NAVAL AVIATION NEWS

40th Year of Publication

SEPTEMBER 1959

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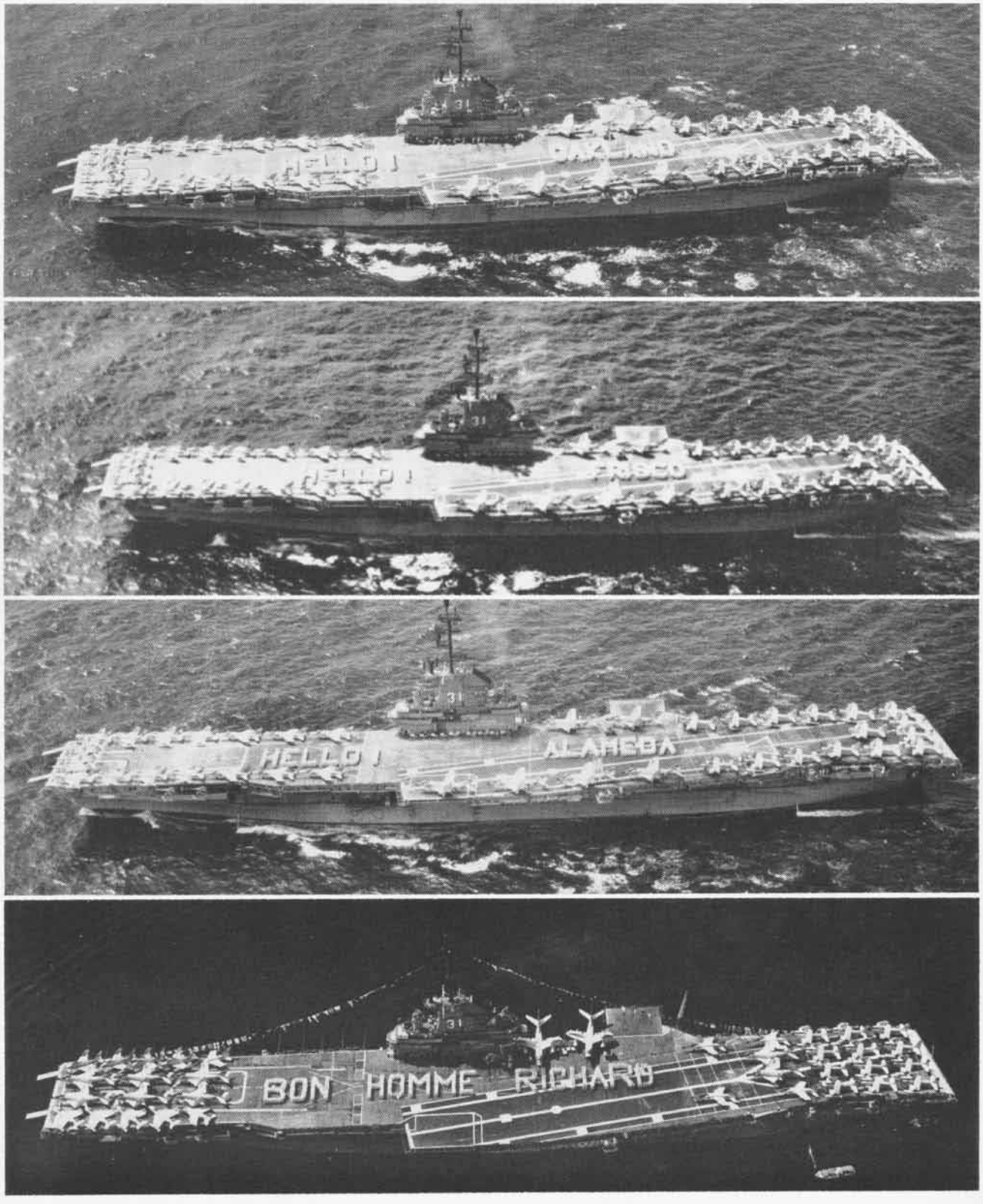


NAVAL AVIATION NEWS

OUR FORTIETH YEAR OF CONTINUOUS PUBLICATION, SEPTEMBER 1959

Accident Rate at New Low

41 lives, $30,000,000 are Saved

Naval Aviation in FY59 achieved an accident rate of only 2.6 per 10,000 flying hours, marking the seventh consecutive annual reduction. The '59 rate halved that of 1953.

In broad terms, the reduction in accident frequency saved the following: 41 lives, 88 aircraft and approximately $30,000,000 in damaged or destroyed aircraft.

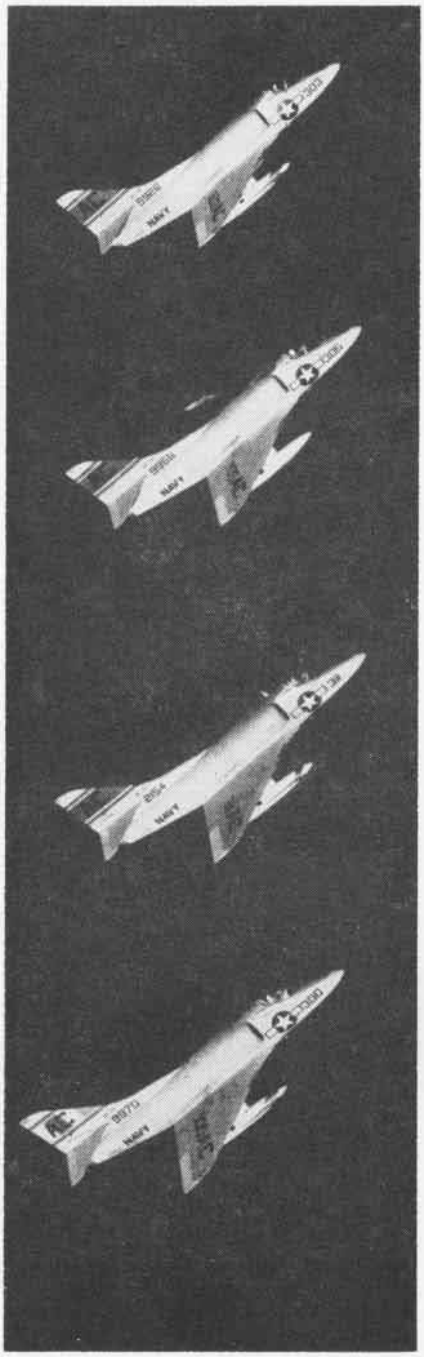
This record was achieved despite extensive fleet operations conducted as a result of the Lebanon and Quemoy crises. Another full year of carrier operations for the new high performance aircraft—the Douglas F4D, A4D, and A3D, the Chance Vought F8U, the McDonnell F3H, and the Grumman F11F—was successfully completed with a 50% reduction in accident rate.

Forrestal-class carriers contributed significantly to the accident reduction record. Their landing accident rate was approximately half that of *Essex*-class carriers. There was only one fatal landing accident on the large carriers as against 10 on smaller ships.

Airfield arresting gear accounted for 340 reported saves for the year.

The impact of the Replacement Air Groups in AirPac and AirLant is considered an important factor. The formidable concentration of instructor pilot know-how, supervised flight training, ground schools, and simulator devices has shown definite results in the prevention of aircraft accidents.

Installation of speed control and angle of attack devices to cut down landing accidents, backfit of Martin-Baker ejection seats to give a low altitude escape capability, detection devices to warn of incipient engine failure; all have contributed to this step toward the goal of maximum combat readiness consistent with safety.



VA-34 CLIMBS TO NEW FAME WITH BULLPUP

VA-34 Fires a Bullpup

First Operational Atlantic Use

A *Blue Blaster* pilot of VA-34 fired the first operational *Bullpup* in the Atlantic Fleet from an A4D-2. Ltjg. Sam Hawkins scored the historic hit off the Florida coast.

Cdr. G. C. Talley, Jr., squadron skipper, hailed the missile as a valuable addition to the weapons capability of the versatile *Skyhawk*.

History Repeats Itself

Wright Brothers Take to the Air

Orville and Wilbur Wright are still keeping 'em flying, this time as Navy and Air Force aviators!

Ltjg. Orville Wright is undergoing flight training at NAAS WHITING FIELD. He has completed the transition stage and has soloed in the T-28. His brother, Wilbur, is an Air Force lieutenant. Both are graduates of the U.S. Naval Academy.

Fifty-five years after the historic flight down the hill at Kitty Hawk, the Wright Brothers, although no relation to the original, are keeping up the old flying tradition.

ANG Gets Sidewinders

Three Supersabre Units are First

Three Air National Guard fighter squadrons are being equipped to handle the Navy *Sidewinder* air-to-air missile.

First to receive the missile will be the 152nd Fighter Interceptor Squadron, Tucson, Arizona. Aircraft of the 188th Fighter Interceptor Squadron, Albuquerque, New Mexico, and the 118th Tactical Fighter Squadron, Windsor Locks, Connecticut, are also being modified to handle it.

All three squadrons fly the North American F-100 *Supersabre*.

Sidewinder, designated the GAR-8, was developed by the Navy and proved extremely effective when employed in combat by the Chinese Nationalist Air Force during the crisis off Quemoy.

Summary of Air Changes

Squadrons, Stations, Units Named

Station and unit changes in Naval Aviation which occurred during the first half of 1959 were summarized for Naval Aviation News by the Aviation Plans Division of DCNO(Air).

On July 1, VF-21 was redesignated VA-43, VA-25 became VA-65, VF-81 became VA-81, VA(HM)-13 became VP-24, VF-64 became VF-21, VFP-61 became VCP-61, VAP-61 became VCP-63, VA-63 became VA-22, VA-65 became VA-25, and VA(HM)-10 became VP-17.

On June 30, these stations were disestablished: MCAAS MOJAVE, NATTC NORMAN, NAS CHINCOTEAGUE and NAS DENVER. The same day, NavSta Kwajalein was inactivated and Naval Support Activity Kwajalein was established; the O&R department, NAS CORPUS CHRISTI was inactivated; NAAS EL CENTRO was disestablished and redesignated an auxiliary landing field to NAS NORTH ISLAND. Commands decommissioned June 30 included Heavy Attack Wing Two, and FASRons 2, 6, 8, 109, 112, and 116. Redesignations effective June 30 were: VA(AW)-35 became VA-122; VA(AW)-33 became VAW-33; Heavy Attack Training Unit Pacific became VAH-123.

NAS NIAGARA FALLS was disestablished June 18, NARF MIAMI was disestablished two days later, and disestablishment of NAS COLUMBUS followed on 26 June. On June 15, NAF SIGONELLA, Sicily, was established.

Two squadrons decommissioned April 15 were VF-61 and VF-82. San Clemente Island was designated an auxiliary landing field April 1.

Between March 9 and 31, these changes were made: VF-24 became VF-211 and what had been VF-211 became VF-24; Target Air Training Unit, FASRon 121, VF-71, and VA-104 were decommissioned.

Changes taking place between February 1 and 23 follow: VA-105, VF-173, VF-11, VAH-15 and VF-52 were decommissioned; Air Task Group One was disestablished; VF-43 became VF-11, VF-23 became VF-151, VF-112 became VA-112, VF-144 became VA-52, VA-116 became VA-144, and VA-151 became VA-23.

In January, VF-111 was decommissioned and VA-156 became VF-111; VAH-16, decommissioned; MCAAS YUMA, Arizona, was established, and MCAAS MOJAVE, Cal., inactivated.

FASRON-11 Receives Award

VAdm. Pride Commends Safety

Fleet Aircraft Service Squadron 11, stationed at NAS ATSUGI, has been presented the Quarterly Aviation Safety Award for the first three months of the current calendar year.

The award from VAdm. Alfred M. Pride, then Commander Naval Air Force, Pacific Fleet, stated in part: "You have completed a total of 863 flight hours with no aircraft accidents being charged against your safety record. This achievement requires the employment of sound maintenance practice, effective training procedures, and a high degree of air discipline. All hands are to be congratulated for their efforts in making this record possible."

Cdr. D. A. Scott heads FASRon-11.

SMALL CHILDREN *were handed down from the quarterdeck in "bucket brigade" fashion when the seaplane tender, USS Salisbury Sound, visited Saigon and invited 100 children of the An-Lac Orphanage to tour the ship.*

NEWLY NAMED PHANTOM II, *McDonnell F4H-1, foreground, flies in formation with earlier McDonnell Navy fighters, F3H Demon, center, and F2H Banshee, top. The F4H-1 was named Phantom II to perpetuate the Phantom name given the FH-1, first operational Navy jet fighter. Nearly 1000 mph faster than the F2H-2 Banshee which flew from the Essex in the Korean conflict, the Phantom II's name was announced by Mrs. C. P. Milne at St. Louis.*

MarCads Start Training

First Separate Class in 18 Years

A class of 12 Marine Aviation Cadets, the first in 18 years, has started pre-flight training at the Naval Air Training Command, Pensacola.

Since 1941, when the original MarCad program was discontinued, the Marine Corps has obtained many of its combat pilots through the Naval Aviation Cadet program.

The MarCads will wear Marine Corps officer-style uniforms. Upon successful completion of the 18-month flight course, they will be awarded commissions as second lieutenants and assigned to operational squadrons.

Eleven in the first class were recruited from the ranks of enlisted Marines. One came from civilian life.

P&W's New Navy Contract

Study of Nuclear Aircraft Engine

The Bureau of Aeronautics has awarded a contract to Pratt & Whitney division of United Aircraft Corporation for the development of aircraft nuclear propulsion components.

Amount of the contract is approximately $2,000,000. It is the Navy's first award for developmental nuclear aircraft engine hardware. The components to be fabricated are in connection with the Navy's requirements and authority to develop a secondary heat transfer system for an indirect cycle nuclear aircraft powerplant.

Work will be performed by P&W Aircraft at the Middletown, Conn., Aircraft Nuclear Engine Laboratory.

CPO Wins Legion of Merit

Perfected Better Bomb Technique

ADC Lawrence E. Leeper has been awarded the Legion of Merit at NAS SANFORD for "exceptionally meritorious conduct in the performance of outstanding services to the Government of the United States."

According to the citation, Leeper contributed materially to advancing the capability of heavy attack squadrons to achieve their mission in defense of the country.

He invented the Leeper Radar Prediction System which permits A3D bombardiers to predict how a target or a target complex will appear on radar.

Ships Join Recovery Team

Pilots, Frogmen to Serve in Crew

Two satellite recovery ships, USNS *Dalton Victory* and USNS *Haiti Victory*, have arrived in Honolulu for final outfitting and training of personnel. They will relieve the fleet destroyers currently being used in recovery of satellites launched into the Pacific Missile Range.

Under operational control of the Commander, PMR, both ships will assume duties as the seagoing component of the satellite recovery team now operating in Hawaiian waters.

The recovery crew will include aviators to pilot helicopters, frogmen to handle satellite capsules, and technicians to operate radar communications and specialized equipment. When not operating with the ships, the helicopters will be based at the Marine Corps Air Station, Kaneohe.

Serving with Navy personnel on the recovery team will be technicians from Bendix Radio and the U.S. Weather Bureau. The Advanced Research Projects Agency, sponsor of the *Discoverer* satellite project, provided funds for outfitting the two new ships.

Project officer for recovery operations is LCol. Gus Ahola, USAF, with headquarters at Hickam Recovery Center. Cdr. A. W. Hayward is the Pacific Missile Range representative. He will be located at MCAS KANEOHE BAY.

A TEST VERSION *of the air-to-surface Corvus, a liquid propellant rocket-propelled missile, has been successfully flown at the Pacific Missile Range Test Center, Point Mugu. The test vehicle was fired from the A4D Skyhawk. Corvus was developed by the Temco Aircraft Corp., Dallas.*

Charlie Holds ASW Games

Nuclear Sub Skipjack Takes Part

Convex 3-59, an antisubmarine warfare exercise involving advanced concepts of escort and protection of convoys, has been carried out by Atlantic Fleet units.

"Protection of convoys, both merchant and naval, against submarine attack will be one of the Navy's most important missions in any future conflict," said VAdm. William G. Cooper, Commander Antisubmarine Defense Force Atlantic Fleet, and exercise commander. "This exercise was designed to provide realistic advanced training for our air and surface antisubmarine forces in the convoy escort role."

RAdm. Charles E. Weakley, commander of Task Group Charlie, was in command of sea forces for the exercise.

Atlantic Fleet units taking part included USS *Tarawa*, with a helicopter antisubmarine squadron embarked, six auxiliary ships, four ships of Escort Squadron 10, four destroyers, seven submarines including the nuclear *Skipjack*, and two detachments of P2V's.

PIPED ASHORE. *The last "blue nose" Cougar of VA-76 is retired with full honors at NAS Oceana. Cdr. H. R. Chenvront, squadron C.O. taxies the F9F-8 which has been flown by VA-76 since January, 1956. Now flying A4D-2 Skyhawks, "The Fighting Spirits of 76" can look back on five deployments in the Grumman Cougar which took them to Gitmo twice, the Suez crisis, the Mediterranean and the North Atlantic.*

GRAMPAW PETTIBONE

Beached

A couple of seaplane pilots were out on an engine test hop in a P5M-2. They had climbed to 7500 feet, feathered and unfeathered the port engine, then feathered the starboard engine, and flew on the port engine alone for about five minutes. Unfeathering the starboard engine, they dropped down to 350 feet and commenced practice mining runs.

After making runs, a severe gas leak in the port engine was reported. The pilot immediately commenced to climb and feathered the port engine. As they returned to the home seadrome after declaring an emergency, the leak was determined to be oil and not fuel.

An uneventful single engine landing was made, and a beaching buoy assignment requested. The seadrome tower instructed him to wait until another aircraft was launched.

With a single engine and an on-shore wind, he decided to make a "dry run" on the beaching buoy located about 100 yards off the ramp. While making this trial run, he lost control of his hydroflaps, went to manual operation, and taxied from the beaching ramp area.

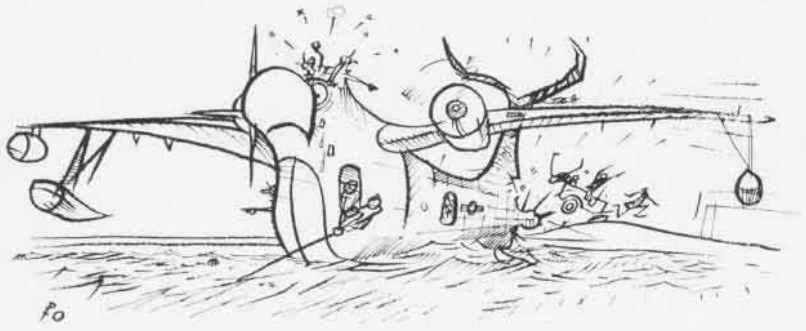
Clearance was then requested to the buoy patch and he practiced making buoys for 25 minutes. Reverse pitch on his one good engine was checked during this time and operated satisfactorily.

Finally directed to the ramp, the pilot stationed three men in the bow

with the anchor broken out and commenced his buoy approach parallel to the sea wall, the good engine outboard to counteract the on-shore wind's weather cocking effect.

He momentarily lost control of his hydroflaps and by the time he had the discrepancy corrected, found the P5M was heading straight for the sea wall! Into reverse pitch went the one good prop, power was poured to the engine, and the big seaplane began to back out of the tight corner, gaining momentum.

The pilot attempted to bring it out of reverse, but finding it wouldn't come out after three attempts, ordered the anchor over the side and cut the engine. The P5M had backed down in a big semicircle, and aided by the on-shore breeze, smashed into the seawall backwards. As is happened, the anchor never had a chance to grab hold.



Grampaw Pettibone says:

Jehosophat! This lad just couldn't stand prosperity. After making a good single engine return to base and a successful landing, he had to goof around on the water making practice buoy approaches. Under the circumstances and with a strong on-shore breeze, no one woulda thought he was chicken if he'd asked for the assistance of a boat.

A seaplane on single engine IS an emergency and should be treated as such until it's safely beached.

Wheel-Gone

An A3D-2 returned to a CVA after a simulated night radar mission. It had been a long hop and fuel state was about 4500 pounds. The time was 0300 local. The crew had been up and working since 0500 the previous morning, so they were all a little edgy.

Swinging over the ship, the pilot saw the dust pan lights were not on, so he cleaned up, singled up, and proceeded to hold at 1500 feet. About 15 minutes later, he got a green light and the dust pan lights came on. He flew a normal mirror pass and the A3D touched down nicely in a position that looked like a #2 wire, but he boltered.

Four more passes were made on which wave-off lights were received early in the groove, for no apparent reason. He broke radio silence, requested info on what was wrong with his passes, informed the ship he had low fuel state and wanted to get aboard. A calm voice answered "You lost your port main wheel on your first pass!" He was further informed they were rigging the barricade. The thought of a night barricade engagement gave him some misgivings, to put it mildly, and he informed the ship "Negative, I'll make a normal arrested landing."

