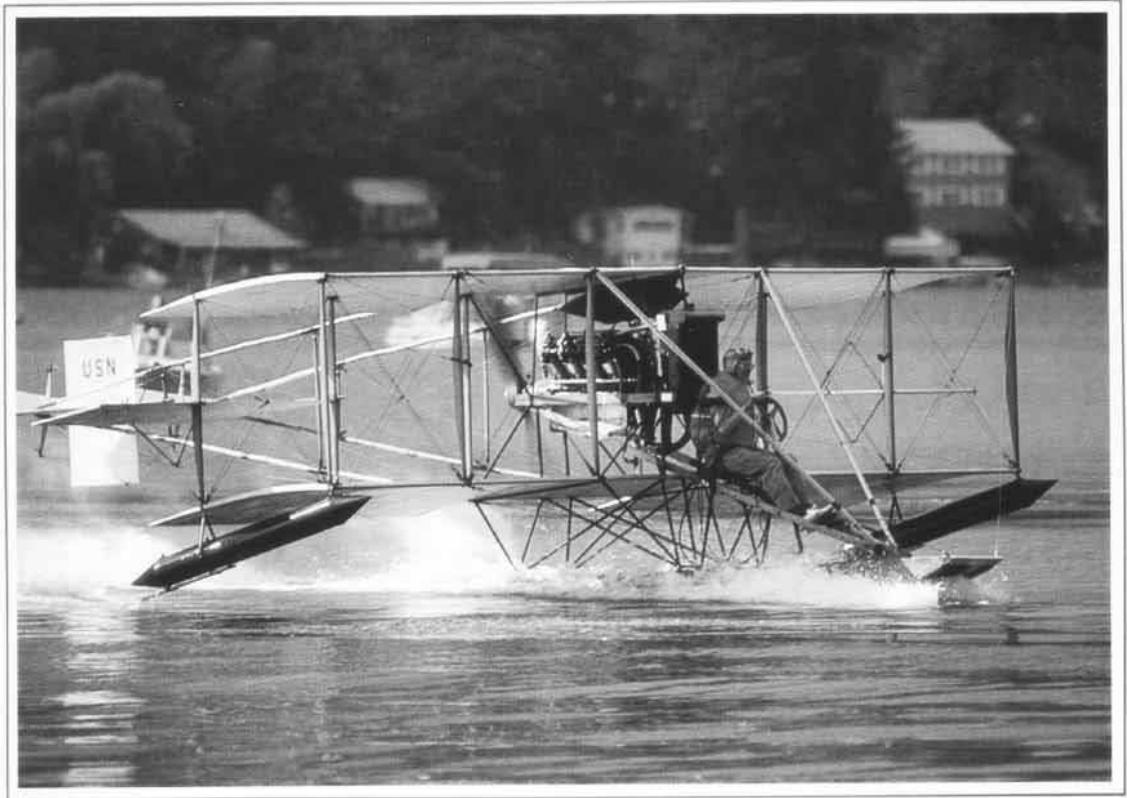


# NAVAL AVIATION news



Festival of Flight

**Oldest U.S. Navy Periodical**  
**Sixty-Eighth Year of Publication**  
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**COVER**—Dale Crites' Curtiss pusher kicks up spray in an attempt to take off from Keuka Lake at Hammondsport, N.Y., during the Festival of Flight.

(JOCS Kirby Harrison)

**Features**

Festival of Flight . . . . .	4
The Glenn Curtiss Memorial — A Fitting Tribute . . . . .	8
Future of Naval Aviation? . . . . .	9
Modern Mines for an Aging Stockpile . . . . .	10
Mining Haiphong Harbor . . . . .	14
Top Gun — The Standard in Fighter Excellence . . . . .	18
The A-6F: Advanced Medium-Attack Aircraft of the 1990s . . . . .	22
New Ship for Helo Training . . . . .	26

**Departments**

Editor's Notebook . . . . .	1
Grampaw Pettibone . . . . .	2
Naval Aircraft: H-34 . . . . .	16
State of the Art . . . . .	28
Awards . . . . .	28
Professional Reading . . . . .	29
People—Planes—Places . . . . .	30
Flight Bag . . . . .	inside back cover

