NAVAL AVIATION NEWS

44th Year of Publication

NOVEMBER 1962

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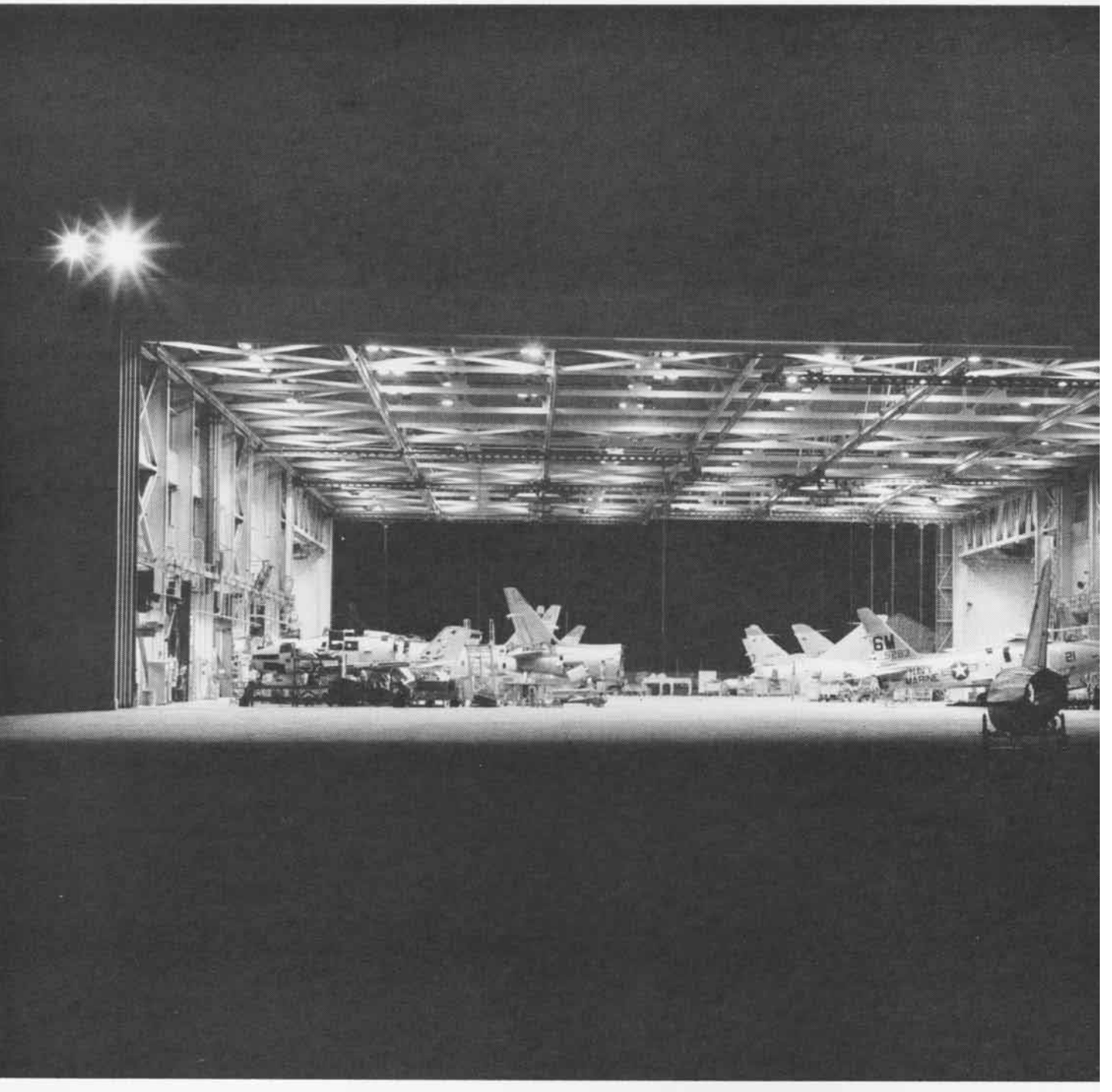

REVOLUTION INSIDE THE HANGAR

In Fiscal 1961, one-quarter of the Defense budget was spent for Maintenance—in terms of cash, $11 billion for 'equipment' maintenance and $2 billion for 'facilities' maintenance. In aviation electronics, a major breakthrough promises lower costs coupled with better performance and maintainability of equipment. For pictures and story of Naval Aviation's stake in this amazing new technological explosion, read 'Revolution in Electronics,' pp. 34-37.

COVERS

Cover shot, which shows one of VF-41's F4H Phantom II aircraft with bomb load, was taken by VFP-62, based at NAS Jacksonville. Above, the Overhaul and Repair Activity, MCAS Cherry Point, was photographed by Sgt. B. V. Davidson.

NAVAL AVIATION NEWS

FORTY-FOURTH YEAR OF PUBLICATION NOVEMBER 1962

IN THIS ISSUE

THE STAFF

Issuance of this publication was approved by the Secretary of the Navy on 3 April 1961

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NAVAL AVIATION NEWS

New Astronauts are Chosen

Six of Nine Men Navy-Connected

Of the nine new Astronauts selected September 17 to pioneer U. S. space ventures, three hold Navy commissions, four USAF commissions and two are civilians.

The three Naval Aviators are Lt. Charles Conrad, Jr., LCdr. James A. Lovell, Jr., and LCdr. John W. Young.

The two civilians are Mr. Neil A. Armstrong and Mr. Elliot M. See, Jr. The former was a Naval Aviator, 1949-1952, and engaged in 78 Korean war combat missions. Most recently he has been an aeronautical research engineer for NASA. Mr. See, a former Naval Aviator and a flight test engineer, has been a project pilot for General Electric on the J79-8 engine evaluation program for the F4H.

The four Air Force officers are Maj. Frank Borman, Capt. James A. McDivitt, Capt. Thomas P. Stafford, a graduate of the Naval Academy, 1952, and Capt. Edward H. White, II.

Qualifications for the selection were high. Each had experience as a test pilot in high performance aircraft, had worked with experimental programs, was less than 35 years of age, possessed a degree in physical or biological sciences or engineering, and had the recommendation of his organization.

Busiest Air Space in U.S.

FAA Singles out NAS Pensacola

On a typical busy day last year, according to an FAA report, there was more air traffic over NAS PENSACOLA area than any place else in the country. The report stated there were 113,656 minutes of military flying there, 469 minutes of air carrier flying, and 3072 of general aviation aerial activity.

These figures dwarf the number two and three areas in air traffic density. The second most densely traveled piece of airspace—the Los Angeles-San Diego area—showed 25,518 minutes of military flying, 1336 by air carriers, and 25,518 by general aviation aircraft.

New York placed third in the density report, with 15,668 minutes of military flying, 12,450 by air carriers, and 35,672 by general aviation.

About 96 percent of the aircraft over the Pensacola region are military.

VT-7 Tops its Own Record

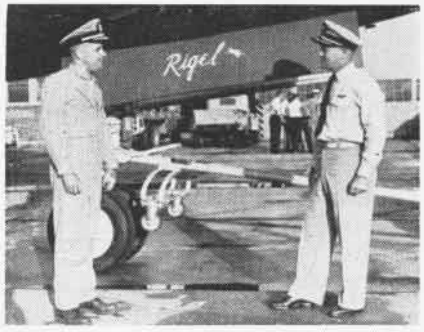
Outstanding Maintenance Credited

Training Squadron Seven instructors and students, with the full cooperation of the squadron's maintenance department, flew a total of 3528 hours in 23 days during August. The squadron believes this to be a possible all-time record for a jet training squadron.

VT-7's previous record, established four months earlier, was 3357 hours.

According to Cdr. J. J. Brosnahan, VT-7 C.O., the squadron's maintenance Department, under the supervision of Maj. R. A. Cameron, USMC, is credited with making the record possible by producing high aircraft availability. During the month of August, an average of 51 out of 57 T2J-1 *Buckeyes* were ready for flight operations every morning.

IT WILL COME *as a surprise that so many Naval Aviators (and those serving with them) have had destroyers named for them. As a salute to the Destroyer Anniversary, NANews on pp. 8-11 has listed those so honored.*



CDR. ANDREW SERRELL, *VP-44 C.O. at Patuxent River, and Cdr. James Ball, X.O., are shown with first P3V. P3V-1 (#1 side number) was named Rigel. Other P3V's will be named for other stars in Orion constellation.*

Glenn Gets Another First

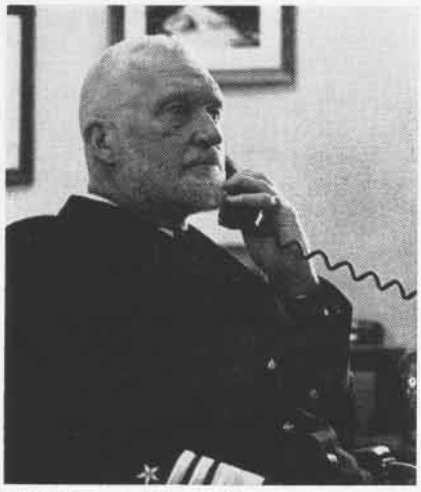
Is Awarded 'Aviator of the Year'

LCol. John H. Glenn, Jr., first American to orbit the earth, has added another "first" to a growing list of accomplishments and awards. He has been selected "Marine Aviator of the Year" for 1962-63, and will be the first recipient of the Alfred A. Cunningham Trophy.

The Cunningham Trophy, presented to the Marine Corps by the First Marine Aviation Force Veterans Association of World War I, will be awarded each fiscal year to the outstanding U. S. Marine Corps Aviator of the year.

Col. Glenn was selected to be the first recipient of the trophy because of his outstanding work with the National Aeronautics and Space Administration. He will receive the award at the Association's annual reunion this month, at Marine Corps Schools, Quantico, Va.

The Cunningham Trophy is named in honor of the first Marine Corps aviator. Marine Corps Aviation was founded May 22, 1912. This year, it is celebrating its Fiftieth Anniversary.



ENDING A COLORFUL *40 year Navy career that included 33 years of Naval Aviation, VAdm. Pirie has retired. A former test pilot who held many sea commands, he became Deputy Chief of Naval Operation (Air), 1958.*

Schoech Named DCNO (Air)

Relieves Pirie in Top Aviation Post

VAdm. William A. Schoech, USN, this month takes over as Deputy Chief of Naval Operations (Air), relieving VAdm. Robert B. Pirie, who retired from active duty on November 1.

VAdm. Pirie had held the post for four and a half years, longest tenure of the 13 men who have held the DCNO (Air) position since 1943. VAdm. Schoech, former Deputy Chief of the Bureau of Naval Weapons, was Commander, Seventh Fleet. In a departure statement, VAdm. Pirie said:

"After 40 years of Navy life, with 33 years in Naval Aviation, I am retiring from active service. I leave with a gratitude, deeper than any words can express, for the loyalty, the dedication, and the effectiveness of my shipmates over this long span of years. It has been a happy association with seniors, contemporaries and juniors alike, and a very full and rewarding life. I am proud to have been a part of Naval Aviation with its great accomplishments and tremendous progress in the half-century of its existence.

"In retrospect, its technical and operational accomplishments seem monumental. For the future, I see limitless possibilities. As I look forward, I feel secure in the knowledge that new fields to conquer are left to proven champions, Naval Aviators in whose skills and wisdom I have the greatest confidence. The future of Naval Aviation is in good hands."

VADM. WILLIAM A. SCHOECH *this month takes over as DCNO(Air), following in the steps of VAdm. Robert B. Pirie who retires November 1. VAdm. Schoech comes to this position from the post of Commander, Seventh Fleet.*

No Lost Time in Learning

School Moves to Continue Training

"We take the school to the student" has long been the motto of Naval Air Maintenance Training Group. To be on hand, NAMTRADET 1082 (WF-2) preceded the movement of VAW-12 from NAS QUONSET POINT to NAS NORFOLK, Va.

The move was coordinated with the squadron transfer, so that maintenance training of the squadron personnel could continue without interruption.

Making Friends at Rota

VP-56 in People-to-People Project

Patrol squadrons deployed at the Spanish-American Naval Base on the Bay of Cadiz, Rota, Spain, have only a few months to get a lot done. In four-to-six-month rotations in Europe, the crews of the P2V *Neptunes* carry out a steady number of operational commitments, not only with units of the U.S. Sixth Fleet, but also with the Spanish and NATO navies.

VP-56, commanded by Cdr. D. W. Herlong and just relieved by VP-16, was making friends until three days before departure. Already the authors of several treats for such Spanish youth groups as the *Arqqueros*—the equivalent of our Boy Scouts—the VP-56 airmen took time in the midst of departure prepartions to bring 30 small orphan girls from nearby Puerto de Santa Maria for a morning of treats.

HEAVY ATTACK SQUADRON SEVEN'S *A3J-1 Vigilantes await launch from the deck of the USS Enterprise in the Mediterranean. VAH-7, commanded by Cdr. Louie B. Hoop, Jr., has received a special commendation for three consecutive years of accident-free flying from VAdm. Frank O'Beirne, Commander Naval Air Force, U.S. Atlantic Fleet. Called "Peacemakers of the Fleet," they returned in mid-October from their first deployment with the Vigilante in the Med.*

GRAMPAW PETTIBONE

Hedge-Hopper

One of those real dependable type HUS-1 helos departed its base below the Mason-Dixon line for a scheduled cross-country training hop to New York.

En route, the UHF radio became not so dependable and the pilot landed at what he thought was NAS WALLOPS ISLAND for repairs. Of course, this is now a NASA airfield, and no parts were available. Weather conditions had deteriorated badly, so he took advantage of their hospitality and RON'd.

Early the next morning he hopped off for NAS PATUXENT, but they couldn't fix the radio. Still pushing for New York and undeterred, he refiled for NAS WILLOW GROVE. They couldn't fix it either. He filed VFR for New York. Although there was a 1200-foot overcast, he planned to fly right up the Delaware River, thus keeping clear of obstructions and using the river as a navigation aid.

Lift-off and departure were uneventful, controlled entirely by light signals from the control tower and he flew on an easterly heading toward the river, holding about 300 feet of altitude.

Reaching the river he dropped much lower and headed upstream.

The copilot busied himself with the Tacan and bird-dog, checking his chart for frequencies. At the same time, the pilot's attention was diverted by a peculiar looking pontoon-constructed

excursion boat directly ahead. Not wanting to endanger the craft with his rotor wash, he swung to the left.

Suddenly power lines loomed directly ahead and with a gasp of alarm, the pilot pulled sharply back on the cyclic and started an abrupt climb! Almost instantly the first wire hit the clam shell door, another slammed into the landing gear. The rotor blades coned above them, one blade tore off and the HUS did a quick on-the-spot 180° left turn and descended rapidly.

The pilot did some mighty rapid work with rudder and cyclic and managed to level it up and ease the rate of descent just before impact.

They hit hard, but fortunately the helo didn't break up or overturn. The water was very shallow, and they were able to wade ashore after stopping the rotor and securing all switches. No injuries, but the helo was a strike.

Grampaw Pettibone says:

Sufferin' catfish! Seems like all I do these days is read and write about helo pilots runnin' their birds into wires or some other kind of obstruction. OpNavInst. 3710.7A, section 7, paragraph 2, says that VFR flights shall not be conducted below an altitude of 500 feet above the terrain or water, except for takeoff and landing or when the mission requires otherwise. This applies to helos too!

Good common sense oughta tell a man to stay up above all the power lines, TV transmitter and relay towers and smokestacks. When you're low enough to endanger a boat with rotor wash, you're almost swimmin' anyway.

Dunno what his radio trouble was, but you've gotta have radio to go into a high density traffic area—at least, in my book you do. He should have turned back the day before.

Sayonara

Two young Japanese men went swimming just east of Mt. Fuji. When one of them got caught in the undertow, the other went to a nearby U. S. military survival training school and asked the pilot of an HOK-1 for help.

The helo had no hoist installed but the pilot yelled "Let's go," asked an infantry officer to get a raft and come along to assist him, started up the helo, engaged the rotors and lifted off. Just before lift-off, another infantry officer jumped in the helo, also carrying a raft.

They proceeded directly to the man in the water, now about 200 yards off shore and entered a hover over him at about 15 feet altitude.

The pilot's impromptu crew inflated a liferaft and dropped it to the man in the water. He promptly clambered into it, shouting "Thank you."

ILLUSTRATED BY Osborn

The pilot now tried to maneuver closer to the raft intending to have the swimmer pass the bow line to his crewman and thus enable them to tow the man through the surf to shore. Rotor wash blew the raft further away however, and the pilot suddenly realized he had gotten too low. The right main landing gear was in the water!

He applied power, climbed to 20 feet and circled once around the swimmer, then made a descending approach encompassing the swimmer within the rotor diameter. He was successful—the raft remained motionless.

He eased the helo down to water level until the raft was bumping alongside. The man in the raft, thinking the pilot wanted him to climb in the helo, kept trying to reach for the cockpit. The impromptu aircrewman, not knowing what the pilot had in mind either, unstrapped and leaned out to grasp the hands of the Japanese swimmer.

Just as their hands met the helo engine coughed once and quit! The carburetor air intake, located only 20 inches above the bottom of the landing gear, even with oleos extended, was underwater! That did it!

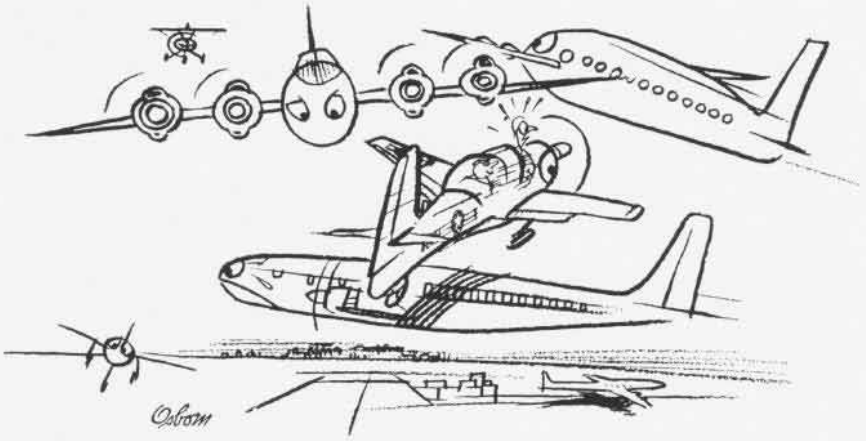
The HOK dropped in and rolled over, sinking the raft and puncturing it as the rotors stopped. In 10 seconds the helo was gone. Heads popped to the surface. There were now *four* swimmers in the water! No Mae Wests, no rafts, no nothing!

After about 30 minutes of swimming around, personnel of the survival unit brought out lines and flotation equipment through the surf and all three men from the helo were safely pulled ashore through the heavy surf and strong undertow. The Japanese swimmer? He'd had enough. He swam back along the beachline off shore to climb aboard a Japanese fishing boat which had been attracted to the scene.

Grampaw Pettibone says:

Sufferin' catfish! This guy had some pretty wild ideas about rescue techniques what with hoverin' too high for swimmin' and too low for flyin', no rescue or survival gear in the helo, an untrained, *unbriefed*, un-everything crew, and a very confused rescuee in the water.

After they had the swimmer safely in a raft, what was the hurry? A little reappraisal of the situation, say from 100 feet up, would have saved an aircraft and a lot of paper work.



Close One

An AD-5 piloted by an aviator with almost 500 hours in the Able-Dog was en route to a major civilian air terminal one fine summer afternoon. There were two passengers in the back, neither one of them airplane drivers or crewmen.

The pilot had never flown into this big air terminal before and had determined to be especially vigilant, therefore he was keeping a keen lookout for high speed commercial aircraft as he arrived in his destination area.

It's lucky he had a swivel neck, for an *Electra* loomed up ahead of him at 6500 feet on a collision course and was closing fast. The AD pilot pulled up, the *Electra* nosed down—near miss! Whew! The letdown was resumed but another *Electra* was climbing across his path. They didn't seem to be on collision courses, but he took evasive action anyway and nosed over abruptly.

Still descending, the AD pilot called the tower and was cleared to enter the pattern downwind at 1500 feet and cleared to land No. 2 behind a DC-7.

As he was making a gentle right turn to enter the downwind leg, he suddenly became aware of an aircraft approaching from his left and took immediate evasive action. A *real* close one! That was a Cessna. He'd have mangled it.

These three experiences had left the pilot somewhat on edge, to say the least. Traffic is pretty hairy around these civil airports.

The downwind approach leg was resumed, wheels lowered and check-off list completed as he peered ahead into the late afternoon sun, looking for the DC-7 he was to follow.

Two miles past the 180 position he still hadn't spotted the airliner, so he decided to take it around, applied power and raised the gear.

Just then he spotted the DC-7 below him and just crossing the threshold. Throttling back, he called the tower, told them he had his traffic in sight and received clearance to land.

On final the AD just "didn't feel right," but he attributed this to the fairly high approach speed he was still carrying.

As he flared for landing, the tower transmitted "Navy—wave-off, no-wheels!" He went to 46 inches and pulled up. He could barely feel it hit, and as he gained altitude, the tower called to tell him he was trailing gas, but no fire was visible. He climbed straight ahead.

Cleared for any runway, he did a 180-degree turn and landed without further incident. The belly tank had been smashed and the prop damaged. He'd been lucky, if you can call it that.

Grampaw Pettibone says:

Great land o'Goshen! A DODO flying one of the AD birds seldom has a wheels-up scored against him mostly because he doesn't have any habits built up about flyin' it. It's the *old hands* who get in trouble. "Habit interference," the Docs call it.

I give this man credit, he blamed only himself. Most wheels-up characters blame the tower, wheels watch, RDO, everybody but themselves. Me—I figure you signed for it, you better fly it—all the way. All the outside help is just there to prop up the *weakies*.

There's just no substitute for the Check-off List!

Traffic *is* hairy around major air terminals. It's well to stay clear unless the trip is absolutely necessary.

San Diego Gets A-1 Model

Replica is Put in Balboa Park

The flying replica of the Navy's first aircraft, the Curtiss A-1, was made available to the City of San Diego for display and preservation in an Aerospace Museum Building at Balboa Park on September 27.

Capt. Robert W. Leeman, Commanding Officer of NAS NORTH ISLAND, the custodian of the A-1, presented the aircraft to the city for display.

The A-1, built as a joint project by the Navy and the Institute of Aerospace Sciences to commemorate the Fiftieth Anniversary of Naval Aviation last year, is a flying replica of the first aircraft ordered by the Navy in 1911. The Navy and the IAS built two replicas, one of which was shipped to the Smithsonian Institution.

VT-9 has Enviable Record

It has Never had an Air Accident

On December 16, 1961, the U. S. Navy commissioned Training Squadron Nine. Since that day, VT-9, flying the T2J-1 *Buckeye,* has accumulated over 21,000 hours of flight time—all of them accident-free.

In competition with other squadrons of its type flying the T2J-1, VT-9 achieved a zero accident rate for fiscal 1962 while accruing 15,125 operating hours.

The squadron, commanded by Cdr. D. John Birdsong, is the recipient of both the CNO and CNABaTra Aviation Safety Awards for 1962. VT-9 is stationed at NAAS MERIDIAN, Miss.

HMM-361 Sets New Record

Unit Flies 2000 Hours in 30 Days

Marine Medium Helicopter Squadron 361, based at MCAF SANTA ANA, set a Third Marine Aircraft Wing record for helicopter operations when it flew 2000 hours in a 30-day period last August.

