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Deadly Deterrents

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COVER—As an example of this issue's theme—Naval Aviation Missiles—this semi-active, radar-controlled *Sparrow* is locked on target and launched by a VF-211 F-14 *Tomcat* during a routine training sortie.

Features

Departments

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Missile technology is changing aerial combat dogfighting. The pilot can now hit the target without visual contact if necessary. That's why we call this piece "Naval Aviation Missiles: Diverse and Deadly Deterrents," beginning on page 4.

The versatile and effective *Harpoon* missile is the topic of an interview with former Chairman of the Joint Chiefs of Staff, Admiral Thomas H. Moorer, USN(Ret.), in "Moorer on Harpoon," page 10.

Guided missiles of yesteryear were a lot different from the high-tech systems of today. The "Drone Bombers of WW II" were among the early attempts to develop guided missiles, in this case, a remotely-controlled, explosive-laden, pilotless PB4Y designed to hit distant targets, page 13.

VAdm. William P. Lawrence, USN, the Chief of Naval Personnel, works for the good of the fleet's sailors to improve their capabilities, better their quality of life and prepare them for the mission at hand. It's taken "A Lifetime of Leadership" to do it. See page 16.

Hydrogen-filled WW II U.S. Navy balloons are aloft again in the night sky over Akron. They are being flown by a group of ballooning enthusiasts, one a Naval Reservist, who are keeping interest in LTA alive. It's an uplifting story of "Classical Gas" on page 20.

WW II's *Yorktown* (CV-10), *The Fighting Lady,* preserves the memories of great aircraft carriers and the men who served in them. On display at Charleston, S.C., it is one of the many projects of The Yorktown CV-10 Assoc., discussed in "Yorktown Legacy Survives" on page 24.

STATE OF THE ART

First Production P-3C Update III

The first production version of the P-3C Update III has been accepted by the Navy and is undergoing test and evaluation by VX-1 at NAS Patuxent River. Although it shares the basic P-3C *Orion* airframe and engines, the Update III will be twice as effective as the Update II in submarine detection because of the addition of four major elements: a sonobuoy four-antenna system, a sonobuoy receiver system that extracts acoustic data from the sonobuoys, a sonobuoy signal testing device, and an IBM Proteus acoustic analyzer.

New Bomb Fin

Shown is a Naval Air Test Center F-4J moments before a high-speed release of a MK-83 bomb equipped with a new type of bomb fin – the BSU-85/B. The bomb fin, which is undergoing developmental testing, is intended to provide both high and low drag deliveries of 1,000-pound, general-purpose bombs at supersonic speeds, and utilizes a totally new design. Weather conditions over the Chesapeake Bay at the time of the photograph were just right to show the classic "Mach diamond" behind the shock wave attached to the aircraft's wing as it neared supersonic speeds.

AV-8B Harrier II

The AV-8B *Harrier II* has been involved in lengthy developmental testing which has been highly successful. The testing has included four Navy Preliminary Evaluations (now called Developmental Tests), three Initial Operational Test and Evaluation test phases and participatory flying, in which Marine test pilots are asked to fly or participate in the contractor phase of flight testing. It gives them the opportunity to evaluate early-on corrections to deficiencies, and make comments and recommendations without waiting for the next phase of dedicated Navy testing. A total of five full-scale development aircraft, four AV-8Bs and one YAV-8B, have been involved in flight testing, principally at NATC Patuxent River, Md. The engine evaluation and high angle-of-attack testing is being conducted concurrently at Edwards Air Force Base, Calif., where the dry lake beds are available in case of emergency landings.

Most of the developmental testing is now complete with the final phase of operational evaluation starting this past summer. The operational evaluation will be conducted in two phases, the first focusing on the air-to-ground mission and the second on the air-to-air mission. With initial operational capability scheduled for 1985, the Marine Corps' light attack force will begin transitioning to an all-V/STOL force that will give the Marine battlefield commander the most responsive air support to date.

First ICAP-2 Prowler

The first electronic countermeasures EA-6B *Prowler* with ICAP-2 (increased capability-2) improvements was recently introduced by the Grumman Corporation. It is the third in a series of major improvements since the EA-6B joined the fleet in 1971. Each of the five pods carried under the fuselage and wings contains an exciter that tailors the jamming signals for transmission by two powerful amplifiers. ICAP-2 aircraft contain the latest Navy standard AYK-14 computer and improved software that provide threat identification information and a geographic display.

Missile Target

The Beech missile target Model 997A, powered by the French Microturbo TRI 60-2 engine, in demonstration flights at the Pacific Missile Test Center, Point Mugu, Calif., has met Navy evaluation criteria in the six required categories: high altitude, endurance, high-altitude speed, low-altitude speed, sustained maneuverability and instantaneous maneuverability. Beech has also completed successful demonstration flights of the Model 997A with the Teledyne CAE 373-8 turbojet engine, offering a choice of engines. Recoverable and reusable, Model 997A features extensive use of composite materials which give a strength-to-weight ratio and reduced drag advantages. Its low-profile "H" tail with twin vertical surfaces adapts it for either ground or air launch. The Navy will operate the new target to simulate the flight of threat aircraft and cruise missiles, and train both aircraft pilots and ship-and-shore crews. It will also be used in the development and evaluation of weapons systems.

Deburring Robot

Northrop Corporation has begun operating the first robot capable of deburring complex machined parts, reducing man-hours by 40 percent. The robot is programmed for precision removal of sharp edges from aluminum parts manufactured by Northrop for the F/A-18 *Hornet* strike fighter.

Hornet Flight Simulator

Combat realism, involving a computerized, 360-degree image of earth, sky and targets, is now available to Navy and Marine Corps pilots in a Hughes flight simulator. It is the first of four weapons tactics trainers designed to teach novice or experienced pilots the operational combat use of the F/A-18 *Hornet*. It is the first simulator to incorporate an electronically created flight environment that enables pilots to see up, down, forward and to the rear in simulated aerial combat. It gives pilots unprecedented sensory immersion into the sights, sounds, motion and urgency of combat.

ARBS Accuracy

Marine Corps A-4M *Skyhawks* are more lethal with the angle rate bombing set (ARBS) aboard. Marine Attack Squadron 311, equipped with ARBS, was able to concentrate bomb drops significantly closer to targets in bombing exercises than pilots were able to previously using manual delivery techniques. The increased accuracy of ARBS-equipped aircraft can cut measurably the number of missions required over enemy territory to hit the same number of targets. A pilot's survivability is thus improved, and ARBS' consistent precision accuracy enhances the A-4M's primary close air support mission of attacking targets near friendly ground troops.

Grampaw Pettibone

Backyard Mechanics

During a preflight for a return trip to his NAS home base, a *Skyhawk* pilot noted a hydraulic leak near the tailhook selector valve. He assumed the responsibility of trouble-shooting and directing the repair effort, working with the host support crew while periodically telephoning maintenance personnel and the ASO at his parent command for help.

Unavailability of a part precluded complete repair of the valve. Parent command personnel recommended capping the valve and plugging certain lines. The pilot told the host crew to disable the valve. These efforts stopped the leak but the hook could be extended only once, if needed. The parent command ASO authorized a one-time flight for the A-4. No VIDS MAF was initiated for the repair action and a CDI did not inspect the work as required.

The pilot launched. Three minutes later, nearing 8,000 feet, he noted light smoke around his feet accompanied by a burning sensation in his eyes. The utility hydraulic light illuminated, so the flyer reduced power and turned toward the starting point. The fire warning light came on and the flight controls became sluggish. The pilot pulled the flight control disconnect handle but response to stick inputs was nil. He heard a pair of muffled explosions, lost generator power and made a decision. He pulled the lower ejection loop, initiating a successful egress sequence. The *Skyhawk* plummeted into the ocean. Although slightly injured, the pilot was rescued by helo and hauled safely ashore.

Grampaw Pettibone says:

Fumin' fireballs! I read up on this one and my brain boiled! Lack of knowledge and get-home-itis make a bad stew. Loss of evidence in the briny deep prevents learnin' what actually caused the problem. But we know some things. Turns out the Scooter driver was in a hurry to return to his civilian employment. He shoulda waited for the pros from his home unit, only a few highway hours away. Instead, it was maintenance by committee and Ma Bell. Help from the home unit, by the way, was hardly help. The tail hook system in the A-4 is Z-coded, which means if it's down, the bird's down.

One-time flight was right. Scratch one Skyhawk!

Canyon Catastrophe

Two predominantly helo-experienced aviators (O-4s) were cross-training in the OV-10A in anticipation of test and evaluation flying duties. They were on a multiple-stop syllabus round robin, building up time and exchanging seats after legs. Pilot "A," up front, was recently NATOPS and instrument-qualified in type. "B" was undergoing training. The *Bronco* was motoring along at 9,500 feet VFR over mountains when the pilot in command, "A," saw a rain shower at the end of a valley and made a left 270-degree turn. The surrounding mountain tops were partially hidden

ILLUSTRATED BY Osborn

by broken clouds at 14,000 feet but a two-mile-wide clear area was visible at the end of the valley 10 miles ahead. "A" began a climb to clear the peaks. Five miles later, at 11,000 feet, the backseat pilot "B" commented on the *Bronco's* poor climbing capability (compared to a helicopter).

"A" began another turn aiming for a low point in a ridge line to the OV-10's left. He applied military power and selected takeoff/land with the prop condition levers. This allowed the twin-engined aircraft to clear the saddle by 15 feet but airspeed dropped from 130 to 98 knots. The flyers had now entered a two-mile-long box canyon featuring almost vertical rock walls and a gradually rising floor. "A" traded more airspeed for altitude, slowing to 85 knots. "B" announced, "We aren't going to make it," and warned they should prepare for ejection.

A mile from the canyon's end, "A" tried a climbing right turn. Realizing it was impossible to clear the mountains he initiated command ejection with the lower handle. The *Bronco* was about 25 feet above the terrain, traveling at 70 knots with the right wing down. "B" experienced less than a full swing from his parachute before colliding with the ground. He was dragged 100 feet over the boulder-strewn earth before he could release his Koch fittings. "A's" parachute extracted but he was too close to the ground for seat-man separation and was killed on impact.

Two hikers witnessed the crash from a nearby ridge line, hurried to the site, and comforted the survivor. Three other hikers at a lower altitude trekked three and a half hours to the nearest phone. Since it was late in the day, rescue began early next morning when a CH-53A collected the party. "B" suffered minor injuries.

Grampaw Pettibone says:

Dang blast it! What happened to basic head work and solid supervision?

I know that one pilot was technically qualified in the Bronco but neither of these aviators had adequate fixed-wing experience to fly without supervision by a more experienced type. They shouldn't have gone together.

The struggle for altitude while airspeed bleeds off is a time-tested cue that trouble's a-brewin'. Some of my whirlybird buddies might argue, but I believe this crew mighta become wary a bit earlier, if they had not been used to the relatively low, slow, VFR environment of the helicopter pilot's world.

Boxed canyons have lured unprepared pilots for a long time now, no matter how many hours at the controls. Those mountains haven't lost a contest to an aircraft yet.

Respect that!

Bruised and Beet'n

A student A-7E *Corsair* pilot returned to home field after his first night, dive-bomb practice mission of the weapons training detachment. He proceeded at 300 KIAS for a six-mile, straight-in VFR approach to the field, maintaining 3,000 feet altitude until clear of the county municipal airport traffic pattern four miles to the east.

The pilot reduced speed, lowered the gear and flaps, and pushed the nose over. From his start at 1,700 feet above glide slope, just less than four miles to touchdown, he established a steep, power-off descent. Having executed this approach during the day, he estimated reaching glide slope at 800 feet altitude, 2 nautical miles from the field. He intercepted the glide slope with a high meatball at approximately 500 feet, with airspeed decelerating through 150 KIAS. He added some power and visually checked the pattern for tower-advised traffic. The pilot then observed the meatball settle rapidly below the datum lights, and quickly advanced power to military to arrest the rate of descent. Shortly thereafter, the ball disappeared off the bottom of the Fresnel lens. He noticed little or no engine response to his power addition and lowered the nose slightly to maintain optimum angle of attack.

Then the radar altimeter low-altitude warning buzzer sounded, indicating 170 feet altitude AGL. At this point, the pilot realized he was in difficulty and considered ejecting but hesitated, thinking that the engine would respond soon. Suspecting a possible engine or fuel flow problem, he selected manual fuel position. With sink rate unchecked and horizon and runway lights disappearing, he again thought of ejecting but now considered himself to be outside a safe ejection envelope.

He braced himself for collision as the aircraft impacted the ground in a farmer's cultivated beet field some 950 feet short of the runway. The aircraft plowed 500 feet through the field and came to rest. The pilot, observing flames in the cockpit area, ejected and on landing was dragged through the field 150 feet by his wind-filled chute before he could effect release.

Grampaw Pettibone says:

Holy sufferin' sharecroppers, can you beet this? This pilot was an above-average student whose inexperience suckered him into a deviation from the briefed reentry to the field. The briefed procedure called for a 1,500-foot altitude righthand base leg entry from the north to runway 26, turning inside the county airport for a two-mile, straight-in approach.

The six-mile approach, as executed in the mishap, requires a steep power-off, at a 2,500-2,700 fpm rate of descent after clearing the municipal traffic pattern. And is a far more hazardous and demanding approach, even for experienced aviators. There was no problem with the engine. With the power so far back during the descent, there was not enough time for the engine to spool-up and stop the rate of descent. This mishap represents a good example of the lost situational awareness hazards, addressed in the June 1982 issue of Approach magazine.

This error cost one A-7E and the price of a few rows of veggies, but nearly bought him the farm. Fortunately, he evaded the harvest of the Grim Reaper, was only bruised and busted a leg. Now, let's all profit from his mistake.

Naval Aviation Missiles Diverse and Deadly Deterrents

By JO2 Timothy J. Christmann

"Only when our arms are sufficient beyond doubt can we be certain that they will never be employed."

John F. Kennedy, Inaugural Address, January 20, 1961

On August 19, 1981, two F-14 *Tomcats* from VF-41, operating aboard the carrier *Nimitz* (CVN-68), intercepted two Soviet-built SU-22 Libyan fighters 60 miles from the Libyan coast. For the *Tomcat* aircrews this was supposed to be a routine intercept. But, as they approached the SU-22s, one of the Libyan pilots fired a heat-seeking *Atoll* air-to-air missile. It went wide. Surprised by this unprovoked attack in international airspace, the F-14 pilots maneuvered behind the SU-22 *Fitters* and each launched an AIM-9L *Sidewinder* missile. In mere seconds, the two superior U.S. Navy air-launched missiles had found their mark. Both Libyan fighters burst into flames. Unharmed, the F-14 *Tomcats* returned to *Nimitz*.

Today, it is often difficult to predict what actions a potential adversary will take even in international air space. In Libya's case, it was the pilot of an inferior SU-22 attempting to shoot down an advanced American F-14 *Tomcat*. But, tomorrow, the pilot of a more modern enemy jet or the captain of a warship might attempt a similar belligerent act. There are no guarantees. Naval Aviators therefore must be prepared to respond quickly to any eventuality. This cannot be accomplished, however, if they aren't equipped with the most sophisticated and capable missiles for air-to-air and air-to-surface combat.

Seventy years ago, Naval Aviators discovered that air-to-air and air-to-surface combat was risky business. During WW I, pilots found that the best way to shoot the enemy out of the sky was to try to ambush him from behind with bursts of machine gun fire at very close range. If the element of surprise failed to make a kill, both planes would dogfight, which usually involved the two pilots maneuvering desperately to obtain firing positions off each other's tails.

Air-to-surface combat was just as hazardous. Naval Aviators had to sneak over an enemy stronghold, drop their meager payloads at precariously low altitudes, and escape before they were shot down by antiaircraft machine gun batteries or enemy interceptors. In many instances, even when pilots had virtually no ground resistance, their unguided bombs were tough to place on the target.

