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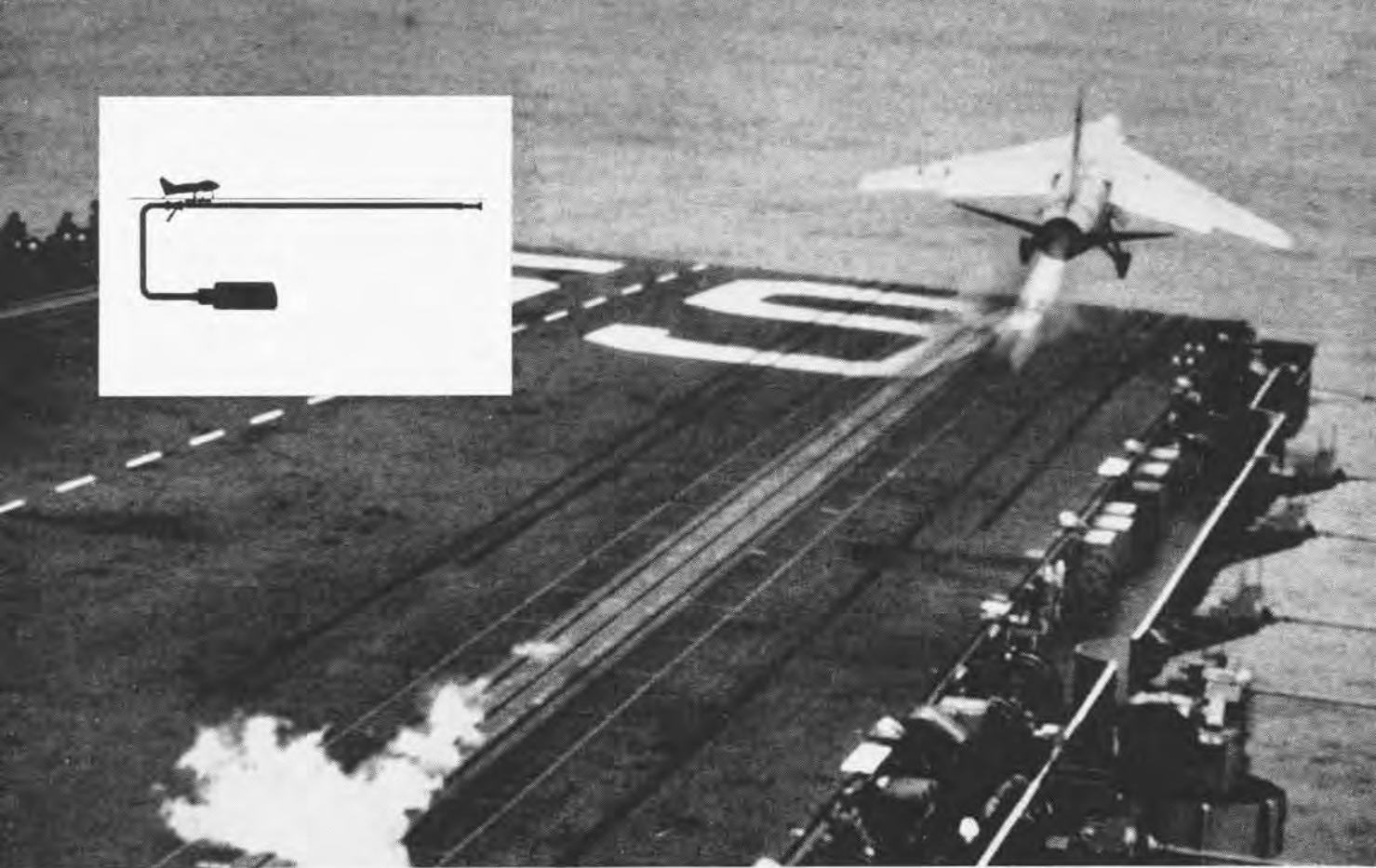
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IT IS LAUNCHING AND RECOVERY EQUIPMENT THAT MAKES A SHIP A CARRIER





POWER FOR THE KICK-OFF

Challenging task of getting aircraft off and on carriers is special mission of new Naval Air Engineering Facility

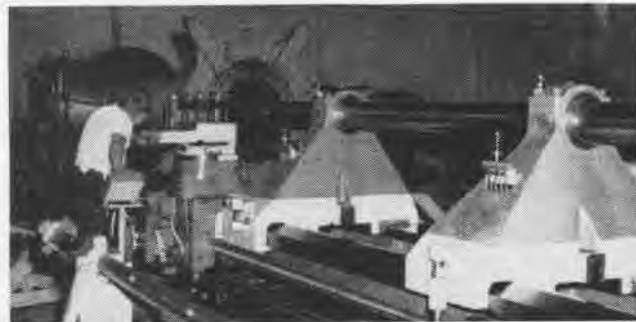
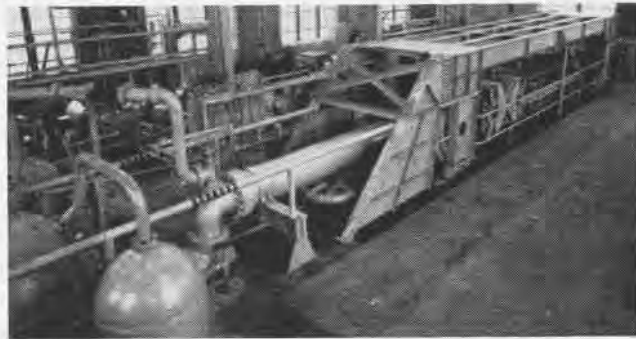
By Ronald J. Hobin

THE NAVY'S role in the defense of the United States is fundamentally based on the aircraft carrier. This weapon, forged in the fire of World War II, has become the heart of the Fleet. The aircraft which it carries and which give it striking power have, through the years, grown heavier and faster. This has resulted in the present-day fact: a ship cannot support modern aircraft unless it relies upon launching and recovery equipment, and this equipment must be one step ahead of the aircraft it services.

On 26 April 1956, the Secretary of the Navy established the Naval Air Engineering Facility (Ships Installations) at Philadelphia for "re-

search, engineering, design, prototyping, development, limited manufacturing and maintenance of launching and recovery devices and related equipment for aircraft and guided missiles." This mission had previously been ably accomplished by the Naval Aircraft Factory, but the mushrooming importance of launching and recovery equipment required the redesignation of the NAF as the NAEF (SI).

On 1 June, special ceremonies were held. RAdm. C. S. Cooper, Deputy Chief of the Bureau of Aeronautics, was the principal speaker. Capt. T. D. Davies accepted the command of NAEF (SI) on June 8th from Capt. H. W. Keopka.



ON POWERFUL and precise production equipment are manufactured the launching and recovery devices which handle the planes and missiles of the Fleet. Picture at top shows Regulus just after catapulting.

IN HIS MESSAGE to the Facility, Adm. Arleigh Burke, CNO, stressed the importance of its mission in no uncertain terms: "The success with which the Navy will operate the aircraft of the future from the carrier of the future has . . . been largely placed in your hands."

The NAEF(SI) is empowered to seek new solutions to the problems of maintaining aircraft at sea; to determine specifications for launching and recovery devices; and to control the design and development of the equipment which it considers to be the best.

NAEF(SI)'s mission lies in two broad areas: launching and recovery equipment, from initial research through design and development to production and installation aboard carriers. The arresting gear is not merely a wire rope lying across the deck which stops the aircraft by some magical elasticity. It is a highly developed system of engine, controls and components on the correct operation of which the pilot's life depends. The catapult is not merely a hook sticking up through the deck. It is a powerful device utilizing the soundest techniques, systems and materials available to get the pilot into the air, flying the fastest, toughest aircraft produced.

The carrier is a relatively stable item: big, rugged and dependable. The only thing constant about aircraft is change. For efficient operation of modern, high speed, jet aircraft aboard carriers, it is necessary to utilize launching and recovery equipment. Such equipment is limited by ship design and challenged by aircraft characteristics.

The great importance of NAEF(SI) today rests on the fact that it is the facility that designs and builds modern launching and recovery equipment. Aircraft for carriers today are designed on the basis of their being launched by powerful catapults and recovered aboard with the full protection of modern barriers.

World War II proved the tremendous value of the catapult. As the weight of aircraft increased and longer takeoffs were required, catapult launchings became common and by the end of the war, some carriers reported over 40 percent of their takeoffs from catapult. No longer were catapults used as emergency and auxiliary equipment. They became a permanent operational link between ship and plane.

Today's Air Navy operates on equipment developed by the personnel of NAEF(SI). The H8 catapult has been the workhorse of Naval Aviation since the end of WW II. As the end of a long line of hydraulic catapults, it has performed admirably in all quarters of the globe, in all kinds of weather, and under all launching conditions. Efficient and dependable as it is, however, the H8 is reaching the outside limit of its design capabilities. Any substantial increase in performance could only be purchased at the price of a prohibitive increase in the weight of the catapult itself.

EVEN WHILE the H8 was being used during the Korean conflict, it was clear that some propulsive medium other than the hydraulic ram and wire reeving had to be found to launch modern naval aircraft without an unacceptable increase in catapult size. The answer proved to be steam and the slotted cylinder. The steam catapults C7 and C11, newly developed by NAEF(SI), are now aboard or going aboard all first-line carriers, including supercarriers of the Forrestal class. These catapults can handle any attack aircraft now being developed, thus enabling the Navy to take

these aircraft to sea. Some idea of the power of the C7 can be gathered from the fact that if a four-engined commercial airliner could be placed aboard ship, the C7 could launch it.

The C7 and C11 steam catapults are indeed the latest word in launching devices. But the attitude of NAEF(SI) is that the latest word is never the last word. Already undergoing test, on the drawing boards, or in various stages of analysis are a number of more advanced catapults. One is a new steam model, and two will use other propellants. Each of these is a germinating answer to the eternal launching problem.

The second critical operation required in keeping aviation on the seas is to bring the aircraft back aboard the carrier. Anyone who is aware of the postage-stamp size of even the biggest carriers, when seen from the air, appreciates the magnitude of this problem. To bring an airplane safely to rest in such a short distance requires arresting devices of precise and dependable performance. These devices—the cross-deck wires, the mammoth arresting engines, the constant run-out control valves—are a major responsibility of NAEF(SI).

No operational aircraft lands on a carrier without utilizing equipment designed by the personnel of NAEF(SI). The Mark 4, Mark 5 and Mark 7 arresting engines were developed there. The new Mark 7 Mod. 2 and the Mark 8 are now undergoing development. The wire rope barriers and the nylon barricades, which are the ultimate insurance for the landing pilot and which are finding application on commercial and Air Force fields, were invented and brought to their present standard by NAEF(SI).

As operational aircraft become heavier and faster, the problem of recovery grows. The NAEF(SI) designer of recovery devices is fully aware of this fact. He is ready for today and for tomorrow—and he is already making sure that he will be ready for the day after tomorrow.

IN ADDITION to launching and recovery equipment, NAEF(SI) is responsible for a thousand and one items which make a ship a floating airfield. For example, the installation of the new mirror landing system will be the responsibility of NAEF(SI) as is the design of the Primary Flight Control area and lay-out improvements for the new angled deck. Indeed, the design of all specialized aeronautical equipment aboard ship and of all Air Department space aboard ship comes under the direction of NAEF(SI).

To fulfill its broad mission, NAEF(SI) is required first to lay a strong foundation of basic and applied research. The strength of materials is a constant consideration, and intricate mathematical gymnastics are performed in the eternal struggle to reduce weight while increasing capacity. In the analytical sections of NAEF(SI), the black boxes continually grind out fresh approaches to the solution of launching and recovery problems; but black boxes can perform only when they are fed valid data, and valid data can be selected only by the trained mind of the experienced mathematician, physicist or engineer.

Wire rope—the kind that holds up bridges—is a standard NAEF(SI) material. This one item alone requires extensive basic research into the effects of vibration on cables under extreme loadings. Problems met by civil engineers in building bridges are static and admit of comparatively simple



FIRST LAUNCHING of an F7U-3 at the XC-11 Steam Catapult Test Site. The 32,000-pound plane is airborne at a speed of over 100 knots in 200 feet, a distance of roughly five times the airplane's length.



SERIES ON THESE PAGES ILLUSTRATES RELIABILITY OF BARRICADE



AN F9F PANTHER IS BEING LANDED ABOARD USS LAKE CHAMPLAIN

solution, but the problems encountered by mechanical and aeronautical engineers when a ten-ton airplane moves at over 125-knots and hits a wire rope, are manifold and complex.

HYDRAULIC FLUID is the medium used in arresting engines to dissipate the energy generated by the landing aircraft as it is brought to a sudden stop. The fluid in the arresting engine is subjected to instantaneous pressure and temperature change of an order nowhere else found in the realm of mechanical engineering. Hydraulics is, therefore, a field in which NAEF(SI) is performing major research.

To operate launching and recovery equipment, control devices must work quickly, efficiently and consistently. NAEF(SI) investigates and develops control devices operating on mechanical, hydraulic and electrical principles. All means must be investigated to achieve the required end—reliable control.

The Facility must, however, also take into account the needs of stricken aircraft in an emergency. In the development of deck equipment, it therefore aims to obtain the most efficient configuration of barriers and barricades.

To carry out its mission, NAEF(SI) utilizes test apparatus ranging from the five-million-dollar XCIT site to component testers, jury-rigged by inventive mechanics in the rush of a crash program. All in all, NAEF(SI) operates ten catapult and arresting gear sites, located at Mustin Field, Philadelphia, and Patuxent River, Maryland. At present, several high-capacity sites are under construction at the new \$16 million Naval Ship Installations Test Facility at Lakehurst, New Jersey, and will be in operation to a limited degree late this year.

These sites will enable NAEF(SI) to develop the new catapults and arresting engines themselves, as well as new components for this equipment. These sites will also permit extension of the catapult and arresting gear program to include operation with the latest high performance aircraft. Current development work includes the new Mark 7 Mod. 2 arresting gear, the XC13 steam catapult, and the "box-type" barricade.

Test and development is the insurance which, along with research, enables NAEF(SI) to stay one step ahead of the

aircraft designer. Catapults and arresting gear undergoing development today will service the aircraft now on the drawing boards. Catapults and arresting gear on the drawing boards today will service the planes still in the mind of the aircraft designer. This means that NAEF(SI) lives, as a matter of course, with one foot in the future.

The shops at NAEF(SI) and the people who man them are among the finest and most versatile in the Naval Establishment. There are few manufacturing activities anywhere which own and operate the variety of tools found at the Philadelphia Facility. For example, NAEF(SI) boasts the largest vertical hone in the United States, as well as one of the largest lathes and one of the largest planer-mills. Other specialized equipment includes heavy duty swaging machines and a battery of high precision machine tools.

MANUFACTURERS work hand in glove with design and development people. This guarantees a smoothness in manufacturing and a realism in design infrequently found in engineering concerns. Continuous exchange of information gives the manufacturing department an insight into the goals of the design engineer and keeps the design engineer abreast of the latest in manufacturing methods and techniques. A further extension of this liaison is the "Shop Assisted Engineering" program in which shop skills assist by fabrication of a three-dimensional mockup for solution of the solid geometry problems in design. This will result in earlier fleet availability of higher performance gear.

The shops build the prototypes of equipment and also manufacture the first operational models of launching and recovery devices in any new series. NAEF(SI) manufactures all change kits, which include components to be issued throughout the Fleet, to increase the capacity or improve the performance of launching and recovery equipment.

The many urgent demands on NAEF(SI)'s manufacturing facilities require careful planning and scheduling. In its emphasis on the up-to-date, NAEF(SI) is instituting a forward-looking production planning system which will insure that the prototype manufacturing, so essential to continued development, is carried forward to meet Fleet demands. Streamlined planning is an essential element in dovetailing accurate blueprints into practical production.



ARRESTING GEAR WAS BUILT BY NAVAL AIR ENGINEERING FACILITY



HIGHLY CRITICAL OPERATION IS COMPLETED EFFICIENTLY, SAFELY

Catapults and recovery apparatus can be described as heavy industrial equipment. "Gargantuan" is the word for them! In launching and recovery manufacturing, however, there is never found the freedom allowed to the private industrial equipment firm. Industrial safety factors are on the order of 6.0 while the necessity to minimize inertial effects limits NAEF(SI) designers to factors on the order of 1.5. Some idea of NAEF(SI)'s manufacturing problem is grasped if one envisions the task of constructing a railroad locomotive to the specifications and tolerances of a wristwatch.

In addition to research, development and manufacturing, NAEF(SI) must supply the Fleet a variety of materials, information and services. Its people must be ready at a moment's notice to trouble-shoot a job aboard a carrier anywhere from the Mediterranean to Japan.

A constant stream of information flows from NAEF(SI) to the Fleet: handbooks of operation and maintenance, design changes, and service bulletins. This information is "the word" which enables operating personnel to get the most out of launching and recovery equipment.

To allow "the word" to flow in the opposite direction, there is the FUR—Failure Unsatisfactory Report—system. This system enables the operating forces to tell NAEF(SI) when something is not working to the satisfaction of the customer. There will always be room for improvement in equipment. If it were afraid of troubles and problems, the Navy would have gone out of business long ago. The FUR system is operated and monitored by NAEF(SI) in order that it may know how its equipment is functioning. Only by such a system can the Fleet be provided with the quality equipment it needs in accomplishing its assigned missions.

PERSONNEL oversee the installation of all launching and recovery equipment and keep a constant check on overhaul and maintenance methods. At present, the Facility is embarked on a program to standardize every item associated with launching and recovery. It is hoped that standardization will prevail throughout the Fleet in every material, procedure and component down to the legendary last nut and bolt.

