

naval aviation news



**Year
in
Review**

MAY-JUNE 1984

Sixty-Sixth Year of Publication

(ISSN 0028-1417)

Vice Admiral Robert F. Scholtz Deputy Chief of Naval Operations (Air Warfare)
Vice Admiral James B. Busey IV Commander, Naval Air Systems Command
Captain Richard C. Knott Head, Aviation Periodicals and History

Staff

Cdr. Howard Wheeler Editor **Sandy Russell** Associate Editor
Helen F. Collins Managing Editor **JOC Kirby Harrison** Associate Editor
Charles C. Cooney Art Director **JO2 Timothy J. Christmann** Assistant Editor

Associates

Harold Andrews Technical Advisor **Lt. Cdr. Peter Mersky** Book Review Editor
Capt. Rosario Rausa Contributing Editor **Terry C. Treadwell** European Correspondent



There are two sides to the Naval Aviation happenings of 1983—fleet operations and honoring the heroes of the past. Cover design by NANews' Charles Cooney.

Features

Small Decks, Big Missions	4
T-45TS Update	10
The Harrier — Battle Proven and Getting Better	12
Air-to-Air Helo Style	14
Hall of Honor Gets Four More	17
Captain Kenneth Whiting	18
Leroy Grumman	20
Vice Admiral James H. Flatley, Jr.	22
Admiral John S. Thach	24
1983 Year in Review	26

Departments

State of the Art	1
Grampaw Pettibone	2
Professional Reading	36
People—Planes—Places	37
Flight Bag	40

Naval Aviation News is published bimonthly by the Chief of Naval Operations and Naval Air Systems Command in accordance with Navy Publication and Printing Regulations P-35 (revised May 1979). Opinions expressed are not necessarily those of the Department of the Navy. Reference to regulations, orders and directives is for information only and does not by publication herein constitute authority for action. All material not copyrighted may be reprinted. Naval Aviation News offices are located in Building 159E, Room 590, Washington Navy Yard Annex, Washington, D.C. 20374. Phone (202)433-4407/8/9, autovon 288-4407/8/9. Annual subscription is available through Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Phone (202) 783-3238. Second-class postage paid at Washington, D.C., and additional mailing offices. POSTMASTER: Send address changes to GPO Order Desk, Superintendent of Documents, Washington, D.C. 20402.



Off Lebanon's shores, the small decks of the fleet have been sharing the spotlight with the super carriers. The men who command the LHAs and LPDs may have *Small Decks* but *Big Missions*. Read how they got there in the story on page 4.



It used to be called VTXTS. Now the Undergraduate Advanced Jet Training System is called *T-45TS*. What hasn't changed is that it is still built around the T-45A version of the British *Hawk*. See the update on page 10.



The Falklands crisis proved the value of the V/STOL *Harrier* in combat under the most adverse conditions. The U.S. Navy's AV-8B *Harrier II* program is on track to continue the success story. That's why they are "Combat Proven and Getting Better," page 12.



Helicopters in air-to-air combat is not a contradiction of terms. It's serious business and being studied at NAS Patuxent River. If you don't believe it, take a look at "Air-to-Air Helo Style" on page 14.



Four more Naval Aviation pioneers will be enshrined in our own Hall of Honor in May. They are Captain Kenneth Whiting, Leroy Grumman, VAdm. James Flatley, Jr., and Adm. John Thach. Their lives and careers are profiled beginning on page 17.



1983 was filled with Naval Aviation activity. From Central America to Lebanon and around the world, Mr. Roy Grossnick, DCNO(Air Warfare) Historian (OP-05D2), sums it up in the "Year in Review" starting on page 26.

SR&M Kits to Improve Helos

Last December, a Marine Corps CH-46E *Sea Knight*, modified under the Safety, Reliability and Maintainability program, made its first flight. Three additional CH-46s will be updated during 1984 to include the modifications. The program will make 26 improvements to each aircraft, the most significant being changes in the transmission and flight control systems. The modifications, which don't visually alter the external fuselage, are incorporated into retrofit kits built by Boeing Vertol and installed by the Navy at the MCAS Cherry Point, N.C., rework facilities. Delivery of 341 SR&M production kits to the Navy will begin by mid-1985.



Voice Control

A revolutionary concept is being evaluated at the Naval Air Test Center, Patuxent River, Md. An avionics system, capable of understanding and acting on voice commands, is being tested in a TF-18 *Hornet* to demonstrate its use in fighter and attack aircraft.

After four months of ground testing, the system (voice-controlled interactive device) will be flight tested in a two-seat *Hornet*. The prototype will enable a pilot to receive and set navigation data by voice command, perform preflight and landing checklists, get fuel and weapons systems status reports and make weapons systems programming changes. It is also user-selective, as it must be programmed to accept the voice of each person using it. The vocabulary is the common jargon of Navy pilots, since pilots participated in developing its language. The device should reduce a pilot's workload, particularly in low-level flight when he must pay more attention to what is going on outside the cockpit. The new system is the result of 10 years of research by NADC Warminster, Pa., under the sponsorship of NavAirSysCom.

Improved S-3A Weapons Systems

Lockheed has begun upgrading an S-3A *Viking* with improved weapons systems designed to counter the threat of new Soviet sub-

marines. It is the first of two to be modified over the next two years. The refinements include a standoff classification radar system that can classify enemy targets at greater range, a more advanced acoustic processing system, an updated electronic support measures system, a new sonobuoy receiver with expanded capabilities, an electronic countermeasures capability, new analog tape recorder, and addition of the *Harpoon* air-to-surface missile. Later, the Navy may order updates for a total of 160 S-3As. The modified aircraft, known as S-3Bs, will extend the striking arm of future carrier battle groups.

HEELS will Illuminate Night Ditchings

The Helicopter Emergency Egress Lighting System, developed by NADC Warminster, will make it easier for crewmen and passengers to more easily locate emergency exits during night ditchings at sea. The system consists of light-emitting diode tubes to be installed at each exit which, when armed before flight, will illuminate automatically when rotor speed is lost. A prototype system for installation procedures, maintenance evaluation and flight testing at NATC Patuxent River was installed in an H-3 last summer and is being used to conduct a long-term evaluation. The system will be incorporated into fleet helicopters as funds become available.

New Tracking Radar

A precision, monopulse tracking radar has been developed by the Naval Research Laboratory. It is being used by NATC Patuxent River, Md., at its Chesapeake Test Range to provide instrumentation radar for experimental and high-precision tracking measurements for airborne weapons systems testing and evaluation of new equipment and techniques.

The sophisticated system, dubbed TRAKX, is controlled by a small central computer and is designed primarily for tracking low-flying targets such as aircraft, missiles, drones or other airborne targets on range test sites where precision range instrumentation is a requirement. It is the only radar that can perform high-precision tracking of low-altitude targets without the high clutter and severe multipath errors experienced by conventional tracking radars. TRAKX also expands the Test Center's cross-section measurement capability and provides instrumentation for countermeasures experiments, particularly relating to chaff and electronic warfare.

Additional TH-57 Trainers

The Navy will receive 21 additional TH-57 trainers from Bell Helicopter Textron, Inc., beginning July 1984. Thirteen Model TH-57C advanced instrument trainers and eight TH-57B primary trainers are included in this order, which is an add-on to a contract issued December 1981 for 55 trainers. The latest purchase will raise the total acquisition to 97 helicopters.

FOD-free F-14s

In an effort to prevent objects from exiting the F-14 gun compartment and entering the port engine, the Naval Air Test Center Patuxent River, Md., has developed a screen which provides 100-percent coverage of the gun purge door opening when the gun is fired. Since 1981, seven foreign object damage (FOD) engine incidents have been attributed to gun-related material failures. Plans are being made to manufacture and install the FOD screen on fleet aircraft.



Who's on First?

Three CH-46 helos were en route, overwater at night, from one island air station to another. During the post takeoff join-up, number three was closing on number two with the leader some distance ahead. The Lead had reported he was maintaining 80 knots in a climb to 1,500 feet. Two and three increased airspeed to expedite the rendezvous. There were numerous lights evident from ships below as well as other aircraft in the sky.

Lead was level at 1,500 feet, 80 knots, when number three reported his altitude as 2,500 feet, and that Lead seemed to be level and ahead of him and number two. Lead's crew chief reported that two and three were passing above and to the right of Lead. Lead spotted his wingmen and commenced a climb to join them. At Lead's request, two and three turned on their searchlights to confirm their position. Two and three became confused when they realized Lead was behind them and that they had apparently been following another aircraft.

Lead told number two to take the lead and that he would join as dash-three. Number two declined because he had no TACAN and then passed through a layer of scattered clouds.

Lead lost sight of two and announced he had the lights of their destination island in sight, and that he was turning right and descending in order to stay VMC (visual meteorological conditions).

Lead requested that number three join him as dash-two and that number two become dash-three. Number three declined due to the darkness and high terrain in the vicinity. Lead then said the line-up would be number three as dash-one, Lead as dash-two and number two as dash-three. Number two acknowledged Lead's join-up call. Lead's copilot observed number two (who was to have been dash three) at Lead's nine o'clock high position.

Number two was apparently confused about who was leading whom but, when his crew chief spotted the two wingmen starboard, he advised the pilots who commenced a right turn. The crew chief turned on cabin lights in order to secure some equipment but was directed by the pilot to extinguish the lights. The crew chief did so, then sat down aft of the starboard gun mount and attached his gunner's belt. Shortly after this, there was a violent impact with the water. The *Sea Knight* had crashed. The

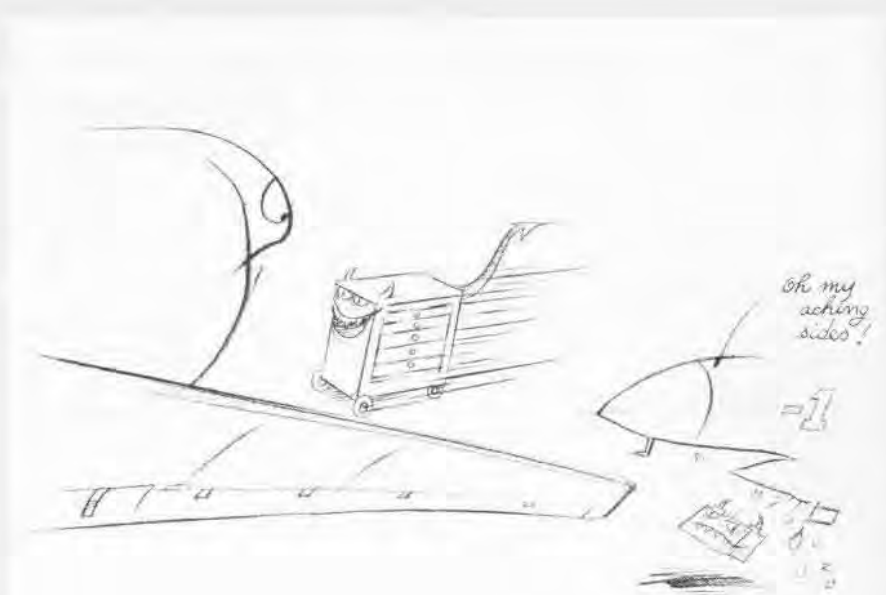


crew chief recalled being underwater before inflating his LPA and floating to the surface. The two pilots were not recovered.



Grampaw Pettibone says:

It's hard to hang the words "pilot error" on any mishap, especially when lives are lost and, true enough, we'll never know for certain why number two flew into the water. Nevertheless, the signs tell me these aviators got themselves disoriented. Sure, there were moving lights below and above. Sure, there was some question as to who and where the leader was. Sure, number two's pilots lacked recent night formation time. Sure, Lead's anti-collision lights weren't working properly. And sure, the aircraft were not equipped with the radar altimeter aural warning system. But there's an everlastin' truth that we who wear the Golden Wings have been taught and must remember: When your mind gets tangled up with distractions like those on this confusing and ultimately tragic night, untangle your mind, rid it of other thoughts, get on the gauges, and fly the aircraft. Above all, fly the aircraft!



Hold that Critter Down, Boys!

Two boobos for thought! Maintenance troops positioned a sizable, roll-around tool cabinet — two by three by four feet — adjacent to and inboard of a *Hawkeye's* port main mount, unchocked. A C-2 *Greyhound* parked next to the E-2 taxied out and flooded the *Hawkeye* with prop wash. The cabinet got under way and struck the fuselage near the LF antenna, causing a six-inch tear in the skin.

Elsewhere, a T-2C was flown on a CQ mission that included multiple passes, one arrestment and a single catapult shot. Fiberglass particles were seen coming from the nosewheel well. The pilot was diverted ashore and during landing rollout a battery fell through the nosewheel well onto the runway, creating FOD which damaged both engines to the tune of over \$40,000.



Grampaw Pettibone says:

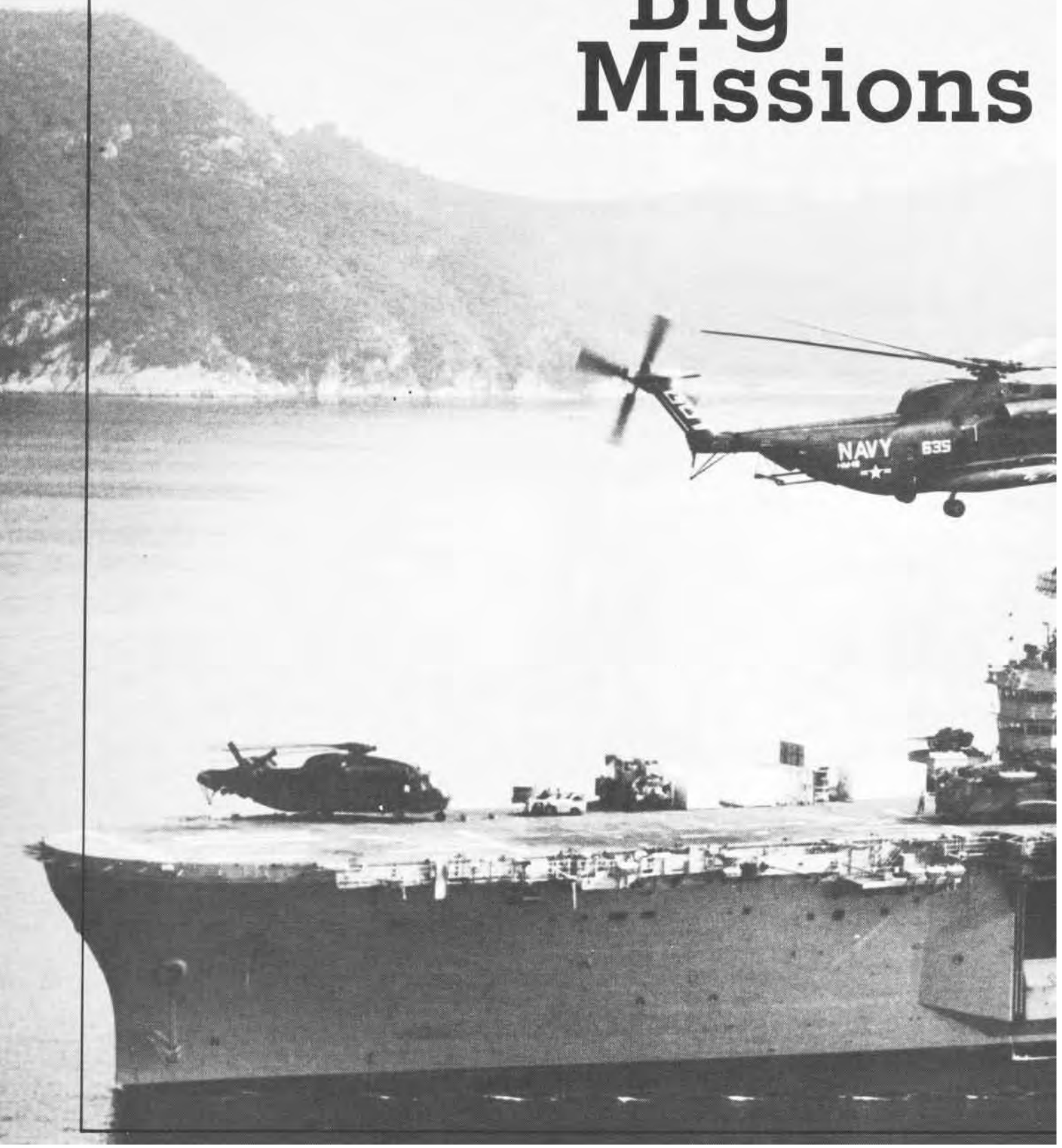
In blunder number one, somebody figured the nosewheel and strut would shield the cabinet, permitting it to remain in place. Tell that to the metal-smiths who had to mend the six-inch tear. Ladies and gents, chock or tie

down objects on the flight line. As sure as the sun sets in the west, you know that sooner or later it's gonna get windy out there. And wind, natural or man-made, makes things move.

The second boobo puts the wrong kind of acid in my battery! The sight of a Navy jet spewing stuff out of the nose on rollout ain't my idea of professionalism. Save that scene for bi-planes and movies like *It's a Mad Mad Mad World*.

A spare battery had been secured in the *Buckeye's* baggage compartment for a logistics flight to home base. Next day, however, the bird was needed for boat work and "pre-carrierized." (The report writer's word, not mine. It ain't in the dictionary but makes the point.) But maintenance forgot to "pre-carrier" the battery, that is, remove it. All that action on the flattop gave the power box a wall-to-wall workout until, like an angry animal, it broke through the bulkhead and spilt to the deck. Fortunately, the pilot was able to extend (but not retract) the nosewheel. I wonder how many batteries Uncle Sam could buy with \$40 grand.

Small Decks, Big Missions



When "aviation ship" is mentioned, the first thing that comes to mind is the super carrier, which is generally accepted as the pinnacle of the state of the art of Naval Aviation technology and the spearhead of our country's sea power. There is no argument that the big decks of the fleet deserve respect for their power and capabilities.

But there is another side to the story of aviation ships that should not be overlooked — the small decks — which are a major part of the Navy's amphibious warfare capability.

Today's amphibious warfare methods are variations of time-proven tactics which date back more than 2,000 years to Alexander the Great. Alexander found these tactics

useful when he invaded the northwest coast of India with an enormous task force of 140,000 men, 200 elephants and some 2,000 vessels; which included 800 armed sloops, 30 oared galleys, several hundred transports and a large number of barges for hauling catapults. Upon reaching the target, his troops charged the beach in waves while his catapults bombarded enemy concentrations ashore. The Indian troops were promptly defeated, allowing Alexander to establish a strategic stronghold and achieve his goal.

Since Alexander's day, amphibious warfare has adapted to changing times. It has been used, to some extent, in every war our country has been involved in, but has achieved its greatest glory over the past four decades in

New Orleans conducts minesweeping operations off the coast of Chinhae, Korea, with the aid of HM-16.



such operations as Normandy, Iwo Jima, Okinawa, Guadalcanal, Tarawa and Inchon.

Today this tactic is still an effective method of warfare and an important element of sea power.

While the methodology is essentially the same as that used by Alexander the Great, technology has changed the vehicles employed. Landing craft and artillery have been upgraded with strike aircraft, helicopters and multipurpose amphibious assault ships (LPHs/LHAs). The aviation ships are the most important elements.

Equipped to support operations with an impressive array of landing craft, helicopters (both logistic and attack) and AV-8 *Harriers*, there is nothing small about the capabilities of LHAs and LPHs. They give the Marine Corps and Navy amphibious force their greatest versatility in history.

Today the fleet has seven LPHs and five more modern and larger LHAs and both types are deployed constantly in most oceans around the world.

In the March-April 1983 issue of *NA News*, we gave a good deal of space to the fleet's super carriers and their commanding officers. The following is a rundown of the small decks of the fleet — which have a not-so-small mission — and the men who command them.



Captain Kent R. Siegel
C.O., Tarawa (LHA-1)
Home port: San Diego, Calif.

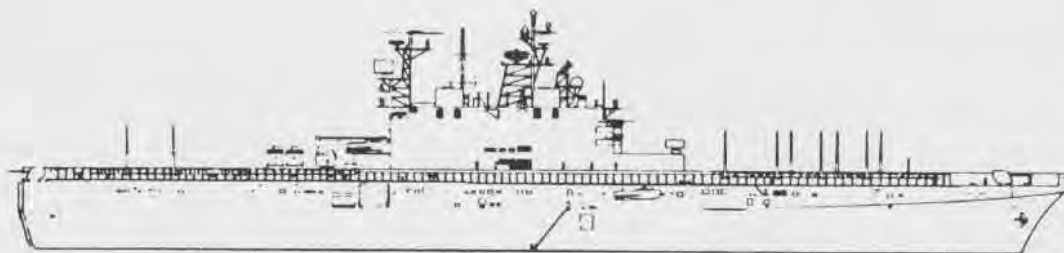
Born: Wausau, Wisc.

Sea Duty: *James E. Kyes* (DD-787); *Tringa* (ASR-16); *Thornback* (SS-418); *Segundo* (SS-398); *Valdor* (SS-490), X.O.; *Pickrel* (SS-524), C.O.; *Little Rock* (CG-4), X.O./C.O.; *Cleveland* (LPD-7), C.O.

