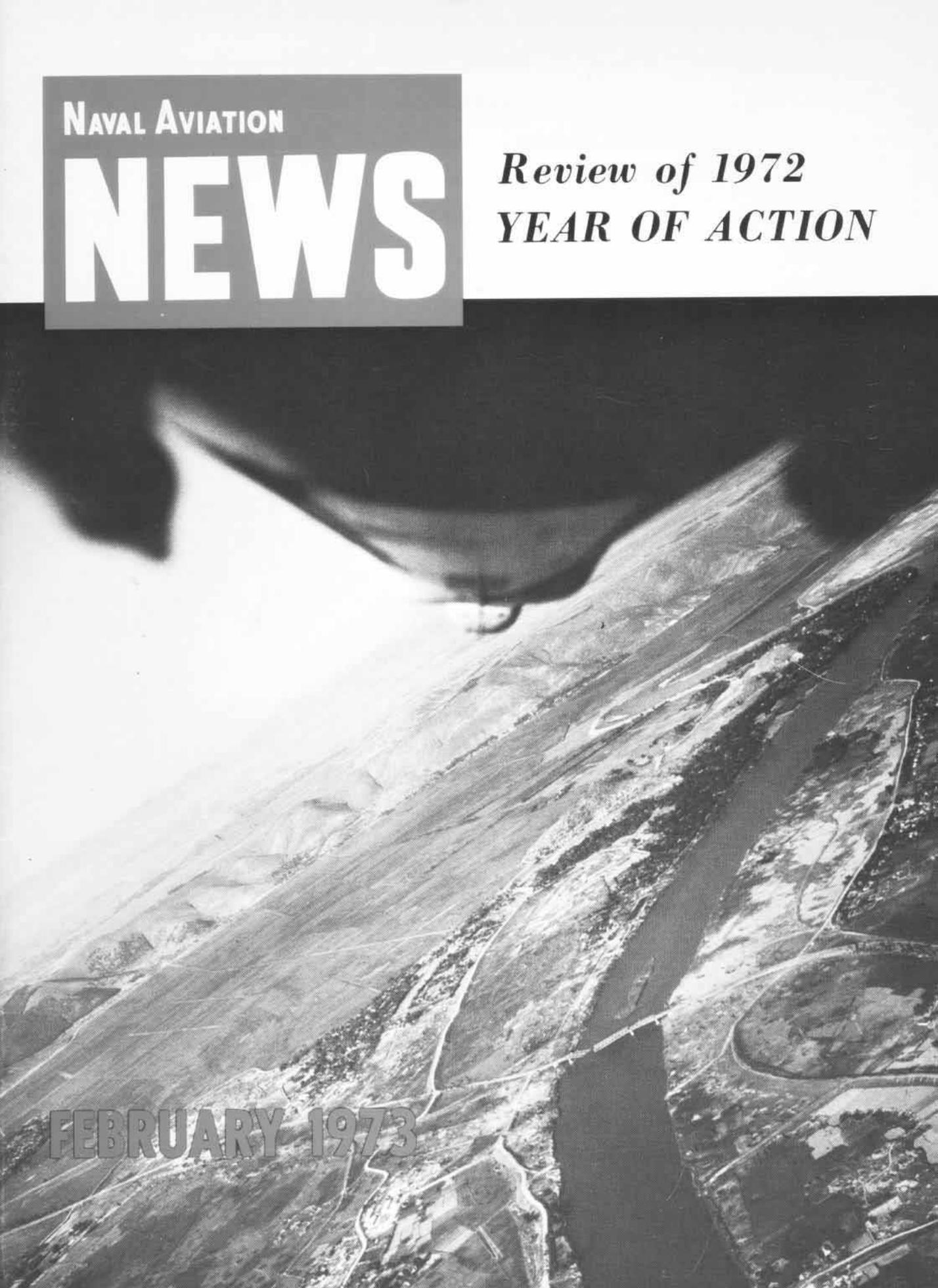


NAVAL AVIATION

# NEWS

*Review of 1972*  
**YEAR OF ACTION**

FEBRUARY 1973

An aerial, black and white photograph of a landscape, likely a coastal or river valley. A prominent river or canal winds through the terrain. The land is divided into various fields and agricultural plots. In the upper portion of the image, a large, dark shadow of an aircraft is cast across the sky and the landscape, suggesting the aircraft is flying directly overhead. The overall scene is captured from a high altitude, providing a wide view of the terrain.

# NAVAL AVIATION NEWS

FIFTY-FIFTH YEAR OF PUBLICATION

**Vice Admiral William D. Houser**  
Deputy Chief of Naval Operations (Air Warfare)

**Rear Admiral Thomas R. McClellan**  
Commander, Naval Air Systems Command

**Rear Admiral William R. McClendon**  
Assistant Deputy Chief of Naval Operations (Air Warfare)

**Major General Edward S. Fris, USMC**  
Assistant Deputy Chief of Naval Operations (Marine Aviation)

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**Harold Andrews** Technical Advisor

**COVERS** — *William Curtsinger, in the cockpit of another A-6, framed these Intruders from VA-176 during air operations in the Caribbean. PH2 Milt Putnam caught the Apollo command module as it floats toward the Pacific under three parachutes, back cover; chart depicts the Apollo flights and recoveries.*

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# EDITOR'S CORNER

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In this issue, DCNO(Air Warfare) Historian, Clarke Van Vleet, reviews the activities and accomplishments of the Navy's air arm for the year 1972. He refers to this period as Naval Aviation's "Year of Action," and the record sustains that evaluation.

At a time when U.S. ground forces in Vietnam were being reduced sharply, aviation units continued to provide much needed direct air support to Allied ground combat units as well as interdict enemy supply lines and stockpiles. Following the North Vietnamese open invasion of the South in the spring, Seventh Fleet aircraft carrier strength reached as high as seven flattops, some diverted from duties in the Atlantic and Mediterranean. During the final month of 1972, requirements for the tempo of naval air activity rose dramatically when an intensive bombing campaign was launched against targets in North Vietnam.

It, therefore, seems a strange anomaly that while sea-based air power continues to demonstrate its particular value to our military posture, there are those who question its present and future usefulness. In recent years, a number of influential individuals, many holding important positions, have indicated that they foresee no significant role for the aircraft carrier in modern warfare. This is not a new issue. The carrier had no sooner proven its ascendancy over the big-gun ship-of-the-line in WW II than voices were raised claiming its obsolescence in the age of the strategic bomber. Even though sea-based air power had led the way across the Pacific and played a major role in clearing the Atlantic of submarines, there were those who promoted a cheaper and more effective method of meeting the challenge of a potential enemy. Luckily complete reliance on some alternative defense system was not adopted, and carriers were retained, though their numbers were greatly reduced.

By the summer of 1950, only five years after the assembly of the greatest armada of aircraft carriers

in history, the U.S. Navy could call on only four Essex-class and three Midway-class ships, the remainder consisting of four CVLs and four CVEs. Four more Essex-class carriers were undergoing modernization in shipyards. This was a small force indeed when compared with the 31 attack carriers, 9 CVLs and 70-odd CVEs that saw service in WW II. The rapid advance of North Korean forces in 1950 compressed American and South Korean troops into the cramped Pusan perimeter and overran most of the airfields needed to defend South Korea. Once again the aircraft carrier was called on to provide aerial support for ground forces and once again its mobility and flexibility paid off. Navy and Marine pilots quickly assumed the burden of close air support and breaking up the opponent's supply system.

Now, 22 years later, we hear some of the same arguments — cost, vulnerability, etc., but Naval Aviation continues to effectively carry out its assigned mission of projecting air power from highly mobile bases moved to positions throughout the world as needed and going about its deadly business in a thoroughly efficient manner. In the intervening years, carriers have been called upon repeatedly to perform their mission in an even more efficient manner — by just being there, in a position to discourage aggressors and maintain world peace.

The pilots, naval flight officers, aircrewmen, flight deck personnel and all the other hard working aviation and non-aviation support personnel who contribute to Naval Aviation's effective fighting team, deserve every bit of credit and recognition they receive for making the aircraft carrier the awesome fighting machine it is. Without the dedicated men who man the Navy's ships and aircraft, the aircraft carrier would be without military value and would be a vulnerable target. However, the performance of these men continues to make the carrier a highly effective weapon and its inherent mobility makes it less vulnerable than any fixed target.

# NAVAL AVIATION



1911

1973

# NEWS

## New NFO Trainer Dedicated at VT-10

PENSACOLA, Fla. — With the flick of a switch, a new phase of Naval Aviation training began, as a computerized device designed to provide communications and navigation training to student Naval Flight Officers was put into operation at the naval air station.

Located at VT-10's Griffith Hall, the trainer is the first of its kind. Designed exclusively for Naval Flight Officer training, it includes individual cockpit stations which permit up to 40 students to learn the aircraft navigation skills and radio communications techniques required in the operation of typical naval aircraft. Each station is capable of simulating a realistic operating environment with respect to aircraft flight performance, fuel consumption, radio communications and navigational systems.

Typical fleet aircraft computer operations are also represented. The 40 cockpit stations are similar to those of the F-4, A-6, E-2 and F-14. They contain aircraft instruments, controls and displays which are controlled by a central digital computer. The computer activates each instrument to respond to a student's input as he attempts to navigate his "aircraft" within a 1,024 by 1,024-mile problem area. The computer is capable of not only simulating flight situations, but is also able to record, evaluate and grade a student's performance throughout a mission. In addition to the pre-programmed training problems, the

trainer will be used as a "hands-on" device to associate the "real world" with the NFO's academic instruction. This includes advanced and basic navigation systems such as inertial, Doppler and air data computers, as well as communications systems and procedures. Future uses of the computer will include training in radar systems simulation.

With the use of this system, it is felt training efficiency will be greatly increased by incorporating instruction into the NFO syllabus without a costly increase in actual flight hours.

## VA-46 Milestone

CECIL FIELD, Fla. — VA-46, based at the naval air station, passed a milestone recently, accumulating 10,000 accident-free hours. A significant portion of these hours was compiled during a recent ten-month deployment to the Med aboard *John F. Kennedy* (CVA-67). On the same deployment, the *Clansmen* accumulated 2,127 day and 872 night carrier arrested landings.

Commander Dale Lewey is C.O. of the A-7B *Corsair II* outfit.



Ltjg. Judith A. Neuffer, first woman selected to enter the Navy's flight training program, is presented an oversized pair of aviator wings by Secretary of the Navy John W. Warner. Looking on is Vice Admiral William D. Houser (left), Deputy Chief of Naval Operations (Air Warfare), and Admiral Maurice F. Weisner, Vice Chief of Naval Operations. Also selected are Ltjg. Barbara A. Allen, Ens. Kathleen L. McNary and officer candidate Jane Millen. They will begin flight training March 2 in Pensacola. Four civilian selectees are in Officer Candidate School for Women where they will be commissioned before reporting to Pensacola.

# Ships Claim Record Vertrep

AT SEA — USS *San Diego* (AFS-6) and USS *Rigel* (AF-58) teamed up for two days in November to transfer 1,300 tons of provisions and supplies to 22 ships in what is reportedly the largest vertical replenishment operation of its kind in naval history. A combined total of 1,045 tons was flown from the flight decks of the two service force ships while at anchor in Souda Bay, Crete.

Pilots from HC-6, Det. 2 logged 15.2 hours of flight time per aircraft during the two-day event. Flying two UH-46 *Sea Knights*, the crews had to fly over four miles to reach the most distant customers. Another UH-46D from USS *Seattle* (AOE-3) assisted on the scene.

Throughout the two days, *San Diego* resembled a supermarket besieged by enthusiastic customers during a clearance sale. At one point, a mini-fleet of a dozen boats waited in line to receive cargo.

While most of the details for the transfer had been planned ahead of time, many ships took advantage of *San Diego's* well stocked holds and sent representatives to shop around for last minute supplies. Two hundred and fifty-five additional tons of cargo, including 30 loaves of freshly baked bread, were dispatched "off the shelves."

## Last Marine NAPs

WASHINGTON, D.C. — Old Marine Corps specialists — enlisted pilots — became a thing of the past this month.

Of the hundreds who served Marine Aviation so faithfully over the years, the four remaining NAPs (Naval Aviation Pilots) retired February 1.

The last four, all master gunnery sergeants, are Robert Lurie and Joseph A. Conroy, both stationed at MCAS Cherry Point, N.C., and Leslie T. Erickson and Patrick J. O'Neil, MCAS El Toro, Calif. All four began their active duty during WW II and have completed over 30 years of active service.

The term NAP became the official name of the program in 1919, al-

though there were enlisted pilots during WW I. Over the years, however, they have been called Flying Peons, Enlisted Pilots and Flying Sergeants. The NAPs themselves adopted the Flying Peon name and a patch that depicts wings through an enlisted chevron.

The NAP program reached its peak during WW II. From 1942 through 1945 more than 500 enlisted Marines were so designated. The majority later received commissions and flew as officers during the war. Official records show this fluctuation by listing only 51 NAPs at the end of the war but about 400 in early 1948, after reversions to enlisted status and a continued input into the program.

From those 400, the number dwindled to 125 in 1954. Still, many NAPs made their mark in the Korean Conflict, some getting a crack at flying jets and helicopters in combat. But by 1962 their number had been reduced to 56.

At press time, besides plans under way to retire the four remaining NAPs at their respective home bases, tentative plans were also being considered to honor all former Marine enlisted pilots to appropriately mark the "End of an Era."

## Antarctic Rescue

McMURDO STATION, Antarctica — A VXE-6 helicopter crew, hovering over a large crack in a "patch" of ice too fragile to sustain the helo's weight, lifted four scientific research students to safety from their precarious perch in the Ross Sea of Antarctica. The rescue ended a massive two-day air search by planes of the U.S. Navy, Royal New Zealand Air Force and Royal Air Force who were participating in Operation *Deep Freeze*.

The five-day search began when the four students failed to return to their



Navy helo crew after Antarctic rescue.

base camp from a boating expedition in the Ross Sea. They were looking for a school of unique Antarctic fish when the boat's engines stopped working.

As the planes searched, the students leaped from ice floe to ice floe, consuming emergency rations from the disabled boat, a raw penguin killed with an ice axe and snow mixed with sugar.

After their rescue, they were taken to the Navy dispensary at McMurdo Station to recover from hunger and exposure, and from there they returned to Canterbury University at Christchurch, N.Z.

The VXE-6 helicopter was crewed by Lieutenants Jeff McComas and Allan Costlow, AMS2 Richard Nelson and ADJ2 Kenneth Moncrief.

## French Test A-4M

PATUXENT RIVER, Md. — Pilots from the Naval Air Test Center's Flight Test Division recently completed A-4M compatibility trials aboard the French aircraft carrier *Foch* (PA-55). Two A-4Ms were flown from Patuxent River, via Goose AFB, Newfoundland, and NS Keflavik, Iceland, to Landivisiau, France, where several shore-based flights were made before flight operations began aboard *Foch* one week later.

The tests were required to establish and define any technical or operational problems that might arise in cross operations with the airplane. Catapult and airplane compatibility was of prime concern, with arresting gear and airplane compatibility of secondary importance. The A-4Ms made 17 catapult launches and arrested landings aboard *Foch*, which is equipped with BS-5 catapult and MK-13 arresting gear. Buildup catapult launches were performed at 17,500, 19,500 and 21,500 pounds gross weight before nose gear loads equal to *Foch's* catapult track cover deflection limits were reached. Several lightweight launches completed buildups to maximum arresting gear engaging speed.

Following debriefs with the French Defense Ministry and Douglas Aircraft Corporation, the project pilots delivered the planes to *J. F. Kennedy* (CVA-67) in the North Sea for surface transportation to Norfolk, Va.

## MC Crewman Honored

MCAS NEW RIVER, N.C. — Sgt. Lester E. Cox, a crew chief with Marine Heavy Helicopter Squadron 461 and the 1972 Helicopter Aircrewman of the Year, was presented a Silver Star Medal for bravery and promoted to his present rank in December. Major General Thomas H. Miller, Commanding General, 2nd MAW, presented the Silver Star.

While Cox was serving as a crew chief with HMM-165 near Quang Tri, RVN, supporting the South Vietnamese Marines, his helicopter received heavy enemy fire and crashed.

Even though suffering from severe burns, the crew chief disregarded his own safety to rescue one American and two Vietnamese Marines from the burning wreckage. Only after searching for other possible survivors, did Cox leave the aircraft. He then joined the survivors in a nearby bomb crater and applied first aid to the injured. Despite his own serious burns, he continued to assist in every way possible until the crew was air-evacuated.

Sgt. Cox previously received the Marine Helicopter Aircrewman of the Year Award in November.

## New AF Prototype

WASHINGTON, D.C. — General Dynamics and the Northrop Corporation have each received a contract from the Air Force to build a lightweight fighter (LWF) prototype aircraft.

The YF-16, to be built by General Dynamics, will be powered by a single P&W F100 turbofan engine, have a swept wing, an under-fuselage inlet, single vertical tail, and forebody strakes. The YF-17 of the Northrop Corporation will be powered by two GE YJ101 turbojet engines, have a twin tail, highly sweptwing leading edge extensions, and underwing side fuselage inlets. Both aircraft are expected to fly in early 1974.

The LWF designs are being prototyped to determine the feasibility of developing a small, lightweight, low-cost fighter; evaluate advanced technologies and design concepts; determine what the aircraft can do; and establish its possible operational utility. The Air Force has no commitment to production at this time.



Boeing's Vertol Division has been selected to design, build and test three prototype helos (mockup above) for the Army. The twin-engine single-rotor aircraft is designed to carry 11 troops and a crew of three. Scheduled to replace the UH-1H Huey, it will be used for troop transport, medevac and logistic support. First prototype flight is scheduled for November 1974.

## Tri-Service SAR Experts Meet

CUBI POINT, R.P. — A two-day search and rescue seminar at the Jungle Environmental Training Center recently underscored the need for continued cooperation between the military services during helicopter rescues of downed airmen in SEAsia.

Thirty Army, Air Force and Navy experts in SAR and environmental survival training techniques traded ideas and recommendations for improving rescue procedures, particularly for those airmen picked up under combat conditions.

All three services are involved in rescues of airmen and, in some instances, they use different equipment and procedures.

Since a survivor may be confused by unfamiliar equipment, the time it takes to pick him up may become dangerously long.

"One of the unique things about the conflict in SEAsia is that a pilot never knows who is going to pick him up," says Lt. Richard W. Ritz, seminar chairman. "In a combat environment, speed is essential. We are looking for ways to cut down the SAR helo's hover time over the survivor."

Ritz, attached to a San Diego-based unit which teaches survival to Navy airmen, said that in order to keep interservice information current, SAR conferences were begun in August 1969.

"We try to recognize the survivor for what he is — probably down for the first time and scared out of his wits. The information we gain here

will be put into our courses immediately and will give any survivor a little more confidence," he continues.

Capt. Peter J. Edgette, USA, says of the seminar, "There is no doubt that by having more contacts with the SAR people from the other services on a regular basis we will have better procedures."

## ASW Support System

PATUXENT RIVER, Md. — Navy's first modular ASW tactical support system will soon be operational at NS Adak, Alaska. Conceived and developed at the Naval Air Test Center, the 15-module system has already been airlifted to Adak.

The portable tactical support system will provide a direct link between operational commanders and remote aircraft data sources. It is designed to be set up and made operational anywhere in the world in seven days. It will extract, process, store, correlate and display data from the sophisticated weapons system of the P-3C *Orion*, and will be compatible with the system of the carrier-based S-3A *Viking*.

Features incorporated in the system include the automatic display of vital operational data and real-time direction of ASW aircraft via digital data link communications system. Facilities are available for rapid computer-controlled reconstruction of aircraft sorties, correlation of intelligence data and analytic processing of sensor data.



# GRAMPAW PETTIBONE

## The Tragic Demo

The lieutenant junior grade instructor pilot and his second lieutenant student were scheduled for a syllabus aerobic hop in a T-28 *Trojan*. The instructor, as is customary, was to occupy the rear seat with the student in front.