Naval Aviators breathe a sigh of relief when they receive

the cut from the LSO; they are safely home. In the instant between the cut and the plane's coming to rest, however, a complex and critical event occurs. The cross-deck wire picked up by the plane transmits the energy of the decelerating aircraft to the arresting engine below deck, where it is absorbed. This event is one of the two major concerns of NAEF(SI) and the reason for its research and development effort: bringing the pilot safely aboard. The other major concern is to launch him successfully, and the major means of insuring this is the catapult. For the pilot and the plane are heavily dependent upon catapult and arresting gear for safe "getting off" and "getting on."

ALL OF THE equipment involved in launching and recovery must operate correctly, not 99 times in a 100, but 100 times in 100. Many of the carrier planes in operation today could not be launched or recovered without catapult and arresting gear. The A-bomb carrying A4D, the multi-jet A3D, the submarine-chasing S2F—all require the assistance of NAEF(SI).

As the guided missile grows in importance, NAEF(SI) again enters the picture. A major problem in the utilization of missiles is the development of efficient launching and handling equipment, especially in the case of missiles employing liquid fuel rocket engines. The Facility must insure that the missile is stored safely and delivered to the launcher without a hitch.

NAEF(SI)'s missile launching responsibilities are twofold: the adaptation of present aircraft catapults, and the development of launchers exclusively for missile use. The launching of the *Regulus* by the CAT steam catapult is an example of adaptation, and the current program for the design of a launcher for the IRBM exemplifies a special development.

At the June 1 ceremonies, RAdm. Cooper stressed the added service the Facility would perform, pointing out that as the Naval Aircraft Factory, it had long since proved its ability and worth. Under its new name, he said, it has a wide and important field of endeavor. "Naval Aviation will keep pace with the tremendous advances . . . not only in the conventional aircraft, but in missiles, seaplanes, nuclear aircraft propulsion and new concepts of warfare."



GRAMPAW PETTIBONE

Orchids or Lilies?

Cruising along at 34,000 feet, the pilot of an FJ-3 noticed an engine rumble followed by a loud explosion. Engine tachometer and tailpipe temperature immediately dropped to zero accompanied by loss of thrust. The pilot set up a 220-knot glide toward the home field.

At high key of 6200 feet, he lowered the landing gear by the emergency procedure, then he held 155-160 knots to the 45-degree position where he lowered the flaps and increased his speed to 170 knots. Touchdown was



made 1000-1500 feet down the runway at 130 knots to terminate the flight, and the pilot secured to get a cup of coffee.



Grampaw Pettibone Says:

Just how cool can you get? There's no question about it—this lad with only 15 hours in model and less than 500 total hours handled the situation like a veteran. He did *well*, but did he do *right*? He saved himself and the airplane by skill *and* luck.

In the FJ the safe conclusion of an air emergency caused by engine seizure is directly dependent on the effective amount of reserve electrical power held by the battery at the time of seizure. However, the exact amount of battery time left cannot be calculated since battery condition is related to the quality of ground servicing and maintenance received, how quickly the pilot shuts off electrical systems non-essential to emergency flight, ambient temperature, and other factors.

Since the electrically-operated emergency flight control system in the FJ is dependent on battery power, the ques-



tion facing a pilot is which will come first—a successful touchdown or a pooped out battery.

To eject or not to eject, that is the next question. Squadron policy and pilot's discretion provide the answer—the local people should know how well their batteries are maintained and whether they have a fighting chance of getting down before control of the aircraft is lost following engine seizure. But the element of chance is involved, and control of an aircraft could and has been lost after it was too late for successful ejection.

This pilot rates orchids for a professional performance in saving an expensive airplane—but the price of failure would have been a bouquet of lilies.

I'm told that Aircraft Service Change No. 381 will provide for installation of a drop-out generator to furnish electrical power in case of engine seizure in the FJ-3.

Clipped Wings

The pilots of two F9F-5's scheduled for simulated instruments engaged in some low, unscheduled passes across a busy highway and into a canyon. During what became the final pass, the pilot of the second aircraft, close behind and overtaking the first, flew under some high tension wires and

then, seeing a steep hill just ahead, pulled up abruptly.

In order to avoid a collision with the first aircraft, the second one executed a sharp climbing right turn as the lead pilot swung to the left. The second airplane mushed over the first, his low right wing striking the high right wing of the first, resulting in a mutual wing-shearing.

The overtaken aircraft crashed and exploded before the pilot had a chance to eject. The overtaking aircraft gained some altitude and the pilot ejected, but for reasons unknown failed to actuate his parachute.



Grampaw Pettibone Says:

Two lives clipped short—tragically and unnecessarily.

The *immediate* cause of the accident was assessed as improper technique employed in the attempted recovery from the low pass; the *overall* cause, the fact that the pilots engaged in improper and unsafe flight conduct by performing an unscheduled, unbriefed, low-level pass in unfavorable terrain, placing the aircraft in perilous positions and resulting in a mid-air collision.

One pilot had a total of 400 flight hours, the other a shade over 500. Hence, both were in the "danger area" that we've talked about so many times before. It seems like just about every pilot has to go through a period when he decides that the rules were made for other gents less daring and skillful than himself.

Maybe some of you lads right out of flight training will take note of what happened to these pilots and temper your enthusiasm with a full measure of caution as you approach the 400-600 hour danger area. After all, it's your neck.

Dear Grampaw Pettibone,

Maybe this is a little out of your line, Gramp, but we think you are pretty good at reaching those who can best profit by your sound advice. And since in your day the pilot who pressed the trigger was also the man who supervised the boresighting of the gun, I'm sure you qualify as an expert on our problem. Will you give the youngsters a few words of wisdom on situations similar to the following?

About a year ago, after boresighting



the guns of an airplane at the sighting-in butts, the crew tested their handiwork by firing. But somebody forgot! The muzzle end part of the boresight equipment had not been removed when the gun was loaded and fired. The flying debris from the barrel rupture killed a man who was too close for safety. As a result of this, BUORD provided a red warning flag for each boresight kit, with instructions posted in the kit requiring conspicuous display when the muzzle end assembly is installed in the barrel.

Now the second ground range accident has been reported. This time they had the flag and the instructions, but didn't use them. The two Ordnancemen, Second Class, and Mechanic Third doing the job were not injured, but the resulting damage to the aircraft was significant indeed.

Grampaw, Sir, will you tell them about officer responsibilities and officer supervision, checkoff lists, and check-and-double-check?

Capt., USN BUORD



Grampaw Pettibone Says:

Now I don't imagine either one of these lads would try to shoot rabbits if they had a rifle barrel that was full of mud. And if they did, the only way they'd get any rabbits would be to club them. These boys were either just plain careless or blind—and there's no vision like supervision. There's no point in my saying any more—it appears to me that the good Captain has done an excellent job of getting the idea across himself.

What's that light?



Dear Gramp:

With all the pro and con discussion on the mirror system these days I thought you might like to know how some of us who have been using it feel about it.

As to the overall picture, I think it's a great improvement for day work, and for night work, there is no comparison. It makes everything real simple—which, in my opinion, is the biggest drawback. People tend to become overconfident. I know, because last night I left a hook mark on the ramp, and it was nothing more or less than getting careless. I've checked with other pilots in the unit and they feel the same way as I do about this business.

You can't do away with the LSO at this time for the simple reason that since the mirror is a mechanical gadget, it can foul up at any time. However, we have had phenomenal luck with this one—we've never had to use the paddles. Another thing, an aircraft might hit the mirror and damage it. This almost happened to us one night when an AD went over the side on takeoff.

Don't get me wrong. I'm not running down the mirror system. I think it's the greatest. But I can't help wondering how much of the reduction in landing accidents is due to the mirror and how much to the angled deck. However, I realize that's an academic question since it can't be used on a straight deck anyhow. It really is the finest little gadget that was ever invented.

LCDR, USN



Grampaw Pettibone Says:

The boys who grind out the statistics say that *both* the angled deck and the mirror landing system increase

the safety record for carrier landings. Recent operations show that pilots are less than half as likely to incur major damage accidents when landing on angled instead of axial decks. This reduced likelihood is again cut in half if the angled deck carrier has the mirror system installed.

Anybody Looking?

Have you ever watched your copilot set the directional gyro? Then have you watched him tune the radio, noticing very carefully the frequency that he is selecting? *You have?*

While you were doing this, *who was watching outside?*



Grampaw Pettibone Says:

There's a time and place for doing everything that has to be done in an airplane, but it should be coordinated well enough for someone to be watching outside at all times. Mid-air collisions are still relatively rare occurrences, but closing speeds are increasing, and we don't usually get to interview any survivors from head-on collisions.

Held Himself Together

A *Banshee* made a forced landing at a civil airport in the Caribbean, hitting the airstrip at higher than normal landing speed and traveling the entire 5000 feet before coming to a stop at the end of the runway.

One of the speed brakes did not retract during a rapid descent, causing an off-center drag which made the aircraft difficult to handle and led to the forced landing. To complicate matters further, the port wheel was damaged but, fortunately, the tire did not blow out.

The pilot pulled through on a combination of skill and good luck—over a hundred boxes of dynamite were deposited only a short distance from the end of the runway.



Grampaw Pettibone Says:

Congrats to this lad for not going to pieces.



USS GUAVINA IN NEW ROLE

DURING A WEEK long Anti-Submarine Warfare exercise off the coast of Florida, a detachment of four P5M-2 Martin *Marlins* were tender-based aboard the USS *Guavina*. This was the first such refueling and anti-submarine operations conducted from a submarine while at sea.

During the exercise, the refueler submarine USS *Guavina* acted as a floating base for the 13 officers and 33 enlisted men of VP-44—including

An advantage suggested by the success of this operation is a mobility for seaplanes in areas where bases have not been established. Another advantage lies in the element of surprise afforded by the combination of underwater craft, and aircraft. When not engaged in the refueling operation, a submarine can stay submerged to avoid enemy detection. Or, it can submerge immediately after refueling aircraft, and thus keep secret the "base of operations."



BACK FROM PATROL, THE MARLIN LIES AFT OF THE GUAVINA, TO TAKE ON SUPPLIES

Cdr. M. J. Burns, squadron CO. It berthed, fed, and gave logistic support to the plane crews. To furnish sleeping accommodations for the airmen, the limited space aboard the sub was stretched as far as possible. Extra bunks were rigged in the torpedo room for some of the *Guavina's* guests.

At night the aircraft themselves were anchored in the vicinity of their 'tender,' tied up in the open sea to the mooring buoys that had been laid by the *Guavina*.

While operations on the open sea were being conducted, aviation fuel and other logistic requirements were transferred from the submarine to the aircraft. Supplies and personnel were moved by means of a platform of inflatable sealed bins extending from the ship to the plane. When partially filled with water, the bins submerged, with 18 to 24 inches remaining above water, and thus served as a pontoon bridge. Crew members walked freely over this bridge during the refueling operations.

Navy Announces the F5D Configuration Similar to F4D-1

The Navy and Douglas Aircraft have announced the flight of a new all-weather supersonic, carrier-based fighter, the F5D-1 *Skylancer*.

With Douglas test pilot R. O. "Bob" Rahn at the controls, the *Skylancer* streaked over the Mojave Desert for over an hour. In subsequent flights, the F5D-1 exceeded the speed of sound in level flight.

The new plane bears a close resemblance to its predecessor, the F4D-1 *Skyray*, but has greatly increased speed, range and performance. A V-shaped windshield on the cockpit enclosure contributes to its higher speed capability.

Powered by an afterburner-equipped J-57-P-8, the new plane was designed for catapult take-off from existing and projected carriers. Its high rate of climb and range make it ideally suited for jet interception.

HS-9 Commissioned at NAS Cdr. Early will Command Squadron

HS-9, commissioned at NAS QUONSET POINT in June, will embark on carriers of the *Essex*-class for coordinated sub-tracking operations with Fleet units from ComDesLant and the New London Submarine Base. Fleet Air Wing-3's P2V *Neptunes* and NAS LAKEHURST blimps will also operate with the versatile helicopters of HS-9.

The squadron will operate under the administrative control of RAdm. J. M. Hoskins, ComFAirQuonset and operationally under the command of RAdm. W. K. Goodney, ComAntiSubLant. Cdr. L. W. Early is skipper of HS-9.

IFR-IQ?

What is the significance of the (L) on the line from a compulsory reporting point to the radio facility identification box as shown on RaFacs charts?

Answer on Page 40

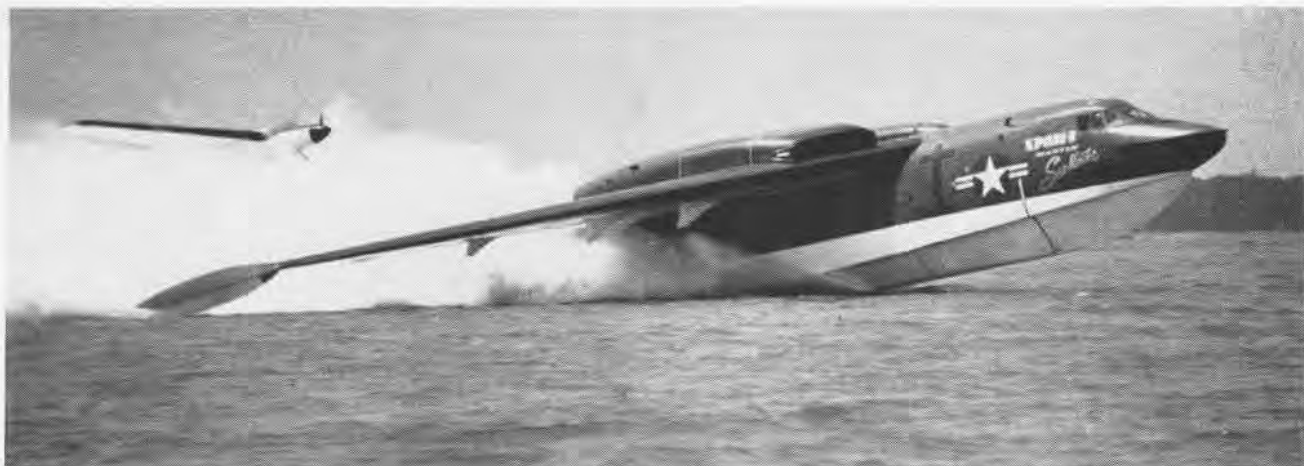
Navy Releases Reservists 25,000 in Inactive Status to Go

About 25,000 inactive Naval Reserve officers who have not participated in Navy training programs for at least three years will be given honorable discharges effective October 1, 1956, the Navy Department announced in May.

All those affected have, for various reasons, failed to participate in training programs that are conducted to maintain the Reserve in readiness for wartime or emergency duties. Civilian affairs or geographical locations here or abroad have contributed to this lack of participation.

Records of these officers have been screened by a disposition board and those qualified were given the opportunity to be placed on the retired list, to resign their commissions, or to become active in the Reserve. Those officers who did not indicate a preference are being given honorable discharges.

The reduction is a continuation of the Navy's policy to maintain a strong and effective Reserve, within the numerical limits required by law and planned mobilization needs.



THE WORLD'S FIRST MULTI-JET SEAPLANE, THE XP6M-1 SEAMASTER, DEMONSTRATES THE 'NEW LOOK' IN ITS HULL DESIGN

MADE FOR NAVY BY MARTIN

★ *This is the third of a series of special articles about the aircraft companies that have built and are building planes for the U. S. Navy.* ★

GLENN L. MARTIN was a forward-looking man. His ideas were far-reaching and significant. When he died a few months ago, the world of aviation lost a pioneer.

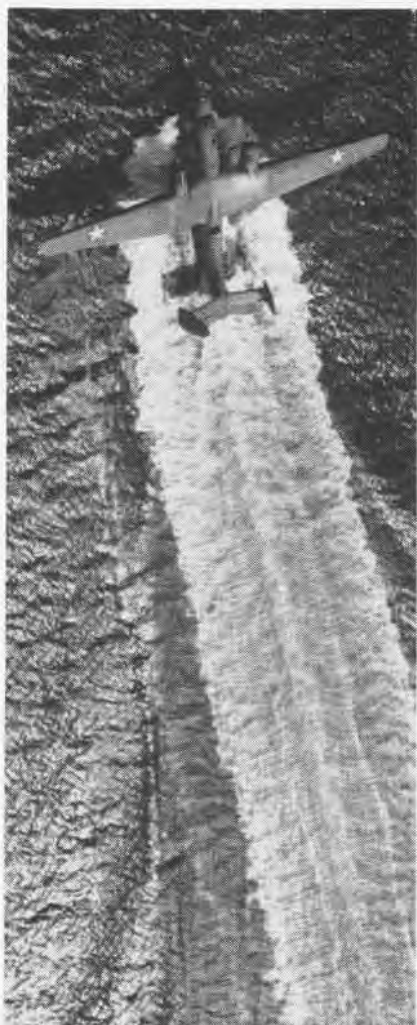
The Wrights' historic flight at Kitty Hawk made a life-long impression on Martin. Only in his teens at the time, he made a resolute decision that aviation would be his life's career. Martin never wavered from that decision.

He gathered around him keen scientific minds, interested in aeronautical research and development. This resulted in a dynamic aircraft company, a leader in the industry.

The Glenn L. Martin Company has continued to base its success on the scientific approach. It not only builds today's aircraft, but through vital research, it is a very important factor in the present study of future outer space travel.