Today air-to-air and air-to-surface combat is still risky business. But, luckily, Naval Aviation possesses an impressive array of reliable, high-tech missiles which, in addition to fulfilling a multitude of combat requirements, also greatly reduces the risks of injury to Navy and Marine

An F-14 Tomcat launches a Phoenix missile during a test shoot at the Naval Air Development Center, in Warminster, Pa.

Corps Aviators. For example, in the air-to-air arsenal of missiles there is a long-range weapon which can be launched to destroy targets more than 120 miles away. And the air-to-surface stockpile includes, or will soon include, missiles which can seek out and destroy enemy radar facilities, sink ships and destroy the heaviest of armored tanks.

Over the years, Naval Aviators have traded stories about the famous dogfights they engaged in and the daring bombing missions they waged against the enemy. But modern missiles like *Phoenix, Sparrow, Sidewinder, Harpoon, Laser Maverick, IIR Maverick,* HARM, *Hellfire, Sidearm* and *Skipper* will do more than just strengthen Naval Aviation and revolutionize its weapons inventory. Their diverse capabilities may help to deter a potential adversary from ever challenging naval aircraft.

AIM-54C Phoenix

The AIM-54C *Phoenix,* the latest version of a missile which was made operational in 1974, has unique capabilities unmatched by any other air-to-air system.

Weighing around 1,000 pounds, *Phoenix* is one of the first lines of defense that enemy aircraft and cruise missiles would encounter during an attack against U.S. battle groups. It is 13 feet long, 15 inches wide and contains a solid propellant rocket motor which gives *Phoenix* the endurance to hunt targets more than 120 miles away at speeds up to Mach 5 (or more than one mile per second).

Carried only by Navy F-14 *Tomcats, Phoenix'* mission is to kill multiple, fast-moving air targets in all types of weather or in a heavy jamming environment. Its warhead, which is equipped with 133-pounds of high explosives, gives the missile a larger kill radius than any other conventional air-to-air weapon.

"There's no question that the one advantage the Navy has is our own capacity to manage this sophisticated weapons system," said Captain Bill Bowes, F-14 *Phoenix* program manager at the Naval Air Systems Command (NavAirSysCom) in Washington, D.C. "Having a weapons system like *Phoenix,* which can fire at six targets simultaneously, puts the aircrew in a much better position to [win in the air] than virtually any other aircraft in the Navy's inventory. With other aircraft, when you engage one target, that's the only target you can engage," he added. "However, with the *Phoenix* missile system, you can fire at numerous targets at the same time. This gives the aircrew a tremendous edge that is unknown in many other weapons systems."

Capt. Bowes remarked that the AIM-54C *Phoenix* incorporates a tremendous improvement in capability over the older AIM-54A (which is currently being phased out) — especially in ECCM performance, reliability and maintainability.

"The processing capabilities that exist in the AIM-54C exceed that of the total weapons system of the first F-14A *Tomcat* which the Navy was flying in the mid-1970s," said Capt. Bowes.

During tests between 1972 and 1980, a total of 155 AIM-54 *Phoenixes* were launched from F-14 aircraft. Eighty-five percent of them scored direct hits. Major milestones included a successful launch by an F-14 aircrew of six *Phoenixes* on a single pass at a six-target formation. The missile has also hit targets from a launch range of more than 100 nautical miles and has proven lethal against small fighters and even smaller cruise missiles.

The Navy is currently researching the possibility of constructing an Advanced Air-to-Air Missile (AAAM) to replace the current AIM-54C series sometime in the 1990s, according to Commander Sim Austin, program coordinator for air-to-air missiles for the Chief of Naval Operations at the Pentagon. "It's going to have a longer range, greater speed and much more capability of handling the threat in the 1990s," he added.

AAAM would be an effective alternative to the current AIM-54C in many respects. It would be capable of being hung on other Navy aircraft which currently can't handle the AIM-54C and would reduce the amount of storage space and missile weight.

Although no other country currently has anything comparable to *Phoenix,* Cdr. Austin said the Navy expects that the Soviet Union will have a similar system by the 1990s.

AIM-7M Sparrow III

The AIM-7M *Sparrow III* is a semiactive, radar-guided, medium-range, intercept missile which is currently in the process of replacing the older AIM-7F *Sparrow III.* Like the 7F, the AIM-7M *Sparrow III* provides all aspects of attack capability in all weather conditions against a broad spectrum of targets. However, the newer AIM-7M can counter an expanded threat more effectively through increased performance in the areas of reliability, range and lethality.

The AIM-7M gives Naval Aviation's fighter jets greater air superiority over hostile aircraft. It is a joint service missile, in addition to being carried on the Navy's F-14s, F/A-18s and F-4s.

As the roman numeral suggests, the *Sparrow III* is the third generation of the weapon's family that dates back to the 1950s, and has undergone several updates, of which the AIM-7M is the most recent.

The AIM-7M is about 12 feet long, 8 inches in diameter, and weighs around 500 pounds. It is armed with a lethal 88-pound explosive warhead and can travel at Mach 4.0 between 30-60 miles.

Besides being used as an air-to-air missile, the RIM-7M *Sparrow III* (which is very similar to the AIM-7M) is used as a surface-to-air missile with the NATO *Seasparrow*. The NATO *Seasparrow* is currently replacing the Point Defense Surface Missile System as the major antiair weapon aboard U.S. and many foreign naval ships.

In time, the Navy will replace *Sparrow III* with the 300-pound Advanced Medium Range Air-to-Air missile called AMRAAM, according to Cdr. Austin.

"The AMRAAM, rather than a semiactive missile, will be an active terminal missile," he added. "It's going to have multiple shoot-and-leave capability, and will be faster than the AIM-7M. However, it won't be operational until the end of the 1980s."

According to Captain Larry Blose, program manager for air-to-air missiles at NavAirSysCom, the Navy will also transition to AMRAAM.

AIM-9M Sidewinder

The AIM-9M *Sidewinder*, which is replacing the AIM-9L, is anticipated to be the first-line, short-range, air-to-air missile through the 1990s with substantial procurement by the Navy and many foreign countries. It is a 50-percent improvement over the highly successful AIM-9L, due to its modernized counter-countermeasures capability and ability to acquire a target against a strong infrared background (like a hot desert). At present, the AIM-9M is being used on Navy and Marine Corps fighters and some light attack aircraft.

Sidewinder is a refinement of a missile which was developed more than 30 years ago. It is about nine feet, five inches in length, five inches in diameter, and weighs about 185 pounds. Despite its small size, *Sidewinder* has been one of the world's most successful air-to-air weapons. For instance, most of the kills recorded by the Navy and Air Force in Vietnam and by the Israelis during the 1967 and 1973 wars were made by heat-seeking *Sidewinders*. And, during the recent Israeli-Syrian fighting over the Bekaa Valley, some 51 of the 55 Soviet-built MiGs were downed by updated *Sidewinders*.

The original *Sidewinder* worked very much like a cannon. A pilot would close in on his target aircraft and then maneuver in behind so that the missile's infrared sensor could lock on to the heat of the target's engine. The modern *Sidewinder*, however, can sense engine heat even when it is fired in front of a target. It can also sense heat across longer distances than the original *Sidewinder* could, and therefore it doesn't have to be aimed so precisely. This improvement enables pilots, in many situations, to avoid engaging in dogfights.

According to Capt. Blose, *Sidewinder* is a good fighter pilot's weapon because "it's simple, requires very little training or maintenance and, most of all, it's quite reliable."

Harpoon

The radar-guided *Harpoon* missile was designed to provide ship, aircraft and submarine all-weather, antiship cruise missile effectiveness. It's 12 feet, 6 inches long, 13 inches in diameter, weighs around 1,170 pounds and supports a 570-pound warhead which can destroy enemy surface combatants and merchant shipping from more than 60 miles away. *Harpoon* became operational on U.S. surface ships and submarines in 1977. An alternative version was later put in service for launch from aircraft like the P-3 *Orion* and the A-6E *Intruder*. According to Commander Bob Pergler, program coordinator for guided air-to-surface weapons at the Pentagon, *Harpoon* will soon be integrated into the F/A-18 *Hornet* and S-3 *Viking* in order to increase the Navy's antiship effectiveness.

Harpoon's improved radar enables it to fly toward a target at sea-skimming altitudes, thus making detection and defense by a target ship very difficult. It's an all-weather missile which has demonstrated a 97-percent reliability rate. Navy records show that it has had fewer failures and is easier to repair than many of Navy's major complex weapons systems.

Laser/IIR Maverick

Laser Maverick is an air-to-surface, short-range semiactive, laser-guided missile with a penetrating blast/fragmentation warhead. It is a variant of a TV-guided missile modified to incorporate a semiactive laser seeker, a larger 300-pound vs. 125-pound, forward-firing, shaped charge warhead with a selectable, delay-time fuse and a reduced-smoke rocket motor.

The missile is planned primarily for close air support (CAS) and will be employed with a single-rail launcher for both Navy and Marine Corps tactical aircraft. *Laser Maverick* will be used to attack enemy installations, equip-

An F/A-18 Hornet fires an AIM-9L Sidewinder during a recent test flight at MCAS El Toro, Calif.

A devastated bow section of a target destroyer attests to the power packed by the Harpoon missile.

ment and supplies within the amphibious objective area and in deep support for the destruction of targets outside that area.

Laser Maverick is compatible with the F/A-18 *Hornet*, AV-8B *Harrier* and will soon be carried by the A-6E *Intruder* and A-4 *Skyhawk* in order to give all Navy aircraft much improved standoff survivability.

"Right now the Marines have no standoff weapons for their attack aircraft," said Captain Larry Kaufman, Defense Suppression Program Manager at NavAirSysCom. "They have laser-guided bombs to give them a little bit of standoff, but nothing compared to *Laser Maverick*."

The key element in the optimization of *Laser Maverick* for the close air support environment is the ability of the ground commander to both select and designate the greatest threat to his unit or mission. With its large warhead, even a near miss will damage both hardened surface targets and heavily armored Soviet tanks.

Laser Maverick works with the ground-based, modular, universal laser equipment (MULE), the ground designator, as well as with all airborne designator aircraft like the A-6E and OV-10. The missile searches and acquires automatically the laser-designated target and tells the pilot where the target is. The pilot doesn't have to pick out the target and lock on – the missile does it for him. *Laser Maverick* is also designed to provide the crucial margin of safety for friendly troops in CAS operations because the missile has the capability of disarming itself. This is the first time Marine Aviation has had a weapon that could accomplish this.

Both the *Laser Maverick* and the *Imaging Infrared (IIR) Maverick* are identical except for the guidance section on the front of the missile.

"The *IIR Maverick* is primarily a ship attack weapon," said Cdr. Pergler. "It allows us to lock on to the target, launch the weapon and then leave. The delivering aircraft doesn't have to stay around once the weapon is launched, which is very important for aircraft survivability." After launching, the missile frees the pilot to take evasive action from hostile counterfire or to engage other targets in the area.

In recent missile tests, the *IIR Maverick* (or Navy *Maverick*) scored direct hits on a stationary destroyer, stationary submarine tender and on a Navy *Septar*-class boat traveling at 15 knots. The ship-tracking algorithms located in the missile's guidance section, enabled the tested *IIR Mavericks* to strike all three targets near the waterline.

Like *Laser Maverick*, the *IIR Maverick* will allow pilots to attack heavily defended ship or land targets from standoff distances. For some land targets, crews can fuse the warhead to detonate on impact. However, for ships or reinforced bunkers, warhead detonation can be delayed until after the weapon has penetrated the hull or wall. Such precision guided missiles will substantially reduce the number of sorties and quantity of ordnance required to destroy a target – a factor which not only reduces the exposure of aircraft and crews to enemy fire, but more than offsets the higher cost of a single, precision guided weapon like *Maverick* over an unguided "dumb" bomb. Furthermore, *IIR Maverick's* ability to be launched day or night doubles the opportunity for tactical aircraft to attack targets, compared with conventional day-use-only ordnance.

"Neither the *Laser Maverick* nor *IIR Maverick* are operational," said Cdr. Pergler. "*Laser Maverick* is in production right now and will be here next year. *IIR Maverick*, however, is still a few years away. Once it arrives in the fleet, however, the *IIR Maverick* will be carried by the A-7, A-6E, F/A-18 and possibly the AV-8B." Both supersonic *Mavericks* are about 8 feet in length and 12 inches in diameter, weigh around 650-pounds, and have a range outside most terminal defenses.

Top, a Laser Maverick missile closes in on a target tank and, above, destroys it during a warhead test at Eglin AFB, Fla.

A complement to the *Mavericks* is the AGM-123A *Skipper*. Relatively new, *Skipper* is a modified 1,000-pound, general-purpose bomb which is powered by a *Shrike* rocket motor and used for ship attack and interdiction roles. *Skipper* is an improvement over the laser-guided bomb because of the additional maneuverability resulting from energy provided by its rocket boost. It can be launched from low altitudes and at ranges which provide for improved delivery, aircraft survivability and standoff if necessary.

HARM

HARM (High Speed Anti-Radiation Missile) is an air-to-surface missile designed to suppress or destroy enemy air defense systems. It performs this function by homing in on the radar signals associated with enemy surface-to-air missiles and radar-directed antiaircraft guns.

The inventory of anti-radiation missiles includes *Shrike, Standard Arm* and HARM. Both *Shrike* and *Standard Arm* were used extensively in Southeast Asia and during the Mideast wars. However, HARM is replacing both systems because the diversity of Soviet air defense systems today requires its unique capabilities.

"HARM covers a large frequency band of enemy radars and is a very high-speed weapon," said Capt. Kaufman. "In addition, it has a much longer range and leaves a much bigger footprint."

Capt. Kaufman added that HARM is very software-intensive and so you can change the capability of the weapon by changing the software. "You're unable to do this with *Shrike* or *Standard Arm*," he said.

HARM is 13 feet in length, 9-10 inches in diameter, weighs 790 pounds and supports a 146-pound warhead. It will be deployed on the A-7, F/A-18 and A-6E aircraft.

Another anti-radiation missile, *Sidearm*, is rapidly being developed to counter point defenses and complement HARM. At nine-and-a-half feet in length, five inches in diameter and weighing about 200 pounds, *Sidearm* is a short-range weapon which can be carried by most naval attack aircraft. But, its primary task will be to give Marine Corps helicopters the capability of countering enemy radars, according to Capt. Kaufman.

"The Marines are really looking forward to this weapon," he said, "because right now Marine Corps helicopters don't have any weapon like *Sidearm* [which can counter the growing array of radar-controlled air defense threats on the battlefield]."

Hellfire

Hellfire is a semiactive, laser-guided, air-to-surface missile which was originally developed by the U.S. Army as its primary antiarmor weapon. It is currently being procured by the Marine Corps for use by its attack helicopter force. It represents a major improvement over current systems.

Hellfire affords the option of a shoot-and-leave operation. Like *Laser Maverick*, the ground commander can select and designate the threat, and the helicopter (after firing *Hellfire*) can depart without having to remain exposed to the enemy's antiaircraft guns and missiles.

Hellfire will be installed first on the AH-1Js, which currently have little antiarmor capability and, later, on the AH-1Ts which now carry TOW.

"The Marine Corps will start receiving *Hellfire* in 1986," said Lieutenant Colonel William W. Moore, program coordinator for Marine air-launched weapons at the Pentagon. "The missile is important because there are so many armor threats to our forces worldwide that we must have the ability to knock them out efficiently and effectively."

Lt.Col. Moore added that *Hellfire* will increase aircraft survivability. "The helicopter pilot won't have to duel one-on-one in a direct-fire situation with enemy armor. This is

View of a HARM missile just before impacting a target during a missile firing test at the Naval Weapons Center, China Lake, Calif.

significant because we expect enemy armor to be integrated fully with enemy air defenses," he said. "We can't afford to lose people, and we don't have unlimited numbers of helicopters. We must be concerned about aircraft survivability in order to go back and do the job again and again."

Moore remarked that you can attack a tank with a "dumb" bomb, but it's likely you won't get a direct hit, which is what you want on the battlefield. Through precision guided missiles like *Hellfire,* there's little chance of scoring anything less than a direct hit.

