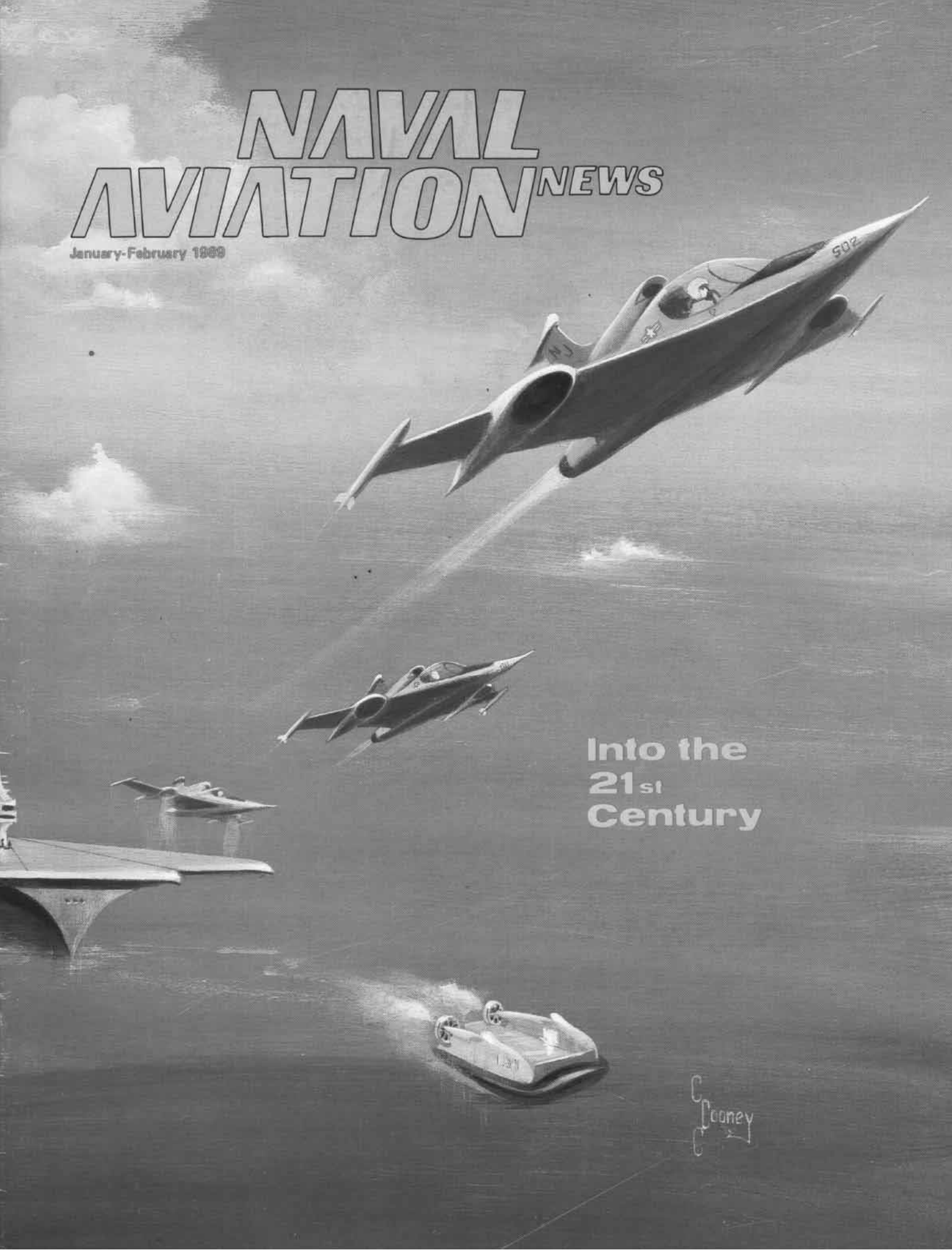
NAVAL AVIATION NEWS

January-February 1969



NAVAL AVIATION NEWS

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Vice Admiral Robert F. Dunn Assistant Chief of Naval Operations (Air Warfare)

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COVER—This wraparound cover is *NANews* Art Director Charles Cooney's creative perspective of Naval Aviation in the 21st century

Project February envisioned Naval Aviation in the next century. Its findings not only predicted new aircraft but determined that people remain the key to the future. **Page 4**

Navy ejection seat technology gets a state-of-the-art boost this year with the Naval Aircrew Common Escape System. It reduces life cycle costs and is "Lifesaving Technology at its Best." **Page 8**

Get "An Inside Look" at the new V-22 *Osprey* in a two-part article that will take the reader from development to rollout to first flight. **Page 12**

Don't let the serene backdrop of their quiet island home in the Azores fool you, NAF Lajes personnel maintain a constant vigil to meet the challenge of "Guarding the Atlantic." **Page 14**

Hank Caruso discovered "The Real Meaning" of a dependents' cruise last year when he and his son were guests aboard *America* (CV-66). Enjoy the refreshing perspective of this artist/engineer. **Page 18**

PUBLICATION POLICY:

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By Vice Admiral Robert F. Dunn, ACNO (Air Warfare)

Basics

The exciting cover of this issue is an artist's imaginative view of Naval Aviation 20 years in the future. Some of the details he envisions may not be exactly the way things will turn out, but we can be sure that Naval Aviation will be very different in 2010 from the way it is today.

In fact, change is synonymous with Naval Aviation. In our first 30 years, we went from Naval Aviator #1 and his 60-mph amphibian to the Battles of Coral Sea and Midway. Since then, we've gone to the moon and back and been swept up in an astounding technological revolution which continues to transform the tools of our profession. There is no indication that rate of change will abate. If anything, it is likely to increase and affect us in ways yet undreamed.

That being the case, it is important for us to try to dream, plan and stay ahead. "Project February" was just such an effort. As you'll read in this issue, it describes the shape Naval Aviation is likely to take by the year 2010, and it inspired the artist's concept on the cover.

But if you look closely, you'll see that everything the artist has drawn is familiar to us. We see a carrier, an air-cushioned vehicle, a hydrofoil patrol boat, tilt engine, powered lift and both fixed and rotary-wing aircraft. The point is that while change is certain and substantial, many things do not change much after all. They are often most important.

As we consider Naval Aviation's future, we must concern ourselves with those things which do not change as well as those things which do. Among the things which are least likely to change is the importance of people to our profession and the training they require. Technology will not replace people, nor will it replace their need to master fundamentals.

For our aviators, basic airmanship will remain the foundation on which everything else depends. No matter how sophisticated our aircraft become, they will still have to be flown by pilots who are solid airmen and airwomen who can knock out the target and then make it home when system failures or combat damage take away the autopilot, autothrottle, an engine or part of the wing. Every carrier aviator understands that technical innovations will never make night cats and traps seem uneventful. For antisubmarine warfare aviators the black-night, low-altitude prosecution of a submarine contact will never be routine.

For every tactician — aviator, flight officer, aircrewman, controller — air discipline will be the glue that holds the Naval Aviation team together in the combat environment of tomorrow. Innovative technology will be required to deal with ever more serious threats. But that very technology will generate a volume of data threatening "information gridlock," crippling our own fighting capability during the heat of battle. The greater interdependence between our aircraft foreseen in "Project February" will increase the potential for this problem. The answer to it is the disciplined employment of tactics, communications and procedures by all hands, and that discipline must be forged through realistic training before the fighting begins.

The same situation applies to the large majority of Naval Aviation personnel who maintain and support our aircraft. The changes which will make new-generation aircraft more formidable in the air will place greater demands on those who attend to them on the ground. Only the common sense, know-how and conscientious dedication of our maintainers can cope with the multiple maintenance challenges of complex machines and the mysterious malfunctions which inevitably accompany them.

"Project February" reached the same conclusion. People will remain the bedrock of Naval Aviation, no matter how exotic our technology becomes. We can be sure that technological change will make Naval Aviation different; it will make Naval Aviation better if we sustain and invigorate those things which do not change — if we stick to the basics — while we aggressively pursue those which do. ■

Lockheed Aeronautical Systems Company

Lockheed engineers believe the aircraft in this artist's concept is a feasible design for a short-takeoff, vertical-landing (STOVL) military jet fighter.

GRAMPAW PETTIBONE

ILLUSTRATED BY Osborn

NANews thought its readers would like to see what Gramps was saying 10, 20 and 30 years ago.

The AWOL Bomb

About 0830 one morning a practice bomb (Mk76) was found downtown, USA, inside an English muffin delivery truck belonging to a local bakery. Military ordnance personnel were quickly dispatched to investigate. They determined that the bomb was inert. The truck's roof was extensively torn where the bomb was reported to have entered. (A damage assessment to English muffins was not readily available.)

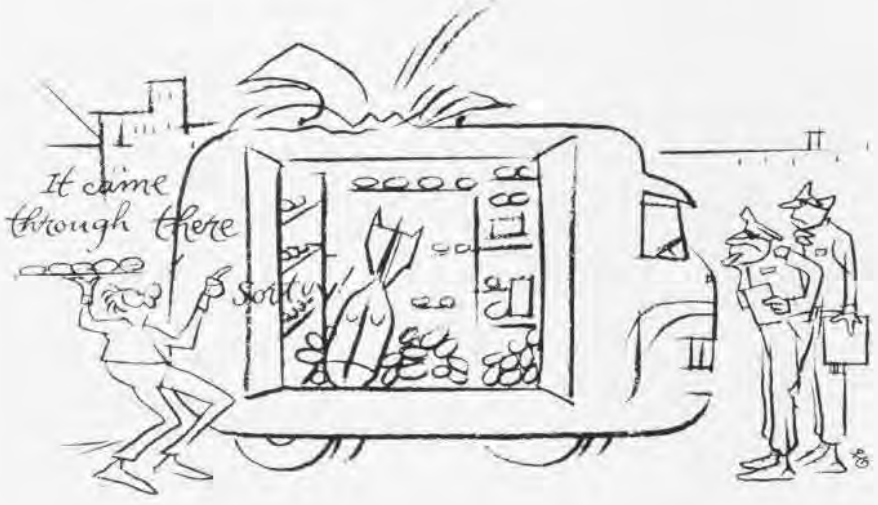
The muffin man refused to release the bomb to naval personnel because he needed it for insurance purposes. The identification numbers of the bomb were noted but could not be matched with any "lot" numbers assigned to nearby military bases. Local military and FAA authorities investigated all possible aircraft which could have dropped the bomb – without success. Further investigation traced the bomb to its home base which was over 500 miles away. No connection could be made between the subject Mk76 and any aircraft.

Grampaw Pettibone says:

Holy bomb squad! Looks like a clear case of muffin' up! You could easily leap to the wrong conclusion on this one. Downtown yet! Well, some good investigating shed light on the mystery of whodunit – and it wasn't an airplane. Allegedly, a young lad who was AWOL from the service and driving the muffin truck had misappropriated a practice Mk76. He had accidentally torn the truck's roof when he drove under an overhanging tree branch. He returned the vehicle without reporting the damage. Next time the truck was used, a different driver discovered the hole and found the Mk76 in the back. Understandably, the owner concluded that the bomb was dropped by an airplane.

Sometimes, what seems obvious at the outset disintegrates in the face of evidence. In this case, an airplane didn't assault English muffins. Nuff sed!

(February 1979)



Short Flight

At 0700 one bright frosty winter morning in the Midwest, a Naval aviator/recruiting officer, arrived at the local airport and met his passenger for a flight in a T-34B *Mentor*. The flight was to be a short orientation/indoctrination hop around the city.

Since the assigned plane captain had not yet arrived, the pilot untied the aircraft and performed his own preflight inspection. As he helped strap his passenger into the rear seat, he briefed him thoroughly on bailout and general emergency procedures. The pilot then completed the prestart checks but could not start the engine.

The two men then exited the cockpit, and the pilot proceeded to another T-34. Having no difficulty in starting up, he shut down and conducted a preflight inspection and again helped strap the passenger in. Climbing into the front cockpit, the pilot started the engine and, as they waited for it to warm up, read the checklist over the interphone to the passenger. When the oil temperature reached 40 degrees, they taxied out. The pilot, on noting the windsock dangling, decided to use the 2,400-foot sod runway with the fewest obstructions beyond the far end. Actually the wind was four knots downwind.

Run-up and engine checks were normal, the takeoff checklist was completed and off they went. At 60 knots,

the nose was raised and the *Mentor* lifted off but then settled back. After further acceleration, it became airborne again at 65 to 70 knots. At 10 to 15 feet altitude, the landing gear was retracted; at 20 to 30 feet, the left wing dropped to about 30 degrees of bank. The pilot immediately leveled the wings, thinking his passenger had inadvertently hit the stick. The wing dropped again and remained there momentarily. As the airspeed decreased and the nose came up, the little plane started to settle and mush toward the ground.

Realizing that he was going down and suspecting a loss of power, the pilot concentrated on keeping the wings as level as possible. The right wing hit first, then the aft fuselage. The craft bounced once, then skidded to a halt on its belly on the frozen sod, 950 feet beyond the end of the runway.

Pilot and passenger quickly left the aircraft after securing the switches to prevent possible fire. The pilot's only comment, heard by witnesses as he walked away, was, "I don't know what happened."

Grampaw Pettibone says:

It happens every winter. Whether it be a T-34, S-2, T-33 or an F-9, the reason is always the same. Why? Don't they teach aerodynamics in preflight anymore? Even ol' Gramps is familiar with laminar and turbulent boundary layer air flow and lift versus drag. It would have taken only a few minutes to have swept the 1/8 to 3/16 inches of frost off the wing and tail surfaces before they climbed in, and, oh, how much better the plane would have flown. Less embarrassin', too, than an ignominious slide into the fence, or worse yet, a stall – spin.

(February 1969)

Born Too Late

A young ferry pilot departed from an East Coast base in an HTL-6 helicopter on a 146-mile VFR cross country flight with an enroute fuel stop. Shortly after he left the Naval Air Station local area his chart was blown out of the open cockpit. Undismayed, the intrepid aviator continued on his way, following a highway with the avowed intention of landing at a service station to secure a "road map" which he felt was more suitable for navigation on his trip!

He found a suitable vacant field in a rural community, with a service station nearby, so a landing was attempted. After descending and coming to a hover, he decided to move to a smoother section of the field. A slow turn to the right was started, but the tail rotor skag hit a stump and one of the tail rotor blades was broken off. With rudder control lost, the helicopter struck the ground, wiping out the main rotor blades and buckling the fuselage. The pilot had his lap belt and shoulder harness tight and locked and was uninjured, although the aircraft suffered overhaul damage.

Grampaw Pettibone Says:

Sufferin' catfish! I guess we been wastin' money all these years printing aeronautical charts and Radfacs. This young man likes the oil companies' products a lot better. The HTL-6 has a good bird dog mounted right in front of the pilot's face where he can see it all the time. His route was a major airway, absolutely straight, with strong range stations at each end. Total enroute distance was only 146 miles, and he had an approved fuel stop enroute. Needless to say, he should have turned back when he lost his chart.

Throughout military and civil aviation, the "state of the art" has progressed considerably in the past 30 years, to put it mildly. We no longer proceed from point to point utilizing land marks, road signs or town names painted on roofs. This young man was born 30 years too late.

(February 1959)

Into the 21st Century

Project February

By Bruce Powers

It was called "Project February" and its findings were so successful that they guided 1988 planning for the future of Naval Aviation. Twelve carefully selected Navy and Marine Corps aviators, representing all communities, gathered in Washington for two weeks last February. Their task: develop a picture of Naval Aviation 20 years hence.

Three-star Marine Corps and Navy officers hand selected them and challenged them to envision Naval Aviation in the next century. What are the war-fighting requirements? What aircraft? What weapon systems? What manpower is needed?

Vice Admiral Robert F. Dunn, Assistant Chief of Naval Operations (Air Warfare), set the ground rules for the discussions. There are no sacred cows. Use realistic cost expectations. Assume the main threat to U.S. security to be Soviet forces, with potential disruptions created within and by third world countries. Navy force levels will evolve around the 600-ship, 15-carrier battle group concept. Soviet weapons systems capabilities will grow along with ours; in third world hands, such systems may not display the endurance expected when in Soviet hands. Carriers in the U.S. fleet will continue toward an all big-deck force with increasing nuclear-propulsion capability.

Project February thus became a penetrating look at the design and structure of future air wings, on aircraft carriers and in the Marine Corps. Here is their view of what Naval Aviation should look like 100 years after Ellyson and the A-1.

