NAVAL AVIATION NEWS

In this issue:

LAMPS, Launches and Lightning

JUNE 1971

' War, and specifically war at sea, is unlike a horse race in the sense that there is no prize for second place.' — Admiral Elmo R. Zumwalt, CNO

Cover photograph of an HH-2D Seasprite was taken during LAMPS evaluation aboard USS Sims (De-1059). Above, four VS-29 Trackers fly by USS Ticonderoga (CVS-14).

NAVAL AVIATION NEWS

FIFTY-SECOND YEAR OF PUBLICATION

FEATURES

THE STAFF

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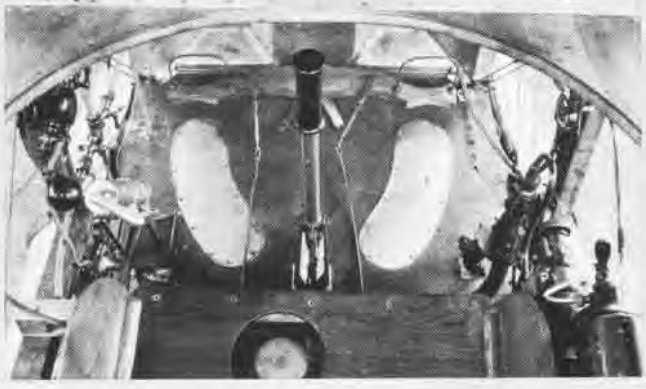
EDITOR'S CORNER

In searching through hundreds of photographs to select those best suited to illustrate Naval Aviation's first 60 years, we had to pass over a great many very interesting and dramatic pictures due to the limited space that was available. Two photos, which are shown here, turned up during that search and probably best demonstrate — from a pilot's viewpoint — the tremendous technological growth of Naval Aviation.

The photograph below, taken in August 1920, is identified only as a Vought cockpit. It may be assumed that it is a view of a VE-7, the Navy's first carrier-based fighter plane. On close examination, there is no doubt that this was constructed in a simpler age. The plywood instrument panel does not confuse the uninitiated with a multitude of dials, gauges, switches and other paraphernalia. Only the bare necessities greet the pilot: altimeter (up to 20,000 feet), fuel and oil pressure gauges, oil and coolant temperature gauges, a crude bank indicator, a thermometer, a clock, an rpm indicator and an airspeed indicator capable of recording speeds up to a hair-raising 140 knots. All the plumbing appears to be easily accessible and a few of the bathroom-type faucet handles near the pilot's left knee seem to be controls for the fuel system.



To the upper right of that uncomplicated layout is a view of part of the cockpit arrangement in a present-day P-3C — a vista which should be enough to cause even the most ardent young Naval Aviator-to-be to pause in awe at the training that lies ahead of him. On the other hand, he must feel reassured that all those gauges, knobs, switches, lights and levers represent improvements which make flying incomparably safer, regardless of the flight or weather conditions.

Another item of historical interest has come to our attention. Aero Publishers, Inc., has produced the fourth in their series of Aero Pictorials entitled Flying Leathernecks in World War II. *This 95-page book, which consists almost entirely of photographs and captions, contains a wealth of fascinating photos illustrating everything from the biplanes that were still in service with the Marine Corps in 1940 to F7F's which were introduced at the war's end — too late to see combat. Gliders, training planes, multi-engined bombers and many little known aircraft appear in this useful pictorial on Marine Aviation.*

NAVAL AVIATION NEWS

1911 1971

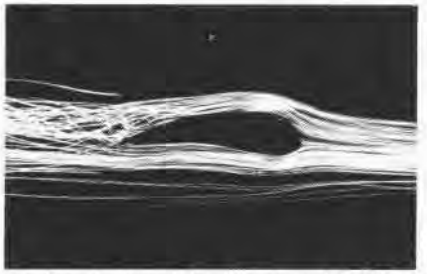
Tip Vortex is Subject of Study

ARLINGTON, Va. – The Office of Naval Research has awarded a contract to Rochester Applied Science Associates (RASA), Rochester, N.Y., to pursue further development of a new approach to solving the tip vortex or wake turbulence problem that seriously affects both fixed wing aircraft and helicopters.

The tip vortex is a funnel-like swirl of air turbulence deposited in the wake of wing tips of an aircraft or rotor blade tips. It can cause a closely following smaller aircraft to roll suddenly or even invert, particularly during takeoffs and landings. There have also been cases of damage to Navy aircraft because of wake turbulence while maneuvering between aircraft in the same flight.

Earlier, RASA explored the theory that injecting a small jet of air into the tip vortex as it formed could accelerate the breakup of the vortex. Tests of the air injection technique were first conducted in the low-speed wind tunnel at the Naval Ship Research and Development Center, Carderock, Md., using a fixed wing model. The tests used a new experimental bubble technique of Sage Action, Inc., Ithaca, N.Y. The device generates tiny helium-filled bubbles that are fed into the wind tunnel airflow and makes it possible to see and photograph the concentrated vortex core and the complicated flow pattern of the bubbles.

The new study will attempt to discover the flow mechanism by which the concentrated tip vortex flow seems to be virtually eliminated, and thus learn the most efficient means of eliminating the effects of the tip vortex under all flight conditions. Studies designed to incorporate the air injection concept ultimately into aircraft design are expected to follow later.



Air flow is traced by illuminated bubbles.

Whittet Becomes MCPO

WASHINGTON, D.C. – Master Chief Aircraft Maintenanceman John D. Whittet became the second Master Chief Petty Officer of the Navy in April. He succeeded Master Chief Gunner's Mate Delbert D. Black who retired after 30 years of continuous service and a four-year term as the Navy's top enlisted man.

A 28-year veteran of WW II and Korea, Master Chief Whittet was Senior Enlisted Advisor on the staff of ComNavAirPac. In his new position, he advises the Chief of Naval Operations and Chief of Naval Personnel on matters concerning enlisted men.

Retiring MCPO helps new MCPO don jacket.

DAR Honors Three

CORPUS CHRISTI, Texas – The Naval Air Advanced Training Command's top student aviators of 1970 received achievement awards from the Texas Society of the Daughters of the American Revolution, during formal ceremonies held at NAS Corpus Christi in April.

The three, Ltjg. Charles E. Morton, USN, 1st Lt. David C. Beard, USMC, and Ltjg. Lee S. Rumley, USCG, earned the awards for their final overall grades and outstanding performance while students in advanced flight training.

The three top flight students received certificates of achievement and engraved gold wristwatches from Mrs. Ford Hubbard of Houston, State Regent of the Texas Society.

The awards ceremonies were held at Training Squadron 31's Hangar 47. Lt. Morton was graduated from VT-31 in February 1970; Lt. Beard was graduated from VT-21 at NAS Kingsville, Texas, in August 1970; and Lt. Rumley, from VT-27 at NAS Corpus Christi in July 1970.

Lt. Morton is currently assigned to VP-48, NAS Moffett Field, Calif.; Lt. Beard is a member of VMA-212, MCAS Kaneohe Bay, Hawaii; Lt. Rumley is assigned to the Coast Guard Air Station, Port Angeles, Wash.

Wings for Physiologist

CORPUS CHRISTI, Tex. – Lt. N. T. (Tom) Bird, an aerospace physiologist in the Medical Service Corps, was recently duo-designated. After five years of intermittent flight training, he earned his Naval Aviator wings at NAS Corpus Christi, Texas.

"All my life I have wanted to be a Naval Aviator," he stated. Now he is – the first Naval Aviator to be taken from the rolls of the Medical Service Corps. Though, in recent years, Captain Rolland Bosee, Naval Aviator, now retired, took additional training to become an aerospace physiologist and contributed to the development and evaluation of aviators' protective equipment.

Lt. Bird began his flying lessons as an eighth grader. A commercial pilot in both single and multi-engine aircraft and an FAA-certified flight instructor in aircraft and instruments, Lt. Bird had more than 2,000 hours of commercial flying before he entered the Navy.

In 1965, Tom Bird began Aviation Officer Candidate School in preparation for flight training. He completed the VT-1 flight syllabus at Pensacola, Fla., and then reported for duty at NAS Norfolk, Va., as assistant aviation physiologist.

Following that tour, he returned to flight training in the basic jet syllabus at Meridian, Miss., before reporting to NAS Corpus Christi to head the flight physiology department. In June 1970, he was a student again, in VT-27 at Corpus Christi where he qualified in reciprocal engine aircraft.

At VT-21 in Kingsville, Texas, he enrolled in the advanced jet syllabus. The final weeks of his training included combat type flights in the TA-4 and carrier landings aboard USS *Lexington* at Corpus Christi. Two days before Christmas 1970, a lifetime dream and a five-year odyssey ended when Lt. Bird added Naval Aviator wings to his aerospace physiologist wings.

Blair Goes to AirPac

SAN DIEGO, Calif. – ASCM Lloyd E. Blair has been selected Senior Enlisted Advisor for Commander Naval Air Force, U.S. Pacific Fleet, by Vice Admiral William F. Bringle at his NAS North Island headquarters.

Chief Blair reported to ComNavAirPac from USS *Coral Sea*, where he served in a similar capacity for six months.

Commenting on why he applied for the billet, Chief Blair said, "I am cognizant of the 'new era' of our Navy today and I welcome the opportunity of involvement to help create, as well as implement, some of the new policies and changes which are being initiated. Although the Navy has made great strides in improving the well-being of enlisted personnel, there is still a lot which can be done."

An Orion gets washed down in the new NAS Barbers Point "birdbath." The bath washes off salt spray that accumulates. An estimated $8,000 is saved in progressive aircraft rework cycle when the bath is used. It cuts down on corrosion and the necessity for repainting.

10,000 Accident Free Flight Hours for VA-174

JACKSONVILLE, Fla. – VA-174, the Cecil Field-based training unit for Atlantic Fleet A-7 *Corsair II* pilots and maintenance crews, passed the 10,000-hour mark in accident-free flying hours in early April.

The hours have been accumulated since October 1970 and include 1,780 carrier landings and 6,400 sorties, according to Commander Roger Bos, squadron C.O. LCdr. Jack Calhoun, safety office, gives most of the credit to the maintenance department. "Maintenance is the beginning of safety," he says.

Commander E. H. Helveston heads a maintenance department of about 700 permanent maintenance specialists, supplemented by A-7 maintenance trainees. They work in three shifts to provide round-the-clock service for the squadron's 70 aircraft.

VA-174 offers two courses of instruction: a six-month curriculum for pilots learning the A-7 and another shorter one for those stepping up to the latest version of the *Corsair*. The courses are taught by 45 pilot-instructors, all of whom have had at least one tour in an operational attack squadron and most of whom are combat veterans.

Squadron LSO's point with pride to the unit's safety record during carquals: VA-174 hasn't had a carrier landing accident in three years.

Phoenix 6 Leaves VXE-6

QUONSET POINT, R.I. – In March, *Connie* crewmen of Antarctic Development Squadron Six watched as Buno 131624 made its way down the ramp from Seaplane Hangar Two to depart NAS Quonset Point on its final flight.

For 13 years, the *Phoenix 6*, so named by its crew, carried thousands of passengers between the U.S. and Christchurch, New Zealand, advance headquarters for Operation *Deep*

Freeze, and between Christchurch and McMurdo Station, Antarctica. During the early years, it was also used in photo-mapping the frozen continent. *Phoenix 6* compiled an accident-free record with VXE-6.

However, last October, when the other VXE-6 *Connie* crashed in bad weather at McMurdo, it was decided to retire the C-121's from Antarctic service.

Pilots and crew members from ferry squadron VRF-31 took *Phoenix 6* from Quonset Point, home base of VXE-6, to Davis Monthan Air Force Base in Arizona for storage.

Thomas and Navy Profit

NAS OCEANA, Va. — AO1 Robert A. Thomas, an instructor in the fleet replacement aviation maintenance personnel department, has received a check for $205 for a recent beneficial suggestion.

PO Thomas teaches ordnancemen

AO1 Thomas with his ordnance teaching aid

the ordnance aspects of the A-6 *Intruder*. Formerly, in order to demonstrate proper bomb loading, a class had to be interrupted and adjourned to the hangar area. To eliminate this disruption, Thomas built an ordnance configuration stand which possesses all the capabilities of the A-6A and A-6B suspension equipment. The stand, built at no cost to the government from scrapped remnants found in the Navy salvage yard, allows the instructor to teach in the classroom.

VF-213 Deploys With ACLS

GULF OF TONKIN — Fighter Squadron 213 is the first Navy squadron to deploy to SEAsia utilizing the Automatic Carrier Landing System (ACLS) with the F-4J *Phantom II*. The *Black Lions* of VF-213 are making "hands-off" landings routinely aboard *Kitty Hawk*.

The ACLS has removed many of the variables involved in carrier aviation. The system utilizes a sophisticated shipboard precision radar linked to the *Phantom's* autopilot and power control system. A data link carries commands for precise heading and altitude which are deciphered inside the airplane and routed to the various control surfaces. The F-4 is guided to the precise spot on the carrier's flight deck where its tail hook engages the number three wire, stopping the plane within 60 feet.

The ACLS was operationally unproven prior to its deployment with VF-213 in November 1970. Since then, the *Black Lions* have demonstrated its capabilities.

Medical Academy Selects Navy Flight Surgeon

PENSACOLA, Fla. — Captain Robert E. Mitchell, MC, Head of Medical Sciences at the Naval Aerospace Medical Research Laboratory, has been elected a member of the International Academy of Aviation and Space Medicine.

The Academy promotes the development of science and fosters research in the realm of biology, aviation and space medicine and helps to improve and develop the exchange of information and ideas in these fields. It also contributes to the search for new knowledge and its practical scientific application, improves the teaching of these sciences, fosters the training of experts in aviation and space medicine, and facilitates international cooperation and relations among persons dedicated to such cooperation. Membership is limited to 200.

Navy Flight Surgeon Mitchell has had medical officer assignments on aircraft carriers and at shore stations in the U.S. and in foreign countries. He is now on his third tour of duty at Pensacola, continuing his association with Dr. Ashton Graybiel on the Thousand Aviator study. This research was the topic of a paper presented by Capt. Mitchell last year at an international symposium in Garmisch-Partenkirchen, Germany.