Missiles of the Future

Not many people are aware that the first air-to-air and air-to-surface guided missiles were tested and developed in the U.S. In September 1938, the Navy's Bureau of Aeronautics developed the first air-to-surface guided missile when an N2C-2 Curtiss training plane drone, using radio and visual guidance, dove on the radio-controlled target ship *Utah* (AG-16) 27 months before a similar development occurred in Germany. And, the first air-to-air guided missile, a Douglas *Sparrow,* successfully intercepted an F6F target drone in December 1952.

Although these breakthroughs were revolutionary for their time, missile developments currently being researched may prove to be even more spectacular in the 21st century.

Over the next two to three decades, air-to-air missiles will be lighter, smaller and faster, according to Peter W. Facas, a coordinator for research and technology for weapons systems at NavAirSysCom. In addition, they will have increased altitude-climbing capabilities, smaller warheads and will be able to track targets with simultaneous guidance seekers (instead of having only a radar or infrared type of seeker). Such dual-mode seekers, which will also be applied on air-to-surface missiles, are important because they will enable missiles to hunt targets more effectively.

Concerning speed, Facas said that there are materials currently being researched which will allow air-to-air missiles (over the next two to three generations) to fly two to three times faster than current generation missiles. Air-to-air missiles require more speed than air-to-surface missiles because multiple-shoot rather than single-shoot capability is needed. This way, they're better suited to destroy incoming enemy aircraft and cruise missiles as quickly as possible.

"The benefits of having high-speed, air-to-surface missiles are that they become harder to defend against, and are capable of penetrating solid targets, such as bunkers or heavy armor," said Edward Gravlin, coordinator for research and technology for air-to-surface guided missiles at NavAirSysCom. He added, however, that air-to-surface missiles won't exceed Mach 2 to 3 in the foreseeable future due to a lack of need for higher speeds and because of aeroheating. Aeroheating is a heating process which severely degrades the performance of a missile's radomes, infrared windows and electronic components when it's fired beyond Mach 3 at low altitude.

Air-to-air and air-to-surface missiles may undergo radical changes in design and aircraft carriage in order to improve the operational performance of Navy and Marine Corps tactical aircraft. Such modernization will enable planes to experience less drag, which will improve speed, range and maneuverability, according to Facas.

Gravlin said that he doesn't "foresee air-to-surface missiles getting much heavier than 2,000 pounds," because anything exceeding such a limit would impose severe loads on aircraft structures, especially during launch and recovery operations. Instead of increasing the weight of the missile, Gravlin remarked that the Navy is currently researching better methods of placing warheads more precisely on target.

"You get better yield from a warhead by placing it directly on a vulnerable site, on a target," he said. "Also, you can get more efficiency out of a warhead by having an improved fusing system."

Gravlin said that NavAirSysCom is attempting to develop fuses that can respond to the characteristics of a target. "For example, if you're shooting at a small ship and you penetrate its hull, you may want the warhead to explode 10 feet inside," he explained. "However, if you're attacking a very large ship and the warhead goes off 10 feet inside, it may only damage an outer compartment and never reach a more vulnerable area." Gravlin added that current research in this area will involve ways of programming a fuse so that it will detonate the missile's warhead where the target is most vulnerable.

Facas said that NavAirSysCom will strive to develop smaller air-to-air missiles "so we can begin to limit [present] missile space requirements aboard aircraft carriers."

This reduction will not only increase the number of missiles a carrier can store to support its deployed tactical aircraft, but will also enable such planes to carry more armament. Therefore, Navy and Marine Corps aircraft will be more ideally suited in the future to engage what NavAirSysCom expects will be a "target-rich environment." ■

Missile line drawings are by courtesy of General Dynamics.

Moorer on Harpoon

JO2 Timothy J. Christmann

Admiral Thomas H. Moorer, USN(Ret.), retired from active duty 10 years ago last July after more than four decades of service to his country. His last assignment was Chairman of the Joint Chiefs of Staff.

From midshipman at Annapolis in the 1930s through active combat in WW II and on to full admiral in 1964, leadership and achievement distinguished his career. He was the first of his class to attain rear admiral rank; first to serve as Commander in Chief of both the Atlantic and Pacific Fleets; the only officer to hold, concurrently, the three top Atlantic commands, including NATO's Supreme Allied Commander, Atlantic; the second youngest admiral to be chosen CNO; and the second naval officer to chair the Joint Chiefs of Staff, the U.S. military's highest office.

A combat-decorated Naval Aviator with a great deal of operational and combat experience, Adm. Moorer believes that "The seeking out and assumption of responsibility is the most challenging and thereby most rewarding achievement of man."

When asked what he is doing today, Adm. Moorer says, "I kibitz, primarily." However, it is quite evident that his advice is solicited and his influence does count. From his Washington, D.C., office, as a senior associate of Georgetown University's Center for Strategic and International Studies, Adm. Moorer still maintains a close watch on Naval Aviation. He is currently proposing a study of conventional weapons for the future, which will concentrate on making their potential for damage more lethal in order to moderate the use of tactical nuclear weapons.

NANews recently asked Adm. Moorer to comment on the development of air-launched, antiship missiles and, more specifically, on today's *Harpoon*.

NANews: Adm. Moorer, as a fleet commander in the mid-1960s, you proposed the development of an air-launched, antiship missile in the Navy. What prompted you to take this action? Was there a hole in our capabilities at the time?

Adm. Moorer: I had a considerable amount of experience in my aviation career in patrol aircraft. The thought occurred to me, because there was so much emphasis at that time on antisubmarine warfare, that patrol aircraft could well encounter not only submarines but surface ships. You never know what you'll run into when you take off on a mission. Most of the time, it turns out to be different than you expected. I had that fact driven home to me during WW II when I was flying a PBY and got shot down, so I felt it was important that a patrol aircraft have a means of sinking a surface ship. At the time, patrol planes had nothing but machine guns and torpedoes.

I had also been involved in missile development at the

View of a P-3 Orion carrying six long-range antiship Harpoon missiles. McDonnell Douglas Corporation

Naval Aviation Ordnance Test Center, Chincoteague, Va., and Naval Ordnance Test Station, China Lake, Calif. Later, I began to plug away at building a missile for patrol aircraft. By the time it really got going, it was adapted to submarines and surface ships as well as aircraft.

Having Harpoon today is greatly due to your initiative and it is proving to be a highly effective weapon system. In your opinion, now that Harpoon is operational, how has it changed the carrier battle group tactical scenario?

I wasn't the only one who was promoting this capability. There were many others involved. In the Navy, no one does anything single-handedly.

Harpoon serves to reduce the surface surveillance capability of the other side. Anything that gives you the ability to destroy the enemy reduces the threat to your own forces. In effect, this weapon system provides patrol and other aircraft with a dual capability. Also, since patrol planes have a long-range mission, they generally don't go very fast compared to, say, the fighters of today. The advent of improved air defenses for surface ships made it necessary for patrol planes to have a standoff capability. That is what I was looking for, and *Harpoon* provides it.

If we had had Harpoon during the Cuban missile crisis, how would it have changed our experience?

The change would have been in the Soviets' attitude after recognizing the tremendous capability of *Harpoon*. We laid on a very dense patrol at that time and it would have been impossible for a Soviet merchant ship to get to Havana without being detected. If the Soviets refused to stop when told, they would have been subject to attack by these patrol planes. The question then arises whether or not the fact that this could happen would have forced them to withdraw sooner. You can only speculate, of course, but the main point is that *Harpoon* would have complicated the Soviets' problems and greatly influenced their decision.

How do you feel about the notion that technology will give us the edge over the enemy in the future?

I think it *must* give us the edge. There are two parts to technology. The first is the methodology used to develop a certain weapon system and the second is manufacturing it in such a way that it is of high quality and easy to maintain. It takes technology across the board.

I've always said that a good officer must have technical curiosity. Fortunately, our great strength lies in the fact that our young people in America have been exposed to technology in day-to-day life. Consequently, they adapt quickly to new developments.

It is impossible to stop technology. It is always moving and we've got to make certain that we push it ahead at every opportunity. The Navy has always taken the lead in technology. Practically all the weapon systems that aircraft used in the Vietnam war were developed by the Navy.

I believe that we have the leg up in technology. In fact, at the last major conference before he died, Mr. Brezhnev pointed out that this is the Soviets' greatest weakness and it is where they must concentrate their effort.

If weapon systems like Harpoon help to deal with the present threat, what more does the carrier battle group need to better face the threat during the next decade?

I support pushing ahead in electronic countermeasures. In order to fully utilize the current techniques available through technological advances, it is most important that commanding officers thoroughly understand the tools accessible in electronic warfare. The explosion of technology that has pushed electronics in the forefront has been so fast that it is a real challenge for senior officers to stay abreast of new developments in electronic countermeasures. However, it is this knowledge that will ultimately protect our missile systems and satellite communications from the ever-present Soviet threat.

In my opinion, WW I was a battleship war, WW II was an aircraft carrier war, and if there is a WW III it will be an electronic war. He who controls the electronic spectrum — not only in communications but in the guiding systems for missiles — will prevail. ■

VAQ-34 Starting from Scratch

By JO2 James Elliott

How do you go about starting a squadron? Tactical Electronic Warfare Squadron 34 can tell you. VAQ-34 celebrated its first birthday at the Pacific Missile Test Center, Point Mugu, Calif., on March 1, 1984, and the memories of its birth pangs are still fresh.

They started with an old hangar. Yeoman First Class Jack L. Payne was the first of the squadron personnel to arrive at Point Mugu. Although he was assigned a desk, a chair and a phone, he soon found that there was a vast difference between furniture assigned on paper and furniture in hand. There was mostly just the old building.

A little later, Lieutenant Stephen R. Land arrived in November 1982, to head the advance detachment that came in ahead of the squadron. They acquired a typewriter, but had to borrow the paper. During the months until March 1983, when the squadron was formally established, they answered telephone inquiries about the base, weather, etc., arranged for housing and, in general, paved the way for incoming personnel.

Finally, on March 1, 1983, in the middle of a major storm that hit Southern California that day, VAQ-34 was officially established with Commander John E. Millward as its first commanding officer. The squadron's mission was to provide electronic warfare support and training for the fleet.

Lieutenant Junior Grade Jeff Gruetzmacher, a squadron NFO who also serves as its public affairs officer, says, "We did pretty well in our first year, taking bits and pieces from here and there, as well as help from anyone who would give it." Where assets were lacking, ingenuity took over.

The first priority was aircraft. A field team from NARF Alameda was assigned the task of retrieving four RA-3Bs from desert storage at Davis-Monthan Air Force Base, Ariz. Since 40 percent of the major aircraft components were either missing or unusable, much preparatory work had to be done by the NARF team before they could fly the planes out. The planes were then inducted into standard depot level maintenance to get them ready for delivery to VAQ-34, and all of them have since been accepted by the squadron.

The RA-3Bs are scheduled for conversion to ERA-3Bs under a contract from NARF Alameda which will equip them for their intended electronic warfare role. This will enable the squadron to provide the most realistic, hostile electronic environment possible for fleet training. Cdr. Millward refers to the squadron's role as the fleet's sparring partner.

The same boneyard that yielded up the four RA-3Bs relinquished a KA-3B to the squadron's own "desert reclamation team." The operation was accomplished between February 19 and March 9, 1983, while VAQ-34 was still forming, and it allowed training of aircrew and maintenance personnel to begin while they waited for delivery of the ERA-3Bs. The squadron team redeemed the aircraft at a large savings in man-hours and money.

An RA-3B Skywarrior at Davis-Monthan AFB, Ariz. is being prepared for a flight to NARF Alameda, to be converted to an electronic reconnaissance (ERA-3B) configuration.

The newly acquired KA-3B is used for aerial refueling during operational exercises, refresher and initial tanking qualifications for West Coast air wings, and tanking support for various priority projects as designated by the Chief of Naval Operations.

Six TA-7Cs were also transferred to the squadron from existing fleet assets. The planes were modified at Point Mugu, where change kits were installed to convert the jet aircraft to electronic warfare platforms to create a realistic air-launched threat scenario. They are being redesignated EA-7Ls to indicate their unique configuration.

During the period of its build-up, VAQ-34 flew a total of 1,765 hours in support of major fleet exercises, including training in antiair warfare, electronic counter and counter-countermeasures and electronic surveillance, command and control training in the electronic warfare environment, practical emissions control, and operator training in the face of simulated missile attacks. The squadron also participated in numerous small-scale exercises in support of the fleet.

All these operations were carried on with limited equipment and while the squadron spaces were undergoing major renovations in the electrical wiring, plumbing, phone systems — even new walls, ceilings and floors. In order to meet their operational commitments, they had moved in before their quarters were ready. This has been a first for everyone since no one aboard had ever before been involved in getting a squadron on the road, and executive officer Commander Richard Affeld says, "I think we surprised everybody, especially here at the station."

Cdr. Millward commented that starting with a diverse group, all coming together at one time from many areas of the Navy, they had melded into a closely knit squadron. He feels that they're pretty good at their job across the board.

In discussing their role as the adversaries, he said, "We had a crew of nugget pilots who are competent fleet aviators now, and who can go on their own in a full spectrum of the squadron's operational missions." ■

Drone Bombers of WW II

The Story of Special Air Unit ONE

By Commander Alexander G. Monroe, USNR-R

Forty years ago last August 12, U.S. Navy Lieutenants Joseph P. Kennedy, Jr., and Wilford J. "Bud" Willy strapped into a modified B-24 *Liberator* bomber, BuNo 32271 (known in the Navy as the PB4Y-1) and took off from RAF Fersfield, United Kingdom. The aircraft in fact was an explosive-laden drone, an innovative weapons system that involved ingenuity and state-of-the-art technology. Their mission was to fly it *at least part of the way* to "a special strategical target in enemy territory [in France]."

The operation — code named Operation *Anvil* — was planned by the officer in charge of Special Air Unit ONE, Commander James A. Smith, USN.

The mission failed shortly after takeoff when the PB4Y-1 exploded, causing the death of the two brave airmen. They were to have flown the PB4Y-1 drone to a point north of Dover, England, near Manston, and then bail out. From that point on, the drone was to have been flown by remote control to the target by a crew in a trailing Lockheed PV-1.

Though Kennedy's and Willy's sacrifice and courage are well-known and have been extensively memorialized, the story of the Training Task Force and the contributions of other individuals, such as Ensign John Demlein, are less known. Theirs is a fascinating tale of ingenuity and bravery carried out in remote places and under strict security, which ended in the fall of 1944 when the mission of Special Air Unit ONE was finally fulfilled.

This initial effort was the culmination of more than four years of planning by the Navy to develop an airborne weapon that could be deployed at minimum risk and with what Cdr. Smith termed "great destruction power."

Demlein, who played an active role in the deployment of Special Air Unit ONE, was designated a Naval Aviator in late June 1943, and ordered to report to Naval Air Station, Clinton, Okla. It was, as he recalls it now, somewhat of a disappointment because he expected to serve as an attack pilot on an aircraft carrier, not in a west Oklahoma town, far from the sea.

Bewildered by this turn of events, he was mystified by what he saw. He recalls, "The first day I was there, we went to briefings in a Quonset hut and, out of the corner of my eye, I saw a bomb cart — it was moving but I couldn't see anyone making it move. All I saw was an aerial on the cart, and by then the instructor saw my eyes had strayed."

What Demlein saw at NAS Clinton was a radio-controlled cart which was part of a unit designated the Training Task Force, formed to train and support Special Task Air Groups and Squadrons under the direct guidance and supervision of the Vice Chief of Naval Operations. The ultimate objective was "the training of Air Groups commissioned to use assault drones in combat." The groups, which grew out of Utility Squadrons FIVE and SIX, were "to develop the drone into a crewless weapon that could be used accurately and without cost of life."

