NAVAL AVIATION NEWS

JULY 1973


158546
NAVY
530

NAVAL AVIATION NEWS

FIFTY-FIFTH YEAR OF PUBLICATION

THE STAFF

COVERS —*At left is an EA-6B Prowler of Whidbey Island-based VAQ-133 with the Deception Pass bridge in the background. On the back cover, AA Danny Shrum caught a young "recruit" during a training session. Little Christopher Rew is the son of Lt. Robert E. Rew, a member of NAS Pensacola's SAR detachment.*

Published monthly by the Chief of Naval Operations and the Naval Air Systems Command in accordance with NavExos P-35. Offices located at 801 North Randolph St., Arlington, Va. 22203. Phone: 202 692-4819, Autovon 22-24819. Annual subscription: $9.00 check or money order ($2.25 additional for foreign mailing) sent direct to the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. A single copy of the magazine costs 75 cents from GPO.

EDITOR'S CORNER

Meaningless Matters of Importance

Thomas Jefferson once said, "Let history answer the question."

Recently, a soon-to-retire veteran Navy pilot, apparently gave some thought to that idea.

Following a luncheon talk to an Oceana-based fighter squadron, he was asked a question about Naval Aviation history and what part of the Navy is responsible for keeping up with all facets of it.

The question prompted the speaker to write a letter which mentions "how highly competitive carrier aviators are among themselves, for such seemingly inconsequential things as the Golden Tailhook Award for the squadron which gets the most number of #3 wires during a cruise, etc., etc., etc. Many squadrons come up with the most numbers of this and that, or pilots who have done this and that. Nobody really cares about all these minor accomplishments — except carrier aviators.

"As Vice Admiral Thomas F. Connolly expressed it at the 1971 Tailhook Reunion, '. . . tremendous pride in an accomplishment shared throughout Naval Aviation history by only a relatively small group of capable and dedicated individuals — the carrier pilots.'

". . . I thought it might not be a bad idea to just drop you a note to see if we couldn't set up a kind of historical records section in the Naval Aviation News office (if such an organization has not already been established) to retain and categorize the many types of 'meaningless' records that are constantly being claimed and counterclaimed by squadrons as well as individual pilots. Ten years from now, who would even remember that Squadron X had more pilots who won more E's in bombing than any other attack squadron in history?"

NANews has noted the problem before and observed, in an introduction to the history of the first 25 years of jets in the Navy (April 1968, page 6) that "Everyone always seemed to be the 'first' to do something-or-other. . . . Library shelves creak with claims and counterclaims. . . ."

But there is a way to record the records.

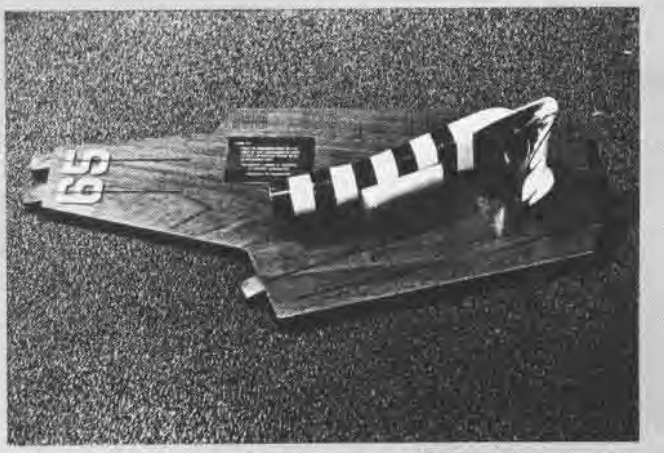
Feats unique to the carrier as well as all other segments of the Naval Aviation community are being reported through the command history program. Every aviation unit is required to submit an annual historical report to Aviation History (Op 05D2) in accordance with OpNavInst. 5750.12B of May 20, 1971. One of the guidelines covers reporting "notable records or firsts, including exact dates."

Unfortunately, desirable as it would be, that office doesn't have a staff to research and compile all the many different records and milestones that have been set by our carriers, squadrons, pilots and crews. However, it does have the raw data in the individual squadron reports — which date back to the beginning of WW II (nearly 500 cubic feet of documentary papers). These records are not "sealed" but open to anyone wishing to peruse them and extract specific data.

So, if ten years from now, someone should want to research the feats of Squadron X, the data will be available — provided, of course, that the unit cranks the information into its historical report.

Command histories become a part of Naval Aviation's permanent archives. They often serve as the only reliable source of primary information for inquiries and investigations, contributing to the determination of future naval and military plans, programs and policies.

In order to stress the value and need for a sound history program, Naval Aviation News, in a future issue, will feature an example of a good unit history, one submitted for calendar year 1972.



This plaque, now on display in the Aviation History Office, carries the legend, "Know ye: That in commemoration of the visit of the Commander in Chief to USS Enterprise (CVAN-65) on 10 November 1967, President Lyndon B. Johnson is hereby designated Honorary #1 Tailhooker."

NAVAL AVIATION NEWS
1911 1973

Training Command First for VT-4

PENSACOLA, Fla. — Three naval officers recently became the first to receive their wings at VT-4 and the first to complete all their jet training in one squadron at the naval air station.

On May 9, Captain David B. Miller, Commander, Training Air Wing Six, officially designated Ensigns Kenneth L. Buchspies and David L. Jackson, and Ltjg. Jeffrey M. Schott Naval Aviators.

The three first reported to VT-4 in February and March 1972 after completing primary flight training at VT-1, NAS Saufley Field.

At VT-4 they received more than 90 hours of classroom instruction and then began the basic jet syllabus in the T-2C *Buckeye*. Basic completed, the three entered the advanced jet program, still in VT-4, in October. After 80 more hours of ground school, they began flying the TF-9J *Cougar*.

Commander Richard V. Christopher is C.O. of the training squadron.

25 Years of TPS

PATUXENT RIVER, Md. — Test pilots from across the nation gathered at the Naval Air Test Center to celebrate the Test Pilot School's 25th anniversary. Among the activities was a luncheon honoring three former prisoners of war: Captain A. W. Franke and Commanders John D. Burns and Jim Hickerson. Rear Admiral Alan Shepard was also a guest at the luncheon.

Symposium topics ranged from the evaluation of today's F-14A and S-3A to research of tomorrow's XFV-12A.

Navy took delivery of its first jet transport, the C-9B, on May 8. The Skytrain II is Navy's version of the DC-9 commercial jetliner. Its range, with a maximum payload of 32,444 pounds, is about 1,150 statute miles. Ferry range is about 3,400 miles and maximum gross takeoff weight is 110,000 pounds. The C-9B will accommodate a maximum of 107 five-abreast in its all-passenger arrangement or eight 88x108 standard pallets in an all-cargo configuration. In the combination cargo-passenger configuration there are seats for 45 passengers in the rear half. VR-30, NAS Alameda, Calif., and VR-1, NAS Norfolk, Va., will operate the transport.

Lemoore Freedom Walk

LEMOORE, Calif. — A living memorial to NAS-based squadrons which served in Vietnam was dedicated June 6 at the naval air station.

The memorial, built with funds provided by the Red River Valley Fighter Pilots Association, consists of a 200-yard-long walk planted with nearly 100 shade trees. At either end of the walk, a bronze plaque embedded in the concrete reads "Freedom Walk — dedicated to all Lemoore-based personnel who served in Southeast Asia between 1964 and 1973."

Nearly 130 Lemoore pilots were downed in SEAsia during that time. Of those, 87 were listed as POWs or MIAs. Forty-three have been released.

HT-18 Safety Record

PENSACOLA, Fla. — HT-18 was recently named the recipient of the Chief of Naval Air Training Accident Free Year Award.

The annual award is given to training command squadrons which complete 12 months of accident-free flying.

Commander John M. Bolton was C.O. during the period covered by the award. He has since been relieved by Commander Richard D. Nichols.

Return to Ellyson

PENSACOLA, Fla. — A former Ellyson Field instructor, retired LCdr. Thomas K. Arnold, returned to the field to visit his two sons, both in the flight program at the NAS. Ens. William G. Arnold was awarded his wings by Commander John M. Bolton, commanding officer of HT-18, while his brother Lt. David K. was completing basic helicopter training in HT-8, before reporting to HT-18.

Arnold Sr. recalled that in his days as a young Naval Aviator, the SNJ was a common sight around Ellyson in place of today's *Hueys* and *Sea Rangers*.

New Blue Leader

PENSACOLA, Fla. — The *Blue Angels* acquired a new skipper when LCdr. Skip Umstead replaced LCdr. Don Bently as officer in charge and flight leader of the *Blue Angels*.

The new flight leader recently completed a tour as lead solo pilot for the *Blues*. He came to his present assignment from VF-2 at NAS Miramar where he was safety officer.

Mugu Civilian Aviator

POINT MUGU, Calif. — Howard Trickey is one of the Navy's few civil service term-appointment pilots. He got his appointment in 1968 when the Navy was short of pilots during a peak in the Vietnam War. It was a four-year appointment, extended in 1972 for one year and again in April until 1974.

Trickey's work in the Threat Simulation Department involves testing autopilot systems in the various drone target aircraft, QF-4, QT-33 and QF-9. His bright orange flight suit is identical to those worn by Navy fliers in the department, except for a leather name tag reading "Chief Crab."

New Safety Record

NAS ALBANY, Ga. — In April, Reconnaissance Attack Wing One, flying the RA-5C *Vigilante*, claimed a safety record in the carrier jet community. This past year the wing flew 20,000 accident-free hours and accumulated over 4,000 carrier landings.

Although a component of the Atlantic Fleet, the wing's squadrons regularly deploy aboard Pacific Fleet carriers.

Lightning Strikes at NATC Patuxent River

PATUXENT RIVER, Md. — There is at least one place at the Naval Air Test Center where people are doing more about the weather than just talking about it. At the new Lightning and Precipitation Static Environmental Test Laboratory, they are creating it. Lightning and other "shocking" things are being ordered up on cue to expose Navy planes and components to elements they may encounter under various atmospheric conditions. The lightning lab, a part of the Electronic Warfare and Reconnaissance Branch of the Weapons Test Division, is located in WST's electromagnetic compatibility hangar. This lab can accommodate as many as three C-130s at one time.

Lab tests lightning and static effects.

In a demonstration at the lab's official opening ceremony, a P-3 scale model was exposed to one million volts, about half the capacity of the lab's high voltage generator.

In the Dark Room

POINT MUGU, Calif. — A new naval air station facility opened in May whose workers operate in total darkness. The dark room, which is called the IFR room, is Point Mugu's new Radar Approach Control Facility, occupying 700 square feet beneath the control tower.

Darkness is essential so that air traffic controllers can more clearly view the lighted surveillance and precision approach radarscopes which track primary targets up to 60 miles and secondary targets as far as 200 miles.

Pilots will have round-the-clock radar approach control services for all landings at Point Mugu. Such services were previously supplied by the ground control approach unit at Runway 3 for only about one-quarter of the take-offs and landings. Of last year's total of 86,633 aircraft operations at Mugu, 6,992 were radar controlled approach landings and about 15,000 were radar controlled departures.

In addition to video maps and scopes that present a larger picture, new communications equipment and updated control tower equipment are part of the facility.

Airman apprentices visit VS-33, NAS North Island, as part of a new 16-day aviation training course given to aviation personnel assigned to fleet units on graduation from recruit training.

Recruiting Soars

NAS Los Alamitos, Calif. — Naval Aviation recruiting has been getting a boost from Don Davis, a retired lieutenant commander, Long Beach architect and glider pilot. Assisting the commanding officer, Captain Grant Boice, in the station's recruiting efforts, Mr. Davis and other glider pilots have donated their equipment and services on weekends. They flew over 170 auto-towed flights in one month, with 70 of the flights logged in Davis' glider, giving aviation recruiting 64 potential applicants. They plan to continue their glider demonstrations indefinitely.

Mr. Davis soloed in 1940 from Los Alamitos when it was still a bean field.

Jane McWilliams recently became Navy's first woman flight surgeon candidate to be appointed directly from the civilian community. This month, Lt. McWilliams will begin six months of advanced training at the Naval Aerospace Medical Institute at Pensacola, Fla. Then she will receive six weeks of flight training at NAS Saufley Field in the T-34 Mentor. Rear Admiral Oscar Gray, C. O. of the Aerospace and Regional Medical Center, administered the oath.

NATC Evaluation

Patuxent River, Md. — The Naval Air Test Center recently completed a developmental evaluation of two Inflight Engine Condition Monitoring (IECM) systems. One was manutured by Teledyne, the other by Pratt and Whitney. They were installed in A-7s by the Naval Air Rework Facility, Jacksonville, Fla.

The nine-month evaluations included catapult launches and arrested recoveries by the flight test division and electromagnetic interference testing by the weapons systems test division in its shielded hangar.

The purpose of these systems is to permit detection and correction of incipient engine component failures through either onboard computer analysis of various engine parameters or ground computer analysis of recorded flight information. Pilot warning of impending engine problems or failure is provided to permit recovery of the aircraft prior to actual engine or component failure. Additionally, these systems provide a ground computer analysis of engine trends, engine and component fault diagnosis and recommended corrective maintenance actions. Both systems have similar component structures, being composed of a signal acquisition unit which receives analog information from sensors monitoring the engine and related components, a data management unit which converts the analog information to digital and compares it with the onboard computer program, and a data recording unit which records the inflight information. Information is recorded during any of three modes of operation: when engine limits are exceeded, at predetermined intervals for engine trending and on pilot command.

The purpose of the system is to increase engine reliability, which directly increases flight safety, and to improve maintenance assistance through fault isolation and engine trending. The evaluation of these two prototypes has proven that an effective and practical IECM is attainable and that Navy-wide application would greatly enhance engine reliability and maintenance techniques with an obvious beneficial impact on flight safety.

Coast Guard Crews Carrier Qualified

Brooklyn, N.Y. — Eight men from the Coast Guard Air Station at Floyd Bennett Field are laying claim to being the only "carrier qualified" HH-3F crews in the Coast Guard.

It all began in March when the Norwegian merchant vessel *Norse Variant* sank in the Atlantic. During the search for survivors, two Coast Guard *Sea Kings* flew from the deck of USS *Independence*, 200 miles offshore.

A sole survivor, Stein Gabrielsen, was taken aboard *Independence* in the *Sea King* piloted by Lt. Gene M. Field, Jr. Other members of that crew were Ltjg. Bob Gravino, copilot, and AT1 Stuart Perry and AM3 Dave Swigert, crewmen.