From the outset, one dominating tenet was the need to reduce the number of types of aircraft and increase the commonality in both aircraft and weapons systems. Fewer types of more multimission aircraft must be designed to do at least what a large number of types of somewhat less versatile aircraft are accomplishing now. Benefits for operational flexibility, and reduced training and logistical complexity, drove this.

Interoperability with Army and Air Force units and with allied military elements was stressed as a necessity for future designs. There was great emphasis on the need for high-reliability equipment with reduced maintenance requirements. The panel was requested to be bold and innovative. As a result, some innovative design concepts emerged. The carrier air wing and accompanying antisubmarine warfare (ASW) elements were viewed coherently as a unit, not as a collection of discrete platforms.

The panel asked, "What needs to be done to ensure the missions of the carrier battle group are achieved effectively in the future?" Evolutionary changes in practical employment of today's platforms provided the clues for where we should be going. For example, the E-2 *Hawkeye*, originally fielded as an airborne radar platform, now functions substantially as an information and battle management vehicle. Information management must be elevated to a frontline role and electronic warfare systems have to be good enough to ensure that access to the information is preserved, especially in the heat of battle. If information management does achieve this new prominence, it follows that designs of other aircraft could be affected. Greater reliance on one aircraft type to fuse and disseminate information would mean that less processing might occur on weapon-firing aircraft.

Some concepts already accepted and in some stage of development were reaffirmed, such as employment of stealth aircraft. Stealth technology should permit aircraft to probe deeply into the most fiercely defended environment, hit targets and return to base safely for follow-up missions.

Amphibious assault operations figure heavily in the future, and their success will be made more likely as landing forces equipped with MV-22s can be launched from greater distances offshore. That range advantage, coupled with the speed and survivability of the *Osprey*, means amphibious commanders will have much greater choice concerning where and when to land.

In the ever-critical arena of antisubmarine warfare, the quieting of Soviet subs calls for increasingly effective sensors. In fact, sensors are — and surely will be — more important than the aircraft that carry them. Active sensors will probably increase in importance compared to passive types. Also, consolidation of sensor-derived information and methods to ensure the timely sharing of the data among all key players is a must.

Aircrews and support personnel in the new century must

Lockheed-California's design concept for a future advanced multimission sensor system aircraft is depicted in an antisurface warfare version (top) and an airborne early warning model (bottom). Artist Robert McQuarrie

be able to conduct night operations like daytime operations. Electronic warfare must not be an afterthought. Indeed, there should be commonality among electronic warfare suites for every aircraft type. The benefits of such commonality would include enabling aircraft to guide a cruise missile fired by another platform.

Mission areas examined by the panel were: strike/antisurface warfare, antiair warfare, antisubmarine warfare, command and control communications intelligence/space, electronic warfare, combat search and rescue, assault, training personnel and support. With these in mind, the officers took a hard look at carrier air wing composition as it should be at the start of the next century. A reduction in the number of aircraft types was reiterated. At present, there are seven types of aircraft (eight when ES-3s permit routine fleet air reconnaissance operation from aircraft carriers (CVs) again).

In the future, there should only be four. The chart depicts existing aircraft and those planned as replacements. The A-12 advanced tactical aircraft (ATA) would assume the A-6 *Intruder's* role and expand on it. The Advanced Strike Fighter (ASF) would replace the F/A-18 *Hornet* and F-14 *Tomcat* with a single airframe that would cost less per unit both by design and by virtue of increased production rates.

The Advanced Support Platform (ASP) would supplant the E-2 *Hawkeye*, EA-6B *Prowler*, S-3 *Viking* and the electronic versions of the A-3 *Skywarrior* and *Viking* aircraft. The SH-60 *Seahawk* will replace the time-tested but aging SH-3 *Sea King* soon, and might itself be replaced in two decades by an advanced ASW helo. In any case, an active dipping sonar helo operating from both CV and smaller decks would be needed early next century.

Training for all these aircraft must be enhanced by flight simulators, a consistent pilot training rate and a stable flight hour program to ensure flyers spend sufficient time in the air for instructional, safety and morale/retention purposes. At this writing, the goal is a minimum of 25 hours per pilot per month in fleet squadrons.

Also important to flight training in the future are on board recorders with playback features so that all movements in the sky can be analyzed and studied, and improved TACTS (tactical aircrew combat training system) ranges at sea and ashore.

Supplementing the "four for eight" replacement plan, Project February identified some "must" and "maybe" programs.

The aircraft "musts" include:

A-12 Advanced Tactical Aircraft (ATA) — featuring state-of-the-art stealth technology

Tilt-rotor MV-22 *Osprey* — as a CH-46 *Sea Knight* replacement for the Marine Corps

Advanced Strike Fighter (ASF)

Advanced Support Platform (ASP)

Advanced Tactical Battle Management (ATBM) aircraft would most likely be an ASP variant

Long-Range Air ASW-Capable Aircraft (LRAACA) — replacing the P- 3 *Orion*

SH-60B/F Integration

Advanced Helicopter (HLX) — as a replacement for the H-1 *Huey*

"Maybes" include:

EA-6B replacement

ASW version of the ASP — depending on ASW performance by other platforms

CH-53E *Sea Stallion* replacement — a heavy-lift V-22 variant instead?

V/STOL — development of a new vertical/short takeoff and landing aircraft may be possible by 2010.

The Osprey has a unique folding capability which gives it less restricted shipboard ops.

In the future, the Navy's eyes and ears for detecting and tracking enemy submarines will be the LRAACA. Among the advances shown in this artist's concept are the General Electric GE38 engines, featuring five-bladed propellers and offering improvements in fuel efficiency and horsepower. The aircraft accommodates the Update IV avionics suite and has room for growth.

Lockheed Aeronautical Systems Company

In the weapon systems category, the group emphasized self- protection for ASW aircraft, manned reconnaissance aircraft and remotely piloted vehicle (RPV) systems, and air-deployable counter targeting devices to protect ships. Also included were air-to-air missiles with standoff capabilities — such as AAAM and ARM missiles — guns for short-range use, multi-spectral sensors, standoff air-to-ground weapons and the MK-50 shallow water ASW weapon. The panel indicated there should be an R&D effort soon to develop a MK-50 successor.

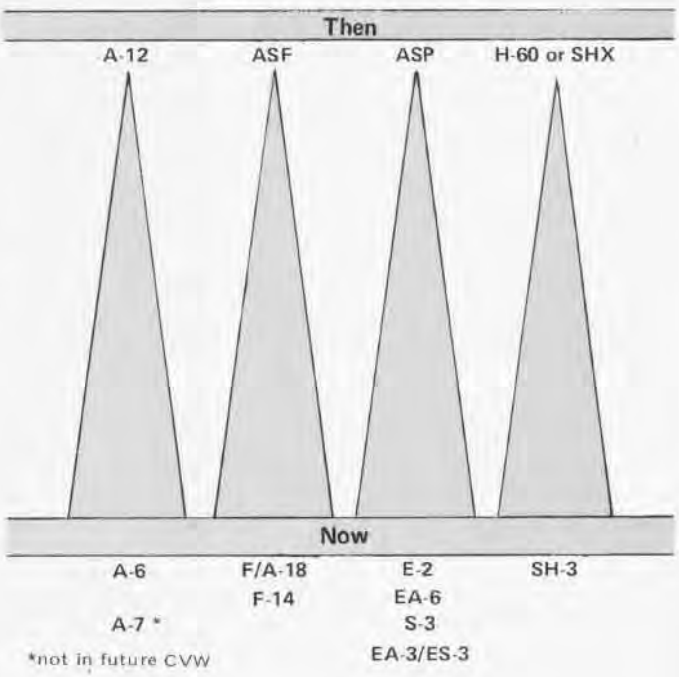
The ASP would also replace the carrier on-board delivery aircraft, and take on mine warfare and tanker functions. The ASP could, in fact, be a derivative of the *Viking* or another airframe. The LRACCA would become the feature performer in land-based maritime patrol efforts. Its upgraded sensors would be designed to allow it to share information with other aircraft, particularly the ATBM.

The panel was constantly aware of dollar and manpower constraints and held fast to the belief that getting the right people after 2000 would be as important as achieving requisite funding. With respect to manpower, the Navy and Marine Corps must recognize the severity of competition in recruiting young talent, not only among the services but within American society at large. Challenging work and user-friendly equipment are essential in keeping morale high and in aiding retention efforts.

In summary, the Project February officers noted that many of the programs that would shape the future have been set, but tightening cost constraints means certain innovations are in order. Overall, the Navy Department must view the carrier air wing and Marine air wing as coherent entities. In prior years, it has been common practice to replace each aircraft type as it retires on an individual basis. The panel believed that with proper planning, creative design and examination of mission requirements, this will change and that fewer aircraft types will do more missions just as effectively as a larger number of types is doing now.

People remain the key to the future. The panel stressed the need to recruit the best possible people, to train them well and to present them with challenging work so that the very best will stay to extract maximum effectiveness from the weapon systems at hand. ■

Project February CVW Design



Naval Aircrew Common Escape System

Life-Saving Technology at its Best

By JO2 Julius L. Evans

Navy ejection seat technology will get a state-of-the-art boost this year. The Martin-Baker Company of England has been contracted to develop and produce the Naval Aircrew Common Escape System (NACES) ejection seat. The design is the first to employ a fully electronic sequencer that computes airspeed, altitude and atmospheric conditions at the time of ejection and then calculates when to fire the parachute to give the pilot the ultimate likelihood of survival.

The first deliveries of production seats are due in May 1989 and are expected to be installed in operational aircraft by October. The F-14D *Tomcat* and the McDonnell Douglas/British Aerospace T-45 trainer will be the first Navy aircraft to receive the new seat.

Early Navy ejection seat testing identified various problems that NACES will eliminate.

It became obvious that some type of escape device was needed to remove some of the dangers associated with high-speed ejections.

NACES will supersede the Martin-Baker Mk. 7 seat in the F-14D and the Martin-Baker Mk. 10 in the T-45 and F/A-18. Eventually, all aircraft delivered to the Navy are expected to have NACES.

In the early years of aviation, the pilot escaped from disabled aircraft the best way he could, which often included climbing onto the wing and jumping overboard hoping that he would not hit the aircraft's tail section. The Navy's first successful emergency parachute jump was executed by Gunner W. F. Coles of VF-1, following a midair collision on October 16, 1924, over Coronado, Calif.

But it was obvious that some type of escape device was needed to increase the pilot's chances of surviving a bailout. Near the end of WW II, allied pilots reported seeing German flyers pop out of damaged aircraft like corks from a bottle. The explanation was that the Germans were using some type of ejection device. In fact, they had already experimented with four different types of ejection seats which included hydraulic power, compressed air power, explosive charge and even a giant torsion spring seat.

The problems associated with a pilot's egressing from a disabled aircraft was one of universal concern. The Martin-Baker Company, which previously had an interest in escape systems, combined forces with the Navy in 1945 in the ejection seat development process. The Navy subsequently made its first airborne test using a Martin-Baker seat on October 30, 1946. Lieutenant (jg) A. J. Furtek ejected from a JD-1 *Invader* at 250 mph at 5,000 feet.

It wasn't long after this that ejection seats became a standard feature on aircraft. But since ongoing developmental testing of the ejection seats was being conducted, many pilots were not overly excited about using them. Some squadrons encouraged their pilots to keep the seat pinned to prevent ejection rather than risk being a guinea pig by assisting in the operational testing of the seat.

Although successful ejections had been accomplished, it wasn't until after 1950 that the ejection seat won widespread acceptance. Both Navy and Air Force pilots conveyed their experiences of ejecting from combat-damaged aircraft during the Korean War, which helped earn the seat a good reputation.

Even though the ejection seat emerged from the Korean War as a proven and needed aid to pilots in distress, much was yet to be learned about the device. Today, thanks to innovative technology in escape systems, Navy pilots can rest assured that many of the dangers associated with ejecting from high-speed aircraft are being removed from the system.

The Navy's primary goal in NACES development was to introduce a common, competitively procured seat that could be installed in aircraft already in the inventory. No modifications to Navy aircraft will have to be made. To date, the seat has been qualified in nine different cockpits without the need for any airframe changes. NACES interfaces with all standard Navy flight suits, life support systems and survival equipment.

"Initially, every time a developer designed a different aircraft, a separate seat was installed. This led to a proliferation in the inventory and drove our life cycle cost up," explained Tom Pavlik, Head, Emergency Escape Systems Branch, Naval Air Systems Command (NavAirSysCom).

In 1983, Secretary of the Navy John F. Lehman directed NavAirSysCom to develop a common ejection seat capable of being installed in U.S. production military aircraft and to implement acquisition strategies that would create competitive sources.

"We've implemented a leader-follower policy in which Martin-Baker is the primary contractor. East West Industries of Long Island, N.Y., will be trained by Martin-Baker to construct NACES, thus giving the Navy a second source company based in the United States," Pavlik said. Martin-Baker will also train Universal Propulsion Company in Phoenix, Ariz., as a second source for all explosive components on the seats.

In addition to a common seat with obvious life cycle cost advantages, the Navy also wanted a better seat. NACES provides improved performance capabilities over current ejection seats and eliminates undesirable characteristics which have led to injuries and fatalities, according to Pavlik. "The characteristics that are integrated into this particular seat make it probably the best parachute recovery system ever developed," Pavlik emphasized.

The single biggest NACES advantage is the parachute recovery system. The

NACES parachute is designed to lower the rate of descent which increases the chances for a smoother landing and ultimately reduces injuries. The 6.2-meter aeroconical parachute provides a 20-25 percent reduction in vertical descent with low oscillation and is capable of safe deployment at airspeeds 100 knots faster than current systems. Injury-causing inflation loads are much lower than current systems. Additionally, the system provides a control panel that enables the ejectee to activate small steering toggles to avoid hazards during descent.

The NACES parachute is environmentally sealed in a vacuum bag which gives it an extended, five-year repack life, while normal parachutes require repacking about every 420 days. This eliminates the need for parachute repacking capability aboard ship which reduces space requirements. The bag has a viewer window which indicates if the vacuum seal has been broken. If the indicator changes color, the vacuum seal is broken and the parachute must be repacked within 12 months vice five years.

The parachute is attached to a rocket motor that extracts it rapidly at low speeds. This aspect of the design is particularly valuable, because the ejectee is under a fully opened parachute as quickly as possible. This is accomplished in part by the sequencer, which is the key element in the seat's design and is operated independently by thermal batteries. The seat uses pitot probes which sense the airspeed. The sequencer senses static pressure and deceleration forces. This information goes into the sequencer's computer look-up tables and the seat is able to determine the best time to deploy the parachute based on the conditions. It then calculates the relationship to altitude, selects the proper timing to begin sequencing and then triggers each separate function.