For weeks at a time, the aviators worked to master the techniques of controlling the drones in flight from mother ships in trail. TBMs and PV-1s were used as control aircraft and TDR-1s, originally intended to be operational torpedo drones, were used as training drones. The TDR-1 had a television camera in the nose, also known as a *block camera,* and a picture was transmitted to the mother ship. Standard practice was to control the drone from a position about 7 to 20 miles astern and at a somewhat higher altitude. As Demlein recalled, pilots flew in the drones during training flights and "you developed a real faith in the controller in the mother ship because you had to, he had control. . .the only difficulty was that there was no sense of depth perception in the television screen, which could be a problem when making a dive."

As training progressed, the squadrons known as STAGRONS, VK-13 and 14 were moved to NAS Eagle Mountain Lake, Texas, to NAS Houma, La., and finally to NAS Traverse

City, Mich. The pilots and flight crews became more proficient, and they were in a constant state of readiness, without assigned combat duty. Demlein recalls that it was mentally exhausting to be always ready and, to relax, he fished continuously in nearby lakes.

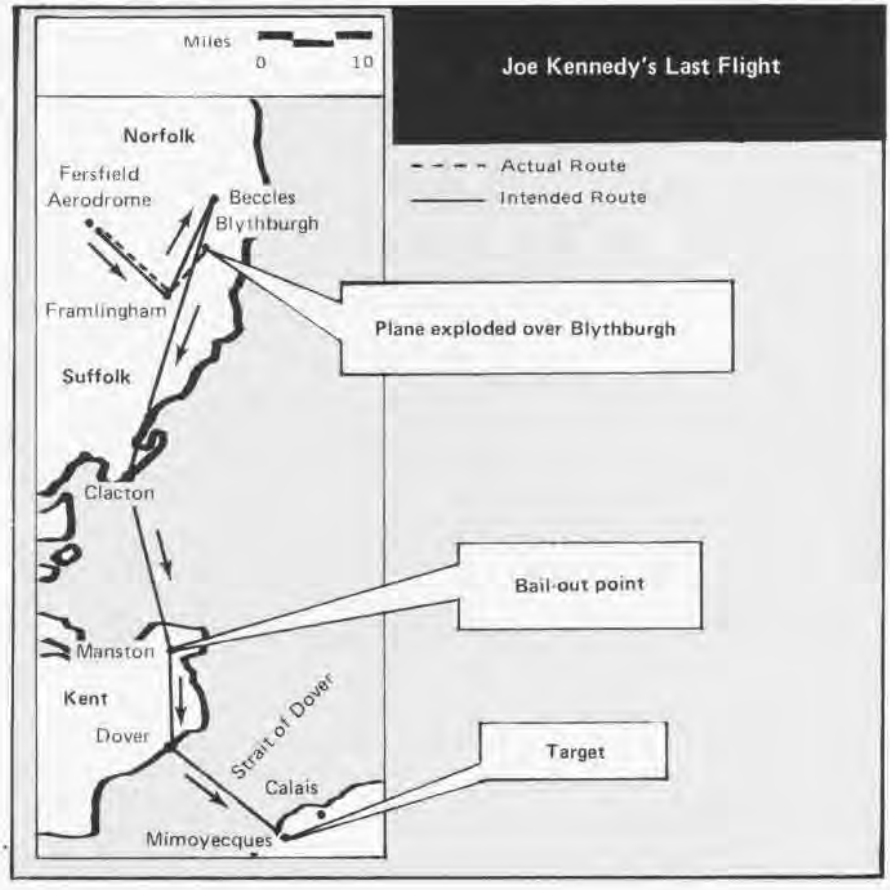
There was a deep air of mystery surrounding these squadrons at all times. Even the history of NAS Traverse City refers only to operations of a Special Weapons Test and Tactical Evaluation Unit as being "of a classified nature."

On July 6, 1944, certain officers and men of VK-13 and 14, among them Demlein, were summoned to Cdr. Smith's office and told they were to ferry two PV-1s to NAS Norfolk. As Demlein remembers it, "I took along my whites because I expected to fly to New York on the way back to Traverse City, and I wanted to see my financee. When we got to Norfolk and were on the ground, we were surrounded by men with machine guns. I knew we'd flown low, but not that low."

They were soon to learn that there was another leg to the trip. VK-14's history notes, ". . .three officers and two men, together with one modified PV-1, were assigned to temporary additional duty with Fleet Air Wing SEVEN. . .in the European [United Kingdom] theater of operation. . . ."

The newly established command's flight to Britain was uneventful except for a stop in Iceland when a ground crewman at the air facility accidentally blew a hatch covering survival gear and the equipment had to be repacked. Arriving at Fersfield, England, on July 23, 1944, Cdr. Smith prepared to carry out his assigned mission to deliver "an aircraft heavily loaded with explosives against [an important enemy] target."

The risks were great. On August 12, the PB4Y-1 drone was loaded to maximum gross weight of 65,000 pounds with 21,170 pounds of Torpex high explosives. For reasons never precisely specified in official reports, the aircraft exploded in midair 21 minutes after takeoff, probably due to a fuse malfunction. But this did not hold back the program. In the words of a report later submitted by Cdr. Smith, Operation *Anvil* was placed in a "proving operational status and assigned targets accordingly."



There was great disappointment at the failure of the initial mission and an enormous sense of loss at the death of Lt. Kennedy, who had volunteered for the temporary assignment to Operation *Anvil* from VB-110, and Lt. Willy. Nevertheless, those involved wished to finish the job they had worked to complete for so long. Lts. Kennedy and Willy both received the Navy Cross posthumously.

In a second attempt, on September 3, 1944, Lieutenant Ralph Spalding, USNR, controlled by Ltjg. John Anderson in PV-1 #143 and Ens. John Demlein in PV-1 #131, took off in another PB4Y *Liberator*, heavily laden with Torpex. The target in the second mission was a German submarine base at Heligoland Island, 371 miles away. The controller in aircraft #131 mistook, in a rain shower, a breakwater on the island for the island itself and thus guided the drone into a coal pile adjacent to a set of barracks rather than into the submarine pen.

Though the second mission was unproductive, it proved that "a PB4Y drone could be flown under radio control for long distances." As Cdr. Smith stated, "the mission was very successful from an experimental operational view." Demlein recalled that ". . .this was a Buck Rogers kind of warfare. I had only seen television once before, at the World's Fair in New York in 1939. . .and here I was guiding a drone by it. It was a suicide-type weapon that didn't involve suicide as the Japanese kamikazes did." Though Cdr. Smith strongly urged ". . .that the PB4Y Drone-Control Plan Team be directed operationally against Japan at the earliest possible date," Commodore William Hamilton, USN, was somewhat cautious in his endorsement to the strike report. He hailed the execution of a "pioneering mission" but suggested that "this demonstrates the readiness of the weapon for operational deployment on a modest scale, in the event of continued success." He finally held that targets in Europe were "limited," thus mandating deployment in the Pacific.

On November 20, 1944, VK-13 and 14 were disestablished, slightly more than two months after Commodore Hamilton forwarded Smith's report up the chain of command and 13 days

Above, the TDR-1 was used by the Navy's Special Air Unit One as a remotely-controlled training drone during the early 1940s. Below, pilotless, explosive-laden PB4Y-1s like this one over Bay of Biscay in 1943 were used operationally in attempts to hit enemy targets.

after Fleet Admiral Ernest J. King recommended to Secretary of the Navy James Forrestal that the report of the loss of Lts. Kennedy and Willy be accepted. Aviation Planning Directive 74-FV-44 states that all personnel at the various installations were to await further orders and that "all files of subject units are to be turned over to CNO, for storage and safekeeping." The squadron histories, somewhat yellow with age, are equally terse, except that the final note in the history of VK-14 is that ". . .the pilots of the Squadron. . .flew a total of 7,710 hours without injury to any personnel, and with damage to airplanes consisting of minor damage to the vertical fin and rudder of one plane, and damage resulting from the collapse of two tail wheels. . . . It is a record of which the Squadron is proud."

The rapid approach of the conclusion of WW II doubtless precluded further employment of the drone bomber. Cdr. Smith went on to a varied career, which included command of *Antietam* (CVS-36). Ens. Demlein, following Patrol Plane Commander School at NAS Banana River, went on to the patrol community and ended the war at Whidbey Island. He recalls the drone program as a worthwhile period of his life, with a clear objective. He remembered the mystery which surrounded this operation and mentions, with some amusement, that it was the only thing he did in the Navy that wasn't covered by written orders. In fact, until February 1984, he had never seen the report of the September 3, 1944, mission. Development of the drone bomber, highlighted by the work of the STAGRONS and Special Air Unit ONE, was an important use of technology, slowly nurtured, little used and abruptly ended. Even if it had not resulted in the tragic loss of Kennedy and Willy, it would have been noteworthy as a demonstration of the Navy's ability to adapt to any circumstance. ■

JO2 Timothy J. Christmann

Vice Admiral William P. Lawrence

A Lifetime of Leadership

The Chief of Naval Personnel is responsible for just about everything that affects Navy people — officer and enlisted — in every aspect of their careers, including assignments, promotions, morale, discipline, regulations, uniforms and even retirement.

When the announcement came from Washington that Vice Admiral William P. Lawrence would take over as Chief of Naval Personnel in September of 1983, many Naval Aviators throughout the fleet were pleased. Those who had worked for him or knew him personally were certain he was the best man possible for the job. Others knew of his reputation as a real "people" person, a sailor's admiral.

In the year that he's been in the job, Lawrence has lived up to that reputation. As Chief of Naval Personnel, he is responsible for originating policy on issues that will enable Navy to meet personnel objectives of the Chief of Naval Operations, and for seeing that those policies are implemented. From recruiting to training to career development, he ensures that the Navy is producing people who can perform their jobs effectively.

"My primary focus is on those sailors out in the fleet," VAdm. Lawrence remarked. "Everything I do is for the good of those sailors, to improve their capability to do the job, better their quality of life, and prepare them for important missions in the Navy. The men and women we have in the Navy today are doing important jobs, and are performing superbly," he said. "They are the most important factor in determining how successful we will be at attaining a certain goal or accomplishing our mission. That is why they are our first priority."

But, it was Naval Aviation that first interested VAdm. Lawrence when he embarked on his distinguished 33-year career. Growing up in landlocked Nashville, Tenn., young Lawrence was not often exposed to the Navy. In the 1940s, however, while Naval Aviators were taking the fight to the Japanese, he read avidly about their exploits.

"I was impressed with the naval campaigns in the Pacific," VAdm. Lawrence said recently. "That's what attracted me to the Navy."

Acknowledged as a "born leader" by those who know him well, Lawrence became one of Nashville's favorite sons at an early age. "Since he was 14, people noticed the special qualities in him," said Fred Russell, vice president of the Nashville *Banner*. "He was smart, very athletic and, in everything he entered, he gained the respect and confidence of those around him. He has carried this ability with him throughout his life," Russell added. "He exemplified every quality I think a man would love to have. I always knew he'd make it."

While a student at Nashville's West End High School, Lawrence excelled in baseball, football and basketball, and maintained a 96.4 scholastic average. "He was a gifted athlete," Russell said, "but his most dominant trait was leadership."

He was selected for the Naval Academy in 1947 and majored in electrical engineering. While there, Lawrence played on the varsity baseball, basketball and football teams. He led the establishment of the present-day Brigade Honor Concept and was chosen president of the class of 1951, finishing eighth in a class of 725.

During his years at the Naval Academy, jet aircraft were making their appearance and Lawrence became interested.

"Jets attracted me more to Naval Aviation than anything else," he said. "They were expanding rapidly and I wanted to be a part of their development."

That goal was realized when, after tours with VF-193 and the Naval Aviation Safety School at the University of Southern California, he reported to the U.S. Naval Test Pilot School at NAS Patuxent River, Md. Lawrence graduated as the class honor student, subsequently serving as a test pilot and later as an instructor on the TPS staff.

"It was a great time to be at the Test Center because, by then, the jet era was in full bloom," he remarked. "I was able to be part of the early days of supersonic aviation."

Lawrence became the project pilot of the F8U-3, which was one of the first aircraft the Navy procured that could fly at twice the speed of sound.

"I did a lot of the early jet testing, which was very exciting because we were exploring some unknowns like high Mach numbers," Lawrence said. "Supersonic flying in those days [1950s] was still a new area. Then all of a sudden, we had airplanes that could go twice the speed of sound and that was a whole new dimension."

Below, Vice Adm. William Lawrence, left, is joined by his Executive Assistant, Capt. J. M. Boorda, middle, and Special Assistant for Public Affairs, Capt. Don E. Repass, right, in the office of the Chief of Naval Personnel.

JO2 Timothy J. Christmann

Lawrence added that 30 years ago testing at Patuxent River was still considered seat-of-the-pants aviation. It wasn't as safe or as advanced as test flying is today. But it would use he said.

Following a tour in *Saratoga* (CV-60), Lawrence served as assistant operations officer with VF-101; navigator on cruiser *Newport News* (CA-148); maintenance officer for VF-14; and senior aide and executive assistant to the Commander in Chief, U.S. Strike Command, at McDill AFB, Fla. While C.O. of VF-143, he was shot down over Nam Dinh, North Vietnam, in June 1967 and held as a POW until March 1973.

During his captivity, Lawrence was beaten and tortured, and spent a total of 14 months in solitary confinement.

"It was especially difficult for a person who thought nothing of jumping into a jet and flying for miles to suddenly be thrown into a seven-foot-square cell," he said years later.

His excellent physical condition and his self-discipline helped him to endure those terrible years. To keep his mind alert, especially during the many periods of solitary confinement, Lawrence rethought his entire life in minute detail, recalled stories he had read and heard about heroic people and POWs from other wars, and concentrated on poetry, once a favorite pastime.

"Many prisoners memorized poetry as a good way of using their minds effectively, so they wouldn't lapse into unproductive mental activity," Lawrence said.

Once when he was caught communicating with another POW, Lawrence was put into an isolated cell which the prisoners called "Calcutta" after the Black Hole of Calcutta.

"It was a four-by-six-foot cell which had a tin roof," he said. "During the day the sun beating down on the tin caused the room temperature to rise well above 100 degrees." Heat sores rendered him virtually immobile. "I knew they would probably keep me confined there for several weeks. I also knew I had to get some good productive mental activity going just to keep my rationality."

The mental activity he chose was composing lines of poetry in his head, 15 to 17 hours a day. By the end of three weeks he had constructed and memorized a poem about his home state which he titled, "Oh Tennessee, My Tennessee."

When Lawrence was finally released from captivity in March 1973 and returned to his hometown, the city of Nashville gave him a welcome-home party. During that celebration, he was asked to make a speech, and he recited "Oh Tennessee, My Tennessee." That year, it was designated the state poem by an act of the state legislature.

"You have a greater appreciation for America after you've been a POW," Lawrence remarked recently. "You gain an appreciation for freedom and all its opportunities. Another thing is that once you've endured an experience like being a POW, there's very little you encounter afterwards which you feel you can't handle. That feeling gives you a calm and confidence about life," he said. "It contributes to your positive outlook."

After convalescence at the Naval Hospital in Memphis, Tenn., Lawrence attended the National War College where he was designated a distinguished graduate. He also earned a master's degree in international affairs from George Washington University during that period.

In 1974, he was promoted to rear admiral and served as Commander Light Attack Wing, U.S. Pacific Fleet, at NAS Lemoore, Calif. Following a tour as Director, Aviation Programs Division and Assistant Deputy Chief of Naval Operations (Air Warfare) in the Pentagon, he became Superintendent of the Naval Academy in 1978.

"As Superintendent, I was very much involved in the introduction of women into the Naval Academy," Lawrence said, "and I was there when the first class including women graduated in 1980."

One of the midshipmen at the Naval Academy at that time was VAdm. Lawrence's daughter, Wendy, who graduated in 1981 and is now a Navy helicopter pilot.

In 1981, a year after his promotion to vice admiral, Lawrence assumed command of the Third Fleet and, in September 1983, he became Deputy Chief of Naval Operations (Manpower, Personnel and Training) and Chief of Naval Personnel.

His current duties include frequent trips to Capitol Hill to testify before Congress on personnel programs and funding. Lawrence is deeply committed to maintaining equitable compensation for Navy people, and to quality of life programs which help offset the demands of a Navy career.

