naval Aviators were called back from leave but could find no evidence of a submarine, nor could anyone locate any record of a naval patrol bomber in the reporting area. It was eventually determined that the message had leaked from a flight simulator's powerful radio "phantom" antenna at Naval Air Station, Patuxent River, Md.

These early growing pains did little to endear the use of electromechanical computer flight simulators for training purposes to operational personnel.

The need to train and test flight crews became apparent before the United States officially entered WW II. Naval patrol operations had increased rapidly. Planes were scarce. Youngsters, flying half-million-dollar airplanes, looked more like students than pilots. Their lives, and the lives of many others, depended on their crew combat team ability. The Navy needed an effective means of teaching in-flight teamwork.

Captain Luis de Florez, head of the Navy's Bureau of Aeronautics special devices division, explored various ideas with many individuals including Charles Lindbergh and Dr. Albert Einstein. A well known aviator, inventor and engineering corporation president, de Florez believed flight crew training could be best accomplished by simulating flight in a trainer on the ground.

He first discussed this concept with the Pioneer Division of Bendix Aviation Corporation in September 1941 and the following month plans and specifications arrived from synthetic training activities in England. The plans described a Silloth trainer which simulated a Lockheed Hudson aircraft. It had been developed by an English organ manufacturer, worked by air pressure and was being successfully used to train combat crews as units. Employing pneumatic bellows, linkages and other apparatus, it provided pilots with the actual feel of flight control.

The U.S. Navy liked the idea and decided to build its own simulator which would duplicate, as nearly as possible, the operating characteristics of the Martin PBM *Mariner* flying boat.

Taking its cue from the English, the Navy sent the specifications to M. P. Moller, Inc., an organ manufacturing firm in Hagerstown, Md. Development and construction began within weeks.

In spite of both major and minor modifications, including changing to a later model flying boat after development had begun, the Moller company completed a considerably different Silloth trainer by June 1942. Months of Navy testing followed. Accuracy, however, was inadequate for operational training. Instruments actuated by air pressure gave erratic indications which did not inspire confidence in either pilots or maintenance personnel. Air pressure gauges contained metal springs similar to those in bathroom scales which gave different readings with every room temperature change.

The problems encountered in this first attempt led to a new approach and a second model was constructed to operate electrically. Engineers added movement similar to the instruments in the Link trainer. Maintenance was difficult because the device was not of standard manufacture and not too carefully designed or blueprinted. Large, heavy and awkward, the trainer was not a practical simulator and was not put into production. It had, however, provided the knowledge and experience to proceed further and experimenters believed that a satisfactory working model was now within reach.

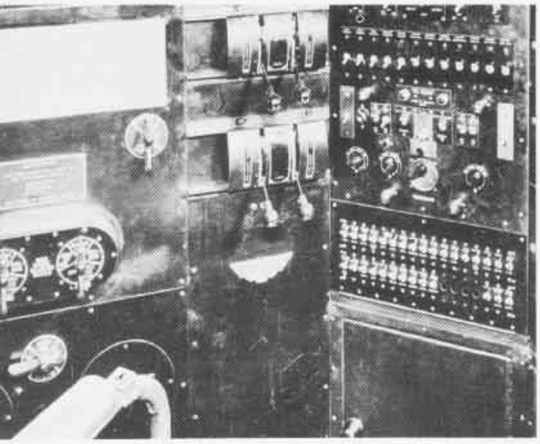
A new simulator was designed to use standard, readily-procured parts for easy maintenance and minimum "down" time. It was simplified to some extent by the elimination of actual movement. Basically it was to be a computer which would provide appropriate instrument indications for a variety of flight situations. Because it could be programmed, this system had the added advantage of being readily adaptable to the operating characteristics of a number of aircraft.

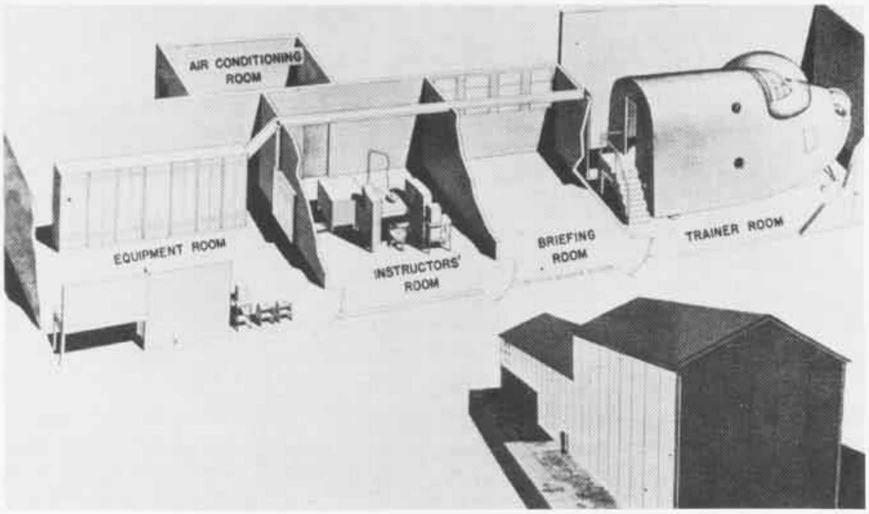
Discussions were held with representatives of Bell Telephone Laboratories, a division of Western Electric. After preliminary investigations, the laboratory gathered and trained an electronics group in aircraft engine and aerodynamics theory. Within three months, these people had enough information to begin designing and constructing an electronic computer operational flight trainer. For realism, the Navy furnished the laboratory with a 20-foot-long crew section of a Martin flying boat. It had been originally constructed by the Ridgefield Manufacturing Corporation of Riverdale, N.J., as a radar trainer but was no longer in use. The Navy also provided the latest wind tunnel tests and other engineering data. Extensive Martin test flights enabled the engineers to study the plane's flight characteristics in detail.

Bell Telephone successfully produced a production prototype simulator in October 1942, complete with manufacturing specifications and drawings. It was a sophisticated electronic, computer-operated simulator which enabled the pilot, copilot, navigator, flight engineer, and radar operator to train together as a unit without leaving the ground and at a greatly reduced cost.

The wooden hull interior, reaching just behind the flight engineer's position, accurately represented the plane. The equipment taken from operational

Martin PBM Mariner.



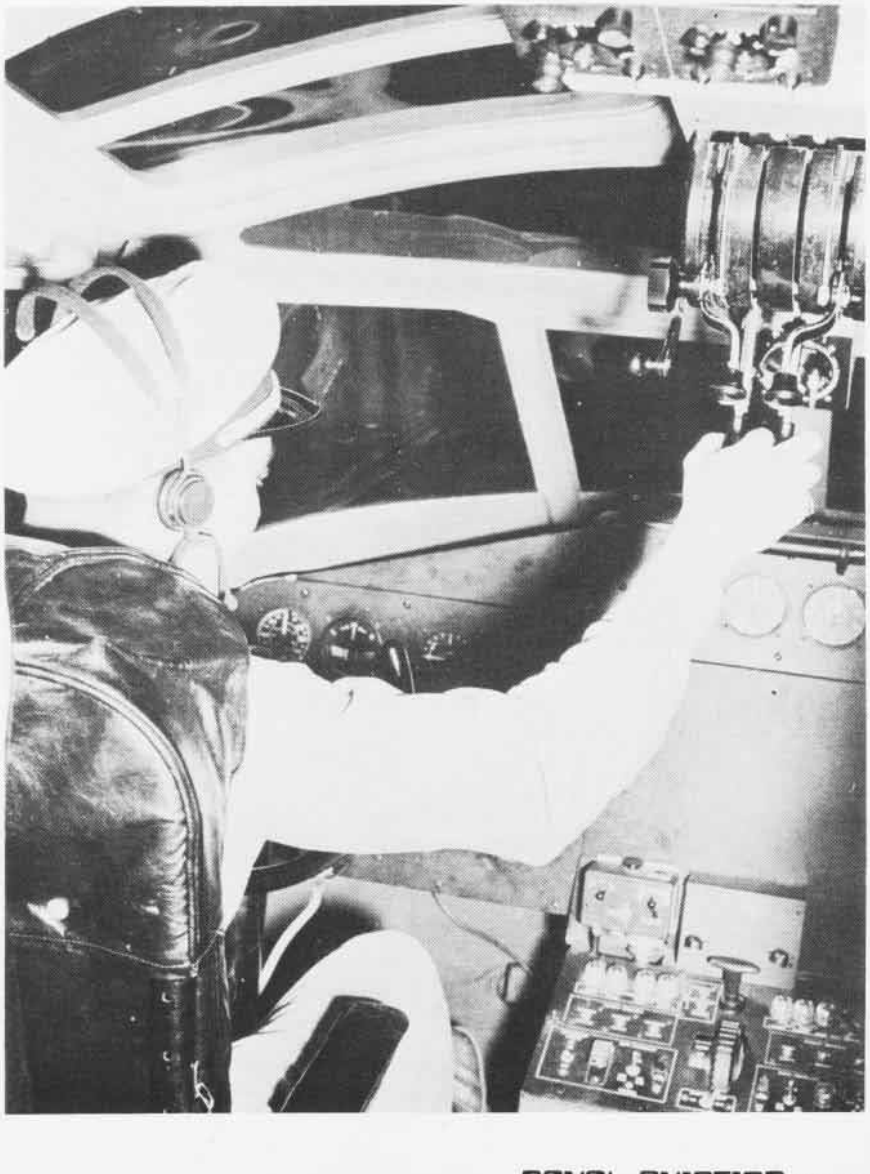


aircraft was modified and interconnected through an automatic measuring and calculating system which translated and registered readings and warning signals. The control feel, engine noise and hull vibrations were also faithfully reproduced and varied with engine power setting and airspeed. These features provided the illusion of movement which helped to make the experience realistic.