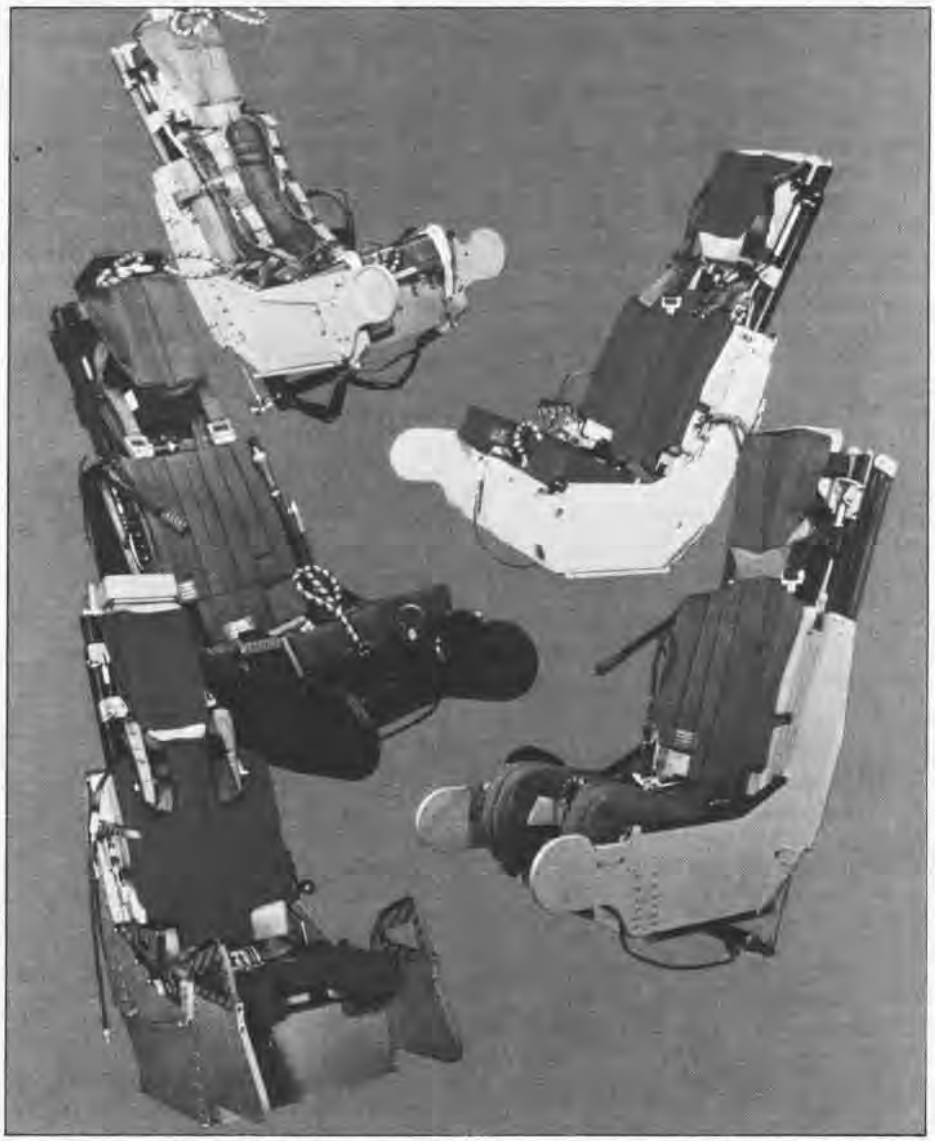
The sequencer is controlled by three microprocessors. Each independently evaluates the data and the seat is actuated via a majority voting system. This not only ensures proper operation of the device, it also prevents inadvertent operation. This sequencer operation is linked to the firing of the seat.

Within the first 100 milliseconds, during which the seat travels up its catapult rails, integral thermal batteries are energized and provide power to the microprocessors, which are initialized and ready to operate instantly. As the seat egresses from the cockpit, two pyrotechnic cartridges are fired by cables to produce gas to ignite the under-seat rocket, deploy the pitot probes on both sides of the seat's headrest and trip two sequencer switches, either of which will start the sequencer.

As the ejectee is in flight, the seat gathers the atmospheric conditions and compares the information stored on the look-up tables. It then selects one of five preprogrammed ejection modes, each of which are designed to provide optimum seat performance within a given speed and altitude range.

Mode 1 is timed for low-speed, low-altitude ejections below 8,000 feet and 300 knots. These ejections require the parachute to be deployed as quickly as possible. Modes 2, 3 and 4 are set to handle high-speed ejections at low and medium altitudes — up to 18,000 feet and 300-600 knots. Mode 5 is for high-altitude ejections — those above 18,000 feet.

According to performance tables, NACES provides a remarkable escape performance improvement over many current systems. On most existing seats, the parachute will deploy in a fixed-timing sequence with regard to the ejection. The F/A-18, for instance, has a fixed 1.5-second time delay. "So



Every time a developer designed a new aircraft, a new seat was installed. This led to the proliferation of seats in the Navy inventory.

whether you're at zero speed or 600 knots, the parachute deploys at 1.5 seconds. With NACES, at zero speed, the parachute deploys in less than one-half a second. As soon as the seat clears the aircraft structure, the parachute is deployed; this is a whole second faster," Pavlik stated.

At higher speeds, below 8,000 feet, the parachute deploys at either 1.1 seconds or 1.3 seconds. NACES will wait three seconds before deploying the parachute when between 8,000 and 18,000 feet. For very high altitudes, the ejectee will stay in the drogue-stabilized seat until 18,000 feet is reached and then the parachute will deploy.

A unique NACES feature is a totally automatic backup system. If four seconds pass after reaching 18,000 and the parachute is not deployed, the backup system in the seat will automatically deploy it.

"The ejectee can have total electronic failure, the thermal batteries can fail to work and connections may be disconnected. The seat will still function properly. This backup system is completely independent and will deploy the parachute anyway," Pavlik explained. "If there is some type of environmental threat that we aren't aware of which will render the sequencer inoperable, the seat will still work successfully. There are no other seats in existence that have that type of automatic feature."

NACES also incorporates a manual override system which does not include a rip cord. The ejectee has a handle that will deploy the parachute if everything else fails; however, it is only operable after ejection has been initiated.

All of the critical functions incorporated in the NACES ejection seat are backed up by dual, independent systems. NACES has undergone more testing than any other ejection seat ever introduced into the Navy inventory. The seat's adaptability to a wide variety of atmospheric conditions during the ejection evolution significantly increases the design's reliability and represents the advanced technological progress the Navy has made toward future escape systems.

Additional improvements include better control over the seat's pitching and yawing tendencies during the ejection trajectory. A three-point drogue harness is attached to the seat which increases stability during descent by keeping the seat facing into the airstream. "This lowers the load on the body and minimizes arm and leg swinging during high-speed ejections," Pavlik said. At low speeds the parachute deploys immediately, therefore the drogue is not used.

NACES contains an improved life raft that has excellent stability in high sea states. An inflatable floor and roof provide extra insulation compared to the life rafts in use today. The added features enhance survivability in cold weather conditions.

The NACES advantage provides aircrews with the best possible chances of escaping any ejection scenario virtually unharmed. It reduces squadron workloads for seat maintenance and provides extended preventive maintenance intervals. It significantly reduces life cycle costs and, most importantly, it will save lives. With technological advances like NACES, Navy aircrews are one step closer to always returning to the ground feet first. ■

A three-point drogue harness increases the seat's stability by keeping the seat facing into the airstream.

V-22 Osprey
An Inside Look

By Hal Andrews

(First of a two-part article)

Artists renditions have depicted the joint services Bell-Boeing V-22 *Osprey* in flight performing the missions of its four service users for a number of years. As the *Osprey* currently begins its flight test and evaluation program, the time comes closer when these will be replaced by the real thing. And with the Marine Corps to be the first user of the initial MV-22A version, the evaluation phase will include operations performing typical Marine missions, conducted by HMX-1 for Commander, Operational Test and Evaluation Force.

With the V-22's combined helicopter and airplane characteristics, the services will be able to exploit the first really different type of aircraft to become available for military use since the helicopter and jet V/STOL. While it embodies many different new technologies, the design approach used has followed the success of the F/A-18, with great attention to reliability, maintainability and supportability from the start. In the past, even evolutionary new aircraft have demanded primary attention to all that goes into just keeping them in the air. With the *Osprey*, whether the Army, Air Force, Navy or Marine Corps, the services will be devoting their primary attention to exploring the effectiveness of this new aircraft in their missions, as these have been depicted over the years.

Rollout of the first V-22 — actually an MV-22A as prototype for the Marine assault transport version — at Bell's flight test facility in Arlington, Texas, confirmed what many of these artists' impressions of the aircraft-to-be had shown. Its vertically tilted engine nacelles and rotors at the wing tips largely overshadowed the rather conventional airplane appearance of the rest of the aircraft. Easily envisioned, however, was its fully airplane-like form with the nacelles tilted forward and the rotors rotating as propellers in airplane-mode flight.

The *Osprey* might most simply be described as all of the appurtenances for helicopter and airplane flight mounted to an almost rectangular cargo box. One feature that contributes to this appearance is the mounting of the wing above the basic fuselage so it can be rotated for shipboard storage. And, like this arrangement, all of the V-22's design is the result of carefully selected and sophisticated design application of appropriate latest technology and individual proven components.

Not apparent from looking at the V-22 is the extent of composite materials used in the construction of its airframe. Unlike other current production Navy aircraft using composite materials, almost all of the *Osprey*'s airframe is made of graphite epoxy composite laminates. As with other current rotor systems, the blades are largely of fiberglass. Major use of metals in the structure is for wing and rotor leading edges and the prop rotor hubs where abrasion is of concern, and areas where concentrated and complex load paths occur. The weight savings in composite structure compared to traditional metal, some 25 percent, are essential to the V-22's effectiveness, and the composites' increased fatigue and corrosion resistance will greatly reduce airframe maintenance in service and increase service life.

The fuselage, built by Boeing Helicopter Company, is designed around the 24-foot-long cabin, with its uninterrupted nearly square six-by-six-foot cross section. The cockpit section accommodates a three-man crew — pilot, copilot and crew chief — with extensive vision area as found in helicopters. An "anti-plowing" bulkhead forward of the crew compartment increases crashworthiness and also carries the retractable dual wheel nose landing gear and the nose-mounted sensor systems.

Sponsons, running along each side of the lower fuselage, house fuel cells and the retracting main dual wheel landing gear legs, along with the environmental control system. The latter maintains a slight positive differential pressure in the cockpit and cabin to prevent infiltration of chemical, biological or radiological contamination, along with the usual functions. Behind the cabin section is the aft fuselage section, in which the hydraulically operated loading ramp is located, and which carries the H tail empennage, with typical airplane fixed and control surfaces. The empennage is built by Grumman under subcontract to Boeing. On top of the fuselage is the one feature that is unique to the *Osprey*: the 90-inch-diameter stainless steel ring which carries the wing (or through which the wing carries the fuselage in flight) and on which the wing rotates 90 degrees to its folded position along the top of the fuselage.

The wing, like the nacelles, rotors and drive systems designed and built by Bell Helicopter Textron, is a continuous structure between the tip-mounted nacelles. Untapered, the panels are slightly swept forward and carry trailing edge flaperons which serve as ailerons in airplane flight and are fully deflected downward in rotary-wing flight to decrease the download on the wing from the rotor downwash. The wing carries the cross shaft between the engines. Normally unpowered, the cross shaft transmits power from either engine to the other rotor in case of power failure of the other engine. A mid-wing

Right, a look at how the pieces of the V-22 fit together, with the nacelles and prop rotors in the airplane-mode position. Below, the first Bell-Boeing V-22 at its rollout ceremony with its nacelles and rotors in vertical flight mode.

gearbox drives the hydraulic pumps and electric generators. These and the auxiliary propulsion system are mounted in the center section, which carries a fitted portion of the wing-fuselage fairing.

The tip nacelles house the 6,000-shaft horsepower Allison T406-AD-400 turboshaft engines and transmissions, as well as mounting the prop rotors. Actuators to tilt the nacelles from vertical to horizontal, or to 10 degrees aft of vertical, are mounted beside the nacelles. At the rear are infrared suppressors for the exhaust. Typical rotor controls are covered by a large hub faired into the nacelle, with the whole nacelle assembly designed for minimum airplane flight drag while meeting vertical flight inlet requirements.

The fiberglass prop rotors are designed to function effectively as vertical flight rotors, and at reduced rpm, as airplane flight propellers, requiring careful compromises in airfoil section and twist. For folding, the synchronized rotors are indexed so that one blade lies along the wing plane and the two outboard blades are power-folded inward and parallel to the first.

Another major advance in the V-22 that is not externally obvious is its digital fly-by-wire flight control system, triple redundant and fully integrated with the digital engine control system. Unlike the F/A-18, there is no emergency mechanical backup flight control. In vertical flight, the system operates the rotor controls in response to cockpit inputs in the same manner as a helicopter. As the rotors tilt forward, the flaperons are retracted and all control surfaces respond as on a conventional airplane. Engine response to pilot controls, and change in rotor rpm during conversion, are similarly controlled through the integrated digital system.

The hydraulic system operates at 5,000 psi, reducing pump and actuator weight and size, and is triplicated for powering the flight controls. Similarly, the electric system provides special features to support the fly-by-wire control system. Dual DC generators are separately operated and a backup battery system provides emergency power for 20 minutes flying time in the event that both generators fail.

Wing tanks, located along the span in the torque box, feed the engines with the majority of the fuel carried in the sponsons. Two cabin-mounted fuel tanks can more than double the fuel carried for long-range ferry flights.

Avionics common to all versions of the V-22 will be based on the use of dual digital data buss systems with dual-mission processors. Secure voice communications and integrated navigation systems will be included, feeding digital map displays in the cockpit. Sensors to suit mission needs will also feed the processors and the cockpit digital mission displays. Each service's version will incorporate mission avionics systems peculiar to its needs.

In the cockpit, the advances of the F/A-18 are carried one step further. With symmetrical dual displays and controls for pilot and copilot, the cockpit is still uncluttered in layout, and both have full access to all control and display functions. Dual flight and mission displays are available to each pilot, as well as a complete system control panel, with its display providing monitoring of system condition and operation. Stick, rudder pedals and power-collective lever reflect helicopter and V/STOL experience. While ejection seats are carried for test flying, service aircraft will follow transport and helicopter practice, with autorotation, crashworthiness and escape provisions for flight crew and passengers.

The cabin, with its strengthened cargo floor, is designed to accommodate 24 combat-equipped troops or up to 10,000 pounds of cargo, loaded via the rear ramp. The latter includes various sizes of standard pallets, or a Jeep, Mule or similar size vehicle. External loads can be carried on two hooks, fore and aft. Each can carry 10,000 pounds. Dual hook lifting can be used to stabilize loads at higher flight speeds, and up to 15,000 pounds can be lifted using the dual hooks.

Mission systems peculiar to each service's use of its V-22s will be incorporated but the basic aircraft described, including the basic avionics and cockpit systems, will all be standard.

With vertical lift capabilities suitable for operational use in "high and hot" conditions, and cruise speeds in the 250-knot range, the *Osprey* will provide a new capability to meet future military peacetime or wartime needs.■

(Continued in Naval Aviation News, March-April 1989)

Covering 3.8-million miles of ASW surveillance area, a detachment of P-3s – four aircraft and five flight crews – maintains a constant watch over the mid-Atlantic from Lajes Field.

NAF Lajes
Guarding the Atlantic

Story and Photos by JO1 Jim Richeson

A thousand shades of green and tons of black rock, painstakingly stacked by hand, mold the landscapes. Steep black cliffs drop dramatically to the Atlantic and a mountain gently rises into the broken cumulus clouds to the west. These are a visitor's first impressions of Terceira, a quiet island some 800 miles west of Portugal.

One of nine volcanic islands which comprise the Azores, Terceira's solitude deceives its guests. There is tranquility here, a feeling that conveys a slow, unhurried pace yet belies the reality of harsh Atlantic storms that bash the island for days on end with high unrelenting winds and horizontal rain. There is a sense of having gone back into another century, to a place where it is not uncommon to see ox-driven carts make their way down the island's narrow streets. A place where old women still weave straw hats the way their mothers and grandmothers did centuries before, while the men prepare for that long voyage in search of whales and proud farmers toil the lava-enriched soil everyday.

Traditional and provincial are words which describe the life-styles and surroundings of the island's inhabitants. Their beliefs and customs still exist today as they did when their descendants immigrated to the island from southern Portugal.

For many of the island's residents, the solitude is often intruded upon by the steady high-pitched whining of a P-3 *Orion*'s auxiliary power unit giving life to one of the U.S. Navy's most relied upon antisubmarine warfare (ASW) aircraft.

Lajes Field, an airstrip located at the northeast end of the island aboard Portuguese Air Base Four, is home for more than 200 Navy men and women. They support a small detachment of P-3s that patrol the vast expanse of ocean surrounding the Azores. Together, they carry out their mission as guardians of the Atlantic.

Naval Air Facility, Lajes, which was established on January 18, 1957, is a tenant command of the U.S. Air Force 1605th Air Base Wing, Military Airlift Command, also a tenant on the Portuguese Air Base.

Captain Dennis A. Pignotti, the facility's commanding officer, wears four "hats": C.O.; Commander U.S. Naval Forces, Azores; Commander Azores ASW Sector 84.2; and Commander Antisubmarine Warfare Group 415.2, Azores in the NATO chain of command.

According to Capt. Pignotti, "The island itself is rustic and the base is unique. The work can be very intense, but like anywhere else we work hard and we play hard," he said. "As Commander Task Group 84.2, I oversee more than 3.8-million miles of ASW surveillance/search and rescue area."

In addition, Capt. Pignotti supports the daily operations of the more than 500 sailors assigned to various Navy tenant commands, such as the Naval Oceanography Command Center detachment, Naval Security Group Activity, Personnel Support Detachment and a small group of Seabees on the island.