Members of the other crew, who are now carrier qualified, are Lt. Edward King, pilot; Lt. Darryl Hannon, copilot; and AT1 Ken Gallo and AD3 Mike Mieth.

Red River Rats Reunion

[illegible]

GRAMPAW PETTIBONE

Belly Whopper

Two senior aviators, one with over 4,000 hours and the other with over 3,000, were scheduled for a local night training flight in a US-2. The aircraft commander arrived on the scene first and commenced preflight of the aircraft. The copilot arrived shortly thereafter and a briefing was held on sequence and conduct of the flight. The aircraft commander was to occupy the right seat.

Pre-start, start, pre-taxi, engine run-up, and pre-takeoff checklists were followed, using the challenge and reply method. Prior to takeoff, another brief was given by both pilots concerning takeoff and procedures in the event of an engine failure.

Following the initial takeoff, the aircraft remained in the local traffic pattern, with each pilot making several touch-and-go landings. Following several normal GCAs by both pilots, various simulated emergencies (i.e., no gyro, radio failure) were introduced to provide additional training for the GCA controllers. On the last approach, the aircraft commander reported a simulated fire in the electrical compartment and requested an immediate landing.

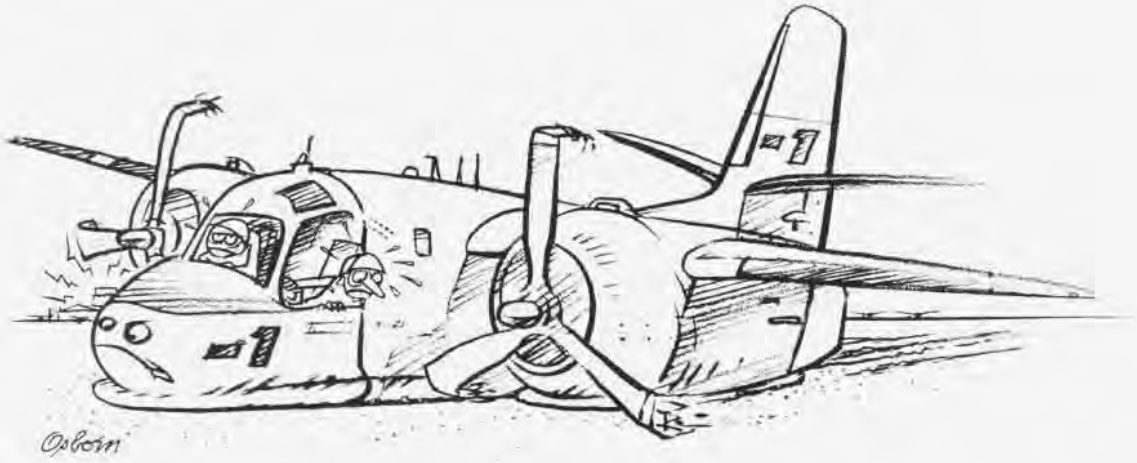
Vectors were given to intercept the final approach course at two and three-quarter miles from touchdown. During this approach a transmission to "perform landing cockpit check" was not given by the controller; however, the "wheels should be down" transmission was given shortly after interception of the final approach course. The aircraft continued the approach, touched down 1,200 feet past the threshold, coming to a stop 2,200 feet later.

Shortly after initial contact with the runway, the pilots realized the landing gear handle was up and secured the magnetos, battery and mixture and placed the flap handle up. The fuel was turned off after the aircraft came to a stop, and all occupants exited the aircraft, uninjured. The aircraft sustained substantial damage.

Grampaw Pettibone says:

Great jumpin' Jehosaphat!? I can't believe it! Two experienced drivers deviate from NATOPS and then when they land minus the rollers, they holler, "But GCA didn't warn me to perform landing checklist." Baloney! These boys were too busy giving GCA a practice emergency approach; they didn't realize they were booby-trapping their own aircraft. My, let's see how sharp GCA is today. A damn sight sharper than the driver in the cockpit!!

I get sick and tired of readin' about this type of accident. I might have a little sympathy for a pilot who at least tries to comply with NATOPS but no sympathy for pilots who either don't know NATOPS — or don't care!



ILLUSTRATED BY Osborn

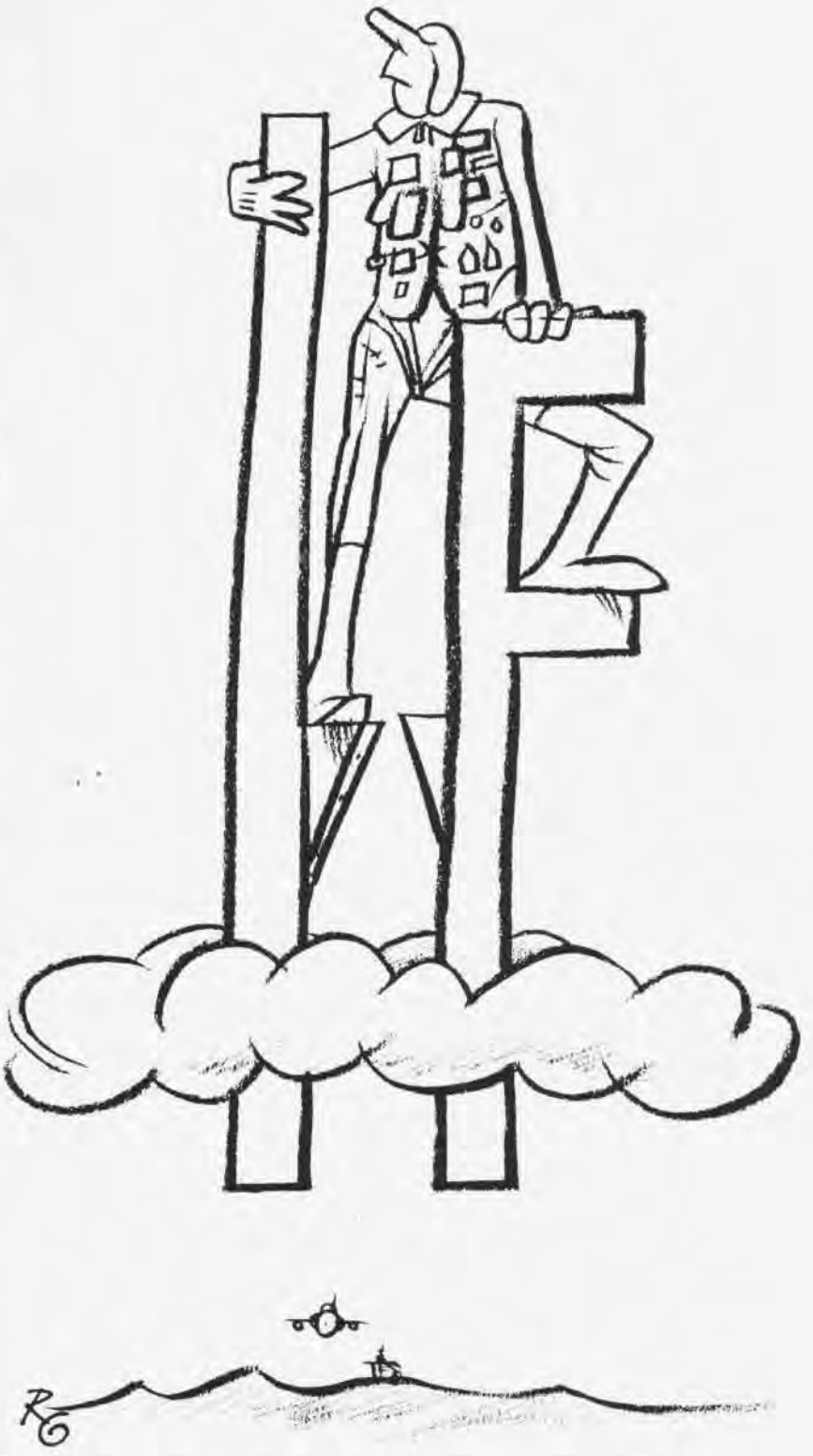
I have to surmise, in this case, that the pilot was unaware of the proper method of going through the checklist in an S-2. If that's so, then we have a supervisory problem because of improper initial checkout! Nuff said.

If

A lieutenant-type aviator was scheduled as a wingman on a two-plane practice night bombing flight in an A-4E *Skyhawk*. Pre-launch activities and departure from the ship were uneventful. The two-plane formation proceeded to the practice target area. The bombing portion of the flight was completed without incident and the flight leader took the flight to the local bingo field to check the weather and then back to the ship for recovery, where the two A-4s separated for individual approaches to the ship. Our pilot commenced his approach to the ship but was waved off for being low and slow. During the second approach, the ship entered a rain shower and the *Skyhawk* was waved off again and told to rendezvous with the tanker overhead and proceed to the divert field.

The tanker, an A-3 *Skywarrior*, had been experiencing radio difficulties which made rendezvous more difficult. The ship directed the two aircraft to tank at 5,000 feet; however, there were clouds at 5,000 feet, so the *Skyhawk* was directed to proceed to the bingo field (30 miles) and tank en route. The A-4 now continued its climb to 30,000. Its fuel state was approaching a critical condition. Upon reaching 30,000, the aircraft commenced an idle descent. During the descent, the A-4 pilot finally spotted the tanker and attempted to plug in. The weather at the divert field was reported 500 scattered, 1,900 overcast, visibility of ten miles with periods of 700 overcast, 1,900 overcast, visibility seven miles in heavy rain showers.

While attempting plug-in in rough air with the fuel gauge reading zero, the A-4 flamed out due to fuel starvation. The pilot broadcast his intention to eject. The ejection was uneventful and the pilot was picked up by the ship's helo and returned to the ship.



Grampaw Pettibone says:

Sufferin' catfish! You really blew it, son! What in the heck did you climb to 30,000 feet for? Seems to me some pilots believe we print bingo charts for nothin'! In spite of a briefing before the flight, this lad proceeded to botch the whole job by losing his machine and placing his own life in jeopardy.

There are an awful lot of "ifs" in this fiasco . . . if only the radios in the A-3 were working properly . . . if only the bingo procedures on the ship were different . . . if only the pilot had not climbed to 30,000 feet . . . if . . . if . . . if . . .!

TOMORROW'S NAVAL AVIATION

LOOKING

Man has made more technological progress in the 20th century than he has throughout all the rest of his history. He has gone from the wireless to almost instantaneous communications anywhere in the world, and from the horse and buggy to the moon.

One can only imagine that this progress will continue at an unprecedented rate through the remainder of the century, progress that cannot help but touch Naval Aviation. It would be impossible to accurately visualize Naval Aviation in the year 2000 A.D., but plans are being formulated for the more immediate future.

Chief of Naval Operations Admiral Elmo R. Zumwalt, Jr., remarked to the U.S. Senate Committee on Appropriations, on March 30, that "The oceans of the world will play a critical role in both the economic and the political future of nations. Every nation will have a growing interest in transporting vital resources by sea. This need already is evident in the current energy debate. We also can expect that over time there will be an equally expanding interest in the resources of the oceans as world demand for

Possible future SCS is the SWATH ship.

AHEAD

By JOC Dick Benjamin

energy, foodstuffs and other vital material grows, as sources on land diminish, and as ocean bed reserves remain substantially untapped. . . .

"We recognize that the Navy has a responsibility not only to contribute to the deterrence of nuclear war, but also to assure our free use of the seas and continued support for our allies. Adversaries must not be tempted to use military power to gain political objectives inimical to our interests. Our military posture must not display conspicuous vulnerabilities that others can exploit to erode allied confidence in the U.S. The world must understand that we are not withdrawing from our treaty commitments or losing our ability and determination to defend our interests and to support our friends and allies."

An important task outlined by the admiral to the committee is "to provide general purpose forces that contribute directly to the broad national security strategy outlined by the Secretary of Defense. We see this task as placing increased reliances on forces that, by their nature, are flexible and mobile and provide deterrence over land as well as sea."

Much of the hardware that will go to make up or support the forces Adm. Zumwalt referred to is in various stages of development or production; some are no more than ideas or drawings. Throughout the years, *NANews* has reported on various developments as they occurred. Presented here is a capsule view of plans, concepts and programs for Naval Aviation beyond 1973. Many of these will be presented later in more detail.

As reported in Secretary of the Navy Warner's remarks to the Senate committee (page 22), the Navy hopes to have four nuclear-powered carriers by 1980 with the delivery of the unnamed CVN-70. This would provide two nuclear-powered task forces for both the Atlantic and Pacific Oceans.

Composition of the air wing flying from carriers will be highly flexible in the era of the CV concept. (Task dedicated decks such as the CVA and CVS are preferred, but the limited number of authorized carriers forces the CV concept as the best alternative.) Type aircraft on a carrier can be increased or changed to fulfill fighter, attack, reconnaissance, electronic or anti-submarine warfare roles as a particular situation might dictate.

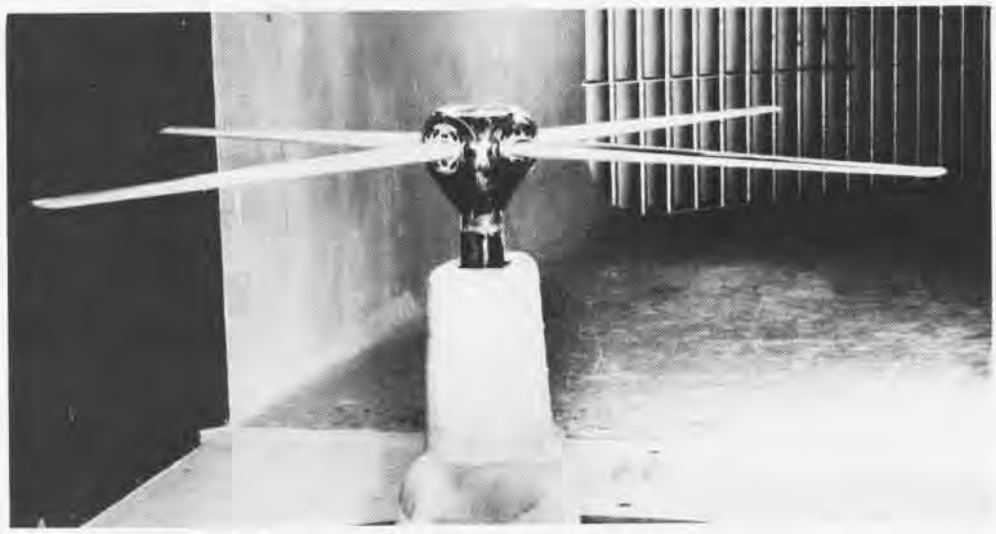
It is envisioned that a fighter force made up of F-14s will meet the requirements of air superiority and fleet air defense. The *Tomcat's* capability has been demonstrated in more than 2,700 flight hours amassed in over 1,350 flights, and the aircraft is meeting or exceeding overall performance predictions. The test and evaluation program has not been trouble free and there are areas which are receiving special attention, but there are no problems that affect safety or impair ultimate F-14 performance.