VA-27 Wins Derby

LEMOORE, Calif. — Attack Squadron 27 has been named the overall winner and recipient of the Golden Bomb in the ComFAirLemoore air-to-ground competitive exercise, *Derby Two*.

VA-27 also captured the Silver Bomb award for the A-7E (visual and hooded) portion of the derby and the Black Bomb for the simulated all-weather portion. Commander L. B. Keely, squadron skipper, earned two individual pilot Golden Bomber awards as "best visual delivery pilot in the U.S. Navy" and "best hooded delivery pilot." Top award for strafing excellence went to Ltjg. M. J. Johnson, also with VA-27.

Attack Squadron 56 won the Silver Bomb for the A-7A/B portion of the derby; LCdr. W. L. Randolph, VA-153, was given the Golden Bomber Award as best pilot in that competition. Winner of the individual dive-bombing competition was Commander W. T. Majors, VA-147.

Participating squadrons were permitted to enter four pilots; a commander, lieutenant commander, lieutenant and lieutenant junior grade, plus one backup pilot who launched only if one of the original four did not.

Derby Two was under the direction of Captain J. M. Tully, Jr., ComFAirLemoore. Serving as chief arbitrator was Captain D. C. Stanley, C.O. of NAS Lemoore.

Other squadrons participating in the exercise included VA's 97, 125, 146, 22, 94, 122, 155 and 215. VA-127 did not compete but provided heavy support, flying observation and escort.

The Navy's oldest Buckeye trainer, BuNo 144217, retired in January at VT-9, NAS Meridian, Miss., after 12 years of service. LCdr. R. J. W. Klimetz, squadron training officer, was in the cockpit for the last flight.

GRAMPAW PETTIBONE

Swallowed Up

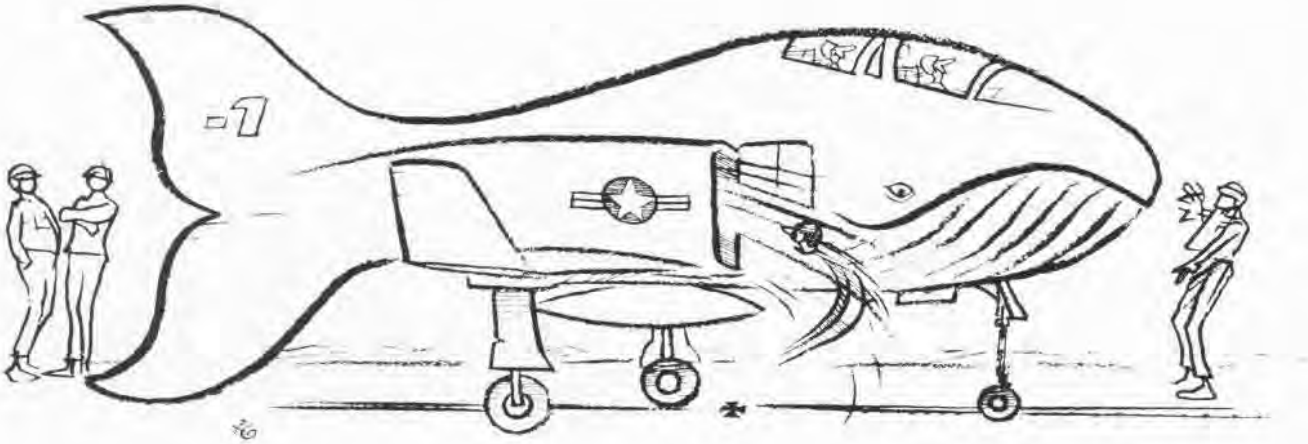
The F-4B *Phantom II*, number two aircraft in the pattern on the 1700 recovery aboard the large CVA, landed without incident and was de-armed and taxied forward onto the bow parallel to the starboard (#1) catapult track. As the left wing cleared the right wing of an F-4 spotted in the center of the bow between catapults one and two, the plane director, a third class aviation boatswain's mate, gave the *Phantom* pilot a left turn signal. Because of the high winds and the greasy catapult track, the nose wheel of the aircraft wouldn't cross the track and began to slide. The director motioned for a plane handler to push the nose of the plane across the inner lip of the cat track and then gave a come-ahead signal to the pilot when AN Spoiler was in position at the starboard nose of the aircraft. The pilot, watching the director on the port side, momentarily added power to about 80 percent several times.

AN Jonah, another plane handler, seeing there was difficulty in spotting the *Phantom* and observing the director's push signal, proceeded from the center of the flight deck, forward of the left wing, and crossed under the F-4. He then stood up directly in front of the starboard intake. As he raised his hands to push the aircraft, the pilot added power to cross the catapult track. Before AN Jonah could even place his hands against the aircraft he was sucked headfirst into the starboard intake.

The addition of power moved the nose wheel across the catapult track, and the F-4 taxied into its final spot, chocked and tied down. As the pilot routinely conducted his normal shutdown procedures, several people noticed the starboard engine was emitting sparks.

Several minutes later, after the engines were secured, the squadron power-plant troubleshooter dove the duct to see if the engine had received foreign object damage. Halfway down the duct, he saw something but couldn't tell what it was. He took off his goggles, turned on his flashlight and saw AN Jonah lodged against the engine. Shocked, the trouble-shooter turned around and scrambled out of the intake. He immediately grabbed the first person he saw, the RIO, who was just climbing down from the cockpit, and advised him of what he had seen.

Flight deck control was immediately notified and a medical alert sounded. The squadron line division officer entered the duct and observed AN Jonah still up against the engine but decided not to move him for fear of increasing his injuries. A hospital corpsman soon arrived and other personnel



ILLUSTRATED BY Osborn

assisted him in removing the injured airman from the intake and taking him to sickbay. Aside from shock and severe bruises, AN Jonah's major injury was a deep laceration on his thigh – from the intake pitot tube.

Grampaw Pettibone says:

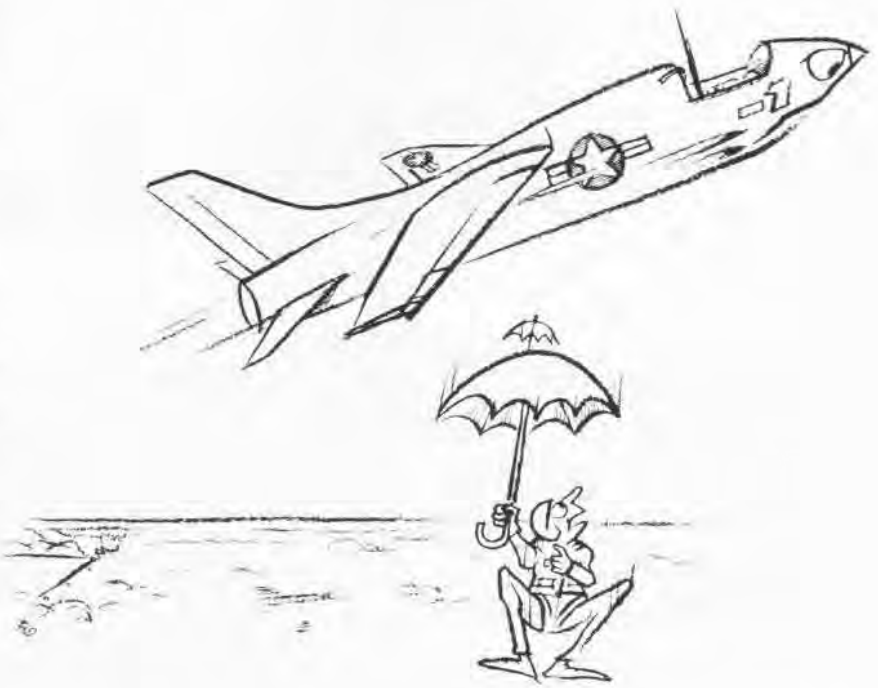
Jumpin' jiminentlies! I just cain't hardly believe it! Y'know there were five different persons who saw that poor man get sucked into the intake, but no action was taken. One man spoke to another about it – but he didn't believe it, didn't seem to understand. Others just went on about their business. Poor Jonah in the belly of the whale.

The engine of that *Phantom* was running for almost five minutes after the incident, and it was several minutes after that before Jonah was discovered and removed. What kind of a flight deck operation was being run out there? Of course it is noisy and confused on the bow during a recovery. People everywhere! That's why we put some of our best people up there. What has happened to our concern for others? This story is too similar to those about the people in the city who watch someone being mugged, robbed, etc. and do nothing about it. Have our Navy and life aboard the big carrier become so impersonal as all this? In today's Navy, with its increasing hazards and dangers, as well as its advantages, we must each and every one become "our brother's keeper."

To Go or Not To Go

At 1032 and 5 seconds, the U.S. Marine Corps Reserve Lieutenant Colonel cycled the throttle outboard on his F-8K *Crusader*, thus lighting the afterburner to commence takeoff roll for a flight to a mid-continent naval air station.

At liftoff, he noted that the fire warning light came on. (The fire warning system had malfunctioned on the previous flight but had reportedly been repaired by maintenance.) Suspecting a further malfunction and not having enough runway remaining to abort, the colonel continued his takeoff. He raised the landing gear and started to climb, whereupon there was a loud explosion in the aft section of the aircraft. He also noted that the PC-1 hydraulic system pressure was dropping



to zero. He then started the two-position wing down at 220 knots airspeed, and shortly thereafter there was another double explosion in the rear of the aircraft.

This time he saw the engine oil pressure gauge going to zero, a decreasing engine rpm and some smoke in the cockpit. As he cycled the engine out of afterburner, he broadcast to departure control on the radio, reporting that he was flaming out and leaving the aircraft. The colonel then pulled the face curtain with both hands and partners Martin and Baker deposited him unceremoniously on the ground just outside the field boundary at 1032 and 50 seconds. His estimated airspeed and altitude at ejection were 300 knots at 300 feet.

Following the ejection, the now pilotless *Crusader* continued in a shallow right climbing turn. Analysis of statements of ground observers and the departure radar controller confirmed that the craft continued in flight for almost two minutes, completing at least one 360° turn and climbing to almost 5,000 feet over the field where it was seen by the pilot of an airborne C-117D. He observed the F-8 to be in a slightly nose-high attitude and a 30° bank to the right. The aircraft was seen to roll to about 80°, right wing down, and disappear from sight as it entered the top of the overcast at 3,000 feet. Fortunately, the *Crusader* crashed on vacant land near the air station.

Grampaw Pettibone says:

Egads lads, my knees still feel a little weak!! Somebody could'a got hurt. Makes one think, don't it? Who can say whether the colonel did the right thing at the right time or not. There've been several other accidents of this type in recent years, some not so fortunate. When is the right time to go? Out of control? No power? Loss of control response? Altitude? Airspeed? Attitude?

Considerable research is in progress right now to give the pilot a go, no-go light in the cockpit. Run by a computer, it would analyze and integrate many of these parameters and give the pilot an instantaneous decision.

In the case of this *Crusader*, after a long delay in salvage of the wreckage, the disassembly inspection report found nothing wrong with the engine. It was producing power and there was no evidence of an inflight fire????

By Michael G. McDonell

Lamps

A marriage is in the making – and it has been a long time coming.

The destroyer-type ship has long been the keystone of ASW operations and the advent of the sub-hunting rotary-wing aircraft has improved ASW capabilities even more.

Now, the versatilities and capabilities of the helicopter and the destroyer are to be combined. This union is bound to increase the mission potential of both.

The air portion of this combination, the Light Airborne Multi-Purpose System (LAMPS), provides a manned helicopter to augment the destroyer's weapons system – extending its search and attack capabilities.

The idea of a combination of these two types is not new: during the Sixties, the Navy operated the QH-50 drone antisubmarine warfare helicopter (DASH) from the decks of approximately 130 destroyers and destroyer escorts. But the remotely controlled DASH was limited to the "destroy" aspect of ASW and, due to its high failure rate, was deemed too costly to operate. The concept, while good, was both limited and lacking.

The operation of manned helicopters from the decks of ships not normally associated with aviation is, again, not new – we have been doing it for some time: *Huey* gunships operate from LST's in the Mekong Delta; H-2 *Seasprites* fly VIP's, mercy missions, mail and supplies from fleet flagships; and UH-46 *Sea Knights* conduct vertrep operations from replenishment ships to nearly everything that floats and has a deck.

But augmenting a non-aviation ship's weapons system with manned helicopters is something relatively novel.

Scan the latest edition of *Jane's Fighting Ships* and you will find that several countries, notably Canada and Great Britain, have modified old destroyers and built new destroyers, escorts and frigates to accommodate helicopters which operate as part of and in concert with the ships.

Normally, these helicopters fulfill a primary ASW mission, and this is where LAMPS differs. The LAMPS program is designed to accomplish two primary missions: ASW and Anti-Ship Missile Defense. The potential and actual danger of hostile submarines seems to have been with us since WW I, and as time and technology advance, the danger increases.

But it was not until recently that another menace made a startling debut: on October 21, 1967, the Israeli destroyer *Elath* was sunk by a non-nuclear *Styx* missile fired from a small Egyptian patrol boat located several miles away. The West was aware of such a potentially dangerous weapon, but the event clearly illustrated the need for an adequate defense in such circumstances. LAMPS may be an answer to the possibilities of dual undersea and airborne menaces which may at some time threaten peacetime tranquility.

As Captain Spencer E. Robbins, manager of Naval Material's Ship and Air Systems Integration Project, states, "LAMPS is a fly-before-you-buy proposition." Thus, the program is divided into two parts – a test and fly phase and the soon-to-be-delivered LAMPS SH-2D helicopter.

For the past two years, the Naval Air Development Center at Warmin-

Anti-ship-missile modified HH-2D prepares to come aboard USS Fox (DLG-33) in San Diego harbor during recent landing tests.

is Launched

ster, Pa., has been fitting and mounting various sensors, normally employed on fixed wing aircraft, onto a test bed helicopter. This effort to work out the technical bugs through off-the-shelf avionics has proven successful.

