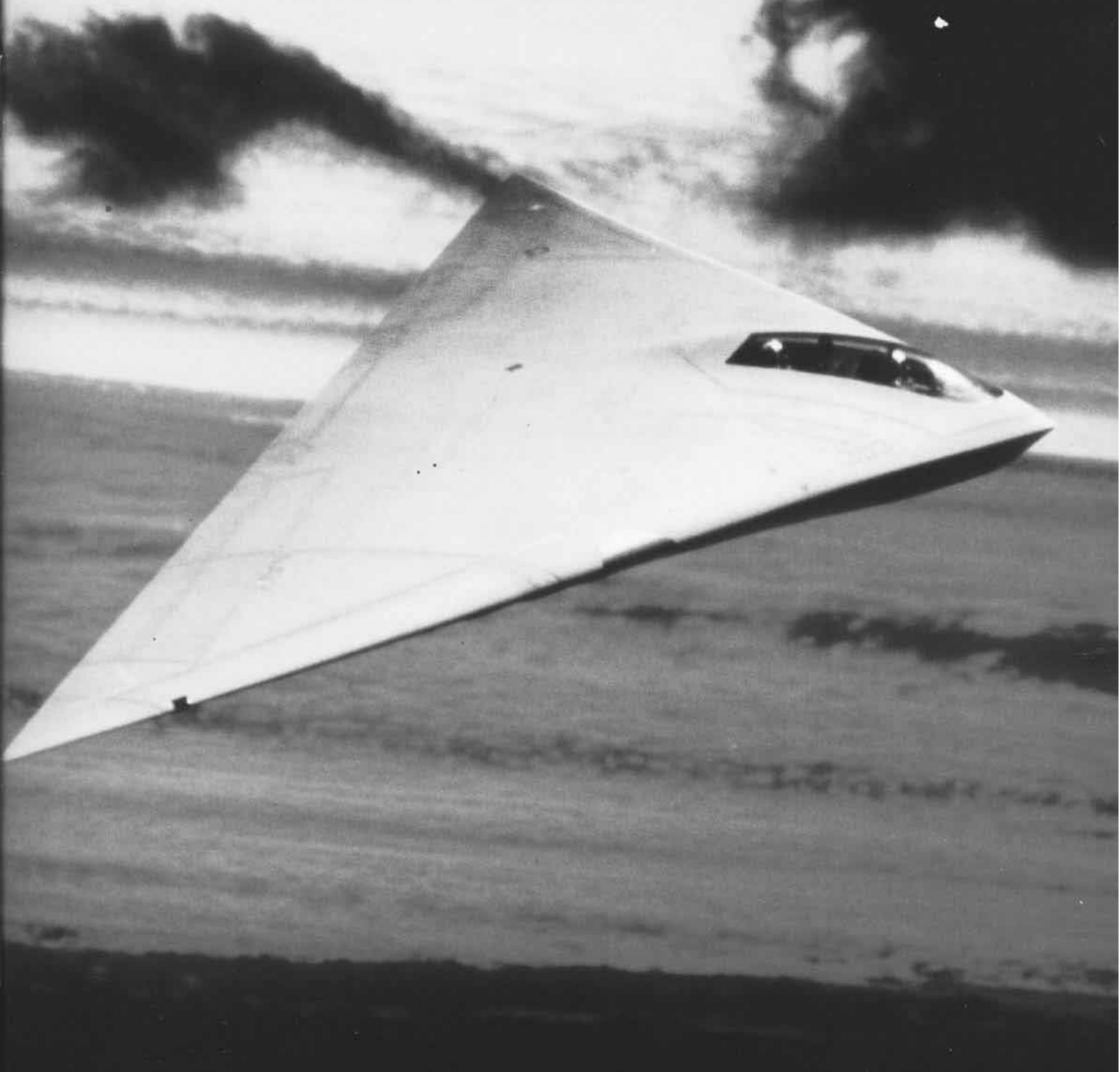


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A-12 Avenger

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COVERS—Front: an artist's rendition of the revolutionary A-12 shows the shape of things to come. Back: the lights from Abraham Lincoln's island brighten the night while CVN-72 is moored at NS, Norfolk, Va. PH2 Tracy Didas won honorable mention in an ANA photo contest for this colorful shot.

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Ready When Called

By VAdm. Dick Dunleavy, ACNO (Air Warfare)

Ike's return from the Middle East in September was duly noted by the news media amid the excitement of Operation *Desert Shield*. But what was barely noticed was that *Ike*, which responded to the Iraqi invasion of Kuwait at the tail end of her deployment, returned home only four days past her scheduled date. The significance should not be lost to the present and former carrier sailors who have spent 9, 10, and even 11-month deployments responding to crises in the past 30 years.

We were able to bring *Ike* home because *John F. Kennedy* got under way for an extended deployment on just a week's notice. Although not scheduled to deploy, she was ready to go when the call came. Her "can do" enabled us to maintain three carriers in the Middle East.

Once again, self-contained, geographically unrestrained carrier bat-

tle groups formed the tip of the spear, this time to give Saddam Hussein pause to consider the error of taking on the world. Forward-deployed, the carriers gave the president the flexibility and capability to respond while the full array of military forces, hurriedly gathered from halfway around the world, was being deployed en masse to the Arabian peninsula.

Most observers of the *Desert Shield* operation, including longtime critics, have been quietly impressed with the smoothness of the American deployment. That smoothness came from readiness. In the CNO's words: "The capability to respond quickly and effectively to the call... can be attributed largely to this nation's commitment a decade ago to amass resources to sustain such an operation."

Even as *Desert Shield* was being launched, Marine Corps helicopter crews, under the cover of *Harriers* and

Sea Cobras, pulled off the evacuation of Americans from Liberia and inserted Marine reinforcements to our embassy there. The tenacious staying power inherent in maritime forces enabled the Marines to wait offshore for months, ready to act at a moment's notice. The American citizen is reaping the fruits of supporting a muscular, forward-deployed Navy-Marine Corps team.

These displays of flexible, tailored strength came because Naval Aviation has good planes, good ships, and great people. Naval forces can arrive on the scene quickly, stay as long as needed, and bring the appropriate firepower to bear. I'm terrifically proud of Naval Aviation's response to the call. The events of Summer 1990 go down as one more reminder of the country's need for strong Naval Aviation far into the future. You are it. Keep strokin'. ■



Ike transits the Suez Canal during Operation *Desert Shield*.

Into the Valley

The pilot and aviation observer (AO) of an OV-10 were scheduled to fly a mission in support of a Marine ground unit. When the unit cancelled the support requirement, the *Bronco* crew requested they be allowed to fly a local flight. They also requested a 30-minute extension of flight time with a takeoff at 1130 vice 1200 as originally scheduled. The mission changes were approved by the C.O.

At about 1030 the pilot called his mother who lived near the base and told her he would fly over her house. The crew did not leave planned route information with the duty officer. During preflight, the plane captain overheard the pilot and AO talking about flying over a mountain range in the area.

The pilot made a wider than normal turnout after takeoff and rocked his wings over his mother's house before continuing the climbout.

In the next hour and a half, witnesses sighted the OV-10 at various points and at low altitude over the mountainous area. About an hour and 45 minutes after the *Bronco's* takeoff, a passenger in an airliner saw black smoke emanating from a mountain-side at a point about 1,000 feet from the top of a canyon.

The smoke dissipated before initial search aircraft arrived and there were no signs of wreckage. The aircraft was declared missing and a major search effort got under way. Two weeks later, a civil air patrol pilot spotted the wreckage. Both crew members were dead. Recovery and investigation of the mishap began.

The OV-10 presumably became entrapped in a box canyon. The crew had ejected but both men died of thermal burns, apparently having descended into the fireball caused by the crash of the aircraft into the mountain.



Grampaw Pettibone says:

Recipe for death: Begin with timeless desire to flathat; season with a measure of carelessness! Seems the Bronco was flyin' low and the floor of a canyon rose up at



'em. The crew ran out of power and ejected too late.

Looking into the past, investigators learned that the mishap pilot had had bitter marital problems which took a lot of time to resolve. His relatively poor flight and job performance were, in part, attributed to them. He was known to remove himself from the flight

schedule with regularity. He ended up with less flight time than counterparts.

On the "rough" write-up following one NATOPS (Naval Air Training and Operating Procedures Standardization) check flight, his performance was considered weak, but the "smooth" form didn't reflect the deficiencies. One officer admitted he refused to fly with the mishap pilot but said nothing until just before transferring from the squadron. There seemed to be no written documentation to many of the criticisms directed at the pilot, although he was counseled by seniors.

Occasionally, he did fly a good hop and stayed with the program. For a period prior to the accident, the pilot seemed to have turned things around. Marital difficulties had subsided and his overall performance improved significantly.

The night before the crash, the pilot had remarked to his roommate that he was "stressed out" about his ground job, but investigators did not deem this a factor in the accident.

Maybe not. But somewhere along the line the higher-ups shoulda taken a tougher stand on this aviator. He was often marginal at best in the air, even with the improving performance toward the end.

In Naval Aviation, as elsewhere,



we are our brother's keeper.

Seniors have got to understand that.

But Ole Gramps has known for years that no power on earth can stop some people from the cardinal sin of flathatting.

Lights, Rumbles, Action!

A flight of three TA-4s was on an air combat maneuvering training flight. The first three air-to-air engagements were uneventful. But prior to the fourth, noting a 20-percent oil light with oil pressure decreasing from 30 to 0 psi, the instructor in the third aircraft transmitted, "Knock it off." The pilot noticed the oil pressure decrease about three seconds after he saw that the low oil light was on. Because he and his student Naval Aviator were looking out of the cockpit, it is uncertain how long the light was on before oil pressure decreased. The pilot left the power at 88 percent.

Prior to illumination of the light, neither the instructor nor the student pushed the oil test light to check oil quantity.

The flight leader detached the solo student in the second *Skyhawk*, told him to orbit five minutes, then to proceed directly to home base about 50 miles away.

An outlying field, closed for normal operations but equipped with E-28 arresting gear in battery for emergency use, was 34 miles distant in the general direction of home base.

Number three turned toward home base and asked the student to read off procedures from the checklist for oil malfunctions and for controlled ejection.

The flight leader declared an emergency and requested to proceed directly to home base. Number three was at 9,000 feet, the flight leader in three-mile trail, closing toward the *Skyhawk* in trouble.

Number three radioed his intentions to shoot a straight-in arrested precautionary approach at home base. Moments later, the flight leader was in parade position on number three and told number three there was oil on the TA-4's tailpipe. Number three reported zero oil pressure but engine exhaust temperature OK.

A little later the flight leader reported



that oil appeared to be leaking from the aft hell hole. The flight was now just under 8,000 feet.

A couple of minutes later, at 7,000 feet, the flight leader radioed that the outlying field was just off to the left, about seven miles away. Number three told approach control he was now proceeding to the outlying field.

At about 6,000 feet, number three heard a rumbling sound emanating from the engine. He continued the descent and was on centerline at 5,000 feet, in the precautionary approach, when the flight leader saw that number three was on fire. The flight leader also saw a compressor part depart the aircraft just above its right wing. Number three felt a thud.

The descent continued. Two miles short of the runway, with gear and flaps down, 200 knots airspeed, thrust deteriorated and rpm rolled back through 50 percent. Number three was now at 600 feet.

At no time did either number three or his student Naval Aviator notice an engine fire light on.

At about one mile from the approach end, the pilot initiated command ejection, with his left hand pulling the lower handle and his right hand on the control stick. The survival equipment functioned properly. Once on the ground, the survivors got together and communicated with the flight leader using their PRC-90 radios.

The *Skyhawk* exploded on impact

and was destroyed.



Grampaw Pettibone says:

Oil starvation, possibly caused by a problem with the engine gearbox drain hose, caused the engine to quit and forced the *Skyhawk* out of the sky. Not much a pilot can do about that. Power plant failures are rare nowadays, but they do happen. And when they do – when warnin' lights light and rumblin' sounds push your heart up your throat – you best be ready.

The trusty TA-4, in this case, mighta been saved. It wasn't until four and a half minutes *after* the problem began that number three decided to go for the outlying field. The flight leader also failed to direct number three to the *nearest suitable field* – which was the outlying field – at the beginnin' of the emergency. Which is what the book calls for!

Think about it! All they needed was an extra mile! A little change in course early on coulda made the difference between egressin' the machine by way of a boot in the behind a few hundred feet up in the sky, or climbin' out nice and easy while the bird was on the ground.

Ole Gramps is happy as heaven that the fliers made it, though!

Ike Returns from Desert Shield

Dwight D. Eisenhower (CVN-69), with CVW-7 embarked, returned to Norfolk, Va., on September 12 after a Mediterranean deployment that was extended slightly as part of the Navy's participation in Operation *Desert Shield*, the response to the August 2 Iraqi invasion of Kuwait.

Ike transited the Suez Canal and operated in the Red Sea for a few weeks before being relieved there by *Saratoga* (CV-60) and CVW-17, which had deployed as scheduled on August 7 from Mayport, Fla. Another battle group rapidly formed around *John F. Kennedy* (CV-67) and CVW-3 left port on August 15, heading to the Mediterranean after a brief workup period. For a time in late August there were four carriers on station in the Middle East, the fourth being *Independence* (CV-62), with CVW-14 embarked, in the Arabian Sea.

The return of *Ike* marked the

completion of the first deployments of the F-14A+ version of the *Tomcat* (flown by VFs 142 and 143) and the S-3B version of the *Viking* (operated by VS-31). *Saratoga's* CVW-17 also operates the F-14A+ (with VFs 74 and 103) and the S-3B (with VS-30). The two light attack squadrons aboard *Kennedy*, VAs 46 and 72, took the A-7E *Corsair II* on what may be its last deployment as a carrier aircraft.

In addition to carrier air wings, a wide variety of Naval Aviation forces are supporting *Desert Shield*, including LAMPS helicopters, patrol planes, and transports. Over 300 Marine Corps aircraft from both coasts are deployed ashore in the Middle East and on amphibious assault ships offshore in the largest deployment of Marine aircraft since the Vietnam conflict.

Navy Reduces Pilot Training

The Navy is reducing its number of student Naval Aviators to align its training output with future anticipated fleet requirements. The reductions will be made by releases and reduced accessions.

A growing excess of aviators exists because of smaller fleet requirements (based on anticipated budget reductions and force structure changes) and lower-than-expected pilot attrition rates. The excess has caused lengthy delays between training phases, increased training costs, and morale problems.

The Navy will reduce pilot accessions to a level necessary to sustain anticipated long-term requirements. In addition, 300 students will be released from training in FY 91. Voluntary disenrollments will be solicited, with some opportunities for interservice transfers. Those who show

the greatest aptitude for service as an aviator will be retained, while others will be released from training, with some being transferred to other officer career fields and others being released from active duty.

Forrestal to Replace Lexington in 1991

The Secretary of the Navy recently approved a decision to replace *Lexington* (AVT-16) with *Forrestal* (CV-59) by June 1991 as the Navy's training carrier.

As the Navy's last *Essex*-class carrier, *Lexington* will be over 48 years old by the time she is decommissioned next year, spending the last 28 of those years as a training carrier. Rather than continue *Lexington* in service with an expensive overhaul, an early retirement was decided.