A discussion ensued, the gist of it being:

"You are cleared to come into the barrier."

"Please lower the barricade and let

me aboard. Do you want to kill this crew?"

"We can only take you aboard in the barrier."

"I'll have the crew bail out before I put it in the barrier."

Finally the pilot won. The ship ordered a low pass to recheck the port gear. After the pass, he was told he still had the brake assembly on the axle and was cleared for a normal arrested landing.

The A3D was now down to 1800 pounds of fuel, so he offered the crew an opportunity to bail out. They refused, said they would stick with him. The pilot then informed the crew he would make two passes. If unsuccessful he would tidy it up, and they would all step out the chute.

His first approach was right on glide slope, slightly high at the ramp with 124 knots. He angled slightly to the right and kept the starboard wing down just a little. The hook grabbed #4 wire, and as the port gear assembly struck the deck during the run-out, the big A3D slewed gently around to the left and came to rest about four or five feet from the deck edge. Safely aboard!

Grampaw Pettibone says:

Shucks! I really see this feller's point in being a little edgy about a night barricade engagement, but the ship was thinking only of his safety. The barricade engagement IS safer!

***If* his port gear had collapsed on touchdown, he *might* not have picked up a wire and a successful bolter under the circumstances would have been questionable.**

That's a lot of *ifs*, but I think the ship was right.

The ship should have broken radio silence to tell this pilot to "*single up and DOG it*" instead of letting him make four fuel-wasting passes to wave-offs while they rigged the barricade. You don't suppose they weren't going to tell him they had it up?

Gramps' Advice to the Airborne

Trust everybody — but cut the cards!

On Again, Off Again

A young helicopter pilot did a thorough pre-flight inspection of his HUP-2 whirlybird, strapped himself in, and proceeded to start the engine.

On his first attempt, the engine flooded and he pulled off the mixture. During the second attempt, the engine flooded again and he pulled the mixture off, but also cut the fuel pump off and gas off. While clearing the engine it fired, and the crewman turned the fuel and mixture on and the pilot turned the fuel pump on. The engine got up to 500 RPM and then quit again so the pilot turned the fuel pump, mixture, and gas off. Again the engine fired while clearing it, so the pilot kept the primer on with his right hand and with his left hand turned the gas, mixture and fuel pump on, or so he thought.

It kept running and was within limits on the mag check and clutch disengagement check, so he engaged the clutch, got clearance from the tower and lifted off.

The pilot climbed the HUP to 600 feet and circled the field. The mech meanwhile had scanned the engine instruments. As he checked the lower pedestal panel containing the mag switch and fuel selector, to his horror he saw the fuel was OFF! He immediately called the pilot's attention to the fuel selector and they both checked it visually. The pilot, annoyed, stated that it was ON and commenced his approach to a hover. The attention of the mech for the balance of the flight was riveted to the fuel selector handle, which he could see was clearly in the OFF position!

As they came out of hover and commenced to move forward, the engine suddenly quit and the HUP hit hard, driving the starboard landing gear strut up through the deck of the aircraft.

The fuel selector WAS in the OFF position, but just open enough to allow sufficient fuel to pass for engine operation. Vibration in flight had finally fully closed the spring loaded valve.

The pilot had not used a check-off list at any time during the brief flight, a habit he had picked up during a previous deployment aboard ship.

Grampaw Pettibone says:

Sufferin' catfish! This lad was real thorough on his outside inspection, but as soon as he strapped in, all his trainin' jest seemed to go down the drain.

Ever try to sit down and write your aircraft's check list strictly from memory? You always miss an item or two! It's there in the cockpit. USE IT!

That HUP fuel selector is a real booby trap. Point it straight up for ON and straight down for OFF, and both ends are kinda pointy. This outfit now paints both the ON half of the pointer and the upper half of the selector plate white. Gives a good positive visual check on settings.

When your crewman calls your attention to somethin' he thinks is wrong, it pays to give it more than a cursory glance. Remember, the valuable life you save might possibly be your own.

FLORA, FAUNA AND FLIERS

BARPAC PILOT *views legend of 14 "Gooney strikes" sustained during flight operations from Midway Island. Early solution to acute problem is being sought by military and civilian experts.*

BOMB-LADEN Naval Air Reserve aircraft from NAS MINNEAPOLIS orbit high above a Northern Minnesota peat bog. On signal they peel off and accurately unload 500, 1000 and 2000-pound live bombs. Deafening explosions rock the Paul Bunyan countryside.

At Horno Strip, Camp Pendleton, California, a Marine Corps HR2S helo alights, and disassembly of strange looking gear commences. Technicians remove a large mess hall steam kettle, a length of eight-inch pipe and a notched angle iron.

On remote Green Island near Midway in the Pacific, a Navy LST beaches itself purposefully and disgorges a bulldozer manned by a SeaBee. The one-man landing force lowers his blade and charges dead ahead.

Despite the difference in location and modus operandi, the three incidents have one thing in common—*conservation.* These serve to illustrate the Navy's continuing, effective participation in the conservation and management of U.S. renewable natural resources.

The Northern Minnesota episode, requested by state authorities, involved the creation of water holes in the peat bogs with surplus ordnance thus providing the extensive wildlife population of the area with nourishment, water and nesting habitat in dry summer months.

Removal of the steam kettle from the Marine helo didn't mark the end of an airborne barbecue experiment. Instead it concluded the expeditious, aerial seeding of 8550 acres of burned-over watershed in the Cleveland National Forest. The discarded steam kettle had been jury-rigged to serve as a chopper hopper for some 68,000 pounds of grass seed which was distributed at the request of the U.S. Forest Service.

The Green Island landing, a Navy training undertaking, represents the latest attempt by the Navy to clear up the Midway Island "Gooney Bird" mess without riling bird lovers everywhere. Making Green Island a more attractive habitat is the case in point. Presently covered with man-sized shrubs called napaka or scaveola, which prevent the Gooney from nesting, the bulldozing operation will create a number of 50-foot wide swaths from the center of the island to the sea. It is hoped this improvement will make Green Island, some 50 miles from bird-leaguered Midway, the center of the Gooney Bird world.

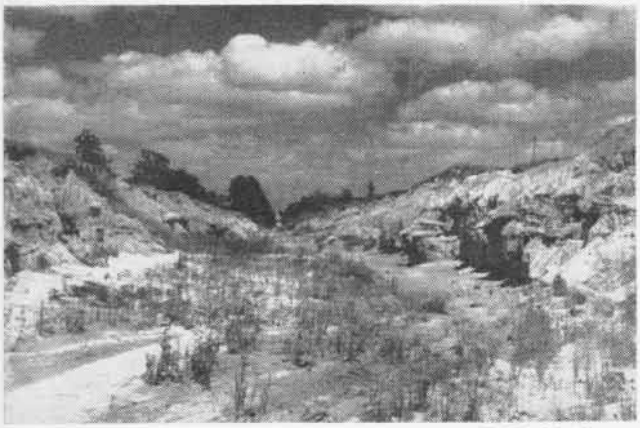
These are but three examples in thousands which occur annually in one of the Navy's oldest but least publicized programs—The Management and Conservation of Renewable Natural Resources.

Starting in 1799 when the Congress appropriated $200,000 "to purchase growing timber suitable for the Navy and to cause the proper measures to be taken to have the same preserved for the future uses of the Navy," the occupation of public lands by the Navy has been famed for the attention focused on the conservation of local resources. Curiously, and it is a tribute to the foresightedness of that early Congress, the wood requirements of the Navy as late as WWII exceeded steel needs in tonnage.

Other natural resources have been and are today the very life blood of Fleet operations. These, in two noteworthy instances, have been placed directly in Navy hands. In the coal burning days of the "Great White Fleet," the Navy was charged with the administration of coal reserves. With the advent of oil-burning ships, President Taft in 1912 set aside the vast Naval Petroleum Reserves which the Navy still administers. During the late stages of WWII, the oil reserves were a telling factor in the Navy's Pacific Fleet operations.

As a result of wartime expansion and ever-increasing weapons range and training requirements, the Navy today is a large landholder. Its inland depots and training centers especially, encompass huge areas. For example, the Naval Ammunition Depot at Hawthorne, Nevada, is over 200,000 acres. The impact area of the Naval Ordnance Test Station at China Lake, California, is more than 1,000,000 acres, its huge size being necessary due to missile test work conducted there. The Marine Corps Desert Training Center at Twentynine Palms, California, is 550,000 acres.

Most of the public lands handed the Navy were submarginal when first received. Worn out by improper farming



LUNAR LANDSCAPE *is actually view of erosion at NAD McAlester, Okla. Condition is typical of that found in arid, submarginal land areas.*

"AFTER" VIEW *of same area shows startling effectiveness of soil management planning and execution. State soil experts assisted Navy.*

methods or desert areas, they had reverted to public ownership generally because of non-payment of taxes. The initial poor quality of these grants was further aggravated by wartime activity: rapid construction of buildings, roads and railroads which upset what little natural vegetation was left. Water and wind erosion of soil became a major problem, in some instances endangering structures which had been erected.

To combat this problem, the Navy instituted a management program with increased emphasis on conservation of natural resources. More recently, the program was extended to include the conservation and management of game resources.

In order to appreciate the workings of the programs, let's take the case of a new C.O. aboard a hypothetical inland facility, NAF WILDWOOD. Bird lover or no, dimly aware of wildlife and only routinely appreciative of trees, he peruses SecNav Instructions 11015.2 and 5800.8C and suddenly realizes he is to have an abiding interest in all three for the duration of his tour.

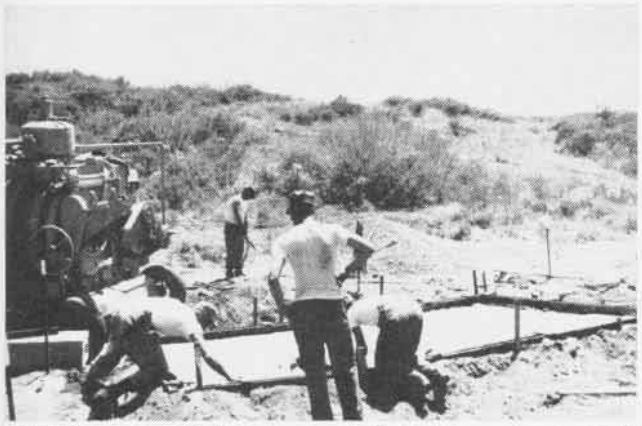
The primary military mission of his command requires rigid security and public protection provisions. In addition to highly classified development operations, he will administer an impact area of considerable proportions. All in all he is concerned with 100,000 acres of fenced property containing a little bit of everything in the way of natural resources and wildlife. Everything, that is, except Gooney Birds.

His key man, he finds, is his Public Works Officer. While not a trained conservationist, the latter knows where to go for the answers to the facility's conservation plan.

With the help of a conservation consultant located at Naval district headquarters, the PW officer establishes liaison with the state and federal agency representatives who are specialists in resource and game management in this particular region.

A soil expert from the Soil Conservation Service recommends a plan for correction of erosion which involves the long range planting of grasses, shrubs and trees in specified areas. In view of an existing water shortage, it it also recommended that a dam be constructed at a strategic location in one watershed, thus creating an artificial lake from which water could be diverted into the water supply system. The new water resource will augment the installation's fire protection system and serve as an additional recreational facility.

The regional forester of the U.S. Forest Service is requested to conduct a forest inventory. He recommends a plan for harvesting high quality timber outside of the impact area, and a plan for a future forestry program. Since returns from the sale of the timber products will more than justify a spe-



MARINES *construct "gallinaceous guzzler" (underground water tank) at Camp Pendleton. Tank provides constant water source for quail.*

NAVY FORESTRY *programs are largely self-supporting. Congressional recognition of wood needs in 1799 paid off as late as World War II.*

HMX-1 *bears aerial hand in conservation by restocking rainbow trout in Quantico, Va., area.*

cialist's salary, the C.O. is authorized to employ a full time forester to monitor this program.

State fish and wildlife experts present several recommendations. Inasmuch as the huge area abounds with game, they suggest an arrangement whereby local sportsmen may be permitted to hunt or fish during certain periods. The C.O. buys this plan with certain exceptions. The impact area, for obvious reasons, is excluded as are those areas which must be restricted for security reasons. The remainder of the area is approved for public access, its wildlife hunting and trapping management assumed by state officials. The C.O. points out another advantage to this plan. By granting permission to his 8000 personnel to use the area, he is relieving the load on other state hunting and fishing sites. The matter of public access is resolved quickly.

The wildlife people request permission to live-trap a certain species of desert quail which are plentiful aboard the facility for shipment to Greece and Turkey in exchange for red-legged partridge. They explain that the imported partridge are to be spread throughout the state in hopes of establishing populations for civilian sportsmen. This plan is approved readily. Similar arrangements involving the trapping and transfer of deer and turkeys to state game sanctuaries are made. In effect, the military installation becomes a game reserve from which state officials can tap for future supplies.

Placement of "Gallinaceous Guzzlers" is broached next. Noting the blank response of the C.O., the state game representative hastily explains these are water catchment and underground storage tanks which are needed for the quail population. Relatively simple to build, the evaporation-proof tanks are designed to trap the local annual rainfall thus providing a constant source of water in Wildwood's semi-arid environment. Lastly, two abandoned windmills are pinpointed for repair in order to provide water for deer and any other thirsty wildlife.

RAINBOW *trout furnished by U.S. Fish and Wildlife Service are released in reservoir.*

The construction and location of game feeders is proposed. These will be erected by the state, and feed will be supplied by state agencies. The PW officer assumes the responsibility for attending the feeders. As a result of this concession, it is estimated that the game bird population in the area will be doubled in a short time.

In this manner an effective management plan is executed with the assistance of state and federal agencies. Public lands occupied by the Navy are improved greatly as a result of the occupation.

Not all of the conservation efforts have such happy histories or endings. A current problem, and one which has existed for a long time, has involved a series of attempts by the Navy to effect a solution to the Albatross (Gooney Bird) riddle on Midway Island.

The individual Gooney represents a very real hazard to flight operations on Midway. Each weighs an average of 12 pounds, and it is estimated that there are some 300,000 of them in the immediate vicinity of Midway.

Since the Gooney Bird is particularly adept at soaring and the best soaring conditions are to be found above or adjacent to Midway's runways, pilots using the airfield consider each takeoff and landing a highly dangerous undertaking.

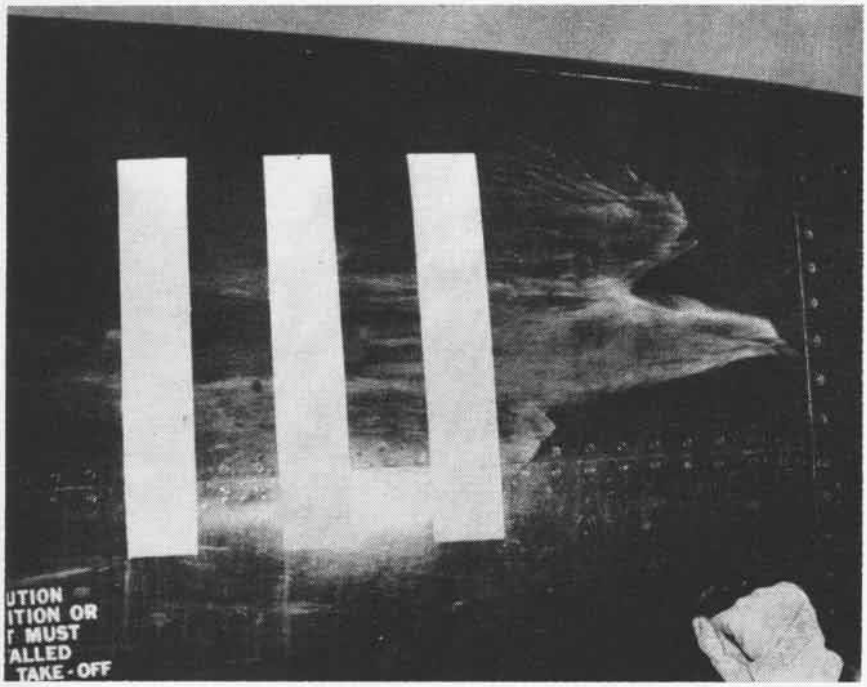
For example, during the month of April, bird "strikes" on BarPac squadron aircraft cost an estimated $33,000, broke a crewman's shoulder and endangered the lives of hundreds of airmen while curtailing DEW line missions. The total tally to date on the Barrier's Early Warning Wing aircraft shows 538 known collisions with Gooney Birds, 227 of these causing damage. The repair bill on these came to $156,002.60 with a loss of 1813.7 scheduled operational hours.

The long time effort to relieve this situation has been charged with frustration and grim comedy, not only on the part of the Navy but other governmental agencies as well. This is due entirely to the Navy's extreme reluctance to harm the Gooneys or to endanger the survival of the species.

In 1956, an appeal to the U.S. Fish and Wildlife Service brought two research biologists to Midway to study the problem and recommend measures to alleviate the situation. Several measures have been attempted. The biologists thought if life was made unbearable for the Gooneys by harassing tactics they would leave in disgust.

GAME FEEDER *is reloaded at Quantico. Wildlife programs get help from state, federal sources.*

At the start grotesque scarecrows were erected all over the island. It was hoped these monsters would terrify the birds and they would leave. Instead, the Gooneys increased in number, ganged up and promptly pecked the flapping scarecrows to bits. Sulphurous flares, mortar shells and bazookas were set off near or lobbed over the



COLLISIONS *with feathered missiles are considered real hazard to flight while costing thousands of dollars, causing flight cancellations. Image of seagull here resulted from strike with F9F.*

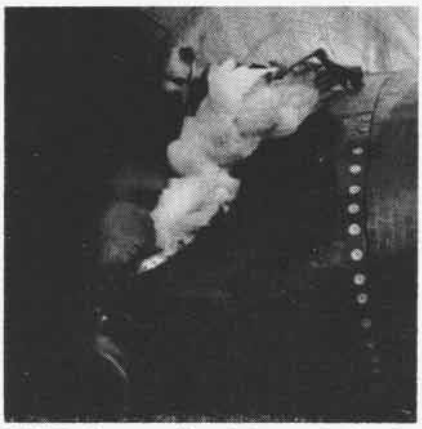
birds' heads. Instead of the explosions startling the Gooneys, they had the opposite effect. They were attracted in greater numbers to the island and thousands lined the sand dunes to watch the show. In desperation, the biologists enlisted a Navy radio team which set up a generator, amplifying a range of 20 to 20,000 cycles, and directed the speaker at a crowded Gooney encampment. Instead of the birds flying away, they moved to within a few feet of the speaker, clacked their bills, stretched their necks and screeched defiantly at the strange black box.

For 19 months, every conceivable harassment tactic was tried. Nothing worked. In fact, as if angered by the organized plan to oust them, the Gooneys grew more obstinate and ran rampant over the area. The biologists withdrew. The Gooneys stayed.

The latest plan to evolve in the "Second Battle for Midway" is a result of joint military-civilian study of the vexing situation. The Navy advocates the plan as an initial step in a double-barreled "enticement, discouragement" program. The plan is to make Green Island of Kure Atoll, only 50 miles distant, as attractive to the Gooneys as possible, while tearing down their favorite playgrounds near Midway airstrips.

Presently Green Island has a covering of dense, six-foot high shrubs called napaka, or scaveola. This prevents the Gooneys from nesting on the ground, hence they won't habitate in numbers. In the past, the center of Green Island, which is a dry lagoon, has been used as a nesting site by the Gooneys. After hatching, however, the dense growth surrounding the lagoon has prevented the new-born Gooneys from reaching the sea and they invariably have died of starvation.

In the near future, the SeaBees will move in and bulldoze sixteen 50-foot wide swaths from the beaches to the island interior. In the center, a 100 yard by 50-foot water hole will be excavated and will serve as the "hub" from which the 50-foot wide clearings will radiate. This will serve as nesting areas and "runways," both of which the Gooneys demand when considering a prospective homestead.



SEVERE *vibration followed Gooney Bird strike. $6,000,000 WV-2 had 23 Navy airmen aboard.*

On Midway Island all dunes and high areas adjacent to aircraft runways will be leveled and hardened. This will eliminate the Gooneys' first love, air currents on which to soar and frolic. Also, according to a Pearl Harbor SeaBee spokesman, the leveled areas will be packed and oiled to discourage nesting.

Biologists and others acquainted with the habits of these birds believe there is an excellent chance to accomplish the Gooney relocation.

According to Col. C. O. Totman, USMC, Coordinator of the Navy's Resource and Wildlife Management Program, the Navy is hopeful of an early solution to the Midway problem with the full support of all interested groups.