Ancillary to the test-bed developments, similar equipment packages have been installed aboard fleet HH-2D's deployed for "at sea" evaluation.

These two methods of evaluation are currently employed in a continuing effort to identify the best equipment, tactics, support requirements and training parameters for LAMPS.

In the early days of the program, it was not known how much weight the platforms of most of the ships considered would support. They had been designed to support the 6,000-lb. DASH. As interest and determination to pursue the LAMPS program progressed, a deck-strength test was conducted in November 1970 utilizing a 12,500-lb. HH-2D *Seasprite* on board USS *Sims* (DE-1059). The tests revealed that the HH-2D could operate from the decks with no problem.

In March 1971, CNO announced the decision to commit the Navy's 115 *Seasprites* to the LAMPS program in order to further develop the LAMPS theory and to increase fleet capabilities. It is anticipated that eventually all destroyers, frigates and destroyer escorts will operate LAMPS as part of their weapons systems. The first of ten LAMPS is scheduled to join the fleet by October 1971, having completed board of inspection surveys by that time. The next nine SH-2D's, their flight crews and support personnel will operate from DLG-26 class guided missile frigates and from USS *Truxtun* (DLGN-35), a nuclear frigate. These first ships will require very little modification before certification; however, there will be some change in CIC to provide for integration of the helicopter's detecting equipment with the ships' weapons systems.

Above and below, the Kaman SH-2D LAMPS-configured Seasprite, equipped with radar, MAD, sonobuoy rack and torpedo, is scheduled for service with the fleet in the fall of this year.

The modification necessary to convert *Seasprite* to its LAMPS role give it an appearance unique among U.S. rotary wing aircraft. A radome housing antenna for a search radar has been installed under the nose of the helicopter and, on the starboard fuselage, a pylon has been installed which contains a winch used to deploy and retrieve a magnetic anamoly detector (MAD).

The SH-2D's auxiliary fuel tank mounts will also carry launchers for the MK-46 ASW torpedo.

A sonobuoy rack has been installed on the port side of the aft cabin and smoke marker launchers have been placed in flotation fairings just ahead of the retractable landing gear. Antennas and sensors associated with the aircraft's sundry electronic equipment have been installed at several locations on the fuselage.

A three-man crew will man the SH-2D: pilot, copilot and sensor operator. The copilot will serve as TACCO, responsible for navigation, communications, electronic support measures and the launching of stores. The third crewman will operate a control console in the aft cabin, monitoring and interpreting signals received from sensors.

Prior to the March 1 decision to move ahead with the program using the *Seasprite*, there were several LAMPS candidates proposed by various members of the aviation industry.

Kaman Corporation unveiled a mockup of its contender, the *Sealite*, in September 1970. The *Sealite* incorporated the flight dynamic systems of the HH-2D in a new airframe tailored to meet space and weight requirements of the ships that it would have worked from.

With some 15 different models supplied to Naval Aviation over the years, Bell Helicopter's version of LAMPS bore a strong resemblance to the Navy/Marine twin engine UH-1N, scheduled for delivery this year.

Sikorsky introduced the WG-13 *SeaLynx* as its candidate. *SeaLynx* is being built by Westland, a Sikorsky licensee in England, and is scheduled to enter the British and French armed forces in the mid-70's.

Boeing/Vertol is already flying its candidate. The BO-105 is a light (6,000-pound) twin engine, West Ger-

man-designed helicopter that is manufactured under an agreement with Messerschmitt-Boelkow-Blohm.

In the future, as the state of the art progresses, it is expected that these and other companies may produce follow-on candidates.

What can be expected of the LAMPS mission? As stated earlier, the program is designed to augment and extend the ship's weapons system. During an ASW engagement, the LAMPS helicopter would react to initial contact by the ship or other detecting forces. Acquisition of the submarine by the ship's sonar would be further aided by LAMPS' detecting equipment (i.e., active and passive sonobuoys, MAD or radar), allowing the helicopter to localize, classify and attack the submarine.

In the realm of Anti-Ship Missile Defense, the value of LAMPS would likewise enhance the defense of the ship. With the present defense of the destroyer consisting of rapid-fire five-inch guns, LAMPS could supplement the ship's defense by deploying along the axis of probable attack, providing nearly double the early warning time and, under certain circumstances, an attack capability against hostile forces.

In addition to these primary missions, reconnaissance, vertrep, medevac, personnel transfer, SAR, tactical gunfire support and other missions would also be performed.

Obviously, the new program will require pilots and technicians – without them the program cannot function. LAMPS could conceivably involve at least 4,000 trained and experienced aviation personnel, and since this is a new program, this total will have to be in addition to present personnel. At least 1,000 experienced helicopter pilots will be necessary, and this will cause an increase in flight training and could be a definite boon to career patterns of many helicopter personnel.

All of these considerations, including a vast logistical support system for the program, must be solved if the program is to fly.

LAMPS could well be one of the revolutionary changes in an already rapidly changing U.S. Navy.

Four former candidates: Kaman's Sealite; Boeing/Vertol's BO-105; Sikorsky/Westland's SeaLynx; and the Huey-like version from Bell.

VERTREP

By PHC B. M. Andersen

The ships and sailors of the Sixth Fleet have a never ending appetite for food, clothing and repair parts. To help satisfy this insatiable hunger is the task of some of the hardest working ships and helicopters in the fleet, the supply ships of Commander Service Forces Sixth Fleet and the *Sea Knights* of HC-6. The combat stores ship, USS *Sylvania*, is typical as she sails the waters of the Mediterranean in search of a hungry giant . . . a Sixth Fleet task group.

Days before a replenishment is to take place, the hard work begins. Supplies must be located on one of the ship's five levels of five large cargo holds. Then they must be assembled, packed on pallets, and cargo nets and slings must be attached. Forklifts are as busy as bumper cars at a fair, moving the pallets of cargo into the proper sequence to be delivered.

Conveyor belts and elevators ease the task somewhat, but a lot of brawn and brain is still required to move the myriad loads of supplies.

Supplies are moved up to the helo

HC-6 crewman prepares for a cargo hookup, left; above, last minute check of supplies before vertrep; waiting for helo hookup, right.

UH-46D comes in for a load as cargo personnel move on, below. Flight deck crewman holds up a board which gives the pilot destination and weight of the load, right.

deck aft by two deck elevators. The deck is staged, barely leaving enough room to push one of the two helicopters that will be moving the supplies into position for takeoff.

Reveille is at 3 a.m. on the day of a major replenishment and the first helo is launched at the crack of dawn, 5 a.m. For the next eight hours this is where the action is!

The UH-46D's of HC-6 Det. 97 ferry sling after sling to the aircraft carrier. Once that is finished, they start vertical replenishment of several small

destroyers and an ammunition ship.

Approximately 160 tons of supplies are delivered to the eight ships of the task group: meat, fish, vegetables (fresh and frozen), candy, cigarettes, toilet articles, clothing, electronic tubes, paint, wire and replacement parts.

When one replenishment is finished, it is soon time to start all over again. This dedication to hard work and accomplishment of an unglamorous mission help keep the Sixth Fleet on station in the Mediterranean.

Contact! Hookup of a cargo sling is made as a Sea Knight hovers over the flight deck of USS Sylvania (AFS-2).

VAL-4

A VAL-4 Bronco, above; viewed from the cockpit, a 5-inch Zuni leaves a fiery trail, left- an OV-10 Bronco in full battle dress, below.

ONE OF

By JO3 Dan Gaylien

At Binh Thuy, 80 miles southwest of Saigon, are two aviation units, Light Attack Squadron Four (VAL-4) and Light Helicopter Attack Squadron Three (HAL-3). And each is the only one of its kind.

The pilots of VAL-4 have nothing but praise for the stubby-winged *Bronco* that they fly in close-air support of Vietnamese Navy riverine forces and other government troops in an area that covers 4,000 square miles. Its short field takeoff and landing capability and endurance of 5+ hours, its ability to carry more than 3,000 pounds of ordnance, its speeds from 95 to 300 miles per hour make the OV-10 a formidable weapon.

VAL-4 pilots have been flying the *Bronco,* first fixed-wing aircraft built specifically for the type of counter-insurgency warfare encountered in Vietnam, since April 1969, and have lost only three aircraft – all in combat.

The squadron has been commended many times for providing support which saved ground units from being overrun by attacking enemy forces.

HAL-3

A UH-1 Huey takes to the air, above; right, pilot records location coordinates on windshield while .50 cal. spits lead, below.

A KIND

And close air support is also the mission of HAL-3. The only helicopter attack squadron ever commissioned in the U.S. Navy flies the UH-1 *Huey*.

HAL-3 was commissioned in April 1967. Since then the squadron has grown to nine detachments located at strategic points throughout Military Region IV and the southern portion of Military Region III. Four detachments are in the heart of what was formerly undisputed Viet Cong territory.

Scrambles are numerous, and often one operation will last for hours and the gunships must return to base periodically for refueling and re-arming. The men who keep the squadron in a state of readiness have cut replenishment time to about 55 seconds.

The destructive power of their weapons, coupled with their flight characteristics, makes the gunships of HAL-3 highly suitable for their mission.

Each of the gunships is piloted by two Naval Aviators. The rockets are fired by the command pilot from the right seat, and the copilot usually fires the mini-gun from the left seat. The door-mounted machine guns are handled by two enlisted crew members.

NAVAL AVIATION NEWS

International Ice Patrol Begins 57th Season

GOVERNORS ISLAND, N.Y. — The Coast Guard opened its 57th International Ice Patrol season in March as it once again began tracking the icebergs which menace the safety of the North Atlantic shipping lanes.

Coast Guard C-130's fly from the Canadian airfield at Summerside, Prince Edward Island, tracking and reporting icebergs sighted below 50° latitude, an area heavily traveled by merchant and fishing vessels. Any sightings are reported to designated radio stations in the U.S. and Canada, such as the Coast Guard Radio Station (NIK), Boston, and the Naval Radio Station (NSS), Washington, D.C., which broadcast ice patrol bulletins twice daily.

The International Ice Patrol was born in January 1914 almost two years after the *Titanic* collided with an iceberg and sank. The patrols have continued since then except for one period from 1941 to 1944. The patrol is supported by 18 maritime nations, including the U.S., Great Britain, France and Germany. Each nation contributes its share in proportion to the amount of shipping from that nation passing through the ice-threatened area.

New Medical R&D Facility

PENSACOLA, Fla. — Rear Admiral Oscar Gray, Jr., MC, recently announced that a major new medical research and development facility is being established by the Naval Aerospace Medical Research Laboratory at NASA's Michoud Assembly Facility in New Orleans, La. The research and development program which will be performed at the facility over the next five years will be manned by a team of civilian and military scientists headed by Captain Channing L. Ewing, MC. A staff of 43 civilian and military personnel is anticipated.

Equipment for the facility will include a large impact accelerator with an enclosed track which will extend for 750 feet.

Data collected will be processed and analyzed by the NASA computer complex at Slidell. Results will be made available to engineers and scientists in government and private industry to assist them in designing and testing devices which will protect aviators against high speed crashes in helicopters and other aircraft. The results are also valid for all forms of human vehicular transportation.

VT-29 is Honored

CORPUS CHRISTI, Tex. — A special CNAVanTra ACES award, was presented to VT-29 to mark its aviation safety record of 12 consecutive years of accident-free flying.

The long record goes back to March 12, 1959 — VT-29 was then designated Advanced Training Unit 501 — when a P5M nosed over in Corpus Christi Bay during a practice landing. May 1960 saw the squadron formally commissioned as a separate command with the primary mission of training navigators. It has seen many aircraft and many changes since the old days.

VT-29, commanded by Commander J. E. Paul, provides advanced navigation training to prospective NFO's.

Landmark Comes Down

NAS GLYNCO, Ga. — The last remnants of an era at this station disappeared in March when dynamite charges toppled the massive concrete pylon that stood at the east end of the old blimp hangar site.

Thousands of tons of concrete, steel and wood crashed down with the collapse of a 300-foot-long horizontal box girder and twin 150-foot concrete towers.

With concrete towers 14 inches thick, the hangars were so well built that it took two days to bring them down. After being dynamited the first day, the huge structure dropped about six feet and leaned but did not fall. Another set of explosive charges brought it down the next day.

Both hangar sites are scheduled to be completely cleared by year's end.

Blimp hangar pylon comes tumbling down.

Major General P. J. Fontana, Commanding General, MCAS Cherry Point, greets Lt.Col. J. C. Robinson, C.O., station Operations and Engineering Squadron, shortly after the colonel landed the air station's new T-39D. The Sabreliner is the first jet of its class to join the Marine Corps' aviation inventory.

Helo Deck Tests Made

NATC PATUXENT RIVER, Md. — At the direction of the Chief of Naval Operations, an evaluation was made of new and current visual landing aids (VLA) and ship deck lighting for day and night helicopter operations — in the continuing effort to increase the number of non-aviation ships which can launch and recover helicopters.

A simulated DE-1052-class destroyer with a hangar was installed on the taxiway at NATF Lakehurst. It was strengthened to support all the VLA systems and the flight deck had movable lights so that various lighting patterns could be evaluated.

NATC Flight Test rotary wing pilots, in HH-2D's, H-46D's and AH-1J's, evaluated 17 different glide slope indicator systems and numerous deck lighting patterns and intensities. The best combinations of deck lights and glide slope indicators were selected and will be installed aboard ships for follow-on shipboard evaluation — with ultimate application to LAMPS and other helicopter shipboard missions.

ON PATROL

with the Fleet Air Wings

VP-26 Hosts Norwegian Crews

VP-26 recently hosted Colonel Bjorn Johansen and two crews of the Royal Norwegian Air Force during their one-week stay at NAS Brunswick late in March.

Captain Sidney Edelman, CFAW-3 and Commander Robert D. Porter, C.O. of VP-26, were on hand to meet the Norwegian P-3B *Orion* as it taxied up to the squadron line.

The Norwegian crews were at Brunswick to use the P-3 trainers.

VP-26 recently marked two important events: the logging of the squadron's 75,000th accident-free flight hour and a Meritorious Unit Commendation for contingency operations in the Eastern Mediterranean during their last deployment.