HYDROFLAPS INCREASE MANEUVERABILITY OF P5M-1 MARLIN, SUCCESSOR OF MARINER



PBM MARINER HAD LONG SERVICE RECORD

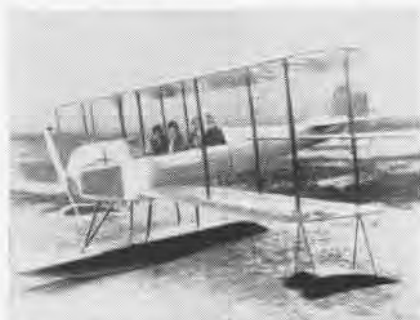
DURING THE first half-century of powered flight, the Glenn L. Martin Company has established itself as the nation's oldest aircraft manufacturer in continuous existence. It has become a leader in the development of seaplanes, bombers, and tactical missiles. Like most other aircraft manufacturers, Martin sprang from a humble origin.

Six years after the Wrights' first flight, young Glenn L. Martin, with the aid of two helpers, built his first airplane in an abandoned church in Santa Ana, Calif. He had no plans to go by. His guides to design were newspaper and magazine pictures of the Wright plane. The fact that the bamboo and wire craft, powered by a 30hp Eldridge, flew was due partly to Martin's genius, and partly to his determination.

During the next decade, as the Wright-Martin Company,



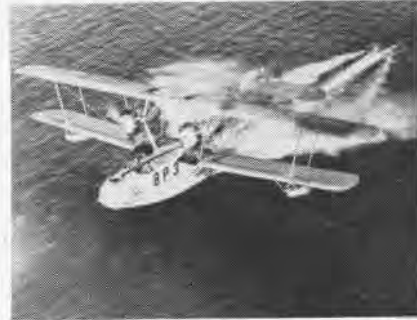
AERIAL VIEW OF THE MARTIN PLANT #1 AT MIDDLE RIVER, MD.



DATE OF HYDROPLANE IS ABOUT 1913



A T4M-1 CIRCLES FOR A CARRIER LANDING



PM-1 WAS EARLY OCEAN PATROL SEAPLANE

it proved its versatility, producing bombers, seaplane and passenger models. It was one of the first companies to proclaim the airplane as a decisive war weapon. In 1913, the company sold the Army Signal Corps its first trainer and its first armoured aircraft. In 1916, Martin delivered its first plane to the Navy. In 1917, the idea of the paratrooper was envisaged as Martin experimented with an aircraft to drop a motorcycle and its rider.

In 1918, the Martin Company moved to Cleveland, Ohio. Here the Glenn L. Martin bomber was produced, the first large land machine of American design built in answer to WW I demands. During the twenties, Martin made further advances in American aviation. It developed the first experimental night mail plane (1922); the first American metal monoplane and the first to carry a 2,000-lb. bomb (1922); the first all-metal seaplane (1923); the first air-cooled engine bomber and the first alloy-metal fuselage (1926).

The Martin Company moved, in 1929, to its present site at Middle River, near Baltimore, Md. Since Martin was primarily a manufacturer of military planes, its founder wanted to be close to fighting service headquarters in Washington. Another reason for the move was the fact that the early freezes on the Great Lakes hampered the testing of water-based aircraft.

Martin's 1917 contract with the Navy called for three two-place tractor seaplanes. A 1920 contract with Martin was for ten aircraft—torpedo and bomber-torpedo planes. An aircraft under a 1925 contract was for the SC-2 which closely resembled the T3M which was developed for the Navy about the same time. This plane-type reached further development in the T4M, a three purpose craft—scouting,

torpedo or bomber. This biplane featured interchangeable wheel undercarriage and twin floats, which readily converted the craft from landplane to seaplane. The T4M was usually carrier-based.

The BM, developed in 1931, was the first dive bomber with all metal frame to be approved by the Navy. The Navy's two squadrons of BM's were the first capable of carrying a 1000-lb. bomb in a terminal velocity vertical dive and of recovering from the dive without dropping the bomb.

Although the company continued to produce different plane-types, over the years the Navy man began to associate Martin with seaplanes and amphibians. For more than two decades, Martin has been a prime contractor for the Navy patrol seaplanes and flying boat transports.

The series began with the move to Middle River, and a contract for the PM twin-engine biplane patrol flying boat. These seaplanes boasted a top speed of 123 miles per hour and a range of 937 miles. The PM could be used as a bomber, and was equipped to carry a large pay-load. In 1931, Martin was producing the P3M, a long-range patrol/bomber flying boat. This high-wing monoplane was built around two P&W *Wasp* engines and carried a crew of four. With a bomb load, its maximum speed was 113 mph, its range was 450 miles; as a patrol plane, its range was 1000 miles.

The history of the famous and venerable PBM *Mariner* series began in 1936 when the Navy placed its original order. A full-sized prototype was delivered in 1938. The PBM-1 was designed as a twin-engined medium-range bomber/patrol flying boat. Its principal characteristics were the "gull" wing arrangement and retractable wing-tip floats. It could accommodate a crew of seven and was fitted



PRODUCTION LINE OF P5M-1 MARLINS IS IMPRESSIVE SIGHT

military passengers and cargo on regular weekly runs between Alameda and Honolulu.

After WW II, Martin produced a single-seat attack bomber for the Navy, the *AM Mauler*. The cantilever low wings folded upward for stowage. Its 3,000 hp P&W *Wasp-Major* engine gave it a maximum speed of over 350 mph and a range of over 1,700 miles. Its diving speed surpassed 500 mph.

The *P4M Mercator*, delivered to the Navy in 1950, was a long-range patrol landplane with a combined power plant of reciprocating engines and turbojets. Each engine nacelle contained one P&W *Wasp-Major* engine and one Allison jet unit. Maximum speed was over 350 mph at 16,400 feet.

The year 1948 marked the first flight of the *P5M-1 Marlin*, a twin-engine patrol flying boat, built for the Navy



EXPERIMENTAL P2M-1 HAD THREE ENGINES



BM-1 WAS NAVY ALL-METAL DIVE BOMBER



MAULER WAS SINGLE-SEAT ATTACK BOMBER

with two 1,350-hp air-cooled *Wright Cyclone* engines.

In the later models of the *Mariner*, the retractable wing-tip floats were replaced by fixed floats. Over the years, refinements in design were incorporated to give it more range, greater striking power and more adequate protective armament, larger load capacity. The *PBM-5* had a maximum speed of over 200 mph, and a range of 3,000 miles. The *PBM-5A* was an amphibian version of the *Mariner*. The forward portion of the hull was redesigned and strengthened, and amphibian landing gear added. The main wheels could be raised up into the sides of the hull, and the front wheel lifted into the underside of the nose.

In production for nine years, more than 1,000 *PBM*'s were delivered to the Navy. Because of their WW II performance, they were again called upon to strengthen Naval air power during the Korean conflict.

The last operational *PBM* squadron turned in its *Mariners* in June, marking the end of an era in Naval Aviation. It will largely be replaced by the *P5M Marlin*. The *Mariners* are now being used in training commands.

The *Mars* prototype made its first service flight as a Naval transport in December 1943. Originally built as an experimental patrol bomber, it was subsequently modified to serve as a cargo transport with the designation *JRM*. This four-engine flying boat is one of the largest aircraft ever built. Its wing-span is as long as a 20-story building is high, and its hull has the cubic space of an average 15-room house. The mammoth wings are thick enough for mechanics to stand inside and service the engines in flight. Until recently, four of these aircraft—the *Philippine*, *Hawaii*, *Marianas*, and *Caroline Mars*—constituted the "big four" in water-based aviation, transporting a combination of

to test a new type of hull design, intended to provide improved hydrodynamic characteristics. The chief design feature is the length and depth of the hull aft of the main Vee step. This long after-body is designed to permit safer landings in rough seas without excessive pitching and bouncing, and to reduce normal take-off time and distance. Added buoyancy aft protects the tail surfaces in rough seas.

The forward portion of the hull and wings are similar to the *Mariner*, but new large central vertical tail surfaces are provided for maximum control and stability. Primarily designed as an anti-submarine weapon to replace the old *PBM*'s, and equipped with the latest electronic detecting gear, the *P5M* was the first twin-engine flying boat to be developed for the Navy since WW II. In 1954, Martin delivered the *P5M-2*. The main external difference between this and its predecessor is the "T"-tail with the horizontal surfaces on top of the fin. This *Marlin* has a lower bow chine line to reduce spray damages to the airscrews, increased fuel capacity, and the very newest ASW equipment. Maximum speed is 250 mph.

Martin's latest Navy plane is the *P6M-1 Seamaster*. This four-jet, swept-wing high-performance flying boat is in the 600-mph class, and is "the fastest low-altitude attack aircraft in existence today," according to Adm. Arleigh Burke, Chief of Naval Operations. The *Seamaster*'s two prime functions will be mine-laying and photographic reconnaissance, but it can also undertake other combat missions.

The *P6M* is designed to remain in operation, in the air or afloat, for long periods of time. Carrying a crew of four, it is powered by four Allison *J-71* turbojet engines with take-off afterburners. Its speed, swept wings, and narrow hull make it comparable to a modern land-based jet bomber.



THE WING SPAN OF THE JRM MARS IS AS LONG AS A 20-STORY BUILDING IS HIGH. HERE 125 MEN LINE THE MAMMOTH WINGS

IN DESIGN, the *Seamaster* hull represents the culmination of a long series of Martin water-based aircraft developments, beginning with the WW II PBM *Mariners*, and extending on through the giant *Mars*, and the P5M *Marlins*. Martin's second prototype P6M successfully made its first test flight over Chesapeake Bay on May 18, 1956.

Over the years, Martin has not restricted itself merely to the production of airplanes. It has also been active in the field of guided missile research and development.

The year 1948 marked the first flight of the *Gorgon IV*, a pilotless ramjet aircraft built for the Navy. Piloted by remote control and tracked by radar, the *Gorgon* was launched from a mother aircraft and flight information was telemetered to a ground receiving station by an electronic "brain." This experimental craft was used to investigate ramjet performance in free controlled subsonic flight. The production development of the *Gorgon IV*, was the KDM-1 *Plover*. Produced for the Navy in 1950, *Plover* is a radio controlled ramjet-powered anti-aircraft target drone.

At Martin, the scientific approach to upper atmosphere research has most recently led to work which is now under way on the rocket launching vehicle for the first earth satellite, to be launched during the coming International Geophysical Year. This project, on which the attention of the world is focused, will inevitably prove a major step toward development of the space ship of the future. It is also the fruits of work begun by Martin over a decade ago, in which a series of 12 *Viking* research rockets were developed, launched, and then finally achieved an altitude record of 158 miles. The *Viking* project at White Sands, N. M., gained invaluable data in exploring altitudes previously

closed to research in cosmic rays, atmospheric composition, radio propagation, photography and spectroscopy.

BUAER and the Office of Naval Research recently announced the awarding of a contract to the Martin Company for study of an airframe for nuclear-powered aircraft.

George M. Bunker, president of the Glenn L. Martin Company, took office in 1952 with the approval of Mr. Martin himself. Currently employing more than 20,000, the two major Martin plants at Middle River occupy a 1,260-acre site. The company maintains one of the world's largest private airports, and nearby Chesapeake Bay provides excellent "proving grounds" for seaplane flight-tests. Late in 1955, Martin announced plans for a new multi-million dollar Denver Division. Here the Company will work on a new intercontinental ballistic missile, the *Titan*.

As the second half-century of powered flight unfolds more rapidly than the first, the scientific approach in aircraft manufacturing becomes increasingly complex. The only missing link is a parallel acceleration in basic research. Usually, such research has been primarily the function of a university or government laboratory.

In the belief that basic research can be nourished and should thrive in an environment using the skills and resources of industry, Martin has established a subsidiary corporation known as RIAS, Inc. The new company will be housed in a building to be constructed in the Baltimore-Washington area. It will be staffed with a selected group of scientists who will be encouraged to create their own program of research aimed to go beyond the present frontiers of man's advancing scientific knowledge in aeronautics.



DISTINCTIVE 'T' TAIL MARKS THE P5M-2 P5M-1 IS STILL SERVING WITH THE FLEET AMPHIBIAN MODEL OF MARINER IS PBM-5A



THE FLEET CHAMPIONS, SHARPSHOOTERS AND MAINTENANCE MEN, MIRAMAR'S VF-112

NAVY FLEET AIR GUNNERY MEET

FLYING HIGH and shooting true, a crack shot team of VF-112 has won the title of "the Navy's finest aerial gunners." To take top honors in the first Navy Fleet Air Gunnery Meet, hosted by the Fleet Air Gunnery Unit at NAAS EL CENTRO, the dead-eye Dicks of VF-112 hung up a score of 2964 points, closely trailed by VMF-314 with a score of 2544 points. Bringing in the highest average individual score in the meet, Lt. A. N. Wellman of VF-43 won the trophy for individual "best shot in the Navy," with 1096 points.

Chosen from fighter squadrons presently based within the United States, six teams were there competing in the meet. Two teams each were entered by AIRLANT and AIRPAC, and one team each from the Fleet Marine Forces, Atlantic and Pacific. Each selected squadron sent its commanding officer and four other pilots, one of whom acted as alternate. Twenty-two maintenance personnel were allowed from each unit.

AIRLANT was represented by Oceana-based VF-33 flying FJ-3 *Furies*, and by VF-43, from Cecil Field, Jacksonville, in F9F-8 *Cougars*. AIR-

PAC's teams were VF-112 from NAS MIRAMAR in F9F-8's and VF-211, Moffett Field, flying *Furies*. East coast Marines were VMF-114, based at Cherry Point flying F9F-8's while the Pacific Force team was VMF-314, from El Toro, in F9F-5's.

Rules for the competition pointed emphasis on target tracking and on simulating combat conditions as closely as possible. Firing altitudes were 15,000 and 25,000 feet, beginning with the lower level.

NAS MIRAMAR'S VF-112 topped the other five teams at both 15,000 and 25,000 feet, thereby earning the Earle Trophy, which will be presented annually to the winner of the Fleet Gunnery Meet. The Earle Trophy was established by the Chief of Naval Operations for the purpose, and was named in memory of Lt. Thomas Earle, who was killed in 1944, while on an aerial gunnery training mission. The winning team also received a Championship Team Trophy.

Each pilot and maintenance man of the team received a replica of the Championship Trophy which becomes personal or squadron property. The Earle Trophy, which was presented to the Navy by Mrs. Wilton Earle and a group of her son's friends, is a perpetual trophy for the future meets.

Safety Awards Presented VF-111 and VA-196 are Recipients

Two ComAirPac squadrons, VF-111 and VA-196, of NAS ALAMEDA, have been presented the last of the coveted ComAirPac Aviation Safety Awards in recognition of their safety record for calendar year 1955. The awards are being replaced with the newer CNO Annual Aviation Safety Award.

The blue and gold plaques were presented to the squadron CO's by RADM. R. F. Hickey, ComFAirAlameda, in behalf of VAdm. A. M. Pride, ComAirPac, at Adm. Hickey's headquarters.

During 1955, the *Sundowners* of VF-111, commanded by Cdr. G. A. Medick, flew a total of 3,647 hours in



CO'S WERE PRESENT FOR THE PRESENTATION

F9F-6 and F9F-8 *Cougar* jets while the *Yellow Devils* of VA-196, skippered by Cdr. R. B. Giblin, logged an impressive 10,500 hours and 1,263 carrier landings in AD-6 *Skyraiders* without accident. Both squadrons are units of CVG-1, headed by Cdr. C. D. Fonvielle, Jr.

The remaining two squadrons of ATG-1, VF-52 and VA-151, can also boast remarkable safety records. VA-151, commanded by LCdr. R. H. Moore, was recently awarded CNO's Annual Aviation Safety Award and VF-52, commanded by Cdr. L. Barker, has been accident-free for the past 18 months. These records, with those of VF-111 and VA-196, possibly mark ATG-1 as Navy's "safest" air group.

WELL DONE

A recent issue of the Navy's Aviation Safety Center's Weekly Summary of Major Aircraft Accidents revealed that during the month of May there were only eight carrier landing accidents reported, and only one of these was a jet hard carrier landing accident. It further stated that a significant contribution to this record was made by AirLant when they reported NO major aircraft accidents.

NANews joins the Aviation Safety Center in relaying a "Well Done" to those squadrons, detachments, air groups and individuals responsible for this fine record. Like the man said, "Keep it up by keeping it down."

Members of the VF-112 team hurried back to NAS MIRAMAR, proud to share their new honor with Capt. D. L. Mills, Miramar's retiring CO, whose leadership, they felt, had a big part in their proficiency. Retirement and change of command ceremonies for Capt. Mills were held at Miramar the day following completion of the gunnery meet.

RED RIPPERS FIGHTING 11 TOP BOMBERS

JUST CALL us the 100% Squadron, that's good enough for us," is the refrain of Fighter Squadron 11, famous *Red Rippers*.

Proof that the best is good enough for them has been furnished by the entire squadron, with the 14 squadron pilots, literally, carrying the ball. Flying F2H-4 *Banshees*, these marksmen set an aerial bombing record never before attained by an Atlantic Fleet unit, as every single one garnered top honors in loft bombing during Air-Lant's annual competitive exercise.

To win their coveted "E's," these *Red Rippers* excelled in the extreme accuracy required of loft bombing. This method of bomb delivery, which was, until only recently, cloaked in secrecy, and spoken of only on a need-to-know basis, allows the bomb-carrying aircraft a slight margin of time between the actual dropping of the lethal payload and the bomb's detonation. In that margin of time, the bombing plane can put a safe distance between itself and the bomb blast.

"The credit for our accomplishment is due not only to VF-11 pilots, but to every squadron member functioning as a team," Cdr. E. L. Feightner, squadron CO, stressed. "It is the culmination of a very intensive effort by all hands in executing a rigorous training cycle."