The *Phoenix* missile and the AWG-9 airborne search and missile fire control system were evaluated in an electronic countermeasures environment with excellent results.

For the future, it is anticipated that a smaller strike/fighter or fighter/attack aircraft will be needed to complement the F-14. This aircraft will have superior maneuverability and compatibility with medium and short-range air-to-air missiles, and be able to penetrate enemy defenses.

An ultimate goal is to reduce the aircraft types on a carrier deck as well as the number of engine types, simplifying support requirements and tasks. Basic aircraft designs would be modified and applied for multiple missions. For this reason, the strike/fighter will probably fill a variety of roles and be mentioned several times in this article.

Immediate planning for attack aircraft is to have an all A-7E and A-6E force, and work is under way to update earlier models of the aircraft. More distant planning includes the possibility that both



could be replaced by a single aircraft such as the strike/fighter, or a sophisticated medium attack plane. This version of the strike/fighter would be capable of highly accurate weapons delivery at long range, day or night, and in all weather.

The RA-5 would be phased out in favor of a simplified and less expensive multisensor reconnaissance system with real time remote readout. This would be accomplished through the use of a pod of multiple sensors adapted to existing fighter and attack aircraft. A second possibility would be the use of remotely piloted vehicles (RPVs) which would augment the sensor pod. In most instances where reconnaissance missions might be extremely hazardous for piloted aircraft, the RPV would be used.

Primary antisubmarine warfare aircraft will be the land-based P-3C and the carrier-based S-3A, and both have high priority. They are considered complementary ASW weapons systems in that each performs certain missions better than the other and both are required to counter the total threat to successful use and control of the seas.

Included in the FY 74 budget is a request for 12 additional P-3Cs, with the aim of an all-P-3C active force. As P-3Cs join the active force, P-3As and Bs will move into the reserve force, replacing the remaining P-2s.

S-3A development has been notable in that every scheduled milestone has been reached early and all flight and systems performance goals have been met or exceeded. The present budget request is for an additional 45 *Vikings* to continue the replacement of the aging S-2.

The S-3 has many possible applications in tomorrow's Naval Aviation. Derivatives of the *Viking* could replace A-3 and EA-6 jammers in electronic warfare, or be used as tankers, medium attack planes or for carrier onboard delivery (COD).

A derivative of the S-3 is only one of four possibilities for a new COD but it appears to be the most feasible. The three alternatives are to build a sophisticated V/STOL which would require extensive research and development, to develop a new conventional COD which also would be expensive, or to start building the C-2 again, trying to eliminate its previous problems. Although refining the C-2 would ultimately be less expensive, it would still have far fewer capabilities than an S-3 derivative.

New circular control rotor under investigation at the Naval Ship R&D Center, Carderock would reduce helicopter hub complexity and increase lift capability and speed, top. Technology developed for ground effect and air cushion vehicles is being used by Carderock to determine feasibility of an air cushion landing gear system for high performance aircraft, left; a modified A-4 was recently tested in the Temco-Vought wind tunnel. Opposite is artist's concept of McDonnell Douglas lift/cruise fan V/STOL for SCS surveillance and ASW missions.

Complementing the nuclear and conventional-powered CVs will be eight sea control ships (SCSs). The principal mission of these relatively small, austere ships will be to protect underway replenishment groups, amphibious ready groups, convoys and task groups without aircraft carriers in company. They will displace about 14,000 tons and have an overall length of 610 feet, long endurance and speeds compatible with their tasks (*NANews*, March 1972, p. 42).

SCSs could well be double-hulled catamarans such as the one presently being tested at the Naval Ship Research and Development Center, Carderock, Md. Engineers at the center are working with a 20-foot model of a new and much improved type of catamaran called a small waterplane area twin-hulled (SWATH) ship.

An expert in the advanced concepts office at Carderock stresses that the SWATH ship would be quite different from the conventional catamaran in that the hulls are cigar-shaped and have thin fins at the air/sea interface. Four major advantages reportedly derived from the SWATH concept are:

A significant increase in the number of helicopter and V/STOL aircraft which can be carried on the wide cross-structure, which in turn increases American presence;

Higher sustained speeds in adverse seas;

Greatly reduced ship motion which would provide high availability of aircraft in rough weather and increased aircraft safety; and

Improved hull-mounted sonar performance brought about by a more compatible hull form, reduced motion and a wider sonar receiver baseline.

In the more distant future, a SWATH ship design could provide a larger tactical sea control ship of up to 33,000 tons.

Air wings flying from the SCS will consist of vertical takeoff anti-submarine, airborne surveillance and fighter/attack aircraft. The ASW and surveillance aircraft will be derivatives of the same airframe — and they could be helicopters or fixed-wing aircraft.

Boeing and Sikorsky have been awarded contracts to develop conceptual aircraft designs to satisfy the ASW and surveillance requirements. Boeing is conducting comparative studies of helicopters including compound configurations with and without ringtails, and tilt-rotor. Sikorsky's studies cover standard and compound helicopters, together with two new rotor concepts, the reverse velocity rotor and advancing blade concept.

A viable candidate for the job will be an advanced model of the Canadair Limited (a General Dynamics subsidiary) CL-84 now being tested at NATC Patuxent River, Md., by the British, Canadians and Americans.

Navy's interests in the tests are to determine instrument flight requirements for V/STOL aircraft that would operate from the SCS. Primary objectives of the current tests are to investigate instrument flight head-up and head-down display requirements for terminal area guidance and control; handling characteristics for terminal area instrument flight; degree of control required for instrument flight terminal area guidance and control and the associated displays; transition and steep angle approach flight profile parameter limits; and operating and design parameters as they apply to the SCS concept.

A second CL-84 is scheduled to arrive at Patuxent River this month for further evaluation, some of which is expected to be done aboard the interim sea control ship, USS *Guam*. Work at NATC will include pilot checkout, flight control and stability augmentation systems checks and flying qualities tests in all flight regimes. Tests aboard *Guam* will include deck handling, operating techniques, short takeoff performance, wind-over-deck effects on vertical takeoff and landing operations, crosswind launch and recovery, and night operations.

The air-defense/surface-attack mission of the SCS will be accomplished by a high performance V/STOL fighter/attack plane. There are presently three possible designs for this aircraft: a thrust-augmented wing by North American Aerospace, a lift-plus-lift/cruise by Convair Aerospace, or an advanced model of the Hawker Siddeley AV-8A *Harrier*.

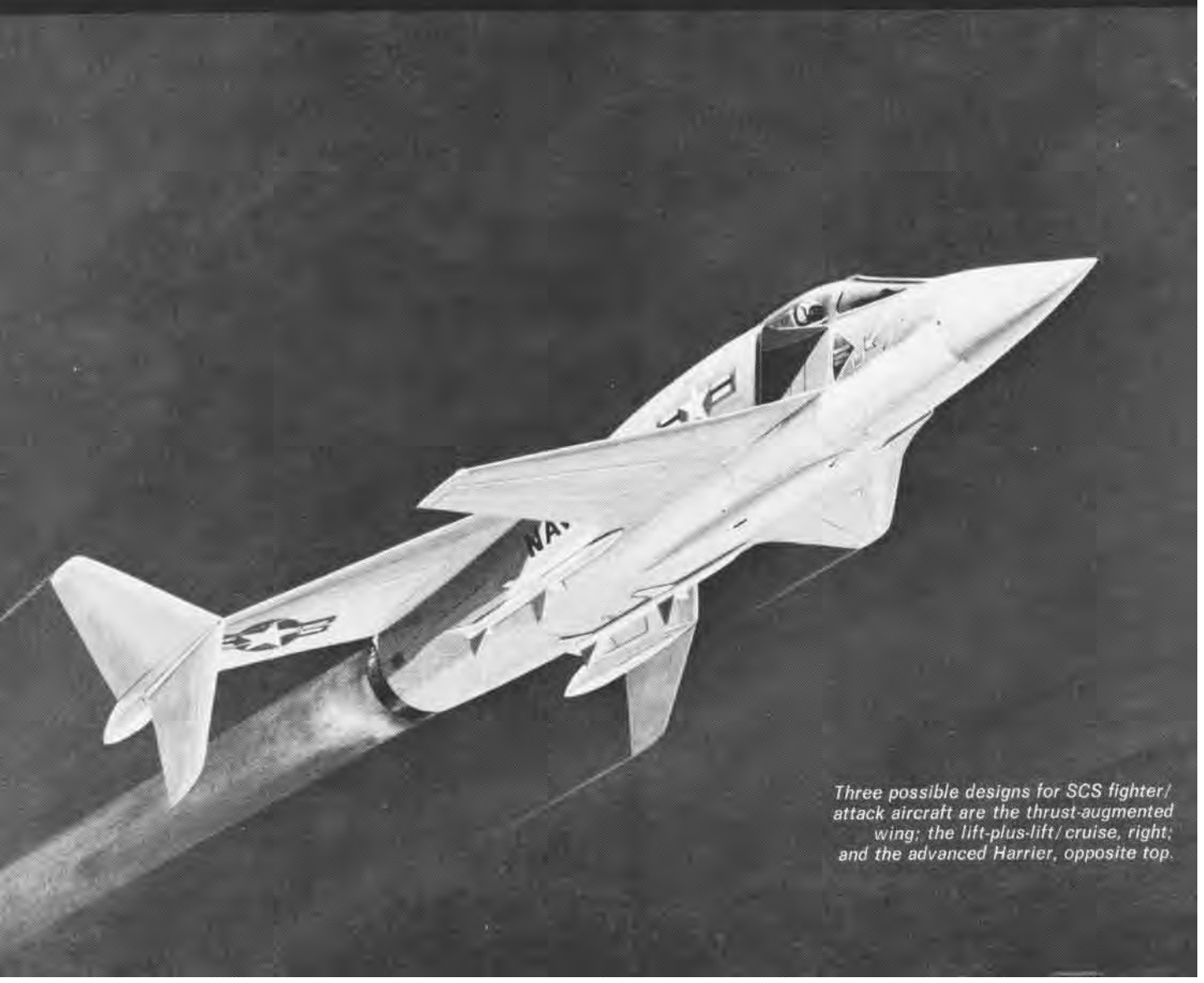
North American has a $48 million contract to develop and test fly two XFV-12As as single-seat, single-engine prototypes.

The aircraft has forward canards and semi-delta wings, and will be powered by the P&W F401-PW-400 engine, the one intended for use in the F-14B. Lift propulsion is distributed around the aircraft's center of gravity in a four-poster effect via augmenters in the wing and canards. In hover and low-speed flight, the engine air is blocked and distributed evenly to nozzles in each augmenter. Attitude control is attained by varying the magnitude and direction of the four vectors. Flap positioning changes the magnitude and direction of the vectored thrust.

An integrated lift/propulsion/control system facilitates converting speeds from hover to Mach 2 plus. Although the F401 is only two-thirds the size required for direct lift in this aircraft, sufficient lift for VTOL is generated by mixing a large volume of outside air with engine exhaust air. Wing augmenter flaps serve as speed brakes, which saves on weight since separate speed brake surfaces are not required. High acceleration/deceleration is obtained using these large surfaces. Direction stability and control is provided by vertical control surfaces mounted on the wing tips.

Existing aircraft assets are being used where possible to reduce construction costs. A-4 forward fuselage, nose and main gear, and F-4 inlets and wing box are being combined with newly designed components.

General Dynamics has been awarded a $249,000 contract to continue work on its three-engine, lift-plus-lift/cruise V/STOL. The plane will have two lift engines mounted vertically in the fuselage behind the cockpit, plus the P&W F401 cruise engine with deflected thrust to provide vertical lifting force. The lift engines shut down and cruise engine exhaust is directed aft for conventional flight. The lift engines may be an improved version of the Rolls-Royce/Allison XJ-99, but Garrett AiResearch and Teledyne CAE also have lift engines



Three possible designs for SCS fighter/attack aircraft are the thrust-augmented wing; the lift-plus-lift/cruise, right; and the advanced Harrier, opposite top.

under consideration.

A controllable canard forward of the wing provides high maneuverability and control which, combined with the delta wing, offers high performance potential.

An advanced Harrier, the AV-16A, would be powered by a *Pegasus* 15-02 engine which would provide a thrust increase of 3,000 pounds, some new avionics, new engine ducts, a new nose, a raised cockpit and a new wing to fulfill the Marine Corps' close air support and SCS requirements.

Avionics in the *Harrier* would be removed until a "baseline avionics configuration" is reached. To minimize cost and complexity of modifications, the radio communicator, air data computer, head up display, IFF and TACAN will be retained.

Among the new equipment installed would be the angle rate bombing system developed for the A-4; a radar warning device which would alert the pilot to enemy presence, type, direction and launch sequence of missiles to allow him to use necessary evasive maneuvers; and a laser target designator system used in conjunction with equipment employed by a forward air controller.

Under development by Sikorsky is a "Super Stallion" which will give the Navy and Marine Corps a helicopter with over twice the lift capability of the CH-53D. Designated the CH-53E, the helo is a standard fuselage-configured troop and logistics support aircraft with a 16-ton external load capability.

Despite its 100 percent increase in lift capability, the CH-53E is not much bigger than the D model and requires only ten percent more space in its stowed configuration. A third engine will be mounted aft of the main transmission, and the engines are to be uprated versions of the current T64-GE-413 with an increase in performance to 4,376 shp.

A newly designed rotor head will have seven blades instead of the present six and the rotor diameter will increase from 72 feet to 79 feet. The tail rotor will be canted 20 degrees to the left to allow for increased center of gravity travel by providing a vertical lift component and its diameter will be increased by four feet to provide greater anti-torque control.

Cruise speed for the Super Stallion will be 180 knots with a maximum unrefueled ferry range of over 1,200 miles. It will have auxiliary external fuel tanks and a refueling probe, and a self-contained navigation system for all-weather operations and extended overwater commitments.

The Marine Corps is presently looking at a small tactical aerial mobility platform (STAMP). STAMP is seen as a one or two-man vehicle with vertical and horizontal thrust which operates at speeds up to 60 knots in a 30-mile range.