VP-23 Comes Home

Commander R. J. Campbell, C.O. of VP-23, led the squadron back to NAS Brunswick in March, thus terminating a four-month deployment to Rota, Spain. This was the first deployment for the squadron since transitioning to the P-3B in June 1970. During the deployment, the squadron maintained detachments at Soudha Bay, Crete; Sigonella, Sicily; and a five-plane detachment at Lajes Field in the Azores.

The split deployment presented the squadron with many challenges both operationally and administratively. The bulk of the maintenance and administrative load was carried by personnel in Rota. Squadron maintenance personnel did an outstanding job of keeping the planes flying as the squadron logged close to 1,000 flight hours each month.

Rescue Mission

Hampered by low cloud cover and rain squalls while searching the gale-whipped South China Sea, Crew 12 of VP-17 recently located the lone survivor of a sunken merchant ship and directed search and rescue efforts until the man was safely recovered.

The ill-fated ship, the Panamanian registered *Wing Hing*, was en route from Hong Kong to Borneo with a heavy load of cement and bricks when heavy seas broke open her wooden hatch covers and she began to take on water.

A distress call started search and rescue efforts by the U.S. Navy and Air Force. The 25 crewmen aboard the slowly sinking ship attempted to launch two lifeboats and a raft during the dark, stormy morning hours. All were lost.

One crew member jumped from the deck of *Wing Hing*, swam to a lifeboat and climbed aboard. As he called to his shipmates to toss a line to him or to jump overboard and swim to the lifeboat, the ship sank.

The next morning, Crew 12, commanded by Lt. Zeph T. Thorning, located one of the empty lifeboats. They continued to search alone after a USAF plane had to depart because of low fuel.

Later that afternoon, Ltjg. John H. Wolthausen, TACCO, spotted the lifeboat with the crewman on board. Weather conditions were so poor that the aircraft had to pass directly over the lifeboat before it was sighted.

Crew 12 dropped a smoke marker and called USS *Denver* (LPD-9) and guided the Navy ship to the boat. The Chinese sailor was brought aboard *Denver* and given medical treatment.

Led by Commander John M. Quin, Jr., VP-17 is home-ported at NAS Barber's Point and is presently deployed to Sangley Point, R.P.

Safety Milestone

NAS Patuxent River's VP-30, replacement training squadron for Atlantic Fleet VP's, reached a milestone recently when it logged 75,000 accident-free flight hours in the P-3. The mark was reached during a routine training flight made by Lt. C. Ingram, electronics division officer, and his crew.

Preparations for a cake-cutting ceremony held in the VP-30 hangar two days after the flight saw a bit of irony color the day's events. A duty driver wasn't quite accident-free: coming from the galley, he dropped the ceremonial cake. Unsightly, but otherwise unharmed, the once ornately decorated cake was cut and eaten with appropriate ceremony.

Providing training in the P-3 since June 1962, VP-30 has averaged almost 8,500 flight hours a year, with significant increases in recent years. In 1970, the squadron marked 11,261.3 flight hours during 2,722 sorties.

VIP Exercise for VP-49

In an effort to increase his familiarity with the airborne tactical ASW environment of his command, Vice Admiral F. G. Bennett, ComASWForLant, flew with VP-49 during a recent training exercise.

VAdm. Bennett left Norfolk with the squadron's C.O., Commander E. A. Tansey, and Crew One. The exercise off the Virginia Capes was a controlled effort which allowed the crew to develop proficiency in sensor operation and crew coordination.

Using USS *Finback* (SSN-670) as a cooperating target, the crew was able to demonstrate the improved anti-submarine warfare capability of the P-3C system.

At the completion of the exercise, the aircraft landed at NATC Patuxent River where the exercise data was analyzed and displayed in rapid time at the new Tactical Support Center. The center affords the shore-based commander the opportunity to better analyze and reconstruct the events of an ASW operation. The airborne crew also benefits from the opportunity to review its techniques and tactics.

NAVAL AIRCRAFT

SEA

The *Seasprite*, which has been in service since late 1962, is truly one of the Navy's most versatile aircraft. Its range of missions includes all-weather search and rescue, plane guard duties, gunfire observation and vertical replenishment. But that is only a partial list. The *Seasprite* also performs tasks such as courier service, personnel transfer, casualty evacuation, tactical air control and reconnaissance missions. To these add wire laying, towing, and various supply and logistic support flights. While the list is impressive, it is not entirely complete, for now the *Seasprite* is scheduled to provide the platform for the LAMPS program (p. 8). *Seasprite* in its various models (UH-2A, UH-2B, UH-2C, HH-2C and HH-2D) can be found largely at sea with the fleet. It is mainly assigned to helicopter combat support squadrons (HC's) though some may be found in the Naval Air Training Command and at naval test facilities. The HC detachments make their homes at sea aboard both CVA and CVS-type carriers while some are assigned to such diverse ships as cruisers, combat stores, amphibious transports and even DLG's.

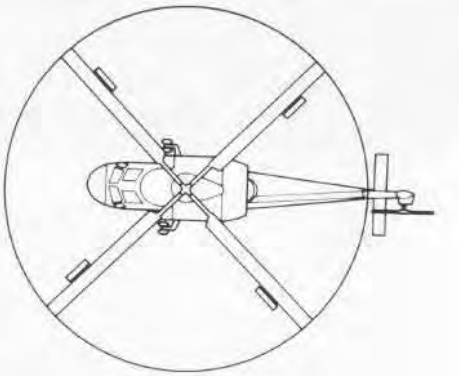
The *Seasprite* is provided with electronic equipment for all-weather navigation as well as auto-navigation and automatic stabilization gear. It has water flotation provisions for its largely over-water tasks. An external cargo hook system with a 4,000-pound capacity is standard equipment. To these the UH-2B added auxiliary fuel tanks and improved navigational equipment but remained basically the same as the initial production model. With the introduction of the UH-2C, a second T58-GE-8B turbojet engine was added, which considerably improved the *Seasprite's* performance. The HH-2D features even more powerful engines, giving greater speed, range and other performance characteristics.

SPRITE

UH-2A UH-2B

UH-2C HH-2D

Length	39'7.5"
Height	14'8.6"
Rotor diameter	44'
Engine: UH-2A/B	one T58-GE-8B
UH-2C/HH-2D	two T58-GE-8B
Power, S.L.	1,250 esph ea.
Maximum endurance	
UH-2A/B	4.4 hours
UH-2C	2.7 hours
HH-2D	3.1 hours
Cruise speed	
UH-2A/B	125 kts.
UH-2C/HH-2D	133 kts.
Maximum speed	
UH-2A/B/C	140 kts.
HH-2D	143 kts.
Service ceiling	
UH-2A/B	15,000 ft.
UH-2C/HH-2D	21,700 ft.
Hover ceiling	
UH-2A/B	4,600 ft.
UH-2C/HH-2D	14,500 ft.
Hoist capacity	600 lbs.
Crew	2 pilots, 1 optional crewman



LAUNCH! LAUNCH! LAUNCH!

By Rear Admiral J. R. Tate, USN (Ret.)

From the beginning, aviation, particularly Naval Aviation, has relied on the catapult to get planes into the air. The Wrights and Langley relied on these devices to launch their craft. Individual tests and single launches in the early days provided varied results – some O.K., many disastrous.

It was not until after WW I, in the late Teens and early Twenties, that serious thought was given to universal use of the aircraft catapult in the fleet and to the idea of aircraft being permanently assigned on board ship. One of the earliest was the Mk 1 air catapult. It was a frame that could be rotated and was mounted on cruisers and on the quarterdeck of battleships. The latter was done against terrific opposition from some of the BB captains. I heard many times, especially in "O" club bars, the statement, "It will be over my dead body that they put one of those noisy, oil throwing, messy contraptions on my beautiful quarterdeck. You can't even holy-stone out the oil spots from them on that beautiful teak." Opposition is an understatement. There was real hate for the dirty planes and the men who flew them. And, too, there was considerable doubt as to their military value. Spotting gunfire? "Yes, but we can do just as well from the masthead." Scouting? "Yes, but what about bad weather?" Most of the line officers were definitely negative as to the value of the aircraft and very positive about their faults, the greatest fault being the launch and recovery of planes in the open sea. In spite of all the opposition, the installation of the catapults went ahead. The first air catapult was a backbreaker. A device called a "tumbling link" was used to release the full pressure of the airbanks against the piston head. There was no progressive buildup of pressure. When the tumbling links fell, you got the full pressure in one terrific shock. It was a tooth-jarring experience. The planes used were light. (We used the Vought UO-1 with a weight a little over 2,500 pounds.)

Lt. A. C. (Andy) McFall was the real leader of the battleship contingent of aviators. He made most of the early shots.

The first carrier catapult was a modification of this air catapult, and the first use from a carrier was made by Commander Kenneth Whiting with only fair results – launching a PTP. This was an R6L with HS-2 wings.

When the heavier Vought O2U series came into use, everyone thought a heavier catapult engine was necessary. In order to provide progressive pressures, the gunpowder catapult was decided on. This awesome machine used a 5" gun shell (blank, of course). The resulting ride was faster and much

smoother. When the original model was fired, it went off with the same bang as a five-incher. In one of the early firings, Lt. Joe Maser, who happened to be standing near the exhaust, had his head blown off. A muffler was soon designed. It consisted of a six-inch piece of pipe about 20 feet long with a lot of holes bored in it to obviate this defect. On the BB's, another catapult of this type was installed on top of #3 turret. The cruisers had two catapults fitted amidships with a small hangar for the planes.

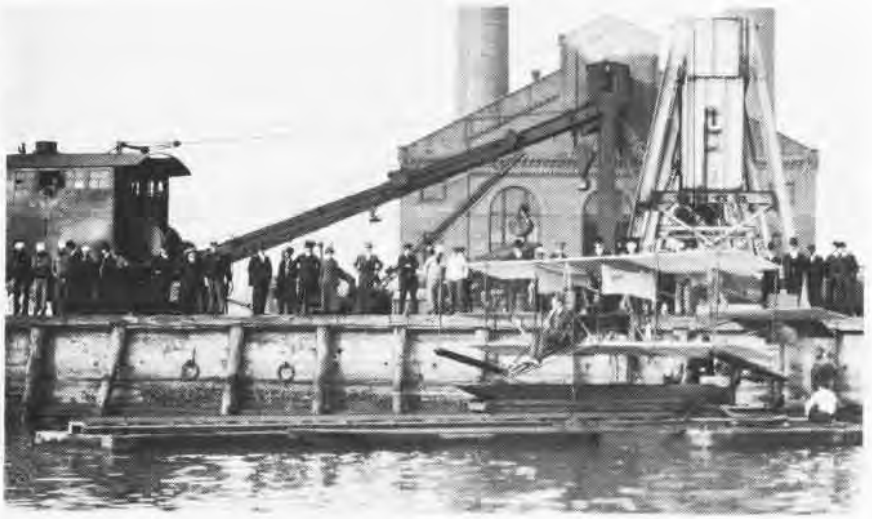
Recovery cranes were fitted on the extreme stern – to pick up the planes from the water and put them on the deck handling gear.

The big thing, however, was recovery in the open sea. After the aviator had sweated his little seaplane down, he still had to get aboard. The capital ships objected to laying to, especially in enemy waters, and forming a lee so the planes could hook on the crane.

To obviate this difficulty, a procedure called a "cast" pickup was devised. A tow pawl about six inches long was fitted on the keel of the forward end of the pontoon just at the waterline. A sled device was fitted to be hung from the aircraft crane and towed by the ship. At the end of this six-foot wide sled was a section of cargo net about six feet long.

A cast recovery went something like this. The BB took a heading towing the sled 45° off the wind line and hoisted the "cast" signal. On "execute," the cast signal was hauled down and the ship turned with full rudder through the wind to a course 45° off the wind. During this ship maneuver, the pilot had to come in and land in the slick at a point close enough to the ship so that with full gun he could taxi up astern of the ship and place his pontoon nose on the sled as the ship completed its turn. As the plane hooked the cargo net on the sled, the pilot cut the gun and the mech hooked on the hoisting gear. This maneuver was every bit as exacting and required all the skill of a carrier landing – particularly if several planes were to be recovered in one maneuver.

When the *Lexington* and *Saratoga* came out, they were equipped with the Norden catapult. This was an awesome 12-ton cone of steel about seven feet high. It was turned by an electric motor at 300 rpm. The catapult wire carried a hook-on traveller on deck and over the cone, formed into a loop. The plane

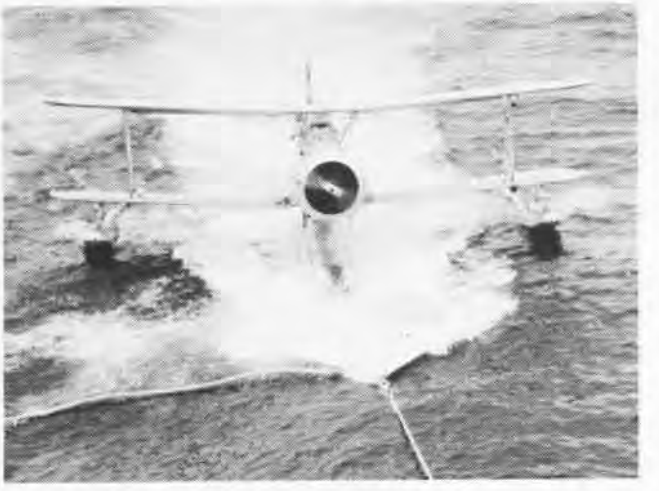


The Navy's first successful catapult launching was made at the Washington Navy Yard in November 1912. Powered by compressed air, the device launched Lt. Ellyson in a Curtiss A-3. Later models of the compressed air catapult were installed in Langley and aboard battleships and cruisers, as on Arizona, opposite. At right, O2U-3 is launched by powder catapult from Pensacola. F4B-3, below, was used for first flush deck catapult tests at Philadelphia Navy Yard using hydro-pneumatic design.

was held back on deck by a breaking strip. When the plane was ready to go, the loop was dropped over the rotating cone, moving faster and faster as it ran lower on the cone. One turn at the top of the cone moved the wire only a few feet, whereas, as it neared the bottom, one turn moved the wire almost 15 feet. It was a real Rube Goldberg invention and seldom used.