"A top civilian advisory committee formed at the invitation of SecNav is on top of this and other major problems resulting from our occupancy of public lands. The committee members are nationally recognized experts in every phase of natural resource conservation and wildlife management. Cooperation with the Navy by state and federal agencies has been uniformly outstanding and has helped us solve some serious problems. We expect the same results at Midway," he explained.

JOINT *nature of conservation and management program is highlighted at NAS Whidbey.*

Bombing peat bogs, sowing seed from a helo or changing the face of Green Island with a bulldozer—they all spell Conservation in the U.S. Navy.

Midway Beats Own Record

442 Landings Made in 14½ Hours

By making 442 landings between 0600 and 2030, pilots on the USS *Midway* (CVA-41) beat their own record for the number of wire-catchings in one operating day. The new record averages more than one landing every two minutes.

Just the day before, the pilots of Carrier Air Groups 12 and 19 had scored 397 landings during carrier qualifications off the California coast.

The squadrons which helped set the high marks were VF-124, flying F8U *Crusaders*, and VA-124 in A4D *Skyhawks*, of CVG-12; from CVG-19, VA-195 and VA-196, with *Skyhawks* and AD-6 *Skyraiders* respectively.

Midway is operating with the First Fleet from her homeport of Alameda.

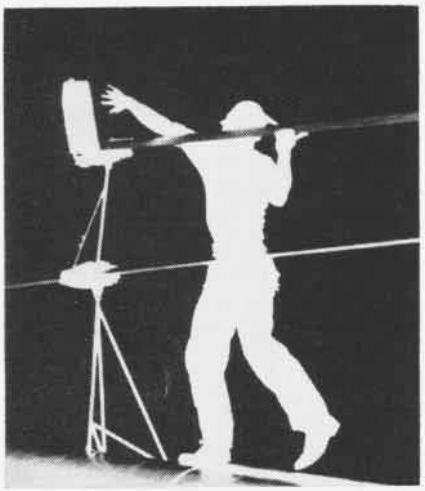


PHOTO QUIZ. *Negative printing from color film sometimes disguises routine action. Local guesses on this one ran from a javelin thrower to man carrying pipe while waving at friend. What's your guess? See p. 40 for the answer.*

AF to Get Water Squeezers

Will Replace Chain-type Arresters

Air Force bases throughout the United States soon will begin using "water squeezer" type runway arresting systems provided by the All American Engineering Company.

The arresting device is used to bring high speed aircraft to a safe stop in a very short distance when the plane's braking system is inoperative. "Water squeezers" will replace the present anchor chain arresters.

USAF planes will employ an arrester hook which can be lowered by the pilot to engage a cable crossing the runway. The cable, in turn, is connected on both sides to an underground conical cylinder which is filled partially with water and anti-freeze.

As the plane hooks the cable at speeds up to 160 knots, the cable pulls pistons through the liquid solution toward the small end of the conical cylinders. The farther the piston is pulled, the more resistance it encounters, bringing the aircraft to a smoothly decelerated stop.

The system automatically resets itself for another stop within minutes.

A4D Air Duct Redesigned

Modification Saves 18 Man-hours

A modification designed to save approximately 18 man-hours of work in removing air intake ducts from A4D-2 *Skyhawks* has been submitted by Acting MSgt. William C. Blix of VMA-121.

By redesigning the air duct into a two-piece unit, mechanics can remove the duct more quickly.

The alteration stemmed from a recent A4D-2N engineering conference at the Douglas El Segundo plant which was attended by 75 Navy and Marine Corps representatives.

At that time, Sgt. Blix made 38 recommended and approved changes to the aircraft, which has not yet been delivered to Marine Corps squadrons.

Joining with Douglas engineers, Blix discussed the modification to the air duct now up for approval in BUAER. He volunteered to work on the project during his free time.

When Blix's plan was completed on paper, Douglas engineers cut the duct as specified, then delivered it for testing and evaluation. Several days of actual installation trials followed.

The change was made to the lower half of the air entrance duct, which leads to the aircraft's engine and serves as a cover for the aircraft's alternator drive unit.

A removable, two-piece, oval-shaped component, the air duct posed a time-consuming problem each time it became necessary to remove the drive unit for maintenance or repairs.

Through timing trials, it has been estimated that prior to modifying the duct, it took an experienced crew a minimum of 20 man-hours to remove and re-install the drive unit. The only other alternative, which requires removal of the entire aft fuselage and engine from the aircraft, is even less expedient inasmuch as that procedure takes approximately 40 man-hours.

By redesigning the lower half of the duct into two pieces, the entrance duct and drive unit can be removed and replaced in approximately two hours.

BETTER KNOWN *to Naval airmen for his pointed illustrations of the hairy and horrible consequences of faulty flight procedures, Robert Trotter, Art Director of APPROACH, Naval Aviation Safety Center magazine, displays three of his paintings of the Civil War which received three awards recently during a showing at Virginia Beach. Paintings carried theme of South's struggle.*

THE U. S. ARMY'S *new VTOL aircraft, the Doak-16, makes a vertical take-off, then with a mid-air transition converts to horizontal high speed flight. Ducted fans rotating on the wing tips point straight up to lift the plane vertically in helicopter fashion. The pilot then swivels the ducts and the craft moves into forward flight. To land, the procedure is reversed. The Doak-16 can be slowed down to hover stationary at 3000-6000 feet, then returned to normal flight. It maneuvers on the ground easily as an automobile, turning and backing up under its own power. It is powered by a single Lycoming T53 shaft turbine engine.*

'Fishhook' Aids Testing

Catches Polaris Dummy in Mid-Air

The use of a giant floating crane in the Pacific Ocean is accelerating Navy's priority *Polaris* missile program. Called "Fishhook," it is a retrieving rig that suspends the *Polaris* dummy missile in mid-air after it has been launched in advanced pop-up tests.

Fishhook is in operation at the San Clemente Island sea ranges of the Naval Ordnance Test Station. The concept and design of the ingenious machine were worked out by the engineers of the Naval Air Engineering Facility, Philadelphia, who applied their long experience with arrestment of carrier aircraft. Announced this summer, it has been in use since April.

Structural test data is needed, showing effects of under-the-sea launching on prototype missiles, while protecting them against obliterating effects from fall-back into the sea. Without Fishhook, a new prototype would have to be used in each individual test. Now the same one can be used repeatedly, thereby saving the time required to construct many missiles, and the cost of building them, which would run into millions of dollars.

The retriever's engine works on the hydraulic-ram type piston principle, actuated by compressed air. It reels up the cable attached to the *Polaris* shape much as a giant fishing reel hauls in the catch. As a pop-up reaches its apex, the Fishhook hydraulic flow is reversed. It decelerates the missile's descent, with hydraulic braking finally arresting the fall.

The barge on which the rig is mounted is 100'x100' with a derrick that towers 186 feet above the water, and extends 100 feet out from the barge. Total displacement is 895 tons.

Crane, barge and derrick were built by the Long Beach Naval Shipyard, Calif. Westinghouse and Lockheed Missiles and Space Division helped in the project.

Undersea Warfare Studied

13 Labs Represented at Newport

Representatives of 13 laboratories met at the Naval Underwater Ordnance Station, Newport, R. I., to discuss advance planning of undersea warfare research and development.

The council they represented was established by joint agreement of the Bureau of Ships, Bureau of Ordnance, Bureau of Aeronautics and the Office of Naval Research, to provide for improved guidance and exchange of information in planning and conducting a more effective undersea warfare research and development program.

The council is composed of the commanding officer and the senior scientist or technical director of certain Naval laboratories and the Director of certain Navy-supported nonprofit laboratories.

Primary responsibility of the council is to formulate and recommend R&D plans that will assist the chief of Naval bureaus and offices in the pursuit of an effective undersea program.

THE GIRL WITH *the hat won! Noelle Jane Engler, Advanced Training Unit 601's entry, was crowned Miss Navy Corpus 1959 during the Navy Relief Festival. The hat belongs to Lt. R. O. Wirt, the MC. He's wearing it!*

BTG-5 Lets Lorge Do It

He Does: 8458 Times in 3 Years

Eight thousand four hundred fifty eight Field Carrier Practice Landings—Pensacola's Basic Training Group 5 claims it's a world record for one pilot—is the total recorded by Lt. Eugene P. Lorge, a Carrier Qualification Demonstration Instructor. Lt. Lorge started his descents to the record in June, 1956.

The old record is believed to have been in the neighborhood of 8300 FCLP'S, a mark held by a former BTG-5 instructor.

While accomplishing his unique claim, Lt. Lorge estimates that more than three-fifths of his total flying time, or 1400 hours, has been flown at altitudes less than 250 feet and at speeds of 90 knots or less.

In these days of space flight and rocketing re-entry considerations, Lt. Lorge's down-to-earth orbital achievements seem all the more noteworthy.

A COLD COURSE IN NAVIGATION

RADM. TYREE, DEEP FREEZE BOSS, WATCHES TSGT. FAVREAU SOLVE PROBLEM

MSGT. BAKER OF VX-6 HELPS LT. MULLER OF VP-18

By James MacDonald, JOC

DID YOU EVER have a hairy mission assigned, comb your experience for a possible solution and come up with a tangled mess of inapplicable answers?

It happens every year in Operation *Deep Freeze*—especially in the Navigation Department of Air Development Squadron Six.

The solutions are hard come by: if there's no precedent, establish one—learn, and pass it on.

Here's an actual case. A party of 10 scientists is exploring a patch of Antarctic terrain some 1200 miles from your home base, McMurdo Sound. They are in critical need of food, fuel, spare machinery and medical supplies. To reach them overland would take months. Weekly air support is absolutely necessary for survival.

Navigators are confronted with several distracting factors:

The terrain over which the plane will fly is unknown. Existing charts frequently are inaccurate. Altitude is anywhere from 5000 to 25,000 feet.

The best information the aerologist can supply is an honest guess based on reports from stations hundreds of miles apart.

Visibility will be zero to 75 miles.

Icing may be light, moderate or heavy at all levels. Temperature at flight level at times dips to 60 below.

Winds drive from any direction at a force from five to 100 knots.

Location of the exploratory party is known only within 40 miles.

The plane will take enough fuel to reach the party and return. Cargo load will bring the total aircraft weight to the maximum allowed under emergency combat operating conditions. There's no reserve holding fuel available, for these men need all the supplies that can be carried.

There just isn't room for error.

Obviously, the navigator is the key man in this operation. He has only the sun to go by—when he can see it.

VX-6 has faced up to these problems through four *Deep Freeze* operations and is entering its fifth.

Through the years, squadron navigators have collected a choice bag of tricks that would astound an ordinary navigator accustomed only to standard problems. On occasions so numerous as to be usual, they have been solely responsible for the safe homecoming of crew and aircraft and the successful completion of a difficult mission.

The navigator, then, is a special breed of man. In the case of VX-6, he has always been a hand-picked, well-experienced, U. S. Marine who has volunteered for the operation.

When a new navigator is ordered to the squadron, he arrives at the VX-6 home base, NAS QUONSET POINT, and immediately starts a specialized two-week course which has no counterpart in the Navy. The schooling, the only Antarctic Polar Navigation Course conducted at squadron level, was ordered into existence by Cdr. Jerry M. Barlow, the squadron commander.

The course is highly advanced for qualified navigators. Its subject matter is presented from the standpoint of practical application. Every problem, every lecture, every trick of the trade is based on hard-won experience in the Antarctic.

Curriculum consists of a thorough indoctrination into such subjects as Polar Celestial Navigation, Free Directional Gyro Steering, Polar Grid Navigation, and peculiarities of Radar Navigation in the Antarctic.

Informal critiques on various flights are conducted to give the student the benefit of another man's experience in outwitting the Antarctic's inherent traps for the unwary. Equipment used in demonstration is the actual equipment used during deployment.

Administration and instruction of the course is effected by two men,

FAMOUS R4D QUE SERA SERA, FIRST AIRPLANE TO LAND AT SOUTH POLE, STOPS OFF AT REMOTE CAMP ON BEARDMORE GLACIER

MSgt. Bill Baker and TSgt. Tom Southwick, both with more than 15 years navigation experience, several of which have been in the Antarctic. The Marine instructors dip into their hard-learned know-how to deal with problems arising from extreme cold and long Antarctic twilight conditions.

Annually, some 80 pilots and navigators will attend the course. Word gets around. When the word is good, it gets around quickly. Requests from other squadrons to send their officers and men through the VX-6 Antarctic Navigation Course have poured in.

It has been necessary to place these requests on a quota basis. Arrangements are now handled by ComNavAirLant, through whom appropriate application must be made.

"The most gratifying reward a commanding officer can experience," said Cdr. Barlow, "is to report on an exceptional job completed by his men under difficult circumstances.

"Our navigators have certainly done this—and even more. No matter how difficult the mission, no matter how impossible the conditions, they pulled us through safely and fast.

"Though instructors, they are still students, for each operation in the Antarctic presents a new problem or a new variation of an old one. They store up experiences and, in the squadron's polar navigation course, pass them on. They help make each successive Antarctic operation a safer one."

LONG-RANGED P2V-7 FLIES OVER RUGGED COMMONWEALTH RANGE ON WAY TO SOUTH POLE

SKI-RIGGED UC-1 OTTER DELIVERS FUEL, FOOD, LAUNDRY TO TRAIL PARTY ON ICECAP

STICK AND THROTTLE JOCKEY? NOT ENOUGH!

By Cdr. Paul Miller

DO YOU THOROUGHLY UNDERSTAND the Vn diagram for your plane? Have you seen the thrust required and thrust available curves for your aircraft? Do you know how "q" affects your bird? Have you heard of inertia coupling and how it can cause high performance jets to come unglued?

Chances are, if you are an average fleet pilot, you cannot answer yes to all these questions. If you can't you're just another stick and throttle jockey —and that's not enough! Not in this age of supersonic jets.

A complete knowledge of the capabilities and limitations of his plane is mandatory for every pilot. We fly aircraft today that can exceed maximum allowable airspeed in straight and level flight. What happens then—directional control is lost; try a roll, inertia coupling sets in and they just don't build 'em to fly sideways.

Or take the case of the nugget who takes off in afterburner and accelerates so rapidly that he is in a high "q" region (going like a bat at low altitude). If it is a slightly turbulent day, the setting is right for a PIO (pilot induced oscillation), JC maneuver or what have you. It has happened, and not knowing how to recover, our boy ejected. Down the drain goes $2,000,000 worth of new airplane—not because of any material failures, but because the pilot was not familiar with aerodynamic characteristics. If we carry this line of reasoning to tactics, we find that the pilot will not obtain maximum combat effectiveness from his aircraft because he does not fully *know* it.

The need for having personnel in the fleet with an aeronautical engineering background is becoming ever more apparent. Technical advances are progressing rapidly. We sat with guns at Mach .8-.9 for a long time. Now we are on the threshold of Mach 2-plus weapons systems. With a decrease in squadrons and airgroups and the spiralling cost of aircraft, we must maintain every organization in a state of top combat readiness.

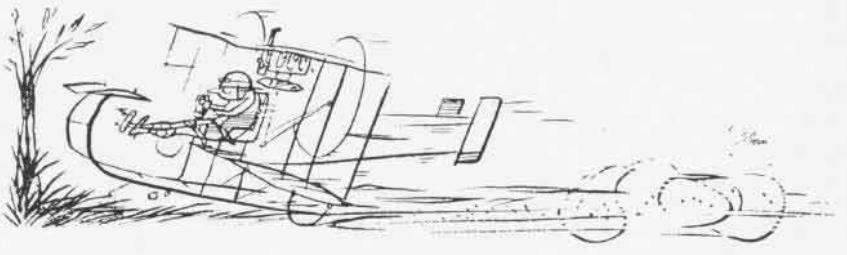
Every pilot cannot be expected to be a graduate engineer. However, as a minimum, every fleet squadron and staff must have aviators assigned with this background. At the staff level these officers are needed to produce maximum effective operational planning, using the increased performance of new equipment. In the squadron they can provide training for pilots in basic aerodynamics, high Mach effects, performance, stability and control.

Where does the Navy get these men? Some come from Test Pilot Training. The Naval Postgraduate School is the only source of graduate engineers. Some Monterey graduates are designated engineering specialists—at their own request. A certain number of AED's are required to fill the billets in the technical bureaus, but the need continues to be met by volunteers. This means that a large percentage of graduates are available for reassignment to the operating forces.

There will be increasing opportunities for pilots to broaden their professional background and enhance their naval careers. The officer who has engineering plus operational experience will be much better qualified to command the weapons systems of the future.

In addition to established engineering curricula in general aeronautics and avionics, the Naval Postgraduate School will offer a course in space technology. BUPERS Notice of 22 May 1959 gives the Postgraduate Education Program for Fiscal 1961. November 1, 1959 is the deadline for receipt of applications by the Chief of Naval Personnel.

Remember, if you are a stick and throttle jockey—it's not enough!



Water Landings Practiced
VAH-5 Conducts Operation Splash

Heavy Attack Squadron Five, NAS SANFORD, has introduced a new feature into its survival program—a means of indoctrinating personnel with parachute landings in water.

The need for such a program arose from several incidents where flight crews, after abandoning their aircraft successfully and making a normal parachute descent, drowned within minutes after hitting the water.

"Operation Splash" consists of dropping flight crew personnel in full flight attire from a height of 15 feet into the water and measuring the time it takes each man to rid himself of his parachute, then inflate and climb into his raft. Height is provided by a crane which is driven to a nearby lakeside.

The training operation usually is scheduled once a week for three crews. First, a comprehensive briefing is given on the three phases of bail-out: abandoning the aircraft, the descent, and the water landing. Following this, the crews are taken to the lake and dressed in flight clothing.

Each member in turn dons a parachute harness connected to the crane's cable. The crane moves the man up and out over the water. Once in position, the man takes his raft out of his parachute seat and gives a "thumbs up" to signify he is ready to drop.

A steel pin is removed from the clove hitch holding the man up and he plunges into the lake. Once in the water, he removes his chute, but does not inflate his Mae West until necessary. When the chute is clear, he inflates it and climbs into his raft.

Essex Lands No. 90,000
Crowds Mark Set by Old Saratoga

USS *Essex* came a step nearer to breaking the record of 97,549 carrier landings set by the old *Saratoga* when Lt. Don Florence of VA-106 recorded the 90,000th landing aboard the *Essex* during Operation *Riptide*.

The *Saratoga* record has stood a dozen years. It spanned the period from 1932 until the *Saratoga* was sunk as a "guinea pig" during A-bomb tests at Bikini in 1947.

Essex is the oldest combatant carrier in active service. Commissioned in December 1942, she served in World War II, was mothballed in 1946, and recommissioned during Korean war.

HOTTER THAN A PISTOL

MOST high-speed aircraft today have a cartridge-actuated escape system. The system involves a single action trigger (face curtain, armrest or seat busket trigger), which initiates a typical sequence of events:

- The canopy is ejected by a powder charge;
- The seat is ejected by a cartridge or rocket catapult;
- The seat belt and restraint harness are released by a ¾ second delay cartridge which allows the man to separate from the seat;
- The parachute is automatically opened by a two-second delay cartridge when the proper altitude is reached.

New aircraft will have the following additional cartridge-actuated devices: seat bottomer (to align the center of gravity with the rocket thrust), knee elevator, leg retention devices, face curtain cable cutters.

Most cartridge-actuated devices have safety pins that must be installed when on the ground, removed prior to taxiing to the runway and replaced immediately upon arriving at the ramp, by either the pilot or plane captain. Safety pins should be carried in any aircraft going on a hop where a stop may be made because the landing field might not have spares.

This information seems very fundamental. However, the number of accidental firings which have resulted in injury or death, indicates that the cartridge-actuated escape system is a potential killer if all personnel involved are not fully acquainted with the installation.

Pilots, crewmen, and maintenance men should be thoroughly checked out in every phase of each system. The current NAVORD Instructions 8190.5 and 8190.6 give the theory; the *Handbook of Maintenance Instructions and Safety Precautions* presents the recommended practice in care and handling.

New low level ejection systems have been developed for greater safety. The Martin Baker and the Rocket Assisted Personnel Ejection Catapult (RAPEC) are being installed in operational aircraft. BUORD says: "New equipment needs new training. Never assume knowledge. Get the complete word.

"It may save a life or it may prevent a plane from becoming a strike."

Astronauts Get Navy Garb
Mark 4 Pressure Suit is Adopted

A modified Navy flight suit has been selected as the life-support garment that will be worn by the Project *Mercury* astronauts in manned orbital flight.

The National Aeronautics and Space Administration selected the Navy suit, made by Goodrich, after more than six months of intensive testing and evaluation of three different suits.

Under the one-piece Navy suit, the astronauts will wear a double-walled rubber ventilated garment of a type used by Air Force pilots. The inner wall of this suit will be perforated to permit body pores to "breathe."