As Commander Task Group 84.2, he controls the operational tasking of Patrol Squadron Lajes which consists of one detachment, from Patrol

On May 20, 1919, the Navy's NC-4 landed at Ponta Delgada on the island of Sao Miguel before completing the world's first trans-atlantic crossing.

Squadron Rota, with a total complement of four aircraft and five flight crews. He pointed out that if additional men and aircraft are needed to meet his operational requirements, he can always call on NS Rota, Spain; NAS Keflavik, Iceland and patrol units within the contiguous United States. If needed, maritime patrol units from NATO countries are available to help maintain the never-ending vigil to guard against the silent Soviet threat within the mid-Atlantic.

Lieutenant Commander Robert L. Westphal, the facility's maintenance officer, operates the second largest P-3 mobile maintenance facility in the world next to Diego Garcia. He pointed out that the facility is well equipped with its inventory of ground support equipment — yellow gear — as well as avionics support materials. Located adjacent to the largest hangar on the airfield are mobile trailers, which contain a small photo lab and several million dollars worth of precision equipment used to test and calibrate every major component of the P-3's sophisticated ASW gear.

"I have enough people here for one shift but, on many occasions, we have to run two shifts due to our operational commitments," LCdr. Westphal said. He explained that the same aviation electronics technicians, aviation machinist's mates and aviation ordnancemen are called in, after their normal eight to 10-hour work shift, to provide expeditious equipment repair for round-the-clock ASW operations. He added, "With a single customer [Patrol Squadron Lajes], we can provide more personalized services with respect to quality and quicker maintenance."

LCdr. Westphal also said that although they are well-equipped to handle most of Patron Lajes' intermediate maintenance needs, the facility does have certain limitations when dealing with hydraulic repairs. "That's an area in which we are working hard to upgrade and expand our capabilities," he said. The facility also has the opportunity to pool its resources with the Air Force's maintenance unit in providing intermediate maintenance support.

Capt. Pignotti noted that sailors enjoy life on Lajes Field. "It's a very close-knit community and there's a lot of Navy pride among these sailors. I encourage them to go to town to see how the other residents of Terceira live. We get along well with the Portuguese." For the past three consecutive years, NAF Lajes has won the Commander in Chief, U.S. Atlantic Command's Silver Anchor Award for small commands, by retaining many of its sailors. Normal tours of duty on the island are 15 months for unaccompanied and 24 months for sailors who are accompanied by their families.

The island's strategic importance is as essential to the United States' security needs today as it was during WWs I and II and more recently during the Yom Kippur War of 1973. Faced with seemingly insurmountable odds, the Israeli army fought its middle eastern enemies with depleted stocks of arms and war material. To fulfill America's commitment to replenish Israel's arms, tons of cargo were flown by Air Force C-5 *Galaxies* to meet this promise. Only Portugal, among America's allies, offered the use of her territories. To support this mammoth logistical effort, U.S. cargo planes were permitted to land and refuel at Lajes before continuing to their destination.

The Azores were discovered by explorers led by Portugal's Prince Henry the Navigator in 1427. History reveals that a flock of birds led the prince and his vessels to land on the archipelago. As a result, its discoverer named the islands Azores — which literally translates as "Goshawks."

Captain Francis T. Evans, the fourth Marine Aviator and Naval Aviator No. 26, together with the 1st Marine Aeronautic Company, comprised the first U.S. military force to show the flag on Sao Miguel, the largest of the nine islands, during WW I. With 12 officers, 133 enlisted personnel and equipped with 10 Curtiss R-6s and two N-9s, Capt. Evans and his men left Philadelphia on January 9, 1918. The unit conducted antisubmarine operations in the Azores from a town called Ponta Delgada.

Lajes Field was originally acquired by the British government during WW II, by invoking its 1373 alliance with Portugal, even though Portugal was committed to a neutral position during this global conflict. At the time, the Azores became the center of attention for the United States, Great Britain and Germany.

While the Portuguese government did not acquiesce to American requests to use the island as home base for its bomber and Naval Air Transport Service aircraft, it consented to have American military presence on Terceira under British command.

On January 6, 1944, Captain W. G. Tomlinson, Commander U.S. Naval Forces, Azores, together with his executive officer Commander J. A. Jaap and other members of his small staff, arrived on the island of Terceira and set up headquarters at what was then known as Lagens Airfield.

On July 29, the first detachment of PB4Y *Liberators* from Bombing Squadron 114, which was based at Port Lyautey, UK, arrived and were placed under the operational command of the British Royal Air Force to conduct antibsubmarine operations from the Azores.

What started out as a tiny, flat strip of runway on the northeast end on the emerald island of Terceira is now the country's sentinel of the Atlantic. More than 40 years later, NAF Lajes Field's sailors continue to provide an essential link to the United States' role of protecting the western hemisphere.■

A newcomer to the island of Terceira, Azores, Dauna L. Murphy, a 23-year-old native of Colorado, is an aviation structural mechanic assigned to the facility's airframes division.

A sonobuoy cart is towed from the hangar at NAF Lajes.

FH Phantom

By Hal Andrews

Overshadowed by its later namesake, McDonnell's F4H/F-4 *Phantom II*, the original McDonnell FH *Phantom* established enough firsts to warrant recognition on its own. It was the first airplane designed from the start as a carrier jet fighter, the first McDonnell Aircraft Corporation design to be put into production and the first jet airplane to land and take off from a U.S. Navy carrier. The first Navy and Marine squadrons to receive jet fighters were equipped with FH-1s, and the Navy squadron became the first squadron to carrier qualify with jets. While the FH-1s were soon supplanted by the initial F2H *Banshees* and Grumman F9F *Panthers* which saw wide Navy and Marine use, the *Phantoms* paved the way for the carrier jet tactical aircraft of today.

Not only was the *Phantom* a first, but its Westinghouse 19B axial-flow jet engine was also; it was the first U.S.-initiated turbojet engine design to reach production and go into service. Serious Navy interest in jet engines for aircraft propulsion began in 1941. They were seen as booster engines for propeller-driven fighters. Military policy then, and through most of the WW II years, was that the aircraft engine companies would concentrate their efforts on reciprocating engines, with all aircraft gas turbine engine work done elsewhere. As a steam turbine builder, Westinghouse became a major early player and its engine was the only early Navy-supported effort to achieve success.

Westinghouse began the design of its axial-flow booster engine in December 1941 with a 1,000-pound thrust goal. By mid-1942, the design was promising enough for the Bureau of Aeronautics (BuAer) to order two experimental engines. With this activity, and the potential for increased thrust, came further interest in the possibility of building fighter aircraft powered by turbojet engines.

In the early war years, the security of all jet engine and aircraft activity — classified Secret — was handled much as compartmented programs are today. The Navy's, and Westinghouse's, work was therefore totally independent of transfer of the British Whittle jet engine design to General Electric and the incorporation of the resultant GE I-16 engines in the Bell XP-59A, the first U.S. jet to fly. BuAer's studies in late 1942 looked at fighter designs powered by two engines of Westinghouse's current size as well as larger numbers of possible smaller jet engines mounted along the wing. Recognizing the high thrust needed for takeoff (and wave-off), and high fuel consumption, pairs of the multiple engines could be shut down for cruise.

The Navy studies showed enough promise by January 1943 to bring in an aircraft company for further studies looking toward designing and building an experimental jet fighter. With engineering staffs of all major aircraft companies overloaded, BuAer turned to a newcomer, McDonnell Aircraft Corporation in St. Louis, Mo. McDonnell was building an Army pursuit aircraft with many innovative design features and was both willing and able to undertake the Navy project, working closely with BuAer and Westinghouse. The new jet would be a short-range interceptor.

XFD-1

FH-1s

After early looks at the various sizes of engines that Westinghouse could define, based on scaling down its current engine, in early spring a twin-engine approach was selected using a developed version of the existing booster engine design. While the same basic size, it would provide as much as 50 percent more thrust and have all the necessary engine-driven accessories that the booster engine omitted. The engine contract was amended to cover what was now designated the 19B engine (of 19-inch diameter) and a contract was initiated for two XFD-1s. (McDonnell was initially assigned "D" in the "doubled up" war years since Douglas wasn't then building fighter aircraft — an interesting common sharing in light of today's McDonnell Douglas Corporation!)

Having looked at various configurations, McDonnell engineers settled on a very conventional approach to applying the new propulsion system. In both overall and detail design, the airplane would be kept as simple and conventional as possible, consistent with incorporating the jet engines. After looking at various ways of mounting the two jet engines, installation in the inboard portion of expanding wing center sections was selected, with intakes at the leading edge and tailpipe extensions on the engine to bring the exhaust nozzle beyond the trailing edge. One new feature for carrier aircraft was required: a tricycle landing gear to keep the jet exhaust off the deck. Fuel tanks were installed in the slender fuselage, with the pilot just forward of the wing leading edge under an early bubble canopy, and four .50-caliber guns in the nose. Wing panels outboard of the center section folded upward and inward for carrier storage. A flush fitting belly tank could be fitted for increased range.

Mock-up inspection at the end of May led to further detail design resolution, though the engine design and installation details weren't resolved until the fall when final contract action

was completed. While first flight in late spring of 1944 was planned, it was recognized that flight engine availability would be the pacing factor. This turned out to be the case, with the first engine not at McDonnell for installation until December. With only the one engine, taxi runs were conducted, including a brief lift-off during a high-speed run on January 2, 1945.

The second engine arrived soon afterwards, with the first two flights on January 26 following its installation. Discovery of a bearing failure in one engine after the first flight delayed further flight tests for over a month until a replacement engine could be provided.

In March more extensive flying was achieved and the airplane showed sufficient promise for a contract covering 100 production FD-1s to be initiated, with increased fuel capacity in a longer fuselage and uprated engines – 19XBs. Considerable work was done to improve the deficient lateral control characteristics and when the second XFD-1 flew in June, more extensive redesign was incorporated in the first. In keeping with common practice at the time, the class desk officer, Lieutenant Commander William Kelly, became the first Navy pilot to fly the *Phantom* in July. Navy Preliminary Evaluation by Patuxent River awaited solution of the aileron problems. Other improvements were also being made and tested for incorporation in the production airplanes.

At the end of the war, *Phantom* development was continued, though production was cut back to 30 FD-1s. In November, the *Phantom* program suffered a major setback with the loss of the first XFD-1, and McDonnell's chief test pilot, due to aileron failure. Development continued with the second airplane, with emphasis on carrier suitability. It went to Patuxent River in April 1946 and, on July 19, Lieutenant Commander James Davidson made the first takeoff and landing on USS *Franklin D. Roosevelt* (CVB-42).

By this time, attention was turning to the production FD-1s and their 19XB engines. Continuing problems with Westinghouse engine deliveries and Navy interest in having Pratt and Whitney enter jet engine production led to a coproduction contract for the 19XB (now designated the J30), the first Navy-sponsored jet engine under the new joint military turbine engine designation scheme. A night-fighter version, the FD-1N, was initiated but soon dropped as interest turned to newer jet designs. The curved tip of the XFD-1 vertical tail was reconfigured, as the wings and horizontal tail had been, by a square cut production version.

The initial FD-1 first flew in October 1946. By then production had been restored for 30 more of the original 100 and deliveries began in December, with several airplanes going to Pax for trials initially. In July 1947 VF-17A at Quonset Point, R.I., began accepting airplanes and transitioning pilots to the newest form of propulsion. About the same time, McDonnell's letter and the *Phantom*'s designation were changed to "H" and FH-1, respectively, in view of continuing fighter developments at both McDonnell and Douglas. While deliveries were still slow, VMF-122 at Cherry Point, N.C., received the first Marine FH-1 in November.

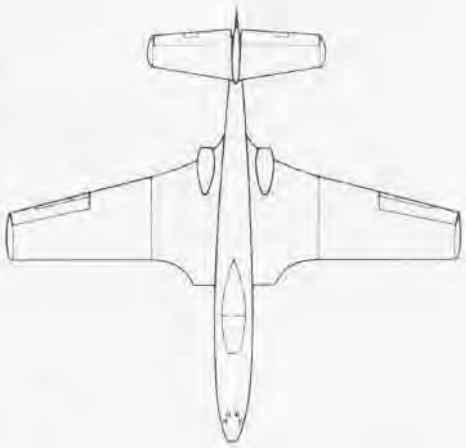
Spring 1948 saw VF-17A fully equipped, and the squadron carrier qualified aboard USS *Saipan* (CVL-48) in May, the same month that the last of the 60 FH-1s was delivered. Some of the last went to VF-1L at Atlantic City, N.J., soon redesignated as part of VX-3. Over the next year, VF-171 (as VF-17A was redesignated) operated aboard different carriers and participated in various exercises.

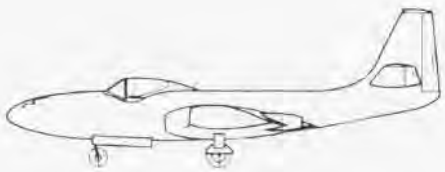
In the spring of 1949, both VF-171 and VMF-122 were part of Caribbean War Games, VF-171 flying from *FDR*. One VMF-122 *Phantom* received a lot of publicity when it made a JATO-assisted takeoff from a beach following minor repairs after a flamed-out, wheels-up forced landing on the sand. The Marines also had a flight demonstration team of *Phantoms* that made many appearances during 1949. However, in March, VF-171 had received its first F2H-1 *Banshee* and the FH-1s were relinquished as the *Phantom*'s successor filled the inventory during the summer of 1949. In VMF-122 some FH-1s lasted another year, primarily as jet transition trainers, before the last was phased out in July 1950.

The *Phantom*'s fleet squadron service was over but not its Navy service. Along with contemporary North American FJ-1 *Furys*, FH-1s were assigned to various Naval Reserve units for jet pilot indoctrination. The first were transferred in late 1949 and they continued in this service until the last were retired in July 1953. Before retirement, several were also flown by the Naval Combat Intelligence Officers School at Glenview, Ill., and the last in flight status was at the Cornell Aeronautical Laboratory in Buffalo, N.Y.

By this time, *Banshees* and *Panthers* had been through the Korean War and the first generation of swept-wing carrier jets were already in fleet service. Carrier jet aviation had made great strides since the early days of the *Phantom*'s design 10 years earlier. ■

Span	**40'9"**
Length	**38'9"**
Height	**14'2"**
Engines	
Two Westinghouse J30-WE- 20	**1,600 lbs. thrust**
Maximum speed/altitude	**421kn/15,000'**
Service ceiling	**34,500'**
Maximum range	
Clean	**560nm**
External (295 gal.)	**670nm**
Armament	**Four 20mm guns**





Dependents' Cruise: The Real Meaning

Story and Photos by Hank Caruso

The dictionary meaning of "dependent" is sterile and unevocative: "A person who depends on someone else for existence, support . . ." As I boarded USS *America* (CV-66) with my son Adam at zero-dark-thirty this past summer, I don't think that my feelings about the meaning and value of the dependents' cruise concept went much deeper than the dictionary definition. My limited perspective was coupled with a feeling of anticipation similar to what would normally precede a visit to an amusement park. But this feeling began to change as our sponsor, Lieutenant John Burpo, with his wife Eileen, escorted us alongside *America*'s resting massiveness toward her gangplank.

Although I've been on board carriers twice in the past, my previous visits seemed like intrusions. The carrier was already at sea and busy with whatever tasks had been set for her, whether I was there or not. Departures were just as abrupt and impersonal. The carrier stopped what she was doing long enough to send me and my fellow visitors back toward shore and then immediately forgot about us as she resumed business.

The dependents' cruise was very different. *America* was waiting only for us; *we* were the plan of the day. She was waking up with us. The darkness, the drowsiness, the stillness all defined a world separate from the one we left behind at the security gate. I began to experience a feeling of privileged intimacy as we climbed the gangplank onto the hangar deck. As the harbor tugs nudged us into the golden waters of the sunrise, *America* came alive.

Since the aircraft carrier's mission is aviation, it's inevitable that the highlight of a dependents' cruise should be the air show. But this was not like any air show that I had experienced on land. Without the constraints imposed by a landlocked airfield, aircrew and aircraft seemed to have more freedom, more energy, more excitement. Over land, the aircraft fly in aerial cages, confined by the concessions needed to maintain a respectable measure of noninvolvement for spectators and neighboring communities. But at sea . . .