The *Yorktown* and *Enterprise* introduced the hydraulic catapults — which gave a much better ride and real positive action. There were two on the hangar deck (which fired almost exactly crosswind). It was a hairy shot and not very popular with pilots. Normally, the CAG took this shot.

O2U prepares to launch from West Virginia in 1930, using turret-top P-4 powder catapult. An SOC, below, during a CAST recovery.



Two O3U-1's of California's scouting detachment are in fair-weather stowage position, above. The P-6 turntable-type powder catapult and aircraft handling equipment are well illustrated in this view. Saratoga's forward catapult, right, was capable of speeding a 5,500-pound plane to 65 knots in a 55-foot run.

at Sea with the Carriers

ATLANTIC FLEET

John F. Kennedy (CVA-67)

The officers and men of *Kennedy* have set up a "trouble desk hot line," open – whenever *Kennedy* is in port – to Norfolk families of prisoners of war and those missing in action. CVA-67 answers all calls for assistance from household chores to minor repairs – the small problems that seem to pile up. *Kennedy* supplies the manpower and the tools; the families pay the cost of the materials.

In announcing the project, Captain Ferdinand B. Koch, commanding officer, indicated that the concern for POW/MIA families was deeply felt by *Kennedy* men and that help would be available whenever possible.

Independence (CVA-62)

One of man's last all-male strongholds, a Navy ship operating at sea, was invaded in March when two Waves visited *Independence* to observe pilot carrier qualifications off the Virginia coast.

Ensigns Capria Cantlin and Diana Shelton, both assigned to VF-101's Oceana Detachment, received CNO permission to accompany the squadron.

Forrestal (CVA-59)

The monotony of long anchorages without liberty is lessened somewhat aboard *Forrestal* by performances of the "Forrestal Follies."

Over 3,500 officers and enlisted men crowd into the hangar bay to enjoy "Woodstock Med" consisting of band concerts, a progressive rock group, vocalists and guitarists, rhythm and blues combo – and Commanding Officer Captain L. A. Snead, who contributes sea stories and never-failing good humor.

Thanks to its creator, CPO Sam J. Williams, and the many talented crew members, Forrestal Follies livens up on-board liberty in the Med.

Barcelona, Spain, was the site for the recent change of command for *Forrestal's* embarked CVW-17 when Commander Thomas H. Replogle relinquished command to Commander Marvin G. McCanna, Jr. Cdr. Replogle, who had commanded CVW-17 since March 1970, has been ordered to the Office of the Chief of Naval Operations in Washington, D.C.; Cdr. McCanna reported from OpNav.

Hancock ordnanceman readies bombs for aircraft launching on strike missions.

CVW-17, home-ported at NAS Oceana, Va., is currently engaged in an extended Mediterranean deployment with *Forrestal*. Member squadrons include VF's 11 and 74 and VA-85 of NAS Oceana; VA's 81 and 83, NAS Cecil Field; RVAH-7, NAS Albany; VW-126, NAS Norfolk; HS-3, NAS Quonset Point; and VMCJ-2 Det. A/59, MCAS Cherry Point.

Wasp (CVS-18)

Wasp was recently awarded the Navy Unit Commendation for contributions made during ASW exercises in the North Atlantic last summer.

The award was presented to the ship's commanding officer, Captain Kenneth H. Lyons, by Rear Admiral Tazewell T. Shepard, Commander, Antisubmarine Warfare Group Two, during ceremonies aboard.

In the citation, SecNav praised *Wasp* for her "vital contribution to the advancement of antisubmarine warfare and to the control of the world sea lines of communication."

PACIFIC FLEET

Hancock (CVA-19)

Hancock's 27th birthday on April 15 found her at sea, six months into her sixth WestPac deployment.

She was the scene recently of the reunion of the Shirkey and the Tozer brothers. SP/4 Mike Shirkey, from the Binh Hoa Army base, and 1st Lt. Raleigh Tozer, Army Special Forces officer with Advisory Team 1, flew from Vietnam to spend a few days with their brothers aboard *Hancock*.

The Navy brothers, Lt. Butch Shirkey and Lt. Eliot Tozer, are A-4F *Skyhawk* pilots of Attack Squadron 55.

Kitty Hawk (CVA-63)

Rotating on Yankee Station Seventh Fleet carriers *Kitty Hawk*, *Ranger* and *Hancock* launched a flow of Task Force 77 jet aircraft flying day and night missions in support of RVN forces which pushed into Laos in an operation called Lam Son 719. In the first six weeks, TF 77 pilots chalked up more than 600 strikes. Targets destroyed or damaged included 167 trucks, 102 bunkers, 91 petroleum storage areas, 30 military structures, 25 tanks and 11 AAA sites.

Eight first tour pilots of VA-195, flying A-7E's, became centurions aboard *Kitty Hawk*. The eight *Dambusters* are LCdr. Mike Boston and Lts. Russ Pearson, Bill Brewer, Don Beus, Gene Allen, Bob Carsten, John Blandford and Tom DeMarino.

The men of JFK perform many chores as part of their hot-line POW/MIA project. Here, FN John Taylor and DC3 Fred Hoffman repair an attic ladder in the home of a POW family.

Air Force Captains Bob Howells and Frank Baque of the 23rd Tactical Air Support Squadron visited *Kitty Hawk* as part of an exchange visit with the Navy. The two captains are forward air controllers. They fly their OV-10 *Bronco's* low and slow to find and mark targets for faster aircraft. Navy pilots and Air Force FAC's work as an integral team. The exchange visits were aimed at a mutual understanding of each other's work and problems.

In a change-of-command ceremony in April, Captain Owen H. Oberg, who came from command of USS *Caliente* (AO-53), relieved Captain Earl F. Godfrey as commanding officer of *Kitty Hawk*. Capt. Godfrey has reported to the staff of Commander, Naval Air Force, Pacific, in San Diego.

Five members of the House Armed Services Committee took a look at Navy air operations in SEAsia when they flew aboard *Kitty Hawk* as she cruised in the Gulf of Tonkin.

On Call to Haul

The Cubi Point Detachment of VRC-50 is in business to provide mail service and rapid passenger transportation to and from Yankee Station.

"The C-2A aircraft is definitely the electrode of the fleet!" says Lt. John H. Bell, a Naval Aviator with more than two years' experience as a pilot of C-2A's for VRC-50. During his last deployment in the Western Pacific, Lt. Bell flew emergency leave and some permanent-change-of-station personnel from the carriers.

An average of 1,600 pounds of mail is delivered each time a VRC-50 *Greyhound* makes a mail run to a Seventh Fleet carrier. In a recent two-and-a-half-month period, the squadron's aircraft handled 1,450 passengers, 72,853 pounds of mail and 89,990 pounds of cargo for just one carrier, *Kitty Hawk*.

All C-2's flown by VRC-50 are scheduled by the Commander, Attack Carrier Strike Force 77. Daily, these aircraft can be seen heading for the flight decks of carriers in the Gulf of Tonkin.

In April, the last VRC-50 C-2 at NAS Atsugi took off for its new home at NAS Cubi Point, R.P. All VRC-50 operations in Southeast Asia will be handled from Cubi Point. Pilot and maintenance personnel training will be handled at NAS North Island, Calif.

The squadron, led by Commander R. L. Williams, has been operating in the Western Pacific since 1951, first as VR-23 and later as VR-21 — when VR-23 became a detachment of VR-21. The detachment was redesignated VRC-50 in 1966.

JOC Dick Graddick

Representatives Jack Brinkley (Ga.), Harold Runnels (N.M.), Bob Wilson (Calif.), Bill Young (Fla.) and Floyd Spence (S.C.) were welcomed by Rear Admiral D. W. Cooper, Commander Task Force 77. Vice Admiral M. F. Weisner, Commander, Seventh Fleet, and Rear Admiral L. B. McCuddin, Commander, Carrier Division Nine, also welcomed the guests.

During the four-hour visit, the Congressmen were briefed on Navy's Yankee Station operations, support operations for Lam Son 719 and the protective reaction strikes in North Vietnam. Then they toured the ship and observed flight operations, talking with pilots returning from air strikes.

Ranger (CVA-61)

While operating in the Gulf of Tonkin, *Ranger* responded to a distress call for medical assistance from the SS *Hyria*, a British merchant ship out of Singapore.

Navy flight surgeon Lt. Michael W. Pekas and HM Hugh Foley were helicoptered from the carrier to the destroyer escort, USS *Bradley*, which then steamed at top speed to her rendezvous with the *Hyria*. There they administered medical aid to an injured crewman whose leg had been severely cut.

While CVA-61 was visiting NS Subic Bay, Captain W. H. Shawcross, station commander, and *Ranger* C.O., Captain Joseph L. Coleman, hosted the Australian Ambassador to the Philippines, the Hon. Edward Ingram. The Ambassador also visited HMAS *Perth* and HMAS *Brisbane*, which were tied up at the same dock.

Shortly before the in-port period, *Ranger* delivered oil and sacks of mail to *Perth* at sea, in return for which *Perth* gave the carrier a six-pack of Australian beer, which was later raffled off.

Lieutenant General Na-Nakorn Serm, Commander of the Royal Thailand Forces, was another guest aboard *Ranger*. General Serm and his party of Thai military leaders were escorted by RAdm. James Ferris, ComCarDiv-1.

Chee Mai Yung, a Chinese orphan girl in a home near Hong Kong, has had 33 "uncles" aboard *Ranger* for nearly a year – all members of the interior communications division. As her sponsors, they have been sending money to the orphanage for her care, and letters and packages to her. When CVA-61 visited Hong Kong in January, the sailors met their young friend for the first time, brought her on board for a visit, and visited her orphanage near the Communist Chinese border. The crewmen are participating in a foster child program sponsored by the Christian Children's Fund, Richmond, Va.

In March, 165 *Ranger* men enjoyed a mid-cruise leave with their families back in the U.S. They were able to do this under the new liberal leave policy which allows men to take leave while their ship is deployed.

Ticonderoga (CVA-14)

Last April, *Tico's* daily paper carried the UPI story about Gary Hall and his sister, Pamela, who suffer from a kidney disease and must use, at great cost, a blood purifying machine in order to stay alive. Within a short time, $1,400 had been collected among the men, enough to keep Gary and Pamela alive for more than two months.

Captain Edward A. Boyd, commanding officer, thanked the crew ". . . who, while far at sea, still are concerned for those at home."

Oriskany (CVA-34)

Oriskany, commanded by Captain Frank S. Haak, is conducting training exercises off the coast of southern California in preparation for her sixth deployment to Yankee Station.

A young visitor to Midway during her recent dependents' day cruise watches intently as CVW-5 aircraft demonstrate flight operations.

THE SELECTED AIR RESERVE

Carquals

It was "just another day" aboard USS *Independence* at sea off the East Coast. Flight operations had begun at 2 a.m., just as they had for three days straight, and carrier qualifications for Navy and Marine Aviators were in full swing.

About 8 a.m., a flight of F-8 *Crusaders* broke out of the overcast and dropped into the landing pattern. "Clear deck" was signaled and the first F-8 touched down and then zoomed skyward again. This procedure was repeated by every *Crusader* in the flight until each had two touch-and-goes. The F-8's then came around for a final approach and an arrested landing.

As the planes were trapped, plane handlers made sure the arresting cable disengaged and plane directors sent the aircraft forward to the catapult where checkers insured thumbs-up for a launch. Airborne again, the planes joined the landing pattern and the round-robin procedure that is all a part of carrier qualifications.

Thus began carquals for VF-201 and VF-202 of NAS Dallas. Sharing time with the two Dallas VF squadrons aboard *Independence* were the VA squadrons of CVWR-20 and several regular Navy and Marine squadrons.

On the flight deck, Regulars, Reservists and TAR's worked as one compact team. Checkers, trouble shooters, plane captains and plane handlers came from the squadrons; the ship provided directors, refuelers and crash crews.

In addition to providing invaluable training for the flight deck personnel and carrier qualifications for the pilots, duty with *Independence* provided navigational training for the pilots. Flying from NAS Oceana, the pilots would find the carrier, complete their required landings and return to the beach where another group of maintenance personnel was waiting to correct any problems that had developed.

Navy Bobsled Team

While most Texans were enjoying a mild winter, PO1 Robert W. Huscher, a Naval Air Reserve recruiter at NAS Dallas, Tex., and a member of the U.S. Navy Olympic Bobsled Team, was up to his neck in snow. The team was competing in the world championship matches in Italy.

Back in 1964, PO1 Huscher and LCdr. Paul Lamey decided to form a six-man Navy bobsled team. Both men became drivers and Huscher went on to the position of brakeman. Besides stopping the sled at the end of a run, he has the responsibility of getting the sled off to a smooth, fast start and helping to maintain balance on sharp curves.

After the bobsled season was over in late February, Huscher returned to his recruiting duties in Dallas.

Three senior Naval Air Reservists found themselves in unfamiliar territory recently while participating in the 5th West Coast Senior Naval Reserve Officer Orientation Program. Standing in the control room of USS Darter (SS-576) are, left to right, RAdm. Robert P. Owens and Capt. George A. O'Connell, Jr., CNAResTra staff; LCdr. Charles Noll, Darter's skipper; and Capt. Wilfred E. Blessing of NARS G-1, NARTU Alameda, Calif.

Change of Command

Brigadier General Jay W. Hubbard recently assumed command of the 4th Marine Aircraft Wing/Marine Air Reserve Training Command at NAS Glenview.

He relieved Major General Robert P. Keller who has been transferred to Hawaii to assume duties as Assistant Chief of Staff, J-3, Pacific Command.

Present at the ceremony was Major General Homer S. Hill, Deputy Chief of Staff (Air), Headquarters Marine Corps, representing the Commandant of the Marine Corps.

VA-303 Gets Corsairs

On April 5, two A-7's left VA-125, NAS Lemoore, for their new home at VA-303, NAS Alameda, thus beginning a new era in Reserve Aviation.