Air will flow into the inner suit through a waist connection, then circulate through the suit and be exhausted through a pipe in the helmet. The air will then move through an air conditioning system under the astronaut's couch where impurities will be removed before air is recirculated.

The outer suit has body, leg and arm lacings. The headgear, which locks to the suit on a neck ring, resembles a football helmet with a plastic facepiece.

As in modern fighter aircraft, the outer suit will be pressurized only if the capsule pressure fails. It will serve as a backup safety feature.

The suit will be coated with a silver spray which will act as a heat buffer as well as a radiation shield.

THETIS BAY SHOWS THE WAY

MARINE HUS OF HMR-362 DEMONSTRATES AIR-SEA RESCUE OFF PORT BEAM OF USS THETIS BAY DURING A PACIFIC OPERATION

USS THETIS BAY traces her name to the legendary Greek goddess Thetis who mothered Achilles. Following tradition, the current Thetis is mothering a new warrior concept—vertical envelopment of enemy strong points by helicopter-lifted Marines.

Formerly a CVE, *Thetis Bay* became the Navy's first helicopter carrier in 1956. As such, she was the prototype for Amphibious Assault Ships.

In three years of Pacific Fleet operations the *Thetis Bay* has operated Marine HRS, HUS, HUL, HOK, HUP and HR2S helicopters and Army H-21's. Her 15,000th accident-free helicopter landing was recorded this summer.

Gearing for helicopter operations required many changes in the *Thetis Bay*. Catapults, arresting gear and two center-line elevators were removed and additional space was made available for berthing. Part of the hangar deck was converted to troop space, shops and parts stowage. A large aluminum stern elevator was installed and the hangar deck was reinforced. Piping and ventilation systems were re-designed and the ship was rigged with an exhaust system to eliminate turn-up gases.

A two-stage cargo elevator was installed: the lower stage running from the first platform to the hangar deck, and the upper stage traveling between the hangar and flight decks.

Facilities were provided for the handling and stowing of packaged gasoline in 55-gallon drums and 5-gallon cans. Catwalks were widened to give combat-equipped troops easy access from their compartments to the embarkation points, and helicopter maintenance facilities were improved.

Helicopters embarked for operations carry troops internally and cargo externally. A typical "D-day" schedule starts with flight quarters at 0430 and the first launch is made in morning twilight. Waves of helicopters are launched in groups of four.

After a rendezvous, they proceed to the landing area at the designated hour, delivering fully equipped Marines. They swarm back to the ship, land once again in formations of four, load more men, and take off again, delivering enough troops and equipment to the landing area to guarantee success.

IN DAWN'S EARLY LIGHT, ASSAULT WAVE FLIES IN FOR LANDING

BIG BIRDS LIKE THIS HR2S REQUIRED REINFORCED FLIGHT DECK

Shatters Gunnery Record

Pilot Hits with 97 of 152 Rounds

A Chase Field instructor shattered the base's record for air-to-air gunnery and then, to prove it wasn't luck, bettered his own record four days later.

Lt. Carroll E. Myers, gunnery officer for Advanced Training Unit 213, scored 71 hits out of 115 shots for a record 60 per cent. Next week, the sharp-shooting jet pilot raised the mark to 64 per cent by riddling the target with 97 hits out of 152 shots.

Scores of 33 per cent are average

LT. MYERS EARN'S 'ACE OF CHASE' TITLE

for Chase Field instructors and 15 per cent is above average for students in air-to-air gunnery without radar.

During gunnery flights the pilots fire at a 6x30-foot target banner which is towed at a speed of 250 mph. The firing aircraft, flying at approximately 525 mph, approaches the target at an angle where the target appears to be a 6x6-foot square, firing from approximately one thousand feet away.

HatWing 2 Decommissioned

Control Goes to ComFair Whidbey

Heavy Attack Wing Two, which has provided squadrons and detachments for 13 Pacific Fleet aircraft carriers since its commissioning in 1956, has been decommissioned. The Wing's last commanding officer was Capt. William M. Romberger.

In making his final address, Capt. Romberger pointed out that six months after the Wing was commissioned, the long-range, all-weather capability of the Pacific Fleet had increased 50 per cent. A year later, with the advent of the A3D *Skywarrior*, there was a 550 per cent increase in strength available to Commander Seventh Fleet.

Capt. Romberger was assigned to duty in Washington. Control of the heavy attack units at Whidbey will go to Commander Fleet Air Whidbey.

ADVANCED TERRIER MISSILE BLASTS OFF IN TEST FIRING AT NOTS, INYOKERN, CAL.

BETTER TERRIERS COMING

PRODUCTION of improved *Terrier* missiles has begun at the government-owned, Convair-operated Naval Industrial Reserve Ordnance Plant at Pomona, California.

In flight tests of the anti-aircraft missile at China Lake, its performance was described as "highly satisfactory." The improved *Terrier* will replace present *Terriers* which have been operational since January 1956.

Under present shipbuilding programs, the advanced missile will become a major element in the Navy missile arsenal. USS *Dewey*, a guided missile frigate which will be commissioned late this year, will be the first ship to get the advanced *Terrier*.

The nuclear-powered *Enterprise*, as well as two conventional carriers, three guided missile cruisers and 18 more guided missile frigates, will get the missile. Advanced *Terriers* eventually will be installed on the nuclear-powered guided missile cruiser *Long Beach* and the nuclear-powered guided missile frigate *Bainbridge*.

The advanced *Terrier* will be able to intercept any present-day supersonic bomber, many miles from its intended target. Like the original *Terrier*, the new weapon is a supersonic missile powered by two stages of solid fuel rockets. The first stage, a separate booster rocket, supplies high thrust for a short period to launch and accelerate the missile to supersonic velocity.

After the booster fuel is expended, the empty booster case falls away, and the second stage rocket ignites. The second stage, called the sustainer grain, is part of the missile proper and it maintains the acquired velocity for the remainder of the flight. This velocity is sufficient to match any evasive maneuver the target aircraft takes.

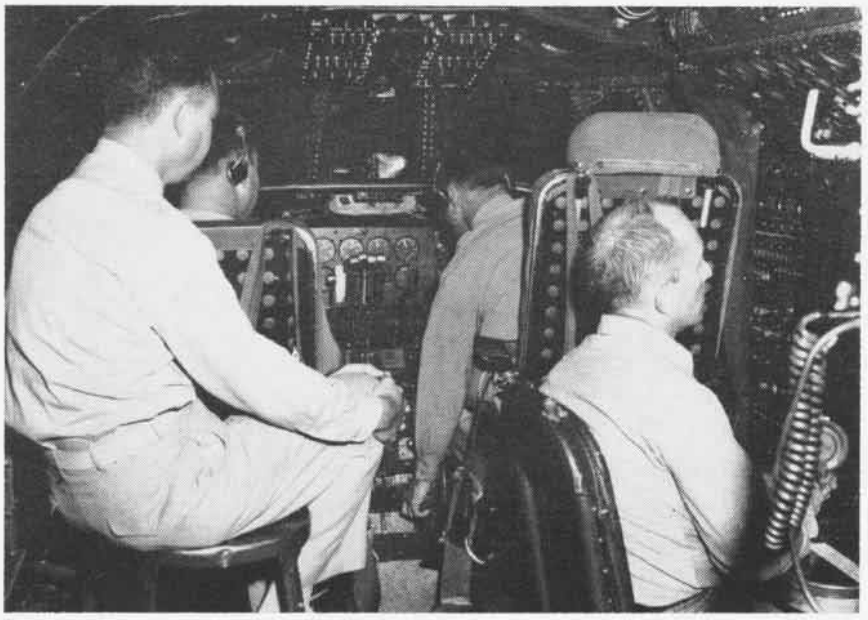
On guided missile warships, both those now in use and those under construction, flight-ready missiles are contained in large, automatic-loading magazines. The loading mechanism moves missile-booster combinations into position and rams them onto the launcher, enabling a salvo of two *Terriers* to be fired at rapid intervals from each launcher.

Like its predecessor, the advanced *Terrier* will be used from mobile ground launchers for the anti-aircraft protection of U. S. Marine detachments on land. The *Terrier* is equipped with portable radars, launchers and loaders that have been designed for mobile, land-based use.

Terriers are stockpiled at both inland and tidewater supply depots. They are stored as complete rounds, ready for use. In the event that reprovisioning of fighting ships becomes necessary in combat zones or in remote areas of the world, a technique for rapid transfer-at-sea from supply ships has been perfected.

Selected teams of missilemen who handle and service the improved *Terriers* have been developed under the present Navy and Marine Corps training programs. These teams provide a constant surveillance on the flight-readiness of stock-piled *Terrier* missiles.

THERE, BUT FOR THE GRACE . . .



PILOT, CO-PILOT AND FLIGHT ENGINEER 'TAKE IT UP' WHILE INSTRUCTOR OBSERVES

WITH NUMBER three engine already feathered, number four hydraulic pump of MATS 53533 fails completely. There is no secondary hydraulic system.

Wearily the co-pilot finishes pumping the flaps and landing gear down and prepares for landing. In the left seat, the pilot sweats profusely.

Outside the window, he can see absolutely nothing. The turbulence is so bad he can hardly keep his grip on the control column. The altimeter reads 550 feet . . . descending slowly. The GCA operator's voice drones in his ear: "Approaching GCA minimums . . . ."

Suddenly, from the engineer, "Fire warning in number four. Recommend feather."

"Feather number four—execute emergency procedures!" returns the pilot.

". . . thirty feet below the glide path . . . one mile from touchdown . . . tower advises go-around, truck on runway!"

"Max power! Go around!" says the pilot tersely. It is too late. With a deafening roar, MATS 53533 "crashes."

The only judgment facing the pilot, however, is the stern remonstrance from his instructor. "You cranked down too much flap. Remember you can't get it up without a secondary system. We'll try it again after a break."

With that, the crew—all in good shape—steps out of MATS 53533, in reality the C-121 simulator used by VR-7 at NAS MOFFETT FIELD to train NATSPac personnel.

Operating some 12 hours per day during three scheduled periods, the simulator provides valuable cockpit indoctrination. Any approach which the airplane is capable of performing can be practiced in the trainer, including GCA and radar vectoring.

Weather phenomena are particularly realistic in the device. Rough air, a wide variety of icing conditions, and the time of night or day can be ground into the system. Many sounds, including tire squeaks on landing, unsynchronized propellers and crash sounds can be frightening; all this in addition to the range of emergency situations that can be artificially generated to plague the best of pilots.

The simulator, officially known as the Curtis Wright Dehmel MB-13, went into operation at Moffett on 15 October 1958. Since then, it has averaged 191 hours a month. It is the responsibility of the VR-7 Special Devices Division, headed by LCdr. J. S. Neander. D. J. Miller, TDC, is the leading chief; eight enlisted men, divided into two working sections, and three civilian technical representatives are also attached.

The device occupies a room 36 by 40 feet. There are 14 computer cabinets in addition to the simulator fuselage, and some 750 vacuum tubes. Even at this, the MB-13 can be operated at about 10% of the cost of actual aircraft operations.

The true value of the simulator is inestimable. It provides indoctrination for new pilots before actual transition takes place, and it gives old hands the opportunity to handle emergencies in a realistic manner. At the same time, there is no risk to personnel or equipment involved.

Barrier Pac Has Birthday

Ship, Plane Crews Receive Awards

Officers and men of the Pacific Barrier who have flown 1000 hours or made eight surface patrols were presented awards by RAdm. B. E. Moore as the barrier's first anniversary was commemorated.

The *Super Constellations* on barrier flights have flown 33,750 hours in the past year, requiring flight crews to spend the equivalent of one and a half months in the air.

Barrier picket destroyers steamed 535,000 miles in the same period, using enough fuel to propel a single truck across the United States 23,000 times.

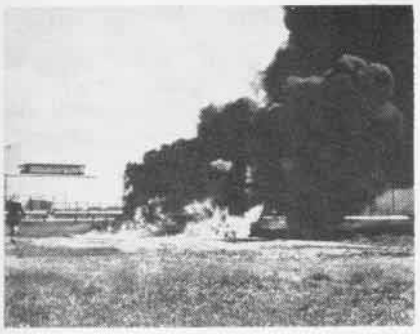
Messages sent by planes and ships on barrier patrol would have filled at least 93 novels.

The Pacific Barrier connects with the Distant Early Warning Line across Canada to further provide the Continental Air Defense Command and the Civil Defense Authority with early warning of an impending attack by enemy bomber-type aircraft.

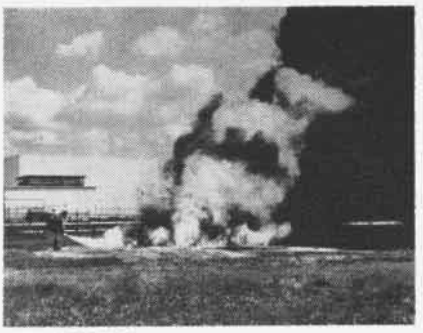
The Airborne Early Warning Wing is comprised of two operating squadrons, VW-12 and VW-14, and one maintenance squadron, Airborne Barrier Service Squadron Two.

The Barrier's surface command is Destroyer Escort Squadrons Five and Seven, presently composed of 18 radar picket ships.

Ships of the command are based at Pearl Harbor and the aircraft operate from Barber's Point, deploying to Midway as their outlying operations base.



ONE SECOND



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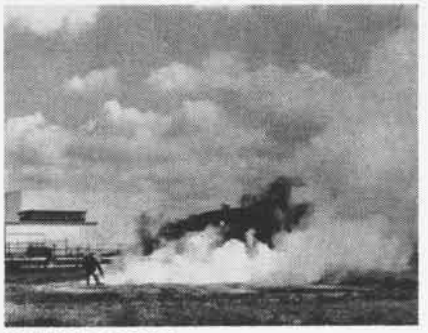
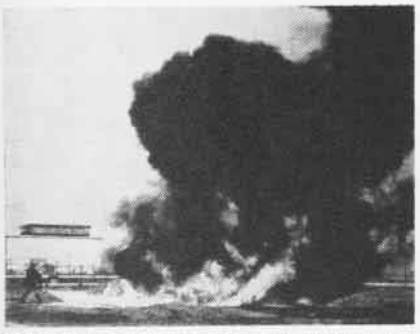
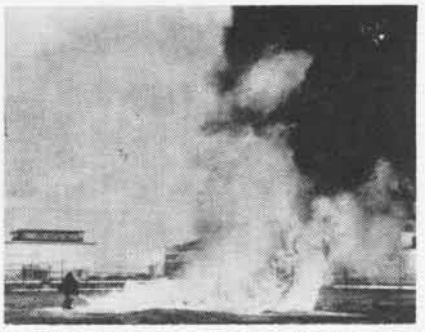
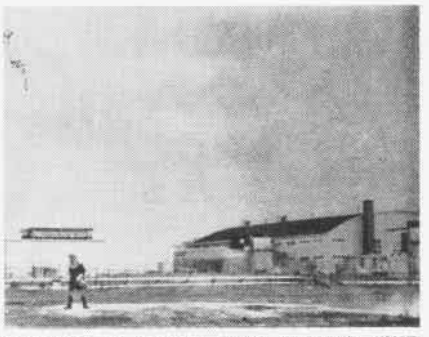


SIXTEEN SECONDS







OLD EXTINGUISHING AGENT'S ABILITY TO QUENCH FIRE, TOP SEQUENCE, IS COMPARED TO PURPLE K BELOW, SAME ELAPSED TIME

PURPLE K POWDER

PURPLE K DOUSED THIS ONE IN 3 MINUTES

SCIENTISTS at the Naval Research Laboratory have made the first major break-through since 1913 in fighting gasoline and oil fires. The discovery is "Purple K," a dense-white, flame-shielding, fire-quenching cloud of very finely powdered potassium bicarbonate.

The name Purple K derived from the fact that the new powder changes the color of flames from yellow to lavender as it extinguishes the fire.

It permits fire fighters to extinguish gasoline and oil fires in half the time they would need if they used another agent. Purple K is expected to replace the old bicarbonate of soda now used in fire extinguishers.

More significant than its color-changing namesake, however, is Purple K's ability to reduce the amount of heat emitted by the fire. This enables fire-fighters to move in closer to the flames and thus fight them more effectively.

The new agent is easy to obtain, it is inexpensive, it is not toxic, and it can be used in conventional fire extinguishers.

Since bicarbonate of soda was first used to put out oil fires in 1913, many attempts have been made to develop a better powder. The old powder was treated with various substances to improve it, and many special agents were added to make it more effective, but it continued to have limitations.

Preparation of the new powder is the latest achievement in a 20-year program of fire research conducted at NRL for the Bureau of Aeronautics. Previous work has led to the development of many important fire extinguishing devices now being used to protect Naval Aviators from fires that break out as the result of crashes.

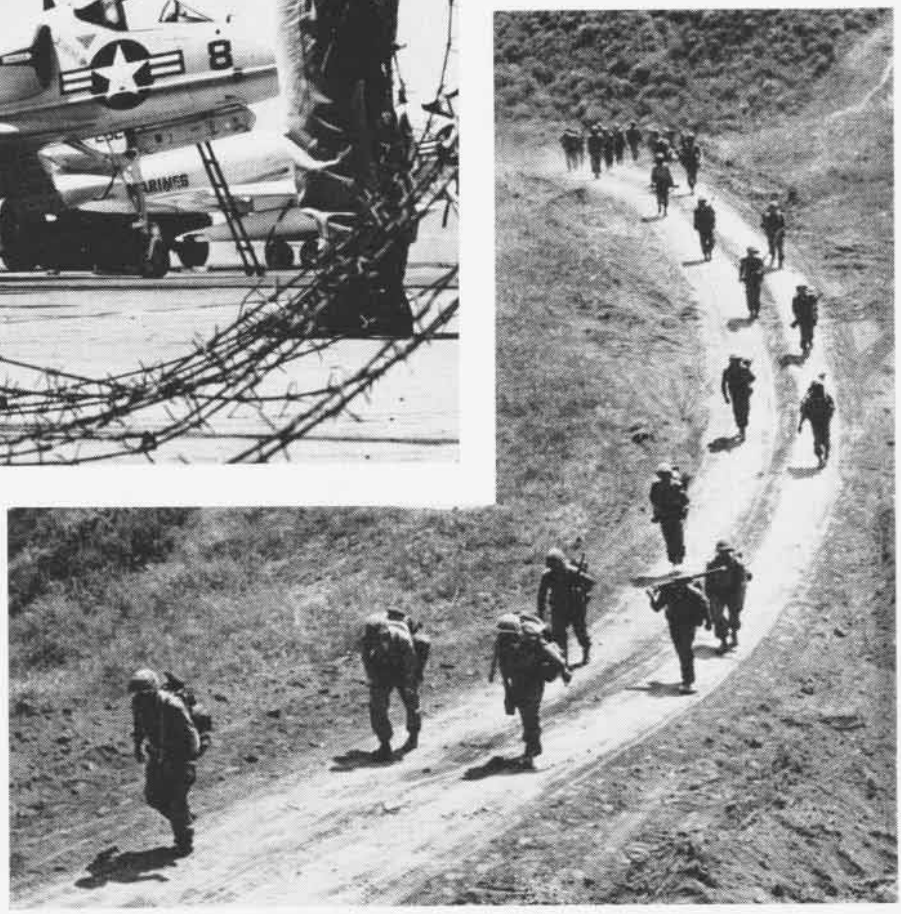
Purple K powder is in the process of commercialization. Large quantities will probably be kept on hand at places where oil fires are likely to break out, such as petroleum refineries. The powder also shows promise of becoming an important fire extinguisher in homes and shops.

In field trials at NRL, two crewmen, with fire-fighting equipment including Purple K, were flown a quarter-mile by helicopter to the site of a 40-foot-wide gasoline fire. Working against time, the crewmen unloaded from the helicopter and successfully extinguished the fire in three minutes.

LAND THE LANDING FORCE!