"We ask a lot of our people," he said recently, "and we know that their concerns extend beyond a paycheck. We must make sure they are compensated fairly for their efforts, but we must also do what we can to help relieve some of the special demands that come with a Navy career."

Programs like the Family Service Centers, recreation, education, casualty assistance and overseas duty support are one way to provide that added help, Lawrence believes.

The admiral is also a firm believer in the One Navy concept and is a solid supporter of the Naval Reserve. "The reserves have always been a highly professional organization and make a great contribution to the Navy's overall readiness," he said recently. "Our civilian personnel are also invaluable. They conduct some of the finest research and development going on in the country today."

As Chief of Naval Personnel, VAdm. Lawrence is also responsible for formulating policy for Navy civilian employees, and gets a first-hand look at the work being done by civilian personnel.

"We have over 167,000 full-time federal employees working for us, and they are an integral part of the Navy team," Lawrence said. "Their contributions in scientific and technical fields, support roles, financial management and skilled craft areas are invaluable. We rely on them today more than ever for continuity, productivity and management of some of our most important programs."

VAdm. Lawrence thinks the morale and spirit of the people on the Navy team are higher than he's ever seen. Contributing to this has been the resurgence of patriotism throughout the Armed Forces and the nation, according to Lawrence, as well as programs designed to increase pride and professionalism, aggressive efforts to eliminate drug and alcohol abuse, and other programs geared toward Navy families.

He feels that high morale and team spirit are especially evident in the Navy's aviation community. While he was commander of the Third Fleet, he was involved in Fleet Exercise 83-1, one of the largest operations conducted in the Northern Pacific since WW II. Because of extremely rough weather, the three carriers involved, *Enterprise, Midway* and *Coral Sea*, were expected to have a difficult time launching and recovering aircraft.

"But after three weeks of very intense air operations in that extremely severe environment, we did not suffer a single major mishap," said Lawrence. "That was a real tribute to the professionalism of Naval Aviation personnel. Not only did the aircrews function effectively in handling their aircraft under dangerous conditions, but the carrier personnel kept the planes ready and flying. It was just a magnificent achievement."

"There's a tendency for people to talk about the 'good old days,' implying that things were better in the past," Lawrence remarked. "This might apply in some areas in the Navy, but it certainly doesn't apply in Naval Aviation. I've been in the profession over 30 years, and I've been impressed with the steady improvement. We are 25 times safer in Naval Aviation than we were when I started out, and that's a direct reflection on the increase in professionalism. Everyone is doing the job effectively," he said. "It's not just the pilots and the NFOs who are improving the safety record. It's the maintenance personnel, the plane captains — the whole Naval Aviation team. The high quality of people is the big factor."

Lawrence said that one of the most significant things happening in Naval Aviation today is the steady increase in the capability of the Naval Air Reserve.

"Some of the finest aviators in the Navy right now are in the reserves," he remarked. They have always played an integral part in our nation's defense, he said, and are improving their capabilities significantly, especially with the new aircraft they are getting.

He is also pleased with the progress of women in the Navy, and has been actively involved in the expansion of opportunities for women. "I am very proud to have been able to make some policy changes that will put women in aviation on a more even footing with their male peers," Lawrence added.

Two of those policy changes are of real significance to women in aviation. One opens up mobile logistics support force ships in the Sixth and Seventh Fleets for temporary assignment of women, allowing female helicopter pilots to deploy with their male counterparts. The other allows for permanent assignment of women to ground support roles in all of the Navy's operational patrol squadrons, giving women in many ratings an opportunity for sea duty billets that did not exist before.

VAdm. Lawrence's achievements as a leader are well-documented, and have been recognized by the Navy and the civilian community as well. He is highly decorated, with the Distinguished Service Medal (3), Silver Star (3), Legion of Merit, Distinguished Flying Cross, Bronze Star with Combat V, Air Medal (3) and Purple Heart (2) to his credit.

In 1979, he received the prestigious Gold Medal from the National Football Foundation and Hall of Fame. The foundation's highest honor, the Gold Medal is awarded to a former college player who has distinguished himself by his personal qualities, professional life and contributions to his country. Past winners were Presidents Dwight D. Eisenhower, John F. Kennedy and General Douglas

MacArthur.

In 1983, he was named recipient of the NCAA's Theodore Roosevelt Award, presented annually to a prominent American "for whom competitive athletics in college and attention to physical well-being thereafter have been important factors in a distinguished career of national significance and achievement."

VAdm. Lawrence is highly regarded among his peers, who have consistent praise for his abilities.

"[He] is a quiet, unassuming man," said retired Admiral Maurice F. Weisner, a friend from the early 1950s when the two were assigned to VF-193. "He has strong beliefs and great capability. He's never [been afraid] to take on a complex problem, and carry it out to a successful completion."

"Lawrence is one of the finest officers in the Navy," remarked retired Admiral Thomas H. Moorer, former Chairman of the Joint Chiefs of Staff. "He's exceptionally intelligent and competent."

Moorer, a friend of Lawrence's since 1957, added that he's not surprised that the Chief of Naval Personnel has such a positive, optimistic attitude, despite his POW experience. "That's why Lawrence is such a great leader," he said. "He accepted difficulty and misfortune and continued where he left off in life."

As important as these words of praise are to VAdm. Lawrence, he is more pleased with his reputation as a "people" person. "I want our sailors out there to know that the leadership in the Navy and the Chief of Naval Personnel are concerned about their well-being, and are committed to making sure that they are taken care of. They are the men and women who make the Navy what it is. They are the ones who, in the final analysis, give us the superb capabilities we have today.

"I believe that in any conflict between superpowers, it is the quality of the individual sailor that will make the crucial difference," VAdm. Lawrence says with confidence. "Those sailors are our most critical asset and they merit our support."

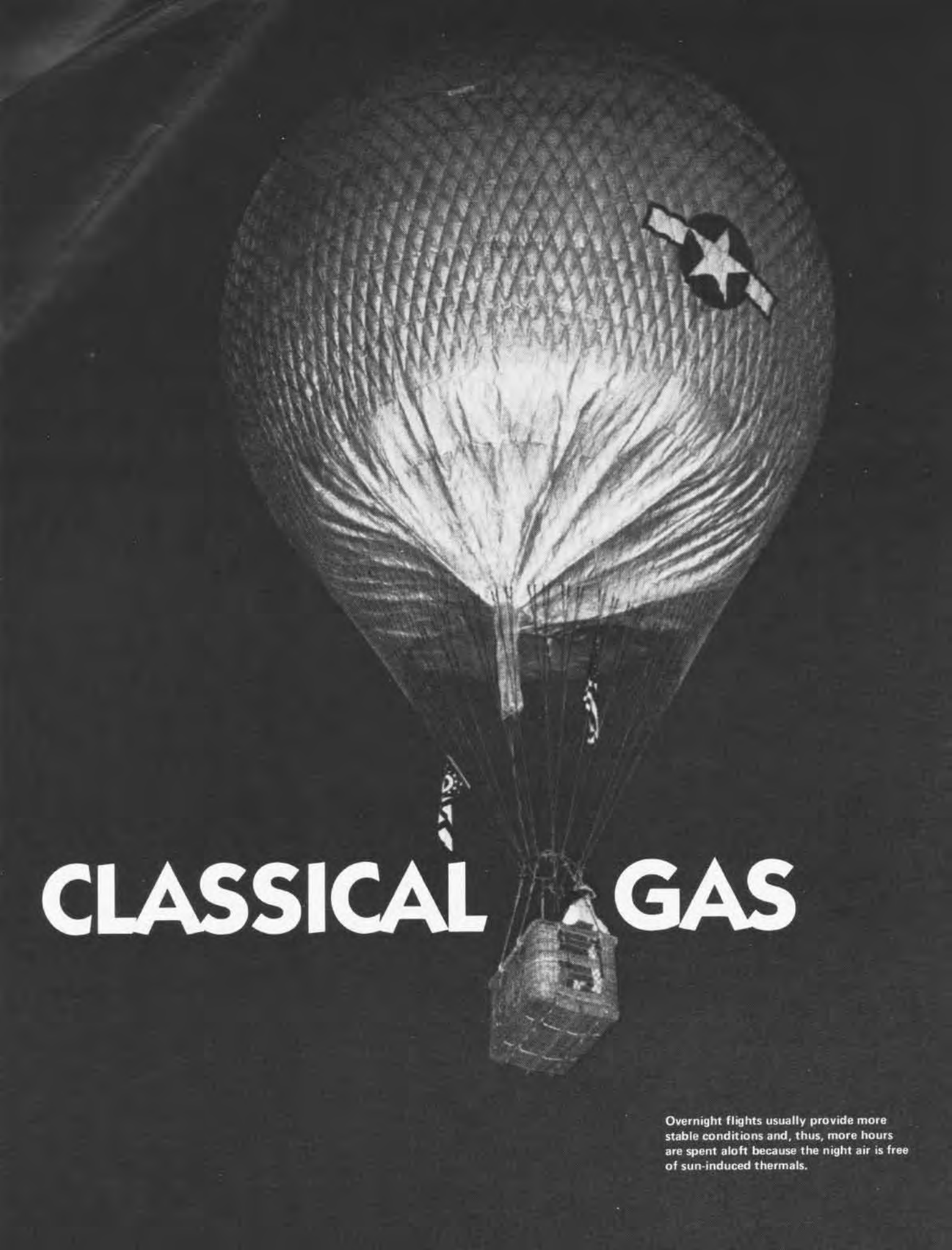
There is no question about the Chief of Naval Personnel's number one priority. That is the source of his reputation as a sailor's admiral. ■

JO2 Timothy J. Christmann contributed to this article.

1,000 Traps

The following is a list of those Naval Aviators who have made 1,000 or more carrier arrested landings. Ranks may have changed. If we have missed listing you or someone else who is qualified for membership on this exclusive roster, please let us know.

Capt. H. D. Alexander
Capt. John E. Allen
Cdr. Edward K. Andrews
Capt. Robert B. Arnold
Capt. Stanley R. Arthur
Cdr. Ronald N. Artim
Cdr. Fred Baldwin
RAdm. Joseph J. Barth, Jr.
Cdr. R. P. Boenninghausen
Cdr. Hugh C. Bowles
Cdr. Wilton D. Bradshaw
Capt. John S. Brickner
Capt. Edward F. Bronson
Cdr. Emory Worth Brown, Jr.
RAdm. Thomas F. Brown
Cdr. Daniel C. Bunting
Cdr. John C. Burch
Capt. Norman D. Campbell
Capt. Guy Cane
Capt. Roy Cash, Jr.
Cdr. Austin E. Chapman
Capt. W. Lewis Chatham
Capt. Douglas L. Clark
Cdr. John W. Combs
RAdm. Bryan W. Compton, Jr.
Cdr. Charles A. Cook
Cdr. W. Winston Copeland, Jr.
Cdr. Lewis W. Dunton III
Cdr. James E. Eckart
Como. Leon A. "Bud" Edney
Capt. David R. Edwards
Cdr. Lawrence L. Elmore
Cdr. Kent W. Ewing
Cdr. Richard S. "Fox" Farrell
Capt. John L. Finley
Cdr. James H. Finney
RAdm. James H. Flatley III
Cdr. Roger P. Flower
Capt. Samuel C. Flynn, Jr.
Cdr. John P. Gay
Cdr. George Gedney III
Cdr. Robert W. Geeding
Cdr. Franklin H. Gerwe, Jr.
Cdr. R. W. Hamon
Cdr. Robert W. Hepworth
Capt. Robert P. Hickey
Capt. David W. Hoffman
Cdr. Marshall A. Howard
Capt. Richard L. Kiehl
Capt. Robert L. Kiem
Cdr. J. E. Killian
Cdr. Henry M. Kleemann
Capt. H. P. Kober, Jr.
Cdr. James A. Lair
Cdr. Thomas V. LaMay
Capt. Bobby C. Lee
Cdr. Fred L. Lewis
Capt. P. H. "Bud" Lineberger
Capt. R. E. Loux
Cdr. John M. Luecke
Cdr. Robert A. Maier
Capt. Roger A. Massey
Capt. James T. Matheny
Cdr. J. J. Mazach
Cdr. Donald L. McCrory
Cdr. John L. McWhinney
Cdr. Hugh "Tony" Merrill
Cdr. Frederick P. Meyers
Cdr. Eugene F. Mitchell
Cdr. Thomas R. Mitchell III
Capt. Thomas G. Moore
Cdr. J. A. Moriarty
Capt. Melvin D. Munsinger
RAdm. L. R. "Moose" Myers
Capt. W. R. "Buzz" Needham
Capt. A. J. Nemoff
Cdr. Michael B. Nordeen
Cdr. Jerry Palmer
Cdr. J. P. Park
Capt. J. W. Partington
Cdr. Richard K. Pottratz
Cdr. Lawrence H. Price
Capt. John K. Ready
Cdr. A. F. Richardson
Capt. W. V. Roeser
Capt. David N. Rogers
Cdr. Philip J. Rooney
Cdr. Dan H. Ryder
Cdr. Raymond C. Schroeder, Jr.
Capt. James M. Seely
Capt. Tom E. Shanahan
Capt. Philip M. Shannon
RAdm. William G. Sizemore
Capt. Bernard J. Smith
Capt. Leighton W. "Snuffy" Smith
Cdr. Robert E. Smith
Capt. William F. Span
Capt. Haywood G. Sprouse
Cdr. Gary L. Starbird
Capt. Paul D. Stephenson
Cdr. Raymond F. Sullivan
Cdr. John M. Sumnick
Cdr. T. R. Swartz
Capt. Jeremy "Bear" Taylor
Cdr. John M. Taylor IV
Capt. Robert C. Taylor, Jr.
Capt. Bert D. Terry
Cdr. Frank Lee "Raider" Tillotson
Capt. Dwight D. Timm
Capt. Charles L. Tinker
RAdm. Ernest Eugene Tissot
Capt. R. E. "Gene" Tucker, Jr.
RAdm. Jerry O. Tuttle
Cdr. Garth A. Van Sickle
Cdr. John E. Vomastic
Capt. John M. Waples
Capt. George Watkins
Cdr. George J. Webb, Jr.
Capt. D. R. Weichman
Cdr. William W. West
Capt. W. R. Westerman
Capt. Gary F. Wheatley
Como. John R. Wilson, Jr.
Cdr. Richard A. Wilson
Cdr. Rexford E. Wolf
Cdr. T. W. Wright
Cdr. John P. Wrynn



CLASSICAL GAS

Overnight flights usually provide more stable conditions and, thus, more hours are spent aloft because the night air is free of sun-induced thermals.

By Lieutenant William G. Armstrong Jr., USNR-R

It was the dream of flying gas balloons that originally drew two youths into ballooning in their teenage years. Mike Emich and I had our roots in the Akron area and exposure to the historic exploits of gas balloonists excited our imagination. During our high school years, we would hitchhike to Goodyear's Wingfoot Lake Airship Base in Akron for gas balloon "work parties," earning points toward our first ride. However, only the older, experienced pilots ever got the chance to go up.

Our small club, known as the Balloon Flyers of Akron, acquired 12 silver balloons when the Navy ended its airship coastal patrol program in the early 1960s. The Navy, of course, had used free balloons to train airship pilots, since an airship without power is just an oddly shaped free balloon.

In recent years, the Navy and Coast Guard have renewed their interest in the use of lighter-than-air vehicles, and the sport of gas ballooning has been revived. Coincidentally, Mike and I found that we finally had the means and the time to learn this fine art. We decided to simulate the original Navy training program as much as possible and the reward for qualification would be an insignia similar to the coveted gold single-wing Navy Balloon Pilot insignia.

Our first step was to go to our club's storage bin and select the balloon we would use. "The balloon we chose for our training program, a 19,000 cubic footer, is small by today's competitive standards," Mike says, "but it was in pristine condition, and was still folded up in its original carry bag."

Markings on the appendix indicated that the balloon, Serial No. 09760, had been manufactured at the Lakehurst Naval Air Station in October 1943. We matched it with a seine twine net, a wooden load ring, and an 18-inch, double-claque wooden valve. We wove half-inch rope into a 3x4-foot wicker basket that had never been roped for flight, and fabricated 100 new sandbags.

