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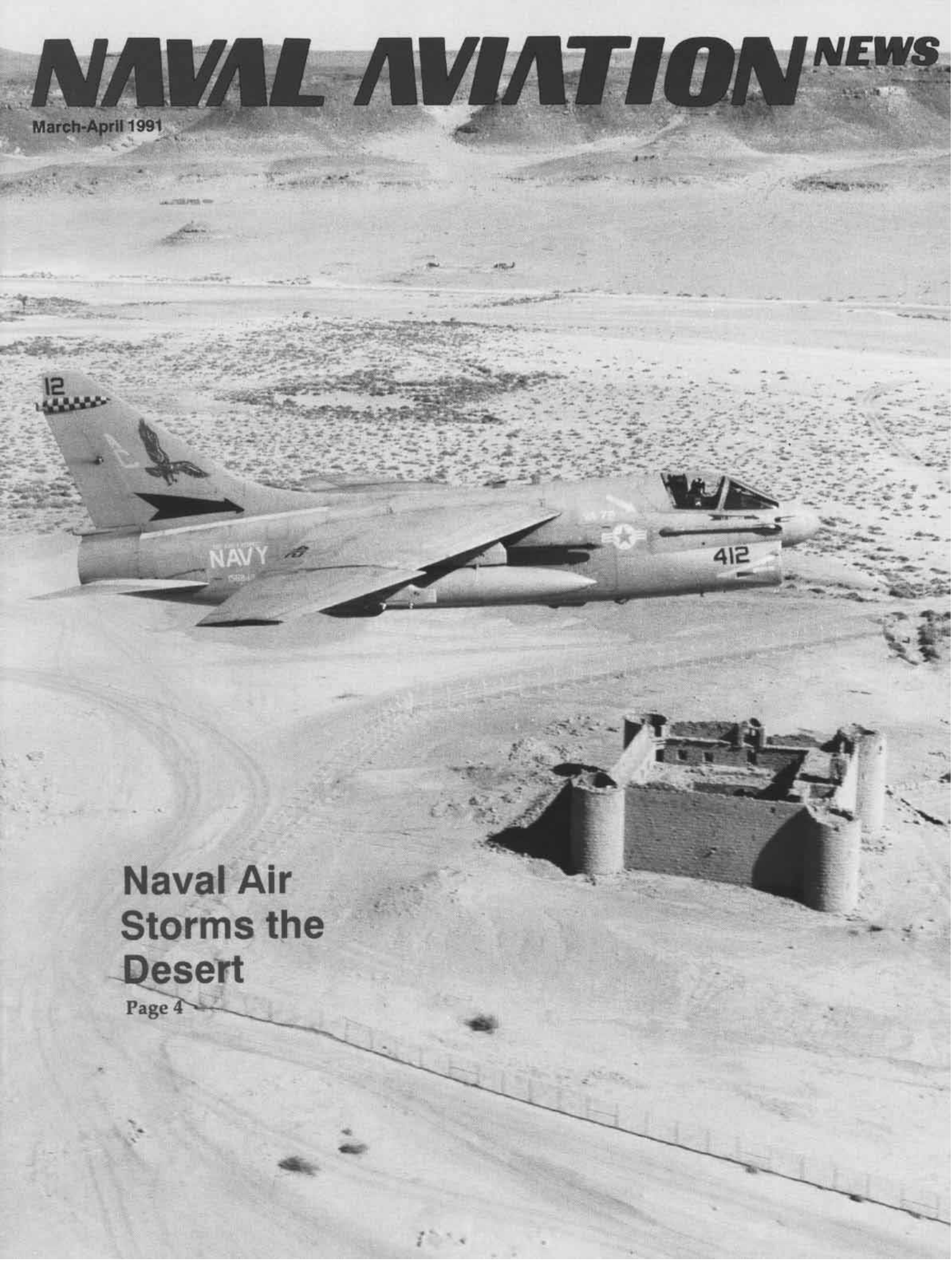

Naval Air Storms the Desert

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NAVAL AVIATION NEWS

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COVERS – Front: A VA-72 A-7E Corsair II flies low over the Saudi Arabian desert (Cdr. John Leenhouts). Back: An SH-60B Seahawk prepares to land aboard Doyle (FFG-39), escort ship for Abraham Lincoln's (CVN-72) round-the-horn cruise in November 1990 (PH2 Joseph Horner).

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Desert Storm: A New Baseline

By VAdm. Dick Dunleavy, ACNO (Air Warfare)

As *Desert Shield* transformed into *Desert Storm*, there was a lot of talk about lessons. Generals (yes, admirals, too) are always said to be preparing to fight the last war, but we were as ready as we could be for this one. The lessons of Vietnam, Lebanon, Libya, Grenada, and Panama were learned; now we have a new baseline of experience.

The high success of our air strikes against Iraqi targets and especially the low aerial loss rates that we have experienced affirm the wisdom of much of our emphasis and investment in recent years. Realistic training from "Strike University" and "Top Gun" and in the fleet is paying off. Equipping our warriors with the best planes that we can buy provides them the edge over the enemy, and the careful maintenance given those planes by the enlisted sailors of Naval Aviation makes that edge razor sharp. The expensive but effective electronic and infrared countermeasures are saving a lot of aviator lives. The emphasis on smart weapons like HARM, SLAM, and laser-guided bombs has enabled our crews to hit hard and live to fight another day.

Lives are also being saved by our leaders. The commitment to apply relentless pressure on Iraq from the start and knock out defenses early has made for friendlier skies. The unified and streamlined command and control in the Persian Gulf region has ensured a unity of purpose and great economies in applying force.

The flexibility of the aircraft carrier and the talents of our carrier crews are being accentuated in this war. They have been called upon to launch strikes for the first time in history from relatively confined waters of the Red Sea and Persian Gulf. They are making it work.

We are now also witnessing the first large-scale mobilization of the Naval Air Reserve in 22 years. The lessons learned in 1968 and since are embodied in the strike rescue, fleet logistics, and Marine helicopter and tanker squadrons called up to serve in the gulf. The Total Force concept is working for Naval Aviation.

This war will further define our needs for the future. The dust hasn't settled on the demise of the A-12. We are shaping our requirement for a replacement for the A-6 – a need recognized at the highest levels of our government.

A new generation of Naval Aviation is gaining broad combat experience that will set the course for years to come. We are learning new lessons which we will incorporate in our training. In the meantime, America is reaping a good return on its investment in Naval Aviation. You men and women of Naval Aviation have seen to that. Keep strokin'.

PH1(AC) Scott Allen

AV-8Bs lined up for launch off an LHA in Middle Eastern waters.

GRAMPAW PETTIBONE

Osborn

Hypoxia Hazard

A pair of F-14 *Tomcats* launched on an overland cross-country. They were cleared to flight level 370. As the formation climbed and leveled off, the radar intercept officer (RIO) in the lead aircraft was "70-percent sure [the mishap crew's oxygen] masks were off." He also later stated that he had flown with the pilot of number two before and they never took off their masks until completing a positive cabin pressurization check on climb-out. For this reason, he wasn't concerned that there might be a potential problem, even though the pilot and RIO in the number two aircraft had their masks off.

Number two began dropping back to number one's five-o'clock position without calling the leader. This made it difficult for the leader to keep his wingman in sight. A little later, number two pulled up 200 feet abeam lead on lead's port side.

The leader then saw that the pilot and RIO in number two had removed their helmets in addition to their oxygen masks and were wearing their garrison caps.

"That's real funny," the lead pilot said sarcastically to his RIO. When lead saw number two's crew salute in unison, he signaled them to come up on base frequency. Number two then crossed under lead and stabilized at his four o'clock position, 200 feet away and 50 feet above lead's altitude. Number two subsequently slid aft toward the five-thirty position about a half mile distant.

The fliers in *Tomcat* number one believed that those in number two were removing their garrison covers and putting helmets and masks back on. However, they tried numerous times, without success, to communicate over the radio with number two. The sun angle impeded visual contact with the wingman as well.

The lead crew did not suspect hypoxia immediately because their own *Tomcat*'s cabin altitude was 14,000 feet. They were more concerned that number two was making unnecessary throttle movements and using up too much fuel.

Eventually, number one tried moderate turns hoping to catch sight of number two and even porpoised the nose, signaling the wingman to join up – all to no avail.

A civilian aircraft reported seeing an explosion in a desert-like area to ground controllers. Unaware of this, the lead crew assumed number two had diverted to an air force base because of radio failure or some other problem. On intercom, the lead crew discussed the possibility of hypoxia affecting number two's pilot and RIO.

There followed numerous transmissions between number one and ground facilities during which it was reasoned that number two had crashed. Number one landed at an air force base and gave an account to base flight safety personnel.

Number two *Tomcat* had, indeed, struck the earth. Both crew members were killed instantly. Investigators found all four oxygen mask bayonet fittings and helmet bayonet receivers at the site. None of the bayonet fittings were attached to the receivers, indicating the pilot and RIO were not wearing oxygen masks on impact.

Grampaw Pettibone says:

Gol dang it!

The book (OPNAVINST 3710) says: "Oxygen shall be used by all occupants from takeoff to landing in tactical jet and tactical jet training aircraft." That means wear those masks!

Turns out there are aviators who flaunt this rule – and get away with it. The masks become uncomfortable, so they say. Could be. But a little discomfort sure as shootin' beats what happened to these two highly regarded fliers.

It was also said that some training command instructors removed their masks while students had to keep theirs on; that in fleet readiness squadrons, fliers don't keep 'em on from launch to recovery all the time.

Such tales rattle these old bones!

For one thing, lack of oxygen at 35,000 feet gives a flier 30 to 60

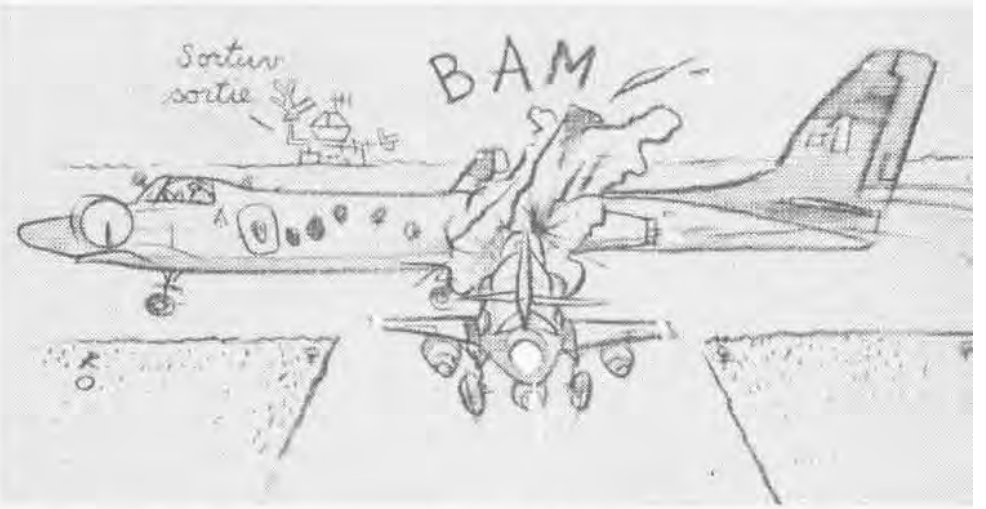
seconds of "useful consciousness." Plus, lead shoulda gotten worried sooner, 'specially when the men in Tomcat number two removed helmets, put on fore and aft caps, and saluted! "Euphoria" is the fancy word for such behavior and hypoxia can breed euphoria.

The Tomcat coulda had a pressurization leak or somethin' like it. Won't ever know for sure. But the signs were there.

Still, lead motored on and when he did tell ground controllers he'd lost contact with his wingman, it was 45 minutes after the fact and 30 minutes after two had crashed!

Also, crew number two was due for aviation physiology training and hadn't had same since the training command, about four years before. C.O.'s, please take note of that.

It's too late for these two fellows. Until we come up with a better system, keep those oxygen masks on from launch to recovery!



Be Careful or Collide

A Navy-contracted, civilian T-47 Cessna *Citation II* landed on the right-hand, parallel runway (west right) at about the same time a TA-4 *Skyhawk* touched down on "west left." It was night and both aircraft were rolling out normally when the tower controller issued instructions.

The T-47 slowed to make a left turn from west right in order to cross west left and proceed to the parking area. In addition to the *Citation*'s pilot, there was a student Naval Flight Officer (NFO) in the right seat, the mission commander (instructor) in the jump seat, and another student NFO in the back.

During the *Citation*'s landing rollout, tower directed exit of the runway to the left, when able, and to hold short of west left. The *Citation* pilot acknowledged receipt of hold-short instructions. Additional traffic, a T-38 *Talon* on two-mile final for west right, became a "separation" factor following the T-47. The tower directed the *Citation* to expedite exiting the runway, if able. Although acknowledged, that transmission may have been misunderstood as authorization to cross west left. A difference of opinion existed as to exact location of the T-47 on the airport at the time of transmission.

The *Citation* executed a left turn but the *Skyhawk* was still on its rollout. Both aircraft were traveling at approximately 15 knots. They collided on west left at roughly 90-degree angles to each other. There were no injuries in either plane. The *Skyhawk* sustained less damage than the *Citation*, which incurred major damage to its wing and fuselage.

Grampaw Pettibone says:

Look before you leap!

In Ole Gramps' day, we didn't have parallel runways. A cleared path in a pasture could do in a pinch. Later on, we got paved strips. That was high tech for us. Yet, we still bumped into each other now and then when we didn't pay full attention. Which is what happened here.