The Bell simulator was an important innovation in flight training because it provided a stepping stone from which pilots and crewmen could make the transition from the classroom to the air. Moreover, it placed the students on their own and forced them to think for themselves. It permitted student experimentation in a completely safe environment, built confidence and provided valuable but harmless lessons in the consequences of using improper procedures. Some emergencies which a flight instructor might not prudently demonstrate in the air could be safely and effectively simulated in the trainer. Of special significance was the fact that students developed their skills and operating procedures as a crew. And when a session in the trainer was complete, the flight recorder, navigation and radio logs documented the results. The patrol plane commander could tell if his copilot, flight engineer, navigator and radioman accomplished what they should under various circumstances in flight.

The instructor's deck, located in a room by itself, provided the means to monitor the crew's individual and

Above left, flight engineer's station. Above, original PBM simulator building showing interior layout. Below, cockpit was designed for maximum realism.



collective performance. It also provided an added incentive because the repeating dials and indicators kept the instructor continuously informed of crew actions and responses. All phases of conduct of flight could be evaluated from takeoff to landing. Emergency conditions that could be introduced included failure of one (a common occurrence at the time) or both engines, or the radio equipment. Instructors could simulate icing, rough air, and fuel supply problems while a flight recorder traced the path flown. Navigation problems could be designed to familiarize pilots and crew members with the idiosyncracies of the areas in which they would be operating.

The Navy moved the simulator in December 1943 from the New York laboratory to Naval Air Station, Banana River (now Cape Canaveral), Fla., for evaluation of reliability and accuracy in an operational situation. After some minor changes in March 1944, the Navy officially accepted the simulator.

Like many innovations, the concept had its critics. Some questioned its effectiveness while others claimed the simulator was not worth the cost or the consumption of scarce wartime resources.

Ultimately, two investigations were conducted to determine whether the time, effort, dollars and material involved had been expended wisely. The training command evaluated effectiveness while Congress looked at the cost. A log documented combat-experienced crews' performance while an investigation group took a hard look at the device itself as well as at the history of its development. In the process, personnel opposing the simulator were given ample opportunity to express their views. Despite such careful scrutiny, the simulator received a clean bill of health. Investigation concluded that it increased air-time value, saved aircraft, gasoline, and flight instructor time while providing effective training even when weather did not permit flying.

The PBM simulators cost $150,000 each, not including government-furnished equipment such as the wooden hull and aircraft accessories. This compared favorably with the PBM aircraft which cost $414,150. The chief of the engineering section of Pan American Airways computed hourly costs of training in a PBM aircraft, based on depreciation over five years, with an average daily flight time of six hours (approximately 2,000 hours per year) and compared these costs with those of the PBM simulator. These were the results:

	PBM Aircraft	PBM Simulator
Crew salary	$ 22.50	$ 8.85
Maintenance	30.00	.56
Oil	.48	—
Gasoline	44.10	—
Insurance	4.50	—
Ground crew salaries	8.82	—
Depreciation, misc.	30.00	8.00
Total cost per hour	$140.70	$17.31

The simulator building cost $20,000 compared to $275,000 for a wooden hangar for the Navy's smallest type airplane, the N2S trainer. A masonry and steel building to hangar PBMs cost an estimated $1,000,000. Critical materials, including 140 gallons per hour of 100 octane (grade 130) high-test gasoline, could also be saved.

A follow-on four-engine simulator, designed to duplicate the flight characteristics of the new PB4Y-2, complete with bombardier compartment, cost only $120,000. This was $30,000 less than the PBM simulator and $392,000 less than the PB4Y-2 aircraft itself. Congress concluded its investigation report by officially recognizing the electromechanical computer flight simulator's outstanding contribution in training aircrewmen for operational assignments.

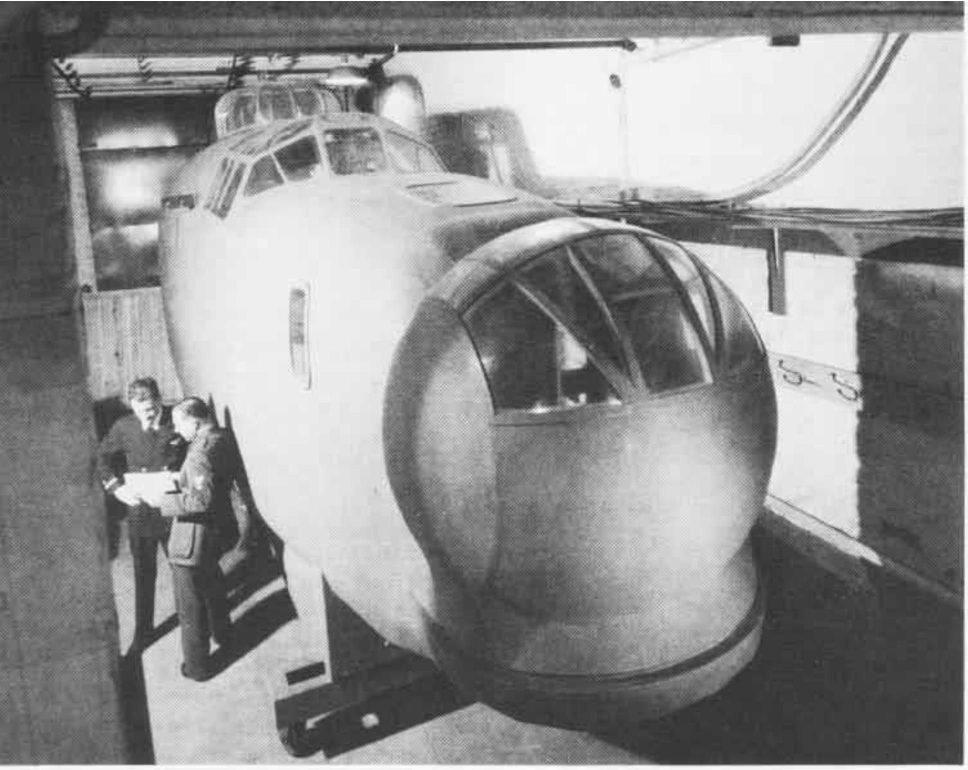
The Navy installed five additional flying boat simulators that first year, as well as seven fighter types and one four-engine land-based bomber type. A new kind of radar, LORAN (long-range radio aid to navigation), and a wide-angle projector lens for contact flying were also integrated into the system.

One staging area installation provided a complete six-hour problem for each crew which included as much realism as possible. The examination, prepared by a fleet-experienced squadron commander, commenced with crew briefing by the squadron air combat intelligence (ACI) officer. The plane commander received a fly sheet incorporating a transPac flight and search mission. Proper plane loading was observed and the takeoff conformed to naval air station operations traffic and communications. During the flight the entire crew was kept busy.

Pilots faced checks on characteristics of flight, plane and power handling, and general ability. The radioman received and transmitted coded messages, after setting the proper frequencies and establishing contact with requisite bases. The flight engineer responded to usual and unusual engine operating conditions. A how-goes-it chart checked cruise control, power settings and fuel flow. Actual weather readings from a recent transPac flight provided wind factors. Detection of an enemy task force by radar was demonstrated, as well as identification after contact and shadowing. The squadron ACI, communications, navigation and tactics officers graded the flight log, charts and coded communications. Crews failing the simulated proficiency flights were not cleared for fleet operations. The flights had the added benefit of disclosing weak points in the existing training program.

The National Aeronautic Association recognized the simulator's value in 1944 by presenting the Collier Trophy to Capt. de Florez for the "greatest achievement in aviation, the value of which has been demonstrated by actual use during the preceding year." Navy public relations released news about simulators in January 1945 and in March the New York Electrical Society covered the technical aspects, for the first time, at one of its meetings.

At the war's end, the Navy discussed available basic research with



various organizations. Mr. Donald Douglas of Douglas Aircraft Corporation considered, in August 1945, adapting the simulator to the manufacture of new type aircraft, introducing flight data from the wind tunnel into simulator circuits and analyzing the results before flight tests. The following month, F. R. Collbohm, of Douglas, suggested the simulator's use in design and supersonic aircraft development, stability and control comparison, and for pilot training and guided missile intercept problems.