Shore Duty: U.S. Naval Academy, instructor; Submarine Squadron Four, chief staff officer; Navy Recruiting Command; Director, Chief of Naval Operations Sea Power Presentation Program.

Training/Education: University of Wisconsin; Naval Postgraduate School; Royal College of Defense Studies.

Decorations: Meritorious Service Medal; Navy Commendation Medals (2); various theater and campaign ribbons.



Tarawa

	Tarawa	Saipan	Belleau Wood	Nassau	Pelelieu
	LHA-1	LHA-2	LHA-3	LHA-4	LHA-5
Length, Waterline	778'	778'	778'	778'	778'
Overall	820'	820'	820'	820'	820'
Beam	106'	106'	106'	106'	106'
Displacement (tons)	39,400	39,400	38,900	38,900	38,900
Propulsion	LHAs have two steam turbines, two boilers, and two shafts which produce 140,000 shp.				



Captain David M. Bennett
C.O., Saipan (LHA-2)
Home port: Norfolk, Va.

Born: Urbana, Ill.

Sea Duty: *Willard Keith* (DD-775), CIC and operations officer; *Notable* (MSO-460), X.O.; *Talbot County* (LST-1153), X.O.; *Joseph Strauss* (DDG-16), C.O.; *Mount Whitney* (LCC-20), C.O.

Shore Duty: Advisor to Vietnamese Navy in South Vietnam; NROTC Unit, University of Nebraska, navigation and operations officer; BuPers, Surface Junior Officer Assignment Section, head; CNO, head of Surface Warfare Plans and Policy Branch, Asst. Manpower and Training in the Planning and Programming Division; Chief of Naval Personnel and DCNO (Manpower, Personnel and Training), exec. asst.

Training/Education: University of Illinois; Officer Candidate School.

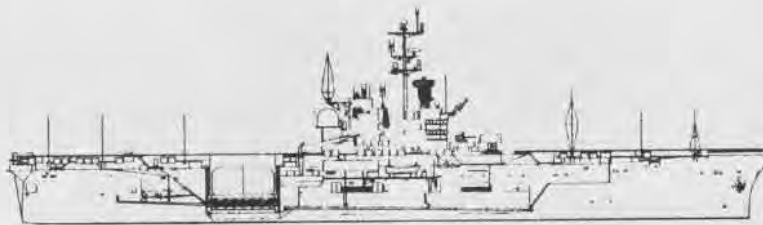
Decorations: Legion of Merit; Meritorious Service Medal (3); Air Medal; and Navy Commendation Medal with Combat "V" (2).



**Commodore-Selectee
Francis R. Donovan**
C.O., Belleau Wood (LHA-3)
Home port: San Diego, Calif.

Born: Arlington, Mass.

Sea Duty: *Timmerman* (EDD-828); *The Sullivans* (DD-537), antisubmarine officer, gunnery officer, operations officer, and navigator; *Salish* (ATA-187), C.O.; *Richard L. Page* (DEG-5), navigator/X.O.; *Claude V.*



Tripoli

[Line drawings with permission from Jane's Fighting Ships, 1982-83]

Iwo Jima	Okinawa	Guadalcanal	Guam	Tripoli	New Orleans	Inchon
LPH-2	LPH-3	LPH-7	LPH-9	LPH-10	LPH-11	LPH-12
556'	555'	556'	556'	556'	556'	556'
602'	598'	598'	598'	592'	592'	598'
84'	84'	84'	84'	84'	84'	84'
18,042	18,154	18,000	18,300	18,515	18,241	18,825

LPHs have one steam turbine, two boilers, and one shaft which produces 22,000 shp.

Ricketts (DDG-5), C.O.; *Meredith* (DD-890), C.O.; *Nashville* (LPD-13), C.O.

Shore Duty: Military planning supervisor on the faculty of the College of Naval Command and Staff; Bureau of Naval Personnel; U.S. Naval Academy, Duty Commandant of Midshipmen and Director of Professional Development.

Training/Education: U.S. Naval Academy; Naval Postgraduate School; Naval War College; University of Rhode Island.

Decorations: Meritorious Service Medal with one Gold Star; Navy Commendation Medal with one Gold Star; National Defense Service Medal with one Bronze Star; Armed Forces Expeditionary Medal.



Captain Ronald H. Jesberg
C.O., *Nassau* (LHA-4)
Home port: Norfolk, Va.

Born: Hastings-on-Hudson, N.Y.

Sea Duty: HU-4, detachment officer in charge; HS-3; HS-7, X.O./C.O.; *Guam* (LPH-9), air officer/C.O.

Shore Duty: Commander Naval Air Forces, Atlantic, helicopter class desk officer; HAL-3, officer in charge; Commander, Operational Test and Evaluation Force, LAMPS and SH-3H project officer; HSL-30, C.O.; DCNO (Air Warfare), head of antisubmarine aircraft requirements.

Training/Education: U.S. Naval Academy; Naval Postgraduate School; Armed Forces Staff College.

Decorations: Bronze Star; Meritorious Service Medal; Air Medal; Vietnamese Cross of Gallantry.



Captain Alvin R. Karn, Jr.
C.O., *Pelelieu* (LHA-5)
Home port: San Diego, Calif.

Born: Richmond, Ind.

Sea Duty: *Renshaw* (DDE-499), communications officer, gunnery officer, operations officer; *Reaper* (MSO-457), X.O./navigator; *Stark County* (LST-1134), C.O.; *Garcia* (DE-1040), X.O.; *Sumter* (LST-1181); *La Salle* (ADF-3), C.O.

Shore Duty: CinCPacFlt, admin. asst. for Asst. Chief of Staff; CinCLantFlt, operations briefer; U.S. Naval Academy, instructor; Commander, Amphibious Squadron Two, chief staff officer; CNO, Head, Surface Warfare Plans and Programs; Commander, Surface Squadron Four, chief of staff; Naval Amphibious School, C.O.

Training/Education: University of Idaho; U.S. Naval Postgraduate School.

Decorations: Meritorious Service Medal with Bronze Star; Navy Expeditionary Medal; Navy Unit Commenda-

Nassau



tion; Vietnam Service Medal with Bronze Star; Republic of Vietnam Campaign Medal; Sea Service Deployment Ribbon.



Captain Hugh A. Merrill
C.O., *Iwo Jima* (LPH-2)
Home port: Norfolk, Va.

Born: Los Angeles, Calif.

Sea Duty: VA-172; VA-56, weapons training/safety officer; *Roosevelt* (CVA-42), asst. strike operations/training officer; CVW-8, operations officer; VA-72, X.O./C.O.; *Independence* (CV-62), X.O.

Shore Duty: VA-44; VA-174, instructor; Office of Legislative Affairs.

Training/Education: Yale University; Naval Postgraduate School; Naval Aviation Cadet Program; Armed Forces Staff College.

Decorations: Distinguished Flying Cross; Air Medals (16); Navy Commendation Medals with Combat "V" (2); various unit, campaign and service medals.



Captain Roger L. Newman
C.O., *Okinawa* (LPH-3)
Home port: San Diego, Calif.

Born: Neptune, N.J.

Sea Duty: VAW-12; VA-42; VA-85; VAQ-137; VAQ-129, X.O.; VAQ-138, X.O./C.O.; *Midway* (CV-41), X.O.

Shore Duty: VT-1

Training/Education: Lafayette College; Naval Aviation Cadet Program; Naval Postgraduate School.

Decorations: Strike/Flight Air Medals (11); Navy Commendation Medal; President's Meritorious Service Medal; various campaign medals.



Captain Paul W. Parcells
C.O., Guadalcanal (LPH-7)
Home port: Norfolk, Va.

Born: Chicago, Ill.

Sea Duty: VS-38; VF-92, maintenance officer; VF-102, X.O./C.O.; *Forrestal* (CV-59), navigator/X.O.; *Nimitz* (CVN-68), X.O.

Shore Duty: VF-121, Naval Air Test Center, F-14 program manager/project test pilot; Aide to Chief of Naval Operations.

Training/Education: U.S. Naval Academy; Naval Postgraduate School; Naval Test Pilot School; Nuclear Propulsion Training.

Decorations: Meritorious Service Medal; Air Medals (5); Navy Expeditionary Medal; various service and campaign medals.



Captain John M. Quarterman
C.O., Guam (LPH-9)
Home port: Norfolk, Va.

Born: Brunswick, Ga.

Sea Duty: HS-3; ComCarDiv 14, flag lieutenant; HS-10; HC-1; HS-3, X.O./C.O.; *Guam* (LPH-9), air officer; HM-12, C.O.

Shore Duty: Naval Air Test Center; HAL-3.

Training/Education: Naval War College; Naval Air Test Pilot School; Industrial College of Armed Forces; U.S. Naval Academy; George Washington University (MPA).

Decorations: Silver Star; Distinguished Flying Cross; Bronze Star; Air Medal (31 strike awards); Navy Commendation Medal (2); Vietnamese Cross of Gallantry.



Captain Robert J. Spane
C.O., USS Tripoli (LPH-10)
Home port: San Diego, Calif.

Born: Ely, Nev.

Sea Duty: VA-66; VA-94; VA-81; VA-37, X.O./C.O.; *Enterprise* (CVN-65), X.O.

Shore Duty: Air Test and Evaluation Squadron Five, project officer; Naval Specialist to the Assistant Director of Air Warfare, Department of Defense Research and Engineering.

Training/Education: U.S. Naval Academy; Naval Postgraduate School.

Decorations: Air Medal (10); Navy Commendation Medal with two Gold Stars; Vietnam Service Medal; Meritorious Unit Commendation; Meritorious Service Medal.



Captain David W. Hoffman
C.O., New Orleans (LPH-11)
Home port: San Diego, Calif.

Born: Philadelphia, Pa.

Sea Duty: VF-96; VF-121; CVW-15; VF-142; VF-33; VF-41, C.O.; Commander, CVW-8.

Shore Duty: Flight instructor at NAS Kingsville; readiness officer on the staff of Commander, Fighter Wing One; Office of the Chief of Naval Operations.

Training/Education: U.S. Naval Academy; Naval Postgraduate School.

Decorations: Distinguished Flying Cross; Bronze Star with Gold Star in lieu of second award; Meritorious Service Medal; Air Medal (14 awards); Navy Commendation Medal; Purple Heart with Gold Star in lieu of second and third awards; and numerous campaign awards.



Inchon



Captain Jack W. Lovell
C.O., Inchon (LPH-12)
Home port: Norfolk, Va.

Born: Oklahoma City, Okla.

Sea Duty: VS-29; VF-31, maintenance officer; VF-96, X.O.; VF-161, C.O.; *John F. Kennedy* (CV-67), X.O.

Shore Duty: VT-21, flight instructor; Commander, Key West Force, aide/flag lieutenant; VF-101, flight instructor/department head; Fighter Wing One, chief of staff; CNO, head, Tactical Air Warfare Section.

Training/Education: U.S. Naval Academy.

Decorations: Meritorious Service Medal; Navy Commendation Medal; Navy Achievement Medal.

T-45TS Update

Bill Johnson

By Commander Howard A. Wheeler

The last time *NA News* did a story on it, it was called the VTXTS — the undergraduate jet flight training system — and that was more than a year and a half ago. It was about the Navy's program to phase out the aging T-2 *Buckeyes* and TA-4 *Skyhawks* from the Naval Air Training Command and introduce their single dual-purpose replacement, the carrier-capable variant of the highly successful British *Hawk* jet training aircraft. A lot has changed since then and it's time for an update.

The program is still on track and, not surprisingly, has gone through a few adjustments to stay in line with budget constraints and the needs of the Navy's jet flight training pipeline. One thing that has not changed is that the program will still be built around the venerable British *Hawk*.

The program is known now as the T-45TS — T-45 Training System. The two key points here are that the official U.S. Navy designation for the carrier-capable version of the *Hawk* is the T-45A and the entire package is called a "training system."

At this time, plans call for introducing the T-45 to the Naval Air Training Command in early 1991, according to Captain Paul Polski, the Naval Air Systems Command T-45TS Program Manager (PMA-273). A major step toward meeting that goal is the anticipated approval to begin negotiating a contract for full-scale development of the T-45TS. In short, RDT&E funds will be made available for the first flight of the T-45A aircraft in July 1988. If all stays on schedule, low-rate initial production deliveries will begin in 1991 and 1992. Full-rate production deliveries will start in 1993 and continue through fiscal year 1997.

Every one of the T-45As will be configured with tail hooks and launch bars to make them fully capable of supporting carrier qualifications.

But, there is much more to the T-45TS than just the aircraft. Mr. Jim Nehman, T-45TS Deputy Program



Above, the simplicity of the engineering of the British Aerospace Hawk is evident in the maintenance hangar of the RAF Four Flying Training School. Below, two RAF Hawk trainers begin a takeoff run during training last July.

Manager, is quick to point out that, for the first time, the Navy is purchasing an entire training package under a single contract. In addition to the *Hawk*, it includes state-of-the-art computer-aided instruction (CAI); instrument and operational flight trainers; formal academics; training integration system to streamline management of the training program; and contractor maintenance support of the system.

A close look at the training content of the package reveals that of the 450 hours of training the flight student will receive in the undergraduate jet phase, approximately one-third (160 hours) will be spent airborne. The remaining time will be divided between time in the classroom or in front of the CAI video screens (160 hours) learning systems and procedures; and in the simulators (130 hours) practicing instrument and cockpit procedures. The methodology of extensive ground training, reinforced by hands-on experience in the air, enhances safety and minimizes the time required to master the aircraft and its systems.

While all the major elements of the training package are still on the drawing board, so to speak, the basic aircraft has already proven itself. The British Aerospace *Hawk's* track record of performance, reliability and economy of operation is as impressive as the simplicity of its design. These

are the major reasons why it was chosen as the new undergraduate jet trainer. Capt. Polski is most impressed with its fuel-efficient and highly reliable Rolls-Royce Adour engine. He says that the British have enjoyed significant success with this engine and, with the modifications the Navy plans to make, its service life will be



Bill Johnson

dramatically increased and will further enhance its economy of operation.

The fact that the *Hawk* is not a new aircraft or a new design makes it a particularly appealing alternative to designing a new trainer from the ground up. The inherent economies associated with using a proven aircraft design should help to keep the T-45TS on schedule during the upgrade development phase and production before it is introduced to the Naval Air Training Command.

The *Hawk* is used by the Royal Air Force (RAF) as its advanced jet trainer. Fast, agile, simple in design and extremely reliable, it is mastered by every RAF flight student at the RAF No. Four Flying Training School (4FTS) at RAF Valley in Wales, which is near the port town of Holyhead on the island of Anglesey.

It is obvious from the comments of the RAF flight instructors that they are pleased with the *Hawk*. During a briefing last summer, Wing Commander Derek Lewis, the RAF Chief Instructor of the Four FTS at RAF Valley, pointed out that the FTS has been flying the *Hawk* for six and a half years. He said, "The *Hawk's* safety record is remarkable. We recently logged our 100,000th hour on it with only two accidents which were both

pilot attributable." The FTS provides the advanced flying training for all fast jet pilots of the RAF and the Royal Navy. A recent update confirmed that the FTS had flown more than 112,000 *Hawk* hours as of March 1984.

The *Hawk's* safety record in the United Kingdom is one measure of success but there is another even more meaningful. Wing Commander Lewis put it this way. "The technical reliability of the aircraft is phenomenal — about 97 percent. Out of every 100 sorties only three or four defect reports (yellow sheet gripes) are raised by the pilots."

As an example of the *Hawk's* impressive reliability, one FTS instructor recently logged his 1,400th hour in the aircraft and, during that time, had only four sorties canceled due to minor maintenance problems.

Flying an aircraft that has a good safety record and a reputation for low maintenance is fine but the *Hawk* has a third important virtue. According to Wing Commander Lewis, "After an entire training sortie of about an hour and fifteen minutes, there is still plenty of fuel remaining to divert, in the event of poor weather, to the most distant airfields in U.K." They routinely use all of England as their

training area with the exception of certain large cities.

It is noteworthy to mention that the RAF training program and use of the *Hawk* emphasize low-level combat tactics where speed, controllability and efficiency are vital elements of the mission. While transits to training sites may be done at 30,000 feet, they don't stay at that altitude very long. Almost all low-level training sorties take place at 250 feet AGL at 420 knots, usually over very rough and, at times, mountainous terrain. Said Wing Commander Lewis, "We want a pilot who is confident at low-level."

Low-level RAF advanced jet training proves daily that the *Hawk* performs well. Its stamina, agility and superior controllability also can be seen in the public performances of the nine-aircraft British *Red Arrows'* premier aerobatic flight demonstration team. Having flown the *Hawk* since 1980, their dazzling aerial displays can be greatly attributed to the capabilities of the *Hawks* as well as the expertise of the pilots at the controls.

The combination of a seasoned and proven aircraft and years of lessons learned that will go into the design of the T-45 Training System will contribute to continued improvements of the Navy's jet training pipeline. ■



JO2 Timothy J. Christmann

With its U.S. Navy Training Command paint job, this T-45A mockup was on display in the Pentagon's courtyard last April 10. Compared with the training system in use today, the T-45A will require 67 percent less fuel and 29 percent fewer flight hours.

THE HARRIER BATTLE PROVEN AND GETTING BETTER

By Helen Collins

Combining the vertical launch and hovering capabilities of a helicopter with the power, speed and striking force of a jet, the AV-8B *Harrier II*, the most recent improvement in the *Harrier*, is a truly unique military aircraft. It remains the only fixed-wing V/STOL aircraft in the free world today.

More than two decades have passed since the first flight of the British P.1127, the prototype of the *Harrier* strike fighter. Over the years, the single-engine, vectored thrust design has been continuously refined and several versions have evolved, with the design reaching its maturity in the *Harrier II* of today. An evolutionary approach to second generation V/STOL performance, it represents a new vertical/short takeoff lift capability.



AV-8B, U.S. Marine Corps' newest combat jet.

One of the lessons that came out of the Falklands fighting in 1982 concerned the use of V/STOL aircraft. The British *Harrier* was a star performer, operating routinely under conditions of low ceiling and poor visibility that could have grounded conventional attack aircraft. Adverse weather hardly affected their operations, and their ability to operate from a variety of aviation and non-aviation ships increased their time on station in the air and contributed to a high sortie rate. In the Falklands crisis, the *Harrier* proved itself in combat.

Over 1,500 flight hours of testing at NATC Patuxent River, Md., and Edwards Air Force Base, Calif., indicate that the AV-8B should enable the Marine Corps to realize its goal of a full V/STOL light attack force.

The first of 12 AV-8Bs to be delivered to the Marines in FY 1984 arrived at MCAS Cherry Point, N.C., on January 12, 1984. At the welcoming ceremony, Sanford McDonnell of McDonnell Douglas Corp., prime contractor, introduced the *Harrier II* as a "combat aircraft that can be stationed close to the combat zone, hide within the trees and brush just like a rifleman in a foxhole, and...pop up suddenly to deliver tremendous

firepower at the battlefield."

Lieutenant General John H. Miller, commanding general of the Fleet Marine Force, Atlantic, said, "The AV-8B is a long-awaited and very needed weapons system."

Twenty-one additional aircraft will follow the first 12 in 1984, bringing the total number at Cherry Point to 33 by October 1985, when the first AV-8B squadron is scheduled to become operational. Ultimately, the AV-8B will replace five squadrons of A-4 *Skyhawks* and three squadrons of AV-8A *Harriers*.

Production AV-8Bs will be built around the existing Rolls-Royce Pegasus 11 turbofan engine with modifications that boost performance, reliability and maintainability. It will incorporate all the improvements demonstrated on two prototype airframes (YAV-8Bs), as well as other improvements in the areas of cockpit design, weapons systems and avionics.

The first major design change is in the wing, which is a supercritical airfoil that reduces transonic drag, improves maneuvering performance and provides 75 percent more storage for fuel. It is made almost entirely of graphite epoxy materials which saves about 300 pounds in weight.

Extensive aerodynamic and systems changes have achieved accurate, first-pass weapons delivery; improved vertical and short takeoff and landing capability; and reduced pilot workload. The improvements have increased range by 50 percent and payload to more than 9,000 pounds, carried on seven external stations.

The stability augmentation system and attitude hold, designed to reduce the pilot workload during V/STOL operations, also incorporates a new computer control to maintain balance, greatly reducing oscillations which occur during aerial refueling. With increased ease in maneuvering, the pilot has more time to monitor airspeed, altitude, power setting and fuel quantity. The refueling probe is located well within the pilot's field of vision, making it easy to keep the probe, refueling hose and the tanker in sight during refueling.

Approximately 21,500 pounds of thrust is exhausted through four nozzles around the *Harrier II's* center of gravity. The nozzles can be rotated

to full-aft position for conventional flight, full-down for vertical operation, or to intermediate positions for short takeoffs and landings. The ability to rotate the engine exhaust nozzles also aids the pilot during in-flight maneuvering.

McDonnell Douglas installed the first AV-8B trainer simulator at Cherry Point last December. "It is the first time that a flight simulator has been put into operation at a Marine Corps air station before the production aircraft was delivered," stated Lieutenant Colonel Mark O'Connor, officer in charge of the AV-8B Fleet Introduction Team at Cherry Point. He feels that the pilot proficiency gained will have a significant positive effect on flight safety.