Apparently, the pilot of the Citation got distracted by a landing T-38 when he was "clearing" the port side before turning and was unaware of the coming Skyhawk. The student NFO in the right seat had cleared the right area but couldn't see to the left. The pilot himself had the best view of the left area and believed it was O.K. to proceed. The mission commander in the jump seat didn't have a window or a good view.

For the pilot, it was like bein' on the highway with a car comin' up on the left in a "blind" area. All of a sudden, it's there!

Until we develop eyes in the back and on the sides of our heads, check, double-check, and check again whenever there's even a trace of doubt.

Naval Air Storms the Desert

Cdr. John Leenhouts

The following information is derived from news reports and Defense Department press briefings through February 3, 1991. For security reasons, many details of ongoing operations are not releasable at this time. NANews will publish more details later as they become available.

Navy and Marine Corps aircraft blitzed Iraqi forces and installations as Operation *Desert Shield* turned into Operation *Desert Storm* on January 17, 1991, spearheading the offensive to liberate Kuwait from Iraqi occupation. As of the beginning of February, what may be recorded as the most intense aerial offensive in history continued to hammer at Iraqi military targets to pave the way for eventual Iraqi expulsion from the tiny desert emirate.

Hundreds of Navy and Marine Corps aircraft joined with aircraft from the air forces of the United States, Great Britain, France, Saudi Arabia, and Kuwait to conduct an intensive aerial campaign aimed at destroying Iraq's air force, anti-air defenses, ballistic missile launchers,

A-7Es from VAs 46 and 72 refuel from a KC-135 over Saudi Arabia. The two squadrons, attached to CVW-3 aboard John F. Kennedy, are the last Corsair II squadrons in the fleet.

CWO2 Ed Bailey

CVW-17 Hornets, Intruders, and Sea Kings pack the deck of Saratoga during Operation Desert Shield.

command-and-control network, nuclear, biological, and chemical warfare facilities, naval forces, and troop concentrations. During the first three weeks of the operation, Navy and Marine Corps units had contributed over one-third of the more than 42,000 sorties flown.

The main Navy air effort has been mounted from six carriers in the Red Sea and Persian Gulf. *America* (CV-66) and *Theodore Roosevelt* (CVN-71) departed Norfolk, Va., on December 28, 1990, reaching Middle East waters just in time for *Desert Storm*, bringing to six the number of carriers in theater for the first weeks of the operation (see Table 1). The strikes marked the first time that Navy carriers have conducted combat operations from either the Red Sea or the Persian Gulf, both of which are relatively narrow, restricted bodies of water heavily plied by commercial shipping. All of the carriers involved are veterans of combat in previous conflicts, with the exception of *Theodore Roosevelt*, which was commissioned in 1986. (*Saratoga* (CV-60) set a total record of five transits of the Suez Canal in one deployment on December 9, 1991.)

A significant majority of Marine Corps tactical aviation

Table 1

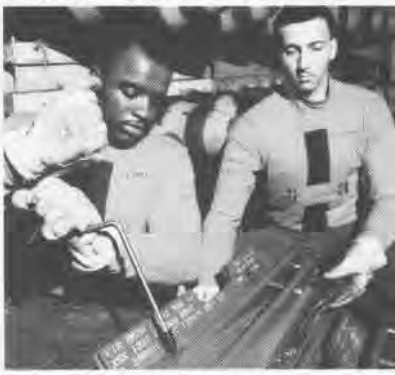
Desert Storm Carriers and Air Wings

Midway (CV-41)	CVW-5
Saratoga (CV-60)	CVW-17
Ranger (CV-61)	CVW-2
America (CV-66)	CVW-1
John F. Kennedy (CV-67)	CVW-3
Theodore Roosevelt (CVN-71)	CVW-8

JO1 J. Parker

An HH-60H strike rescue helicopter from HCS-5 is loaded aboard a cargo plane at NAS Point Mugu, Calif., for deployment to the Persian Gulf.

PH2 Charles W. Moore



The real thing: AOANs Christoper Randolph (R) and Raymond Perry (L) ready MK 82 500-pound bombs aboard John F. Kennedy in the Red Sea.

forces was in place on the Saudi Arabian peninsula or aboard amphibious warfare ships in waters offshore as *Desert Storm* began. (Two squadrons, VMA(AW)-533 and VMA-231, which had just deployed to Japan, quickly redeployed to the Middle East.) With the war on, Marine FA-18 *Hornets*, AV-8B *Harriers*, OV-10 *Broncos*, and AH-1 helicopter gunships concentrated on pounding Iraqi positions in Kuwait. EA-6Bs have been providing electronic jamming of enemy air defenses. Large numbers of UH-1N, CH-46E, and CH-53 transport helicopters stood ready ashore and afloat to move in the event of a ground assault. KC-130 tankers provided aerial refueling support, vital given the long distances involved for many units in the theater.

Navy and Marine tactical aviation units have been using the full gamut of conventional air-to-ground ordnance in their arsenal, including the new Standoff Land Attack Missile (SLAM), the High-speed Anti-radiation Missile (HARM) and Shrike anti-radar missiles, laser-guided and Walleye bombs, "iron" bombs, Rockeye cluster bombs, and Harpoon anti-shipping missiles.

The brunt of the Navy's strikes has been carried out by the venerable A-6E *Intruder* and the FA-18A/C *Hornet*. The last two fleet A-7E squadrons, VAs 46 and 72 aboard *John F. Kennedy* (CV-67), have been adding one more war to the *Corsair II*'s 25-year record of glory before its retirement from the Navy. F-14s, FA-18s, and EA-6Bs have been escorting the strike to the targets to fend off the anti-air threat. The E-2Cs are constantly airborne to warn of any intruders that may threaten the battle groups. Aerial refueling has been provided by KA-6, A-6, S-3, A-7, and Air Force tankers.

Long before the outbreak of *Desert Storm*, Naval Aviation provided forces instrumental in enforcing the economic sanctions against Iraq. P-3C *Orions* and S-3 *Vikings* patrolled the shipping lanes, and EP-3Es were reportedly providing electronic reconnaissance. SH-60B and SH-2F LAMPS (Light Airborne Multi-purpose System) helicopters as well as Marine helicopters were used to cover boardings of ships. LAMPS helicopters were also used to spot mines in the Persian Gulf, of which some 25 had been destroyed in the first two weeks of the war. An SH-60B crew transported the Kuwaiti flag to the first piece of Kuwaiti territory liberated by the allied coalition, tiny Qurah Island in the Persian Gulf. One Air Force pilot was rescued on January 24 by a Navy helicopter from *Nicholas* (FFG-47) after he ejected from his F-16 over the Persian Gulf.

By the end of the third week of the war, Naval Aviation had been largely responsible for the annihilation of the Iraqi navy. Navy A-6s and FA-18s, using ordnance including Harpoon missiles and Skipper and Rockeye bombs, sank and disabled many of the 41 missile gunboats, minesweepers, patrol craft, and other small ships destroyed thus far. Several armed hovercraft have been destroyed as well, including one that attempted to hide under an oil rig. Silkworm anti-shipping missile sites have also been hit. The Royal Navy's Fleet Air Arm pummeled the Iraqi navy, using its shipborne *Lynx* helicopters armed with Sea Skua missiles. Navy SH-60Bs have also reportedly been using Penguin missiles against Iraqi shipping.

Aerial losses to enemy action have been surprisingly light in the first three weeks of the war. As of February 3, the

VS-37's S-3A aircraft were busily engaged in surveillance and refueling missions in support of the Independence carrier battle group during Operation Desert Shield.

Navy had lost five jets to hostile fire, one to a mishap. The Marines had lost two aircraft to hostile fire and three to mishaps (see Table 2). Of Navy and Marine fliers lost to date, three were confirmed as prisoners of war, five were listed as missing in action, one was rescued by an Air Force helicopter, and the status of two was not yet known (see Table 3). Twenty-eight Iraqi aircraft had been shot down by allied aircraft, but no official confirmation that any were downed by Navy or Marine aircraft has yet come forth.

Desert Storm has marked the first combat operations for several type/model/series of naval aircraft, including the F-14A+, FA-18C, AV-8B, OV-10D/D+, AH-1W, CH-53E, MH-53E, HH-60H, and S-3B. It is also the baptism of fire for several squadrons; at least one unit, VA-155, one of two A-6 squadrons aboard *Ranger* (CV-61), is seeing combat on its very first deployment.

The first large-scale call-up of reserves since the 1968 Pueblo Crisis was undertaken for *Desert Shield*. Detachments of HCSs 4 and 5 were sent with the new HH-60H strike rescue helicopter to the region. HS-75 at NAS Jacksonville, Fla., was also activated to provide search-and-rescue support, and four C-9B squadrons – VRs 55, 57, 58, and 59 – were positioned to bases in Germany and Italy to support the fleet in the region. Both Marine reserve KC-130 tanker squadrons (VMGRs 234 and 452) and eight helicopter squadrons (HMH-772, HMMs 764 and 774, HMAs 773 and 775, and HMLs 767, 771, and 776) were also mobilized.

Coverage of Operation Desert Storm will continue next issue.

Table 2

Desert Storm Air Losses (through 3 Feb 91)

To Hostile Fire:

17 Jan	FA-18C	Navy
17 Jan	A-6E	Navy
18 Jan	A-6E	Navy
19 Jan	OV-10A	Marine
21 Jan	F-14A+	Navy
28 Jan	AV-8B	Marine
02 Feb	A-6E	Navy

To Operational Causes:

23 Jan	AV-8B	Marine
24 Jan	FA-18A	Navy
02 Feb	AH-1J	Marine
03 Feb	UH-1N	Marine

Table 3

Desert Storm Naval Aviation Casualties (through 31 Jan 91)

Prisoners of War:

Lt. Jeffrey N. Zaun
Lt. Lawrence R. Slade
Lt. Col. Clifford M. Acree
CWO4 Guy L. Hunter

Missing in Action:

LCdr. Michael S. Speicher
Lt. Robert Wetzel
Lt. William T. Costen
Lt. Charles J. Turner
Capt. Michael C. Berryman

CWO2 Ed Bailey

Pri-fly crewmen aboard Saratoga train with chemical warfare protective gear during Operation Desert Shield.

Carriers Launch Broncos to Desert Storm

By JO2 David E. Smith, USS America

With his heartbeat racing almost as fast the aircraft's engines, the pilot anxiously awaited the 600-foot takeoff from the carrier deck. A pretty routine feat aboard *America* (CV-66) until you realize the longest catapult on the flight deck is just 320 feet.

"We're going to deck-launch 'em," said Robert Chubbs, an aviation boatswain's mate in the carrier's Air Department.

Turning into position as far aft on the flight deck as possible, one of six Rockwell OV-10 *Bronco* tactical reconnaissance planes prepared for a historic takeoff. "The OV-10 was built during Vietnam specifically for close air support, tactical observation, and reconnaissance," said Captain Danno Gannon, weapons and tactics instructor for Marine Observation Squadron (VMO) 1, MCAS New River, N.C.

"What we typically find ourselves doing," stated Gannon, "is working directly with an air

officer for an infantry battalion or regiment, to seek and locate targets to be engaged with supporting arms assets available to us."

Zooming down the runway of a carrier, however, is not a typical endeavor. "We've got a couple of pilots onboard *Theodore Roosevelt* [CVN-71] and *America* who have taken off from LHAs [amphibious assault ships]," smiled Gannon, "but we have never, as an operational squadron, launched from a carrier. It'll be a first."

VMO-1's OV-10s were craned aboard *America* and *Roosevelt*, which departed Norfolk, Va., on December 28, 1990, in support of Operation *Desert Shield*. Near Rota, Spain, the carriers launched a total of 12 *Broncos*, which then departed for Saudi Arabia.

"About 600 feet and 35-knot winds is all we're asking for," said Gannon. The challenge was met as *America* launched all six OV-10s and cleared the flight deck in less than 30 minutes. Afterwards, with the sun still coming up on the horizon, the flight deck crew began its normal routine of catapulting its own aircraft.

PHAN C. T. Bolden

HM-14 deployed MH-53E Sea Dragons, seen here over the Persian Gulf, for mine-sweeping duties in support of Desert Shield.

Cpl. B. J. Johnson

A VMO-1 OV-10 is craned aboard at Norfolk for the voyage across the Atlantic.

PH1(AC) Scott Allen

Lt. Dennis Alston inspects an LNG tanker in the Persian Gulf from his SH-2F helicopter on patrol in support of Desert Shield.

CWO2 Ed Bailey

An FA-18C Hornet from the "Rampagers" of VFA-83 prepares for launch from Saratoga.

A-12 Avenger Canceled

The planned replacement for the Navy's A-6 carrier-based attack aircraft was canceled on January 7, 1991. The Navy notified the contractors, McDonnell Douglas and General Dynamics, that it terminated the contract for the A-12 *Avenger* for default based on the inability of the contractors to design, fabricate, assemble, and test the A-12 within the contract schedule, and to deliver an aircraft that meets contract requirements.

After determination of schedule slippage, cost growth, and management deficiencies, Secretary of Defense Dick Cheney directed the Navy on December 14, 1990, to show cause by January 4, 1991, why the program should not be terminated. Mr. Cheney was told in a January 5 meeting that the only way to preserve the program would be to restructure the contract and provide additional funding.

The January 1988 fixed-price contract called for eight research and development aircraft through full-scale development phase for no more than $4.8 billion. The Defense Department estimated that this phase would cost at least an additional $2.7 billion. The contract also called for six production aircraft at no more than $1.2 billion, and long-lead funding of $200 million for eight more production aircraft. A total buy of 620 A-12s was planned.