Tugs assembling to guide CV-66 out of port

We were not spectators; we were participants! We could smell the distinctive mixture of catapult steam, burned jet fuel and pulverized tire rubber — the body odors of an active carrier. We shuddered with the ship each time a catapult shuttle collided with its water brake. Below deck, our stomachs and ears resonated to the remarkable sequence of sounds from each landing aircraft: the initial impact of arresting hook on metal deck, the shriek and slap of the 1-1/2" thick arresting cables suddenly stretched, the surreal metallic roar of jet engines echoing through space and structure.

We could imagine that we shared the dangers and risks that constantly confronted the deck crew. We could appreciate firsthand how much training, dedication and trust are necessary for carrier deck operations to happen reliably and safely. We were *there*; we were part of it all!

Adam Caruso on America's flight deck

Over the years, I've come to appreciate how accurately the term "family" describes the Naval Aviation community. But I can't recall ever having had this idea brought home to

me more eloquently than on the deck of *America*: a Navy officer proudly escorting his windblown bride through the crowds and the yellow gear that had just borne witness to their wedding vows. It seemed so incongruous and yet so appropriate. After all, this *was* family.

Captain J. A. Lair, *America*'s C.O., wrote in the program for the day, "Today is the day when our crewmen get the chance to demonstrate their skills to those we defend back home."

SH-3 flying U.S. flag

A-6 approaching crowd for landing

Wedding party on board CV-66

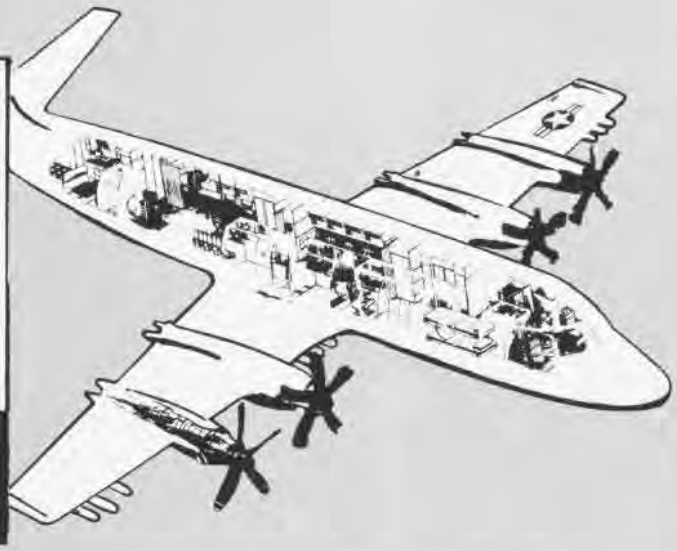
•

This simple, direct statement, combined with all of the sensations and emotions that we experienced that day, gave an entirely new meaning to the concept of the dependents' cruise. It is much more than just a joy ride for the friends and relatives of the ship's company.

All aboard are dependents. The officers and enlisted men aboard are the dependents of their guests — depending on them as taxpayers for fiscal and logistic support, depending on them as family and friends for moral support, patience and understanding. We as guests are the dependents of the carrier and her crew — depending on them to maintain our peace and independence, our values and life-styles. This is indeed a powerful and important message, one which many could never appreciate without a dependents' cruise. ■

The Navy has selected Lockheed to develop the nation's next generation maritime patrol aircraft. Here is a preview of Lockheed's long-range, air antisubmarine warfare-capable aircraft.

LRAACA



DESIGNED-IN GROWTH CAPABILITIES

Built-In Payload Growth Capacity

An additional 12,000 pounds of payload space and weight capability assures acceptance of future advanced systems and payloads without modifications in existing airframe.

Up To 300 Search Stores

112 externally loaded "A" size sonobuoys plus 38 in cabin meet minimum LRAACA RFP requirement of 150. Anticipating future ASW tactical requirements, LRAACA can accommodate another 150 sonobuoys in wing pods, for a total of 300 sonobuoys.

Computerized Armament/Ordnance System

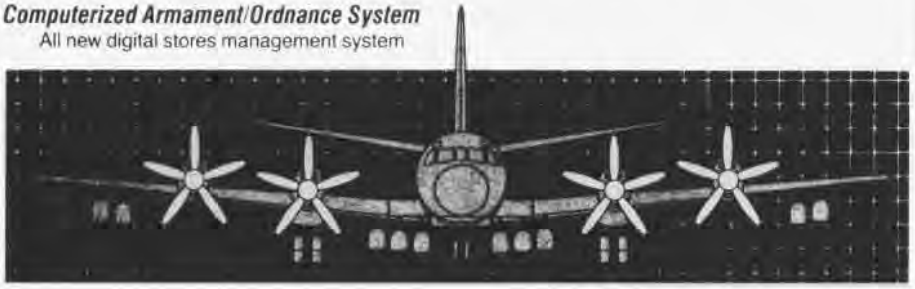
All new digital stores management system allows accommodation of new search stores with minor firmware changes only.

Provisions For 2 Additional Tactical Stations

Space and structural provisions accommodate projected growth in the mission avionics configuration as dictated by MPA requirements.

Provisions For Electrical Growth

Unused drive pads can accommodate 3 additional 90 KVA generators without design modifications—provides over 300% total growth.



EFFECTIVE SURVIVABILITY

Reductions In Vulnerability Over P-3

50% improvement due to Nitrogen fuel tank inerting; 40% improvement due to dry bay fire suppression; critical systems are relocated, dispersed and divided; fly-by-wire and engine control-by-wire.

Effective Defensive Systems

Threat alerting, decoys, jamming and low-visibility paint scheme.

Effective Fly-By-Wire System

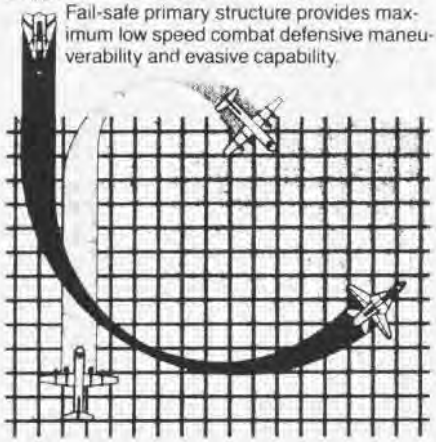
Automatic angle of attack limiting, overstress protection, and redundant control modes ensure total exploitation of airframe defensive maneuvering characteristics.

4-Engine Redundancy

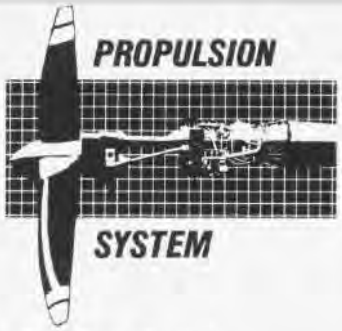
Safe return after possible loss of one or two engines; excellent response to engine failure at low altitude.

Rugged 3.5G MIL-SPEC Airframe

Fail-safe primary structure provides maximum low speed combat defensive maneuverability and evasive capability.



PROPULSION SYSTEM



New GE38 Power Section

Compared to P-3:

- 25% increase in takeoff power
- 66% reduction in parts
- 25% increase in specific range
- 80% reduction in DMMH/FH
- FAA and MIL-E-8593 certified and flight tested by contractor—no development cost to customer.
- Dual redundant, full authority, digital electronic engine control; more reliable, flexible, and survivable than current mechanical systems.

5-Bladed Modular Composite Propeller

- 12% increase in takeoff thrust compared to the P-3.
- Single blade replacement on wing in 30 minutes without rebalancing.
- 1150 lbs lighter than aluminum blades (per shipset).

All New Optimized Propeller Gearbox

- 30% fewer parts than P-3 for higher reliability and reduced repair time.
- Rear mounted propeller control for reduced replacement time.
- 2 generator drive pads/gearbox.
- Integral oil supply tank.
- Designed for 6000 SHP loads.
- Both pitch change and propeller control mechanisms replaceable without propeller removal.
- Lower noise and higher efficiency than 4-bladed propeller.
- 10 to 1 increase in reliability over today's P-3 propeller.
- Designed for 6000 SHP loads.

MISSION CAPABILITY

ROA/TOS — 25% Increase in Specific Range Over P-3

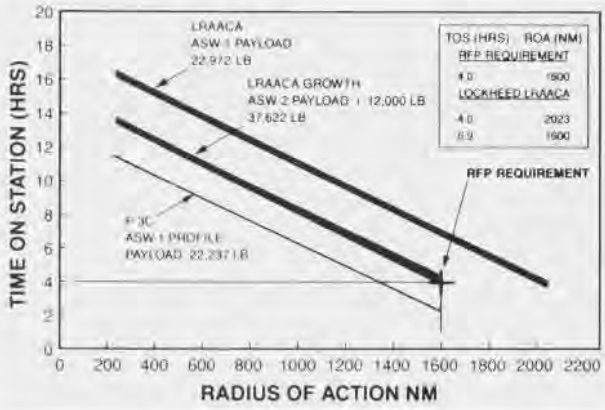
200 Inch Long Weapons Bay

Flexibility to internally carry wide range of weapons — including extended range Harpoon.

Cabin Pressure Altitude Well Below 10,000 Feet For All Operating Altitudes

Supplemental oxygen not required for *any* mission altitude.

PRESSURE ALTITUDE (FT)	CABIN ALTITUDE (FT)
35,000	8,000
20,000	1,000



COLOR CRT TWO PERSON FLIGHT STATION

ENGINE DISPLAY
- Primary engine data on a single display
- Digital accuracy — analog convenience
- Automatic out of tolerance displayed
- Different colors for different conditions
- Expanded data display for engine start mode

PRIMARY FLIGHT DISPLAY
- All primary flight instruments in single display
- Bright, crisp colored symbology
- Reprogrammable, digital software format
- Automatic backup, shift to alternate displays
- High reliability, easily replaceable and interchangeable

SYSTEMS DISPLAY
- Centralized warnings, cautions, advisories & alerts
- Selectable systems status displayed
- Automatic display of emergency checklists
- Normal interactive checklists displayed
- Replaces most dedicated system gauges & indicators

DISPLAY CONTROLLERS (PILOT & COPILO
- Head up location — ease of use
- Primary control modes for primary flight displ navigation & systems displays
- Optimized for minimum crew actions
- Functionally proven in service use

NAVIGATION DISPLAYS
- Selectable multimodes — planning, map, HSI
- Color weather radar overlay
- Both horizontal and vertical navigation modes
- Backup for primary flight displays
- Identical & interchangeable with other 5 CRT
- Standard approach and departure tracks

UPDATE IV TACTICAL DISPLAY
- Optimum location for crew interface
- High resolution color display technology
- Close proximity to copilot navigation display
- Fully integrated with LRAACA systems
- Coupled with steering modes of autopilot

FEATURE	BENEFIT
6 identical 8"x 8" color flight displays	Increased crew efficiency, reduced crew workload
67% reduction in controls and indicators over P-3C	Reduced workload, fewer monitoring tasks, more automation
2-person capable cockpit	Reduced squadron manpower requirements/reduced workload
Color weather radar & passive weather avoidance	Increased safety — damage and terrain avoidance
Quad redundant, digital fly-by-wire flight control system integrated AFCS modes	Optimized control forces, reduced workload, stall protection, load limiting, improved survivability
Automated crew alert system, CRT checklists & navigation aids	Reduced workload, enhanced safety, improved efficiency
Automatic throttles with speed hold & approach modes	Reduced fuel consumption, lower workloads, increased safety

FEATURE	BENEFIT
Blue filtered white lighting	Lower fatigue, increased crew efficiency, lower eyestrain
Flight management system, separate fuel tracking, automated handbook calculations	Increased safety, lower crew workload, increased navigation accuracy, reduced planning time
Dual laser INS	High reliability, accurate navigation
Optimized crew seats	Reduced fatigue, better comfort
Master avionics switch	Reduced workload, improved reliability, quicker pre/post flight
Head up oriented control arrangements	Improved safety, better outside scan capability, avoids vertigo
Dual channel, full authority, electronic digital engine control	Improved survivability, producibility, reliability

INCREASED SAFETY

Automatic Crew Alerting

Electronic checklists and automatic crew alerting of critical failures provide efficient crew alerting to execute emergency procedures.

Automatic G-Load Limiting & Stall Protection

Fly-By-Wire system provides automatic limiting of load factor and angle of attack to avoid overstress and inadvertent stall.

Anti-Skid Brakes

Provides protection against tire blowout, on wet or patch ice surfaces, enhancing aircraft safety.

Ground Proximity Warning

Proven commercial system provides automatic aural warning of impending hazardous conditions — alerts crew.

Quad-Redundant Digital Fly-By-Wire Flight Control System

Improved survivability, more pilot relief modes, more efficient defensive combat maneuvering, low control forces, safe single pilot operation in emergencies.

Universal Flight Station Displays

Six high resolution, interchangeable CRT displays provide flexible flight operations, reducing pilot workload and enhancing flight safety.

Effective Weather Warning

Cockpit controlled commercially-proven color weather radar and passive weather avoidance systems improve safety and operability while eliminating requirement to man sensor station 3 in bad weather.

Automated Controls

Automated control of windshield heat, oil cooler doors, air conditioning, pressurizatio throttles and engine start reduces pilot wor load and increases flight safety.

Computerized Flight Director/Flight Management System

Will automate computation of optimum flight path for mimimum fuel consumption, of time to fly, NATOPS data and navigation information.

This article is reprinted from Naval Aviation News, March-April 1985.

Vice President Bush Calls WW II Experience "Sobering"

By JO2 Timothy J. Christmann

Forty-one years ago, a 20-year-old Naval Aviator named George Bush embarked on a mission which he would later describe as one of the most dramatic moments of his life — an experience which gave him a "sobering understanding of war and peace."

"There's no question that it broadened my horizons," Vice President Bush said recently. "And there's no question that today it has a real impact on me as I give advice to the President."

It was September 2, 1944. Lieutenant Junior Grade George Bush was a pilot with Torpedo Squadron Fifty-One (VT-51) aboard the aircraft carrier *San Jacinto* (CVL-30), a light carrier which was deployed in the North Pacific.

Just two years earlier, on June 12, 1942, Bush had graduated from high school and joined the Navy as a seaman second class. But, in less than a year, he completed flight training at NAS Corpus Christi, Texas, was commissioned an ensign, and went on to fly TBM *Avengers* with VT-51. For a time, he was the youngest pilot in Naval Aviation.

On that sunny morning of September 2, Bush woke aboard *San Jacinto* prepared to fly one of the 58 attack missions he would fly during the war. However, this particular mission would end a little differently than his other 57.

The target was a Japanese radio station on ChiChi Jima, located about 600 miles southwest of Japan in the Bonin Islands. For a time, the enemy on that tiny island had been intercepting U.S. military radio transmissions and warning Japan and occupied enemy islands of impending American air strikes. It had to be destroyed.

Pilot Ltjg. George Bush in the cockpit of a TBM Avenger during WW II.

Before 0900, Bush and two aircrewmen (his regular radioman, Radioman Second Class John Delaney, and substitute gunner Lieutenant Junior Grade William White) strapped themselves inside an *Avenger* and catapulted off *San Jacinto.* Three other bomb-laden VT-51 aircraft, as well as a number of VF-51's F6F *Hellcats,* joined the mission.

"I was replaced by Ltjg. White at the last minute," said Leo W. Nadeau, then an ordnanceman second class who flew as Bush's gunner on all but two of his attack missions. "As intelligence officer, White wanted to go along to observe the island."

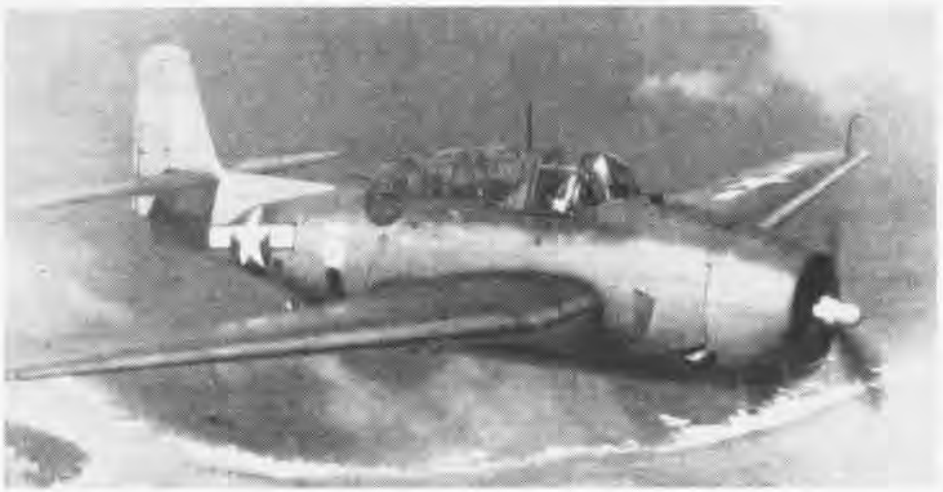
Nadeau, who was 20 at the time, added that the day before, Bush, Delaney and he had flown into ChiChi Jima and destroyed an enemy gun emplacement.