Preflight, brief, takeoff and field departure were normal with the student at the controls. After a climb to 10,000 feet, the student performed several aerobic maneuvers as directed by the instructor pilot. After these maneuvers were completed, the instructor took control and announced his intention to demonstrate a Square Immelman which would require increased airspeed and a 5 G pull-up. On a westerly heading, the instructor lowered the nose and gained 280 knots, then initiated a sharp pull-up. The student noted five to five-and-a-half Gs on the accelerometer and the aircraft began to break apart. A right roll of the fuselage commenced, the canopy shattered and, during the course of these events, the instructor was fatally injured.

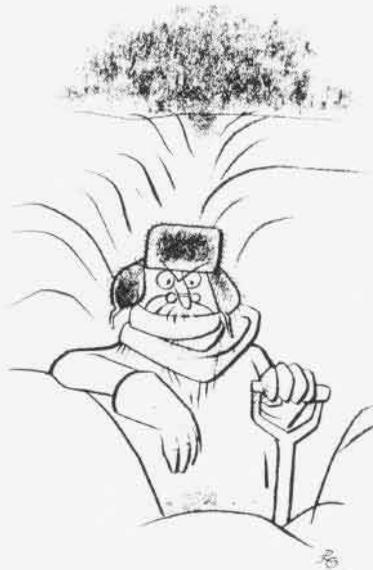
The student released his lap belt and was thrown clear and below the aircraft, whereupon he deployed his parachute. The fuselage continued its roll on a westerly heading, impacting in shallow water near the shoreline. The student landed three-fourths of a mile away in the water. He was assisted by a civilian boat.

The accident board concluded that an overstress of the aircraft occurred which was not observed by the student due to a lag in the G meter.



Grampaw Pettibone says:

Well I'll be a monkey's grampaw! Would you believe that, with all the emphasis the "big fellows" have placed on violation of sound judgment and airmanship, etc., we still have a few who don't seem to get the word! It wasn't too long ago that two other instructors "bought the



farm" in their T-28 (All Claws — No Brains, May 1972) while conducting "authorized maneuvers." Don't we ever learn?

For the majority of the flight instructors, and other aviators, as a matter of fact — you need not read on. But for the three percent who

have tried the unauthorized maneuvers, knowingly violated the rules, performed a little unauthorized low level flying, etc., *You* are living on borrowed time — be smart and aggressive, not foolhardy and stupid! A real pro knows the difference!!!

## Shish Kebab

Following a normal brief, the Marine Aviators manned their two A-4E *Skyhawks* for an ordnance training mission. After takeoff, the flight commenced climbing. At approximately 10,000 feet, the wingman experienced intermittent radio problems. When the flight switched frequencies to contact the range controller, the radio failed completely, the white cockpit lights went out and the fuel flow dropped and fluctuated. The pilot related visually to the leader that he had lost his radio.

As was prebriefed, the flight turned toward the ocean to jettison ordnance. After approximately 90 degrees of turn, the fuel flow gauge of the hapless aircraft shattered explosively, throwing splinters of glass throughout



ILLUSTRATED BY *Opson*

the cockpit and emitting a small amount of smoke into the pressurized cabin.

The pilot joined upon the leader and indicated visually that he wanted to land immediately. The aircraft attitude indicator began malfunctioning (off flags flickered in and out) and the cockpit began filling with heavy smoke.

Assuming the lead, the pilot headed for the runway from which he had departed a few moments earlier. Dumping fuel, he deployed his emergency generator and secured all unnecessary electrical equipment in an attempt to regain radio contact and/or reduce the smoke in the cockpit. At this time, the flight was approximately 10 miles north of the field, setting up a straight-in approach to the runway. The escort declared an emergency, notifying the tower that the lead A-4 was coming in with an emergency of an unknown nature and would possibly be arresting because of his gross weight. He asked specifically that the crash crew be dispatched.

As the pilot reached five nautical miles he lowered the landing gear handle and simultaneously experienced what he interpreted to be a complete electrical failure. All landing gear indicators read "unsafe." As a precaution, he pulled the emergency landing gear handle and lowered the flap handle.

Despite the excessive overweight condition, he stopped the aircraft in 9,000 feet and pulled off the runway. During the aircraft's landing roll-out, the crash crew received a radio call to terminate the emergency. While the crash trucks returned to their original alert stations, the *Skyhawk* taxied partly into the de-arming area and tried to signal for the de-arming crew to check his aircraft for hot brakes and install his landing gear safety pins. During these few moments, he unknowingly continued to dump fuel under the aircraft.

Two other aircraft were in the de-arming area, some distance away, and both pilots noted that the pilot was dumping fuel. They called on the radio to give him this information but his radio remained inoperative. The other pilots then frantically gave him the NATOPS fuel dumping signal (turning over a cupped hand) but the pilot interpreted the signal as "come forward" since he had intentionally



## Some Spaghetti!

stopped his hot brake aircraft a safe distance from the de-arming crew.

A moment later, the fuel beneath the aircraft ignited and enveloped the plane in flames. The pilot heard the engine decelerate, unstrapped from the seat pan and shoulder harness, disconnected his oxygen mask and vaulted over the windscreen and down the left side of the nose, quickly leaving the area. He received burns and lacerations on his unprotected hands. (He had removed his gloves after landing.) The crash crew, which had been prematurely secured, noted the burning aircraft, proceeded to the site and eventually extinguished the fire. The aircraft sustained substantial damage.



Grampaw Pettibone says:

Great balls of fire! I kinda' wonder what manner of aviator this lad is when he can only concentrate on one thing at a time — forgot to turn off his fuel dump because he was busy taking care of "another emergency." Unfortunately, his "reminder" was his aircraft engulfed in flames?! Beautiful, just beautiful! As far as I'm concerned — we can't afford expensive lessons of this kind.

In all fairness to this gent — he didn't get a heck of a lot of help. Some of his electrical problems were due to a nut which was improperly secured during a recent rework. For lack of a nail. . . !

## Memo from Gramps

Heard one the other day that I must pass on — goes like this: "A C-121 was conducting practice approaches to a military field. During five of these approaches, one of the mainmounts broke away from the uplock more slowly than normal. On the sixth approach, this mainmount failed to extend at all (Gulp!). Following two recycle attempts, the gear did extend. Gear was then retracted (Yikes!) and the pilot returned to home base a short distance away. When the landing gear was lowered for the final landing, it failed to extend (no surprise to me!). After many recycles and emergency procedures, the gear did extend and lock into place; an uneventful landing followed."

There it is, gents — if you don't believe it, read it again. I can't believe that an experienced aviator with "roller" problems would bring up the rollers once he got 'em down, particularly when he was just a short distance from his home field and not experiencing other problems! Man — where is your common sense? When you have gear problems and you get it down, pending no other problems — *leave it down!* And just in case we have some sea lawyers around, I know that NATOPS doesn't mention leavin' the gear down; however, as you will note in the NATOPS Manuals, "No manual is a substitute for sound judgment."

By Clarke Van Vleet, DCNO(Air Warfare) Historian



PH1 D. F. Keever

***Year of Action...***

**1972**

**T**he year 1972 was one of great activity for Naval Aviation. It was one of demanding action — from the back-wrenching work of the ordnance handlers aboard our carriers in the Gulf of Tonkin to the all out effort of all the staffs who responded in the emergency.

I have the greatest admiration for the aviation community which so energetically responded to the call in this year of decision. To the officers and men of Operation Linebacker — the carrier personnel; the pilots, RIOs and crewmen of Naval and Marine Aviation who conducted day and night all-weather strike operations against the aggressor's sources of supplies; the surveillance performed by our ASW people; the radar interceptors on surface ships who assisted our aviators; the helo crews who rescued our downed airmen; and to all others, the support and planning people — I wish to extend a Well Done.

As often happens in a year of decision and action, other important events received less notice. There were, for example, the launching of Nimitz; the plans for CVN-70; further tests and development of the F-14, the S-3, the CV and the sea control ship; the establishment of eight Training Wings; the consolidation of CNATra at Corpus Christi; participation in Snowy Beach, Deep Freeze, Magnet, Strong Express, and RimPac '72; the increased burden of ASW responsibilities as CVSs were reduced from three to two; the world's distance record set by an RP-3D; and the final recoveries by TF 130 of the last of the Apollo missions.

As a final note, I reiterate to the men and women of Naval Aviation the message of the Chief of Naval Operations that as national objectives are met, the problems of individual hardships and the long hours and lengthy family separations which are caused by increased action, will receive high priority in our plans and programs for the future.

*William D. Houser*

Deputy Chief of Naval Operations (Air Warfare)

## Beginnings of Buildup

Nineteen Seventy Two began amid increasing U.S. air activity over Vietnam. Selected military strong points in North Vietnam below the 20th parallel were being targeted—a spate of protective reaction raids was soon to develop—and there was to be a renewal of dogfights and MiG kills.

Heightened air operations sprang from U.S. tactics designed to disrupt the heavy buildup of communist troops and material north of the demilitarized zone (DMZ), including an increasing number of mobile SAM sites—an ominous enemy posture in preparation for the coming Easter invasion of the Republic of Vietnam (RVN).

The growing intensity of air warfare was indicated the second day of the new year when U.S. authorities disclosed that ten American planes had been downed over North Vietnam and Laos in the last three weeks of 1971, with 13 missing and six rescued. The extent of operations was also indicated by 90 protective reaction strikes by USN and USAF aircraft against SAM and AA installations in North Vietnam between January 5 and March 10, compared to 108 such raids in all of 1971.

While military activity in South Vietnam continued on a comparatively moderate scale between January 1 and March 29, evidence was mounting that the North Vietnamese were preparing for an offensive in the northern and central provinces of RVN. U.S. intelligence reports had presaged an invasion and, on January 30, the impending communist drive was publicly predicted by Secretary of Defense Melvin Laird. (Since the start of the dry season in October 1971, about 120,000 of the enemy had moved down the Ho Chi Minh Trail, 30,000 more than a year earlier. The communist infiltrators were fanning out from supply routes into South Vietnam, Laos and Cambodia.)

Off the coast of Vietnam, operations during January had been near normal, with one and two carriers "on the line" at a time. *Coral Sea* (CVA-

43) and *Constellation* (CVA-64) had been alternating and overlapping on station in the Gulf of Tonkin. Both were on their sixth WestPac tour since mid-1964. As more and more signs pointed to an imminent move by the communists, *Connie's* leave in Hong Kong was cut short and she returned to the line in early February, shortly after the arrival of a third carrier, *Hancock* (CVA-19), the oldest in the fleet—a 28-year veteran dating from the days of WW II.

Since the eruption of the Vietnam conflict, CVA-19 had spent over 30 months in WestPac and now she was back on station under Admiral John S. McCain II, CinCPac, whose father had commanded TF 38 from the same ship during the Leyte and Luzon campaigns to liberate the Philippines. Twenty-three years later, CVA-19 was a part of TF 77 when LCDr. John S. McCain III was shot down and taken prisoner by the North Vietnamese on October 26, 1967.

As 1972 began, CVAs 19, 43 and 64 had already amassed 64 years of service to the Navy, including 90 months (or nearly eight years) on station with the Seventh Fleet. During the coming year, they were to add another 20 months of combined operations to stem the communist invasion.

## Interlude in the Indian Ocean

Meanwhile, Tonkin's waters were not the only focus of the Navy's attention in volatile Asia. Nuclear-powered *Enterprise* (CVAN-65) was dispatched in December 1971 to the Indian Ocean and adjacent Bay of Bengal with a task force of eight other U.S. vessels in order to show the flag during the Indo-Pakistani War and to counter the buildup of Soviet naval ships off the subcontinent.

As many as 26 Soviet warships had been observed operating near Indian naval facilities at Visakhapatnam on India's east coast and on the South Yemeni Island of Socotra, astride the southern entrance to the Red Sea and the Suez Canal. (As the U.S.S.R. probed new sea frontiers, significant

was the disclosure in January 1972 that it was building its first large aircraft carrier, believed to be double the size of its 15,000-ton helo carriers *Moskva* and *Leningrad* which were launched in the mid and late 1960s and have been alternately operating in the Med since 1970.)

Task Force 74 was withdrawn during January 1972 but the Defense Department had "... every confidence U.S. naval vessels will operate in the Indian Ocean during the next year to 18 months. We will do that from time to time, no fixed schedule, no fixed force level." *Constellation* was scheduled to replace CVAN-65 but circumstances in Vietnam precluded that.

Effective January 1, 1972, the area of responsibility of the U.S. Commander in Chief, Pacific was shifted westward to include the Indian Ocean and the Persian Gulf where the U.S. Middle East Force is on station. As a result of an agreement with Britain, U.S. naval communications, refueling and logistical airstrip facilities continued under construction during 1972 on the island of Diego Garcia, about 1,000 miles southwest of the Indian subcontinent.

## Dogfights and MiG Kills

In Vietnam, American air strength was being increased in anticipation of the expected offensive from the North. (The same day that *Constellation* reported back on station in the Tonkin Gulf, it was disclosed that heavy reinforcements of B-52 bombers were being sent to Guam.) The North Vietnamese had been increasing their military capacity on a large scale in previous months. Some observers noted that by the end of 1971, they had the world's third best air defense system, behind the U.S.S.R. and Israel.

Prior to 1972, there had been a long lull in MiG kills. Only one had been downed during the three years from 1969 through 1971, compared to 81 and 29 by USAF and USN planes, respectively, in the period 1965-68. About two years had passed since the last kill, when Lieutenants

Jerry Beaulier and Steve Barkely, *Ghost Riders* of Fighter Squadron 142 off *Constellation*, had bagged a MiG-21 on March 28, 1970.

But "open season" on Mikoyan-Gurevich fighters arrived again with 1972. The 112th MiG of the war was shot down January 19 during the third engagement in three days between American and North Vietnamese aircraft. That day's action began when SAMs and AA fire were directed against a Navy RA-5 reconnaissance jet and its four fighter escorts near Quang Lang Airfield, about midway between Hanoi and the DMZ. In one of the escort planes was a pilot-intercept officer team — Lieutenants Randy Cunningham and William Driscoll — of VF-96's *Fighting Falcons* from *Constellation*, who scored the kill in their F-4 *Phantom*.

Back on deck, when he was asked how it was done, Lt. Cunningham replied: "There we were. There he was. We fired our missiles and got him!" *Constellation's* newspaper noted, however, that the engagement involved "a low altitude chase, maneuvering, use of afterburner for maximum speed and, finally, the missile firing for the shoot down." It was a New Year's "debut" for Lieutenants Cunningham and Driscoll, followed by further feats that would later make them the first "ace" team of the Vietnam War on the eventful day of May 10, 1972.

The January 19 MiG-21 kill (the tenth such model destroyed by Navy) was followed with a MiG-17 kill (the 22nd of that type) on March 6, when Lieutenants Gary Weigand and Bill Freckleton downed one while on a mission with the *Sundowners* of VF-111, flying off *Coral Sea*. Dogfights and MiG kills were thus becoming more frequent — they would eventually involve the "flaming" of 18 more MiGs by Navy pilots during the next three months. By years end, Naval Aviators downed 23 enemy aircraft.

"There we were, there he was. We fired our missiles and we got him," was the way Lt. Randy Cunningham described his and Lt. Willy Driscoll's first MiG kill on January 19, 1972.

## Other Areas

As the tempo of war stepped up in Vietnam, important events were also unfolding in other regions. Developments in which Naval Aviation had a direct or indirect interest included those involving Bahrain in the Persian Gulf, the island of Malta in the Mediterranean, and the port of Piraeus, Greece. With Britain's evacuation east of Suez creating a power vacuum in that area, an agreement for U.S. facilities on the island of Bahrain was announced early in the year. USS *La Salle*, refitted in 1972 from an LPD, became Navy's newest miscellaneous command ship (AGF-3), with an HH-2D helo aboard, and was scheduled for station in the Persian Gulf as flagship of the Middle East Force.

Of direct interest to the Sixth Fleet and NATO was the accord between the U.K. and Malta, signed March 6 and valid until 1979, permitting NATO to use the island, but significantly precluding the forces of any party to the Warsaw Pact from being stationed in Malta or to use military facilities there. Also important to carriers and surface ships of the Sixth Fleet was an agreement in January establishing home-port facilities for

one carrier and six destroyers at Piraeus, Greece. This was planned in order to reduce family separations and thereby improve morale and reenlistments. Over 6,600 Navy men and 3,000 dependents are affected by this change.

An important accord signed in 1972 significantly affected the Navy — on a planet whose surface is three-quarters water. This was the Incidents at Sea Agreement. The many sea/air incidents between the U.S. and U.S.S.R. since WW II had prompted the U.S. to seek such an agreement, and negotiations toward that end were begun in October 1971 by the then Assistant Secretary of the Navy, John H. Warner. The final accord was signed May 25 in Moscow by Mr. Warner, who was appointed the 61st Secretary of the Navy on May 4. He subsequently said, "This agreement records the mutual recognition of both countries that an unintentional accident between our two navies could have disastrous consequences. To avoid just such consequences, the two navies agreed upon practical procedures aimed at enhancing safety when units of our two navies operate in close proximity. Although the Incidents at Sea Agreement is far from





solving all our problems with the Soviet Union, it should help to decrease tension on or over the high seas." (Naval Aviation history records 15 serious incidents of firing on U.S. Navy planes by communist aircraft since November 1945, the last occurring April 14, 1969, when North Korean jets shot down an EC-121 over the Sea of Japan, killing 31 Navy men. Many other less serious "brushes" between U.S. and U.S.S.R. ships and

planes have occurred, particularly in the Mediterranean.)

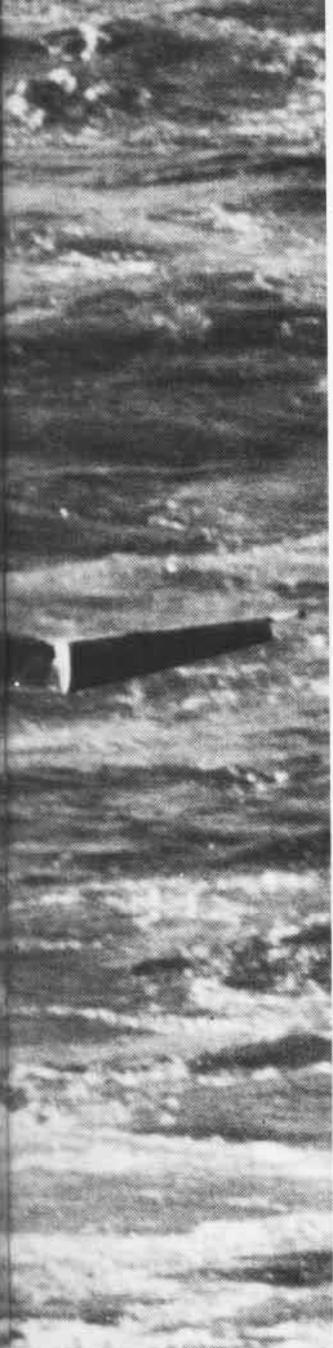
### **Easter Invasion**

In Vietnam, on the day before Good Friday, the long expected assault from the North was launched. On March 30, three North Vietnamese divisions struck into South Vietnam through the DMZ and another

three hit farther south — "a clear case of naked and unprovoked aggression across an international border," President Nixon told the American people; That Easter weekend brought North Vietnamese fighting in the south to well over 120,000 — 12 of Hanoi's 13 regular combat divisions had left their own soil.

The offensive was extended far south into the province of Binh, on the Cambodian border, where An Loc

*Phantom recovers aboard Enterprise during carrier's emergency tour in Indian Ocean.*



concentrated on interdicting men and supplies moving along the Ho Chi Minh Trail in southern Laos, and on providing air support for in-country operations. Except for protective reaction strikes and the five-day *Proud Deep* operation at the end of 1971, very few *Rolling Thunder* attack missions were flown into North Vietnam. The magnitude of the spring invasions emphasized the need for both increased support of the RVN in the south and a major increase in the effort to achieve the objectives of the *Rolling Thunder* campaign (which were to force North Vietnam to stop supporting insurgencies in SEAsia, but the 1972 invasion had gone far beyond that implied by the term "insurgencies").