The unique capabilities and characteristics of the vehicle include its size, availability and responsiveness from forward deployed sites, ability to circumvent natural or man-made obstacles, relative speed advantage over ground transportation, ability to hover, low maintenance requirements and ease of operation. These will make it ideal for such tasks as artillery direction, route reconnaissance, field communication emplacement, movement of weapons to vantage points, nuclear-biological-chemical warfare monitoring, pathfinder insertion, medical assistance, light resupply and urban warfare.

Two test vehicles are being built.

Williams Research Corporation, Walled Lake, Mich., is scheduled to complete a two-man tether flight demonstrating vertical lift early this fall. If evaluation proves the flight successful, the Williams vehicle, which is powered by a WR-19-9 turbofan engine, will undergo wind tunnel tests to determine effects of forward velocity.

Garrett-AiResearch is scheduled to have a two-man tether demonstration flight late this year. This vehicle is powered by a TSE-231 turboshaft engine. Cost of the engines is being absorbed by the manufacturers, with the Marine Corps buying engineless test vehicles.

CH-53E Super Stallion lifts D model in artist's drawing at left, and two versions of STAMP are illustrated below.

Although STAMP is an aerial platform, it is not considered an airplane. It is neither operated nor maintained by aviation personnel, nor is it controlled by any part of the air traffic control system. The vehicle operates without reference to ground-based radio navigation aids, relying on piloting and dead reckoning for position-fixing. The attitude relative to the surface is determined by visual reference.

Some special training is required to operate and maintain STAMP, but this training does not require specialization on the part of the trainee. Training will be done in most part by on-the-job and within-unit instruction. Only selected members of a unit will be trained to operate or maintain STAMP, but the prerequisites are no more stringent than for motor vehicles.

Since STAMP can get into areas inaccessible to motor vehicles or helicopters, it is conceivable that a disabled vehicle will have to be recovered from such an area. By removing gear from a downed STAMP, an operable vehicle is capable of lifting it far enough for it to be acccessible to longer range, heavier lift vehicles.

HARM missile homes-in on the radar of an enemy ship in artist's drawing at right. A UH-2C Seasprite is modified to carry the Sparrow III, below.

Under advanced development at NWC China Lake, Calif., is the high speed, antiradiation missile (HARM) system which is comprised of a radar destruction suppression missile and supporting avionics.

The missile, AGM-88A, will have an all-weather, supersonic, air-to-surface passive homing capability and will ultimately replace the Standard ARM and *Shrike* in the Navy inventory. The four-section missile will consist of guidance, control warhead and solid propellant rocket motor. It will be about ten inches in diameter and 13 feet long, and weigh less than 700 pounds to permit multiple carriage and asymmetric carrier recovery of unexpended rounds by all tactical aircraft.

The engineering development phase is scheduled to begin early next year, and the first tests of HARM will be with the A-7. Primary program objectives will be improved operational capability, low cost and compatibility with suites on various attack and fighter aircraft.

HARM has a definite potential for use in air-to-air, surface-to-surface and surface-to-air applications.

Two other missiles on the drawing boards are the sea-land multimission attack missile and the short-range air-to-surface missile (SRASM).

The multimission missile is designed to provide day and night attack capability against gun-defended ships and waterborne logistic craft. It will be equally effective against mobile land and close air support targets. It will use infrared or laser-infrared guidance and will be a low cost complement to the longer range *Harpoon* and *Condor* missiles.

The missile airframe will be either new or a variation of the Air Force's *Maverick*. A new airframe is desirable in order to best achieve the combination of warhead size and greater range necessary for safe attacks on maneuvering patrol boats. The actual airframe decided upon, however, will be influenced by the types of aircraft employing the missile and decisions relative to Navy use of the *Maverick*.

The SRASM will be a small, lightweight, day and night, short-range attack weapon for use on unprogrammed strike operations against small mobile water and land targets. It will fill the gap between guns and free-fall ordnance and the sea-land multimission attack missile. Objectives are: size and weight to enable high density stores for multiple attacks per sortie, and a cost per weapon commensurate with the cost of the target. SRASM will have growth potential to an adverse weather attack capability. It will be 86 inches long, eight inches in diameter and weigh 250 pounds.

Being tested at the Naval Air Development Center, Warminster, Pa., is a carrier aircraft inertial navigation system (CAINS). The airborne portion of CAINS is the AN/ANS-92(V) inertial navigation system which provides highly accurate navigation information for aircraft weapons systems. The shipboard portion of CAINS consists of a ship's inertial navigation system (SINS) and a data link processor, transmitter and antennas.

Before takeoff, the AN/ASN-92(V) is aligned, using a radio data link to receive the SINS navigation information of the ship's actual position. The AN/ANS-92(V) then automatically computes the aircraft's position on the flight deck and aligns itself with the earth's latitude and longitude coordinates. The carrier's movement through the water is also continuously computed, providing accurate information as to velocity, pitch and roll. During flight, the system gives a continuous readout of the plane's geographical position, velocity, attitude and heading.

CAINS consists of five units and is built to satisfy the most stringent program for any aircraft. The inertial measurement and power supply units are common to all aircraft types. An airborne navigation computer, control indicator and converter amplifier unit or equivalents must be installed in an aircraft to fulfill a particular plane's mission.

Tests indicate an increase in accuracy and a decrease in alignment time with the new CAINS. This substantially reduces the previous alignment time of 18 minutes for an A-7E, and up to 30 minutes for an E-2C or A-6.

Principal system improvements over previous concepts are rapid reaction alignment on a carrier's flight deck or on land, high reliability and a common logistic and support concept. CAINS has a built-in full test capability, and units are interchangeable without calibrating the entire system. It is compatible with the versatile avionics shop test (VAST) system, offers worldwide navigation without aids, is nonradiating and is impossible to jam.

The first carrier launch of an aircraft equipped with the CAINS AN/ANS-92(V) was recently made by a modified S-2E from CV-62.

VAST will enable the Navy to put several types of aircraft on one carrier without special support equipment for each. It works on much the same basic principle as the test equipment in the foreign car television commercial in which the announcer connects a unit to a "bug" to test various parts.

A VAST station, of course, is quite a bit larger and more complex. It is assembled from building blocks that furnish electronic stimuli and measurement capabilities to check avionic equipment. When new avionics are developed, appropriate test programs can be written and a new building block added if necessary.

A general purpose digital computer executes test routines as they are programmed for certain avionics, and provides diagnostic and computation capabilities. A data transfer unit synchronizes instructions and data flow between the computer and the functional building blocks.

When a yellow sheet is filed on a piece of avionic equipment, the unit is removed from the aircraft and taken to the VAST station on a cart where it is connected into the system. The operator selects the appropriate program tape which directs the computer to feed stimuli into the avionics unit being tested. The tape simulates input that the unit would receive while in service and the input feeds through the circuitry of the unit to find the faulty component.

Responses to the stimuli are displayed on a video screen so the operator can take appropriate action. Information on the screen will inform the operator that the test is complete, that the test should be continued, or that a certain component is faulty.

Once the faulty component is isolated, the unit is sent to the avionic repair shop and then returned to the VAST system work center to have the repair verified. From there it goes to the supply support center, ready for installation.

The VAST system not only takes up much less space than the current support equipment, it also isolates a faulty component in seconds, appreciably cutting diagnostic and repair down time. It also saves in other ways. Training an electronic technician to work on avionic equipment requires several years. With VAST doing the trouble-shooting, fewer technicians will be required and more work can be done by personnel with less training.

VAST can only be used with avionic gear designed to be checked with automatic test equipment, and this gear must be compatible with VAST. The state-of-the-art of the latest weapons systems, such as the A-7E and the A-6E, makes them compatible in varying degrees. In addition to CAINS, the requirement for VAST compatibility was included in the specifications for the F-14A, S-3A and E-2C, as it will be for future aircraft.

A test was completed last November aboard USS *Kitty Hawk* (CV-63) in which VAST became the prime checkout equipment for 68 components for the A-7E avionics system. This shipboard test was considered extremely successful and VAST stations will be installed aboard both USS *Saratoga* (CV-60) and USS *Enterprise* (CVAN-65) for avionics maintenance testing.

Thirty-six out of a planned 74 VAST stations have been delivered by the manufacturer, PRD Electronics Division of Harris-Intertype Corporation. Some stations are at Grumman and Lockheed plants for aircraft avionics compatibility testing, and others are at NATC Patuxent River, NMC Point Mugu, NAS Miramar, Calif., and NARF Jacksonville, Fla. The contractor's stations will ultimately go aboard carriers except for a few retained for follow-on tests.

Plans include having four VAST stations aboard each carrier. Some stations will be used more than others and will have building blocks commensurate with the amount of work required of them.

Navy has other plans that have not progressed far enough to mention, or are highly classified. It is a safe assumption that rapid technological progress will continue, progress that will surely touch Naval Aviation.

At Navy League Exposition

STAR OF THE SHOW

She was found in a southern California hangar waiting, like an old war horse, the call. Dust and dirt flaked her aluminum frame and, for many years, her only duty had been served at air shows and fairs.

Her lackluster could not hide her classic lines. She was one of the last of the famed Boeing F4B/P-12 series. The Navy F4Bs were the mainstay of the Navy's air arm in the early Thirties.

Cross-country, William Nickey was about to signal the end of his career with the Boeing Vertol Company. Nickey was one of the first *Red Rippers* to fly the sassy bi-winged F4B-1 back in 1930 when it was being used as a fighter bomber. The squadron at that time, flew from the decks of USS *Lexington* (CV-2).

It all came together at the Navy League Sea-Air-Space Exposition and Technical Briefings held in April at the Sheraton Park Hotel in Washington, D.C.

The Boeing Company decided to star the F4B-1, which it had produced for the Navy, in its display at the exposition. It located the California survivor of this single-seat, fighter-bomber line at the Orange County Airport, Santa Ana, spruced it up with a fresh coat of paint and *Red Ripper* insignia and shipped it to the capital.

At the same time, Boeing sent out a call to *Red Rippers* of that era, inviting them to an informal reunion during the Navy League gathering.

Just a few days before the exposition, Vertol employees gathered for an event of another sort — Nickey's retirement party. One small group began discussing the plans for the Navy League fete and the guest of honor overheard, "Hey! I'm a *Red Ripper*!"

Three days later, Nickey was on his way to Washington.

Among those on hand to greet both Nickey and the plane was Rear Admiral John F. Greenslade (Ret.), formerly with the Office of the Deputy Chief of Naval Operations (Air) and a *Red Ripper*, class of '30.

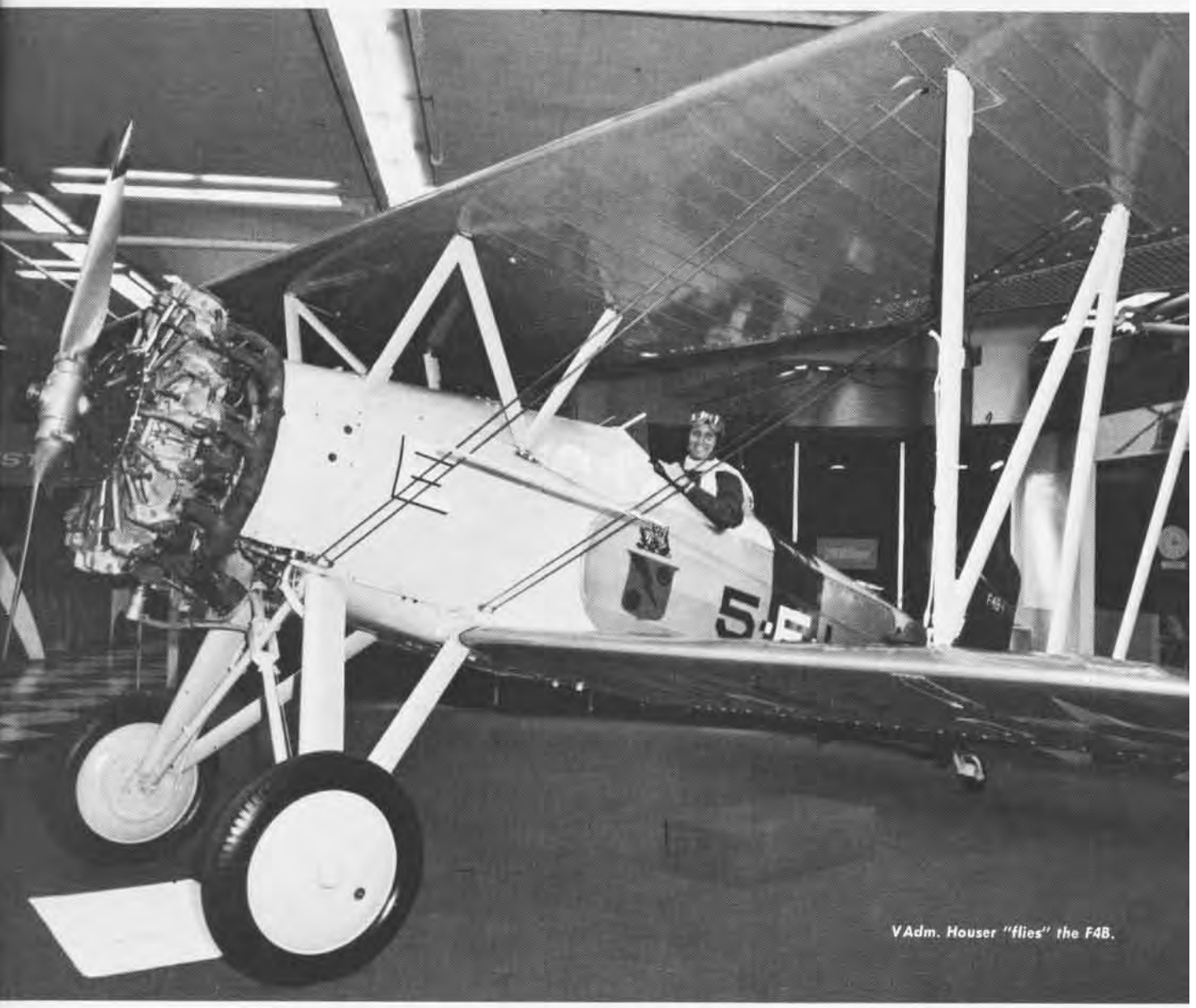
In fact, the admiral, now chairman of the Museum Committee of the Naval Historical Foundation which operates the Truxton Decatur Naval Museum in Washington, even gave a hand in reassembling the newly outfitted F4B-1 for its spot of honor on the exhibit floor.

He had a chance not too long ago to witness one of these early birds attempting to fly in formation with its hot and flashy replacement, the F-4B *Phantom II*, being flown by the current *Red Rippers*, VF-11, deployed aboard *Forrestal* (CVA-59).