"The antiaircraft (AA) fire on that island was the worst we had seen," he said. "I don't think the AA fire in the Philippines was as bad as that."

"ChiChi was a real feisty place to fly into," Stanley Butchart, a former VT-51 pilot and friend of Bush, agreed. "As I remember, it had gun emplacements hidden in the mountain areas. In order to get down to the radio facility, you had to fly past the AA batteries, which was risky business."

As expected, projectiles belched from the enemy's AA batteries as soon as Bush and his squadron mates were over the island. Tiny black puffs of smoke thickened around his plane as he approached the target and dove steeply — so steeply that Bush felt like he was standing on his head. But before he reached the radio facility the plane was hit.

Ltjg. Bush, who felt the plane "lift" from the hit, continued his dive toward the target and dropped his payload. The four 500-pound bombs exploded, causing damaging hits. For his courage and dis-



A VT-51 TBM Avenger flies over Majuro Atoll in the Marshall Islands in 1944.

regard for his own safety in pressing home his attack, he was later awarded a Distinguished Flying Cross.

Bush maneuvered the *Avenger* over the ocean with the hope it would make the journey back to *San Jacinto*. But the plane began to blaze and clouds of smoke soon enveloped the cockpit. Choking and gasping for air, Bush and one of his aircrewmen wriggled out of the plane and leaped from about 1,500 feet. His other crewman, dead or seriously injured from the blast, went down with the *Avenger*.

Bush parachuted safely into the water, dangerously close to the shore. Unfortunately, the aircrewman fell helplessly to his death because his parachute failed to open properly.

"No one ever knew which one bailed out with Mr. Bush," said Nadeau, now a building contractor in Ramona, Calif. "I would assume it was Delaney, because as the radioman he would go out first to leave room for the gunner to climb down out of the turret and put his chute on. There wasn't room in the turret for the gunner to wear a parachute. As a gunner, my parachute hung on the bulkhead of the plane near Delaney. We set up an escape procedure where he was supposed to hand me my chute and jump, and then I was to follow him. The procedure took a couple of seconds."

Nadeau added that he "didn't know what to think" when he heard the plane was shot down.

"I felt bad that Delaney and Mr. White had died," he said. "I just had the feeling that had I been there Delaney and I might have both made it out alive – that is, unless one of us got hit by AA. Delaney and I had practiced our escape procedure constantly. He might have stayed to help White get out of the turret and delayed too long. It's one of those things that never leaves your mind. Why didn't I go that day?"

Vice President Bush said that he chose to finish the bombing run rather than bail out early because as a Naval Aviator he was disciplined to do that.

"We were trained to complete our runs no matter what the obstacle," he remarked.

Once in the water, Bush unleashed his inflatable yellow lifeboat, crawled in, and paddled quickly out to sea. The Japanese sent out a boat to capture him. Luckily, Lieutenant Doug West, a fellow VT-51 *Avenger* pilot, strafed the boat.

"He stopped it," said Bush.

Circling fighter planes transmitted Bush's plight and position to the U.S. submarine *Finback* (SS-230), operating 15 to 20 miles from the island.

Light carrier USS San Jacinto underway off the U.S. East Coast in 1944.

"This was 1944 and there were very few enemy targets left," said retired Captain Robert R. Williams, Jr., 73, who was *Finback's* commanding officer then. "So, the main reason for our being on patrol was to act as lifeguard and pick up aviators."

According to Lieutenant Commander Dean Spratlin, *Finback's* executive officer at the time, the submarine had an area of 200 to 300 square miles to cover, which included Iwo Jima, ChiChi Jima and HaHa Jima (in the Bonin Islands).

A few hours after transmitting Bush's position, Williams, then a commander, sighted him on the periscope six to seven miles away from ChiChi. He ordered the submarine to the surface.

"I saw this thing coming out of the water and I said to myself, 'Jeez, I hope it's one of ours,'" Bush remarked.

Spratlin, who is now in the real estate business in Atlanta, Ga., said he and Williams weren't worried about surfacing in daylight so close to an enemy island because they had several U.S. fighters flying cover.

"We had a big sub [292 feet long], so we rigged out the bow planes which gave us a platform where we could step down and pull him aboard," added Spratlin.

While several of *Finback's* crewmen were helping Bush aboard, Ensign Bill Edwards, the sub's first lieutenant and photographic officer, filmed the rescue. The 8mm film was later sent to Bush while he was a congressman from Texas, and was shown recently as part of a biographical sketch during the Republican National Convention [in 1984].

Bush was taken inside *Finback* and the sub submerged.

"Once he was pulled aboard he was taken to the wardroom," said Thomas R. Keene, a TBF *Avenger* pilot from USS *Franklin*, who was shot down the day before off Iwo Jima along with his two enlisted aircrewmen. "It must have seemed like a dream to him. One minute he was all alone on the ocean, and the next he was on board a submarine being served food in a red-lighted compartment that had music playing on a record player."

"I thought [being rescued by the submarine] was the end of my problem," Bush said. "I didn't realize that I would have to spend the duration of the sub's 30 remaining days on board."

The following day, *Finback* retrieved Lieutenant Junior Grade James Beckman, a fighter pilot off USS *Enterprise*, who was shot down over HaHa Jima.

"We put Bush and the other four men to work as lookouts," Spratlin said. "Four hours on, eight hours off."

As lookouts, they helped make sure that enemy planes and submarines didn't

Vice President George Bush visits the bridge of USS Ranger (CV-61) with VAdm. Crawford Easterling, ComNavAirPac, during a tour of the ship in 1983.

sneak up on *Finback* during daylight or at night. The submarine did much of its patrolling on the surface in the daytime and always at night because that was when *Finback* recharged its batteries.

"Bush and the other aviators really got into the submarine experience," Spratlin remarked. "Every time an enemy plane would force us down, they'd curse it just like we did."

Bush said that the most beautiful time for standing watch was between 2400 and 0400. "I'll never forget the beauty of the Pacific – the flying fish, the stark wonder of the sea, the waves breaking across the bow," he remarked.

The 30 days aboard *Finback* weren't all beautiful, however. Some of the more dramatic moments included being depth-charged and bombed by enemy ships and planes.

"I thought I was scared at times flying into combat, but in a submarine you couldn't do anything, except sit there," he said. "The submariners were saying that it must be scary to be shot at by antiaircraft fire and I was saying to myself, 'Listen brother, it is not really as bad as what you go through.' The tension, adrenaline and the fear factor were about the same [getting shot at by antiaircraft fire as opposed to being depth-charged]. When we were getting depth-charged, the submariners did not seem overly concerned, but the other pilots and I didn't like it a bit. There was a certain helpless feeling when the depth charges went off that I didn't experience when flying my plane [against AA]."

Besides being bombed and depth-charged, Bush was aboard when *Finback* sank two enemy freighters which were trying to get supplies into Iwo Jima a few months before U.S. forces invaded it. By war's end, *Finback* had received 13 battle stars and had sunk 59,383 tons of enemy shipping.

"It was obvious to me that Bush would be a very successful guy in whatever he decided to do," said Tom Keene, now a retired architect living in Elkhart, Ind. "He was always saying something to make us laugh. He kept up our morale."

A month after picking up Bush, *Finback* discharged her five passengers at Midway. Afterwards, the aviators were taken to Hawaii.

"We were supposed to stay at Hawaii for two weeks R&R," said Keene, who became good friends with Bush aboard the sub. "But Bush was concerned about what had happened to his crewmen, and he wanted to get back out to *San Jacinto*. So, we got a ride in a DC-3 and ended up at Guam. We stayed there a few days until we found out where the fleet was."

Once aboard *San Jacinto*, there were few people as happy to see Bush back as his gunner, Ordnanceman Second Class Leo Nadeau.

"I don't know what happened in officers' quarters, but down in enlisted quarters we had the ship's baker make a big cake with the words 'Your First Ducking' written on the top," he said.

Nadeau added that Ltjg. Bush had a lot of friends among the enlisted men.

"Mr. Bush wasn't one of your run-of-the-mill officers," he said. "Being an enlisted man, I couldn't go into officers' quarters and as an officer he couldn't go into enlisted quarters. So we'd meet quite often up on the flight deck by the plane. We'd always be checking our aircraft out. He would look his plane over, and I would look over the armament. We were both very conscientious about the work that we were doing." Once up on the flight deck, Nadeau said the two of them used to talk about most anything, including the women both of them would later marry.

As Bush's gunner, Nadeau said the two of them had some "scary moments" together. He added that one particular moment stands out among the others.

"It was in June 1944," he remembered. "Our plane was taxied to the catapult and tied down. We had to be catapulted instead of making a deck takeoff, because of our heavy load of ordnance. Once we were tied down, a Japanese air wave attacked *San Jacinto*. We couldn't catapult, however, because the ship wasn't into the wind."

While the carrier's guns traded rounds with the enemy planes, Bush, Nadeau and radioman Delaney sat in the *Avenger* with the engine running, praying they wouldn't get hit.

"It was hairy," Nadeau added. "Finally the wave went through. The carrier turned into the wind and shot us off. We scattered. We just wanted to get that bomb-ladened plane off the carrier. We were flying on pins and needles because we didn't know how many enemy planes were still up there.

"At some point we took a hit in the oil line, either from the Japanese when they attacked the ship, or from a stray projectile from the carrier's guns. The plane began spurting oil like mad," said Nadeau. "[Not long after leaving the ship] Mr. Bush came on the intercom and told Delaney and me to hold on because we were going down. Seconds later, he made a beautiful water landing.

"We got into a rubber lifeboat and Delaney and I started singing *Over the Bounding Main*," Nadeau laughed. "Mr. Bush turned around and said, 'You guys had better shut up or they're going to think we're having too good a time out here.'"

An hour later they were picked up by a U.S. destroyer, and returned to *San Jacinto* within five days.

"I can't say anything but good things about him," remarked Jack Guy, who was one of Bush's closest friends in VT-51. "In WW II we all felt we could

depend on George to do his job. We never had to say, 'Where's my wingman?' because he was always there."

Guy, who is now part owner of an investment business in Atlanta, Ga., added that VT-51 was a small, close-knit group.

"He [Bush] was an exceptionally good pilot," said Legare Hole, who was VT-51's executive officer. "He was a smart fellow who had his head screwed on tight."

"An aircraft carrier the size of *San Jacinto* could only hold nine TBM *Avengers* for VT-51 and 24 F6F *Hellcats* for VF-51. Out of the squadron's original 16 pilots, half were killed. Most of our work was to support the ground troops during landings," said Guy, who received a Navy Cross for scoring a couple of damaging hits on a Japanese aircraft carrier during one of the squadron's few night attacks.

VT-51 participated in seven major operations, including the Marianas, the Western Carolinas, Leyte Gulf, Iwo Jima and Okinawa, and made many strikes against the Japanese homeland. It is credited with sinking 17 ships, including the aircraft carrier *Zuiho*. In addition, it damaged the battleships *Nagato* and *Ise* and caused heavy damage to enemy shore installations amidst heavy antiaircraft fire.

During the squadron's fighting years, Stanley Butchart said that "we used to argue like a bunch of young kids as to whose turn it was to go on the next strike."

"I don't think any of us were really scared at the time," added Guy. "We were eager to go into battle. We were sold on the idea that Japan and Germany were our enemy and we couldn't wait to fly out and do our part."

"The cause was clear and there was a great feeling of camaraderie," said Vice President Bush. "There was a gung-ho feeling about the combat missions. But I must confess that there were twinges of fear."

Bush, who received three Air Medals by the time he was discharged in 1945, said, "There is no question that having been involved in combat has affected my way of looking at problems. The overall experience was the most maturing in my life. Even now, I look back and think about the dramatic ways in which the three years in the Navy shaped my life — the friendships, the common purpose, my first experience with seeing friends die. . . ."

Since leaving the Navy, Bush has stayed in contact with a number of his friends from VT-51. In fact, last September 2, 40 years to the day he was shot down, he had a reunion with eight of them at NAS Norfolk, Va.

"The 40th anniversary was great," said Louis Grab, who was a good friend of Bush's during the war. We [all squadron mates] have lost contact with each other over the years. As a result of our getting together in Norfolk, we've exchanged snapshots and are corresponding again."

"I had hoped that there would be some time in Bush's career when we could all get together," added Butchart, who spent 25 years as a test pilot for NASA. "I had a hard time thinking of him as Vice President. I just walked up and said, 'Hi, George.' Days later, he sent me a little note saying that the reunion was one of the highlights of his career."

During the reunion, Bush put on a leather flight jacket and climbed into a restored TBM *Avenger,* which had been sent to Norfolk for the event.

"The *Avenger* was a great, stable airplane," he said. "It was the easiest plane to land aboard the carrier. It was reliable and sound."

Bush, who is credited with 126 carrier landings and 1,228 flight hours, remarked that he's done only a "little bit of civilian flying" since leaving the Navy.

Nowadays, the former Naval Aviator said he is happy to have the pilots of Air Force Two fly him around the world as he fulfills his obligations as Vice President.

"They are A-1 pilots," Bush said. "But their wings aren't gold." ■

Appearing with George Bush, standing sixth from the left in this early VT-51 group photo, are (standing left to right): Stanley Butchart, second; Jack Guy, third; Louis Grab, fourth; William White, fifth; and Doug West, eighth. Legare Hole, then X.O. of VT-51, is seated sixth from the left.

A Notice to Naval Aviation Personnel—

The Makers of History

It's Time for your Annual Command History Report

Tucked away in an old Washington Navy Yard warehouse five floors above the Anacostia River is a maze of offices, filled with steel racks and acid-free gray boxes. Stuffed in those gray boxes are reports, letters, photographs, news clippings, biographies, lessons learned and command histories — the material which represents the collective history of Naval Aviation. It is here in paper form that the daily sweat of Navy men and women lies waiting rediscovery by a historian, a journalist or perhaps the grandson of a Naval Aviator.

Like most Navy offices it is overworked and understaffed. But here, with a view of what once was Naval Air Station, Anacostia, the Navy's aviation historian Roy Grossnick and his staff of four sort, cross-reference and absorb the contents of those gray boxes. They know their files like a pilot knows NATOPS. When president-elect Bush's office wanted to know the bureau number of the aircraft that Bush was flying in WW II when shot down, it came to Roy Grossnick. When VX-1 wanted to know the types of aircraft flown throughout its history, it came to Roy Grossnick.

It is time to submit the annual history report and Roy is ready to add each report to your organization's historical file. The report for calendar year 1988 is due on March 1. "From admiral to seaman recruit, they all take a part in making history. The day-to-day activities and the events in which each Navy person participated during the past year shaped the events of our time and will provide the data that guide future programs," said Grossnick. Quoting Alfred Thayer Mahan, an American admiral whose writings have made a major impact upon modern theories of world strategy, he continued, "The study of history lies at the foundation of all sound military conclusions and practice...."

Roy emphasized, "We need accurate, thorough and well-documented unit histories." He highlighted specific points which should be included by all aviation units, and added that this article is not a quick "gouge" or substitute for the command history instruction OPNAVINST 5750.12D with change 1.

There are two enclosures which provide the basic guidelines for submitting the history of your unit: enclosure (1) is aimed at the operating forces and enclosure (2) is geared for shore activities. Included here are specifics for the operating forces, but the general principles apply to any command history.

There are four major sections in enclosure (1). The information requested in the first section, Command Composition and Organization, is primarily a listing of facts about your command during the reporting period. Do not include any historical data from previous reporting periods. A composite history is not acceptable as an annual command history report. For aviation commands, the following is an acceptable approach to take in presenting this information:

- Mission statement
- If there was a change in the unit's designation, indicate the former designation, the new designation and the date the changed occurred. (Example: VA-83 was redesignated VFA-83 on 1 March 1988).
- Home port or permanent location of your command.
- Name of immediate senior administrative command (indicate if there was a change during the reporting period and date of change).
- Commanding Officer (include the rank, first name, middle initial, last name and date assumed command). Include a biography of the C.O.
- Type of aircraft assigned to your unit (such as A-6E and KA-6D). Also include the date of first acceptance of any new aircraft type received by your unit. (Example: VFA-83 received its first F/A-18 on 11 March 1988).
- Include the tail code used on your unit's aircraft.
- Name of immediate senior operational command (indicate if there was a change during the reporting period and date of change).
- List any unit awards received during reporting period (such as PUC, NUC and MUC).