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In June, the people of Hammondsport, N.Y., witnessed the "Festival of Flight." It was a four-day airplane party that celebrated the 75th Anniversary of Naval Aviation and paid tribute to Glenn H. Curtiss, the man who started it all in 1911. **Page 4**



How would you envision Naval Aviation by 2011, the year of its 100th anniversary? Secretary of the Navy John Lehman says much of tomorrow's capabilities can be projected confidently in light of programs currently under way. **Page 9**



For many years, the Navy has passed mines over for more exotic weapons like missiles. But, today, the Navy's aging mine stockpile is being augmented with sophisticated weapons that will provide tremendous leverage in any future conflict. **Page 10**



Fighter squadron C.O.s realize the importance of the Navy Fighter Weapons School (NFWS), "Top Gun", and send their best aircrews there for training. Read why. **Page 18**



The A-6F *Intruder*, which will replace the A-6E beginning in 1990, will stress improved survivability, maintainability and reliability. Read how the A-6F's upgrades will enable it to perform the medium-attack role in the 1990s. **Page 22**



Student helicopter pilots no longer have to shipboard-qualify solely aboard the USS *Lexington*. A new ship called the Helicopter Landing Trainer provides a small deck that better prepares helo students for landing in the fleet. **Page 26**

# from the EDITOR'S NOTEBOOK

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## NAVAL AVIATION NEWS GOES ELECTRONIC

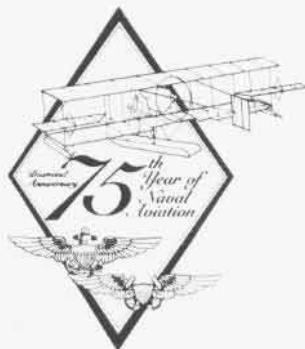
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**T**he word of Naval Aviation's Diamond Anniversary has reached millions all over the world thanks to the skilled efforts of the 75th Anniversary Staff and DIANA, the 75th Anniversary Staff's electronic bulletin board, which has been serving the program 24 hours a day, seven days a week since last December.

For the thousands who got the word of this year's events on DIANA, things will change. Beginning in early September, DIANA will become an electronic version of *Naval Aviation News (NANews)* magazine and its name will be changed to NANci — Naval Aviation News computerized information.

NANci will continue as a public access electronic bulletin board and provide 75th Anniversary information while, at the same time, increasing its directories of stories published in *NANews*, its historical data files and recruiting information.

This change is good news for the many authors in the fleet whose stories we cannot publish because of limited space. Now we will be able to publish these stories electronically in NANci. This is the first step in what today has come to be known as desktop publishing and which



opens up expanded opportunities for Naval Aviation writers. Not only will NANci users be able to enjoy these extra stories but magazines and newsletters can download and publish them. NANci's electronic mail feature also can be used to locate authors to write stories on specific subjects. And, because the stories will be held in electronic files, they may be used in *NANews* at a later date or as source material for researchers.

All authors who submit stories will get a by-line.

In short, NANci will have information on Naval Aviation subjects available to everyone.

To submit stories to *NANews* and/or NANci, send your material typed on plain, white 8 1/2" x 11" paper with one inch

margins. If possible, please use one of these standard typewriter/printer typestyles: Courier 10, Pica 10, Prestige 10 or 12, OCR-B, Elite 10 or 12, Letter Gothic, and Title. We can also accept copy from the following dot matrix printers: Epson FX85 and LQ 1500; IBM Graphic and Proprinter; and Okidata 92 and 192. If you have a personal computer with a modem, you can log on to NANci and upload your story directly to the *NANews* editors or Naval Aviation History Office staff.

NANci can be accessed via modem by dialing commercial (202) 475-1973 or autovon 335-1973 and using 300/1200 baud; 7 bit/even parity or 8 bit/no parity; and 1 stop bit. Beginning on September 8, 1986, NANci will be on line for public access from 5:00 P.M. to 8:00 A.M., Monday through Friday, and 24 hours on Saturday and Sunday.

You can upload stories directly to NANci between 8:00 A.M. and 5:00 P.M. weekdays by calling and making prior arrangements with the *NANews* staff at (202) 433-4407 or autovon 288-4407.