"The trainer is making our transition from the AV-8A to the B model much easier and faster," said Lieutenant Colonel Mike Ryan, VMAT-203 squadron skipper. "Because there are very few similarities between the two cockpits, it is even more important for us to train in the simulator before flying the AV-8B."

Other equipment will instruct pilots in various phases of AV-8B flight. An operational flight trainer will provide instruction in conventional and V/STOL flight, emergency and navigation procedures; and a weapons tactics trainer will sharpen skills in air-to-ground attack operations. These two trainers will be delivered in 1985 when the first AV-8B squadron be-



Maj. John Lizzo (USMC) seated in AV-8B trainer simulator.

comes operational. There will also be a full complement of maintenance trainers for various aircraft systems.

McDonnell Douglas has developed lightweight test equipment which will troubleshoot aircraft avionics nearly 20 times faster than earlier testers. A new expeditionary test set, composed of four testers, weighs only 450 pounds compared with 9,500 for earlier testers. The Marine Corps has ordered 14 of the sets for the AV-8B, the first to be delivered in the fall of 1985.

In a demonstration, a tester designed to check out cockpit displays took only seven minutes to evaluate and locate which of 800 operations in a cockpit display computer were malfunctioning. Other testers in the set are designed to troubleshoot aircraft control, armament and navigation avionics. The four units operate independently, whereas earlier equipment could handle only one type of

avionics at a time.

The portable units can be deployed near the battlefield where malfunctioning avionics can be quickly diagnosed, repaired and reinstalled in the aircraft. The key is the microprocessor, solid state technology that can pack more capability into lighter, smaller packages.

The first AV-8B *Harrier II* close air support squadron, VMA-331, is forming at MCAS Cherry Point, some time before becoming operational in the fall of 1985. As Marine Corps pilots learn how to fly the AV-8B, they will find themselves at the controls of the most advanced V/STOL jet in the world, vastly different from flying the AV-8A. The workload involved in flying the AV-8B in traffic patterns is reduced more than 50 percent and compares favorably with other modern conventional fighters. The *Harrier II's* high-lift configuration provides wing lift at low speeds, thus reducing the time spent flying on engine lift alone. Large amounts of wing lift are produced by the time 40 knots is reached, and therefore the transition from a heavy-weight vertical takeoff is much easier to accomplish.

Commandant of the Marine Corps General Paul X. Kelley says that the letter "A" is the most important letter in the AV-8B because it stands for attack. "It's not simply a word. For the Marines, it's a commitment and philosophy. . . ." The *Harrier's* ability to hit the enemy fast and hard is one of the reasons why it shares the Marines' commitment and philosophy. In short, it can be parked near the battlefield, be rearmed and refueled quickly, enabling it to fly more sorties and deliver more ordnance than conventional aircraft.

Colonel Harry Blot, USMC, AV-8B program manager, says that "the airplane is ideally suited for the Marine Corps close air support mission. V/STOL flying qualities have been improved to the point where pilot training requirements will now be similar to those required by other conventional light attack planes." ■

During the Falklands crisis, an RN 801 Squadron Sea Harrier launches from HMS *Invincible's* ski jump.

Photo courtesy of Cdr. N. Ward, RN.





Air-to-Air Helo Style

By Daniel Laskin

"If two forces field antitank helicopters, they're invariably going to encounter each other; and if they're both armed, not only are they going to try to shoot at each other's tanks, they're also going to shoot at each other's helicopters. Engagements are inevitable."

There you have the rationale, voiced by two pilots who have considered the evidence. The first is a Marine major, the second an Army warrant officer. Both are instructors at the Navy's Test Pilot School, at the Naval Air Test Center (NATC) in Patuxent River, Md. And both have been piloting helicopters in a unique and pioneering series of tests at Pax River, tests that are amassing large quantities of data for the first time on an unusual but critical scenario: air-to-air combat between helicopters or, as the tactics are officially called, evasive maneuvering (EVM).

Unusual, yes — but also inevitable, say the strategists. The evidence? It lies, quite simply, in what one of the test pilot instructors called "the realities." During the past 15 years, the helicopter mission has evolved beyond search and rescue, transport and observation. Today, the major powers field fleets of well-armed attack helicopters: the American AH-1 *HueyCobra* and, as of this year, the AH-64 *Apache*, the German PAH-1, the French SA 342 *Gazelle*, the British WG 13 *Lynx* and, hardly least in either numbers or armament, the

"Air-to-air is the fixed-wing realm. Helicopter pilots are taught not even to use the phrase air-to-air. But the helo attack pilot is keenly aware of the realities. He knows he might find himself one day in a hover hole waiting for a tank, and here comes a Soviet Hind, out to waste him."

Soviet Mi-24 *Hind*. They all serve primarily as tank killers but, in the event of war, they're bound to tangle with one another, even if only in chance encounters.

Helicopter fights are by nature quick and lethal. They usually take place at close range, within 1,000 meters, offering little chance to disengage. Often, the encounter will be over in less than 30 seconds. Superior weaponry can give one pilot the advantage. But, assuming comparable on-board armament, success will belong to the pilot who has the most agile helicopter and the most sharply honed air-to-air maneuvering skills, who is well equipped for EVM.

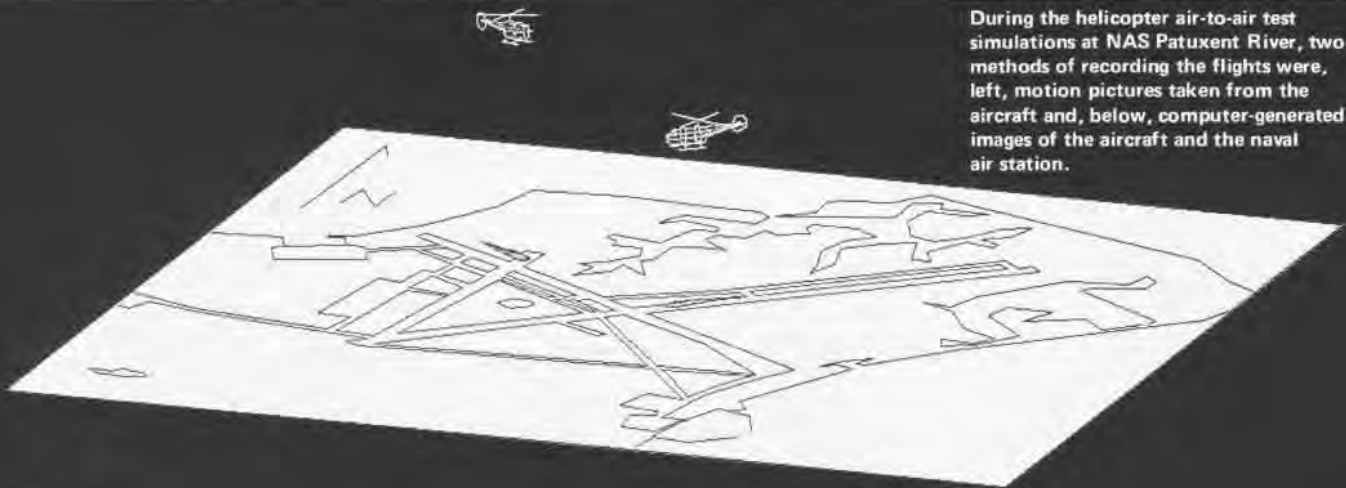
The concept has received increasing attention in recent years, primarily from the Marines and the Army. But while both services offer some pilot training in EVM, they've had no authoritative data documenting helicopter performance during these demanding combat maneuvers — no data that would tell them, for example, which airframes and rotor systems handle EVM most adeptly, or how a pilot might best use his aircraft's excess power to gain a decisive advan-

tage from a particular position. EVM so far has been an art, not a science.

Enter the Naval Air Test Center where the art of the aviator and the science of the engineer routinely merge in the form of meticulously planned, skillfully flown, closely monitored and exhaustively analyzed flight tests. In 1982, Test Pilot School professor Jim McCue assembled a small team to study power relationships and their effect on performance in helicopters. Before long, McCue, an enthusiastic man not given to halfway measures, was selling a much larger project: a thorough engineering investigation of EVM, based on data extracted from helicopters flying simulated air-to-air engagements.

McCue and his Pax River colleagues found keen interest in two organizations that were also pursuing helicopter air-to-air programs. One was Marine Aviation Weapons and Tactics Squadron One (MAWTS-1) in Yuma, Ariz. Established in 1978, MAWTS is a "top gun" training center for both fixed and rotary-wing pilots. Its curriculum includes EVM and its instructors are recognized as military experts in these tactics. In the Pax River plan, MAWTS officials saw an opportunity to supplement their pilot-centered knowledge of what works in EVM with hard data on helicopter flying qualities, performance and structural conditions, and so improve their training.

The idea also appealed to the Army's Applied Technology Laboratory (ATL) in Fort Eustis, Va., which had formulated an aerial testing pro-



During the helicopter air-to-air test simulations at NAS Patuxent River, two methods of recording the flights were, left, motion pictures taken from the aircraft and, below, computer-generated images of the aircraft and the naval air station.

gram for the Yuma Test Range. The laboratory studies and tests, for Army aviation, the most advanced concepts in helicopter technology, in rotor systems, composite airframes, flight controls and targeting systems. One of the lab's big projects is the development of design specifications for LHX, a light, versatile helicopter intended to meet Army needs starting in the 1990s. Planners want LHX to be an agile machine, capable of outmaneuvering enemy helicopters if engagements should occur. Mock combat involving instrumented helicopters — a test scenario made possible by NATC's excellent tracking and data collection facilities — would enable the Applied Technology Lab to study in detail the mechanics of EVM. The lab would use the flight test data to develop and verify mathematical models through computer pilot-in-the-loop simulation, in order to test new helicopter designs.

By April 1983, McCue and Duane Simon of ATL had organized the first series of flights, which involved an AH-1S *HueyCobra*, with an OH-58 *Kiowa* playing "bogey." McCue recruited Marine Major Jim Casler and Army Warrant Officer Les Scott, the two Test Pilot School helicopter instructors quoted at the beginning, to fly for the project. Two MAWTS instructors, Major Mike Kurth and Captain Lou Russo, came to Pax River to teach Casler and Scott EVM maneuvers, and fly with them during the tests. The Applied Technology Lab sent engineers to work with their counterparts from the Test Pilot

School and NATC's Rotary Wing Aircraft Test Directorate.

In preparing for the tests, a series of complex and formidable technological requirements had to be met. These included precise tracking of extremely agile, low-altitude aircraft; airborne motion-picture cameras to provide a film record of the flights from within the cockpits; other test instruments on the aircraft to measure flight conditions and performance. Every element had to work in coordination with all the others, for two aircraft, not just one, and in real time — that is, the data and displays would appear as the airborne action unfolded.

The flights took place at dawn before the Pax River airfield opened to other traffic, and the early hour heightened the atmosphere of tension and camaraderie.

Simple but rigidly prescribed maneuvers for each helicopter came first, accelerations, climbs, turns. Then came a series of controlled engagements like stylized airborne dances, in which various EVM tactics would be called for: high yo-yos, low yo-yos, scissors, pop-ups, wingovers. "Data on," the pilots calmly announced, launching into the routines, and just as calmly, "Data off."

Then a new bit of test pilot terminology made its debut at Pax River: not just "Data on" but "Tallyho, fight's on, data on" — followed, a long moment later, by the call "Knock it off, data off." These were the free engagements, the culmination and crucial point of every day of flying.

The helicopter pilots charged each other, wheeled and climbed, rolling, weaving, with an alertness that encompassed pedal and stick, readout and dial, and the veering adversary beyond the glass.

Meanwhile, in a corner room of the computer-jammed ground station, strip charts rolled past blue markers that quivered and jumped, tracing the fluctuations in bank angle, blade-flap angle, g-levels, torque and other flight parameters. Engineers hunched over the charts, peering intently at the emerging patterns, checking to see that safety limits weren't exceeded and passing on comments to McCue at the tracking station.

There, McCue and other engineers gazed at a large, dark electronic screen, where the new graphics display worked its wonders. Over a realistic map of the Pax River airfield, skeletal images of the two helicopters enacted the maneuvers, duplicating the motions of the real aircraft in the sky. Using a simple joystick, McCue could rotate the 3-D display — map and helicopters together — in any direction, changing his perspective on the battle to get the view he wanted. And he could display real-time data, too — pitch, roll, altitude, separation distance, etc.

In a sense, the flights at Pax River were even more rigorous than the EVM training exercises conducted at MAWTS, for the pilots had to constantly temper their competitive instincts by adhering to the limitations of the test situation. "Test flying in general is very exacting," Scott noted. "You have to meet very specific

Helicopter fights are by nature quick and lethal.

conditions and at the same time observe and collect data. To try to be very exacting and maintain all the limitations, while simultaneously maneuvering the aircraft as aggressively as EVM requires, was a full-time job.

"We had a 60-degree bank limit," he recalled. "If you're at 60 degrees and rolling, and you see that you can gain an advantage by continuing to roll, it can be very difficult to stop."

Nevertheless, not only did the pilots manage to preserve the delicate balance between combat aggressiveness and test-flight restraint, they also seemed to thrive on the experience.

In the July free engagements, each team was told to call out when it felt it had a clear shot at the adversary. And so "Fight's on, data on" was followed by only the briefest of silences and then, "Pipper — Pipper, pipper — Pipper, pipper, pipper."

Both McCue and Simon stress that these first EVM flights at Pax River were intended mainly to develop and refine a methodology. The engineers were not yet ready to begin drawing conclusions about the capabilities of particular helicopters or the success of particular tactics. Instead, realizing that they had embarked on brand new territory, they wanted to make sure that reliable tests could be designed for EVM. They wanted to emerge from the flights with proven techniques for airborne instrumentation, tracking, data processing and documentation — a process that would open the way for conclusive EVM testing and guarantee its quality.

They succeeded admirably, and then some. Not only did they develop a test methodology but, for the first time, they actually documented the EVM tactics taught at MAWTS, proving that these maneuvers are safe to perform (a fact that was not universally accepted before). They also gave MAWTS copies of the graphics displays, videotapes and airborne motion pictures produced during the flights, all valuable for training.

The Naval Air Test Center and the Applied Technology Lab have been

busy analyzing the data. NATC is working with NASA's Ames Research Center in California to develop specifications for flying qualities with EVM in mind. ATL will be using the data to create mathematical models of EVM, both for our own helicopters and (as best they can) for enemy helos. The models will be loaded into simulators to help train pilots, and will figure prominently in the research and development effort to design "the perfect LHX."

Before the models can be made, more flights are needed, involving still other helicopters. The next series of flights is already scheduled and will be sponsored again by the Army and contractors, with technical support at Pax River. Computer scientists at NATC have devised a number of new, more elaborate graphics displays for the next flights.

Meanwhile, the pilots at Pax River feel they've already learned a lot about EVM. They discovered, for example, that superior climbing and turning performance in a helicopter can give the pilot a decisive advantage. Casler and Scott of the Test Pilot School, after their first experience with EVM, believe that the maneuvering envelopes of helicopters may have to be

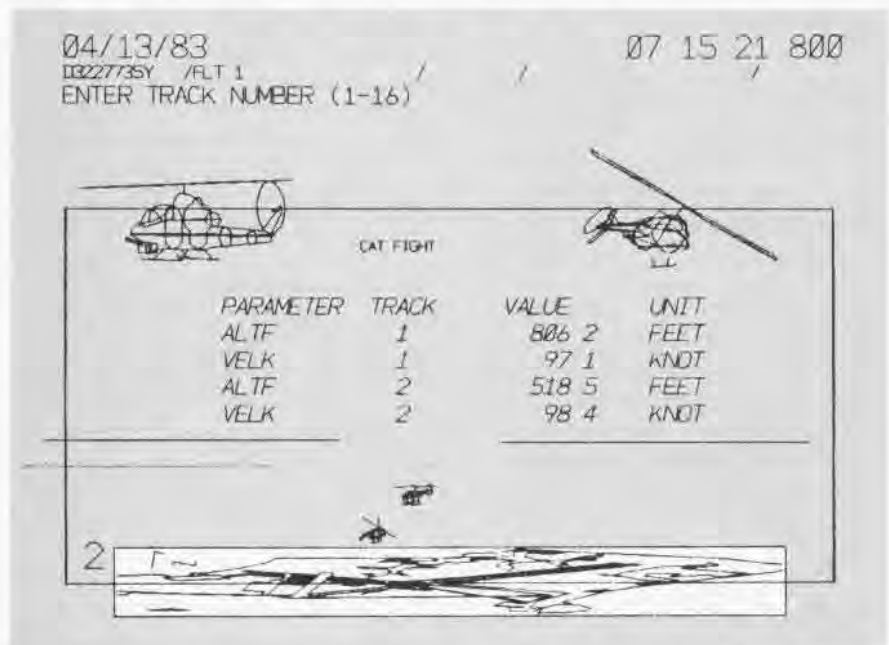
expanded. The 60-degree limit on bank angle was particularly limiting, they said. (On the other hand, the low altitude of EVM encounters would preclude the use of bank angles greater than 90 degrees.)

Airspeed seems to be less crucial. As Casler put it, "A very fast level-flight airspeed might allow you to choose when and where the engagement will occur. But once you're engaged, you're really committed until the fight's over. An airspeed advantage won't allow you to escape; it won't give you a decisive edge." In other words, the old helo pilot's rule of thumb that "speed is life" does not apply, without strong qualifications, to EVM.

Casler was also struck by the degree to which training and experience in EVM can make a difference. "The more experienced pilot flying a lesser aircraft is likely to more than hold his own against the less experienced pilot with a better aircraft," he said.

Clearly, the effort to improve EVM capabilities will have to advance on all fronts — the refinement of maneuvers, the training of pilots and the design of agile helicopters. The ongoing EVM work at Pax River will be crucial to this effort in the years ahead. ■

Computer-generated graphics is used to display three-dimensional views of the helicopters engaged in EVM over NAS Patuxent River.



Hall of Honor Gets Four More

To be inducted into the Naval Aviation Hall of Honor at the Naval Aviation Museum, in Pensacola, Fla., one must have "sustained superior performance in Naval Aviation; superior contributions in the technical or tactical development of Naval Aviation; unique and superior flight achievement in combat or non-combat flight operations"—or, more succinctly, imagination, courage, knowledge and immense dedication to this critically important field.

"One of the most impressive qualities about those in the Hall of Honor is that they were not afraid of change," said Vice Admiral Robert F. "Dutch" Schoultz, Deputy Chief of Naval Operations (Air Warfare), during one induction ceremony at NAS Pensacola. "I would go so far as to say they thrived on it. They realized the great potential of technology and the innovative capacity of our great nation. Like the family of man itself, Naval Aviation has survived and prospered because our predecessors learned to adapt to change. They had great confidence in their chosen profession, in themselves and in the future, and they readily accepted every challenge."

The Hall of Honor was dedicated on October 14, 1981. Since that time, 18 distinguished aviators have been recognized for their immense contributions to Naval Aviation. They were carefully chosen by a nine-man selection committee. Most of these 18 enshrinees are early Naval Aviators, but the list also includes two Marine Corps pilots, a Coast Guard aviator and three civilians.

A bronze plaque displayed in the Hall of Honor com-

memorates each of these men for their special contributions to Naval Aviation:

Vice Admiral P. N. L. Bellinger, USN
Warrant Machinist Floyd Bennett, USN
Rear Admiral Richard E. Byrd, Jr., USN
Lieutenant Commander G. de Courcelles Chevalier, USN
Lieutenant Colonel Alfred A. Cunningham, USMC
Glenn H. Curtiss
Commander Theodore G. Elyson, USN
Eugene B. Ely
General Roy S. Geiger, USMC
Glenn L. Martin
Admiral Marc A. Mitscher, USN
Rear Admiral William A. Moffett, USN
Admiral Arthur W. Radford, USN
Rear Admiral Albert C. Read, USN
Captain Holden C. Richardson, USN
Vice Admiral Charles E. Rosendahl, USN
Commander Elmer F. Stone, USCG
Admiral John H. Towers, USN

At ceremonies on May 4 at the Naval Aviation Museum, four additional names were inducted into the Hall of Honor: Captain Kenneth Whiting, USN; Leroy Randle Grumman; Vice Admiral James H. Flatley, Jr., USN; and Admiral John S. Thach, USN. All four are storied in the following eight pages. ■

Captain Kenneth Whiting



A Fighter for Naval Aviation

By JO2 Timothy J. Christmann

In April 1909, Ensign Kenneth Whiting, a pioneer Naval Aviator who began his career as a submariner, tried the impossible.

As skipper of the mini-submarine *Porpoise*, he ordered his crew to submerge to the bottom of Manila Bay during a training exercise. There, with the vessel resting in 30 feet of water, Whiting said he wanted to prove that in an emergency a man could leave a stricken submarine through its torpedo tubes and survive.

They were dumbfounded. Such a dangerous feat had never been carried out successfully. But Whiting assured them he could do it. After giving each man orders, Whiting stripped to his shorts, climbed inside one of *Porpoise's* torpedo tubes, and ordered his crew to close the door behind him. Reluctantly, they obeyed.