Grossnick says these nine items are those most commonly requested by official and unofficial sources. He is developing a new computerized data base which will make this information more readily available.

The second section, A Chronology, should be brief and to the point, no more than one or two lines per entry. For example:

January 1988

5 Change of Command, Cdr. John E. Doe relieved Cdr. Tom F. Fly.

13 VFA-83 boarded USS *America* (CV-66) departed Norfolk for training cruise in Caribbean.

19-25 Participated in READIEX-88, a multinational exercise involving a war-at-sea scenario, conducted in the Caribbean with units from England, Spain and France.

30 Returned to Norfolk, disembarked from *America* and returned to NAS Cecil Field.

February 1988

2 Received the first F/A-18D aircraft, bureau number 175824, with improved avionics and night vision capabilities.

8 VFA-83 changed operational command from CVW-8 to CVW-13.

12 An F/A-18, bureau number 178936, while on a routine flight from NAS Cecil Field, crashed in the Blue Ridge Mountains. Lt. John E. Doe was killed in the crash.

17-21 Carrier qualifications on *America*, operating in the Virginia Capes area. Returned to NAS Cecil Field on 21 Feb.

28 VFA-83, an element of CVW-13, boarded *America* and departed Norfolk for an extended deployment to the Med.

A good rule of thumb according to the historian is that when in doubt about an item, go ahead and list it. It is better to have a few more entries than miss a significant event.

The third section, Narrative, should be a more in-depth treatment of the chronology entries. It should include a detailed account of your unit's activities during the reporting period. Objectives, lessons learned and results are the three key words to keep in mind when drafting the narrative section.

If your command has already

produced a document or report relating to a particular event or project, include a copy of it in section four, Supporting Documents, and reference it in your narrative. It is not necessary to rewrite the information in the narrative if a report has already been compiled and is enclosed in section four of your unit's command history. Examples of supporting documents are as follows:

- Change of command brochure.
- For major exercises listed in the chronology, enclose a copy of the exercise report/message or lessons learned report/message and reference it in the narrative.
- When a new weapon system, aircraft or major piece of equipment is received it should be noted in the chronology and its capabilities described in the narrative, including how successful it is and any problems encountered in using the new equipment.
- See the instruction for a more complete list.
- Reports, messages, studies, documents and photographs that should be included in section four are listed in enclosure (1) of the command history instruction.
- Photographs are particularly important for units with aircraft assigned. These photos provide the Aviation History Office with information, such as markings and color schemes used by the squadron, and are also used by *Naval Aviation News* magazine. A negative or print is acceptable.

Aviation shore activities should use enclosure (2) of the command history instruction as a guide to prepare their histories. There are only three sections for the shore activities: Basic Historical Narrative, Special Topics and Supporting Documents. The narrative should include the statistical listing of data applicable to the command that is outlined above. The lists of items are relevant to almost all aviation commands and are an important part of the aviation history data base program.

Grossnick pointed out that command history reports will probably be the only permanently retained documents chronicling the achievements and activities of your organization. The study of naval and military history is currently receiving a high priority by the House Armed Services Committee Panel on Military Education, as well as a renewed emphasis by Vice Admiral R. F. Dunn, Assistant Chief of Naval Operations (Air Warfare) and the Director of the Naval Historical Center.

History has enabled Naval Aviation to benefit from its past experiences, and it is a way to preserve and explain the Navy's heritage and its role in the development of our nation.The mistakes and successes of the past can help develop and guide future programs and policies, as well as operations. History and its systematic analysis of past naval events can be a tool for planning, decision making and educating its leaders, as well as the general public. The best way to ensure there is a record of what you or your organization accomplished while serving your country is to submit a well thought out command history.

If any aviation command has questions concerning the submission of its command history report, please call the Naval Aviation History Office at autovon 288-4355/4358 or commercial (202) 433-4355/4358. Address your command history reports to Director, Naval Historical Center, Attn: Aviation History Branch, Washington Navy Yard, Washington, D.C. 20374-0571. ■

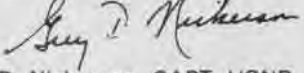
An Open Letter

To the airline pilot wannabe . . . from an old skeptic

So you want to be an airline pilot? Well, there's nothing wrong with that. It's a fine profession, but let me give you some straight talk as I see it. There are a few bumps in that road. As a detailer, this old pilot has spoken with more than a few young aviators who paint such a rosy picture of the airlines that I'm tempted to test the waters myself. (Don't laugh, some major carriers are picking up us senior citizens.) But as I reflect, it seems to me that this rosy picture is a snapshot of today rather than a depiction of several decades past. To this observer, its reliability as an indicator of the future is suspect. As I look back on my lieutenant years, I remember the airlines were on a hiring binge then, too. It was the late sixties and the old WW II pilots were nearing retirement. Many of my contemporaries took the bait. Some did well; others did lousy. The bugaboo was the demon "furlough." Furloughs always came at the worst possible time, were totally unavoidable and, often, just the threat of furlough frayed the nerves of the hardiest. Some of my friends never got past the probation period when the axe fell, and they never recovered. Others got furloughed as many as four times, suffering abrupt life-style changes and family hardships for extended periods, but surviving in the long run. Then there were those who went through without a hiccup, but there weren't any guarantees:

- The airline industry can be enormously unstable. (Make a list of major carriers of five years ago and today. See what I mean?)
- When they're hot they're hot, but when they're not . . . (Being "ace of the base" does not equate to job security; numbers count, not merit.)
- Airlines are hit hard during recessions. (Pick up the financial section and see what the heavy hitters are predicting for our economy.)
- Airlines are very sensitive to the price of oil with profits fluctuating inversely to oil prices. (Ask a Texan where we are in the oil price cycle right now.)

I don't want to be the harbinger of doom and gloom or even begin to pretend I predict the future. I just worry a bit (which is my mandate as mother hen) over what I see as one-way, grass-is-always-greener thinking, as evidenced by some fine young Navy pilots who may be a little short on conceptual vision. Thar's gremlins on both sides of the fence. If you can't see them, you may need to turn your head and take a harder peek. Many of my vintage wish they had. There are great opportunities on both sides. Make a balance sheet, pros and cons. Put it all in perspective, eyes wide open, and make a decision you can live with, no regrets. Think about it.



G. D. Nickerson, CAPT, USNR
Head, TAR Officer Distribution Branch
Naval Military Personnel Command

Awards

Lt. Michael P. Schmidt of VAW-124 was presented the Lloyd Barker Memorial award, which recognizes the *Hawkeye* Maintenance Man of the Year. Schmidt's insistence on the highest quality of maintenance and strict adherence to sound maintenance practices contributed to the *Bear Aces* winning the ComNavAirLant Battle E for 1987.

The 1987 Thomas Jefferson (TJ) Award for excellence in journalism was presented to the *Constellation* (CV-64) PAO staff recently. The award acknowledges the ship's newspaper *Time and Tides* as the military's best newsletter-style publication. As the paper's primary contributor toward winning the award, JO2 Bill Miles received a bronze statue of Thomas Jefferson.

In 1985, *Time and Tides* won its first Chief of Information (CHINFO) Merit Award (honorable mention), and the following year received the first-place CHINFO and second-place TJ awards. In 1987, the paper again received top honors in the CHINFO competition which set the stage for the TJ award.

The pilots of VA-97 took top honors in the tailhook competition for top landing grades in CVW-15. In a presentation aboard *Carl Vinson* (CVN-70), Cdr. Mike Winkler accepted the squadron honors. This marked the fourth consecutive line period in which *Warhawk* aviators captured the top tailhook squadron award.

Eight Naval Aviators of TraWings Five and Six, NAS Pensacola, Fla., were cited by the local Lions Club as the area's top naval flight instructors. Honorees included Lts. Jack Lind, VT-2; Steven Clary, VT-3; Donald McArthur, VT-6; Ronald Sandoval, HT-8; and Michael Boettcher, HT-18 (all from NAS Whiting Field, Milton, Fla.) and Lts. Martin Gallagher, VT-4; David Van Der Like, VT-10; and James Reynolds, Jr., VT-86 (from NAS Pensacola, Fla.).

VAdm. Richard Dunleavy, Commander Naval Air Force, U.S. Atlantic Fleet, presented the *Privateers* of VFA-132, NAS Cecil Field, Fla., the ComNavAirLant Fox One Award for FY 87. The award was established in 1979 to stimulate increased AIM-7 *Sparrow* efficiency and was expanded to include AIM-9 *Sidewinder* guided missile competition among all East Coast Navy and Marine Corps fighter and strike fighter squadrons.

Records

Several units marked safe flying time: VS-29, 70,500 hours and 17 years; VMA-142, 30,000 hours; VAQ-132, 30,000 hours and 18 years; VA-46, 29,000 hours and 6 years; VMA-214, 26,000 hours and 5 years; VA-37, 20,300 hours and 4 years; NAS Dallas, Texas, 17,528 and 18 years; and VFA-86, 17,000 hours and 18 years.

LtCol. Michael L. Aslaksen, C.O. of MAG-46, Det. A, 4th MAG, NAS Norfolk, Va., flew his 5,000th accident-free flight hour while his X.O., Maj. William J. Davin, completed his 4,000th hour.

Lt. Ted Berger of HSL-36, Det. 2, completed his 1,000th accident-free flight hour while piloting an SH-2F.

VAQ-309's LCdrs. "Smoke" Williams and "Fox" Bregar marked the 270,000th aircraft trap aboard *Enterprise* (CVN-65) when they landed their EA-6A *Intruder*. VAQ-309 is a reserve electronic jamming squadron based at NAS Whidbey Island, Wash.

AD3 Carol Payne, NAS Point Mugu, Calif., amassed 1,000 hours flight time in a C-12. The two-engine aircraft is used for passenger transport and logistic flights by the Pacific Missile Test Center. She is the NATOPS aircrew instructor for the Super King Air.

VS-33 has recorded 130,000 hours and 28 years accident free, flying both S-2 Trackers and today's S-3 Vikings (in photo).

Rescues

"I felt the training was tedious when we were taking it. I never thought I would have to use it, but when it became necessary I didn't have to think about what to do. It just came automatically."

Those were the thoughts of Ronald Kramer and Kenneth Webster after they rescued a drowning swimmer using emergency medical training that they received while in flight training at NAS Pensacola, Fla.

The two ensigns were enjoying a leisurely Labor Day at the beach when their fun was interrupted by screams for help coming from a swimmer caught in a dangerous undertow. The officers plunged into the perilous waters, swimming about 200 yards out to the victim who was unconscious, barely breathing and noticeably discolored. The officers asked another swimmer to go back to shore and call 911. After pulling the victim to shore, the rescuers began basic lifesaving procedures.

Both men learned their lifesaving techniques at Pensacola, where students are taught the basic procedures, including CPR and rescue breathing. They also learned techniques for survival in water landing situations which enhanced their swimming abilities.

Three members of HSL-94, NAS Willow Grove, Pa., attempted a heroic rescue following a light airplane crash at Wings Field in Montgomery County, Pa. The aircrew was at the civilian airport for repair because a bird strike had damaged one engine of its SH-2F *Seaprite* the previous day.

LCdr. Morgan A. Merritt, AE3 Reuben Flowers and AW3 Mike Stevens risked their lives in an attempt to rescue the pilot and passengers from a burning single-engine Beechcraft Sierra 200 that crashed about 150 yards short of the runway at the civilian airport.

The total engine compartment and cockpit of the Beechcraft were engulfed in flames and black smoke. Merritt and Flowers dragged one victim away from the wreckage. Other attempts to return to the burning aircraft were thwarted by the heavy smoke and extreme heat of the burning aviation fuel. All four people in the civilian aircraft perished in the crash.

Anniversary

NAS Norfolk, Va., turned 70 in the summer of 1988. Although it was not officially commissioned until August 1918, in October 1917, a naval air detachment of officers, students and mechanics was transferred from the Curtiss Airplane Company field in Newport News to 150 acres of what was then the Jamestown Exposition. The air station started out with seven seaplanes and six canvas hangars located in the area which is now the Naval Aviation Depot.

The naval air station has grown to over 1,800 acres. There are now more than 6.6-million square feet of building space, 2.7-million square yards of pavement and a combined population greater than 20,000 military and civilian personnel.

The *Tomcatters* of VF-31 celebrated their 40th birthday in a ceremony held aboard *Forrestal* (CV-59). The squadron was originally commissioned as VF-1B on July 1, 1935. After three number redesignations and five aircraft transitions, the squadron was designated VF-31 on August 7, 1948.

Established

The Navy's newest naval air station was established at Mayport, Fla., the East Coast home of the LAMPS MK III program.

Naval Air Facility, Mayport was upgraded to a naval air station — making Jacksonville, Fla., the only city in the U.S. that is home to three separate naval air stations. The LAMPS MK III community at NAS Mayport now includes Commander Helicopter Sea Control Wing Three and HSLs 40, 42, 44 and 46. An additional fleet squadron, HSL-48, is scheduled to be established in the fall of 1989.

The establishment of HCS-5 marked the first Helicopter Combat Support Special Squadron (HCS) in the Naval Air Reserve Force. It replaces HAL-5, the *Bluehawks*, which was disestablished after 11 years of reserve service flying the HH-1K *Huey*.

The new *Firehawks* will fly the HH-60H gunship. HCS-5's unique mission combines the tasks of a helicopter light attack squadron with those of a combat search and rescue squadron.

NAS Norfolk began with canvas hangars and seaplanes that were located at the head of an old lagoon, which was later filled in and became part of a landing field named for Capt. W. I. Chambers, a former C.O. of the air station.

Honing the Edge

A VFA-305 F/A-18 Hornet catches the wire on board Enterprise.

Today's Naval Reserve focuses its efforts in two categories: mobilization readiness training by performing active duty for training at the mobilization gaining command, and mutual support training accomplished as a by-product of mutual fleet-reserve interoperation. To this end, CVWR-30 teamed with *Enterprise* (CVN-65) to train and function as a single ship-air wing team.

CVWR-30 has completed it's transition to the Navy's frontline fighters and is the first reserve air wing to have a full complement of both F-14 *Tomcats* and F/A-18 *Hornets*. VF 301 and 302 *Tomcats* provide the air wing with maritime air superiority and reconnaissance capability.

VFAs 303 and 305 transitioned to the *Hornet*, while VAW-88 moved on to the E-2C *Hawkeye* last year. VAQ-309 marked its last embarked deployment with EA-6A *Intruders* aboard *Enterprise*. Next year, the *Axemen* will transition to the EA-6B ICAP-II *Prowler*.

The *Griffins* of VAK-308 supported the air wing from NAS Miramar, Calif., with their KA-3B *Skywarrior* tankers. The *Griffins* were disestablished last fall as a result of the Navy's horizontal integration policy.

Reservists joined Navy SEALs recently in an all-Naval Reserve air strike exercise. Elements of nine organizations associated with Naval Air Reserve, Norfolk, Va., and members of Sea-Air-

Land Team Four from NAB Little Creek, Va., participated in the exercise at the Dare County Target Range near Manteo, N.C.

The exercise included multiplane air strikes against adversary aircraft, forward air control, airborne refueling and search and air rescue. The Navy SEALs and helicopter crews from HAL-4, NAS Norfolk, Va., conducted SEAL team insertion and extraction exercises.

The Coast Guard deployed two of its new HH-65A *Dolphin* short-range recovery aircraft on a mission to the Arctic aboard the icebreaker USCGC *Polar Star* (WAGB-10). As the first HH-65As to be deployed on an icebreaker, the helos were tasked to provide training, logistics and administrative support for the ship.

The two *Dolphins* will be used as replacements for the aging HH-52A *Sea Guards*.

HMH-772, of MAG-49, NAS Willow Grove, Pa., recently deployed four CH-53A *Sea Stallions* to MCB Quantico, Va., to give future infantry officers their first taste of combat air support. "This was a very successful deployment," said LtCol. Walter F. Conner, HMH-772 C.O. "It illustrated just what the air wing is here for. We're the supporting arm of the Marine Corps. We're here to help the infantry, to support the ground element," he added.