The squadron, commanded by LCol. R. H. Brumley, topped the previous 30-day flight hour record of 1859.3 hours set in April 1961 by HMM-362.

In logging the record time, the squadron flew varied missions, including several battalion exercises at Camp Pendleton with the First Marine Division, plus carrier operations on USS *Yorktown* and USS *Ticonderoga.*

GONE IS *the familiar champagne bottle configuration of the Polaris. The new bullet shape of the A3 encloses a missile 80% new and is expected to extend Polaris' range to 2500 miles, 1000 miles more than the A2's.*

Navy Pilots Claim Records

Amphibian Used in Scoring Flights

Three U. S. Navy pilots, two in flights on September 12, and one in a flight beginning on September 15 and ending the next day, are claiming three world flying records. Two have been held by Russia since 1940, and the third—a world speed record—has been unclaimed.

Flying a Coast Guard-owned, twin-engine Grumman *Albatross* amphibian, LCdr. Fred A. W. Franke took off from NAS NEW YORK, carrying a 2000-kilogram (4410-pound) load, and reached an altitude of 27,380 feet, a new altitude record for an amphibian. The old record of 20,617 feet was set by a Russian pilot, Ivan Soukhomline, on June 19, 1940.

A second record claimed the same day for the United States was the altitude record for amphibians carrying a 1000-kilogram (2205-pound) load. This flight was also flown from NAS NEW YORK. The pilot was LCdr. Donald E. Moore, using the same aircraft flown in the first flight. LCdr. Moore reached an altitude of 29,460 feet, eclipsing the previous record of 23,406 feet, also set by Soukhomline, on June 17, 1940.

The previous records were established in flights in a Tsagui 44D amphibian from Katcha, Russia, near Sevastopol.

The third flight was made by LCdr. Richard A. Hoffman, in the same *Albatross* amphibian used in the earlier flights. He landed at NAS NEW YORK after completing a 5000-kilometer (3100-mile) closed course flight while carrying a 1000-kilogram (2205-pound) load at an average speed of 151.4 mph (131.47 knots). This is the first time for this record.

The flight course was from NAS NEW YORK to Plattsburg, N. Y. to Dupree, S. D., and return to New York. The total flight time was 20 hours, 37 minutes, and 34 seconds.

The record attempts were supervised by the National Aeronautic Association under the rules of the *Federation Aeronautique Internationale* (FAI), the world governing body for all aviation records.

LCdr. Franke and LCdr. Moore are both assigned as instructors at the Test Pilot School, NAS PATUXENT RIVER. LCdr. Hoffman is currently assigned to the ASW branch of the Aircraft Service Test Division.

Bombing Derby Date Given

Tenth Annual Competition Dec. 3-8

Commander Heavy Attack Wing One, Capt. Joseph M. Tully, Jr., has announced that squadrons comprising HAtWing One will compete in a bombing derby at NAS SANFORD, Fla., Dec. 3-8. This will be the Wing's tenth annual derby.

MAG-26 Claims Helo Score

Low Accident Rate for Fiscal 62

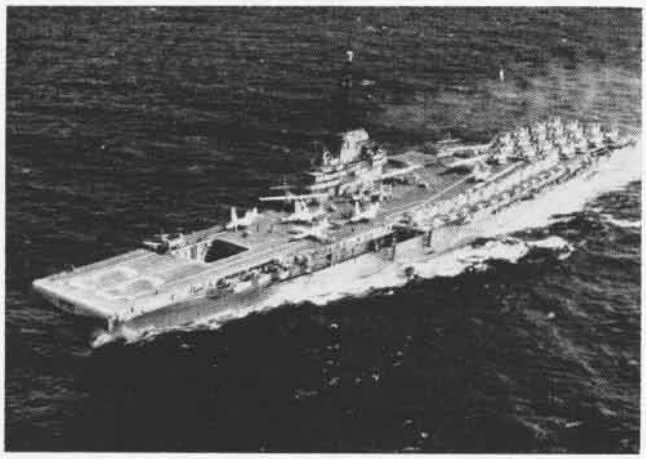
Marine Aircraft Group 26, MCAF NEW RIVER, N.C., commanded by Col. Robert L. Cochran, claims new helicopter flight records for FY 62.

During the fiscal year, the group attained an accident rate of .74 percent for each 10,000 flight hours. The group believes this to be the lowest accident rate ever recorded by a Marine Tactical Group.

MAG-26 flew 54,192 flight hours to establish a new flight record for the group and to lead all Marine Tactical Groups during the fiscal year.

Marine Medium Helicopter Squadron 263, commanded by LCol. Clyde H. Slaton, established a new record for single-engine aircraft by flying 29,648 accident-free flight hours.

In addition, 19,244 shipboard landings were logged during the period.



ALPHA AND OMEGA FOR Σ7—*Cdr. Schirra's flights began with a long, arduous training program. Every piece of equipment was tried and proved in laboratories and preceding Mercury flights. Cdr. Schirra's space flight ended in the Pacific near USS Kearsarge, recovery ship.*

SCHIRRA SUCCEEDS IN SIGMA SEVEN

THE SIX-ORBIT flight of *Sigma Seven* —third American attempt to orbit a man—was accomplished on October 3, 1962, with a minimum of delay and trouble.

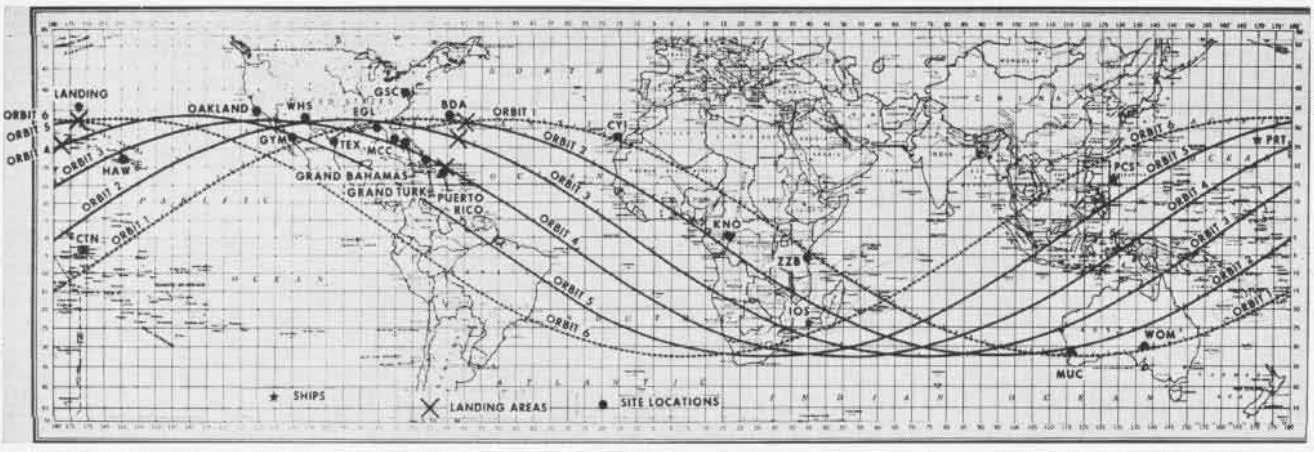
Cdr. Walter Schirra, Jr., USN, 39, the astronaut assigned by the National Aeronautics and Space Agency, lifted on schedule from the pad in his *Mercury* capsule atop an *Atlas* missile, landed in the Pacific nine and a quarter hours later, again on schedule, and within five miles of the USS *Kearsarge* (CVS-33) in the assigned project recovery area.

While spaceborne for the six flights around the earth, Cdr. Schirra executed all missions assigned by the *Mercury* program. When it was over, his *Sigma Seven* capsule lifted to an elevator on the *Kearsarge*, the astronaut calmly asked "permission to come aboard"—as if he were completing a normal carrier flight recovery mission.

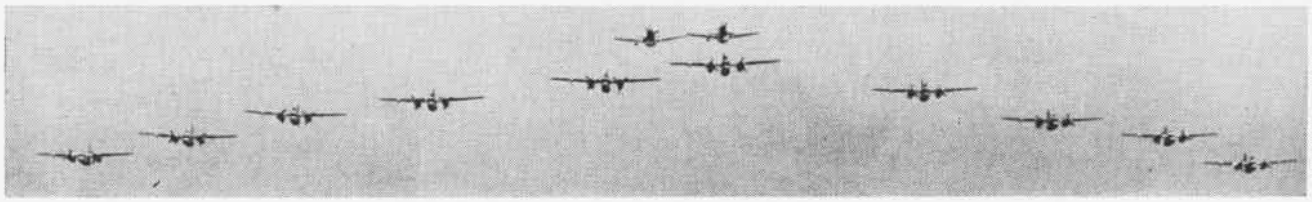
CDR. SCHIRRA *named capsule Sigma (many) to honor all who made his flight a success.*

NASA officials were obviously pleased with the conduct of the flight. All phases of the action, from lift-off to recovery, had been conducted according to plan. It was the first time the Pacific Fleet had been scheduled to recover an astronaut. All previous sub-orbital and orbital flights had been made with Atlantic Fleet recovery forces. The rendezvous was so nearly perfect that Cdr. Schirra joked about almost landing on the *Kearsarge*.

Schirra's vehicle landed in the ocean some 275 miles northeast of Midway Island. He was taken aboard the USS *Kearsarge* 46 minutes later.



THE SIX ORBITS *of Cdr. Schirra are depicted in a series of lines which form a slightly eliptical circle. Ships along the initial launching path served as potential rescuers in case the flight was cut short. No cut-off came, and the astronaut landed in good order near USS Kearsarge.*



DESTROYER NAMES HONOR NAVAL AVIATORS

DESTROYERS in this century have lived up to their name. From the USS *Bainbridge* (DD-1) commissioned November 24, 1902, to the USS *Bainbridge* (DGL(N)-25), commissioned October 6, the long line of destroyers has attacked the enemy in two World Wars and the Korean conflict, protected its surface allies, and given to aviation outstanding and welcome cooperation.

It is appropriate that so many destroyer types should bear the names of Naval Aviators or enlisted men in Naval Aviation, for destroyers are no strangers to the officers and men who fly above them. Destroyers are, and have been, important members of air task forces.

In WW II, a carrier group usually was made up of three to five carriers, four to six battleships and cruisers, and 12 to 20 DD's. Three or four of these groups combined became such a command as Task Force 58. The carriers, powerful and lethal as was their punch, did not travel without their protective screen of destroyers.

Destroyers were prime rescuers in the Pacific. During the Battle of the Philippine Sea, 20 U.S. planes were shot down, and another 55, forced down by lack of gas, landed in the water. Of approximately 180 personnel involved, all but 16 pilots and 23 aircrewmen were recovered, the majority by U. S. Navy destroyers before dawn.

In the struggle for Okinawa, according to *U.S. Naval Aviation in the Pacific,* "Fifteen radar picket stations, located from 20 to 95 miles from the center of the area, had been established to cover paths of approach. Each station was manned by a radar-equipped destroyer or smaller vessel with a fighter-director team aboard. These teams were linked with the central air-defense control organization. They directed fighter patrols assigned to their sectors and passed control and information to other units as the raiders left their area. The picket line was so effective in intercepting enemy raids that the Japanese switched tactics and began to concentrate on picket vessels which heretofore had been neglected for larger or more profitable targets. Despite the pounding these picket stations received, which resulted in seven destroyers sunk, 18 seriously damaged, and six slightly damaged, fighter-director ships were still on station when responsibility for air defense was transferred ashore to the Air Defense Commander 82 days after the original landings."

In commenting on the Okinawa experience later, VAdm. Walden L. Ainsworth, USN (Ret.), wrote: "The ring-down of the curtain at Okinawa—the end of the show—brought the most bitter naval battle of the war to the destroyer, and ended in victory for the radar picket. Day

after day, week after week, the suicide assault from the air took its toll of the small ships; day after day other pickets took their place to hold the screen and to shoot the enemy down. The Japanese had to destroy the screen before any attack on the transport could meet with success. For us, there could be no driving in of the pickets. The line *must* hold."

And it did, at great cost, but it defeated the *kamikaze*, protected the Fleet, and brought final victory.

In celebrating Sixty Years of Destroyers, *Naval Aviation News* has undertaken the task of making available for the first time, so far as is known, a list of those connected with Naval Aviation for whom destroyers have been named. The lists presented here are based on the careful research of Mrs. Effie M. Miller of the DCNO (Air) History Unit. Her research is based on *Ships of the U.S. Navy and Their Sponsors*, Vols. I, II, and III.

The valor of certain Navy and Marine pilots is commemorated in the names of ships as follows:

Aviator's Name	*Ship*	*Launched*
Abercrombie, W. W., Ens., USNR	*Abercrombie* (DE-343)	1/14/44
Adams, S., Lt., USN	*Adams* (DM-27—ex-DD-739)	7/23/44
Allen, E. H., Lt., USN	*Edward H. Allen* (DE-531)	10/17/43
Ault, W. B., Cdr., USN	*Ault* (DD-698)	3/26/44
Baker, J. D., Ens., USNR	*Baker* (DE-190)	11/28/43
Baker, P. G., Ltjg., USN	*Paul G. Baker* (DE-642)	3/12/44
Bass, H. A., Ens., USNR	*Horace A. Bass* (APD-124—ex-DE-691)	9/12/44
Bass, H. B., LCdr., USN	*Brinkley Bass* (DD-887)	5/26/45
Bassett, E. R., Ens., USNR	*Bassett* (APD-73—ex-DE-672)	1/15/44
Bauer, H., LCol., USMC	*Bauer* (DE-1025)	6/4/57
Barnes, D. C., Ens., USN	*Doyle C. Barnes* (DE-353)	3/4/44
Bebas, G. G., Ens., USNR	*Bebas* (DE-10)	1/9/43
Billingsley, W. D., Ens., USN	*Billingsley* (DD-293)	12/10/19
Berry, F. T., Cdr., USN	*Fred T. Berry* (DD-858)	1/23/45
Blessman, E. M., Lt., USN	*Blessman* (APD-48—ex-DE-69)	6/19/43
Bowers, R. K., Ens., USNR	*Bowers* (APD-40—ex-DE-637)	10/31/43
Brackett, B. G., Lt., USNR	*Brackett* (DE-41)	8/1/43
Brannon, C. E., Ens., USNR	*Charles E. Brannon* (DE-446)	4/23/44
Bridget, F. J., Cdr., USN	*Bridget* (DE-1024)	4/25/56
Bristol, A. L., VAdm., USN	*Arthur L. Bristol* (APD-97—ex-DE-281)	2/19/44
Brock, J. W., Ens., USN	*Brock* (APD-93—ex-DE-234)	1/20/44
Bronson, C. K., Ltjg., USN	*Clarence K. Bronson* (DD-668)	4/18/43
Bull, Richard, Ltjg., USNR	*Bull* (APD-78—ex-DE-693)	3/25/43
Bull, R. S., Lt., USN	*Richard S. Bull* (DE-402)	11/16/43
Brough, D. A., Ltjg., USNR	*Brough* (DE-14)	4/10/43
Butler, J. C., Ens., USNR	*John C. Butler* (DE-339)	12/11/43
Byrd, R. E., Jr., RAdm. USN	*Richard E. Byrd* (DDG-23)	2/6/62
Camp, J. H., Ens., USNR	*Camp* (DE-251)	4/16/43
Campbell, J. E., Ens., USNR	*Joseph E. Campbell* (APD-49—ex-DE-70)	6/26/43
Campbell, K. C., Ens., USNR	*Kendall C. Campbell* (DE-443)	3/19/44
Carpenter, D. M., LCdr., USN	*Carpenter* (DDK-825)	12/28/45
Chaffee, D. E., Ens., USNR	*Chaffee* (DE-230)	11/27/43
Chambers, R. F., Ens., USNR	*Chambers* (DE-391)	8/17/43
Chevalier, G. De C., LCdr., USN	*Chevalier* (DD-451) (DD-805)	4/11/42 10/29/44
Clark, H. F., Ltjg., USN	*Howard F. Clark* (DE-533)	11/8/43
Collett, J. A., LCdr., USN	*Collett* (DD-730)	3/5/44
Coolbaugh, W. W., Ltjg., USNR	*Coolbaugh* (DE-217)	5/29/43
Cooner, B. R., Ens., USNR	*Cooner* (DE-172)	7/25/43
Cooper, E. G., Lt., USN	*Cooper* (DD-695)	2/9/44
Corry, W. M., LCdr.,	*Corry* (DD-334) (DD-463) (DD-817)	3/28/21 7/28/41 7/28/45
Craig, J. E., LCdr., USN	*James E. Craig* (DE-201)	7/22/43
Cross, F. C., Ltjg., USNR	*Cross* (DE-448)	7/4/44
Cunningham, A. A., LCol., USMC	*Alfred A. Cunningham* (DD-752)	8/3/44
Davis, F. C., Ens., USNR	*Frederick C. Davis* (DE-136)	1/24/43
Dickson, H. R., LCdr., USN	*Harlan R. Dickson* (DD-708)	12/17/44
Deede, L. C., Ltjg., USNR	*Deede* (DE-263)	4/6/43
Dobler, J. J., Lt., USNR	*Dobler* (DE-48)	7/24/43
Doherty, J. J., Ens., USNR	*Doherty* (DE-14)	8/29/42
Donnell, E. R., Jr., Ens. USNR	*Donnell* (DE-56)	3/13/43
Doyle, C. J., 2nd Lt., USMC	*Cecil J. Doyle* (DE-368)	7/1/44
Duffy, C. J., Ens., USNR	*Duffy* (DE-27)	4/16/43
Dufilho, M. W., Lt., USN	*Dufilho* (DE-423)	3/9/44
Eichenberger, C. E., Ens., USNR	*Eichenberger* (DE-202)	7/22/43
Eldridge, John, Jr., LCdr., USN	*Eldridge* (DE-173)	7/25/43
Ellison, H. J., Ens., USNR	*Harold J. Ellison* (DD-864)	3/14/45
Ellyson, T. G., Cdr. USN	*Ellyson* (DMS-19—ex-DD-454)	7/25/41
Eversole, J. T., Ltjg., USN	*Eversole* (DE-404) (DD-789)	12/3/43 1/8/46
Fechteler, F. C., Lt., USN	*Fechteler* (DE-157) (DD-870)	4/22/43 9/9/45
Fieberling, L. K., Lt., USN	*Fieberling* (DE-640)	3/2/44
Fleming, R. E., Capt., USMC	*Fleming* (DE-32)	6/16/43
Fogg, C. T., Ltjg., USN	*Fogg* (DE-57)	3/20/43
Fox, Lee, Jr., Ens., USNR	*Lee Fox* (APD-45—ex-DE-65)	5/29/43
Gentry, W. R., 2nd Lt., USMC	*Gentry* (DE-349)	2/15/44
Gillette, D. W., Ltjg., USNR	*Gillette* (DE-681)	9/25/43
Gray, John P., Ltjg., USNR	*John P. Gray* (APD-74—ex-DE-673)	3/18/43
Greene, E. A., Ens., USNR	*Eugene A. Green* (DD-711)	3/18/45
Griswold, D. T., Ens., USNR	*Griswold* (DE-7)	1/9/43
Hale, R. O., Jr., Ltjg., USN	*Roy O. Hale* (DE-336)	11/20/43
Halsey, W. F., Jr., FAdm., USN	*Halsey* (DLG-23)	1/15/62
Hammann, C. H., Ens., USNR	*Hammann* (DD-412) (DE-131)	2/4/39 12/13/42
Hancock, Lewis, Jr., LCdr., USN	*Lewis Hancock* (DD-675)	8/1/43

Aviator's Name	*Ship*	*Launched*
Hanson, R. M., 1st Lt., USMC	*Hanson* (DD-832)	3/11/45
Hart, P. H., Lt., USN	*Hart* (DD-594)	9/25/44
Harwood, B. L., Cdr., USN	*Harwood* (DD-861)	5/22/45
Hastings, B. R., Lt., USN	*Burden R. Hastings* (DE-19)	11/20/42
Hissem, J. M., Ens., USNR	*Hissem* (DE-400)	12/26/43
Hodges, F. G., Ens., USNR	*Hodges* (DE-231)	12/9/43
Holder, R. M., Ltjg., USNR	*Holder* (DE-401) (DD-819)	11/27/43 8/25/45
Holt, W. M., Ltjg., USNR	*Holt* (DE-706)	2/15/44
Hopping, H. L., LCdr., USN	*Hopping* (APD-51—ex-DE-155)	3/9/43
Hurst, E. W., Lt., USN	*Hurst* (DE-250)	4/14/43
Hutchins, C. B., Lt., USN	*Hutchins* (DD-476)	2/20/42
Irwin, N. E., RAdm., USN	*Irwin* (DD-794)	10/31/43
Isbell, A. J., Capt., USN	*Arnold J. Isbell* (DD-869)	8/6/45
Jaccard, R. A., Ens., USNR	*Jaccard* (DE-355)	3/18/44
Johnson, E. V., Ltjg., USN	*Earl V. Johnson* (DE-702)	11/24/43
Keller, R. F., Ens., USNR	*Robert F. Keller* (DE-419)	2/19/44
Kennedy, J. P., Jr., Lt. USNR	*Joseph P. Kennedy, Jr.* (DD-850)	7/26/45
Kenyon, H. R., Ens., USNR	*Henry R. Kenyon* (DE-683)	10/30/43
King, E. J., FAdm., USN	*King* (DLG-10)	12/6/58
Kinzer, E. B., Ens., USNR	*Kinzer* (APD-91—ex-DE-232)	12/9/43
Knox, L. L. B., Ltjg., USNR	*Leslie L. B. Knox* (DE-580)	1/8/44
Lansdowne, Zachary, LCdr., USN	*Lansdowne* (DD-486)	2/20/42
Lewis, V. A., Ens., USNR	*Lewis* (DE-535)	12/7/43
Lindsey, E. E., Lt., USN	*Lindsey* (DM-32—ex-DD-771)	3/5/44
Lough, J. C., Ens., USNR	*Lough* (DE-586)	1/22/44
Lovelace, D. A., LCdr., USN	*Lovelace* (DE-198)	7/4/43
MacLeish, K., Lt., USNR	*MacLeish* (DD-220)	12/18/19
Mason, N. H., Ens., USNR	*Mason* (DE-529)	11/17/43
Massey, L. E., LCdr., USN	*Massey* (DD-778)	8/19/44
McCain, J. S., Adm., USN	*John S. McCain* (DL-3)	7/12/52
McCord, F. C., Cdr., USN	*McCord* (DD-534)	1/10/43
McCormick, A. A., Ltjg., USNR	*McCormick* (DD-223)	2/4/20
Menges, H. H., Ens., USNR	*Menges* (DE-320)	6/15/43
Mills, L. J., Ens., USNR	*Mills* (DE-393)	5/26/43
Mitchell, A. E., Ens., USNR	*Mitchell* (DE-43)	8/1/43
Mitchell, Oliver, 2nd Lt., USMCR	*Oliver Mitchell* (DE-417)	2/8/44
Mitscher, M. A., Adm., USN	*Mitscher* (DL-2)	12/29/51
Moore, U. M., Ens., USNR	*Ulvert M. Moore* (DE-442)	3/7/44
Mosley, W. H., Ens., USNR	*Mosley* (DE-321)	6/26/43
Mullinnix, H. M., RAdm., USN	*Mullinnix* (DD-944)	3/18/57
Mustin, H. C., Capt., USN	*Mustin* (DD-413)	12/8/38
Nawman, M. R., 2nd Lt., USMCR	*Melvin R. Nawman* (DE-416)	2/7/44
Norris, B. W., Maj., USMC	*Norris* (DD-859)	2/25/45
O'Flaherty, F. W., Ens., USNR	*O'Flaherty* (DE-340)	12/14/43
O'Hare, E. H., LCdr., USN	*O'Hare* (DD-889)	1/22/45
Osberg, C. A., Ens., USNR	*Osberg* (DE-538)	12/7/43
Osmus, W. F., Ens., USNR	*Osmus* (DE-701)	11/4/43
Owens, J. C., Lt., USN	*Jack C. Owens* (DD-776)	10/1/44
Parks, F. B., Maj., USMC	*Floyd B. Parks* (DD-884)	3/31/45
Peiffer, C. D., Ens., USNR	*Peiffer* (DE-538)	1/26/44
Pennewill, W. E., LCdr., USN	*Pennewill* (DE-175)	8/8/43
Peterson, D. W., Ens., USNR	*Dale W. Peterson* (DE-337)	12/22/43
Potter, S., Ens., USNR	*Stephen Potter* (DD-538)	4/28/43
Powers, J. J., Lt., USN	*John J. Powers* (DE-528)	2/29/44
Raby, J. J., RAdm., USN	*Raby* (DE-698)	9/4/43
Raven, J. A., Lt., USNR	*Julius A. Raven* (APD-110—ex-DE-600)	3/3/44
Reid, B. W., Ens. USN	*Beverly W. Reid* (APD-119—ex-DE-722)	3/4/44
Rich, R. M., Ltjg., USNR	*Rich* (DE-695) (DD-820)	6/22/43 10/5/45
Richey, J. L., Ens., USNR	*Richey* (DE-385)	6/30/43
Riddle, Jos., Ens., USNR	*Riddle* (DE-185)	10/17/43
Riley, P. J., Lt., USN	*Riley* (DE-579)	12/29/43
Rinehart, C. F., Ltjg., USN	*Rinehart* (DE-196)	1/9/44
Roberts, J. Q., Ens., USNR	*John Q. Roberts* (APD-94—ex-DE-235)	2/11/44
Roche, D. J., Ens., USNR	*Roche* (DE-197)	1/9/44
Rodgers, John, Cdr., USN	*John Rodgers* (DD-574)	5/7/42
Rombach, S. L., Ltjg., USNR	*Rombach* (DE-364)	6/6/44
Rowell, R. M., Ens., USNR	*Richard M. Rowell* (DE-403)	11/1/43
Saufley, R. C., Ltjg., USN	*Saufley* (DD-465)	7/19/42
Seaman, A. L., LCdr., USNR	*Seaman* (DD-791)	5/29/46
Seid, Daniel, Ens., USNR	*Seid* (DE-256)	2/22/43
Sellstrom, E. R., Ens., USNR	Sellstrom (DE-255)	
Shea, J. J., Cdr., USN	*Shea* (DM-30—ex-DD-750)	5/20/44
Shelton, J. A., Ens., USNR	*Shelton* (DE-407) (DD-790)	12/18/43 3/8/46
Sherman, F. J., Adm., USN	*Forrest P. Sherman* (DD-931)	2/5/53
Smartt, J. G., Ens., USNR	*Smartt* (DE-527)	2/22/43
Snyder, Russell, Ens., USNR	*Snyder* (DE-745)	8/29/43
Stickell, J. H., Lt., USNR	*Stickell* (DD-888)	6/16/45
Strickland, E. C., Ens., USNR	*Strickland* (DE-333)	11/2/43