Minutes later, the torpedo tube filled with water, its exterior door opened, and Ensign Whiting disappeared into the bay. The crew, fearing for his life, quickly brought *Porpoise* to the surface. Once the sub broke water, several crewmen climbed out onto the deck and found Whiting floating on his back several yards away as though on a leisurely swim. In 77 seconds the daring and

ambitious young ensign had demonstrated in a very personal way that escape from a stricken submarine, at least from shallow depths, was possible. Thus he silenced any skeptics.

Whiting accomplished this without using high-pressure air, which would have propelled him into the water like a torpedo. He didn't use air pressure because such an attempt had ended in a fatality only a year or so earlier.

Within a week, stories about Whiting's exploits were rife throughout Manila. Soon articles appeared in local newspapers — most of them florid fiction about “the whistling explosion of compressed air which blew him into the embrace of the ocean.”

Despite press inaccuracies, he refused to talk to reporters and spoke very little about the affair. In fact, when signing the *Porpoise's* weekly log he wrote simply, “Whiting went out the torpedo tube as an experiment.” He was a modest man, one who, surprisingly, is remembered today more for his significant contributions to Naval Aviation rather than submarines.

Born in Stockbridge, Mass., on July 22, 1881, Ken Whiting's early Navy career involved service aboard six mini-submarines and three surface ships. But his interests lay heavily in

aviation. He was one of the few servicemen at the time who found aviation fascinating when most thought it ill-conceived.

Whiting was called a fool for going into something that people said wasn't going to amount to much. To promotion boards at the time, only cruisers and battleships had futures. But Whiting persevered.

In June 1914, under the tutelage of Orville Wright, he learned how to fly at the Wright Company in Dayton, Ohio. It was there his Naval Aviation career nearly ended before it began. One day, while he and Wright were on a training flight, the wing on their hydroplane broke off, causing them to fall into the Miami River. Both narrowly escaped drowning.

In September 1914, Whiting was designated “an actual flier of heavier-than-air craft,” and in November was assigned as officer in charge of the Naval Aeronautical Station in Pensacola, Fla., then the only naval air station in the U.S. It was here another well-known aviator and friend, Lieutenant G. deC. Chevalier, taught him how to fly Navy seaplanes. In April 1915, Whiting qualified as a Naval Air Pilot.

In March 1917, Whiting, as senior Naval Aviator aboard the armored cruiser *Seattle*, helped equip three cruisers with catapults as one of the Navy's early efforts to put “wings on warships.”

When WW I was imminent, Whiting was detached from *Seattle* and ordered to special duty in command of the First Aeronautical Detachment which consisted of 7 officers and 122 enlisted men. In June 1917, this detachment was the first U.S. military unit to arrive in France as a token of American assistance. Although only a lieutenant and with no specific orders from his superiors, Whiting developed a system of bases to be operated by naval air units for coastal patrols. He was instrumental in the establishment of one training and three coastal patrol stations, and set into motion an overseas base construction program that provided 27 locations in France from which U.S. Navy aircraft could operate. He also developed plans for U.S. participation in anti-submarine warfare.

On July 20, 1918, Whiting became C.O. of NAS Killingholme, England, and during the less than four months until the Armistice, 233 combat flights were made from this station, totaling 968 hours and 66,000 miles. Its planes convoyed thousands of ships.

After the war, he returned to the U.S. and was assigned to the Division of Naval Aviation and, later, the Planning Division in the Office of the Chief of Naval Operations.

Naval Aviation was in a period of transition following WW I because everyone had a different opinion as to the types of planes to be developed and how they were to be used. "Nobody had a definite say about the matter," said Whiting years later.

With his help, however, the Bureau of Aeronautics including what is now DCNO(Air Warfare) was established on August 10, 1921, and all these problems were subsequently remedied.

"We all got together and ironed out our differences within the bureau," said Whiting, who became head of the bureau's plans division. "We started out the best way we could."

For the next 14 years, Whiting was closely involved in the development of carriers, carrier equipment and their operational employment. Although he thought aircraft carriers at the time were vulnerable to attack, Whiting also felt they were crucial to America's defensive and offensive capabilities. "Carriers are very valuable for coast defense in that they carry the war into the enemy's territory and prevent him from bothering your coast. . . they have to be ready for operation and be right there when the admiral needs them," he said.

In January 1922, Whiting was assigned fitting-out duty aboard *Langley*, the Navy's first carrier. He was senior officer present afloat from March until June, then serving as X.O. until 1924. Later, he made the first catapult launch from *Langley*, flying the PT-1.

During this period, Whiting and his contemporaries had trouble convincing admirals of the complexity of the catapult and the amount of time needed to perfect and test it.

"There were many admirals who knew little or nothing about aviation and who expected new things like

catapults to be installed and immediately put to use without testing," he said in the 1920s.

Whiting had a lot to do with the early development of the catapult. One of his biggest achievements occurred in 1919 when he devised the "turntable" catapult which was later employed aboard cruisers and battleships.

Besides catapults, Whiting helped pioneer the development of flight deck procedures and concepts used in aircraft launch and recovery. One of his most important contributions happened almost by accident when Whiting, while aboard *Langley*, vigorously waved a hat in each hand above his head one day to indicate to an oncoming aircraft that its approach was too high. It was recognized at once that an observer on the flight deck could gauge a landing aircraft's position and speed better than its pilot could, particularly since the flight deck was blocked out in the final stages of the approach by the lower wing and engine. Afterwards, Whiting made sure he had a control officer on deck who would indicate to the pilot the angle at which he should descend to a light on the deck. Thus, the Landing Signal Officer (LSO) function was created.

Commander Whiting returned to duty in the Bureau of Aeronautics in 1924 and was put in charge of arresting gear development for carriers. During this period, he became famous for his testimony before the President's Aircraft Board, better known as the Morrow Board. It had been convened to investigate the best means of "developing and applying aircraft in national defense." One of the questions under investigation was a proposal that there be a single air force — which would strip the Navy of its air arm.

Whiting, the Navy's star witness, was strongly opposed to anything which would separate Naval Aviation from the Navy, and he spent many long hours testifying on Capitol Hill.

"I personally do not see how an independent air force can be of any use in the protection of the country unless you want to stay at home and let the enemy come to you and fight," he told congressmen during

a cross-examination. "It has got to fall back sometime for more gas and ammunition. And if you build up a large air force in this country it would be good for the protection of the coast so long as you assume you haven't a Navy. If we have aviation in our fleet, you don't have to worry about attacks on our coast by any enemy. The Navy is no good unless it has aviation with it."

After lengthy testimony from Whiting and many other Naval Aviators, the Morrow Board recommended against the creation of a separate air force, pointing out that Naval Aviation was an integral part of the Navy and should not be administered by non-naval officials.

Because Naval Aviators at that time felt there was prejudice against them in the areas of rank, training and career, Whiting presented (at the Morrow Board) a reorganization plan which eased their discontent. The plan, unofficially dubbed the Whiting Plan, called for aviation-bound officers to undergo flight training at Pensacola, Fla.; included specifications on how they would advance in rank; and attempted to keep them in aviation-related billets. The Navy adopted much of this plan and some of its basic precepts remain today.

Between 1930 and 1933, Whiting was C.O. of NAS Hampton Roads, Va., and the Naval War College in Newport, R.I. He became C.O. of *Langley* late in 1933. Following that tour, he reported to the Newport News Shipbuilding and Drydock Co. to help outfit *Ranger* and assist in development plans for *Yorktown* and *Enterprise*. In June 1934, he became C.O. of *Saratoga*. By this time, he had more than 1,000 flight hours.

Prior to WW II, Whiting commanded the Fleet Air Base and Patrol Wing Two at Pearl Harbor, Hawaii. During the war, he commanded NAS New York, N.Y., with additional duty as District Aviation Officer, Third Naval District.

On April 24, 1943, he died of meningitis at the Naval Medical Center, in Bethesda, Md. NAS Whiting Field, established July 1943, and the seaplane tender *Kenneth Whiting*, commissioned January 11, 1944, were named in his honor. ■

Leroy Grumman:



L-R, Leon Swirbul, Leroy Grumman and William Schwendler inspect the cockpit of a TBF-1 Avenger.

Grumman Aerospace Corporation

He Believed in a Solid Job

By JO2 Timothy J. Christmann

Leroy Randle Grumman, father of the *Wildcat*, *Hellcat* and *Avenger*, was an aviation pioneer whose innovative ideas helped America and her allies win WW II.

Born the son of a carriage maker in Huntington, N.Y., on January 4, 1895, "Roy" Grumman rose to become one of the founders of the Grumman Aircraft Engineering Corporation. On his way up, he spent many years testing, designing and constructing airplanes — an experience which later proved vitally important to the Navy.

Grumman worked his way through Cornell University and earned a B.S. in mechanical engineering in 1916. When WW I began, he joined the U.S. Naval Reserve as a machinist's mate second class. Spurred by a lifelong

desire to become a pilot, Grumman applied and was accepted for flight training at NAS Pensacola, Fla. In September 1918, he became Naval Aviator No. 1216 and was commissioned an ensign.

While a project engineer and test pilot at the Naval Aircraft Factory, Philadelphia, Pa., Grumman met Albert and Grover Loening, owners of the Loening Aeronautical Engineering Corporation in New York City. The brothers were impressed with Grumman's efficiency and concern in building amphibian planes for the Navy, so they asked him to join their firm. He accepted the offer and resigned his naval commission.

Grumman, who in time became general manager at Loening, built up invaluable experience designing and building both military and com-

mercial aircraft, mostly amphibians. Years later, this helped him to better anticipate the Navy's requirements, demonstrate his aircraft's design and capabilities and, in a small way, influence strategic planning. Also while at Loening, he became friends with Leon A. "Jake" Swirbul and Bill Schwendler, who helped him guide the future Grumman Corporation to its important place in today's aerospace industry. Swirbul later became the company's executive vice president and Schwendler vice president.

In 1929, corporation mergers forced the Loening plant to move to Bristol, Pa. Grumman, Swirbul and Schwendler didn't want to relocate, so they scraped together \$64,325 and formed the Grumman Aircraft Engineering Corporation on December 6. The company, based in Bethpage, Long Island, N.Y., opened for business in a rented, run-down garage less than a month later. It had 15 employees and prided itself on being able to repair any aircraft.

For several years the company barely survived. In fact, it started manufacturing truck bodies to supplement its scant profits.

Initially, the Navy had Grumman build floats for its Vought *Corsairs*. Subsequently, after some convincing, the soft-spoken company president sold the Navy a fighter plane with retractable landing gear.

Shaped like a huge teardrop, the XFF-1 flew 200 miles per hour, faster than any single-seat fighter the Navy owned. Impressed, the Navy bought 27 FF-1s and, later, 33 scout versions from Grumman, marking the beginning of a long association between the two.

Between 1936 and May 1939, Grumman delivered 162 production F3F fighters to the Navy. The F3F was the predecessor of the famous *Wildcat* fighter, the first of the cat family to be reckoned with in Europe and the Pacific.

At this time, the Grumman Corporation had more than 800 employees and was doing a business of almost \$4.5 million a year. Within a couple of years it mushroomed to more than 25,000 employees.

Delivery of the TBF-1 torpedo bomber to the U.S. Navy began in

January 1942, and it became a principal tactical offensive weapon. The plane was named *Avenger* and lived up to that title after the attack on Pearl Harbor. In one six-month period, it accounted for sinking 31 German U-boats, more than half of the total sunk by the Navy up to that time, and a larger number of Japanese ships and submarines.

In 1941, naval planners were continuing to develop the concept of folding aircraft wings to increase the number of planes capable of going aboard carriers.

One day, Grumman cocked his feet on his desk and stuck two paper clips in a gum eraser. He worked out a wing (later called the "sto-wing") that would rotate almost vertically while swinging aft and parallel bird-like along the fuselage of the F4F-4. Once folded, the Grumman wing required only slightly more room than an airplane without wings. In addition to increasing aircraft storage aboard carriers by more than 30 percent, Grumman's sto-wing proved to be reliable and safe. Almost immediately, company engineers begin installing the new wing on most of its carrier aircraft.

With its six .50-caliber machine guns, pilot-protecting armor plating and self-sealing fuel tanks, the rugged *Wildcat* could give as well as take an enormous amount of punishment. But, the less strongly built Japanese *Zero* fighter, which was faster, more maneuverable and could go farther, forced American pilots to double up and fight as teams rather than take it on one against one. Having less armor, the *Zero* could not sustain a direct blast of six .50-caliber machine guns, while the *Wildcat* most often was able to absorb the *Zero's* firepower comprising two 20mm cannon and two 7.7 machine guns. Nevertheless, the Navy wanted the *Zero's* advantages along with the *Wildcat's* ability to endure punishment.

Design for a *Wildcat* successor had been under way since before Pearl Harbor. Several months after the Battle of Midway, the Grumman F6F-3 *Hellcat* was delivered to the fleet. It was just what Naval Aviators wanted.

The *Hellcat* could go faster, climb

higher and maneuver better than the *Zero*. Besides mounting six .50-caliber machine guns, the *Hellcat* could lug two 1,000-pound bombs, whereas the *Wildcat* could only carry two 100-pound bombs. Moreover, its ordnance carriage was later adapted to deliver six five-inch rockets or one 2,150-pound torpedo.

The Japanese respected the *Hellcat* above all other planes. They had good reason to. Six months into 1944, Navy pilots flying the F6F shot down 444 enemy planes and destroyed another 323 on the ground at a cost of 71 of their own aircraft. In the Battle of the Marianas alone, which Navy pilots called the "turkey shoot," *Hellcats* shot down 360 Japanese planes in one day — the greatest aerial battle of the war. By VJ day, the *Hellcat* was credited with shooting down 5,155 enemy aircraft.

With Roy Grumman at the helm, his company delivered planes to the Navy and U.S. allies at low cost and in vast quantities, sometimes faster than the Navy could use them.

In 1942, the Navy needed additional *Wildcats* to support the Marine landings on Guadalcanal. Grumman responded by hitting a peak production rate of 15 airplanes a day, this over the regular rate of three a day. Production was stepped up so fast that by 1944 Grumman informed the Navy that output would soon reach 700 a month. The Navy couldn't handle so many, and asked him to cut back to 500. Months later, however, when the Navy increased its quota, Grumman shocked the industry by building 664 aircraft in 31 days.

Between 1940 and 1945, 31,376 planes of Grumman design were delivered to the Navy and U.S. allies. The sprawling Grumman complex at Bethpage, Long Island, and its manufacturing satellites hummed day and night to fill contracts. The task was herculean. But so was employee morale, partly because Grumman workers had the satisfaction of knowing their planes were in the fight over Wake, Midway, Guadalcanal, Iwo Jima, the Solomons, etc. In addition, an incentive wage plan, production bonuses and employee activities helped stimulate high production. So high, that it enabled Grumman to

slash many of its original contract prices. For example, in 1944, the price of the *Hellcat* was cut from \$50,000 to \$35,000, two-thirds the cost of a competitor's fighter. Needless to say, the Navy liked how Roy Grumman did business. His aircraft largely contributed to the destruction of 9,249 enemy planes in WW II.

Said Vice Admiral John S. McCain, then commander of Fast Carrier Task Force 38, "The name Grumman on a plane or part has the same meaning to the Navy as sterling does on silver."

Roy Grumman resigned as president of the well-established aircraft company in July 1946, after serving 17 years, but stayed on as chairman of the board.

In the late 1940s and the early 1950s, the corporation continued to build improved aircraft like the F8F *Bearcat*, F7F *Tigercat*, F9F *Panther*, F9F *Cougar*, and F11F *Tiger*. In the late 1950s, however, widening opportunities lured Grumman into another sphere of engineering — aerospace technology.

The Grumman Corporation helped in America's race to land a man on the moon by building the lunar module (LM), the last stage of the *Apollo* which descended onto the planet's surface. The LM was highly successful and rocketed the company into further aerospace systems development.

Roy Grumman retired as chairman of the board on May 16, 1966, having devoted the best years of his life to his corporation. In a very quiet way he gave it his greatest energy. He received many awards for single-mindedly directing the company toward the goal of design and production of quality naval aircraft, during one of America's most crucial periods — and also for establishing a major aerospace corporation. These awards included the Presidential Medal of Merit (the highest civilian award), Daniel Guggenheim Medal, Frank M. Hawks Memorial Award and the Hunsaker Medal.

In 1970, when he was asked what he had to say about his company on the celebration of its 40th anniversary, Grumman replied, "We tried to do a solid job."

He died October 4, 1982, after a long illness. He was 87. ■

Vice Admiral James H. Flatley, Jr.

WW II

Combat Ace



By JO2 Timothy J. Christmann

On August 30, 1943, the day before the attack on Japanese-held Marcus Island, Lieutenant Commander James H. Flatley, Jr., assembled his young, apprehensive group of pilots in the wardroom aboard the aircraft carrier *Yorktown*.

They were going into combat for the first time against the Japanese and Flatley, then commander of Air Group Five, could sense their nervousness. Still, the combat veteran wanted nothing short of a strong determined attack.

"You have the best equipment in the world," he told them. "Use it effectively. Make the Japs pay through the nose by placing every bullet and bomb where it will do the most good. We are the best air group on the best ship in the Navy. Let's prove it tomorrow."

At 0430 the next day, Air Group Five took off with 16 *Hellcats*, 11

Dauntlesses and 18 *Avengers*. They formed en masse behind Flatley's plane, a *Hellcat*, and commenced a fatal attack against the surprised Japanese militia on Marcus.

Flatley's pilots bombed and strafed the island's installations repeatedly — twice returning to *Yorktown* for more fuel, bombs and ammunition. By dusk, 85 percent of the vital enemy stronghold was destroyed.

For his "leadership, aggressive fighting spirit and valiant devotion to duty" which had contributed greatly to the success of the mission, Flatley was awarded his third Distinguished Flying Cross and was promoted to commander. By this time, he was also a well-known fighter pilot.

Born January 17, 1906, in Green Bay, Wisc., Flatley was appointed to the U.S. Naval Academy at age 19. As a midshipman he managed the football team and fought on the boxing squad. Classmates and teachers thought him a natural leader.

He earned his wings in April 1931, and until 1936 he flew with Fighter Squadrons 4, 5 and 6 aboard the carriers *Ranger*, *Lexington* and *Enterprise*, respectively. In 1939, he became a flight instructor at NAS Pensacola, Fla.

During the years leading up to WW II, Flatley was distressed at the lack of U.S. air readiness — especially in the face of the enormous military buildups in Germany and Japan. He felt sure that war was unavoidable, and knew the cost it would take in U.S. lives to achieve victory.

For weeks following the attack on Pearl Harbor, the Japanese military ruthlessly swept through the South Pacific, crushing all resistance.

U.S. industry tried to catch up in the production of war goods while training centers worked overtime to produce desperately needed pilots — aviators Flatley had argued for earlier. Military defeats mounted for the Allies on both fronts, and morale plummeted. Said Winston Churchill at the time, "The whole fate of Christian civilization hangs desperately upon the need for at least one single victory."

Lieutenant Commander James H. Flatley, Jr., took an important step toward achieving that victory.

On May 5, 1942, a long-range Japanese patrol plane was spotted spying on a carrier task force led by *Lexington*. Seconds later Flatley, flying nearby in a *Wildcat*, radioed that he also sighted the intruder.

"The next thing we knew, a ball of fire came down through the clouds and crashed in the sea," said Stanley Johnston, then a correspondent for the *Chicago Tribune*, who was aboard one of the ships. "Flatley had de-

livered the armed patrol plane for the whole fleet to see."

The action lifted the hearts of an anxious task force that was involved in the Battle of the Coral Sea, the war's first naval engagement.

Flatley later contributed so much to this campaign that Admiral Bill Halsey awarded him the Navy Cross. The citation detailed his exploits: "As leader of the fighting escort attacking an enemy Japanese carrier (*Shoho*) on May 7, Lt.Cdr. Flatley fearlessly engaged enemy fighters, destroyed one and helped destroy another with no losses to his escort group. That evening he led a seven-plane division in a fierce attack against enemy scouting planes and assisted in shooting down two aircraft. On May 8, he led a division of combat planes in a courageous attack against enemy aircraft attacking U.S. surface forces and destroyed an enemy fighter harassing U.S. anti-torpedo planes, assisting in the destruction of two others. . . ."

Flatley later described the destruction of the Japanese carrier *Shoho*, which he had helped to sink with 13 bombs and seven torpedoes: "I was sitting upstairs watching the bombs go down [on *Shoho*]. They began exploding at three to four-second intervals. Fire, flame and seawater flew hundreds of feet high. The 1,000-pound bombs smashed that carrier so badly, I got sick watching it. They literally tore that big ship apart. She burst into flames from bow to stern. I don't see how anyone could have survived."

Said Hampton Barnes, an intelligence officer who worked with Flatley, "Everything that followed only verified what we had learned at the start, that Flatley was a giant among men."

In 1942, Flatley commissioned and trained the *Grim Reapers* of VF-10, which became one of the war's most storied fighter squadrons. He trained them on the premise that if they were to be successful they had to have confidence in themselves, their airplanes and their fighter tactics. "If they had these, morale would follow," he said.