Mr. Cheney stated that the program could not "be sustained unless I ask Congress for more money and bail the contractors out. But I have made the decision that I will not do that. No one can tell me exactly how much more it will cost to keep this program going, and I do not believe a bailout is in the national interest. If we cannot spend the taxpayers' money wisely, we will not spend it.

"My decision against a bailout is solely in response to the problems with the current program. We will still need to develop a next-generation strike airplane for our aircraft carrier force to replace the aging A-6. Stealth technology will be required if attack aircraft are to elude advanced fighters and surface-to-air missiles in the future. The U.S. needs to maintain the capability to project power through the use of naval strike forces," Cheney stated.

CVW-13 Guardians Disestablished

The Navy's youngest carrier air wing, CVW-13, was disestablished effective January 1, 1991, disbanded after almost seven years of noteworthy service as a result of budgetary constraints and pending force structure reductions.

The fourth air wing in Naval Aviation history to bear that number, CVW-13 faded into history in a ceremony held at NAS Oceana, Va., on January 16 as its last commander, Capt. Paul Cash, directed that the air wing's flag be folded. The squadrons assigned to CVW-13 have all been reassigned, and some are slated to soon fade into history as well.

CVW-13 was established on March 1, 1984, specifically for assignment to *Coral Sea* (CV-43), the ship on which it made all three of its Mediterranean deployments. CVW-13, the first to deploy the FA-18A *Hornet*, first headed for the Mediterranean on October 2, 1985, introducing the new fighter into combat against Libya in March and April 1986. The *Guardians* returned from their last deployment on September 30, 1989, when *Coral Sea*, the "Ageless Warrior,"

returned from hers.

The retirement of CVW-13 leaves the Navy with 12 active and 2 reserve carrier air wings.

1990 Safest for Navy Air

The Navy achieved its best Class A mishap rate in 1990, coming in at 1.98, the first time ever below the 2.00 mark. The combined Navy/Marine rate for 1990 was 2.96, the third best year in Naval Aviation history, exceeding only 1988 and 1989.

Naval Air Force, U.S. Atlantic Fleet, tied its best year with a rate of 1.64. Naval Air Force, U.S. Pacific Fleet, equaled its lowest number ever of Class A mishaps. Naval Air Training achieved its best year also, flying over 490,000 student flight hours and incurring only four Class A mishaps for a rate of 0.81, its second year below the 1.00 rate. The number of fatalities in all Navy/Marine mishaps totaled 44, the lowest ever recorded.

USMC Helos Evacuate Embassy in Somalia

In a daring operation reminiscent of *Sharp Edge* in Liberia last year, Marine Corps helicopters extracted American citizens and other foreigners from the war-torn capital of Somalia in January 1991.

In the rescue named Operation *Eastern Exit*, helicopters from *Guam* (LPH-9) and *Trenton* (LPD-14) inserted a platoon of Marines into the U.S. embassy compound in Mogadishu at night and evacuated 260 Americans and foreigners from 30 other nations on January 4 and 5, 1991. *Guam* and *Trenton* were diverted from their Operation *Desert Shield* station in the northern Arabian Sea to perform the rescue.

The first helicopters on the scene were two CH-53Es from HMH-461 aboard *Trenton*, which were refueled twice in flight by Bahrain-based Marine KC-130 tankers to make the 450-plus-mile night over-water flight from the ships to Mogadishu. As the ships closed the distance, CH-46E helicopters from HMMs 263 and 365 aboard *Guam* completed the evacuation as battles between opposing Somali factions raged in the city. Shortly after the evacuation, the embassy was pillaged by looters.

VAdm. Robert J. Kelly, Deputy CNO for Plans, Policy and Operations, praised the successful mission as "a perfect example of what freedom of the seas and forward presence represents."

For the Record...

- The Navy's support of the longest running noncombatant evacuation operation in recent naval history came to an end on January 9, 1991, when *Nashville* (LPD-13) with CH-53E helicopters of **HC-4** departed "Mamba Station" off Liberia. Operation *Sharp Edge* evacuated over 2,400 people with Navy and Marine Corps helicopters and transport aircraft. (See *NANews*, Nov-Dec 90, pp. 5-6, and Jan-Feb 91, p. 9.)
- Navy aircraft flew **40,870 hours** in support of **drug interdiction operations**, in 1990, compared to 3,633 hours flown in 1989.
- The VA-37 *Bulls* were officially redesignated **VFA-37** on November 28, 1990, as they transitioned at NAS Cecil Field, Fla., from the A-7E *Corsair II to the* **FA-18C** night-attack *Hornet*.
- VA-105, also in transition to the night-attack **FA-18C**, was officially redesignated **VFA-105** on December 17, 1990; the redesignation was marked in a ceremony held at NAS Cecil Field, Fla., on January 10, 1991. On November 29, 1990, the *Gunslingers* transferred one of their last A-7Es, BuNo 159268, to the Intrepid Sea-Air-Space Museum in New York City; the *Corsair II* was restored in the colorful green and white markings worn during the mid-1970s.
- The Pacific Fleet's last fleet *Corsair II* squadrons, VAs 27 and 97, were redesignated **VFAs 27 and 97** effective January 24, 1991. Assigned to

PH3 Walter Smith

After a hiatus of four years, "tail feathers" are returning to tactically configured P-3 patrol planes assigned to squadrons of Patrol Wings, Atlantic. Removed beginning in August 1986 for reasons of operations security, the once-colorful unit markings were a familiar sight around the world as symbols of unit pride and camaraderie. In October 1990, RAdm. Byron Tobin, Commander Patrol Wings, Atlantic, authorized the return to unit markings (albeit in low-visibility paint to match the tactical paint scheme), to include tail codes and insignia, and nose modex numbers. Shown here is the tail of the second VP-10 P-3C to have its markings affixed.

CVW-15, the two units transferred their last A-7Es in December 1990 and are being equipped with night-attack-capable **FA-18C** *Hornets*.

• The *Bats* of VMA(AW)-242 at MCAS El Toro, Calif., were redesignated **VMFA(AW)-242** on December 14, 1990, becoming the second Marine operational squadron to transition to the **FA-18D** *Hornet*. The *Bats* transferred the last El Toro-based *Intruder* to VA-52 on December 21.

• **VP-16** recently transitioned from the P-3C Update II.5 to the **P-3C Update III**, marking the completion of the outfitting of Patrol Wing 11's six squadrons with the Update III version.

• The **Korean Defense Ministry** announced on December 10, 1990, a decision to procure eight Lockheed **P-3C** Update III *Orion* patrol planes. The deliveries, scheduled in 1995, will result in an opening of a P-3 production line at Marietta, Ga. Production at Palmdale, Calif., is scheduled to end this year with the delivery of three CP-140A *Arcturus* versions. (See *NANews*, Nov-Dec 89, p.5, and Jul-Aug 90, pp.4-5.)

• Former Commander, Naval Air Systems Command, **VAdm. Forrest S. Petersen**, USN (Ret.), died on December 8, 1990. VAdm. Petersen was a WW II veteran, an X-15 test pilot, commanding officer of *Enterprise* (CVAN-65) during the Vietnam war, a carrier division commander, and Deputy Chief of Naval Operations (Air Warfare).

• Retired **RAdm. Thomas D. Davies** died on January 21, 1991. RAdm. Davies piloted the famous P2V **"Truculent Turtle"** on a nonstop flight in 1946 from Perth, Australia, to Columbus, Ohio, an 11,236-mile distance record unbroken for the next 16 years. RAdm. Davies won a Distinguished Flying Cross for sinking a German submarine in WW II, and later commanded a fleet air wing and a carrier division. As president of the Navigation Foundation, he headed the investigation that refuted claims that Robert E. Peary falsified his claim of reaching the North Pole in 1909.

• The remains of **LCdr. Robert C. McMahan** were the first identified from a group of 20 sets returned to the United States from Vietnam in September 1990. LCdr. McMahan, assigned to VF-194 aboard *Ticonderoga* (CVA-14), was lost when his F-8E was shot down over North Vietnam on February 14, 1968, by a surface-to-air missile. The remains of **LCdr. Frederick W. Wright III** were later identified from the group. LCdr. Wright, Operations Officer for CVW-3, was shot down over North Vietnam on November 10, 1972, while flying a VA-37 A-7A from *Saratoga* (CV-60).

• The *Blue Wolves* of **VS-35** will be officially established at NAS North Island, Calif., on April 4, 1991. VS-35 will be the third S-3 squadron to bear that designation, one other existing briefly in the mid-1970s and another for over a year in the late 1980s.

• A new reserve fleet logistics support squadron will be established at NAS New Orleans, La., effective June 1, 1991. **VR-54** will operate two **C-130T** *Hercules* transports.

Photos courtesy National Museum of Naval Aviation

A third Navy plane has been recovered from the bottom of Lake Michigan by a salvage team sponsored by the National Museum of Naval Aviation. The only remaining Grumman F4F-3 Wildcat, BuNo 03872 (top), one of 285 built with nonfolding wings, was recovered in 160 feet of water on December 22, 1990. This F4F was lost on August 17, 1943, during carrier qualifications aboard Wolverine, a small, paddle-wheeled training carrier used during WW II to train aviators. The pilot, Lt. Albert Newhall, was unhurt in the mishap. After almost five decades underwater, the aircraft still had operable controls, air in the tires, fuel in the tanks, and oxygen in the bottles. The Wildcat joins an SBD-3 Dauntless, BuNo 06508 (center), and the only SB2U-2 Vindicator known to exist, BuNo 1383 (bottom), which were also recovered from Lake Michigan last year (see "Dive Bombers Rise from the Deep," NANews, Jan-Feb 91, p.8).

Osprey Makes First Shipboard Landing

By JO3 Michael Buckingham, USS Wasp

PH2 Roy C. Witham

MV-22A prototype number four, BuNo 163914, makes the first shipboard landing of an Osprey on December 4, 1990, aboard Wasp (LHD-1) off the coast of Norfolk, Va.

As the Navy steams toward the 21st century, *Wasp* (LHD-1) plots a steady course with the future in mind. On December 4, 1990, this first-of-her-class multipurpose amphibious assault ship completed the first-ever recovery and launch of the Bell-Boeing MV-22 *Osprey*.

These operations were conducted to test the *Osprey*'s shipboard compatibility. While the MV-22 was designed to operate on the LHD-1 class, it had not yet been tested aboard a ship. The third and fourth V-22 prototypes were involved in the operations conducted in December approximately 10 miles off the coast of Norfolk, Va.

The aircraft's ability to take off and land was tested, as well as its ability to be moved about on the flight and hangar decks. Maintenance personnel simulated tasks which would be performed on the aircraft onboard the ship.

"One of our concerns was the severe turbulence which is created by the two 38-foot propeller rotors," said ABHC Mike P. J. McGeary, *Wasp*'s flight deck leading chief petty officer. "This turbulence makes it very difficult for the flight deck personnel to work around the aircraft while the propellers are turning."

The *Osprey*, which is capable of all-weather, day-and-night operations, was unable to make an earlier scheduled flight to *Wasp*. This was due to rainy conditions, which would have had an adverse affect on the sensitive equipment installed aboard. "Because of all the test equipment onboard the aircraft, it was undesirable to fly the *Osprey* in the rain during this testing and evaluation period," Chief McGeary explained.

According to Kurtis R. Long, Flight Test Engineer for the V-22 Osprey Program, the *Osprey* is considered to be the replacement aircraft for the medium-lift assault mission. "Basically, it is supposed to replace the H-46 helicopter," he said. "The V-22 program, which started in the early eighties, is an offshoot of the XV-15 tilt-rotor program," he added. The XV-15 program, better known as JVX, was the first successful tilt-rotor program.

The *Osprey* is a multimission aircraft which was designed for all branches of the military. However, its primary Navy/Marine Corps mission is the vertical assault transport of troops, equipment, and supplies from amphibious assault ships to operational areas.

Other primary *Osprey* missions envisioned are strike rescue, delivery and retrieval of Navy SEALs and other special warfare teams, and logistics transportation in support of the fleet.

The new tilt-rotor aircraft boasts two 10,000-pound external cargo hooks, crashworthy troop and crew seats, a rescue hoist, in-flight refueling, a cruising speed of approximately 270 knots, and a shorter dash speed of around 300 knots.

Despite all of the *Osprey*'s capabilities, the multimillion-dollar project's financial future has been in question for sometime. But the program has seen some positive developments since Congress approved funding for continued research, development, and testing.

With all tests of the MV-22A *Osprey* completed successfully, *Wasp* looks forward to accomplishing her primary role: embarkation, deployment, landing, and support of all elements of a U.S. Marine Corps landing force.

PH2 Roy C. Witham

The complex wing and rotor-folding arrangement of the MV-22A Osprey is evident in this view taken during shipboard compatibility trials aboard Wasp (LHD-1).

T45TS: Evolving and Expanding

By LCdr. Rick Burgess

Photos courtesy of McDonnell-Douglas Corporation

The T-45 Training System (T45TS) program, designed to train future Naval Aviators in the strike syllabus, is progressing well toward fleet introduction after correcting the majority of known deficiencies. It is also being expanded to encompass more of the Navy's aviation training requirements. The program has been "re-baselined" for an initial operational capability by the end of 1992.

The heart of the T45TS, the McDonnell-Douglas T-45A *Goshawk* training aircraft, is undergoing developmental and operational testing after receiving several "fixes" to carrier suitability problems identified in the initial testing conducted in November 1988 (see *NANews*, March-April 1990, page 4). The first two production aircraft have joined the two prototypes in the test program. In the meantime, production has switched from California to Missouri, and the requirement for a digital cockpit and for aircraft to train Naval Flight Officers and E-2 and C-2 pilots has been added.