You may mail your stories to us at this address: Naval Aviation News, Bldg. 159E, Washington Navy Yard Annex, Washington, DC 20374-1595. ■

## Three's a Crowd

A T-2C *Buckeye* rolled down the runway and rose into the hot, southern sky. As it did so, a UFO, quickly identified as a sizable black and yellow bee, buzzed the instructor in the aft seat, then winged into the front cockpit. The student Naval Aviator (SNA) forward was startled but quickly calmed himself and did battle with the intruder. The student won but the bee went down with his stinger stinging, through the flyer's glove, no less.

There was redness at the point of impact but the SNA felt fine and wanted to continue the flight. After an hour in the air, however, his hand was swollen. The *Buckeye* landed safely and the student was grounded for two days of treatment.



**Grampaw Pettibone says:**

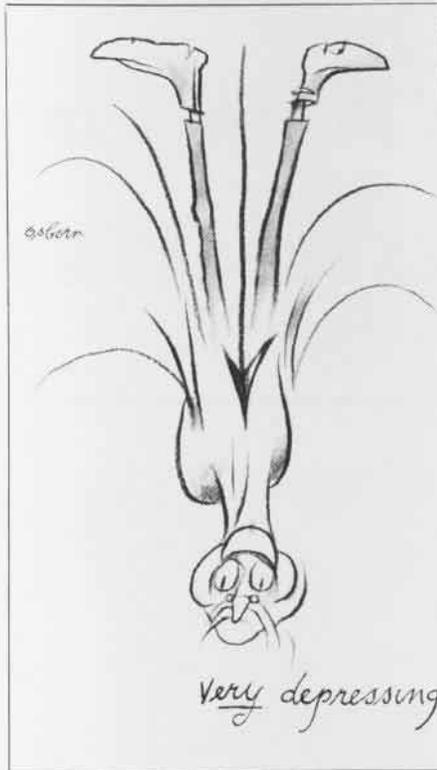
Reminds me of a long ago story, never fully proved, but worth tellin'. A highly experienced pilot in a single-engine prop plane was making practice night dive-bombing runs. There was no sign of trouble with him or his bird, but he flew into the ground anyway and was killed. So I was told, a bee was found imbedded in his forehead. Could very well be that the creature stung and distracted the veteran to the point that he lost control — and his life.

Ole Gramps doesn't want anybody hung up on what the dictionary calls *Apis mellifera* (bee), but don't take 'em lightly.

*Gramps Looks Back to the Training Command, Circa WW II*

### Solo Flight

A cadet pilot landed at an outlying field, retarded throttle, set parking brakes and left his N2S-4 unattended, with the engine running, while he walked over to chat with two other pilots. The little "yellow fighter" took in the situation and considered the time opportune to make a dash for freedom. Its throttle began to creep forward, the



brakes became disengaged and the plane began to move. The cadet, observing the motion, ran to his plane and grabbed a wing, but by this time speed had increased so that he was unable to do more than just hang on, causing the plane to commence a series of ever widening circles. Speed continued to build up and the cadet lost his hold, admitting defeat by turning tail and scampering over a fence to safety.

The other two students joined the chase, also leaving their planes with engines running, unattended. The contest proved too much for these last two entrants and they were forced to return to their own planes and taxi them out of danger. By this time, the renegade N2S was pretty mad, digging a wing into the ground now and then just to show its temper. At last the little fighter apparently became weary of the sport and decided to spread its wings. Speed was sufficient so that when coming into the wind for the last

time, the plane straightened out, took off and climbed normally until reaching an altitude of about 50 feet, at which time it apparently decided to make a steep turn and zoom the field downward. But like so many foolishly piloted planes before it, this trainer stalled in the turn and dived to earth.



**Grampaw Pettibone says:**

Wasn't that funny! I smiled, too, but the thing that wiped the smile off my face was the realization that an airplane was completely wiped out because a pilot deliberately disobeyed orders. The money value of this plane was approximately \$10,000, but money won't replace the loss of critical materiel and labor involved. (Reprinted from January 15, 1944).