Flatley had five fundamental requirements for a successful squadron: leadership, sound training, morale, pilot efficiency and material efficiency.

"They are all closely bound together," he said. "Lack one and the rest will fall through. Stress each and they will all add up to the whole."

Flatley believed a fighter pilot must devote all his attention to "keeping fit and developing flying and shooting ability until he is a true professional." He defined a fighter pilot as a hunter who stalks his prey in the air and never lets the enemy get away "because," he remarked "the enemy who gets away today may shoot you or your comrades down tomorrow."

Flatley learned quickly all he could about the enemy and the enemy's equipment. Combat reports collected from scores of pilots gave him an accurate picture of Japanese fighter tactics. Tirelessly, he tested and retested new methods to combat the superior Japanese *Zero*. Before too long, he developed and enforced the most effective strategies.

The greatest of them was the "Thach Weave," which he helped his friend Lieutenant Commander John Thach (page 24) to perfect. This scissoring defense and counterattack maneuver enabled carrier fighters to destroy 14.3 enemy aircraft for every U.S. Navy plane lost.

Flatley made his *Grim Reapers* practice tactics like the Thach Weave until "they could fly them with their eyes closed." When it came time to fight, his squadron didn't disappoint him.

Deployed aboard *Enterprise*, the only carrier trying to hold the battered line in the South Pacific, VF-10 was constantly engaged in aerial combat against heavy odds. In campaigns in the Solomons, Santa Cruz, Espiritu Santo, Rennel Island and Guadalcanal, Flatley repeatedly led the *Reapers* against more heavily armed Japanese surface and air forces, destroying numerous enemy aircraft, combatant ships, transports and shore installations. For heroism in the face of massive anti-aircraft fire and enemy opposition, Flatley and his squadron

were awarded a presidential unit commendation.

"In all those dreary months of danger and anxiety, I never saw him angry, out of sorts, or guilty of bad judgment," a friend later remarked of Flatley.

After serving with Air Group Five aboard *Yorktown*, Commander Flatley became operations officer under Admiral Marc A. Mitscher, commander of America's carrier forces in the Eastern Pacific.

With more than 1,000 aircraft under his command Flatley, then an ace with 6.5 kills to his credit, planned and conducted the great air operations over Iwo Jima and Okinawa. His bombers also struck Tokyo, Kyushu and other targets deep inside Japan itself.

In 1945, Mitscher's flagship was crippled by kamikaze attacks. Flatley took command of operations, ferried the admiral and other flag officers across dangerous waters to another ship, and reestablished the continuity of the American attack amidst bitterly fought air engagements. For this act he was awarded the Legion of Merit.

Later, when the ship was hit by two more enemy aircraft, he led fire-fighting parties below decks to rescue personnel from smoke-filled compartments."

By the war's end, Captain Flatley was one of the Navy's most decorated fighter pilots.

After VJ day, he returned to the U.S. for staff duty. Between 1952 and 1956 he was C.O. of USS *Black Island*, NAS Norfolk, Va., and USS *Lake Champlain*, respectively. In 1957, as a rear admiral, Flatley was assigned to the Office of the Chief of Naval Operations as head of the Special Weapons Plans Branch, Strategic Plans Division, and later became Director, Air Warfare Division. The famous WW II fighter pilot advanced to the rank of vice admiral in June 1958. He died a month later at the U.S. Naval Hospital, Bethesda, Md. The guided missile frigate USS *Flatley*, commissioned June 20, 1981, was named in his memory. ■

Admiral John S. Thach



Tactics Genius

By JO2 Timothy J. Christmann

Months before the attack on Pearl Harbor, Lieutenant John "Jimmy" S. Thach saw an intelligence report out of China warning the U.S. about a new Japanese fighter plane that could outfly any U.S. aircraft.

The report claimed the airplane, called the Mitsubishi A6M Reisen *Zero*, could climb 3,000 feet a minute, go 311 miles per hour and fly 1,930 miles.

Many naval officers doubted anything could be that superior to the Navy's own F4F *Wildcat*. Lt. Thach, then C.O. of VF-3, thought differently. He knew Japan had been arming at an excessive rate, and did not discount the possibility of their building an airplane far superior to the *Wildcat*. His pilots disagreed. Thach told them, however, that even if the *Zero* was half as good as the China report described, it still outclassed the Navy's best carrier fighter.

Thach was concerned because (like many of his contemporaries) he thought war with Japan inevitable. He also knew that since the Navy had only seven fighter squadrons, VF-3 would be one of the first to fight. This impelled him to develop an air combat

maneuver that would overcome the *Zero's* many advantages.

Thach needed a basic plan, however, before practicing tactics in the air with his pilots. So, for hours each night, he set up formations of match sticks simulating *Wildcats* on his kitchen table. There he judiciously moved them around until, months later, he had what he thought was a winning strategy.

He explained the new tactic to his pilots, but they were skeptical. Nevertheless, Thach picked four of them to test the theory with him. Once airborne, he told Lieutenant Butch O'Hare (later the Navy's first WW II fighter ace) to act as an enemy *Zero* pilot. But before O'Hare attacked, Thach ordered him to fly full speed and the other pilots to fly half speed to simulate the difference between the *Zero* and the *Wildcat*. Everyone heeded his orders and O'Hare, thinking them easy prey, charged hungrily.

Thach and the other three pilots paired off. They flew far enough apart so that each time O'Hare got on one of their tails, they would turn sharply toward the other pair of *Wildcats* and cross practically head-on.

"This quick turn did two things," said Thach years later. "It threw off

O'Hare's aim and [because he would naturally follow the turning *Wildcats*] led him straight into the other pair of planes which were turned toward him."

Thach's tactic (later named the "Thach Weave" by his friend Lieutenant Commander James Flatley, Jr.) depended on good pilot marksmanship and the ability to tell when an enemy pilot had actually committed himself.

"Our weaving formations didn't need any radio communication because my pilots knew [after much practice] how to wait until the enemy was just about to open fire," he said. "Then and only then did they turn." If the enemy was able to continue the attack, the carrier fighters would simply continue weaving.

When Thach and his pilots landed, O'Hare ran over to him and said, "Skipper, it really works. Every time I started to make an attack on one of your half-speed planes, another would be around pointing his nose at me. I really think we have something." Thach agreed.

By this time, intelligence reports confirmed the *Zero* was as good as the initial reports had described. After Pearl Harbor, the combined Japanese fleet, with hundreds of aircraft, drove swiftly through the Pacific, compiling easy victories at Wake Island, Darwin, Ceylon, Malaysia and the Philippines. In these areas, the U.S. Pacific Fleet played cat and mouse with the Japanese navy — reluctant to commit its few carriers and air wings to full-scale combat with the numerically superior enemy forces.

Thach wrote the Commander Air Battle Force (Commander Naval Air Force, Pacific) recommending that fighter squadrons use his tactic. But they replied the plan was "too radical." This bothered Thach, yet it did not deter him from using the maneuver.

Within the first four months of hostilities, Thach was nominated for, and later received, the Navy Cross and Distinguished Service Medal for "thorough and comprehensive training of his pilots (VF-3) in brilliant combat tactics and excellent gunnery which enabled them to destroy 19 of 20 Japanese bombers that were attacking the aircraft carrier *Lexington* on

February 20, 1942." Thach was credited with shooting down one enemy bomber and assisting in the destruction of another. In addition, he was praised for making an essential contribution to the success of the air attack on Salamaua and Lae, New Guinea, on March 10, 1942.

Months later, in the Battle of the Coral Sea, Lt.Cdr. Flatley (who helped perfect the weave) used Thach's maneuver with great success and urged the Navy to make it standard operating procedure. Despite not having official blessing, the Thach Weave spread like wildfire throughout the fleet, because squadrons found it could defeat the dreaded *Zero*.

During the Battle of Midway, Thach led five *Wildcats* in support of 40 outdated TBD *Devastator* torpedo bombers en route to attack an advancing four-carrier Japanese task force. Although the battle ended as a tremendous victory for the greatly outnumbered American fleet and ended forever Japan's offensive prowess, this particular mission proved disastrous.

"We weren't even over the Japanese fleet when I looked up and saw about 20 *Zeros* curling down after us," Thach later recalled. "I didn't think any one of us would get out alive.

"The *Zeros* zipped right past us [the *Wildcats*] on all sides and burned the torpedo group right away." Thirty-four *Devastators* were shot down in minutes and only six were able to make it safely back to *Yorktown*. More than 60 pilots and gunners were killed, and not one torpedo had struck an enemy ship. "After burning the bombers, the *Zeros* began working on us," he added.

With enemy planes all around his *Wildcats*, Thach ordered his pilots to commence flying the weave. But, just as soon as they began the maneuver, one of his *Wildcats* was shot down.

"I thought to myself...this weave isn't working," said Thach. Minutes later, however, his *Wildcats* began shooting down the pursuing *Zeros*. They shot down so many that Thach stopped crossing Xs on a pad he kept bound to his leg for such purposes.

He received a Gold Star in lieu of a second Navy Cross for shooting down three *Zeros* and, later that day, for

leading an "effective attack against enemy torpedo planes which were attacking *Yorktown*." In this fight, Thach was credited with one kill. By war's end, he would earn the distinction "ace" for shooting down a total of seven enemy aircraft.

Following Midway, the Thach Weave became standard operating procedure and enabled carrier fighter planes to destroy 14.3 Japanese planes for every U.S. Navy plane shot down.

Said Admiral John S. McCain, then Commander Second Task Force, "The genius of the Thach Weave broke and defeated the air forces of Japan."

The defensive/offensive maneuver (later adopted by the U.S. Air Force, Royal Air Force and Russian Air Force) accomplished three important tasks: It equalized the *Zero*; gave U.S. manufacturers time to build a better fighter, namely the *Hellcat*; and, most important, it saved lives.

Although the Thach Weave began with using four aircraft, it was eventually used by as many as six or as few as two. In addition, the tactic wasn't limited to fighter aircraft only — bombers also employed this method.

"Never be caught by a *Zero* alone in a *Wildcat*," Thach constantly preached to his pilots. "With the advantage the *Zero* had over us, the Japanese pilot was bound to win unless the fool made a horrible mistake, which wasn't likely. The only way *Wildcats* could win was to fly in pairs and fight as a team."

As air operations officer under Admirals Marc A. Mitscher and John S. McCain, Thach developed a system of blanketing enemy airfields with continuous patrol and carrier-based fighters which prevented land-based planes from taking off, and systematically destroyed them on the ground. Under his skillful planning, the planes of Adm. McCain's Task Force 38 destroyed hundreds of enemy aircraft.

Also during this time, Thach directed air operations against enemy forces in Formosa, in October 1944, and developed anti-kamikaze tactics which successfully overcame that menace between Okinawa and Hokkaido. For these achievements he was awarded a Silver and Bronze Star, respectively.

In recognition of Thach's brilliant

work throughout the war, Admiral Bill Halsey invited him to witness the Japanese surrender ceremony aboard the battleship *Missouri* on September 2, 1945.

Born April 19, 1905, in Pine Bluff, Ark., Thach graduated from the Naval Academy in 1927. There he earned the nickname "Jimmy" owing to his resemblance to an older brother of that name who preceded him at Annapolis.

He entered the Navy wanting to work in cryptanalysis. But the opportunity for flight training came up and he took it. He graduated from flight school at NAS Pensacola, Fla., in January 1930, and in March that same year reported to VF-1.

By the end of 1940, Thach was C.O. of VF-3 and, under his leadership, the squadron produced some of the fleet's best sharpshooters. More than half of Thach's pilots earned the coveted "E" which was painted in traditional white with black shadowing on the sides of their peacetime aircraft. Until his retirement in 1967, Thach constantly stressed the importance of shooting proficiency.

In 1934, he was a test pilot of experimental aircraft at NAS Hampton Roads, Va., and flew rough-water tests of seaplanes and landplane-type aircraft. His most important assignment was flying the seaplane XP2H-1, which at the time was one of the largest planes ever constructed in the U.S. Thach flew it on a nonstop 25-hour test flight from Norfolk, Va., to the Panama Canal, January 15-16, 1935.

Following WW II, Thach commanded the carriers *Sicily* and *Franklin D. Roosevelt*, respectively, before commanding Carrier Division 16 in 1957. Before his retirement 10 years later, he commanded the Antisubmarine Defense Force Pacific and was Commander in Chief, U.S. Naval Forces in Europe.

A staunch supporter of the aircraft carrier, Thach warned that "as long as we have aircraft, we will need carriers because they enhance the value of aircraft by 10 times."

Thach died an admiral on April 15, 1981. The guided missile frigate USS *John S. Thach*, launched in 1982, was named in his honor. ■

1983 Year in Review



A VA-82 A-7 Corsair II flying over Nimitz. The Marauders were part of CVW-8 deployed aboard Nimitz during her 1983 Med cruise.

By Roy A. Grossnick, Naval Aviation Historian

Naval Aviation activities in 1983 were closely aligned with the international events that took place during the year and the application of American foreign policy.

This review deals primarily with three components of Naval Aviation. It highlights the deployments of the ASW land-based patrol community; the small deck carriers (LHA/LPH); and air wings aboard the large deck carriers (CV/CVN), all of which deploy overseas for extended periods with full complements of squadron aircraft and personnel. The narrative section of the 1983 Review does not cover operations conducted in home waters.

Limitations in space preclude an in-depth look at all of Naval Aviation's activities in 1983. Therefore, VR, HC, VO and HSL communities, which typically deploy only detachments overseas, will not be covered. These units, along with other elements of Naval Aviation not covered in the narrative, are nevertheless vital to the success of its overall mission.



The patrol community carried out its mission from six of the seven continents and from islands too numerous to list. Its primary mission is all-weather anti-submarine warfare, with additional duties of ocean surveillance, photoreconnaissance, search and rescue assistance and antiship warfare. Patrol squadrons usually deploy for extended periods to overseas stations in Okinawa, Japan, Guam, the Philippines, Diego Garcia, Bermuda, Iceland, the Azores, Spain and Sicily. From these overseas bases, they fly over vast areas of water, coordinating with fleet operations and requirements.

There are 26 active duty VP squadrons. Twenty-four deploy overseas on a regular basis, while the other two squadrons support fleet readiness training. During 1983, 22 patrol squadrons deployed for extended periods: VPs 1, 4, 5, 6, 8, 9, 10, 11, 16, 17, 19, 23, 24, 26, 40, 44, 45, 46,

48, 49, 50 and 56. These squadrons were involved in operations and exercises that ran the gamut from fleet operational exercises to the tracking of specific targets by individual aircraft. Various patrol squadron detachments were involved in special operations — providing maritime surveillance in Central America, in support of the amphibious assault on Grenada and drug interdiction operations. Other events were Operation *Unitas* in South and Central America and *Fleet Exercise 83-1* in the Northern Pacific.

A VP-10 detachment provided long-range patrol coverage during Operation *Unitas* from June through November, and operated with other U.S. forces and naval forces from Brazil, Venezuela, Netherlands, Antilles, Panama, Uruguay, Colombia, Ecuador, Peru and Chile.

In late March and early April, NS Adak, Alaska, hosted nine patrol squadron detachments, including one Canadian

Painting by R. G. Smith of patrol squadron aircraft deployed to Adak, Alaska, for Fleet Exercise 83-1 in March-April.



patrol squadron. These squadrons had gathered for *Fleet Exercise 83-1*, which also involved the *Enterprise*, *Midway* and *Coral Sea* battle groups, submarines and U.S. Air Force units. It was the largest operation in the Northern Pacific since WW II.

The small deck carriers were involved in extensive operations. The amphibious assault ships, the LHAs and LPHs, make up the second largest group of aviation ships that deploy with squadrons aboard. The CV/CVNs and the LHA/LPHs are the only two groups of aviation ships that carry a complete complement of squadron aircraft and personnel aboard when they deploy. In the fleet, 12 ships are designated LHA/LPH, compared to 14 large deck carriers with the designation CV/CVN. Nine of the 12 small deck carriers made major deployments to support U.S. foreign policy and/or in response to crisis situations around the world. Two other small deck carriers participated in special operations with international implications.

Two small deck carriers deployed to the North Atlantic in 1983. *Guam* (LPH-9), with HMM-365 aboard, participated in cold weather operations with NATO forces during her deployment to the North Atlantic from February 7 to April 18. *Guam* operated first in the rough wintry seas off Norway and then cruised to Spain in the spring.

With HM-16 embarked, *Inchon* (LPH-12) sailed for the North Atlantic on August 11, to participate with NATO forces in *Exercise MCM-83*. After more than two months of mine countermeasures operations, HM-16 and *Inchon* returned to the United States on October 21.

The most critical small deck carrier operations were in support of the U.S. contingent of the multinational peacekeeping force in Lebanon.

Before her North Atlantic cruise, *Inchon* was deployed off Lebanon with HMM-263 aboard at the start of 1983. She remained on station for the first two months and returned to the United States in early March after being relieved by *Guadalcanal* (LPH-7) and HMM-264.

Guadalcanal was cruising off the coast of Lebanon on March 20, when President Amin Gemayel visited the ship. He was given a briefing on the capabilities of the Navy's amphibious forces in the Med and a demonstration of helicopter assault operations. *Guadalcanal* continued her support of the multinational peacekeeping force until she was relieved in May, returning to the United States in June.

Iwo Jima (LPH-2) with HMM-162 aboard, relieved *Guadalcanal* and assumed support operations off the coast of Lebanon. *Iwo Jima* and HMM-162 experienced one of the most critical and intensive periods of operations for a small deck carrier in 1983.

It was during their deployment that the U.S. Marine compound was bombed by terrorists in October and 243 men were killed. The personnel of *Iwo Jima* and HMM-162 responded with all the assistance that was humanly possible. After several weeks of intensive operations following the October bombing, *Iwo Jima* was relieved and headed for home in mid-November.

Guam's deployment did not follow the usual route taken by small deck carriers en route to the Med. In October, *Guam* and HMM-261 were diverted to the southeastern part of the Caribbean to play an active role in the amphibious assault on Grenada. HMM-261 lost three pilots in combat



America, with CVW-1 embarked, deployed to the Med and Indian Ocean.

during the assault. One *Cobra* gunship from HMM-261 was destroyed and another sustained major damage from anti-aircraft fire. *Guam* also provided hospital facilities for injured personnel until the arrival of *Saipan* (LHA-2) in late October.

With the successful completion of the Grenada assault operations, *Guam* and HMM-261 headed east across the Atlantic in early November on their scheduled deployment. *Guam* relieved *Iwo Jima* and took up her duties in support of the multinational peacekeeping force in Lebanon. She continued her support of U.S. Marines stationed ashore as 1983 came to an end.

Small deck carrier operations that attracted world attention centered around Central America, one of 1983's crisis areas. In November, *Exercise Big Pine II* was held off the coast of Honduras, and *Nassau* (LHA-4) and *Guadalcanal* joined the amphibious assault forces engaged in the exercise. *Nassau* had HMM-264 deployed aboard and *Guadalcanal* carried VMA-513 with AV-8C (modified AV-8A) *Harriers*. The operation involved a combination of air, land and sea power, demonstrating American interest in this area of the world. On completion of the exercise, the units returned to Norfolk in the latter part of November.

West Coast small deck carriers also had an active deployment schedule. In January, *Belleau Wood* (LHA-3) with HMM-262 aboard was deployed in the Western Pacific. She was relieved by *New Orleans* (LPH-11) with HMM-265 aboard and returned to the United States in February. In May, *New Orleans* cruised in the Indian Ocean before returning home.

By the middle of 1983, *Tarawa* (LHA-1) and *Tripoli* (LPH-10) were operating with the Seventh Fleet in WestPac. HM-14 was aboard *Tripoli* from April through October when the small deck carrier returned to the United States.

In August, *Tarawa*, with HMM-165 and VMA-231 Det B aboard, entered the Indian Ocean to participate in *Operation Bright Star*, which involved amphibious assault training exercises in Somalia. In September, *Tarawa* transited the Suez Canal and operated off the coast of Lebanon, provid-

ing additional support for the multinational peacekeeping force. After a short period off Lebanon, *Tarawa* returned to the Indian Ocean, where she continued to operate until relieved by *Pelelieu* (LHA-5). *Tarawa* and her air units arrived home the latter part of November, completing a deployment that covered three major areas of the world.

Pelelieu departed the United States for WestPac on September 12 with HMM-262 embarked. In early October, *Pelelieu* inchooped to the Seventh Fleet and relieved *Tripoli*. From the Western Pacific, she continued on to the Indian Ocean, relieving *Tarawa* in the latter part of October. She remained on station in the Indian Ocean until the end of November. *Pelelieu* returned to the Western Pacific in December and at the end of 1983 was operating in the South China Sea.