RAdm. D. S. Cornwell, Commander Fleet Air, Jacksonville, a former *Red Ripper* pilot, emphasized Cdr. Feightner's statement: "To my knowledge, this is the most outstanding bombing feat ever performed by a Navy fighter squadron, but only team work could have made it possible.

"In addition to the pilots, high praise goes to each plane captain whose alert-



ALL 14 VF-11 PILOTS WON THE NAVY 'E'

ness and good judgment were constantly required to keep his aircraft 100 percent flight ready. Intricate electronic parts had to be geared to perfection daily by electronicsmen, while ordnancemen checked and rechecked for 'bugs' in the plane's armament operations, and other members did an equally fine job," Adm. Cornwell concluded.

One of the oldest squadrons in the Navy, VF-11 dates back to 1 February, 1927, when it was commissioned as Fighting Squadron Five at the Naval Air Station, Hampton Roads (Norfolk) Virginia. Assigned shortly thereafter to the Scouting Fleet aboard the USS *Wright*, the *Rippers* began the first of many deployments at sea, aboard the first of many carriers.

The *Red Rippers*' missions and designations have changed many times since their commissioning nearly 30 years ago. But their insignia has remained substantially the same. The red and yellow boar's head still snarls atop a blue shield rent by a red lightning flash, and two red roundlets.



VADM. F. RUGE, Head of Navy Division, German Defense Ministry, meets Adm. A. A. Burke, CNO, at the start of his three week tour of U.S. Navy facilities on the Eastern coast.

ONR is Ten Years Old Has Put Navy Ahead in Research

Just ten years ago this August, the Office of Naval Research was established. Its mission was to bring scientists and engineers together on numerous Navy projects and extend the boundaries of scientific knowledge.

Under a wide and extensive contractual system, outstanding laboratories all over the country have engaged in basic research. Not only has this research benefited the Navy, but it has also been of incalculable value to the advancement of science.

The contributions to aviation such as the development of the flying platform, the Aerodyne, and the vertical take-off fighters are well-publicized, but no less important to aeronautical engineering is research in such fields as the metallurgy, chemistry, nuclear propulsion, computer development, etc.

The Office of Naval Research coordinates the research program for the entire Navy and administers the Navy's patent program in addition to carrying out its own projects.

Photo Squadrons Re-named VC's and VJ's are Re-designated

Composite Squadrons 61 and 62 have been re-designated as "Light Photographic Squadrons." Henceforth, they will be known as VFP-61 and VFP-62.

A similar change has been made in designation for VJ-61 and VJ-62. They have become "Heavy Photographic Squadrons" designated VAP-61 and VAP-62.

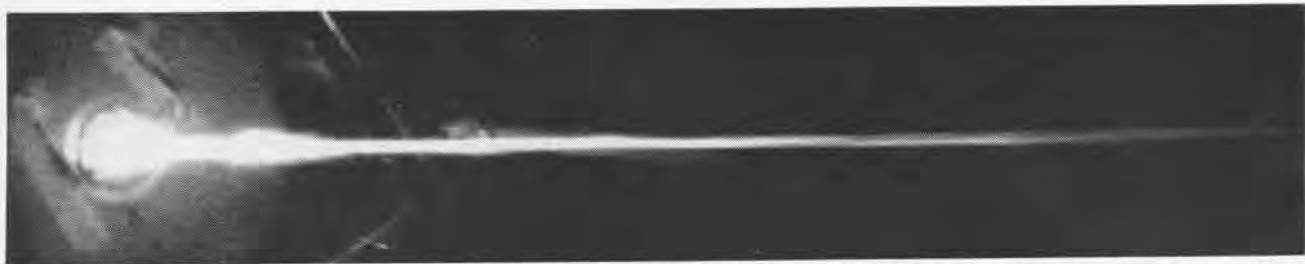
The new designations are more descriptive of the mission of the squadrons, that of supplying photographic reconnaissance to the Fleet.

Aviation Song Copyrighted BuAer's Cornelius is Composer

Cdr. George Cornelius, a Naval Aviator stationed at BUAE in Washington, is the composer of a new marching song entitled "Navy Wings of Gold."

The song was formally introduced by the Navy Band, Cdr. C. E. Brendler conducting, over a local Washington radio station. The band arrangement was made by Ernest Forte, MUC, of the Navy Band.

The Bureau of Navy Personnel will use it in recruiting programs.



ENOUGH LIGHT TO TAKE ITS OWN PICTURE IS GENERATED BY MODEL SPEEDING LEFT TO RIGHT AFTER FIRING FROM NEW GUN

10,000 MPH SPEEDS REACHED IN LABORATORY



AMOUNT OF FLATTENING OF SPHERE REVEALS FLIGHT PRESSURE



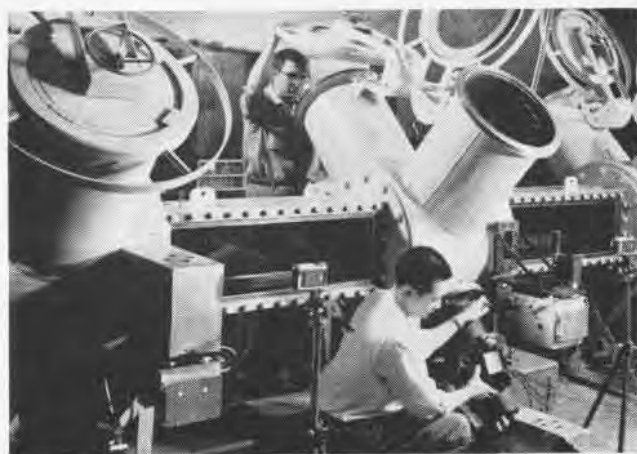
TINY MODEL USED IN FIRING IS HELD IN AMES SCIENTIST'S PINNERS

THE FASTEST flight speeds yet reached under laboratory test conditions—exceeding 10,000 mph—are being achieved at the Ames Aeronautical Laboratory, Moffett Field, Cal., according to NACA. This figure is more than twice the speed reported for the Aerobee-Hi sounding rocket which has been used by the Air Force and Navy.

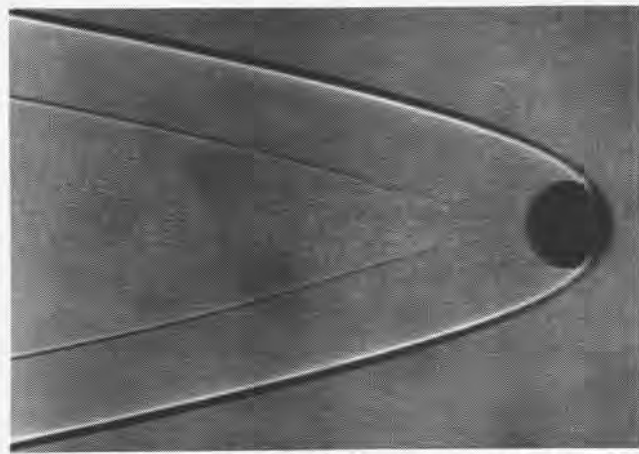
The record speed was set by a model fired from a newly developed light-gas gun. It was fired under conditions that reproduce the heat encountered by an Intercontinental Ballistic Missile as it plunges down through the earth's atmosphere and nears the end of its trajectory.

For test purposes, the gun can be

fired into a pressurized tank filled with air at any pressure to simulate various altitudes. The tank can also be filled with gases other than air. Models can also be fired from the light-gun head-on into a supersonic air stream generated in a special wind tunnel. In this way, the gun can fire models in free flight at test Mach numbers up to 20.



CAMERAS PHOTOGRAPH MODEL PROPELLED THROUGH TANK



FLIGHT AT HIGH SPEEDS IS STUDIED AS SPHERE GOES AT 10,000 MPH

LATEST NACA WIND TUNNEL IS NOW OPEN



MAIN COMPRESSOR BLADES PROPEL 2000 POUNDS OF AIR PER SECOND THROUGH TUNNEL

A FEW MANIPULATIONS of the control panel initiates a series of operations that almost stagger the imagination. Huge motors, mazes of flickering dials and gigantic metal tubes form the backdrop of the new supersonic wind tunnel, in full operation since May, at NACA's Lewis Flight Propulsion Laboratory, adjoining the Cleveland Airport.

This wind tunnel makes nature's most violent hurricane seem like a breeze. The tunnel's 250,000 hp electric-motor drive, the most powerful of its kind in the world, can produce air speeds between Mach 2.0 and 3.5, or

between 1200 and 1800 mph at simulated altitudes up to 30 miles.

The Lewis Unitary Plan Supersonic Wind Tunnel, built for development testing of engines and components for high-performance aircraft, is used in cooperation with industry and the Armed Forces by the National Advisory Committee for Aeronautics. This cooperation accounts for the name *Unitary Plan*.

According to Dr. E. R. Sharp, director of the laboratory, the new tunnel is valuable especially for work on problems of turbojet and ramjet engines. Engines and components as large as five

feet in diameter may be studied in the 10-foot-square test section.

The tunnel may be operated either in closed circuit for aerodynamic tests, or in open-end propulsion circuit, with engines running under combustion test. Its main purpose is to investigate such problems as engine-inlet and outlet geometry, engine matching and interference effects, and over-all drag. The test section can accommodate full-size engines and components.

In operation, the tunnel draws air through a dryer and a flexible-wall nozzle, which controls air flow and permits change of air speed during operation, into the test section. This is where the engine or airplane model is mounted. For speeds above Mach 2.5, two axial flow compressors are operated together. For lower speeds, the secondary compressor is shut down and the air flow is valved around it through a bypass circuit.

Centerline length of the wind tunnel circuit is 1090 feet through both compressors, 1180 feet through primary compressor and bypass leg. A 24-foot diameter, 38-ton two-position valve closes in one position to direct tunnel air through the exhaust section into open air, or in the other position to seal



A 16-INCH RAMJET IN TEST POSITION



THIS IS THE AIR DRYER BUILDING OF LEWIS UNITARY PLAN WIND TUNNEL COOLED TUNNEL AIR IS DIFFUSED AROUND THIS CONE

the exhaust section for closed circuit operation.

The bottom of the test section is an elevator platform, which can be lowered to shop floor level to facilitate model mounting. Force data on test models is measured by electrical resistance strain gauges. Air flow is observed and photographed through a Schlieren optical system, and closed-circuit television provides test monitoring from the control room.

The simulated altitude is regulated by means of exhausters located near the flexible nozzle. Air temperature is controlled by a water cooling tower separated from the main tunnel struc-

ture. Sound-proofing reduces the noise.

Complete test information is recorded automatically by electronic devices for immediate processing, or for later computing in a unique central data handling system. These "electronic brains" cut delay between a test run and the return of computed data to the engineer. Computations are available within 30 seconds after the data is taken in the test section.

The new Lewis tunnel, the highest powered of three designed and built by NACA under the Unitary Plan Legislation passed by Congress in 1949, cost \$32,856,000. The other two tunnels are at the Langley and Ames laboratories.



SCREENED INLET OF COMPRESSOR NO. 2



ELECTRONIC DIGITAL COMPUTER IS MASTER 'BRAIN'



CONTROL ROOM OF THE WIND TUNNEL, VIEWED FROM THE OBSERVATION ROOM

SHELTER-FOR EMERGENCY USE ONLY

ONCE AGAIN the famous caves of Atsugi, Japan, are being readied for possible use—in an emergency.

During World War II, Atsugi was a Japanese Naval Air Command, home of the First and Second Sagami Naval Air Forces, a large and important naval air training command, and as such, a prime bombing target by the Allies.

Late in 1944, as the American air raids were stepped up, the Japanese, driven to seek protection, started construction on a network of caves under the air base. Estimated to total about 25 miles in length, the system was completed in about eight months, honeycombing the entire Air Base, with the exception of the runways. The command center, living quarters, galleys, class rooms, warehouses, and a huge hospital were moved underground to escape the devastating bombings.

Built entirely by Japanese enlisted men, using pickaxes and shovels to dig the clay, and straw baskets to carry out the earth, the Atsugi shelters became nationally famous in Japan, and were used as models for others.

After WW II, many exaggerated stories sprang up about the caves. One was that the caves ran all the way to Yokohama, 17 miles distant. These tales were fostered by the civilian populace who explored the abandoned caves with candles and, comparing their length with the small shelters they themselves had dug, exaggerated their size.

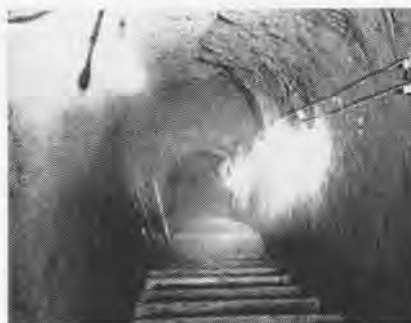
Knowing the danger of open caves, the commanding officer, U. S. Naval Air Station, Atsugi, ordered the underground passages all closed, and the openings locked. Long neglected, the caves fell into complete disrepair, with rotting wood and debris filling the passageways.

Those caves chosen by the U. S. Navy at Atsugi to be rehabilitated as shelters in the event of disaster have been cleaned out and equipped with lighting and gravel floors. L-shaped concrete entranceways with gas tight steel doors are being built to protect the mouths of the underground shelters.

The old Japanese command center has been repaired and made ready for use. From here, in an emergency, base operations will be conducted. One cave



THIS WAS THE COMMAND CENTER AT ATSUGI



STAIRS LEAD TO INTRICATE TUNNEL SYSTEM



CHILDREN TAKE COVER IN YOKOSUKA CAVE

will house the hospital if the need arises. It contains an operating room, isolation room and wards.

"Moisture is our biggest problem in the restoration," said Lt. Armstrong of NAS ATSUGI Operations. (Because of his work in the restoration of the underground shelters, he is known as "Mr. Cave" at Atsugi.) "Some of the caves had to be abandoned when they sank below the water level.

"Once the program is completed," he concluded, "we feel the caves will be able to withstand any conventional

attack, and fare well through a possible atomic explosion. A severe typhoon could theoretically level the whole base, but all personnel in the caves would emerge safely."

Caves at the Yokosuka Naval Station are included in the U. S. Fleet Activities, Yokosuka's disaster and emergency planning. These caves, like those at Atsugi, will be used as shelter in case of a natural disaster or hostile attack. Defense drills have already familiarized base personnel with safety procedures that will be followed.

Snapshots at 100 Miles Up Rockets to Photograph Hurricanes

Ships and aircraft of the Atlantic Fleet have completed recovery technique tests in the first phase of a project to photograph hurricanes with rockets. The dress rehearsal, conducted in the vicinity of Wallops Island, Va., was under the sponsorship of the Office of Naval Research.

A P4Y-2 *Privateer* from NRL dropped an inert rocket nose cone from an altitude of 18,000 feet, and it was recovered by the USS *Wren* (DD-568). A WV-2 from VW-2 at NAS PATUXENT RIVER was the communications link between the National Advisory Committee for Aeronautics at Wallops Island and the destroyers.

The USS *Ross* (DD-563) acted as a guard ship during the tests but did not assist in locating the nose cone.

During the East Coast hurricane season this year, four two-stage rockets will be launched under the direction of NACA. The rockets will be equipped with cameras and air and seaborne location and recovery devices. Floating rocket nose cones containing the cameras will be disengaged from the rockets and parachuted to the sea surface. Ships from DesFlot-4 will recover the cameras.

The *Nike-Cajun*, a two-stage rocket, will carry the cameras to about 100 miles altitude and pictures taken from there will cover a radius of about 800 miles. After the films have been recovered and developed, broad aspects of the storm can be studied.

The project is part of the National Hurricane Research Project sponsored by the Weather Bureau.

LET'S LOOK AT THE RECORD



LGEN. JOS. SMITH DECORATES LT. RICH

Naval Aviator Wins Award Is Decorated by Air Force General

Lt. Robert G. Rich, who served on the staff of the Senior Naval Officer, MATS, Headquarters, has been awarded the Commendation Ribbon by LGen. Joseph Smith, USAF, MATS Commander.

Now stationed at NAS JACKSONVILLE, Rich was cited for devising a series of manuals which time-capsule 30 minutes work in 30 seconds for MATS-men. His folder of graphs now tell MATS pilots immediately the amount of fuel needed for a proposed flight, how long the flight will take, true air speed and optimum altitude for all aircraft in the Transport Fleet.

The Fuel Planning Manuals include graphs for various types and models of cargo-carrying aircraft. The booklets also give checks on equivalent and true air speeds plus checks on lessening horsepower requirements as plane loads lighten in flight.

Commenting on the award, BGen. A. T. Wilson, Jr., USAF Deputy Chief of Staff for Operations, said Rich's manuals will increase MATS efficiency.

VMA-212 Hits a New High Squadron Sets All-Service Record

Through stiff training and a study of operational readiness, VMA-212 at MCAS KANEHOE BAY lays claim to a new all-time, all-service flight record. The AD-4 equipped squadron recorded an extraordinary 4276.2 hours during the month of May.

Operating as a unit of MAG-13, the squadron utilized more than 65,000

man-hours of labor and flew 1,485 flights to set the new record.

Maj. J. J. Rollins, skipper of the *Devil Cat* squadron, said that the goal of the month's training, development of a professional attitude in both pilots and crews, and a high state of combat readiness, had been reached and overtaken. Rollins paid particular praise to his enlisted crews who made the record month a reality through their concentrated efforts at maintenance. They pulled 132 periodic checks for the month.

Aircraft availability averaged 81% for the month and each flight averaged three hours. Each of the 29 pilots in the squadron passed the one hundred-airborne hour mark.