Forrestal, presently based at NS Mayport, Fla., will be redesignated from CV to AVT upon *Lexington's* decommissioning and will shift home port to Pensacola, Fla., when port upgrades are completed. The carrier will retain its combat capability in the event it is ever needed again as a fleet carrier. *Forrestal* is 35 years old and completed the Service Life Extension Program (SLEP) during the mid-1980s.

Also affected in the decision is *Kitty Hawk* (CV-63), which will complete SLEP in 1991. A plan to base her in Pensacola as a fleet carrier has been changed; she is now scheduled to return to her former home port at NAS North Island, San Diego, Calif.



PH1 Michael D. P. Flynn

When *John F. Kennedy* departed for Operation *Desert Shield* in August, VAs 46 and 72 took the A-7E *Corsair II* for what may be the aircraft's last deployment.

VMFP-3 Deactivated; Corps Farewells RF-4B

Marine Tactical Reconnaissance Squadron (VMFP) 3 was deactivated effective October 1, closing out a 15-year history and ending over 25 years of service for the RF-4B reconnaissance version of the McDonnell Douglas *Phantom II*. The ceremony held at MCAS El Toro, Calif., on August 10 also marked the end of the *Phantom II*'s long career in the active Marine Corps.

The RF-4B, based on the similar USAF RF-4C, first flew on March 12, 1965, with 46 of the aircraft being built to replace the RF-8G *Crusader* in the three Marine Composite Reconnaissance Squadrons, VMCJs 1, 2, and 3. The RF-4B saw extensive action in the Vietnam war. On July 1, 1975, VMFP-3 was activated at MCAS El Toro, consolidating all RF-4Bs from the deactivated VMCJ squadrons. From 1975 to 1984, VMFP-3 provided a permanent detachment aboard *Midway* (CV-41) with CVW-5 in Japan.

With VMFP-3 fading into history, the only *Phantom IIs* left affiliated with the Marines are the F-4S fighters belonging to reserve squadrons VMFAs 112 and 321. The RF-4Bs, however, may yet fly again; five RF-4Bs were flown to

NaDep Cherry Point, N.C., to be stored in humidity-controlled bags for eventual conversion to QF-4 target drones. The reconnaissance mission for the Marine air wings will be assumed by the VMFA(AW) squadrons using FA-18D *Hornets* equipped with the digital-video Advanced Tactical Air Reconnaissance System.

USMC Helos Pull Americans from Liberia

When the call finally came on August 5, Marine helicopters evacuated threatened American citizens to safety aboard Navy ships offshore Liberia, as a devastating civil war raged through Monrovia, the capital.

In Operation *Sharp Edge*, MARG 2-90, an amphibious ready group centered around *Saipan* (LHA-2), with the 22nd Marine Expeditionary Unit (MEU) embarked, waited off Liberia for 62 days, ready to assist American citizens in the event that the situation in Liberia required evacuation. When one group of Liberian rebels threatened to take American hostages, President Bush ordered the reinforcement of the U.S. embassy and evacuation of American citizens.

The 22nd MEU's air combat element, HMM-261(C), was comprised of CH-46Es from

HMM-261, CH-53Ds from HMH-362, UH-1Ns and AH-1Ts from HMLA-167, and AV-8Bs from VMA-223. The CH-46Es and CH-53Ds flew in a company of Marines to reinforce the embassy compound and evacuated 61 Americans and 11 other nationals on the first day. Over the course of the operation, 1,648 people – including 132 Americans – were evacuated from the country, and the helicopters flew in medical supplies, 35,550 gallons of fuel, and 4,800 gallons of water to the embassy. Ambassador Peter John Delves praised the Marines, expressing his gratitude for their "flawless execution of a very demanding mission."

The airlifts were covered by the AH-1W gunships and the AV-8B *Harrier IIs* from *Saipan*. Other Naval Aviation units sup-

V-22 Osprey prototype Number 4, the only one to sport the Marine camouflage scheme, is shown at NATC Patuxent River, Md., on August 28 during testing for future shipboard compatibility trials.



Two of VMFP-3's RF-4Bs present at the August 10 deactivation ceremony sported colorful paint schemes before their retirement.

VMFP-3 retires its colors after 15 years.



Kaman Aerospace Corporation

The first of six production SH-2G Seasprite LAMPS MK I helicopters, BuNo 163541, was delivered to the Navy in August. On August 21, Kaman Aerospace Corporation was awarded a contract to convert 12 SH-2Fs to the new SH-2G configuration, in addition to the two already converted.

porting the operation included detachments from MACG-28 and MWSG-27, two KC-130 tankers from VMGR-252 based at MCAS Cherry Point, N.C., and Navy KC-130Fs from VR-22 based at NS Rota, Spain.

MARG 2-90 was relieved off the Liberian coast on August 21 by ships and Marines of MARG 3-90, which continued evacuations of foreign nationals and lifted tons of food to relieve severe shortages in Monrovia.

Marines board CH-46 helicopters on Saipan (LHA-2) during a rehearsal for Sharp Edge while on station off Liberia.

JO1 Kip Burke



Avionics Rating Merger Modified

The Navy has modified its planned merger of avionics ratings to accommodate changing force structure requirements and ensure stability in the avionics community. The revision, which becomes effective January 1, 1991, will merge the aviation electronics technician (AT), the aviation fire control technician (AQ), and the aviation antisubmarine warfare technician (AX) ratings, which will be combined into the AT rating for paygrades E-3 through E-8. As is presently the case, the aviation electrician's mate (AE) will combine with the AT rating at the E-9 level to form the avionics maintenance technician (AV) rating.

Under the old proposal, the AT, AQ, and AX ratings would have combined into AT (for intermediate-level maintenance) and AV (for organizational-level maintenance). The revision preserves stable and

equitable promotion and assignment opportunities, as well as equitable sea/shore rotation.

The merger is expected to affect approximately 18,000 sailors. The present AT rating badge, currently optional for wear by all of the affected ratings, will become mandatory for the combined AT rating by July 1, 1992.



PR School Moves to Memphis

In a move delayed since 1955, the Navy's Aircrew Survival Equipmentman School has relocated to the Naval Air Technical Training Center (NATTC), Memphis in Millington, Tenn., from the Naval Air Engineering Center, Lakehurst, N.J., ending a 66-year legacy of parachute rigger (PR) training at Lakehurst.

The last Lakehurst PR "A" school class graduated on October 5, with the last PR "C" school class there finishing up on August 22. Fifty school staff members and 60,000 pounds of equipment have been moved to NATTC aboard NAS Memphis.

Rigger training began at Lakehurst on September 1, 1924, in an unheated shed, with Chiefs Alva F. Starr and Lyman H. Ford as instructors. The PR rating was established as a separate rating in February 1942. Today, the 11-week school teaches PRs how to care for survival equipment such as parachutes, life rafts, life vests, helmets, safety harnesses, anti-exposure suits, antigravity suits, and survival kits.

It was once a tradition for PRs to jump with a chute that they had packed in order to enhance "quality control" and the

confidence of the aircrew they served. This tradition ended on February 4, 1987, because of budget constraints, after 72,049 jumps made by staff and students since the school was founded.

Fliers Provide Philippines' Quake Relief

Marine helicopter crews spearheaded American efforts to provide relief to Filipinos isolated and suffering from the earthquake that struck northern Luzon, R.P., on July 16. The earthquake was the largest to strike the Philippines in 14 years. The helicopters assigned to MAGTF 4-90 and HMM-164(C) hauled rice, water, meals, and medical supplies to earthquake victims for two weeks. CH-46E, CH-53D, and CH-53E helicopters were used for transports, while searches for survivors were conducted by UH-1N and AH-1W helicopters and OV-10 observation planes. One VMO-2 Marine aviator lost his life and an observer was seriously injured when their OV-10D crashed on a July 20 mission

near Baguio City.

Navy SH-3G helicopters assigned to VC-5 at NAS Cubi Point, R.P., also assisted with relief efforts, lifting medical teams and delivering cement-cutting saws and trained operators to stricken areas. By the end of July, the Marine and Navy aircraft involved had flown 340 sorties and lifted over 1,800 passengers and 630,000 pounds of relief supplies.

Museum Doubles Size

The Greater Pensacola Blue Angel Atrium was dedicated on August 21 at the National Museum of Naval Aviation, Pensacola, Fla. The seven-story, glass and steel atrium features four A-4F *Skyhawks* suspended from the ceiling in diamond formation. Three of the four *Skyhawks* are original *Blue Angel* aircraft. The atrium was funded by \$1.4 million from the citizens of Pensacola, and the A-4F restoration by a \$500,000 donation from the McDonnell-Douglas Corporation.

The atrium was part of a \$9-

million expansion that added the new 130,000-square-foot West Wing, which was dedicated in a ceremony held October 12 attended by Transportation Secretary Samuel Skinner, and Navy Secretary H. Lawrence Garrett III. The expansion was spearheaded by the Naval Aviation Museum Foundation.

The West Wing, mostly devoted to WW II carrier aviation, showcases an authentic replica of an *Independence*-class carrier island and flight deck section. The deck was

The Navy retired its six Cessna O-2A Skymaster spotter aircraft in September. The ex-USAF O-2s were acquired in the early 1980s, operated by VA-122 (shown here) and later VFA-125 from NAS Lemoore, Calif., and NAS Fallon, Nev., to provide target range spotting for ordnance runs. The O-2, used extensively by the Air Force in Vietnam, is being replaced by the T-34C, some of which have been used for several years as spotters out of NAS Cecil Field, Fla. Two O-2s were transferred to the National Museum of Naval Aviation, Pensacola, Fla., two went to the Marine Corps Air-Ground Museum, Quantico, Va., and two were transferred to the Army at Fort Huachuca, Ariz.



Mike Grove, Courtesy of The Hook



Four A-4 Skyhawks, in the Blue's famed diamond formation, serve as the centerpiece of the Greater Pensacola Blue Angel Atrium.

constructed from spruce wood originally stockpiled for *Lexington* (AVT-16). The wing also features a working deck-edge aircraft elevator and an area outfitted like a hangar bay.

The Naval Aviation Museum Foundation also announced, with Navy approval, a new expansion project: a 24,500-square-foot, seven-story main entrance building to house a 500-seat, large-screen multimedia theater and lecture hall, as well as more displays.

In Brief ...

- **VF-45**, an adversary squadron based at NAS Key West, Fla., established a permanent detachment at NAS Cecil Field, Fla., on June 11. The detachment will consist of four to six A-4 *Skyhawks* to provide training for squadrons

assigned to Strike Fighter Wings, Atlantic.

- **HCS-5**, a reserve strike rescue squadron based at NAS Point Mugu, Calif., completed the first carrier detachment of the HH-60H *Seahawk* in July aboard *Nimitz* (CVN-68) with CVW-9.

- The **Pakistan Navy** is scheduled to take delivery of the first of three new production **P-3C Orions** (BuNos 164467-164469) in November. VP-30 will commence training the Pakistani crews in February 1991.

- **Carl Vinson** (CVN-70) returned to NAS Alameda, Calif., on July 31, bringing home the A-7E *Corsair IIs* of VAs 27 and 97 from the A-7's last WestPac cruise. The two CVW-15 squadrons are transitioning to the FA-18C *Hornet*.

- **VQ-3** at NAS Barbers Point, Hawaii, transferred its last **EC-130Q TACAMO** aircraft, BuNo 156174, to NaDep Cherry Point, N.C., in August, com-

pleting the squadron's transition to an all E-6A fleet.

- **Abraham Lincoln** (CVN-72) departed Norfolk, Va., on September 25, commencing its transit around Cape Horn to its new home port of NAS Alameda, Calif. CVW-11 will be assigned to the Navy's newest carrier.

- Twenty years of service in the Naval Air Reserve for the **P-3A** version of the *Orion* came to an end on October 12 when VP-69 at NAS Whidbey Island, Wash., transferred BuNo 152152 to the National Museum of Naval Aviation at NAS Pensacola, Fla. VP-69 has been reequipped with the P-3B.

- A September 15 ceremony at NAF Washington, D.C., marked **VAQ-209's** completion of transition to the Grumman EA-6B *Prowler*.

- After repealing a 1923 law prohibiting its navy from operating fixed-wing aircraft,

Italy announced its intention to purchase two TAV-8B *Harrier II* trainers in preparation for equipping its new VSTOL carrier *Giuseppe Garibaldi* with a further 16 *Harrier II+* aircraft, which will feature the Hughes APG-65 multimode radar.

● Turkey became the first foreign nation to order the Marine Corps' Bell **AH-1W** *Super Cobra* helicopters when plans were announced July 25 to procure five of the gunships.

● **Lockheed Aeromod Center, Inc.**, in Greenville, S.C., announced on August 25 that it was awarded a contract to perform heavy maintenance, repairs, and modifications on Navy and Marine Corps C-9B and DC-9 transports.



LCdr. Rick Burgess

The one-and-only UA-3B version of the Skywarrior, BuNo 144834, was retired by VAQ-34 to the Arizona desert in August. The UA-3B was manufactured as an RA-3B and later modified to an NRA-3B for test work at the Pacific Missile Test Center, Point Mugu, Calif. Its ponderous redesignation as a TNRA-3B was changed to UA-3B and the aircraft subsequently served with VQ-2 (shown here) and VAQ-34.

PH1 Robert Wilcox



An A-4E Skyhawk of VC-5 streaks through the skies off Thailand during Seventh Fleet training exercise Cobra Gold '90. The VC-5 Checkertails provided "enemy" aircraft for the exercise for the seventh year in a row.

PH3 Anthony Borjes



EP-3E BuNo 156507 arrived at NAS Patuxent River, Md., on August 7 to begin four months of testing by the Naval Air Test Center's Systems Engineering Directorate, followed by further testing at NAF Atsugi, Japan, commencing in January. The Aries II aircraft, delivered to VQ-1 on July 21, is the first of 12 P-3C Orions to be modified under a conversion-in-lieu-of-procurement program. The 12 newer aircraft will replace 2 EP-3Bs and 10 old EP-3E Aries I aircraft that have served in VQs 1 and 2.

The Master Chief Petty Officer of the Navy Speaks Out

Master Chief Avionics Technician (AVCM) Duane R. Bushey became the seventh Master Chief of the Navy on September 9, 1988. In a recent interview, he gave his insights and feelings on issues of major concern to military members.

What personnel policies/programs are of greatest interest to the new Chief of Naval Operations (CNO)?

The CNO is concerned with quality. Quality in our life, in our work, in our leadership. Improving everything just a little bit more. He's pledged to us that he's going to keep our sea operations tempo where it is, although that may fluctuate because of the crisis in the Middle East. He's very committed to taking care of our sailors. We are going to see training become a high priority. We're going to become a smaller Navy, so it's absolutely essential that everybody work smarter; to do that, you have to have training.

Is the Enlisted Aviation Warfare Specialist Program producing more professionalism in the aviation community?