Aviator's Name	*Ship*	*Launched*
Sturtevant, A. D., Ens., USNR	*Sturtevant* (DD-240) (DE-239)	7/29/20 12/3/42
Suesens, R. W., Ltjg., USN	*Richard W. Suesens* (DE-342)	1/11/44
Tabberer, C. A., Ltjg., USNR	*Tabberer* (DE-418)	2/18/44
Talbot, Ralph, 2nd Lt., USMC	*Ralph Talbot* (DD-114)	10/31/36
Thomas, Lloyd, Ltjg., USN	*Lloyd Thomas* (DE-764)	10/5/45
Thomas, L. E., 2nd Lt., USMCR	*Leland E. Thomas* (DE-420)	2/28/44
Taylor, L. C., 2nd Lt., USMCR	*Lawrence C. Taylor* (DE-415)	1/29/44
Thornhill, L. W., Ltjg., USN	*Thornhill* (DE-195)	12/30/43
Tills, R. G., Ens., USN	*Tills* (DE-748)	10/3/43
Towers, J. H., Adm., USN	*Towers* (DDG-9)	4/23/59
Trumpeter, G. N., Ltjg., USNR	*Trumpeter* (DE-180)	9/19/43
Turner, R. K., Adm., USN	*Richmond K. Turner* (DLG-20)	10/ /62
Tweedy, A. W., Jr., 2nd Lt., USMC	*Tweedy* (DE-532)	10/7/43
Underhill, S. J., Ens., USNR	*Underhill* (DE-682)	10/15/43
Vammen, E. V., Jr., Ens., USNR	*Vammen* (DE-644)	5/21/44
Vandivier, N. F., Ltjg., USNR	*Vandivier* (DE-540)	12/27/43
Van Voorhis, B. A., LCdr., USN	*Van Voorhis* (DE-1028)	7/18/56
Varian, B. S., Jr., Ens., USNR	*Varian* (DE-798)	11/6/43
Waldron, J. C., LCdr., USN	*Waldron* (DD-699)	3/26/44
Ware, C. R., Lt., USN	*Charles R. Ware* (DD-865)	4/12/45
Weber, F. T., Ens., USNR	*Weber* (APD-75—ex-DE-675)	5/1/43
Wileman, W. W., Ens., USNR	*Wileman* (DE-22)	12/19/42
Wilhoite, T. M., Ens., USNR	*Wilhoite* (DE-397)	10/5/43
Willis, W. M., Ens., USNR	*Willis* (DE-395)	9/14/43
Wilke, J. W., Ens., USNR	*Jack W. Wilke* (DE-800)	12/18/43
Wiltsie, I. D., Capt., USN	*Wiltsie* (DD-716)	8/31/45
Wingfield, J. D., Ens., USNR	*Wingfield* (DE-194)	3/29/44
Wiseman, O. B., Ltjg., USN	*Wiseman* (DE-667)	11/6/43
Woodson, J. D., Ltjg., USN	*Woodson* (DE-359)	4/29/44

CERTAIN ADMIRALS, while not pilots, were significantly involved in the growth of Naval Aviation. They also have been honored by having destroyers named after them:

RAdm. W. A. Moffett, first Naval Aviation Observer, fifth director of Naval Aviation, and first Chief of the Bureau of Aeronautics—USS *Moffett* (DD-362), launched December 11, 1935.

RAdm. Mark L. Bristol, the second director of Naval Aviation—USS *Bristol* (DD-453), launched July 25, 1941.

RAdm. H. I. Cone, in charge of Naval Aviation in Europe during World War I—USS *Cone* (DD-866), launched May 10, 1945.

Adm. Harry E. Yarnell, a Naval Observer in 1927 and an early advocate of carrier development—USS *Yarnell* (DGL-17), launched December 9, 1961.

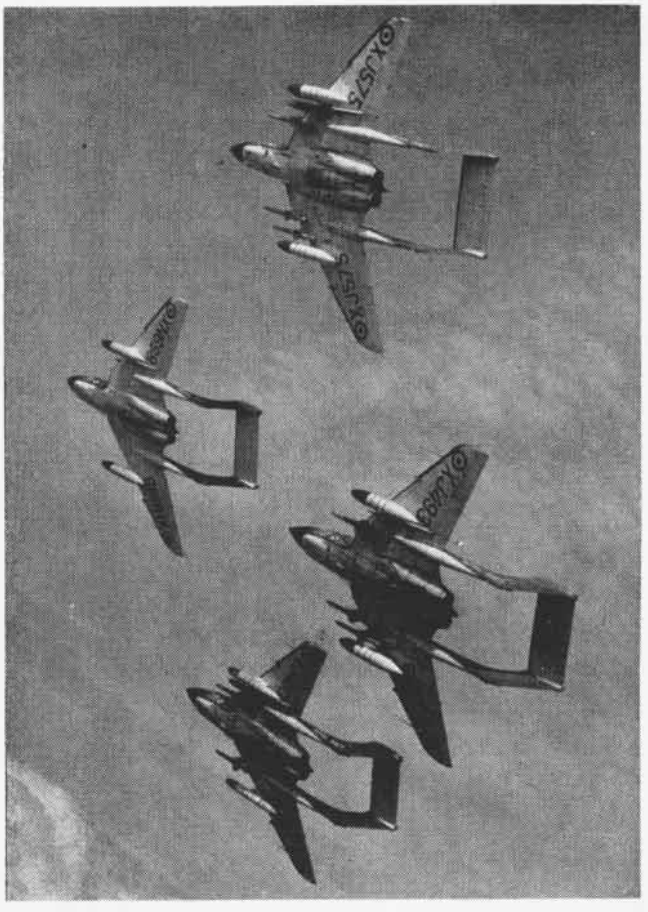
Of the enlisted men who served in the field of Naval Aviation, the one best known is Floyd Bennett, an enlisted pilot and later a warrant officer. CWO Bennett, who enlisted in 1917, was commended in 1925 by the Secretary of the Navy for the energy and courage he displayed in the MacMillan Polar Expedition.

In 1926, Bennett was the pilot for RAdm. Richard E. Byrd on his historic flight over the North Pole on May 9, 1926. For this Bennett received in August the Distinguished Service Medal. For the same flight, Bennett was promoted by Act of Congress of January 5, 1927, to officer rank, Warrant Machinist. On February 19, 1927, Congress awarded him the Medal of Honor which was presented to him personally by the President. On April 16, 1942, USS *Bennett* (DD-473) was launched.

Enlisted men in Naval Aviation for whom destroyers have been named are as follows:

Name	*Ship*	*Launched*
Bangust, Joseph, AMM2	*Bangust* (DE-739)	6/6/43
Brazier, R. B., ARM	*Robert Brazier* (DE-345)	1/22/44
Brown, W. S., AMN2	*Walter S. Brown* (DE-258)	2/22/43
Bunch, Kenneth C., ARM-1	*Bunch* (APD-79)	5/29/43
Carter, Jack, AO	*Carter* (DE-112)	2/29/44
Dennis, Otis Lee, RM3	*Dennis* (DE-405)	12/4/43
Edmonds, Bert C., AO1	*Edmonds* (DE-406)	1/15/43
Formoe, Clarence M., AMM1	*Formoe* (DE-509)	4/2/44
Francovich, A. A., AMM1	*Francovich* (APD-116)	6/5/45
Gorka, W. S., AO3	*Walter S. Gorka* (APD-114)	5/26/45
Griffin, D. T., AMM1	*Daniel T. Griffin* (APD-38)	2/25/43
Haas, John W., MMC	*Haas* (DE-424)	3/20/44
Hall, E. B., AMM2	*Earle B. Hall* (APD-107)	3/1/44
Hilbert, Ernest L., AO3	*Hilbert* (DE-742)	7/18/43
Huntington, R. K., ARM	*Robert K. Huntington* (DD-781)	12/5/44
Keith, Ellis J., Jr., S2	*Keith* (DE-241)	12/21/42
Lansing, William H., AMM1	*Lansing* (DE-388)	8/2/43
Lawe, W. C., AM3	*William C. Lawe* (DD-763)	3/21/45
Miller, W. C., RM1	*William C. Miller* (DE-259)	2/22/43
Neunzer, Weimar E., MM	*Neunzer* (DE-150)	4/27/43
Newman, Laxton G., AMM3	*Newman* (APD-59)	8/9/43
Pettit, Robert Lee, RM1	*Pettit* (DE-253)	4/28/43
Scribner, James M., RM3	*Scribner* (APD-122)	8/1/44
Scroggins, Ted H., ARM2	*Scroggins* (DE-799)	11/6/43
Waterman, Andrew K., AMM1	*Waterman* (DE-740)	6/20/43

ENGLISH ELECTRIC *Lightnings were featured performers daily in 1962 Farnborough Society of British Aircraft Constructors' Exhibition.*



TWIN JETS AND BOOMS *of Royal Navy's Sea Vixens sweep by during Farnborough air show. Vixens are two-seated, all-weather fighters.*

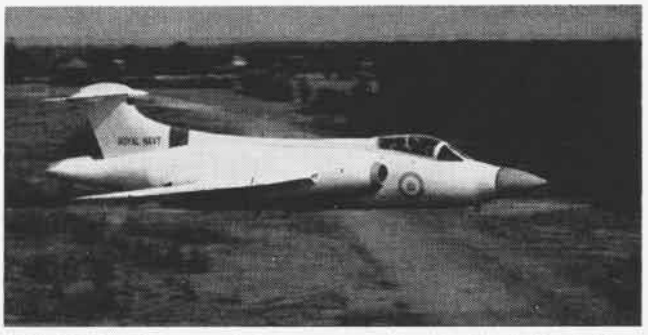
VINTAGE YEAR FOR FARNBOROUGH

By Cdr. Edward L. Barker, USNR

SOME MAY QUESTION the claim that Farnborough is the greatest show on earth. But one thing is certain—no other industry does anything like Farnborough. It doesn't matter if the year is "vintage" or indifferent, as the British are wont to classify the affair. The comparison of this week-long show with a sort of *Oktoberfest* is not amiss for, as described by local wits, the sober slopes of Farnborough take on the atmosphere of a Mediterranean wine festival.

In this regard it was generally concluded at the close of the show that this was indeed a vintage year. Six

STAR PERFORMER *of British exhibition is Hawker P.1127 VTOL fighter. Vectored thrust jet permits aircraft to hover or fly backward.*



TWO-SEATER *Buccaneer is long-range strike aircraft of Royal Navy designed for low-level flights with nuclear or conventional weapons.*

new aircraft were displayed. Also to be seen was a fine cross section of uniforms from every corner of the earth.

Records for all types of attendance were announced. This included 330,000 people over the entire week, September 3-9, of which 11,000 were overseas guests. On the last day alone more than 100,000 citizens, mostly British, turned out as paying customers.

As the greatest exhibition on earth, Farnborough this year was not disappointing. The single-seat, single-jet Hawker P. 1127 was the show stealer from the start. Two of these VTOL's, painted with imaginative markings representing colors of the U.S., Britain and Germany, were put through their paces daily. This included a variety of maneuvers. Initially they made a conventional takeoff, reportedly because the *Pegasus* jet engine lacked sufficient thrust to lift the full-loaded takeoff weight.

After performing like conventional fighters, in company with a Hawker *Hunter*, in fast runs over the field, they went through their unconventional maneuvers. This included hovering 200 feet over the runway, spinning slowly like a top and then backing up at about 24 knots. Hawker states that jet pilots have been checked out in the P.1127 in about 15 minutes.

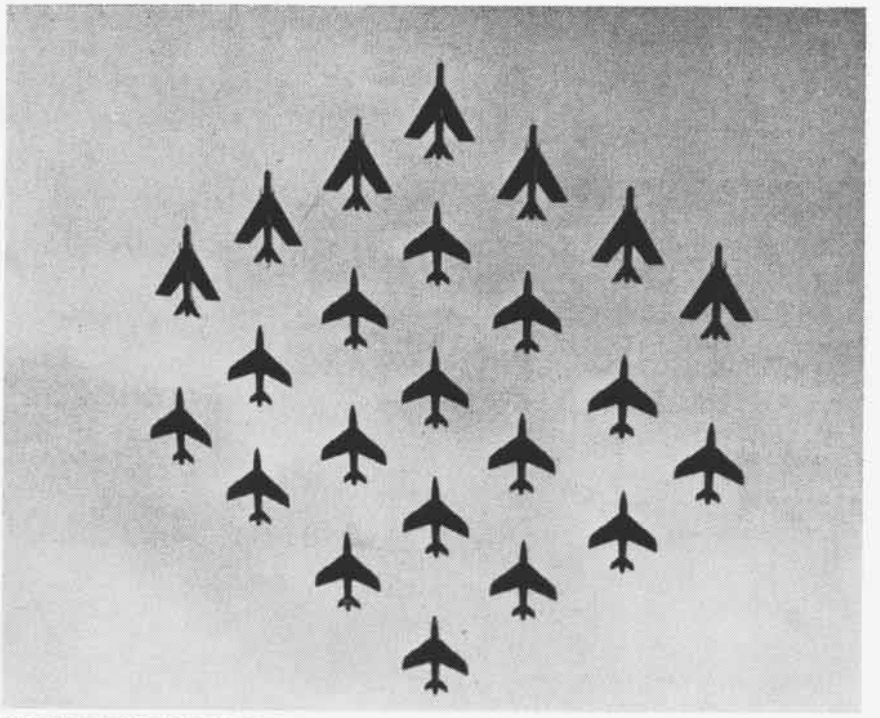
Helicopters were not much in evidence this year. On display were the *Scout*, the *Wessex* 1 and 2, and the *Whirlwind* Series 3 and Mk. 10.

The military formation aerobatics as usual were superb. Five jet *Provost* trainer Mk. 4's, *The Red Pelicans*, from the Central Flying school opened this part of the show. The Royal Navy came on later in the afternoon. Four Fleet Air Arm *Scimitars* and a *Buccaneer* took off from the field and were shortly joined by *Fred's Five*, *Sea Vixen* twin-jets from the aircraft carrier *Centaur*. Tight maneuvers were performed while the aircraft streaked red and blue smoke trails. A high point was reached when two *Sea Vixens* circled low over the runway in an aerial refueling maneuver.

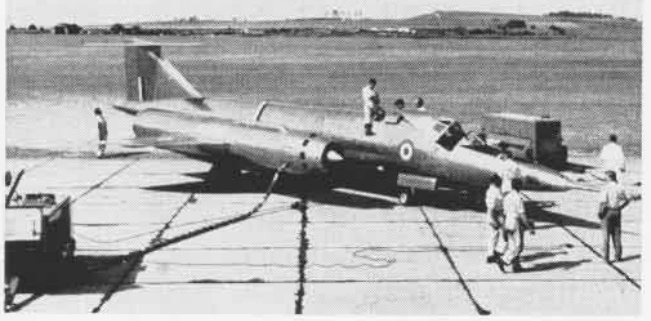
To commemorate the 50th anniversary of British military aviation, nine veteran aircraft were displayed at the close of the week: the popular WW I SE5A fighter; and from WW II a Gloster *Gladiator* biplane, a Fairey *Swordfish* torpedo bomber, de Haviland *Mosquito*, and the Battle of Britain twins, the long-famed Hawker *Hurricane* and Supermarine *Spitfire*.

A section of the hillside outside the exhibition tent was devoted to missiles. A *Blue Streak* stood just outside the main entrance. Britain now hopes to use this missile as the first stage of the three-stage satellite launcher in conjunction with a European effort. *Blue Steel*, a stand-off interim air-to-ground missile, was seen slung under a Vulcan B.W. *Bloodhound 2* and *Thunderbird 2*, ground-to-air missiles, were on display for the first time. Also seen publicly for the first time was an air-to-air missile, *Red Top*.

The noted Society of British Aircraft Constructors plans now to hold the show only every other year.



SEVEN ENGLISH ELECTRIC LIGHTNINGS *and 16 Hawker Hunters form a tight flyover formation in daily performances at the air show. Several RAF and Navy squadrons flew during the week.*



BRISTOL TYPE *188 aircraft, featuring stainless steel hull, is a research vehicle which is used to investigate heating problems at Mach 2.5.*

MORE THAN *330,000 spectators, including 11,000 visitors from more than 20 countries, take look at British display aircraft and armament.*

MARINES TO GET NEW ASSAULT HELICOPTER

THE S-64, ON WHICH CH-53A TECHNOLOGY IS BASED, WAS FIRST FLOWN THIS YEAR

A NAVY CONTRACT for two heavy assault transport helicopters has been made with Sikorsky Aircraft, and subsequent orders are planned. The new transport will be capable of speeds of more than 200 mph and will carry payloads up to nine tons.

The new aircraft, based on the technology of the twin-turbine Sikorsky S-64 *Skycrane*, will use many of the components of this earlier aircraft which made its first flight on May 9, 1962. Deliveries of the new helicopter are expected to begin by 1965.

Known as the CH-53A (for cargo helicopter), it will have a normal gross weight of 33,267 pounds. The helicopter will carry a four-ton payload on a military mission of 230 miles (four tons on the 115-mile trip out and two tons on the return trip) at a cruising speed of 172 miles per hour.

However, according to Sikorsky, the new aircraft's performance capabilities will permit it to carry almost eight tons of payload and still complete its 230-mile round-trip mission. In addition, under an overload condition, it will carry nine tons on shorter missions. Its ferry range, with payload consisting chiefly of fuel, will be 1874 miles.

Flown by a three-man crew, the CH-53A will carry 30 combat-equipped troops and will be capable of carrying 63 troops in a high density seating arrangement. As a flying ambulance, it will carry 24 patients and three attendants.

The new helicopter's normal gross weight of 33,267 pounds is well under the 35,000-pound maximum set by BUWEPS. The cabin of the new helicopter will be 30 feet long, 6½ feet high and 7½ feet wide. A full-size rear opening will permit easy loading and unloading on the ground. A high-speed hydraulically operated internal cargo loading system is designed to speed freight and equipment transfer from ground carrier to helicopter by means of a rear ramp. Winch and floor rollers further facilitate loading and unloading.

The CH-53A, within its four-ton limit, could carry two jeeps or two *Hawk* M-3 missiles plus cable reels and console control or a 105mm howitzer with carriage.

The CH-53A is designed as an all-weather, all-climate aircraft. It will have a hovering ceiling of 7600 feet out of ground effect at its normal gross weight and will be able to operate from almost any terrain. It will have a water-tight hull for emergency flotation. The landing gear will be retractable.

Power plants will be General Electric T-64 turboshaft engines. The CH-53A will carry an auxiliary power plant for easy self-starting and for checking out all of the systems.

SIKORSKY CH-53A TRANSPORT WILL BE THE LARGEST OF ITS TYPE IN THE FREE WORLD

Golden Cadillac to VA-43

Symbolizes Support Equipment Care

NAS OCEANA's "Golden Cadillac" was awarded VA-43 in recognition of excellent care given ground support equipment by the squadron's maintenance crews. This rolling symbol of excellence is awarded quarterly to the Oceana-based squadron judged tops in keeping vital group support equipment mission-ready.

The Golden Cadillac is actually a dolled-up tractor, painted gold and silver, with white sidewall tires.

VA-44 Trains Army Men

Fort Rucker Specialists at Jax

Strange sights, such as a T-28 armed to the teeth, have been common around VA-44 at Jax where the T-28's have been operating for a number of years. These bomb, rocket and machine gun-laden *Trojans* belong to the U.S. Army Aviation Board, Fort Rucker, Ala. Along with the Army's AO-1 *Mohawk*, the T-28 *Trojans* have been making extensive use of targets in the Jacksonville area.

The detachment of Army personnel went to Jacksonville to receive training in ordnance delivery and to learn the basic principles of weapon handling, loading and safety.

LCdr. Dan Mealy of VA-44 and Lt. Ron Boyle have been responsible for the instruction. VA-44 ordnancemen have been instrumental in training the Army loading crews.

Of the Army pilots, only Maj. David B. King, detachment training officer, had received training of this type.

Maj. Billy L. Odneal, project officer for the Army Aviation Board, says that the objectives hoped for while at VA-44's "Hornets' Nest" were met.