"The old F4B-1 had a top speed of 135 knots and the modern F-4B couldn't slow down to that speed," he remembers.

There was nothing slow, however, about the crowds queuing up to the Old Timer at the Navy League convention display. Nor were the VIPs bashful about donning an old flight helmet and leather jacket and posing in the cockpit for the photographers.

Among those captured by the cameras in or around the plane were Vice Admiral William Houser, Deputy Chief of Naval Operations (Air Warfare); Rear Admirals Donald C. Davis and Robert P. Coogan, both of the Office of the Chief of Naval Opera-



VAdm. Houser "flies" the F4B.

tions; Rear Admiral E. L. Feightner, the senior active duty *Red Ripper* at the event and Deputy Commander for Plans and Programs, NavAirSysCom; Secretary of the Navy John W. Warner; and Admiral James Russell (Ret.), former Vice Chief of Naval Operations and a Boeing consultant.

Also present among other past and present *Red Rippers* were five *Rippers* from the 1930 squadron. They were Greenslade, Nickey, Vice Admiral W. F. Raborn (Ret.), Captain Charles T. Fitzgerald (Ret.) and Lt. George H. Moffett (Ret.).

Surrounded by photographs drawn from the squadron's history, the *Rippers* regaled each other with oft-told tales concerning their own exploits and of the damnedfoolishness of those who were unlucky enough not to have served with the *Fighting Five*.

NAVAL AIRCRAFT

AVE

The TBF was designed in response to a Navy invitation for new designs for a torpedo bomber to replace the TBD *Devastator*. In April 1940, a contract was issued for two prototype XTBF-1s. First flight was August 7, 1941. The first public look at the plane was scheduled for December 7. That day's events led to naming the new aircraft *Avenger*.

In December 1940, one year before U.S. entry into WW II, a production contract was ordered and TBF-1s began rolling off Grumman's assembly lines soon after. Among these early models were some assigned to Torpedo Squadron Eight. Though they did not reach the Pacific in time to join VT-8's TBDs on *Hornet*, six participated in the Battle of Midway from that island's airfield.

In November 1942, Eastern Aircraft, a division of General Motors, began delivering the first TBM-1s, supplementing *Avenger* production, and, in December 1943, Grumman discontinued building TBFs to concentrate on producing the F6F *Hellcat*.

The *Avenger* was produced in many versions, the most numerous being the TBF-1 and TBM-1. Other models included the TBF-1C and TBM-1C with two wing-mounted .50 cal. guns; followed by versions with special radar; with cameras for photo recon and with searchlights for ASW. The TBM-3 with more powerful engines replaced the -1 series in production. Versions were built or modified including -3Es with improved radar; the first carrier AEW airplane; and ASW, utility, ECM and COD models.

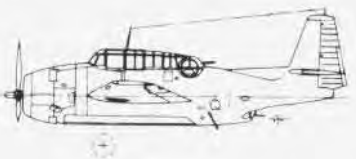
The *Avenger* made its name in WW II as a rugged torpedo plane used effectively against surface vessels in the Pacific and from CVEs in the Atlantic as an ASW attack plane.

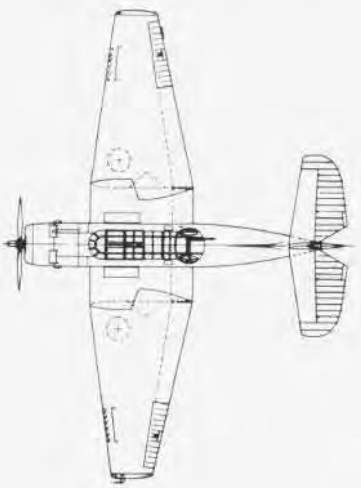
Avengers also served with the Royal Navy, Royal New Zealand Air Force and French Navy. Ironically, the last TBMs to be retired from active service, in 1962, were flown by the Japanese Maritime Self Defense Force.

NGER

TBF/TBM

Length	40′11½″
Height	16′5″
Wing span	54′2″
Power plant	
TBF-1	R-2600-8 1,700 hp
TBM-3E	R-2600-20 1,900 hp
Maximum speed	
TBF-1	232 kts
TBM-3E	220 kts
Cruising speed	
TBF-1	126 kts
TBM-3E	125 kts
Service ceiling	
TBF-1	22,400′
TBM-3E	27,100′
Maximum range	
TBF-1	1,055 nm
TBM-3E	880 nm
Armament	
TBF-1	one fixed cowl-mounted .30 cal., one dorsal .50 cal., one ventral .30 cal., 1,600 lbs. in bomb bay
TBM-3E	two fixed wing .50 cal., one dorsal .50 cal., one ventral .30 cal., 2,000 lbs. in bomb bay
Crew	pilot, gunner, radar operator





Secretary of the Navy John W. Warner appeared before the Senate Defense Subcommittee of the Committee on Appropriations March 30 in support of the Department of the Navy's appropriation request for $26.8 billion for Fiscal Year 1974.

In his statement to the Subcommittee, Mr. Warner identified seven objectives requiring special attention: improving force readiness, continuing modernization, continuing to improve the weapons system acquisition process, improving career motivation and personnel management, reducing general support costs, upgrading the quality of the Reserve forces and continuing emphasis on environmental projects.

Highest priorities were directed at the first two of these objectives which he termed vital to security as the United States moves into a new era of peace and negotiations.

The following sections of Secretary Warner's statement are pertinent to Naval Aviation.

Naval Aviation, FY 74

It is a pleasure for me to make my first report to you on behalf of the Department of the Navy.

In an era when the perception of national power will carry great weight at the negotiating tables of the world, the military portion of that national power must remain strong. Our economic and political interests dictate that we retain a stature such that no adversary will question our ability to protect the vital sea lines of our commerce, our resolve to support our allies in their pursuit of their sovereign interests, or our intention to work for world peace from a position of benevolent strength.

To achieve these goals we must have a modern naval force of adequate size and composition to offset the growing capabilities of our major potential adversary.

Improving Force Readiness

The maintenance of adequate forces in a high state of readiness is our fundamental responsibility. Any discussion of readiness must quickly center on the status of the manpower and material available.

People are vital to readiness. They are the key to a modern, effective Navy-Marine team. We must have not only people in adequate numbers, but people with the training and skills necessary to man and maintain our equipment. The prolonged conflict in SEAsia has impacted heavily on our people and, hence, on readiness. It has imposed personal hardships and produced considerable turbulence in the personnel area.

Maintaining the essential manpower base has become a difficult and expensive task. Despite steadily declining numbers, manpower costs consume nearly 45 percent of the Department of the Navy budget. To control these costs we will seek still further reductions in manpower; but, in this regard I repeat the view of the Secretary of Defense that such reductions must come about primarily through economies in the utilization of manpower and without reduction in fighting capability. We are pursuing many on-going projects with this end in mind. Examples of these are: civilian substitution, revalidation of manning levels, reduction of transfers, recruiting effectiveness, improved quality in accessions, reduced recruit attrition, headquarters reduction, establishment of a new Naval Training Command, and refined training procedures.

The conflict in SEAsia has also impacted heavily on the material side of readiness. The operating tempos for our ships and aircraft have resulted in materiel degradation. War reserve ammunition and materiel stocks have been reduced. This heavy commitment coupled with funding

HH-2D Seasprite is equipped with an inflatable radar antenna system. The 6'8" radome, located under the nose of the helicopter, can be inflated to 52 inches and retracted to 12 inches.

constraints has precluded the allocation of resources sufficient to maintain the high readiness required. Ship maintenance has been delayed; major overhauls of some 40 ships have been deferred; aircraft reworks have been postponed — some 20 percent of our aircraft are operating on extensions beyond the prescribed rework date; and stock levels have been reduced. A disturbing percentage of our ships and aircraft squadrons are currently in a marginal status of readiness due to lack of critical repair parts or personnel deficiencies.

Our fiscal 1974 budget provides increased funding that will correct a portion of these readiness deficiencies. It provides for essential personnel needs, for increased ship maintenance and aircraft reworks, and would enable us to improve stock levels in the munition and spare part areas most critical to readiness.

Providing Adequate Modern Forces

Modernization of our forces is a major objective. In broad terms, well over one-third of our budget is allocated to new or on-going ship, aircraft, and equipment programs designed to enhance the effectiveness and capabilities of our Navy/Marine Corps team.

The department has undergone significant reductions in its forces during the last four years. From a high of 976 ships in 1968, we will decline by the end of FY 73 to 586 ships, a reduction in force of 40 percent. Operational aircraft have been reduced from 7,103 to 5,919 over the same period.

We are requesting funds in the amount of $3.9 billion to cover procurement of 14 new combatant ships and provide for the modernization and upgrading of existing ships. Additionally, some $3 billion is requested to procure 305 new aircraft and provide for aircraft rework, spares and related items. Marine Corps procurement is funded at $182 million.

Tactical Aviation Forces

Aircraft carriers, their associated air power and Marine Corps tactical aviation have been and will continue to be the nucleus of U.S. quick reaction forces in support of foreign policy.

Two nuclear-powered aircraft carriers, *Nimitz* and *Eisenhower*, are presently under construction. In FY 73 Congress provided funding for long-lead items for the third nuclear carrier in this program — CVN-70 — in the

amount of $299 million, and this year's budget request for $657 million provides full funding. With this procurement, we will have two rapid-reaction nuclear carriers for each ocean.

The aircraft procurement requested in FY 74 totals 305 Navy and Marine Corps aircraft of which 166 are tactical aviation aircraft. These are on-going programs and will be reviewed in detail by their sponsors in subsequent Congressional appearances. I will mention, however, two tactical aircraft programs as matters of special interest.

The F-14 program continues to rank among our highest procurement priorities. With its *Phoenix* air-to-air missile, which is performing successfully, the F-14 provides the combat superiority and firepower essential for future fleet air defense. Twenty-one F-14As are now in the Navy inventory. The first two operational squadrons were commissioned in October 1972.

Development, test and evaluation are all proceeding satisfactorily. In previous years, funding was provided for 134 F-14As, but contractual difficulties arose over the production of Lot V. Agreement has now been reached on this matter. In brief, Grumman has agreed to produce the aircraft called for in Lots I through V, to assume consequential losses thereunder, and to relinquish its right to challenge the legal validity of Navy's contract option for these lots. The Navy in turn has agreed not to exercise its options for Lot VI and beyond and to continue providing financial assistance to Grumman through progress and/or advance payments.

This termination of the contract with Lot V will affect the procurement of F-14s in the FY 74 budget and in subsequent years. We are now in the process of revising the FY 74 program as a consequence of this settlement and will submit the necessary revisions as soon as practicable. Future F-14 procurements will be annually negotiated contracts dependent upon Congressional authorization and appropriations.

For the Marine Corps we are recommending commencement of a four-year procurement of the proven McDonnell-Douglas F-4s to provide necessary fighter aircraft modernization. The program envisages 138 of the F-4J improved models. Likewise, Marine Corps A-4 procurement is continuing at a steady pace with the goal of achieving an active force of all A-4M models by FY 76.

Antisubmarine Warfare Forces

ASW aircraft procurement plans contain two types of fixed-wing aircraft. We propose to buy another 12 P-3C *Orions*, the long-range, land-based ASW patrol aircraft. This procurement will enable us to pursue, at a modest

S-3A Viking is launched from a field catapult, top, and landed with cable arrestment, bottom, during carrier suitability testing of maximum arrest and launch loads at NATC Patuxent River, Md. The Viking accelerates from zero to 138 mph in 2.2 seconds from a catapult launch and decelerates from 115 mph to zero in less than three hundred feet during an arrested landing.

rate, modernization of active ASW patrol aircraft assets and modernization of the increasingly important Reserve forces which will receive the P-3A/B.

To complement our long-range, land-based P-3C aircraft, we are recommending continuation of the successful S-3A *Viking* program. The S-3A is a carrier-based ASW aircraft which will be a vital member of our ASW forces and will enable us to counter the wide-ranging threat of a large nuclear-powered submarine fleet. Our FY 74 budget proposes procurement of 45 S-3As plus long-lead funding for 48 additional aircraft in FY 75.

The LAMPS Mk I helicopter system continues as a high priority in our ASW improvement efforts. Through use of a companion helicopter, the sensor and weapons delivery capabilities of our surface escort ships can be greatly extended. By modifying existing helicopter and ship platforms, we have acquired 20 of these systems, and are proceeding expeditiously to modify all capable platforms to perform the LAMPS role. Simultaneously, and because of the high potential of this system, we have undertaken the development of a follow-on LAMPS Mk III system and helicopter which will incorporate improved range, endurance and sensor capabilities.

Amphibious Forces

The largest modernization project affecting our amphibious capability is the LHA. You will recall that in December 1970, we reduced the original buy from nine to five ships. Navy has been unable to reach a negotiated agreement with the Ingalls Shipbuilding Division of Litton Industries for resetting the price and delivery schedule of these ships. As a result, Navy has issued a contracting officer's decision which unilaterally establishes, within the terms and conditions of the original contract, firm provisions regarding target cost, target profit, ship delivery schedules, progress payments and escalation.

We have included $192 million in our FY 74 budget for an increase from target to ceiling ($103.8 million) and escalation ($88.2 million). These actions allow Ingalls to be paid up to $946 million for work on the five ships but make the company liable to the government for $3 million damages due to delays and for repayment of $55 million in excess of physical progress.

Other Modernization

We have been focusing intensive efforts on the antiship missile defense problem (ASMD). The Soviets continue to expand and diversify their air, surface and submarine antiship missile launching forces, and many other navies are beginning to develop a substantial antiship missile capability.

Strong carrier-based air forces remain an important shield against these threats. But the proliferation and increased performance of antiship missiles as well as the appearance of submarine-launched versions make it necessary now for our ships to have a backup system to intercept those missiles penetrating the air defenses.

For the past year we have been pursuing a comprehensive ASMD plan which will provide varying degrees of "close-in point defense" protection. At present our emphasis is on upgrading existing sensors and weapons wherever possible in order to reduce costs, risks and delays.

We expect that the antiship missile threat will continue to grow; consequently, we are expediting research and development and procurement plans to provide our ships with adequate protection. Current plans include relying on aircraft (VA, VF and S-3A) which can destroy enemy airborne, surface and subsurface platforms before missiles are launched. High capability systems, such as F-14/*Phoenix* and *Aegis*, will provide further defense for entire task forces by countering massed missile attacks. To protect individual ships against missiles that may penetrate the outer defenses, we are developing a number of lower cost systems, such as the Close-In Weapons System, the Point Defense Missile System and improved detection equipment.