Although American Airlines' Captain William B. Lester, Jr., superintendent of flight training, offered a C-54, and the Civil Aeronautics Administration (now FAA) encouraged the use of flight simulators, they were not extensively developed commercially until recommended by the

Helo Simulator Evaluation

by Lieutenant Timothy Hallihan

The constant rise in flight-hour costs, coupled with fewer available aircraft, has resulted in the increased use of aircraft simulators for training throughout the entire aviation community. These complex, motion-based simulators, with their advanced visual display systems, have been developed for use in military pilot training as well as by commercial operators.

Throughout the evolution of flight simulation, the Naval Air Test Center has been involved in the development of simulator test techniques. An example of recent progress made by NATC personnel is the design and development of a portable instrumentation package for use in recording the dynamic response characteristics of flight simulators. The capabilities of this package and the resultant simplification of data processing represent significant technical advances in simulator evaluation.

The purchase of several helicopter flight simulators for use by the Navy and Marine Corps has resulted in a significant test and evaluation effort by Rotary Wing Aircraft Test Directorate (RW) personnel. In addition to ensuring the initial fidelity of simulators, RW has been tasked with annual quality assurance and revalidation inspections to ensure that the simulated flying qualities of these devices do not deteriorate with continued use or with unintentional modification.

The fidelity of the simulator's flying qualities is normally evaluated through discussions with pilots and comparison of the simulator's dynamic response characteristics with those of the aircraft whose characteristics it is designed to reproduce. Because of the pilot's tendency to adapt to the simulator, many small but significant differences are noted only through accurate comparison of quantitative data in the form of time histories of aircraft and simulator dynamic responses. The degree of spatial freedom enjoyed by the helicopter and the complexity of the typical helicopter aerodynamic model increase the importance of an accurate comparison of aircraft and simulator data.

Rotary wing aircraft test personnel initially became involved with the simulator development effort during acceptance tests of the Kaman SH-2F *Sea Sprite* operational flight trainer. Several pilots flew the trainer and concluded that it did not accurately simulate the flying qualities of the SH-2F. To substantiate this to the contractor and to the Naval Training Equipment Center, the rotary wing aircraft test team set about quantitatively identifying differences in the dynamic responses of the simulator and the aircraft. Two six-channel strip chart recorders were connected to the analog outputs of the simulator, and a series of tests were conducted to produce time histories of the dynamic response characteristics. Similar tests were conducted in the aircraft, and comparison of the data supported the conclusion that had been reached earlier through qualitative evaluation.

The contractor now had quantitative proof that the fidelity of the

President's Airport Commission in 1952.

Since then, flight simulators have come into their own. The complexity of modern high-performance aircraft and the costs involved in their operation make these innovative devices an essential part of today's military and commercial aviation. Their extensive use has resulted in more effective flight crew training, more efficient use of expensive aircraft, increased safety and greatly reduced costs. Clearly, the flight simulator is here to stay.

Left, PB4Y-2 Privateer simulator under development at Bell Telephone Labs, 1944. Above right, instructors simulate the problem and monitor flight progress. Below right, personnel involved in the development of the simulator pose with the Collier Trophy. Standing in front row, Capt. de Florez is third from left, Lt. Huff is second.

simulator could be improved and also had a substantial data bank to utilize in pinpointing the problem areas. Although this comparison of dynamic response characteristics represented a substantial improvement in the process of simulator development and evaluation, many problems still existed in the data processing necessary to produce valid data comparisons.

The ideal method of comparing time history data is by overlaying the traces for direct comparison. This method was not possible using strip chart recordings. Side-by-side comparison of aircraft and simulator data was the best obtainable. It was a tedious process of cutting out each trace and pasting the strips on the side-by-side format. Reproducing the data comparison for a formal report was another tedious task, as was recording the simulator data directly on a strip chart. Duplication was possible only through repeating the test. Loss of or damage to the original copy required several repeated test points. RW personnel realized that an improved method of data processing would be desirable for anticipated involvement in other simulator development programs.

A portable instrumentation package was designed and developed for use in subsequent efforts. In addition to two eight-channel strip chart recorders, the package included a pulse code modulation encoder and a magnetic tape cartridge recorder. The entire package can be easily transported to the simulator site for developmental work and acceptance testing at the contractor facility or for follow-on quality assurance inspections in the field. In addition to the strip chart recording used for real-time analysis of data, the package produces a permanent magnetic tape of the data for use in reproducing copies or for production of subsequent reports.

When combined with data processing equipment available at NATC, the magnetic tape recording can be used to produce computer-plotted data suitable for publication in a formal report. If actual flight test data from the aircraft is obtained on magnetic tape, this data can be computer plotted simultaneously to produce overlaid traces for direct comparison. Many man-hours are saved by eliminating the need to handle the strip chart recordings as the final data format. The capability to overlay simulator-aircraft data reduces the volume of required formal reports while providing a more accurate comparison of dynamic responses.

The instrumentation package is currently being used to conduct in-plant acceptance evaluation of the SH-3H operational flight trainer. The package has been used extensively throughout the development and preliminary evaluations of the device. It will also be used at NAS Jacksonville for the on-site acceptance evaluation of the Sikorsky SH-3H *Sea King* trainer. Further use is expected in the near future in the development and acceptance of an additional SH-3H trainer, as well as the Sikorsky CH-53D/E *Sea Stallion*, the Bell AH-1T *Sea Cobra* and the Sikorsky SH-60B *Sea Hawk* flight trainers. Continued use is anticipated in fulfilling the requirements to periodically validate the fidelity of the SH-2F and the Boeing CH-46E *Sea Knight* simulators currently in operation.

The capability to directly compare simulator dynamic response to that of the aircraft is expected to substantially improve the fidelity of the simulators and increase the value of pilot training obtained in these devices.

naval aircraft


East Hartford

1932 was a transition year in the Bureau of Aeronautics' thinking on Navy fighter designs. It was also a transition year in fighters at the Boeing Airplane Company.

Boeing's plant in Seattle was busy on a big F4B-4 order. It had a contract for a potential Navy successor, to be designed in the traditional manner, using a new, higher-power engine, and updating the design in streamlining and construction techniques. Boeing also flew its first low-wing monoplane fighter, the XP-936 for the Army, in March. And its engineers were working on another Navy contract, to design a monoplane carrier fighter.

BuAer's officers and engineers were reassessing the Navy fighter picture. Always alert to explore the application of new aeronautical developments to the Navy's aircraft needs, they recognized the impact on aircraft performance of such items as cantilever monoplane configurations, all metal construction, retractable landing gear and enclosed cockpits. For their carrier fighters, they were still faced with the problem of getting them on and off the ship — something the Army (and Boeing) didn't have to worry about on the XP-936 which became the Army's famed P-26A pursuit plane. Flaps and slats could help in this area. Even so, achieving the speed, climb and maneuvering performance necessary for carrier fighters to defeat all types of opposing aircraft, while retaining good low-speed characteristics and performance, appeared beyond what all of the then recent developments could promise. Turning back to the 1930 fighter competition (see "*Sparrowhawk* — The Airship Fighter," Part I, April 1980), they reduced the military load and fuel requirements. Two .30 machine guns and no bombs would be carried by the VF Special Fighters in which the aircraft companies were encouraged to incorporate all of the latest concepts to achieve the desired performance.

While BuAer's fighter philosophy had been evolving, leading to the award of three experimental contracts for the Special Fighters starting in the fall of 1932, Boeing and BuAer were reassessing Boeing's designs for a successor to the F4B. The biplane XF6B-1 was continued as the first fighter with one of the then new twin row engines, though its potential was recognized as limited with the evolutionary approach. Boeing proposed new design approaches for their experimental monoplane fighter contract, and the final XF7B-1 design was selected to incorporate the Special Fighter requirements.

With this decision, agreement on the detail design specification was reached in December and, while engineering design continued under the existing contract, a new contract was signed in March 1933 to build and demonstrate the XF7B-1 prototype airplane — for $18,000! (The prior contract did bring the total cost to around $70,000.) A low-wing, all-metal, cantilever monoplane, the new Boeing fighter would incorporate an enclosed canopy, rearward retracting main landing gear, would have internal, sealed-wing and tail compartmentation for emergency flotation and be powered with the latest supercharged Pratt & Whitney Wasp engine, driving a controllable-pitch propeller.

Mock-up inspection took place in May with BuAer officers commenting specifically on the fact that the forward cockpit placement overcame much of the downward vision problem normally associated with low-wing monoplane configurations. Once the mock-up changes were incorporated in the design, construction proceeded rapidly. In July the fuselage completed static proof tests, the wings following in early August, succeeded by all the installations. The completed airplane was transported to Boeing Field in early September, with its first flight taking place on September 16.