The System

The T45TS is a total system approach to training, with five major components being provided by the contractors – one of which is the *Goshawk*. On-site testing is being conducted at NAS Kingsville, Texas, on the computerized academic instruction 4E10 device, which has sophisticated animation to teach such subjects as gunnery and formation flight. On-site installation of the training integration system, Device 4E9, has begun and is scheduled to be fully operational by June 1991; this system provides documentation and scheduling of all training.

Two types of ground-based simulators will be used. The 2F137 instrument trainers will familiarize students with the cockpit and instrument flight conditions. The 2F138 visual simulators, in the process of final government acceptance, provide the student with a computer-generated landscape and atmosphere and are programmed to train the student in such phases as carrier approaches, formation flight, emergencies, and weapons delivery. The simulators have no motion bases, but are equipped with G-suit/G-seat motion cuing to present a feel for the effects of G forces in flight. The simulators may be used for T-2 and TA-4 students as appropriate until the T-45 replaces the older jets.

The final component is the integrated logistic support, which is undergoing progressive build-up. Contractor support of the simulators at NAS Kingsville has already begun, and aircraft maintenance support will commence in January 1992 when the first production T-45A is delivered to Training Air Wing (TraWing) 2 at Kingsville.

Fixes

Five deficiencies identified in the T-45 prototypes during the initial testing phase have been corrected and successfully verified by Navy test pilots. A problem of longitudinal control system oscillation at high Mach number speeds was corrected by installation of revised gearing, rebalanced control rods, and viscous dampers. Poor wave-off and bolter performance, inadequate thrust in the pattern, and control of glide slope from off-optimum conditions were corrected by replacement of the Rolls-Royce Adour 861 (F405-RR-400) engine with the Adour 871 (F405-RR-401), along with fuel control adjustments. The Adour 871, producing 5,845 pounds of thrust, was designed originally for use in hot Middle-Eastern climates by British Aerospace *Hawk* trainer and ground attack aircraft, from which the *Goshawk* is derived.

Another deficiency that was corrected was an abrupt pitch that occurred with speed brake operation; a pitch compensator and improved speed brake actuators were installed and tested. Lateral/directional handling characteristics during power approach were improved by installation of a six-inch fin cap extension, a no-float rudder, a central ventral fin, improved aileron gearing, an aileron-rudder interconnection, and improved yaw damper. These corrections improved

roll response, poor control harmony, and excessive adverse yaw and Dutch roll.

Inadequate stall warning and excessive roll-off at stall called for installation of wing leading-edge slats, a rudder shaker for warning, and increased lateral control gearing. The first prototype was modified in 1990 at NATC Patuxent River, Md., with slats fixed in the extended position and is being test flown as such; the second prototype is being flown with slats in the retracted position. The full-span slats, similar to those on the A-6 aircraft, make the T-45 stall as benignly as the T-2 that it will replace. The first and second production aircraft, manufactured without slats, will have them retrofitted, whereas subsequent production aircraft will emerge from the St. Louis, Mo., factory with fully operational slats.

Another deficiency identified later was an intermittent lateral oscillation during the landing rollout from 120 down to 70 knots. This was corrected by revised nose-wheel steering that engages at touchdown and retained rudder yaw damping while on the ground.

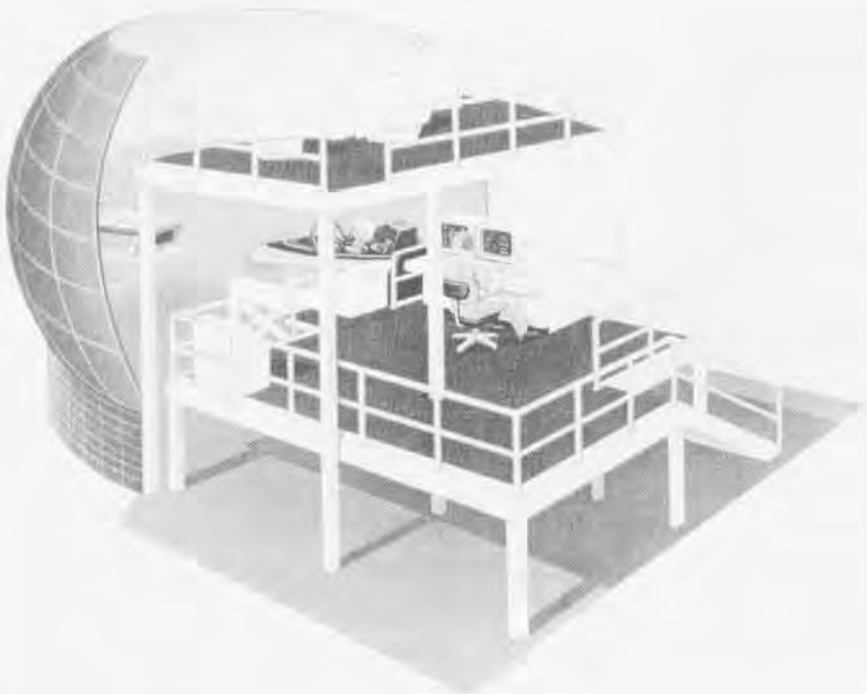
In the over 700 hours of testing, the T-45 has demonstrated a remarkable ruggedness. According to Captain Richard E. Koehler, the T45TS program manager, the *Goshawk* has suffered "no structural failures – phenomenal for a tactical-type aircraft."

Test Fleet

By the closing months of 1990, the entire fleet of four T-45As had been concentrated at NATC Patuxent River for an intensive test program. The first prototype, BuNo 162787, has been refitted with the production Adour 871 engine and the fixed extended slats. The second prototype (BuNo 162788), built at Douglas' Long Beach, Calif., factory like the first, retains an uprated Adour 861 engine and has slats fitted in the retracted position. The first and second production aircraft (BuNos 163599/163600), delivered by Douglas at Palmdale, Calif., on October 10 and November 15, 1990, respectively, are configured with the same engine and

Opposite page, the first production T-45A Goshawk jet trainer, BuNo 163599, will be retrofitted with leading edge wing slats. Below, the first three T-45As are seen over NATC Patuxent River, Md., in late 1990.

U.S. Navy



The 2F138 visual simulator will allow students to practice approaches, formation flight, and weapons delivery.

Family portrait – the entire T-45A fleet gathered at NATC Patuxent River, Md., in late 1990.

Below, the 4E10 desktop computer has sophisticated animation to train student aviators in such subjects as gunnery and formation flight. Bottom, the first T-45A prototype has been fitted with leading edge wing slats fixed in the extended position for testing.

wing as the second prototype and will have fully operational slats retrofitted.

Production

A year will elapse until the third production example is delivered in January 1992. BuNo 163601 and all subsequent aircraft will be assembled at the McDonnell factory in St. Louis. (Seventy percent of the components are manufactured in the United Kingdom.) These aircraft will feature fully operational slats and will be the first T-45s to enter service with TraWing-2, NAS Kingsville, flying with VTs 21, 22, and 23. TraWing-1 at NAS Meridian, Miss. (with VTs 7 and 19), and TraWing-3 at NAS Chase Field, Beeville, Texas (with VTs 24, 25, and 26), will follow in transition. A requirement of 302 T-45As has been set, in addition to 32 2F138 simulators, four Device 4E9 training integration system computers, and 49 Device 4E10 computer-assisted instruction devices. McDonnell is tooled for a production rate of four T-45s per month with one shift of workers.

Expanding Requirements

The planned production of 302 aircraft is based on a requirement to train 600 pilots per year. Although force-level reductions may result in a pilot training requirement (PTR) of 400 to 450, an ability to surge to a PTR of 600 has been deemed desirable by Navy officials in view of historical trends. Even assuming a PTR of 450, the ability of the T-2 and TA-4 inventory, given historical attrition, to meet that PTR would falter by mid-1996. Some T-2 parts are out of production, forcing cannibalization of parts from the T-2 fleet.

In 1990, a proposal was made to incorporate the training of Naval Flight Officers and E-2 and C-2 pilots in the T45TS program. The requirement would call for 59 analog cockpit T-45As and six simulators to replace T-2B/C and TA-4J aircraft with VTs 4, 10, and 86 in TraWing-6, NAS Pensacola, Fla.

Going Digital

Another requirement initiated in 1990 was the incorporation of a full digital ("glass") cockpit in the T-45. Originally, a hybrid digital-analog cockpit was envisioned, but in March 1990 the Chief of Naval Operations initiated a concept study for a fully digital cockpit. The percentage of strike syllabus graduates detailed to fill fleet digital cockpits is expected to reach 60 percent by the end of the decade as the Navy and Marine aircraft inventory is increasingly modernized with digital cockpit aircraft, such as the FA-18. To meet the residual analog cockpit training requirement, the T45TS simulation can be programmed to display analog instruments. The flexibility of digital displays may also allow the T-45 to be used for economical "lead-in" familiarization with the fleet aircraft that the student will eventually fly.

Economies

The T45TS is designed to further economize the Navy's strike pilot pipeline in terms of flight hours, personnel, and aircraft (see table). Contractor maintenance has been a feature of the training command for years and will continue, with no requirement for enlisted mechanics to maintain the aircraft and simulators. Further economies will result from reduced flight instructor and aircraft needs, as well as lower fuel requirements coming from the reduced hours and the fuel economy inherent in the Adour 871 engine.

Weapons

Instructor pilots will see some changes in the strike syllabus with regard to weapons. Unlike the TA-4J, the T-45A is not fitted with a gun. Gunnery training will be conducted using simulation and the student will get feedback from a video camera linked with the heads-up display. The only weapons that the T-45 will carry will be 25-pound Mk 76 "LBBs" (Little Blue Bombs) and 2.75-inch rockets.

Milestones

The four T-45 test aircraft will continue in their intensive test program throughout 1991 and 1992. Carrier suitability trials commence this year, with sea trials planned later in the year. Additional high-angle-of-attack and initial spin work will continue this year and into 1992, with technical evaluation and operational evaluation preceding the scheduled initial operational capability.

This spring a decision will be made whether to order limited production of the T-45A. At this point, the *Goshawk* seems to be well on its way to success as the jet that will train a couple of future generations of Naval Aviators. ■

System Comparison

(Strike Pipeline)

	Current System (T-2/TA-4)	T45 Training System	Delta
• Syllabus Requirements			
Flight Hours	191	160	-16%
Simulator Hours	112	95	-15%
• Personnel			
Enlisted	No Change	No Change	No Change
Instructor	407	342	-16%
• Hardware Requirements			
Number of Aircraft	371	210	-43%
Number of Simulators	51	32	-37%

Special thanks to Cdr. Robert Yakeley, T45TS Requirements Officer, for assistance with this article.

XF6B-1

By Hal Andrews

Boeing today is this country's – and the world's – premier manufacturer of transport aircraft. With the 50th anniversary of our entry into WW II coming in December, attention will be paid to the Boeing bombers which played a major role in both European and Pacific theaters during the war. And Boeing's last bombers, the B-52s, are still part of the forces in the Persian Gulf arrayed against Iraq's occupation of Kuwait.

So it's sometimes hard to realize that Boeing's original recognition was as a principle builder of fighter aircraft. For over a decade, starting in the early 1920s, Boeing produced more fighters ("pursuits" to the Army Air Corps, predecessor of today's Air Force) – and more different basic production models – for the Army and Navy than even its closest rival, Curtiss. In those days of biplanes with low takeoff and landing speeds, the two most widely used Boeing models (the first operating ashore, off grass fields, without brakes) were flown by both the Army and the Navy, with carrier hooks and different landing gears on the Navy versions.

The first four basic models used by the Navy, FBs through F4Bs, saw extensive Navy service; these two specific models served in Marine squadrons as well. The fifth, the 1930 XF5B-1 (*NANews*, Jan-Feb 87) all-metal, parasol monoplane did not go into production, but its semi-monocoque fuselage replaced the fabric-covered frame construction of the early F4Bs in the later F4B-3s and -4s, produced in 1931-32. Like the prototypes of earlier Boeing Navy fighters, the XF5B-1 – and even the prototype of the all-metal fuselage F4Bs – was built at company expense.

At Boeing, as well as in the Navy's Bureau of Aeronautics (BuAer), the early thirties was a period of major transitions in aircraft design. Boeing and other companies were flying their first cantilever low-wing, all-metal monoplane transport aircraft. Monoplane racers were winning the air races. Higher power twin-row radial engines looked like the next step in aircraft power plants. These, along with many other advances, such as the National Advisory Committee for Aeronautics (NACA) engine cowling for reducing the drag of air-cooled radial engines and retractable landing gears, promised more efficient, higher speed aircraft.

In many cases, the net advantages of incorporating these features in prospective military aircraft designs were not completely clear. In these early depression years cost was also a major consideration, with all of the advanced features increasing aircraft cost. Within BuAer, there was interest or activity in many of these technical areas, as well as an evolving interest in providing fighters, already used for dive-bombing with 100-pound-class bombs, with the ability to deliver a single more-effective 500-pound bomb.

Late in 1930, BuAer was working with Boeing towards the first Boeing Navy fighter prototype that would be developed under contract, a high-speed monoplane. XF6B-1 was the tentative designation used. At the same time, BuAer designers were working on the design of a biplane carrier fighter/500-pound dive-bomber, and a program was initiated to develop a twin-row engine suitable for such a design. The twin-row engine, especially when cowled, would increase the pilot's visibility for carrier landings due to its smaller diameter compared to the single-row radials of equal power then in use.