Commander W. E. Nelson, C. O. of VA-303, and Commander H. W. Herrigstad, OinC, flew the *Corsairs* to their new home. Commander Herrigstad said of the occasion, "The advent of the *Corsair II* has updated the Naval Reserve Force by at least 10 years."

"We now have a first-line aircraft, the same model as is being used on active duty with the fleet. As a result, the Reserves can now match the fleet in all phases of the attack squadron mission," is the way Captain H. A. Hoy, C.O. of NARTU Alameda, feels about the latest addition to the Reserve jet set.

VA-303, the first Reserve squadron to operate the modern jet, is scheduled to have 12 *Corsairs* by July 1. Future squadron plans include a carrier deployment with their new aircraft.

Linking Sky and Sea

Linking the Navy's air arm with amphibious forces during an invasion on enemy shores is the mission assigned to tactical air control squadrons.

To complete this task, squadrons such as TACRon 21 provide air traffic control and air operations coordination for close air support, assault troop air cover, combat air patrol, helicopter troop movement, and search and rescue efforts within an objective area.

TACRon 21 is made up of 45 officer and enlisted experts in communications, airborne armament, intelligence assimilation and evaluation, gunfire support and many other skills needed to blend airborne and amphibious units into a successful assault team.

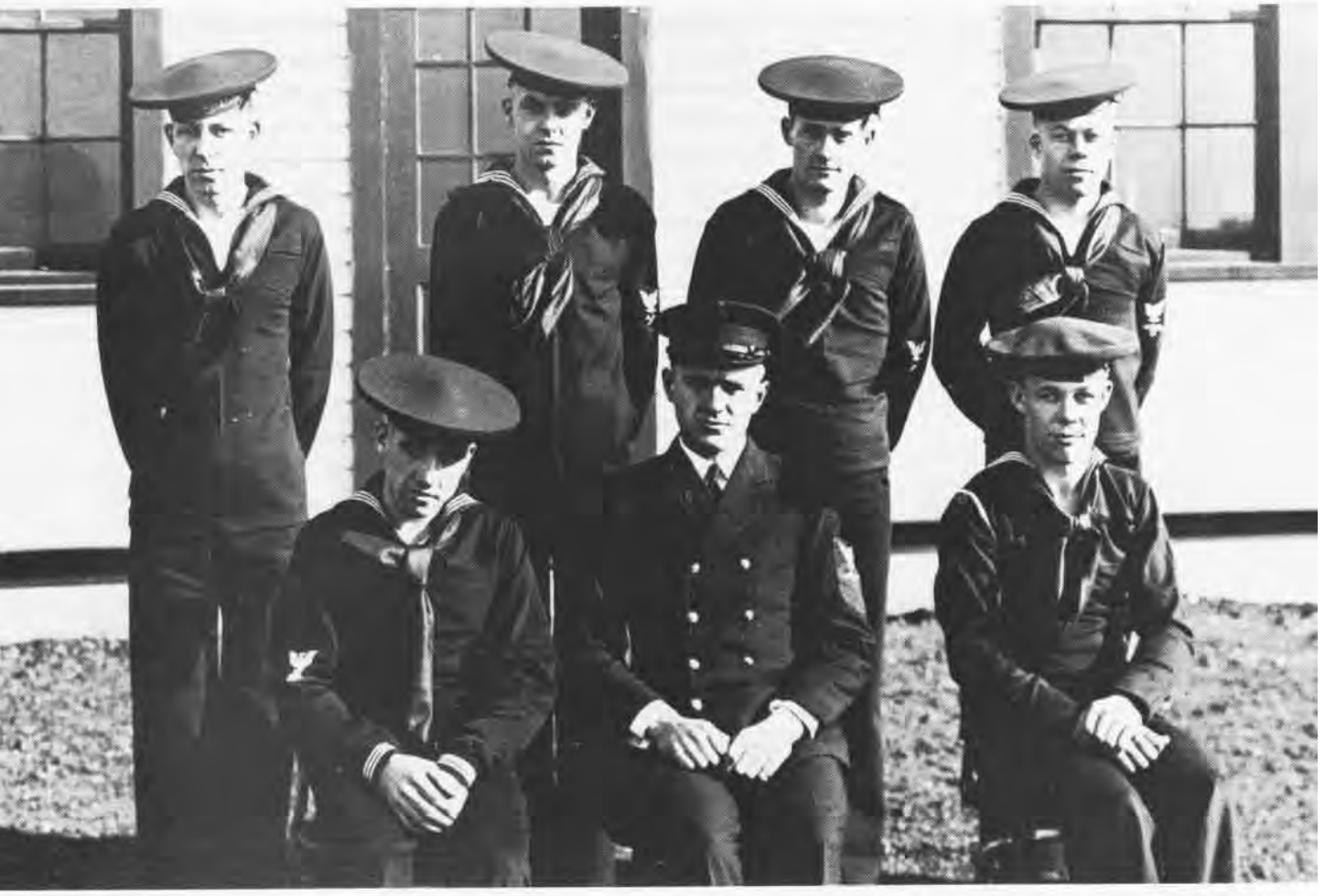
The squadron's assets include radio trucks and equipment, target charts and maps, reams of message traffic, piles of invasion plans, stacks of status boards and the use of a communications satellite.

In addition to deploying at sea, TACRon 21 maintains mobile communications stations which can be used as beachhead and advanced command and observation posts. These truck-mounted stations have both high and ultra-high frequency radio transceivers. In peacetime, they permit the use of shore installations for close air support training for attack and fighter squadrons and various Naval Air Reserve units.

Led by Commander Richard M. Hawkins, the squadron is one of two on the East Coast. Based at the Naval Amphibious Base, Little Creek, Va., TACRon 21 also has detachments on station in the Mediterranean and Caribbean. These detachments are complete entities and can provide air control support for contingency operations.

Three West Coast tactical air control squadrons are located at the Naval Amphibious Base, Coronado, Calif.

TACRon mobile detachment provides air control for Oceana and Cecil Field squadrons during close air support training at Camp Pickett, Va., top right. From atop a tower observation post, ATN3 W. R. Hunt designates target to inbound aircraft, above. ACAN A. L. Joseph spots, reports and records strike miss distances and hits, right.



Weather – sometimes it's good, other times not so good. While the weather might not bother some people, the conditions that prevail here and afar are important in Naval Aviation.

Even with the electronic all-weather capabilities in his modern aircraft, a pilot wants to know what kind of weather he will be flying in. An NAS ops officer might rightly get upset if a storm suddenly restricted the availability of his duty runway – and he had not had previous warning. And a carrier skipper would, more than likely, prefer to skirt a typhoon than try steaming through it.

Whatever information might be needed about the weather is available through an environmental organization commonly known as the naval weather service system. The system is comprised of various naval commands working together to provide services to meet Navy environmental and Department of Defense oceanographic requirements.

The system embraces weather service personnel attached to combatant vessels: carriers, cruisers, guided missile ships, amphibious assault ships; staffs of force and fleet commanders; Marine Corps weather offices; weather reconnaissance squadrons; training, logistic and material support commands; and the Naval Weather Service Command (NWSC).

The system is unique among weather services, providing meteorological and oceanographic predictions covering areas from 1,200 feet below the surface of the ocean to 100,000 feet in the air, all over the globe. The basic functions involved are almost identical, and the atmosphere and oceans are treated as two fluids in a single, coupled air-ocean environment.

Because air-ocean prediction functions are identical, the naval weather service system can utilize common facilities and dual-trained personnel to provide services in both media. The Navy system is configured to go either way – or both ways simultaneously.

But before any prediction can be made, the state of the air-ocean environment must first be determined. At central analysis points, observations are collected and processed and the results are used to prepare basic prognostic charts. This processed information is then interpreted by meteorological environmentalists who emphasize conditions of particular interest to the ultimate user, and format that information to meet individual requirements.

The most important and largest single component of the system is NWSC. It is primarily involved in centralized analysis, prognosis and interpretation of atmospheric and oceanographic conditions.

The concept of a functional prediction service to meet Navy requirements has its historical beginnings in

First class graduated from aerographer's school at Anacostia in January 1925

Navy's Weather Service

the U.S. Marine Meteorological Service established in the 1800's, and in the Aerological Service which the Chief of Naval Operations, in 1919, directed the Bureau of Navigation to establish and maintain.

From this background, progressing through several organizational changes during and subsequent to World War II, evolved the present NWSC established by the Secretary of the Navy in July 1967.

Today, the vast complex is commanded by Captain William J. Kotsch, a rear admiral selectee. He is the first meteorological specialist to attain flag rank.

The command, with its headquarters in Washington, D.C., is directly under the Chief of Naval Operations; supervision and policy guidance are effected through the Director of Command Support Programs.

NWSC's four computer-equipped Fleet Weather Centrals (FWC's) in Guam, Pearl Harbor, Norfolk and Rota collect environmental observations, process data and disseminate area analyses, prognostic charts and weather warnings within their areas of responsibility. A fifth, at NAS Alameda, differs from the others in that its responsibilities are functional rather than geographic. It handles a large volume of optimum track ship routing.

Ten Fleet Weather Facilities assist the FWC's in their mission, provide support to local aviation operations and, at most locations, have additional specialized functional responsibilities. For example, Keflavik and Quonset Point provide detailed support for antisubmarine warfare operations, Jacksonville deals with hurricanes, and Kodiak concentrates on sea ice forecasting.

Naval Weather Service Environmental Detachments are assigned to the centrals and facilities. The 53 detachments support aviation operations of all types, including ASW environmental support to VP aircraft.

More than ten years ago, the Navy realized that the sheer volume of data involved in global environmental analysis and forecasting, and the inevitable advances in related techniques, could only be handled by numerical means. Navy moved into the era of computerized environmental products when a Fleet Numerical Weather Central (FNWC) at Monterey, Calif., was added to the weather central complex.

As the operational hub of both the naval weather service system and the Command, the central at Monterey has hemispheric meteorological and oceanographic responsibilities — producing analyses and forecasts for direct operational use and in support of all elements of the system.

Here's how it works.

Environmental observations are collected from worldwide sources, including observations from the naval

weather service system. The World Meteorological Organization, a specialized agency of the United Nations, provides guidance for the standardization and collection of environmental observations from 130 member nations around the world.

These meteorological and oceanographic observations are transmitted to FNWC Monterey, where they are quality-checked, sorted and edited by automated programs. Then, the analysis and prognosis functional programs take over, and basic processed data are transmitted to the fleet weather centrals, computer-to-computer, at the rate of 4-6,000 teletype words per minute.

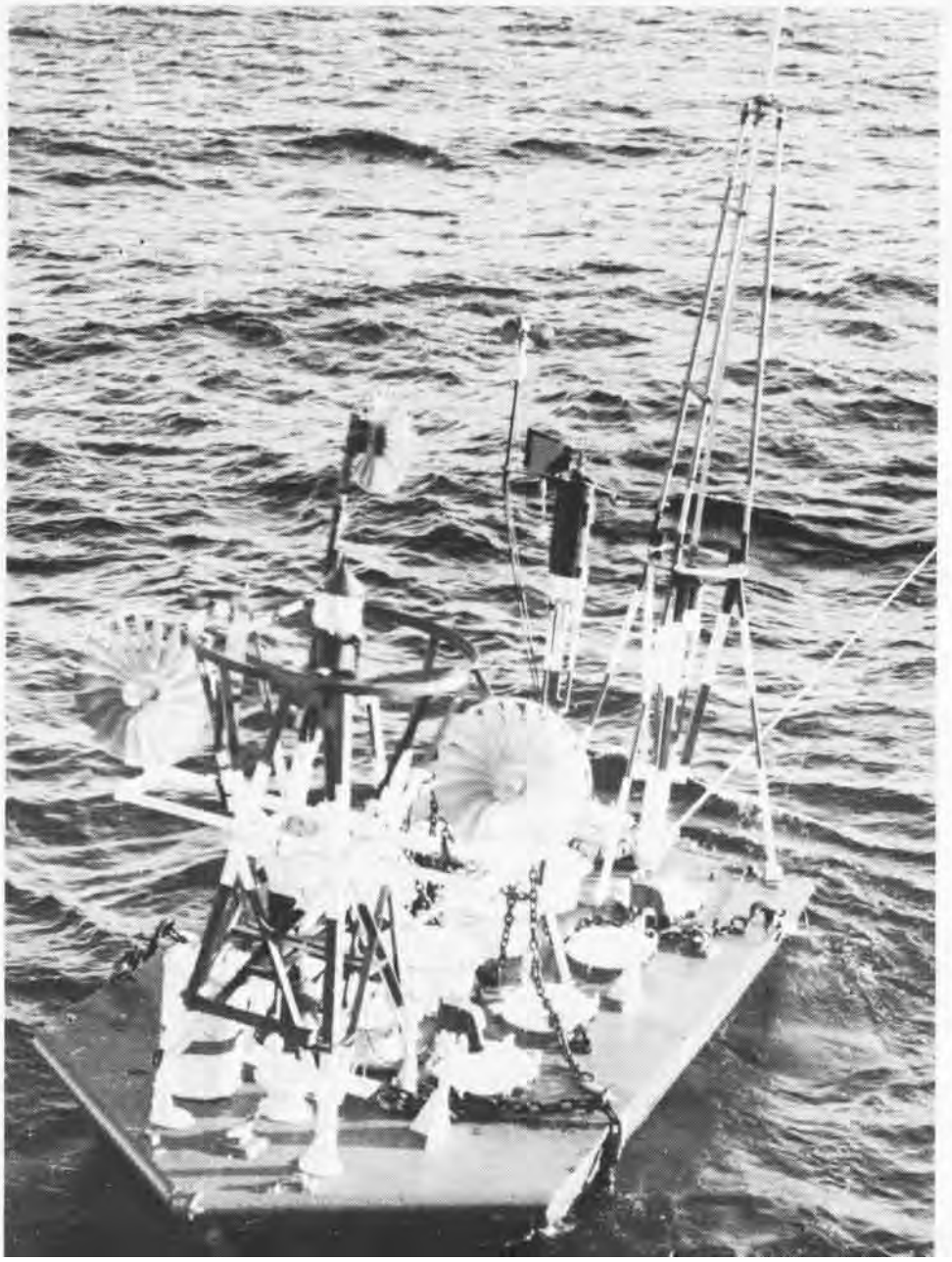
At the same time, the centrals are returning to Monterey their own observations and any that they have collected from ships in their areas.