HELICOPTER EXPERTS *met at Stratford, Conn., in September to review Naval Air Training and Operating Procedures Standardization manuals used by naval helicopter men. Cdr. R. T. Forbush, representing the Chief of Naval Operations, headed the NATOPS team. Cdr. V. D. Bursik, representing BuWeps, explained that through the use of the manuals, "NATOPS aims to reduce loss of aircraft and loss of personnel by ignorance" and improve safety and combat readiness.*

EASY DOES IT *as a 1st Marine Brigade artilleryman "walks in" an airborne HUS-1 to lift a Howtar, newest addition to the Brigade's artillery arsenal. A battery of Howtars—4.2 mortar-mounted on 75mm pack howitzer frames—has been added to each Marine direct support artillery battalion. The helicopter-transportable weapon and its crew can be airlifted in, fire, and be withdrawn from a specific area before the enemy can even begin counter-battery fire.*

Terriers' Transfer Complete

Marines Turn Them Over to Navy

Transfer has been completed of more than $70 million worth of *Terrier* missiles, equipment and spare parts from the Marine Corps to the Navy as a result of screening actions under the Defense Inter-Service Support program.

The *Terrier* surface-to-air missile system has been replaced in the Marine Corps by the helicopter-transportable *Hawk* anti-aircraft guided missile. The Navy will continue to use the *Terriers* aboard ship.

System components acquired by the Navy consist mainly of fire control, assembly, launching, handling and test equipment and *Terrier* missiles.

VAW-12 Completes Move

From Norfolk to Quonset to Norfolk

After a 14-year absence, Airborne Early Warning Squadron 12, with 350 families, completed their move to Norfolk, Va., in September.

VAW-12 made the move from NAS QUONSET POINT, R.I., to Norfolk to better utilize the capabilities of the new WF-2 *Tracer's* special radar features. The squadron provides early warning of approaching ships and aircraft and serves as a radar and communications relay.

Originally commissioned in Norfolk in July 1948 as VAW-2, the squadron moved to Quonset Point a month later.

Cdr. W. H. Cruise, Jr., is C.O.

AT SEA WITH THE CARRIERS

CARRIER AIR GROUP TEN *Centurions on the Shangri La have completed seven months of Mediterranean flying. Included among them are 15 pilots who became Double Centurions, 65 who made their 100th landing. Missing from photo are 14 pilots who were transferred during the cruise.*

PACIFIC FLEET

Kitty Hawk (CVA-63)

Readying for its first Far East cruise, the *Kitty Hawk* scored a direct hit on a jet-powered Q-2C target drone in *Terrier* firing practice. Proof of the direct hit was presented to the *Kitty Hawk's* C.O., Capt. Walter Curtis, Jr., in the form of a pierced tail section of the drone. The recovered drone section was given to the ship's crew by Cdr. E. P. Carlson, VU-3, the unit which had controlled the drone during the exercises in June.

The C.O. of *Kitty Hawk's* VF-114, Cdr. A. W. Chandler, Jr., introduced his father to the Mach Two club just before setting out for Pacific duty with the *Kitty Hawk*. Cdr. Chandler's father, RAdm. A. W. Chandler, DC, USN (Ret), rode the back seat of an F4H *Phantom II*. The senior Chandler, who is 72 and has been retired since 1952, had ridden with his son once before, in a *Meteor* jet while Cdr. Chandler was serving with English Squadron 802 ten years ago.

Bennington (CVS-20)

Prior to departure for a Bremerton modernization period, the *Bennington* passed out Centurion certificates to 10 pilots. Included were Cdr. R. J. Laughton, C.O. of VS-33; LCdr. B. W. Warren, O-in-C of Det. Q of VAW-11; LCdr. J. V. More of CVSG-59, and Capt. H. Meier, USAF, an exchange pilot with VS-33.

Ranger (CVA-61)

The population of the *Ranger* was doubled August 4 as the ship's crew and dependents made a Family Cruise in the Bay area. While a total nose count was not made officially, it was estimated that the ship had 7,000 persons on board.

A native of Bountiful, Utah, had a bountiful birthday. Lt. Tom Melville, VA-94, made his 100th landing on the *Ranger* on August 13, his birth date, flying an A4D-2N *Skyhawk*.

Yorktown (CVS-10)

Lt. Craig McCarter, VS-23, reached a double milestone with one landing on the *Yorktown* in August. While logging his 100th landing on the *Yorktown*, joining the Centurions Club, he was feted also as the pilot who made the 85,000th landing on the carrier. Flying as co-pilot in the S2F *Tracker* was Lt. J. E. Mergele.

FIRST F4H *Centurion, Cdr. Spencer (right) and RIO, Lt. Wagner, VF-74, in front of plane.*

Hornet (CVS-12)

A rare visit of a carrier brought five days of excitement to the people of Hakodate, Japan, on the southern tip of Hokkaido. Using smallboats, barges and tugs as shuttle "ferries," the *Hornet* had 7000 visitors come aboard at Hakodate harbor. Various displays of safety and flying equipment were provided by the *Hornet*, first major American ship to stop there this year. A wreath was placed on the graves of two sailors who accompanied Commodore Matthew Perry during his 1853-54 expeditions to Japan. RAdm. T. A. Christopher, ComCarDiv 17, and Capt. Hoyt Mann, *Hornet's* C.O., headed a Navy-Marine detachment at the ceremony.

First aircrewmen to qualify for flight crew duty in the HSS-2 *Sea Kings*, based on the *Hornet* with HS-2, received the right to wear crewmen's wings after completing a challenging ground school course, airborne training and survival training course. HS-2 had 17 men complete the training program.

WITH HORNET *anchored in Hakodate Bay in background, ship's honor guard of Marines and Sailors stand at parade rest during the ceremony at the graves of Perry Expedition sailors.*

Ticonderoga (CVA-14)

Ticonderoga participated in shipboard handling tests of the *Bullpup* B liquid-fueled rocket and the KD2B drone. A combined force from Naval Missile Center, VX-4, GMU-41 and Operational Development Force completed the tests, which marked the first time that liquid rockets were handled aboard Navy ships in a fueled condition. Missiles were transferred to the carrier from the Mauna Kea (AE-22), then were unpacked, assembled, stowed and finally prepared for firing. A KD2B drone, Mach Two target designed for weapon system training and testing, was catapulted under the wing of an F3H in a parallel test.

ATLANTIC FLEET

Forrestal (CVA-59)

First reported Centurion in the F4H *Phantom II* is Cdr. Paul Spencer, C.O., of VF-74. He made his 100th landing on the *Forrestal* as the carrier was taking part in the NATO *Riptide III* exercise. Pilots of VF-74 have logged almost 1000 landings in the speedy F4H. Lt. Jim Wagner, RIO, was in the back seat when Cdr. Spencer flew his Phantom II aboard.

Cdr. Roy Farmer, C.O., of VAH-5, became that ship's first A3D Triple Centurion, flying aboard August 14 in a *Skywarrior*. The arrestment brought his personal career total to 518, the previous landings largely being made in the F6F *Hellcat* and the AD *Skyraider*.

Saratoga (CVA-60)

Scheduled to rejoin the fleet this month, the *Saratoga* has been at the Norfolk Naval Shipyard receiving a modernization and overhaul treatment. Included in the program was installation of the PLAT (pilot landing aid, television) system, improvement of the crew's berthing and recreation facilities, and beefing up of the carrier's arresting gear.

SLEEPING TWINS, *born during Shangri La's cruise, greet father, LCdr. Parrish, VF-13.*

Franklin D. Roosevelt (CVA-42)

Before departing on another Med deployment in September the *Roosevelt* sent out releases marking the ship's 113,000th landing, "still the record" (But see *Antietam* below.)

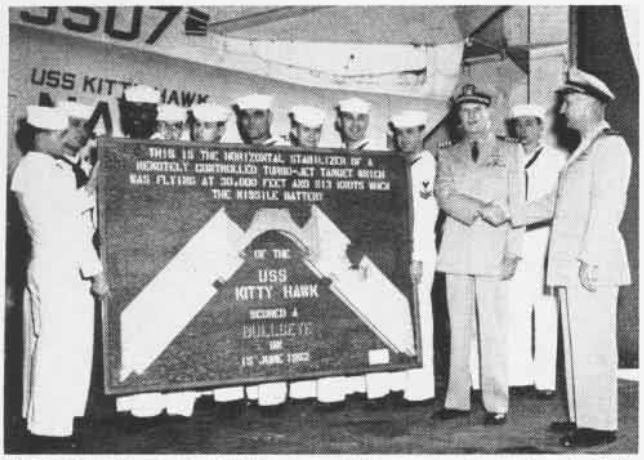
Antietam (CVS-36)

Antietam, nearing the end of her active days as the training command carrier recorded its 118,000th landing on August 23. One witness of the landing was Frank Knorr, Jr., now owner of radio station WPKM, Tampa, who has a picture of landing #1000 made on the *Antietam* while he was serving as S-2 (commissary) division officer in 1945.

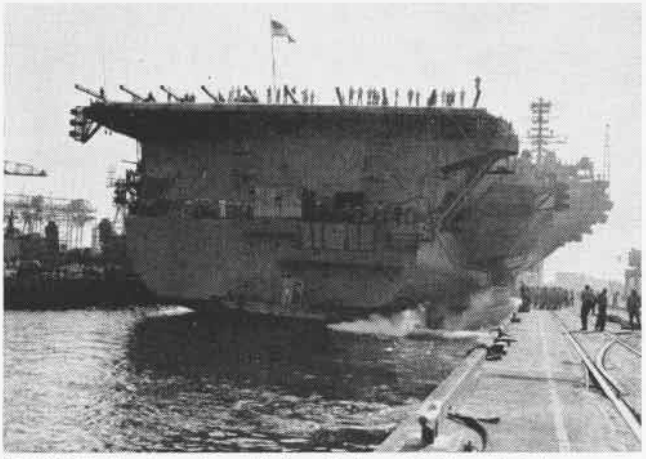
MACH TWO *at 72 in F4H is readied for Adm. Chandler by son, Cdr. Chandler, VF-114 C.O.*

Independence (CVA-62)

Two VA-75 *Skyraider* pilots passed personal milestones while serving with *Independence* and her air group. Cdr. Ken Lyons, VA-75 C.O., presented a silver spangled hook point to Lt. Al Mangelsen for logging his 100th night landing. (He is more than twice a Centurion counting day and night landings.) LCdr. C.D. Morrow made three last-day arrestments on the ship to run his total number of carrier landings in the AD to exactly 500. The landings were the last made during the *Independence's* Med cruise.



KITTY HAWK'S *Terrier "kill" is recorded for posterity on board. C.O., Capt. Curtis, at right, accepts the trophy from VU-3's Cdr. Carlson.*



TIGHT FIT! *Saratoga clears dock walls by only three feet, hangs over the edge as the carrier enters the Norfolk shipyard drydock for repairs.*

Randolph (CVS-15)

In a dramatic mid-Atlantic rendezvous, a German merchant seaman was transferred by helicopter to the *Randolph* to undergo an emergency appendectomy. The sailor, Harry Beyer, attached to the German SS *Mercator*, was flown to the carrier where Lt. Emerson Cochran, MC, USN, performed the operation. For the doctor, it was a repeat performance. On his first day aboard the *Randolph* in July 1961 he had performed a similar operation on a destroyer sailor in Task Force Alfa.

Shangri-La (CVA-38)

Upon being relieved in the Med by the first nuclear CVAN, the *Enterprise*, the *Shangri La* reportedly had a sign posted near the gangway that read: "USS *Enterprise* personnel are required to be decontaminated before entering the utopian world of *Shangri La*." This gentle poke at the atomic powerplant of the world's largest warship was followed by helicopter delivery of a greased pig to the *Enterprise's* flight deck.

The ship reported the following statistics for its seven-month cruise: Centurions, 65; Double Centurions, 15; hours flown, 19,552; miles steamed, 52,084; loaves of bread baked, 182,700; pounds of potatoes eaten, 200,180; days operating, 126; tons of stores received, 2,050; exercises participated in, 129; coffee consumed, 1,445,184 cups, and cigarettes smoked, 12,678,800. Something of a record!

500TH AD *Skyraider landing brings smile from LCdr. Morrow, VA-75, at end of Med cruise.*

Boxer in Trinidad Gala

Navy Hails Nation's Independence

USS *Boxer* (LPH-4) with Commander, Amphibious Squadron 10, and Commanding Officer, 6th Marine Expeditionary Unit, represented the U.S. at the Trinidad Independence celebration Aug. 31 through Sept. 3.

The Navy and Marine contingents arrived in Trinidad at the very start of the occasion. In unison with British, Canadian and Venezuelan warships present, *Boxer* fired a 21-gun salute to the newest arrival into the family of nations.

Capt. James A. Marks, Commander, Amphibious Squadron 10, was the senior representative of the U.S. Navy at special functions, including the official flag raising ceremony at government headquarters.

Independence Day, August 31, was also marked on September 1 and 2 by a ceremonial raising of the new Trinidad flag at the U.S. Naval Station, Trinidad, followed by a salute of 21 guns by the *Boxer*. Festivities gained momentum as *Boxer* hosted over 1000 Trinidadians during special tours of the ship. The carrier also entertained 100 children from the Belmont Orphanage.

Highlights of the independence celebrations were three mass helicopter parades flown over downtown Port of Spain by Marine Squadron HMM-263, led by the squadron commanding officer, LCol. C. H. Slaton, USMC. Approximately 20 of the HUS and HR2S helos flew over the city on September 2 and twice the next day. The second flight on the third was timed with the official independence parade which featured the Trinidad Regiment and "C" Company of the First Battalion, 6th Marines.

Upon the *Boxer's* departure, the guided missile frigate USS *MacDonough*, and later USS *Lexington*, continued U.S. Navy participation in the celebrations.

HS-3 Deploys Aboard Wasp

14 Sea Kings Fly so Far—so Fast

In September, 14 HSS-2 turbo-jet helicopters of Helicopter Anti-Submarine Squadron Three departed NAS NORFOLK to deploy aboard the USS *Wasp*, based in Boston, Mass.

The Sikorsky *Sea Kings*, which hold the world's helicopter speed record of over 200 mph, made the non-stop flight in less than four hours.

The formation was led by Cdr. J. M. Wondergem, Commanding Officer, who recovered Astronaut Carpenter.

CAPT. ROMANO, *Chief of Staff of Italian forces in Italy, assisted by Italian Air Group members, outlines his plans for the study program.*

AT ITALIAN ASW *base, Fontana Rosa, Catania, Sicily, Erickson, AT2 (R), compares electronic maintenance techniques with Italian counterparts.*

RANDOLPH GROUP STUDIES ASW IN ITALY

By Ltjg. Linus Travers

SEVEN OFFICERS and six enlisted men from Carrier Anti-Submarine Air Group 58 embarked aboard the USS *Randolph* (CVS-15) took their aircraft and skills to Sigonella, Sicily, while their ship was anchored at Palermo, Sicily. With units of the Italian Navy and Air Force, these NATO allies sat down at the conference table and shops and began a four-day symposium on their common job: anti-submarine warfare.

The group brought three U.S. aircraft, the HSS-1N, the S2F-3 and the WF-2, which are the stock in trade of the *Randolph's* air group and form the backbone of airborne ASW. The Italian ASW staff at Fontana Rosa field were familiar with the S2F-1 and the HSS-1, but the S2F-3 and the HSS-1N were completely new to them. The WF-2 "flying saucer" had never before been seen in an ASW role. Coordinated exercises using the powerful WF-2 radar were a highlight of group discussions.

Meetings took place in the classrooms, on the flight line and in the shops. No item was overlooked in the discussion of today's most potent threat—the undersea intruder. Each of the U.S. aircraft types were described to a receptive classroom audience, eager to learn.

Both groups agreed that they shared these common problems in the prosecution of ASW in the Mediterranean: (1) The sea is shallow, salty and its bottom uneven with many pinnacles and crags which defy the experienced sonar or MAD (Magnetic Anomaly Detection) operator. (2) Because of lava and other metallic deposits beneath the ocean surface, many pieces of electronic equipment give erroneous readings. (3) The sonobuoys used by the ASW aircraft do not always have enough "room to operate" in the shallow Mediterranean. (4) The constant haze, sun-interference, many islands, mountains, refraction and dust from the Sahara Desert make radar operation more difficult than normal.

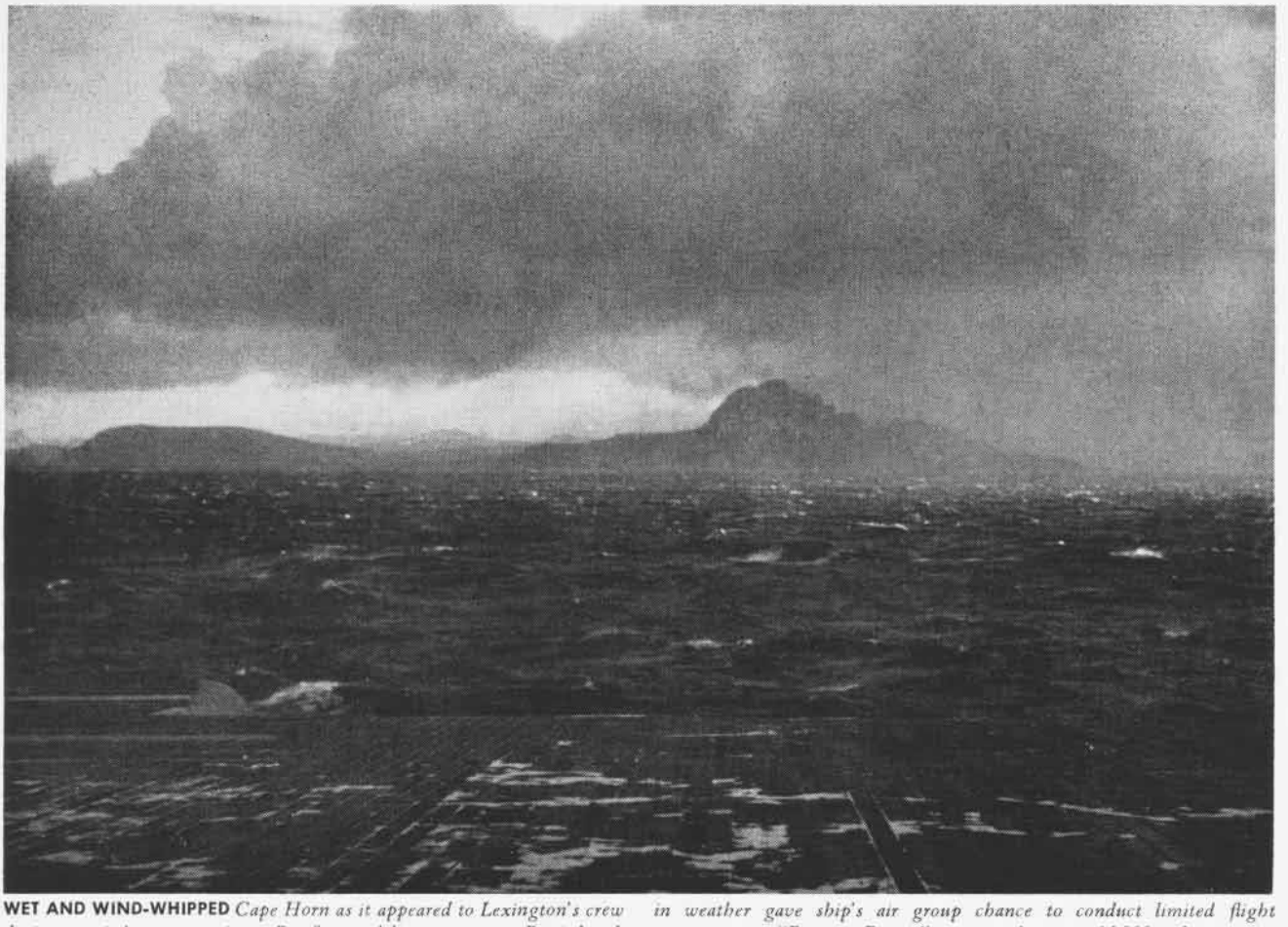
Solutions to these problems, it was agreed, would be slow in coming, but two days of classroom seminars produced results. From the classrooms to the airfield, the "students" moved, and a top-to-bottom search of the three advanced aircraft systems yielded much valuable information to the hosts. Then a day spent at the Italian training facilities at Augusta Bay gave more of the ASW picture. Schools, ranging from a Class "A" for the sonarman to a War College curriculum, lent their services to the American visitors.

FLAGS OF FREEDOM *fly at Sigonella, Sicily: those of the United States, Italy, and NATO.*

What was the result? The *Randolph* airmen became completely aware of the need for the NATO principle of operations. Their Italian counterparts, skilled and familiar with the conditions of Italy's Mediterranean coastline and ASW problems were able to shed light on some of the geographic and topographic problems which had been troubling U.S. ASW forces. The language barrier was not a major one; the NATO nations have devised a universal language which is used by all forces, hence all the ASW terms are common to both navies.

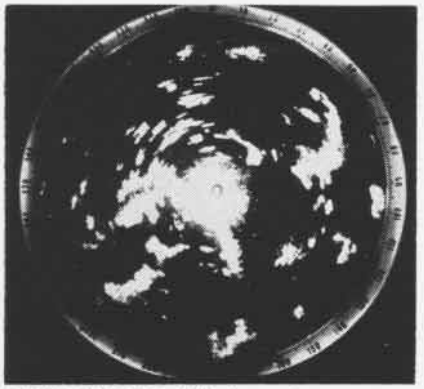
The Chief of Staff of the Italian forces in Sicily summarized the ASW operations and the working visit of his American allies by saying, "Operating with other nations under the NATO flag presents problems in the technical, tactical, and linguistic areas. This type of visit helps to iron out the difficult and the unfamiliar, and strengthens bonds between countries unified under one command, dedicated to the preservation of peace and the propagation of liberty."