The phrase resounds throughout the 60 ship armada. H-Hour! 15,000 Leatherneck hit the beach in conventional landing craft Behind an armored spearhead, they thrus forward to join 1000 Marines heli-lifte from an amphibious assault ship who ar attacking the enemy from the rear. Durin the entire operation Marine A4D Shyhawk provide aerial protection for the forc and close air support for ground troops In peacetime the Navy-Marine team con ducts many such large-scale exercises t prove and perfect tactics and equipment i order to be prepared for the real thing


8
MARINES



OVERHAUL AND REPAIR *is exemplified by this F3H Assembly line which is well situated in terms of its ultimate customers, the U.S. Navy's big attack carriers anchored at North Island. According to VAdm. A. M. Pride, "The Fleet is absolutely dependent upon the O&R Departments."*

FOUR DECADES OF SERVICE MARKED

By Elretta Sudsbury

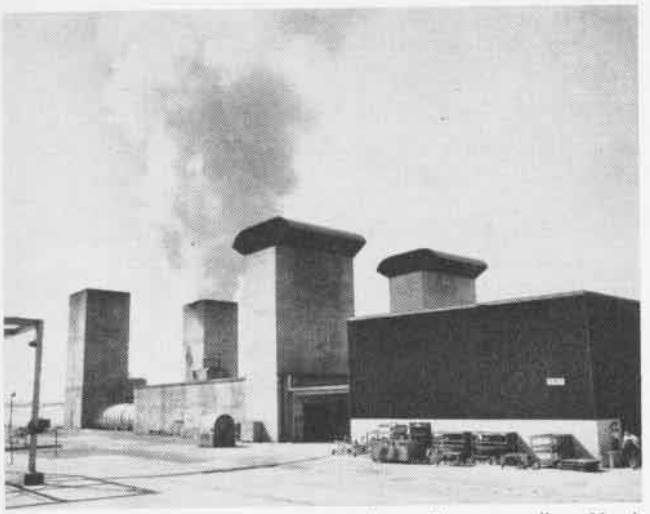
FOUR DECADES of outstanding service on the part of Overhaul and Repair, NAS NORTH ISLAND, did not go unheralded in the proud and spacious West this summer. The huge celebration at San Diego included not only distinguished guests, among them the Honorable Richard Jackson, Assistant Secretary of the Navy and VAdm. A. M. Pride, then Commander, Naval Air Forces, Pacific Fleet, but also a schedule of exhibitions, live and static, that portrayed the multiple concerns and skills of O&R.

In an average quarter today, O&R at North Island repairs or reworks about 300 aircraft, 160 engines, 40,000 aeronautical components, and 12 to 18 missiles. Nor is its sphere limited to the station, for specialists are sent to distant bases to repair crash-damaged aircraft. Whether the aircraft is a F3H *Demon*, F4D-1 *Skyray*, F8U-1 *Crusader*, F3D-2Q *Skyknight*, PBM *Mariner*, P5M-2 *Marlin*, etc., or any of six models of helicopters, O&R is ready and able to handle it. It is equally versatile in engine types. Looking ahead, O&R is preparing to handle the WF-2 and the F8U-2.

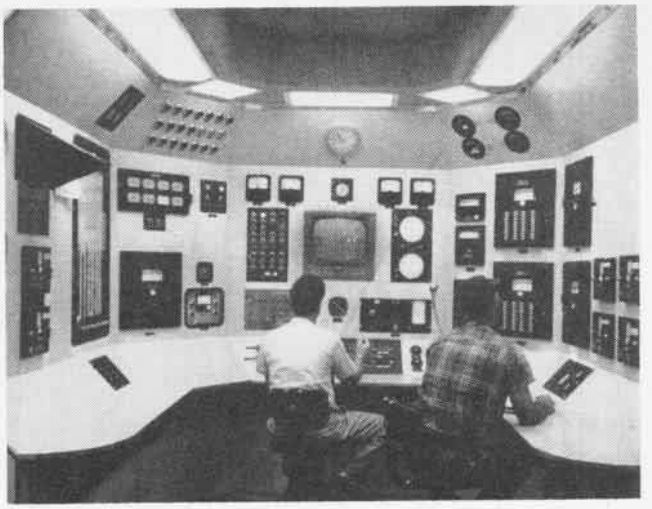
Gone are the days when any good aircraft mechanic had the know-how to overhaul or rebuild an entire aircraft from prop to tail. Specialization is a necessity today, and O&R North Island is geared to a high standard of modern industrial practice. This was recognized by Secretary Jackson when he presented the plaque honoring the 40-year service of military and civilian employees which sustains the flying Navy. Upon receiving the plaque, Capt. John B. Bowen, Jr., commanding officer of NAS North Island, turned it over to Capt. L. J. Hunt, O&R officer.

The history of Naval Aviation at North Island itself is, of course, even older than O&R. It was the scene of many of the early exploits of flying pioneers of the U. S. Navy. Lt. T. G. Ellyson, first officer to report for flight instruction was ordered to North Island in December 1910 to begin his training. It was also there that Glenn Curtiss made the first successful flight with a seaplane. North Island saw the arrival of other officers early in 1912: Powers, Herbster, Rodgers and seven enlisted men. They lived in tents and practiced flying back and forth between North Island and the waterfront of National City—a trip of about 30 minutes. One of the early crewmen, Howard Morin, remembers that "the island at that time was densely covered with mesquite brush. Sand blown by the trade winds filtered into the aircraft and made maintenance difficult."

Upon declaration of war 6 April 1917, total strength of Naval Aviation was 48 officers and 239 enlisted



EQUIPMENT IS *modern, complete—and large. This test cell at North Island provides O&R with means to test jet engines after overhaul.*



HIGHLY SKILLED *personnel are used in the control room as engines are tested. Note closed circuit TV which indicates test progress.*

men in Navy and Marine Corps. The aircraft of the Navy consisted of six flying boats, 45 seaplanes designed only for training, three landplanes, three balloons and one unsatisfactory dirigible.

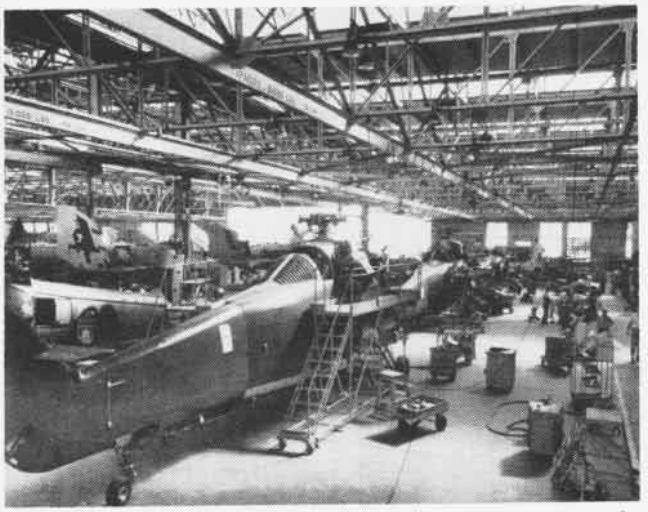
WW I made expansion imperative, and on 8 November 1917, Lt. Earl W. Spencer arrived at San Diego to establish a station. Pilots and aviation mechanics were trained there. The training accomplished at San Diego contributed the grand total of Naval Aviation forces at the end of WW II: 6,998 officers and 32,873 enlisted men. On hand were 2107 aircraft and 230 dirigibles and balloons.

Though the early quarters of O&R were primitive, there was nothing small about some of the jobs Navy mechanics were called upon to do. One of the first mechanics, W. H. Roberts, remembers that in 1920 aircraft were assigned to a crew who stayed with the plane until it was returned to the fleet. The planes were constructed mostly of wood and fabric, and often they had to be stripped of fabric and actually rebuilt. The crew bet their lives on their work, for they helped with the flight test once their work was complete.

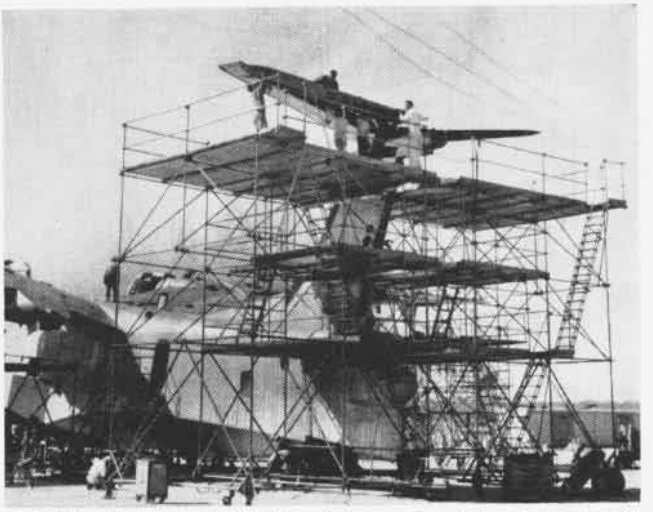
The first aircraft completely overhauled were the Curtiss N-9 trainers. Contemporary with these, also overhauled at North Island, were the F5L and the Curtiss F-boat.

Through the twenties, aviation developed fast and each man had to be an expert technician to keep abreast of the changes in aircraft. But even expansion did not mean that the facility was anything that foreshadowed the proportions of the work today. As Mr. F. G. Arnold, now Aeronautical Engineering Superintendent recalls it, there were only three small buildings with limited shop facilities when he reported for work in 1929 as a civilian engineer.

Most of the O&R work at that time involved the overhaul of seaplanes of various types, but by 1929, three carriers were in operation and work on landplanes began to mount. Engine overhaul had been set up as a separate operation. Test stands con-



ROTARY-WINGED *aircraft are relatively young in the aircraft family. Here a Sikorsky HSS-1 helicopter is undergoing its final assembly.*



THE SIZE *of certain tasks O&R is called to perform today is dramatically portrayed in this picture of a P5M assembly during overhaul.*

structed by the workers supported the Pratt & Whitney *Wasp* and the Wright *Whirlwind* and *Cyclone*.

Development of metal aircraft made specialized trade skills essential. Toolmakers and machinists were needed to work with the military. Between 1929 and 1935 from 400 to 700 military and about 50 civilians were normally assigned to O&R. Some 175 airplanes a year were overhauled.

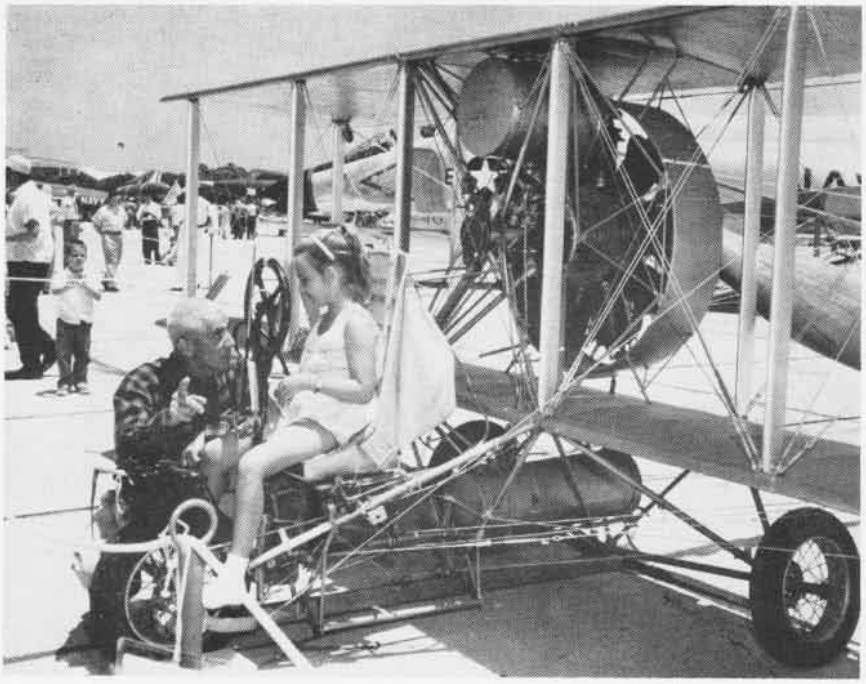
As the danger of conflict in Europe increased during the thirties, the aviation forces grew and O&R exploded in a frenzy of activity. To meet the requirements of combat operation during WW II, the overhaul concept at North Island had to be dropped in favor of concentrating on reconditioning, contractor modifications and special configurations.

In addition to the regular jobs O&R was assigned, there were emergency tasks that had to be executed under pressure. For example, early in WW II, there was an urgent need of the Pacific Fleet for 50 arresting hooks to replace worn ones. Factory delivery date was early summer, but the war couldn't wait for orderly schedules, and O&R employees knew it. They stepped in and supplied the hooks by working round the clock until the dies could be made, the castings poured and the finished arresting hooks ready, packed and sealed for delivery.

D. A. HALL, *who heads the Helicopter Branch, designed Landbergh's "Spirit of St. Louis."*

The fact that the job was new didn't stop them. They worked out methods as the project developed. The hooks were sent to Hawaii and installed on planes that took part in the Battle of Midway.

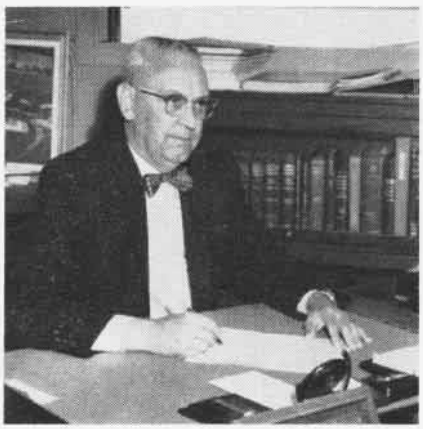
Spectacular service or routine, O&R came through. By 1945 the military and civilian personnel totalled 11,000.



ROY FIFE, *O&R Aircraft Evaluator, demonstrates his "pusher biplane" to a small visitor. Mr. Fife began to construct the plane in 1926 and patterned it after a Curtiss pusher.*

Early postwar years were marked by austerity and reduced operations. Expansion was again in order to support the Navy when the Korean conflict opened. In 1951, O&R production rose to 1120 aircraft. At the same time jets, helicopters, and missiles were coming in, and these required extensive changes to plant facilities.

Today, O&R North Island is big, noisy, active. A sprawling industrial complex of large structures and thousands of specialists, it is spread through 44 buildings and uses 10,000,000 square feet of land. Its 5000 men and women represent more than 100 different trades and occupations, ranging from typist to engineer, from analyst to foundryman, from electronics mechanic to tractor driver.



F. G. ARNOLD, *hired in 1929, is now Superintendent of Aeronautical Engineering Group.*

Shops and hangars are adjacent to five and a half miles of runways. Nearby are 11 carriers and tender berths where aircraft and components can be quickly off loaded for O&R processing. Easy accessibility of O&R makes it possible to give efficient service to the fleet.

O&R's celebration of its fortieth anniversary included tours of the USS *Oriskany*, flight demonstrations over North Island, a tethered launching of a *Regulus* missile, an Air Defense scramble by VF(AW)-3, a fire-fighting exhibition, and an open door display of aircraft, engines and parts.

It's a far cry from tents, mesquite brush, and N-9's, but imagination and creative ability still characterize the men and women who work in O&R. Behind the big carriers, guided missiles, supersonic jets and other weapons of modern defense must be careful planning and hard work. O&R North Island has years of experience and considers its role dynamic and significant in today's Navy.

As a proud contemporary to another, the 40-year-old *Naval Aviation News* salutes O&R NORTH ISLAND.

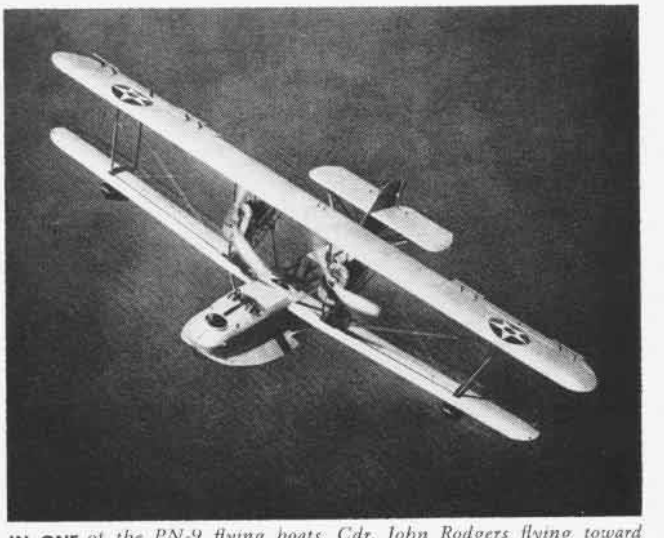
IT WAS REALLY *only yesterday that this type of aircraft was being overhauled at North Island. The F4B-2 was operational in mid-thirties.*

WHEN THE AIRCRAFT *is almost ready for its return to the Fleet, workers make a thorough ground check. Then a military crew test-flies the plane.*

THE XOP-1 *Autogiro 1931, is a forerunner of modern helicopters. First carrier landing was made in 1931 on USS Langley by Lt. A. M. Pride.*

THIS HU-1 *helicopter exemplifies the modern designs in whirlybirds. O&R is ready as more and more helicopters are put into Navy service.*

ANOTHER MODERN *type of aircraft is the P5M-2 Marlin. This seaplane can be fully serviced at the Overhaul and Repair shops at North Island.*



IN ONE *of the PN-9 flying boats, Cdr. John Rodgers flying toward Hawaii set a long distance record of 1841 miles in August of 1925.*

Weekend Warrior NEWS

MUTUAL ASSISTANCE *is provided during drill weekends at NAS Dallas. HU-702 makes simulated triple-rescue of VR-701 men for practice on both ends of the hoist. Helicopters, left to right, are piloted by Ltjg. D. G. Buswell, Lts. R. I. Benoit, A. H. Ebert.*

RAdm. I. M. McQuiston Retires

Stirring ceremonies were held at the Naval Weapons Plant in honor of the retirement of RAdm. Irving M. McQuiston, who was a member of the Naval Reserve for 40 years, 30 of which were on active duty. Since 1918 he has worn the Navy Wings of Gold.

Throughout his entire Naval career, Adm. McQuiston has contributed substantially to the whole field of Naval Aviation. In 1923, he helped establish the first Naval Reserve Aviation Base at Squantum, Massachusetts. At the request of the Chief of the Bureau of Aeronautics, he reported to the Bureau in 1930 and served there continuously until 1941 in connection with the training of the Naval Air Reserve. In this assignment he was given the responsibility for developing the legislation for the Naval Aviation Cadet Program. After its passage, he organized and implemented it.

"For exceptionally meritorious conduct . . . as Director of the Progress Division in the Bureau of Aeronautics, from April 1, 1941 to February 1, 1946; and as Chief of Aviation Progress in the Office of the Deputy Chief of Naval Operations (Air), from September 10, 1943 until May 28, 1945" he was awarded the Legion of Merit.

Since 1950 RAdm. McQuiston has served as the Military Executive Officer of the Reserve Policy Board in the Office of the Secretary of Defense. He was the first member of this group, which was originally called the Civilian Components Policy Board.

RAdm. McQuiston was the only member of the Naval Air Reserve of flag rank on active duty when he retired. At the farewell ceremony Under Secretary of the Navy, Fred A. Bantz, gave a commendation medal.

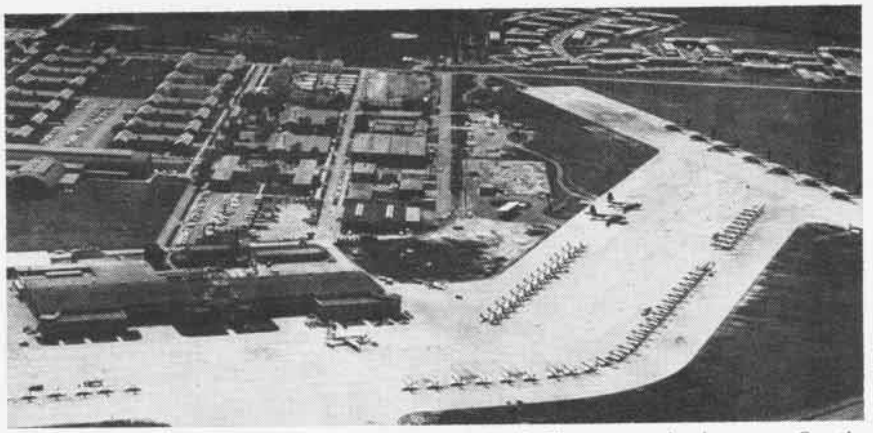
NAVY LEAGUE *President, F. G. Jameson, C.O., Capt. J. A. Masterson visit at Anacostia.*

St. Lawrence Seaway Opens

It was a busy week at NAS GLENVIEW. Carrier Air Group 8 from NAS OCEANA migrated to the Middle West station to take part in the festivities for the Inland Waterway opening.

For the first time in history, Chicago and Milwaukee saw a tactical air group in action. Residents were awed as a steady stream of F8U *Crusaders*, A4D *Skyhawks* and AD *Skyraiders* took off and landed on the Glenview runways. In addition, there were VMA-224 *Skyhawks* from Cherry Point,

UNDER SECNAV *Fred A. Bantz pins Medal of commendation as RAdm. McQuiston retires.*



OPERATION INLAND *Sea had a big assist from the Naval Air Reserve. Photo at right shows some of the CVG-8, and other visiting aircraft, that used NAS Glenview as headquarters. On the left USS Macon, part of Task Force 47, leaves St. Catherine Lock.*

HMR-162 helicopters from MCAF NEW RIVER and VP-23 P2V *Neptunes* from NAS BRUNSWICK, Me.