SSgt. Barbara E. Omohundro

An HMH-772 CH-53A Sea Stallion returns from a tactical mission at Quantico, Va.

Et cetera

Cdr. Donald K. Buffington, Jr., and HN Donald K. Buffington III thought they should spend time together and chose *Enterprise* (CVN-65) as the place.

"I told him I had a deal that he just couldn't refuse and that was to do a two-week drill with CVWR-30 on *Enterprise*," said the senior Buffington, who is a reserve F-14 pilot with VF-301 at NAS Miramar, Calif. When he's not drilling, Cdr. Buffington is a pilot with USAir in San Diego.

The younger Buffington joined the Naval Reserve last October as a hospital corpsman. A student at Portland State University in Oregon, Donald plans to join the NROTC so he can become a Navy pilot.

PH2 Lou Rosales

Cdr. Buffington (left) and son Donald on active duty training with CVWR-30 aboard Enterprise.

Hail to the Chief-Elect

JO1 Jim Richeson

President-elect George Bush, together with Vice President-elect Dan Quayle and their wives, receive a warm welcome from a cheering crowd at Andrews AFB, Md., following election day 1988.

Shangri-La (CVA-38) left the Philadelphia Naval Shipyard last September on her final cruise. She was sold to Taiwan for scrap metal.

Change of Command

CNET: VAdm. John S. Disher relieved VAdm. N. R. Thunman.

FitMAtAEWWingsLant: RAdm. Frederick L. Lewis relieved RAdm. James E. Taylor.

HC-9: Cdr. Alexander P. Huish relieved Cdr. Ronald B. Kurth.

HS-5: Cdr. Michael K. Murray relieved Cdr. Steven J. Tomaszeski.

HS-11: Cdr. Robert B. Lambert relieved Cdr. Charles P. Finney.

HSL-74: Cdr. David R. Berry relieved Cdr. Edward B. Carter.

NAR San Diego: Capt. Thomas F. Leonard relieved Capt. Herbert E. Hermann.

NAS Barbers Point: Capt. Louis D. Milioti relieved Capt. Walter D. West.

NAS Oceana: Capt. Michael N. Matton relieved Capt. John E. Allen.

NavSafeCen: RAdm. Frederick L. Lewis relieved RAdm. James E. Taylor.

Tripoli (LPH-10): Capt. E. L. Peterson relieved Capt. G. P. Love III.

VA-27: Cdr. Richard E. Clayton relieved Cdr. Malcolm P. Branch.

VA-42: Cdr. Stephen H. Baker relieved Capt. Garth A. Van Sickle.

VAQ-132: Cdr. William D. Joslin, Jr., relieved Cdr. Paul Odell, Jr.

VAW-121: Cdr. Edward F. Caffrey, Jr., relieved Cdr. Ordale P. Babin, Jr.

VF-43: Cdr. Robert D. Berger relieved Cdr. Jerry D. Merritt.

VF-142: Cdr. Lindell Rutherford relieved Cdr. Richard W. Potter.

VF-301: Cdr. D. G. Stillings relieved Cdr. J. D. Harris.

VP-48: Cdr. Richard P. Fleming relieved Cdr. Richard M. Lunning.

VS-0294: Cdr. James A. Gosma relieved Cdr. Michael W. Senior.

VS-28: Cdr. Michael J. Green relieved Cdr. G. T. Lennon, Jr.

VTC-22: Cdr. Francis X. Kraemer relieved Cdr. Ross C. Hansell.

STATE OF THE ART

X-31A EFM Aircraft

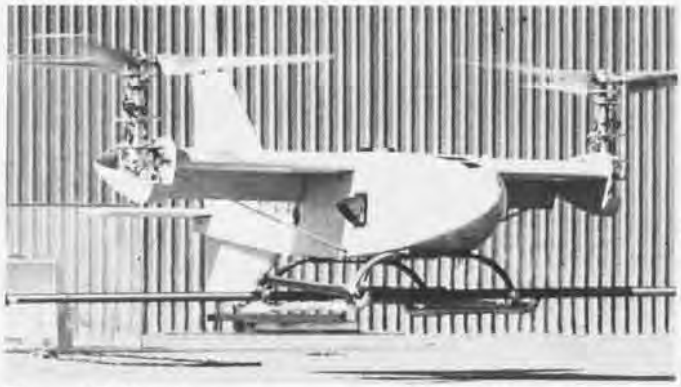
Rockwell International, North American Aircraft Operations, Los Angeles, Calif., was awarded a $7 million contract for two X-31A enhanced fighter maneuverability (EFM) demonstrator aircraft and 12 hours of contract flight test certification for the Navy. Work is expected to be completed in 1990.

LRAACA Contract

Last October, the Navy selected Lockheed Aeronautical Systems Company, Burbank, Calif., to develop the long-range, air antisubmarine warfare-capable aircraft (LRAACA). Up to 125 will be produced, succeeding the current antisubmarine warfare aircraft, the P-3C *Orion*, also built by Lockheed.

The LRAACA design is derived from the P-3C but incorporates new materials, manufacturing technologies and other features that improve performance and reduce overall program cost. Lockheed will develop two prototypes in the early 1990s before beginning full production in 1992.

Tilt-rotor Unmanned Air Vehicle



Boeing Helicopters

The world's first tilt-rotor unmanned air vehicle (UAV), Bell-Boeing's Pointer, made its first flight on November 21, 1988. During initial flight testing only, it was equipped with "outriggers" for added safety and stability in low hover. The Pointer, which is patterned after the V-22 Osprey, is being developed by Bell Helicopter Textron and Boeing Helicopters as a separate, privately funded program in response to substantial worldwide demand for versatile, low-cost UAVs.

Advanced Cockpit Displays

Two recent advanced concepts developed by McDonnell Aircraft Company are the Big Picture cockpit display panel and and Agile Eye helmet. They made their international debut at the 1988 Farnborough Air Show in England as part of the company's exhibit.

McDonnell Douglas Corporation

Big Picture improves situational awareness by presenting various types of data on one large, easy-to-interpret integrated tactical display. In this air-to-air scenario, the pilot can clearly see the number, type and position of four adversary aircraft. New navigation routes can be set simply by tracing them across the screen with a fingertip. The Agile Eye helmet worn here projects vital flight data onto the inside surface of the pilot's helmet visor, enabling him to see the data wherever he looks during combat maneuvers.

Night Attack AV-8B

The Marine Corps recently completed a three-month operational evaluation of the night attack AV-8B *Harrier II*, including nighttime remote site and desert operations and weapons delivery tests. The aircraft features a forward-looking infrared sensor, a color digital moving map, and night vision goggles and compatible cockpit lighting. The first production night attack AV-8B is scheduled for delivery in 1989.

AWARDS

Gray Eagle

VAdm. Robert F. Dunn, Assistant Chief of Naval Operations (Air Warfare), recently relieved Adm. Ronald J. Hays as the Navy's most senior aviator on active duty by date of designation.

Adm. Hays, former Commander in Chief, U.S. Pacific Command, became the Navy's 37th Gray Eagle succeeding LtGen. Frank E. Petersen, Jr., in June 1988. Hays held the honor for a brief four months before ending his 38-year naval career.

VAdm. Dunn, a 1951 graduate of the Naval Academy, was designated a Naval Aviator on October 21, 1953.

JO! Jim Richeson

VAdm. Robert F. Dunn receives the coveted Gray Eagle trophy.

PROFESSIONAL READING

By Cdr. Peter Mersky, USNR-R

AeroArt, Official Publication of the American Society of Aviation Artists, 15 West 44th St., New York, NY 10036.

The field of aviation art has grown dramatically in the last decade, spurred on in part by an increased public awareness of aviation beyond airliners and light aircraft. Military aviation has always excited modern artists, but it is only in the post-Vietnam era that we find a certain pride in showing beautifully rendered aircraft on a mission, or a rediscovery of WW II aces and their creatively marked aircraft.

Until recently, aviation artists were an amorphous group whose names — Smith, Ferris, Wootten and Phillips, to name only a few — were becoming recognizable to a growing number of print fanciers and aviation buffs. These men have now formed the American Society of Aviation Artists (ASAA), a group which is long overdue. Britain has had its Guild of Aviation Artists — admitting only British artists — for many years, and this distinguished organization holds an annual display of member works that is eagerly anticipated by every enthusiast on the continent.

Perhaps the new American group will come to enjoy such a reputation. It certainly has the basis for it. ASAA has a more open membership policy, with several categories, including Artist Fellow Members (those artists who earn more than 60 percent of their income from aviation art) and Artist Members (who do not earn that level and have not yet achieved major recognition for their work).

In conjunction with the new society, the ASAA publishes a slick quarterly journal, the first issue of which appeared in Summer 1988. The masthead is impressive and this new magazine quickly establishes the ASAA's goals with columns and well-illustrated articles on such topics as fine print production, a profile on R. G. Smith and a history of aviation art.

Well-known aviation author Jeff Ethell's column, "The Flying Machines," is a unique way to get the reader into the cockpit, the better to create and appreciate today's authentic aviation art.

While we usually don't review magazines in this column, we have, on occasion, noted special efforts that break new ground, such as the U.S. Naval Institute's *Naval History* quarterly.

The ASAA's *AeroArt* warrants such exposure. Aviation art has outgrown its popular perception as a quick and dirty illustrative complement to "There I was" stories, and the many people who have devoted their lives to creating this new form of 20th century art deserve recognition for their work and this new society.

Membership in the ASAA is $35 a year and includes a subscription to *AeroArt*.

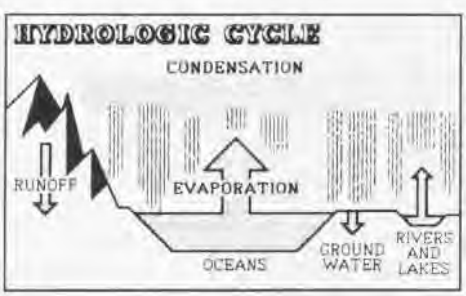
WEATHER FRONT

Hydrologic Cycle

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

The next time air traffic control has you stacked in the muck and the rain, sleet and snow are pounding your machine, or you are on the flight line sloshing through the puddles or drifts . . . relax! Just think of yourself as an on-scene observer of the hydrologic cycle, one of Mother Nature's more important evolutions — and of extreme significance to the human race. What we are discussing is the continuous sequence of atmospheric events which affects the distribution of this planet's limited water supply. A basic fact: no water — no life!

Water is crucial to the existence of the human race. With adequate water supplies, civilizations flourish and, as history has shown, too little or too



much and they disappear. Recall last year's summer drought in the heartland of the U.S. The Mississippi River dried up to a point where shipping was limited. Crops shriveled, train tracks buckled and even watering lawns became a problem. Fortunately, droughts are not an annual occurrence. On the other hand, the hydrologic cycle is an unending exchange; water is transferred from ocean to atmosphere, from atmosphere to land and finally from land to sea. About 97 percent of the world's water supply is found in the ocean, 0.3 percent in the atmosphere. Two percent is frozen assets such as mountain snows, ice caps and glaciers; 0.6 percent is stored as ground water; and 0.1 percent is stockpiled in lakes, inland seas and rivers.

As an aside, the Navy was a key participant in a project designed to manipulate the hydrologic cycle in an aptly named project called "Stormfury." This "environmental engineering" effort which existed from 1962 through 1973, was an attempt to tame hurricanes. Ironically, it appeared to be on the verge of success when the budget axe fell. Some examples: Hurricane Debbie was seeded in August 1969 and winds at the 12,000-foot level diminished by 31 percent. In September 1971, the cloud structure in Hurricane Ginger was significantly altered in the seeded area. But with the termination of the project, Mother Nature was assured that another of her closely guarded secrets remained secure.

Ghost Stories

I was thrilled to read "Ghost Aboard Forrestal" in *Naval Aviation News* (September-October 1988) because I collect military ghost stories. As a handicapped veteran, it's a great way to keep my mind active and make life interesting. It is also an educational and fascinating pastime.

Leon Thompson
1211 Chicago St.
Kent, WA 98031

I am researching a project, "Ghosts of the Air," about ghosts, phantoms, hauntings and other mysteries involving aviation. I would like to hear from anyone who has "incredible" tales of ghostly aircraft and aircrews, including dates, places, names, etc. Those who wish to remain anonymous will have their privacy guarded; stated names will be used with dignity. Help me bring some marvelous stories into print to enhance the folklore of aviation.

Martin Caidin
Box 13416
Gainesville, FL 32604

USS Liscombe Bay

I am a researcher who seeks contact with former sailors, airmen and survivors of USS *Liscombe Bay* (CVE-56) in WW II.

Dave Lusk
1710-1/2 Market St.
Lewisburg, PA 17837

Blues Seek Enlisted Members

The *Blue Angels* seek enlisted personnel for the 1990 show season. Applicants must have PRDs between May 1989 and February 1990 and be in one of the following ratings: AD, AE, AK, AME, AZ, AT, AMH, AMS, AO, AS, PR, YN, PH, DM, JO and HM1 (NEC 8406). Expect travel, hard work, long hours and exposure to the public. Interested personnel are encouraged to contact AZCS Mrnak, *Blue Angels*, NAS Pensacola, FL, autovon 922-2466/4475/2583 or (904) 452-4475/2466/2583; or at El Centro (January through March), autovon 958-8536/7 or (619) 339-2536/7.

Amelia Earhart

I am researching a book about the Amelia Earhart mystery and am planning an expedition to the Pacific to search for the crash site. Data, remembrances and correspondence from those interested would be appreciated. Call me at (404) 426-7883 or write:

Don Wade
560 Campbell Hill
Marietta, GA 30060

Photo Credit

Lt. Greg Lotz, VFA-151, took the CVW-5 photos which appeared on the front cover and on pages 17-20 of NANews, November-December 1988.

Reunions, Conferences, etc.

Air Group 12 aboard USS Randolph (January-June 1945) reunion, March 2-4, Pensacola, FL. Contact Glenn Chaffer, 30 Anchorage Dr., Bridgeport, CT 06605, (203) 384-8034.

USS Lexington CV-2 Club reunion, May 17-20, Galveston, TX. Contact Walt Kastner, 466 Ivy Glen Dr., Mira Loma, CA 91752.

WW II Navy Armed Guard reunion, June 1989, Seattle, WA. Contact Leonard Carlson, 5894 N. St. Albans, Shoreview, MN 55126.

USS Shangri-La (CV/CVS/CVA-38) reunion, June 15-18, San Diego, CA. Contact Jack R. Sanford, 6238 Pueblo Dr., Magalia, CA 95954, (916) 873-2713.

VXE-6 reunion, May 26-27, NAS Point Mugu, CA. Contact O.A.E. Rep, VXE-6, NAS Point Mugu, CA 93042-5014, autovon 351-7585 or (805) 989-7585.

USS Ranger (CVA-61) reunion, August 25-27, San Diego, CA. Contact John Muzio, PO Box 49, Round Top, NY 12473.

USS Salisbury Sound (AV-13) reunion, July 1989, Albuquerque, NM. Contact Marian Bruce, 813 Branding Iron, SE, Albuquerque, NM 87124, (505) 293-3841.

USS Saratoga 10th Division Electricians (1941-45) planned reunion. Interested shipmates please contact A. Herrick, 31083 Hoover Rd., Warren, MI 48093.

The Association of Naval Aviation Photo Contest

The Association of Naval Aviation and its magazine, *Wings of Gold*, is sponsoring an annual photo contest, beginning in January 1989. There will be six bimonthly winners and end-of-year first, second and third-place winners. The contest is intended to capture on film the exciting world of Naval Aviation, its airplanes, ships and people in the Navy, Marine Corps and Coast Guard. Winners will be announced with their photos in *Wings of Gold* and *Naval Aviation News*. Everyone is eligible except the staffs of the Association of Naval Aviation 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.

Cash Awards

Bimonthly:	$100
Annual:	
First	$500
Second	$350
Third	$250

Deadlines for submissions for the bimonthly awards are the 1st of February, April, June, August, October and December. The deadline for the annual awards is December 1. Please be sure to include a complete name and address with each entry.

Bimonthly winners will be selected by the staffs of *Wings of Gold* and *Naval Aviation News*. All photos submitted throughout the contest period, whether or not they were bimonthly winners, will be considered for the annual awards by an expanded panel of judges which will include recognized out-of-house experts in the photography field. This ensures that EVERY ENTRY will get a fresh look. All submissions become the property of the Association of Naval Aviation.

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

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