Early flight tests showed that the high-speed performance guarantee (240 miles per hour) would be missed by some 10 miles per hour, and extensive flight testing was devoted to improving the engine and cowling installation to increase the speed. Finally, it was decided to fly the airplane to East Hartford, Conn., where Pratt & Whitney


Anacostia 1935


Navy flight test

would modify the engine and further investigation of the engine and cowling installations could be made. Interestingly, the Chance Vought Company did the latter work — all three companies were part of the United Aircraft and Transport Corp. at that time. With the changes made, the XF7B-1 arrived at Anacostia for demonstration and Navy service type trials in mid-November.

By late December, Anacostia could advise BuAer that the XF7B-1 did essentially meet its high-speed performance guarantee. However, poor downward visibility, lack of lateral stability, inferior maneuverability compared to other fighters under test, and excessive takeoff distance made it unacceptable as a service type.

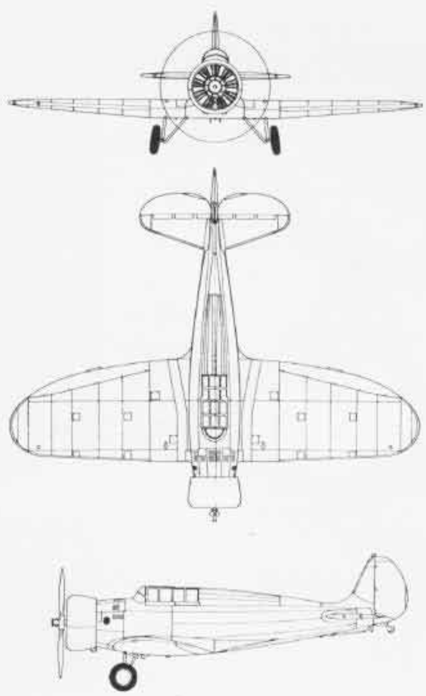
Shipboard suitability tests which followed were interrupted by engine problems, but by March the trials were completed and the XF7B-1 returned to Boeing in early April 1934, unacceptable as an experimental type without correction of a number of deficiencies. With 50 percent of their contract price at stake ($9,000), as well as some initial hope for sufficient improvement to warrant reconsideration for service use, Boeing undertook major rework, including the installation of flaps, replacement of the enclosed cockpit with an open one to improve pilot vision, increased wing dihedral and further engine/cowling changes.

As priorities shifted, completion of the modifications was delayed, and it was November before the XF7B-1 was back in the air. Again, engine cooling and low maximum speed plagued the Boeing engineers. By January 1935 a complete redesign of the cowling for the accessory section and engine was undertaken. With these changes, the cooling was found satisfactory in February flight testing, but the performance was still deficient. Further effort was dropped and the airplane returned to Anacostia in early March for a minimum flight demonstration and experimental-type acceptance tests program.

During the one required zero-lift demonstration dive, the windshield failed, causing the pilot to inadvertently make a 12 G pull-out. While the airplane held together, the center fuselage and wing structure were badly deformed, requiring major rebuilding for continued flight. The cost was not warranted, neither for Boeing to collect the other $9,000 on the contract nor for the Navy to rebuild the airplane at the Naval Aircraft Factory for general use. The contract was settled for the 50-percent payment and the airplane was surveyed and used for static tests.


XF7B-1

Span	**32.0'**
Length	**27'7"**
Height	**10'10"**
Engine P&W R-1340-30	**550 hp**
Maximum speed	**239 mph**
Service ceiling	**29,200'**
Maximum range	**824 miles**
Armament — two .30 machine guns	



VP-44

by John Francavillo

No one at Patrol Squadron 44 was surprised when the Navy's Human Resources Management Survey recently found the squadron to have, for the second consecutive year, the finest "command climate" in the entire Navy.

Based on a detailed questionnaire given to each individual, the tailored study deals with command climate or working environment, supervisor and peer leadership, equal opportunity, and job satisfaction.

A good working environment means good leadership, and that translates into effectiveness in accomplishing the assigned mission.

"It's tough to identify the secret of success," says Commander Donald Avery, the 42nd commanding officer of the Brunswick, Maine squadron. "If I knew what it was I'd package it."

When one examines VP-44's track record for recent professional and military awards, the results of good leadership become evident:

Meritorious Unit Commendation for the squadron's deployment to Iceland.

Battle E for battle efficiency.

Top Bloodhound Award for best torpedo attack capability.

Golden Wrench Award from Lockheed for excellence in aircraft maintenance.

Golden Anchor and Silver Anchor Awards for high reenlistment rates.

Known as the *Golden Pelicans*, VP-44 operates nine Lockheed P-3C Update II antisubmarine patrol planes. It has 270 enlisted personnel and 60 officers.

Avery attributes the squadron's success to individuals who care about each other. Commander Richard

Above, AE1 Bob Roomsburg removes intake covers from P-3C; right, AO3 John Buckoff loads sonobuoy. Opposite page, above, VP-44 patrol planes at NAS Brunswick; below, lineman gives signal to start engines.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Goolsby, executive officer, believes it is "teamwork and devotion to duty."

"If you take care of your people," adds Commander Sam Eubanks, who is in his second tour with a patrol squadron, "they'll take care of the aircraft."

"They're not stifled," says Avery, who expects petty officers to assume the leadership role. "Everyone must realize he plays a significant part. The syndrome of 'I'm an airman and can't contribute anything' is quickly put to rest." To support this contention he can cite examples of airmen who have saved the Navy thousands of dollars through beneficial suggestions.

Avery also believes that leadership and management responsibilities must be assigned to each department. "They must not come only from the top."

Lieutenant Junior Grade Joe Gilio, a navigator-communications officer, talks about the benefits of exchanging ideas up and down the chain of command. "I've had enlisted men teach me a lot about my job. It works both ways."

Another key ingredient in the squadron's success story is its chief petty officers – the middle managers. "They're extremely strong," says Avery. "They're cohesive and they exercise their leadership beautifully."

But the squadron's pattern for successful leadership is rooted in a person's attitude long before he becomes a *Golden Pelican*. "We contact individuals before they get here," says Goolsby. "We want them to know what's going on. We want them to know we take a personal interest in all our people."

Goolsby believes if you take care of a person's needs, mission readiness follows. Referring to a pyramid in understanding motivation, he insists that the base of the pyramid – food, shelter, basic security – must be first met before one moves up to the next level and expects more from people.

This personal interest also extends into recognizing people for good work. In addition to the usual Sailor of the Month award, VP-44 has initiated a unique Supervisor of the Month

Above, tactical coordinator, Lt. John Plehol, aboard a squadron P-3C. At right, AX2s Greg Smith and Joe Garrett operate acoustic sensor station on P-3C.

award for exceptional second and first class petty officers. This entitles an awardee to extra liberty, private parking, and a free dinner for him and his family.

YNC Jim Thomas believes that it is this personal contact that makes the squadron work well. "I can remember duty on a carrier where many crewmen didn't even know the C.O.'s name," he says. "At VP-44 this never happens."

"Hot supervisors," is what flight engineer AD1 Dan Hill believes makes VP-44 run better than most. "People here care from the top on down."

Whatever the reason, it seems VP-44 has discovered the formula for successful leadership. And the entire Navy reaps the benefits.

[Ed's note: Cdr. Avery recently transferred to London and the X.O., Cdr. Goolsby, is now the commanding officer of VP-44.]

Above, Ltjg. Joe Gilio, navigator-communications officer, receives data from computer. Left, LCdr. Sam Eubanks leaves P-3C after flight.

These Curtiss SOC Seagulls bear horizontal tail markings of a cruiser-based scout squadron.

Friend or Foe?

By John Elliott

The rapid identification of a fighting man as a friend or enemy has been of vital importance since man first picked up a stone to attack his neighbor. Numerous devices have been used for this identification – objects mounted on a pole to be held aloft, which evolved into flags and banners; bright and distinctive designs worn by the individual, which produced the art of heraldry and to which we owe our unit insignias; and colorful and distinctive regimental uniforms. None of these methods were completely satisfactory when early military aviators were faced with an identification problem in the air.

During the first few years aircraft were operated by the military, identification of the few other aircraft in the air was a minor problem as their mission was observation, not fighting. A friendly wave rather than a burst of gunfire was the normal greeting. However, with the advent of synchronized forward-firing machine guns, the positive long-range identification became critical. Colors, designs and aircraft recognition were the most appropriate means to achieve this end. By the end of WW I, combat aircraft had an overall camouflage paint scheme with national markings in contrasting colors. A few individual aircraft had bright and colorful paint schemes and designs in contrast to the camouflage scheme, just as we find today.