VMF-115 at NAAS El Centro Pilot Qualification Record High

VMF-115 had a very successful deployment at NAAS EL CENTRO. In a two-week period, pilots flew their *Panthers* for a total of 1227.3 hours, making 1172 sorties and expending 111,348 rounds of 20mm ammunition.

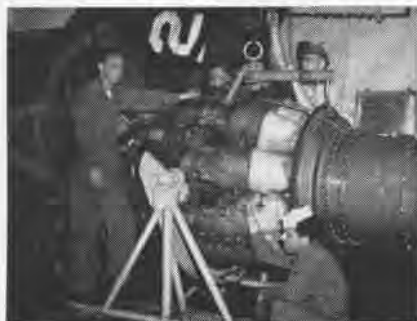
Of the 38 pilots, 87% qualified in air to air gunnery, 100% in rockets, 95% in dive bombing, and 82% in strafing.

VFM-115 expects to be the first Marine squadron to fly the *Skyray*.

Aircraft Available Record Two Days, 80 Flights, 8 Cougars

VF-32 on board the USS *Ticonderoga* in the Mediterranean has set something of a record in aircraft availability.

On the eve of a combat-readiness



CHECK CREWS DID AN OUTSTANDING JOB

exercise in June, six of the squadron's 14 F9F-8's were found to be out of commission owing to the non-availability of elevator cables in the ship's supply system.

The flight schedule called for 80 flights in a two-day period by the *Cougars*. On the first day there were to be five launches of eight aircraft each, and on the second, ten launches of four aircraft each. A one-hour turn-around was all that was available.

Cdr. H. F. Thompson, squadron CO, held a hasty conference with his maintenance personnel. Could eight aircraft carry out the schedule? This would be asking 100% availability from these aircraft for 80 sorties. W. A. Webster, ADC, VF-32's maintenance chief, replied that his men would try.

The flights went off in the two-day exercise on schedule. As each flight came aboard, maintenance men rushed out and put the planes in condition, ready for the next flight. Check crews swarmed over the *Cougars* at the close of the first day.

The record was made: 80 scheduled hops, 80 flown, with eight aircraft.

LSO Scores on Princeton CV's 62,000th Fixed-Wing Landing

Ltjg. M. Staser Holcomb scored one for the LSO's when he made the 62,000th fixed-wing landing aboard the USS *Princeton*. Holcomb of VS-21 who made the landing in an S2F, was



WALN (L) CONGRATULATES LTJG HOLCOMB

honored with the traditional cake-cutting ceremony on deck.

Co-pilot for the record landing was Ltjg. Robert H. Waln. Holcomb and Waln, with their two crewmen, have worked as a team for ten months, and have made about 50 landings together.

VS-21 has the reputation for making records, but this is the first time an LSO has ever had any of the record-making glory for himself.



SECNV THOMAS SPOKE AT COMMISSIONING



SARATOGA FIGHTERS MAKE INITIAL SWEEP



REGULUS IS CHECKED FOR USE ON THE SARA

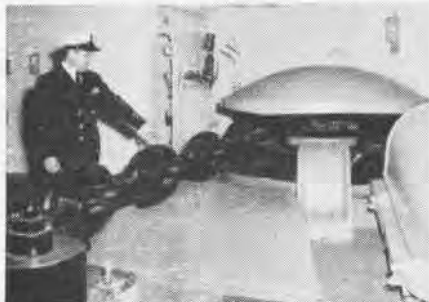
USS SARATOGA



AGE-OLD NAVY OPERATION—GETTING A FIX



RADARMEN AT WORK IN CVA-60'S CIC ROOM



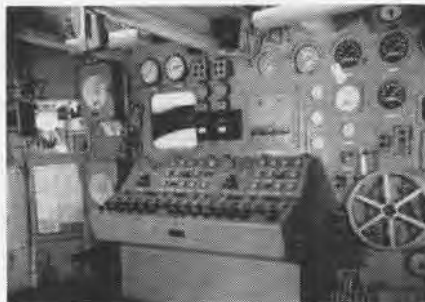
CPO RUYMEN INDICATES ANCHOR CHAIN SIZE



MURPHY AND KELLY OPERATE THE CONSOLE



BACKDROPPED BY THE MANHATTAN SKYLINE AND THE WILLIAMSBURG BRIDGE, THE USS S



HAGAN CONTROL CONSOLE IS MASS OF DIALS



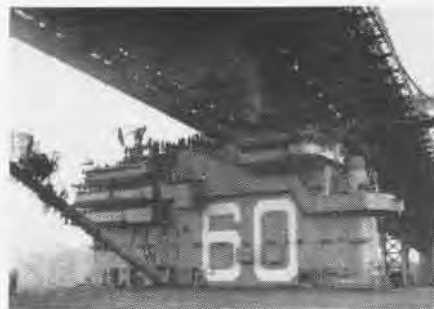
MORE LETHAL POWER ADDED TO SARATOGA



THE CVA 60 IS MOORED IN GRAVESEND BAY



HER MASTS ARE LOWERED TO CLEAR BRIDGES



MANHATTAN SPAN IS LOW BRIDGE FOR SARA

DGA CVA 60



SARATOGA JOINED THE FLEET, ON COMMISSIONING DAY, AS THE NAVY'S NEWEST AND FINEST



THE SARATOGA HAS LEFT HER BIRTHPLACE



FOUR-FT. SQUEEZE UNDER BROOKLYN BRIDGE



ENORMOUS DECK MAKES PYGMIES OF HER MEN



LOVELY VISITOR CHECKS SHIP'S COURSE



MICHIGAN 'PRINCESS' ENJOYS SHIP'S CHOW



SLOWLY SHE MOVES DOWN THE EAST RIVER



IN OLD SYSTEM, AD-6 CARRIED ONLY 12 FIVE-INCH ROCKETS WITH NEW SYSTEM, AD-6 CAN LOAD 156 OF THE 2.75 ROCKETS

PLANES WILL PACK MORE POWER

FIRE POWER of the Navy's fighter plants will soon be greatly increased. That is the "great expectations" for all types of Navy fighter and attack planes when they are equipped with the Aero 7D rocket launchers now under order by BUAER.

Alleged to be capable of "heavy-cruiser fire power," AD-3N *Skyraiders*, loaded with eight Aero 7D rocket launchers, have fired as many as 156 *Mighty Mouse* Folding Fin Aircraft Rockets at one time during tests at the Naval Ordnance Test Station, China Lake, California. Developed by NOTS, this rocket launcher-package carries 19 of the *Mighty Mouse* 2".75 FFAR's, which it ripple fires in air-to-air and air-to-ground fighting.

In the 14-year span since rockets were first fired from aircraft during the early days of World War II, these lethal missiles have increased in size, and then have decreased. Today's emphasis is on the airborne *Mighty Mouse* with folding fins which flip out

when the rocket emerges from its launcher. These rockets, comparatively small and light weight, are designed to stop an enemy plane in its tracks.

All the time research, development, and testing of aircraft rockets was in progress, methods of carrying and launching them from beneath planes' wings or within their fuselages were being tried out. There was a procession of launching rails, pylons, pods, zero-length launchers, tanks, and tubes—at least 15 different types in all. (See NANews, July 1953)

Late in 1951, a six-tube low-drag streamlined launcher for the *Mighty Mouse* made its appearance at the Naval Air Development Center, Johnsville.

This six-round launcher was the forerunner of the seven-round Aero 6A completed in 1953, of the 19-round Aero 7B developed the next year, and of the considerably improved Aero 7D rocket launchers now under contract.

Fully loaded, the Aero 7D weighs 427 pounds, and is hoisted onto its

station on the aircraft like loading a 500-pound bomb. This is loading rockets 19 times as fast as the single-rocket-by-hand method, or about three times as fast as by the Aero 6A.

Resembling a hot water heater in appearance, somewhat, the Aero 7D is 16 inches in diameter, and 98 inches long when its two frangible plastic cones are attached over each end. These cones help the launchers withstand the stresses of supersonic flight of which they are capable. Since the cones are destroyed when the rockets are fired, they do not interfere with launching.

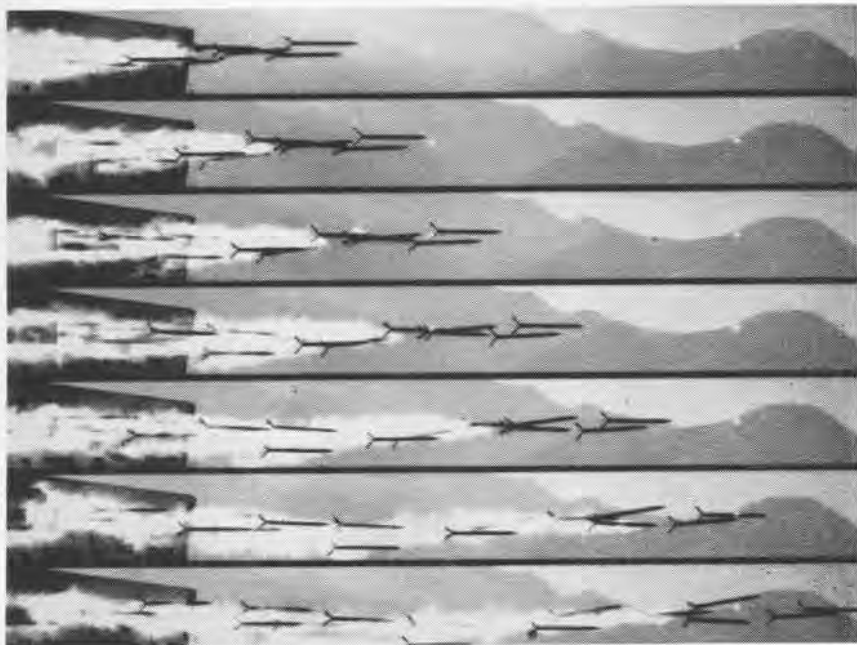
A significant point of interest about the Aero 7D is the relatively small use of materials other than non-critical in its construction. The unit consists of paper tubes impregnated with a special varnish, covered by an outside aluminum skin which serves as a shield against electromagnetic or radar radiation. A strong aluminum extrusion beam forms the backbone of the launcher through which all the firing



SEVEN AND NINETEEN-ROUND LAUNCHERS HAVE FRANGIBLE CONES



F9F-8 COUGARS FIGHT WITH 38 MIGHTY MOUSE ROCKETS



THIS SEQUENCE SHOWS TEST FIRING OF THE AERO 7D LAUNCHER AT NOTS, CHINA LAKE

and all the flight loads are supported.

Total cost of this rocket launcher in production is comparable to the price of two of the "low priced" *Mighty Mouse* rockets it carries. After firing, the launchers are jettisoned. In view of the original low cost of the containers, this jettisoning, as it eliminates the cost and trouble of maintenance, actually is an economy. But more important is the fact that the aircraft is in a 'clean' condition for the return flight.

"The unique feature of the Aero 7D launcher is that it provides for the shipment and stowage of 19 assembled 2".75 FFAR's complete with high explosive warheads and unarmed fuses," said Steven M. Little, Head of the Aircraft Launcher Section of the NOTS Rocket Development Department.

"Departure from the custom of shipping the sub-assembled components was desirable because of the prohibitive time required to assemble and load large numbers of rockets into conventional launchers just prior to flight time," continued Little. A Navy flyer during WW II and Korea, and now a member of VF-776, Los Alamitos, Little knows, first hand, how rocket arming and loading stretch into time.

The safety factor of handling these assembled rockets is very high. Much of the possibility of personnel error has been eliminated—the *Mighty Mouse* rockets in the Aero 7D have been assembled by experts at the factory.



NINETEEN 2.75 ROCKETS ARE READY TO GO



PILOT APPLEBAUM AND S. LITTLE WORKED TOGETHER IN NOTS ROCKET LAUNCHER TESTS

High powered radar will not energize them, the danger with some other rockets. They will not burn, nor will they "go propulsive," even in fire, or if shot into. This is assurance that any skipper would require before he'd put to sea with a magazine full of assembled rockets.

The Bureau of Ordnance gave its approval to ship the assembled *Mighty Mouse* rockets within the Aero 7D launcher only after exhaustive tests of fire and of aircraft strafing were performed to determine the hazards involved. Analysis of the results of the tests revealed that shipping the assembled 2".75 FFAR's was no more hazardous than the previous methods used—that of shipping the components disassembled, but within the same canister.

These Aero 7D launchers will fit any airplane—the first rocket launcher that will fit *everybody's* airplane, according to Mr. Little. Tests have been conducted in connection with fleet demonstration trials, using the FJ-4, F9F-8, F4D-1, the F3H-2N and the AD-3N.

Air-to-ground firings at NOTS CHINA LAKE, provided an opportunity for a number of pilots to use the new launcher. Among the pilots were LCdr. Irving Applebaum and LCdr. Tom Mix, who have the distinction of being the first to fire 156 rockets at one time from a single aircraft.

The Bureau of Aeronautics has a contract for the purchase of 44,000 of these aircraft rocket launcher-packages. It is estimated that by the end of the year the units of the fleet will begin to see them in operation.



OPEN HOUSE was held at NAS Jacksonville during Armed Forces Day. Static displays were set up in the NARTU hangar. On the flight line, all types of aircraft were on display. Demonstrations were given of simulated attacks, fire-fighting, and in-flight refueling.

TRAINING IS SUMMER KEYNOTE OF RESERVE

OPEN HOUSE at NAS Jacksonville was an all-service affair for Armed Forces Day. Thousands of people attended the displays and viewed

the flight demonstrations of simulated attacks. Each year the interest in the exhibits is increasing.

To help keep the public informed on the status of national defense, the Naval Air Reserve plays an important part. Jacksonville is a typical example of a well-organized, well-planned presentation of Naval Aviation.

Young Stowaway Wants to Fly

Ten-year-old Wayne Chandler had bad luck on his first attempt to become a stowaway. The youngster, son of Mr. and Mrs. Paul Chandler of Atlanta, tried to slip aboard a Navy transport bound for Pensacola, Florida.

Wayne wanted to go along with his brother, 15-year-old Gary, on a flight of Explorer Scouts. When he saw his chance to climb aboard the plane unnoticed, he took it. But unfortunately for Wayne, he was discovered before the transport took off. Wayne figured he just wasn't getting a break.

Navy regulations said he was too young to go, so Wayne was left behind while the Scouts flew off for an exciting three-day "Buddy Cruise."



G. B. WILLIAMS, ADC, thwarts Wayne's first attempt at being Florida-bound stowaway.



LCDR. GORDON Kennedy, CO, swears fourth Walters brother into VS-711 of NAS Denver.



VF-724 OF GLENVIEW lines up for squadron picture at MCAS Miami during 14-day active duty training. Night flying and gunnery were

important phases of training. Ground school classes, including survival and air intelligence, kept pilots busy when not flying.



MIAMI HOTELS form a backdrop for a VF-724 training mission. Pilots kept their 14 Corsairs and two instrument training jets on the go.



EVEN ON liberty, this squadron member chooses to take to the air. Swimming was a major diversion for the men during their off-hours.



LCDR. LEONARD R. Kozlowski, VF-724's skipper, is a Chicago Park District policeman.



VF-724 AIRMAN visits aboard Canadian destroyer, the HMCS Iroquois, at Miami.



CREWMEN ARM jets for gunnery missions which took F9F-8's over the Atlantic.

NARTU Lakehurst Hosts Model Trials

NARTU LAKEHURST was host to the Academy of Model Aeronautics in June for their annual indoors trials.

Eleven-year-old Garry Brant of Windsor, Conn., broke the indoor Class B Junior record for stick-paper covered models four separate times during the one-day meet. His best time was nine minutes, eight seconds.

Model airplane enthusiasts found the huge airship hangar just the place for the meet, and contestants from all over the East took part in the event.

Additional one-day meets are scheduled at the air station on 5 August and 23 September. Anyone interested in participating in these events may contact Mr. Anthony J. Becker, 2212 Griffith Street, Philadelphia 15, Pa.



WITH HIS 42 years of service, the Chief's bashmarks outshine RAdm. Gallery's braid.

Chief with the Golden Arm

For a chief to outshine an admiral is something of an achievement. But that was the case when RAdm. D. V. Gallery, CNARESTRA, and Wallace S. Seebach, ADC, measured their gold at the annual inspection at Oakland.

The Chief's ten hashmarks far outshone the gold braid of Adm. Gallery.

Adm. Gallery said, "Since you have commanded 42 years of Naval service, and I have only 39, I'd like to tell you we are proud of you indeed . . . and tonight, I salute you, Chief."

Grosse Ile Demonstrates Navy Might

Residents of the Detroit area had a chance to see some of the latest Navy planes on Armed Forces Day at Selfridge AF Base. Thousands toured the



J. M. KELLEY, instructor at NAS Seattle, teaches veteran ADI's of FASRon-891 intricacies of propeller system with visual training aid.



MICHIGAN'S GOVERNOR Williams, ex-Naval Officer, and Lt. Tom Kelley, Grosse Ile NavCad Officer, swap "sea stories" at Detroit show.

NAS Atlanta Gets P2V-3

Something new is in the air over NAS ATLANTA. The air station has begun to receive its quota of P2V-3's.

When the first *Neptune* arrived at Atlanta, Capt. R. E. Stieler, commanding officer of the station, was on hand to accept the plane's logbook from LCdr. C. G. Levonius who flew the craft in from Willow Grove. LCdr. R. D. Anthony was co-pilot on the hop.

Also on hand for the official welcome was LCdr. Jack Pilgram, former Exec of Atlanta's VP-671, now commanding officer of the newly commissioned VP-672.