Absolutely. It's not necessarily the fundamental things that you learn, but it's getting out of your work space and seeing what other people are doing that make the program so valuable. A well-rounded sailor is a lot more valuable than someone who is focused on one thing. If you're at an aircraft intermediate maintenance department (AIMD), you have to get out and go to the air control tower. It exposes you to other jobs and the people who do them. The program adds professionalism to any sailor who's willing to work to earn it. I was around when it was first established and I don't think it was a very good program in the beginning. The Surface Warfare Program got on line a little faster, with accountability and credibility. I can remember when the program started you could go to a two-week training program at some bases, and when you came out you were air warfare qualified. That wasn't its purpose. It's supposed to be a Personnel Qualification Standards program in which you personally go out and learn these areas. The

program is supposed to be "hands-on," not just textbook.

How does the Navy plan to downscale its force in response to budget cuts? Will there be programs to include early-outs or reductions in force (RIFs)?

The Navy has a plan and so far Congress is allowing us to use it. The Navy can grow smaller by closely controlling attrition, accession, and high year tenure. Our Chief of Personnel, Admiral Boorda, knows how to work that system. While making the Navy smaller, we have to protect the assets of the service – its people – and I can guarantee that if you're a good sailor, you have no worry about the future. There are no plans for RIFs of enlisted personnel, nor will early-outs be an option.

Secretary of the Navy Garrett was an enlisted man and worked himself up through the ranks. He knows exactly how to take care of people and he knows how important they are. Our Under Secretary of the Navy, Mr. Howard, was an enlisted man in the Marine Corps. He also knows how to take care of people. Our CNO is very committed, and he has a track record of at least 34 years in the Navy caring for people. Anyone who has ever served with him knows he knows how to manage and take care of people. Leaders from the Vice CNO to the Chief of Naval Personnel know how to do it. On the aviation side we have Vice Admiral Dunleavy, who's a team player. In other words, he's going to do what's right for everybody in the Navy and in the community.

Simply put, if you're earning your paycheck, you don't have to worry about anything; you have a future with us.

With the cancellation of the P-7, what does the future look like for flight engineers in the VP community?



JO: Milinda D. Jonsen

With the cancellation of the P-7, I see no change in the flight engineer community. But let's assume the P-7 was still a "go." The P-3 would not disappear overnight. During my career, I've been a plane captain, an enlisted navigator, and a P-3 flight engineer. Each time I transitioned to a different plane I was told they would not be around much longer. All of them are still flying. In my opinion, flight engineers are needed because they bring maintenance expertise to the cockpit. I feel that Naval Air Training and Operating Procedure Standardization (NATOPS) doesn't answer all the questions. NATOPS sets a standard but sometimes you get into a situation where it doesn't work, so having a flight engineer in the cockpit – someone who has worked on those engines or system – is very valuable. You have to remember we're a combat organization. It's OK when you're operating out of an airfield that has an AIMD and support facility. In a wartime situation or crisis, you may end up operating out of a dirt field where there is no maintenance expertise or support on your aircraft. That's when a lack of knowledgeable enlisted flight engineers can ruin your day. It just gives us more combat capability.

Of those women who are now assuming sea-duty assignments, do we have any statistics which indicate the effect of sea duty on their advancement potential? What about women deploying with squadrons? Are there any statistics to show how their advancement potential has been affected?

It's not something that has been tracked yet. Maybe it's something that we need to look at, but I feel that a sailor's a sailor. Women have fared very well in the promotion cycle.

"Great things begin with an idea. We must be sure we listen to those ideas. It is a leader's position to listen, sort in the ideas that fit, and hand back the ideas which don't fit in a way that won't discourage the suggestion."

Master Chief Petty Officer of the Navy
Duane R. Bushey

Are women going to be hurt in promotions if they don't go to sea?

No, because during my travels I've talked to women who want to get a ship and are frustrated because they can't. I hear that from JO's (journalists), AZ's (aviation maintenance administrationmen), YN's (yeomen), and from other ratings. There are just not enough billets for them at sea. The jobs you select from the ones that are available are important, just as getting to a steel hull is not as important as the willingness to take challenging duty. You can have the female complain that she couldn't get a steel hull, but the question is: 'Are you willing to take challenging, arduous duty other than a ship?' When I look at the record of a person complaining about promotions, I'll likely find that this person has repeated the same duty station two or three times, has opted not to take an arduous or challenging billet, and has worked the same type of job in every assignment. It's not a male-female issue at all. It's the drive to go on and do more challenging things.

The Navy has recently decided to combine three aviation ratings, AT, AQ, and AX into one rating: AT. Originally the plan called for the three ratings to be combined into the AV and AT ratings. Why the change from the original plan?

How do personnel in these ratings feel about that conversion?

My office was briefed on this when I first came to Washington, D.C., and I thought it looked good. It was planned to have an Organizational-level track and an Intermediate-level track. The AT was going to be I-level maintenance and the AV, O-level maintenance, to save training dollars for cross training.

Later in my travels sailors asked questions like: What is this going to do to my sea/shore rotation? What type of master chief are we going to end up with when they go strictly through the I-level track? If the master chief never gets to experience the difficulties on the flight deck or in the hangar, will the master chief be able to make the proper decisions? I kept bringing these concerns back, plugging them into the system, and letting it be known that the sailors weren't too happy with the conversion. This is a good example of TQL, Total Quality Leadership. Instead of finding things to prove them wrong, OP-13 and OP-05 looked at it from the people side as well as at the dollars.

Some findings: the sea/shore rotation is not very good for the proposed AVs, but it would have been really good for the new ATs. Promotions would have been very good up to the E-5 level for the AV, and from the E-5 on it would be very tight and slow. There were just too many bad things. Looking at it from another angle, it wasn't going to save training dollars because there was little shore duty for the AVs. They would have to go to general duty billets, then they would have to be retrained before going to sea. So it didn't really save money. The most recent change (AT, AQ, and AX become AT) is good because the flavor of the AT, AQ, and AX in the field of electronics is so similar today; this will eliminate many of the NECs (Navy Enlisted Classifications) and distribution problems. AEs and ATs will still be AVs at the E-9 level. That's good.

How will the Persian Gulf situation effect Personnel Tempo policies?

The commitment is to keep it as it is. The CNO is committed to maintaining the 50% home-port time; however, with the Gulf crisis, there may be some extensions. I think most sailors understand that. I feel very certain that you're not going to see the old days with the return of the 9, 10 or 11-month cruise. You can see the commitment to that with the return of the *Eisenhower* battle group. She was only 4 days late.

What problems have been encountered during the Persian Gulf build-up?

There have been no major problems. Getting the proper assets

on the scene in the proper sequence and on time was a tremendous feat. The Military Sealift Command did an excellent job. On the aviation side of the house things went very well. As soon as problems happened they were taken care of. I think the biggest problem was not being able to take everyone at one time. We had no lack of volunteers; even retirees were calling to come back on active duty.

Regarding the call-up of reservists during the Gulf crisis: Any special problems involved in this evolution? Are they performing as officials had planned?

We had some minor problems, such as getting green active duty identification cards done in a timely manner, to ensure that families either were or got enrolled in DEERS (Defense Enrollment Eligibility Reporting System). However, the people and equipment showed up on time and were ready to go. I don't think anyone can predict how long we'll have to keep the reservists on active duty. The numbers on the Navy side were fairly small; they looked at specialties they needed. Those needs may not go away, so a relief cycle must be established. Reservists are performing extremely well, as we knew they would. The reserve community is pretty excited that they were called. This proves that they are a part of the total force and are very valuable to the active force.

From your point of view, how is the morale of our sailors who are serving in the Gulf during the present crisis?

I haven't gone there yet but from all the reports of those coming back, the morale is great.

How are aviation detailers responding to this crisis?

They're going on with business as usual. They've had to shuffle to get some units under way, but their job is pretty much the same.

Any additional comments or issues that you would like to address?

To our new chiefs, display the following qualities:

Loyalty, courage, emotional/physical stamina, self-confidence, accountability, and credibility.

Above all, remember where you came from.

Naval Aviation Cadet

Meeting the Challenge

Story and Photos by JO1 Milinda D. Jensen

Little things happen that let you know you're making progress," reflected Naval Aviation Cadet (NavCad) Lieutenant Derence Dermody. "It might not seem like much to anyone else, but when you're a junior candidate and you move up a table in the chow hall you know that the senior candidates have moved on, and soon it will be your turn," he added.

"Aviation Officer Candidate School (AOCS) is hard. Enlisted boot camp is nothing like this," Candidate Lieutenant Commander Jeffrey Thomas Moran emphasized. A former enlisted E-6, he added that having prior service helped him adapt quickly to the rigors of boot camp. "I was already used to the discipline. The candidates without any experience took a couple of weeks to lock on," he said.

The main difference between a NavCad student and another aviation officer candidate is that NavCads enter AOCS with only a two-year degree.

"When you're enlisted, it's really hard to go to school and get the credits you need. I had never been to college, but I had my Navy schools and took some CLEPs (College Level Examination Program). You need 60 credits, the equivalent of an Associate's Degree, to enter the program," Moran said.

Moran worked as a Machinist's Mate (Nuclear) during his enlisted service. After deciding he wanted to stay Navy, but move up, he applied to the Naval Aviation Candidate program. "I always wanted to fly. I was enlisted for six years and got my private pilot's license during that time. I never thought I'd have the chance to fly professionally; the NavCad program offered me that opportunity," Moran explained.

In the last weeks of the program, candidates are ranked according to their class standing. The candidate rated as number one is awarded five bars to wear and addressed as Candidate Commander. The second in

"The days go by like weeks and the weeks go by like days..."

Cadet Dermody

class standing wears four bars and is called Candidate Lieutenant Commander. The ranking order descends to one bar and the title of Candidate Ensign.

NavCads can't be older than 25 at the beginning of the program; however, some age waivers are granted to personnel already serving in the fleet. The program also allows candidates who excel in performance the opportunity to continue college after their pilot training. To be eligible for promotion beyond lieutenant commander, NavCads must finish a four-year degree at sometime during their career.

Upon graduation from AOCS, Naval Aviation Cadets are equal to a cadet at the Naval Academy.

After NavCads have completed flight training and received their wings, they are commissioned as reserve officers. If they apply for acceptance into the regular Navy they can return to school. The Navy will pay full allowances and benefits but they must pay their own tuition.

"Some NavCads are so outstanding that they are designated as distinguished naval graduates and recommended for regular commissioning," commented former NavCad Captain Robert Goodloe, C.O., Naval Aviation Schools Command, NAS Pensacola, Fla. "That is a testimony to the real strength of the program," he added.

"The program is very intense. NavCads are tested from the minute they get here. The first week is like nothing they've experienced before. We call it "Poopie Week" and on their fifth day here, generally a Friday, they take the "death march," explained Marine First Sergeant Carlton Kent, Aviation Officer Candidate School Chief Drill In-

structor (DI).

The "death march" tests a candidate's ability to cope with stress. Candidates must carry their seabags about 50 yards to a building which will become their training barracks. During this short trip many things can go wrong. For example, a recruit could have his seabag inspected and fail, or not double-time to the DI's satisfaction. Dissatisfaction on the drill instructor's part leads to the repetition of an action and can seem like a fate worse than death.

"These people [candidates] could be flying million-dollar aircraft one day; we have to see if they really want to be here," Kent stated. "The first week a lot of physical training takes place. Day in and day out they're on the move. There are a lot of inspections.



Candidates learn the correct way to put on cover devices and get their first feel of a Navy hat.

We use this week to weed out some and make the remaining ones stronger," he explained.

NavCads who can't take the pressure can drop on request. "A lot quit the first week," Kent added.

"About once a day the thought would cross my mind that I could just say to hell with this," said Candidate Dermody. "Most candidates have that thought when things get stressful. Part of our motivation is the fact that if we wash out of the program, we are still

Candidates prepare for the long awaited graduation from Aviation Officer Candidate School.

obligated to serve for seven years as an enlisted member."

A standard seven-year commitment after commissioning is one requirement of the program.

Capt. Goodloe remembers going through the school in 1961. "The numbers of NavCads were much greater. Back then, about half the aviation students were NavCads; now the mix is about seven to one. The training is about the same today as it was then," he added. In 1968 the program was discontinued. Nineteen years later, it was reinstated.

The 14-week course of instruction is geared more toward academics than physical training.

"It took me by surprise that there was more emphasis on academics. There's still a great deal of physical training, but less than I had thought there would be," Dermody remarked. "The whole program is designed so that if you can make it, they want you to stay. It's a whole series of trials. There's a lot of testing to see if you'll make a good naval officer," he added.

Naval officers and chief petty officers are the academic instructors, but it's the DI's daily influence that shapes the young future pilots into naval officers.



"It's amazing to see the amount of respect that these candidates have for their DIs. In fact, the nickname that they have for them is very complimentary; they refer to their DIs as Dad," Capt. Goodloe said. "This school is the 'Top Gun' assignment for drill instructors."

"The DIs are hand picked and it

shows. They're fair but firm. My father was a major – a pilot – in the Marine Corps, so perhaps I'm a little biased towards them," NavCad Dermody said.

"The program's hard in a lot of ways but it's not designed to tear you apart," he emphasized. "I'm better for going through it. I've gained confidence. It's been instilled in me that I have what it takes to be a naval officer and pilot, and that I can do it as long as I put my mind to it."

"I think anyone who is interested in a commissioning program should be encouraged to go for it," added Candidate Moran.

After graduation, the Naval Aviation Cadets attend their respective flight schools.

Chief DI Kent summed up: "Those that go through this program can say that they've really earned that privilege." ■



During "Poople Week" candidates experience exercises that challenge them mentally and physically.

Coming Soon to a Carrier Near You:

Avenger

By JOC Jim Richeson

On the morning of June 4, 1942, Lieutenant Langdon K. Fieberling, a 32-year-old native of Oakland, Calif., left the liny airstrip on Midway Island. Leading six of the Navy's newest torpedo bombers, Fieberling and a detachment of five officers and 12 crewmen from Torpedo Squadron Eight set out to engage the advancing Japanese Navy.

The day marked the combat debut of Grumman's TBF-1 *Avenger*. Without any fighter escort, Lt. Fieberling's assault became futile and the aircraft, which was destined to replace the Douglas TBD-1 *Devastator*, suffered at the hands of Japanese fighters.

By day's end, one badly riddled *Avenger* — piloted by Ensign Albert K. Earnest, USNR, with his injured radioman/tunnel gunner RM3c Harry Ferrier and dead turret gunner Seaman First Jay D. Manning — managed to make the trip back to the island.

Despite the *Avenger's* unfortunate baptism into battle, the aircraft became the Navy's standard torpedo bomber throughout WW II. It remained in operational fleet service in a variety of versions and roles until 1954. Some models were fitted with special radar, cameras for photoreconnaissance, and searchlights for antisubmarine warfare. Ironically, the last *Avenger* to be retired from operational military service was flown by the Japanese Maritime Self-Defense Force in 1962.

The American public got another nostalgic look at this rugged aircraft during President George Bush's inaugural parade in 1988. For a time the youngest Navy pilot in WW II, 19-year-old Lieutenant Junior Grade Bush emerged as one of the most prominent figures who had the opportunity to fly the mighty *Avenger*. (See *Naval Aviation News*, March-April 1985.)

Nearly 50 years after the TBF-1 was christened the *Avenger*, Navy officials recently announced details of the gallant warbird's namesake: the revolutionary new-generation attack aircraft, the A-12 *Avenger*. The A-12 is earmarked to replace the aging Grumman A-6E *Intruder* which, 30 years after its first flight, continues to be the Navy's primary medium-attack aircraft, providing all-weather, day-and-night, long-range attack capability against both fixed and mobile targets.