## Ejection Rejection

A T-2C *Buckeye* on a familiarization flight was warming up for aerobatics with a vertical recovery maneuver. The instructor pilot (IP), while demonstrating the maneuver to his student, noticed the number 2 hydraulic pressure fall to 0 psi, but quickly return to normal. (A drop or fluctuation in hydraulic pressures during this particular maneuver is not uncommon.) Upon completion of the IP's demo, the student Naval Aviator (SNA) in the forward cockpit took control as the IP coached him through a similar maneuver. The SNA commenced a 4-G pull at 280 knots, 11,000 feet. At approximately 80 degrees nose up, 180 knots, 15,000 feet, the SNA initiated a recovery by applying forward stick to five units angle of attack with power advanced to military.

During the recovery, the number 1 and 2 hydraulic pressures fell to 0 psi. The IP took control and with maximum backstick pressure applied could not bring the stick back to the neutral position. He then told the SNA to help pull. With no effect and the aircraft passing 7,000 feet, 300 knots and a nose attitude approaching 90 degrees nose down,

ILLUSTRATED BY *Osborn*

the IP called for ejection. The SNA pulled the upper ejection handle without result. He then pulled the lower ejection handle. Again, no ejection.

The aircraft was beginning a dramatic buildup of negative Gs as it accelerated downward through the inverted position. The IP was unable to reach his upper or lower ejection handle as he was forced to the canopy by excessive negative Gs. The aircraft continued through its uncontrolled 'outside' loop at 2,000 feet AGL and 400 knots. As the aircraft transitioned to a nose-up attitude, inverted, at the completion of its outside

loop, the IP suddenly regained elevator authority. With full control of the aircraft, the IP returned to base for an otherwise uneventful landing.



**Grampaw Pettibone says:**

**Whew! What a wingdinger of a roller coaster ride these gents had!**

**Due to a mix-up during post-flight examination of the T-2's elevator boost actuator, the cause of this hazardous condition is undetermined. The hydraulic and flight control systems otherwise**

**checked out okay. It's possible that the lead seal on the elevator boost pack may have been the culprit. The aircraft should have been flyable with the boost off.**

**The best lesson from this loop-the-loop adventure focuses on ejection procedures. The IP forgot to tell the student to reposition the ejection command selector handle. Even though both flyers were harnessed in tight and locked, the increasing negative Gs prevented the IP from initiating ejection.**

**These Buckeye drivers lucked out. Others in the community should take a hard look at ejection procedure briefings. And be wary of control loss possibilities during such maneuvers.**

#### **From the Mailbag**

Dear Gramps,

While reading "And How Was Your Day?" in the July-August 1986 issue, I was reminded of a situation involving the loss of radios on a carrier recovery with a VS squadron. I was the plane's AW2 sensor operator.

It was a night recovery. An errant lightning bolt zapped the aircraft, disabling our HF and UHF radios. The situation was sticky and ejection was discussed when I remembered that we still had four radios in excellent condition aboard. The aircraft commander reminded me that the lightning had knocked out our radios and asked me to please stop jabbering while we were in an emergency state.

Four radios remaining following an in-flight lightning strike? Yep! PRC-90s in each SV-2 left pocket. So, Vinegar 607, ON GUARD! A little reshuffling of the stack, and eventual recovery on board USS *America* (CV-66).