Following Easter weekend, carriers off Vietnam were increased to four — *Hancock* and *Coral Sea*, already there, were joined by *Kitty Hawk* (CVA-63) on April 3 and, shortly thereafter, by *Constellation*, again recalled from leave, at Yokosuka this time. Low cloud cover prevented large scale bombing during the initial week of the offensive. Heavy raids against the North began on April 6, the first since the halt of 1968. They were directed mainly against missile sites north of the DMZ — those which had been firing at U.S. and RVN aircraft attempting to bomb invading North Vietnamese troops.

Targets were subsequently extended to include roads, bridges, storage areas, military units and airfields. Navy men hit petroleum facilities at Haiphong on April 16, the first time since the bombing restriction three and one-half years earlier. By April, developments had brought Naval Aviation's 1972 objectives to (1) destruction of all North Vietnamese aggression-supporting resources, (2) harassment and disruption of enemy military operations and (3) reduction and impediment of movements of men and materials through southern North Vietnam.

Meanwhile, the services — Navy, Marine and Air Force — were sending in reinforcements. Doubling Navy's

air potential in a matter of days entailed no delay of follow-on logistics since the carriers moved in with accompanying ordnance, fuel and other self-sustaining supplies. The new reinforced "backfield" was planning for even heavier pressure against the aggressor, because the objectives mentioned above were a prelude to *Linebacker*, an operation soon to be activated. Two more carriers would also "hit the line" on Yankee Station, bringing to six the number called to engage the enemy.

## Year of the Carrier

Commemoration of the 50th anniversary of USS *Langley* (CV-1) marked 1972 as the "Year of the Carrier." As it turned out, it was more than appropriate. Carriers were again proving their value in Vietnam. The White House budget request to Congress for funds in FY 1973 included \$299 million for advanced procurement toward construction of CVN-70, a fourth nuclear carrier. By 1981, it would complement *Nimitz* (CVAN-68) and *Dwight D. Eisenhower* (CVAN-69), now under construction and tentatively scheduled for service in 1973 and 1975, respectively, and *Enterprise*. *Nimitz* was launched on May 13, 1972.

Like her sister ships, the third of the three *Nimitz*-class carriers will be comparable to the length of three and one-half football fields, an 875-car parking lot on its top deck, the weight of 900 *Santa Marias* in displacement tonnage, the population of Alamo City, Texas, in crewmen aboard, and an airport with air traffic control and accommodations for 100 airplanes. However, the carriers will be mobile, propelled by nuclear reactors capable of operating for 13 years without "tanking up."

In discussions concerning the need for another carrier, questions were posed by some officials and laymen alike as to the necessity for an expensive carrier in this age of nuclear weapons. Prominent among queries

was besieged. The invaders also pushed into the Central Highlands where positions protecting Kontum were overrun. By May, the North Vietnamese had achieved a major success, capturing Quang Tri, 20 miles south of the DMZ, the first provincial capital taken by the enemy.

U.S. response signaled the start of a new phase in the air war in Southeast Asia. Since the bombing halt of October 1968, the air effort had been

were two: "Why are they so essential?" and "In this nuclear environment, why spend money on 'floating targets?'" To the first, the answer was that no other weapons system can replace the long-range, sustained, concentrated offensive and defensive power of a modern carrier.

Why?—Because, as a mobile air base, it has jet fighters to destroy enemy interceptors and cruise missiles, attack aircraft to hit hostile forces, early warning airplanes to detect an adversary, electronically equipped planes to deceive the devices of a potential attacker, antisubmarine helos and fixed wing aircraft to search out and destroy submerged submarines and, finally, support planes to supply the ship during sustained operations. It was thus pointed out that the unique capability of the aircraft carrier provides a highly mobile umbrella of air power to accomplish Navy's mission of control of the seas.

As to the survivability question, it was noted that the carrier is the strongest naval ship that can be constructed in this day and age. Flight and lower decks and side armor are shielded by high strength steel. The new energy-absorbing hull is designed to counter major torpedo explosive warheads.

Nearly 2,000 watertight, shock-resistant compartments, and all structures are designed to meet modern blast and shock protection standards. While no weapon or locale is invulnerable today, the carrier has overriding assets, inherent mobility, indefinite endurance, aircraft capable of operating beyond the range of antiship missiles, and detection ability extending more than 100 miles from its roving airfield platform. Because it can keep moving and deliver a good counter punch, it is probably a safer place to be than in a static city dwelling.

"More than any other single new general purpose weapons system, CVN-70 will demonstrate our capability and resolve to meet the challenge of the Soviets; it will serve as a visible and credible naval deterrent. I consider CVN-70 the item of highest priority in the general purpose budget." —Admiral E. R. Zumwalt, Jr., CNO, March 23, 1972.

### MiG Interceptor

In Vietnam a series of sea/air events involved Chief Radarman Larry Nowell on the cruiser *Chicago*. The citation with his Distinguished

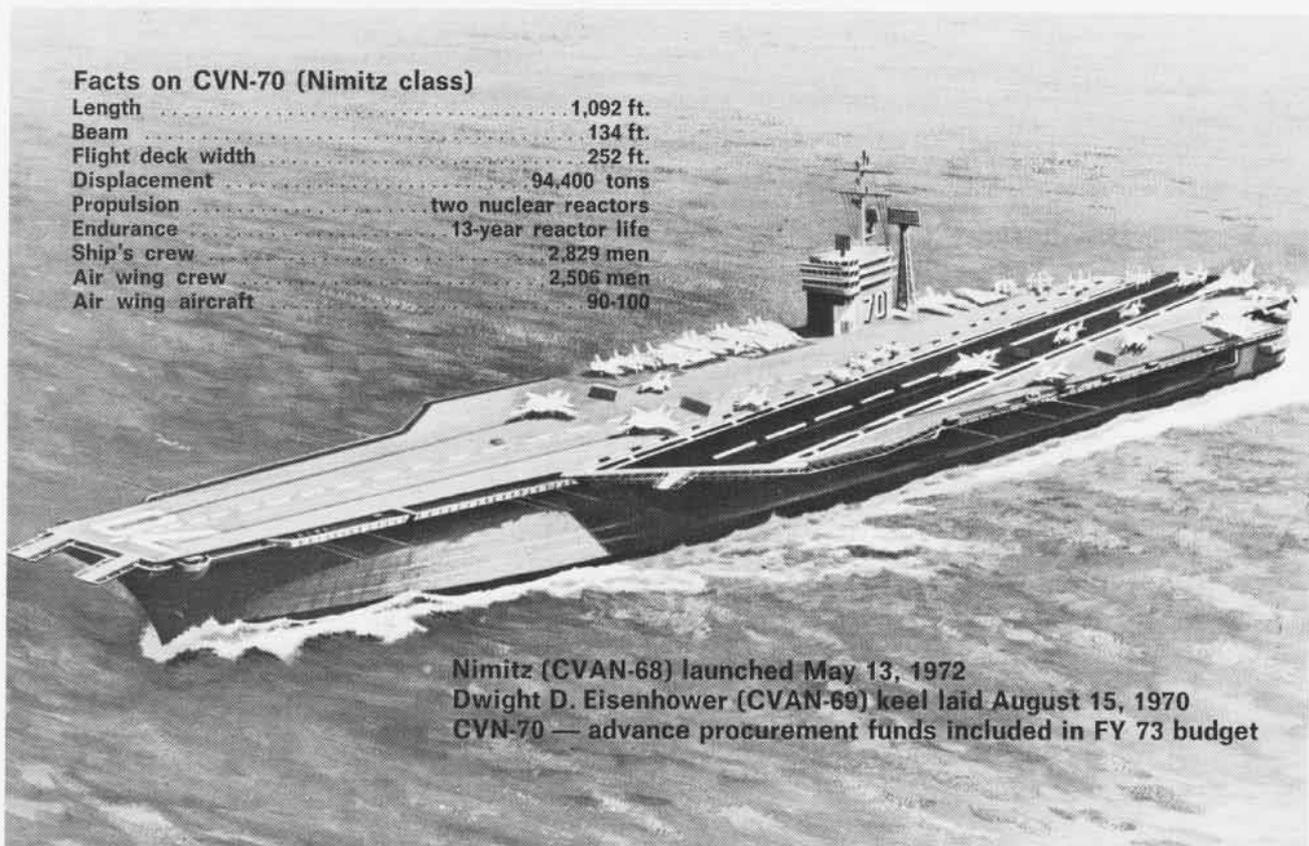
Service Medal reads: "During the period March through May 1972, he personally controlled U.S. Navy and Air Force intercept aircraft over North Vietnam with such precision and skill that ten enemy aircraft were engaged and destroyed. . . ." So outstanding were Chief Nowell's feats, that Secretary of the Navy John Warner personally presented the medal at a Pentagon ceremony.

As air intercept controlled for *Piraz* (Primary Identification and Radar Advisory Zone for protecting ships and aircraft operating under potential threat of enemy air strikes), Chief Nowell not only directed U.S. fighters in the interception of enemy MiGs, but also advised pilots low on fuel where to find tankers for inflight refueling, and coordinated rescues for downed aviators and their search parties. His responsibilities on *Chicago* included knowing every cubic foot of sky on Station *Piraz*, and every aircraft in it. He said, "My job is to draw the pilot a continuous mental picture of where he is in relation to the tactical situation."

An example of the chief's work is the story of the first MiG he helped shoot down, mentioned earlier in connection with the kill scored March 6

### Facts on CVN-70 (Nimitz class)

Length	1,092 ft.
Beam	134 ft.
Flight deck width	252 ft.
Displacement	94,400 tons
Propulsion	two nuclear reactors
Endurance	13-year reactor life
Ship's crew	2,829 men
Air wing crew	2,506 men
Air wing aircraft	90-100



Nimitz (CVAN-68) launched May 13, 1972  
 Dwight D. Eisenhower (CVAN-69) keel laid August 15, 1970  
 CVN-70 — advance procurement funds included in FY 73 budget

by Lieutenants Weigand and Freckleton of VF-111. They were part of a two-plane mission flying protective cover for a ground strike with Lt. Jim Stillinger, the flight leader, in another *Phantom*. Suddenly Nowell, aboard *Chicago*, came through on the circuit, telling them he had a faint "paint" (enemy image) on his radar screen. Lt. Stillinger remembers, "We were climbing steadily, following Nowell's headings, when he came up and told us, 'Look low, look low.' I rolled the port wing down and spotted the MiG exactly where Nowell said it was."

Climbing, rolling, and coming in behind the enemy fighter, Stillinger said, "I couldn't turn-tight enough to stay with him. I cut the afterburners and overshot him, giving him a good look at my tail." Meanwhile Lt. Weigand, following in a much wider turn and roll, recalled that "The MiG pilot was so intent on getting a shot at Jim, he forgot about me. I pulled in behind him and sent a *Sidewinder* up his tailpipe. It blew the aft section off his aircraft and he went into a steep glide. The whole thing started at about 5,000 feet and ended at less than 400. It took less than a couple of minutes." This was the first MiG for Weigand and Freckleton and last but not least for Chief Nowell on *Chicago*. But May 10 was the red letter day—four MiGs credited to *Chicago's* air controllers, three to Chief Nowell.

## New Concepts — SCS and CV

Back home, the Year of the Carrier was witnessing the testing of new concepts designed to influence Naval Aviation tactics during the 1970s and 1980s. One is the sea control ship (SCS), a new class of vessel planned to provide protection to surface forces from its deck load of special helicopters and vertical/short takeoff and landing aircraft (V/STOL). This ship is designed to protect surface flotillas such as troop and merchant convoys, amphibious assault forces and task groups that do not have an aircraft

carrier in-company to protect them. The sensors and weapons of the aircraft aboard are aimed mainly at enemy submarine threats, thus serving as another measure to counter the growing Soviet underwater fleet (now numbering over 340 subs vis-a-vis 138 in the USN).

Not a carrier, neither in role nor capability, the SCS is a new class by itself. The Navy plans eight such ships for the future with the FY 73 budget calling for \$10 million in advance, long lead procurement funds. Testing of the concept got a practical start in January and evaluation continued throughout the year. One of the training exercises consisted of practice V/STOL sorties off 72'x72' landing areas cut from the forests of North Carolina where Marine Attack Squadron 513 carried out some tests for the SCS with AV-8As.

For interim evaluation, the ship selected was *Guam* (LPH-9). In addition to VMA-513, HS-15 with SH-3H *Sea Kings* was commissioned to conduct tests, trials and training in *Guam* including V/STOL and helo compatibility, antisnooper and antisurface tactics, bow and cross axial landings, night operations, shipboard control of airborne intercepts, and preparations to achieve a level of training sufficient to establish further tactical testing. Evaluation of both men and machines is expected to continue into June 1973.

The other new concept was named the CV. Instead of two types of carriers, attack (CVAs currently total 14) and antisubmarine (CVSs now number two), this concept will use a mix of tactical aircraft of the attack carriers, as well as antisubmarine aircraft, combining two separate missions into one. Current plans call for the eventual conversion of most attack carriers to CVs, bringing to 11 the number of CV-types expected in the fleet by 1977.

The new concept obviates the necessity for two kinds of carriers and the consolidation should be more economical. The CV concept was generated by the requirement for greater

flexibility and independent operations by carriers. The idea fulfills the need to maintain a multimission vigilance, considering the limited number of carriers allowed for the future.

Converted, tested, trained and exercised in 1971, *Saratoga* (ex-CVA-60),\* now the newest CV, went to sea in April bound for Vietnam to help stem the communist advance. Earmarked for further training, she was instead needed to meet a crisis. It was not her first crisis. She had been called to Lebanon in 1958, Cuba in 1962, the Middle East in 1967 and the Med in 1970. She left Mayport, Fla., in April 1972 after less than 60 hours of "set sail" orders. She rounded the Cape of Good Hope and sailed 13,000 miles before plowing into Yankee Station in May. She carried her new CV flexibility with her and, for this mission, a deck mix of *Hawk-eyes*, *Sea Kings*, *Vigilantes*, *Corsairs*, *Phantoms* and *Intruders*.

## Mining in May

Though slowed by the interdiction by U.S. air power, the North Vietnamese offensive continued and, by May 1, it had overrun the provincial capital of Quang Tri, 30 miles north of the important, symbolic city of Hue. To further blunt the attack and curb the flow of enemy supplies, the President announced on May 8 that all important harbors in North Vietnam were being mined and that maximum bombing of rail and road communications lines would commence. At 0900 on May 9, Vietnam time, Navy aircraft began dropping mines. Within two hours of the President's broadcast, the initial phases of the operation had been successfully completed.

In addition to the mines sown in

\* History repeated itself. *Saratoga* of WW II fame was the first U.S. vessel ever launched as an aircraft carrier, November 16, 1927, with the designation CV-3. She beat the *Lexington* (CV-2) launching by 28 days. CV-1, *Langley*, had been converted from a collier. Thus, the term CV, established in 1920, came full circle.



*Nuclear-powered Enterprise and her sisters covered the oceans of the globe, moving from ocean to ocean while again proving the mobility of the modern aircraft carrier, top. Interim evaluation of the sea control ship concept aboard Guam will continue in 1973, above. Capt. W. D. Carr, Jr., USMC, later chosen flight officer of the year, flew an A-6 Intruder, right, when "leading the strike which established the critical attack azimuth for the mining of Haiphong Harbor."*

Haiphong, mines were subsequently seeded in ports to the north, Hon Gai and Cam Pha, and four to the south, Thanh Hoa, Vinh, Quang Khe and Dong Hoi. The mines had a three-day delayed fuze action. International shipping was notified by "Special Warning No. 42" from the U.S. Naval Oceanographic Office that the harbors had been mined and that the fields would activate the evening of May 11, thus permitting merchant ships time for departure or a change in destination.

A-6A *Intruders* carried out tense and complicated operations from three of the carriers without loss of aircraft. *Ticonderoga* (CVS-14) had joined the task force to provide ASW surveillance.

Vice Admiral William P. Mack, now Superintendent of the U.S. Naval Academy, then Commander, Seventh Fleet, said, "We were required by the President to drop the first mine within seconds of nine o'clock because the President was going to announce the mining to the American public at that precise moment back in the States.

"The timing had to be exact. The mines had to be loaded, the crews briefed, flight crews had to know exactly where they were going and then drop the mines in a very narrow channel regardless of fog, rain or darkness. The drop had to be planned so that several aircraft could pick a point in the harbor area and drop their mines at 200 feet, microseconds apart, while going 300 to 400 knots. The navigational and flying problems our pilots had to solve were tremendous — and they did it.

"All the mines were dropped in the area where we wanted them. That was the initial closure of Haiphong Harbor. This mining mission was a remarkable job. We had to know how to prepare the mines and make sure they all worked. These young aviators dropped their mines right on the button and right on time. It was a great exhibition of naval flying.

"In Haiphong there was a high concentration of SAMs and AAA, so we had to have special strikes before, during and after. As a diversionary measure, I took two destroyers and

two cruisers up there and bombarded the coastal defenses near Haiphong at the same time the mining was going on. Over the next several days, we mined additional small harbors, river entrances and off-loading points up and down the coast — and most of these operations required local strikes and local cover. There were repeated launches, with a continuing launch cycle. There was a total of 150 sorties in general support of the operation: bomb strikes, fighter protection against MiGs, SAR flights and others."

### Mining and Linebacker

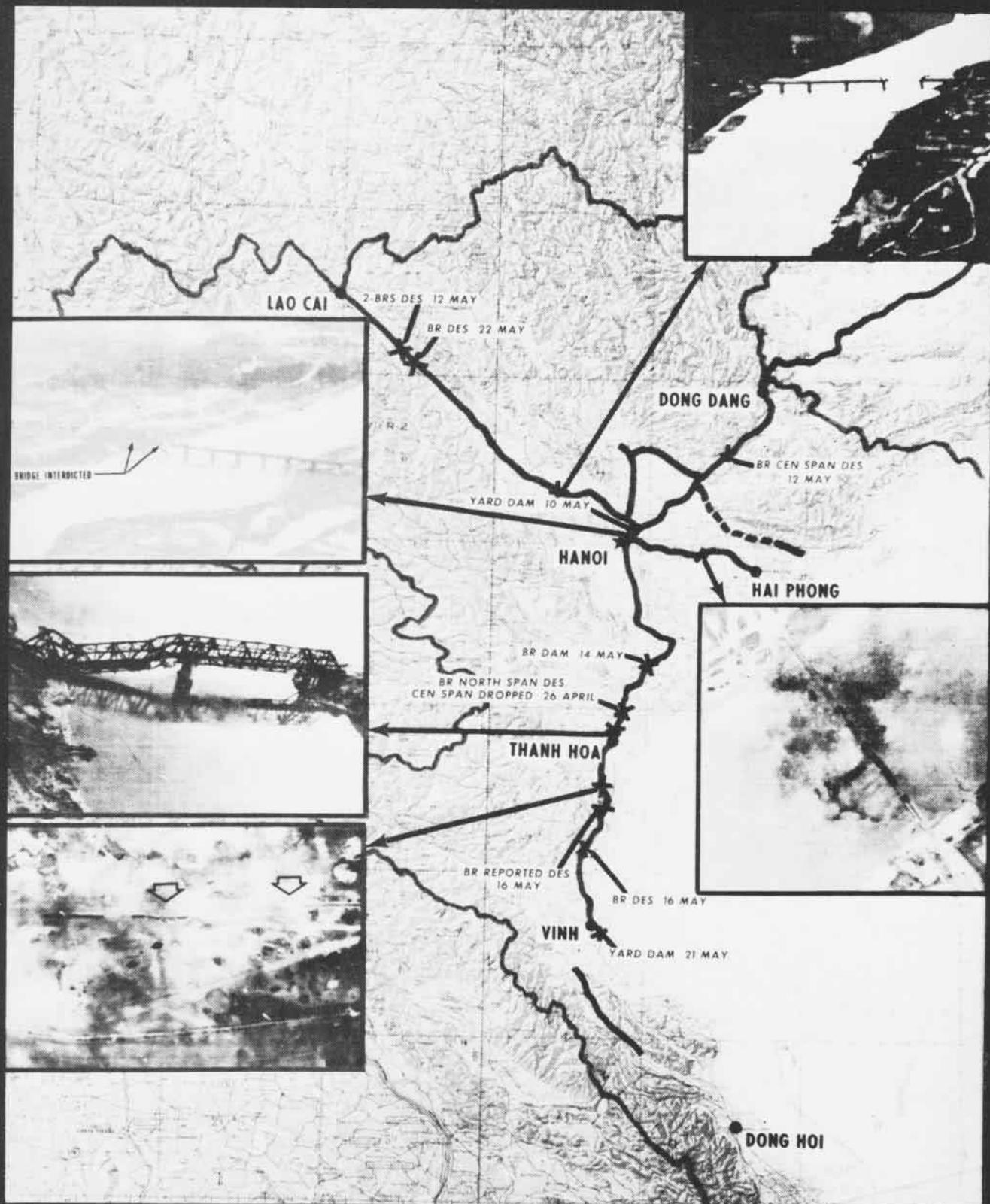
In addition to choking off supplies for Hanoi's fighting troops, closing the ports saved many pilots' lives. Without the steady import of backup SAMs and AA ammunition, there was less flak in the air against aviators. Adm. Mack noted that "When we sent strikes in before the mining, there was a steady streak of perhaps 100 SAMs coming up at every group of sorties. Within two weeks after the mining, both SAM firing and the opposing gunfire rate dropped. Before, you could see a ship going by every day, taking in the next load of SAMs and ammunition. When you can stop that kind of flow — at least a ship a day — you know you have done some good."