Naval Aviation deployed 10 air wings/carriers during 1983, as follows:



The beginning of 1983 found Air Wing 11 and *Enterprise* (CVN-65) in the Indian Ocean. The air wing included squadrons HS-6, VS-37, VAQ-133, VAW-117, VA-95, VA-94, VA-22, VF-114 and VF-213. In February, *Enterprise* sailed to the South China Sea and operations in the Western Pacific, which were followed by preparations for the largest operation of ships and aircraft in the Northern Pacific since WW II. Three carrier battle groups participated: *Enterprise*, *Midway* and *Coral Sea*. The exercise involved a large number of other fleet units: VP elements from Barbers Point and Moffett Field, as well as Canadian and U.S. Air Force units. A real world scenario developed when Soviet units took an active interest in the operations. The exercise wound down in mid-April and *Enterprise* and CVW-11 headed for Alameda, arriving there on April 28.



Nimitz (CVN-68) and Air Wing 8 were deployed in the Mediterranean when 1983 began. Their operations in support of the U.S. Marines in Lebanon continued during most of their 1983 deployment. The embarked air wing squadrons were HS-9, VAW-135, VA-86, VA-35, VS-24, VA-82, VF-41, VF-84 and VAW-124. Besides the normal activities while on "bagel" station, *Nimitz* and her air wing took part in numerous exercises, including *National Week 83*, as well as operations off the coast of Libya. Completing a successful Med deployment, Air Wing 8 and *Nimitz* returned to Norfolk on May 20.



Air Wing 1 aboard *America* (CV-66) began 1983 deployed to the Mediterranean, with embarked squadrons VS-32, VA-72, VA-34, VAW-123, VA-46, VF-33, VF-102 and HS-11.

The first three weeks of 1983 were involved in the support of the multinational peacekeeping force in Lebanon. On January 31, *America* transited the Suez Canal and operated in the Indian Ocean for the next three months, participating in four major exercises. VAQ-136 joined the carrier in the Indian Ocean for operations from February 6 through April 22. *America* sailed back through the Suez Canal on May 4 to rejoin the Sixth Fleet briefly before heading for home. She arrived in Norfolk on June 2.



The newest addition to the carrier fleet, *Carl Vinson* (CVN-70), began an odyssey that epitomized Naval Aviation in 1983. With CVW-15 aboard, she began an around-the-world cruise on March 1, her maiden voyage. The carrier and her air wing, composed of VAW-114, VA-52, VA-105, VA-37, VAQ-134, VS-29, HS-4, VF-51 and VF-111, left Norfolk headed for the carrier's new home port of Alameda, Calif. After exercises in the Caribbean, the air wing conducted flight operations in the Med over the Gulf of Sidra and the Central Mediterranean.

Vinson then headed for the Indian Ocean, stopping briefly en route at Casablanca, Morocco and Abidjan, Ivory Coast. They conducted flight demonstrations in various countries during the cruise. In the Indian Ocean, the air wing's squadrons participated in Exercise *Bright Star*, testing American ability to deploy quickly in response to a Middle East crisis. The exercise also included elements of the U.S. Sixth Fleet, U.S. Air Force and military units from countries in the Middle East.

Vinson's operations in the Indian Ocean ranged from Somalia to Australia, and then continued on to the Orient. After a visit to Pusan, Korea, *Vinson* and Air Wing 15 sailed for home, arriving in Alameda on October 29, after steaming over 60,000 miles in the Atlantic, Mediterranean, Indian Ocean, South China Sea, Sea of Japan and the Pacific, and visiting four continents. The deployment was a display of U.S. Naval Air power and its ability to respond to crises in all parts of the globe.



Coral Sea (CV-43) also changed home ports but her odyssey was counterclockwise to that of *Carl Vinson*. *Coral Sea* began her around-the-world cruise from NAS Alameda to NAS Norfolk. Departing San Francisco on March 21, the carrier and Air Wing 14, after a brief stop in Hawaii, headed towards their first major exercise of the deployment. Air Wing squadrons VA-27, VAW-113, VA-196, VF-154, VF-21, VA-97 and HS-12 prepared for *Fleet Exercise 83-1* in the North Pacific. A significant portion of the exercise involved the engagement of *Coral Sea*, *Midway* and *Enterprise* battle groups, supported by a large VP contingent, against a force of submarines.

On completion of the exercise in mid-April, *Coral Sea* and her air wing sailed southwest toward operations with Japanese and Korean military units in the Sea of Japan. They continued on to the East China Sea, the Philippine Sea and South China Sea, and then made a transit through the Malacca Straits into the Indian Ocean where, in early June, they engaged in battle exercises with *Carl Vinson*. This meeting of the two carriers, each on her way around the world, brought together the newest carrier in the fleet and one of the oldest still operating. (*Midway* is the oldest operating fleet carrier and *Lexington* is the oldest in commission.)

On June 14, *Coral Sea* sailed through the Suez Canal and joined the Sixth Fleet. After two more months of operations, *Coral Sea* continued on to her new home port, making one more detour. The situation in Central America took *Coral Sea* and her air wing to the Caribbean to demonstrate American resolve in that area. *Coral Sea* remained for three weeks off the coast of Central America in a demonstration of air power and surveillance operations, including

those involving illegal drug traffic. *Coral Sea* finally arrived at her new home port of Norfolk on September 12. She and her air wing had taken part in three major exercises and had operated with four other carrier battle groups.



With Air Wing 7 on board, *Dwight D. Eisenhower* (CVN-69) departed Norfolk on April 27 for a Mediterranean cruise. The squadrons embarked were VAW-121, VF-142, VF-143, VA-65, VA-66, VA-12, HS-5, VS-31 and VAQ-132. The ship and her air wing took part in four major exercises during the cruise, as well as several carrier battle group exercises/encounters. Her presence offshore during the Lebanon crisis and the Libyan-Chad conflict demonstrated American air power. On December 2, *Eisenhower* returned to Norfolk, completing a seven-month deployment.



On July 15, Carrier Air Wing 9 deployed to the Western Pacific on board *Ranger* (CV-61). The tempo of operations for the *Ranger* battle group quickened almost immediately after departure. *Ranger* and CVW-9, consisting of VF-211, VAW-112, HS-8, VF-24, VA-192, VA-195, VA-165, VAQ-138 and VS-33, were temporarily diverted from their planned crossing of the Pacific and were ordered to waters off the coast of Central America, to coincide with the deployment of *Coral Sea* on the Atlantic side of Central America.

After almost three weeks off the Central American coast, *Ranger* sailed to Hawaii and then, on August 25, to the Western Pacific. Following brief operations in the South China Sea during September, *Ranger* headed for the Indian Ocean in early October. En route to operations in the Arabian Sea, Air Wing 9 conducted exercises with the British carrier HMS *Invincible* and her deployed AV-8 *Sea Harriers*. On November 1, in the North Arabian Sea, *Ranger* suffered a serious fire in her machinery spaces which resulted in the deaths of six personnel. *Ranger* remained on station and for the remainder of 1983 the carrier and her air wing continued operations in the North Arabian Sea.



In 1983, *John F. Kennedy* (CV-67) and Air Wing 3 were involved in two major cruises. On May 26, the ship departed Norfolk for exercises that took her to the North Atlantic and operations with NATO forces from Britain, Canada, France and the Netherlands. Squadrons in Air Wing 3 included VS-22, VA-75, VA-37, VF-11, VF-31, VAQ-138, VA-105, VAW-126 and HS-7. After an intensive at-sea period involving round-the-clock flight operations, *Kennedy* had a short period of liberty in Portsmouth, England, before heading back to Norfolk, arriving there June 30.

On September 27, *Kennedy* sailed for the Mediterranean on her second 1983 deployment with air wing squadrons VF-11, VF-31, VA-75, VA-85, HS-7, VS-22, VAW-126 and VAQ-137. After training operations in the Virginia Capes area, *Kennedy* headed for a goodwill visit to Brazil and bilateral training with Brazilian units. After a port visit to Rio de Janeiro on October 17, *Kennedy* sailed east. Arriving in the Med in the latter part of October, she continued on to operations off Lebanon.

On December 4, in retaliation for the Syrian attacks on VF-31's F-14 photoreconnaissance missions, *Kennedy* launched A-6 *Intruders* against Syrian antiaircraft positions in Lebanon. In a concerted effort with attack aircraft from

CVW-6 on *Independence*, the aircraft struck Syrian targets. The aircraft from CVW-3 and CVW-6 experienced heavy antiaircraft fire from surface-to-air missiles and antiaircraft guns. An A-6 *Intruder* from VA-85 on *Kennedy* was hit and the pilot, Lt. Mark A. Lange, and bombardier/navigator, Lt. Robert O. Goodman, were forced to eject over an area in Lebanon controlled by Syria. Lt. Lange died of injuries received during ejection and Lt. Goodman was made a POW, becoming the first POW in Naval Aviation since the end of the Vietnam conflict in 1973.

With the close of 1983, Air Wing 3 and *Kennedy* were on station off the coast of Lebanon continuing routine operations and maintaining vigilance.



On October 18, *Independence* (CV-62) with CVW-6 embarked departed for her scheduled Med deployment. Events moved quickly to make their cruise different from the normal routine of an Atlantic crossing and inchope to the Sixth Fleet. With the completion of carrier qualifications, the carrier received orders to the eastern part of the Caribbean. Air Wing 6 squadrons VA-87, VA-15, VF-32,

Kennedy, with CVW-1 aboard, deployed to the North Atlantic for operations with NATO, to South America for operations with Brazilian forces, and to the Med in support of the multinational peacekeeping forces in Lebanon.



VAW-122, VAQ-131, VF-14, VS-28, VA-176 and HS-15 began preparing for the support of military action in Grenada, which started on October 25. VF-32 was called upon to provide armed photoreconnaissance support for American ground troops. Air Wing 6's *Corsair IIs* from VA-15 and VA-87, and A-6 *Intruders* from VA-176 flew combat missions in close air support. After American forces gained control of the situation in Grenada, *Independence* departed for the Med in early November.

On November 11, *Independence* and her air wing joined the Sixth Fleet. By the middle of the month, she was operating with *Eisenhower* and *Kennedy* in the eastern Med. *Eisenhower* and her air wing were relieved by *Independence* and arrived in Norfolk on December 2.

Independence launched A-6 *Intruder* and A-7 *Corsair II* aircraft, for a coordinated attack with A-6s from *Kennedy*, against Syrian positions in Lebanon. The attack was led by Commander Edward Andrews, Commander of Air Wing 6. During the mission, the attacking aircraft were exposed to heavy antiaircraft fire, including surface-to-air missiles. Two of the 28 aircraft involved in the operation

JOC Kirby Harrison



VF-211 and its F-14 Tomcats deployed with CVW-9 aboard *Ranger* to the Western Pacific and Indian Ocean.

were lost due to the heavy fire. Cdr. Andrews' A-7 was hit by the intense antiaircraft fire and he was forced to eject after his plane became uncontrollable. He landed in the water, was rescued and was taken to Guam for medical attention. The second aircraft lost was *Kennedy's* A-6 *Intruder*. All other aircraft returned to the carriers. An A-7 from VA-15 received serious damage from a SAM but the pilot, Commander Les Kappel, was able to bring the aircraft back aboard *Independence*. With the conclusion of the December 4 strike, CVW-6 aboard *Independence* had been involved in two combat operations in two parts of the world in less than one and one-half months.

Independence and her air wing continued operations off the coast of Lebanon, making a brief port call at Haifa, Israel, during the Christmas holidays. As 1983 drew to a close, they were back on station.

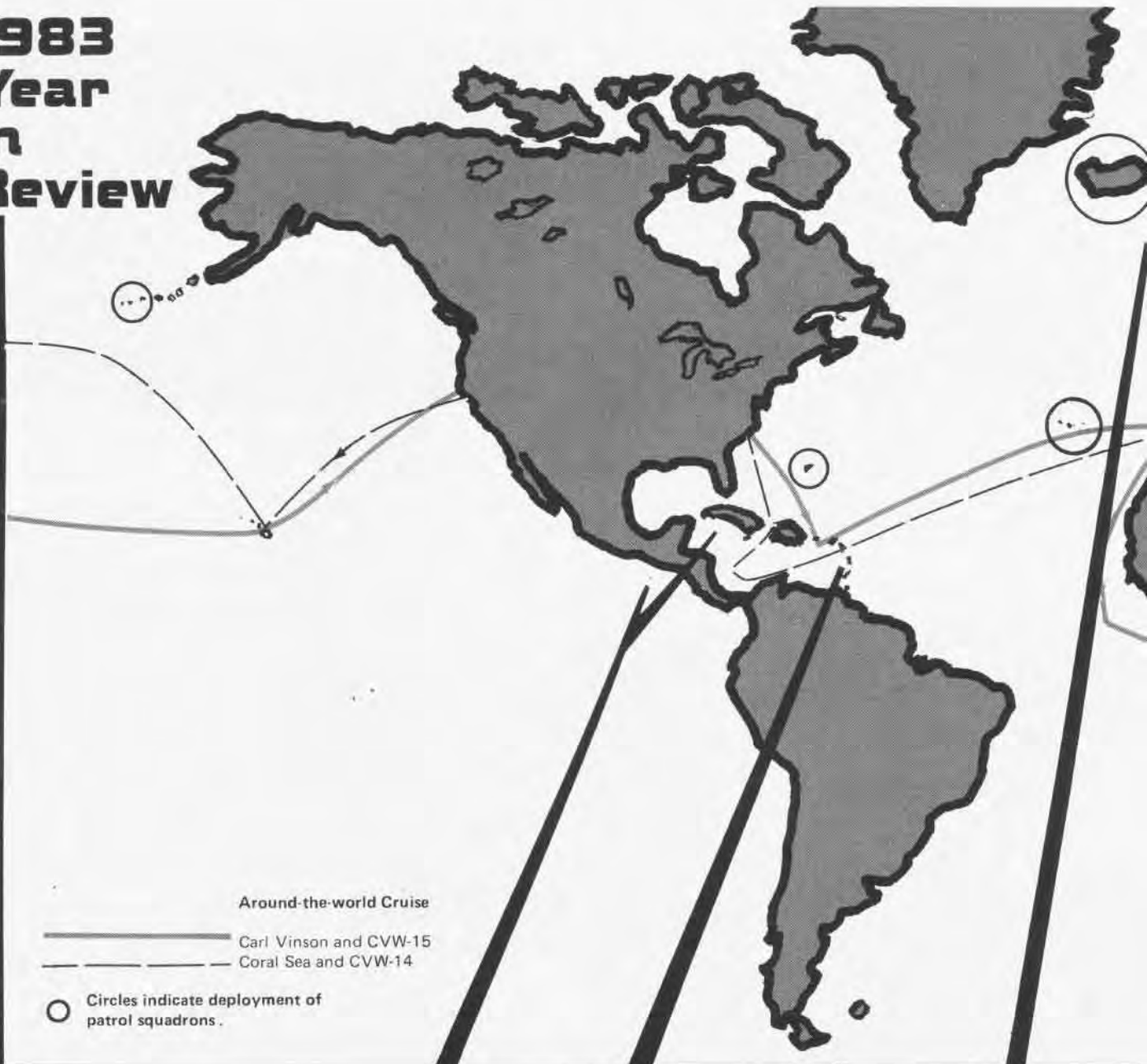


Midway (CV-41) and CVW-5 are the only carrier and air wing permanently based/deployed overseas. Their major area of operations is the Western Pacific with deployments to the Indian Ocean. Elements of CVW-5 that were forward deployed in 1983 include VAW-115, HC-1 Det 2, VF-161, VAQ-136, VA-56, VA-93, VA-115 and VF-151.

Midway and CVW-5 conducted local operations in the Western Pacific during the early part of 1983. In March, *Enterprise* joined *Midway* for Exercise *Team Spirit* in the Sea of Japan, followed by *Fleet Exercise 83-1* in the North Pacific. At the end of the exercise in the latter part of April, *Midway* and *Coral Sea*, with their air groups, headed south to the Sea of Japan for brief operations before entering port.

Midway conducted training operations in May and early June, and then cruised to the South China Sea for exercises there in the latter part of June. Operations continued during July with port calls to Subic Bay and Hong Kong, and then the ship and air wing returned to Japan in August. During October, routine operations were conducted in and around Japan, followed by another trip south to Subic Bay. This routine continued into December, followed by a return to the South China Sea in the latter part of the month to prepare for further operations in 1984. ■

1983 Year in Review



Carrier Units Operating off Central America

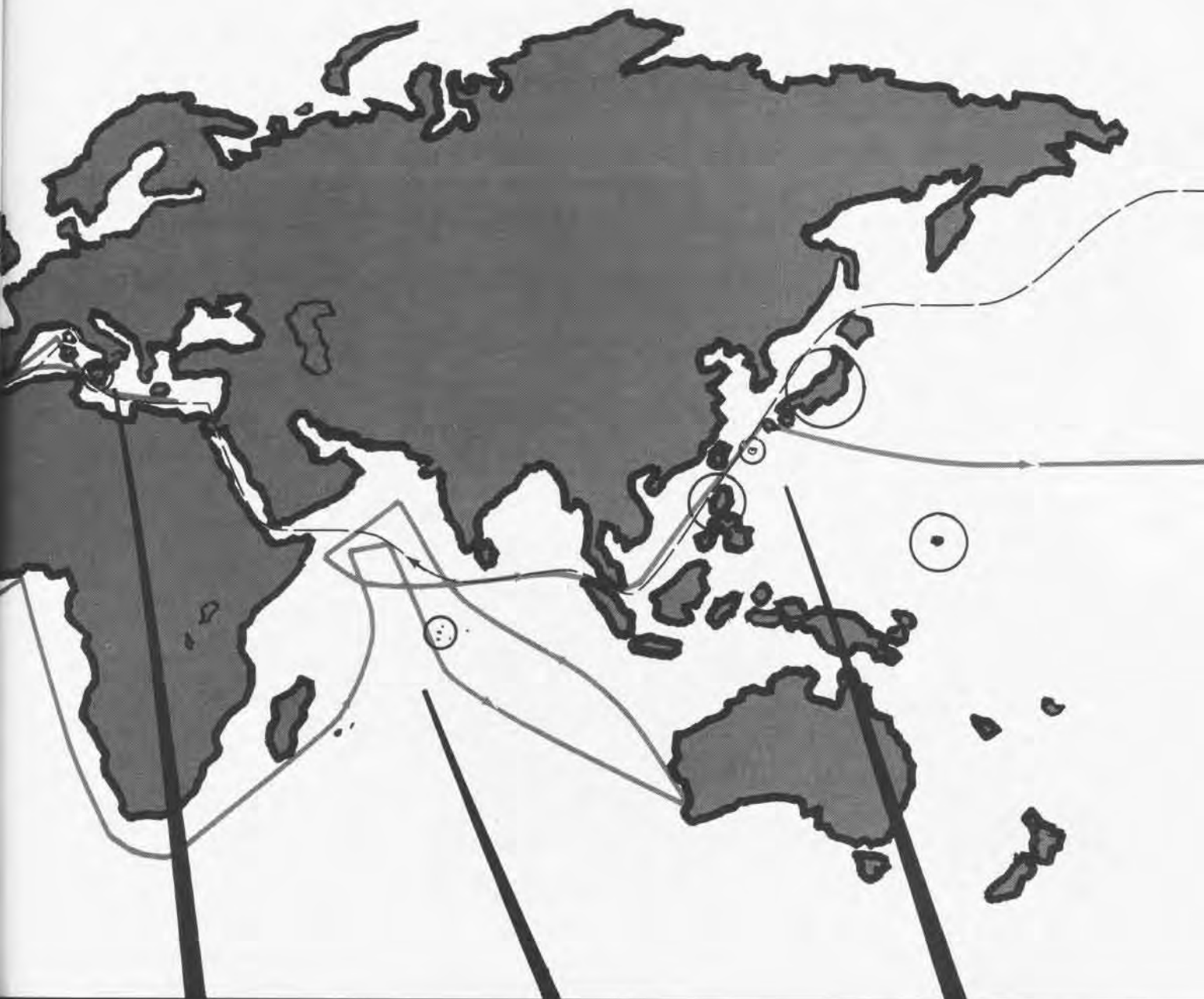
Ranger and CVW-9
Coral Sea and CVW-14
Nassau and HMM-264
Guadalcanal and VMA-513

Carrier Units Supporting the Grenada Operation

Guam and HMM-261
Saipan
Independence and CVW-6

Carrier Units Operating in the North Atlantic

Guam and HMM-365
Inchon and HM-16
John F. Kennedy and CVW-3



**Carrier Units Operating in the Medi-
terranean Sea**

Inchon and HMM-263
 Guadalcanal and HMM-264
 Iwo Jima and HMM-162
 Guam and HMM-261
 Tarawa and HMM-165,
 VMA-231 Det B
 Nimitz and CVW-8
 America and CVW-1
 Carl Vinson and CVW-15
 Coral Sea and CVW-14
 Dwight D. Eisenhower and CVW-7
 John F. Kennedy and CVW-3
 Independence and CVW-6

**Carrier Units Operating in the Indian
Ocean**

New Orleans and HMM-265
 Tarawa and HMM-165,
 VMA-231 Det B
 Pelelieu and HMM-262
 Enterprise and CVW-11
 America and CVW-1
 Carl Vinson and CVW-15
 Coral Sea and CVW-14
 Ranger and CVW-9

**Carrier Units Operating in the Western
Pacific**

Belleau Wood and HMM-262
 Tripoli and HM-14
 New Orleans and HMM-265
 Tarawa and HMM-165,
 VMA-231 Det B
 Pelelieu and HMM-262
 Enterprise and CVW-11
 Carl Vinson and CVW-15
 Coral Sea and CVW-14
 Ranger and CVW-9
 Midway and CVW-5

Other Highlights of the Year

JANUARY

7 The first F/A-18 *Hornets* entered operational service (excluding operational training squadrons) with the *Black Knights* of Marine Fighter Attack Squadron 314 (VMFA-314), replacing their F-4 *Phantom IIs*. This transition marks the beginning of the replacement of F-4 and A-7 aircraft with the *Hornet*.