Our primary antiship missile will be *Harpoon* which is now under development. *Harpoon* will provide us the significant increase in capability we require in this area. Basically, it is a long-range missile designed to be launched from aircraft, surface ships and submarines. Despite strict technological demands, the development is well managed, proceeding on schedule and remains within budget constraints. We are requesting a total of $97 million to prosecute this important program for FY 74.

The sea control ship (SCS) represents a new concept in sea lane tactical control and is one of several undertakings designed to avoid some of the cost problems inherent in the ever-increasing complexity and sophistication of weapons systems. SCS will carry a mix of some 17 ASW helicopters and/or V/STOL aircraft. It will provide protection to those forces, task groups and convoys that do not have an aircraft carrier present, relying primarily on airborne rather than shipborne sensors and weapons. We are asking for $29 million to procure long-lead items for the first ship and the initiation of detailed design efforts. Construction has been scheduled for FY 75 in conformance with Congressional guidance concerning concurrency in development and production. Present plans anticipate acquiring a total of eight of these ships spaced over the four-year period, FY 75-78.

Career Motivation and Personnel Management

Young men and women coming into the service from our contemporary society bring different values than their predecessors of a generation ago. Habitability, job satisfaction, special duty options, high pay, greater leisure time, educational opportunities and promotion opportunities are of great importance. Recruits expect more open communications and visible concern for their needs and desires. Like their counterparts in society, they are sensitive to intercultural problems.

We recognize these changing values and have been responding with a wide variety of leadership and management initiatives. The realities of recruiting in an all-volunteer-force environment require that we continue a concerted effort to provide for these expectations to the degree practicable within the confines of our mission and fiscal reality.

I will not attempt to discuss the myriad of ongoing efforts designed to meet the realities of changing times. Leadership

and human resources management programs, intercultural and race relations programs, personnel services programs, housing programs, recreational programs, drug and alcohol programs, educational programs, special compensation programs, expanded recruiting programs and informational programs are examples of the many things that are essential parts of our effort. It is important to recognize that each of these areas requires increased attention and that each generates new demands for manpower and fiscal resources.

Reducing General Support Expenditures

Because of rising costs and fiscal stringency, the department is giving particular attention to the broad category of expenditures termed "general support." By this I mean the bases, facilities, ships and units, including all their equipment and personnel, whose function is to raise, support or maintain the forces structured for direct combat. Our budget for FY 74 reflects some significant savings due primarily to personnel reductions in our headquarters, staffs and training commands.

Our efforts to control support costs are complicated, to a degree, frustrated, by several factors:

Recruiting costs are higher and the important programs designed to improve service life are costly. Nevertheless they are all essential in today's world;

Personnel turbulence in the Navy remains abnormally high. Reassignments caused by force reductions and by the relocation of ships and squadrons for proper peacetime posture keep the number of transients and PCS transfers far above the desired level;

A combination of past funding constraints and the tempo of operations in SEAsia has created serious problems in force support areas vital to readiness; and

The complexity of modern equipment and operations increases requirements for training and education.

Each of these separate considerations drives us toward increased expenditures in the general support category. As a consequence, it is all the more essential that we achieve maximum economy in those areas where streamlining is feasible.

Let me illustrate our approach to support problems.

High demands for shipbuilding funds, rising costs and declining manpower levels made it necessary for us to examine new ways of meeting our sealift and fleet support requirements. Over the past 18 months, in cooperation with the Maritime Administration and the Military Sealift Command (MSC), a number of fleet support initiatives have been evaluated:

Merchant tankers under charter to MSC have been used to refuel carriers, fleet oilers and deep-draft naval vessels;

The Navy crew on the fleet oiler *Taluga* has been replaced by civil service mariners augmented by a small group of Navy communications personnel;

In the Sixth Fleet, vertical replenishment by helicopters from a LASH-type commercial barge ship has been tested as a possible means of reducing the number of replenishment ships required; and

The same LASH barge ship was also used for the in-port transfer of dry cargo to a resupply vessel.

These tests, and others, have been helpful. They suggest that we may find less costly alternatives that can benefit our sealift and fleet support system.

Upgrading Quality of Reserve Forces

In keeping with the policies enunciated by the Secretary of Defense in 1970, the Department of the Navy continues to consider its Reserves, Navy and Marine, as an integral part of the total force available to meet our national security needs. We have been pursuing plans that will enhance the role of the Reserves and keep them vital and responsive forces.

The changes we envision will make the Naval Reserve

Corsair II approaches J. F. Kennedy for recovery aboard the carrier in the Med, left; modernization of the Naval Air Reserve includes transitioning CVWR-30 to an all A-7 capability. F-14A refuels from a KA-6D, opposite; Tomcat ranks among highest procurement priorities.

a more hardware-intensive organization. The maximum feasible number of ships and aircraft phasing out of the active inventory should migrate to the Reserve where they can be maintained in a high state of readiness and available to augment the active forces. Steps to modernize the Naval Air Reserve include the introduction of F-4s to replace a squadron of F-8s, completion of the transition of an attack carrier wing (CVWR-30) to an all A-7 capability, and the transition of a fourth patrol squadron to P-3As.

A second portion of the plan involves the streamlining of the Naval Reserve command structure which was announced last November.

To get a better return on the dollars invested in Reserve Centers, we will concentrate more of our resources in a few centralized locations. Our FY 74 budget makes provision for seven major Reserve Readiness Centers: two on each coast and one each in the Great Lakes, Midwestern and Rocky Mountain Regions. The additional instructors, expanded facilities and new instructional devices to be available at these sites should provide improved training and permit other remaining centers and facilities to function as satellite activities with reduced active duty staffing.

The key element of the Marine Corps Reserve continues to be its air-ground team organized essentially in the same manner as a regular Marine Amphibious Force. The objective is to have this force — the 4th Marine Division, the 4th Marine Aircraft Wing and combat support and combat service support units — trained and equipped for rapid mobilization and deployment.

During FY 73, significant improvements are being made in Marine Corps Reserve equipment. Reserve helicopter elements already operate the same models used by the active force, and the first F-4s will be introduced this year. We intend to continue such improvements in FY 74 and thereafter. Procurement plans for M-60A1 tanks include equipping Reserve units, and KC-130 aircraft will be allotted to the 4th Marine Aircraft Wing to replace its C-119s.

Environmental Protection

Environmental protection standards and regulations have a significant impact on the Navy and the Marine Corps because we operate in all environmental areas — land, sea and air. It is not only a challenge of considerable magnitude today, but a continuing one because the standards we must meet will be subject to periodic upgrading in the future. . . .

While technology is generally adequate for most shore-based waste water and sewage treatment systems, improved means are needed for disposing of unserviceable ammunition, for reducing pollution from aircraft engines and engine test cells, and for controlling oil spills. We must continue active research and development efforts in these areas. Our greatest challenge, however, lies with the development and installation of reliable, compact and economical pollution abatement systems for shipboard use.

In the changing social and environmental climate, and as we move into an era, hopefully, of reduced confrontation, we envisage the need for greater application of Navy's scientific and technological resources to worldwide problems. In the near future we will be faced with difficult international negotiations concerning Law of the Sea and the exploitation of ocean resources. Very few countries are capable technologically of making these resources a reality. Our unique capabilities to do underwater research, deep submergence operations and underwater construction, which have been developed to meet military requirements, can be offered, as necessary, in the international arena to assist lesser developed countries facing ocean resource, pollution and coastal zone management problems.

THE WSO:

The Essential Partner in Modern Aircraft

Photos by Dick Sander

The days of dogfights, when daredevil pilots in simple but rugged machines dueled in close-in combat, are now captured only on old films. Which is not to say that dogfights are passé; they're not. But —

One *but* is speed of a modern aircraft. Another *but* is the plane's complexity. And in simple terms, perhaps the greatest change is a reflection of what it's called: what once was a *plane* is now commonly considered (in the military) as a *weapons system.*

What that means for Grumman aircraft — F-14, A-6E, EA-6B, E-2C — is that the pilot is not flying alone. His company is at least one highly trained Weapon Systems Operator (WSO), in the case of an F-14 or an A-6. With the EA-6B, three additional men are present. In other words, the pilot today is one part of a team — a very closely knit team. In fact, Navy practice is to have the same flight crew fly together because, over a period of time, one gets to know the other's way of doing things. That type of "learned communication" can be very valuable, especially in emergencies.

"Besides that," says Chief Test Pilot Chuck Sewell, "a pilot isn't able to fly a mission by himself. The pilot and the WSO are equal partners."

That's confirmed by Roger Ferguson, who is chief of WSOs and F-14 Project WSO. "In test flying here at Calverton, or at Point Mugu, it has to be a team effort," Ferguson says. "At Calverton, too, you can build a case that there's a vital third link, the automated telemetry station (ATS), for it's a three-way conversation or communications loop. So, everything that occurs during a flight is communicated to and from all planes flying a particular mission, including chase planes, and the ATS ground station. The entire flight is monitored in real time and recorded at ATS."

But that record — necessary though it is — is less important in this story than how the record is compiled.

Says Ferguson, "The overall responsibilities of the WSOs are roughly the same, regardless of the aircraft being flown. The WSO assists the pilot to accumulate test data throughout the flight envelope of the aircraft. He records data, operates test equipment and coordinates ATS communications. His specific duties, of course, depend on the type of test flight being run, for example, aerodynamic, flutter, structures, etc. While the pilot maneuvers the aircraft through test points, the WSO operates test equipment necessary to evaluate areas such as aircraft structures, engine performance, speed envelope, weapons systems and so on."

Pete Beresford, EA-6B project WSO, sees things in a different light because three WSOs fly in the EA-6B *Prowler* in addition to the pilot. (The exception is that, during test flights, the fourth seat is crammed with instrumentation, including a closed-loop TV circuit, so that the cognizant engineer sees and hears what's going on during the flight, a spectrum analyzer to view the broad-band frequency environment, an oscilloscope to view and measure circuits, audio recorders, digital recorders and more.) Beresford says that "This ECM (electronic countermeasures) weapons system is as sophisticated a system as there is in the world."

"We have a 'bible' on it, a NATOPs manual that spells things out in detail and we have to know it and follow it.

"Being a tight team is a bit tougher only because four (instead of two) men are involved. There's another running complication — or challenge: enhancement must be constant. ECM quickly turns into ECCM (electronic counter-countermeasures), then to ECCCM and so on. You have to be at least one step ahead of the enemy all the time. If we're jamming him, he's going to counter by wiping out our jamming (if he can); so, by the time he's zeroed in on us, he finds we're jamming him in a new way. There isn't any letup," says Beresford.

In a combat situation, Beresford explains, one equipment operator in the *Prowler* sits next to the pilot. The operator and the men behind him operate the equipment that finds and jams enemy radar. The third WSO concentrates on finding and jamming the enemy's voice communications, thereby neutralizing enemy aircraft.

What all this boils down to for a *Prowler* mission can be put simply: the pilot is responsible for the safety of the aircraft and its crew and the command ECMO (electronic countermeasures officer) is responsible for the conduct of the mission.

That's similar to the arrangement on the A-6E where Jim Johnson is the Project WSO (or B/N). "The A-6 *Intruder* is really a self-contained weapons system: we carry the weapons, detect the targets and attack — and illuminate the target after a firing to assess damage. It's a full-time job for the crew."

Johnson also emphasizes that teamwork is the heart of mission success — and that continuing updating of weapons systems capability is a must. He says that "The A-6A was a great

From Grumman's Plane News

plane, the only one that I know of that was truly an all-weather aircraft, and it's still a good plane. But anything can — and should — be improved. So now we're building the A-6E and modifying the As into Es. And soon there's going to be TRAM (target ranging and acquisition multisensor), a forward-looking infrared system with a laser that will provide improved tracking and ranging. And again, it's the WSO who'll be responsible for the operation of the weapons system."

Johnson stressed, too, that "Our WSOs are in a unique position to know not only a specific piece of equipment but how each part relates to another. That's the great advantage of Grumman: we're in systems integration, not the building of computers or radars, so we get to look at what the other guy is doing. That way we can select what looks best and suggest modifications of equipment for our uses."

And, like the pilots, the WSOs are engaged in initial design concepts, equipment, training, flight test and liaison with vendors and customers . . . so that familiarization is in-depth.

That familiarization begins when Navy personnel are detached to study maintenance and flight operations under the direction of Grumman or Hughes training people. At first, it's textbook' oriented; simulators follow; and, finally, the WSOs assist in training Navy instructors at Point Mugu, Miramar and Patuxent River. Once done, all subsequent training is in the Navy's hands, though naturally, Grummanites — particularly product support people — must be in close liaison with the fleet.

All through this process, the key point is probably that the company's test pilots and WSOs, in addition to flying the test points, keep in mind the big questions for the "new" Navy man: Is this going to make it easier for him? Is it clear, so he'll understand what to do? Is it beneficial to him?

"Everything has to move together smoothly, and a lot of that is up to the WSO," says Sam Ammons, Grumman's Project WSO at Point Mugu, who's been with what he calls "the airborne weapons platform" and has seen how the *Tomcat* performs. He describes the WSO's role:

"It all depends on the tactical situation, of course, as to which weapon is used — the long-range *Phoenix*, the medium-range *Sparrow*, the short-range *Sidewinder* or the gun. The pilot makes the choice. The WSO detects the target by radar, acquires it, and then advises the pilot of vectors to fly in order to position the weapons platform so as to optimize the guidance of the selected weapon. The WSO uses a computerized fire control system to help him advise the pilot of the altitude, range, speed and geometry of the target as well as the status of his own weapons platform. A WSO has to have a lot of skill, just as a pilot has to have skill. They are complementary skills . . . and a lot more."

The lot more is, as Ferguson put it, "what can't be put in words." How do pilots and WSOs relate closely on a combat mission? What's the chemistry that allows two men (or four, in the case of the EA-6B) to function so well, almost as one?

Probably the key factors are that crew members have a high level of knowledge of their aircraft and its weapons system and an understanding of each other. And there's something very important — and cannot be put in words: crew members must be "professional airmen."

At this stage of human development, there is no answer to the equation, and there may never be. And until perfect understanding is achieved, we can resort only to a hackneyed word, teamwork. That's what the WSOs and pilots strive to attain.

at Sea with the Carriers

Intrepid (CVS-11)

When the *Fighting I* pulled into her home port of Quonset Point, R.I., in May, she was returning from her last cruise — an extended tour in the Med.

Six days before the Japanese attack on Pearl Harbor, the keel of the aircraft carrier *Intrepid*, the fourth U.S. Navy ship to bear the name, was laid at the Newport News Shipbuilding and Drydock Company. On August 16, 1943, she was commissioned, with Captain Thomas L. Sprague commanding.