Major General Robert N. Ginsburgh, Office of the Secretary of the Air Force, observed that "probably the least anticipated — and, in my view, the most significant of the President's actions — was the decision to mount a systematic sustained campaign to reduce the flow of external supplies into North Vietnam and to destroy the war resources already there. There are several major differences between this campaign against the North, called *Linebacker* [launched as a follow-up of the mining in order to hit Hanoi's overall war supporting capabilities], and the *Rolling Thunder* campaign of 1965-68 [for which authorizations on a target-by-target basis were granted only periodically]."

Gen. Ginsburgh estimated that *Linebacker* had much greater impact in its first four months of operation than *Rolling Thunder* had in three and one-half years. "Most important, the ports through which North Vietnam obtained 85 percent of its imports have been closed by mining — seaborne imports into North Vietnam have been cut from over 250,000 tons a month to almost none."

Proof of the effectiveness of the mining by the end of the year — nearly eight months following the mining operation — was the failure of the North's invasion. By summer, the offensive had slowed, subsequently stopped and, later, in some instances reversed. Hanoi's war plans had not been fulfilled because its logistics system was strangled. The North Vietnamese faltered in attempts to capture Kontum, failed to take Pleiku, overran but later retreated from Quang Tri, and fell back at An Loc following an 80-day siege that was comparable to many sieges already milestones in military history. Thus, the cutting of war supplies by mining Haiphong and other important points, combined with the resistance shown by the South Vietnamese ground troops, caused the war to take a turn not intended by the invader.

This was not the first application of aerial mining in Vietnam. Seven A-6As from *Enterprise*, led by Commander A. H. Barie, C.O. of VA-35's *Black Panthers*, planted two mine fields on February 26, 1966, in the mouths of the Song Ca and South Giang Rivers and, in March, fields were sown in three other small rivers by *Intruders* from *Kitty Hawk*. These operations succeeded in stopping coastal barges from moving supplies in these immediate areas but, despite the success, no deep water ports, such as Haiphong, were authorized for mining by highest authority. One reason was that high civilian authority thought "it would escalate the war and risk confrontation either with Russia or Red China or both." ("TF 77 in Action off Vietnam," Vice Admiral M. W. Cagle, *Naval Review*, 1972.)



Some of the numerous North Vietnamese rail lines and bridges destroyed or damaged by the American air interdiction include, left, top to bottom: the Doumer bridge in Hanoi; the Thanh Hoa rail and highway bridge; and a rail siding 23 miles southwest of Thanh Hoa. Others are the Viet Tri railroad and highway bridge, top right, and Hai Duong railway bridge, bottom right.

## From the Halls of Montezuma

The familiar call "The Marines have landed" was again heard in the *Year of the Rat*. Marine Aviators returned to the country they had evacuated only months earlier in the general withdrawal of American troops. They flew in from Japan, Okinawa and the U.S. as part of the overall call for reinforcements to stop the all-out aggression.

Within half a day after the decision on April 5 to bring in Marine Aviation, elements of two *Phantom* squadrons touched down at Da Nang. They were soon performing air-to-ground missions in support of RVN forces in Military Regions I and II, particularly around Quang Tri. Targets were tanks, trucks and troops, giving RVN forces a chance to re-group and re-establish a line of defense north and west of Hue. For example, over 1,000 combat sorties were flown by the *Lancers* of Marine Fighter Attack Squadron 212 before they left in June.

Meanwhile, an additional Marine base at Bien Hoa had been activated for two A-4 squadrons from Iwakuni, Japan. They "Skyhawked" to the base in Military Region III in mid-May. Missions from Bien Hoa hit the enemy in southern South Vietnam, principally Military Regions II and IV, with most of the concentrated air strikes centering around the besieged city of An Loc. Calls for the *Skyhawk* also came from RVN forces counter-attacking to regain ground in adjacent areas. The *Tomcats* of veteran VMA-311 increased their all-time combat sorties to over 50,000 during the tour. (In the Korean conflict, members of VMA-311 were nicknamed *Tomcats* or *311 Lovers*. Squadron insignia has included the head of a tomcat superimposed on a heart since that period.)

Da Nang and Bien Hoa were not the only bases from which Marine pilots operated. A jungle-rotted installation deep in Thailand which had been abandoned in 1967 was reactivated. Located in the East Central Plains in juxtaposition to the North Vietnamese attacks in South Vietnam's highlands, the old airfield at

Nam Phong would not have satisfied the criteria for a "bare base" concept. It was in such rough shape that a joint USN/USMC engineering survey team moved in to hack out roads as well as aircraft parking and ammo storage areas. By late spring, the place was ready for initial operations. There, Task Force *Delta* performed its missions with VMFAs 115 and 232, VMA(AW)-533, and detachments of KC-130 *Hercules* and CH-46 *Sea Knights*. Austere Nam Phong was not so affectionately called the "Rose Garden" by the men who got and kept it "flying" for the first time in 1972.

Marines also flew from carriers in Vietnam — VMA(AW)-224 from *Coral Sea* and, later, the *Shamrocks* of VMFA-333 from *America* (CVA-66). The former was the first Marine A-6 squadron to fly combat from a carrier, performing such missions as strike and interdiction in both North and South Vietnam, assisting in aerial mining operations, flying anti-radiation (*Standard Arm*) missile strikes, and supporting RVN ground troops. The squadron flew in excess of 2,800 combat sorties and accumulated 4,500 flight hours before returning home with *Coral Sea* in July. The *Shamrocks* were aboard CVA-66 when she was ordered to cancel her intended Med cruise and instead chop to Yankee Station. Marine EA-6A *Prowlers* also worked with the carriers, significantly reducing aircraft losses to enemy SAMs. A detachment of AH-1J attack helicopters from HMA-369 stationed on *Cleveland* (LPD-7) sought out the night barge traffic attempted by the enemy after the mining.

## MiG Month, Thanh Hoa and LGB

With the launch of *Linebacker* in early May, Navy pilots began ranging over most of North Vietnam, attacking strategic targets such as railroad facilities, bridges, repair shops, petroleum centers, trucks, waterborne craft, supply points and storage sites. Important installations at Hanoi and

Haiphong were hit, the first time the two cities had been attacked since April 16. The northwest rail line from Hanoi to the Chinese frontier was also bombed, both near the border and outside the capital.

One May 10 target, Hanoi's Paul Doumer bridge, in memory of one of France's former presidents, was attacked where it crosses the Red River, an estuary of symbolic remembrance to the *Red River Rats*, an association of all U.S. pilots who ever flew over the river's course. May 10 was also a busy day for dogfighters. Navy pilots flew their jets out, dogging MiGs. Seven *Frescos* and *Fishbeds* were shot from the sky that day. Lieutenants Mat Connelly and Tom Blonski, VF-96, knocked out two *Frescos*. Lieutenants K. L. Cannon and R. A. Morris, VF-51, caught another, and the team of Cunningham and Driscoll flamed three to boost their dealings to a "five ace hand," following the two they had downed on January 19 and May 8. Lt. Curt Dose and Commander Jim McDevitt, VF-92, accounted for the seventh MiG that May "hay day." Before the month was out, the teams of Lieutenants Henry Bartholomay and Oran Brown, Pat Arwood and Mike Bell, and J. C. Ensch and Commander Ron McKeown, all of VF-161, were credited with four enemy fighters — two *Farmers* (MiG-19s) and two *Frescos*.

Three days following the MiG fracas, the famous bridge of Thanh Hoa was dropped. For more than three years it had been a recurring target and had progressively become a psychological block as pilots hit it time after time without appreciable results. Navy, Marine and Air Force Aviators had vainly attacked the seemingly indestructible, trussed stone structure standing on solid rock. Between 1965 and 1967 over 600 sorties had been mounted against this main thoroughfare, a conveyor of southbound truck and rail traffic. Eight aircraft had been lost and over 1,250 tons of bombs dropped on the span that became a symbol of the strength and resolve of Ho Chi Minh himself.

Finally, on May 13, a vital part of

the steel-bridge-mounted-in-stone on the river Song Chu was destroyed. Success was attributed to the new "smart" laser guided bombs. The bomb's forefathers had been developed in the late 1960s but this latest generation was so perfected for precision bombing that aircraft could lay a laser beam on target and then home the missile with its attached guidance systems with pinpoint accuracy. Previous visual bombing, using large numbers of aircraft, repeatedly hit major strong points such as Thanh Hoa without causing lasting damage. The smart bomb, however, accurately attached itself to vital parts of targets with the use of only a few planes, another development that cut the loss of aircraft and aviators.

Another major target was the oil pipeline running south, to and through the DMZ. It carried 1,300 metric tons of petroleum a day to supply enemy tanks, trucks and armored cars operating in Quang Tri province. The pipeline was cut in several places and all pumping stations were destroyed. In June, increased raids were carried out against railroad facilities near the Chinese border. In two days in mid-June, USN and USAF aircraft destroyed 97 SAMs. Attacks on targets such as these and support of RVN troops on the fighting fronts continued to be objectives of the carriers which, by the end of June, numbered seven which had served portions of the month off Vietnam.

### Change of Command — Change of Stars

Midyear back in the USA, an important part of Naval Aviation history came to a close with the decommissioning on July 1 of the Naval Air Advanced Training Command at Corpus Christi, Texas. For over 30 years it had provided advanced training for more than 84,000 Naval Aviators. The station's mission was not over, however. Commander Naval Air Training took CNAVAnTra's place, moving to Corpus Christi from Pensacola. The shift and absorption of

advanced and basic training responsibilities completed another step in the reorganization of the Naval Air Training Command. Restructuring began more than a year ago and it was "off the deck and flying" in 1972. Eight training air wings to replace both the Basic and Advanced Training Command structures were established before midyear.

At the heart of the reorganization was a concept called "single base training." The program calls for assigning a student, after he has completed primary flight, to a specific training program (jet, prop or helo) at one installation where he completes the remaining instruction for his wings. The concept is also another Navy economy move, since the student pilot of the future will be trained at less expense without sacrifice of traditional high quality instruction. As the history of the Naval Air Advanced Training Command came to a close, the then Deputy Chief of Naval Operations (Air Warfare), Vice Admiral Maurice Weisner, paid tribute to those who had qualified the "world's finest aviators" and was "confident the Naval Air Training Command will continue to accomplish this goal in the same exemplary manner under its new organization."

Shortly after his tribute to aviation training, VAdm. Weisner also moved. He was elevated to the post of Vice Chief of Naval Operations on August 5. Taking over as DCNO(Air Warfare) was Vice Admiral William D. Houser. Both admirals who headed the office of DCNO(Air Warfare) during 1972 have had exciting and illustrious careers. Both began as surface officers in 1941, Adm. Weisner on the carrier *Wasp*, VAdm. Houser on the cruiser *Nashville*. After becoming an aviator, the former went on to a distinguished career of action in WW II and Korea (Patrol Squadrons 20, 98 and 46), followed by numerous important assignments, including Commander, Seventh Fleet.

VAdm. Houser, upon graduation from the Academy in 1941, served as gunnery, deck and CIC officer on the ship which embarked General Mac-

Arthur on his "I shall return" saga to the Philippines. After returning to the States and winning his wings, he joined Fighter Squadron One-L in October 1946 as his first assignment.

After leading the *Hornets* of VF-44 into action in Korea aboard the carriers *Lake Champlain* and *Boxer*, VAdm. Houser held a variety of assignments, including that of military assistant to the Deputy Secretary of Defense. Assuming command of *Constellation* in 1966, he again received the awards and commendations that have marked his service in the Navy. Other assignments with CNO and JCS preceded his nomination as DCNO (Air Warfare) on August 5, 1972.

The next month there was another change in a top aviation post when Major General Edward S. Fris relieved Major General Homer S. Hill as Deputy Chief of Staff, Air, HQMC, and Assistant Deputy Chief of Naval Operations (Marine Aviation).

### Resurgence of Linebacker

The tempo of air warfare continued in Vietnam through the summer and into the fall. In July, a total of six aircraft carriers — *America*, *Hancock*, *Kitty Hawk*, *Midway*, *Oriskany* and *Saratoga* — at one time or another sent sorties off their decks on Yankee Station. July 4 was no holiday for carrier pilots and crews. *Midway* aviators struck several times that day — one flight hit trucks near Thanh Hoa; other sorties swooped in on Kep Airfield, 30 miles northeast of Hanoi, while a third strike smashed storage areas southeast of the capital. The same day, pilots from *Saratoga* and *Hancock* attacked targets near the same strategic cities. To the south, planes from *Oriskany* were supporting friendly troops below the DMZ near Quang Tri.

Action in August continued apace, typified by the acts of heroism of two helicopter pilots who were later awarded the Navy Cross. On August 7, Lt. William Young, Helicopter Composite Squadron 2, flew his rescue plane off *Saratoga* and "although his aircraft was repeatedly hit by enemy

ground fire, he continued the search until the downed airman was visually located and picked up. Lt. Young then flew back to the safety of *Saratoga* at treetop level with his crippled aircraft." That same day, Lt. Harry Zinser, USNR, a fellow *Fleet Angel*, flew "nearly five hours of coordinated search—in the face of intense enemy fire—turned on his landing lights—carried out a skillful landing, picked up the downed airman . . ." in North Vietnam.

Vice Admiral J. L. Holloway III, who relieved Vice Admiral W. P. Mack as Commander, Seventh Fleet in May, moved a four-ship task unit into position off Haiphong Harbor the evening of August 27, where it shelled petroleum and military targets within two miles of the city's limits. It also sank one and damaged another North Vietnamese torpedo boat. A pilot from *Midway* finished off the damaged PT. Embarked in the heavy cruiser of the unit, VAdm. Holloway messaged, "It was inspiring to steam into combat with a unit such as this. My personal congratulations and a heartiest Well Done to each of you."

In Tonkin, *Big Mothers* continued their competent role of search and rescue. With the motto "Combat SAR Prevents POWs," rescue crews of HC-7 by September had been on Yankee Station 1,827 consecutive days. Since March 1972, they had made 22 rescues, six of which were rescues of USAF pilots. Also known as the *Nomads of the Tonkin Gulf*, men assigned to the detachments of HC-7 have served aboard ten different attack carriers during the war.

With the coming of October, the enemy showed signs of desiring peace and the U.S. ordered a temporary halt to bombing north of the 20th parallel, shifting the major concentration of air strikes to the southern panhandle—a gesture of U.S. sincerity in the secret talks. However, as the year wore on through November and into December, negotiations became snagged on various unresolved points. On December 18, the bombing of the North above the 20th parallel began again. Carriers resumed the missions origi-

nally begun by *Linebacker* seven months earlier; 1972 thus held to its label—Year of Action.

## Final Splashdown and Recovery

The day following the resumption of more arduous flying and fighting in Vietnam, a peaceful yet significant event occurred elsewhere in the Pacific. *Apollo XVII*, the last flight of the lunar program begun in 1960, splashed back on earth on December 19, 1972. It was the second command module to parachute into the Pacific during the year. The other, *Apollo XVI*, hit the water on April 27 with astronauts Captain John Young, USN, Commander Thomas Mattingly, USN, and Colonel Charles Duke, USAF.

Commander Arnie Fieser, C.O. of Helicopter Composite Squadron One from the recovery carrier *Ticonderoga* (CVS-14), picked up the *Apollo XVI* crew. HC-1 executive officer, Commander Ted Dahill, also flying off CVS-14, recovered *Apollo XVII*'s team of Naval Aviators, Captain Eugene Cernan and Commander Ronald Evans, and geologist Harrison Schmitt. (The back cover contains more data on the *Apollo* series.)

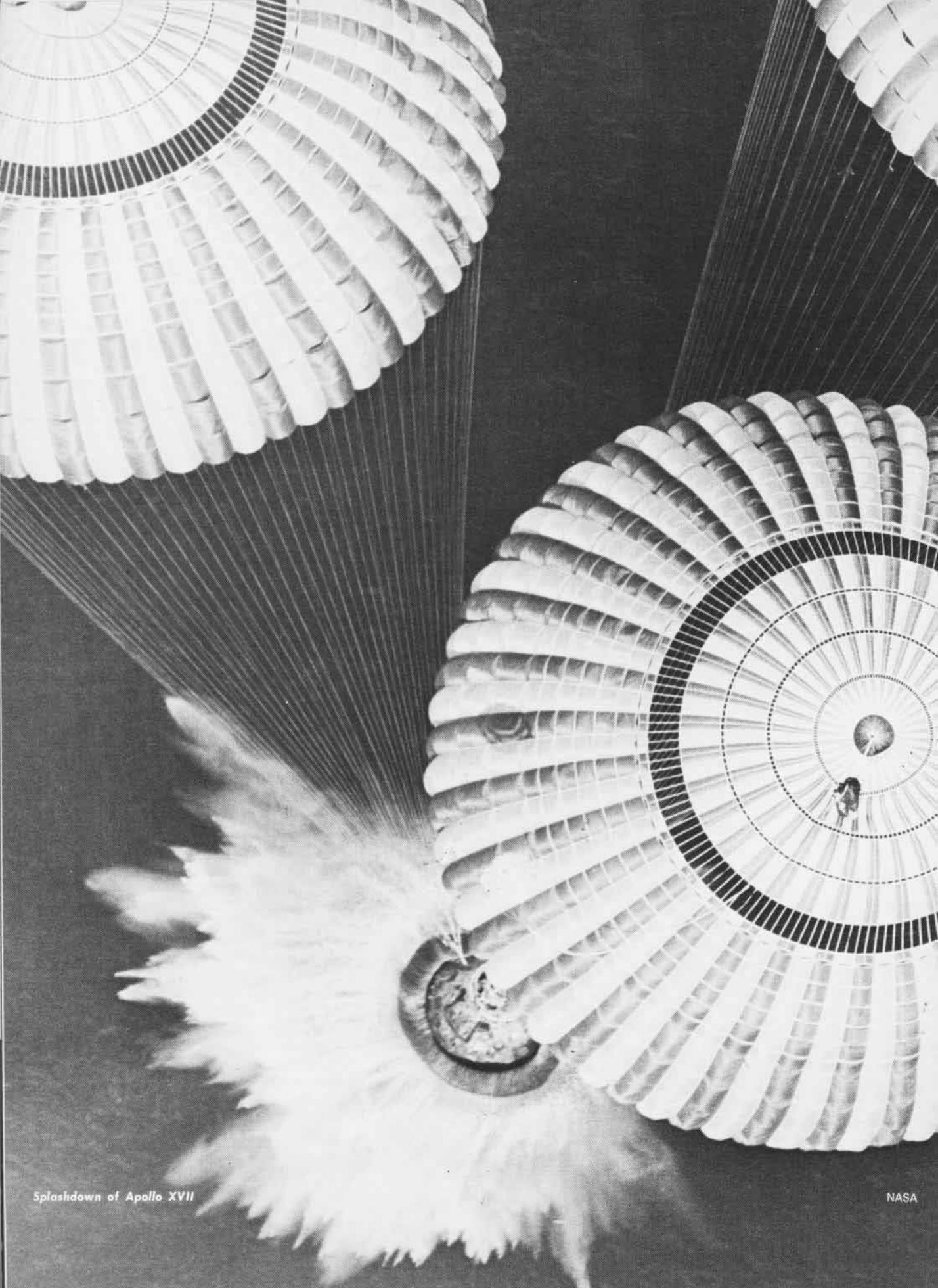
The Navy has been a key participant in America's space program since it began in 1958. The program was predicated on the concept of at-sea landings and recoveries, mainly because of safety and cost factors involved. The Navy's role in support of NASA's manned space effort was successfully performed in the *Mercury* and *Gemini* series (16 space shots and recoveries involving 26 astronauts) and continued through the completion of *Apollo* (11 manned shots with 33 men) in December 1972. During the series, more than 200 ships, numerous aviation squadrons and underwater demolition teams were employed in worldwide recovery duties. The units involved were assigned to Navy's Manned Spacecraft Recovery Forces, TF 140 in the Atlantic and TF 130 in the Pacific.