When carrier aviation became a reality and after years of experimentation with markings, a standard system of aircraft identification was established. A solid color on the complete empenage, rather than the originally prescribed vertical red, white and blue tail stripes, quickly identified aircraft of a given squadron when more than one squadron of the same class operated together. This resulted in several colors being used by the aircraft on each carrier. The same system was also used by the battleship-based observation squadrons. It was directed that the colors conform to section colors, which meant the lowest numbered squadron of a particular class would have red tails, the second, white, etc. In actual practice this was not followed. However, in July 1937, the system was changed so that all aircraft on a specific carrier would have the same color tail. For some unknown reason, the colors were not assigned in accordance with the sequential hull numbers so that the following combinations resulted:

CV-2	*Lexington*	lemon yellow
CV-3	*Saratoga*	insignia white
CV-4	*Ranger*	willow green
CV-5	*Yorktown*	insignia red
CV-6	*Enterprise*	true blue
CV-7	*Wasp*	black

A different system was used by the cruiser-based scouting squadrons. This consisted of either single or double horizontal stripes on both sides of the vertical and horizontal tail surfaces. All the prescribed section colors were used but not in the normal sequence.

Patrol aircraft also used distinctive tail markings, but of greater variety. Solid-colored tails, horizontal stripes, vertical stripes and checkers were all used in the various section colors for a great variety of designations.

All aircraft in a squadron carried a chevron, of the appropriate section color, centered on the upper surface of the top wing. This chevron normally was applied with the point facing forward and was an aid in formation flying.

The forward-pointing chevron on the upper wing of these Grumman F2F fighters was color-coded to identify the section.

Prior to the introduction of radios in aircraft with visual recognition the only means of identification, the brilliant color scheme served to quickly identify each aircraft within a squadron. Detailed briefings and thorough indoctrination in squadron tactics, limited hand signals and movement of the aircraft were the only means of control once the squadron was airborne. Positions within the squadron were normally assigned as follows:

1 C.O.

2 3

4 7

5 6 8 9

10 X.O.

11 12

13 Eng. O. 16 Gunnery O.

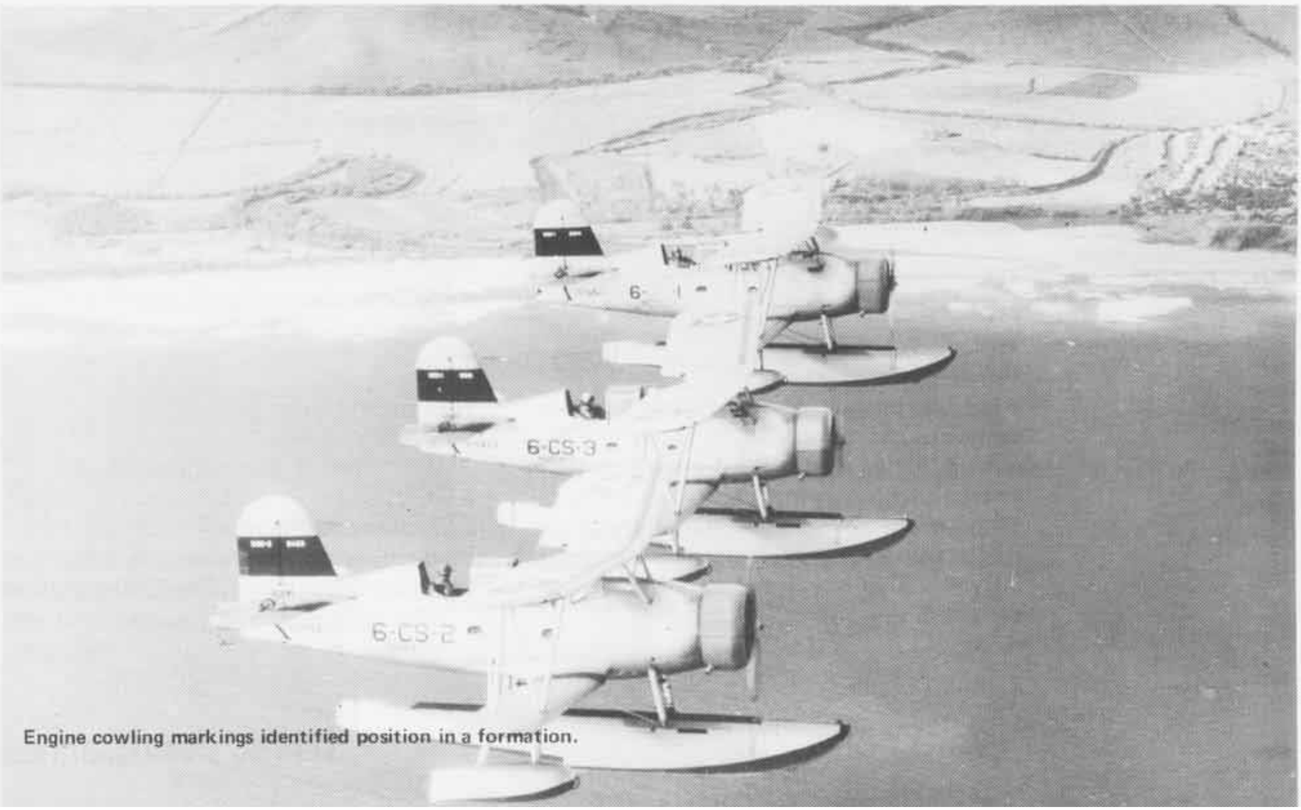
14 15 17 18

Great emphasis was placed on the flying of the numerous formations and the movement from one to another, such as an echelon of Vs to line, right turn of Vs, right turn of Vs to right echelon, etc.

The most distinctive part of the system was based on an 18-plane squadron, consisting of two 9-plane divisions, each with three 3-plane sections. The normal formation was a section V with larger formations consisting of a V of Vs. To be able to quickly rendezvous, each section leader's aircraft was identified by a 20-inch band around the fuselage in the color assigned to that section. The ring cowl, or appropriate width band in the case of a liquid-cooled engine, and the engine faceplate, were painted the same color. Number two man who flew on the left was identified by having the top half of the ring cowl and faceplate painted the section color, while number three had the lower half so painted. There was a definite sequence of colors to identify each section as follows: 1st section, insignia red; 2nd section, insignia white; 3rd section, true blue; 4th section, black; 5th section, willow green; 6th section, lemon yellow.

As with all systems there are exceptions. One such exception was the cruiser-based squadrons. Each cruiser division had a scouting squadron assigned. However, the Omaha-class cruisers of the Battle Fleet could only carry two aircraft, so that these squadrons had only eight aircraft, and each section only two. Thus, the first two aircraft followed the pattern, but the number 3 aircraft was the section leader of the second section and was so marked. Number 4 then became the number two man of the second section and was identified by the top half of the cowl being painted white. This sequence was carried on through the remainder of the squadron. The "treaty cruisers" assigned to the Scouting Fleet were capable of carrying four aircraft, each resulting in four-plane sections, with each squadron totaling 20 aircraft. The first three aircraft in each section followed the system while number 4 was identified by a stripe one-sixth the diameter of the cowl, painted fore and aft on both top and bottom of the cowl in the appropriate section color. Thus, section leaders flew aircraft numbers 1, 5, 9, 13 and 17.

The battleship-based observation squadrons were normally organized in three-plane sections with one section aboard each vessel so their markings followed the basic system.



Engine cowling markings identified position in a formation.

PEOPLE · PLANES · PLACES

Awards

On September 2, 1980, Rear Admiral Robert N. Pitner, USNR(Ret.), was presented with the Distinguished Flying Cross by Rear Admiral Paul H. Speer, Assistant Deputy Chief of Naval Operations (Air Warfare). The award was made for heroic achievement in flight when on June 22, 1951, Pitner, then a lieutenant with VF-791, led a flight of F4U *Corsairs* from USS *Boxer* to attack a North Korean troop and supply train which was concealed in a tunnel. With utter disregard for his personal safety, Pitner made low-level skip bomb and rocket

attacks on the tunnel, scoring direct hits and causing its destruction. Then, despite heavy ground fire, he led his flight in successful attacks on other enemy positions in the area. Through an oversight, RAdm. Pitner's spectacular feat has gone unrecognized for 29 years. That oversight has now been corrected.

Records

Several flyers achieved personal milestones in their respective aircraft. From HMA-269: Maj. Mike Parks, 1,000 accident-free hours in the AH-1T *Cobra.* VMFA-232: Capt. Mike Greaux, pilot, and Capt. Chris Gieser, RIO, 1,000 hours in the F-4S. VMAQ-2 Det Z: Capt. John Olkowski, 1,000 cumulative flight hours in the A-6A, A-6E, EA-6A and EA-6B. VAQ-132: LCdr. Harv Goninan, 1,000, EA-6B. Cdr. Robert W. Geeding, skipper of the VF-111 *Sundowners,* marked 5,000 career flight hours. His flying history includes such aircraft as the T-28, T-39, F-9, F-8, F-104, F-4 and the F-14 which his squadron presently flies.

Saratoga's C.O., Capt. James H. Flatley III, chalked up another one for the record books – 1,500 carrier landings by an individual. The interesting part of this historical landing is that Capt. Flatley had a special

passenger aboard the F-4J *Phantom*: his son, Midshipman James H. Flatley IV. The midshipman was among 25 aboard *Sara* learning about life at sea. Capt. Flatley took a similar cruise before he graduated from the Naval Academy in 1956.