TO AND FRO AROUND CAPE HORN



WET AND WIND-WHIPPED *Cape Horn as it appeared to Lexington's crew during carrier's passage from Pacific to Atlantic waters. Brief break in weather gave ship's air group chance to conduct limited flight operations in "Roaring Forties" area, midway in 14,000-mile journey.*

When the Constellation (CVA-64) and USS Lexington (CVS-16) 'swapped oceans' recently, the crews found more than just 'good liberty' with our Good Neighbors. Lex hosted Brazil's carrier airmen, claimed 'first operations' in Cape Horn's violent weather. Constellation hosted 51,700



RADAR WEATHER EYE *shows Lexington circled by storms and islands in Cape passage.*

NAVAL AVIATION 'FIRST' *was claimed by Lexington's VA-52 Skyraider squadron, which made 36 launches and recoveries, believed the first conducted in the stormy Cape area.*

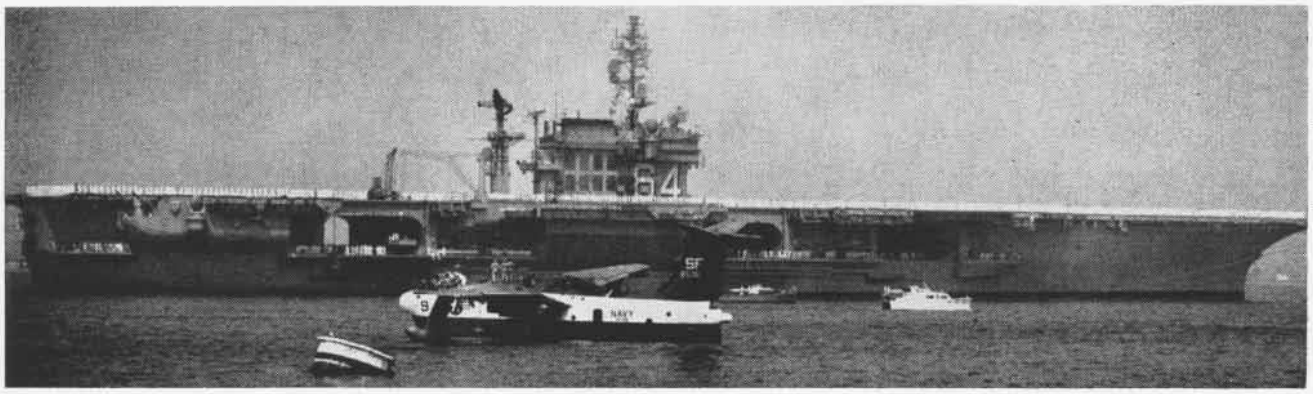
CONSTELLATION'S *first class petty officers hosted 120 boys during ship's visit to Rio. Boys ate lobster, ice cream and this special cake.*

PAINTING OF CHILEAN *orphanage by CVA-64's crew brought a return good will gesture, presentation of national emblem to the ship.*

PRESIDENT CHIARI *of Panama is given tour by C.O. of Constellation, Captain T. J. Walker.*

PENSACOLA-TRAINED *Brazilian carrier men receive on-the-job instruction during air operations in the Lexington. Group observes the U. S. Navy's air control methods.*

visitors in Panama. Her crew gave 120 pints of blood in Rio, painted a Chilean orphange, flew in formation over Copacabana Beach. The Lex reports to Pensacola this month as training carrier. Constellation joins USS Ranger (CVA-61) and USS Kitty Hawk (CVA-63) as largest Pacific carriers.



JOURNEY'S END *for Constellation crew, lining the rail as carrier ended 15,000-mile transit September 17 at San Diego. Ship is third of new attack carriers to join Pacific Fleet. Lexington reports to Atlantic Fleet as replacement for USS Antietam, which becomes inactive.*

Evolution of Aircraft Carriers

THE EARLY ATTACK CARRIERS

'We have hit the Japanese very hard in the Solomon Islands. We have probably broken the backbone of the power of their Fleet. They have still too many aircraft carriers to suit me, but soon we may well sink some more of them. . . . We are going to press our advantages in the Southwest Pacific and I am sure that we are destroying far more Japanese airplanes and sinking far more of their ships than they can build.'—Franklin D. Roosevelt, President of United States, 1942.

By Scot MacDonald

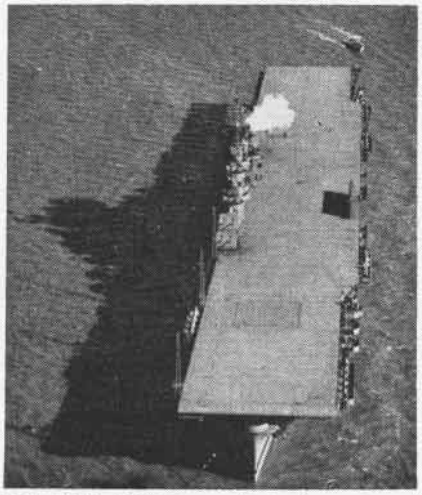
AT THE OUTBREAK of World War II, the United States had in commission seven aircraft carriers and one escort carrier. USS *Langley*, the experimental ship officially classed as CV-1, had been assigned to duty as a seaplane tender on September 15, 1936.

After the abrogation by Japan from disarmament treaties, the U.S. took a realistic look at its naval strength. By Act of Congress on May 17, 1938, an increase of 40,000 tons in aircraft carriers was authorized. This permitted the building of USS *Hornet* (CV-8) and USS *Essex* (CV-9). On June 14, 1940, another increase in tonnage was authorized. Among the ships built under this program were the *Intrepid* and the new *Yorktown*. On July 19, an additional 200,000 tons for carriers was authorized.

Adm. H. R. Stark, then Chief of Naval Operations, reported to the Secretary of the Navy: "In June 1940, the Congress granted the Navy an 11% increase in combat strength and, in July, a further increase of approximately 70%. When these ships and aircraft are completed, the U.S. Navy in underage and overage ships will include 32 battleships, 18 aircraft carriers, 91 cruisers, 325 destroyers, 185 submarines, and 15,000 airplanes. . . .

"From 1921 to 1933, the United States tried the experiment of disarmament in fact and by example. This experiment failed. It cost us dearly in relative naval strength—but the greatest loss is TIME. Dollars cannot buy yesterday. Our present Fleet is strong, but it is not strong enough."

Additional tonnage was authorized December 23, 1941 and July 9, 1942.



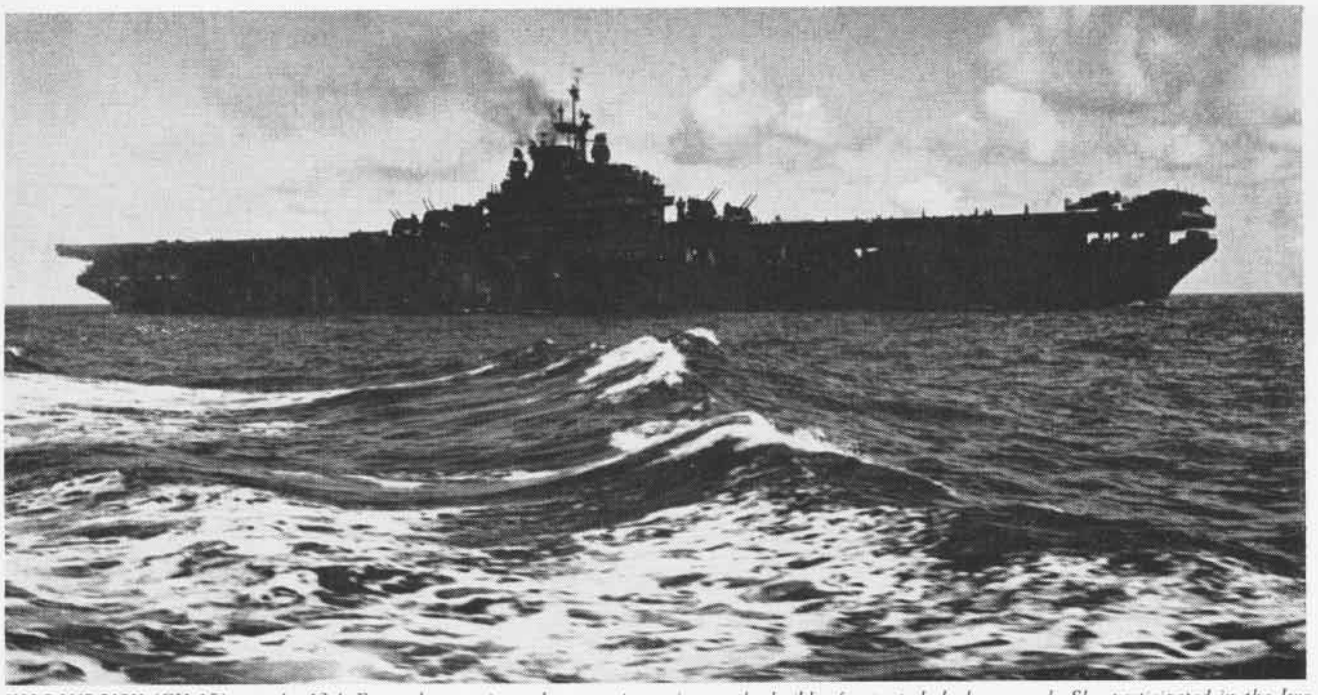
USS ESSEX *(CV-9) was first of a series of early attack aircraft carriers of World War II.*

CV-9 was to be the prototype of an especially designed 27,000-ton (standard displacement) aircraft carrier, considerably larger than the *Enterprise* and smaller than the *Saratoga*. These were to become known as the *Essex* class carrier, although this classification was dropped in the '50's.

On September 9, 1940, eight more of these carriers were ordered and were to become the *Hornet, Franklin, Ticonderoga, Randolph, Lexington, Bunker Hill, Wasp* and *Hancock*, CV-12 through -19, respectively. Reuse of the *Lexington, Wasp* and *Hornet* names was in line with the Navy's intent to carry on the traditions of the fighting predecessors: *Lexington* (CV-2) was lost in the Battle of the Coral Sea in May 1942; *Wasp* (CV-7) was sunk September that year in the South Pacific while escorting a troop convoy to Guadalcanal; *Hornet* (CV-8) was lost the following month in the Battle of Santa Cruz Islands.

It is appropriate to comment here that the ships' names at commissioning date did not all bear the same name at the date of their programming. Names were changed during construction. *Hornet* (CV-12) was originally *Kearsarge, Ticonderoga* (CV-14) was

FIGHTER AIRCRAFT *of Air Group 9 are parked aboard the aircraft carrier Essex during her shakedown cruise in the Caribbean in 1943. During WW II, U.S. shipyards built and Navy commissioned 16 sister ships. Including post-war production 24 Essex class were commissioned.*



USS RANDOLPH *(CV-15) was the 13th Essex class carrier to be commissioned. She was the first of these carriers to enter combat without returning to the builder for post-shakedown work. She participated in the Iwo Jima, Okinawa, and Third Fleet operations against Japan in 1945.*

the *Hancock*, *Lexington* (CV-16) was *Cabot*, *Wasp* (CV-18) was *Oriskany*, and *Hancock* (CV-19) was originally *Ticonderoga*.

Last two of the 13 originally programmed CV-9 class aircraft carriers, *Bennington* (CV-20) and *Boxer* (CV-21), were ordered on Dec. 15, 1941.

In drawing up the preliminary design for USS *Essex*, particular attention was directed at the size of both her flight and hangar decks. Aircraft design had come a long way from the comparatively light planes used in carriers during the Thirties. Flight decks now required more takeoff space for the heavier fighters and bombers being developed. Most of the first-line carriers of the pre-war years were equipped with flush deck catapults, but owing to the speed and size of these ships very little catapulting was done—except for experimental purposes. With the advent of war, airplane weights began to go up as armor and armament got heavier; crew size aboard the planes also increased. It was inevitable, noted the Bureau of Aeronautics toward the war's end in 1945, that catapult launchings would become more common under these circumstances. Some carrier commanding officers reported that as much as 40 per cent of launchings were effected by the ships' catapults.

The hangar area design came in for many conferences between Bureaus and much more official correspondence. Not only were the supporting structures to the flight deck to carry the increased weight of the landing and parked aircraft, but they were to have sufficient strength to support the tricing up of spare fuselages and parts (50 per cent of each plane type aboard) under the flight deck and still provide adequate working space for the men using the area below.

"At present," noted the Bureau of Construction and Repair in April 1940, "it appears that a few of the smaller fuselages can be triced up overhead in locations where encroachment on head-room is acceptable, and that the larger fuselages will have to be stowed on deck in the after end of the hangar. The number to be stowed will depend upon the amount of reduction in operating space in the hangar which can be accepted."

Capt. Marc A. Mitscher, then Assistant Chief BuAer, answered: "The question of spare airplanes is now under reconsideration in correspondence with the Fleet and the results decided upon will have a bearing in the case of CV-9."

A startling innovation in CV-9 was a port side deck edge elevator in addition to two inboard elevators. Earlier, BuAer experimented with a ramp arrangement between the hangar and flight decks, up which aircraft were hauled by crane. This proved too slow. BuShips and the Chief Engineer of A.B.C. Elevator Co., designed the engine for the side elevator. Essentially, it was a standard elevator, 60 feet by 34 in platform surface, which travelled vertically on the port side of the ship. Capt. Donald B. Duncan, *Essex's* first commanding officer, was enthusiastic. After the first four months of operation after commissioning, he wrote to BuAer:

"The elevator has functioned most satisfactorily in all respects and it is desired to point out some of the operational advantages realized with this type of elevator.

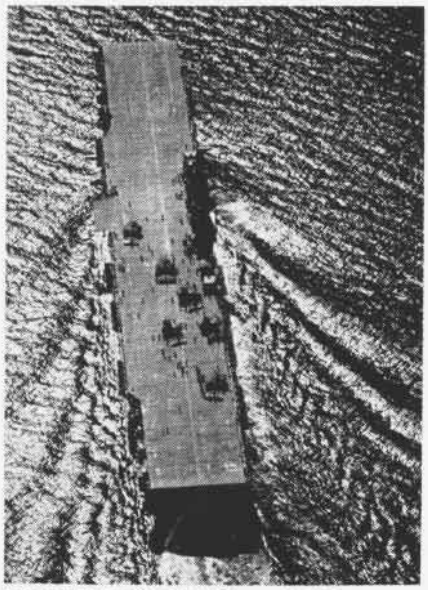
"Since there is no large hole in the flight deck when the elevator is in the 'down' position, it is easier to continue normal operations on deck, irrespective of the position of the elevator. The elevator increases the effective deck space when it is in the 'up' position by providing additional parking room outside the normal contours of the flight deck, and increases the effective area on the hangar deck by the absence of elevator pits."

The elevator performed well, its machinery less complex than the two inboard elevators, requiring about 20 per cent fewer man-hours of maintenance. Capt. Duncan recommended that consideration be given using two deck edge elevators, one on each side. BuAer, in forwarding the recommendation to BuShips, offered another advantage for consideration: a conventional elevator suffering a casualty while in the "down" position "would leave a large hole in the flight deck while the deck edge type would cause only minor and non-critical loss of flight deck area."

BuShips, obviously pleased with the operational performance of the new elevator—the first of its kind—reluctantly turned down the recommendation, however. The Bureau noted that the addition of a starboard deck-edge elevator would not permit an *Essex* class aircraft carrier to transit the Panama Canal. Any other location for a second such elevator would involve structural and arrangement changes too extensive to be considered.

On April 28, 1941, keel for the USS *Essex* was laid at Newport News Shipbuilding and Dry Dock Co. On October 2, the following year, her prospective commanding officer filed his first weekly progress and readiness report to the Chief of Naval Operations. He noted that there was marked speed-up of work on the ship during the preceding month and estimated that the ship would probably be delivered on February 1, 1942.

"There are certain items that have been authorized for installation on the CV-9-19 class carrier," he said, "but will not be accomplished on this vessel prior to delivery." The ship was launched July 31, 1942.



USS YORKTOWN *(CV-10) was third Essex commissioned, sponsored by Mrs. F. D. Roosevelt.*

RAdm. Walter S. Anderson, president of the dock trials and inspection team of CV-9 on December 23, 1942, noted a few of these discrepancies in his report:

"Due to late authorization of a number of changes arising out of recent war experiences, the volume of uncompleted hull work was greater than normal. . . . The Board regrets that the catapults for this vessel were not delivered in time for installation, as military value of the vessel would be much improved thereby. . . . Only the starboard flight deck track was installed . . . . This class of carriers is designed to include cruising turbines as part of the main drive turbine installation. However, due to production difficulties and as a result of efforts to expedite delivery, cruising turbines were omitted. Space and connections for their future installation are provided and this can be accomplished with very little alteration . . . ."

Nevertheless, the Board was pleased and impressed with progress on construction of the *Essex*. Adm. Anderson recommended acceptance of the ship. "On 31 December 1942," he said, "only slightly over 20 months will have elapsed since keel-laying, which is, in the opinion of the Board, a record worthy of commendation. This indicates a high degree of cooperation between the Supervisor of Shipbuilding, the Newport News Shipbuilding and Dry Dock Co., and representatives of the officers and men of the ship's company." On the last day of 1942, USS *Essex* was comissioned.

Capt. Duncan was proud of his new command, but not so impressed as to ignore certain discrepancies that still existed. The ventilation system, for instance, was less than satisfactory. BuShips sent representatives to the ship to assist in correcting discrepancies, during sea trials March 1 in the North Atlantic and, a month and a half later, when the ship was again at Norfolk and still had complaints.

As other CV-9 carriers were launched, the complaints continued to be registered. BuShips investigated the ventilation system as installed in USS *Intrepid* (CV-11) and outlined corrective measures in future carriers of the class.

Requested to comment on the adequacy and operation of the trash burner installed in the *Essex*, Capt. Duncan started off quietly enough. "It is most unsatisfactory," he said. Then

VIEWED IN FEBRUARY *1944, her flight deck covered with parked aircraft, USS Lexington (CV-16) had already been commissioned one year. Her namesake, CV-2, was sunk in the Battle of the Coral Sea. CV-16 earned the Presidential Unit Citation, 11 battle stars, and other awards.*

he warmed to his subject. "It is doubtful if it could be worse. It is in the very center of the office spaces. There is no satisfactory place for collection of trash waiting its turn to be burned. All of it has to be carried through the passageways in the vicinity of the departmental offices. The heat from the trash burner when it is operating (which is not often because it is usually broken down), is such as to make the surrounding spaces almost untenable.

"The design of the trash burner is poor. Its construction is worse. The ship had not been in commission a month before it practically fell apart. The brick work fell down, the door fell off and it suffered other casualties too numerous to mention. It has taken constant attention from the Engineer's force to keep it operating at all and the heat generated in the compartment in which it is located is such that it is physically impossible for men to stay in it for continuous operation."

The trash burner was redesigned.

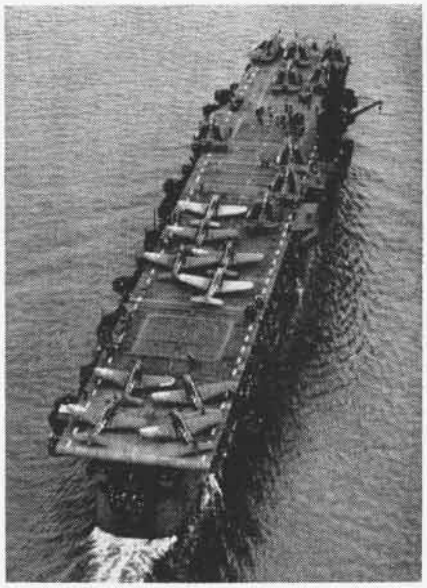
Lexington was commissioned on February 17, 1943, followed by *Yorktown* on April 15, *Bunker Hill* on May 25, *Intrepid* on August 16, *Wasp* on November 24, and *Hornet* on November 29 that year. In 1944, *Franklin* was commissioned on January 31, *Hancock* on April 15, *Ticonderoga* on May 8, *Bennington* on August 6, and *Randolph* on October 9. The last of the programmed 13 CV-9's, *Boxer*, was commissioned on April 16, 1945.

The lighting system installed in the *Lexington* came under the scrutiny of BuShips. Generally, it was considered inadequate—"in intensity and quality"—in many passageways and compartments, in addition to the running, signal, and anchor lights. A survey of the system produced the following action on the outside lights: the ahead masthead light was relocated to the forward edge of the foretruck (frame 92), the ahead range light was moved forward and shielded from illuminating the deck below, the astern masthead light was moved higher, so as not to interfere with gunnery, and the astern range light was removed.

Nineteen more *Essex*-class ships were ordered or scheduled, starting with ten of them on August 7, 1942. They were *Bon Homme Richard* (CV-31) *Kearsarge* (CV-33), *Oriskany* (CV-34), *Reprisal* (CV-35), *Antietam* (CV-36), *Princeton* (CV-37), *Shangri La* (CV-38), *Lake Champlain* (CV-39), *Tarawa* (CV-40), and *Crown Point* (CV-32)—later renamed *Leyte*. The last three ordered were *Valley Forge* (CV-45), *Iwo Jima* (CV-46), and *Philippine Sea* (CV-47). The keels were laid for *Reprisal* and *Iwo Jima* on July 1, 1944 and January 29, 1945, but both were cancelled on August 11, 1945. Six additional 27,000-tonners, CV's 50 through 55, were canceled on March 27, 1945.

THE USS COWPENS *(CVL-25), was one of nine cruiser-to-aircraft carrier conversions.*

In recap, after WW II erupted and until its successful conclusion by Allied forces, the U.S. Navy ordered 32 aircraft carriers of the CV-9 class, of which the keels of 25 were laid down. A total of 17 were actually commissioned during the war years. The total number of CV-9's commissioned—including those commissioned after the war—was 24.



USS INDEPENDENCE *(CVL-22) has SBD's and TBF Avengers on deck in July 1943 in Pacific.*

Several characteristics marked the *Essex* class carriers upon their introduction to the Fleet. The pyramidal island structure, for instance, rose cleanly from the starboard side, topped by a short stack and a light tripod mast. The port elevator was also a distinguishing feature, along with the two inboard elevators. *Ticonderoga, Randolph, Hancock, Bennington* and *Boxer*, as well as hull numbers from CV-31 on, had rounded bows extending beyond the flight deck.

Overall lengths varied within this class; they were either 872 feet long or 888. It is interesting to note that they had a uniform water line length of 820 feet. All were armed with 12 five-inch .38 caliber dual purpose guns, but some had 17 quadruple 40mm anti-aircraft mounts while others had 18. A few also had 20mm AA armament. Generally, there were accommodations aboard each for 360 officers and 3088 enlisted men.

Except for CV-2 and CV-3, *Lexington* and *Saratoga*, the power plants were increased over other aircraft carriers in the Fleet. The machinery was "entirely modern in design and arranged so as to gain the maximum resistance to derangement and battle damage. There are eight control superheat boilers arranged in four firerooms. Steam lines are such that the boilers in each fireroom can be connected to one main machinery unit so that the plant can be operated as four separate units." They had four screws.

These carriers had better protecting armor than their predecessors (again excepting *Lex* and *Sara*), better facilities for handling ammunition, safer and greater fueling capacity, and more effective damage control equipment.

THE TACTICAL employment of U.S. carriers changed as the war progressed. In early operations, through 1942, the doctrine was to operate singly or in pairs, joining together for the offense and separating when on the defense—the theory being that a

separation of carriers under attack not only provided a protective screen for each, but also dispersed the targets and divided the enemy's attack. Combat experience in those early operations did not bear out the theory and new proposals for tactical deployment were the subject of much discussion. As the new *Essex* and *Independence* class carriers became available, these new ideas were put to the test.

The *Independence* class carriers—light carriers, designated CVL's—were products of an effort to increase this country's sea-going air strength in the early days of the war. Nine keels to light cruisers of the *Cleveland* class were laid down at the New York Shipbuilding Corp. yard at Camden, N.J., three of them before the war started. They were to have been the *Amsterdam* (CL-59), *Tallahasee* (CL-61), *New Haven* (CL-76), *Huntington* (CL-77), *Dayton* (CL-78), *Fargo* (CL-85), *Wilmington* (CL-79), *Buffalo* (CL-99), and the *Newark* (CL-100). They eventually became the *Independence, Princeton, Belleau Wood, Cowpens, Monterey, Langley, Cabot, Bataan,* and the *San Jacinto,* CVL's 22 through 30, respectively.

Naming and designating these last four sometimes went through a rigorous and confusing metamorphasis. Neither *Cabot* nor *Bataan* encountered any difficulty. The names and designations were reached in June and July 1943 without attending problems But *Fargo* was named *Crown Point* (CV-27) when the decision was reached to convert her to an aircraft carrier. Then, on July 15, 1943, her name was changed to USS *Langley* and she was given the designation CVL. (Actually, all these cruiser-to-carrier conversions were originally designated CV's when the decision to convert was made; all were redesignated CVL's on the same day.)