Navy recovery forces in the At-

lantic and Pacific reported to the DOD Manager for Manned Space Flight Support Operations. From Mission Control Center, Houston, the DOD Manager has exercised overall coordination of the worldwide deployment of military recovery forces based on information supplied by NASA. Ships were on station prior to each mission and remained there until splashdown. Although the recovery of manned flights received the most publicity, naval forces also had primary recovery responsibilities for numerous unmanned space launches which have provided the nation with essential scientific and technical data.

Of the 33 astronauts who participated in the manned *Apollo* series, 22 have U.S. Navy backgrounds, either through education at the Naval Academy and/or training as Naval Aviators before entering the space program. Notable among them have been Rear Admiral Alan Shepard, first American in space, and a former *Ghost Rider* of VF-193; Neil Armstrong, first "moon walker," who flew combat in Korea with the *Screaming Eagles* of VF-51; Captain Richard Gordon, *Apollo XII*, ex-member of VF-11's *Red Rippers* and a 1961 Bendix Trophy winner for cross-country speed flight; and Captain John Young, pilot of the first manned *Gemini* flight in 1965, who was holder of the 1962 world time-to-climb record (25,000 meters in 230.44 seconds) while with the Navy at Point Mugu.

Navy will continue its contributions to space. NASA announced in April those astronauts selected for the upcoming *Skylab* probes to begin in 1973. The first mission covering 28 continuous days in space will be commanded by Captain Charles Conrad accompanied by Commander Joseph Kerwin, MC, and Commander Paul Weitz. Captain Alan Bean heads the crew for *Skylab II* with civilian Dr. Owen Garriott and Major Jack Lousma, USMC, aboard. Mission III will be commanded by Lieutenant Colonel Gerald Carr, USMC, in company with civilian physician Dr. E. C. Gibson and Lieutenant Colonel William Pogue, USAF.



*Splashdown of Apollo XVII*

NASA

## Other Developments

January — The S-3A *Viking*, under development as a replacement for the S-2 *Tracker* in 1974, made its maiden flight. Operation *Snowy Beach* in Maine, with F. D. Roosevelt and *Guadalcanal* participating, tested helicopters extensively in ASW, mine countermeasures, amphibious assault, and mobile logistic support roles for cold weather operations.

February — *Deep Freeze '72* ended its 18th consecutive year of operation with VXE-6, air arm of Navy's Antarctic TF 43, retiring its last reciprocating engine aircraft to be replaced with turbo-prop *Hercules* and twin-turbine *Iroquois* for the upcoming 1973 operations which began in the fall of 1972.

March — DE-1089 was named after Ens. Jesse L. Brown, USNR, black Naval Aviator of VF-51, killed in Korea after shooting down Navy's first enemy aircraft in that conflict. The term "Training" was dropped from reserve unit designations and the Chief of Naval Air Reserve Training was redesignated Commander, Naval Air Reserve, who began reporting directly to CNO. Operational tests commenced on the supersonic, anti-ship, remotely piloted vehicle, *Firebee II*. Feasibility of at-sea aviation refueling from civilian tankers got under way with *Independence* replenished by SS *Erna Elizabeth* in a joint Navy-Maritime Administration program subsequently extended to carrier operations of the Sixth Fleet in the Med.

April — F-14 *Tomcat*, being developed as a replacement for the F-4 *Phantom II*, began catapult and carrier landing checks.

May — First Night Carrier Landing Trainer began operating at NAS Lemore with a second device scheduled for installation at NAS Cecil Field. A P-3 *Orion* made the first drop test of a *Harpoon* missile from 20,000 feet.

June — HC-2 and HSs 15, 74 and 75 flew relief and rescue during Pennsylvania's disastrous floods. MCAS New River's field was named after General K. B. McCutcheon in honor of his early work in helicopter aviation.

July — The ASW carrier *Wasp* (CVS-18) was decommissioned. *Saratoga* (CV-60), *Hancock* (CVA-19), *Ticonderoga* (CVS-14) and *Inchon* (LPH-12) won the Admiral Flatley Memorial Award for outstanding performance and safety in their classes. VA-27, VF-96 and HS-7 were named the Admirals McClusky, Clifton and Thach Award recipients for outstanding attack, fighter and antisubmarine squadrons, respectively. Sixteen Naval Reserve Support Units were established to serve Reserve NAS, NAF and NARU commanding officers. *Tripoli* (LPH-10) and HMM-165 assisted in relief and rescue work after Typhoon *Rita* hit in the Philippine Islands.

August — The oldest carrier in the fleet, *Intrepid* (CVS-11), spent its 29th anniversary conducting ASW training north of the Arctic Circle.

September — *Strong Express*, the largest joint exercise in the 23-year history of NATO, involved land, sea and air operations in the North Atlantic, including ASW, minelaying, mine countermeasures, land-based patrol and sea-based attacks in which J. F. Kennedy and *Inchon* participated. ASW Exercise *RimPac 72*, staged near Hawaii, involved forces from Australia, Canada, New Zealand and the U.S., including *Ticonderoga* (CVS-14). Helicopter Sea Control Ship Group One was established to include HC-2, HS-15 and HSL-30, the latter two being the first SCS and LAMPS squadrons, respectively.

October — An air combat maneuvering range system began operations near MCAS Yuma with an East Coast counterpart scheduled to begin operations near MCAS Cherry Point in

October 1973. The FY 73 defense budget originally submitted in January was revised, calling for acquisition of 48 F-14 *Tomcats*, 35 S-3A *Vikings*, 12 P-3C *Orions*, 7 EA-6B *Prowlers*, 8 E-2C *Hawkeyes*, 30 AV-8A *Harriers*, 48 A-7E *Corsair IIs*, 21 A-6E *Intruders*, 20 AH-1J *Sea Cobras*, 24 T-2C *Buckeyes*, 24 UH-1 *Iroquois*, 3 C-9B transports and 5 CT-39 cargo planes plus 6 VH-53D *Sea Stallions* for White House detail.

November — An RP-3D *Orion*, a Project *Magnet* aircraft, with Commander P. R. Hite as chief pilot, flew a non-stop new world's distance record of 5,461 nautical miles in 16.5 hours from Patuxent River to the magnetic North Pole and return, breaking the existing record of 4,322.14 nautical miles made by a Soviet-built Il-18 in June 1969.

December — NAS Cubi Point held ceremonies naming its field after Vice Admiral Arthur W. Radford, who was largely responsible for the establishment of the Cubi installation in the 1950s. Adm. Radford attended the dedication.

## Tributes

All men, ships and units deserve high praise. Among many others, commendation came from VAdm. Mack: "I would like to make some general remarks about the quality of Naval Aviators and the whole aviation community. It is a great tribute to the whole system when you look at the small number of operational accidents and the small number of pilots and crewmen lost. It is a tribute to Naval Aviation in general, and to the Commanders of the Naval Air Forces of the Atlantic and the Pacific, their staffs and the whole aviation system, that they took carriers not quite prepared, sped them up, got them on the scene, and had them operating like veterans the day they arrived. It was amazing."



*'It was a year of demanding activity  
of the ordnance handling  
effort of all the staff.'*



In a message to the fleet, the Chief of Naval Operations stated that he was very aware of the hardships of long hours, family separations and unexpected schedule changes brought about by the increased action of 1972: "North Vietnam's flagrant invasion of South Vietnam, March 30, 1972, required us to double the number of ships and units in Southeast Asia and to greatly enhance their operating tempo. Reinforcements came from all parts of the Atlantic and Pacific Fleets, impacting adversely on schedules and operating tempo all over the world. . . . I have noted with pride and pleasure the timely and enthusiastic response of all commands and individuals. . . .

"As national objectives are met, our efforts will be directed promptly toward less arduous schedules. The longer range goal remains to reduce or restructure overseas and underway commitments to increase the time each man spends at home. An immediate goal of each commanding officer and of each supporting staff must be to minimize individual hardships resulting from the increased tempo. Pass the word as soon as possible. Look for ways to bring families together. Process emergency requests expeditiously and with compassion.

"In the interim, all Navy men and their families should take great pride in the accomplishments of the United States Navy and in the knowledge that they, individually, are making major contributions to world stability and to the security of their nation."

*on - from the back-wrenching work  
aboard our carriers to the all out  
who responded in the emergency.'*

# TECHNICAL REPORT

By Lee M. Pearson, Naval Air Systems Command Historian

In reviewing technical progress over a period of a year, it is customary to reach into a bag of goodies and more or less randomly pull out descriptions of promising new technological breakthroughs, some of which are going into operational use and others little more than gleams in the eyes of dedicated researchers. Indeed, considering the breadth of technical effort directed by the Naval Air Systems Command, only a limited sampling is possible. One trouble with this approach is that the length of developmental lead time is such that a promising new development seems to become old before it reaches operational use.

Actually, the developmental aims of the Navy are twofold. Not only is improved new equipment developed, but also the technical data from that effort is put to immediate use in supporting existing operational gear. Thus the payoff is literally double-barreled. This duality can be demonstrated by an example from the materials and structures area.

Incipient failure in an aircraft structure triggers an investigation which reveals that the inventory of a first line aircraft contains a collection of accidents waiting to happen. There is no time for leisurely study; corrective action must be taken at once. The cause is quickly identified as stress corrosion, a phenomenon which the Navy has been studying for years. In a matter of weeks, fixes are devised and placed into effect. So rapid is the response that scarcely a sortie is missed.

Quick reaction to technical problems encountered during operations occurs routinely and almost without notice. It is made possible by the technical work directed by the Naval Air Systems Command.

In the above instance, materials and structures engineers had been monitoring and directing developments aimed at preventing stress corrosion in naval aircraft. Working with the aluminum industry, they had developed a new stress-corrosion-resistant aluminum alloy. Incorporation of this alloy in new production aircraft was part of the solution.

Study of stress corrosion is part of a continuing materials development program. That program in its entirety includes the efforts of a number of Navy and other Defense agencies and laboratories, the aircraft industry, the materials industry and university materials laboratories.

Materials and structures engineers in NavAirSysCom, in the Aero Materials Laboratory at the Naval Air Development Center, Warminster, Pa., and in the materials laboratories at naval air rework facilities center their attention on the unique materials problems encountered in operating aircraft in a naval environment.

Pilots may feel that a technological endeavor aimed at developing a new alloy is not important to them. Their maintenance officers know better. In materials, as in a multiplicity of other technical disciplines, far reaching programs will provide improved aircraft in the future. They also provide the Navy with the expertise necessary for a quick reaction capability when technical and engineering problems develop in operational aircraft.

Stress corrosion is only one problem of concern to materials and structures engineers. The punishment imposed on landing gear during a carrier landing is another. These are only two examples out of several dozen that are being pursued in materials and structures areas. On many the payoff is less evident. Even so, the entire effort contributes symbiotically to both the development of improved equipment and to trouble-shooting when problems arise with existing equipment. This is equally true in other technical areas.

Technical areas involved in developing naval aircraft systems involve most aspects of modern technology: aerodynamics, aircrew equipment, mechanical equipment for aircraft, antisubmarine sensors and signal processing equipment, smart bombs, guided missiles, fire control systems, communications and navigation equipment, radar, lasers, infrared devices, aircraft catapults, arresting gear, fire-fighting equipment, engines, engine controls—the list might go on and on.

Cutting across many of these fields is the digital computer which has brought new dimensions in capability and introduced new problems involving support and maintenance. The computer is not only part of the problem but part of the solution. Maintenance men have long used BACE (Basic Automatic Check Equipment) in trouble-shooting and repairing the A-5's complex avionics. SACE (Semi Automatic Checkout Equipment) is used with the A-6 and E-2 while the A-7 avionics maintenance depends



At the end of the year, the F-14 Tomcat was entering Phase I of Navy BIS trials.



heavily upon ground support equipment dedicated to that purpose. The multiplicity of special purpose automated avionics test gear is overcrowding shipboard avionics shops.

The Navy has long recognized that avionics has become so complex that automated test gear is necessary and can most readily be developed as special purpose gear. At the same time, it has recognized that a general purpose automated test gear offers advantages in versatility and in saving space. Conceptual study of general purpose gear began nearly 15 years ago and, in 1964, a feasibility model of a Versatile Avionics Shop Test (VAST) was ordered. This soon developed into a full-fledged effort to develop such a unit for wide use. The sustained effort is now culminating with ship and shore evaluation, with some VAST stations actually in use as part of the Navy's avionics maintenance effort.

Development of a new cruise missile to provide a heretofore unavailable capability is a long term effort. *Harpoon* had its beginning in exploratory development and has existed for a year and a half as an engineering development of a defined weapon. Last year, basic concepts were verified in a variety of firings to test various elements. Success in this area led to integrated tests of the complete round which culminated when an air-launched bird homed on its target. This success should lead to early procurement of prototype *Harpoons* to confirm their operational capability.

Much effort lies between the design of a new aircraft and its introduction to the fleet. Products of various technical areas must be integrated into new aircraft systems and the effectiveness of the integration must be validated by extensive flight tests. One purpose of that testing is to ensure that the aircraft manufacturer has complied with the contract requirements and that the aircraft meet specifications. The specifications define in technical language the military worth of the aircraft. Preliminary flight tests demonstrate that the various components of the aircraft function technically as designed, and appropriate adjustments are made to eliminate interference between subsystems. At that point the Board of Inspection and Survey becomes involved in order to validate the progress while the Operational Test and Evaluation Force looks at the

aircraft's military utility in an operational environment. Of the Navy's two new aircraft, the S-3A was successfully passing through the early phases of its flight test program while, at the close of the year, the F-14A was entering BIS for Phase I trials.

In the following discussion of these selected programs, the breadth and depth of work in the numerous technical areas should be kept in mind as an indication of the continuing, complex development efforts. If we remember that the technical expertise necessary for such development directly contributes to resolution of problems with current operational equipment, the effort can be seen in its true perspective.

### Stress-Corrosion-Resistant Alloy

A new stress-corrosion-resistant, high strength, aluminum alloy, designated 7050, was released for service use and is being incorporated in selected components of new construction A-6s and F-4s.

To appreciate this, recall the August 1971 A-6 crisis. It was during the monsoon season in Vietnam and the A-6 was the only aircraft in TF 77 scheduled for maximum sorties. On *Midway*, an alert maintenance man routinely inspecting an A-6 noticed cracks in a main fuselage bulkhead at the point where it secured the wing. A similar crack was found in another A-6 on *Midway*, in eight A-6s on *Enterprise* and in nearly 10 percent of the A-6s in the total Navy inventory. All A-6 models except the EA-6B were involved. Laboratory analysis showed that the cracks had resulted from stress corrosion.

A three-fold solution to the problem was devised. If cracks were found, either by visual inspection or by buffing off the finish and using a dye penetrant test, the weakened portion of the bulkhead was cut from the structure and replaced with steel. If cracks had not yet developed, a slip bushing was substituted for the pressed-in bushing provided in the original design, and the residual stress was alleviated. Fortunately, NavAirSysCom had been sponsoring development of the 7050 alloy. Early in 1972, it was approved for use in fuselage bulkheads in new production A-6s and the problem was eliminated at its source.

Stress corrosion, while obscure, is serious. It can be catastrophic and one aircraft crash (not an A-6) is attributed to stress corrosion. As a materials phenomenon, stress corrosion has received increasing attention over nearly 30 years. It has not, however, been possible to thoroughly understand the causes. Stress corrosion, as the words imply, occurs in material under tensile stress. The stress may result from the use to which the article is put or it may be present as residual stress from fabrication or assembly of the structure. Stress corrosion also requires mildly corrosive surroundings — such as that provided by the minute quantity of moisture that penetrates paint or other protective coatings on naval aircraft. In aluminum, it begins as a microscopic crack along the grain boundaries and frequently progresses to complete failure. Aircraft, ship structures, lightweight guns and cartridge cases are all susceptible. Present losses of parts and materials to stress corrosion total some \$50 million.

Alloy 7050 is particularly promising for applications requiring a lightweight, high strength material. It was developed by NavAirSysCom through a contract with Aluminum Company of America over a four-year period. It promises to virtually eliminate stress corrosion in aircraft and may be widely adopted for other uses. Incorporation in new production A-6s, early in 1972, marked its introduction into service.

#### Landing Gear Dynamic Test Facility

As part of the S-3A development, a dynamic testing technique was devised and used which accurately duplicates, under laboratory conditions, the stress of carrier landing, including the shock when the landing airplane strikes deck obstacles such as a PLAT (Pilot's Landing Aid Television) cover plate or an arresting cable. The technique, devised by Vought Aeronautics Company which

has contractual responsibility for S-3A landing gear and carrier suitability, involves use of a dynamic test facility built for that purpose.

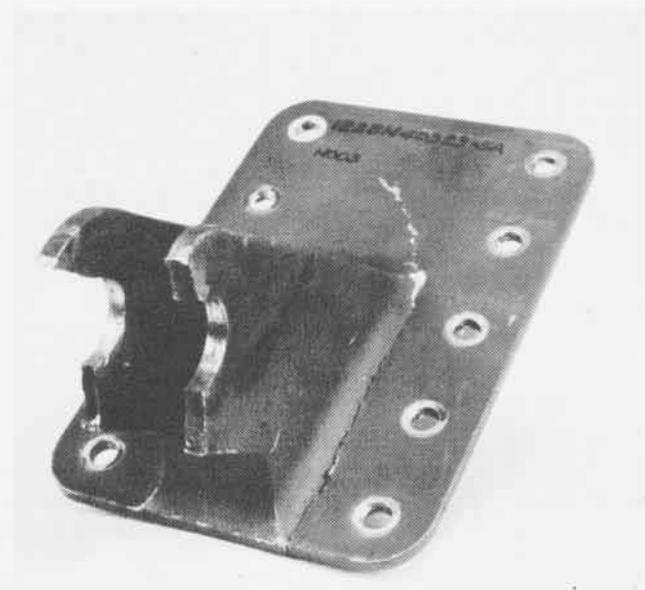
Basically, the aircraft is dropped onto a rapidly moving platform so that relative speed between the test aircraft and the platform is equivalent to that between an aircraft and the carrier flight deck at the moment of touchdown. Obstacles secured to the platform impact the aircraft wheels at a preselected point in the runout.

Vought's dynamic test facility was completed last spring and used in drop tests of the S-3A landing gear in July and of the aircraft itself in November. The tests show that the shock of encountering a PLAT cover plate momentarily increased the axial load on landing gear struts by 20 to 25 percent. Such knowledge will enable landing gear to be designed with accurate strength margins.

#### VAST

During 1972, VAST, the new automated general purpose avionics test equipment, underwent extensive test and evaluation. At the beginning of the year, a modern VAST unit or station (USM-247) was being installed aboard *Kitty Hawk* for use by the intermediate maintenance department. It went on the line in February as a backup to the peculiar ground support equipment used to repair A-7E avionics. Thus the avionics technicians gained experience with VAST. In mid-July, VAST became the prime checkout equipment for 68 components of the A-7E avionics system including the head up display, forward looking radar, tactical computer, Doppler radar, armament control system and air data computer. The shipboard test and evaluation was completed in November.