Missions

The A-12 is designed for strike, antisurface warfare, interdiction/search-and-destroy, and mining use. Secondary missions include antiair warfare, reconnaissance, and electronic intelligence gathering, with a significant avionics growth potential for alternate roles.

Design

The A-12 is a delta flying wing design with no vertical control surfaces. Cheek air scoops frame a small nose radome, behind which is a well-faired, two-man tandem cockpit. The two turbofan engines are embedded in the wing. Weapons are carried in internal bays. Artist conceptions revealed to date show no details of the landing gear arrangement, nor provision for ferry tanks, although an external stores capability is mentioned.

Capability

Experts say that the new *Avenger* will embody substantial improvements in war-fighting capability and will fly farther and faster than the A-6E *Intruder* with greater weapons payload, all carried internally. The A-12 is capable of employing all weapons currently being used by the A-6E, as well as air-to-air missiles. The A-12's extremely accurate navigation system will allow the



A-12 Avenger

aircraft to deliver its weapons with exceptional precision.

Survivability

The A-12 is the first aircraft designed for the Navy with survivability in mind. It is designed for deep penetration into highly defended areas, using passive sensors and stealth technology for enhanced survivability. An automated electronic cockpit will provide the crew with a variety of systems to aid in detection and avoidance of enemy threats, including an electronic surveillance measurement system and missile warning system to identify enemy radar and guided missiles. Designers are confident that the use of inert nitrogen-charged fuel cells, multiple redundant electrical and hydraulic systems, dry bay fire suppression system, and other survivability measures will minimize the effects of battle damage. The vulnerability area of the A-12 is about 1/12th that of the A-6 and 1/5th that of the FA-18.

Performance

A large aircraft, the A-12 will exceed the A-6 in every measure of performance. Although initially its weight was underestimated, a comprehensive

The earlier Avenger



weight-control effort will result in outstanding carrier suitability. The A-12 will have a significantly greater combat radius than the A-6. Because of its internal weapons bay, its combat radius is almost unaffected by variance in its weapons load (see Figure 1). Its acceleration time with stores is half that of a loaded A-6 and is still better than an A-6 without stores. Its maximum instantaneous turn rate will exceed that of both the A-6 and FA-18 fighters. The A-12's sustained turn capability will be better than that of the A-6, and that of the FA-18 not using afterburner.

Crew

Bucking the trend in recent years toward single-seat cockpits in advanced tactical aircraft, the A-12 retains a two-man crew of a pilot and bombardier/navigator. However, unlike the side-by-side seating of the A-6, a tandem arrangement was chosen for the *Avenger* because of drag and radar cross-section considerations.

Reliability and Maintainability

The A-12's airframe has a projected service life of 20 years. The A-12 will be fitted with General Electric's F412-GE-400 engine, which is a derivative of the FA-18 *Hornet*'s F404-GE-400 engine. An auxiliary power unit will make it less dependable on ground-support equipment. Experts say that the *Avenger* is expected to be twice as reliable as the A-6E, while needing only half the maintenance man-hours and significantly reduced support equipment requirements. The aircraft's low observable materials and composite construction are designed to withstand the aircraft carrier's corrosive environment.

Deck Handling

The A-12 reverses the trend toward crowded carrier decks, and is going to make the carrier air boss's job easier,

not harder. The A-12's wings fold upward in the manner of the A-6's, leaving a folded span slightly larger than that of the *Intruder*; however, with no empennage, the A-12 fits into a much smaller space than the A-6 (see Figure 2). With wings unfolded, their span is only slightly greater than that of the F-14. The catapults currently in use aboard carriers will handle the A-12 and the deck-edge elevators will accommodate two A-12s; only a small number of ship alterations for composite repair work will be required to handle the new jet.

Production

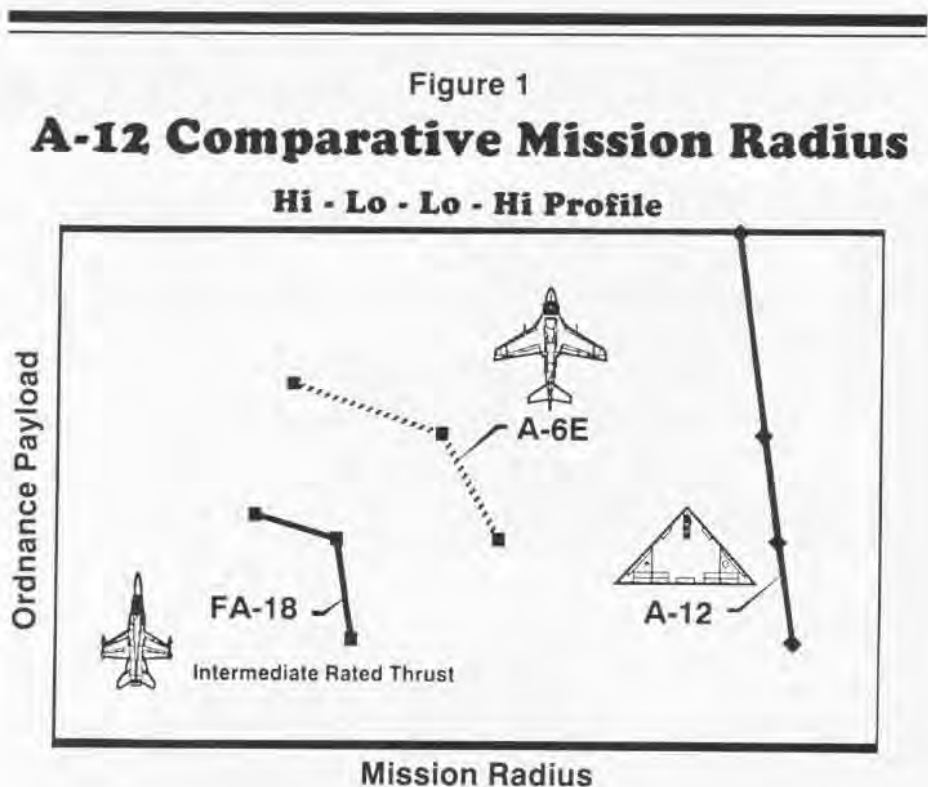
McDonnell Douglas and General Dynamics were awarded the *Avenger's* contract for full-scale development with a ceiling cost of \$4.78 billion. Both manufacturers share the development in a 50-50 arrangement. Production will take place primarily at General Dynamics' Fort Worth, Texas, plant and McDonnell Douglas' facility in St. Louis, Mo., with final assembly and flight testing at Tulsa, Okla. Eight aircraft are being built for the full-scale development

program, and six production aircraft were funded in FY 90 for operational test and evaluation and fleet introduction.

In the midst of shrinking funds, Defense Secretary Richard B. Cheney was forced to cut the proposed total number of A-12s to be procured from 858 to 620, based on the U.S. Marine Corps decision not to participate in the A-12 program, and on a planned force of fewer carriers and carrier air wings. Each carrier air wing is proposed to include two A-12 squadrons totaling 20 aircraft per wing, although funding constraints may reduce that number initially. The planned 620 buy includes aircraft for training; research, development, test and evaluation; reserve squadrons; the overhaul pipeline; and an allowance for attrition. The Navy has issued bureau numbers for the first 15 *Avengers*: 164519-523, and 164526-535.

Milestones

The aircraft's first flight is now scheduled for March 1992. A three-year flight-test phase will follow, including work at Naval Air Test Center, Patuxent River, Md., and Naval



Weapons Center, China Lake, Calif. Initial sea trials will commence in late 1993. The first fleet readiness squadron will stand up in 1994, with operational evaluation taking place in late 1995. The first operational squadron will become combat ready mid-to-late 1996 after a 12 to 15-month transition into the aircraft. A-6 squadrons will transition at a rate of about one per year. These dates are subject to change, of course, since the A-12 program is currently in a state of flux due to recent budget decisions.

Basing

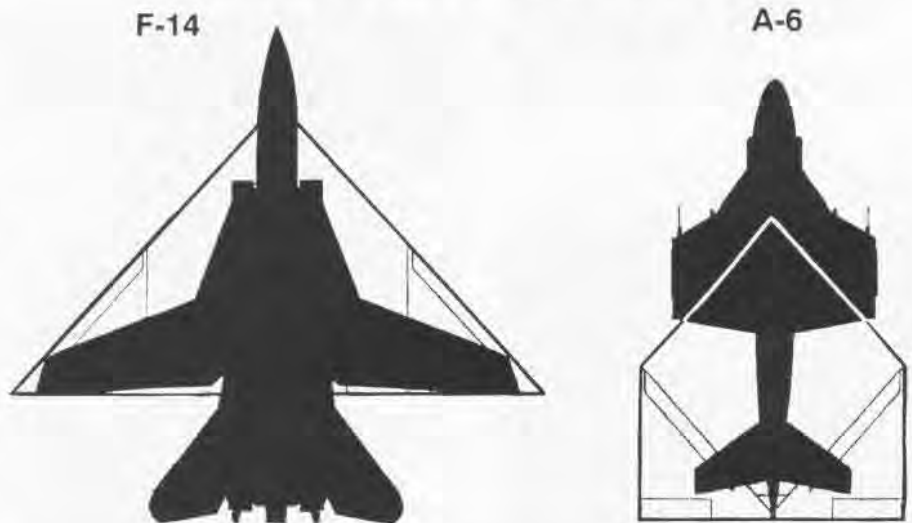
The Navy has conducted environmental assessments and facilities site surveys of both NAS Whidbey Island, Wash., the current home of West Coast A-6 units, and NAS Lemoore, Calif. The availability of training ranges has also been studied. The selection of either of these bases as the first A-12 base has not yet been decided, as it is involved in the whole base closure issue now facing the Congress and the Department of Defense. No East Coast site has been formally announced, although NAS Oceana, Va., the East Coast A-6 base, is the primary potential candidate.

Carrier Assignments

Under present planning, 14 existing or future carriers are identified to operate the A-12 from their decks (see Figure 3). *Enterprise* (CVN-65) in the Pacific Fleet will likely be the first A-12 carrier. Of carriers presently in commission, *America* (CV-66), *Ranger* (CV-61), and *Forrestal* (CV-59) are not scheduled to operate the A-12.

Figure 2

Aircraft Size Comparison



Adaptability

The Navy is examining the use of the A-12 airframe and systems for other missions, which would reduce the number of different types of aircraft deployed with each air wing and minimize the need for development and procurement of various types of single-mission aircraft in the future. The *Avenger's* electronic displays, high-speed fiberoptic data bus, Very High Speed Integrated Circuit technology, programmable processors, and large weapon bay and air-to-air bay capacities make it well suited for various roles.

During a recent interview with *Avia-*

tion Week & Space Technology, Vice Admiral Richard M. Dunleavy, Assistant Chief of Naval Operations (Air Warfare), pointed out that the Navy is seriously considering the A-12's airframe for the primary role of the Navy's Advanced Tactical System (ATS) aircraft, which could replace the EA-6B *Prowler* in the electronic jamming mission. The ATS would also take on the E-2C *Hawkeye's* airborne early warning mission, the S-3 *Viking's* antisubmarine warfare role, and the ES-3's electronic reconnaissance function. He emphasized that the technology is available to develop A-12 derivatives that would replace those aircraft. "The most severe technical challenge with the A-12 would be to create an E-2C derivative," he stated.

VAdm. Dunleavy added that another potential role for the A-12 would be to assist in providing fleet air defense in the outer air battle. "It does have that air-to-air capability," he said.

The Air Force is also investigating configurations of the A-12 as a potential replacement for the General Dynamics F-111 strike aircraft, whose design is now over 25 years old.

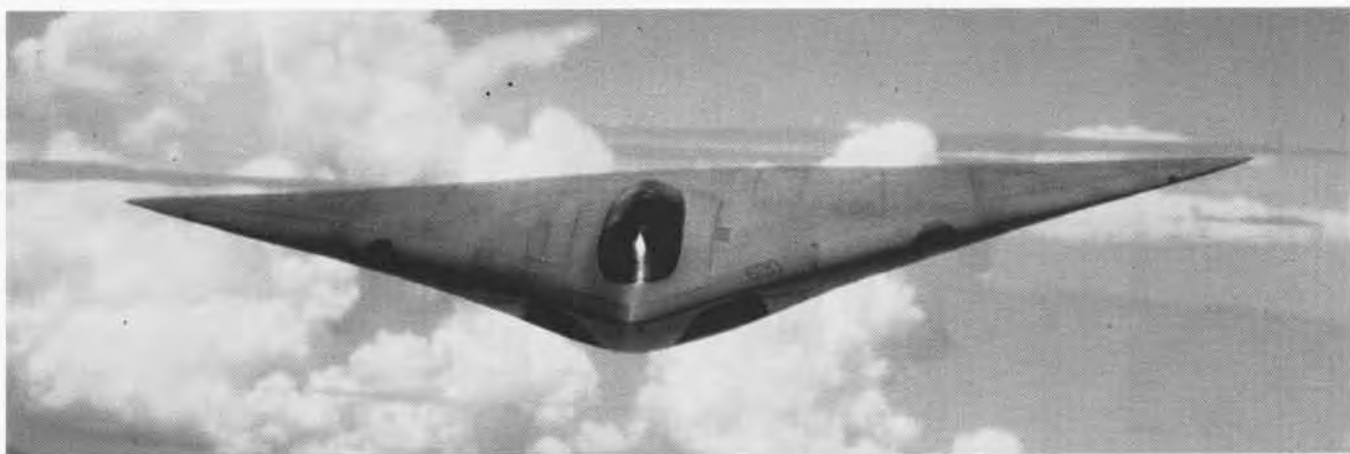
As a promising revolutionary design, the A-12 has the potential to eclipse even the A-6 as an aircraft of versatile utility and historical significance. ■

Figure 3

CV Candidates for A-12

Listed by fleet in order of assignment

Pacific Fleet	Atlantic Fleet
Enterprise	George Washington
Nimitz	John F. Kennedy
Independence	Dwight D. Eisenhower
Carl Vinson	Saratoga
Kitty Hawk	John C. Stennis
Constellation	Theodore Roosevelt
Abraham Lincoln	CVN-75



Artists' conceptions show details of the A-12's delta flying wing design.



Special thanks to Capt. Mike Currie (OP-502) and Lt. Jim Wood of CHINFO for assistance with this article.





Association of Naval Aviation Bimonthly Photo Competition

A final checker signals that the F-14A is good to launch from Enterprise. Felix Garza, Jr., won the fifth bimonthly ANA Photo Contest with this dramatic shot.



Felix Garza

A VX-1 SH-60B launches a Penguin antishipping missile over the Caribbean Sea.



PH2 Danny Lee

A C-9B at sunrise, NAS North Island, Calif.



AMH1 James Reeder



PH2 David Armer

VXE-6 LC-130s take Christmas Day off at Willy Field, Antarctica.



VA-46 A-7Es en route to the target range.

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.

Farewell, Good

C-131 Piped Ashore at 36+

By LCdr. Rick Burgess



LCdr. Rick Burgess

An era in Naval Aviation came to a close in August when the Navy's last Convair C-131 was retired, closing out a long career of yeoman service for the twin-engined transports.