After months of planning, research and hard work, we took the restored system to the Federal Aviation Administration, who inspected and approved it and issued an airworthiness certificate.

Then we had to work on getting our license. FAA regulations enable a commercial hot air balloon pilot to qualify for gas by making two gas balloon ascensions under instruction, averaging two hours each.

The practical portion of the officer's curriculum at Lakehurst had required seven flights, including one solo and one overnight. We searched through dusty archives and bookstores for the training syllabus and technical materials covering the use of our balloon.

We turned up three 1940 manuals issued by the War Department, Chief of Air Corps: TM-305, "Theory of Ballooning;" TM-315, "Technical Manual on Hydrogen;" and TM-325, "Technical Manual on Aerostatics." We also unearthed a 1917 Goodyear publication titled, "A Short Course on the Theory and Operation of the Free Balloon," several syllabus selections from the Officers Airship Training School at Lakehurst, and a rare 1936 copy of Walter Diehl's "Balloon and Airship Gases." These documents not only proved relevant to the operation of gas balloons today, but have been cited as source materials for modern manufacturers' manuals.

In addition, senior members of the Balloon Flyers of Akron, who learned the art of ballooning from old Navy pilots, shared their experiences with us. In past years, our club made scientific and commercial flights, notably for the Navy, Air Force and the National Oceanic and Atmospheric Administration, and flew the balloon featured in the popular Smithsonian film *To Fly*. The senior members also accumulated extensive experience over the years with coke gas, natural gas, hydrogen and even helium. Past president Don Overs wrote the BFA manual on flammable gases; Roger Wolcott, a Goodyear retiree, maintained detailed records on net building and envelope repair; Art Swanson made the last previous hydrogen flight from Akron; and, in 1972, Swanson with Kurt Stehling challenged a Russian distance record.

Since the Navy balloons were built with all-natural materials such as rubber or cotton neoprene, hydrogen was used for free balloon training in the early days at Lakehurst. We decided that, given this equipment and the expertise of our club with flammable lifting agents, we would use hydrogen in our cotton neoprene balloon. Although it requires more care in handling, it has the greatest lifting capacity (69 pounds per mcf) and costs about one-fourth as much as helium. Even at bargain rates, however, each fill-up would cost about $550.

Our initiation into gas flight began on June 5, 1983, the 200th anniversary of ballooning. A ground crew of 12 assembled at midnight at Akron Municipal Airport in the shadow of the great Goodyear-Zeppelin airship hangar. Since gas ballooning is a labor-intensive activity, it requires much handwork to prepare the balloon for launch. After working throughout the night, we were absolutely exhilarated to see this doyenne of LTA history take shape on the airport tarmac. I wanted to salute and request permission to come aboard when she was rigged for flight and standing tall.

When instructor Don Overs ordered us on board, we made ready to go. Just at the crack of dawn, the 40-year-old balloon took off from Akron on her first flight. We found a swift wind at 3,000 feet which carried us due east at about 25 knots. After we completed the required time aloft, and made one brief intermediate landing, we valved down in Bullion, Pa., 92 miles from Akron.

"It was a fantastic flight, even if it was our first," Mike recalls. "We couldn't stop grinning for hours. The only sound in the basket was an occasional creak of the wicker; for four hours we talked in a whisper. Best of all, our final touchdown was a gentle, stand-up landing in a nice big field. We had proved to ourselves that we could repair and restore this equipment, carry out all of the administrative and technical details, and that it would all work."

The FAA issued our licenses a few days later.

The next flight, in September, yielded us six more hours of flying time. We went up to 6,500 feet and rode above the clouds, but in a light wind we covered only 40 miles.

That second flight gave us tremendous confidence in our ability to handle the air work. We induced all of

the movements we wanted, and gained an increased understanding of the effects of ballast, venting and superheat. We also learned a valuable lesson about landing a balloon in midday over a hot field, when we were caught for a few moments in a whirling "dust devil" and had to valve vigorously to get down safely.

On all of our flights, we have waited for optimum forecasts, and have carried the latest available surface and 850-mb wind flow charts, as well as satellite photos of conditions within our part of the country – all courtesy of the National Weather Service.

During the spring of 1984, we planned the flight that was always a highlight of the Lakehurst training program – the night flight. Old airshipmen we talked with had remembered those flights most fondly.

Recalling his overnight flight, retired blimp pilot Thomas C. Watters said, "It was like velvet."

Another writer, William F. Althoff, notes that the overnights were "invariably an intense experience, one which remained with the Navy men."

We found that intensive preparation was needed. Night flying requires special equipment such as aircraft radios and navigational aids, running lights, up-to-date aeronautical and marine charts, warm clothing – and the indispensable cadre of loyal friends who serve as the launch and chase crew.

Word spread quickly about our flight plans. By Saturday evening, May 26, more than 40 volunteers had assembled at the Akron airport to help us inflate the Navy balloon. Some of them were hot air balloonists who had cancelled their flights that night because winds were too strong; by contrast, our gas balloon inflated easily.

We were underway by 9:30 p.m. that night. The sky was cool, clear and filled with stars. Later in the evening we saw the Milky Way in a band across the top of the sky. Navigating by city lights quickly proved impossible, the difficulty compounded by the effect of the balloon's continuous slow rotation. Otherwise, it was a most splendid and breathtaking experience. Our goal was to fly until dawn, review the weather and, if possible, keep going all the next day.

Riding the crest of a weak high-pressure system, we headed southeast and stabilized at 3,400 feet. For the first four hours we flew at more than 20 mph – and then were becalmed. At dawn, well into the hills of West Virginia, we encountered light rain and decided to call it a flight. After 10 hours in the air, we had covered 150 miles. We valved down and made a calm landing.

For the future, we would like to stay up much longer and perhaps challenge some of the old Navy performance records. That won't be easy. In February 1927, a 19,000 cubic footer from Lakehurst landed in Lisbon, Maine, having covered 478 miles in 21½ hours. Other overnights went as far as Quebec.

However, we have a sense of accomplishment. This past September, we departed from Akron in a late afternoon wind, sailed over Lake Erie by nightfall and passed over downtown Toronto at 1:30 a.m. After navigating most of the province of Ontario in the dark, we encountered threatening weather at sunrise south of Ottawa and valved down into a pasture and a farmer's warm welcome – 162 miles in 14 hours.

By attaining our long-term goals of becoming gas-qualified and having a balloon to fly, we have joined the ranks of perhaps fewer than 100 U.S. balloon pilots licensed to fly gas.

And, not incidentally, in the process we feel we are upholding an all-but-lost tradition in naval lighter-than-air! ■

• William G. Armstrong, Jr., is president of the Balloon Flyers of Akron, past president of The Lighter Than Air Society, and past vice president of the Balloon Federation of America. A stockbroker by profession, he is a lieutenant in the U.S. Naval Reserve.

• Michael C. Emich is vice president of the Balloon Flyers of Akron. He is a fixed-wing pilot and recently earned his golden parachute wings for making his 1,000th jump. He is an engineering technician for an Akron tire company.

LTA Update

The subject of lighter-than-air vehicles and their revival continues to generate interest as solutions are sought for new problems in the nation's maritime security. With the incorporation of new technology, LTA could play an important part in the coastal patrol missions performed by the Coast Guard and, perhaps, even supplement Navy fleet assets.

David Bailey of the Naval Air Development Center at Warminster, Pa., reports that the Coast Guard LTA program (see *NANews*, November 1981, p. 42) is alive and moving ahead. Under NADC's contract with the Coast Guard, 250 flight hours of test and evaluation were completed at the Naval Air Test Center at Patuxent River, Md., in 1983, using the British-built AI-500 airship, with test flying accomplished by two NATC test pilots.

From Patuxent River the airship went to the Coast Guard station at Elizabeth City, N.C., for a maritime mission demonstration. The airship carried surface search radar, infrared gear, a search and rescue winch and an inflatable boat system. The results were positive and the Coast Guard is speeding its search for a modern airship that will be a suitable surveillance and patrol platform in search and rescue operations, preparedness for military operations under the Navy in the event of war, law enforcement, ice operations and a wide variety of other missions.

Surveillance is the common denominator, the single mission platform characteristic common to all Coast Guard activities – the capability to search, detect and identify or examine. Therefore, the surveillance potential of

JOC Kirby Harrison

The remarkably agile, British-built AI-500 blimp, with its unique vectored-thrust propulsion, was demonstrated at Andrews Air Force Base near Washington, D.C., during the spring of 1983.

JOC Kirby Harrison

the airship is the primary mission requirement. It must also be able to operate in the full climatic range.

While NASA has curtailed some of the projects it was conducting in airship development, it is working on a flight dynamics simulator for airships, and the Naval Air Development Center will be able to draw on NASA for support in this area when needed.

The Navy is following all developments closely, its interest focusing primarily on the possible use of airships with non-carrier surface forces to provide continuous airborne service.

And so airships with their unique capabilities may be taking to the skies again as one answer to many of the Coast Guard's mission needs, with a potential for use in the future in naval service. ■

Here, AI-500 cruises over the rolling Maryland countryside.

Yorktown Legacy Survives

U.S. Naval Aviation was in the thick of the battle in the Pacific 40 years ago as *Yorktown* (CV-10) and other carriers pounded the enemy.

Fresh out of overhaul, by November 1944 *The Fighting Lady* had returned to the fight against Imperial Japan. *Yorktown's* flyers struck at shipping in Manila Bay, Philippines, where they found 25 to 30 enemy ships, including a few floating dry docks. The following month, she was smashing enemy airfields on Luzon again, this time in support of landing operations on Mindoro Island.

One historian described the action this way: "The Japanese were getting it right and left. . .and *Yorktown* was in there doing her part to bring the Pacific war to a close." But, to say that the *ship* was doing *her* part does not nearly tell the story, for a ship is much more than hull and flight deck. The fiber of a ship is her crew.

The men of *Yorktown* proved time after time during the Pacific combat operations that carrier aviation was a formidable force in the war, worth perpetuating in memory.

Today, the legacy of *Yorktown* endures as a direct result of the Yorktown CV-10 Association and Foundation, Inc., a nonprofit group of about 1,506 Navy veterans who served aboard *Yorktown* between 1943 and 1970, and who have reunited annually since 1948. The Association is dedi-

Carrier Aviation Hall of Fame Members

Selected in 1981:

Rear Admiral Frank Akers, USN 1901-
Pioneer in aviation communications and electronics, and instrument flying.

William E. Blewett, Jr. 1895-1965
President and Chairman of the Board 1934-65, Newport News Shipbuilding and Dry Dock Company; built 19 carriers between 1934 and 1965.

Donald W. Douglas 1892-1981
Founder of Douglas Aircraft Co.; builder of WW II carrier aircraft, e.g., the SBD *Dauntless* which sank four Japanese carriers at the Battle of Midway.

Leroy R. Grumman 1895-1982
Founder of Grumman Aircraft Corp. in 1929; builder of the F4F *Wildcat,* F6F *Hellcat,* F9F *Panther* and F-14 *Tomcat.*

Fleet Admiral Ernest J. King, USN 1878-1956
Commanding Officer of Lexington (CV-2); Chief of Naval Operations during WW II.

Rear Admiral William A. Moffett, USN 1869-1933
Father of Naval Aviation as Chief of Bureau of Aeronautics (1921-33).

Admiral Alfred M. Pride, USN 1897-
Naval Aviation pioneer; developer of flight deck systems of early carriers.

Admiral John H. Towers, USN 1885-1955
Naval Aviation pioneer; Naval Aviator No. 3; Deputy to Admiral Chester W. Nimitz.

Selected in 1982:

Vice Admiral James H. "Jimmy" Flatley, Jr., USN 1906-1958
WW II carrier fighter tactician; promoter of safety in Naval Aviation; Admiral Mitscher's fast carrier Task Force 58 operations officer.

Captain David McCampbell, USN 1910-
Medal of Honor winner; leading WW II U.S. Navy ace, with 34 aircraft.

Rear Admiral Clarence W. McClusky, Jr., USN 1902-1976
Decorated WW II dive bomber pilot; led 37 SBD *Dauntless* dive bombers to sink three carriers at the Battle of Midway.

Admiral Marc A. Mitscher, USN 1887-1947
Commanding Officer of *Hornet* (CV-8) for Doolittle's Tokyo Raid and Battle of Midway; premier carrier leader of WW II.

Lieutenant Commander Edward H. "Butch" O'Hare, USN 1914-1943
Medal of Honor winner; became U.S. Navy's first WW II ace, shooting down five aircraft in four minutes.

VAdm. William I. "Bill" Martin is being congratulated after being inducted into Yorktown's Carrier Aviation Hall of Fame by RAdm. James H. Flatley III, USN, Commander, Carrier Group 8, aboard Eisenhower (CVN-69). Flatley, whose father was on Enterprise with RAdm. Martin in Air Group 10, August to October 1942, was the enshrinement speaker for Martin at ceremonies aboard Yorktown on October 9, 1983.

as of October 7, 1984

Admiral Arthur W. Radford, USN Top carrier division commander, WW II, Chairman of Joint Chiefs of Staff 1953-1957.	1896-1973
Admiral John S. "Jimmy" Thach, USN WW II ace and fighter tactics expert noted for developing the "Thach Weave."	1905-1981
Lieutenant Commander John C. Waldron, USN Commanding Officer of Torpedo Squadron 8 at Battle of Midway.	1900-1942
Selected in 1983:	
Lieutenant Commander Verne W. "Pappy" Harshman, USN A foremost pre-WW II aviation pilot; pioneered development of survival-at-sea equipment.	1902-1984
Henry J. Kaiser Founder of Kaiser Industries; built 50 Navy WW II escort carriers.	1882-1967
Vice Admiral William I. Martin, USN Pioneer of carrier instrument, night and all-weather operations.	1910-
Charles J. McCarthy Outstanding aviation industrialist; instrumental in development of the F4U *Corsair*, F7U *Cutlass* and F-8 *Crusader*.	1890-
Captain Joseph T. O'Callahan, (CHC), USN WW II Medal of Honor winner and inspirational leader on USS *Franklin* (CV-14).	1905-1964
Commander Eugene A. Valencia, USN Third ranking U.S. Navy WW II ace, with 23 aircraft.	1921-1972
Selected in 1984:	
Admiral Robert E. Dixon, USN Winner of two WW II Navy Crosses; he and his squadron sank a Japanese carrier at the Battle of Coral Sea.	1905-1981
Captain Arthur R. Hawkins, USN Highly decorated U.S. Navy WW II ace (3 Navy Crosses), with 14 aircraft.	1922-
Admiral James S. Russell, USN Instrumental in the development of the first carrier-based, supersonic aircraft, the F-8 *Crusader*.	1903-
Vice Admiral Frederick M. "Trap" Trapnell, USN Pioneer test pilot; instrumental in the development of the F6F *Hellcat* and F4U *Corsair*; carrier-based jet aircraft; established test pilot training at NAS Patuxent River.	1902-1975

cated not only to the preservation of *Yorktown* but to the memory of the 143 other carriers and the brave men who served in them and did not return home. Because of the Association's efforts, *The Fighting Lady* has been designated as a memorial monument dedicated exclusively to aircraft carriers, at the Patriots Point Navy and Maritime Museum in Charleston, S.C.

It is called Naval Aviation's National Memorial to Carrier Aviation and is known to many as "The Arlington of Carrier Aviation." On display are 36 large bronze plaques dedicated to the memory of the aircraft carriers shown on the accompanying list, and the 3,213 men assigned to them who died in combat. As part of this phase of its work, the CV-10 Association is trying to obtain the names of casualties and to have individual plaques cast for the approximately 65 other *Fighting Lady* sister carriers which sustained losses in World War II, Korea and Vietnam. This is their first priority, according to Mr. James T. Bryan, Jr., the Association's executive director, and the list is expected to grow to more than 10,000 as the research continues.