Early in 1931, work on the monoplane was stopped and the Boeing effort shifted towards a prospective contract to build a fighter/bomber matching the BuAer

design, but using typical design features based on Boeing's F4B-3 for which a production contract was just being signed. One major change would be to replace the F4B's wooden wing structure with metal, though retaining the fabric covering, in the XF6B-1's new equal span and area biplane wing design. At the end of June – in those days, the end of the fiscal year – the XF6B-1 contract was signed and design was under way.

While Pratt & Whitney had not yet defined the design of the new R-1535 engine well enough to provide a mock-up, the rest of the mockup was ap-

Rollout

redesign.

January 1933 saw the completed XF6B-1 rolled out in Seattle, Wash., with initial flights in February. Early test results were disappointing, particularly with respect to maximum speed. The landing gear and its fairing were redesigned, different engine cowling designs and propellers tested, and other fuselage and strut fairings tried before a final configuration was reached. Demonstration and the start of Navy testing followed at NAS Anacostia, D.C., in May, but by then BuAer had decided that the F6B would not go into production due to remaining performance and engine deficiencies; the testing was for acceptance as an experimental type.

Trials were completed in June and the XF6B-1 was accepted and started its test career, initially addressing development and service testing of the R-1535 engine. Modifications were made by Pratt & Whitney and Chance Vought at East Hartford, Conn. (with Boeing, both were part of United

Navy flight test

Flight test modified

proved in the fall, subject to correction of the usual design problems. Two major design problems subsequently resulted in significant changes. One was the need to move the 500-pound centerline mounting forward for center-of-gravity location purposes, necessitating redesign of the landing gear to clear the bomb during carriage and release. The other was redesign of the wing spars.

By February 1932, mockup inspection of the revised design – still without the engine – was completed and component construction and testing under way. In August, the engine mockup was received so that the power plant installation design could be completed. Failure of the landing gear in drop tests in the fall led to its further

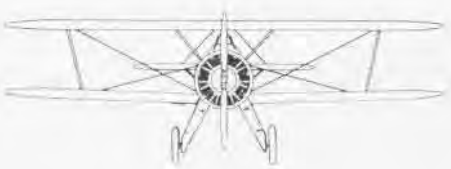
Aircraft and Transport Corporation), followed by service test flying at Anacostia and Norfolk, Va.

In March 1934, the XF6B-1 was redesignated XBFB-1, reflecting the change for all of the Navy's 500-pound-bomb-carrying fighters. Later that year, it was assigned for dive and other high-speed flight testing by NACA, predecessor of today's National Aeronautics and Space Administration, at Langley Field, Va.

Overhauled at the Naval Aircraft Factory, Philadelphia, Pa., in late 1934/early 1935, it returned to Langley for continued research flying until retired in August 1936. By then, Boeing had left the fighter business, tying its future to multiengine bombers and transports. ■

XF6B-1

Span		28'6"
Length		22'1"
Height		10'5"
Engine	P&W R-1535-44	625 hp
Maximum speed		195 mph
Service ceiling		20,700'
Range (normal)		437 m
Maximum fuel		737 gal.
Armament		One 30-cal. machine gun; One 50-cal. machine gun; and One 500-lb. bomb



Wings in Washington

Story and Photos by JO1 Milinda D. Jensen

Sometimes you have to climb out of the cockpit and climb behind a desk. Not exactly where most pilots want to be, but according to the Aviation Junior Officer Assignment Shore Coordinator in the Naval Military Personnel Command (NMPC), Lieutenant Commander Paul Pietsch, "A career-oriented naval officer will never regret coming to Washington, D.C. It's an eye-opening experience."

Lieutenant Bob Shea agrees."You see how the Navy functions in the big picture, but you also get to see the pieces."

Lt. Shea has been seeing a lot of the pieces during his tour as an action officer in the White House Liaison Office.

"I answer queries to the President and Vice President from the public. Most of my job is dealing with human relations," he said.

In a recent query, Lt. Shea provided information that may have saved a life. "A dependent wife was having problems getting CHAMPUS to help her get a lung transplant. She came to us as her last hope. Fortunately, we were able to help out because we knew the proper channels to go through to get her the medical assistance for this experimental type of operation," the White House liaison officer commented. "That's what makes this job so interesting. You're always dealing with different people and different problems.

"I miss the comradery of the squadron, but I've been able to enhance my administrative skills and learn computers and that will help in future job assignments."

Learning computers and data systems was the lure that brought Lieutenant Bill Thorpe to his assignment as Volunteer Education Programs Officer in NMPC.

"One of the main reasons that I took orders to D.C. was to gain knowledge of computers. After arriving, I found out that I was needed in this job, so my original plans changed," Lt. Thorpe said. "I get an enormous amount of satisfaction knowing that what I do enables the fleet sailor to continue his/her off-duty education," he went on. "I see the care and concern that goes into these programs and how much officials here want sailors to improve themselves through college options."

Thorpe added, "One thing to keep in mind when accepting orders to D.C. is that you might not end up in the job you originally were billeted for. Stay flexible."

Adapting to job changes within the system is a given; adapting to cost of living expenses is another matter. "If you're in the aviation community and get flight pay, the bonus, or both it's still affordable for a lieutenant to live in the area," Thorpe commented, "but your standard of living isn't going to be the same. You learn to live on a budget and pace certain things that you want to do.

"The cosmopolitan atmosphere has a lot to offer and there's a wealth of

"I've been able to see how the future leadership in my community is chosen."

Lt. Bob Shea

"It's pretty relaxed in this area. When scheduling you can take into account what people need to do for themselves. You don't have that flexibility in a squadron."

Lt. David Waagbo

good schools for higher education," he added.

Like any major move, the knowledge that is learned and put to good use can be helpful. "I've been able to work as a projectionist during a promotion board. You really get a good sense of what good fitness reports are and how they can affect your future," Thorpe said. "I've also been able to see some of my recommendations implemented on policy and how they've improved conditions fleetwide.

"The most important thing anyone can do before coming to Washington is set your own goals," he emphasized. "Decide if you want more time with your family or time to work on a degree – whether you want a low-key job that's not going to be stressful or a job that's going to put you on the fast track. Make a decision, then talk to the detailer, and see if he can get you what you're looking for." He added, "Do a little homework before you come here."

Lieutenant David Waagbo did his homework and found that his reasons for wanting a D.C. assignment fit right in with the needs of the Navy.

"I have family in the area, so my first goal was to come back home. My second goal was to keep flying," he explained.

Lt. Waagbo has been able to do both in his job as an Assistant Schedules Officer/Research P-3 Pilot at the Naval Research Lab, one of the few flying billets in Washington.

"I fly about two to three days a week. The rest of the time is spent in the office," he commented. "I'm flying the same platform as the P-3, but the planes are gutted so we can install scientific equipment to obtain data. My main mission is to support the scientists in their research. I lobbied pretty heavily for this job," he added. "It's important to keep in touch with the detailer, so he knows what you're looking for and when it might be available."

Since the junior officer detailer places over 2,000 personnel within the D.C. area, it's a wise move to stay in close contact with him. "If you're interested in primo duty and career-enhancing jobs, you have to start about nine months before you're ready to roll," said LCdr. Pietsch. "It's really important that you have a strong performance record. After I receive a call I find out that individual's background and desires, then I can start matching the person with the job. Some of the D.C. billets require packages to be sent to a perspective billet and selectees to be interviewed, so it works a lot like civilian job hunting. If you want a certain job and you fit the requirements for that billet, you have to put in some groundwork to even be considered. It's like most anything worth having; you have to work for it," added the aviation detailer.

Pietsch summed up, "Keep in mind that the needs of the Navy generally come first, but as far as coming to D.C., Vice Admiral Dunleavy, Assistant Chief of Naval Operations (Air Warfare), said: 'In peacetime, Washington is combat duty; it's the place to be.'" ■

Lieutenants Waagbo, Shea, and Thorpe were all attached to VP-45, a P-3 squadron at NAS Jacksonville, Fla., before coming to Washington, D.C.

"You really learn how the Navy organization is run."

Lt. Bill Thorpe

Test Pilot School Student Logs MiG-21U Time

One of the latest entries in Lieutenant Dave Prater's flight logbook is an aircraft few U.S. Navy pilots will ever get the chance to fly. As a member of the Naval Test Pilot School Class 98, Prater flew a MiG-21U, a two-seat trainer version of the famous Soviet-built fighter, for his final exercise before graduation last December 14.

During the Development Test, Phase IIA (DT-IIA) exercise, each of the 33 students plans and executes a comprehensive flight test evaluation on an aircraft he or she has never flown. Earlier in the year the students in his class were asked to select the top three aircraft they'd like to fly for their DT-IIA. Though no one at the school had ever flown the MiG for the final project, Prater listed it as his first choice. Noting that a great deal of coordination was required before the Soviet-made aircraft could be deemed suitable for a DT-IIA, he credited the efforts of Test Pilot School (TPS) staff for this once-in-a-lifetime opportunity. Specifically, each DT-IIA platform must pass suitability criteria involving safety, maintenance, and cost. In this case, Commander Steve Enewold and Commander Farrell Corby of TPS inspected and flew the MiG-21 in preparation for Prater's flights.

On November 3, 1990, Prater, an FA-18 pilot, received word that he had been chosen to fly the MiG. Eleven days later, he was on his way to Burlington, Vt., home base for the aircraft's owner, Warplanes Incorporated, a civilian company that buys and sells classic airframes and parts. Prater was to fly a MiG-21U which the company had purchased in July and received State Department approval to operate in the U.S. for selected government projects. This particular aircraft was built in 1967 and had been used by the Hungarians as a trainer. Perhaps the most exported jet combat aircraft in history, the MiG-21U is still regarded as a capable fighter.

After two days of aircraft familiarization, Lt. Prater launched on the first of four test flights. He said the aircraft performed well. It accelerated rapidly, especially at high speeds, but he felt the MiG's flying qualities left a lot to be desired. Prater added that the aircraft also had low fuel capacity; in four test flights, he logged only 3.7 flight hours. Comparatively speaking, he said the MiG might be similar to an A-4 with afterburner.

Since it was built in the Soviet Union, the aircraft's instrumentation was in Russian; however, the plane's owner had labeled most of the cockpit instruments and controls in English. Overall, Prater said the MiG was an extremely simple aircraft to fly.

Because of its age, the MiG-21U didn't offer much insight into today's Soviet aircraft, "but," the TPS graduate added, "it was a fun airplane to fly and presented a challenging and rewarding conclusion to the rigorous 11-month TPS syllabus." ■

Thanks to the NAS Patuxent River Public Affairs Office and The Tester staff for their contributions to this article.

Lt. Dave Prater poses with the MiG-21U at the Burlington, Vt. airport.

Photo courtesy Aero Union Corp.

P-3A BuNo 151385 demonstrates business of the Aerostar: droppi 3,000 gallons of fire retardant.

Old Orions, New Roles

By LCdr. Rick Burgess

The P-3A version of the Lockheed *Orion* is no longer hunting submarines for the Navy – something it did with excellence for 28 years of the cold war. Most of the aircraft retired gracefully to the Arizona desert. In 1990, however, a few of them went on to new careers fighting hotter wars, the ones against the devastating wildland fires in California.

Chico, Calif.-based Aero Union Corporation, a company experienced in aerial firefighting, purchased 10 P-3As to add to its fleet of DC-4 and P-2 aircraft used in fighting fires under contract to the U.S. Forest Service. Two of them, BuNos 151355 and 151385, were modified in time to fight the fires that raged last year in California. One went into action on May 16, 1990, from Santa Barbara, and the other on June 10 from Redding.

The aircraft, renamed *Aerostar* by the company, underwent a three-month modification process that involved removal of most Navy equipment, making the aircraft much lighter, and installation of a 3,000-gallon retardant tank in the bomb bay area.

A typical mission involves a 40-mile-radius flight, during which the P-3A drops its load of chemical retardant on the flanks or in front of a fire. During the 1990 season, the aircraft crews, working with ground fire teams, were credited with saving many homes and other structures.

Not surprisingly, many of the pilots that fly the *Aerostars* were Naval Aviators in their earlier careers; their skills as military aviators are easily transferrable to fighting fires.

Charles Isele, Director of Operations, is a former commanding officer of VP-47, a P-3 squadron based at NAS Moffett Field, Calif.

Aero Union expects to convert its P-3A fleet into firefighters at a rate of two or three per year, with four or five aircraft ready for the 1991 fire season. One of the unmodified aircraft, BuNo 151377, was leased to Allison for a period as a test bed for the new GMA 2100 turboprop engine under development – possibly as a contender for any future reengining of the Navy's P-3 fleet. ■

Although designed as floatplanes, land-based OS2Us provided vital ASW patrols along the East Coast and Caribbean.

Wings of Victory

Part 3

By Lee M. Pearson

Parts 1 and 2 discussed prewar technical development of Naval Aviation and wartime development in some areas. In this concluding article, developments in other areas are discussed.

Attack Planes

In December 1941, the fleet was equipped with the obsolete TBD *Devastator* torpedo bomber and its contemporary but modernized SBD dive-bomber. In mid-1942, the Grumman TBF *Avenger*, also built by Eastern as the TBM, replaced the TBD. The SBD fought from carriers for another two years; a more powerful engine, radar, improved armament, etc., kept it combat worthy. It typifies the endeavor described by S. Paul Johnston, a leading aeronautical research administrator: "Everything... learned from wind tunnel and structural test laboratories was incorporated in the production models in an effort to outfly and outfight the opposition."