The years of fleet service ended on August 30 in a ceremony at NAF Washington, D.C., on Andrews AFB, only a few miles from the former Naval Air Station, Anacostia, where the C-131's naval career began over 36 years ago. Fleet Logistics Support Squadron (VR) 48, the last Navy C-131 unit, formally transferred C-131H BuNo 550299 to the State Department Bureau of International Narcotics Matters.

During the brief ceremony, VR-48's commanding officer, Commander Samuel Swah, lauded the aircraft's accomplishments and handed over the "key" to the last C-131 to Ambassador Mel Levitsky, Assistant Secretary of State for International Narcotics Matters. With the skipper's announcement, "C-131H, United States Navy, Departing!" sideboys towed the aircraft from the hangar in preparation for its departure flight. Shortly thereafter, a VR-48 crew launched the C-131 from Andrews, making one last wing-rocking fly-by before heading for the delivery site in Florida. The C-131 was then on its way to another career, the drug interdiction war. It will eventually find its way to the Upper Hualaga Valley in Peru, where it will be used as a transport supporting the Peruvian National Police.

The Navy fulfilled its need, as did the Air Force, for a high-performance, medium-range transport in the early 1950s by ordering versions of the twin radial-engined Convair 340 *Convairliner*. Designated R4Y under the old designation system, the first example (140378) was delivered to NAS Anacostia as an R4Y-1Z staff transport for the Assistant Secretary of the Navy. Eventually 36 more R4Y-1s (140993-141028) were delivered, most

to transport squadrons and to Navy and Marine Corps air stations. Eventually redesignated C-131F, these aircraft became familiar (if unheralded) sights all over the world as staff transports. A few were given the VIP designation VC-131F. All were progressively modernized during their careers with weather radar and structural modifications.

Some C-131Fs served as RDT&E aircraft in various test establishments, with their spacious fuselages accommodating electronic equipment, and sporting antennae, radomes, and blisters. One (141024), which served with the Pacific Missile Test Center, NAS Point Mugu, Calif., for its entire career until being retired in 1979, was designated an EC-131F.

Two aircraft based on the Convair 440 airliner were acquired by the Navy in 1957 as R4Y-2s (145962 and 145963) and served as VIP transports, one each for the Navy and Marines. These were redesignated in 1962 as C-131Gs.

In January 1963, the Navy acquired from the Air Force 10 T-29B *Flying Classroom* aircraft, which were similar to the C-131 but were based on the Convair 240 airliner. The T-29Bs entered service with Training Squadron (VT) 29 at NAS Corpus

Christi, Texas, eventually replacing TC-47 and TC-117 aircraft in training naval flight officers and aviators in the art of over-water celestial and long-range navigation. By November 1975, the T-29Bs were wearing out and the Navy placed in service three similar T-29Cs that were also acquired from the Air Force. When maritime navigation training was consolidated at Mather AFB, Sacramento, Calif., in 1976 using the Boeing T-43A, VT-29 retired its T-29Cs and was disestablished on December 31 of that year.

Several old Air Force C-131s were drafted into the Coast Guard to replace its HU-16E *Albatross* amphibians in the medium-range, search-and-rescue role in the interim until the HU-25A *Falcon* was delivered. The 22 aircraft, redesignated HC-131As, served from 1976 to 1983.

The Navy's piston-engined C-131s soldiered on into the 1980s, however, but were slowly phased out as administrative support aircraft, replaced by UC-12 and UP-3A aircraft. Most were retired to the Arizona desert, with the last ones being stricken in February 1988.



Above, C-131s were delivered in the 1950s to Navy and Marine bases as R4Ys. Facing page, 299's sister ship, 542815, was also transferred to the State Department.

Samaritan

LCdr. Rick Burgess



Commanding Officer Samuel Swah recounts VR-48's accomplishments with the C-131H to the ceremonies audience.

299 taxis out for its final flyby as a Navy aircraft.

Cdr. Swah transfers the "key" to C-131H 550299 to Ambassador Mel Levitsky.



fleet logistics system alongside the C-9B and DC-9 jets that equipped their sister squadrons. They were later redesignated C-131Hs to reflect their use as general transports, although, retaining their VIP interiors, they continued to perform occasionally as VIP transports. One of the trio, 542817, crashed on November 15, 1985, at Dothan, Ala., on a post-rework check flight, killing the crew.

In 1989, the federal government's accelerating drug interdiction program resulted in a need for transport aircraft to handle the increasing logistics workload. The decision was made to transfer the remaining two C-131Hs to the State Department's Bureau of International Narcotics Matters. The first, 542815, was transferred on February 1, 1990. Before 550299's ceremonial farewell, it flew to Wright-Patterson AFB in Ohio to have former President Johnson's seats removed for display in the Air Force Museum. With the Navy's C-131s gone, only one C-131 remains in U.S. military service – the Air Force's Flight Dynamics Laboratory's NC-131H (53-7793).

The C-131 and T-29 had official names, but they never stuck. The name *Samaritan* reflected the aeromedical evacuation mission for which the Air Force procured the plane. The T-29's appropriate name, *Flying Classroom*, was uninspiring. The C-131Hs borrowed their civil counterparts' *Turboliner* name.

But for almost everyone associated with them, they were simply "Convoirs."

The C-131H occupied a niche in the Navy's organic airlift system that will be hard to fill. A replacement for VR-48's use is planned but not yet finalized. But whatever it is, it just won't be the same anymore. ■



LCdr. Rick Burgess

299's last Navy crew: L-R AD1 Corky Withers, AMH1 Mike Patskin, LCdr. Jeff Blackburn, and Cdr. Rick Weidman.



PH1 Tom Borrauff



In May 1979, the Navy acquired three VC-131Hs from the Air Force. These aircraft, powered by Allison T56 turboprops, were originally produced as C-131D and VC-131D piston-engined transports and modified in 1965-66. They were used to transport President Lyndon Johnson to and from

the LBJ Ranch in Texas, later being passed to the D.C. Air National Guard. They equipped a detachment of reserve squadron VR-52 at NAF Washington, which was established as VR-48 on October 1, 1980.

For the remainder of the decade, the VC-131Hs were integrated into the

Wings of Prewar Technica

Part 1

By Lee M. Pearson

The mythology of WW II aviation contains tales of aircraft that were designed and developed by an inspired contractor at a time of great peril and rushed into production and combat to meet a dire need. In contrast, the Navy fought WW II almost entirely with aircraft of designs that predated the outbreak of war. Only the Curtiss SC, a battleship and cruiser scout, was begun after December 1941. Two aircraft – the TBF/TBM and F6F – were initiated between September 1939 and December 1941; both were vitally important.

Three designs were more than 10 years old by 1945: the Curtiss SOC and Consolidated PBY initiated in 1933, and the SBD in 1934. Their age emphasizes that aircraft development was complex and time consuming. The Navy strove to obtain airplanes that best fit its needs. In doing so, its development processes were a mixture of astute analysis and skilled design leavened by trial and error, as it determined types of aircraft, characteristics for each, and the most useful designs and models.

Captain S. U. Ramsdell's articles in this series (*NANews*, Sep-Oct and Nov-Dec 89) pointed out that the Bureau of Aeronautics (BuAer) and its field activities provided the Navy with aircraft and aeronautical equipment. BuAer's Materiel Division, comparable to today's Naval Air Systems Command, was responsible for aircraft design, development, and production. Guidance on types and characteristics was provided by other BuAer divisions and the fleet. Key members of the Materiel Division staff had aviation experience back to WW I in developing

the special technologies needed to take airplanes to sea. Professionally, the staff contained both line and engineering specialty officers – Aeronautical Engineering Duty Officers after 1935, before then, Naval Constructors and Engineers – and civilian engineers and draftsmen.

Experimentation was centered at the Naval Aircraft Factory (NAF), built during WW I at the Philadelphia Navy Yard, Pa. "Factory" became a misnomer during the Republican administrations of the twenties; however, NAF designed and built some experimental aircraft. Its developmental abilities increased as laboratory facilities were built up in such fields as metallurgy, structures, instruments, etc. In 1923, the Aeronautical Engine Laboratory was relocated at NAF from the Washington Navy Yard in D.C. In 1933, a naval flight surgeon was assigned to NAF, beginning a physiological laboratory. In 1937, the Ships Experimental Unit was transferred from NAS Norfolk, Va., where it had pioneered in developing arresting gear.

There were other major technological facilities. Navy wind tunnels were an adjunct to the model basin at the Washington Navy Yard; in 1936, construction of a new model basin with wind tunnels was begun at Carderock, Md., northwest of Washington, D.C. Navy flight testing was carried out at naval air stations, usually NAS Anacostia, also in D.C. At the close of

WW I, aircraft radio development was handled by a radio laboratory at NAS Anacostia. When the Naval Research Laboratory (NRL) was established nearby in 1923, the radio laboratory became part of it. Ordnance installations were usually tested at the Naval Proving Ground, Dahlgren, Va.

The National Advisory Committee for Aeronautics (NACA), the forerunner of the National Aeronautics and Space Administration, was responsible for aeronautical research. It had been created by public law in 1914 to "supervise and direct the scientific study of the problems of flight with a view to their practical solution." Its governing committee included two Navy members from BuAer; in addition, Rear Admiral David W. Taylor,

Victory, Development

F4F

Pensacola, Fla., who would be responsible for its use, did the test flying. After BuAer purchased 50 Boeing NB airplanes based on their findings, they were found to be susceptible to flat spins and unsuited for inexperienced pilots. More effective control of aircraft design and testing was needed.

The DT-1, the Navy's first carrier-worthy torpedo plane, was at the other extreme. When it was developed, Commander Jerome C. Hunsaker was head of airplane design. He later recalled that Donald Douglas had shared his BuAer office for a week while he designed the DT; thus, Douglas talked to pilots and engineers and considered their views in making

data. After basic decisions were made, BuAer began sending the drawings and data to industry as part of informal design competition. Thus, the companies could either propose their own designs or develop an airplane based on the BuAer design. After they responded, BuAer evaluated their proposals, usually selected one or more for development, and issued contracts for complete design data and prototype airplanes.

In the late 1930s, BuAer stopped putting three-view drawings in the design competition package. Losers sometimes complained that they were not chosen because they had not slavishly followed the whims of BuAer's designers. Eliminating the drawings not only freed BuAer from that charge, but also eliminated any tendency among company designers to copy a BuAer design rather than use it as guidance in thinking creative-

who retired from the Navy after WW I, served as a public member until 1938. NACA's research laboratory, on the lower Chesapeake Bay, contained wind tunnels; a towing basin opened in 1931 and other special facilities. During the interwar period, NACA headquarters was in the Navy Department, convenient to BuAer.

This colocation facilitated exchange of views between the BuAer and NACA staffs and no doubt brought synergism to the technical expertise of both.

Two episodes from BuAer's early days illustrate some of the complexity in aircraft development. BuAer selected a new training plane on the basis of "fly before you buy" tests of three competing designs. Aviators at

the design. The down side, as Hunsaker pointed out, was that if the episode had become public, BuAer would have been vulnerable to charges of extreme favoritism. BuAer needed a better way of acquainting industry, on an across-the-board basis, with Navy thinking about airplanes.

BuAer, as part of the process of defining types of aircraft needed, was already using its drafting rooms to make design studies, including three-view drawings, performance calculations and, sometimes, wind tunnel

ly about the Navy's problems.

To obtain improved models of an existing design, a product improvement, or evolutionary, path was followed: new engine, changes to armament, improved structure, changes requested by squadrons, etc. For example, the 1934 XBT-1 (see "Naval Aircraft," *NA News*, Sep-Oct 89) through product improvement became the SBD that in

Naval Aviation in WW II

-5 and -6 configurations served as a firstline dive-bomber into 1944 and in less demanding roles for the duration. In contrast, the TBD-1, developed the same year, received only minimal improvements and was in production for only two years. Thus, it was outdated by December 1941 and was replaced in mid-1942 as soon as the vastly superior TBF became available. Product improvement was important in aircraft designs that remained in production over a period of years.

The remainder of this article will survey progress in some key areas: power plants, radio, shipboard equipment, and targets and guided missiles. It will conclude with a look at aircraft development of the four major WW II combat types: patrol planes, torpedo bombers, dive-bombers, and fighters. From this, I hope that the reader will gain appreciation of the manner in which the Navy utilized America's engineering and innovative skills on the eve of WW II.

Power Plants

The airplane's engine is as important as its wing and is less appreciated. One pioneer airplane designer stressed this by asking me, "Who knows the name of Paul Revere's horse?"

Many fundamental changes affecting WW II engines were begun in the twenties and early thirties. **First**, the Navy decided to rely almost exclusively on radial, air-cooled engines beginning with the Lawrence 200-hp radial engine developed immediately after

WW I. **Second**, in 1925, Pratt & Whitney Aircraft (P&W) became a rival to Wright Aeronautical Corporation which had taken over the Lawrence design. Subsequently, both firms competed in developing engines of about the same size and power. **Third**, about 1930 airplane designers began using circular engine cowlings, particularly the NACA cowling, to minimize the drag stemming from the radial engine's large frontal area. **Fourth**, designers of larger engines began arranging the cylinders in two rows to diminish frontal area. P&W began this in 1929; an experimental engine followed in 1931 with the R-1830 widely used during WW II. **Fifth**, use of radial engines necessitated that the Navy stress antiknock qualities in fuel. Navy squadrons, as early as 1926, began mixing tetraethyl lead with their gasoline while refueling.

An essential element of engine development was running an engine until it failed, redesigning the weakest part, and running it some more. The Aeronautical Engine Laboratory, along with other labs, engaged in such tests. Spark plugs, ignition wires, bearings, cooling fins, valves, cams, etc., were tested and improved. An emergency occurred in 1937 when new fighters and dive-bombers began experiencing failure of the main crankshaft bearing during high-speed dives. This problem, which threatened a generation of high-performance airplanes, was corrected by developing silver-lead-indium bearing material.

Overall during the interwar period,

these various efforts resulted in a five-fold increase in engine power as well as greater fuel efficiency and longer engine life. At the close of WW I, most airplane engines were rated about 400 hp; by contrast the R-2800 and R-3350, both begun in 1936, were rated over 2,000 hp.

Radio and Radar

During WW II, no field was more crucial than radio and radar. A major step in improving radio performance in 1929 was a general shielding conference. Practical methods of shielding aircraft radio from stray electric currents were identified and shielding requirements were incorporated in the 1932 general airplane specification.

Navy engineers were deeply involved in studying high-frequency radio waves and developing high-frequency equipment. The GF-RU transmitter and receiver, the first effective radio for single-seat aircraft, was installed in fighters from the early thirties through WW II.

NRL developed the IFF Mark I aircraft identification system in 1935-37. The aircraft carrier *Ranger* tested it in 1938 and it went into service in 1939.

A rotating beacon homing system with sector identification was developed and tested in the same timeframe and replaced an earlier system in which airplanes were fitted with cumbersome loop antennas.

Beginning in 1936, the Bureau of Standards developed a radiosonde – a small radio transmitter attached to weather instruments – and a balloon for use in measuring and reporting pressure, temperature, and humidity at altitude and transmitting that information to a surface station. By the end of 1938, these were coming into use by ships and shore stations.