Honing the Edge

VR-52 Det Detroit has participated in Exercise *Unitas* since 1972. The exercise is a goodwill effort in which a U.S. task force conducts ASW operations with various South American navies. The 1980 operations mark the 21st *Unitas* (Spanish for unity). The C-118 *Liftmasters* of Det Detroit provide logistics support for the exercise. OinC Cdr. Ray Chop is a SAR, as are crew members Cdrs. Charlie Buehrer and Tom Proven, LCdr. Jon Folven, AFCM Jim Hawkins and ATCS Leonard Kress. TARs in the crew are ADCS Bob Sierakowski, AT1 Keith Burt, AMS1 Wayne Pryor and AD2 Walt Halay.

Looking like creatures from another world, and even before the steam from a previous launch has blown away, sailors are scrambling to set up for another launch during air ops aboard *Midway.* The carrier and her aircraft were participating in the Navy/Marine Corps Exercise *CASEx 1-80,* a three-day close air support exercise set up to test the Marines' command control system by giving it an opportunity to work with a variety of aircraft from both services in a simulated tactical air situation. Marines provided F-4 *Phantoms* from VMFA-232, Iwakuni, as well as A-4 *Skyhawks* from VMA-214 and AV-8A *Harriers* from

VMA-542 Det B, both from Kadena. Navy F-4s, A-6 *Intruders* and A-7 *Corsairs* were flown from *Midway,* then operating north of Okinawa.

Rescues

Crew 10 of VP-8, Brunswick, aided in the sea rescue of an English contestant in the 1980 Observer Singleheaded Trans-Atlantic Race held recently. The man was sailing his trimaran *Liberty Dole* when heavy seas damaged the vessel and forced him to abandon ship. Crew 10 coordinated its search with a Canadian *Aurora,* which had picked up a signal on the international distress frequency. The *Aurora* crew remained on station until it sighted a raft, and informed Crew 10 of the location. The P-3 crew launched a SAR kit to the lone survivor and remained overhead until it contacted a West German container ship and guided it to the survivor's location for pick-up. VP-8 crew members were LCdr. Johns, pilot, Ltjg. Dave Thorn and PO3s Kevin Kimball and Tim Wynne.

Breeze Corporation's helicopter hoists and winches have been used in thousands of dramatic lifesaving operations. This

photo by PH3 J. D. Johnson, USS *Okinawa* (LPH-3), shows a seaman and his rescuer being hoisted aboard a Navy UH-1N after the seaman fell overboard from *Okinawa*. The rescue operation was carried out in the face of high winds and heavy seas.

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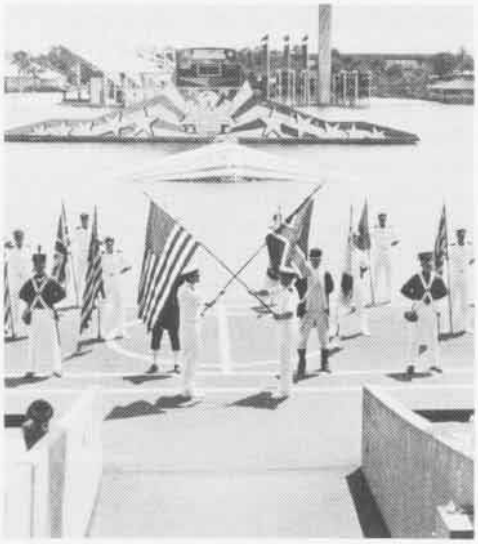
Et cetera

The Naval Air Training Command pageant of flags is composed of 29 aviation officer candidates and has been part of commissioning ceremonies and other events for many years. The half-hour performance traces the evolution of the American flag and the fighting men who have defended it



through many periods of our history. In photo, the group is shown in the Orlando, Fla., area last summer.

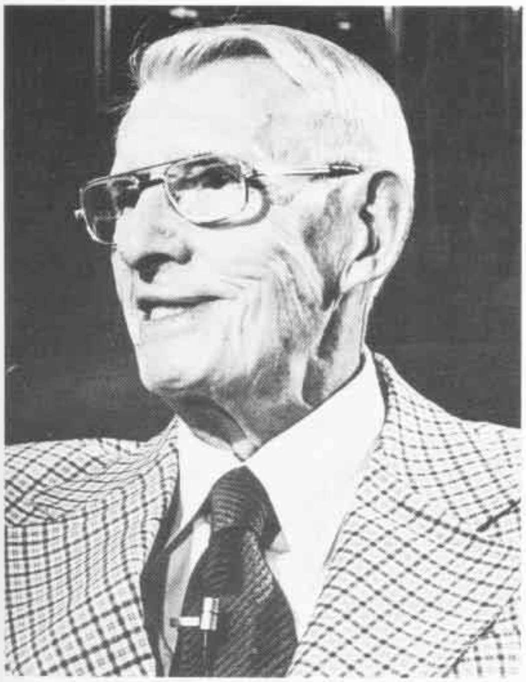
"Commodore" Tommy Lupo, a senior vice president at large for the Association of Naval Aviation, was honored last June by the Naval Aviation Museum Foundation and the Naval Aviation Schools Command, Pensacola, in recognition of his contributions to Naval Aviation. Lupo was a Naval Aviator in WW II, flying the TBM *Avenger*. He was a torpedo pilot in 1944 in a jeep carrier squadron where he attained national fame and the nickname "Lucky Loop" for single-handedly sinking a Japanese *Magami*-class cruiser during the Battle of the Philippine Sea, which blocked the escape route of the Japanese Fleet and materially contributed to Adm. Halsey's destruction of the enemy's fleet the same night.

The hulks of these two RA-5Cs are prepared for flat-bed shipment from NARF Jacksonville to Eglin AFB, Fla. They have

been stripped of parts usable by the Navy, and are the last two of seven *Vigilantes* given to the Air Force for use during simulated target practice.

AWCS William D. Johnson celebrated his 55th birthday on August 11, 1980. Not so unusual, you say, to be 55 and still on active duty. What is unusual is that he is still flying as an aircrewman. In fact, Senior Chief Johnson may be the oldest crew member on active duty flying in a tactical jet. Any challengers? A member of VS-41, North Island, Johnson joined the Navy in 1942 and has been flying either on active duty or in the active reserve ever since.

Walter Hinton (Naval Aviator #135), who flew the NC-4 on the world's first flight across the Atlantic in May 1919, celebrates his 92nd birthday on November 10, 1980. The spry nonagenarian recently returned from a visit to his birthplace at Van Wert,



Ohio, where he received the key to the city and officiated as parade marshal during the Isaac Van Wert Days Festival. Happy birthday, Mr. Hinton!

Change of Command

ComASWWingPac: RAdm. Louis A. Williams relieved Capt. H. A. Zoehrer.

ComCarGru-4: RAdm. R. Byron Fuller relieved RAdm. Crawford A. Easterling.

ComHelSeaConWing-1: Capt. Jerry M. Hatcher relieved Capt. Dale P. Myers.

ComTacWingsLant: Capt. Robert W. Jewell relieved Capt. Danny J. Michaels.

HC-9: Cdr. James P. Cavanaugh relieved Cdr. James L. Lovejoy.

HS-10: Cdr. Duane R. Steiner relieved Cdr. Donald G. Richmond.

MCAS Futenma: Col. Jon R. Robson relieved Col. Michael J. Needham.

NARF Norfolk: Capt. Billy L. McClellan relieved Capt. Henry C. North, Jr.

NAS Corpus Christi: Capt. John E. Simpson II relieved Capt. Joseph K. Kuehmeier.

NAS Whiting Field: Capt. Charles L. Tinker relieved Capt. Robert W. McKay.

PatWing-5: Capt. Ronald G. Castle relieved Capt. Oakley E. Osborn.

VA-56: Cdr. Charles S. Mitchell relieved Cdr. Leon C. Bryant.

VA-85: Cdr. Daniel A. Wright relieved Cdr. Ronald J. Zlatoper.

VA-95: Cdr. Patrick C. Hauert relieved Cdr. Richard J. Toft.

VA-176: Cdr. Douglas K. Griffith relieved Cdr. Frank L. Stauts.

VAQ-33: Cdr. W. G. Ahern relieved Cdr. D. B. Graham.

VMFA-451: Maj. J. D. Cummings relieved LCol. C. R. Geiger.

VT-19: Cdr. Roy E. Adair, Jr., relieved Cdr. William L. Randolph.

TraWing-6: Capt. Robert B. Lynch, Jr., relieved Capt. Donald B. Gilbert.

Professional Reading

Miller, Nathan, *The Naval Air War, 1939-1945.* Annapolis: The Nautical & Aviation Publishing Company of America, 1980. 223 pp. $18.95.

Broad coverage of Allied and Axis sea-air operations in WW II. Includes significant events in all theaters and describes the roles of individuals involved. Liberally illustrated with black and white photos.