At the centrals, the data fields of interest are automatically extracted, supplemented with local data, interpreted and formatted as required for customer use. The information is then disseminated by radioteletype, radio facsimile or data link to other NWSC units, and ultimately to the fleets, Marine Corps units and all naval air stations.

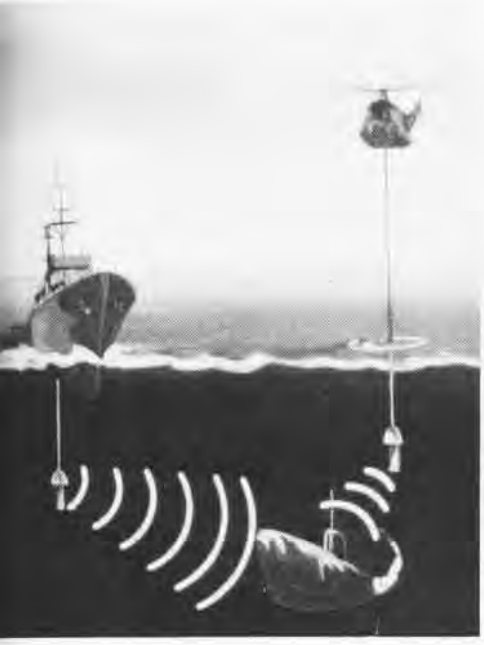
Most of the analysis and dissemination processes are completely automatic, utilizing modern computer and auxiliary equipment coupled with a highly efficient, three-continent, high-speed communications linkage which is called the Naval Environmental Data Network.

The main trunks of the network emanate from the computer complex at Monterey and connect with the computers at Guam, Pearl Harbor, Norfolk and Rota. From Norfolk and Monterey, the trunks fan out along the East and West Coast tie-lines to locations which extend on the West Coast from Alameda to San Diego and on the East Coast from Brunswick to Key West.

These terminal stations are concerned basically with antisubmarine warfare or control of operational forces. Non-Navy customers at terminal stations include the National Weather Service, the Air Force, Coast Guard, Woods Hole Oceanographic



Floating weather station, NOMAD I, is a hurricane-predicting robot. It is put into position in the Gulf of Mexico each summer at the beginning of the hurricane season and remains anchored, and unattended, for five to six months. Its electronic gear transmits weather data every six hours during normal conditions and every hour during gale conditions. NOMAD I provided the first warning of Hurricane Ethel in 1961.



A destroyer and a helicopter use dipping sonars to hold contact on a submarine in the artist's drawing at left. The warship and the helo get valuable sonar information via the ship, helicopter acoustic range prediction. The drawing at right depicts a P-3 Orion gaining sonobuoy contact with a submarine with the help of acoustic sensor range prediction for fixed wing aircraft.

Institute and the National Marine Fisheries Services. The terminals are connected to remote automatic plotters which provide hard-copy map analyses and prognoses.

The bulk of the meteorological data input required to support the system flows through the Air Force automated weather network to Carswell AFB and ultimately to Monterey. This relationship has proven extremely effective, allowing the Navy to specialize in product dissemination to afloat forces. Ongoing projects continue to enlarge the scope of Navy and Air Force cooperation.

Many services are generated by the Command for its customers.

A variety of analyses and prognostic weather charts provides fleet forces with a three-dimensional hemispheric picture of the air-ocean environment in which they are operating. These charts are used in the conventional way by forecasters to provide necessary services to the fleet.

Products in the meteorological services area include high winds and high seas warnings, hurricane and typhoon forecasts, ice forecasts, and en route weather forecasts for individual ships and forces.

Supplementing this material are numerous products and services tailored specifically for unique naval operations:

• Amphibious landings require a variety of parameters including height, type and period of breakers, width of surf zone and littoral currents.

• Carrier operations make use of strike forecasts, route winds at flight altitudes, ceilings, visibilities and ditch headings.

Capt. M. A. Eaton was the first Navy project coordinator for storm seeding operations — Project Stormfury. The project is a joint effort of the Departments of Commerce and Defense to explore the structure and dynamics of hurricanes and tropical storms, and to reduce the force of these storms.

• Fire support operations require ballistic winds and density for accurate gun and missile firing.

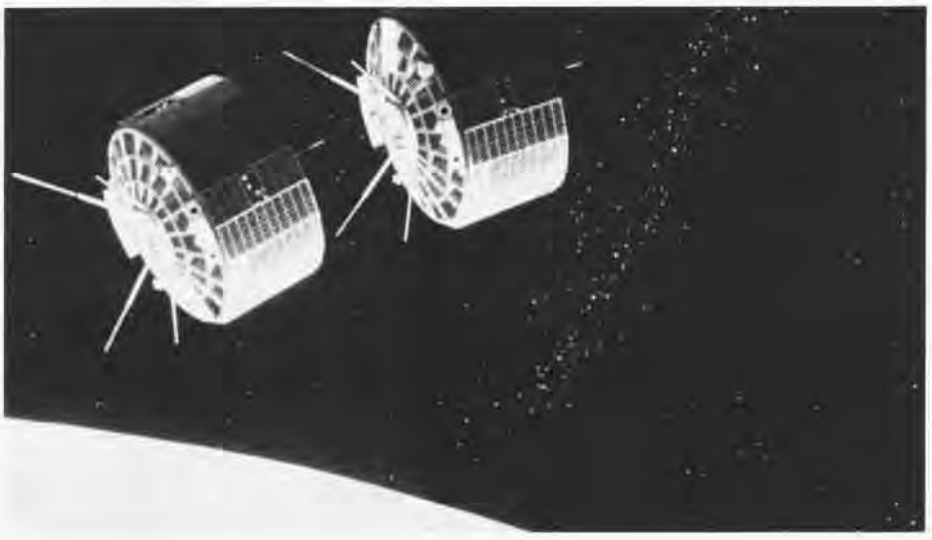
• Underway replenishment operations utilize a tailored product that provides a measure of the anticipated difficulty — or a risk — of replenishment underway.

• Optimum track ship routings, developed by the Naval Oceanographic Office and operated by NWSC, integrate anticipated sea and weather conditions with individual ship characteristics and operating constraints to select a safe, least-time track for a given ship voyage. FWC Alameda routes approximately 3,500 ships a year, and Norfolk about 1,000.

Support of antisubmarine warfare forces constitutes NWSC's primary emphasis in oceanographic prediction. The Command analyzes the complex, extremely variable and little understood physical ocean characteristics, predicts these variables on a synoptic basis and applies the predictions to the propagation of sound in the ocean.

By working with Navy and other scientists, Monterey acquired the ability to forecast the effectiveness of sonar (active and passive) and to provide real-time guidance in its employment. Monterey also has several programs under way to adapt newer and more powerful acoustic models to their operational schedules.

To merely provide fleet units with



Meteorological satellites have added a new dimension to atmospheric and oceanographic studies. Weather systems and cloud cover can be observed and tracked through satellite observations. These are especially valuable in providing data over oceans where normal observations are relatively scarce.

unending volumes of sea-surface temperatures, layer depth predictions, temperature profiles, sound velocities and sea states is to miss the mark slightly. These oceanographic parameters are important, not so much in themselves, but to the extent that they influence or affect the sound ray path and propagation loss. In fact, fleet operators really are primarily concerned with the question "At what range will my sonar system acquire a target in my immediate area today?"

The Naval Weather Service Command, utilizing the computer capabilities and expertise of its numerical center in Monterey, has evolved a system for providing fleet units with forecast detection ranges for each of the several sonar systems now in use.

This is the approach.

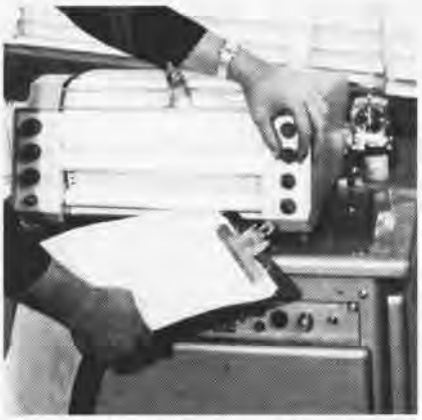
A full array of oceanographic analysis fields, prepared in-house, is combined into composite propagation loss profiles and ray path tracings for a series of point locations which are representative of predetermined acoustical regimes. Water mass boundaries are first determined and identified. Bottom contours are then overlain, and finally acoustic bottom types are introduced to finalize boundaries of areas which are homogeneous with respect to the three parameters. Daily range predictions are prepared for over 800 such areas.

Both power-limited and ray path-limited ranges are predicted; the selection of one or the other depends on the spatial relationship of the transducer and target – whether they are in the same layer, lie across a layer boundary or are both in a duct.

As a further refinement, the range variability that might be expected within each regime is also calculated. The system is adaptable to both active and passive sound detection systems.

A fleet user requests detection range forecasts based on the characteristics of his particular sonar equipment, for a particular time and in a particular area.

The system is divided into acoustic sensor range prediction for support of fixed wing aircraft, and the ship, helicopter acoustic range prediction system for support of other users. A third range prediction series, tailored for submarine sensors, is being tested operationally in the Mediterranean.



Automatic line plotters, remotely run by computers in major centrals, provide analyses and prognoses charts in about three minutes.

All three are simple to use. The user is told what sonar ranges are possible in his operating area or where he may go. This leaves the sonar operator essentially free of the burden of all computational work.

Range variability is presented to indicate the spectrum of expected ranges in any one area and bottom reverberation loss calculations are provided. Convergence zone and bottom-bounce ranges are provided, enabling ships to select their optimum mode of operation. Ranges are presented for in-layer and below-layer targets based on 50 percent detection probability of a random aspect target by an unalerted operator, with the calculations further based on noise-limited performance figures which correspond to sonar type and three different ship speeds – 12, 18 and 24 knots.

Fleet users can adjust detection range forecasts within the spectrum of ranges furnished them, taking into account factors unknown to the Naval Weather Service Command: alertness of the operator, ship's speed, condition of sonar equipment and previous target identification.

Lack of global scale observations, particularly in the Southern Hemisphere, has plagued both the meteorologist and oceanographer for years.

Satellites, however, will increase the observational capabilities by order of magnitude. With this broadened data base of both atmospheric and oceanographic observations, marked advances in air-ocean environmental prediction services are foreseen.

Advanced vidicon cameras (highly sensitive television cameras), automatic picture transmission systems and high resolution infrared radiometers will furnish environmental information day and night.

As to the future, the Naval Weather service system, led by the Command, has three basic responsibilities for providing environmental support: to obtain greater accuracy and prognostic capability through advances in satellite, computer and communication technology; to achieve complete capability to provide individual fleet units with real-time, on-call environmental information tailored to immediate tactical situations; and to support interdisciplinary and international cooperative efforts to advance our knowledge and understanding of the air-ocean system.

Officials feel that these goals are reasonably certain of attainment in the not-too-distant future. The Naval Weather Service Command is organized for service – it's most important product. It is constantly ready to adapt for fleet use, in mimimum time, the newer concepts and techniques the Navy developmental team has waiting.

Maybe the weather isn't always the best. But the next time you are catapulted from a carrier deck with the knowledge that only clear blue sky is ahead of you, think about where your information came from.

Tip your hat to that little old weatherman, and the many more like him.

An aerographer's mate takes temperature readings in an instrument shelter for a local weather forecast at NAS Glenview, above. Below, aerographer's mates launch radiosonde from USS Coral Sea to gather upper air soundings.

LIGHT

Naval Aviators daily face a danger that is just as real and just as deadly as any faced in combat or during carrier operations. Throughout the world, thunderstorms move across the face of the earth everyday, flashing with the great electrical energy that we know as lightning. The lightning bolts emanating from these storms can and do strike aircraft. The effects of lightning and other electrical phenomena range from the eerie spectacle of a glowing green ball rolling through the interior of the aircraft to heavy destructive strikes that can cause the loss of a radome and/or secondary damage to the airframe.

Although we have found no way to predict or prevent lightning strikes to aircraft, understanding the nature of this phenomenon is a beginning.

The following summary of a workshop held at NAS Moffett Field, Calif., in December 1970 under the auspices of Commander Fleet Air Wings, Pacific, and the Office of Naval Research gives some answers and provides some insight into the nature of lightning and its effects on aircraft.

Dr. George Frier is a member of the University of Minnesota's School of Physics and Astronomy and was one of the many scientists who attended.

In thunderstorms, positive charge is transported to the top of a cloud and negative charge to the bottom of the cloud by processes that are not yet fully understood. These two separate charges produce strong electric fields between the top and bottom of the cloud and between the cloud and the conducting Earth. When the field reaches a breakdown value, at some point during the process, a spark will start to propagate (extend) in a direction which is approximately parallel to the electric field lines in that region. As the charge moves along the conducting channel, new fields are superposed on the original field ahead of the channel tip [charge] and, thus, produce further breakdown. If the process reaches the Earth, a return discharge moves back along the channel and neutralizes the charge deposited in the original breakdown processes. The first part of this process is referred to as the "leader stroke" while the later part is called the "return stroke." The original discharge may be followed by an average of four or five more similar strokes separated in time by approximately 1/500 of a second. The successive strokes follow the original channel, so that if the strokes pass through a fast moving plane, the strokes in the sequence may intercept the plane at different points and leave a series of holes in the plane. If the spark enters a more pointed region of the plane, repeated strokes may enter or leave the plane at the same point by introducing a short new section of channel. The repeated striking of a point in the airplane may cause a much more serious burn at that point.

Lightning strokes may occur between positive and negative charged regions of the cloud, or between one of these regions and charges on the surface of the Earth induced by the cloud.