The *Newark* (CL-100) had a rougher time of it. On June 2, 1942, she was changed to CV-30; on June 23, her name was changed to *Reprisal,* which she kept for a little over six months. On Jan. 6, 1943, her name was again changed, to *San Jacinto.*

The light carriers displaced 11,000 tons standard. In design, the bridge was box-like in appearance, with a small crane forward. They had four stacks, paired off in twos, on the starboard side, aft of the island. These stacks angled out from the hangar deck and rose vertically above the flight deck level.

As the *Essex* and *Independence* class carriers joined the Fleet in increasing numbers, it was possible to operate several carriers together, on a continuing basis, forming a carrier task group. Tactics changed. Experience taught the wisdom of combined strength. Under attack, the combined anti-aircraft fire of the task group carriers and their screen provided a more effective umbrella of protection against marauding enemy aircraft than was possible when the carriers separated. When two or more of these task groups supported each other, they constituted a fast carrier task force.

The first attempt to operate a multi-carrier group occurred on August 31, 1943, during a raid on the Japanese-held island of Marcus. Task Force 15, which conducted the raid, consisted of *Yorktown* (CV-10), *Essex* (CV-9) and *Independence* (CVL-22), the cruisers *Nashville* and *Mobile,* the battleship *Indiana,* and ten destroyers. Aircraft were launched from the carriers at a point approximately 130 miles north of the island.

On October 5-6, 1943, RAdm. Alfred E. Montgomery led Task Force 14 on a second raid on Wake Island. The task force was comprised of two task groups, operating a total of six aircraft carriers—*Essex, Yorktown* (CV-10), *Lexington* (CV-16), *Independence, Belleau Wood,* and *Cowpens* —seven cruisers and 24 DD's, the largest carrier task force yet assembled.

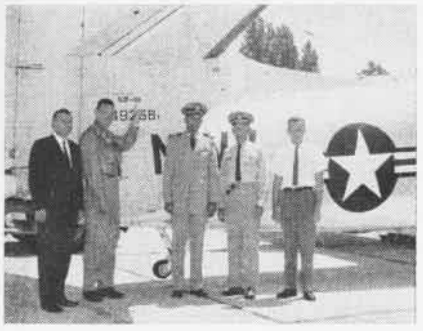
In the course of the two-day strikes, ship handling techniques for a multi-carrier force, devised by RAdm. Frederick C. Sherman's staff, were tested under combat conditions.

Adm. Chester W. Nimitz, then Commander in Chief, Pacific Fleet, dispatched his congratulations. "The thorough job done on Wake by planes and ships of your task force will have results reaching far beyond the heavy damage inflicted."

The words were prophetic. Lessons learned from operating the carriers as a single group of six, as two groups of three, and three groups of two, provided the basis for many tactics which later characterized carrier task force operations. With the evolution of the fast carrier task force and its successful employment in future operations, the rising sun of the east began slowly to sink in the west.

FAST CARRIER *task forces included both Essex and Independence class carriers, shown above, and viewed from USS Lexington in January 1945.*

ON A PHOTO *mission, a TBM passes USS Shangri La (CV-38), named in honor of the Doolittle raid on Japan and paid in full by War Bonds.*



VS-41 WELCOMES CRAFT AT NORTH ISLAND

VS-41 Receives the S2F-3S

RAG First to Get Plane in PacFlt

Air Anti-Submarine Squadron 41, S2F replacement training squadron based at NAS NORTH ISLAND, San Diego, Calif., has received the first S2F-3S in the Pacific Fleet. The "S" is the latest model of the S2F-3 ASW aircraft and incorporates the newest and more advanced ASW electronic capabilities.

The aircraft was flown direct from the Grumman Factory at Bethpage, Long Island, N. Y., to North Island. It was piloted by the squadron ASW instructor, Lt. R. A. Walker. Co-pilot was LCdr. R. T. Grant, fleet replacement pilot, and the aircrewman was ADCS R. A. Schug.

Shown in the photo from left to right, are: Frank Huttle, Grumman representative; Lt. Walker; Cdr. G. R. Rymal, squadron skipper; Cdr. D. W. Hazelton, CAG-51; and Lou Gerken, another Grumman representative. Cdr. Rymal recently assumed command of VS-41, having relieved Cdr. C. L. Otti.

VS-41 has been in commission since June 1960 and has trained more than 170 Fleet Replacement Pilots, 125 aircrewmen, and 500 enlisted maintenance trainees for the fleet squadrons. VS-41's instructor pilots have a total pilot time of over 71,300 hours or almost 2900 days in the air.

BuWeps Issues Contract

General Dynamics Studies GETOL

BUWEPS awarded a $74,500 contract to General Dynamics Corp., Convair Division, San Diego, Calif., to continue study on a Ground Effect Take-off and Landing (GETOL) airplane. This study is part of a long-range program intended to ascertain the effectiveness and economy of utilizing the GETOL principles in an ASW seaplane.

The GETOL concept has been studied and tested at General Dynamics/Convair for the past four years, using the principle of ground effect to take off and land on a cushion of air that is over the surface of the water.

The GETOL plane needs only a lifting thrust power equivalent to .8 of its own weight. It retains the desirable features of VTOL aircraft, but offers greater flexibility of operation.

Studies will determine the best components and arrangements of the air moving system for a patrol-type GETOL plane. Efficiency, simplicity and weight will be the guiding factors as engineers conduct study and testing in the airflow laboratory.

'Can Do' Cuts Downtime

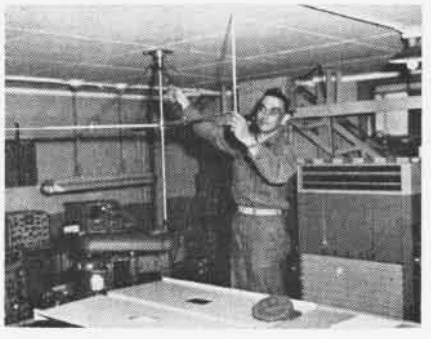
MARS Men Build Tracker Tester

Some "can do" Marines of Marine Aircraft Repair Squadron-17, MCAS IWAKUNI, figured out a way to save weeks of expensive support equipment downtime.

The problem was calibrating the WM-1 electronic blade tracker used to check helicopter blades. Before MSgt. John W. Kielwein of the Avionics Shop turned to on the problem, the blade trackers had to be sent to Tachikawa for calibration and repair.

MSgt. Kielwein with the help of LCpl. Scott V. Hoag and Cpl. James Wallenburg of the MARS Machine Shop fabricated a simulator from some one-inch metal tubing and other parts available locally. The simulator is powered by an ordinary drill press.

According to W. O. Fred L. Kelly, assistant avionics officer, "The simulator has operated so successfully, that blade trackers are being returned to 1st Marine Aircraft Wing units in days rather than weeks."



MSGT. KIELWEIN CHECKS TRACKER TESTER

CAPT. HARTY RECEIVES GIFTS TO PAKISTAN

Books Are Sent to Pakistan

Greenwich Bay Transports 9 Tons

Capt. H. L. Harty, Jr., C.O. of the USS *Greenwich Bay* (AVP-41), has received "Books for Pakistan" from Bill Varney of James Madison High School, Vienna, Va., in the presence of other student and faculty representatives.

The "Books for Pakistan" project came about as a result of last fall's visit to the high school of Beshir Ahmed, the Pakistani camel driver invited to the United States by Vice President Lyndon B. Johnson. Students and teachers, on learning of the need for school supplies in Pakistan, donated time and money in preparing over 200 packages and plywood cartons of pencils, paper, and textbooks, totaling some 18,000 pounds.

The special load for Pakistan will be delivered by the *Greenwich Bay* in Karachi. Beshir Ahmed and the Pakistani Director of Education will accept delivery and designate the schools that are to be the recipients.

VAH-7 Keeps A3J's Up

Maintenance Good on Enterprise

The *Peacemakers* of VAH-7 set a high record for availability with their A3J-1 *Vigilantes* during the first month of their first deployment aboard *Enterprise*.

For the first month of the deployment, the North American-built *Vigilantes* exceeded their programmed flight hours. During Operation *Riptide III*, the squadron completed 18 out of 18 sorties scheduled. Average availability for the first month exceeded what is believed to be the fleet average for all deployed models. Cdr. Louie B. Hoop commands the *Peacemakers*.

For background on how VAH-7 did it, see "Card Sharp Maintenance Yields Bonus," NANEWS, Aug., pp. 33-35.

WEEKEND WARRIOR NEWS

AT NAAS FALLON *in the A4D, Lt. Andy Gilcrest won his E in rockets, Lt. Harry Jevas, his E in bombing, and Lt. Bill Nelson, his E in rockets.*

CAPT. MARCUS L. LOWE, JR., *(left), C. O. of NAS Glenview, gives final approval to station's float for 125th birthday parade for Chicago.*

Marines End 'Operation Tiger'

The largest live ordnance problem since World War II, Operation *Tiger*, was conducted by 5000 Marine Reserves near 29 Palms, Calif. Air units from the Marine Air Reserve's Alameda A4D *Skyhawk* squadrons provided opening day air cover for infantrymen of the Eighth Marine Expeditionary Brigade as the four-day exercise got underway.

Live ordnance drops and artillery shells were dropped or fired into controlled zones away from the advancing infantry units. Vertical envelopment helicopters shuttled troops to positions behind the advancing ground forces. A climax to 1962 training designed to test ground and air readiness, *Tiger* provided summer training for VMA-133, VMA-141, Medium Helicopter Squadron 769, H&MS-42, MACS-25, all from Alameda, and the 12th Staff Group, Los Angeles.

From Manhattan to Cecil

Hosted by VA-134, personnel of New York's VA-831 spent their cruise period working at NAS CECIL FIELD, Fla. Flying the FJ-4B *Fury*, pilots and squadron personnel spent the training period learning about the A4D *Skyhawk*, which is scheduled for delivery to New York this fall.

Two Celebrations in Glenview

NAS GLENVIEW marked its 25th Anniversary with a fly-in breakfast for civilian aircraft owners. Pancakes were served in a hangar as thousands of area residents looked at a display of WW II and modern aircraft. In the aircraft line-up were a PBY, TBM, FM, a pre-war Meyers trainer and an N3N. Current jets in the display were the FJ-4B *Fury* and the A3D *Skywarrior*.

In a parade celebrating the 125th anniversary of the City of Chicago, the air station contributed a float depicting a chapel and an A3J model. The theme was dedicated "to those who fly on Sunday . . . so you may worship in Peace."

Grosse Ile, Michigan

Grosse Ile's first Navy air show in more than 10 years brought out more than 100,000 spectators early in September. Featured performers for the

THREE ALAMEDA *reservists total 40 years of attendance, Cdr. Parks, Rheaume and Gaal.*

LCDR. R. B. NEWMAN *gives poster to former Navy-man, now Postmaster, H. P. Hofstetter.*

aerial program were the *Blue Angels* flight demonstration team and the *Chuting Stars* parachute team. Also on the program were Capt. Dick Schram, USNR, flying a *Cub* and J. W. Fornoff, who gave an exhibition flying the F8F *Bearcat*, last of the Navy's WW II propeller aircraft.

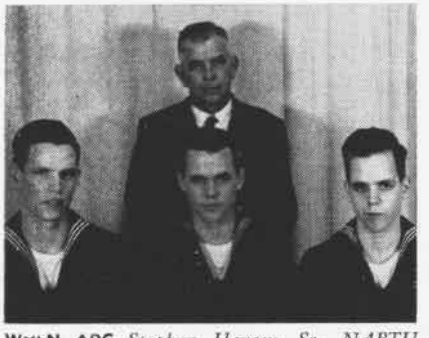
The program marked the 35th anniversary of the reserve base, located on the Detroit River south of the Motor City. Ground events included the station's *Tars And Rifles* drill team, several bands and the CNaBaTra trampoline team, the *Starflights*.

NARTU Norfolk, Virginia

How much training can one Reservist receive? The answer, apparently, is "an unlimited amount."

Marine Air Reserve Attack Squadron 233 points with pride to Sgt. Russell E. Theisen, who sees no end to his electronics training with the Marine Corps. Theisen has taken 32 courses while attending 11 schools during training periods. In his search for more knowledge, the sergeant has trained in technical schools at Memphis, Willow Grove, and Jacksonville. Other courses were available to him in the Norfolk Navy complex. Associated with the reserve since 1954, Theisen has now applied for 32 weeks of B school (Electronics) at Memphis. He is employed as a radio and television repairman during the week.

A glossary of terms from a "Pilot's Dictionary" published in the NARTU *Newsletter* contained the following: "Basic VFR Minimums—Those meteorological conditions under which a chicken can clear a low fence while maintaining satisfactory forward visibility."



WHEN ADC *Stephen Havasy, Sr., NARTU Andrews, returned at end of WW II, he posed with his sons, Gerard, Richard and Stephen, Jr., in sailor suits. Now they are all in uniform, and a fourth son, James, 17, enlisted in the U.S. Naval Reserve 15 September 1962.*

Lakehurst, N.J.

A former Navy recruiter's first official act as a postmaster was to—you guessed it—place a Navy recruiting poster on the post office bulletin board. The new PM is Henry Hofstetter, Pine Beach, New Jersey, who for the last five years was a recruiter with NARTU LAKEHURST. He retired recently after 20 years of service and was designated postmaster in Pine Beach.

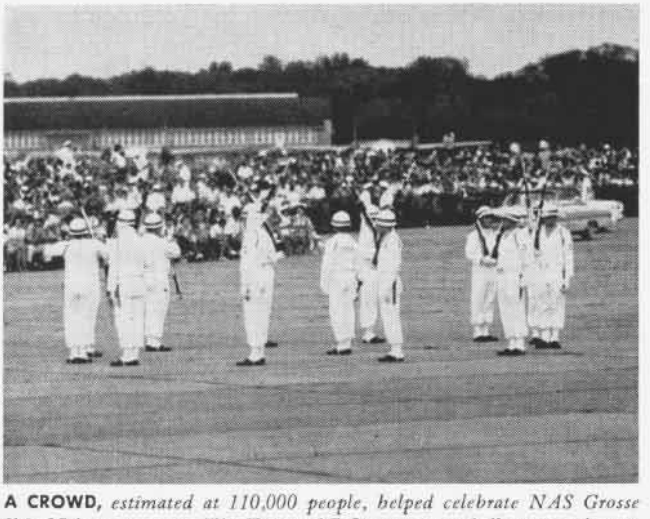
Alameda Pilots Win A4D E

Flying the *Skyhawk* during active duty periods at NAAS FALLON, Nev., three pilots of VA-876 won E's during an official competitive exercise in the A4D *Skyhawk*. First to attain the proficiency mark were Lts. Andy Gilcrest, Harry Jevas and Bill Nelson. VA-876 qualified 17 pilots in rockets and 13 in bombs during the cruise, and all squadron pilots qualified for instrument cards. Skipper of the unit is Cdr. Neal Kappeler.

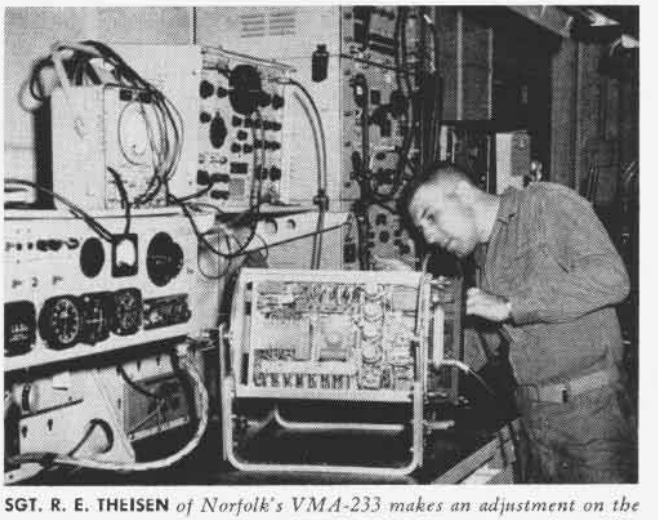
Three other Alameda-based Reservists scored 4.0 in attendance records. Perfect attendance records (totalling 40 years among the three) were registered by Cdr. William Parks, El Cerrito; Lawrence Rheaume, AD1, Hayward, and Emery Gaal, ADC, of Castro Valley, Calif. None has missed a drill since 1949.

Seattle, Washington

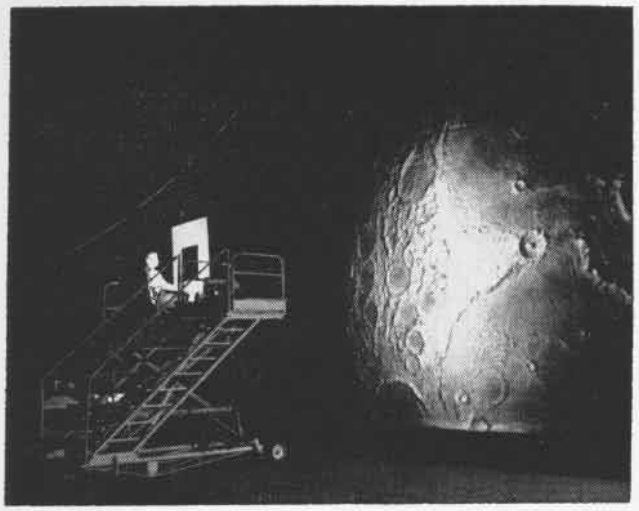
The Lockheed Recruiting and Retention Trophy, awarded annually to the NARTU with the best recruiting record, has been given to NAS SEATTLE for fiscal 1962. A trip to the Lockheed Burbank plant and possession of the trophy were the recruiting department's awards.



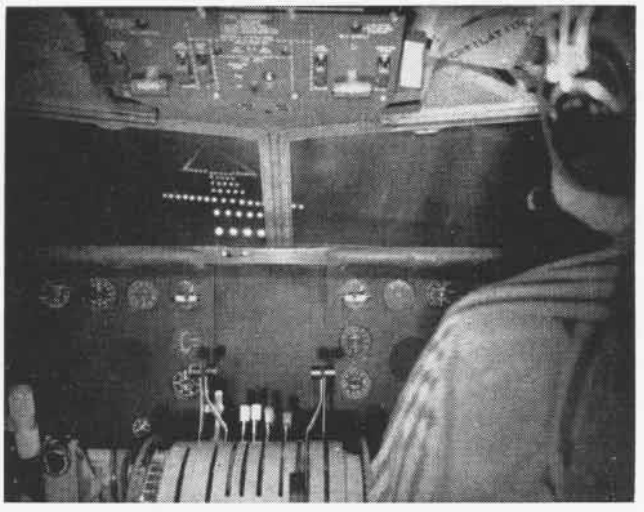
A CROWD, *estimated at 110,000 people, helped celebrate NAS Grosse Ile's 35th anniversary. The Tars and Rifles precision drill team took part.*



SGT. R. E. THEISEN *of Norfolk's VMA-233 makes an adjustment on the azimuth instrument control of ARN-21 TACAN for a squadron A4D.*



LUNAR APPROACH SIMULATED BY IMAGE ON PLANETARIUM WALL



PILOT PRACTICES NIGHT LANDING IN AMES' DALTO LANDING DEVICE

SIMULATORS DESIGNED FOR MANY TASKS

SIMULATORS HAVE long been a method of teaching fliers the intricacies of flight in ways that would not jeopardize their lives or their aircraft. Now with the development of such experimental aircraft as the X-15 and the need for experience in piloting orbital flights, the art of simulation plays a greater role than ever before in training programs.

On September 1, NASA's Office of Advanced Research and Technology brought out a pamphlet entitled, "Research Flight Simulation Facilities." That these facilities are of great value was dramatically stressed when Astronaut Alan Shepard pointed out that in his training, the most important lessons he learned were those he was taught while flying in Project *Mercury* simulators.

NASA defines the term *simulator* as "a device which will permit a representation of a flight task wherein a human operator is provided with input information through visual and/or motion cues and flight controls." The flight regime, simulated through the use of a computer which integrates the inputs, can alter the "flight" and thus condition the operator to the various performance characteristics of the real vehicle he is training to fly.

There are two basic types of simulators which vary in complexity, cost and capability: fixed base simulators and moving base simulators. The first type, fixed base simulators *with simple visual displays*, are usually assembled at the NASA Research Centers from available equipment. These are designed to meet particular flight simulation tasks. The operator is usually provided with simple thrust and flight controls, the output of which is integrated by an available computer.

The most expensive element is the computer which, depending upon the complexity of the problem simulated, could cost as much as $75,000. This computer, a highly flexible device, can be used over and over for various simulation or data reduction tasks, such as takeoff of supersonic transport, flying and handling qualities of such aircraft, and X-15 mission simulation.

Langley and Ames Research Centers have fixed base simulators *with complex visual displays* similar to those described above, except that a visual display device represents the orientation of the vehicle with respect to the outside environment. This gives the pilot the illusion of motion. Results of the flight control inputs by the pilot provide computer outputs which vary the outside visual display as well as the indications of the instruments. These simulators are used where the illusion of motion will significantly affect the performance of the operator and where the illusion can be represented visually without the need for body acceleration stimuli.

The Langley Inflatable Planetarium, for example, provides realistic flight conditions. Typical applications of its use include lunar approach, midcourse rendezvous guidance and lunar trajectory control.

At Ames Research Center, the Ames Dalto Simulator consists of a television camera scanning a model of a night-lighted runway and its approach lights. The camera is positioned laterally, vertically and responds in roll, pitch and yaw to signals from an analog computer which integrates pilot input commands. The runway is rolled on an endless belt toward the camera in response to the pilot's velocity commands. As the pilot in the simulator maneuvers the controls, the camera is positioned, so that the visual cues received are similar to those seen in an actual landing.

MOVING BASE simulators *with limited rotational motion* are similar to those with fixed bases, except that the pilot inputs are used in the computer to control servo motors. These cause the cab in which the pilot sits to move throughout a limited range. The computer also provides the data for the instrument displays. This type of simulator is used for aircraft stability studies, flying and handling

research, helicopter and V/STOL maneuvering power and damping requirement studies.

Moving base simulators *with rotational freedom about all axes* are similar to those described in the preceding paragraph with two exceptions: Some differ only in that full freedom is provided; others, in that they are used to simulate space flight and are used with replicas of attitude control devices proposed for space vehicles and are, therefore, not connected to a computer. In the latter case, the instruments are largely self-contained and indicate the actual state of the parameters measured (pitch, roll, heading, etc.).

Such a device at NASA's Ames Research Center is used to experiment with attitude control devices for space vehicles for determining performance and design parameters, accuracy limitation, and power requirements, etc. The Rotation Simulator at Langley is designed to provide motion stimuli for a wide variety of aircraft, V/STOL, and space studies. It will be used as part of the rendezvous simulator.

Moving base simulators *with rotational freedom and complex visual displays* are illustrated by the Langley

PILOT IN A 3-DEGREES-OF-FREEDOM VEHICLE

lunar and planetary midcourse simulator. This device combines a moving base cockpit with a lunar or stellar background optically projected. This simulator will have a definite advantage over the inflatable planetarium in that a rigid sphere will be provided to increase the accuracy of positioning projected images. Further advantages will accrue from the use of a moving base for the pilot's cockpit.

Combined *rotational and linear motion simulators* are used to represent

ASTRONAUT ABOUT TO START 'FLIGHT' IN LEWIS RESEARCH CENTER'S MASTIF TRAINER

flight control tasks in which acceleration is bound to affect the pilot's performance. Because the motions involved and the forces generated usually require considerable power, the design of these devices is conservative for reasons of safety. The cabs are equipped with instrument and flight controls connected to the computer. The outputs of the computer are used to control the motion of the cab, so that the pilot experiences the accelerations, insofar as practicable, of actual flight.