Milestones in Naval Aviation, 1910-1980: A Pictorial Calendar for 1981. Annapolis: U.S. Naval Institute, 1980. $6.95.

Traces seven decades of Naval Aviation history through black and white photographs and short narratives concerning the people and events depicted. Begins with the early efforts of Captain Washington Irving Chambers and ends with carrier operations in the Arabian Sea. Additional reminders of historic dates appear on calendar pages.

New Squadron Flies Military's Only C-131Hs

VR-48

by Cdr. James E. Carrico, USNR-R

On October 1, 1980, the Washington, D.C. detachment of Fleet Logistics Support Squadron 52 became a squadron on its own. Designated VR-48, the squadron is located aboard Naval Air Facility, Washington, D.C., and is the only U.S. military unit now flying Convair C-131H aircraft. The squadron is commanded by Commander Bobby Vaughn of Fredericksburg, Va.

The transition from C-118s to C-131Hs took place between November 1978 and March 1979. Since that time, 22 pilots and 34 aircrewmen have qualified for crew positions on the new aircraft. Cdr. Vaughn said, "I am very proud of the flight crews, both pilots and aircrewmen, for the great job they did during our transition to the 131. It took a lot of intense study, both on the ground and in the air, to accomplish our highly successful, accident-free transition." As anyone who has ever transitioned from one aircraft to another knows, this is one of the most difficult tasks a squadron can undertake.

Twenty-two percent of VR-48 personnel are TAR officers and enlisted men who provide operational, administrative and maintenance continuity. But the bulk of people are Selected Reservists. "The tempo of operations cannot be sustained by TARs only," Cdr. Vaughn, a Reservist himself, said. "The Reserves, by necessity, have become a viable and important port of the squadron. This is especially true in maintenance where the men are scheduled as needed to help with the heavy workload."

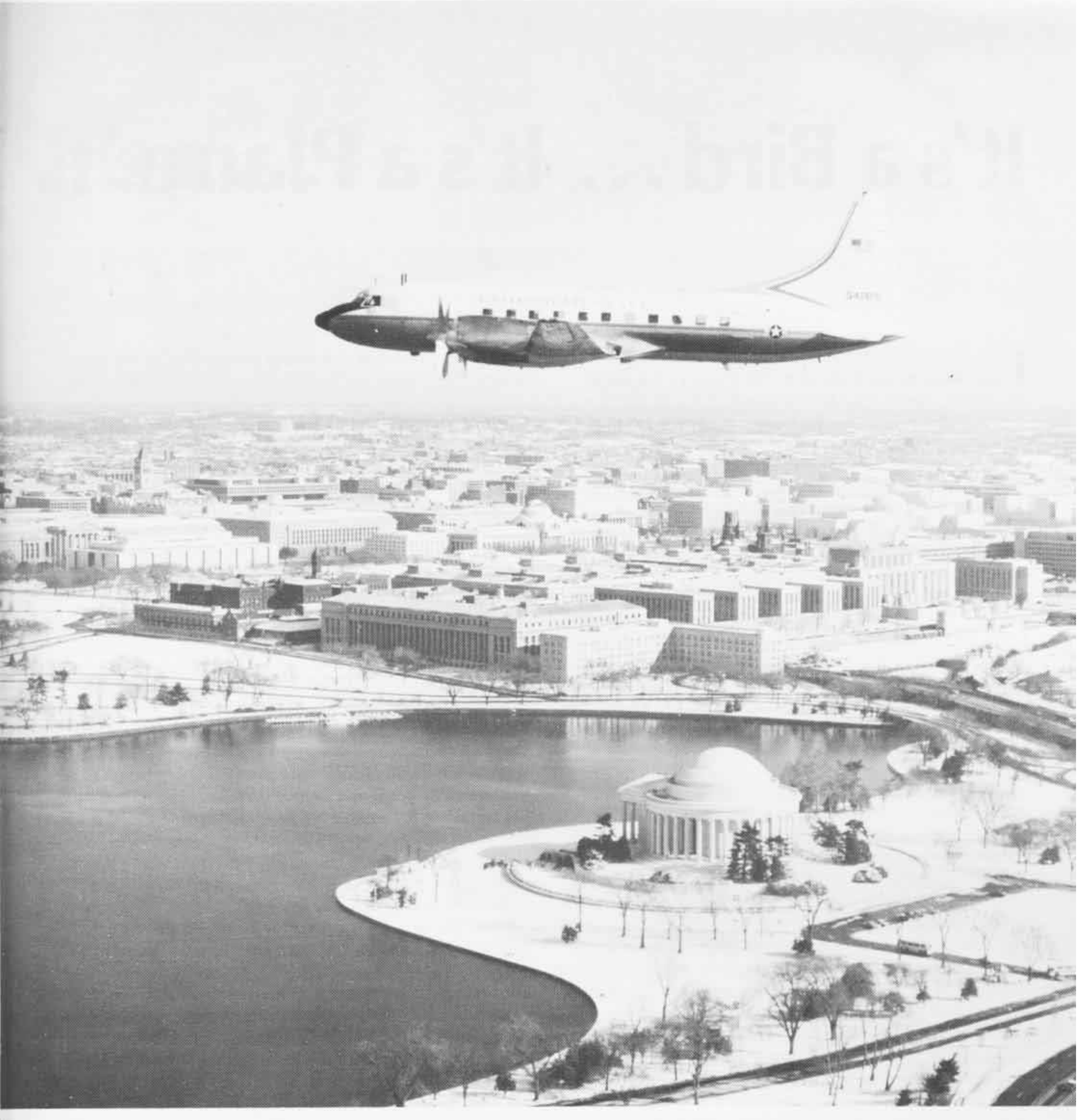
The Reservists bring a variety of backgrounds to VR-48. "A lot of our Reservists," Cdr. Vaughn said, "including myself, come to VR from the airlines. We have 12 civilian airline pilots in the squadron. It makes our reserve duty seem like a busman's holiday, but we all enjoy it and keep coming back."

Other squadron personnel come from such diverse fields as government, law, associations, education and commercial businesses.

The services of VR-48 are often called for on very short notice and although the aircraft are older and need a lot of maintenance to keep them in top condition "squadron morale has never been higher," Cdr. Vaughn noted. "Proof of this is our 96-percent aircraft availability, which shows a lot of hours put in by our maintenance people. The readiness of the aircraft makes our operations department job a lot easier. Scheduling people and aircraft isn't that difficult when all of the planes are flyable."

As goes morale, so goes retention. "Our retention rates are running at 89 percent for first-term and 96 percent for career people." These are the highest rates in the Reserve Tactical Support Wing.

One of VR-48's C-131Hs poses with snow-covered Washington, D.C., as a backdrop. The photo was taken by LCdr. Eliot Tozer of VFP-306 who recently lost his life in an air accident.



It's a Bird... It's a Plane...

by Major William S. Lawrence, USMC

In the early dawn, the aircraft slipped quietly above the tree tops, twisting along at 300 knots as the pilots anxiously searched the surrounding countryside for signs of detection by the enemy. En route from an offshore carrier, this aircraft had a mission common enough during wartime – to rescue an aviator downed deep in enemy territory. Arriving near the crash site, the pilot slowed the aircraft and came to a stable hover, transitioning in a rapid, smooth, continuous maneuver. The pickup was successful and with the wounded aviator aboard, the aircraft quickly accelerated to 300 knots, escaping enemy fire that had erupted near the landing zone. It returned to the aircraft carrier by a different route to confuse searching enemy units. The entire rescue, penetrating over 100 miles into enemy territory and returning to the carrier 10 miles offshore, had taken less than an hour. The low noise level, relatively high en route speed, and exceptional acceleration/deceleration had accomplished a far safer and quicker rescue than was previously possible.

The story is fiction; the aircraft is not. Thirty years of research and experimentation have produced the XV-15, a tilt rotor aircraft manufactured by Bell Helicopter Textron. Bell first flew a tilt rotor aircraft, the XV-3, in the early 1950s. This experience revealed several major technology-related problems, but also demonstrated the feasibility of operating one airframe as both a helicopter and as an airplane. The XV-15 program, the culmination of a continuing series of tilt rotor technology projects, evolved as the result of a NASA/Army contract in 1973 to design, manufacture and test two tilt rotor research aircraft. The U.S. Navy joined the program in 1979.

The tilt rotor was developed as an innovative approach to vertical takeoff and landing aircraft. It is a compromise between the pure helicopter and the conventional fixed wing airplane. In principle, it exhibits the ability to hover efficiently with a minimum workload, low noise level and helicopter-like downwash characteristics. And, in the airplane mode, it is able to cruise at relatively high airspeeds with the low noise and high efficiency normally associated with airplanes. Perhaps most interesting, the tilt rotor can function in the "tilted area," between a helicopter and an airplane, unlike either, allowing definition of a new spectrum of missions, and redefinition of several old ones.