Aboard *The Fighting Lady* is the Carrier Aviation Hall of Fame, displaying an array of bronze plaques which honor the heroes, leaders and civilians who have contributed significantly to carrier aviation. Each year

since 1981, several new names have been added to the list, which now numbers 26.

But, the goal of the CV-10 Association goes beyond preserving the legacy of *Yorktown* and the other carriers, and the memory of distinguished men. It has more recently become involved in locating and salvaging WW II-vintage U.S. naval aircraft. Last June, the Association was responsible for raising an FG-1D *Corsair* (a version of Vought's famous F4U, built by Goodyear) from the bottom of Lake Washington in the state of Washington, at a cost of some $30,000.

Plans call for the *Corsair* to be restored (although not to flying condition) and displayed eventually in *Yorktown* with other WW II carrier aviation relics.

The National Memorial to Carrier Aviation as of October 7, 1984

		Wartime Casualties	
CV-2	Lexington	119	WW II
CV-3	Saratoga	155	WW II
CV-5	Yorktown	148	WW II
CV-6	Enterprise	356	WW II
CV-7	Wasp	194	WW II
CV-8	Hornet	192	WW II
CV-9	Essex	183	WW II, Korea
CV-10	Yorktown	186	WW II, Vietnam
CV-12	Hornet	121	WW II
CV-16	Lexington	238	WW II
CV-18	Wasp	196	WW II
CV-21	Boxer	31	Korea
CVL-23	Princeton	144	WW II
CVL-26	Monterey	28	WW II
CVL-27	Langley	61	WW II
CVL-28	Cabot	73	WW II
CVL-30	San Jacinto	38	WW II
CV-34	Oriskany	111	Korea, Vietnam
CV-39	Lake Champlain	2	Korea
CV-41	Midway	18	Vietnam
CV-42	Franklin D. Roosevelt	22	Vietnam
CV-43	Coral Sea	46	Vietnam
CV-47	Philippine Sea	24	Korea
CV-59	Forrestal	134	Vietnam
CV-60	Saratoga	5	Vietnam
CV-61	Ranger	44	Vietnam
CV-62	Independence	10	Vietnam
CV-63	Kitty Hawk	60	Vietnam
CV-64	Constellation	26	Vietnam
CVN-65	Enterprise	54	Vietnam
CV-66	America	9	Vietnam
CVE-11	Card	5	WW II
CVE-21	Block Island	12	WW II
CVE-60	Guadalcanal	14	WW II
CVE-73	Gambier Bay	136	WW II
CVE-106	Block Island	18	WW II
		3,213	

Capt. Denis Schwaab, then commanding officer of America (CV-66), dedicated his ship's plaque during ceremonies aboard Yorktown at Patriots Point, Charleston, S.C., in October 1983.

Yorktown is one of the gallant fighting ships no longer needed to play an active role in the nation's defense. Today, she serves as a bridge to the past, affording her visitors a glimpse of the illustrious careers of many of America's warships and the part Naval Aviation has played in preserving our nation's heritage. ■

Charles C. Cooney

PROFESSIONAL READING

By Lieutenant Commander Peter Mersky, USNR-R

Boyne, Walter J. and Donald S. Lopez. *Vertical Flight: The Age of the Helicopter.* Smithsonian Institution Press, Washington, D.C. 20560. 1984. 258 pp. Illustrated. $10.95.

It's hard to believe that the helicopter as we know it today has been with us for over 40 years. As a real piece of practical hardware, helicopters first took to the skies in December 1941, when Igor Sikorsky flew his VS-300 the day after Pearl Harbor. (The Germans had made several successful flights with the autogyro-like FW 61 and were among the first to use modern helicopter design and flight.) There are several articles dealing with the historical and technical aspects of vertical flight, together with a good selection of photographs and drawings. There is also a useful bibliography and research guide in the back covering books, photographs, technical reports and even movies on helicopter development and use. The impact of the helicopter on military and civilian aviation is well illustrated in words and pictures in this useful book.

Mendenhall, Charles A. *Wildcats and Hellcats: Gallant Grummans in World War II.* Motorbooks, International, Osceola, Wisc. 54020. 1984. 160 pp. Illustrated. No price indicated.

The importance of the F4F *Wildcat* and the F6F *Hellcat* during WW II in the Pacific can never be overstated. In the hectic, often discouraging period after Pearl Harbor, the *Wildcat* was the only U.S. fighter capable of taking on the redoubtable Japanese *Zero* with any degree of success. This situation did not change until mid-1943 when the first *Hellcats* began to appear in strength. The F6F, although obviously a descendant of the tubby little *Wildcat,* was a totally new design. Although its front-line experience was relatively short, it was one of the most successful naval fighters of the time.

This paperbound volume, which juxtaposes the careers of these two Grumman stablemates, is a good basic treatment of these wartime "*Cats.*" It encompasses the pre-war genesis of the F4F, derived from the highly successful series on the Grumman biplanes FF-1, F2F and F3F, with a chapter devoted to the *Wildcat's* and *Hellcat's* main wartime opponent, the Mitsubishi *Zero-sen.* Most of the photos have been seen before, but they do complement the text, as do the page-size drawings.

Chesneau, Roger. *Aircraft Carriers of the World: 1914 to the Present.* U.S. Naval Institute, Annapolis, Md. 21402. 1984. 288 pp. Illustrated. Indexed. $27.95.

This book is an excellent companion to another USNI publication, *U.S. Aircraft Carriers: An Illustrated Design History* by Norman Friedman, which is more technically oriented. Together these two books are fine treatises on aircraft carrier design and history. Chesneau's book is divided into two sections: historical and developmental.

The first deals with carrier development in general, and specific areas such as aircraft, catapults, arresting gear and interior design. There are some very interesting photographs and charts. The first section closes with a small essay on the continuing development of the modern carrier, the interest in smaller, less expensive carriers, and the possibilities of less costly non-dedicated vessels, such as merchantmen, carrying V/STOL aircraft.

The second and largest section contains a compendium of all carriers, listed chronologically within each national subsection. Again, there are excellent photos and arrangement drawings. The United Kingdom, Japan and the United States have the largest sections, but postwar Soviet ships, Spanish, Indian, South American and Italian carriers are also covered. All in all, a well-presented, well-researched volume.

Kinzey, Bert. *F11F Tiger in Detail and Scale.* Aero Publishers, Inc., 329 W. Aviation Rd., Fallbrook, Calif. 92028. 1984. 72 pp. Illustrated.

The latest in this growing series, this paperbound book takes an in-depth look at one of the forgotten jet fighters of the late fifties and early sixties, the Grumman F11F *Tiger.* A transitional design at best, and a lackluster operational performer at worst, the *Tiger* had a short career in the fleet, although its service with the *Blue Angels* spanned 1957 to 1969, after which the demonstration team transitioned to F-4Js. The F11F was the Navy's first operational supersonic fighter, but served with only seven fleet squadrons, as well as VX-3 and the *Blues.* (It also served as an advanced trainer for a period.)

This is a fine book, full of good, never-before-published photographs, which show an amazing amount of detail and variations in design. There is also a short section devoted to plastic scale models of the *Tiger,* and various specialty decal offerings for the model kits. A set of five-view general arrangement drawings is well executed in 1/72nd scale. The *Tiger* is an interesting footnote in U.S. Naval Aviation and this book is a worthwhile reference aid.

The above insignia were recently approved by the Insignia Board.

Awards

The Aviation Boatswain's Mates Association has announced the 1984 Boatswain's Mates of the Year. ABE1 Jeffrey L. Wisler from *Kennedy* was chosen from the Atlantic Fleet and ABE1 Paul E. Erickson, recently assigned to *Enterprise*, was the winner from the Pacific Fleet.

YNC James R. Beaver became the first "blackshoe" in VR-24 to earn Enlisted Aviation Specialist wings. The designation recognizes his acquired skills, knowledge and experience in a number of aviation warfare areas.

The *Champs* of VA-56 "trapped" the CVW-5 landing competition for *Midway's* Indian Ocean deployment. The squadron was cited for superior performance on landing grades awarded to pilots during the carrier landing evolution.

Outstanding achievements by various individuals in the aviation community were recognized by the Navy League's 1984 National Awards:

John Paul Jones Award for Inspirational Leadership: Capt. Gary F. Wheatley, C.O., *Kennedy*, and Capt. Joseph W. Prueher, ComCVW-7.

Rear Admiral William R. Parsons Award for Scientific and Technical Progress: Dr. Alan R. Somoroff, Technical Director, Air Vehicle Division, NavAirSysCom.

Admiral Claude V. Ricketts Award for Inspirational Leadership by a Navy Enlisted Man: AW1 James H. Cox, HS-5.

Captain Winifred Quick Collins Award for Inspirational Leadership by an Enlisted Woman: ATC Cynthia A. Alderson, NAS Barbers Point, Hawaii.

Stephen Decatur Award for Operational Competence: Lt. John W. Miller, VF-31, CVW-3 embarked in *Kennedy*.

Established

HS-17 was established at NAS Jacksonville on April 4, 1984. Commanded by Cdr. W. C. McCamy, *Neptune's Raiders* deploy aboard *Coral Sea* to provide ASW close-in defense.

Rescues

Three of HS-17's personnel have been honored for their role in preventing the possible loss of a sister squadron's aircraft at NAS Jacksonville last June. AD1 James Strickland, AD2 James Toscano and AE2 Joseph Rolfer were assisting in the launch of an HS-17 helicopter when a helicopter from HS-1 ruptured a blade fold line during the fold cycle. Hydraulic fluid sprayed onto the #1 engine exhaust cowling and ignited. HS-1's plane captain was unable to see the fire because of his location, and so Petty Officers Strickland and Toscano manned a CO_2 fire bottle and discharged it onto the engine while Rolfer signaled the pilot. Their immediate response to the emergency prevented possible loss of the aircraft and injury to the flight crew.

Records

The *Bluetails* of VAW-121 celebrated 77,000 hours of accident-free carrier operations recently. This record is the third highest ever attained by a carrier-embarked squadron and the highest of any E-2C squadron.

Several squadrons marked accident-free flight time: VP-93, 10,000 hours; VP-56, 20 years and 139,300 hours; VXN-8, 17 years and 70,000 hours; VP-10, 11 years and 75,000 hours; VP-65, 13 years and 50,000 hours; VF-301, 13 years and 47,000 hours; VFA-113 (formerly VA-113), 10 years and 44,500 hours; VAW-110, 9 years and 35,000 hours, VX-1, 7 years and 27,400 hours; and VT-24, 5 years and 68,400 hours.

The following individuals recorded personal career milestones:

ComPatWing-5: Capt. Robert P. Berg, completed his 8,000th pilot flight hour. In his career, he has flown the T-28 *Trojan*, P-2 *Neptune* and the P-3B and P-3C *Orion*.

VF-2: Lts. Kent Rominger and Tom Joyce each reached 1,000 hours in the F-14 *Tomcat*.

VA-94: Cdr. E. L. Tetrick, C.O., and Cdr. T. L. Hightower, X.O., each attained 3,000 hours in the A-7 *Corsair II*.

VT-9: Lt.Cdr. H. T. Nygard reached his 5,000th career flight hour while flying a T-2C *Buckeye*.

VA-34: Cdr. T. Steve Therrel, 700 career traps; Cdr. Bob K. Champney, 500 A-6 traps; Lt.Cdr. Bill H. Gregory, 1,000 A-6 flight hours; Lt.Cdrs. Kolin M. Jan and John R. Powell, 400 A-6 traps; and Lt.Cdrs. F. Lee Van Deman IV and John W. K. Klein, 300 A-6 traps.

Honing the Edge

VF-84 traveled to Nellis AFB, Nev., for *Red Flag 84-4*, an annual exercise sponsored by Commander, Tactical Air Command, USAF, to provide low-level intercept training in a realistic environment. During the two-week evolution, the *Jolly Rogers* flew "Red Force" missions in conjunction with Air Force F-5s and F-15s. Their primary mission was to thwart coordinated strikes posed by multinational interceptor/attack F-16 squadrons, in company with USAF F-4, A-7, B-52, A-10, C-130, F-15 and F-111 aircraft. Combined with intercept control by E-3A AWACS and air refueling with KC-135 aircraft, a realistic wartime scenario was presented.

For the Marines stationed at MCAS Yuma, the sight of Navy blue uniforms around the flight line is becoming more common. The *Sharpshooters* of VMFAT-101 have begun training Navy pilots and radar intercept officers in the F-4 *Phantom*, and continue to train Marine flight crews. The new requirement to train sailors has also added a new dimension to the training conducted by the Marine squadron – carrier qualifications. The only remaining active duty F-4 squadrons in the Navy are assigned to *Midway* and all Navy flight crews must be fully trained in carrier operations prior to reporting to the fleet. To assist in the training, VMFAT-101 has received four Navy flight instructors, two RIOs and two pilots who are both landing signal officer qualified. Squadron ops officer Maj. Ron Snowden says, "The interaction between the two services has been good" and ". . .has helped to bridge the gap that sometimes exists between members of different services when they work together."

The *Bounty Hunters* of VF-2, Miramar, are believed to be the first operationally deployed F-14 squadron to launch while towing a banner from the flight deck of an aircraft carrier. Shore-based squadrons frequently launch a banner for gunnery practice; however, the task ashore is much easier since there are 8,000 or more feet of runway in which to stabilize both aircraft and banner prior to actual takeoff. As in most skills, shooting the F-14's gun requires practice to maintain proficiency. This new procedure will enable pilots to keep their gunnery talents fine-tuned while deployed.

Well-tuned aircraft serviced by hard-working maintenance Marines contributed to a successful six-month WestPac deployment for VMFA-312, MCAS Beaufort, S.C. During its deployment, VMFA-312 participated in two joint exercises with Japanese forces in addition to Exercises *Cope Thunder* and *Team Spirit 84*, flying bombing, air-to-air, combat air patrol and intercept missions. Commanded by Lt.Col. Harry Lee III, the squadron currently flies the F-4S *Phantom*.

Anniversaries

HMM-265 marked its 20th year of flying the CH-46 *Sea Knight*. On June 30, 1964, HMM-265 became the first Marine Corps squadron to receive the versatile, tandem-rotor transport helicopter.

Several units celebrated anniversaries recently: Marine Corps Reserve, 59 years; 1st Marine Aircraft Wing, 43 years; VF-143, 34; VF-213, 29, MAWTS-1, 6; and HC-4, 1.

Training Personnel Recognition

The Master Training Specialist Recognition Program which began in 1976 gives distinction to outstanding active duty (officer and enlisted) and civilian employees in instructor-related or curriculum development billets. The program has also created a nucleus of Master Training Specialists whose proficiency enables them to certify incoming instructors and participate in instructor evaluation and in-service training. A Master Training Specialist has a medallion on his name tag, an easily recognized symbol of achievement.

Eligible for the program are personnel working throughout the Naval Education and Training Command as instructors (classroom, learning center, shop, flight, etc.), recruit company commanders at recruit training commands, instructor trainers and integrated training brigade staff. Selections for Master Training Specialists are made by boards at the command level and forwarded to the Chief of Naval Education and Training (CNET) or functional command level, using criteria applicable to the specific school or curriculum.

Commands interested in nominating an individual for the Master Training Specialist Recognition Program should review CNET Instruction 1650.4A of April 4, 1983, or call the office of CNET's Fleet Master Chief Tommy L. Connell, autovon 922-3418, FTS 948-3418, or commercial (904) 452-3418.

Et cetera

Several former members of CAG-16 returned to *Lexington* last June 20 to present the ship with a bronze plaque commemorating an event which has become known as the "Mission Beyond Darkness." On June 20, 1944, Task Group 58, under the command of VAdm. Marc A. Mitscher, launched more than 200 aircraft from its carriers against the Japanese fleet. After a highly successful attack, the American aircraft had to return to their carriers under the "darken ship" order which was given to protect the task group's location. Fearing for the further loss of task group personnel and aircraft, Mitscher ordered, "Turn on the lights!" until the last of the returning aircraft had landed. Twenty minutes later, the Pacific was again in darkness. The former CAG-16 members gave the plaque in "grateful remembrance" of Mitscher for his decision which saved many lives and aircraft.