One of the most sophisticated of these devices is the Ames Centrifuge, which is very new. This five-degree-of-freedom (three angular and two linear) simulator, recently completed, will be used to simulate many flight modes in helicopter, V/STOL, aircraft and, of course, spacecraft.

Each of the NASA Research Center simulation facilities is adjacent to an analog computer facility. These computers can serve a number of simulators on a time-sharing basis. The versatility of the computer is inherent, for they are equipped with "patch boards" for the rapid assembly and quick interchangeability of external wiring. The computers also have potentiometers with precise numerical settings for the adjustment of the various circuit constants.

The computers can be programmed for various tasks in approximately the same time it takes to arrange the physical hardware for the experiment.

Upon occasion, the capability of the computation facility is augmented by cable tie in the central data processing centers located nearby.

'Green Knights' Fly Long

Unit Sets Marine Air Wing Record

The "Green Knights" of VMA-121 broke the Third Marine Air Wing record for total hours flown by an A4D *Skyhawk* squadron in one month when they amassed 1171 hours in August.

Of this total, over 1000 hours were actual syllabus training hours in which they qualified 100 per cent of their pilots in conventional ordnance, such as rockets, bombs and napalm. In the special weapons field, which deals with nuclear weapons delivery, over 50 per cent of the pilots qualified that month.

Capt. G. L. Rutledge was top pilot in the total hours department, with over 70 hours flying time.

Eight hundred and fifty hours is considered average for an A4D unit.

Doppler Producer Chosen

System Readied for ASW Aircraft

General Precision Laboratories, Pleasantville, N.Y., has been selected to produce the Navy's new lightweight Doppler Navigation System. The contract was awarded following a series of tests of prototype equipment conducted by the Navy during the past year.

First applications of the equipment will be in the P3V-1 *Orion*, S2F-3 *Tracker*, A2F *Intruder* and W2F *Hawkeye*, the Navy's new ASW aircraft.

'Bye, Bye, Thunderbirds'

VA-135 Decommissioned on Oct. 1

Attack Squadron 135, commanded by Cdr. B. W. Smith, departed NAS JACKSONVILLE August 7 to complete decommissioning at Cecil Field.

The *Thunderbirds'* short history saw them pile up many firsts. Commissioned to meet the needs of the Berlin crisis in 1961, they were first in Air Group 13 to become combat-ready. VA-135's *Skyraiders* were first of the type to operate from the newest and largest carriers in the world, the USS *Enterprise* and the USS *Constellation*.

Seventeen *Thunderbird* pilots put the pipper in the bullseye more consistently than competitors, the squadron reports, and amassed 58 Navy E's. VA-135 flew 4700 accident-free hours and made over 1500 landings aboard four aircraft carriers in less than a year.

VA-135, commissioned August 21, 1961, was decommissioned October 1.

FAMILY DAY *at VP-16 included lunch, movie, tour, and curious children "filling Dad's shoes" on job. VP-16 departed Jacksonville in September on good will missions in Europe and North Africa. Cdr. C. E. Rodgers is C.O.*

Distance Flight is Made

VMT-2 Flies Coast-to-Coast Hop

Ten F9F-8T *Panther* jets flew nonstop to MCAS CHERRY POINT from El Toro, Calif., in September. The flight, the first west-to-east non-stop coast-to-coast hop by a Marine squadron, took only five hours and 20 minutes, according to VMT-2. The two-seated training jets were refueled twice en route by Marine GV-1 *Hercules* in flight.

Purpose of the long hop was to provide experience in aerial refueling in conjunction with navigational missions. It also provided the squadron and its flight instructors with added information for future operations. Plans are now being considered to include aerial refueling in the regular jet fighter training schedule.

GRANDPAW PETTIBONE'S *fame continues to spread as "Popular Mechanics" applauds Naval Aviation's curmudgeon in a feature article. In January 1963, Gramps celebrates his 20th anniversary as the pilot's critic and friend.*

Iwakuni Unit Scores High

1st MAW Tops own Safety Record

First Marine Aircraft Wing (MAW-1) at MCAF IWAKUNI completed a banner year by topping its previous safety record.

In FY 1962, the wing flew approximately 110,000 operational mission hours with a total of 19 aircraft accidents. This rate is about 1.72 accidents for every 10,000 hours flown.

Marine Aircraft Group 11 (MAG-11) at NAS ATSUGI posted the best record, with 10,500 accident-free flight hours.

According to MAW-1, this is the first year that the wing has had an accident rate lower than 2.0.

A4D Pilots Get New Aid

Bombing System Trainer Completed

Naval Air Mobile Training Detachment 1100 at MCAS CHERRY POINT recently received a new training aid, enabling the detachment to train *Skyhawk* pilots in the simulated dropping of ordnance.

The new equipment partially simulates ground control bombing whereby the pilot, under control of a ground control radar station, can accomplish highly accurate low altitude bombing. This system will aid A4D pilots in training for tactical air support for ground troops.

With the new trainer, the detachment revised its course for the A4D-2 and -2N. The one-week course now includes faimiliarization in the hydraulic system, engines, ordnance, emergency ejection, radio and radar, electrical system, and techniques of ground control bombing.

VP-4 to Get 12 Neptunes

Replacements are for the P2V-5's

In September, Patrol Squadron Four, based at Naha, Okinawa, received the first of 12 P2V-7 *Neptunes* ordered as replacement for the P2V-5 aircraft it has been flying.

The squadron, commanded by Cdr. Gordon R. Bennett, turned out to greet the returning crew members who flew the *Neptune* from NAS ALAMEDA, Calif.

VP-4 is a member of the U. S. Seventh Fleet and is under the operational command of RAdm. Bernard M. Strean of the Taiwan Patrol Force.

CVG-1 Deploys to the Med

Extended Cruise on USS Roosevelt

Carrier Air Group One sailed from Mayport, Fla., in September for an extended Mediterranean cruise aboard the USS *Franklin D. Roosevelt* (CVA-42).

This departure occurred a year after the Group's return from a similar cruise in August 1961. During the intervening period, CVG-1 performed 18 moves between ships and shore stations while participating in eight shipboard deployments of one to ten weeks duration.

In January 1962, CVG-1 went "fission," deploying aboard the world's first nuclear-powered aircraft carrier, the USS *Enterprise*. Cdr. George C. Talley, Jr., skipper of the Group, made the first landing on the 4½-acre flight deck of the *Enterprise*. The ship and air group then conducted intensive shakedown training in the Guantanamo, Cuba area.

CVG-1 is comprised of Fighter Squadrons 11 and 14; Attack Squadrons 12, 15 and 172. Heavy Attack Squadron 11, and detachments from VFP-62 and VAW-12.

FAA Takes on Another Job

To Check USAF Navigation Aids

Responsibility for flight-checking the U.S. Air Force's world-wide system of air navigation aids will be transferred to the Federal Aviation Agency under an agreement announced by FAA Administrator N. E. Halaby and Assistant Secretary of the Air Force, Joseph S. Imirie.

The flight inspection program, now performed by the Air Force Communications Service, will be phased in over a nine-month period which began in September in Alaska. The program was implemented in the southern and southwestern United States in October and will extend over the entire nation on January 1, 1963. Air Force air navigation aids in Europe and the Mid-East will be included on April 1; those in the Far East, on June 1, 1963.

The FAA already checks all civil navaids as well as those operated by the Army and Navy.

Approximately 1600 AF navigation aids are involved. They range from en route facilities, which provide pilots with bearing and distance information, to such terminal facilities as the Instrument Landing System.

ALL TOGETHER NOW. *Let's head for the hills! The 24 helos of HMM-161 mark a Hawaii "first," a full-squadron training flight. Based at MCAS Kaneohe and led by LCol. L. V. Tope, C.O., HUS transports flew over Oahu.*

New Type Ship for Fleet

Amphibious Transport Dock Ready

The first of a new type of ship, the amphibious transport dock *Raleigh* (LPD-1), was commissioned September 8 at the New York Naval Shipyard, Brooklyn, N. Y.

Gen. David M. Shoup, USMC, Commandant of the Marine Corps, was the principal speaker at the commissioning ceremony.

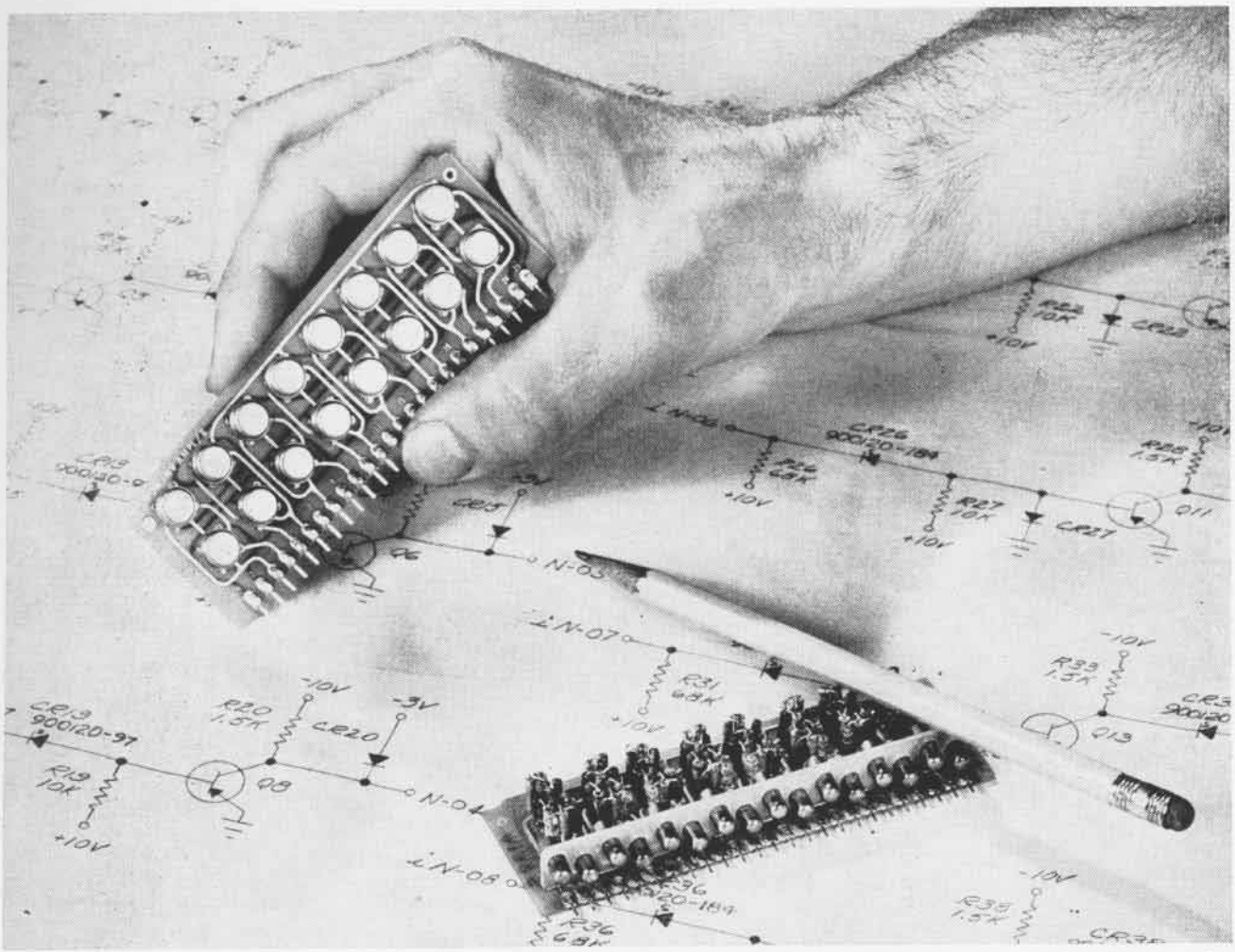
Designed to combine the functions of the attack transport (APA) and the attack cargo ship (AKA), the LPD will enable troops to travel to the assault area on the same ship with their heavy equipment. The LPD is similar to the dock landing ship (LSD) but with a shortened and covered well.

A helicopter platform, built over the well, enables the LPD to carry and launch six HR2S amphibious transport helicopters which will land combat-equipped troops. Nine landing craft (LCM), pre-loaded with troops and equipment too heavy to be carried by helicopter, can be launched from the well that opens to the sea at the rear of the ship.

The *Raleigh*, 521 feet long, will have a standard displacement of 8040 tons and 13,900 tons fully loaded. Her speed will be in excess of 20 knots.

The new ship joined the Atlantic Fleet Amphibious Force upon its commissioning. Capt. A. W. Whitney is its first commanding officer.

FORTY TRIPS *around the world at the equator amount to a million miles of traveling over land and sea. While Chief Machinist's Mate Claude L. Freese has not circled the globe that many times, he has flown more than a million miles during his more than 20 years in Naval Aviation. As a Navy flight engineer, Chief Freese completed his 365th airborne early warning patrol as a member of Airborne Early Warning Squadron Detachment 13, based at NS Keflavik, Iceland.*



HAND HOLDS *micro-electronic functional card, the electrical equivalent of modern transistorized plug-in card, lower right. The new technology, permitting equipment reliability 100 times better than with vacuum tubes, is revolutionizing Naval Aviation's avionics.*

TODAY'S REVOLUTION IN ELECTRONICS

By Col. A. C. Lowell, USMC
Director, Avionics Division, BuWeps

THE YEAR is 1968. The carrier steadies on its FOX CORPEN. It is night with ceiling and visibility both near zero. Sixteen light attack aircraft are airborne. One by one, as regular as the drips from a leaky faucet, the planes come aboard. There are no bolters, no missed approaches. Alert pilots monitor the approaches, but not one has to take over. The approach power compensators all work perfectly, as does the automatic landing equipment.

The planes have just returned from a night attack mission as part of a fleet exercise. All targets were "destroyed." Navigation to and from the targets was on the button. The inertial navigators functioned 4.0.

As the aircraft land, the electronics gang turns to, getting the avionic gear ready for the next mission. A fast look is enough to tell them most of the planes are trouble-free. An automatic feature of the electronic system causes a trouble light to glow whenever there is a malfunction anywhere in the system. One plane is showing such a light. A quick checkout device built into the gear indicates the defective functional component.

To make the repairs, a technician merely pulls the bad "card"—a piece looking like a plastic plate about as big as a cigarette pack and as thick as half a dozen playing cards—replaces it with a new one, and throws the old one away. Repairs completed, the system light glows green. The year is 1968.

This picture may sound "far out," but it represents some of the goals of Bureau of Naval Weapons avionic research and development efforts. Furthermore, these goals are realistic. The Navy intends to reach them.

These goals are now possible principally because of the revolution in electronics known variously as micro-electronics, molectronics, integrated circuitry, or solid-circuits.

You will be hearing more about solid-circuit micro-electronics in the years ahead. The new techniques will

not only revolutionize electronic equipment, they are even revolutionizing the entire electronic industry. The respected and conservative management magazine, *Business Week*, characterized the effect of micro-electronics on the industry this way:

"If the transistor and its brothers and sisters shook up the electronics industry, the tiny devices . . . now under development will turn it upside down. . . . It's as if someone were to present the transportation industry—all at once—with a motor that cost a tenth as much, ran 10 times as long between overhauls with one-tenth the fuel consumption, weighed five pounds instead of 500 pounds, required little labor to produce, and still developed 300 horsepower."

Micro-electronics is opening great opportunities for improvement in electronic reliability, maintainability and performance. We in BuWeps Avionics RDT&E are "driving" to take full advantage of these opportunities.

The breakthrough in micro-electronic technology came along none too soon. Only through such a miracle would it be possible to really meet the Fleet's electronic needs and at the same time solve the electronic maintenance problem.

Upon analyzing the problems related to improving mission effectiveness for the Fleet, RAdm. F. L. Ashworth, Assistant Chief of BuWeps for Research, Development, Test and Evaluation, noted certain significant factors to be met in the design and development of new equipment.

Our first line aircraft are spending too much time on the deck for maintenance. Avionics failures are causing a high percentage of maintenance downtime. The faults are difficult to locate and, when found, take too long to repair.

VADM. R. B. PIRIE *views micro-electronic devices held by author, Col. A. C. Lowell.*

Looking into the future, it is easy to see that things are more likely to get worse than better. A large proportion of the men who have been carrying the load in avionic maintenance are now retiring on twenty. The problems of training and keeping new technicians, capable of coping with the avionics now in the Fleet, is a story too well known to need retelling here.

While the technician problem is becoming more acute, the maintenance job is getting tougher with the complicated avionic gear now reaching the Fleet and soon to be delivered. Where the declining curve of our avionic maintenance capability crosses the rising curve of avionic complexity is a most miserable "spot."

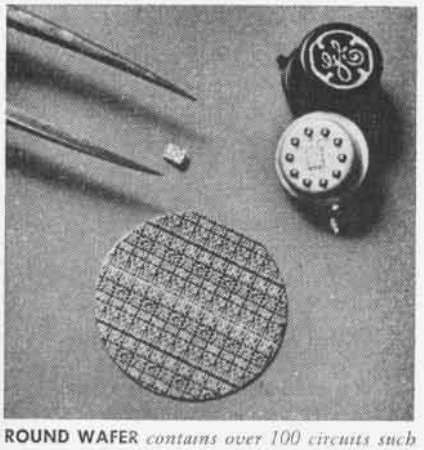
This does not mean that we must go backwards from a Swiss movement to the alarm clock. We are an all-weather Navy and intend to keep it that way. The needs for improved accuracies in navigation and other areas are growing. We intend to meet those needs. However, we must take a revolutionary step to make our avionics equipment more reliable and easier to get back up when it is down.

Cost is another consideration which bears directly on the Navy's ability to carry out its mission in the future. Cost in relation to the mission effectiveness achieved will influence the size of the force which the Navy will have. (See "Naval Aviation and the 'Program Packages,'" NANews, December 1961, pp. 14-15). "Cost" as used in determining future force levels is the total cost of owning a piece of equipment throughout its life. Total lifetime cost includes not only the initial price of the equipment, but also the special training, spare parts, support equipment, technical manuals—everything required to keep a system ready to go for its entire fleet life. The best way to make a big cut in total cost is to improve maintainability and reliability.

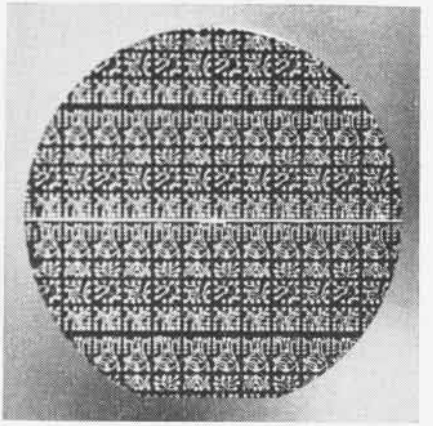
As a result of these considerations, RAdm. Ashworth laid down the following guidelines for avionic research and development effort:

- Aircraft readiness must be improved by reducing the time planes are down for avionic maintenance.
- Equipment reliability must be greatly improved. The demand here is not for a 5% to 15% improvement, but for a major breakthrough—improvements in mean time between failures on the order of 1000%.
- Maintenance man-hours per flight hour (MMH/FH) must be reduced drastically. Not only must the total MMH/FH be brought down, but also the level of training required by avionic maintenance people must also be reduced. Again, a major breakthrough is demanded.
- Requirements for test equipment, support equipment and spare parts must be reduced.
- Costs must be brought down. This means the total lifetime cost of the system in relation to its operational value.

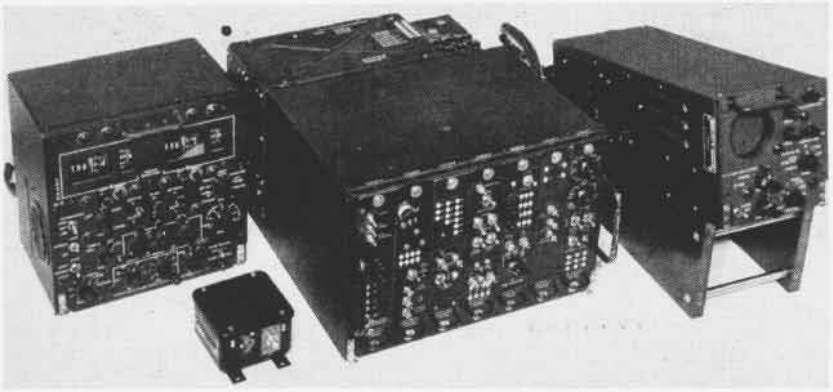
Proceeding under these guidelines, Capt. L. S. Chambers (RAdm. selec-



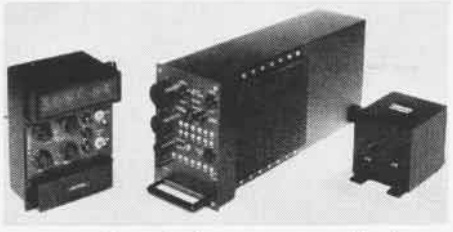
ROUND WAFER *contains over 100 circuits such as one shown mounted beside the cannister.*



AS MANY *as 18 transistors and 66 tapped resistors are available on a TO-5 case chip.*



LORAN-C, left, scaled picture of mock-up of same equipment using micro-electronics, below. Old, 100 pounds, 2.5 cubic ft.; new 18 pounds, ½ cubic ft.



SAVINGS IN SIZE, *weight and power requirements are spectacular with micro-electronics. Greatest benefit, however, is lower failure rate and ease of repair. Virtual elimination of soldered connections avoids big cause of trouble in transistorized equipment.*

tee), Aircraft Officer for BuWeps, has backed a bold new program to improve avionic system effectiveness. This campaign will exploit to the fullest the advances recently scored in micro-electronics.

Micro-electronics might be thought of as the third phase of an electronics revolution which started with the development of the first successful vacuum tube. This first phase of the electronic revolution permitted some impressive electronic achievements—radar, television, computers, etc.

The vacuum tube, however, has an inherent problem of reliability which limits the complexity and reliability of the devices which can be built with such tubes as the basic elements. The vacuum tube requires heating of an electronic filament which will eventually deteriorate and fail.

The second phase of the electronic revolution began with the development of transistors and other solid state devices. Since these devices were first demonstrated 15 years ago, their use has spread to where, for equipment coming off the line in 1961, there were two transistors for every vacuum tube.

These devices could perform most of the functions of vacuum tubes, but had a mean time between failures which could be measured in centuries. Solid-state electronic devices permitted a jump in system reliability on the order of ten to one.

Transistors and other solid-state devices did not provide the ultimate answer to electronic failures, however. With the new reliability of the transistors, it was found that the "weakest link" in the circuits often became the so-called "passive elements," the connections and particularly the soldered joints. The extremely compact construction of circuits built up from the solid state devices made their repair an extremely delicate operation.

Micro-electronics constitutes the third phase of the electronic revolution. The micro-electronic breakthrough has been accomplished not merely through the efforts of scientists in electronics, but also through the efforts of physicists, chemists, ceramists, and metallurgists.

Under micro-electronic technology, entire circuits, including all the functions of transistors, resistors, capacitors, and all connecting linkages, are built up into one rock-like solid state device. These units are sometimes called microcircuits. Some of these solid state circuits are so small, they can be seen only under high magnification.

Through use of micro-electronic solid-circuits, the number of components and connections in a piece of equipment can be cut drastically.