The term "general purpose," as used with VAST, is an expression of intent in that it can be used only with avionics that are designed to be checked out with automatic



Aluminum alloy may reduce stress corrosion, left; above, P-3 launches Harpoon; right, VAST gear.

test equipment. Even then, VAST can only be used if the avionics gear is VAST compatible. The requirement for VAST compatibility was included in the specifications for the F-14A, S-3A and E-2C. Thus, as the Navy takes over more of the testing of these aircraft at the Naval Air Test Center, Patuxent River, Md., and Naval Missile Center, Point Mugu, Calif., VAST will be used extensively to check out the complex avionics on these new aircraft models. As a preparatory step, VAST stations were installed at NATC and NMC at midyear. Thus, shore-based evaluation of VAST will proceed simultaneously with BIS trials of the new aircraft models. A VAST station was also installed at NAS Miramar and one is scheduled for early installation at NAS Norfolk for use by Naval Aviation Maintenance Training Detachments, Pacific and Atlantic, in training maintenance technicians in support of F-14As and E-2Cs.

In the fall, a VAST station was installed at the Naval Air Rework Facility, Jacksonville for use in depot level checkouts of the head up display avionics in the Air Force's A-7D and the Navy's A-7E. An important part of this project is that the Navy is obtaining an in-house capability to reprogram VAST software which is necessary for full utilization of the VAST capability. Experience has already indicated many ways in which software can be changed to simplify and increase the use of VAST.

Since June, the intermediate maintenance departments at NAS Whidbey Island and NAS Oceana have been using first generation VAST (USM-335) to augment SACE in testing A-6 avionics. After only three months of on-the-line use of VAST, Whidbey Island reported that on two A-6 assemblies that were VAST supported, the ratio of flight hours to maintenance man-hours increased three to four times as compared to a year earlier. While many factors were involved, part of the credit belongs to VAST.

The evaluation and use of VAST in various environ-

ments assure its future use. Plans for the coming year include permanent installation of three VAST stations on each of two CVAs.

### Conformal Carriage

A promising method of carrying bombs on tactical aircraft is being investigated on an F-4B at the Naval Weapons Center, China Lake, Calif. The concept, originated at the aviation and surface effects department of the Naval Ships Research and Development Center, Bethesda, Md., is being developed as a joint Navy-Air Force effort. Bombs and rockets and their racks and launchers are mounted within a housing designed to blend into the aircraft's under-surface. Advantages over present methods of carrying weapons externally include reduction in drag of the aircraft and ordnance, simplified loading, and improved weapons separation. In addition, blunt-nosed weapons can be utilized; they can be packed more densely than low drag shapes, thus increasing the ordnance capacity of the aircraft.

### Harpoon

Development of the triple-threat *Harpoon* was marked by a series of tests designed to confirm the capability of its various components and demonstrate its ability to perform its mission from any of its three launching environments — subsurface, surface or air.

Important tests of components include captive proof tests of the terminal target seeker conducted at Point Mugu beginning in July. Warhead penetration tests commenced at China Lake in March. Free-fall separations of the *Harpoon* airframe from a P-3 were made in May and June and the final captive tests of the engine were completed during June.

Firings of Blast Test Vehicles (BTVs) from an *ASROC*



launcher to check aerodynamics and performance of the booster engine, used in launching surface and subsurface versions, were made during the summer and fall at NMC.

Validation testing of the subsurface configuration was carried out at about the same time. For subsurface launch, the missile and booster are enclosed in a capsule. In July, a missile airframe was boosted from the center section of a capsule on San Clemente Island. Two months later, a capsule was launched from a submerged torpedo tube. As the capsule broke the surface, the nose cone and tail cap were blown off and the booster was fired, placing the missile in a normal launch trajectory.

Firing of controlled test vehicles began on October 17 when a round fired from a P-3 flew a full operational course. This round carried all operational hardware except the warhead and radar seeker as did a second round fired three weeks later which carried out programmed maneuvers. On December 2, the third *Harpoon* controlled test vehicle was successfully fired from an *ASROC* launcher at Point Mugu.

The first Guidance Test Vehicle, GTV-1, was fired from a P-3 on December 20 and successfully homed on the target ship, the decommissioned destroyer, *Ingersoll*.

#### F-14

Flight tests of the F-14A *Tomcat* continued throughout the year, confirming the aircraft's technical and tactical superiority. The initial carrier operating trials began on June 15 when an F-14A, piloted by LCdr. E. M. Brown, was catapulted from *Forrestal* off the Virginia Capes, and were completed on June 28 after three catapult launches, two arrested landings, 13 touch-and-goes and three intentional wave-offs.

Integration testing of the F-14 and *Phoenix* began a year ago last fall when the first F-14A arrived at NMC. Flight tests of the *Phoenix* in combination with the F-14 include a free-fall launch in mid-April, a live firing in early June and the simultaneous firing of two *Phoenix* missiles in July. The first live firing was scored as a kill against a QT-33 target. The first dual firing was a look-down, shoot-down attack on two QT-33s during which the AWG-9 missile control system not only locked on the two widely separated maneuvering targets but also continued to scan for other targets. One of the two missiles passed within lethal range of its target and was scored a kill while an electrical failure, which developed near the end of its flight, caused the second to miss. By the end of the year, the F-14A had also successfully fired a *Sidewinder* against a flare-augmented BQM-34A.

The dual-firing of *Phoenix* missiles was part of the Navy Preliminary Evaluation II, a five-week test which was completed in mid-August. During it, 11 Navy pilots made 72 flights totaling 178 hours. The airframe and engine phase of this evaluation was conducted at Grumman Corporation's flight facility at Calverton, Long Island, while the avionics and weapons systems phase was conducted at NMC.

The BIS initial trials phase began in November at NMC using two aircraft to evaluate the aircraft avionics, weapons

control system and missile firing performance. This marked the beginning of a joint evaluation test by representatives of the Board of Inspection and Survey, NATC, NMC and VX-4. This will include technical evaluation and BIS final trials and culminate in an operational evaluation scheduled for next summer. As of the end of 1972, 18 aircraft had made some 1,000 flights totaling 2,000 hours.

While the complex testing program was confirming the F-14A's promise of operational excellence, a direct step was taken to prepare for its operational use. This was the commissioning of Fighter Squadrons One and Two, the first F-14 squadrons, at NAS Miramar on October 14. Secretary of the Navy John W. Warner, who conducted the commissioning ceremony, flew from Point Mugu to Miramar in an F-14.

#### S-3A

At the beginning of 1972, the S-3A *Viking*, the Navy's new carrier-based antisubmarine warfare plane, was approaching first flight. In early January, it underwent slow speed taxi tests at Lockheed Aircraft Corporation's Burbank, Calif., plant. It was then trucked 45 miles to Palmdale for high speed taxi tests. On January 21, two months ahead of schedule, Lockheed test pilot John Christiansen made the first flight of one hour and 42 minutes. The actual envelope for this flight included a speed range of 120 to 200 knots and altitudes up to 20,000 feet.

Simultaneously, at its Rye Canyon Laboratory, Lockheed was completing ground tests of the new avionics equipment. These tests had begun a year earlier when individual components—the acoustical signal processor, general purpose computer, processor control system and tactical display—were assembled with relative positions of boxes and with cable lengths exactly as in the airplane. Both hardware and software were debugged module by module.

Airframe and avionics tests continued to pace each other. For assessment, the avionics were installed in a P-3 flying test bed which accommodated not only the S-3A avionics system and its four crewmen but also additional instrumentation, engineers and extra crewmen. The Navy's first airborne assessment of the avionics package was completed on schedule in late May. That same month, the first NPE of the S-3A flight performance was completed.

On July 17, airplane No. 3 made its first flight. This was the first S-3A to be fully equipped with its avionics suite. Thus the flight marked the start of the final phase of the development program. The following month, VX-1 completed the operational evaluation of the high resolution APS-116 radar in a P-3C and reported that the radar exhibited outstanding reliability and ability to detect periscopes in heavy seas.

During the week of August 14, the S-3 underwent its third program review and all major elements were found to be on schedule. During that month, the Navy accepted General Electric's final report on qualification tests of the TF34-GE-2 engine and approved it for quantity production. A development program was completed that had included 10,000 hours in test cells, 400 hours in a B-47

flying test bed and over 600 flight hours in the first three S-3As.

On October 12, one of the four *Vikings* then flying arrived at the Naval Air Test Center to begin carrier suitability tests. In November, the second NPE of the aircraft was completed confirming its excellent flying qualities. The final evaluation of the avionics system in the P-3 flying test bed was also performed that month. The Navy team concluded that the S-3A avionics system shows outstanding potential to handle the ASW threat of the Seventies and Eighties.

Throughout the development, schedules have been maintained or bettered, and searching reviews have confirmed that the S-3A will be completed within the cost envelope. By the time that this article is published, the aircraft should have completed its third Navy Preliminary Evaluation, the first in which the Navy will evaluate the aircraft and its avionics as a complete system. Fleet introduction of the S-3A is scheduled for February 1974.

## V/STOL

If the sea control ship is to become a significant Navy warship, new, high performance vertical/short takeoff and landing aircraft will be required that can operate from a small deck and have adequate performance for fleet defense. Such aircraft must be able to combat enemy aircraft, provide surface surveillance, attack enemy surface ships and intercept cruise missiles.

As a step towards providing aircraft to fill these needs, NavAirSysCom has studied various V/STOL concepts and has selected two, the thrust augmented wing V/STOL and the lift plus lift/cruise V/STOL, as sufficiently promising to warrant further investigation.

In the thrust augmented wing, vertical lift for takeoff and landing is provided by directing the jet engine exhaust gas through ducts into the wing, where it exhausts through a spanwise throat. As the hot gas enters the throat, it passes over nozzles and, by aspiration, entrains a large volume of ambient air. The mixed air and gas then pass through the throat and exhaust vertically downward, providing lift. Canard and regular wings are used on such a design with the gas exhausting through all four wing surfaces, providing positive control during takeoff and landing by a "four-poster" effect. For normal flight, the exhaust gases are directed through the tailpipe.

A thrust augmented wing aircraft is, at least theoretically, simpler to operate than most V/STOLs and should readily meet the performance requirements of the future. Technical problems remain with the ducting, valving, aerodynamic surfaces and nozzles. The most important is whether the thrust augmentation will provide sufficient lift for takeoff. This will be demonstrated in a full scale ground test rig prior to the expenditure of major effort upon development of the flying prototype. Despite the uncertainty, this approach was given priority because of the potential payoff.

During 1972 designs of various V/STOL aircraft were evaluated and a contract was awarded to North American Rockwell for two thrust augmented wing aircraft to demon-

strate the feasibility of that concept. The aircraft are expected to have supersonic speed and an operating radius of more than 500 miles.

The second concept is known as lift plus cruise lift. In such a design, high thrust, lightweight engines will be incorporated which exhaust almost straight downwards, thus providing direct lift, while the exhaust from a conventional engine will be deflected to provide further lift for takeoff. In horizontal flight, the direct lift engines are shut down. This concept is undergoing laboratory investigation pending more definite results from the augmented wing program. Various lift plus cruise/lift aircraft have flown and a design to that concept will serve as a backup in the event that the thrust augmented wing design fails to meet expectations.

## Supercritical Wing

The sound barrier was pierced more than 25 years ago and supersonic aircraft have been operational for at least 15 years. Flight close to the speed of sound, however, still poses special problems resulting from the onset of sonic drag. Dr. Richard Whitecomb of NASA concluded, on the basis of theoretical study, that wings could be so designed that the drag rise encountered in sonic flight occurs at a higher Mach number than in a conventional aircraft. A wing with this higher critical speed is called a "supercritical wing."

In November, a joint Navy-NASA test of a thick supercritical wing installed on a T-2C *Buckeye* was completed by North American Rockwell at Columbus, Ohio. The entire test program, began in 1969, was highly successful.

The supercritical wing was obtained by building up the wing on a T-2C with balsa wood and fiber glass. Initial feasibility flight testing demonstrated that the flying characteristics of the wing were not impaired by the new wing shape. This was followed by a thorough exploration of the flight envelope which confirmed quantitatively that the aircraft's controllability and performance were comparable, and in some respects superior, to those of a standard T-2C. The aircraft was then instrumented with air probes and used to chart boundary layer phenomena.

This information provided a basis for so locating the probes that the actual transition points could be determined and the airflow characteristics measured precisely. Through this means, the relationship between the shape of particular portions of the wing and the nature of the airflow was obtained.

While the supercritical wing has not reached the point of utilization, aerodynamicists point out that it will make various engineering trade-offs possible. For example, an aircraft designed to current performance requirements would have a thicker wing with less sweepback than heretofore. This would simplify structural problems and decrease the weight of the wing. It would also increase the inner volume of the wing providing more space for fuel or other use. Alternatively, a fighter could be designed to current weight and range requirements that retained its subsonic maneuverability nearer to Mach 1 than do today's fighters, thus enhancing its combat potential.

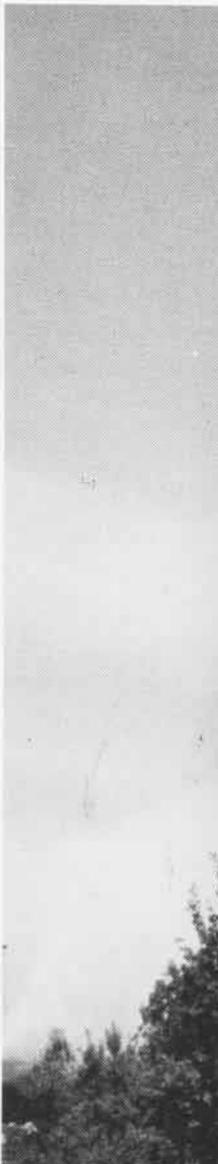
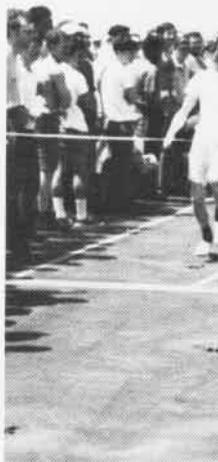
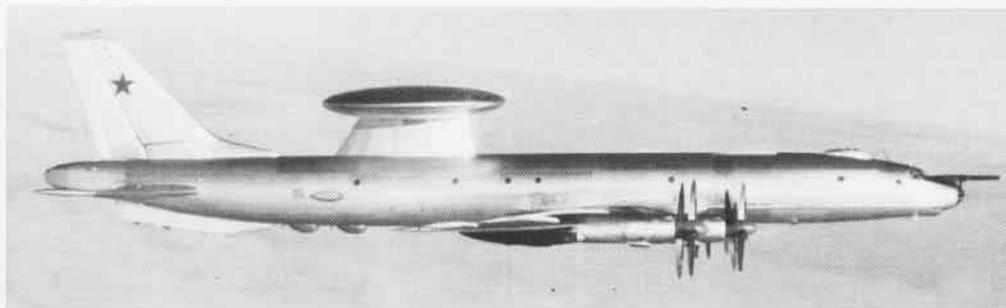


**Hustling Harpoon**

A Harpoon antiship missile breaks the surface during a simulated submarine launching.

**Traveling TU-114**

Soviet airborne early warning aircraft, code-named "Moss," had its picture taken over the Med.





### Kennedy Sprints

JFK crewmen cheer six shipmates across the finish line during a recent field day.

### Fire Fighter

Two former Navy Mars flying boats now serve as water bombers in British Columbia.





# THE SELECTED AIR RESERVE

## A Statement of Support

Secretary of Defense Melvin R. Laird and Mr. Richard C. Gerstenberg, Chairman of the Board and Chief Executive Officer for General Motors Corporation, have signed the first "Statement of Support" to improve relations between an employer and members of the Naval Reserve and National Guard.

At the December 13 Pentagon signing of the "Statement of Support," General Motors became the nation's first company to agree that:

"Our employees' job and career opportunities will not be limited or reduced because of their service in the Reserve or Guard;

"Our employees will be granted leaves of absence for military training in the Reserve or Guard without sacrifice of vacation time; and

"This agreement and the resultant company policies will be made known throughout the organization and announced in company publications and through other existing means of communication."

The document was also signed by Mr. James M. Roche who was appointed by President Nixon last June as Chairman of the National Committee for Employer Support of the Re-

serve and Guard. The statement is the first of many steps the committee plans to take to improve relations between members of the reserve components and their employers, who often do not understand the problems of the Reservists and Guardsmen who must maintain two careers.

## Consolidated Reserve

In a move designed to strengthen the Naval Reserve, Secretary of the Navy John W. Warner announced on November 25 the consolidation of the Naval Surface and Air Reserve Commands.

Vice Admiral Damon W. Cooper has been nominated to head the new command with the title, Chief of Naval Reserve. He will also assume an additional new position on the staff of the Chief of Naval Operations as Director, Naval Reserve.

The Chief of Naval Reserve will also report to the Commanders in Chief of the Atlantic and Pacific Fleets in response to the previously announced integration of Regular and Reserve forces. He will have two rear admiral deputies—one for Air and one for Surface Reserve.

The Secretary of the Navy said that in due course he would like one of the deputies to be an active duty Reserve officer voluntarily recalled to active duty.

Headquarters of the new command will be at New Orleans, La., where a port facility and a nearby Reserve naval air station are available. The move will relocate 175 officers and enlisted men of the Naval Air Reserve Command administrative staff now located at NAS Glenview, Ill. The staff move will not affect the operation and readiness of Glenview, and will not appreciably reduce the number of people located there.

Secretary Warner called the decision a positive step in support of the total force concept.

## Change of Command

Brigadier General James H. Berge, Jr., relieved Brigadier General Jay W. Hubbard as Commanding General, Fourth Marine Aircraft Wing/Marine Air Reserve Training Command, at NAS Glenview, Ill., on November 18.

During the ceremony, BGen. Hubbard was awarded the Legion of Merit (Gold Star in lieu of the fourth award) for "exceptionally meritorious conduct in the performance of outstanding service as Commanding General, Fourth Marine Aircraft Wing/Marine Air Reserve Training Command." BGen. Hubbard retired after 32 years in the Marine Corps.

## New Policy Board Advisor

John Slezak, Chairman of the Reserve Forces Policy Board, has designated Rear Admiral John B. Johnson as military advisor to the chairman and executive officer and member of the board effective January 19, 1973. RAdm. Johnson succeeds Major General John S. Patton, Air Force Reserve.

The Reserve Forces Policy Board was established by Congress in 1952 and is the principal advisory body to the Secretary of Defense on Reserve/Guard policy matters. As an independent source of counsel to the Secretary, the Board consists of 21 civilian officials and Regular and Reserve flag and general officers representing the Navy, Army, Air Force, Marine Corps, Coast Guard and National Guard. RAdm. Johnson is a TAR and a Naval Aviator.

## Top Recruiters

At a recent administrative and material inspection at NAF Detroit, the recruiting branch was presented the 1971-72 Lockheed Recruiting Attainment Trophy by Captain Richard G. Hanecak, chief of staff of the Naval Air Reserve Command, and Captain Howard H. Soester, commanding officer of NAF Detroit.

The Lockheed Trophy is awarded annually to the Naval Air Reserve recruiting branch that accumulates the most enlistment points during a fiscal year. These points are calculated on the basis of the number of enlistments in relation to branch quotas.

Normally, the trophy is retained a full year by the winning naval air station. This year, however, two recruiting branches tied when the points were finally counted. The co-winner was the recruiting branch at NAS Dallas. Each branch will hold the trophy for six months.



Two AV-8A Harriers of VMA-513 fly in formation off the Southern California coast with F-4 Phantom IIs and an F-86H Sabre of VX-4.

# Harriers Complete Tests

Thirteen AV-8A Harriers from VMA-513 recently completed tests at the Pacific Missile Range, Point Mugu to determine the aircraft's ability to survive in air combat maneuvering situations. Although the AV-8A was never intended to act as a fighter, the V/STOL aircraft's unique ability to employ vectored thrust coupled with reaction controls allows it to compete with and successfully defend itself against fighter aircraft.