The new plane, largest ever to be used at Atlanta, is a long-range patrol craft. P2V-3's will eventually replace Atlanta's PBY *Catalinas*,



CAPT. STIELER accepted logbook from LCdr. Levonius as Anthony, Pilgram look on.

display area which featured the *Skyray*, *Skywarrior*, *Skyhawk*, *Demon*, *Fury*, *Cougar*, *Skyraider* and *Neptune*. It was the first time some of these planes had ever been in the Detroit area.

Aerial performances included four AD's from Grosse Ile. They gave demonstrations of simulated carrier landings. An HUP-2 rescue demonstration also delighted the crowds.

Michigan Governor G. Mennen Williams was a guest at the event. He was especially interested in the size of the A3D. He commented on the progress in Naval Aviation to accommodate such large aircraft aboard a carrier.

Judging by the "ohs" and "ahs" from the younger generation at the show, procurement for the NavCad and AOC program will be picking up shortly.

Vertol Awarded Contract To Develop 'VTOL'-Type Aircraft

The Office of Naval Research and the Army have awarded a contract to Vertol Aircraft Corp., for the design and development of a tilt-wing, turbine-powered vertical take-off and landing (VTOL) research aircraft.

Don R. Berlin, President of Vertol, announced that this VTOL aircraft will combine the vertical take-off and landing capabilities of the helicopter and the high speed performance of today's transport airplane.

The proposed plane will be equipped with a single turboprop engine, geared to two rotor-propellers mounted on the wing tips. In hovering flight, the tilt-able wing is in the vertical position and the rotor-propellers provide the vertical thrust as in the helicopter. In cruise and high speed flight, the wing is in the normal horizontal position. The transition from vertical lift to forward flight is accomplished by tilting the wing propeller combination forward.

In forward flight, the tilting wing provides the lift while the rotor-propellers provide the forward thrust.

ICAO Meeting in Venezuela To Seek Outer Space Agreement

The International Civil Aviation Organization is concerned about the lack of air law guidance regarding outer space travel. Because of the earth satellite and outer space rocket activities, agreement on the use of outer space by the nations of the world will have to be reached soon. This is the subject of a report which will be put before the ICAO convention when it meets in Caracas, Venezuela this summer.

None of the rules which furnish legal guidance to nations on problems of authority applies to trips into outer space. ICAO, with membership of 67 nations, gives each complete and exclusive sovereignty over the airspace above its territory, but makes no mention of whether this jurisdiction extends beyond the boundary of the air.

At present, there is no UN specialized agency responsible for working out agreements on rights in this regard, but since any space craft would have to pass through the atmosphere before it reaches outer space, ICAO will be interested in the matter.



ROTOR DOWNWASH CLEARS PATH TO COCKPIT, AIDING RESCUERS AND FIRE-FIGHTERS

HUP DOWNWASH CAN SAVE LIVES

A NAVY HUP helicopter at NAS ATLANTIC CITY hovers upwind of a simulated airplane crash fire and enables a dummy "victim" to be rescued in only a few seconds.

Tests conducted by the Navy, Vertol Aircraft Corporation and the Ansul Chemical Company prove that the helicopter's rotor downwash of air is successful in fighting crash fires. A properly directed downwash can flatten the fire and effectively establish a path, relatively free of flame, high heat and smoke, to the cockpit or passenger area. This makes a rapid rescue of occupants possible.

In one test, with the helicopter approximately 100 feet upwind of the fire, the "victim" was rescued in 17 seconds, and the fire extinguished with a dry chemical in 24 seconds. Even when the 'copter rotor downwash was not used, firefighters were able to put out a fire in two minutes five seconds.

The man-made fires in the test program were ground spills of inflammable mixtures on a hard soil surface. Approximately 80 gallons spilled over an obsolete fighter, caused a blaze. The dry chemical extinguisher used was a 1000-lb. Ansul Chemical Company unit with a nozzle rated at 450 pounds per minute.

With the helicopter 100 feet from the crash, firefighters wearing only conventional outfits of coat, boots and mask, were able to wade through the low flames to rescue the dummy. Intense heat and dense clouds of black smoke were blown away from the cockpit area to assist the rescuers. With a steady rotor downwash on the

flame, flashbacks of fire were prevented.

Position of the helicopter is of great importance in cutting down the time it takes to extinguish a fire. With the 'copter hovering about 20 feet upwind, the fire was extinguished in 60 seconds. In this same position, a rescue was made in 25 seconds with no attempt to extinguish the fire. The method is much more effective when the downwash comes from a distance of about 100 feet from the source of the fire.

Choice of extinguisher also makes a difference. It was found that the helicopter is more of a hindrance than a help, when the fire is being fought with foam, instead of the dry chemical. Rotor downwash keeps the foam "blanket" from properly forming to smother the flames.

The crash-fire tests and those which are to follow reveal a relatively easy method for saving the lives of crew members who might otherwise die in flames. Proper use of rotor downblast is the key to the situation.

Further tests are being planned to determine the best extinguisher equipment, as well as what can be easily transported by helicopters to the scene of crash fires. Tests will also be conducted to develop various rescue and fire-fighting techniques.

• The top ranking WW II Navy ace is Capt. David McCampbell, Test Coordinator at NATC. He shot down 34 planes in WW II. His record of nine in one battle has yet to be exceeded.

• One hangar at NATC Patuxent River is lead lined to exclude electrical interference. It can accommodate the largest military planes while their radio installations are tested.



LAST MINUTE ADJUSTMENTS ARE MADE WHILE GETTING FINAL WORD



THEY'RE ENROUTE FOR THE ALL-IMPORTANT, QUALIFYING JUMP

RIGGERS PASS A RIGOROUS TEST

FLIGHT PLAN — R4D-7, BUNO 99826; Lakehurst, N. J.

ETD: 1015; Crew 3, 16 passengers.

ETA: 1035; Crew 3, no passengers.

This schedule reads like an appropriate opening of a paperback thriller, but it is a common and far from somber occurrence at Lakehurst. Passengers go out and do not come back—the same way. They simply jump!—and go through the air with the greatest of ease.

The passengers are students at the Parachute Rigger School, Naval Air Technical Training Unit, NAS LAKEHURST. The flight they take permits them to learn first hand the importance of the parachutes it is their job to pack. The practice of having the riggers jump goes back to the early days of parachutes.

It was not until 1924 that a parachute was accepted by the Armed Forces and it became mandatory for all aviators to wear them. To "wear parachutes" was an easy regulation to enforce, but to overcome the natural reluctance to hurl oneself into the thin air was unenforceable. Rather than take a chance on this new device, hundreds of pilots rode their flaming or disabled planes into the ground.

Although his name is now lost in antiquity, one of the far-sighted founders of the school decided on a novel way to combat the airman's fear or reluctance to "hit the silk." He reasoned that if it became known that the

man who packed and repaired parachutes had enough confidence in his ability and equipment to make a deliberate, premeditated jump, the aviator might be more willing to take a chance on his parachute than to crash with his plane.

This plan paid off. Today there are almost daily reports of bailouts and ejections. Entire bomber crews have saved their lives by jumping.

The mandatory jump has become the highlight of the Parachute Rigger's course. Every Rigger is proud of the fact he volunteered for this duty.

He undergoes five weeks of intensive training in the packing of service parachutes—which he is required to pack

for his own use. The required 20 hours of tumbling include simulated parachute landings. The men are then given a thorough physical examination.

At that point the pre-jump briefing is held. This is a lecture at which no man has ever been known to fall asleep. All procedures are carefully explained by a qualified parachutist. The men are told every detail; how to dress for the jump, how to enter the plane, how to conduct themselves in the plane, and what body position to assume when jumping from the door. Proper pulling of the ripcord is stressed.

In the written test that follows, each man is expected to make 100%! Any questions that are missed are thoroughly reviewed by the instructor to make sure that the procedures are completely understood. All preparations are now made, but the worst is yet to come—that period of "sweating it out" until weather conditions are right.

Here is the actual jump procedure: the Senior Jumpmaster works out a jump list for the 27 men in this class. In the R4D, he figures he can carry a maximum of nine trainees per load or a total of three loads. He assigns an experienced instructor as "spot jumper" (first out) for each load and another instructor as follow-up jumper. Each load is then divided into three sticks (groups) of three trainees each.

In the meantime, frequent checks are made with Aerology who send aloft pilot balloons to determine the wind



INSTRUCTOR INSPECTS HARNESS ADJUSTMENT



THE FIRST 'STICK' HITS THE SILK WITH INSTRUCTOR IN LEAD, AND RIGGERS ARE ON THEIR WAY IN PARACHUTES THEY PACKED

velocity and direction at the 1,000, 2,000 and 3,000-foot levels. Armed with this information, the jumpmaster calculates the amount of drift and direction of a descending parachute and chooses a "spot" over which to drop the jumpers. Finally comes the word—all conditions favorable.

"Prepare for parachute descents" is the signal for exciting activity. Get into those boots. Tuck the trouser cuff in. Get helmets on and parachute bags out of the jump locker.

The initial excitement abates somewhat by the time the bus reaches the waiting R4D. Parachutes are donned, fitted and minutely inspected by instructors. Now a careful resume of the jumping instructions by the Senior Jumpmaster and the first three sticks enter the plane, single file, and in reverse jump order—the last man on the plane will be the first off.

All jumpers are seated, the engines roar and the plane is airborne. It is the first flight for many of the trainees, and they are on the *qui vive*.

At 3,000 feet a dummy is put out. The jumpmaster watches its descent and the spot where it lands for the purpose of checking and, if necessary,

correcting his calculations. On the next pass, a spot jumper bails out.

ONCE AGAIN the plane comes on the range and then the word, "Let's go, men!" An instructor, then three trainees, another instructor, all disappear through the door—the first stick is out. A slow circle of the area and the second stick bails out—then the third. Landing, the plane picks up the second load. Operation repeated. One more load and the jumping is done.

Before the first load took off, elaborate preparations had been made in the landing area. Various vehicles were stationed at strategic points: a truck to pick up the deflated parachutes, a jeep to pick up the jumpers, a radio jeep for contact with plane and tower and a rarely used ambulance.

The Ground Crew Officer, equipped with a power-driven megaphone, is speaking to that last stick who are now about 500 feet from the ground, "Prepare for landing. Feet together. Then tumble." The last man hits the ground, collapses his chute and another class of Parachute Riggers have made their qualifying parachute jumps.

Since a new class graduates every

month and the instructors jump with each class, some of the instructors build up impressive jump records. At the present time the total number of jumps of the on-board instructors totals 894 or an average of 31 per man. Several old timers have made over 100 leaps into space.

More than 10,000 jumps have been made since the founding of the school September 1, 1924. Included in this number have been Sailors, Marines, Coast Guardsmen, Waves, Women Marines, French and Canadian Sailors, Australian and Canadian Air Force Officers and a Japanese Officer and enlisted man.

Parachute School instructors have put on exhibits at the National Air Races. On two occasions, at the request of CNO, they have tested new survival equipment by jumping with it into the Atlantic Ocean.

Care of survival equipment is an exact science. VAdm. A. M. Pride expressed the Parachute Riggers' creed when he said, "No urgency is that great, not any set of circumstances that compelling, which can condone carelessness, lack of supervision or ignorance which might endanger life."

ARMAMENT GEAR ADAPTED FOR FLIGHT CONTROL

A 1946 BUORD project has been adopted for use in Naval aircraft after a long series of modifications. Originally designed for use with armament fire control computers, angle-of-attack instrumentation is being installed in Navy trainers to familiarize pilots with this invaluable flying aid.

The unit first gained the attention of Naval Aviation in 1950 when BUAER contracted for its modification

(photo). The portion of the transmitter which extends into the airstream is a highly polished tube approximately three inches in length and $\frac{3}{8}$ inch in diameter.

Two slots extend lengthwise along the tube which is free to rotate along its longitudinal axis through 30 degrees or more. In flight, the tube rotates automatically so as to position the slots symmetrically in relation to the direc-

instrument panel for use with the mirror landing system. This unit works in conjunction with the external three-light system.

The external lights of the system are installed on the nose wheel housing or other suitable location for the use of the Landing Signal Officer.

Angle-of-attack indicating systems are installed in F2H-3 and -4, FJ *Fury*, F3H *Demon*, F9F, and F4D airplanes. The equipment will be installed in production models of Lockheed's T2V-1 *Seastar* and Grumman F9F-8T and backfitted into the TV-2 and F9F-5 *Panther* trainers to introduce pilots to the use of this equipment.

The gear offers an additional advantage in FJ and F3H aircraft models. It provides artificial stall warning by using a small electric motor that "shakes" either the rudder pedals or the stick to warn pilot of impending stall.

ASP Rocket for the Navy Developed for Upper Air Probing

The Navy's ASP research rocket has been successfully field tested. The ASP, short for Atmosphere Sounding Projectile, will be used to gather weather information, study cosmic ray emanations and other geophysical data.

Constructed under a program involving research, development and production, the ASP was brought to a successful test flight stage in less than five months. It was developed and built by Horning-Cooper, Inc., of Monrovia, Calif., under contract from BUShips.

Scientists of the Naval Radiological Defense Laboratory at San Francisco, a field activity of BUShips, prepared the specifications for the transducer.

The rocket is small—diameter of $6\frac{1}{2}$ inches and length of 12 feet—and is powered by a solid propellant rocket motor. It can attain a speed five times the speed of sound. It is launched from simplified portable launching racks. These racks can be directed vertically to attain high altitude or horizontally to achieve long range. Tiny high frequency radio transmitters installed in the rocket head, transmit data to the earth.

An ASP was tested in full scale firings at NAMTC Pt. MUGU and the White Sands Proving Grounds, N. M.



ANGLE-OF-ATTACK TRANSMITTER WILL BE INSTALLED IN MANY AIRCRAFT IN THE FLEET

to include a pilot's indicator for use on naval aircraft. Specialties Inc., of Long Island, N. Y., originally designed the equipment in 1943 and has manufactured it ever since. The original design has been drastically changed to effect a weight saving of 50 percent with increased versatility.

Consisting of a transmitter, three lights—a green, an amber, and a red—and a small indicator for cockpit instrument use, the angle-of-attack indicator was further improved in presentation as a result of evaluation by NATC PATUXENT RIVER, VX-3 at NAS ATLANTIC CITY and VMF-122 at Cherry Point. After extensive tests at Cherry Point, Guantanamo Bay and aboard the USS *Coral Sea* with VMF-122, the manufacturers were given the go-ahead signal on the production of additional units.

The indicator is a single pointer instrument graduated in 30 increments of angle of attack. It operates from direct current signals proportional to angle of attack provided by an angle-of-attack transmitter. This transmitter is usually located on the side of the fuselage forward of the cockpit (see

tion of the air-stream at all times.

Since angle of attack is defined as the angle between a fixed reference line on the airplane and the direction of the airstream, this position of the slots relative to the fixed reference line is the angle of attack at the place where the transmitter is installed. It is this angle which is transmitted to the indicator.

At altitudes below 10,000 feet, a particular model airplane in the landing configuration will stall at one indicated angle of attack at all times regardless of gross weight or flight path. But if the angle of attack of the airplane is not allowed to attain this angle, the airplane will not stall. The instrument provides a direct indication of stall margin.

In addition, by maintaining an indicated angle of attack which is slightly less than the stalling angle of attack of the airplane for the landing configuration, it is possible to achieve the highest lift and slowest safe landing speed.

The newest addition to the angle-of-attack indicator is a small set of three lights which is installed above the

A Family Day with VF-81 Oceana Outfit Treats Dependents

Cdr. M. M. Hershey, CO of VF-81, his officers and men spent a busy week preparing for a squadron "Family Day." Then on Saturday the NAS OCEANA squadron threw open its gates to families and friends.

A jet was put on jacks to demon-



COCKPIT LAYOUT FASCINATED THIS BOY

strate the operation of landing gear, flaps, speed brakes and wings. Ordnance had set up a functioning model of the 20mm cannon, and the parachute riggers had a complete survival kit on display including an opened chute suspended from a hangar crane.



'DAD, WILL YOU BUY ME ONE OF THESE?'

Following a flight briefing demonstration, the LSO gave a short account of the procedures he uses to bring aircraft safely aboard carriers. Radio transmissions from the four-plane flight were heard over a loudspeaker rigged for the occasion.

• The only husband-wife Chief Warrant Officer combination in the U.S. Navy is stationed at NAS Patuxent— Mr. and Mrs. H. Baker,



HUNTER/KILLER operations for the USS Princeton (CVS-37) are interrupted by the bigline transfer of personnel from the submarine USS Catfish (SS-339). Operations were being conducted between Okinawa and the Philippine Islands. Insert shows "telephoto" view of man being transferred.



THIS BOW-LOADER version of Convair's R3Y Tradewind has been assigned to VR-2 at NAS Alameda for evaluation tests to determine her eventual assignment to other Fleet units. Commanded by Capt. W. A. Sullivan, the squadron has been flying the R3Y-1 version of the Tradewind in like tests.



MEMBERS of Sausley Field's GCA Unit 18 pose for a "family portrait" before leaving for their new home. The unit is moving to Forrest Sherman Field after nine years association with NAAS Sausley Field. A farewell party for the unit was held at the main gate of the air station.



PLANK OWNERS of FASRon-114, D. R. Arbogast, PN1, and R. G. Fowler, AK1, meet again after nearly 10 years separation. Both were with the unit when it was commissioned in Kodiak.

Preparing for a Telecast VX-2 Plays Role in Terrier Shoot

Of the millions of viewers who witnessed NBC's salute to Armed Forces Day on "Wide, Wide World," few realize the tremendous task involved in getting planes, drones, ships and missiles ready. The four minutes of the *Terrier's* TV debut were preceded by detailed planning by officers and men of VX-2, OpDevForLant, ships assigned to the job, and TV technicians.

The day before the telecast, a full stage dress rehearsal was staged in order to obtain perfection. In all, 16 aircraft participated in the event.