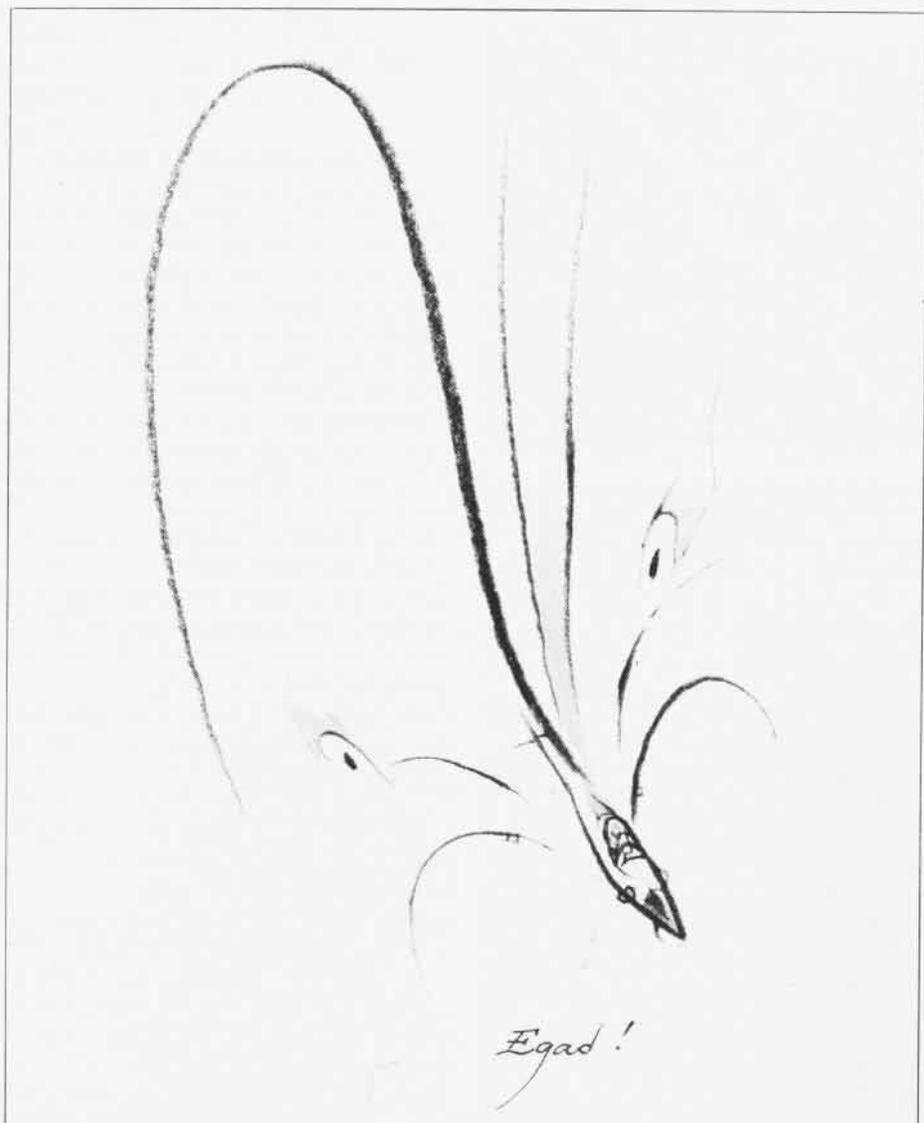
Please reemphasize to all readers that the contents of the SV-2 needn't be saved until the aircraft is abandoned.

AZ1 Clyde E. Coleburn  
AIMD, USS Iwo Jima (LPH-2)  
FPO New York 09561-1625



**Grampaw Pettibone says:**

**Well done to AZ1 Coleburn!**



An aircrewman on the Coast Guard H-52 helicopter out of Brooklyn, N.Y., waves to spectators during the Festival of Flight air show.



# Festival of Flight



Story and Photos by JOCS Kirby Harrison

In June, the Glenn H. Curtiss Museum at Hammondsport, N.Y., held an airplane party. It wasn't as big as the week-long fly-in at Oshkosh. And it didn't have the boom and thunder of the National Air Races at Reno. But as a tribute to Curtiss and to U.S. Naval Aviation on its 75th anniversary, the "Festival of Flight" beside Keuka Lake was a successful four-day excursion into aviation nostalgia.

Eighty years ago, manned flight was just beginning to catch the public's imagination. Men were beginning to design aeroplanes and daring to fly. One of them was a slender, young motorcycle racer and inventor from Hammondsport named Glenn Hammond Curtiss.

By 1907, Curtiss had ridden an eight-cylinder motorcycle of his own design to the then-incredible speed of 136 mph. His reputation as a motorcycle racer and designer was firmly established, but Curtiss became fascinated by flight. So much so that he joined Dr. Alexander Graham Bell's Aerial Experiment Association, an organization whose aim was "...to get into the air." In 1908, he made the first officially accredited, publicly witnessed flight in America in the *June Bug*, an airplane he and his comrades

from the Aerial Experiment Association had designed and built. The flight earned him Pilot's License No. 1 from the nation's first aviation-governing body, the Aero Club of America.