NAS GLENVIEW is geared by manpower and facilities to support about 60 planes, the staffs of the Chief of Naval Air Reserve Training and the Commander, Marine Air Reserve Training, and 28 reserve squadrons. The task of supporting more than 100 extra aircraft seemed gigantic. All hands, however, took it in stride. They were happy to reciprocate for the many times regular squadrons and installations rendered similar service for Reserves on annual training duty. They were pleased, moreover, to demonstrate their readiness and ability.

AIRTU's Make Port Study

A study of the Port of Philadelphia by Air Intelligence Reserve Units 931 and 932 of NAS WILLOW GROVE is underway. Started last spring, it will encompass portions of several drill weekends, and will be finished this fall.

DO-IT-YOURSELF *golf course at NAS New Orleans is started by Capt. W. A. Hood, C.O.*

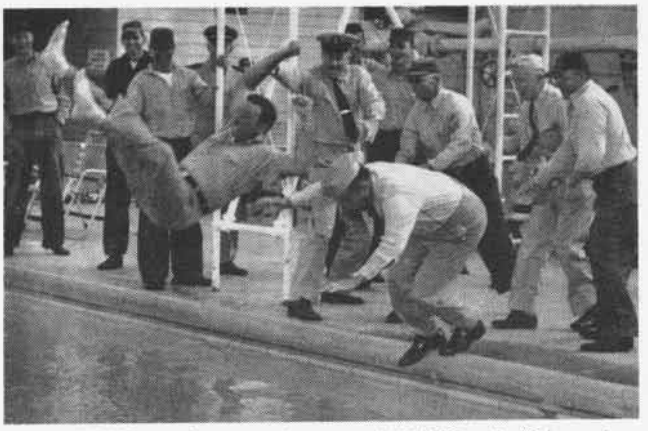
Under the supervision of LCdr. Chuck Hurley, Assistant District Intelligence Officer (Air), Fourth Naval District, the project supplements the Air Intelligence Syllabus, with particular emphasis on Photographic Interpretation of port and harbor facilities.

Several field trips have been made covering some of the major types of port facilities. Individual officers were assigned specific areas of responsibility and were required to submit reports, supplemented by their own photography. To complement this information, a cruise on the Delaware River was arranged to see the same spots from the waterside. RAdm. C. H. Lyman, III, ComFour, permitted the use of his barge for the day.

There was also a tour of the Philadelphia Naval Shipyard where shops, drydocks and Reserve Fleet activities were visited. A trip to New York Shipbuilding Corp., Camden, N. J. to view nuclear ships is planned.

The end result of all the data-gathering will be an annotated uncontrolled mosaic with a textual supplement in brochure form. Cdr. E. L. Barker, C.O. of AIRTU 931 and LCdr. Jack O'Brien, skipper of 932, will present copies of the study to CNAResTra and the DIO, Fourth Naval District.

GROUP PHOTOGRAPH *of members of Willow Grove's AIRTU 931 and 932. Cdr. Barker is second row center. LCdr. O'Brien is on his right.*



OAKLAND HAD *a real wetting-down party! VP-876-er L. Nelson, shoeless, made ADC. Shipmate Davidson, shod, also ended up in the drink.*

LET'S LOOK AT THE RECORD

DIXIE TEAM HAS SHARP HELMETS AND CAPS

Dixie Five Set the Pace

Team Training Starts at ATU-203

"Dixie" is the name of the first flight of students to go through jet training under a new method of instruction at Advanced Training Unit 203 at NAAS CHASE FIELD. The system puts three or four students as a team through their paces in swept-wing *Cougars*.

Before this was initiated, students were trained individually with one instructor per phase. Much competitive spirit was lost. Now, with Dixie leading the way, other flights are doing their best to look and be sharp.

Members of the pioneering Dixie Five are Capt. Chester A. Liddle, Ltjg. Carl W. Sommers, instructors; 1st Lts. James B. Arrington, Robert D. Davis, and NavCad Neil D. Koth, students. Capt. Liddle is the only southerner, but the rest of the group liked the tone of the name.

Well pleased with both the name and the esprit de corps it is promoting throughout the unit is officer-in-charge, Cdr. Sam M. Tharp, Jr.

VA-113 Centurions Cheer

Skyhawk Shares the Celebration

Cdr. R. L. "Zeke" Cormier, Commander, Carrier Air Group 11, and four pilots from Attack Squadron 113 celebrated their entrance into the "Stinger" Centurion Society by setting still another record while posing for pictorial posterity.

After logging more than 100 arrested *Skyhawk* landings each, LCdr. M. M. Simons, executive officer; Ltjg. J. C. Holland; Cdr. Cormier; Ltjg's. S. R. Jones and K. I. Jurgensen (clockwise in picture, with LCdr. Simmons in high-noon position) wedged themselves into the cockpit of a squadron A4D-2. There were no injuries.

All the landings were made aboard USS *Shangri-La* during a WestPac deployment. Cdr. H. S. Matthews is C.O.

A4D COCKPIT-FUL OF STINGER CENTURIONS

Oceana Civilians Cited

Saved Pilot from Burning Aircraft

L. J. Lukey, R. W. Atwood and S. D. Carroll have been presented letters of commendation for their part in rescuing Ltjg. Ellis T. Riker, III, after his jet aircraft crashed and burst into flames at NAS OCEANA.

Quick action on the part of the three civilians permitted Ltjg. Riker to survive the crash with minor burns and a broken leg. The letters were presented by Capt. E. G. Konrad, C.O.

HS-4 Flies Helos Safely

Logs 10,000 Accident-Free Hours

Helicopter Antisubmarine Squadron Four at NAAS REAM FIELD completed 10,000 accident-free flying hours in a 30-month period which started 31 December 1956. The skipper, Cdr. W. S. Orndorff, Jr., made the hop which brought the squadron flight time to that total.

The record was compiled in HSS-1 and HSS-1N helicopters. A total of 2059.1 hours was racked up in the latter configuration which is still in the experimental stage.

The squadron deployed to the Far East aboard USS *Boxer* and USS *Princeton* during the safe-flying period. It is bound to add to the record.

Lt. York Repeats Honor

Named Top BTG-3 Instructor Twice

Marine 1st. Lt. Eugene York has been named Instructor of the Month for two consecutive months by Basic Training Group Three at NAAS WHITING FIELD. He competed against 152 other instructors for the honor.

In April he flew 104 syllabus hours; in May, 88.8; and in June, 87.5.

Lt. York entered flight training in December 1956, received wings and commission in June, 1958, and has since flown 1044.8 accident-free hours.

Trojan Pilot is Just That

Almost Girds Globe in His T-28

LTJG. THORESON IN HIS TRUSTY TROJAN

The prodigious effort of VA-122's Ltjg. Wayne L. Thoreson in June caused squadron statisticians to wax convincingly with comparative figures on his feat. Thoreson, a squadron instrument flight training instructor, logged 108.2 hours in a T-28.

VA-122 actuarians point out this is equivalent to flying 21,200 nautical miles or once around the earth 15 degrees above the equator. They add that Thoreson spent four entire days aloft while logging his amazing time total over a period of 22 working days.

The T-28 sessions involved tutoring Fleet Aviators undergoing refresher instrument training. These included ground controlled approaches, cross-country flights and instrument approaches to San Diego-based carriers.

CAN THERE BE MOONBEANS?

HIGH ALTITUDE BEETS AND BEANS AND TURNIP GREENS ARE STUDIED AT REPUBLIC

THERE SEEMS to be no doubt that man will get to the moon sometime in the foreseeable future. What he will eat when he gets there has been a cause of some concern. The more popularly mentioned space diets include such delicacies as algae, lichens and Iceland moss.

Aviation engineers at Republic Aviation Corporation, appropriately located in Farmingdale, have taken a grass-roots approach to moon food. They're studying what it takes to establish a lunar garden. Such a farm would probably be grown within a specialized greenhouse and would offer a much more palatable menu than the above items.

Basic aim of the research project is to determine the lowest pressure at which vegetables can be grown to maturity. Since the moon has virtually no atmosphere, the less pressurization needed for a lunar greenhouse, the less cost in weight and materials. The company is already experimenting with raising turnips, carrots, beets and snap beans at simulated altitudes of 8000, 16,000 and 27,000 feet.

Hyman Stein, manager of space projects and studies for Republic, points out that an active man requires more than 3000 calories a day. Despite the reduction of gravity on the moon, it is probable that his needs will be the same. For one thing, the pressure of work will be so great that it will require each man to operate at his maximum capability. Plants or vegetables, if they can be found to be adaptable, would be the best source of this food.

An ideal moon vegetable will have a seed that is light per pound of vegetable produced; will germinate readily and will not be sensitive to light, gravity, X-radiation, or cosmic rays; it will not require any oxygen, will be entirely edible raw or cooked and will provide a balanced diet—all this in addition to a short growing period in full sunlight, at low pressures under a wide range of temperature conditions. At present, one vegetable can't do all this. Corn, roasted peanuts, soybean sprouts and lettuce can take care of diet needs.

The experiments at Republic will also determine whether or not significant increases in crop production can be obtained by lengthening the working day. Since a typical lunar day runs to about 14 days of continuous daylight, growing time might be reduced to possibly ¼ of that on earth.

The effects of reduced pressure on plant growth have not yet been determined. Republic tests have indicated that very little germination results at a pressure altitude of 46,500 feet.

GCA Record at North Island

Unit Four Logs 100,000th Landing

GCA Unit Four at NAS NORTH ISLAND has logged its 100,000th GCA landing.

Only three other Navy GCA units in the world have been so active, according to Unit Four. Since 1957 when the unit was four years old and had only 68,000 landings to its credit, it has consistently averaged more GCA approaches and landings per month than any other unit.

Aircraft Controller Paul R. Reynolds, Radarman First Class, guided a T-28 *Trojan* piloted by Lt. Theodore C. Steckbauer onto the runway for the 100,000 landing.

Over the past two years, the unit has been off the air only 90 hours—hours required for circuit maintenance.

VF-124 Production Record

Nine U-Bird X-outs in Four Hours

Moffett's VF-124, which specializes in familiarizing replacement pilots in the F8U, reports an unusually successful afternoon recently. Popularly known as the "Crusader College," the West Coast unit launched nine of its students on initial flights during a four-hour period thereby establishing a new record.

Initial flight in the F8U includes basic maneuvers, supersonic flights, simulated landing patterns and touch-and-go landings.

While all of the first flight candidates were favorably impressed with the spectacular performance of the Chance Vought jet, the neatest comment of the day was attributed to VF-124 LSO, Lt. Darl "Ace" Jewell. "I caught up with the airplane just as I pulled into the chocks," he said.

Other first flight pilots were: LCdr. J. J. Diffendorfer; Lts. J. E. Perkins, D. Z. Skalla, J. S. Clare, J. L. Ellis, J. B. Miner; Ltjg. R. A. Steelnack; and Ens. W. M. Boardman.

"Dean" of the college is VF-124 commanding officer, Cdr. F. X. Timmes.

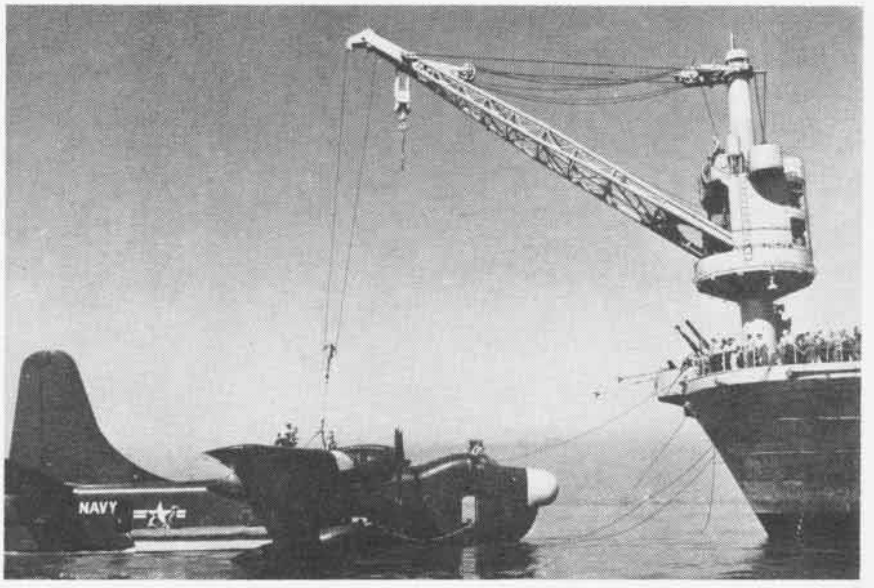
TENDER LIFE IN THE FAR EAST

PRIMARY MISSION of a seaplane tender, as its designation indicates, is taking care of flying boats, but there are numerous other tasks.

USS *Salisbury Sound* (AV-13) is one of two seaplane tenders in the Pacific Fleet. Designed for her main mission from the keel up, *Sally* can handle large P5M's with ease. During WestPac deployments, she assumes a second role—flagship for RAdm. Paul P. Blackburn, Jr., Commander Taiwan Patrol Force and Commander Fleet Air Wing One. "Home away from home" for most of the deployment is Buckner Bay, Okinawa, but the ship is a familiar sight in such far-flung ports as Yokosuka, Sasebo, Iwakuni, Manila, Subic Bay, Hong Kong, Keelung and BoKo Ko.

Commanding Officer of the *Salisbury Sound* is Capt. Richard L. Fowler; Cdr. Walter J. Leary serves as Executive Officer. As head of the Air Department, LCdr. Edward P. Davis sees to it that the planes and their crews get the attention they need. Cdr. A. R. Rogers is the Operations Officer. Under LCdr. William E. Zielinski, the Supply Department is responsible for running the laundry; tailor, cobbler and barber shops; ship's store and gedunk stand.

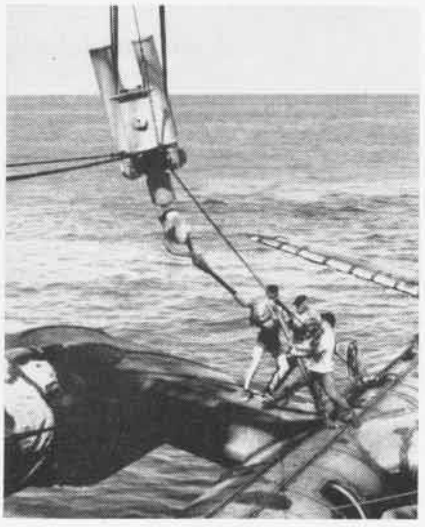
When the ship prepares for operations, the first order of business is laying a seadrome. This involves putting out buoys, lights and other flying aids. The first contact the seaplane has with the ship is when it reports over the "homer" in the tender's tower, which is manned in CIC. The plane is picked up on radar and voice communications are established to advise the pilot of the length, width, and direction of the sealane, and the location of the buoys.



PREPARATIONS ARE UNDERWAY FOR HOISTING THE SEAPLANE ABOARD SALISBURY SOUND

Upon notification, the Air Department sends out a crash boat to clear the lanes of debris. Meanwhile, the tower operator talks home the plane in a Tender Controlled Approach similar to GCA. The pilot is guided in the step-down pattern until he is 50 feet above the water at the end of the sealane, at which point he takes over. Once the plane is safely down, the crash boat guides it to a mooring buoy and takes the crew to the ship.

The plane captain makes his wants known to the maintenance men of the V-2 division. Routine work is performed on the aircraft while it is in the water. Servicing a seaplane afloat from a small boat presents a particular type of a challenge. The motion of the


CRANE HOOK SECURED TO HOISTING SLING


SAFETY LINES IN PLACE AND LINE HANDLERS READY TO MANEUVER PLANE ON BOARD

DURING SAIGON VISIT, TAYLOR, RM3, SHOWS DRILL PRESS TO VIETNAMESE SAILORS

'SALLY' TOPS OFF A CHINAT DESTROYER

water requires a high degree of skill and coordination. The men of the Aviation Ordnance Division must also possess the special knack. They load the seaplane with JATO bottles, rockets, and other pyrotechnics, from the pitching platform of a boat. Drill and competitive exercises keep the crews in form.

However, a tender is also equipped with a seaplane deck. If conditions warrant, the aircraft can be brought aboard to be worked on. The crane on the stern of the ship is hooked on the plane, the 55,000 pounds hoisted clear of the water and placed on deck. Should a brisk breeze be blowing, all hands—including the mess cooks—are needed to handle the lines that keep the flying boat in lowering position.

From the moment RAdm. Blackburn's flag is broken in the *Salisbury Sound* at the beginning of deployment until it is hauled down at the end, the *Sally* performs smoothly all the duties entailed in acting as flagship. Staff officers take over the Aerology and Communication Departments, and facilities are expanded to meet the needs of the staff. Ship's company and staff work efficiently as a team.

At least once on each deployment the ship operates with the Chinese Nationalist Navy in tactical maneuvers, gunnery exercises, and seamanship evolutions. Liberty time is shared also. During a visit to Kaohsiung, Taiwan, this year, a very successful combined beach party was held.

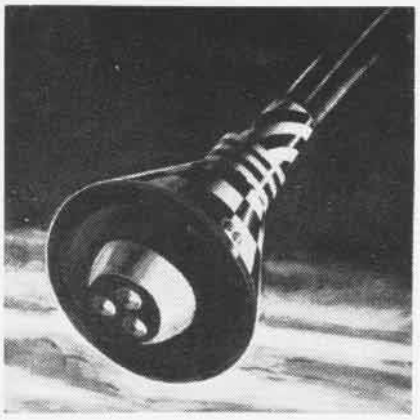
In addition to tending seaplanes for the Navy, the *Sally* has demonstrated her versatility in many places and in many ways throughout the Far East. During Operation *Strongback* in Dingalan Bay, P. I., in 1958, she served as a floating hotel. Approximately 150 officials, including 19 Admirals and Generals, representing almost every nation in the SEATO organization, were aboard at one time.

The ship has also gone to the aid of Air Force and Navy pilots downed at sea. Once, during a yard period in Japan, *Sally* had to get underway at night to search for aviators who had splashed in the drink. Scaffolding was still up on her hangar and seaplane decks. The AV-13 has also carried Army and Air Force personnel to Hong Kong on a recreation cruise.

The *Salisbury Sound* is ready and willing to do anything, any time, to keep up the tradition of a can-do ship.

IT TAKES A LOT OF SKILL AND KNOW-HOW TO MANAGE A MARLIN

END OF A SUCCESSFUL EVOLUTION, P5M ON THE SEAPLANE DECK



SPACE
MYSTERY AND MASTERY
PART TWO

CELESTIAL MECHANICS

Celestial mechanics is the study of motion in space, whether the object in motion is natural or man made. For purposes of this discussion, it will be confined to our own solar system.

GRAVITY

In addition to his laws of motion, Sir Isaac Newton formulated the law of gravitation, which is concerned with the mutual attraction, or "pull," that exists between all particles of matter. In its most simple form, Newton's law says this:

- All bodies, from the largest star in the universe to the smallest particle of matter, attract each other with what is called a gravitational pull.
- The strength of their gravitational pull is dependent upon their masses.
- The closer two bodies are to each other, the greater their mutual attraction. Specifically, the attraction varies inversely as the square of the distance between the two bodies.

Earth, a body moving in space, has a gravitational pull. It pulls anything within its sphere of influence toward the center of the Earth at increasing speed. This acceleration of gravity on Earth at its surface is used as a basic measurement. It is known as one gravity, or 1 "G."

Earth's gravitational influence is believed to extend throughout the universe, although the force weakens with distance and becomes virtually impossible to measure.

Any vehicle moving in space is subject to gravity. The vehicle, having mass, is itself a space body, therefore it attracts and is attracted by all other space bodies, although the degree of attraction of distant bodies is too small to require consideration. A vehicle moving between the Earth and the moon would be influenced by both bodies, and also by the sun.

ESCAPE VELOCITY

To leave the Earth on space exploration missions, a vehicle must overcome the pull of Earth's gravity. This can be done by accelerating the vehicle to a given speed. Since the force of Earth's gravity declines with distance from the center of Earth, the minimum speed required to overcome gravity varies. At or near the Earth's surface, the speed required to overcome gravity is slightly more than seven miles a second, or 25,000 miles per hour. At an altitude of 500 miles from the surface, the requirement drops to 23,600 miles per hour and at 5,000 miles altitude it is only 16,630 miles per hour.

The minimum speed at which an object overcomes gravity is known as *escape velocity*. "Escape," however, does not mean that the object is forever free from Earth's gravitational influence; it means only that the object or vehicle will not be pulled back to the surface, even when its power is exhausted.