NRL's radar development began in 1930 after a stray aircraft reflected the radio signal during tests of a homing beacon. In 1934, the project was redirected from continuous waves to pulse. As experimental designs met their main objectives, a shipboard set was tested aboard the destroyer *Leary* in 1937. The XAF intended to operate aboard major ships was designed in 1938. Following its test onboard the battleship *New York*, Rear Admiral



Concentrated prewar development of patrol seaplanes resulted in the PBY Catalina.

Brewster's F2A Buffalo was inadequate to counter newer Japanese fighters at the war's outbreak.



Naval Aviation in WW II

Alfred W. Johnson, Commander of the Neutrality Patrol, described it as "one of the most important military developments since the advent of radio itself."

Ship-related Devices

Carriers and helicopters dominate modern Naval Aviation, but during the interwar years, many methods of taking airplanes to sea were investigated. Catapults for launching aircraft from battleships and cruisers were developed by the mid-twenties; in 1936, towed nets were devised that permitted these ships to recover floatplanes while under way. In 1926, an aircraft operated from a submarine and in 1940 from a destroyer. For lighter-than-air use, small aircraft, equipped with an overhead hook, flew from and returned to a trapeze on the Navy's last rigid airships; during WW II, Marines would experiment with a similar device, the Brodie gear, to operate a spotting plane from an LST (tank landing ship). An autogiro, with free-wheeling rotor, landed aboard the carrier *Langley* in 1931.

An interesting experiment was the bow arresting gear first installed on *Ranger* and tested in 1934. Bow gear was installed on the later prewar and early *Essex*-class carriers.

The earliest carrier catapults were designed to launch seaplanes, but a wheeled airplane was catapulted from *Langley* in 1929. Serious development of the flush-deck, compressed-air catapult was begun at NAF in 1934. Initially, these were installed on the flight deck and athwartships on the hangar deck of later prewar carriers. Hangar deck catapults were also originally planned for the *Essex*-class carriers.

BuAer hoped to increase flying boat loading by catapulting, and in the late 1930s, NAF began developing a 30-ton catapult so designed that two in parallel could launch a 60-ton flying boat. This was abandoned after a liquid rocket-assisted takeoff project was assigned in May 1941 to the Engineering Experimental Station at Annapolis, Md.

Patrol Planes

Today, the prewar emphasis upon flying boat patrol planes seems an anomaly. Through WW II, they played a major role. Before the war, the Navy

operated water-based aircraft and left large landplanes to the Army. Any views to the contrary were lost in the brambly thicket of Army-Navy relationships. Moreover, the 1930s was the decade of the flying boat. A new era in research and development appeared imminent when the NACA opened its towing basin in 1931. Flying boats pioneered many transoceanic air routes. For example, in 1935, Pan American's *China Clipper* inaugurated San Francisco to Manila service.

Despite such promise, the 1933 PBY (originally designed as the XP3Y-1) – rather than a larger craft with longer range, higher speed, and greater carrying capacity – was the most widely used WW II patrol plane. The Navy sponsored at least six distinct flying boat designs as follow-ons to the PBY. A twin-float patrol torpedo bomber was at one extreme and the flying boat designed for catapulting was at the other. Major efforts went into more conventional large boats, some with two and others with four engines. Out of these efforts came the Martin PBM and the Consolidated

PB2Y; both entered limited service in 1940. In late 1939, when the Navy needed to order a tested patrol plane for the Neutrality Patrol, the PBY had no competition.

Dive-bombers and Fighters

Dive-bombing was developed by Navy fighter squadrons and shown to be effective against ships in 1926. Since a bomb sometimes struck the propeller or lodged in the landing gear of the releasing plane, the tactic was in jeopardy until 1931 when displacing gear, or bomb yoke, was developed which swung the bomb clear.

For several years, there was much overlapping among fighters, dive-bombers, and scouts. Some clarification took place in mid-decade; in 1934, BuAer held design competitions for both heavy (1,000-lb.) and light (500-lb.) dive-bombers and, in 1935, for a single-place fighter. Two aircraft were selected for development from each, and five of the six resulting designs were used at least briefly during WW II. The most important were the SBD dive-bomber and the F4F fighter.



Above, the TBD-1's minimal development before the war made it obsolete at the war's outset. Right, Curtiss SOC floatplanes served throughout the war. Facing page, aerodynamic refinements and a new power plant in the BT (XBT-1 shown here) eventually produced the successful SBD Dauntless.



The Douglas SBD was a product improvement development of the Northrop XBT-1. Northrop (in 1934, a subsidiary of Douglas) proposed one design as meeting requirements for both heavy and light dive-bombers. BuAer selected it for development as a heavy dive-bomber and procured it as the BT-1 (*NA News*, Sep-Oct 89). The last airplane was updated and designated XBT-2. By the time the BT-2 was ready for production, Douglas had absorbed its subsidiary and the plane became the SBD-1.

BuAer held another dive-bomber competition in 1938 from which it chose the Brewster XSB2A-1 and the Curtiss XSB2C-1. Development contracts were issued in the spring of 1939. The next year, after the fall of France, both were rushed into production before their first flights. With both production problems compounded development problems. The SB2A was eventually used briefly as a training plane. The SB2C entered combat in November 1943 and served as the Navy's chief dive-bomber during the last year and a half of the war.

The 1935 fighter design competition winners were the Brewster XF2A-1 monoplane and the Grumman XF4F-1 biplane. Grumman decided its design was outmoded and in mid-1936 substituted the monoplane XF4F-2. During 1938 tests of these planes, the Navy was vying with the Army for the first 300-mph fighter and its new planes missed by about seven percent. NACA full-scale wind tunnel tests of the XF2A-1 provided a basis for cleaning it up so that it reached 300 mph. Tests of the XF4F-2 were equally successful. Full-scale wind tunnel tests were then used to improve many WW II aircraft. In mid-1938, BuAer chose to procure the F2A-1. Grumman redesigned the XF4F-2 into the XF4F-3, increasing wing area and

installing a more powerful, two-stage, supercharged engine; the F4F-3 went into service in December 1940.

By 1937, fighter designers faced serious problems since multiengine bombers were approaching the speed of fighters. BuAer held fighter design competitions in both 1937 and 1938. The first, for twin-engine fighters only, was fruitless. From the next, BuAer chose to develop three widely different designs: the Bell XFL-1 with buried, liquid-cooled engine; Grumman XF5F-1 with twin, air-cooled engines; and Chance Vought XF4U-1 with a single R-2800 air-cooled engine and an inverted gull wing. Of the three designs resulting from the competition, the most conventional, the XF4U-1, came to meet expectations. According to Vought historians, it reached 400 mph on its first flight in May 1940. The Navy almost immediately placed a production contract.

Torpedo Bombers

There were only two design competitions for torpedo bombers during the thirties. One in 1934 produced the Douglas TBD-1 and one in 1939, the Grumman XTBF-1. The Navy obtained 130 TBDs and production was completed in 1939. The TBF, being four years younger and fitted with a more powerful engine, had much better performance. It also carried an additional gun, armor for the pilot and crew, and self-sealing fuel tanks.

Before the 1939 design competition, BuAer investigated glide bombing as an alternative to horizontal bombing. Elimination of the Norden bombsight would have saved space and weight but that was more than offset, in the eyes of BuAer engineers, by the fact that a stronger and therefore heavier plane would have been required. Unfortunately, there was no data on the

November 1: Atlantic Squadron renamed Patrol Force, United States Fleet, Naval Air Station, Alameda, Calif., established.

November 15: Naval air operations began from Bermuda. First to operate were the planes of Patrol Squadron 54 based on *George E. Badger* (AVD-3).

November 16: The Bureau of Aeronautics established a catapult procurement program for *Essex*-class carriers. One flight deck catapult and one athwartships hangar deck catapult were to be installed on each of 11 carriers.

December 23: Naval Air Station, Key West, Fla., established.

December 30: The Bureau of Aeronautics directed that fleet aircraft be painted in nonspecular colors. Ship-based aircraft were to be light gray all over; patrol planes were to be light gray except for surfaces seen from above, which were to be blue-gray.

relative accuracy of glide bombing and high-altitude horizontal bombing.

In conclusion, the foregoing touches many but by no means all of the areas in which the Navy improved aviation technology during the interwar years and adapted it to taking airplanes to sea. A few of the paths were deadends; others appear to have been so but more study would likely show that they had application in WW II. In some areas, such as rotary wing, it could be argued – but not proven – that greater prewar effort would have yielded more wartime utility. In retrospect, something should have been done with jet engines and much more with antisubmarine warfare.

Such carping should not be allowed to obscure basic facts. Overall, the Navy's efforts were successful. Airplanes that were developed and in production by late 1939 replaced earlier biplanes and fended off a thoroughly prepared enemy at the beginning of the war. With additions that were started between late 1939 and late 1941, they provided the wings of victory. ■

Lee Pearson was a naval historian from 1947 to 1977, when he retired from the Naval Air Systems Command.



See Part 2 in next issue.

Honing the Edge

A Naval Aviation milestone was recorded at NAS Pensacola, Fla., recently with the 20,000th landing aboard the Navy's smallest training carrier, the **Helicopter Landing Trainer (HLT) IX-514**. The landing was made by Capt. Dave Falls, USMC, of HT-18 and Lt. Marc Feallock, USN, of HT-8 in a TH-57 helo.



Capt. Jim Alrich, C.O. of NAVPRO Bethpage, N.Y., and LCdr. Bill Lindner pause in front of F-14D No. 1 prior to the Navy's first acceptance test flight at Grumman Corporation's Calverton, N.Y., facility. Upon completion of acceptance tests and induction into the Navy inventory, the aircraft will be delivered to NATC Patuxent River, Md., for carrier suitability evaluation.

Scan Pattern

What's in a name? Two senior officers bearing the same name – one of the U.S. Navy and one of the Royal Australian Air Force (RAAF) – began an association over 12 years ago.

Rear Admiral David N. Rogers and Air Commodore (AIRCDRE) David N. Rogers first met in 1978 aboard *Enterprise* (CVN-65) when they were a Commander and Wing Commander, respectively. They have crossed paths frequently since and developed a firm friendship.

In 1986-87, the Australian Rogers spent two years in Washington, living only five miles from the American Rogers. RAdm. Rogers has made frequent visits to Australia as captain of several USN ships, including the carrier *Kitty Hawk* (CV-63). His latest visit

was to officiate as the Navy's senior representative in the handover of the last FA-18 *Hornet* to the RAAF, the same program on which AIRCDRE Rogers had been the RAAF's senior representative in Washington.

The coincidences continue: both are pilots with a strike background, both have the same size family, and both of their sons want to follow in their father's footsteps. RAdm. Rogers is now the Deputy Assistant Chief of Naval Operations for Air Warfare, while AIRCDRE Rogers is the Director General of Air Warfare Policy and Plans.

To commemorate African-Americans' achievements in aviation from 1917 to the present, a 51-foot-long mural entitled "**Black Americans in Flight**" was recently unveiled at St. Louis-Lambert International Airport. The mural's major sponsor was Anheuser-Busch Company. On the fourth panel, the mural includes contemporary black naval pilots from 1950 to the present. Those shown are Ens. Jessie L. Brown, first African-American Naval Aviator, killed in action, Korea; General Frank Petersen, Jr., USMC, combat pilot in Korea and Vietnam; LCdr. Donnie Cochran, first African-American member of the Navy Flight Demonstration Squadron, *Blue Angels*; and Lt. Clemie McKinney, a Naval Aviator missing in action in Vietnam.

Rick Stanikhaven



Ens. Jessie L. Brown is pictured top row, second from left.



Gen. Colin Powell is designated an "honorary tailhooker" by VS-32's Cdr. Mark Kikta and Lt. Tom Greenspon in commemoration of his first carrier launch and trap.

On March 18, 1990, Cdr. Mark Kikta, VS-32 X.O., and Lt. Tom Greenspon had the honor of presenting **Gen. Colin Powell, Chairman, Joint Chiefs of Staff**, with a framed picture of the S-3 *Viking* in which he made his first carrier launch and arrested landing. The squadron also had the catapult holdback fitting set in a clear block of lucite as a paperweight so that Gen. Powell would always remember his first carrier experience with the *Maulers*. The engraved brass plate says it all: General Colin Powell "Honorary Tailhooker."

NANews Bids Farewell to JOC Richeson

In November, *Naval Aviation News* bids a fond adieu to Assistant Editor and Photojournalist JOC James G. Richeson.

Chief Richeson arrived at *NANews* in June 1987. During his tour, he consistently produced outstanding, in-depth feature articles which enhanced the magazine and promoted the objectives of the Assistant Chief of Naval Operations (Air Warfare) and the Naval Historical Center. In January of this year, Chief Richeson was chosen as Sailor of the Quarter for the Naval Historical Center. Jim's expertise in typesetting and "computerese" will be sorely missed, along with his comical remarks which helped to make many a long day more tolerable. What will the

Anheuser-Busch Company



staff do when someone calls out, "Where's Jim? This stupid computer is acting up!"

"Chief Jim has always been there to guide me through," said JO1 Milinda Jensen. "Even though he was my boss, he's also been like a brother; I look forward to working with him again."

Managing Editor Sandy Russell added, "Jim's good-natured dedication has enriched the staff's capabilities. He is a prime example of the talented, high-caliber person which *NA News* has been fortunate to have in its journalists."

During off-duty hours, JOC Richeson furthered his education by enrolling in college courses. His hard work paid off when he received an Associate of Arts degree from Central Texas College in April 1990.

The *NA News* and Naval Aviation History staffs wish Chief Richeson well in his assignment aboard *LaSalle* (AGF-3), flagship of Commander, Middle East Force. Think snow, Jim!

Change of Command

CarGru-3: RAdm. Timothy W. Wright relieved RAdm. Daniel P. March.

CarGru-7: RAdm. Ronald J. Zlatoper relieved RAdm. Thomas A. Mercer.

CVW-11: Capt. Stephen L. Webb relieved Capt. Thomas J. Ford.

CVWR-20: Cdr. James D. Cannon relieved Capt. Dana F. Miller.

Forrestal: Capt. Robert S. Cole relieved Capt. Louis E. Thomassy, Jr.

HelWingsLant: RAdm.-Sel. Joseph S. Walker relieved RAdm. Ronald H. Jesberg.

HelWingRes: Cdr. Robert J. Thomas relieved Capt. Michael R. Matt.

HC-2: Cdr. Joe A. Baker III relieved Cdr. John J. Ward, Jr.

HC-11: Cdr. Larry W. Hayner relieved Cdr. Ivan E. Needles.

HC-16: Cdr. R. C. Haas relieved Cdr. P. H. Crowell III.

HMM-166: Lt. Col. Michael E. Carroll relieved Lt. Col. Warren W. North.

HS-10: Cdr. William Young relieved Cdr. Michael Charley.

HS-1535: Cdr. James W. Aires III relieved Cdr. George T. Conaway.

HSL-37: Cdr. John J. Coyne relieved Cdr. Scott L. Steele.

HSL-42: Cdr. John Lynch relieved Cdr. Larrie G. Cable.

HSL-94: Cdr. John P. McLaughlin relieved Cdr. Ronald A. Pignataro.