Her first battle action came in February 1944 with the attack on the Marshall Islands. By war's end, her totals included 100 enemy aircraft shot down, 86 more destroyed on the ground, and 11 ships sunk, including the Japanese battleship *Yamato*.

In 1947, following the war, *Intrepid* was mothballed at San Francisco. Moved to Portsmouth Naval Shipyard in 1952, she was recommissioned in 1954. In early 1955, she was assigned as flagship for ComCarDivSix at her new home port, Norfolk, and became an Atlantic Fleet carrier.

In December 1961, she was reclassified a CVS and then, in April of the next year, entered the New York Naval Shipyard for a six-month rehabilitation and modernization.

The next chapter began when the *Fighting I* deployed to Vietnam in April 1966. En route to her second tour in SEAsia, she became the last American warship to transit the Suez

Intrepid returns to Quonset Point from her last cruise, above. At left, a Soviet KA-25 Hormone flies very near JFK in the Med.

Canal before the outbreak of the Six Day War.

Early in 1969, the veteran underwent extensive overhaul at Philadelphia and returned to her former role as an Atlantic CVS, assigned to Quonset Point, replacing the deactivated *Essex*. This summer she retires.

Enterprise (CVAN-65)

On April 28, *Enterprise* and CVW-14, in a continuing effort to maintain readiness, participated in a joint air-to-air weapons delivery exercise with USS *Ranger*, each ship's aircraft attempting to penetrate the other's defense.

The next day, CVW-14 held a bombing derby in which VFs 142 and 143, VAs 27, 97 and 196, and HS-2 participated. VF-143 took squadron honors and LCdr. Rich Wilson of that squadron accumulated the best individual average.

Later in May, the *Enterprise*/CVW-14 team participated in a Blue Sky Exercise with units of the Nationalist Chinese Air Force. CVW-14 pilots flew simulated strikes against Taiwan to test the Nationalists' defenses. The Chinese Air Force flew practice bombing and strafing missions against *Enterprise's* bombing spar.

F. D. Roosevelt (CVA-42)

As part of a program to improve public relations, promote Navy enlistments and bridge the generation gap, CVA-42 hosted eight NJROTC cadets from Bishop Kenny High School, Jacksonville, Fla.

During the four-day cruise, Cadets Mike Paulson, David Baronek, Tom Calhoun, Walter Ellison, Ron Gibson, Bill Morris, Pat Finn and John Jackson were exposed to almost every facet of carrier life including mops and brooms.

According to Cadet Jackson the program served its purpose. "We learned a lot. We had studied about things like gun direction and navigation in school, but it was great to get some firsthand knowledge."

Commander E. M. Clemens, X.O., says, "The students were excited and had a good time. I hope we helped them make up their minds about coming into the Navy when they finish their education."

Kitty Hawk (CV-63)

The Navy's newest CV celebrated her 12th birthday in April as she returned to afloat status from drydock at Hunter's Point Naval Shipyard.

During her recently completed six-month overhaul, she has undergone extensive conversions, including the addition of an antisubmarine classification and analysis center, larger jet blast deflector shields, and conversion from "black oil" to distillate fuel, an almost completely pollution-free fuel.

Under the command of Captain Marland W. Townsend, Jr., *Kitty Hawk* becomes the third attack carrier to be redesignated. She joins USS *Saratoga* (CV-60) and USS *Independence* (CV-62).

In Haiphong Harbor, crewmen of Dubuque (LPD-8) pull a minesweeping MK-1B aboard after a minesweeping run during Operation End Sweep, above. Another ship of the force, New Orleans (LPH-11), is at anchor in Subic Bay, below.

THE SELECTED AIR RESERVE

VP Pipeline Unit

RTU-68, NAS Patuxent River, Md., trains Naval Air Reservists for fleet billets in the event of mobilization and provides support for VP-68. As part of the Naval Air Reserve pipeline for patrol plane activities, RTU-68 spent its two weeks of active duty finding out how many skills its members had retained — or lost — since they had been part of an active duty squadron. Training was the theme for the 14 days of work with no days off for the aircrews or ground support personnel. The unit launched six aircraft to Rota, Spain, and the Azores, in addition to keeping up with its daily flight schedule of pilot FAM flights, NATOPS checks, training exercises and surveillance flights. During the 14-day cruise, enlisted personnel also prepared for the next series of advancement exams.

Some RTU-68 personnel commute hundreds of miles for their monthly drills. A Navy Reserve VR squadron operates an airlift to Pittsburgh to pick up some of the unit members. A handful drive to Patuxent River from Rhode Island, Connecticut, Ohio and West Virginia. One pilot, who has now switched to a stateside job, used to commute from San Juan.

Trial Program

A trial program is under way at NAS South Weymouth, Mass., to take Reservists out of the classroom and put them into their respective fields. The idea is not to belittle classroom training but to stress the importance of on-the-job training.

Under the new program, members of NARDivs Z-1, Z-2 and Z-3 are training to fill positions on the air station's transient line and in its maintenance department. Commander Richard DiSilvestro, NAS maintenance officer, explained that many work stations were undermanned, while at the same time NARDiv personnel had no assigned tasks. So, with a little teamwork, the Reservists were soon checking flight controls, operating ground equipment, fueling aircraft — they were learning by doing. If the program works, NARDiv personnel will perform the same tasks as active duty members in the same rating.

Career Opportunities

NAF Detroit sponsored an Educators' Visit attended by over 50 metropolitan Detroit teachers, counselors and coaches, who were briefed on the educational and career opportunities available to youth in the U.S. Navy. The practical application of naval training was pointed out to them, as well as the scope of naval educational opportunities. A question and answer session followed, with a presentation on the Sea Cadet and Junior ROTC programs.

The naval air facility is under the command of Captain Howard H. Soester and is the training headquarters of nearly 1,800 Reservists.

One Navy Recruiting

On April 1, 1973, the Navy Recruiting Command assumed responsibility for recruiting all first term naval Reserve enlistees into the Navy. Previously, the Commander Naval Air Reserve and the Commander Naval Surface Reserve were responsible for first term accessions, as well as veteran affiliation with the Reserve programs of their respective forces.

As part of their on-the-job training at Patuxent River, RTU-68 maintenance department Reservists tackle an engine change in a P-3A.

A pilot program to consolidate Navy recruiting efforts was started in Pittsburgh, Pa., in April 1972 and expanded in October to include additional recruiting districts. By cross-training Reserve and Regular recruiters in the programs each has to offer, utilizing mutual assets and sharing recruiting goals, the recruiters proved they could work under the management control of the commanding officer of the Navy Recruiting District, while preserving the best parts of their separate traditional efforts. A CNO message stated, "In the broadest sense, the goal of One Navy Recruiting is to provide the strongest possible Navy in a total force concept as we enter the threshold of an all volunteer force."

Whidbey Reforestation

Twenty thousand trees were planted in the first phase of a reforestation program at NAS Whidbey Island. Community and military volunteers, as well as Sea Cadets and Boy Scouts, took part in the project which was coordinated by Whidbey Naval Air Reservists. The trees were provided by Seattle's branch of the Western Region Naval Facilities Engineering Command and the Weyerhaeuser Company.

The tree-planting project will continue annually for several years until hundreds of acres at the naval air station are covered.

HS-85

Five H-3 *Sea Kings* of Alameda's HS-85 responded to a recent call from the California Office of Emergency Services. Helos were needed to stand by at the scene of an explosion of a Southern Pacific freight train near Sacramento. The burning train contained heavy ordnance which had started a series of explosions endangering people and buildings in the area. Four helicopters carried medical equipment and personnel from HS-85 and RTU-85. The fifth was used as a forward controller. When the period of emergency was over, 24 hours of flight time had been logged and over 40 people had been involved.

An HS-85 crew was involved in another emergency when it rescued an injured hiker some 30 miles southwest of Red Bluff, Calif. Kevin Brown, 16, had fallen from a rocky cliff 70 feet into a small river, hitting a submerged rock and breaking his hip. Floating downstream, he managed to ground himself and crawl onto a rock in the middle of the river where he was found by a rescue party the next morning. However, the rugged terrain and sheer cliffs prevented his being carried out. The squadron helo descended into the deep ravine and hovered 15 feet off the ground as the corpsman brought the injured teenager up the rescue hoist. With its rotor tips only 15 to 20 feet away from the walls of the ravine, the helo departed the area in a vertical climb on its way to a waiting ambulance at Corning Airport.

When two helicopters from HS-85 headed out over the Golden Gate Bridge, it looked like another routine operational flight, but it wasn't. The aircraft were headed out over the Pacific to intercept the French helicopter carrier *Jeanne D'Arc*, a 12,000-ton training ship on a world cruise. She was ten miles offshore, having steamed out of San Francisco in the early morning hours. *Jeanne D'Arc* is used by the French Navy to train officers and sub-officers (equal to U.S. Navy petty officers) and has a crew of 800. The mission of the HS-85 helos was to practice landings on the 280-foot flight deck of *Jeanne D'Arc* and demonstrate some of the U.S. Navy equipment. The 16 landings and takeoffs not only requalified the squadron pilots but was a squadron first in the use of an European flight deck.

SH-3A Sea King from HS-85 flies from Alameda past the Golden Gate Bridge. In addition to its primary mission of antisubmarine warfare, the squadron flies many rescue missions.

Reserve Officers Training Syllabus

Reserve officers are learning the latest fleet procedures at the CFAW-11 Tactical Support Center (TSC) Jacksonville, Fla. The Reserve officer training syllabus stresses tactical support center/operational control center equipment and procedures used by the active duty forces.

It consists of two phases, each lasting one week. The first covers opcon procedures, flight following, message drafting and handling. The second week is devoted to the TSC system, acronyms and operating equipment, and a 12-hour indoctrination flight aboard a P-3C. At the end of the syllabus, the Reservist is designated a CFAW-11 staff duty officer, qualified to stand weekend duty.

At NRL it's

EN AVANT

It was an hour and a half before midnight when the Ford trimotor took off from Little America on McMurdo Sound, Antarctica. At 8:55 the next morning, the flight, commanded by Commander Richard E. Byrd, reached the South Pole.

On that historic day, November 29, 1929, Byrd's aircraft and the ships delivering supplies for the expedition were equipped with radio gear designed and fabricated by the Naval Research Laboratory (NRL). NRL maintained regular communications with the Antarctic base and the support ships.

At the same time, NRL was using an aircraft flying near San Diego, Calif., to successfully demonstrate the usefulness of shortwave communications with aircraft.

NRL began unraveling such secrets of science July 2, 1923, when it was founded. Much of the Laboratory's research during its first half century has had a profound influence in the growth of Naval Aviation and, as it celebrates its 50th Anniversary, it anticipates continuing in the same manner.

The Naval Research Laboratory was established to conduct scientific research and development directed toward producing new and improved materials, equipment, systems and techniques for the Navy. Its investigations were originally focused pri-

By Lloyd F. Carter

marily in the areas of radio and sound. With steady growth, its capabilities for solving some of the Navy's most difficult short and long-range technical problems increased.

NRL's milestones of science in the 1920s had, in one way or another, an early influence on aviation and astronautics. For instance, NRL pioneered a method of detecting moving ships by radio waves which later led to the development of radar. Laboratory scientists produced one of the first workable methods of controlling the flight of a pilotless plane by radio, and they developed high-frequency, high-powered, crystal-controlled radio transmitters.

Scientists at the Laboratory paved the way for development of airborne shortwave radio, and first advanced the theory of radio "skip distance" effect, considered the foundation of modern wave-propagation theory. They were the first to transmit radio signals two times around the world, and to demonstrate cross-country radio transmission from an airplane.

During the 1930s, although limited in manpower and with few research laboratories, NRL scientists continued to unravel scientific questions important to aviation.

During those years they found ways to detect airplanes in flight by radio waves, apply radio beacons for landing aircraft and detect aircraft by pulse radar. They also developed the radar duplexer, enabling radar transmission and reception on the same antenna, and designed the first plan position indicator which is used in most modern radar.

In 1938 NRL further demonstrated its leadership in electronics when it developed the first 300-MHz airborne communication equipment, pioneering VHF development for the Navy.

NRL milestones of the 1940s, especially during the war, included advanced radar systems, anti-jamming techniques for radar, million-watt-peak radar transmitter, monopulse radar (now the basis for all modern tracking and missile control radar), and effective practical equipment to mitigate precipitation static interference in aircraft radios. One innovation of

NRL pioneered rocket astronomy in the late 1940s, and Aerobee rockets are used today for scientific research, left. N-9, above, was used in the first radio-controlled flight in September 1924.

particular importance was the development of a countermeasure program against German radio-controlled flying bombs. The system was also used against enemy submarines and ships.

Following the war, NRL employed a flying laboratory to study radio propagation in the troposphere which demonstrated evidence of scatter propagation beyond the horizon. In 1946, NRL demonstrated the first radar beam-rider receiver for missile guidance. Two years later, utilizing a high-altitude rocket, the Laboratory produced a photograph of the earth from an altitude of 101 miles.

As the Forties came to a close, NRL produced the first ionospheric radar with the ability to detect targets over the horizon, and developed the high-resolution airport taxiing surveillance radar.

By 1950, NRL had designed the first surface-to-air missile control radar, predecessor of present-day missile systems. Another significant development was the Laboratory's demonstration in 1952 of the first electron memory tube with an indefinite memory and instantaneous erasure time, followed in 1954 by its traveling-wave oscilloscope tube for recording high speed events in the order of one millimicrosecond duration.

The following year the Laboratory accomplished the first real space com-

munication, using the moon as a passive reflector and, the year after, reported observations of the absorption of the emissions of radio stars by interstellar hydrogen gas.

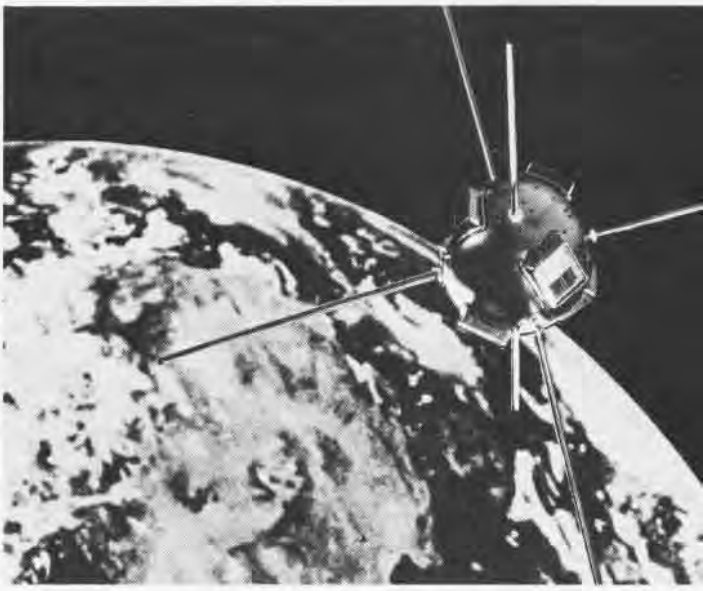
In 1957, NRL participated in the first demonstration of a fully automatic landing system for aircraft on carriers, and built the first worldwide satellite tracking system, *Minitrack*. Using *Minitrack* and observing U.S. and Soviet satellites, NRL scientists first determined the upper atmosphere density.