At the time that the aviation industry was expanding, the Bureau of Aeronautics (BuAer) was increasing the number and complexity of new aircraft designs. Inevitably, there were growing pains. Thus, the three most advanced developmental dive-bombers – the Curtiss SB2C, Brewster SB2A, and Douglas SB2D – and the leading torpedo bomber, the Grumman TBF, all became so seriously overweight that their usefulness was questioned.

As a fallback for the TBF, BuAer chose the competitively designed Vought XTBU-1. Since Vought was already committed to the F4U and OS2U, BuAer persuaded Vultee to manufacture the TBU as the TBY, in a truck plant in Allentown, Pa. Engineers were scrounged throughout the industry and the aircraft was redesigned as the TBY-2. The TBY never saw combat; when production began in 1944, the TBF/TBM was meeting Navy needs.

The SB2C went into combat after long travail. Production was achieved in late 1942, but two carriers turned it down favoring the SBD. The SB2C underwent three modification programs, then VB-17 on *Bunker Hill* (CVS-17) used it in the second Rabaul strike in November 1943. They gave it a "thumbs up"; the worst was over. The SB2C replaced the SBD aboard ship in time for most of the 1944 offensives. The SB2A and SB2D (by this time converted to the single-seat BTD) were both terminated.

With BuAer guidance, Douglas then designed the XBT2D-1. To save weight, the bomb bay was omitted, an explosive bomb ejector replaced the displacing gear, and the structure was designed understrength and reinforced after structural tests.

Grumman, after working on a couple of twin-engine torpedo planes, eventually proposed a design based on the TBF but larger and cleaner, and with a jet propulsion unit in the tail; it was developed as the XTB3F-1. Martin, having completed production of an Army attack plane, undertook the XBTM-1. The BT2D, TB3F, and BTM were continued postwar as the AD, AF, and AM.

Tactical and technical considerations were both involved in combining the dive-bomber and torpedo bomber into a general-purpose attack plane. By the end of 1941, British and Japanese combat experience was leading to the conclusion that all offensive carrier planes should be capable of torpedo attack. The Battle of Midway, where our torpedo squadrons made no hits and only six of 41 planes survived, suggested otherwise. For the next two years, airborne torpedoes were weapons of opportunity. During that time, the Bureau of Ordnance (BuOrd) and the National Defense Research Council (NDRC) corrected the Mark 13 aircraft torpedo's many defects and improved it for use at moderate altitude and speed; our airborne torpedoes acquired the effectiveness ascribed to them by prewar advocates.

Several other factors were also important. Midway and other early operations also demonstrated that high-altitude bombing, the secondary mission of torpedo planes, was ineffective against ships. Torpedo planes, not being stressed for dive-bombing, came to be used for glide and toss bombing. The SB2C was capable of torpedo attack. Fighter escorts were found to be necessary, even though the SB2C and TBF were equipped with flexible guns, some of them in power turrets. Hence, the guns and gunners were eventually recognized as superfluous. Airborne radar had altered the role of carrier scouts and by mid-1945 airborne early warning was promising even greater changes.

The reasons mentioned in the previous two paragraphs all contributed to the decision to replace dive-bombers and torpedo planes with general-purpose attack planes. The process is very complex and a dozen experimental designs were initiated between 1939 and 1945 to arrive at the combination of missions.

Patrol Planes

In December 1941, the Navy had three operational and three experimental flying boats. Two experimental models were soon dropped and the third was converted to a transport. Of the operational types, the PBY had

been thoroughly debugged. It was small and slow but reliable and easily serviced. The amphibian PBY-5A, which was nearing service, added to the design's versatility. The PBY was the most widely used of all patrol planes. The other two flying boats encountered severe problems. Most PB2Ys were used as transports. The PBM-3's short engine life indicated that it was overloaded and much gear had to be removed. Eventually, in the PB2Y-5 and PBM-5, more powerful engines increased effectiveness.

By a July 1942 agreement, the Navy obtained multiengine landplanes from the Army Air Force (AAF): the North American PBJ (AAF B-25), Consolidated PB4Y (B-24), and Lockheed PV (B-34). These came to be used more widely than flying boats; procurement totaled about 4,600 landplanes and 4,200 flying boats (including 1,350 for allies).

The landplanes were equipped for high-altitude bombing and had to be refitted as patrol planes; this required nearly as many man-hours as it did to build them. Thus, the PB4Y-2 was developed: twin rudders, the trademark of the B-24, were replaced by a single tail and the body was lengthened; fuel, guns, and radar were added; and the turbo-supercharger was removed. In a similar but less extensive redesign, the PV-1 was superceded by the PV-2 with greater wingspan and area.

Two twin-engine landplanes were developed: the Lockheed P2V began in February 1943 and the Martin P4M in July 1944. They used the largest engines available, the R-3350 in the P2V and the R-4360 in the P4M. The latter also had auxiliary J-33 jets. On October 1, 1946, a P2V completed a nonstop flight from Perth, Australia, to Columbus, Ohio, showing the soundness of design and concept.

Antisubmarine Warfare (ASW)

Submarine warfare was mostly ignored between the wars. ASW started from scratch in September 1939 when U-boats attacked British shipping. Aircraft were used for search. Admiral K. Doenitz, in charge of U-boats, contemptuously noted that aircraft could no more sink U-boats than crows could kill moles. This changed in August 1940 when the British began using aerial depth bombs.

In November 1940, the director of the Chief of Naval Operations' (CNO) War Plans Division listed American ASW devices and commented, "Although the list of *projects* is formidable, the list of *accomplishments* is meager." Of the nineteen projects listed, only magnetic detectors and short-wave radar with position indicator were for aircraft.

The Atlantic fleet received 1,000 depth bombs for service tests in mid-1941. General use began in the spring of 1942. During one attack, a depth bomb hit a surfaced U-boat and wedged in a grating; when an eager "Seemann" rolled it over the side, the hydrostatic fuse worked and the depth charge exploded, destroying the U-boat.

Various aircraft were used: patrol planes, OS2Us on in-shore patrol, F4F/FM fighters and TBF/TBM torpedo bombers in escort carrier-based VC squadrons, and K and M-class airships. As capabilities were developed, aircraft became effective killers as well as hunters.

Different devices helped make the aircraft a potent enemy of U-boats. Geologists used airborne magnetometers to hunt for oil in the late 1920s. In October 1941, a PBY at NAS Quonset Point, R.I., testing similar gear, detected the S-48. Project Sail, established at Quonset Point in June 1942, tested magnetic airborne detectors (MAD) under development by the Naval Ordnance Laboratory and NDRC. In December 1942, service use of MAD began in conjunction with retro-rockets which had been tested at Goldstone Lake, Calif., in July 1942.

On March 7, 1942, the K-5 blimp and S-20 sub tested a radio sonobuoy and found that it could hear a submarine three miles away and that its radio transmission was received by blimps at a five-mile range. By December 1943, practical radio sonobuoys had been designed and built and were being assigned to ASW squadrons beginning with VC-1 on *Block Island* (CVE-21).

In 1943, U-boats began staying on the surface and fighting back against aircraft. This led to increasing forward firepower and armor in ASW aircraft. For example, the twin .30-caliber forward turret in the PBY was replaced by a twin .50-caliber turret. Forward-firing rockets, introduced in late 1943, proved an effective counter.

Another important piece of equipment was the AN/ARC-1 VHF radio which facilitated airborne communications. Airborne searchlights, coordinated with detectors, helped locate surfaced submarines at night. In 1945, periscopes were installed in the PBY's radio compartment to help focus the wing-mounted light.

Helicopters

Rotary-wing aircraft trials in the 1920s and 1930s were nonproductive. Early in the war, Coast Guard aviators urged the Navy to resume tests. Receiving responsibility in February 1943, the Coast Guard conducted training and experimentation at CGAS Floyd Bennett Field, Brooklyn, N.Y. BuAer in March 1943 ordered three Sikorsky HOS helicopters; in October 1943 it ordered the HNS trainers (for early delivery); and in 1944 ordered tandem-rotor Piasecki HRPs and twin-engine McDonnell HJDs.

50 Years Ago — WW II

March 1: Support Force, Atlantic Fleet, was established for operations on the convoy routes across the North Atlantic. Its component patrol squadrons were placed under a Patrol Wing established at the same time.

March 12: Naval Air Station, Corpus Christi, Texas, was established.

March 28: The commanding officer of *Yorktown*, after five months' operational experience with the CXAM radar, reported that aircraft had been tracked at a distance of 100 miles and recommended that friendly aircraft be equipped with electronic identification devices and carriers be equipped with separate and complete facilities for tracking and plotting all radar targets.

The PBM Mariner evolved as the definitive patrol seaplane during the war.

In May 1943, the Navy watched an Army pilot land a helicopter aboard a tanker in Long Island Sound. In January 1944, a Coast Guard pilot with an HNS helicopter embarked on the British freighter *Daghestan*. Limited flying was possible on only three days during the mid-winter Atlantic crossing and a Combined Evaluation Board concluded that existing machines were not adequate for ASW.

On January 3, 1944, an HNS-1 delivered blood plasma from lower Manhattan to Sandy Hook, N.J., for survivors of an explosion on the destroyer *Turner*. In May, a Coast Guard pilot with an HNS-1 rescued 11 Canadian airmen from northern Labrador.

A helicopter was also tested as an ambulance. Rescue hoists were developed and tested, and an automatic pilot was developed. In May 1945, dunking sonar was tested. In short, the helicopter's utility as a rescue craft was demonstated, and as the war ended it was poised for ASW and other uses.

Guided Missiles

Navy pioneer guided missile development grew out of a radio-controlled target airplane begun in 1936 and used in 1938. (One result was the TDC Culver target drone of WW II.) The people involved were certain that radio-controlled aircraft would make effective weapons. To that end, a radio altimeter was initiated in 1939 and airborne television and radar guidance in 1941. The Naval Aircraft Factory (NAF) and Utility Squadron 5 were assigned Projects Fox and Dog, which involved the development and testing of radio-controlled offensive weapons. After torpedo and crash-dive attacks were demonstrated in early 1942, Admiral Ernest J. King directed that guided missiles be developed and readied for combat in decisive quantity. BuAer undertook development of TDN and TDR radio-controlled, television-directed "assault drones." BuOrd, through NDRC and the Bureau of Standards, developed the Pelican and Bat radar-directed glide bombs.

The assault drone involved NAF and air stations at Cape May, N.J..; Traverse City, Mich.; and Clinton, Okla. NAF made some drones; small companies with minimal or no aviation experience made the rest. Even so,

success was achieved and the proponents vainly sought an escort carrier for a combat trial. In September 1944, a drone unit deployed to the northern Solomons and in a 30-day trial hit Rabaul and other bypassed enemy positions.

The PB4Y-1 was also used as a guided missile. Rather than risk unmanned liftoff, a pilot would fly off the explosive-laden machine, switch to radio control, and bail out. Intended against German targets, the first machine exploded over England soon after takeoff, killing the two-man crew. On September 3, 1944, a radio-controlled PB4Y hit a barracks at a German submarine base in Helgoland.

The Bat radar-directed glide bomb was used by some PB4Y squadrons in 1945. It sank at least one Japanese merchantman.

BuAer and BuOrd initiated a number of missiles in 1944 and 1945; air and surface launches and targets and numerous guidance, propulsion, and airframe systems were used. Of these, the Loon was a carrier adaptation of the JB-1, an Army version of the German V-1 Buzz Bomb. Little Joe was begun in May 1945 as an emergency counter to the kamikaze; it used a jet-assisted takeoff unit for propulsion, carried a 100-pound warhead, and had a 2.5-mile range.

Opinions vary as to whether guided missile efforts were "too little" or "too soon." The technology has proven to be much more complex than it appeared, but much sound work was done.

Power Plants

Development of engine components increased power and reliability. Fuel quality, also essential, was upgraded as supplies permitted from a performance number (roughly, octane number) of 100 in 1941 to 115/145 in 1945. In 1942, Pratt & Whitney developed a water injection system which provided a 20 to 30-percent increase in maximum power for about 10 minutes.

The WAC R-3350 engine used in several developmental aircraft – including the P2V and BT2D/AD – reached a high degree of development in part because of its earlier use in the Army B-29. In 1940, Pratt & Whitney began the R-4360 with 28 cylinders in four rows. Limited production was achieved by 1945 and it was used in the F2G, BTM/AM, and P4M.

Jet-powered aircraft were flown in Germany in 1939; Italy, 1940; and England, 1941. From 1938 on, the U.S. Army and Navy had sponsored rocket and jet propulsion studies. By 1941, European progress was becoming known and a National Advisory Committee for Aeronautics Special Committee on Jet Propulsion was formed. As development began, the Army and Navy recognized that their aircraft production relied on reciprocating engines and chose not to divert major aviation resources to jet propulsion. Thus, both Wright and Pratt & Whitney concentrated on piston engines while outsiders – General Electric, Westinghouse, and Allis Chalmers – worked on gas turbines.

The Army obtained British data, while the Navy sponsored Allis Chalmers' study of ducted fans and Westinghouse's study of axial flow turbo-jets. On October 22, 1942, BuAer authorized Westinghouse to build the 19A jet engine. One of these was test flown in a Goodyear FG *Corsair* in January 1944. An improved model, the 19B, powered the twin-engine McDonnell XFD-1 which made its first flight in January 1945.

Radar

In the fall of 1941, I heard rumors of a wondrous device that could fix an airplane's range, course, speed, size, and loading. Other tales were slightly

TBM torpedo bombers operate from an Essex-class fleet carrier.

less bizarre. Thus, in 1944, Commander William I. Martin (now a retired vice admiral) recalled his "initial shock of finding out that radar did not present a colored picture of the terrain...."