HSWing-1: Capt. Mark T. Vanderberg relieved Capt. Patrick D. McGovern.

HT-18: Lt. Col. Royce W. Setzer relieved Cdr. Michael L. Price.

Independence: Capt. Robert Ellis, Jr., relieved Capt. Thomas Slater.

MACG-38: Col. Joseph Della-Corte relieved Col. Joseph W. Robben.

MAG-13: Col. Joseph T. Anderson relieved Col. Jay C. Lillie.

MAG-16: Col. Larry T. Garrett relieved Col. John J. Barrétt.

MALS-16: Lt. Col. Henry A. Commiskey relieved Lt. Col. Michael J. Kennedy.

MAWTS-1: Col. Michael P. Delong relieved Col. Michael D. Ryan.

MCAS Yuma: Col. Clarence B. Cheatham relieved Col. Mack Luckie.

MWSG-37: Col. Robert W. Coop relieved Col. Ronald M. D'Amura.

MWSS-371: Lt. Col. Harry W. Gullett relieved Lt. Col. Wayne A. Clemmer.

MWSS-373: Lt. Col. Stephen D. Hanson relieved Lt. Col. Jerome L. Geil.

NaDep Norfolk: Capt. Thomas W. Hancock relieved Capt. Garland F. Skinner.

NAMI: Capt. Hardy Bercier, Jr., relieved Capt. Ronald K. Ohslund.

NAR Norfolk: Capt. Johannes Wytmsa relieved Capt. Roger Richardson.

NAS Cecil Field: Capt. Robert W. Nordman relieved Capt. Frank Herron.

NAS Lemoore: Capt. Joseph E. Hart relieved Capt. David M. Gist.

NAS Oceana: Capt. Lawrence W. Urbik relieved Captain Michael N. Matton.

NAS Pensacola: Capt. Richard J. Burns relieved Capt. Harry A. Jupin.

PatWing-1: Capt. Philippe M. Lenfant relieved Capt. Michael D. Haskins.

PatWing-11: Capt. Richard G. Kirkland relieved Capt. Richard L. Norwood.

Peleliu: Capt. Richard T. Myers relieved Capt. Philip S. Gubbins.

2d MAW: Maj. Gen. Richard D. Hearney relieved Maj. Gen. Richard A. Gustafson.

SOMS El Toro: Lt. Col. David H. Jacobs relieved Lt. Col. Douglas A. Farmer.

SOMS Yuma: Lt. Col. Michael J. Sweigart relieved Lt. Col. Richard A. Hagerman.

StrkFightWpnsScolPac: LCdr. Carlton A. Simmons, Jr., relieved Cdr. John V. Stivers.

VA-34: Cdr. Ronald K. Alexander relieved Cdr. Eugene K. Nielsen.

VA-85: Cdr. L. W. Crenshaw relieved Cdr. D. W. Ellerman.

VA-174: Cdr. Robert C. Rubel relieved Cdr. Jerry B. Singleton.

VA-185: Cdr. Bernard M. Satterwhite, Jr., relieved Cdr. Michael J. McCamish.

VA-204: Cdr. Ronald J. Roshelli relieved Cdr. Keith R. La Flair.

VAQ-141: Cdr. Jack O. Skjoldager relieved Cdr. Frank E. Folly.

VAW-110: Cdr. Terry E. Magee relieved Capt. Ronald B. Weber.

VC-6: Cdr. Donald C. Fox relieved Cdr. John J. Nacht.

VF-74: Cdr. Douglas K. Dupouy relieved Cdr. Mark P. Grissom.

VFA-22: Cdr. Robert Darwin relieved Cdr. Dale Doorly.

VFA-131: Cdr. Robert C. Rubel relieved Cdr. Jerry B. Singleton.

VFA-305: Cdr. John McGulre relieved Cdr. David Janiec.

VMA-311: Lt. Col. Dickie J. White relieved Lt. Col. Gary O. Norris.

VMA-531: Lt. Col. K. J. Stalder relieved Lt. Col. John F. Goodman.

VMFAT-101: Lt. Col. George C. Tullos relieved Lt. Col. Jon W. Morrow.

VMFP-3: Lt. Col. Michael S. Fagan relieved Lt. Col. John C. Pastuf.

VMGR-352: Lt. Col.-Sel. Arlen D. Rens relieved Lt. Col. Robert A. Price.

VP-1: Cdr. William F. Eckert relieved Cdr. William R. Blake.

VP-5: Cdr. Franklin D. Bryant, Jr., relieved Cdr. Howard S. Hilley, III.

VP-11: Cdr. J. Rich Miller relieved Cdr. R. Peter Scott.

VP-17: Cdr. Charles A. Jedlicka relieved Cdr. John E. Fink.

VP-31: Cdr. David C. Hull relieved Capt. Ralph M. Alford.

VP-40: Cdr. George C. Hill relieved Cdr. Raymond R. Yeats.

VP-44: Cdr. Alan M. Harms relieved Cdr. Walter C. Spearman, Jr.

VP-46: Cdr. Vernon Ingram relieved Cdr. Dana Richardson.

VP-90: Cdr. Sam H. Kupresin relieved Cdr. Louis F. Rabe.

VR-52: Cdr. H. Ray Fisher relieved Cdr. Michael B. Bryant.

VS-30: Cdr. Thom W. Ford relieved Cdr. David Architzel.

VT-3: Lt. Col. Michael F. Monigan relieved Cdr. Randall J. Hess.

VT-28: Cdr. Robin M. Parker relieved Cdr. David P. Alleman.

Awards

VAdm. Howard B. Thorsen became the 13th **Ancient Albatross** when VAdm. Clyde E. Robbins passed on the title in 1990. The Ancient Albatross award honors the Coast Guard aviator on active duty who has held that designation for the longest time. The names of the recipients are inscribed on a large bronze and wooden plaque.

ADCM James T. Woltz became the **first enlisted Ancient Albatross**, a newly created award.

VF-202, NAS Dallas, Texas, won the **Moran Award**, which is sponsored by the Delta Cruise Line Company. It is presented to the safest squadron in the Naval Reserve.

Jay Beasley, 76, consultant to both the Navy and Lockheed Aeronautical Systems Company, was presented the Navy's Distinguished Public Service



H. Lawrence Garrett III presents the Distinguished Public Service Award to Jay Beasley.

Award by Secretary of the Navy H. Lawrence Garrett III at the annual Patrol Forces reunion held in Washington, D.C.

Beasley, renowned in the Navy community for training pilots in the finer points of flying the *Orion*, is affectionately known as "Mr. P-3." He has logged over 30,000 landings in the aircraft since his test pilot days when the P-3 began rolling off the production line. Beasley trained so many pilots in his career that he was designated Honorary Naval Aviator No. 11.

Anniversaries

NAS Alameda and NADep Alameda shared a 50th anniversary celebration on November 1, 1990. This event marked one-half century of

service by men and women of many commands on base and generations of aircraft and naval vessels.

Records

Several units marked **safe flying time**.

HC-3: 107,631 hours and 16 years
 HC-16: 6 years
 HM-15: 7,800 hours and 2 years
 HML-771: 30,000 hours and 10 years
 HMLA-369: 50,000 hours and 8 years
 HMM-261: 31,000 hours and 5 years
 HMM-361: 20,000 hours and 5 years
 HMM-465: 10,000 hours
 HMM-774: 38,000 hours and 21 years
 HMT-301: 90,000 hours and 15 years
 HS-1: 50,000 hours and 7 years
 HS-4: 30,000 hours and 9 years
 HS-5: 31,800 hours and 10 years
 HS-9: 42,000 hours and 10 years
 HSL-35: 13,000 hours and 2 years
 NAS Brunswick: 43,904 and 30 years
 NAS Point Mugu: 23,000 hours and 11 years
 NAVPRO Melbourne: 2,000 hours and 5 years
 SOMS Yuma: 16 years
 Test Pilot School: 28,000 hours and 4 years
 VA-27: 18,000 hours and 4 years
 VA-72: 25,000 hours and 6 years
 VA-115: 29,642 hours and 6 years
 VA-128: 14,000 hours and 1 year
 VA-165: 43,835 hours and 10 years
 VAW-88: 27,642 hours and 20 years
 VAW-110: 70,440 hours and 15 years
 VAW-112: 32,743 hours and 17 years
 VAW-117: 29,787 hours and 13 years
 VAQ-113: 24,000 hours and 12 years
 VAQ-132: 33,000 hours and 20 years
 VAQ-133: 6,150 hours and 4 years
 VAQ-141: 2,938 hours and 3 years
 VAQ-130: 15,000 hours and 9 years
 VAW-110: 72,000 hours and 15 years
 VAW-113: 24,000 hours and 12 years
 VAW-124: 19 years
 VC-5: 6,300 hours and 1 year
 VF-1: 12,000 hours and 3 years
 VF-31: 15,000 hours and 4 years
 VF-102: 6 years
 VF-142: 26,000 hours and 7 years
 VF-211: 14,000 hours and 4 years
 VFA-15: 20,000 hours and 5 years
 VFA-146: 19,000 hours and 5 years
 VMA-322: 18,000 hours and 7 years
 VMA(AW)-332: 45,000 hours
 VMAQ-4: 10,000 hours and 9 years
 VMFT-401: 10,000 hours and 3 years
 VP-1: 42,000 hours and 7 years
 VP-10: 17 years
 VP-17: 135,200 hours and 20 years
 VP-22: 73,497 hours and 11 years
 VP-26: 221,000 hours and 28 years
 VP-56: 174,000 hours and 26 years
 VP-65: 75,000 hours and 19 years
 VP-92: 44,000 hours and 12 years
 VPU-2: 21,300 hours and 8 years
 VRC-50: 65,000 hours and 2 years
 VR-22: 65,000 hours and 14 years

VS-21: 8,000 hours and 2 years
 VS-24: 31,000 hours and 8 years
 VS-31: 81,700 hours and 20 years
 VS-32: 28,900 hours and 7 years
 VT-23: 19,683 hours and 1 year
 VT-27: 130,000 hours and 3 years
 VXE-6: 18,966 hours and 3 years and
 VXX-8: 89,000 hours and 23 years



Lt. Col. Edward P. Hay, C.O. of VMFT-401, exits his F-5E after flying the sortie that brought the squadron up to 3,000 accident-free flight hours in the Tiger II.

Correction to NANews, Sep-Oct 1990, p. 30: Maj. Colin Lampard, VMFA-122, surpassed his 3,000th career mishap-free flight hour. He has flown over 10 types of aircraft and has amassed 400 hours in the FA-18 Hornet.

Rescues

PR1 Thomas L. Garton's quick thinking and prompt action saved a human life. While dining with his family at a local restaurant, Garton noticed an elderly lady choking on some food. Being first aid and CPR certified, he immediately went to her assistance. She was in a state of panic and had started turning blue from lack of oxygen. Quickly, Garton asked someone to call an ambulance and then began to perform the Heimlich maneuver, which was required several times. The lady became unconscious but on the last thrust, the food was dislodged and she began to breathe on her own. Garton then recommended that she be taken to the hospital for a follow-up evaluation.

Assigned to the VP-68 *Blackhawks*, PR1 Garton is home-based at NAF Washington, D.C. For his actions, he is being recommended for the Navy Lifesaving Medal.

Swanborough, Gordon, and Peter M. Bowers. *United States Navy Aircraft Since 1911*. U.S. Naval Institute, Annapolis, MD 21402. 1990. 612 pp. Ill. \$39.95.

This long-awaited, revised third edition of a standard reference enjoys considerable updating since the 1976 second edition. New details and new aircraft are included, as well as a fine introduction on aircraft markings and a history of Naval Aviation. The complex system of Navy aircraft designations is also discussed. The main portion of the book on individual aircraft provides a good grounding in the peculiarities and operational requirements of the U.S. Navy.

There are a few errors, largely typos, as well as a few questions that might concern more knowledgeable readers. Some of the general arrangement drawings show only the early, less-important models, such as the A-6A or FA-18A, instead of the more definitive A-6E or FA-18C.

Several relatively important aircraft are relegated to the section titled, "Minor Types." Anyone who spent many 10 to 12-hour flights in C-118s would hardly consider Douglas' hard-working transport a minor type. And while perhaps not used in large numbers, aircraft like the Beechcraft T-44, Bell H-57, Convair C-131, and North American AJ and T-39 served – and in some cases continue serving – as important trainers and transports. Certainly the C-9 *Skytrain II*, which shoulders much of the burden of moving people and supplies for the Navy and Marines, rates a separate entry in the main portion of the book.

These points aside, this new edition stands on its own merits and should be considered by enthusiasts and researchers as a valuable addition to their libraries. The editors have done a good job in photo selection and reproduction.

WEATHER FRONT



Gently falling snowflakes, the sculpture of drifting snow, and even Santa and his flying reindeer – VFR over a snowy landscape – evoke visions of romanticism and charm. So long as you don't have to make an approach in the stuff, or are responsible for snow removal, it indeed can be a pretty sight! The meteorologist's favorite poet, Robert Frost (pun intended), wrote many a verse of snowflake and snowfall: "Dust of Snow," "My November Guest," and "To the Thawing Winds." Even the U.S. Postal Service gets into the act with "Neither snow, nor rain, nor heat, nor gloom of night ..." etc. So then, about snowflakes. How does it all happen?

A snowflake is no more than an ice crystal that forms when water vapor in a cloud freezes. If a falling snowflake passes through warm air, it melts into a raindrop. Snowflakes are characteristically tiny six-sided crystals. Depending upon conditions at the time of their development, some are flat, while

Snowflakes

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

others form needle-like shapes. Because snowflakes are crystals, they contain significantly less water than a raindrop. As a general rule, it takes approximately 6 inches of moist snow, or a 30-inch accumulation of dry, powdery snow, to equal 1 inch of rainfall.

Conventional wisdom agrees that one of the most quoted features about the snowflake is that no two are alike. In the interest of scientific accuracy, however, the local weather guesser in Operations is more likely to substitute "identical" for "alike." Actually, the final shape of a snowflake depends upon a multitude of factors, such as temperature, humidity, and rate of descent. Even the orientation of the crystal as it falls from the cloud influences its shape, because growth is always greater on the leading edge than at the center.



Unlike the artist's single well-defined snowflake depicted commonly in Christmastime advertisements, snowflakes in real life are usually made up of an aggregation of crystals which merged as they fell from the sky. Broken single crystals, fragments, and clusters of crystals are the most likely forms of snow that strike the windscreen of your aircraft, or are lifted off the tarmac by your duty shovel. The ability of snowflakes to cluster together is responsible for the very large flakes that are observed during periods of extremely still air. The *Glossary of Meteorology*, published by the American Meteorological Society, notes that snowflakes of 10 inches in diameter can occur under these conditions. Keep your fingers crossed that those conditions won't occur the next time snow is forecast and you are in the duty section!



Define Naval Aviator

As a former Naval Aviator (USMC pilot) from 1955 to 1977, I was led to believe that the term pilot is synonymous with aviator and that aircrewman, navigator or Naval Flight Officer (NFO) is independent from the position of pilot/aviator. Although NFOs are referred to as pilots and/or aviators occasionally in print, most of us do not agree that the terms are interchangeable. Otherwise, any aircrew member could be called an aviator.