It's not unusual for a group of sailors to be assigned to an aircraft carrier for a seven-day working cruise. But last summer when one Navy officer, one Marine sergeant and about 40 enlisted troops came aboard *Constellation*, the event marked a first for the combatant ship. The new personnel were females assigned to seven squadrons that were undergoing carrier qualifications. Until a few years ago, women were prohibited by law from filling sea duty billets. In October 1978, Congress amended that law, allowing women on support and noncombatant ships only. However, an exception to the law states that women may be assigned *temporary* duty to *any* Navy ship not expected to be engaged in a combat mission.

The Weapons Quality Engineering Center at Yorktown, Va., has its first woman director, Dr. Frances G. Holt. She comes to the post with a background in engineering and experience as a technical consultant for underwater mines, and surface and air-deployed mine countermeasures systems. The Weapons Quality Engineering Center makes quality evaluations of aircrew survival equipment, air-to-air and air-to-surface missiles and bombs, for the Naval Air Systems Command and the Naval Aviation community at large.

Vintage Grumman aircraft shared the spotlight with the modern F-14 Tomcat at the 1984 Kalamazoo Air Show in Michigan. Here, they fly the famed "missing man" formation in memory of a member of the Army Golden Knights parachute team who was lost earlier in the year.

Lt.Cdr. Lon J. Huffman

Change of Command

ASWWingPac: Como. Roger L. Rich, Jr., relieved RAdm. Lee E. Levenson.

CNATra: Como. John S. Disher relieved RAdm. Peter B. Booth.

CVW-6: Cdr. Carter B. Refo relieved Capt. Edward K. Andrews.

CVW-8: Cdr. Daniel Rainey relieved Capt. Arthur Cebrowski.

CVW-15: Cdr. Bill Switzer relieved Capt. Tom Slater.

CVWR-30: Cdr. Christopher T. Wilson relieved Cdr. Thomas B. Latendresse.

H&HS-90: Maj. J. A. Brizendine relieved Maj. J. W. Loynes.

HMH-461: Lt.Col. John A. Tucker relieved Lt.Col. Henry A. Detering.

HMM-261: Maj. Frank L. Brewer relieved Lt.Col. Granville Amos.

HSL-35: Cdr. Richard J. Jaeger III relieved Cdr. D. H. Wassmer.

MAtVAQWingPac: Como. James M. Seely relieved Como. William D. Zirbel.

NALC: Como. John H. Kirkpatrick relieved RAdm. Charles J. Moore.

NAMTraGru: Capt. William C. Purcell relieved Capt. Bernard J. Loonam.

NAR Jacksonville: Capt. Robert E. Webb relieved Capt. Vincent J. Schuppert.

NAS Cecil Field: Capt. Jack B. Austin relieved Capt. William P. Behning.

NAS Dallas: Capt. Robert J. Naughton relieved Capt. Charles G. Andres.

NAS Oceana: Capt. L. F. Norton relieved Capt. C. L. Tinker.

NAS Patuxent River: Capt. John M. Welch relieved Capt. Robert I.

Heisner.

NS Roosevelt Roads: Capt. Francis X. Mezzadri relieved Capt. James W. Keathley.

PatWing-5: Capt. Peter H. Cressy relieved Capt. Robert P. Berg.

ResPatWingLant: Capt. M. A. Nash relieved Capt. E. R. Riffle.

2d MAW: Maj.Gen. Richard M. Cooke relieved Maj.Gen. Keith A. Smith.

TACGru-2: Capt. E. D. Estes relieved Capt. D. E. French.

VMFA-312: Lt.Col. Sidney Wade, Jr., relieved Lt.Col. Harry Lee III.

VA-34: Cdr. James B. Dadson relieved Cdr. Garth A. Van Sickle.

VA-37: Cdr. Brian L. Lehman relieved Cdr. Robert L. Ramsay.

VA-56: Cdr. Paul R. Statskey relieved Cdr. Garold S. McDaniel.

VA-74: Cdr. Kenneth Burgess relieved Cdr. Bill Walker.

VA-85: Cdr. Paul L. Bernard relieved Cdr. Kirby E. Hughes II.

VA-95: Cdr. J. S. McMahon relieved Cdr. R. T. Wojcik.

VA-174: Cdr. M. B. Nordeen relieved Capt. Robert L. Kiem.

VA-176: Cdr. James E. Hurston relieved Cdr. Michael P. Currie.

VA-192: Cdr. C. D. Englehardt relieved Cdr. Gilman E. Rud.

VA-305: Cdr. Robert W. Lind relieved Cdr. Jerry DeGiorgio.

VAQ-34: Cdr. Richard L. Affeld relieved Cdr. John E. Millward.

VAQ-131: Cdr. Victor E. Dodds relieved Cdr. James C. Kennedy.

VAQ-134: Cdr. Tom White relieved Cdr. Ted Meserve.

VAQ-135: Cdr. B. J. Hedger relieved Cdr. R. R. Penfold.

VC-12: Cdr. John B. Totushek relieved Cdr. Charles E. Long.

VF-11: Cdr. Keith E. Shean relieved Cdr. John W. Combs.

VF-101: Cdr. L. L. Ernst relieved Cdr. H. M. Kleemann.

VF-201: Cdr. Stanley D. Graber relieved Cdr. Edward C. Flynn.

VF-301: Cdr. G. Cress Bernard relieved Cdr. J. Thel Hooks.

VMA-311: Lt.Col. Achim Lind relieved Lt.Col. Gordon Jefferson.

VMFA-115: Lt.Col. James D. Wojtasek relieved Lt.Col. John C. Church.

VMGR-352: Lt.Col. Thomas O'Malley, Jr., relieved Lt.Col. Bruce Major.

VP-8: Cdr. Charles A. Gabriel relieved Cdr. Raymond J. Figueras.

VP-26: Cdr. Robin C. Larson relieved Cdr. Donald F. Rahn.

VP-47: Cdr. S. T. Quigley, Jr., relieved Cdr. Stanley M. Brown III.

VP-50: Cdr. Donald A. Giles relieved Cdr. Albert J. Begbie.

VP-56: Cdr. Donald L. Riffle relieved Cdr. Michael J. Caruso.

VP-93: Cdr. George M. Fusko relieved Cdr. Robert W. Davis.

VR-56: Cdr. Frank S. Cadwell relieved Capt. Russell W. Kuhl.

VS-24: Cdr. S. M. Dwyer relieved Cdr. R. J. Uhrie, Jr.

VT-6: Cdr. R. F. Duggan relieved Cdr. James C. Woodard.

awards

McClusky Award

VA-35's *Black Panthers* are the recipients of the RAdm. Clarence Wade McClusky Award in recognition of their outstanding achievements and contribution to Naval Aviation during the past year. The trophy, sponsored by LTV Aerospace and Defense Company, is awarded annually in honor of the air group commander who distinguished himself while leading a bombing attack on June 4, 1942, during the Battle of Midway. Nominees for the award were from both the Atlantic and Pacific Fleets. Areas considered in the selection process included achievements in combat, weapons systems readiness and development, aviation safety and personnel readiness and retention.

Daedalian Award

Naval Air System's Command program manager Capt. Larry E. Kaufman has received the 1984 Daedalian Weapon System Award, recognizing his and his program team's contributions in bringing the high-speed, antiradiation missile HARM to production. The award is presented each year successively to the Air Force, Army or Navy recipient judged to have made the greatest contribution to the development of the most outstanding weapon system in use by that service. The Order of Daedalians is a national fraternity of military pilots dedicated to perpetuating patriotism, love of country and service. It is celebrating its 50th anniversary this year.

Clifton Award

The RAdm. Joseph C. Clifton Award for 1983 has been won by NAS Miramar's VF-211. The trophy, sponsored by Litton Industries, is symbolic of meritorious achievement by a fighter squadron and recognizes the traits and leadership exemplified by the fighter pilot of WW II during his naval career.

Britannia Award

The Britannia Award for 1983 has been won by 1st Lt. Scott R. Pomarico, USMCR, VMAT-102, as the student aviator who has completed advanced flight training with the highest overall weapons score. The award was originated in 1956 by the Lords Commissioners of the Admiralty of the United Kingdom in appreciation of the assistance given by the U.S. Navy in training Royal Navy pilots during the Korean War.

Thach Award

VS-22, NAS Cecil Field, is the winner of the 1983 Adm. John S. "Jimmy" Thach Award as the outstanding carrier-based VS squadron in superior ASW performance. Sponsored by Lockheed Corporation, the trophy honors the dedicated officer whose flying achievements and tactical developments during WW II are legendary.

AEW Excellence Award

The Airborne Early Warning Excellence Award for 1983 has gone to VAW-126, NAS Norfolk. The Grumman Aerospace Corporation award recognizes excellence in operational readiness, safety, retention and contributions to tactics and weapon systems development.

Radford Award

VAQ-137, NAS Whidbey Island, has won the 1983 Adm. Arthur W. Radford Award. The trophy is sponsored by Grumman Aerospace Corporation and is awarded to the carrier-based tactical electronic warfare squadron which has excelled in operational achievement and contributions to Naval Aviation during the preceding year. The award honors the WW II carrier division commander who was responsible for organizing the first radar-equipped combat patrol.

FliGHT BAG

More on Awards

Please add the following award to your list: Lifelong Service Recognition Award, sponsored by the Navy Helicopter Association and the Bendix Corporation, presented annually to the individual who in the opinion of the Board of Directors has lifelong contributed most significantly to vertical lift development and the Navy Helicopter Association.

M. C. Miranda
Bendix Oceanics Division
15825 Roxford Street
Sylmar, CA 91342

Enlisted Personnel in Naval Air

Congratulations on your March-April issue. It was gratifying to see the Navy's aviation magazine acknowledge the enlisted contribution to Naval Air. Perhaps an issue of this fine publication could trace the heritage of our side of the Naval Air team. Enlisted men and women have served Naval Aviation in innumerable ways and I'm sure many of your readers would be interested in reading about their accomplishments. Enlisted involvement is part and parcel of the past, present and future success of Navy/Marine Corps Aviation.

AMS1 Robin L. Torske
Whittier Recruiting Station
13311 Penn St.
Whittier, CA 90602

Ed's note: Some years ago, NANews ran a series of in-depth articles on enlisted ratings and we may be able to repeat the series. We also welcome stories or articles on Naval Aviation personnel that would be of interest to our readers. Keep those cards and letters coming.

Photos Needed

I am compiling a pictorial history of Naval Aviation and would like to solicit the help of your readers. If anyone has photos for a work of this type, please write to me.

Billy Frank Morrison
P.O. Box 267
Ft. Campbell, KY 42223

Reunions, Associations, etc.

Anyone who served in escort carriers (CVEs) during WW II and the Korean conflict and is interested in forming a **carrier-escort sailors association,** please write W. W. Irwin, Jr., 2134 Hoyt Dr., Baton Rouge, LA 70816.

Those interested in a **VAH-2 (1963-4) reunion,** contact Frank Kuntze, Ten Tower Pl., Faribault, MN 55021, (507) 332-7605.

NAS New York (TARs, USN, organized reserves, Marines, officers, enlisted and civilians) **reunion,** November 9-11, 1984, in Orlando, Fla. For details contact Frank Treubig, 703 Westfield Dr., Port Richey, FL 33568.

Navy Air Group 153-15 reunion of squadron officers from 1945-49, June 6-9, 1985, Pensacola, Fla. Contact Al Rappuhn, 10920 Manatee Dr., Pensacola, FL 32507, (904) 492-1829.

Aircraft Wanted

The Naval Aviation Museum is interested in acquiring as many as possible of the aircraft listed below. Anyone who has one of these aircraft or knowledge of the whereabouts of any of them, is asked to contact Capt. Grover Walker, USN (Ret.), Director, Naval Aviation Museum, NAS Pensacola, FL 32508, (904) 452-3604 or autovon 922-3604.

Model	Popular Name	Manufacturer
Attack/Fighter Aircraft		
CS-1/2	—	Curtiss
SBC-3/4	*Helldiver*	Curtiss
SB2C-1/3/4/5	*Helldiver*	Curtiss
F6C-1/3/4	*Hawk*	Curtiss
F7C-1	*Seahawk*	Curtiss
F8C-4	*Falcon*	Curtiss
F9C-2	*Sparrowhawk*	Curtiss
F11C-2	*Goshawk*	Curtiss
TBY-2	*Sea Wolf*	Consolidated
FB-1/2/3/5	—	Boeing
F2B-1	—	Boeing
F3B-1	—	Boeing
F4B-1/2/3/4	—	Boeing
SB2A-1/2/3/4	*Buccaneer*	Brewster
F2A-1/2/3	*Buffalo*	Brewster
BG-1	—	Great Lakes
TG-1/2	—	Great Lakes
F2F-1	—	Grumman
F3F-1/2/3	—	Grumman
SBD-1/2/3/4/5/6	*Dauntless*	Douglas
TBD-1	*Devastator*	Douglas
DT-1/2/4	—	Douglas/NAF
PT-1/2	—	NAF
SBN-1	—	NAF
SC-1/2	—	Martin
T3M-1/2	—	Martin
T4M-1, TG-1/2	—	Martin; Great Lakes
FR-1	*Fireball*	Ryan
SBU-1/2	—	Vought
SB2U-1/2/3	*Vindicator*	Vought
F4U-1	*Corsair*	Vought
F4U-4	*Corsair*	Vought
F7U-1/3	*Cutlass*	Vought
VE-7; VE-9	—	Vought/NAF
Patrol/EW Aircraft		
PB4Y-1	*Liberator*	Consolidated
P2Y-1/2/3	—	Consolidated
PD-1	—	Douglas
P2D-1	—	Douglas
PH-1/2	—	Hall
PK-1	—	Keystone
PM-1/2	—	Martin
P3M	—	Martin
P4M	*Mercator*	Martin
PBM-1/3/5	*Mariner*	Martin
PBJ-1	*Mitchell*	North American
Observation Aircraft		
OJ-2	—	Berliner-Joyce
O2B-1	—	Boeing
OY-1	*Sentinel*	Consolidated
SOC-1/2/3	*Seagull*	Curtiss
SO3C-1/2/3	*Seagull*	Curtiss
M-8	—	Loening
OL-1/2/3/4/6/8/9	Loening Amphibian	Loening/Keystone
OV-10	*Bronco*	North American
O2U-1/2/3/4	*Corsair*	Vought
O3U-1/2/3/6	*Corsair*	Vought
UO-1/4	—	Vought
WW I Aircraft		
F5L	—	Curtiss/NAF
H-12	—	Curtiss
H-16	—	Curtiss
HS-1/2/3	—	Curtiss
R-3/5/6/9	—	Curtiss
DH-4	—	Dayton-Wright
Training Aircraft		
Aeromarine 40	—	Aeromarine
NB-1/2/3/4	—	Boeing
HT-B/HT-2/U-2	—	Burgess
NY-1/2/3	—	Consolidated
N2Y-1	—	Consolidated
HN-1/2	—	Huff-Daland
NK-1	—	Keystone
N3N-1	*Yellow Peril*	NAF
NJ-1	*Texan*	North American
NP-1	—	Spartan
Sturtevant S	—	Sturtevant
TT-1	*Pinto*	Temco
SH-4	—	Thomas Morse
S4-B/C	—	Thomas Morse
Helicopters		
AH-1	*Cobra*	Bell
HSL-1	—	Bell
H-46	*Sea Knight*	Boeing
H-12 (HTE)	—	Hiller
H-2 (HU2K)	*Seasprite*	Kaman
HTK-1	—	Kaman
H-3	*Sea King*	Sikorsky
H-53	*Sea Stallion*	Sikorsky
HNS-1	—	Sikorsky
HOS-1	—	Sikorsky
HO5S-1	—	Sikorsky
HH-52	—	Sikorsky
Gliders		
PS-2	—	Franklin
Prufling	—	German built
LNS-1	—	Schweizer
LNT-1	—	Taylorcraft
LRW-1	—	Waco
Miscellaneous Types		
JRM	*Mars*	Martin

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