By modern standards, wartime radar was crude. Sets were soldered with bulky tubes, resistors, capacitors, etc. As the Navy, NDRC Radiation Lab, and radio and electrical industries developed airborne radar, they learned of the need for minimum weight, compactness, and ruggedness in carrier plane equipment.

The XAT radar, developed by the Naval Research Laboratory (NRL) from a radio altimeter, became the ASB; 25 sets were ordered in December 1941 and delivered in October 1942 as ASB-3s for experimental service. The ASB underwent constant updating and the last of the 26,000 sets obtained were ASB-8s. The ASB was used for search and bombing in the TBF/TBM and other carrier planes. A radar operator was necessary but a pilot's repeat indicator could be installed.

Some Neutrality Patrol planes had British ASV (air-to-surface vessel) radar. It used large antennas, one for sending and a second for receiving. An NRL-designed duplexer, enabling a single antenna to do both, was used in Navy airborne radar and in NRL's ASE modification of the ASV.

Microwave (or centimeter) radar, made possible by the British cavity magnetron, gave sharp definition with a small antenna. A 10-cm radar with plane position indicator was tested at Boston Airport in September 1941, and by mid-November preliminary design of a 3-cm radar was made.

The APS-2 10-cm radar was used in K-type airships in later 1942 and also in PB4Ys. The 3-cm APS-3 and 4 (the latter in a nacelle) were used for search, navigation, and bombing; the APS-6 was used for night interception; and the 3-cm APS-15 replaced the APS-2.

Airborne early warning (AEW) was begun in 1942 after Adm. King expressed a need for the Navy to "see over the hill," i.e., beyond the horizon. Cadillac resulted, a 10-cm APS-20 radar in a TBM with radar data relayed to a shipboard combat information center (CIC). Cadillac II, added in 1945, included radar and an airborne CIC in a PB-1W (Army B-17) patrol plane. The kamikaze increased their urgency and in 1945, 27 TBM-3Ws were equipped and the first land-based AEW squadron, VPB-101, was established. Neither saw combat.

With ground controlled approach, air traffic controllers used surface radar to control aircraft landing in extremely poor visibility. After an experimental demonstration in December 1942, it was used "for keeps" on New Years Day 1943 to land PBYs at Boston Airport after a sudden snowstorm closed Quonset Point.

Conclusions

In looking back at WW II technical development, the most important element was the enormous number of military aircraft built. This was made possible by the American aviation industry's successful conversion from handicraft to mass production.

Qualitative superiority was almost equally important. Our carrier planes destroyed some 12,000 enemy aircraft, including 6,500 in air combat, while losing 450 planes in air combat.

The quality of American aircraft steadily improved as engineers and scientists expended great effort in improving existing equipment and aircraft designs.

Technical areas of special importance were radar, airborne and surface, and the overlapping field of antisubmarine warfare where we began from scratch.

Improved designs with which the fleet was outfitted in 1942-43 – mostly notably the TBF/TBM, F4U, F6F, and SB2C – in large measure provided the wings of victory. Other aircraft, including some whose development was begun after we entered the war, were being readied for combat at the end with promise of further improvement.

Effort in advanced areas involving jet propulsion and missiles proceeded more deliberately so as not to interfere with production of more conventional models.

By contrast, and as confirmed by postwar investigation, Germany was superior in jet propulsion, high-speed aerodynamics, bombardment missiles, and submarines (the snorkel). German interchange with the Japanese was much less complete than that between the U.S. and Britain. Japan did, however, use the Ohka (Baka – "fools bomb" we mistakenly called it), a small rocket-propelled suicide plane.

Except for accidents of timing, advanced German technology might have changed the course of the war. On the other hand, the German effort might have been more effectively applied to producing conventional weapons. Detailed examination of these used is beyond the scope of this article. As it turned out, the combination of decisions made, hard work, superior resources, and good luck favored our side.■

In the next issue: *"Fleet Organizational Developments."*

Names of WW II Naval Aircraft

WWII naval aircraft had official names. The articles on technical development often omit these names; thus, those for principal aircraft are given below.

Aircraft	Name
F2A	Buffalo
FD/FH	Phantom
F4F	Wildcat
F6F	Hellcat
F7F	Tigercat
F8F	Bearcat
FR	Fireball
OS2U	Kingfisher
SB2A	Buccaneer
SB2C/SBF/SBW	Helldiver
SBD	Dauntless
BT2D/AD	Skyraider
TBD	Devastator
TBF/TBM	Avenger
BTM/AM	Mauler
SC	Seahawk
PBJ	Mitchell
PBM	Mariner
PBY	Catalina
PB2Y	Coronado
PB4Y-1	Liberator
PB4Y-2	Privateer
PV-1, -3*	Ventura
PV-2	Harpoon

*The PV-3, from lend-lease (British) production, was the first PV obtained and used by the U.S. Navy.

Anniversary

The San Diego-based aircraft carrier ***Ranger*** (CV-61) recently celebrated her 33rd birthday. The third ship of the Forrestal class, *Ranger* was commissioned August 10, 1957, in Newport News, Va. She is the seventh ship to bear the name.

Awards

Lt. Earl Ray Brown, an air navigation instructor in the Naval Air Training Unit at Mather AFB, Calif., received the **George M. Skurla Award**. The award is presented annually to the top Naval Flight Officer instructor in the Naval Air Training Command. Sponsored by Grumman Aerospace Corporation, it is named in honor of the company's former Chairman of the Board and is permanently displayed at the National Museum of Naval Aviation, Pensacola, Fla.

RAdm. George M. Furlong, Jr., USN(Ret.), Executive Vice President and Chief Operating Officer of the Naval Aviation Museum Foundation, Pensacola, Fla., was recently inducted into the **Arkansas Aviation Hall of Fame.** Inductees are chosen each January by members of the Arkansas Aviation Historical Society based on the individual's contributions to aviation.

RAdm. George M. Furlong, Jr.

Raised in Pine Bluff, Ark., Furlong is a 30-year career Naval Aviator, having served as a carrier fighter pilot, test pilot, and fighter squadron commanding officer. He was also C.O. of *Independence*, Chief of Staff of the U.S. Sixth Fleet, and Deputy Chief of Naval Education and Training.

NAVAIRES, Whidbey Island, Wash., was chosen in FY 90 as the first recipient of the **Ens. C. H. Hammann Award**. The Commander, Naval Air Reserve Force award is presented to the most efficient Naval Air Reserve command. Selection criteria includes fiscal management, timely submission of reports, contributions to overall command readiness, retention, and long-range planning.

The award is named for Ens. Charles Hammann who was a Naval Air Reservist during WW I. While evading enemy aircraft, Hammann landed his damaged flying boat alongside a downed fellow aviator in open water, took the victim onboard, and flew back to base. He was awarded the Congressional Medal of Honor for his heroism.

Records

LCdr. William Hughes and LCdr. Thomas Dargan of HSL-48 marked their 2,000th and 1,000th career flight hours, respectively.

Cdr. Mike Anderson of VFA-81 achieved his 1,000th trap, aboard Saratoga (CV-60), on November 9, 1990.

Cdr. Larrie G. Cable, C.O., and **Cdr. John Lynch**, X.O., of HSL-42 both exceeded 2,000 flight hours in the SH-60B *Seahawk*.

Units marking safe flying time:

Squadron	Hours	Years
HC-5	15,000	3
HC-6	34,000	5
HMM-163	60,000	11
HMM-262	9,000	2
HMM-264	31,000	4
HMT-303	60,000	9
HS-12	11,000	3
HSL-31	21,000	5
HSL-33	13,000	2
MCAS Futenma	30,000	18
NAF Atsugi	6,000	14
NAS Barbers Point	3,000	4
NAS Lemoore	24,000	10
NRLFltSuppDet	43,000	28
PMRF Hawaii	35,000	19
VA-55	22,445	7
VA-95	56,000	12
VA-105	30,000	7
VAQ-135	18,000	11
VAQ-140	8,000	5
VAQ-309	12,000	11
VAW-116	29,000	15
VAW-120	24,000	5
VAW-125	42,000	22
VF-31	14,807	4
VF-32	3,000	1
VF-74	10,000	3
VF-126	7,000	1
VF-192	29,672	7
VF-301	63,000	20
VFA-81	5,000	1
VFA-94	20,000	4
VFA-127	11,000	2
VFA-192	30,000	7
VFA-195	83,660	20
VFA-305	54,000	14
VMFA-121	10,000	3
VMFA-531	39,000	7
VP-9	77,000	12
VP-60	75,000	20
VP-67	64,000	20
VP-68	90,000	20
VP-91	85,000	20
VP-94	71,000	20
VS-24	30,000	7
VS-28	29,000	7
VS-37	35,000	8
VT-4	42,000	5
VT-10	74,000	4
VT-22	75,000	6
VX-5	35,000	7

Rescues

Sometimes you need a little help from your friends. A rapid response by search and rescue personnel aboard the carrier *John F. Kennedy* (CV-67) saved the life of a flight deck crewman in November 1990 during flight operations in the eastern Mediterranean Sea.

ABEAR Michael A. Hawkes was blown from the carrier's flight deck by jet exhaust during morning flight ops and fell 80 feet into the Med. An alert lookout attached to *Kennedy*'s deck department, SA Corey W. Lee, immediately spotted his shipmate in the water, threw him a life ring, and notified the bridge.

Within minutes, the flight crew of an SH-3H *Sea King* attached to the carrier's embarked CVW-3 pulled the uninjured Hawkes from the water. Lee was awarded the Navy Achievement Medal for his outstanding alertness and performance on watch.

Four crewmen from an EA-6B *Prowler* were treated for minor injuries and released December 31, 1990, after ejecting from their aircraft during a landing aboard *Theodore Roosevelt* (CVN-71). The incident occurred during routine flight operations in the Atlantic about 200 miles west of Bermuda. The aircraft went into the water after an arresting gear cable apparently parted during the landing. The crewmen ejected safely before the aircraft impacted the water.

Three of the four crewmen, assigned to VAQ-141 embarked aboard *Roosevelt*, were picked up within minutes by an SH-3 *Sea King* from **HS-9**. The other crewman was recovered by a motor whaleboat from the carrier.

PH2 Charles Moore

The U.S. Ambassador to Saudi Arabia observes flight operations on John F. Kennedy (CV-67), including the landing signal officer's daily tasks. Ambassador Charles W. Freeman, Jr., his wife, and several diplomatic assistants were onboard with a media group for general carrier orientation.

Catapult No. 1 aboard Kitty Hawk (CV-63), dormant since the aircraft carrier entered overhaul three years ago, shot 61 truck-sized pontoons during a two-day certification test. The orange pontoons, called dead loads, simulated the weight of fleet aircraft weighing as much as 96,000 pounds.

Scan Pattern

2nd Lt. Randy Bresnik, USMC, recently became the first flight student to "ace" the primary ground school syllabus at NAS Whiting Field, Fla.

"I really didn't think about it," Bresnik said about his perfect scores. "I didn't think it was that big a deal." But, according to Whiting officials, it is that big a deal, especially since this syllabus at Whiting Field is designed to advance only the most qualified students for further training.

Guadalcanal (LPH-7) crewmen watch an AV-8B Harrier "jump-jet" descend to the amphibious assault carrier's flight deck.

Change of Command

CarGru-6: RAdm. Walter J. Davis, Jr., relieved RAdm. Richard C. Allen.

HS-7: Cdr. Gary M. Cerney relieved Cdr. Daniel W. McElroy.

HS-9: Cdr. John D. Christensen relieved Cdr. William S. Kordis.

HS-17: Cdr. Stephen J. Bury relieved Cdr. Russell E. Tate.

HSL-34: Cdr. Jan C. Gaudio relieved Cdr. Paul G. Sherland.

HSL-36: Cdr. John Thogerson relieved Cdr. Michael Brinkac.

HSL-48: Cdr. Leland S. Kollmorgen, Jr., relieved Cdr. Stephen D. Beal.

Dwight D. Eisenhower: Capt. William V. Cross relieved Capt. J. J. Dantone.

Kennedy: Capt. John P. Gay relieved Capt. Herbert A. Browne, Jr.

Lexington: Capt. William H. Kennedy relieved Capt. C. Flack Logan.

NAR Jacksonville: Capt. Royce R. Mattson relieved Capt. Joseph W. Harris.

NAR San Diego: Capt. Robert H. Kiral relieved Capt. Thomas F. Leonard.

NAS Norfolk: Capt. Dannie H. Allen relieved Capt. Barton C. Gohmann.

PMTC: RAdm. William E. Newman relieved RAdm. George H. Strohsahl.

VAQ-133: Cdr. Michael R. Bender relieved Cdr. Gary S. Mowrey.

VAQ-142: Cdr. Brian W. Moss relieved Cdr. Edward F. Gordon.

VAW-88: Cdr. Robert K. Ferguson relieved Cdr. David R. Guebert.

VF-41: Cdr. Chris W. Wuethrich relieved Cdr. Kenneth F. Heimgartner.

VF-86: Cdr. Matthew G. Moffit relieved Cdr. Ted J. Venable.

VF-102: Cdr. Thomas F. Enright relieved Cdr. Robert L. McLane.

VF-111: Cdr. Bryan L. Rollins relieved Cdr. Thomas L. MacKenzie.

VF-143: Cdr. Brent S. James relieved Cdr. Gary M. Jack.

VF-213: Cdr. Lee C. Mason relieved Cdr. Greg L. Gerard.

VP-16: Cdr. John L. Bohn II relieved Cdr. Gregg L. Wedding.

VP-50: Cdr. John Mauthe relieved Cdr. E. F. Carter, Jr.