I have discussed this matter with those on both sides of the cockpit, as well as your counterpart at *Approach*, where I was a writer-editor from 1978-80. The pilots say that they are the only *real* pilots/aviators. On the other side, the NFOs say they, too, are aviators and in some cases pilots.

We who wear the Wings of Gold (one anchor on shield) would like clarification on this issue.

Joe Homer
4520 Sir Johns Lane
Virginia Beach, VA 23455-4936

Ed's note: Your perceptions are correct. According to the Naval Military Personnel Manual (Article 1410100), a Naval Aviator is "a commissioned line officer in the Navy or Marine Corps who has successfully completed the course prescribed by competent authority for naval aviators" and is designated such. The article uses the word "pilot" interchangeably with "aviator"; the article dealing with Naval Flight Officers never uses the term "aviator" as an alternate term. Strictly interpreted, only pilots are properly referred to as Naval Aviators. The use of the term "aviator" as an umbrella word for all naval flying personnel has in recent years become a convenient way to refer to the Naval Aviation community when discussing it relative to the submarine and surface warfare communities.

R4D-6

I am restoring the instrument panel from an R4D-6, BuNo 50817, and need more information, manuals, etc. I also want to contact anyone who worked on, flew in, or crewed 50817. Photos of her during her service life would be helpful.

Donald L. Keller
P.O. Box 2111
Beaverton, OR 97075

PBM/P5M

I wish to contact ex-aircrew who flew PBM/P5Ms from 1951-54 in VP-46, NAS North Island, Calif.

Don V. Dixon
3666 Diamond Ct.
Wellington, NV 89444

H-34

I am a Chicago-based historian doing research on the Sikorsky H-34 (HSS-1/HUS-1) and wish to hear from anyone having information on the helicopter's use in the Navy and Marine Corps.

Lennart Lundh
16236 South Haven Ave.
Orland Hills, IL 60477-5949

Regulus Missile History

I am writing a comprehensive history of the Regulus missile, which was fired from the aviation ships *Norton Sound* (AV-11), *Franklin D. Roosevelt* (CVA-42), *Princeton* (CV-37), *Saratoga* (CVA-60), *Lexington* (CV-16), and *Randolph* (CV-15).

Any reader who served aboard these vessels, or as an aviator in an embarked squadron, and is interested in sharing experiences/photographs please write me or call (602) 624-3690

David K. Stumpf
630 N. La Cholla Blvd.
Tucson, AZ 85745

Torpedo Squadrons at Midway

I wish to hear from surviving members of VTs 3, 6, and 8 who flew in the Battle of Midway. Please call (613) 788-7416 or write:

Prof. Brian Nolan
School of Journalism
Carleton University
Ottawa, Ontario K1S 5B6

Reunions, Conferences, etc.

VP-90 reunion, 8 DEC, NAS Glenview, IL. POC: Ramon Firnstahl, 9478 Inver Grove Ter., Inver Grove Hts., MN 55076, 612-455-5257.

Fanshaw Bay (CVE-70) reunion, 1991. POC: Duane Iosli, 310 Edwards St., Ft. Collins, CO 80524, 303-482-6237.

VP-40 seaplane era reunion, 10-13 JAN, POC: F. W. Humphries, 3746 Cameo Ct., San Diego, CA 92111-4038, 619-292-4974.

Counterparts/CO VA MY reunion, 15-17 FEB, Houston, TX. POC: Counterparts/CO VA MY, PO Box 40, Circleville, WV 26804, 415-939-7920.

Kula Gulf (CVE-108) reunion, APR 91, Hickory, NC. POC: Larry Eckard, PO Box 5145, Hickory, NC 28603, 704-256-6274.

VB/VPB-106 reunion, 27 APR-1 MAY, Cape Kennedy Space Center. POC: Art Hacker, 610 Woodbridge Dr., Melbourne, FL 32940, 407-242-1937.

Wasp (CV/CVA/CVS-18) 1943-72 reunion, 1-5 MAY, San Diego, CA. POC: Richard VanOver, USNR(Ret.), 6584 Bunting Rd., Orchard Park, NY 14127.

VC-5 reunion, 17-18 MAY, Atlantic Beach, FL. POC: Bill Bain, 706 Trinidad Rd., Jacksonville, FL 32216, 904-721-9795.

Long Island (CVE-1) reunion, 23-25 MAY, New Orleans, LA. POC: John Koehl, 9770 Rockton Circle W., New Orleans, LA 70127, 504-242-2539.

VRC-50 reunion, Summer 1991, Orlando, FL. POC: Clint Staples, 6910 Windstream Ter., Orlando, FL 32818, 407-299-8428.

VFs 14/53/141 reunion, JUL 91, Myrtle Beach, SC. POC: Harold Dolin, 9646 Hamilton Hills Dr., Fishers, IN 46038, 317-849-0218.

VP-18 officers (1953-57) reunion, OCT 91, POC: Jack Bahm, 403 Shoreline, Gulf Breeze, FL 32561.

Carrier Air Group 153-15 (1945-49) reunion, 9-13 OCT, San Antonio, TX. POC: Capt. R. Moore, USN(Ret.), 209 Tamworth, San Antonio, TX 78213, 512-344-9197.

VP-68 reunion, 17 NOV. POC: Bill Trudell, 560 Cane Run Rd., Lexington, KY 40505, 606-299-4284.

Forrestal reunion association formed. For membership application, write Forrestal Reunion Association, POB 490007, Lauderdale Lakes, FL 33349-0007, 305-978-9147.

ACORN 45 WW II Sangley Point reunion planned. POC: Martin Walton, 306 S. Madison St., Bloomfield, IA 52537.

VF/VT-33 reunion planned. POC: Bill Byron, 2189 Argyle Ave., Los Angeles, CA 90068, 213-463-7869.

VF-46 reunion planned. POC: Frank Fogde, 5803 Glen Eagle Dr., Stuart, FL 34997.

Kearsage (CVA-33) reunion information wanted. Contact Gene Beaver, 3812 Kiowa Ct., Sierra Vista, AZ 85635.

Correction to NANews, Sep-Oct 90, page 5: In "RH-53D Joins the Corps" caption, Col. H. G. Roser is C.O. of MAG-42 vice MAG-46.

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<i>Abraham Lincoln</i> , Caruso onboard	May-Jun	14	Supercarrier, evolution	May-Jun	16	Marne Aviation Logistics Squadron, mission	Jan-Feb	24
commissioned	Jan-Feb	8	<i>Vinson</i> , A-7E's last WestPac cruise	May-Jun	5	Maritime Patrol Force, modernization	Mar-Apr	8
new home port	Nov-Dec	8	Caruso, Hank, Ensign Nolo and the Drones	Jan-Feb	12	Master Chief of the Navy, AVCM D.R. Bushey	Nov-Dec	10
<i>America</i> , 25th anniv.	Sep-Oct	30	onboard <i>Lincoln</i>	May-Jun	14	McMahon, Thomas, senior aviation LDO	Jan-Feb	11
<i>Bennington</i> , stricken from register	Sep-Oct	5	<i>Chained Eagle</i> , Alvarez	Mar-Apr	13	Missiles		
<i>Bon Homme Richard</i> , stricken from register	Sep-Oct	5	<i>Desert Shield</i> , Operation, Persian Gulf	Nov-Dec	4	AGM-65F, first P-3 firing	Sep-Oct	7
<i>Carl Vinson</i> , last A-7 WestPac cruise	Nov-Dec	8	Drones, Ens. Nolo	Jan-Feb	12	standoff land attack, 5th test flight	Mar-Apr	7
<i>Constellation</i> , SLEP	May-Jun	5	Dunleavy, VADM R.M. A-12: Confronting the Flak	Sep-Oct	1	Missing in action, remains identified	Jan-Feb	6
<i>Coral Sea</i> , decommissioned	Jul-Aug	7	Hollow Force? Not on My Watch!	May-Jun	1		Sep-Oct	7
history	May-Jun	8	Join Up and Fly Wing	Jul-Aug	1	Mitchell, CAPT R.E., Honorary Naval Aviator No. 21	Sep-Oct	11
last deployment	Jan-Feb	4	Ready When Called	Nov-Dec	1	Moorer, ADM T.H., National Football Hall of Fame	Sep-Oct	29
<i>Eisenhower</i> , deploys S-3B/F-14A+	May-Jun	4	Squadron Command: Just the First "Plum"	Mar-Apr	1	Museums		
			Steady As She Goes	Jan-Feb	1	National Air and Space, carrier exhibit	Jan-Feb	4
			Earthquake relief, helo ops	Mar-Apr	4	Sea-Air Ops Gallery	Sep-Oct	7
			Marines in R.P.	Nov-Dec	7	National Museum of Naval Aviation, size doubles	Nov-Dec	7
			Elliott, John M., retires	Jul-Aug	34	Naval Aviation, name changes	Jan-Feb	30
			Ellyson, LT T.G., log rediscovered	Sep-Oct	19	San Diego Aerospace, Navy-Vietnam exhibit	Sep-Oct	31
			Enlisted aviation ratings, change	Jul-Aug	4			
			merge	Nov-Dec	6			
			Evolution of the Supercarrier	May-Jun	16			
			<i>Flight of the Intruder</i>	Mar-Apr	10			

Subject	Issue	Page	Subject	Issue	Page	Subject	Issue	Page
Naval aircraft series			systems trainer	May-Jun	7	VQ-3, first E-6	Jul-Aug	20
E-6A	Jul-Aug	18	tactical helmets,			last EC-130Q	Nov-Dec	8
FJ-1 <i>Fury</i>	May-Jun	20	tested	Jul-Aug	6	VS-21, new home port	Jul-Aug	4
N2S	Jan-Feb	16	Reserve, Naval Air,			VT-10, resumes AIO		
PBO-1 <i>Hudson</i>	Mar-Apr	16	opportunities	May-Jun	C3	course	Jul-Aug	5
XN5N-1	Sep-Oct	16	Review, 1989	Jul-Aug	8	30th anniv.	Sep-Oct	30
Naval Aircrew Candidate			Richeson, JOC J.G.,			VX-4, last F-4	Jul-Aug	5
School	Sep-Oct	12	transfers	Nov-Dec	30	new "Vandy One"		
Naval air stations			Safety, CY-89 aviation	Mar-Apr	4	F-14	Sep-Oct	7
Alameda, 50th anniv.	Nov-Dec	32	Sailors of the Year,			VXN-8, retires cartoon		
NADep, 50th anniv.	Nov-Dec	32	1990	Sep-Oct	18	characters	Sep-Oct	6
Naval Aviation Cadet			<i>Sharp Edge</i> ,			Supercarrier, evolution	May-Jun	16
program	Nov-Dec	12	Operation, Marines in			Survey, readership,		
Naval Aviation Depot.			Liberia	Nov-Dec	5	1989 results	Jan-Feb	31
Cherry Point	Mar-Apr	24	Ski jump ops.			TACAMO, tanking the	Jul-Aug	20
Naval Aviation in WW II series			<i>Harrier</i>	May-Jun	12	Top Gun	Jan-Feb	15
Aviation Training and			Squadrons			Training		
Expansion, Part 1	Jul-Aug	22	HAL-4,			Exercise <i>Cobra</i>		
Part 2	Sep-Oct	22	disestablished	Jan-Feb	6	Gold '90	Nov-Dec	9
Ready or Not ... Naval Aviation's			HC-8, assists			Naval Aircrew Candidate		
Aircraft and Ships			<i>Constitution</i>	May-Jun	7	School	Sep-Oct	12
on the Eve of Pearl			HC-9, disestablished	Sep-Oct	4	night attack weapons		
Harbor	Jan-Feb	18	HCS-4, established	Jan-Feb	6	system trainer	May-Jun	7
The Neutrality Patrol			HCS-5, first HH-60H			Pilot/NFO goals		
To Keep Us Out of			carrier det	Nov-Dec	8	achieved	Jan-Feb	6
World War II?			HM-15, det deploys			Pilot, reduction	Nov-Dec	4
Part 1	Mar-Apr	18	MH-53E	Mar-Apr	5	PR School, moves	Nov-Dec	6
Part 2	May-Jun	22	HMLA-167, receives			P-3B, phased out	May-Jun	6
Wings of Victory,			AH-1W	Mar-Apr	5	Top Gun	Jan-Feb	15
Part 1 - Prewar			HS-2, receives			Vietnam, MIAs identified	Jan-Feb	6
Technical Develop-			SH-60F	Jul-Aug	4	Sep-Oct	Sep-Oct	7
ment	Nov-Dec	24	HS-10, first SH-60F	Jan-Feb	5	Weather		
Naval Aviation Museum,			HS-85, last SH-3Ds	Jul-Aug	7	airport noise	May-Jun	32
name change	Jan-Feb	30	HSL-49, established	May-Jun	6	altimetry	Jan-Feb	31
Naval Aviation			VA-22, redesignated	Jul-Aug	6	cloud seeding	Mar-Apr	30
Observer wings	May-Jun	18	VA-94, redesignated	Sep-Oct	7	heat stress	Jul-Aug	35
Naval Plant			VA-155, MIA remains	Jan-Feb	6	snowflakes	Nov-Dec	34
Representative			VA-203, redesignated	Mar-Apr	7	WestPac typhoons	Sep-Oct	32
Office, redesignated	Sep-Oct	7	VA-205, last reserve			Wings, Naval Aviation		
Night fighter's diary,			A-7 squadron	Jul-Aug	6	Observer	May-Jun	18
Black Mac	Jul-Aug	28	VAQ-209, new home port			World War II series (see		
Osborn, Robert, Navy			and plane	Jul-Aug	5	Naval Aviation in WW II)		
Museum exhibit	Jan-Feb	3	transitioned to					
Pacific Missile Test			EA-6B	Nov-Dec	8			
Center, Targets			VAW-112, E-2C Group I					
Directorate (drones)	Jan-Feb	12	Update	Jan-Feb	7			
Parachute Rigger School,			VC-5, <i>Cobra</i>					
moves	Nov-Dec	6	Gold '90	Nov-Dec	9			
Persian Gulf, Operation			VF-21, new					
<i>Desert Shield</i>	Nov-Dec	4	home port	Jul-Aug	4			
Photo Contest, ANA			VF-45, new det, NAS					
bimonthly winners	Jan-Feb	26	Cecil Field	Nov-Dec	8			
	Mar-Apr	27	VF-154, MIA remains	Jan-Feb	6			
	May-Jun	28	new home port	Jul-Aug	4			
	Jul-Aug	21	VFA-25, gets FA-18C	Mar-Apr	7			
	Sep-Oct	28	VFA-113, gets FA-18C	Mar-Apr	7			
	Nov-Dec	20	VMA-211, first night-					
Pilot visual entry			attack AV-8B	Sep-Oct	7			
standards, modified	Jul-Aug	4	VMFA(AW)-121,					
Prisoner of war,			FA-18D	Jul-Aug	7			
Alvarez book	Mar-Apr	13	VMFP-3, deactivated	Nov-Dec	5			
			VP-6, gets P-3C Update					
			II.5	Jul-Aug	6			
			VP-22, last fleet P-3B					
			squadron	Sep-Oct	7			

R-Z

Research and Development
night attack weapons

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