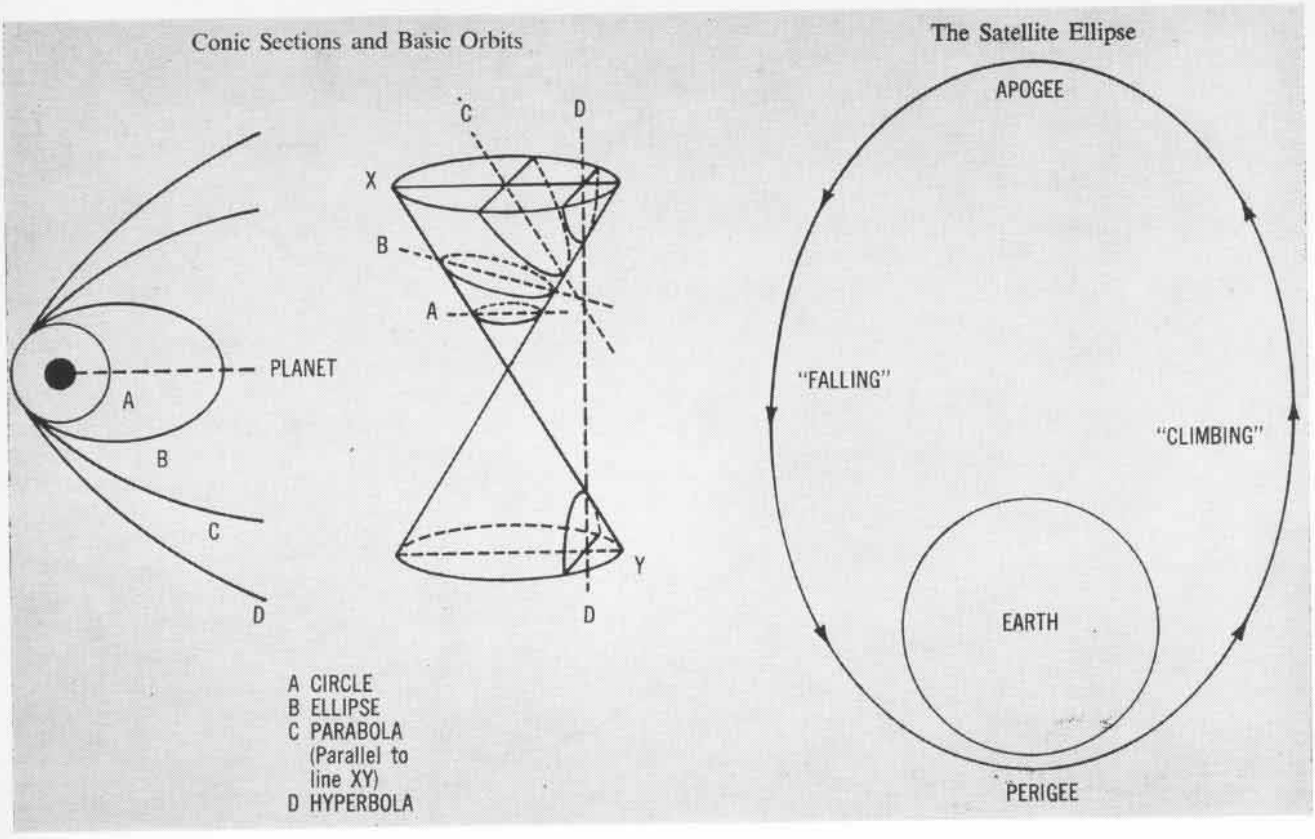
A vehicle having achieved escape velocity does not continue moving at that speed after power exhaustion. Gravity will exert a braking influence and the vehicle will gradually lose speed. It will, however, always have enough momentum to continue moving away from Earth—until the control of the sun's gravity predominates over that of the Earth.

ORBITAL VELOCITY

At a speed lower than that of escape velocity, a vehicle can counterbalance Earth's gravity. For instance, assume that a vehicle is launched into a horizontal path at an altitude of 300 miles. Since it is above the restraining effect of atmosphere, it will continue to move at its original speed. It will be subject to two forces: 1) the centrifugal, or outward force generated by its speed, and 2) the downward pull of Earth's gravity. If, at 300 miles altitude, the original speed is 18,000 miles per hour, the net effect of these two pulls would be zero—one would counterbalance the other. The vehicle or object would be in "continuous fall," its path of movement exactly matching the curve of the Earth. It would remain in that state indefinitely if it did not encounter other resistance and would continue to move about the Earth at the same speed and altitude. It would then be "in orbit."

Orbital velocity is the speed required to achieve such an orbit. Like escape velocity, the required speed varies with distance from Earth's center of gravity; the more distant the orbit, the lower the speed requirement. The moon is a satellite of Earth; it maintains its orbit at a speed of only 2,268 miles per hour, which is more than 3,326 feet a second.

PREPARED BY THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION



ORBITS

An orbit, then, is the path in which a body moves relative to a source of gravity. In the example described above, we were assuming that this path was circular, but it need not be. There are four types of orbits:

Circular orbit, in which the object in orbit remains at all times the same distance from the center of gravity of the influencing body. (In the earlier examples, we used Earth as the focal point, but the gravitational force could be supplied by any body in space. The body exerting the force is referred to as a "primary.")

Elliptical orbit, in which the path is longer than it is wide and the center of gravitational attraction is not always the same distance from the body in orbit.

These two orbits are closed loops, but a partial curve around a primary is also an orbit. For example, an object launched from Earth at minimum escape velocity would leave Earth but would not materially alter the character of its motion, or its mean distance, with respect to the sun. It would be in **parabolic orbit** relative to the Earth, were the Earth not in the vicinity of the sun; however, the presence of the sun causes the object to revolve in an ellipse about the sun once it has effected its escape from the Earth. If it were designed to reach another planet and had the higher velocity to do so, its orbit relative to Earth would be in the shape of a **hyperbola,** but again because of the sun's presence the hyperbola may be modified to the form of an ellipse about the sun once the body has escaped Earth. If the body were projected at a sufficiently great speed to escape both the Earth and the sun, then the orbit would be a hyperbola relative to both the Earth and the sun.

Although they qualify technically as orbits, the parabola and hyperbola are usually called "trajectories" in space flight discussion, while "orbit" is most generally applied to the circle and ellipse. A circular orbit is extremely difficult to achieve not only because it demands perfect precision in a rocket launch but also because it assumes the primary is a perfect sphere. Similarly, a parabola is difficult to achieve because even a slight deviation in speed would change the curve to a hyperbola or an ellipse. Hence, the latter two are the most important in space flight. Man-made objects sent into space will most likely move in elliptical or hyperbolic paths.

MOTION OF BODIES IN SPACE

Any man-made vehicle launched into space will move in accordance with the same laws that govern the motions of the planets about the sun, and the moon about Earth. The solar system and the Earth-moon system, therefore, provide excellent working models to study, in order to learn what to expect of man-made vehicles.

Prior to the time of Copernicus, man generally accepted the belief that the Earth was the center of the solar system. His efforts to explain the motion of the planets on this assumption failed. Copernicus pointed out that the difficulties in explaining observations disappeared if one assumed that the *sun* was the center of the solar system, and that the planets revolved about the sun.

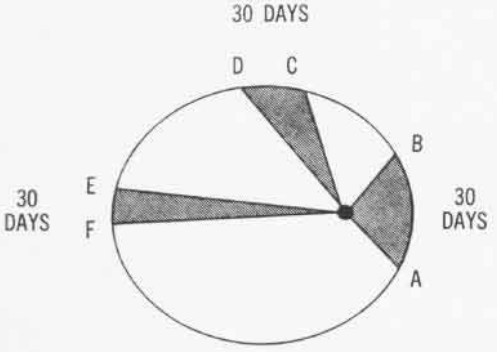
Years later, Galileo took up the defense of Copernicus' theory. With experiments such as the dropping of two

different size masses from the Leaning Tower of Pisa, he started the thinking which led to our current understanding of the laws of motion.

In the early 17th century, Johannes Kepler formulated three laws which described the motions of the planets about the sun. They are:

1. Each planet revolves about the sun in an orbit that is an ellipse, with the sun at one focus of the orbital ellipse.

2. The line from the center of the sun to the center of a planet (called the radius vector) sweeps out equal areas in equal periods of time.



Equal Areas in Equal Time

3. The square of a planet's period of revolution is proportional to the cube of its mean distance from the sun.

These laws, together with Newton's law of gravitation, are important to space research. They make it possible to deduce mathematically the motions of the planets and other bodies in the solar system and plan flight paths to them.

FREE FALL

When a body in space is following an unrestricted course in a gravitational field, it is in "free fall." This condition is also known as "zero gravity."

This does not imply absence of gravity; it means a lack of resistance.

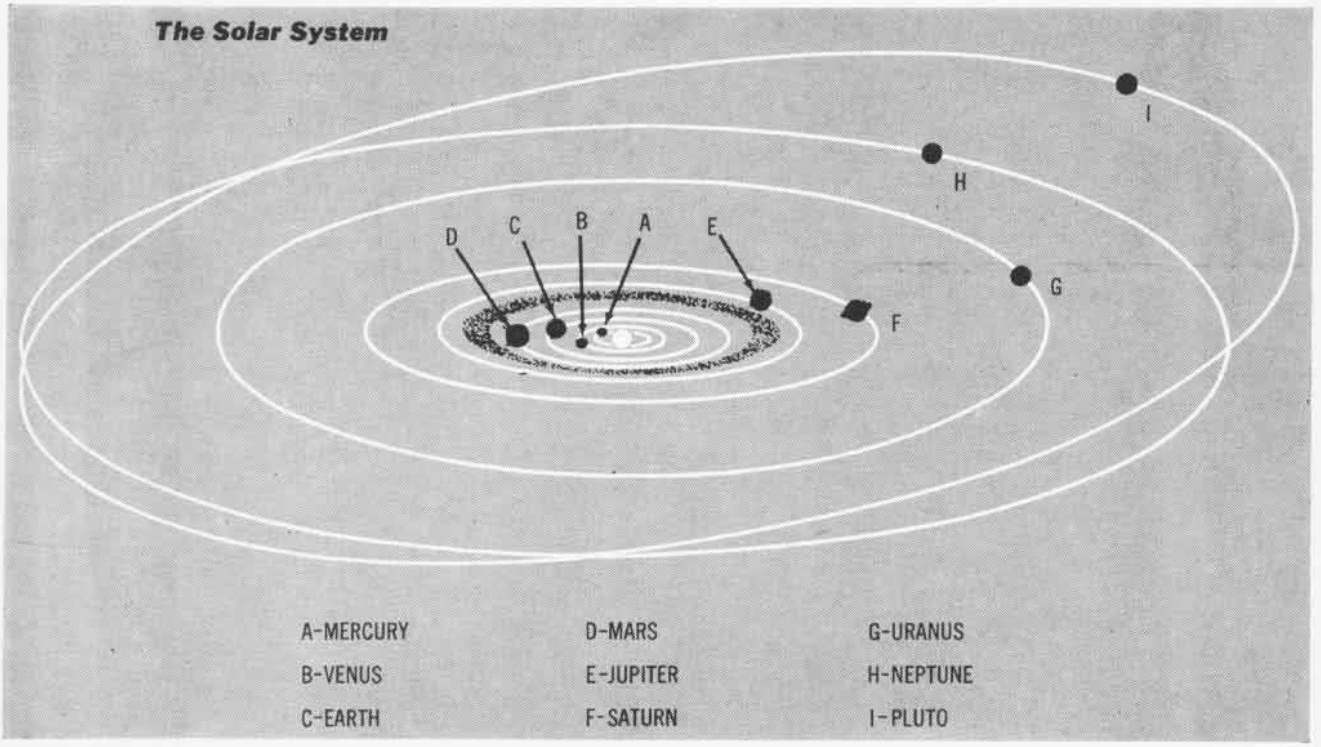
The weight of the human body (or any other object on Earth) is equal to the force of the earth's gravitational pull on that body or object. We can feel our weight because something is resisting earth's gravitational pull—the ground, or the floor of a building—between our body and the center of the earth's gravity. Without this resistance, we would feel no sensation of weight.

The vehicle in space has no medium of support with respect to the surface of any planet. Its only 'resistance' is the pressure of the gases of combustion against the forward wall of the combustion chamber when the rocket engine is in operation. This pressure induces an 'apparent weight' proportional to the amount of thrust being generated by the rocket.

When the rocket power plant is shut off, this apparent weight disappears, so the vehicle and its occupants, are in 'free fall.' The occupants then experience weightlessness.

THE SPACE ENVIRONMENT

The solar system we hope to explore is tiny in relation to the universe as a whole, but an area of tremendous magnitude in Earth terms. Its primary, our sun, is a star located at the center of the system with nine planets revolving around it in near-circular orbits. Some of the planets, like Earth, have natural satellites of their own, and there are



thousands of other bodies moving within its own system.

The planets are held in their orbits by the sun's gravity. They all move in the same direction around the sun and their orbits lie in nearly the same plane, with Pluto the exception. Their orbital speeds are higher near the sun. Mercury, the planet nearest the sun, makes a circuit in 88 days. Earth's period of revolution is 365 days, or what we know as a year. Distant Pluto, more than three and a half billion miles from the sun, takes 248 years to make a circuit.

THE SUN

The sun represents more than 99 per cent of the total mass of the solar system. Its mass is 330,000 times that of Earth's and its volume more than a million times greater. The surface temperature of the sun is many thousands of degrees and the temperature at the interior is measured in millions of degrees. From the sun, Earth derives its major input of energy which influences Earth's weather and supports plant and animal growth.

Every 11 years, the number of dark spots on the solar surface, called sun spots, reaches a maximum. These spots show strong magnetic fields. During the maximum of a sun spot period, the sun shows marked activity in shorter "wavelengths"—X-rays and ultraviolet radiation. Frequent solar eruptions and solar flares occur. These produce definite effects on Earth, such as ionospheric disturbances, magnetic storms, interruptions of radio communications, unusual auroral displays and a lowering of cosmic ray intensity.

EARTH

Earth ranks fifth in size among the nine planets. Its mean distance from the sun as it moves in orbit is about 150,000,000 kilometers (93,000,000 miles); this is called an "astronomical unit."

Earth's atmosphere, if it were reduced to sea level conditions, would amount to only an eight kilometer (five mile) depth, although actually it extends out for hundreds and perhaps thousands of kilometers.

The pressure at the surface amounts to about 10 tons per square meter (one ton per square foot). This pressure falls off by a factor of 10 for every 10 mile (16 kilometer) increase in altitude. Thus, 99 per cent of the atmosphere lies below 20 miles (30 kilometers) and all but one one-millionth of the atmosphere lies below 60 miles (100 kilometers).

The composition of the atmosphere remains roughly the same from sea level up to 100 kilometers (60 miles), although the percentage of water vapor in the high atmosphere is far below that on the surface. At the higher levels, a small amount of ozone is formed by ultraviolet radiation from the sun. Above 100 kilometers, oxygen dissociates into atomic form due to the influx of solar radiation, while the heavier gases tend to settle out, the lighter gases rising upward. It is anticipated that at the uppermost reaches the atmosphere will be found to be largely hydrogen.

In the upper atmosphere is found the ionosphere, the portion in which the air molecules are ionized and in which there are large numbers of free electrons. The ionosphere extends outward for tens of thousands of kilometers.

TABLE 1
SOLAR SYSTEM

	Sun	Moon	Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto
Diameter (miles)	870,000	2,170	3,100	7,750	7,970	4,140	87,300	71,000	32,000	31,000	3,700
Mean Distance from Sun (Millions of Miles)	—	—	36	67	93	142	484	887	1,785	2,800	3,675
Escape Velocity (mi. per second)	387	1.5	2.6	6.4	7	4	37	22	13	14	?
Surface Gravity (Earth = 1)	28	16	36	86	1	.40	2.64	1.17	91	1.12	?
Eccentricity of Orbit (Circle = 0)	—	054	.206	.007	.017	.093	.048	.056	.047	.009	.248
Inclination to Ecliptic (degrees)	—	5.8	7	3.2	—	1.5	1.18	2.3	.46	1.46	17.8
Number of Satellites	—	—	0	0	1	2	12	9	5	2	0
Period of Revolution	—	27.3 days	88 days	224 days	365 days	1.9 years	11.9 years	29.4 years	84 years	164.8 years	247.7 years

Beginning at some hundreds of kilometers above the Earth's surface, and extending outward to ten to 15 Earth's radii, is the Great Radiation Belt. The belt consists of large numbers of electrons and protons in rapid motion. The outer zone appears to vary markedly in total concentration and extent with solar activity. Apparently beyond 15 Earth's radii there is simply the normal cosmic ray background. The radiation belt is formed by the trapping of charged particles in the Earth's magnetic field which extends outward into the space around the Earth.

Impinging upon the Earth's atmosphere are the various radiations from the sun, stars, and galaxies. These radiations are both electromagnetic and particle. The electromagnetic radiations doubtless range from the shortest gamma rays through X-rays, ultraviolet rays and the visible, to the infrared and radio waves. Among the particle radiations striking the Earth's upper atmosphere are the cosmic rays, meteors, and the particles discovered in the Radiation Belt.

INTERPLANETARY SPACE

Beyond the Earth's atmosphere is a region populated by meteors, micrometeors, cosmic rays, and various electromagnetic radiations arriving from the whole universe. It is thought by many that much of the solar system may be filled with the sun's corona, and it is estimated that the density of coronal particles at the distance of the Earth may amount to a thousand hydrogen atoms and that the temperature of this thin gas may be as much as a quarter of a million degrees. As one approaches the sun the density of this gas would increase as would its temperature.

From a vantage point in interplanetary space, it should be possible to observe the sun, planets, the medium of interplanetary space itself, the galaxy, and the rest of the universe in wavelengths that are cut off by the Earth's atmosphere.

THE MOON AND PLANETS

The moon is a natural satellite of Earth and one of the oldest objects in the solar system. Because of its lack of any appreciable atmosphere, it remains to this day in essentially its original state, and for this reason it is an important object of study in space research. Among the primary questions man seeks to answer about the moon are: Does it have a trace of atmosphere? Is there a lunar ionosphere? Is there a radiation belt around the moon?

Among the planets, Venus and Mars will doubtless be the first to receive close study by means of space probes.

Observations of Venus from the surface of the Earth have shown an atmosphere containing an extensive and completely enveloping cloud cover. Carbon dioxide is a major constituent of this atmosphere, but water has not been identified with it. Temperature measured with a thermopile is approximately zero degrees Centigrade, while radio astronomy measurements show a temperature, presumably deeper in the atmosphere, of about 300 degrees Centigrade. Observation of an aurora or airglow has been reported.

Of interest to space researchers is knowledge of what are the actual constituents of the Venusian atmosphere, again whether it has an ionosphere and possibly a radiation belt.

Water is associated with the polar caps of Mars, which vary with the season. Average surface temperature is eight degrees Centigrade and surface pressure is estimated at approximately eight per cent of Earth's sea level atmospheric pressure. Clouds of dust have been observed in the Martian atmosphere, and Mars is the one planet on which there seems to be some evidence of life. Green markings on the planet vary with seasons in such a way as to suggest the possibility of a form of plant life. The question of whether life exists in any form is the matter of major interest about Mars.

The atmosphere of Jupiter is composed of a number of different gases and surface temperature is minus 150 degrees Centigrade. Thermal and pulse-type radio emissions from Jupiter have been detected and the atmosphere exhibits differential rotation at different latitudes. The atmosphere also contains the famous "red spot," the nature of which is unknown and which would appear to be a major item of research interest.

TRAVEL IN THE SOLAR SYSTEM

Certain factors about the composition and mechanics of the solar system seem to indicate that Nature is kindly disposed to the idea of man's moving about within the system.

First, space is almost a perfect vacuum, so there is no restraint to vehicle movement such as the drag of the Earth's atmosphere upon aircraft moving in it. The speeds required for interplanetary travel can be obtained only in a near-vacuum.

The relatively small size of Earth also helps. Its gravitational pull is such that relatively low velocities will permit escape and its comparatively thin atmosphere offers resistance for only a short period.

The orbital planes of the planets are nearly coincidental. This offers two advantages: 1) it simplifies interplanetary guidance problems, and 2) it lowers the energy or velocity requirements for movement between the planets.

The fact that the planets move about the sun in the same direction is also a "plus," because it allows the space vehicle to take advantage of the orbital speed of one planet in achieving the required velocity to launch to another. In addition, the planets rotate about their own axes in the same direction they revolve about the sun, so the space vehicle can get a small but significant added "push" by taking off in the direction of rotation.

Finally, planetary orbits are near-circular, which means that energy requirements for transferring from one orbit to another are almost the same for all points of departure along an orbit.