21 HSL-41 was established with Cdr. Michael B. O'Connor, Jr., as the *Seahawks'* first commanding officer. They will be flying the new Sikorsky SH-60B *Seahawk* and, as the LAMPS MK III fleet readiness squadron, will train pilots, aircrew and maintenance personnel for SH-60B fleet squadrons.

MARCH

1 Tactical Electronic Warfare Squadron 34 (VAQ-34) was established with Cdr. John Millward as its first commanding officer. The squadron will provide tactical electronic warfare training to Pacific Fleet units. VAQ-34 is the West Coast counterpart of VAQ-33 at NAS Key West.

11 The first fleet CH-53E *Super Stallion* was delivered to the Helicopter Mine Countermeasures Squadron 12 (HM-12) *Sea Dragons*. The CH-53E can transport heavier loads over longer distances than previous helicopters used for logistics in the fleet. Modifications include the addition of a third engine, a larger main rotor system and changes to the tail rotor. These changes will allow the CH-53E to carry three times the payload of its predecessor the RH-53D.

21 Carrier aviation experienced another first when an all-female flight crew from VRC-30, the *Truckin' Traders*, conducted an operational mission in a C-1A *Trader* that terminated in a carrier arrested landing aboard *Ranger* (CV-61). The aircraft was commanded by Lt. Elizabeth Toedt and the crew included Ltjg. Cheryl Martin, AD3 Gina Greterman and ADAN Robin Banks.

25 Fighter Attack Squadrons were redesignated Strike Fighter Squadrons (VFA). They will be flying the F/A-18 *Hornet*.

29 Attack Squadron 113, the *Stingers*, was redesignated Strike Fighter Squadron 113 (VFA-113) and began preparations to transition to the F/A-18 *Hornet* from the A-7 *Corsair II*.

APRIL

1 Naval Air Reserve Units (NARUs) were redesignated Naval Air Reserve (NAR): NAR Alameda, NAR Jacksonville, NAR Memphis, NAR Norfolk, NAR Whidbey

Island, NAR Point Mugu and NAR North Island.

7 VF-201 and 202, Naval Reserve fighter squadrons, participated in *National Week '83* exercises. This was the first time that tactical air reserve units had conducted joint operations with the Sixth Fleet. The two squadrons with their F-4N *Phantom IIs* deployed from NAS Dallas to NAS Sigonella via NAS Oceana; Gander, Newfoundland; Lajes, Azores; and Rota, Spain.

MAY

1 RVAW-110 and 120 were redesignated VAW-110 and 120. Responsible for training personnel in early warning services for future assignment to fleet units, the VAW-110 *Greyhawks* are based at Norfolk and the VAW-120 *Firebirds* at Miramar.

2 Lt. Leslie Provo, a Naval Aviator assigned to VRC-40, the "Codfish Airlines," became the first woman to be designated a Landing Signal Officer.

6 Helicopter Combat Support Squadron 4 (HC-4) was established, permanently based at NAS Sigonella, Sicily, and flying the CH-53E *Super Stallion*. Its mission is to provide vertical onboard delivery (VOD) for the Sixth Fleet. Cdr. Ronald A. McDaniel is the squadron C.O.

11 Two new galleries/exhibits were opened at the Naval Aviation Museum, Pensacola. One exhibit traces the evolution of Coast Guard Aviation from its pioneer days to its present position as an integral part of Coast Guard operations. The other exhibit traces the development of lighter-than-air (LTA) from the Navy's first involvement to the end of the LTA program in the Navy in the 1960s.

12 Six leaders in aviation were enshrined in the Hall of Honor at the Naval Aviation Museum, Pensacola. The six new inductees were Marine Corps Gen. Roy M. Geiger, Glenn L. Martin, Adm. Marc A. Mitscher, Adm. Arthur W. Radford, VAdm. Charles E. Rosendahl and Cdr. Elmer F. Stone, USCG. This brings the total number of enshrinees to eighteen.

23 The Navy's EX-50 Advanced Lightweight Torpedo made its first launch from a tactical aircraft, the S-3A *Viking*, at NATC Patuxent River.

JUNE

10 Lt. Colleen Nevius became the first woman Naval Aviator to graduate from the U.S. Naval Test Pilot School at Patuxent River and be designated a Navy Test Pilot.

16 The guided missile frigate *Crommelin* (FFG-37) was commissioned at Todd Shipyard, Seattle, Wash. The ship is named in honor of three brothers, all graduates of the Naval Academy, who received citations for their heroic service during WW II. Two, Richard G. and Charles L., were Naval Aviators.

23 The British-built airship, *Skyship 500*, arrived at NATC Patuxent River for test and evaluation. The Navy and Coast Guard are interested in the airship for possible maritime patrol, search and rescue and geo-survey missions.

HSL-33 Det 9 deployed with *New Jersey* (BB-62), becoming the first aviation unit to deploy aboard a battleship since the mid-1950s.

JULY

1 A new alignment of the Naval Air Systems Command headquarters (NavAir) was implemented, in which the position of Deputy Commander was established, headed by a civilian, Dr. A. J. DiMascio. The realignment was designed to provide a corporate management perspective enabling NavAir to operate more efficiently.

1 Attack Squadron 25 (VA-25), the *Fist of the Fleet*, was redesignated Strike Fighter Squadron 25 (VFA-25), in preparation for its transition from the A-7 *Corsair II* to the F/A-18 *Hornet*. (Its first *Hornet* was subsequently received on November 11, 1983.)

1 Tactical Electronic Warfare Squadron 139 (VAQ-139) was established. The *Cougars* fly the EA-6B and are homeported at NAS Whidbey Island.

6 A Marine Corps CH-53E *Super Stallion* flew coast to coast in a 15-hour flight from Patuxent River, Md., to MCAS Tustin, Calif., refueled four times by a Marine Corps KC-130 *Hercules*.

23 The U.S. Navy's only ace during WW I, David S. Ingalls, was enshrined in the National Aviation Hall of Fame in Dayton, Ohio. Mr. Ingalls was honored for his service in WW I, in WW II in the Naval Air Transport Service (NATS) and his postwar role in commercial aviation.

AUGUST

1 VAdm. James B. Busey IV relieved VAdm. Ernest R. Seymour as Commander, Naval Air Systems Command. VAdm. Busey is the eighth commander of NavAir.

1 A Marine Corps OV-10A *Bronco* landed on *Nassau's* (LHA-4) flight deck, the first time a *Bronco* had ever landed on an LHA. The recovery on *Nassau* opens up the possibility of a future role for the OV-10A in amphibious operations.



The first F/A-18 received by VFA-25, the second Navy operational fleet squadron to receive the Hornet.

11 The White House announced the names of the Navy's next two nuclear-powered aircraft carriers, under construction at Newport News Shipbuilding and Dry Dock Co. *Abraham Lincoln* (CVN-72) is scheduled for delivery in 1989 and *George Washington* (CVN-73) in late 1991.

25 The Navy Department accepted the production prototype of the P-3C Update III *Orion*. The aircraft was flown to NATC Patuxent River for test and evaluation by VX-1. It is expected to be twice as effective in submarine detection as the Update II since it will provide increased effectiveness in the acoustic processing system.

29 The first flight of the AV-8B *Harrier II* production model was conducted at the McDonnell Douglas plant in St. Louis.

30 Lt. Cdr. Dale A. Gardner was a space shuttle crew member aboard the space shuttle *Challenger*, becoming the first Naval Flight Officer (NFO) in space.

SEPTEMBER

1 The MH-53E *Super Stallion* production prototype made its first flight. The MH version of the CH-53E heavy-lift helo was developed to meet the Navy's needs for airborne mine countermeasures missions. The MH versions are expected to begin fleet service in 1986 and will also augment the vertical onboard delivery (VOD) requirements of the Navy.

2 Carrier Airborne Early Warning Squadron 127 (VAW-127) was established, based at NAS Norfolk. The squadron C.O. is Cdr. Robert L. Peterson.

20 The first launch of the Navy's AGM-65F imaging infrared (IR) *Maverick* missile took place. It was launched from an A-7E *Corsair II* and made a direct hit on a destroyer target. The AGM-65F is the latest addition to the *Maverick*

family of air-to-ground missiles and is designed to enhance the Navy's anti-ship capabilities.

26 The first takeoffs of an F/A-18 *Hornet* from a ski-jump ramp were conducted at NAS Patuxent River, Md. The tests are part of an evaluation of conventional jet aircraft using an upward curved ramp to shorten takeoff roll.

28 The *Seahawks* of HSL-41 received their first production SH-60B. HSL-41 is the Navy's first LAMPS MK III squadron.

OCTOBER

1 A reorganization of Commander, Naval Reserve Force, formerly Chief of Naval Reserve, included a change in which Commander, Naval Air Reserve Force reports to Commander, Naval Reserve Force vice the Chief of Naval Operations. The restructuring is designed to improve command and control of the Naval Reserve Force and enhance combat readiness.



An EA-6B Prowler from VAW-131. The Lancers deployed with CVW-6 aboard *Independence* and were involved in operations in Grenada and Lebanon.

1 The new Naval Space Command was established, with former astronaut, then Capt. Richard H. Truly as its first commander, to consolidate the Navy's present space-related activities under one organization. Elements that have been placed under the new command include the Naval Space Surveillance System, Naval Astronautics Group and activities supporting the Fleet Satellite Communications System.

3 Ens. Don Slone received his "Wings of Gold" as a Naval Flight Officer, becoming the first former enlisted man to complete the Enlisted Commissioning Program (ECP) and the Aviation Officers Candidate School (AOCS).

3 Strike Fighter Squadron 131 (VFA-131) was established. The *Wildcats* are led by Cdr. James Ellis.

7 Attack Squadron 55 (VA-55) was

established at NAS Norfolk. The *Warhorses* are skippered by Cdr. S. W. Bryant.

25 Combat amphibious assault operations on Grenada were supported by aircraft from CVW-6 aboard *Independence* (CV-62). Surveillance operations were provided by patrol squadrons and support operations by several reserve VR units.

NOVEMBER

23 A modified CH-46 lifted off Boeing Vertol's flight ramp at Philadelphia for its first flight. This modified CH-46 carried improvements that, when incorporated in all the H-46s, will extend the service life of the Navy/Marine Corps fleet of H-46 aircraft through the 1990s.

DECEMBER

4 In a strike against Syrian positions in Lebanon by CVW-6 and CVW-3 aircraft, two aircraft were lost to anti-aircraft fire. This was the first loss of Navy fixed-

wing aircraft (an A-7 *Corsair II* and an A-6 *Intruder*) in combat since the end of the Vietnam conflict in January 1973.

10 The guided missile frigate *McClusky* (FFG-41) was commissioned. The ship is named for RAdm. Clarence Wade McClusky, Jr., an aviation hero of WW II and later Chief of Staff for Seventh Fleet operations during the Korean War.

27 The Secretary of the Navy announced the assignment of the name *Wasp* to LHD-1. The LHD-1 is the first of a new class of amphibious assault ships designed to accommodate new air-cushioned landing craft, as well as conventional landing craft, the AV-8 *Harrier* and all types of helicopters.

PROFESSIONAL READING

By Lieutenant Commander Peter Mersky, USNR-R

Friedman, Norman. *U.S. AIRCRAFT CARRIERS: An Illustrated Design History*. Illustrated by A. D. Baker III. U.S. Naval Institute, Annapolis, Md. 21402. 1983. 427 pp. Indexed. \$44.95.

The scope of this outstanding reference work is generally limited to exactly what its title says — the design of U.S. Navy aircraft carriers. There is relatively little operational history. Well illustrated, this volume addresses all phases of the development of the U.S. Navy carrier, with sections on equipment such as catapults, amphibious assault ships and ASW carriers, all specialized carriers within the general type. This should become a standard reference book.

Doll, Thomas E., Berkley R. Jackson and William A. Riley. *NAVY AIR COLORS, Vol. 1, 1911-1945*. Squadron/Signal Publications, 1115 Crowley Drive Carrollton, Texas 75011. 1983. 97 pp. Illustrated. \$8.95.

This latest Squadron/Signal piece is a good pictorial reference, especially for the modeller. The photographs are interesting and many have never been printed before. Don Greer's artwork is as always first-rate. There are also several pre-1941 color photographs and a useful chart showing the geometric markings which were applied late in the war to dark blue-painted carrier aircraft. This is a useful volume, encompassing a large period of aviation history.

Sullivan, Jim. *Skyraider in Action*. Illustrated by Don Greer. Squadron/Signal Publications, Inc., 1115 Crowley Drive, Carrollton, Texas 75011. 1983. 49 pp. \$4.95.

Number 60 in this inexpensive series, *Skyraider* details one of the most important piston-engined military aircraft of the post-WW II period. Although there are deficiencies in the proofreading, the large, well-selected photographs and well-done color profiles should be of great value to both the military historian and modeller alike. Only two major works on the AD have been published, in 1966 and 1982. This is a good intermediate effort between those two books, including details of various models and developmental shots.

Drendel, Lou. *Air War over Southeast Asia, Volume 2*. Squadron/Signal Publications, Inc., 1115 Crowley Drive, Carrollton, Texas 75011. 1983. 79 pp. \$8.95.

Volume 2 in this series covers the period 1967-70, which saw heavy air-to-air combat, as well as increasing commitment to strategic bombing by both the Air Force and Navy Air until the November 1, 1968, bombing halt. This paperback book, which includes several of the author's illustrations, both pictorial and profile, an informative text and good photography, is a good value. Navy aircraft are shown to advantage, most of them having one or more photos of representative operations. Volume 3 will cover 1971-75.

Messimer, Dwight R. *Pawns of War — The Loss of the USS Langley and the USS Pecos*. U.S. Naval Institute, Annapolis, Md. 21402. 1983. 248 pp. Illustrated. \$18.95.

This book tells the story of what can best be described as a historical footnote. *Langley* was significant as CV-1, the first American aircraft carrier. Serving throughout the 1920s and 30s, she contributed much to the development

of Naval Aviation but by 1936 she had been relegated to mundane duties. Pearl Harbor and its aftermath changed that and, in her only action, *Langley* and the fleet oiler *Pecos* were sunk by Japanese dive bombers in February 1942. The old carrier died transporting aircraft, but she was never able to launch her Army P-40s to intercept the enemy. How *Langley* came to be in the Java Sea carrying Army fighters and the story of her sinking make interesting reading. Personal glimpses of the officers and men of both ships — as they fought first to save their ships and then, when that proved impossible, themselves — make up much of the narrative.

Maroon, Fred J. and Edward L. Beach. *Keepers of the Sea*. Naval Institute Press, Annapolis, Md. 21402. 1983. 256 pp. Illustrated. \$45.00.

This "coffee table" reference book contains a host of beautiful photographs complemented by well-written text. The pictures show the Navy experience in all types of settings and circumstances. Submarines, surface ships, aircraft and personnel are covered, although the section on Naval Aviation shows only two carrier arrestments (an F-14 and an A-7), while there are numerous views of launches. There also are sections on U.S. Marine Corps and SEAL operations and various boot camp scenes.

Linn, Don. *Harrier in Action*. Squadron/Signal Publications, 1115 Crowley Drive, Carrollton, Texas 75006. 1982. 50 pp. Illustrated. \$4.95.

Number 58 in the *In Action* series, this volume is timely in view of the fighting in the Falkland Islands. Hawker Siddeley *Harriers* played a significant role in the war, flying from HMS *Hermes* in support of British troops ashore, and defending the assembled fleet. The combat record of the *Harrier* is evidence of the value of the VTOL concept.

This is mainly a picture book, with large black and white photographs. The history of the aircraft is well presented, including the prototype P.1127 which first hovered in 1960. All RAF marks of the *Harrier* are covered, as are the markings for the AV-8A and AV-8B flown by the U.S. Marines. It includes a few photos of aircraft which took part in the fighting in the South Atlantic.

USAF Southeast Asia Monograph Series. *Last Flight From Saigon*. U.S. Government Printing Office, Washington, D.C. 20402. 1978. Illustrated and Indexed. 138 pp. \$5.50.

This paperback book details the end of the U.S. presence in Vietnam. Starting from the 1973 Paris Agreement to the mass exodus in late April 1975, this volume is well worth reading. The three authors, Lieutenant Colonels T. G. Tobin, A. E. Laehr, and J. F. Hilgemberg, were all veterans of combat tours in Vietnam and in the country during the events they detail.

There are reference maps, tables and several interesting, though poor quality, photographs of the action, people and aircraft involved in the airlift from Saigon. The text recalls U.S. Navy and Air Force air cover flights for the final evacuation, as well as Marine CH-53 operations during that hectic time.

The story of the heart-breaking final hours of South Vietnam is well told in this small volume, and in greater detail than ever before.

Awards

Nimitz' AIMD was awarded the 1982 Villard C. Sledge Memorial Maintenance Award for the repair of *Tomcat* TF-30 and *Prowler/Intruder* J-52 jet aircraft engines. Presented annually, the award recognizes AIMDs which have excelled in repairing certain engines. It is given in memory of Lt. Cdr. Sledge whose entire naval career was devoted to developing a professional maintenance program with safety as its goal.

Under the leadership of Cdr. Stephen Barkley, VF-51 was named winner of the 1983 ComNavAirPac Boola Boola Award. The *Screaming Eagles* were recognized as the squadron with the highest capability to utilize and maintain air-to-air missiles in the Pacific Fleet.



Lt. Cdr. "Bandstand" Clark and Lt. "Gar" Williamson execute another successful Phoenix shot.

NAF Washington, D.C., was chosen as having the best dining facility under Commander, Naval Reserve Force and will enter Navy-wide competition for the 1983 Edward Francis Ney Memorial Award among a field of winners from each naval ashore district and force commands overseas. Established in 1958, the program gives recognition and encouragement for outstanding accomplishments in the preparation and service of food in Navy enlisted mess halls.

NAS Lemoore won the 1983 Secretary of the Navy Environmental Protection Award for having the most outstanding environmental protection program of any large naval shore activity. The 1983 awards

marked the 12th consecutive year that ships and shore commands have documented their environmental protection programs in competition for this recognition.

Midway received the FY 1983 CinCPacFlt Golden Anchor Award for aircraft carriers, recognizing excellence in retention of personnel in the aircraft carrier category. During



Capt. Charles R. McGrail, C.O., proudly surveys *Midway's* 20-ton golden anchor, symbolizing the best retention by a Pacific Fleet carrier.

the past three years, reenlistments have increased 100 percent aboard the carrier although the number of personnel changes has remained relatively constant.

VF-142's *Ghostriders* won the 1983 Commander Fighter Wing One Showdown Trophy, an award presented annually to the Atlantic Fleet fighter squadron which scores highest in the fleet fighter air combat maneuvering readiness program conducted by VF-43. The *Ghostriders* handled the F-5 and A-4 aggressor aircraft to the tune of a 3.22-to-1 kill ratio and the highest overall grade of any competing squadron. VF-142 is commanded by Cdr. Mick Sumnick.

ComNavAirPac's 1982-83 Battle E went to VAW-117 as the premier squadron in the airborne early warning community. The award recognizes the completion of a successful 18-month period for the *Night Hawks*, during which the squadron transitioned from the E-2B to the E-2C aircraft; engaged in major exercises in the Western and Northern Pacific, Indian Ocean and

Sea of Japan; recorded over 3,400 flight hours, 1,339 carrier landings and 4,685 intercepts; and reached a milestone of 13,323 accident-free flight hours.

Last January 12, the aircrewmembers of HMM-162, MCAS(H) New River, N.C., received visible recognition for flying combat missions in Lebanon while under hostile enemy fire when they were presented Combat Aircrew wings. This marked the first time since Vietnam that the device has been awarded.

Sgt. Allen Johnson



Combat Aircrew wings are pinned on one of the deserving veterans of Beirut by HMM-162's C.O. Lt. Col.

L.R. Medlin.

The *Cougars* of VT-25, NAS Chase Field, received the 1983 CNATra Effectiveness Award for Advanced Squadrons. During the past year, squadron personnel trained 96 new Naval and Marine Aviators by flying 7,296 student training flights, including 96 carrier qualifications with over 570 student traps. These flights, completed safely, amounted to over 13,400 accident-free flight hours in 1983.

Lt. Cdr. Jim Dodge of VF-213's *Blacklions* received the 1983 Topcat of the Year Award. The Grumman-sponsored award is presented annually to the pilot or naval flight officer in the F-14 community who makes the most significant contribution to the F-14 program, tactics and weapons systems employment.

Records

Several units recorded accident-free flight hours: VMGR-352, 80,000; VRC-30, 67,000; HML-167, 64,000; HSL-31, 50,000; VS-41, 40,000; VA-304, 32,000; and VF-32, 18,000.