NRL then launched the first *Vanguard* artificial earth satellite which has become the oldest man-made satellite in orbit. Later, in 1958, NRL's *Spasur* became the first satellite surveillance system and, in 1959, the Laboratory demonstrated the first automatic data reduction equipment for satellite research.

The 1960s were equally productive. NRL started the decade by launching the first solar observatory satellite, *Solar Radiation I*, and pioneering the injection of multiple satellites into orbit from a single launch vehicle. In 1961, through the use of NRL's *Lofti I* satellite, scientists disproved the widely accepted theory that very-low-frequency waves do not penetrate the ionosphere. That year, scientists also demonstrated the successful communication relay from shore to ship at sea.

Aerial view of 130-acre NRL complex as it stands today, opposite top; five outlined buildings are all that existed when the Laboratory was opened July 2, 1923. NRL scientist uses electron microscope in research, opposite center. Former Secretary of the Navy Josephus Daniels breaks ground in 1920 for NRL's first building, top. NRL-developed chemical fire-fighting unit is used aboard ships and at airports, center. Fleet's first radar, above, was operationally demonstrated during exercises in 1939.

NRL researchers delve into microelectronics, right, and often build their own systems. Center right is antenna used by NRL for first voice transmission and reception using moon as passive satellite relay, July 24, 1954. NRL's Vanguard I, oldest orbiting satellite, has been circling earth for 15 years, far right. Helo demonstrates aerial use of Purple-K-Powder, a chemical fire suppressant, below.



again using the moon's surface as a passive reflector. It was also in that year, as part of the space study program, that the Laboratory built the first high-performance, steerable, 150-foot parabolic reflector antenna.

Since the early Sixties, NRL has achieved numerous pioneering milestones that reflect not only progress in aviation and astronautics, but in many other fields as well.

NRL developed methods to detect x-rays from the sub-ultraviolet spectra beyond the atmospheric cutoff; was the first to obtain ultraviolet and x-ray solar photographs and the first solar images recorded by a satellite; found ways of explaining radio fade-out; and obtained photographs of the white light corona made from rocket experiments without a solar eclipse.

The Laboratory also developed purification systems for use in closed environments, such as submarines and space ships; provided engineers, for the first time, with basic knowledge and methods for fabricating strong, brittle materials for use on aircraft and ships; pioneered theoretical and experimental research in electron x-ray and neutron diffraction as they pertain to the structure of matter; and developed paints, fuels and lubricants being used in modern aircraft and ships.

Scientists at NRL are credited with developing the aqueous film-forming foam, light water, now used at airports and on ships for fire suppression; aircraft radio antistatic devices which have contributed much to reliability of flight communications; and new antennas for use in air traffic control radar beacon systems for Navy and commercial airlines.

Laboratory scientists are also responsible for new systems such as the *Omega* navigation system which enables aircraft crews to use radio signals for navigational purposes. And NRL *Timation* satellites have proven useful for microsecond, worldwide time checks and for navigational purposes.

Although it had a meager beginning, the Naval Research Laboratory today is one of the major scientific establishments of the Department of Defense. It has a 4,000-man staff of research, engineering and support personnel, with research organized into four major areas: electronics, materials and general science, space science and technology, and oceanology.

Organizationally, the Laboratory is under the Office of Naval Research which is directly responsible to the Assistant Secretary of the Navy for Research and Development. Work at NRL is sponsored largely by major Navy commands, such as the Office of Naval Research and the Naval Systems Commands, which account for 73 percent of the total funding. Other DOD organizations, such as the Air Force, Advanced Research Projects Agency and the Defense Atomic Support Agency, account for another 17 percent. Non-defense agencies, such as the Atomic Energy Commission and the National Aeronautics and Space Administration, contribute the remaining ten percent. Total funding from all sources is about $110 million a year for the research programs — a long way from the $100,000 funded for research in 1923.

NRL's main installation on the Potomac River at the southern tip of Washington, D.C., includes 16 of its 17 research divisions and the bulk of its varied equipment. Research that cannot be done on this 130-acre plot with its more than 125 buildings is done at two dozen field stations in Maryland, West Virginia, Florida and Bermuda. Research is also conducted aboard aircraft and ships that travel to most oceans and continents.

The scope of NRL research today is very broad — tenaciously pursuing still elusive facets of such old fields as acoustics, chemistry and optics, and at the same time pioneering in new fields such as space communications, satellites and plasma physics.

For five decades, the Navy's corporate Laboratory has set a remarkable track record in science for the Navy and for the nation, a record it is striving to extend well into the second half of its first century.

Letters

Save a CVE

Your December '72 issue began with a letter from a reader and your reply, all on the subject of saving one of the remaining WW II carriers as a sort of floating memorial. I think the idea is a very appealing one and I would like to propose an idea that might overcome one of the problems, or at least help to do so.

Most of the discussion concerned saving a CVA. How about a CVE? At half the tonnage and two-thirds the length, the berthing and maintenance problem would be appreciably reduced. There is room for a great deal of history to be collected aboard, and I have learned, thanks mostly to your magazine, just how much history was made by these little ships. (I had barely been aware they existed before you published Admiral Gallery's "Calculated Risk" in 1969.)

In another respect, I think one of these ships would make a singularly good memorial. Most people have seen something of the modern carrier and can picture what a formidable task it must be to fly and fight from one. To see a straight deck, half the length of a modern one and try to image coming aboard on a stormy North Atlantic night makes the idea seem awesome. What better memorial is there for people than an understanding and respect for what they did?

Perhaps it is already too late. I wonder if there are any CVEs left. I recently saw three, probably of the group which had been at San Diego, at Richmond, Calif. They apparently are to be scrapped.

Robert J. Miller
1027 Huntingdon Drive
San Jose, Calif. 95129

You're right, it is *too* late. They have all gone to the scrap yard along with the CVLs and such famous ships as *Enterprise* (CV-6), *Ranger* (CV-4) and several of the *Essex* class.

Surprise?

Although it was obvious that the comment was unintentional, I would like to point out to Lieutenants Minor and Holt ("Questions and Answers," March 1973) that it is not at all "surprising" to me that everyone does not ask for jets. Hundreds of people, many known to me, have asked for multi-engines or helicopters because they preferred them. What is surprising to me is that such a remark slipped past your blue pencil!

J. L. Low, LCdr.
CVSGR-70
NAS Norfolk, Va. 23511

Poor Gramps

As to that cover on which Gramps was flying at Mach 1.03 with no canopy, a V finger sign in the slip stream, no helmet visor and no leading edge . . . the only answer is that if you put it all together and cram him into the cockpit it becomes a little difficult to see what he's thinking in there. Probably Truth is Beauty, but Beauty isn't necessarily Truth.

Bob Osborn
Salisbury, Conn.

Pilots Aboard CV-2

As I mentioned in a recent letter, some of the oldtimers have criticized the articles I have done for you because of the lack of detail. One question asked was "Who were in the original group of *Langley* pilots?"

This is difficult to answer as some, like Frank Tecthler, Haviland and Tuller, were killed or detached before CV-2 started operations. The pilots who were attached and made landings in the first year of operation were (not in order of landing): Kenneth Whiting, exec and acting C.O.; Godfrey de Courcelles Chevalier, air officer; V. C. Griffin, assistant air; A. M. Pride, gear design; Braxton Rhoades, engineering; F. W. Pennoyer, ship and plane gear design; Delbert Conley, radio; and pilots Carleton Palmer, J. R. Kyle, W. M. Dillon, Robert Wooster, J. R. Tate, Anthony Feher, Dan Daily and Sam Darling. Later, when Chevalier was killed, Griffin moved up to air officer.

Before going to the West Coast, Andy Crinkley, Harold Brow, Jake Gorton, Rossmore Lyons and John D. Price joined the assigned pilots. Whiting was relieved by Warren G. Childs and Griffin was relieved by Charles P. Mason.

On *Langley's* arrival on the West Coast in November 1924, all pilots in the area were anxious to qualify for carrier landings and many were qualified. I will not attempt to list them, but many, like Jerry Brogan, Art Radford, Frank Wagner, Ralph Ofstie and Forrest Sherman, were to become famous in later years.

In January 1925, VF 2 was assigned as the first carrier squadron. It was commanded by Nathan B. Chase. This squadron operated so well as the only carrier squadron during 1925-26 in Problem V off Guadeloupe that the CinC, Admiral R. E. Cootz, recommended the *Saratoga* and *Lexington* conversions be speeded up, with top priority.

I hope these items fill some of the vacant spaces. I think the VF 2 data is interesting in view of the organization of that squadron.

J. R. Tate, RAdm., USN(Ret.)
Box 208
Orange Park, Fla. 32073

Air Group Patch

I am trying to locate a patch from Carrier Air Group 8 with which I served as a member of VA-86 in 1956. There were several other squadrons in the group, all depicted on the patch. My efforts to replace my patch, which was lost many years ago, have so far been fruitless.

I know that since 1956 the Navy has re-aligned the squadrons and, of course, this complicates my search. I am a naval reservist attached to IMSU 4V1 at NAS Glenview, and the old CAG-8 patch would look well along side my VA-86 patch which I still wear.

Edward C. Rosenau, USNR-R
5110 N. Keeler Ave.
Chicago, Ill. 60630

FILMS

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

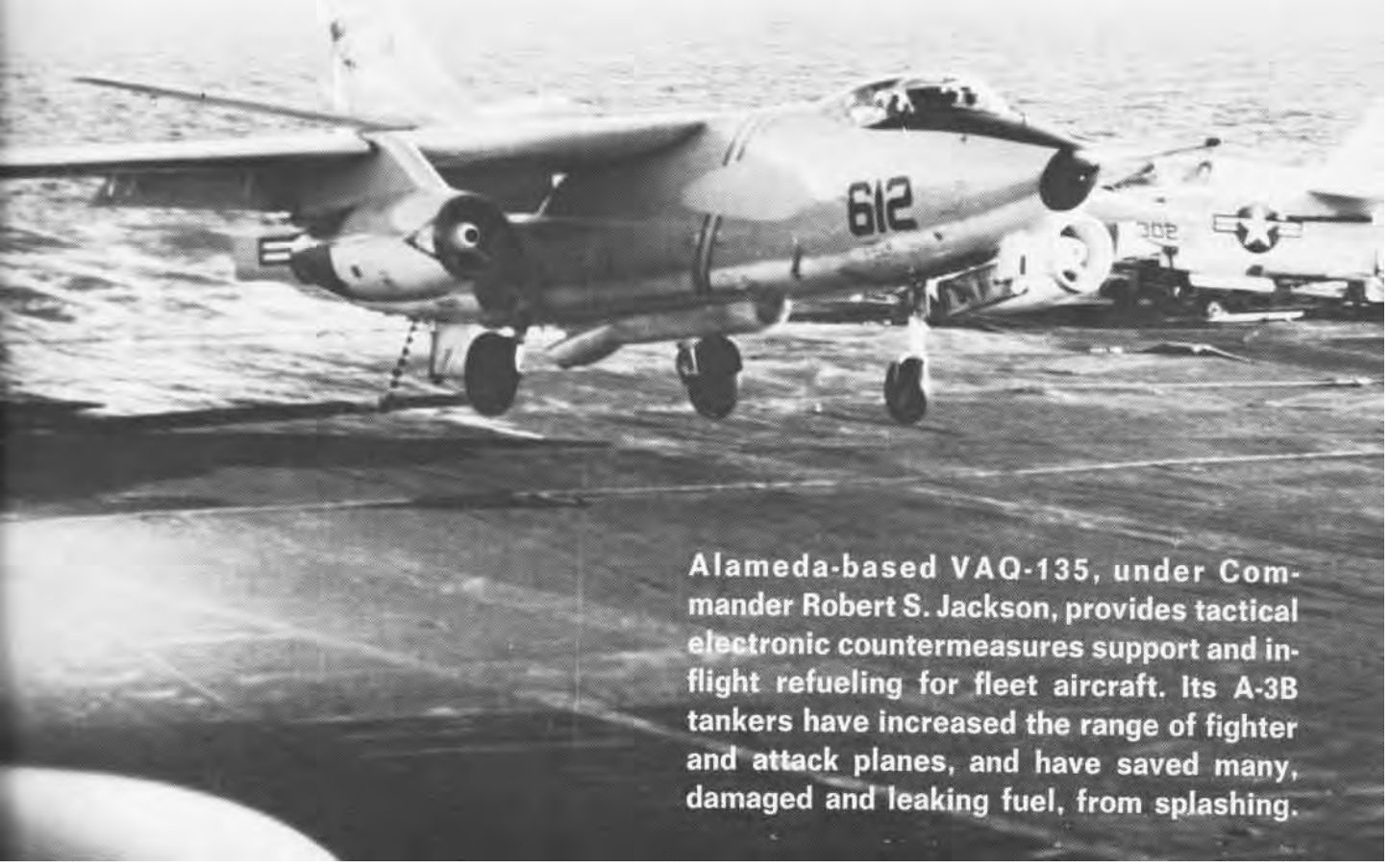
MN-10682C (unclassified) *P-3 Instrument Flight Procedures.* Terminal procedures and techniques for making instrument approaches to a destination airport (26 minutes).

MN-10912A (unclassified) *Helicopter Search and Rescue — Sea Phase.* Vehicles, equipment and devices necessary for helicopter rescue at sea (25 minutes).

MN-11227 (unclassified) *Man from LOX.* The dangers of mishandling liquid oxygen (6 minutes).

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

SQUADRON INSIGNIA



Alameda-based VAQ-135, under Commander Robert S. Jackson, provides tactical electronic countermeasures support and in-flight refueling for fleet aircraft. Its A-3B tankers have increased the range of fighter and attack planes, and have saved many, damaged and leaking fuel, from splashing.

NAVAL AVIATION
NEWS