The AV-8A's ability to take off vertically, hover like a helicopter and then transition to forward flight at speeds up to 600 miles per hour requires a unique control system and a power plant able to produce thrust greater than the weight of the aircraft. Unlike conventional airplanes where the jet exhaust is directed through a tailpipe, the thrust from the Harrier's Pegasus 11 engine is directed through four rotating nozzles, two on either side of the fuselage. The nozzles are controlled by a single

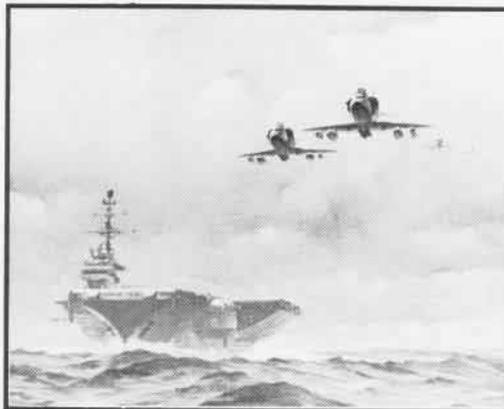
lever in the cockpit and are directed aft for conventional wing-borne flight or rotated to the vertical position for hovering or jet-borne flight. Any intermediate nozzle position can be selected by the pilot for slowing the airplane or providing it with rapid forward acceleration.

During slow and hovering flight, when normal aerodynamic controls are ineffective, the Harrier is controlled by high pressure air jets located on the wing tips and on the nose and tail. The "reaction controls" work in conjunction with normal aerodynamic controls and are activated whenever the engine nozzles are directed to any angle from the normal cruise setting.

It has long been conjectured that the Harrier's particular attributes may be useful in air combat maneuvering. The West Coast tests have confirmed that the AV-8A is a formidable opponent for any modern fighter. Initially, the evaluation was conducted

by means of a digital computer study comparing the AV-8A's performance with various fighter types. The evaluation then progressed to air combat effectiveness plots, manned flight simulator studies and, finally, actual flight testing. During the flight tests, the Harrier's opponents were the F-4J, F-86H and the T-38. These opponents were chosen as fighter representative of high energy, low-wing loading threats. In one hundred test flights, although the Harrier was allowed only limited thrust vectoring, the results were more than satisfactory. The aircraft's quick response to vectored inputs coupled with rapid acceleration made it an illusive foe. The success of the tests was summarized in the words of one squadron officer: "With proper use of vectored thrust there is no known tactical aircraft in the world today that can remain behind the Harrier if it does not desire it to be there."

That's what makes the difference.



# at Sea with the Carriers

## *John F. Kennedy (CVA-67)*

Command of this attack carrier changed hands in November during a ceremony aboard while CVA-67 was at the Norfolk Naval Shipyard, Portsmouth, Va.

Captain John C. Dixon, Jr., former commanding officer of the oiler USS *Canisteo* (AO-99), assumed command of *Kennedy* from Captain Robert H. Gormley.

Capt. Gormley was presented the Legion of Merit by Rear Admiral Donald E. Engen, Commander, Carrier Division Four. "For exceptionally meritorious conduct in the performance of outstanding service. . . . Through his personal attention and guidance, USS *John F. Kennedy* consistently excelled in all phases of operations including four major bilateral exercises, numerous Sixth Fleet national exercises and daily task group operations."

Capt. Gormley will report to the Office of the Chief of Naval Operations, Strategic Plans and Policy Division.

The Norfolk-based *Kennedy* is presently undergoing overhaul at the shipyard after ten months of extended operations in the Med and North Atlantic.

## *Enterprise (CVAN-65)*

*Enterprise*, currently on her sixth WestPac deployment, celebrated her 11th birthday November 25. The celebration was held in the midst of an operating period which found the ship employed in continuous Yankee Station operations.

LCdr. Richard A. Wilson of VF-

143 recorded a "first" with his 500th landing aboard *Enterprise*. No other aviator has accomplished this feat aboard the *Big E*. Lt. John C. Leslie of VA-27 recorded the second milestone of the line period by making the 130,000th landing.

## *Kitty Hawk (CVA-63)*

When BM1 Fred K. Woblick, Jr., checked aboard *Kitty Hawk*, his guide was his son, AO3 Dennis K. Woblick.

Their being stationed together was not an accident, but followed a request BM1 Woblick made to the Chief of Naval Operations when he met Admiral Zumwalt who was visiting

USS *Grapple* (ARS-7), Woblick's former duty station.

Dennis, 21, plans to leave the Navy soon and begin college. Asked why he joined the Navy, he comments, "I just wanted to join on my own. Dad didn't push me into it at all." At present father and son just "enjoy going on liberty and seeing places together."

## *America (CVA-66)*

Another milestone for the EA-6B *Prowler* was recently attained by the *Scorpions* of VAQ-132.

Commander E. F. Rollins, Jr., C.O., was the first *Scorpion* and first Naval Aviator to complete 100 arrested land-



The American attack aircraft carrier USS *Forrester* and the British carrier HMS *Ark Royal* steam in formation during recent cross-decking exercises in the Mediterranean. The ships proved their total compatibility in a wartime situation during the two days of exercises.

ings in the EA-6B. The historical event took place during VAQ-132's fourth line period on Yankee Station aboard *America*. Following closely on the skipper's heels in arrested landings was Lt. Walt Gromada, the squadron personnel officer, who also passed the centurion mark.

VAQ-132 introduced the EA-6B into the fleet in July 1972. The *Prowler* was first introduced into combat on July 12 when a combat flight was flown in support of aircraft deployed aboard *Saratoga*. Electronic jamming was provided for the strike force attacking targets located deep within North Vietnam.



Students from 15 nations attending the Naval Officers Staff Course at the Naval War College in Newport, R.I., tour the ASW carrier *Intrepid* at the ship's home port in Quonset Point.

### *Intrepid (CVS-11)*

*Intrepid* departed her home port of NAS Quonset Point, R.I., in November for an extended Mediterranean deployment. She is now serving as a CV and to fulfill her new mission she has an attack aircraft capability in addition to her usual antisubmarine warfare forces.

*Intrepid* was originally commissioned a CV 30 years ago, distinguished herself in battle during WW II, and was decommissioned in reserve. After conversion to CVA, she was recommissioned in 1954. Seven years later, she became a CVS. From 1966 to 1969, she served in Vietnamese waters as a special attack carrier, and has since functioned primarily in a CVS capacity.

Commanded by Captain Charles S. Williams, Jr., *Intrepid* is the flagship of Rear Admiral John G. Finneran, Commander, Cruiser-Destroyer Flotilla Twelve.

RAdm. Finneran and Capt. Williams hosted members of the staff and student body of the Italian War College when the ship visited Civitavecchia, a little town 40 miles west of Rome. *Intrepid* sailed into the quiet Mediterranean as the 95 guests were then broken into small groups and taken on a tour of the ship. An air show was one of the high points.

### *Ranger (CVA-61)*

Nearly 550 sailors are enrolled in high school and college educational programs aboard this carrier.

*Ranger's* school projects "constitute what is believed to be the largest

single educational program ever attempted at sea," according to a spokesman for the ship's educational services office. PN2 Tony Kerivan points out that the government has more than \$81,000 invested in the programs.

Four hundred and forty of the Rangemen are enrolled in the Program for Afloat College Education (PACE) aboard the ship, with classes scheduled to run in ten-week sessions. The program — cosponsored by *Ranger* and Chapman College, Orange, Calif. — offers fully accredited, college-level courses to men serving aboard the ship. There are 20 classes each week in English, U.S. history, biology, mathematics and psychology.

Five civilian instructors are teaching aboard the ship. Most of the registration for the PACE program was completed while the ship was conducting training missions off the coast of Southern California. Two men from the college were aboard *Ranger* at the time to make final arrangements for the program.

While these crewmen are learning their way toward a college degree, more than 100 of their shipmates are working toward a high school diploma. These Rangemen are taking part in the PREP program, which is coordinated aboard ship by Gavilan Junior College in San Juan Capistrano, Calif.

This program results in a fully accredited high school diploma issued by the San Juan Capistrano school district to sailors who have not yet completed high school. The cost of the course is underwritten by the

Veterans Administration, but it does not count against the individual's GI benefits.

*Ranger* began her seventh combat deployment in December and launched pilots from her deck while operating with the Seventh Fleet off Vietnam.

### *Oriskany (CVA-34)*

Ltjg. Ray P. Rose, VF-191, returned to *Oriskany* recently to score the carrier's 182,000th arrested landing. Rose made the landing when he returned from air combat maneuvering exercises.

*Oriskany* has recorded over 7,500 landings since her deployment to Vietnam last June.

### *Saratoga (CV-60)*

Drama and an air of uneasiness momentarily gripped the men of the Seventh Fleet last Thanksgiving night as helicopters from four ships searched the dark waters off the coast of Vietnam for a downed A-7 *Corsair II* pilot.

LCdr. Dave Edwards was returning from a combat mission shortly after 2000 with other pilots assigned to CVW-14 when, as he attempted to land his A-7 in the black, misty night, the belly of his aircraft hit the deck.

Somehow managing to get his *Corsair II* airborne, despite major structural damage to the aircraft, LCdr. Edwards turned his crippled jet toward Da Nang. Thirty miles north of there, he lost control of his aircraft and was forced to eject.

*Saratoga*, closest to the scene of the accident, launched a helicopter to assist in the search and the combat information center went to work.

Receiving the initial report and position of the downed pilot, OS3 Joseph Courtney relayed the vital information to combat information center officer Lt. Peter O'Brien who vectored *Sara's* helo to the downed pilot's position.

Visibility at the time was one-half mile in rain and fog and, according to the men of the *Saratoga*, "our hearts seemed to beat just a little quicker."

Within 30 minutes after Edwards punched out, he was safely aboard *Sara's* helo piloted by LCdr. William Nordine and Lt. Carl Holeva.

On another night in November, a *Big Mother* launched from USS *Jouett* (DLG-29) plucked two F-4 *Phantom II* CV-60 pilots from heavy seas six miles off the coast of North Vietnam.

Disabled by a SAM, LCdr. Vincent E. Lesh piloted his F-4 out over the Gulf of Tonkin where he and his RIO, Ltjg. Don L. Cordes, punched out just as the *Phantom* went out of control.

The alert watch team aboard *Jouett* received the Mayday and scrambled the ship's helicopter, piloted by Ltjg. Timothy P. Denhirst and Ltjg. Jerry M. Haggerty. Assisting were POs



Seven aviators of CVW-6 recently became qualified officers of the deck aboard the carrier USS *Franklin D. Roosevelt*. From left are Ltjg. M. O. Dunn; LCdr. J. R. Watkins; Lt. R. W. Sinder, Jr.; Lt. J. F. Van Namee; Capt. C. J. Youngblade, *Roosevelt's* skipper; Cdr. W. I. Lewis, Jr., air wing skipper; LCdr. J. H. Lindsay; LCdr. H. H. Weiler; and Ltjg. T. E. McKee.

Matthew Szymanski and Michael J. Sheppard.

PO Dayle I. Fish vectored the frigate's rescue helo towards the downed aviators' position 16 miles east-northeast of Thanh Hoa. The *Big Mother* of HC-7 made a successful recovery within 30 minutes despite darkness, a heavy overcast, rain showers and high

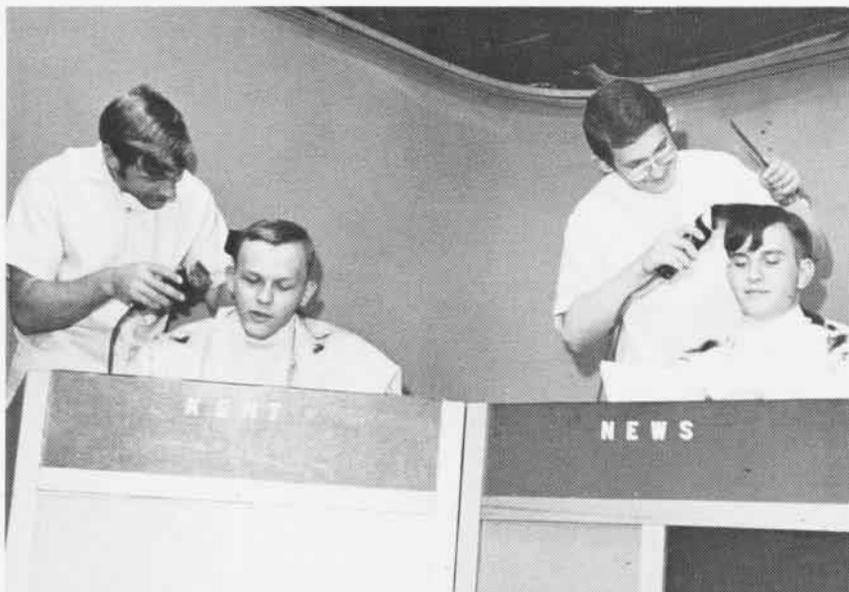
seas. Safely aboard the helo, the pilots relaxed as they were taken to USS *Truxtun* (DLGN-35) before being returned to *Saratoga*.

#### *Franklin D. Roosevelt* (CVA-42)

*FDR* returned to her home port of Mayport, Fla., in December after ten months of extended operations with the Sixth Fleet in the Mediterranean. During the cruise, the veteran carrier steamed over 65,000 miles.

While in the Med, the air wing flew more than 12,000 missions and participated in several NATO exercises. Members of the air wing also represented the U.S. in the international weapons competition, *Best Hit '72*, held in Spain, France, Greece, Italy and Turkey.

"The Officer of the Deck, in his attitude and actions, represents the collective pride of the ship's company as well as the professional reputation of his commanding officer," according to Captain J. V. Noel, Jr., in the *Watch Officer's Guide*. And nothing could be truer of the seven aviators who qualified as OOD aboard *Roosevelt*. Captain C. J. Youngblade, *FDR's* commanding officer, and Commander W. I. Lewis, Jr., CAW-6, congratulated the officers for their unusual accomplishment during a ceremony on the ship's bridge.



ADJ2 Larry Elkins (seated at left) and AE3 Dennis Bohannon get their locks sheared during a live news broadcast over USS *Enterprise's* closed circuit television. Over \$1,674 was donated to the Combined Federal Campaign by crew members who paid to see them and fellow newscaster MM2 Larry Hutchens get their "Marine" hair cuts during the live telecast.

# A Mess On Film

**M**amma Mia, that's a spice-a-meatball . . ." Cut.

The camera zooms in. The director rearranges the shot. And after 15 minutes of lighting changes, different camera angles and still more instructions, the spicy meatball is on its way to stardom.

This was the scene in *Kennedy's* modern aft galley for three weeks. The product of the confusion, which will take five months to complete, will be two Navy training films. The end product will be two food service training films for commissarymen throughout the fleet. The five-man camera team arrived on board in early November with more than 600 pounds of equipment. The team, from Video-Art-Allegro Filming Company, was under the direction of Julius Edelman.

During the filming, lights dangled from the galley overhead and cameramen weaved through a knee-deep maze of tripods and cables. Mr. Edelman explained that it usually takes two or three times as long to set up a shot as it does to actually film it.

CS3 James Brown, Jr., and CS2 Greg Callis were selected to be the stars of the films. "The main characteristics of working in a galley aboard an aircraft carrier," explains Callis, "are the quantity and the hours."

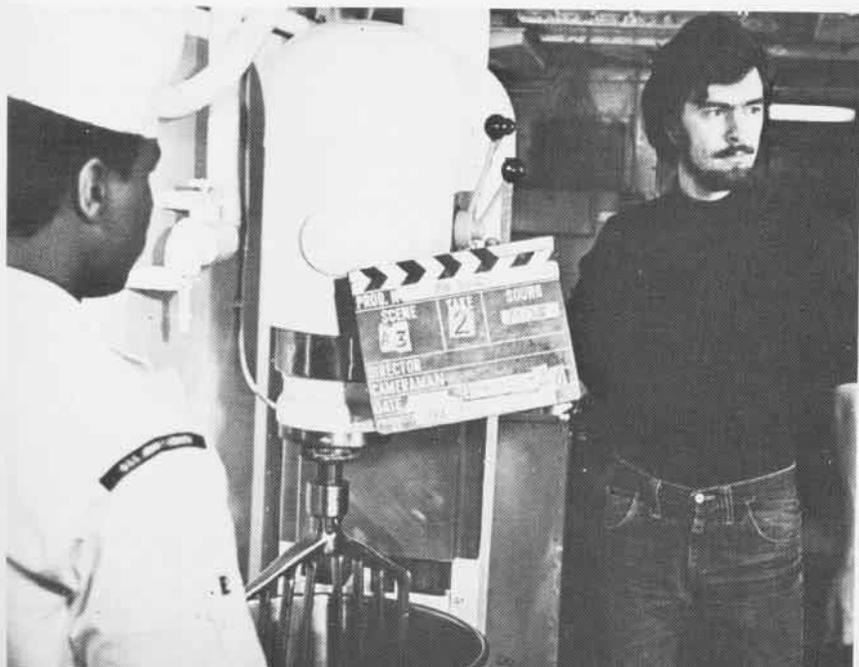
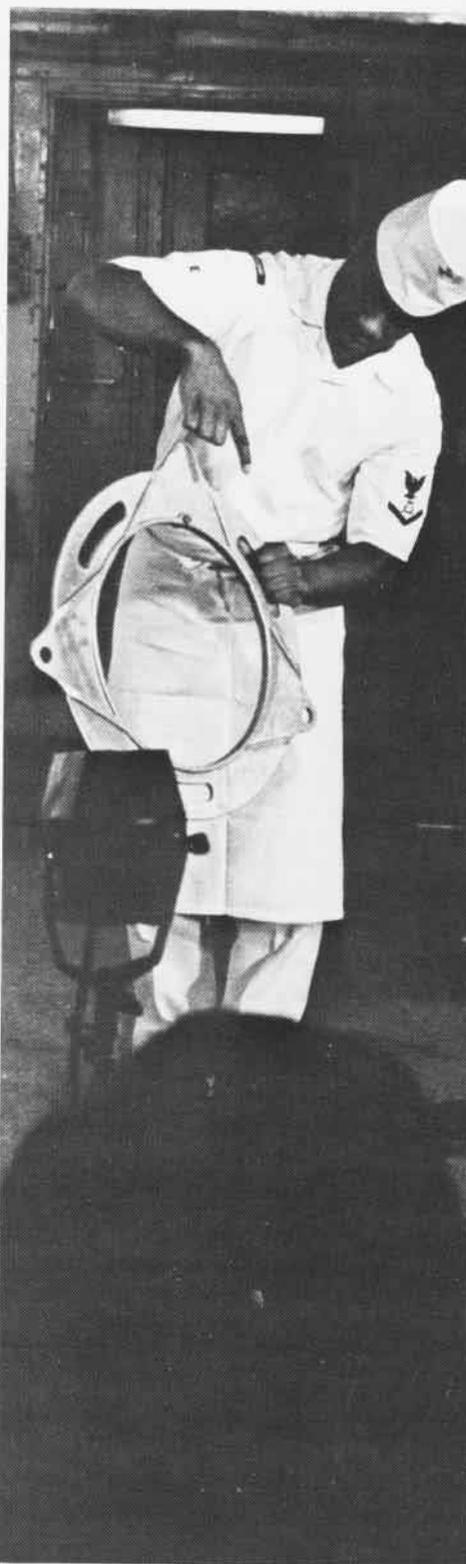
The 47 commissarymen of the food service division prepare more than

4,000 servings for each meal during a cruise. In a six-month period, the figures add up to approximately 700 meals and almost three million servings. With overlapping schedules, the two facilities aboard *Kennedy* offer 22-hour service. While one mess is serving supper, the other will be serving breakfast to night-check personnel.

Brown added that a "breakout" for a day's menu doesn't mean a box of this and a box of that, but more than 12 tons of provisions. On an average cruise, the crew will consume about 1,000,000 pounds of meat, 200,000 loaves of bread and 180,000 gallons of milk.

Film making is not new to *Kennedy*. She was the stage for "Home from the Sea," a documentary of her arrival in Norfolk from her first Med cruise, in 1969; "Flight Deck," a five-minute film produced by Grumman that depicts flight operations; and a Navy training film which shows the features of the carrier's automatic weapons handling system.

At the end of their three-week stay and after filming every piece of equipment that the galley, bakery and butcher shop had to offer, the camera team returned to New York with nearly 11,000 feet of film. Now they will edit and narrate the five hours of film into two 20-minute productions entitled "Food Service Operation and Equipment."



CS3 James Brown, Jr., gets his big chance in front of a movie camera; but, alas, his leading lady is not a beautiful girl but a giant mixer used in *J. F. Kennedy's* galley.