Other units marked safe flying time in years: VAQ-131, 12; VS-38, 10; VF-211, 5; VA-35, 4; VT-26, 3; and MATVAQWingPac, 1.

The following individuals recorded personal milestones:

VAQ-134: C.O. Cdr. Ted Meserve became the first EA-6B *Prowler* centurion aboard *Vinson*. Lt.Cdr. Jay Hixson achieved 2,000 hours in the EA-6B, while Lt.Cdr. Glen Keith logged his 1,000th hour in the aircraft.

VT-4: Lt. Bill Sizemore reached 1,000 hours in the TA-4J *Skyhawk*.

VA-34: Lt. Andrew B. Brown completed his 1,000th flight hour in the A-6 *Intruder* and his 200th carrier arrested landing aboard *America*.

Established

Helicopter Combat Support Squadron 5 was established at NAS Agana, Guam, on February 3, 1984. Commanded by Cdr. W. T. R. Bogle, the H-46 *Sea Knight* squadron will assume the operational mission formerly performed by HC-3 which recently became a full-time training squadron.

The *Privateers* of VFA-132 became the Navy's newest F/A-18 squadron on February 10. The squadron, commanded by Cdr. Robert E. Lakari, will begin operations at NAS Lemoore. Their ultimate home station will be NAS Cecil Field.

Strike Fighter Squadron (VFA) 106 was established April 27, 1984, at NAS Cecil Field, Fla., as the first East Coast F/A-18 squadron and the *Hornet* RAG. Cdr. D. J. L'Herault is skipper of the *Gladiators*. The squadron is scheduled to receive its first aircraft later this year.

Rescues

While holding in a routine marshal pattern over *Kitty Hawk* last December, VF-2 *Bounty Hunters* Cdr. Bob Thomas and Lt. Jon Hults realized they were in a perfect spot to snap a few photographs of a rescue. Two flight deck personnel had stepped into the exhaust of a turning aircraft and found themselves swimming in the Pacific. As one helicopter from HSL-33 and two others from HS-2 dropped smoke flares and set up for a successful rescue, the VF-2 crew maneuvered their *Tomcat* into position for TARPS photographic coverage.



One of the two survivors is hoisted into an HSL-33 H-2 *Seasprite*.

Four members of MCAS El Toro's SAR team participated in an emergency rescue mission last December when they were called to the scene of a landslide in San Clemente to assist in rescuing survivors from one of three houses that had slid 40 feet down a ravine. HM2 Bruce Hastie was lowered into the wreckage and discovered an 83-year-old woman, Meda Carpenter, sitting on her bed apparently unharmed. She was lifted aboard the UH-1N and taken to a local hospital where she was soon released. The other SAR crewmen included pilot Capt. Douglas McDonald, copilot Capt. Paul Christian and crew chief Sgt. Darren Myers.

Honing the Edge

Norfolk's VAW-78 is expanding its use of video recordings for various types of squadron training. In addition to using prerecorded films for general military, professional and rating training, the squadron videotapes all officers' meetings and in-house safety lectures for future use. OinC Lt.Cdr. Michael Walsh says the squadron has used video presentations for years, but the expanded program is intended to improve routine drill training in new areas. Until now, a reservist making up a scheduled drill has had to rely on written lesson plans or study guides to replace missed training sessions. Under the new system, the reservist will be able to watch a tape of the actual lecture given during the regular drill weekend.

The *Bluetails* of VAW-121, who recently returned home from a seven-and-one-half-month Med deployment aboard *Eisenhower*, participated in an electronic warfare exercise in the Virginia Capes operating area. The week-long exercise, called *Seabat*, was designed to train Navy and Air Force aircrews in countermeasures procedures. VAW-121's E-2C *Hawk-eyes* provided air intercept control and early warning to a variety of tactical aircraft including F-14s, F-15s, F/A-18s and F-106s.

Ranger and CVW-9 returned to San Diego February 29, after an eight-and-a-half-month deployment in the Indian Ocean. While with the Seventh Fleet, *Ranger* set a new record of 122 days of continuous at-sea operations by a conventionally powered carrier.

Et cetera

Capt. Ken Haas, the Navy's oldest Naval Flight Officer on active duty (known as the Gray Owl) celebrated his upcoming retirement in a reunion with his son. Not so unusual. But this family get-together marked the captain's last operational flight — as the NFO and "back seater" in a VAQ-34 EA-7L piloted by Lt. Ken Haas, Jr.

The grunts and groans heard aboard one San Diego-based carrier these days may be from the members of the *Ranger* Health Club, who muster on the flight deck for an hour or so each day to whip their bodies into shape. The club was formed by Ltjg. Ben Floyd to provide the best possible workout routine in the

limited space available. The club's program emphasizes increased stamina, flexibility, proper diet and a healthy dose of fun. *Ranger's* C.O., Capt. Arthur H. Frederickson, believes that "a physically fit crew is more combat ready." The club makes it possible to get away from work for awhile, get a much needed workout, and return to the job with renewed energy and a fresh outlook.



The Ranger Health Club battles the bulge aboard the carrier.

VR-24 has a new CNO-approved nickname, the *Lifting Eagles*. This refers to the squadron's diverse mission of lifting cargo, mail, emergency medical patients and VIPs in C-2A *Greyhounds* and CT-39G *Sabreliners*. Because its VOD mission has been transferred to HC-4, which is newly commissioned, VR-24 is now concentrating on COD operations. The squadron will eventually increase its air arm from five to eight Grumman C-2As to accommodate increasing U.S. Sixth Fleet needs. [Ed's Note: If a squadron nickname or motto is included in the official CNO-approved insignia (see OPNAVINST 5030.4C of 6 Nov 1974), it must appear within a scroll placed above the squadron insignia.]

Lt.Cdr. Thomas H. Murphy, USN (Ret.), Naval Aviator No. 51, celebrated his 98th birthday recently in Coronado, Calif. He enlisted in the Navy in 1905, and was one of the first enlisted men selected for flight training. Murphy, a member of the Golden and Silver Eagles, retired in 1945.

Reserves

The newly established Reserve Master Augment Unit at NAS Brunswick, Maine, received a P-3C Update II antisubmarine patrol aircraft from VP-44 on February 13. The Update II is the first of four such aircraft to be transferred to the master augment unit which was developed to train reservists in the fleet aircraft that their active-duty counterparts fly. Eventually, more than 300 reservists from New England will be assigned to this unit.

Change of Command

USS *America*: Lt. W. Smith, Jr., relieved Capt. D. T. Schwaab.
ComLAWing-1: Capt. B. J. Smith relieved Capt. Jim Matheny.
ComTacGru-1: Capt. C. H. Haines relieved Capt. Forrest R. Miller.
HAL-4: Cdr. Richard Kearley relieved Cdr. Jerry Jamieson.
HM-16: Cdr. Mike Lagow relieved Cdr. James L. Hughes.
HMH-462: Lt. Col. James Blinich relieved Lt. Col. Gerald Martin.
HML-167: Lt. Col. Mike Graf relieved Lt. Col. Robert Dougal.
H&MS-49: Lt. Col. Malcolm Lane relieved Lt. Col. G. B. Beck.
HS-74: Cdr. Clement G. Tourigny relieved Cdr. Theodore V. Drozd.
HT-8: Cdr. Loring B. Nichols relieved Cdr. Orrin B. Powell III.
HT-18: Cdr. David J. Raffetto relieved Lt. Col. Thomas C. McDonald.
USS *Midway*: Capt. H. P. Kober, Jr., relieved Capt. Charles R. McGrail.
NAS Barbers Point: Capt. H. B. Robins, Jr., relieved Capt. P. O'Connor.
NAS Whiting Field: Capt. C. L. Lavinder, Jr., relieved Capt. R. E. Jones.
VA-45: Cdr. J. J. Ryan relieved Cdr. L. I. Williams, Jr.
VA-84: Cdr. Dennis J. Carroll relieved Cdr. David H. Finney.
VA-97: Cdr. N. L. Westerbuhr relieved Cdr. T. L. McClelland.
VA-115: Cdr. William A. Goulin relieved Cdr. William W. Radican.
VAW-115: Cdr. D. D. Herzberg relieved Cdr. L. C. Richardson.
VAW-120: Cdr. Leonard N. Oden relieved Cdr. Andrew J. Murphy.
VF-1: Cdr. D. S. Gladman relieved Cdr. J. W. Snyder.
VF-2: Cdr. Paul Ringwood relieved Cdr. Dudley C. Bouck.
VF-114: Cdr. Lyle Bien relieved Cdr. Jay Yakeley.
VF-126: Cdr. Nicholas R. Criss relieved Cdr. David J. Carey.

VMA(AW)-242: Lt. Col. C. E. Reeves relieved Lt. Col. W. L. Cadieux.
VMFA-251: Lt. Col. Dennis L. Doyle relieved Lt. Col. Gary Elsten.
VMFA-333: Lt. Col. R. J. Curtis relieved Lt. Col. C. B. Cheatham.
VP-10: Cdr. John E. Kane relieved Cdr. David B. Bellamy.
VP-31: Cdr. Edward R. Enterline relieved Cdr. C. T. Moyer III.
VP-46: Cdr. Alexander C. Konczyk relieved Cdr. Dennis L. Solomon.
VR-58: Cdr. Gerald R. Sheppard relieved Cdr. James J. Horan.
VRC-30: Cdr. Jack B. Williams relieved Cdr. Brent Jacobs.
VRF-31: Cdr. S. W. Larrabee, Jr., relieved Cdr. W. T. Rossella.
VS-31: Cdr. Ernest L. Street relieved Cdr. John P. Jones.
VT-2: Cdr. Robert B. Cameron relieved Cdr. Warren L. Holbert.
VT-22: Cdr. John E. Mittel relieved Cdr. John E. Padgett.

Corrections to "The Reserves: A Choice for Readiness," NANews, Jan-Feb 1984: Page 5, para. 3 — The statement "all active duty reserve personnel are officially referred to as TARs. . . ." should have read "of the 75,000 active duty reserve personnel, over 15 percent are TARs. . . ." Page 6, para. 9 — In place of the sentence "Their [SelRes] salaries are funded by the Chief of Naval Reserve, while TARs are paid from the same funds as regular Navy personnel," substitute "The pay and allowances of SelRes and TARs are funded through the Reserve Personnel Navy account." Page 7, "Gearing Up the Reserves," para. 7 — Replace "In the future, the reserve helicopter combat support (HC) and helicopter antisubmarine (HS) squadrons will lose their H-3s and H-46s to a version of the SH-60." with "HS-84 will be redesignated as HSL-84 this year and will transition to the SH-2F LAMPS MK I helicopter." In the reference to aircraft flown by SAU personnel, para. 8, change "EA-6Bs at NAS Whidbey Island, Wash.; and A-7Es at NAS Cecil Field, Fla." to "A-6Es at NAS Whidbey Island, Wash.; and E-2Cs at NAS Miramar, Calif."

FLIGHT BAG

Super Stallion

As a postscript to your article on the *Super Stallion* (January-February 1984), rework on the CH-53Es was assigned to NARF Pensacola. The first, an HMH-464 CH-53E, completed rework in December 1983, with 22 more scheduled for FY 1984. The *Super Stallion* will be a mainstay of Naval Aviation for many years to come.

Marge Sanders, PAO
Bldg. 52
NARF Pensacola, FL 32508

Ed's Note: Finished ahead of the rework schedule of 60 days, the plane was flown on its first flight by Capt. Leonard W. McGarity and 1st Lt. Edward J. Buckley, with Sgt. John Horton as crew chief.

A P2V-2?

In your excellent article, on "The Resolute R4D" in the December issue, you entitled the photo on page 10 "Two Classics." One classic was the R4D and I was surprised to see that the other was the Chevrolet Beach Wagon rather than

VOTE

The general election is November 5, 1984, and primary elections are taking place now through September. In addition to the presidential election, all seats in the U.S. House of Representatives, one-third of the U.S. Senate, 15 state governors, and numerous state and local officials will be elected.

How can you vote absentee? The Federal Post Card Application (FPCA) is accepted by all states for either registration, an application for registration forms, or an application for an absentee ballot. For details and assistance to register and to request your absentee ballot, see your voting assistance officer. Questions which cannot be answered at the local level may be referred to the Navy Voting Action Officer, Naval Military Personnel Command (NMPC-12C), Washington, DC 20370; autovon 224-3248 or commercial (202) 694-3248. A toll-free Navy voter hotline, 800-368-5056, is available in all states *except Virginia*, including Alaska, Hawaii and the Virgin Islands.

Your vote is important. Your vote counts!

what appears to be a P2V-2 (or -3) parked beyond the Douglas. Many of us cut our teeth on the early *Neptunes* in the Training Command. They were our first big multiengine aircraft and we were thrilled with flying them. The years have probably mellowed some of our thoughts about their occasional problems but they, nevertheless, served us nobly and I suspect that you'd be hard pressed to find a Naval Aviator who, having operated the early *Neptune*, would not now consider these iron birds as anything but first-rate classics.

David W. Graham
Boston-Logan Airport
P.O. Box 183
Boston, MA 02128

Enlisted Pilots

I am researching for a future book on enlisted pilots and would like to hear from anyone who flew as an EM or has any knowledge of Navy APs.

Don Wade
560 Campbell Hill
Marietta, GA 30060

Thanks

I recently did a painting from a photo that appeared in your March 1980 issue. It's called "Odd Job Hirata" and was done in watercolor. Thanks for printing a photo of my painting in *NANews*.

Ramon Bakerjian
8811 Rackham
Taylor, MI 48180

This is "Odd Job Hirata."



Thanks

I would like to express my appreciation for the assistance you and your staff extended to me. Your cooperation, especially that of the Naval Aviation

historian, was most beneficial to my project. I hope, as I'm sure others do, that *Naval Aviation News* will continue to log "OK-3 wires" for a long time to come.

Capt. R. L. Brace, USN(Ret.)
1725 Jefferson Davis Highway
Suite 601
Arlington, VA 22202

Blue Angels 1984 Schedule

May

5-6 NAS Miramar, Calif.
12 Andrews AFB, Md.
13 NAS Patuxent River, Md.
19-20 Newport, R.I.
21 Naval Academy, Md.
26-27 NAEC Lakehurst, N.J.
28 McGuire AFB, N.J.

June

2-3 Kalamazoo, Mich.
9-10 Waterloo, Iowa
16-17 Hamilton, Ont., Can.
23-24 St. Joseph ANGB, Mo.
30 Redding, Calif.

July

1 Redding, Calif.
7-8 Pasco, Wash.
14-15 Chicago, Ill.
21 Pensacola Beach, Fla.
28-29 Jacksonville Beach, Fla.

August

4-5 Seattle, Wash.
11-12 Idaho Falls, Idaho
18-19 NAS Brunswick, Maine
25-26 Grand Junction, Colo.

September

1-3 Cleveland, Ohio
8-9 Nashville, Tenn.
15-16 Carswell AFB, Texas
22 Virginia Beach, Va.
23 NAS Oceana, Va.
29-30 CFB Shearwater,
Nova Scotia, Can.

October

6-7 El Paso, Texas
13 San Francisco, Calif.
14 NWC China Lake, Calif.
20-21 NAS Point Mugu, Calif.
27-28 NAS New Orleans, La.

November

3-4 Kissimmee, Fla.
10-11 NAS Pensacola, Fla.

Correction: In our March-April 1984 issue, in the story "Scenes from the Peacekeeping Force" on page 15, it was reported that "...more than 96,000 passengers had passed through the NAS Sigonella air terminal since its opening. That figure should have been "...more than 56,000."

Training Command Issue

A Navy recruiter on the University of Massachusetts campus, where I work, recently gave me a copy of *NA News*, which I was delighted to get. I was a Navy pilot during WW II and Korea, with time out to finish college in between. It was good to find that the quality of *NA News* is as high as ever. Those of us who went through the training program never appreciated how tough it was and what an honor it was to finish it and get those coveted Wings of Gold. We were cadets until the date we graduated and were made officers and gentlemen all at once. It was too much for a lot of us to appreciate.

I was particularly happy to get the Sept.-Oct. issue because of its treatment of the training program, which really hasn't changed much except for commissioning and the speed of the aircraft. In addition to the articles being very well done, I really enjoyed the cover by Hank Caruso.

Lt. Evan V. Johnston, USNR(Ret.)
5 East Greene St.
Easthampton, MA 01027

Reunions, Conferences, etc.

Anyone who served aboard *USS Pine Island (AV-12)* please contact Frank Gorthy, Box 416, Ewart, MI 49631, (616) 734-2833, regarding a possible reunion.

Marine Aviation annual reunion of Naval Aviators, aviation ground personnel and NAPs, May 12, 1984, MCAF Quantico. Contact Mrs. Judy Skinner, MCAF Quantico, VA 22134, (703) 640-2442.

Belleau Wood and members of Air Groups 24, 21, 30, 31 and 28 reunion, May 19-20, 1984, in Endicott, N.Y. Contact V.O. Gillett, 48 George St., Binghamton, NY 13904.

Camp Zama American High School (NAS Atsugi, Japan) reunion, 1966-1970 students. Contact Carol Ostergard Woods 1440 S.E. 4th, #1, Gresham, OR 97030, (503) 667-9403.

For *Enterprise (CV-6)* regional reunion information, contact James Barnhill, 6633 Briley Dr., Fort Worth, TX 76118, (817) 281-3384.

VFB-117 40th anniversary reunion, June 6-10, 1984. Contact Art Elder, 2411 Romney Road, San Diego, CA 92109.

NATS reunion, September 3-7, 1984, San Diego, Calif. Contact Capt. Arnie Hudnall, 9807 N.W. 75th Street, Kansas City, MO 64153.



Above insignia were recently approved by the Insignia Board.

USS Ranger (CV-4) reunion, August 10-12, 1984, Holiday Inn Bay Beach, Pensacola, Fla. Contact George Pyle, 8629 Oakleigh Road, Baltimore, MD 21234, (301) 665-1329.

USS Essex (CV/CVA/CVS-9) reunion, Omaha, Neb., June 13-15, 1984. Contact Bob Morgan, 3841 SW 29th Place, Ocala, FL 32674, or Capt. Horst A. Petrich, 621 Robens Road, Virginia Beach, VA 23452.

VF-81, VF-13A, VF-65 and VF-21 officers' reunion is being planned. Contact C.O., VF-21, FPO San Francisco, CA 96601, Attn: Lt. Bateman.

USS Salisbury Sound (AV-13) reunion, July 6-8, 1984, Pensacola, Fla. Contact Don Wade, 560 Campbell Hill,

Marietta, GA 30060, (404) 422-7369.

VR-21 officers' reunion in San Francisco, Calif., October 5-6, 1984. Contact J. D. Stevens, 4839 Junius, Dallas, TX 75210, (214) 821-1575, or Capt. J. G. Klug, NavAirRes, Point Mugu, CA 93042, autovon 351-7162.

USS Cabot (CVL-28) and its air groups reunion, September 5-9, 1984, Las Vegas, Nev. Please write USS Cabot Assoc., 5023 Royal Avenue, Las Vegas NV 89103.

Hurricane Hunters reunion, June 15-16, 1984, Jacksonville, Fla. Contact Hurricane Hunters Reunion Committee, 2818 Cedarcrest Drive, Orange Park, FL 32073.

Dilbert and Spoiler Posters Wanted

The Naval Aviation Museum is trying to complete its collection of Dilbert (the pilot) and Spoiler (the mechanic) posters, which lacks many items. Anyone who has any of the posters listed below is asked to contact Capt. Grover Walker, USN(Ret.), Director, Naval Aviation Museum, NAS Pensacola, FL 32508, (904) 452-3604 or autovon 922-3604.

Spoiler	207-211	161	508	655	865-869
	214-220	165	512	658-681	872-873
2-45	226	168	514	683-690	875
47-73	228	171-172	516-517	693	877
75-77	230-231	210	519-521	700-706	879
79-83	234-554	212	523-526	708-714	881-882
86-87	556-616	216	530-542	719-721	884
89-91	618-699	218		723	888-891
93-98	701-755	228	544	725-730	893-894
101	757-793	238-239	546	732	896
104-105	795-881	259-327	549		902-903
107-109	883-897	394-406	552-562	739-740	910-911
112-119	899-901	408-412	566-567	744-753	924
121-125	903-908	414-420	569	756	927-928
127-129	910-913	423-424	572-573	758	948
132	915-968		575-579	761-762	954
135-137	971	426	581-583	766-768	962
143-149	979-980	428-430	585-588	770	966-972
151-164	985	434	608	774	974-977
166-168	988	436-440	612	778-779	979-985
170-175	All numbers	443-446	616-619	783-788	988
177	994 and over	448-450	621-622	790	990
179-180		452-458	624	793-796	992-998
182		460-469	626-629	800-802	1000
184	Dilbert	471-476	633	804-808	1006
188-189		478	636-639	810-837	1010-1011
193		480-484	643	841	1015-1016
196-197		486-488	647	843-854	
199-201		490	649-650	858	Any higher
205		493-500	653	861-863	numbers

NAVAL AVIATION news