In 1910, Eugene Ely flew a Curtiss pusher from the deck of the light cruiser *Birmingham*. Two months later, he landed aboard and took off from the armored cruiser *Pennsylvania*.

By 1911, Curtiss had established flying schools at Hammondsport and North Island, Calif., and had begun training pilots for the Navy. The Navy would never be the same.

Among the guests at the four-day festival in Hammondsport was Paul Garber. He remembers the early days of aviation with great clarity. He was there, and many of his friends were the men and women who were making aviation history.

Today, Dr. Paul Garber is a historian emeritus at the Smithsonian Institution. His reputation as an aviation historian is as firmly established as that of the institution where he has worked for 65 years.

He bristles at the suggestion that at age 87 he is grounded, if for no other reason than that his imagination still soars.

With the enthusiasm of Lancelot on a quest for the grail, Garber takes any

opportunity to promote the preservation of aviation history, in particular his hopes for a new air and space museum facility at Dulles International Airport, 45 minutes from downtown Washington, D.C.

"Of course, there's nothing out there yet but a twinkle in the eye and several airplanes," he says with a laugh. One of those "airplanes" is the space shuttle *Enterprise*, a fairly substantial "twinkle" in anyone's eye. And there are many who recall that the present air and space museum, in downtown Washington, D.C., began as a "twinkle" in Garber's eye.

In a lecture at Hammondsport on Glenn Curtiss and the NC-4, Garber enlightened a crowd of more than 100 with almost two hours of slides and historical anecdotes.

He spoke of Dr. Bell, his friend, from whom he developed a continuing love of kites.

And about airship designer and pilot Tom Baldwin who built the airship *California Arrow*, of which Garber noted with wry humor, "Any resemblance to an arrow was purely incidental."

And he talked about the day Curtiss drove his fan-propelled "wind wagon" through Hammondsport. "That was the day the horses learned to climb trees."

Garber discussed Curtiss and his fellow designers' contributions to the design and construction of the Navy-Curtiss (NC) flying boats. One of these, the NC-4, was the first aircraft to make a transatlantic flight. Garber noted that Lindbergh often and mistakenly receives credit as the first to fly the Atlantic.

Garber recalled walking through the National Air and Space Museum and hearing a man tell his family about Lindbergh and the *Spirit of St. Louis*.

"That was the first airplane to fly across the Atlantic," the man told the children, pointing to Lindbergh's aircraft.

Garber couldn't resist the urge to set the gentleman straight. "Excuse me," he said, "but that was the 13th plane to fly across the Atlantic."

The man looked at Garber a moment and said nothing. As he turned to walk away, Garber heard his wife ask, "Who was that?"

"Just some old fud," the man replied.

Garber laughed. "I might be an old fud," he told his audience in mock indignation, "but I do try to know my history." (Continued on page 6)



Dr. Paul Garber unveils a portrait of Glenn Curtiss at the Curtiss Museum. Watching are VAdm. Edward Martin, DCNO (Air Warfare), and artist Susie Kohl Andrews, who presented the portrait to the museum.



A smiling Dale Crites prepares to fly his restored Curtiss pusher from Keuka Lake.

A Marine Corps AV-8B Harrier II from VMAT-203 hovers for the crowd at Keuka Lake.



At dedication ceremonies June 29 on the shore of Keuka Lake, Garber and a crowd of thousands watched as a metal, half-scale copy of the Navy's first aircraft, the Curtiss A-1 *Triad*, was unveiled.

Atop a steel column 50 yards from the lake shore, the 1,250-lb. copy is balanced to turn so that it always faces the wind. But it was a wind of a different sort that prematurely revealed the gleaming model to the public the day before the official ceremony.

The silence was shattered when a Marine Corps AV-8B *Harrier II* roared overhead at better than 600 knots, banked sharply and disappeared behind the green hills of the eastern shore. Minutes later, the V/STOL jet returned, this time more slowly.

Flying like a dragonfly in military camouflage, the plane slowed to a hover just above the lake's surface. Downblast from the four jet exhausts created a hurricane of wind and spray that washed over the replica of the A-1, and the blue tarp covering the half-scale model began to flap in the wind, and slip.