●

Over the centuries, man has accumulated a good deal of knowledge about his planet, his solar system and the universe, but any real penetration of space will require considerably more detailed information. The first Earth-orbiting satellites and lunar probes were steps toward acquiring that information, as will be their larger and more complex successors. With the background provided by the sections in this and the August issues, it is now possible to discuss in detail the techniques by which man can thrust exploratory vehicles into space. *(To be Concluded)*

ROCKET TESTER DESIGNED

A SOLID propellant rocket motor simulator has made it possible to study structural and insulating materials for some rocket motors at true performance levels without expending a full-scale propellant charge or firing an actual weapon.

The simulator was designed by Edwin F. Abrams, materials research engineer of the non-metallic materials division, chemistry research department, Naval Ordnance Laboratory.

Mr. Abrams' work was done in response to a BUORD task requirement to evaluate certain materials for rocket motor insulation, for a specific air-to-air missile. The missile is carried on a jet aircraft near the afterburner. While the aircraft is in flight, the missile's rocket motor picks up heat from friction with the air stream, as well as radiant heat from the afterburner itself.

When this heat reaches the propellant inside the motor case, it causes the potential burning time of the propellant to go down and the operating pressure to go up. This increased chamber pressure may cause a deformation in the thin-walled motor, which may break the insulation lining the motor casing.

If the insulation fails, gases from the overheated propellant attack the thin steel rocket motor wall and can blow through the side of the rocket motor. Such an occurrence might present a hazard to the aircraft and its pilot. It would certainly cause failure of the weapon itself.

Mr. Abrams' test vehicle is an operating rocket motor in every respect except its appearance. The device consists of three parts:

- A vessel containing igniter and propellant, and also supporting a solid cylinder of fused silica which forms an annulus (a ring-like space) between itself and the insulation on the rocket motor test section. The size of the annulus is one of the factors which determine the mass rate of flow of hot propellant gases past the insulating material.
- The test section, which is the same diameter as an actual rocket motor casing and which is lined with the insulating material under study.
- The section containing a graphite rocket nozzle.

The entire assembly is held together by steel tie bolts spaced around the outside. A steel rod passes through the hollow center of the propellant charge and supports the fused silica block.

Careful scaling makes it possible to determine the insulation characteristics in the actual rocket using a very small propellant charge. The operating time and operating chamber pressure are almost exactly the same in the NOL device as they would be in the real rocket motor.

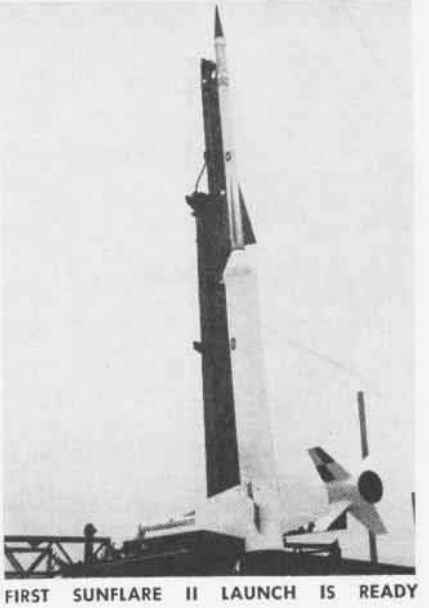
During a test, operating chamber pressure is recorded. Temperature readings on the exterior of the rocket motor casing section are obtained during and after the test. Readings and recordings are made with standard thermocouples and pressure gauges.

Sun Flare Study Continues

Nike-Asp Rocket Used in Research

Project *Sunflare II*, conducted by the Naval Research Laboratory and supported by the Pacific Missile Range, is a study of solar flares. These occur near sunspots and produce short wave radio fadeout. Prime purpose of the project is to study the nature of flares and the processes by which the radio "blackout" is produced.

Sunflare II continues studies which NRL conducted from San Nicolas Island in 1957. This project showed that soft (low energy) x-rays accompany large flares in sufficient quantity to produce absorption of radio waves.



FIRST SUNFLARE II LAUNCH IS READY

The present NRL program of rocket studies at Point Arguello is aimed at increasing the scope of information about flare radiations to include the most energetic (hard) as well as the softer emissions. Rockets are launched as early as possible when a flare occurs. When word is received at Point Arguello from the Lockheed Solar Physics Observatory, Hollywood Hills, that a sun flare is occurring, the missile is fired with a 60-second countdown, providing the range is safe.

The program is supported by a grant from the National Science Foundation.

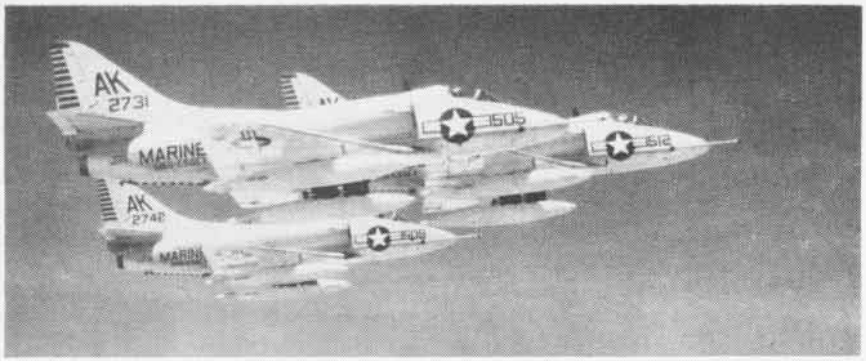
The booster vehicle is a *Nike-Asp* two-stage solid propellant rocket. The *Asp* is coupled to the *Nike* rigidly by a separation ring fabricated from ductile cast iron. The *Nike* booster carries the *Asp* to a height of about one mile. When the thrust of the *Nike* begins to decrease, an acceleration switch ignites two blast caps which break the separation ring and free the *Asp*.

At approximately 22 seconds, the *Asp* has coasted to a height of 50,000 feet where the barometric pressure switches close the firing circuit. The *Asp* reaches an altitude of 80,000 feet with a velocity in excess of 7000 feet per second at burnout. It then coasts to a peak altitude of 150 miles with its 50-pound payload and falls back to earth after a total flight time of eight minutes.

The improved rocketry now available affords approximately five minutes of data in each flight at heights ranging from 60 to 150 miles. All information is telemetered continuously during flight.

The *Sunflare II* program is scheduled to launch a total of 12 rockets.

- The concrete structure designed to house the first nuclear powered aircraft engine will cost $6,004,208 and will contain 20,000 cubic yards of concrete. Under construction at Idaho Falls, Idaho, the building will have a peak height of 99 feet, a length of 320 feet and a width of 234 feet. The test slab in the building will be six feet thick. The new Flight Engine Testing Center will be used to test aircraft atomic engines in conjunction with airframes, typical crew compartments and control systems.



TIGHT FLIGHT *of three A4D Skyhawks starkly portrays the power and precision of fleet flying units. The aircraft are flown by Marine Attack Squadron 225, deployed in the Mediterranean aboard USS Essex, and commanded by LCol. A. M. Boar. Home base is MCAS Cherry Point.*

Tartar Launchers Ordered
Will be Used on 59-60 Destroyers

Northern Ordnance, Inc., of Minneapolis has been awarded a $4.5-million contract for engineering and production of *Tartar* missile launching systems. The systems will be installed in guided missile destroyers of the fiscal 1959-60 shipbuilding programs.

Tartar is the Navy's surface-to-air guided missile designed specifically for use aboard destroyers. It is being developed to be used against low-flying and medium altitude targets.

Perseverence is Rewarded
Korbs Named Chief, Then Ensign

Perseverence paid off for Donald E. Korbs, AM1, of Air Transportation Squadron Seven at NAS ATSUGI. He learned on the same day that he had been selected for advancement to chief petty officer that he had also been selected for a commission in the U. S. Navy's limited duty officer program.

An 11-year man, Korbs had previously gone up once for chief and twice for warrant officer.

Consequently, Korbs will be commissioned January 9, a week earlier that he would have been named chief.

"It would have been nice to be a chief for awhile," said Korbs, "but I won't turn down a commission.

DOUBLE WINNER KORBS, ON JOB AT ATSUGI

It's All in the Family
Salladas Follow in Father's Steps

A Moffett Field jet pilot demonstrated to his younger brother what it really is like to fly a Navy jet.

What made it especially interesting in this case was that the brothers are sons of Adm. H. B. Sallada, USN (Ret.), formerly Commander, Naval Air Force, Pacific Fleet.

KID BROTHER AT CONTROLS GETS THE WORD

LCdr. William F. Sallada, attached to VF-124, took his brother, Ens. Robert V. Sallada, up in an F9F-8T *Cougar*. The flight included acrobatics and a supersonic speed run.

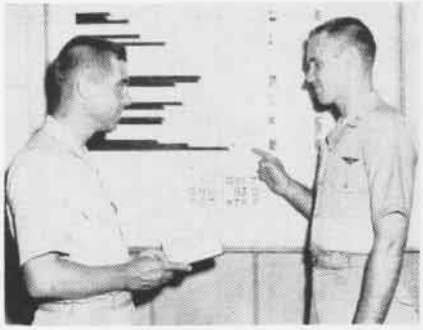
"This will ruin me for light planes," the younger Sallada declared as he climbed out of the jet. He logged about 50 hours of flight time in light aircraft while a Naval ROTC student at Purdue University. Graduated this past June, he was commissioned an ensign on completion of a training cruise aboard the USS *Kearsarge* this summer.

The younger Sallada begins flight training this fall. His brother, LCdr. Sallada, has been selected for advanced training in aeronautical engineering at the Postgraduate School, Monterey.

Eight Planes, 474.9 Hours
VAP-62 Claims Busiest Month Ever

The month of June 1959 will go down in the history of Heavy Photographic Squadron 62 as the flyingest and busiest month ever. Flying seven venerable AJ-2P *Savages* and one SNB-5P *Beech*, the squadron amassed a total of 474.9 flying hours.

The maintenance department, headed by Lt. Lee Marona, insured a constant 80% availability throughout the month. Moreover, the June weather was co-operative, so that VAP-62 was able to fly a great number of flight line miles, merrily snapping pictures by the thousand.



FIGURES DON'T LIE. HOURS TOTAL 474.9

Besides the operational photo commitments, all assigned crews flew navigational round-robins to Puerto Rico and back to home base, NAS JACKSONVILLE. There were also many hops devoted to training new photo-plane commanders, photo-navigators, photo-technicians and plane captains. For many there was no let-up on weekends and evenings. Ltjg. Ned Pederson, for example, flew 84.6 hours.

The commanding officer, Cdr. C. W. Hollinshead, expressed his admiration and pride for every man in the outfit, by the traditional Navy "Well Done."

HMR(L)-264 Commissioned

Maj. Edwin O. Reed First Skipper

HMR(L)-264 was commissioned at MCAF NEW RIVER in July to become the newest helicopter squadron in the Marine Corps. It is the eighth squadron to be attached to MAG-26 and will be equipped with HRS helicopters.

Commanding the new squadron is Maj. Edwin O. Reed, a 16-year Marine vet with more than 6500 flight hours.

Marines Get Former AFB

MCAF Futema to Aid 3rd Division

The former Air Force Base at Futema, Okinawa, will become a Marine Corps Air Facility about January 1. It will house Marine aviation units now based at the Naval Air Facility, Oppama, Japan.

Facilities for one Marine helicopter group and one Marine observation squadron are under construction at Futema. It is expected that units stationed at Oppama will be phased into their new base as facilities become available.

The Futema base will accommodate training operations of Fleet Marine Force transport helicopter and observation type aircraft in support of the Third Marine Division which also is presently stationed at Okinawa.

Kaman Shifts to All Jets

Last Reciprocating Type Delivered

With its final H-43A scheduled to be delivered to the Air Force this month, Kaman Aircraft Corporation becomes the first major company in the industry to convert 100 percent to turbine-powered helicopter production.

The Navy HU2K, with a GE T-58 gas turbine engine, has completed its pre-flight tests and has made its first flight. The H-43B *Huskie*, powered by a Lycoming T-53, will enter Air Force service later this year.

The reciprocating engine, in its advanced development, made the helicopter possible. Once reciprocating engines with enough power, dependability and lightness were developed, a great many helicopter designs became possible. Introduction of the gas turbine powerplant is leading to even greater steps in helicopter design and development.

Turbines offer distinct advantages as a helicopter powerplant. In comparison to the piston engine they are smaller, lighter, more compact, free of vibration, and easier to maintain.

ARMAMENT PRACTICE *demonstrations with the Saab-35 Draken, supersonic jet fighter and attack aircraft, were recently performed in Sweden for representatives of the Swedish and Swiss Air Forces. This photograph shows the highly versatile Swedish aircraft with part of its bomb load, in this case two 1100 pound bombs. The Draken made its first flight on 15 February 1958.*

BHR: She's a Feeder!

Hot Meals Served 24 Hours A Day

No matter what their working hours might be, crewmen aboard USS *Bon Homme Richard* can get hot meals.

"Leaving jobs on the spur of the moment to rush off to meals, only to stand in line for an hour, is eliminated under the new 24-hours-a-day food system," says CWO J. B. Crowder, commissary officer of the *Bonnie Dick*.

When the system went into effect it was feared that food costs would skyrocket and food consumption would increase. The exact opposite result has been achieved.

Serving continues on a 24-hour basis with only three one-hour interruptions, helping to make the ship's crew a more effective team. While one galley and its mess compartments are being used for food service, the other galley with its equipment can be cleaned, repaired or painted.

In port there is another special feature. Since the ship feeds only during the hours of 0500 to 0900, 1000 to 1400, and 1600 to 2000, a special coffee and cake snack is held on the mess decks after the nightly movie.

In addition to the new feeding system, other changes are being planned aboard the BHR. Ice cube machines, already installed, are being used to chill drinks and salads. When the ship arrives in the States, the entire mess hall will be remodeled from top to bottom.

It will look more like a dining room, with its four-man tables, table cloths, imitation plants, and murals on the bulkheads. Milk dispensing machines will be installed in the very near future.

PIASECKI'S JET-POWERED *aerial jeep flies at Philadelphia. The VZ-8P "Sky-Car" was developed and built for the U.S. Army. The wingless ground and air machine can ride along the highway, take off vertically and fly over road obstacles such as bombed-out bridges, traffic jams, unimproved terrain, all the time maintaining a close-to-the-ground altitude. Its compact design makes it safe for flying close to buildings and using rooftops for landings and take-offs.*

LETTERS

SIRS:

I'd like to tell you how much I appreciated reading the *Interpretive Report on ASW* which appeared in the July issue.

The Q&A business with Adm. Cooper and Adm. Thach is the clearest exposition of ASW and its attendant problems I have yet seen in print. I surely look forward to the remaining installments. Please express my congratulations to your interviewer, whoever he may be.

FRANK UHLIG, JR.
Editor, *Our Navy*

¶ Congratulations have been duly given to Joseph E. Oglesby, JOC, who did the three-part ASW series, the concluding article of which will be published in the October issue.

SIRS:

VU-1, formerly VJ-1 is planning an October celebration to mark its observance of a third of a century of service. VJ-1 was originally commissioned on 5 October 1925.

Former members of either unit are asked to submit information regarding the whereabouts and present status of plank owners and oldtimers of VJ-1 for use in a souvenir program being prepared for the occasion. Deadline is 15 September.

Please forward the info to:

LCdr. W. R. Cronenwett
Utility Squadron One
Navy # 14
FPO San Francisco, Calif.

SIRS:

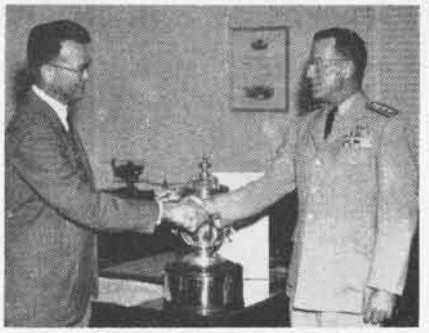
I am preparing a technical article for the Journal of the American Aviation Historical Society on the small 18-foot submarine-borne aircraft operated by the U.S. Navy between 1924 and 1928.

I would like to hear from any person, particularly pilots who flew any of the six wood-and-fabric Cox-Klemin XS-1's and the six all-metal Martin MS-1's. Perhaps some reader can identify which XS-1 was given to the College of Engineering at the University of California, Berkeley.

WILLIAM T. LARKINS
175 Claire Drive
Concord, California

● PHOTO QUIZ

Unless you said that the crewman was securing the rotor blades of a copter (picture on page 10), you were off base, but don't let it worry you—you weren't alone.



GRAY IS CONGRATULATED BY RADM. DIXON

AMAL's Gray Wins Trophy
He Designed High G Space Capsule

R. Flanagan Gray, a psychologist in the Aviation Medical Acceleration Laboratory at Johnsville, became the first recipient of the annual Charles W. and May S. Fliedner Trophy Award.

He was cited by RAdm. R. E. Dixon, Chief of BUAER, for achievement in space medicine.

Last December Mr. Gray completed tests of a new system to protect pilots against high acceleration forces. The system also permits examination of human tolerances relative to acceleration forces expected in space flight.

The system designed by Mr. Gray consists of a rigid metal container in which the subject, with suitable breathing apparatus, is surrounded completely by water.

During tests of the system Mr. Gray sustained 31 G's for five seconds with no evidence of physiological damage or loss of ability to do simple tasks.

The award is a sterling silver trophy, with the recipient's name inscribed on the base. It is awarded annually to a civilian employee of the bureau, field or department who has made a superlative contribution to the Bureau of Aeronautics' program in his field of endeavor and who has brought credit to the Navy and Civil Service.

Chief Journalist MacDonald, the author of "A Cold Course in Navigation," was injured seriously in an Antarctic airplane crash during Operation *Deep Freeze Four*. This was his first story after he was released from Chelsea Naval Hospital. By now he is enroute to the Antarctic again.

● IN THIS ISSUE

Use of funds for printing this publication has been approved by the Director of the Bureau of the Budget, 10 Feb. 1959.

● COVERS

Accentuate the positive of a color negative and the result is an unusual portrait on this month's cover. Ghostly F3H plane captain is frozen as he prepares his fighter for operations on USS *Saratoga*. This shot was made by Ltjg. T. M. Atkins of Naval Photographic Center.

Only two words are necessary to explain this month's dramatic back cover. The USS Hancock (CVA-19), Capt. H. L. Miller, Commanding, spells them out for residents in the San Francisco Bay area.

● SUBSCRIPTIONS

Naval Aviation News is now available on subscription for a $2.50 check or money order ($1.00 additional for foreign mailing) made payable to Superintendent of Documents, Government Printing Office, Washington 25, D. C. Single copies are 25 cents each.

● THE STAFF

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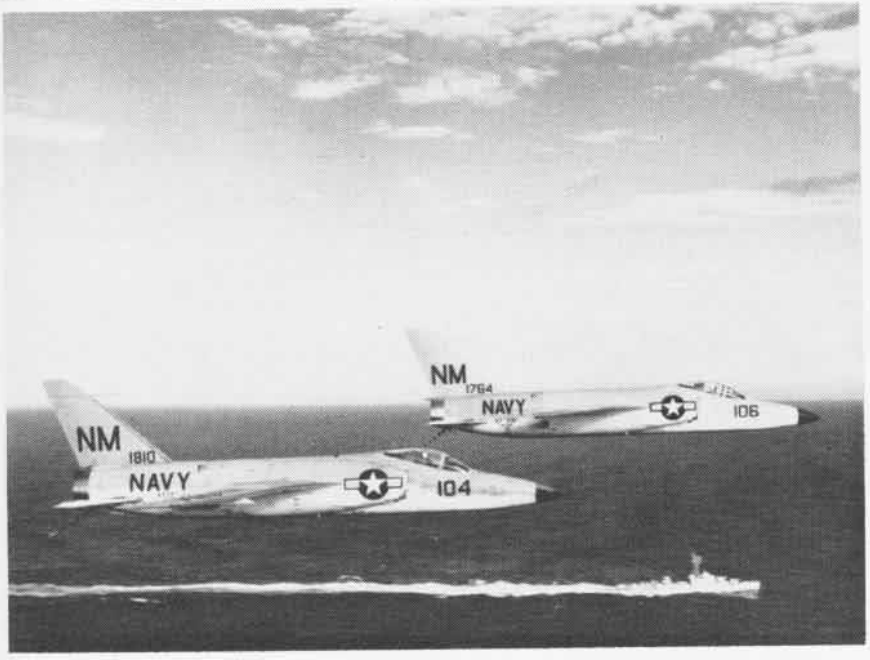

SQUADRON INSIGNIA

Fighter Squadron 191's patch with a fiendish cat hurling pitchfork and lightning bolt is an apt backdrop for the climb formation of squadron F11F Tigers. Led by Cdr. G. C .Watkins, Satan's Kittens are part of CVG-19.


SEA POWER