NING STRIKES

A Technical Report

by Dr. George D. Freier

The former are known as "cloud to cloud" strokes while the latter are "ground" strokes. The nature of the return stroke is somewhat different in the two cases but, for protection purposes, the problem is the same, because once a leader stroke has created a channel through the plane, the plane is subject to the damage created by large currents which are necessary to discharge the cloud.

Why the detailed mechanism of initiating a lightning stroke is arranged so that there can be collection of charge from a large region of space into a channel is not completely understood. It appears that the local intensification of the field by the plane can initiate the discharge.

It cannot be predicted with certainty when, after starting, the lightning stroke will end but en route to Earth it tends to follow the ambient field lines. If a plane is in the region which is permeated by the electric field, there will be induced charges on the plane which alter the field in such a way that the lines of force terminate on one end of the aircraft and continue from the opposite end. Thus, one might say that the plane attracts lightning since these lines of force guide the stroke through the plane.

The plane may also collect charge from precipitation particles, and this charge will also alter the lines of force. The charge on the plane will lead to corona discharge, also known as Saint Elmo's fire, which is seen at the more curved surfaces of the aircraft. The phenomenon can also be produced by the induced charges described above. Whenever Saint Elmo's fire is observed, one can be quite certain that the plane is in a high electric field and chances are good that the plane will be struck by lightning if the surrounding cloud contains concentrated charge

centers, or that there will be some streamer discharges from its surface with probable effects on communication and navigational equipment. Other possible effects include ignition of vented fuel or damage to some electrical circuits on the plane, especially if a circuit has any components which form exterior surfaces of the aircraft.

Records from available information on strikes to commercial planes show that most of the damaging strikes occur between 2,000 and 12,000 feet. About 60 percent of the damaging strikes occur between the −5° C isotherm and the +5° C isotherm. This data reflects, in part, a combination of times spent in climb, descent and IFR holding patterns and the fact that storm avoidance is more difficult in these flight regimes than during actual flight.

When experimental planes, equipped to make measurements of lightning strikes to the aircraft, were flown into thunderstorms, it was found that there are about four times as many strikes at 29,000 feet as there are at 10,000 feet. The energy in these high altitude strikes is, however, much less and hence does much less damage to the plane.

The statistics on strikes presented above have not been weighted in any way to reflect the fact that planes spend different amounts of time at different altitudes. The numbers do seem to indicate that the most dangerous regions are at the freezing levels of the thunderstorm.

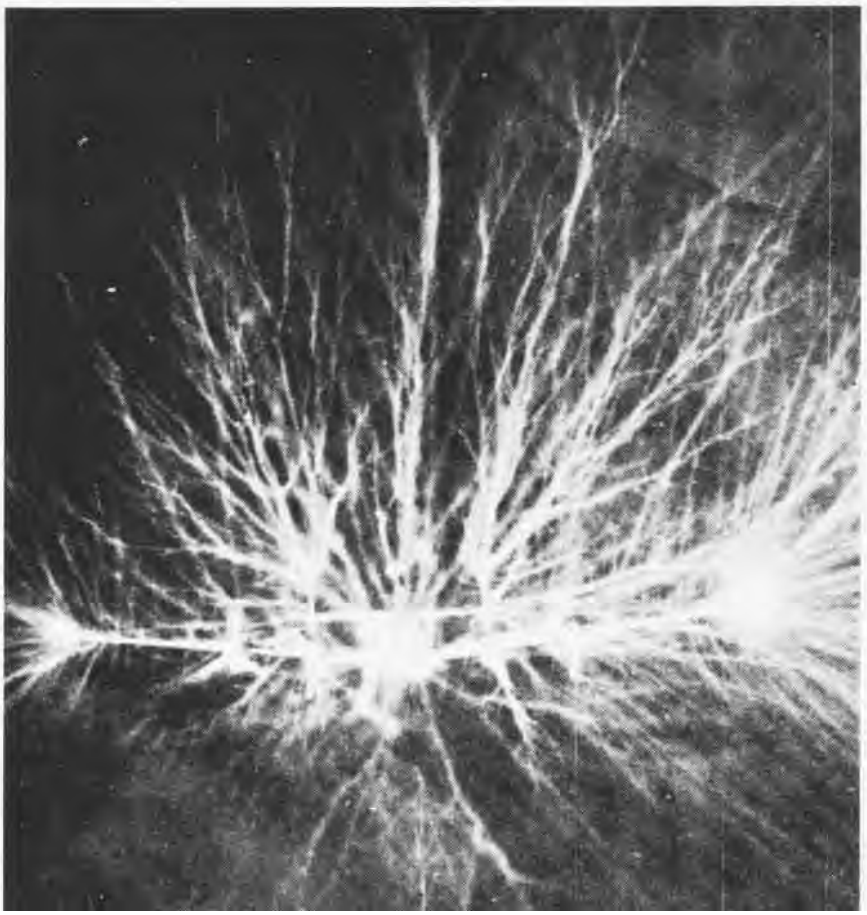
Damage to the aircraft systems may occur in some cases even if there is no direct strike to the plane. If the lightning misses the plane, it still has effective fields around the channel. These fields can induce voltages of two types in the plane. First there is the voltage produced by the electric field which is proportional to the product of the field and the length of a component of the aircraft in that field. For example, this type of voltage may be quite large, extending across the wing from tip to tip or from fore to aft of the plane, while it would be relatively smaller through the thickness of the wing. The field which produces the voltage must, of course, be parallel to the length chosen. The major components of this field are usually parallel to the channel which initiated the field, so that the largest voltages of this type will be along elements of greatest length parallel to the lightning channel.

The second type of voltage generated at a distance from the channel is produced by the change of magnetic field (with time). When this changing magnetic field pierces an area, there is a voltage proportional to the product of the time rate of change of the magnetic field and the magnitude of the area which it pierces. Various circuits on the plane (i.e., solid state circuitry or computer elements) define areas quite well, so that when this area is pierced by a changing magnetic field there will be an extraneous voltage generated in the circuit. This voltage will be generated with the circuit closed or open. If the circuit is closed, there will be a surge of current and this current may produce abnormally large voltages across high impedance elements in the circuit. If the circuit is open, abnormally large voltages may appear across the switching element and cause it to break down. No hard and fast rule can be given as to whether it is better to have the circuit closed or open.

If an airborne operation with a trailing element is carried out (i.e. refueling, helicopter loading operations or trailing a missile target), the electrostatic voltages produced by small ambient electric fields can become quite large. Placing insulation around a conducting element does not help much. An opposite charge to that of the conductor will collect on the outside of the insulation and electrostatic voltage will develop across the insulation and lead to breakdown of the insulating material — just as it would across a condensor element in an electric circuit. The number of lighting strikes in these operations is not very large, simply because the danger is realized and more care is taken. These operations should be carried out while more than ten miles from a thunderstorm.

Records of damage to military aircraft do not show the same frequency of lightning strikes to military planes as to commercial planes. This is probably due to more inadequate records kept on military aircraft. The commercial jet plane records show about one damaging strike per 2,500 hours of flying time. Military records show that military aircraft fly about ten times as many hours per damaging strike. From the commercial records, one might infer that the jet aircraft are less subject to strikes because they fly at greater altitudes. However, there is a rather large number of strikes to bombers which are, in general, high flying planes.

More carefully kept records and more detailed observations by pilots can be a great aid to scientists in ana-



lyzing the problem of lightning strikes. A few observations that can be made are: whenever a discharge of any kind occurs, note the intensity of the flash, the altitude at which it occurred, the nature of the precipitation, the classification of the cloud, the position of the cloud top and cloud base, the temperature at which the strike occurred, the change in behavior of any electrically powered equipment such as radar and radio, and whether the pilot or other personnel experienced any strange reactions.

In the case of Saint Elmo's fire, the length and structure of the discharge should be noted. A corona discharge is different for different polarities of charge.

If it is possible, damaged sections of the plane should be removed for scrutiny by experts.

Many pilots report on ball lightning which persists and moves about the interior of the plane for as long as ten seconds after a strike. This phenomenon is very puzzling to scientists who do not have a good explanation of how it exists or, indeed, why it should exist. The size, color, brightness and the lifetime of the ball, and any physical damage should be observed as carefully as possible.

Scientists need more data on the natural phenomenon of lightning strikes to planes. Pilots experiencing this phenomenon can provide much of the needed information and, together, we may be able to alleviate the hazards to life and property.

Under lab conditions, left opposite, a corona effect is achieved. Above left, time lapse photo of a lightning strike on an F-4; a simulated wing tip strike, above; left, the remains of an F-4's radome, lost to a strike.

Letters

Reunion

The USS Enterprise (CV-6) Association will hold its biennial reunion at the Newporter Inn, Newport Beach, Calif., July 28-31.

The *Big E* participated in many carrier battles in the Pacific in WW II and was officially credited with downing 911 enemy planes, sinking 71 ships and damaging 200 others.

Former personnel, including pilots and airmen, who desire further information, please contact Everett Ratliff, Program Secretary, USS Enterprise (CV-6) Association, 8661 Crescent Avenue, Buena Park, Calif. 90620.

This is the first reunion on the West Coast since 1958.

Capt. E. B. Mott, USN (Ret.)
Chairman, Program Committee for 1971
USS Enterprise (CV-6) Association
1068 Vallejo Circle
Costa Mesa, Calif. 92626

'Hard to Swallow'

The x-ray of 8-month-old Robert Carlquist in your March issue caught my eye. I believe, however, the record was set at Ellyson Field in either 1966 or 1967, when a young Marine accidently swallowed his newly-acquired wings (the big ones). An appropriately worded plaque, with an x-ray similar to Robert's, undoubtedly still hangs in the O' club at NAS Ellyson.

What is it with these young Marines?

LCdr. R. W. Bansemer
NAS Memphis
Millington, Tenn. 38054

Naval Aviation Films

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

MD-692GR (unclassified) *Drug Abuse — Everybody's Hang-up.* A documentary looks at the drug scene in an effort to heighten awareness and concern regarding the drug abuse problem and gives some suggestions for adults toward keeping young people off the chemical road to nowhere (14 min.).

MH-10278T (unclassified) *VMCJ.* The story of a photographic aerial reconnaissance squadron in combat (15 min.).

MN-10872 (unclassified) *OV-10 Spin Characteristics.* OV-10 spin recovery techniques (18 min.).

MN-10978 (unclassified) *Down to the Wire.* A group of student pilots prepare for their first landing aboard a carrier at sea (29 min.).

MN-10937 (unclassified) *Hot Refueling Procedures.* Safety aspects and refueling procedures under hot refueling conditions, for naval jet aircraft (21 minutes).

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

Brunswick CPO Honored

BRUNSWICK, Maine — In ceremonies held in the office of Governor Kenneth M. Curtis, CPO Richard W. Gray of NAS Brunswick's aircraft maintenance department, received the state's General Aviation Safety Award. The award was "presented for demonstrating skill and imagination through maintenance practices in the State of Maine during the year 1970."

In May 1970, Chief Gray submitted a beneficial suggestion to the Navy concerning the procedures for leak testing and repair of engine-driven compressors aboard the P-3 *Orion.* It is estimated that this suggestion will save the Navy approximately $43,000 in its first year of use. The suggestion earned an FAA award and $950.

In April, Gray was promoted to senior chief aviation machinist's mate and transferred to VP-10.

It was all in the bag when the officers, enlisted men and families of VR-21, NAS Barbers Point, got together for a VR-21/ Pepsi Cola-sponsored cleanup of Iroquois Point Beach which fronts the NAS housing area. Fifty volunteers joined squadron C.O. Captain P. Frank Hunter for the cleanup.

Record Hours for VT-3

MILTON, Fla. — Training Squadron Three recently logged its 100,000th accident-free flying hour. Lt. Bill Ridge and his student, Ens. J. M. Stevens, reached the milestone while flying a squadron T-28C.

VT-3, based at NAS Whiting Field, has flown 477 consecutive accident-free days. During this period, the squadron completed more than 450 students in the basic propeller flight syllabus in five phases of flight training in the *Trojan.* These include transition, precision/acrobatics, basic instruments, radio instruments, and formation and night flying. The average student receives 100 hours of flight instruction, 32 of which are flown solo.

The squadron was commended for its achievement by Vice Admiral B. M. Strean, CNATra, and Rear Admiral J. M. Thomas, CNABaTra.

VW-4 Accepts New WP-3A Orion

JACKSONVILLE, Fla. — Weather Reconnaissance Squadron Four has taken delivery of its first WP-3A. *Orions* will eventually replace all of VW-4's *Super Constellations* as the squadron's operational aircraft.

The WP-3A was selected to replace the *Super Connies* after test flights in Hurricane *Inga* in October 1969.

Hurricane flights provide a rough ride in any aircraft, but the *Orion* rated best in performance and handling qualities, and proved to have the best working environment of the aircraft tested.

With load and environment normal for the mission, however, the WC-121 can maintain straight and level flight after an engine failure during climb only by dumping a considerable amount of fuel. The WP-3A can climb at a rate greater than 900 feet per minute on three engines.

For safety reasons, *Super Connies* are frequently limited to less than maximum weight takeoffs at airfields now used by the squadron. This cuts down range and endurance. Navy engineers calculate that the *Orion* will rarely, if ever, be limited to less than maximum weight takeoffs.

VF-161 was commissioned on September 1, 1960, at NAS Cecil Field, Fla., with the F3H-2 Demon as its aircraft. Early in 1961, the squadron moved to NAS Key West, Fla., and later the same year, to its present home base, NAS Miramar, Calif. The 'Chargers' claim the last Demon deployment—aboard USS Oriskany (CVA-34) in 1965. With five Vietnam deployments to its credit, the squadron is led by Cdr. John A. Dickson.

SQUADRON INSIGNIA


The Graduation Present.
Why settle for a solid chrome ballpoint pen, a zodiac calendar watch, or even a supercharged imported car that goes only 120 miles an hour?
There's a slim, sleek multi-million dollar jet that could have your name on it. You can streak along 10 miles above mere earthlings. And cover the entire course at LeMans in minutes.
With it comes an invaluable post-grad education, and the coveted wings of gold, worn by only a few thousand Naval Officers.
Right now is the one chance in your lifetime to really swing, as wide as the sea, as high as the sky.
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