In less time than it took for the official unveiling, the tarp was lying in the water and the *Harrier* was a rapidly disappearing speck on the far horizon.

The A-1 swung uncertainly for a moment on its column, then steadied to face into the wind.

It wasn't planned that way but the crowd recognized a good show when they saw it, and applauded the event as well as their own good fortune at being there to see it.

The air show portion of the festival featured a score of flying boats, among them Connie Edwards' PBV-6A, one of two *Catalinas* which in May reenacted the first transatlantic flight. The big flying boat still wore the same colors with which the NC-4 was painted for the historic 1919 flight. The bright yellow wings and red, white and blue tail stood out in sharp contrast against the steep, green hills around the lake as Edwards made several water landings and takeoffs.

But the most unusual aircraft at the festival was Dale Crites' restored Curtiss pusher.

A youthful 79, Crites learned to fly in the late 1920s, and soloed in a Curtiss *Jenny*. His passion now is his Curtiss pusher, vintage 1911.

It took Crites and friends more than a year to restore the old pusher, using

what he describes as "one and one-half original machines," and more than a few parts that had to be built new.

Crites' pusher is a close cousin to the Navy's first airplane, the A-1. The Navy's amphibious *Triad*, however, had twin seats and "throw-over" controls for training student pilots, and a single pontoon for water takeoffs and landings.

Crites wanted to duplicate the first flight of the A-1 off Keuka Lake on July 1, 1911. He and the museum organizers thought it would be appropriate as part of festivities honoring Curtiss and Naval Aviation, and Mercury Aircraft in Hammondsport offered to build the pontoon that would make the pusher a seaplane.

Crites made two futile attempts to get his pusher off the water on Saturday and Sunday. Curious boaters creating too much wave action and a chipped propeller caused Crites to abort two takeoff attempts that weekend.

On Monday, he again assembled the 700 feet of wire, spruce spars, bamboo poles and fabric, cranked up the ancient OX-5 V-8 engine and taxied out onto the lake.

The wind and water conditions were ideal. One moment the tiny pusher was racing across the lake at 40 knots and, the next, she was airborne, water streaming behind her.

With Crites in his cloth aviator's cap and goggles, and the OX-5 roaring, it was easy for onlookers to form an image of the early days when Curtiss ran a flying school and such a sight was commonplace.

One hundred feet off the water and a mile up the lake, Crites leaned into the shoulder-directed aileron controls and banked into a 180-degree turn for the flight back. Less than a minute later, he brought the pusher down, setting the plane gently onto the water in a shower of spray.

Crites came ashore beaming, a wide smile spreading across his weathered face. For a man who, tongue in cheek, describes the flying characteristics of his pusher as capable of "thrilling the largest crowd and scaring the hell out of the pilot," it was a successful flight.

Wally Schirra is a man who knows about successful flights. A guest at the festival, the former *Mercury* space program astronaut took a moment to sit at the controls of the old Curtiss pusher. Now 63, Schirra's slender

frame holds a few more pounds than in the days when he rode a rocket into space, and the once dark shock of hair has a distinct edge of gray. But the charm that gave him a seat beside Walter Cronkite during broadcasts of the first landing on the moon hasn't faded.

Schirra wedged himself carefully into the single seat of the restored biplane and looked around. Crites showed him how to fit his shoulders into the yoke and lean left or right to move the aileron surfaces, and Schirra laughed as the simple controls were explained. Then, the man who once dodged MiGs in Korea and circled the world at 17,500 mph, stepped down.

The reception at the Curtiss museum was less dramatic than Crites' flight.

The museum is a large, two-story brick building with the kind of ivy-grown walls that only come with sedate aging. The wooden floors and creaking stairway blend well with the collection of aviation artifacts, Glenn Curtiss memorabilia. Representing Naval Aviation were Vice Admiral Edward Martin, Deputy Chief of Naval Operations (Air Warfare); Marine Corps Lieutenant General Keith Smith, Deputy Chief of Staff for Aviation; and Coast Guard Rear Admiral Clyde Robbins, Chief, Office of Operations. Standing in front of a copy of the *June Bug*, the three men paid tribute to Curtiss and presented a set of framed artwork to museum officials.