VQ-2: Cdr. David W. Durfee relieved Cdr. Raymond E. Leonard III.

VR-58: Cdr. Kip R. Osborne relieved Cdr. Dennis R. Mills.

Blue Angels 1991 Air Show Schedule

March

20	NAF El Centro, Calif.
23	NWC China Lake, Calif.

April

6-7	NAS Cecil Field, Fla.
13-14	MCAS Cherry Point, N.C.
20-21	NAS Norfolk, Va.
26-28	MCAS El Toro, Calif.

May

4-5	Stockton, Calif.
11	NAS Corpus Christi, Texas
12	NAS Kingsville, Texas
18-19	Sioux City, Iowa
25	NAS Patuxent River, Md.
27	Naval Academy, Md.

June

1	Blountville, Tenn.
2	NAS Meridian, Miss.
8-9	Detroit, Mich.
15-16	Reese AFB, Texas
22-23	Avoca, Pa.
29-30	Boise, Idaho (ANG)
19-20	NAS Dallas, Texas
26-27	Robins AFB, Ga.

July

4	NAS Lemoore, Calif.
6-7	NAS Point Mugu, Calif.
12-13	Punta Gorda, Fla.
20-21	Dayton, Ohio
27-28	North Kingstown, R.I.

August

3-4	Seattle, Wash.
10-11	Elmendorf AFB, Alaska
16-18	NAS Miramar, Calif.
24-25	Reading, Pa.
31	Owensboro, Ky.

September

1	Greenville, S.C.
7-8	Little Rock, Ark.
14-15	Richards-Gebaur AFB, Mo.
21-22	Peterson AFB, Colo.
28-29	Lincoln, Neb. (ANG)

October

5-6	NAS Memphis, Tenn.
12	San Francisco, Calif.

November

2-3	Miami, Fla.
8-9	NAS Pensacola, Fla.

ANA Annual Photo Contest Winners

These three photos won the 1990 Association of Naval Aviation Annual Photo Contest. Left, first place; below, second place; and below left, third place.

PH2 Curtis Witham captured crewmen from Abraham Lincoln (CVN-72) beginning another day of flight ops.

PH1 John Deditius photographed Abraham Lincoln (CVN-72) in drydock at Newport News Shipbuilding, Va.

These Tomcats of VFs 14 and 32 were filmed by PH2 Charles W. Moore as they stood ready alert aboard Kennedy (CV-67) in the Red Sea during Operation Desert Shield.

ANA Bimonthly Photo Competition

Willard French won the first 1991 bimonthly photo competition with this rare shot of lightning as the backdrop behind a VF-124 F-14 Tomcat at NAS Miramar, Calif.

The Association of Naval Aviation Photo Contest

The Association of Naval Aviation and its magazine, *Wings of Gold*, is continuing its annual photo contest which began in 1989. Everyone is eligible except the staffs of *Wings of Gold* and *Naval Aviation News*. The ONLY requirement is that the subject matter pertain to Naval Aviation. Submissions can be in black and white or color, slides or prints of any dimension. Please include the photographer's complete name and address, **and PHOTO CAPTION**.

Cash awards: Bimonthly — $100; Annual — First, $500; Second, $350; Third, $250.

For deadline and submission details, call (703) 998-7733.

Mail photographs to: Association of Naval Aviation Photo Contest, 5205 Leesburg Pike, Suite 200, Falls Church, VA 22041.

PROFESSIONAL READING

By Cdr. Peter Mersky, USNR-R

Gillcrist, Rear Admiral Paul T., USN(Ret.). *Feet Wet: Reflections of a Carrier Pilot*. Presidio Press, 31 Pamaron Way, Novato, CA 94949. 1990. 348 pp. Ill. $22.50.

This book is a fine memoir spoiled by bad editing. I never got used to the improper aircraft designations, abbreviations, acronyms, and other gaffs, such as using a plane that looks like a T-38 for a carrier approach/landing diagram. These problems make it difficult for the knowledgeable reader to get through this otherwise well-written, exciting book.

The cover illustration shows an F-14 in the groove behind a carrier. The aircraft seems to be in burner with its speed brake out, although the nozzles are not open. It is mechanically impossible to have both the F-14's afterburners lit and the brake up. The aircraft wouldn't be in burner behind the boat, anyway, and the red-tipped dump vent looks like it's plugged!

If you can ignore the editing, however, you have a treat waiting. The narrative is filled with a carrier fighter pilot's loving memories of his career – from his student days in SNJs, through transition to jets, and as a *Crusader* pilot in war and peace. His descriptions of people are personal and up close. He, himself, survived two ejections and he describes these in heart-stopping detail.

Feet Wet is one of the best post-WW II flying memoirs that I have read. The book is evocative and highly entertaining.

Park, Edward. *Fighters: The World's Great Aces and Their Planes*. Thomasson-Grant, Inc., One Morton Dr., Charlottesville, VA 22901. 1990. 228 pp. Ill. $39.95.

This large book could be considered just another coffee-table picture tour, especially since the publisher also produced the trendsetting *The Cutting Edge*. Most of the first-class photography is color, with the supporting black-and-white images nicely reproduced, and there are photos of a surprising amount of flying survivors.

The author was a P-39 pilot in the Pacific and uses his own experiences to give firsthand observations which are interesting and colorful. The text is well-written; however, the book suffers from occasional lapses in accuracy in aircraft identification and background facts. For example, on page 191, Park says that Air Force *Phantoms* made the first MiG kills in Vietnam on July 17, 1965. The Navy's VF-21 actually holds that distinction, with two MiG-17s shot down in June.

The price of *Fighters* is a little steep considering how many similar volumes there are on the market, but it is a good overview of the fighter pilot's world and his aircraft.

WEATHER FRONT

FAA's Weather Radar

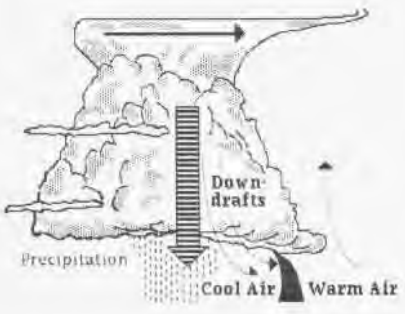
By Capt. Neil F. O'Connor, USN(Ret.)

Between 1975 and 1985, wind shear and microbursts contributed to 14 major commercial aviation accidents resulting in over 400 deaths. Hazardous weather also affects the operational efficiency of the air traffic control system. A report by the Federal Aviation Administration (FAA), cited in 1989 by the General Accounting Office, stated that 65 percent of airline delays were attributable to weather. To help detect hazardous weather and provide information to pilots, the FAA has introduced the ASR-9 Weather Channel, Terminal Doppler Weather Radar (TDWR), and the Aeronautical Data Link (ADL).

The first of the FAA's new systems using digital technology is the airport surveillance radar (ASR-9). This accurate short-range (60 nautical miles) radar will monitor aircraft movement, position, and separation. A separate channel will provide information on precipitation location and intensity. Older radars provide low-quality data on precipitation location and little information on intensity. It is this particular feature that the FAA maintains has the potential to reduce the number of aviation accidents in which severe weather is a cause or contributing factor. ASR-9's capability will help controllers anticipate rerouting or give them information for speedy rerouting around adverse weather. The national network of 101 units is expected to be complete within a year.

The FAA plans to have the first TDWR operational by mid-1993. Forty-seven systems will be installed over the next three years. Microburst detection is the primary capability of the new radar, but it also provides additional weather information. An advantage of the TDWR is the ability to detect the "gust front" – the leading edge of cold air outflow from a thunderstorm – and it also provides advance warning to air traffic controllers about changes to the duty runway.

Regarding the third new system, by mid-1993, 24 ADLs will provide pilots with direct access to weather and other flight services.



The Homecoming

"The Homecoming" by Stanley Bleifeld

Eight-inch replicas of *The Homecoming*, a sculpture portraying the reunion of a Navy family, are for sale through the Navy Exchange system. The life-size bronze statue was completed last summer and shipped to the Navy Memorial Foundation. It will be on permanent display in Washington, D.C., in the Quarterdeck of the memorial's Visitor Center, which is planned to open in late Spring 1991.

For more information, write: Navy Memorial, Box 12728, Arlington, VA 22209-8728 or call 1-800-821-8892. In the Washington area, call 703-524-0830.

Typhoons

Your September-October 1990 "Weather Front" on typhoons credits the Air Force in recent years for weather reconnaissance support. In the interest of history, for 20 years, the Navy was *the* service for this mission. VW-1 (along with other VW squadrons) flew over, around, and into every storm from 1951 til 1971 – when VW-1 was disestablished. We chased "phoons" from Midway to Red China. The Air Force had a few WB-47s which occasionally flew *over* a storm. We went in at 500 feet. We slowly phased out operations as satellites and WC-130s took over, but let's give credit where it's due.

AOCS George R. Dean, USN(Ret.)
208 Tremont Way
Augusta, GA 30907

1991 Naval Aviation Ball

The eighteenth annual Washington area Naval Aviation Ball, sponsored by the Assistant Chief of Naval Operations (Air Warfare), will be held on Saturday, April 6, at the Crystal Gateway Marriott, Arlington, Va.

The formal gathering is open to all active duty and retired Navy and Marine Corps aviators, naval flight officers, and other aviation-related officers, as well as aviation supporting corporate personnel. Cost: $90 per couple. Dress: Dinner Dress Blue or civilian evening dress.

For reservations, contact Capt. Charlie Krotz, OP-553, AV 225-5536 or 703-695-5536.

P-3 Book

I'm writing a book about the P-3 *Orion* and am asking amateur photographers for help. I particularly need photos of P-3s during the sixties and seventies and specially modified *Orions*.

Marco Borst
Akkerstraat 26
2351 SM Liederdorp
The Netherlands

1992 Blue Angel Pilot Openings

The *Blue Angels* will be selecting two Navy demonstration pilots, a maintenance officer, a supply officer, and a Marine C-130 pilot for their 1992 team. All interested officers should submit their applications no later than April 30, 1991.

Applicants for demonstration pilot should have 1,500 flight hours in tactical jets. Letters of application – including the officer's experience, qualifications, and a photograph – should be endorsed by the C.O. and forwarded to the U.S. Navy Flight Demonstration Squadron with a copy to the Chief of Naval Air Training and the Commander, Naval Military Personnel Command.

Address any further questions to LCdr. Lee Grawn, The Blue Angels, NAS Pensacola, FL 32508-7801, AV 922-2583 or 904-452-2583.

Reunions, Conferences, etc.

Note: If any members of aviation reunion groups have historical photos/memorabilia which they would like to loan or donate, please contact the Aviation History Branch, Naval Historical Center, Bldg. 159E, Washington Navy Yard Annex, Washington, DC 20374-1595, 202-433-4355/58.

VS-21 reunion, APR 19, NAS North Island, CA. POC: Lt. Rick Sprenkle, AV 735-7076 or 619-545-7076.

VP-66 20th anniversary, APR 20, NAS Willow Grove, PA. POC: YN1 States, VP-66, NAS Willow Grove, PA 19090-5010, 215-443-6609.

VP-65 reunion, MAY 3-5, NAS Point Mugu, CA. POC: LCdr. Chuck Altobelli, AV 351-8451 or 805-989-8451.

Belleau Wood (CVL-24) reunion, MAY 22-26, New Orleans, LA. POC: Robert Ross, 2732 S. US 23, Oscoda, MI 48750, 517-739-2182.

Assoc. of Aviation Ordnancemen reunion, JUN 13-16, Reno/Sparks, NV. POC: Robert Ashworth, 113 H. L. Sudduth Dr., Panama City, FL 32404, 904-871-1943

VF 11/111 reunion, JUN 27-29, Seattle, WA. POC: K. H. Enander, 419 Maple St., Port Townsend, WA 98368, 206-385-7786.

Guadalcanal (CVE-60)/DEs 133/134/135/149/665 reunion, JUN 91, Groton, CT. POC: J. S. Dutton, 5530 Winchelsea Dr., Normandy, MO 63121, 314-522-3975.

Independence (CV-62) reunion, JUL 11-14, Washington, DC. POC: Denis Bagley, 12 Trenton Ave., Edison, NJ 08817, 908-819-0359.

Philippine Sea (CV-47) reunion, JUL 31-AUG 4, San Diego, CA. POC: Chuck Davis, POB 597, Levittown, PA 19057, 215-946-3836.

Bon Homme Richard (CV/CVA-31) reunion, AUG 9-11, Des Moines, IA. POC: Ralph Pound, Box 1531, 410 Clark St., Tupelo, MS 38802, 601-842-0572/8247.

Ranger (CV-4) reunion, AUG 14-19, Norfolk, VA. POC: George Kingston, 2148 Clubhouse Dr., Lillian, AL 36549, 205-962-2171.

Ranger (CV/CVA-61) reunion, AUG 16-18, Boston, MA. POC: USS Ranger Reunion, P.O. Box 49, Round Top, NY 12473.

Forrestal (CV-59) reunion, AUG 16-18, Washington, DC. POC: W. R. Freeman, 6302 Bren Mar Dr., Alexandria, VA 22312, 703-642-5054.

NASWF Albuquerque reunion, AUG 22-24. POC: Wayne Downing, 406 Lawnwood Dr., Circleville, OH 43113, 614-474-2496.

Windham Bay (CVE-92) reunion, AUG 30-SEP 1, Green Bay, WI. POC: Merlin Vandenplas, 112 Yale St., Green Bay, WI 54303, 414-497-9416.

NAVAL AVIATION NEWS

March-April 1991