As the drone reached the ring range of *Mississippi's Terriers*, the order to fire was given. The men saw the results of their long hours bear fruit as the drone was splashed with the first missile fired.

Leyte Has Network Party As Crew Participates in TV Show

The anti-submarine carrier USS *Leyte* has celebrated ten years service with the Fleet. In conjunction with the celebration, the ship's CO, Capt. H. T. Johnson, members of the crew and a ton-and-a-half cake (yes, a ton-



COMMISSARYMAN HARP AND GARRY MOORE



MARINE MAJ. T. H. Nichols, exchange pilot with the AF, is congratulated by his squadron CO, 1.Col. H. E. Comstock, after a 13-hour flight across the Atlantic Ocean in a P84F.

and-a-half) appeared on the "I've Got a Secret" TV show in New York.

The ship's secret was held by Milton Harp, CSI, who had just finished baking the huge cake. When the TV panel missed the secret, Moore asked to see it and it was wheeled on stage.

Capt. Johnson then called for the rest of the crew to come and sample the cake. Over 250 sailors from the *Leyte* marched on stage. Stragglers came by cargo net à la "Mr. Roberts" and 250 whitehats sailed into the air as the show ended with a stirring rendition of "Shipmates Forever." The ship is scheduled for overhaul at the naval shipyard in Brooklyn, New York.

Water Helps Avert Crash VS-36 Aircrew Ingenuity Pays Off

VS-36 aircrewmembers saved a Navy 52F in May when they applied practical knowledge and a lot of good common sense to an almost impossible task. The crew—Ltjg. Frederick Hollick, pilot; Ltjg. Joseph Barth, copilot, and Carl Fleming, AM1—were returning from an ASW practice mission when they discovered that the left landing gear of the 52F would not lower.

After flying around Norfolk for over two hours, during which time they exhausted every emergency means of getting the locked gear down, Fleming finally suggested that they might be able to pump up enough pressure by adding four canteens of water to the hydraulic reservoir to force the left wheel down.

They dumped the four canteens of water into the reservoir and enough pressure was exerted to break the stuck gear. Using hand tools, the crew lowered the wheel and a safe, routine landing was accomplished.



DONNING CAP and gloves of a Japanese Railroad engineer, Capt. W. E. Premo, CO of NAS Iwakuni, prepares to pilot the first train over new 2.5 mile spur that joins NAS to main line.

Chief Logs 10,000 Hours Has Been Enlisted Pilot Since 1937

At NAS NORFOLK, Edward Bankston, ADC (AP), has brought his total time in the air to 10,000 hours. An enlisted pilot since 1937, Chief Bankston is a test pilot for the O&R Department.

Enlisting in the Navy in 1932, the Chief applied four years later for flight school and received his wings in 1937.

Taking part in carrier operations, Bankston served as a fighter pilot in the Pacific during WW II. During the latter part of the war he was given stateside duty and was commissioned as a Lieutenant (jg). In 1944, he was promoted to the rank of full lieutenant.

After the war, he gave up his commission, and reverted back to Chief so that he could attend Aviation Engineers' School at Jacksonville.

Having flown everything from the old Chance-Vought OSU-1 to the F9F *Cougar*, Chief Bankston came to Norfolk as a flight and radar training instructor for FAETULant. He has served as a test pilot for O&R since last September, and is checked out in every type of plane coming through the Overhaul and Repair department.



BANKSTON SHOWS PLANES HE HAS FLOWN

Air Refueling Systematized Plan Extends Carrier Jet Range

After exhaustive tests, the Navy has decided to use three basic types of tankers for inflight refueling to extend the range of its carrier-based jet aircraft. The three basic tanker types will be the strike tanker, the sustaining tanker and the large tanker.

The strike tanker will be used for the primary purpose of range extension of offensive aircraft. Included in this category is the "Buddy" tanker system. The carrier-based sustaining tanker is used to extend the endurance of defensive aircraft and to refuel aircraft in emergency situations; i.e. should a curtain of fog hide a carrier from its aircraft, this tanker could be sent aloft to refuel them until visibility cleared.

The large tanker, presently Convair's *Ray Tradewind*, affords the ability to exploit all the uses of air refueling. It can refuel as many as four fighter aircraft at once and can deliver huge quantities of fuel over great distances.

Bell Gets Navy Contract For Building HTL-6's and HUL-1's

Two Navy contracts totaling \$2,500,000 have been awarded to Bell Aircraft for the construction and outfitting of 24 three-place HTL-6 and 14 four-place HUL-1 helicopters.

The HTL-6's will be used to train helicopter pilots in Florida. The helicopter is equipped with dual controls, radio, skid landing gear, and hydraulic boost controls.

The HUL-1 is the latest Bell helicopter to be developed. Powered by a 260 hp. Lycoming engine, the HUL-1 is capable of handling a variety of missions. Kits to be furnished the HUL-1's, will include flotation landing gear, radio, night flying equipment, internal electric hoist, long-range ferrying gear, and internal litters.

FAI Honors Are Bestowed Diplomas Attest A4D Achievements

Joint recognition has been given the United States Navy and Douglas Aircraft Company by the Federation Aeronautique Internationale for the 500-kilometer world speed record established by the A4D *Skyhawk* October 15, 1955.

Diplomas attesting the achievement of the *Skyhawk* were presented to Lt.



STIEFLER, BEN COLLINS, GRAY AND RHINE

Gordon Gray, the Navy test pilot, and Mr. Ben Collins, Douglas A4D project engineer, by Mr. Burt Rhine, FAI official, and Mr. Fred Stiefler, timer for the National Aeronautic Association.

Gray flew the attack plane around a 62-mile circular course at an average speed of 695.162 mph to capture this international aviation award.

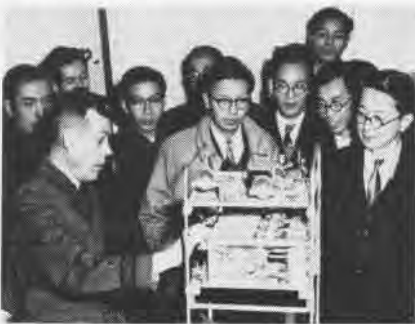
Sailors Save Two Girls But Unable to Rescue Two Others

Nine sailors from NAAS SAUFLEY FIELD saved the lives of two young girls at Pensacola Beach, but were unable to save the lives of two other persons despite their heroic attempts.

The two girls, Suzie and Carol Ann Hall, were caught in a dangerous undertow and fast current. Their father, H. C. Hall, and an Eglin AFB airman, Don Cameron, attempted to save them but got caught in the undertow themselves. Mrs. Hall's shout for help brought the sailors to the rescue.

Hall and Cameron were pronounced dead on arrival at a local hospital, but the two girls were safe.

The nine sailors were J. D. Mills, AA, D. W. Hurd, AA, Edwin Ade, SA, W. F. Loeffler, ADAN, W. F. Raine, AD3, R. B. Baker, AA, W. F. Cowhey, ATAN, B. M. Hill, AB2, and B. L. Gullekson, AA.



JAPANESE meteorologists watch Lt. M. L. Lewis, Navy weather balloon project head, as he explains radio transmitting equipment carried by balloons. The gear signals balloon position back to Oppama, Japan.

Uranium Mining Succeeds Chief Shares in Profitable Strike

A drift mine, slowly being blasted into the side of a canyon in Caprock county, Texas, is the culmination of months of hard weekend tramping through cut-over range lands for Jeff E. Mahan, ADC.

Mahan, a career airman, assigned to the office of the Bureau of Aeronautics Representative, Dallas, since May 1954, is a flight test engineer during the week and a uranium miner on weekends.

A magazine article a year ago which said, in so many words, that the Caprock country should be "hot" for uranium, started the Chief on his weekend mining career.

He met two ranchers named Saul who suggested a good location to test.

"When I climbed out of that 300-foot canyon, we formed a corporation right on the spot with Doyle Saul as president, Clyde Saul as a director and land owner, and myself as vice president and general manager. That canyon was hot."

The mine has been in operation since last September. At present, five men, including two experienced miners, are working there.

Mahan, who has no idea of leaving the Navy until he qualifies for retirement in four more years, has been interested in mining since 1948.

Navy Orders More T-34B's Beech to Build Sizable Quantity

The Navy has signed a new contract for the purchase of an additional quantity of T-34B trainers from Beechcraft of Wichita. The order was for approximately \$4,000,000. First order amounted to about \$6,000,000.

A large number of the trainers are already in service with the Naval Air Basic Training Command at NAS PENSACOLA. Planes produced under this new contract will also be assigned there.

The T-34B's were phased into primary flight training in November 1955. They are gradually replacing the reliable old SNJ *Texan*.

Powered by a 225-hp Continental engine, the plane is characterized by its outstanding performance and economy of operation. Seating two persons in tandem, it has a cruising speed of 150 knots at 60% power, and a maximum range of 845 nautical miles.



KENNEDY IN WHEEL WELL OF HIS NEPTUNE

Resourcefulness Saves P2V AD2 Averts Neptune Crash Landing

The resourcefulness of an AD2 with VP-18 averted a crash landing of a P2V-7 *Neptune* in May and saved the lives of all the crew. W. E. Kennedy managed to push the nose wheel of the *Neptune* down into position and lock it while the plane was airborne.

Trouble for the pilot, Ltjg. A. P. Caldwell, and copilot, Ltjg. A. J. Hyman, developed during a local bounce hop. The pair had completed two such bounces successfully, but on the third try, the nose wheel failed to unfold.

The crew tried every normal and emergency procedure to get the wheel down and locked. Then they notified their skipper, Cdr. J. A. Cooper. Along with a Lockheed representative, Cooper dashed to NAS JACKSONVILLE's control tower to offer assistance. Nothing they suggested worked.

Kennedy then tied a rope around his waist, climbed down into the nose wheel well and released the locks by hand. The wheel dropped but not far enough to lock in the down position.

With the plane slowed to almost stalling speed, Kennedy made a second descent into the nose wheel well and crawled even farther into the housing. After exerting great effort, he kicked the nose wheel into place and locked the pin in position.

Because of tight quarters in the nose wheel well, Kennedy made the two descents without a parachute on.

● Lt. Robert L. Blake, LSO at Barin Field, Foley, Ala., has probably set an NABTC record. His accident-free field carrier landings from July 1953 to February 1956 are totalled at a breath-taking 32,128.

Bear Paws for the HOK-1 Kaman Develops New Landing Gear

A new type of landing gear called "bear paws" has been developed by Kaman Aircraft for its HOK-1 helicopters, now in service with the Marine Corps. Named "bear paws" after the type of snowshoes used by Canadian woodsmen, the gear is quickly attachable to the wheel landing gear.

The "bear paws" make possible oper-



A 'SHOD' HOK-1 IN FLIGHT DURING TEST

ation of the helicopters from snow, sand and mud by providing a large landing gear area which will not sink into soft surfaces. They are small in size, light in weight, and can be carried in the helicopter for quick installation in the field.

HOK-1's are general utility helicopters used for cargo carrying, medical evacuation, search and rescue, reconnaissance and transportation.



A. J. SIDEBOTTOM, PRC, shows the method he uses for recalling Mae West life jackets for periodic inspections. Date is sewn to shoulder strap. He's a member of FAWTUPac.



INVENTORS SHOW DE-BELTER IN OPERATION

Inventive Genius in VF-91 Two AO's Build De-belted Device

The job of de-belted 20mm ammunition has been made easier for the aviation ordnancemen of VF-91. Thanks to the efforts of C. V. Beck, AOC, and L. A. Singley, AO1, the new labor saving device will give these men more time for other jobs around the squadron.

It was while the *Cougar* squadron was deployed to Clark AFB in the Philippines that Beck and Singley first became concerned over the many hours it was taking them to de-belt the ammunition left over after a day's strafing and gunnery by squadron pilots.

The duo named their invention "a Portable De-linking Device." It is nothing more than a salvaged 20mm. feed mechanism with some alteration. Completely portable, it does not bruise the ammunition being de-belted.

Cdr. B. N. Gockel, squadron CO, points out that the de-linker can be made by obtaining an old 20mm. feed mechanism and altering it as follows: Remove the operating lever assembly, cotter pin and pivot pin. Then remove the link assemblies and cartridge holding pawl, spring and dog in that order. Remove the front and rear holding cams and springs.

Mill the mouth of the feed mechanism completely off to allow the de-linked rounds to drop unhindered from the de-linker. It is also possible to make the machine into one that is completely automatic.

● The first A3D *Skywarrior* squadron was formed recently at NAS Jacksonville as a replacement squadron for VP-3. Tagged VAH-1 (Aircraft Heavy Attack Squadron), the unit is commanded by Cdr. P. F. Stevens.



ONE LINE AT EITHER END IS ADDED TO ORIGINAL LEADING LINES, AND THE COUNTERWEIGHT IS EXTENDED AND STRENGTHENED

TOW TARGET CHANGES MEET WITH APPROVAL

COMMANDER Fleet Air Jacksonville reports enthusiastically on the use of a modified Aero 26B Tow Target. The modification was first developed and used by the Fleet Air Gunnery Unit, NAAS EL CENTRO. It lends itself easily to field change.

The modification is not complicated. The standard tow bar counterweight is removed and an extension is put on with the trihedral reflector spinner attached. The spinner itself is strengthened by adding short lengths of pipe to prevent damage during the take-off.

The modified counterweight pipe is strengthened by installing in it armored cable and filling the pipe with lead. This allows the bar to sustain a considerable amount of bullet damage and still remain attached to the banner to give a vertical tow.

Two additional nylon lines are added to give strength to the tow installation.



PIPES PROTECT REFLECTOR ON TAKE-OFF

Naval Aviation Development Center, Johnsville, will incorporate changes in future specification. In the meantime, if squadrons need special information, they may write Commanding Officer, FAGU, NAAS EL CENTRO.

ComFAirJax finds outstanding advantages in using the FAGU Tow:

1. Because it is less vulnerable to gunfire, the leaded counterweight eliminates the horizontal banner problem which is likely to occur if the present counterweight is used.

2. The danger of colliding with a shot-off counterweight or fragment is substantially lessened.

3. The radar reflector spinner gives airborne radars excellent lock-on capabilities at desired firing ranges.

Fighter Squadron 211 has used the modified target in gunnery operations for some time under the direction of LCdr. C. R. Bishop, the squadron ordnance officer. The pilots flew *Furies* during special gunnery training at El Centro and NAAS FALLON.

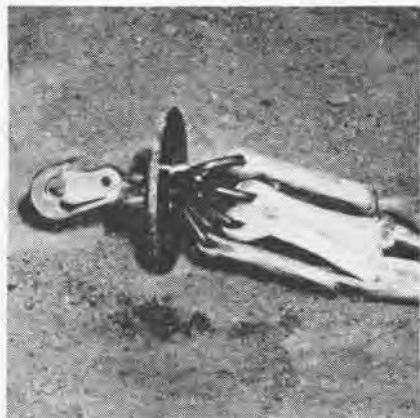
Only three banners were lost of 110 launched at El Centro, and only a few slightly canted or unstable banners appeared out of a similar number towed at Fallon. In each case, the banners with which the squadron had difficulties were canted by faulty rigging.

VF-211 reports that the modified counterweight and five nylon leaders saved innumerable banners. As many as three leaders were shot away, and one banner had five hits in the tow bar, yet the target towed upright and returned capable of being scored. No, repeat No, banners were lost in flight.

Just as Jacksonville squadrons found the modified target an improvement, so did VF-211. Their Commanding Officer, Cdr. Paul E. Pugh, reports: "A standard radar spinner was attached to the counterweight with a loop of armored cable and let drag directly on the runway during the launch. These spinners suffered only minor damage during the launch, invariably spun like a top in the air, and were re-used.

"Towing with the *FJ* proved quite simple. The cable was attached at the very end of the runway; the tow pilot then taxied slowly up the runway, pulling the cable out as he went to a marker flag 1000 feet out. As the bitter end of the cable came to the end of the runway, the banner was attached and tow pilot cleared for launch.

"One ordnanceman can run the launching operation, and runway utilization time rarely exceeds 2 minutes."



DISC GUARDS STRAP FASTENER OF TOW RIG

TEST EQUIPMENT ON WHEELS



WORKING RELATIONSHIP BETWEEN AIRCRAFT TESTED AND UNIT ESTABLISHED BY CABLES

OUTDOOR "trouble shooting" — ground check and flight line adjustments to aircraft reciprocating engines during winter on the New England seacoast—is hard, demanding work. Sub-zero weather, snow, freezing rain, high winds as well as engine noise, vibration and poor communication, and the vagaries of a fine engine analyzer instrument exposed to the elements, produce conditions that make engine adjustment almost impossible.

Last winter at NAS QUONSET POINT, protection was needed not only for a brand new engine analyzer, but also for the men who would be trained in using it. The Overhaul and Repair Department under Cdr. B. C. Shearon did something to meet this problem. Messrs. Abrahamson, Nutini and Rondeau of the plant engineering and industrial planning division, were given the task of designing a portable, all-weather enclosure to house the new Land Air Engine Analyzer instrument. This would provide an on-the-job classroom for training purposes.

A 576-cubic-foot walk-in refrigerator (8x12x6 feet) was obtained from surplus and put on wheels. Its insulated construction was a safeguard against sound and vibration. Facilities

for heating, ventilation, lighting and communications were added, with an unobstructed view of equipment tested.

A standard aircraft tow tractor made the enclosure mobile. Electric power was provided for by using a 70-foot extension rubber-covered cable. Once the unit was moved near a power receptacle, it was ready to operate. Communication was furnished in the form of a tele-talk installation and head set with extension cable for use in an aircraft cockpit.