Story and Photos by JOC Dick Benjamin

*On A*



# Beautiful, Sunny Day

Why Naval Aviation? This is a question with many answers, yet none. But the question remains: With the multitude of career possibilities open to a young man, why does he choose Naval Aviation?

The question is also valid at the U.S. Naval Academy, Annapolis, Md., where the aviation community has more than a fair share of aspirants.

"Behind it all is probably the driving force that got man into the air in the first place," philosophizes Midshipman 1/C Kenneth S. Reightler, "adventure in doing something man is really not supposed to be doing — flying around."

The slender Academy senior is one of those plagued with that driving force, and for him it is Naval Aviation all the way. Not only is he intent on becoming a Naval Aviator, he is also an aerospace engineering major. He feels that a strong background in aviation will only enhance his professionalism as a pilot by giving him greater insight into what it takes to build, and then fly, an aircraft. It will also provide him with a greater selection of possible shore tours.

"I've wanted to be an aviator as long as I can remember," says the Middie 2nd Battalion Commander. "My father was an aviation limited duty officer and I became interested in aviation through him."

A previous association with aviation is by no means a prerequisite for an intense interest in Naval Aviation. Midshipman 1/C Douglas G. Henry is an example. "When I came to the Academy," he recalls, "I had no idea what a Naval Aviator does. I came with the idea of being a career naval officer, but knew nothing about the aviation aspect. I didn't even know what type of aircraft the Navy had." Yet he is as adamant about becoming a Naval Aviator as is Reightler.

"The more I saw of it, the more I

liked it. In my second class (junior) summer I was able to get a look at the broad aspects of Naval Aviation and I said to myself that if I qualified physically, I would try for it."

Although their interest in Naval Aviation developed in different ways, the two provide some insight into why many midshipmen prefer Naval Aviation to other branches of naval service.

"A lot of my friends want to go into Naval Aviation," says Reightler. "They are intrigued by the thought of landing on a carrier and the type of duty they would have."

"I think the attitudes and professionalism of Naval Aviators have impressed me quite a bit," echoes Henry.

According to Reightler, the competition for available aviation billets is tough and a midshipman's class standing determines the choices open to him; those with the highest standings get to choose their specialties first. He recalls one friend who usually propounds the virtues of nuclear power. When all the facts are known, says Reightler, it seems as though his friend really wants to fly but his eyesight is not good enough for him to become an aviator and his class standing is not high enough to get one of the few NFO billets available.

"I think there are a lot of people who would like to have an NFO billet," he says, "and would if the number weren't restricted; 75 has been the number of billets in the past and they go pretty quick. This shows you that Naval Aviation is getting high caliber people from the Academy and there is a lot of interest from midshipmen in Navy air."

Midshipmen are not introduced to Naval Aviation until their second class year. Most of the training they receive up to that time is contoured around duty aboard ship as a surface line officer. During their first and third

summers the midshipmen go aboard ship for their summer tours, first as enlisted men and then as officers. It is during their second summer cruise that they come into contact with the specialties such as submarine and aviation.

The aviation indoctrination takes place at NAS Pensacola, Fla., and this is where firm attitudes toward aviation seem to form.

"A lot of my classmates were sold at Pensacola," says Reightler. "This is where they made up their minds; going down there and having a chance to fly and get out and see the atmosphere that comes with Naval Aviation. I know a lot of people who commented that they didn't think they would like it — then they tried it and said they were definitely going aviation."

Henry is one of these. "My second class summer was the turning point in my interest," he agrees. "We got to take a look at various service aspects such as the Marine Corps, aviation, submarines and surface combatants. I was most impressed with the physical aspect of flying while I was in Pensacola."

"My T-2 hop was probably the most significant event in my decision to go aviation. I went up with a T-2 instructor and it was a beautiful, sunny day. Aviation took on sort of a romantic glow all of a sudden, and I decided to look into it more; to take a look at the pipelines and what one has to go through to get his wings."

While at Pensacola, the midshipmen are broken down into groups and are acquainted with the Dilbert Dunker, the VLF trainer and the ejection seat; fly in jet, prop and helicopter trainers; and receive lectures about the Naval Flight Officer program. Each training squadron gives a lecture about how it fits into the overall training of a Naval Aviator and its participation

in the pipeline: basic, primary or advanced.

According to Reightler, the indoctrination in Pensacola is held more informally than anything the midshipmen are used to, and they really appreciate it. The presentations are formal, but aviation recruiting is completely passive in nature. For those with little interest in aviation, it broadens their education so that whatever specialty they go into, they will have a feeling for the problems an aviator faces. For those who develop an interest in aviation, it takes on an entirely different look — it's a chance to find out more about what has captured their interest.

"I think the training they give you at Pensacola is really a bare minimum of what you can learn," says Reightler. "The actual learning and what you can gain from it are done on your own time.

"It's like coming back after a flight and having a cup of coffee with your pilot. You talk about his home life, what kind of duty he's had, and why he likes to fly a P-3 as compared to an A-4. It's talking to an enlisted mechanic about how he likes his job and how he finds his officers.

"You're not required to go out and talk to someone. Instead they say, 'If you decide you want to go Naval Aviation, we're going to show you what you can expect.' It brings it down to more of a personal basis between the interested midshipmen and the pilots. They're always willing to give up their spare time to talk to you."

Although the decision to go aviation is easy to make, many like Reightler are in a quandary as to which pipeline to follow. The first inclination of a vast number of aviation enthusiasts is to become a jet fighter pilot. As Henry puts it: "I think the fighter pilot aspect is kind of romantic. Like the elite of the elite."

But involvement in Naval Aviation also brings about indecision. Apparently each pipeline has its own "romantic involvement" that turns on different people.

"Until I really investigated various pipelines," recalls Reightler, "I wanted

to go jet fighter. This summer I was on a carrier for my cruise and I became pretty close friends with some pilots in VA-176, an A-6 squadron. They took me flying in an Intruder and now I don't know if I want to fly attack or fighter.

"I have a very good friend who graduated two years ago and who was really set on flying Phantom IIs. He went to Pensacola, graduated first in his class and went P-3s. He said once he got down there and talked to the people and found out about the duty, he was sold on patrol. He told me then to keep my eyes and ears open.

"Right now I would like to keep an

open mind about going into jets or something else. I would hate to set myself up for one particular pipeline and be disappointed. I would rather keep an open mind and see what happens when I get to Pensacola."

Henry has the same basic philosophy.

"I will decide after I get into training," he says. "There have been several midshipmen whom I really respect who were fighter pilots all the way. But when they got to Pensacola they decided on helos or props. The fact that they changed their minds impressed me enough that I'm not going to leave here with a fighters-only type of attitude.



"My major is oceanography and I spent last summer with the antisubmarine warfare staff in Hawaii. Now I want to take a look at the S-3 coming out. I think my mind is open enough to look at each type and choose the one that impresses me the most. Fighters are a definite possibility, but I'm going to have to add up all the pluses and minuses and see what happens."

Aviation recruiting at the Academy is extremely low key, but then that is all it has to be.

"Naval Aviation does not have a recruiting quota and we are getting plenty of people," explains helicopter pilot Lt. William R. Crenshaw, Jr.,

22nd Company Officer. "It's a very popular program offering adventure and a new environment. Our presentations are given only to those who want to come to them. It is strictly voluntary and anyone interested is invited."

"Ours is a passive program," adds Commander Jack Hamilton, "and I wish all of them could be like that. We have no quotas. I think most of us enjoy flying enough that we are interested in guys getting into it as much as we were when we were young. Because we are happy in it, we try to show them the same thing."

Cdr. Hamilton is the 2nd Battalion Officer, the commandant's designated

Naval Aviation representative for the midshipmen brigade, and a fighter pilot.

Occasional meetings are held at the Academy for interested persons, and films such as progress reports on the F-14 and S-3 are shown to stimulate their interest in Naval Aviation and encourage them to go back to their companies and talk about it to other midshipmen. The meetings also provide them information with regard to the training command, when they would go to flight training and how long it takes to get through each pipeline.

During biannual class briefings, selected company officers present their backgrounds in Naval Aviation, what they enjoy about it and what they like about the types of airplanes they have flown. After his ten-minute presentation, each pipeline representative sits at a table where he can meet with interested midshipmen and answer their questions.

"The one thing I try to tell them," continues Cdr. Hamilton, "is that to really be a good pilot you have to enjoy flying. I point out the hazards and dangers, but I also point out that the way to overcome them is to be a professional. The days of leather helmets and goggles are gone. Airplanes are more expensive and everybody has more responsibility toward the planes and their squadron.

"We tell them that 'This is what you will be involved with and this is the reason you need to start being a professional now, not only in academics but in all of your responsibilities as a naval officer.' We try to give them good reasons for being an aviator and specifically a professional naval officer."

Hamilton and Crenshaw are also examples of how a desire to go Naval Aviation sneaks up on a person, and then won't let go. Hamilton had never stepped foot in an airplane until he flew in the T-34. Crenshaw was strictly for submarines when he entered the Academy — until his second class year when he got hit with that driving force.

Why Naval Aviation? Go up on a beautiful, sunny day and find out.



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# Letters

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## Navy-mad

"Shades of the *Shenandoah!* O brother, this Dutch fella really has gone Navy-mad, I tell ya!" These words could have well been said by Gram paw Pettibone. Well, he would be right.

The U.S. Navy has been my prime hobby ever since the early Sixties and *Naval Aviation News* is providing me with interestingly written and easily understood articles and good photos, even for an "outsider."

I hope to receive *NANews* for many years to come. Best wishes for the future and, again, keep up the good work.

Peter Canter Visscher  
47 Eemwijkstr.  
Voorburg, The Netherlands

## Copilot

The article on the AF-2 *Guardian* in the November issue of *NANews* was nostalgic, but not very. What your writer didn't point out was that the AF operated from straight deck Jeep carriers (USS *Point Cruz*, USS *Bairoko*, etc.) and was probably the most underpowered aircraft ever to do so, other than the HUP-1. A late waveoff due to a pitching deck caused many "puckered" moments for both LSO and aircrew. I suspect the AF had more than its fair share of deck crashes and water landings.

An interesting feature of the AF-2S which might intrigue newer airplane drivers was that the searchlight was operated in azimuth and elevation by the third seat man via a periscope, which can be seen protruding beneath the belly of the center picture AF-2S in the article. The searchlight operator then steered the pilot along the searchlight path, providing he had located a snorkel, or other target.

There is also a tale, perhaps apocryphal, that the original XTB3F-1 was the bomber version, if you will, of the Ryan FR-1 fighter. That is, it had a jet engine in the tail for dash purposes. We AF drivers believed that to be true and attributed the lack of a jet engine to some of the underpowered characteristics of the airplane.

One item in your report that I think would surprise most of us was that the AF-2W had a copilot. Granted there

was almost room enough in the cockpit for one. But the only copilot we ever saw was an autopilot which was operated by a joy stick of its own, and which was frequently used, both day and night, on low altitude work.

In the latter days of the AF, several aircraft had hair-raising experiences in which the engine and/or fuselage would break off ahead of the mainmounts during an arrested landing. This sometimes left the pilot sitting on a "front porch," headed for the barriers, rather than in a cockpit and safely hooked to a wire.

D. W. Hazelton, Capt.  
Deputy Director  
Product and Production Engineering  
Office of the Assistant Secretary  
of Defense  
Washington, D.C. 20301

As an old AF driver, I read your *Guardian* article, November 1972, with interest. Those of us who flew this overgrown monster would have loved to have had a copilot in the AF-2W as well as a navigator for the AF-2S.

The pilot did the "whole thing."

J. M. Leib, Capt.  
Logistics Officer  
ComNAR Staff  
NAS Glenview, Ill. 60026

**Captains Hazelton and Leib are quite right. The AF-2W was sans copilot. The XTB3F-1 torpedo bomber prototype from which the AF was developed did have a copilot but the Standard Aircraft Characteristics pamphlet for the *Guardian* failed to note the change in the AF version. We should have caught that one. Capt. Hazelton is also correct about the jet engine. Some of the space made available by dropping the Westinghouse 19XB turbojet from the original design was utilized for ASW electronic equipment.**

## Naval Aviation Films

The following motion picture films are among the latest released by the Film Distribution Division, U.S. Naval Photographic Center.

MN-10682B (unclassified) *P-3 Instrument Flight Procedures—En Route Procedures*. How to fly under instrument flight rules (31 minutes).

MN-10745 (unclassified) *Disasters Don't Just Happen*. How disasters are caused by inadequate supervision, failure to observe safety rules and standards, carelessness and by use of faulty and makeshift equipment. Scenes of the *En-*

*terprise*, *Forrestal* and *Oriskany* disasters and their causes are included (11 minutes).

MN-10998 (confidential) *Nuclear Weapons Delivery by Light Attack Aircraft*. (U) Execution of a carrier-launched nuclear mission by an A-7A/B. Phases of mission planning, launch, post-launch, low-level and route navigation, attack and return to ship (25 minutes).

MN-10479C (confidential) *A-6A Familiarization—Vertical Display Indicator—Attack Modes*. (U) How VDI symbols behave in various attack modes and how to utilize them to insure crew safety (30 minutes).

MH-10588C (unclassified) *Marine Air Command Control System—Tactical Data Communications Central*. Operator training in TDCC (18 minutes).

MH-10990 (secret) *EA-6A Intruder*. (U) Concept and employment of Marine Corps tactical airborne electronic warfare operations (24 minutes).

MN-10479B (unclassified) *A-6A Familiarization—Vertical Display Indicator—Navigation*. Symbol position, steering attitude and altitude commands relative to a landing sequence (22 minutes).

MN-10479D (unclassified) *A-6A Familiarization—Pilot's Horizontal Display—E-SCAN and TCPPI*. How E-SCAN and TCPPI modes of the PVD perform individually and in general context in support of the horizontal display indicator. Use of the bombardier/navigator scope direct view radar indicator in relation to safe flight at low altitudes without reference outside the cockpit (20 minutes).

MN-10593B (unclassified) *CWU-33/P Anti-exposure Ventilated Wet Suit* (replaces MN-10593-). Use and care of the suit by pilots (15 minutes).

MC-11065 (unclassified) *Attack Carrier—Sea of Contentions*. Activities of the Sixth Fleet and the close ties between the U.S. Navy and the navies of the NATO countries in maintaining operational readiness for national defense (28 minutes).

MD-11160A (confidential) *Automatic Secure Voice Communications*. (U) How to use AutoSeVoCom effectively (20 minutes).

MD-11160B (confidential) *Automatic Secure Voice Communications—Short Version*. (U) How to use AutoSeVoCom effectively (7 minutes).

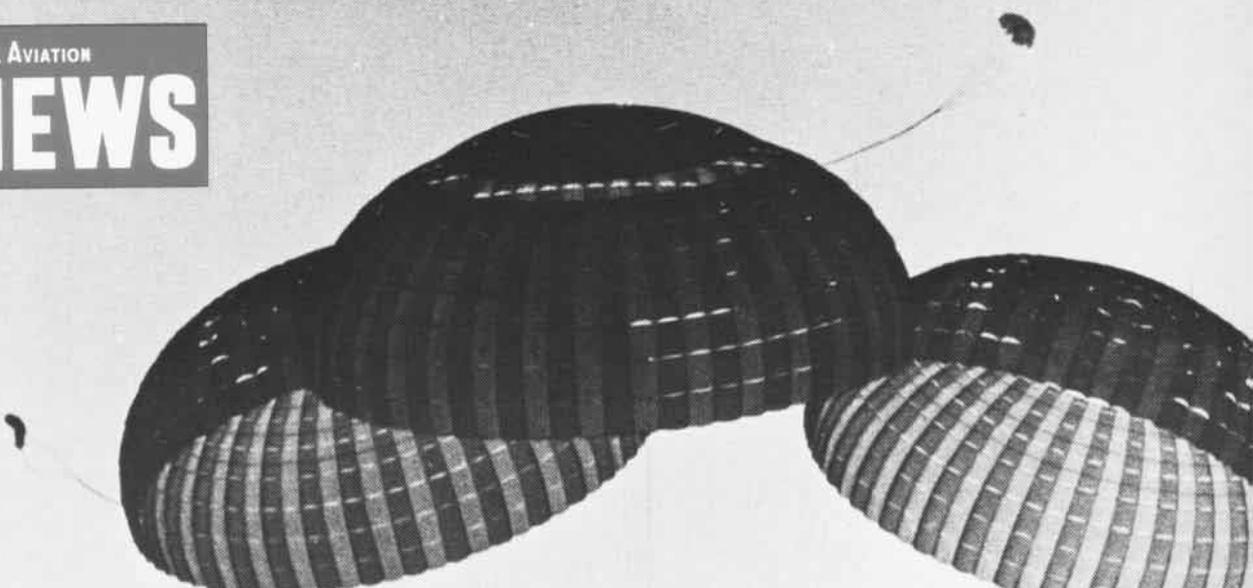
MC-11222 (unclassified) *Diamond in the Sky*. The viewer is placed in the pilot's seat, through aerial cinematography, as the Navy's *Blue Angels* go through maneuvers (10 minutes).

Instructions for obtaining prints of newly released films are contained in OpNav Instruction 1551.1E.



Attack Squadron 45, NAS Cecil Field, Fla., is attached to Light Attack Wing One with a mission of jet instrument training. The Blackbirds, in TA-4F Skyhawks, train fleet aviators and replacement pilots in airways and instrument flying techniques and procedures. One of only four such squadrons in the Navy, it is skippered by Cdr. J. M. Gilmore.





Apollo	Dates	Astronauts	Highlights	Recovery Ship and Commanding Officer	Recovery Pilot
VII	1968 Oct. 11-12	W. Schirra, USN D. Eisele, USAF R. Cunningham, USMCR	1st manned Apollo in earth orbit	Essex Capt. J. A. Harkins	Cdr. E. A. Skube, HS-5
VIII	1968 Dec. 21-27	F. Borman, USAF J. Lovell, USN W. Anders, USAF	1st manned moon orbit	Yorktown Capt. J. G. Fifield	Cdr. D. S. Jones, HS-4
IX	1969 Mar. 3-13	J. McDivitt, USAF D. Scott, USAF R. Schweickart, Civ	1st lunar module flight, docked	Guadalcanal Capt. R. M. Sudduth	Cdr. G. M. Rankin, HS-3
X	1969 May 18-26	T. Stafford, USAF J. Young, USN E. Cernan, USN	1st moon orbit by entire system	Princeton Capt. F. T. Stephens	Cdr. C. B. Smiley, HS-4
XI	1969 Jul. 16-24	N. Armstrong, Civ E. Aldrin, USAF M. Collins, USAF	1st moon landing and walk	Hornet Capt. C. J. Seiberlich	Cdr. D. S. Jones, HS-4
XII	1969 Nov. 14-24	R. Gordon, USN C. Conrad, USN A. Bean, USN	2nd moon walk	Hornet Capt. C. J. Seiberlich	Cdr. W. E. Aut, HS-4
XIII	1970 Apr. 11-17	J. Lovell, USN J. Swigert, Civ F. Haise, Civ	Malfunction Apr. 13; Mission aborted	Iwo Jima Capt. L. E. Kirkemo	Cdr. C. B. Smiley, HS-4
XIV	1971 Jan. 31- Feb. 9	A. Shepard, USN S. Roosa, USAF E. Mitchell, USN	Mission to Fra Mauro	New Orleans Capt. R. E. Moore	Cdr. W. E. Walker, HS-6
XV	1971 Jul. 26- Aug. 7	D. Scott, USAF J. Irwin, USAF A. Worden, USAF	First use of moon rover	Okinawa Capt. A. F. Huff	Cdr. S. A. Coakley, HC-1
XVI	1972 Apr. 16-27	J. Young, USN T. Mattingly, USN C. Duke, USAF	Record 71 hours on the moon	Ticonderoga Capt. E. A. Boyd	Cdr. Arnie Fieser, HC-1
XVII	1972 Dec. 7-19	E. Cernan, USN R. Evans, USN H. Schmitt, Civ	275 pounds of moon soil obtained	Ticonderoga Capt. N. K. Green	Cdr. E. E. Dahill III, HC-1