As a technology demonstrator, not a prototype, the XV-15 was never intended to be effective for any particular purpose or mission. Off-the-shelf hardware was used as much as possible to reduce developmental costs. For example, the landing gear was last seen on the Canadair CL-84, another VTOL demonstrator; the ejection seats are Rockwell LW-3Bs, as used in the OV-10A/D; and the power plants are modified Lycoming T53-L-13 turboshaft engines. Of course, the money saved by using existing parts was offset by the staggering cost of developing new technology-related unique components.

The two T53 engines, cantilever-mounted on the engine coupling gearboxes in wing-tip nacelles, are cross-shafted to maintain required rotor rpm and allow both rotors to be driven by a single engine in an emergency. The freewheeling engines allow the range of rotor rpms required for efficient operation and low noise levels throughout the range of operations. The engine coupling gearboxes transmit engine power through the main transmission to the 25-foot diameter, three-bladed rotors.

Tilt of the twin rotor systems from the helicopter mode to the airplane mode, and back on the pylon conversion spindles, is accomplished by cross-shafted electrohydraulic double ball-screw actuators. Both rotors can safely be tilted simultaneously. Pilot controls are remarkably simple, consisting of three switches located on the collective head, one to set the desired rotor rpm, another to lock or unlock the nacelles, and the third to control the tilt.

A helicopter-type system, consisting of cyclic, collective, and rudder pedals, controls the XV-15 throughout the range of operation. In the helicopter mode, flight control is simi-

It's a . . . ?

XV-15 in helicopter mode.

lar to a tandem-rotor helicopter with the fuselage mounted sideways. Pitch is governed by simultaneous fore-and-aft rotor tilt, roll by differential collective inputs to the rotors, and yaw by differential rotor tilt. The collective is used to alter the pitch and the power input to both rotor heads simultaneously. Pilot inputs are transmitted to the rotors through conventional stationary and rotating swashplates when the XV-15 is operating in the helicopter mode. During conversion to the airplane mode, helicopter controls are washed out through a mechanical linkage. In the airplane mode, the control stick and rudder pedals are conventionally employed, while the collective lever is used for power management.

In today's research and development community, the days of white scarves, leather caps and John Wayne are gone. Technology development is a time-consuming affair. But despite a relatively slow program pace, Bell test pilots have expanded the flight envelope to 300 knots at 15,000 feet, have investigated stalls, limited autorotations and, in general, have accomplished most maneuvers associated with both helicopters and conventional airplanes. In addition, initial explorations are probing into and defining a new set of capabilities. A Marine Corps test pilot from the Naval Air Test Center completed the military's first flights in the XV-15 in May 1980, at the Bell Flight Research Facility in Arlington, Texas.

For the immediate future, the XV-15 project test team at Patuxent River, Md., will continue to actively participate in the XV-15 program. Will the XV-15 be in the fleet next year? Hardly likely. Development of any new technology concept requires many years, and military involvement is presently limited to technology investigation. But, the research has been thorough, the technology appears to be proving itself, and the aircraft are flying. And soon, in more places than just Arlington, Texas, you may hear, "Look! Up in the sky! It's a bird . . . it's a plane . . . it's . . . just what the heck *is* that thing?"

Right, XV-15 converting from helo mode to airplane mode; far right, transition complete.

Letters

Fireball Pilot

Enjoyed your "Naval Aircraft" article in the July issue about the Ryan FR-1 *Fireball*. Thought you might like to know that the pilot who made that first jet trap was Ensign J. C. West of Glen Rose, Texas. He had just been shot from the pointy end of the boat when his Cyclone recip engine quit on him. Although experiencing some difficulties, he managed to turn downwind and execute that historic, albeit totally unplanned, trap for which he received a well-deserved Air Medal. Tragically, he was to die less than a year later. His squadron was performing in an air show near NAS North Island, Calif., when his C.O.'s FR-1 broke up and the wing collided with West's *Fireball*. Both aircraft fell into San Diego Harbor and their bodies were never recovered. I know West's story because I am from his home town and have read his Air Medal citation. I believe it is unfortunate that the name of the pilot who made the first jet carrier landing has received very little recognition in Naval Aviation history.

LCdr. R. T. Spencer
VF-202
NAS Dallas, Texas 75211

Ed's note: The Ryan FR-1 Fireball was the Navy's first venture into jet operations. It had a reciprocating engine up front and a jet engine in the tail.

Photo Goof

I noticed that the A-6 photo on the front cover of your August 1980 issue is printed backwards. I'm sure I'm not the first person to bring this to your attention. Everyone is entitled to goof once in a while, and you're still doing a great job!

AW2 Gary MacNeil
HS-85
NAS Alameda, Calif. 94501

Ed's note: You have a sharp eye! We'll share this goof with the printer.

A Greeting and a Request

I would like to thank all my friends who have written to me over the last 18 months. It has kept me going through my illness. I was taken ill in January 1979 and am only now getting back on my feet. Please keep writing and if anyone has any old magazines they no longer want I will be very pleased to receive them.

One more request. I am researching for an article on *Midway* and would like to have photos, slides, information on units that have been on board and any stories that would be of interest. Any material loaned will be looked after and returned as soon as possible.

John M. Bowdler
63 Haddon Road, Lillington
Warwickshire, CV32 7QZ
England

Orion

I am currently doing research for a book on the Lockheed P-3 *Orion* and would like to hear from members, past and present, of squadrons flying the P-3 who have stories to tell.

I am interested in all phases of P-3 operations, including maintenance, patrols, search and rescue operations. Please be as specific as possible as to dates and locations.

I am also interested in photographs of the P-3 in action. Any photos loaned will be quickly copied and returned. Credit will be given for all stories and photos used.

Stewart W. Bailey
16621 Negaunee
Redford, Mich. 48240

C-47 Dakota

I am collating material and photos for a new book *Dakota at War* to be published by Ian Allan Ltd. It will be an illustrated record of men and machines and will depict the activities of this ubiquitous transport in all theatres of operations. I hope to record its role in the many large and small conflicts since WW II, some of which are still active today.

Personal anecdotes are requested from anyone who served on a *Gooney Bird* outfit with the Navy or Marines during WW II, Korea and Vietnam. This includes SCAT and NATS, plus the Marine Air Wing which operated the Douglas R4D-8, later C-117D, in Korea. The book will record personal experiences involving the early civil DC-2 and DC-3 in combat, and all the many military variants which served the Allies.

Arthur Pearcy, Jr.
Cartrefle
3 Ystad-y-Wenallt
LLanbedr, Gwynedd LL45 2PD
North Wales

Patches and Insignia

For the past two years I have been trying to collect U.S. Naval Aviation patches and insignia with virtually no success.

If anyone can offer any material on U.S. Naval Aviation such as unit histories, patches, insignia, back issues of *NANews*, etc., I would do my best to repay postage, fees and any charges.

John Phillips
Nurses Home
Luton and Dunstable Hospital
Lewsey Road
Luton LU 4 ODZ, Bedfordshire, England

Kudo

The feature story of the Naval Air Rework Facility, Alameda in the August 1980 issue is superb. Particularly impressive was the style of the article which conveyed both the organization and motivation of the NARF to the fleet in a straightforward and interesting manner to which they can easily relate.

It was equally impressive how rapidly this story appeared followjng Cdr. Rausa's visit. There have been many favorable comments about the story from employees on our production line. This recognition will do much toward furthering internal pride in our work and the continued orientation of the work force to fleet support.

Sincere thanks to the efficient and effective *NANews* staff and particularly Cdr. Rausa.

Capt. B. L. Smith, C. O.
NARF Alameda, Calif. 94501

Reunion

USS *Rockwall* (APA-230) reunion in Miami, Fla., in November 1980. For information, contact Donald J. Kusnir, 2140 South Military Trail, West Palm Beach, Fla. 33406, Tel. (305) 965-2266.

TBM

Former Naval Aviator Ray Stutsman and Dr. Dick Deiter of Elkhart, Ind., recently acquired a COD-configured TBM torpedo plane which they proudly flew and displayed at the Oshkosh '80 Air Show in August. It has been meticulously preserved with the names of the pilot and plane captain (Lt. A. E. Atkinson and J. A. Pecran) painted on the side. Stutsman believes these men last flew the old TBM on active service in about 1956. The new owners would like to correspond with them to let them know the old bird is still flying and to learn something about the airplane and its history. Anyone having information on their whereabouts, please contact: Ray Stutsman, 2519 Lake Drive, Elkhart, Ind. 46514

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squadron insignia

Led by Commander William D. Dobbs, the Minutemen of Patrol Squadron 92 stand as ready today to defend American independence and freedom as did Minutemen over 200 years ago. The squadron flies its P-3A Orions out of NAS South Weymouth, Mass., providing a fully manned and equipped patrol squadron for service during any national emergency. The Minutemen celebrate their tenth anniversary on November 14. Under the operational control of Commander Reserve Patrol Wing, Atlantic, VP-92's primary mission is training personnel to conduct antisubmarine warfare.


naval aviation news