The tremendous savings made by using the Land Air Engine Analyzer during the first two weeks of its use equaled the cost of the device. Very often engine malfunction attributed, by off-hand diagnosis, to carburetor troubles was determined through the use of the engine analyzer to be an ignition discrepancy.

Proposed modifications of the enclosure to make it even more useful under cold weather conditions call for the installation of a new reaction engine analyzer and a control instrument for the adjustment of tailpipe temperature and fuel.

Plans also include mounting a repeater scope in the overhead corner for special classroom instruction.

from other planes—and adding the altitude controller to enhance the ability of the automatic pilot for long flights. This particular model is being used on such fighters and bombers as the Canadian CR-100, and the Air Force's F-89, F-101, B-66 and B-36, and is contemplated for others.

Two of the units have been flying several months on R5D planes assigned to Operation Deep Freeze.

The altitude controller is an aneroid pressure instrument that "feels" deviations in a plane's altitude by sensing changes in barometric pressure.

Although it weighs only 9.2 pounds, it is so accurate that it can feel an altitude change of five feet at an altitude of 40,000 feet. After feeling the changes, the controller signals the autopilot to bring the plane back to the desired altitude. It is pressure-sensitive of altitudes to 65,000 feet.

Wheelchair Dance on CVA Former Navy Pilot Formed Club

Eighteen polio victims square danced, waltzed and did the Mexican Hat dance in their wheelchairs aboard the USS *Bennington* in June during a tour of the ship. Headed by Mr. and Mrs. Alton Augler, the group has presented over 600 shows during the last six years. Both Mr. and Mrs. Augler are confined to wheelchairs.

Augler, a former Navy pilot, flew from the decks of the old *Langley*, the *Lexington* and *Saratoga* and was crippled following a plane crash in 1940.

The Auglers formed the group because they both loved to dance before being stricken and thought that such a group would be fun and aid in rehabilitation.

Real headliner of the group was Bill Sloan, Jr., who did handstands and balancing acts on the flight deck from his wheelchair, very difficult feats.



TELE-TALK BOX AND ANALYZER ON TABLE

R5D's to Get New Gear 150 Scheduled for Improvements

More than 150 Navy transport and mapping planes are being equipped with automatic flight controls under a new R5D BUAEER modification program.

Principal components are M-1 autopilots and altitude controllers to be supplied by the Minneapolis-Honeywell Regulator Company.

The Navy is utilizing M-1 autopilots—which it had stored after removal



GROUP ONCE CONSISTED OF 50 PERSONS



CHIEF LENTZ TRAINS AN AVERAGE OF 20 MEN EVERY MONTH



SPARKS ARE ELIMINATED BY ATTACHING CLIPS TO PLANE WING



MINIMUM DISTANCE BETWEEN REFUELING OPERATIONS IS 100'



PRESSURE REFUELER NOZZLE IS FITTED TO TANK OF COUGAR

AIRCRAFT 'FILL 'ER UP' MEN

TO PUMP 3.5 million gallons of fuel into the ever-hungry tanks of hundreds of aircraft in 30 days, and do it safely, takes specialists. NAS JACKSONVILLE boasts of its crew of specialists who have done just that.

A closely-knit group of about 45 men operate 28 5000-gallon tank trucks. They dispense JP3 for jets, 91-96 octane for utility planes, and 115-145 octane gas for P5M's, P2V's and some jets. The Refueler Pool services not only all Jacksonville squadron planes, transient and operations aircraft, but also meets the requirements of NATTC.

The Pool, under Lt. R. W. Shaw, is operated as a part of the Public Works Department. Clifford L. Lentz, BUC, has immediate responsibility for the performance and training of the constantly changing personnel attached to

the Pool and is the only air station man connected with it. The other men, on loan from the fleet, usually serve for three months.

Coming in green, they must be trained to an accuracy and perfection which permits not the slightest error, before they are trusted to drive the trucks and refuel the planes. The short working period, reduced by time spent in training, means a constant turn-over.

Since last October, when the average monthly output was 1.5 million gallons, the Refueler Pool has had a rapidly expanding business. The record shows 3.5 million gallons in May, and the requirements are still going up! More squadrons are now based at Jacksonville, and all are doing much more flying, according to Chief Lentz, head of Transportation's V-1 Division.

"No fuel connection of hose, nozzle

and fuel tank can be too tight," Chief Lentz asserts. "No spillage or leakage can be permitted. The least leak in the connection of the fuel hose would be enough to cause an explosion that could damage 10 planes, kill 15 men. As for the fuel truck, nobody would ever know where that got to."

To avoid such a disaster, men stand by whenever a plane is being refueled, with two CO₂ tanks at the ready. The chief points out with great pride, that realization of their common danger has brought about perfect cooperation between the Pool's personnel and the crews of the aircraft. He cannot recall an accident or explosion during the time the Pool has been operating.

The efficient, safe and fast delivery of the correct fuel to all aircraft is the Refueler Pool's main objective. And it achieves it!



CDR. PEASE GIVES PELICAN TO CDR. HANSON

Norfolk Zoo Gets Bird VS-27 Presents its Pelican Mascot

VS-27 has presented the Norfolk Zoo with its mascot "Pete," a pelican, first in the Zoo's history. Pete was originally presented to the "Pelican Squadron," by VS-22, commanded by Cdr. F. A. Pease.

VS-27 had failed to get their bird at Key West, so VS-22 stepped in and did the job for them.

Cdr. Eugene R. Hanson, skipper of VS-27 based at NAS NORFOLK, presented the bird to the Zoo.

"The Zoo will be a better home for Pete," Hanson said. "Many who may never have seen a pelican will have the opportunity."

The pelican, uncommunicative as he surveyed his new home, found it a far cry from his former habitat in the Florida Keys.

Zoo officials said they were "very pleased" to get the bird. Pete will be on display in the aviary there.



LT. J. R. VOORHEES, senior LSO with VC-61, is given "Seeing Eye Dog Club" Award by his CO, Cdr. Lou Bangs, for 22 consecutive months of waving squadron pilots to safe landings.

AGO Returns as a Pilot 18 Months Training, and He's Back

Eighteen months ago, Ltjg. John Inman left VA-15 as a ground officer. Today he is back with the same squadron as a pilot.

Inman received his commission in 1954 and served with the NAS CECIL FIELD squadron as a ground officer in the operations department. Three months later he was ordered to flight



JENNINGS WELCOMES INMAN BACK ABOARD training. After basic training, he reported to NAS CABANISS FIELD where he flew the AD *Skyraider* and upon graduation in April was assigned to his old unit.

The squadron, commanded by Cdr. L. B. Jennings, is a unit of CVG-1. It returned from a 'round the world cruise aboard the USS *Midway* last year and was one of the 7th Fleet units which took part in the evacuation of the Tachen Islands in 1955.

VAdm. Lappas Decorated SecNav Thomas Presents Award

VAdm. Pyrros Lappas of the Royal Hellenic Navy was decorated in May with the Legion of Merit, Degree of Chief Commander.

The citation, signed by Secretary of Defense Charles E. Wilson noted Lappas' "exceptionally meritorious conduct in the performance of outstanding services from 30 September 1952 to 16 May 1956 as Chief of Naval General Staff of the Royal Hellenic Navy. . . . By his outstanding professional competence . . . he has contributed materially to the maintenance and further strengthening of the traditional bonds of friendship existing between the Navies of Greece and the United States. . . ."

Secretary of the Navy Charles S. Thomas presented the award at a ceremony attended by the senior officials of the Department of Defense.



COX IS CHECKED OUT IN A T-28B TRAINER

NavCad Back at Cabaniss Former 'White Hat' was in ATU-107

NavCad William G. Cox, Jr., formerly a yeoman with ATU-107 at NAAS CABANISS FIELD in Corpus Christi, has returned to his old "white hat" duty station and ATU-107 for flight training.

While at Cabaniss Field in 1954, in charge of the students' flight records, Cox became interested in flying. Instructor Maj. N. J. Johnson, USMC, noted his interest and often took Cox on familiarization flights. Flying proved attractive to the young yeoman.

Cox decided to try for the NavCad program. By March 1955, he had taken and passed the necessary examinations and reported to Pensacola. When he had completed the rigid basic training course, he was transferred to Cabaniss for his advanced flight training.

Now instead of keeping flight students' records in ATU-107, his own record is in the file as a man on his way to his Navy "Wings of Gold."



AN A3D SKYWARRIOR from Patuxent River shoots touch-and-go landings aboard the USS *Forrestal* using the mirror landing system.



PILOTS REQUALIFY ABOARD USS SAIPAN

Carquals Aboard Saipan Carrier Pilots Boast a 100% Score

The USS *Saipan* boasts all ship's company aviators qualified in carrier landings on their own flight deck.

Although the 16 pilots had a grand total of 58,289.4 flying hours, several had never made a carrier landing. None of them had landed aboard ship in the SNJ, the aircraft operated by the *Saipan* in her carrier qualification mission in the Air Training Command.

One at a time as they could be spared from ship duties, each pilot went to NAAS BARIN FIELD to carrier qualification ground school, SNJ practice hops, and FCLP. When they were ready, the *Saipan* pilots made six carquals each on their own carrier, together with NavCads and other students.

There were no exceptions. *Saipan's* skipper, Capt. Allen M. Shinn, and the XO, Cdr. N. R. Bacon, took time out to qualify while their ship was underway in the Gulf of Mexico.

American Chapel at Malta 110 People Witness the Dedication

Chaplain C. W. Ackley now has his Protestant chapel at HNAS HALFAR, Malta. On Palm Sunday, an overflow congregation of 110 people witnessed the dedication ceremonies of the first American chapel on the island.

Cdr. H. B. Van Gorder, CO of FASRON (Special) 201, made the presentation to Chaplain Ackley. Chaplain Ackley is Force Chaplain for ComNAB, Eastern Atlantic and Mediterranean, who visits the island monthly. He was the sparkplug for the construction of the chapel.

Since Malta is predominantly Roman Catholic, the need for the Chapel has been almost exclusively a Protestant problem. The chapel was rushed to completion for Palm Sunday services.

Foreign NavCads at BTU-2 15 Nations Have Been Represented

NAS PENSACOLA'S Basic Training Unit-2 at NAAS SAUFLEY FIELD is becoming known as the U.N. of the South. And all for good reason!

Students from 15 countries have gone through the training unit and even more are scheduled to come. From South America come student pilots from Chile, Argentina, Brazil and Costa Rica. Canadian and Mexican flyers complete the list of all foreign students who have passed through Saufley.

From Britain, France, Italy and Portugal, fledgling pilots report to Saufley for flight training. The unit expects students from Germany before long. At present, they are still going through pre-flight at Pensacola, but will arrive later this year. Rounding out the global coverage are the officers from Turkey and Japan.

Mid-Air Refueling Cited Two Fighter Aircraft are Saved

Two Navy carrier-based fighters, in two separate incidents, have been saved from ditching by their ability to refuel in mid-air.

In one instance one of two F2H *Banshee* fighters scheduled to rendezvous with a tanker, lost radio and radar contact and failed to show up at the appointed refueling station over the Mediterranean. A search by the tanker and the other fighter was immediately started and the missing plane was finally located. With two and a half minutes of fuel remaining, the "lost sheep" was refueled by the North American AJ tanker and returned safely to the USS *Ticonderoga*.

In another case over the Mediterranean, a *Grumman* F9F was saved by aerial refueling. Returning to the carrier, the pilot found he could not land immediately because of a "fouled" deck. With only 300 pounds of fuel remaining, he was faced with ditching but was intercepted by a returning AJ tanker, refueled and thus able to remain aloft until the deck was cleared.

Another use of refueling in the area is also reported in the case of one F2H and two F9F fighters being ferried from Port Lyautey to the USS *Intrepid*. The distance was greater than their normal range, but they accomplished it non-stop, refueling en route.



REP. COLE WITH LCDRS. MILTON, MCBRATNIE

Congressman Cole in A3D Fleet Jet Plane is Demonstrated

Congressman W. S. Cole (R), New York, shot across southern California skies the end of April while taking his first jet plane ride in a Navy A3D *Skywarrior*. It was piloted by LCdr. C. C. McBratnie with LCdr. G. P. Milton acting as co-pilot. Both officers are attached to the BAR office at the Douglas El Segundo plant. McBratnie is the A3D project officer.

The *Skywarrior* in which the Congressman took his flight, is the first of the new bombers which will be delivered to the Navy from the local Douglas plant. It will go into service with a ComAirPac squadron.

A lieutenant commander in the Naval Reserve, Congressman Cole has two sons serving with the Navy—LCdr. William S. Cole, Jr., is serving aboard a submarine and Ens. Thomas E. Cole is aboard a cruiser. Another son is attending Cornell University in N. Y.

Flight Time Record Is Set VMF-232 Logs 2,558 Hours in March

The *Red Devil* fighter pilots of VMF-232 set a new Navy/Marine Corps flight record in March when they flew 2,558 hours. In setting this new record, the squadron surpassed the previous high time by 250 hours.

Fifty-two squadron pilots utilized 21 FJ-2 *Furies* in compiling this impressive score. The unit's maintenance personnel, although 17% below normal, managed to keep an 88% aircraft availability.

The squadron flew only syllabus flights and were not involved in week-end flying. The accumulated time was all accident-free.

Commanded by Maj. S. G. Warren, the squadron is based at MCAS KANEHOE BAY and is part of the defense force guarding the Hawaiian Islands.

LETTERS

SIRS:

Ltjg. Zeiner's article entitled, "The Pace-makers Are Home Again," (NANews, May 1956, pp. 32-33) leaves me and my squadron mates in quite a bit of doubt as to the correctness of a statement made in the last paragraph. This reads: "A total of 11,700 hours were flown by pilots of VF-121 and 2500 carrier landings were made before they disembarked from Hancock at San Diego."

I am inclined to disbelieve the above mentioned figures for this reason: 2,500 landings divided into 11,700 hours, if my meager math serves me correctly, figures out to be an average of 4.68 hours per hop. This inflight refueling is wonderful, but come now, boys, isn't that pushing it just a little far? Would appreciate clarification.

W. J. F. WILTSHIRE
LIEUTENANT JG, USN

VF-32

SIRS:

Back issues of the Naval Aviation News have brought back to mind many fine memories of my short flying career.

You are doing a terrific job with this magazine and I wish to thank you.

THOMAS E. KOLONGOWSKI
Philadelphia, Pa.



THE HONORABLE C. S. Thomas, SecNav, models his latest gear from BuAer. The flight gear, perfectly fitted, was presented to him after it was discovered he had to borrow a similar outfit for official time-saving jet plane flights.



JOURNALIST CHIEF H. C. Varner, who has served NANews as associate editor three years, reports this month to Commander, Cruiser-Destroyer Force, the Pacific Fleet.

All-Weather Experts Confer Exchange Ideas on Matters of Policy

The Navy's first all-weather flight training conference was held in May by invitation of Cdr. Fred L. Bates, CO, Fleet All Weather Training Unit, Pacific. CNO, the various training commands, AirLant and AirPac, and the Marine Corps were represented.

Representatives compared courses, discussed training problems, and exchanged ideas. They urged that every effort be made to standardize basic flight instruments and cockpit arrangements in both trainers and operational aircraft. A similar conference will be held next January.

• Two FAirWing-14 squadrons have been awarded ComAirPac's coveted Quarterly Flight Safety Award: VP-48 and FASRon-110.

• The Navy's P5M patrol planes carry wing-tip searchlights that are equivalent in brightness to approximately 15,000 100-watt bulbs.

IFR-IQ?

According to OPNAV Traffic Control Facilities Section, the answer is: "The CAA has revised Air Traffic Control procedures so that reports need not be made at certain compulsory reporting points from aircraft operating above 15,200 feet. At these reporting points this symbol (L) will be attached to the regular compulsory reporting point symbols.

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● COVER

The USS Forrestal on a shakedown cruise in the Caribbean. Extending forward from the flight deck are newly-designed C-11 catapult bridle arrestors.

● SUBSCRIPTIONS

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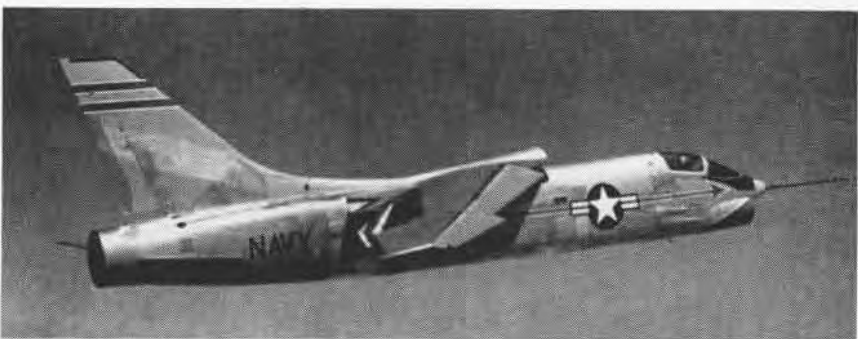
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F 8 U

The two-position incidence wing of the Navy's new F8U-1 Crusader is the first production aircraft to use this concept. It permits the Crusader to fly at extremely high Mach speeds yet slow enough to land on the deck of an aircraft carrier.





NAVAL AVIATION

NEWS

This Combat Information Center plotting board on the USS Randolph is used to keep up-to-date on positions of aircraft in the area. Let Naval Aviation News be your plotting board. Keep up-to-date on what is happening in Naval Aviation around the world. You can get your personal copy mailed to you each month. You will enjoy Grampaw Pettibone's salty humor with a purpose, and the many new features in each issue. Send a two dollar check for a year's subscription to

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