Micro-electronics makes possible spectacular savings in size and weight, but this is not the main attraction to the Navy. The absence of moving parts and reduction of soldered connections reduce the major cause of electronic failures. Micro-electronic circuits are on the order of ten times as reliable as their counterparts using transistors, and 100 times more reliable than with vacuum tubes.

Furthermore, when future equipment is designed around proved standard solid-circuit elements, the cost of all future avionic equipment will be cut sharply. Measures are being taken to provide the necessary incentive to designers to do just that. However, those measures lie beyond the scope of this article.

The techniques of micro-electronics are not in the "wish" stage. They are here. Micro-electronic solid-circuits are already going into production avionic equipment. These applications have been accomplished under the BuWeps value engineering program. It has been possible to substitute micro-electronic circuits for standard circuit function cards *at no increase in cost to the government.*

One of the first equipments to use micro-circuitry is the digital navigational computer which Litton Industries is producing for the Grumman A2F *Intruder* and W2F *Hawkeye.* Electrically equivalent plug-in boards have been developed to replace conventional circuit boards with their transistors, resistors and capacitors.

Replacement of the more reliable, lighter weight, and, except for the connector plugs, smaller board, will actually cost less than its conventional counterpart. This exchange will ultimately result in substantial savings to the Navy in maintenance costs and significantly improved operational reliability.

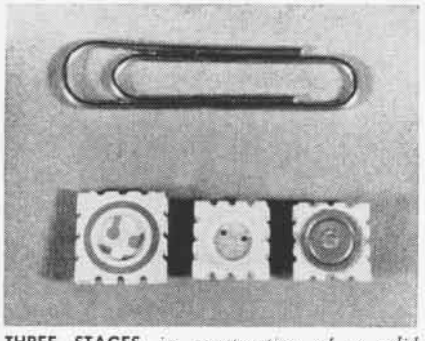
These first steps are only the beginning of a four-phase program, called the MIEETAT program, designed to exploit to the fullest the improvement possibilities inherent in micro-electronic techniques. MIEETAT stands for Major Improvement in Electronic Effectiveness Through Advanced Techniques. Four phases of MIEETAT are:

• Development of the repairable or throw-away modules, such as the replacement plug-in boards for all

the A2F and W2F aircraft computers.

• Development of the maintenance module replacement. This involves the application of modular construction of avionics equipment. Employing this construction design, these modules will be removable, less than 15 pounds in weight, and will provide for rapid fault location, facilitating the replacement of cards and the repair of accessible components.

• Development of functional module replacements. These are functional mission-oriented equipments. Under this phase, numerous efforts are planned, and three contracts for equipment using micro-electronic and solid-state techniques have already been let. One is for an inertial guidance system to be developed by Litton Industries which is scheduled for delivery in 1964. A LORAN-C receiver to be developed by Sperry will weigh about 20 pounds and occupy a half cubic foot of space, a 75% reduction in size and weight over its present design using solid-state elements. An HF single-sideband transceiver is being developed by RCA which will be all solid-state and will weigh about 30 pounds, 70%



THREE STAGES *in construction of a solid circuit are shown below a standard paper clip.*

less than its functional equivalent, the AN/ARC-38A. This phase includes the requirement for modular construction as well as visual fault location.

• Development of fully integrated avionic systems. Modular construction, visual fault location, standard circuits, replaceable throw-away cards are all terms which, in the next generation aircraft, will be commonplace on the line as well as in avionic laboratories.

Micro-electronic circuits have an inherent reliability about 100 times that of equivalent circuits using vacuum tubes. We expect gains in reliability and maintainability far in excess of that 100-to-1 ratio.

Reliability can be defined as the length of time a piece of equipment will operate before it needs repair, and maintainability as the measure of how difficult it is to get it back "up" once it fails.

Micro-electronics opens up tremendous possibilities of improving reliability. Because of the negligible weight and bulk of the solid circuits, we can, in effect, build in almost lifetime spare parts into the equipment. If an element fails, a spare or redundant element will take up its functions with no change in the performance of the equipment.

Through a new design concept known as the "voting technique," it is possible to build equipment in such a way that a substantial portion of the individual functional elements—equivalent to individual tubes or transistors—can fail and still have the equipment function without any degradation of performance. Through this approach, it is possible to boost the reliability of a system with a mean time between failures (MTBF) from 1000 hours to 100,000 hours and more.

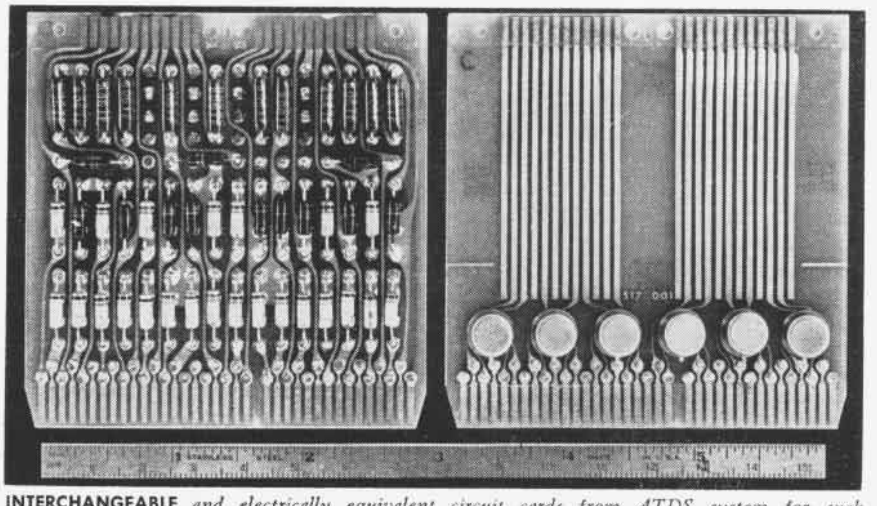
Maintainability can be improved by factors almost as significant. One of the most time-consuming tasks of avionic maintenance has always been fault location. Time required to find the trouble most often exceeds the time to correct the discrepancy. This problem will be met by providing visual failure indication for all systems and components. We can build in these failure warnings on the basis of present engineering knowledge; no further breakthroughs are necessary.

Modular construction will make faults easier to correct once they are located. Major repairs—the replacement of functional components will be no more difficult than changing a light bulb.

Since most equipments will be built up from a relatively small number of standard functional components, the supply problem will also be greatly simplified. Because of a relatively small number of basic functional components, they will be produced in large quantities, hence the cost per unit can be relatively low. When such a unit fails it will generally be thrown away.

Had not World War II ended when it did, the logistics of supply and maintenance could not have continued to support the growing demands of fleet electronics.

The major cost to the service of owning complex equipment lies not in the initial cost of the equipment, but in its maintenance and support. The lifetime cost of ownership of many high performance equipments reaches four to ten times its initial cost. The need for cost reduction lies in this area, and achievement of major gains in reliability and maintainability will mean savings to our country of hundreds of millions of dollars, as well as improved mission effectiveness.



INTERCHANGEABLE *and electrically equivalent circuit cards from ATDS system for such planes as the W2F. Similar micro-electronic cards are now flying in production gear.*

ON THE BEACH, *or in the carrier, quality control principles are the same, says author Clarke. Above, VA-55 men prepare to turn up Skyhawk after check at Lemoore. Right, Chief McAnaly inspects J-65 work in USS Ticonderoga Hangar Bay Three.*

'TAILHOOK' QUALITY CONTROL POINTERS

By LCdr. W. L. Clarke, Jr., VA-55

Squadron Maintenance Officer when he penned these "pointers," LCdr. Clarke, who has a wealth of maintenance training and experience, has since fleeted up to Executive Officer of Attack Squadron 55.

SQUADRON MAINTENANCE OFFICERS of the last five years have had to face the problem of making quality control theory a practical squadron reality. The smart ones didn't fight it, but sifted through the limited practical information available and plunged in. In VA-55 we "joined them" early. AdMats by both ComFAirSDiego and ComFAirAlameda verified that VA-55 *does* have a working Quality Control (QC) Program. Here are a few things we learned while getting it going.

• Quality control is not cheap. Qualified people, in adequate numbers, have to be assigned to the function. Men assigned to the QC Division *will not* be available for routine squadron work. We found an officer and four men adequate—if the officer is a non-pilot and at least one man a CPO.

• Quality control competence requires quality control training. All full-time QC people, and as many division inspectors as possible, should attend a formal school in Quality Control Management. Such courses are provided by O&R's.

• Full-time QC people cannot inspect all work.

Inspection is *not* the basic function of the QC Division. Its basic job is to help the squadron develop and operate a maintenance system that naturally produces quality work, not to sort good work from bad. Defective work indicates either (*1*) the maintenance system is not being carried out as it is designed to work, or (*2*) the system needs to be improved.

If maintenance procedures are not being properly carried out, it indicates the need for training, or perhaps some "motivating." If the maintenance instructions are being carried out and results are still below acceptable standards, then some system and procedures analysis is in order. The QC organization inspects mainly to detect trouble. Once trouble is found, it's their job to spotlight the cause.

For instance, we had a serious control cable corrosion problem. Thanks largely to QC efforts, the problem is now under control.

All work is inspected, but most inspections are performed by collateral duty Production Inspectors. They inspect work from their shops and lay their reputations on the line by signing the work accomplishment record and check sheets. They inspect in the name of the Maintenance Officer under procedures and standards set by the QC.

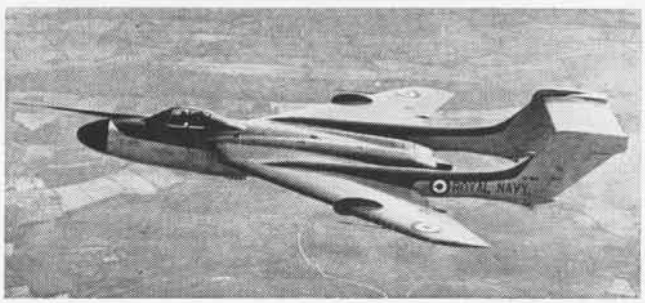
QC Division people *monitor* the quality of work and insure that standard procedures are carried out. They ensure that check sheets are present and are being followed. (You Maintenance Officers make a quiet survey and you'll be shattered to find how many times work is being done by memory, and then the check sheet signed off—again by memory).

A few other activities of the QC crew include:

• Ensuring that all work is inspected by Production Inspectors.
• Administering pilot aircraft inspections.
• Screening and reviewing FUR's.
• Evaluation of squadron training.
• Screening records of work accomplished to insure that all required inspections have been done.

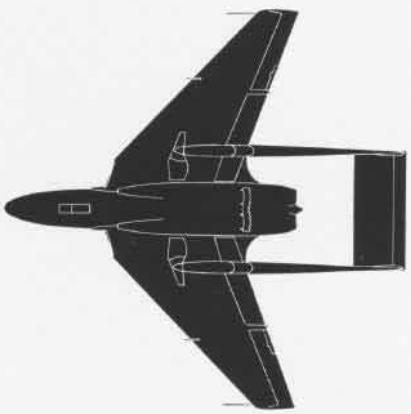
Some skeptics say "Sounds good, but you'll never make it work at sea." We proved that one false. VA-55 quality control functioned fully during an eight-month deployment aboard *Ticonderoga* in 1961-62. Shipboard work is a little more tedious and cramped, but these disadvantages were offset by continued vigilance.

The quality control job and the means of accomplishing it are the same afloat as ashore. The same high quality can be attained. Well designed systems and trained and motivated people are the key to quality at sea in the carrier or shore-based on an air station.



THE ROYAL NAVY'S ALL-WEATHER SEA VIXEN

This two-seat, all-weather fighter has its sharply swept, tapered wings mounted amidships. The rectangular horizontal stabilizer, mounted almost at the top of the tail fins, is contained entirely between the twin booms. Sea Vixen is equipped with latest electronic combat and navigational aids. Armament includes Firestreak missiles, bombs or rockets; no guns are carried on Sea Vixen.



LETTERS

SIRS:

On page 3 of the August 1962 Naval Aviation News, an article entitled "Rescue 'First' is Claimed" claims credit for the first open sea rescue to be accomplished by an HSS-2 helicopter for HS-2. Although no date for the described pickup is listed in the article, we feel this claim to fame is unjustified because of an earlier pickup.

A check of records of this squadron turned up a Helicopter Rescue Report (HS-1 #5-61) indicating that on 29 December 1961, an HSS-2 from AirLant alerted on SAR assignment, rescued an injured survivor floating in the Atlantic Ocean approximately one mile at sea. This particular rescue was described in the Sikorsky News as "believed to be the first rescue made by an HSS-2."

Although the HS-2 rescue may have been a first for the Pacific fleet, we do not believe it is the first for the aircraft as indicated in the first paragraph of the article.

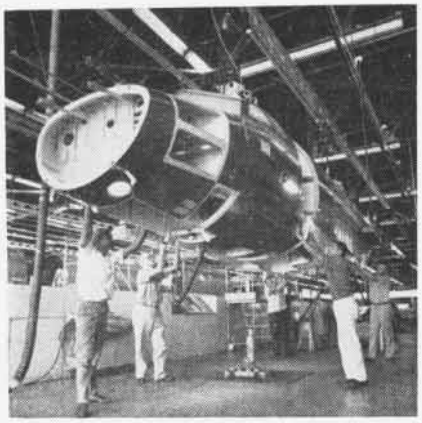
JAMES W. KISSICK, JR., LCDR.
HS Evaluator, AirLant

SIRS:

Your newsworthy article concerning *Enterprise's* outstanding performance was not technically inaccurate, since Air Group Six is indeed assigned to our nuclear-powered carrier at this time. However, the article implies that CVG-6 participated in subject achievement.

In all fairness it should be mentioned that the world's "First and Foremost," Carrier Air Group One, was assigned to the *Enterprise* for the Shakedown Training period, during which the award was earned. The composition of Air Group One while attached to the *Enterprise* from Feb. 7 to April 15, 1962 was as follows: VF-62, VF-102, VA-172, VA-64, VA-15, VAH-7, VFP-62 Det. 60 and VAW-12 Det. 60.

G. C. TALLEY, JR., CAG-1



FIRST T3J-1 *fuselage, USN version of North American Aviation's Sabreliner, is lowered onto final subassembly station. Ten T3J-1's, ordered by the Navy, will be used as radar indoctrination trainers.*

ABOUT THE AUTHOR

Col. A. C. Lowell *(Today's Revolution in Electronics,* pp. 34-37) is a Naval Aviator with extensive flight, command and technical experience.

His technical training includes mechanical engineering at California Institute of Technology and University of California (B.S., 1940); ordnance engineering (jet propulsion) at Naval Postgraduate School; ordnance engineering at Rensselaer (Masters, 1949); and postgraduate work in guided missiles at Johns Hopkins University.

Col. Lowell's previous technical billets have ranged from Engineering Officer of a barrage balloon squadron—before he went to flight training—to Officer-in-Charge of Marine Guided Missile Unit One at Naval Missile Center, Point Mugu.

Completing flight training in 1943, Col. Lowell flew in combat in the Pacific Theatre where he served in various squadrons as operations officer, executive officer, and finally—just before the end of the war—as Commanding Officer of VMB-413 and VMB-614.

Col. Lowell was awarded a Legion of Merit for coordination of air support during the Battle of Vegas Hill in Korea in 1952 when he was Commanding Officer, Marine Tactical Air Control Squadron Two.

He has flown most single-engine type aircraft operated by the Marine Corps, including the F2H, F3D, F4D, F9F, FJ, A4D and, of course, the F4U. He was Commanding Officer, Marine Air Group 24 (1959-60) and Commanding Officer of MCAS IWAKUNI before coming to his present BUWEPS assignment in the summer of 1961.

Sterrett Awards Announced

Bonnie Dick, Champlain Winners

Seven ships of the Atlantic and Pacific Fleets have been selected to receive the Marjorie Sterrett Battleship Fund Awards for FY 1962.

Two carriers were among the 14 ships named by their respective type commanders on the basis of the annual battle efficiency competition: USS *Bon Homme Richard* (CVA-31) in the Pacific Fleet and the USS *Lake Champlain* (CVS-39) in the Atlantic Fleet. Money awards from the fund will be sent to the recreation funds of the ships.

Established in 1917 by the Tribune Association, now the New York Herald Tribune, Incorporated, the Marjorie Sterrett Battleship Fund was initiated by a contribution which accompanied a letter written on February 2, 1916, by 13-year-old Marjorie Sterrett of Brooklyn, N.Y. In her letter to the editor of the *New York Tribune,* she enclosed a week's allowance of one dime to help "Uncle Sam" build a battleship.

The Tribune Association established a trust fund from subsequent contributions. The fund is used to promote battle efficiency among ships.

NATOP NOTICES

Scheduled Distribution

HUL Original Manual	Nov.
HSS/1N First Revision	Nov.
HSS-1 First Revision	Nov.
HSS-2 First Revision	Oct.
F4H Supplement	Nov.
F3D Supplement	Nov.

Watch this box for latest NATOPS distribution data.

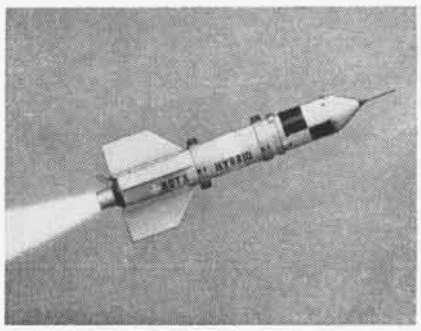
1000 Hours Flown in F8U

Pilot Sets a Marine Corps Record

MAG-11, at NAS ATSUGI, is claiming an all-time record for 1st Lt. James D. Simpson, VMF(AW)-451, who ended 1000 hours of flight time in an F8U-2N *Crusader.*

This is the highest known figure that any one man has accumulated in an F8U *Crusader* in the Marine Corps, states *Torii Teller,* Atsugi station paper.

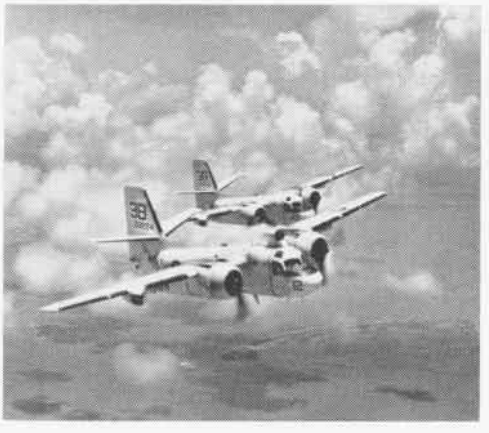
Lt. Simpson completed his flight training at Pensacola in May 1959. He began flying the *Crusader* in October that year at MCAS EL TORO. During the ensuing three-year period, he flew the F8U-1, F8U-2, and the F8U-2N *Crusaders.*



AN ARTIST'S CONCEPT *shows* HYBRID, *a new type of propulsion system combining liquid and solid propellants in a single motor. It has successfully flown in tests at the U.S. Naval Ordnance Test Station, China Lake, Calif.*

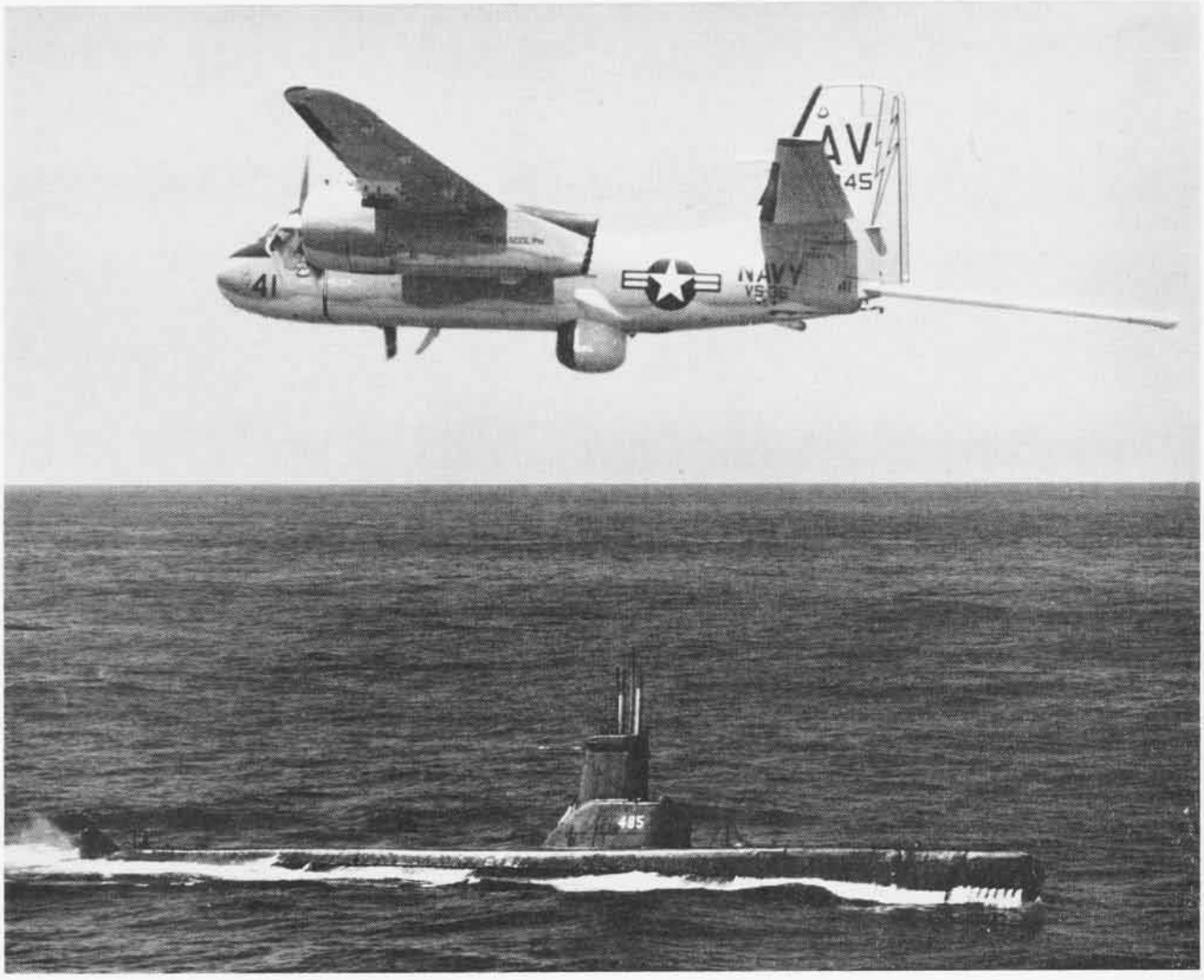
Corpus Christi-based Training Squadron Twenty-eight provides all-weather instrument flight training for all newly designated Naval Aviators slated for VP, VR or VW squadrons. While at VT-28, students receive their first check-out in a service type aircraft. Operating 60 S2F Trackers, and with approximately 70 officers and 400 men, VT-28 is one of the largest squadrons in the Advanced Training Command. Cdr. John W. Stribling is Commanding Officer.

SQUADRON INSIGNIA



TRARON 28

NEW ASW STATUS SYMBOL EMERGES



Ready for wear early in 1963 is the new badge of the Aviation Anti-submarine Warfare Technician (AX). As the Avionics 'doctor' who must 'sweeten' intricate electronics gear when it sours, AX men will assume a key position in the ASW team. Already it has been said that an ASW unit 'will only be as sharp as its AX.' Introduction of the new rating, combining the talents of the expiring ATS and SOA ratings, is another indication of the emphasis being placed on ASW by U. S. Naval Aviation.

AX—Aviation ASW Technician