Paul Garber unveiled a new painting of Glenn Curtiss, noting the historical accuracy of the portrait by Susie Kohl Andrews. He pointed to the goatee just below Curtiss' lower lip. Curtiss, he explained, grew the goatee following an accident in which the area just beneath his lower lip was torn. Since he couldn't shave, he allowed a small patch of hair to grow while the cut healed.

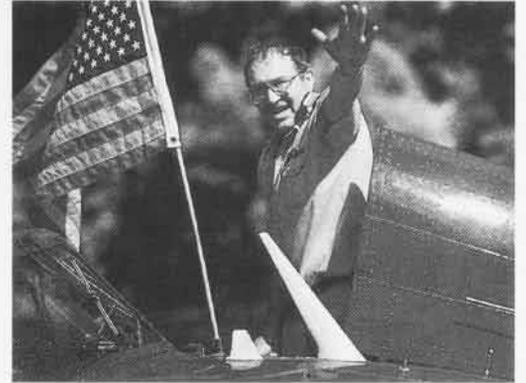
On Tuesday afternoon, the festival ended, not with a bang, but with something more akin to a sigh.

At the Curtiss museum, tourists in no apparent hurry wandered through the exhibit rooms and paused at open windows, grateful for any small breeze. Across the lake, indistinct shouts of children mingled with the occasional buzz of outboard motors.

The festival over and the crowds gone, the village of Hammondsport stretched and settled comfortably back into early summer. ■



Left, Connie Edwards' PBV Catalina is moments from landing on Keuka Lake. Below, an enthusiastic Al Brown, chief engineer on Edwards' PBV, waves to boaters.



Former astronaut Wally Schirra examines the controls on Dale Crites' Curtiss pusher.

An audience of more than 1,000 listens as the Navy's dance band Atlantic Express performs as part of Festival of Flight activities.



# The Glenn Curtiss Memorial

## A Fitting Tribute

By Captain Maury Cagle, USNR

Capt. Cagle is a member of the 75th Anniversary of Naval Aviation Staff collocated with NANews.

The crowds, dignitaries, bands and aircraft which made up the Festival of Flight are all pleasant memories. Hammondsport, N.Y., has returned to the relaxed tempo of life which its residents cherish, and which served as a springboard for the genius of Glenn H. Curtiss. But the long weekend of events in late June on the shores of Keuka Lake produced a unique memorial that will remind visitors of the accomplishments of both Curtiss and Naval Aviation for many years to come.

Near the point where the Navy's first aircraft, the A-1, lifted from the waters of Keuka Lake for its maiden flight, sits a model of the Curtiss biplane — made entirely of metal. The model rests atop a stainless steel pylon sunk deep into the lake's bed and mounted on ball bearings so that it turns with the wind.

It takes a minute or so for a visitor to fully appreciate the scope and detail of the model. Made to exact half-scale, the model stretches 18 and one-half feet between tips of the outrigger ailerons and is 13 feet, five inches long. While its very size is impressive, what makes the biggest impact on a spectator is the level of detail.

As the A-1 turns slowly in the wind, the viewer becomes aware of every wire, turnbuckle and brace. Each cylinder on the V-8 engine is topped with a rocker arm. The wings show the outline of each rib. The effect is metal work brought to fine art proportions.

The wings of the model are made from one-inch-thick billets of solid aluminum, hand-formed to duplicate the ribs of the original fabric-covered wood. The control wheel was milled from a solid block of metal, and turns on its column. Every

wire on the original A-1 is replicated on the model. Each part has been anodized, or coated with a protective film to provide years of care-free maintenance, and matched to the original colors. The model weighs some 1,300 pounds, about the same as the original A-1.

The model is the brainchild of Joe Meade, president of Mercury Aviation and a lifelong Hammondsport resident. Several people from the firm worked on the model for a total of over 7,500 hours. Carl Kohl built the engine. Dave Dowdle made the full set of working drawings, which have been donated to the Naval Aviation Museum, NAS Pensacola, Fla. Many volunteers — some of them retired employees — donated their time, including Harry Salzman, Bud Keeler, Dan Wright and Joe Barody. A student at a local vocational high school made a mold and cast the propeller.

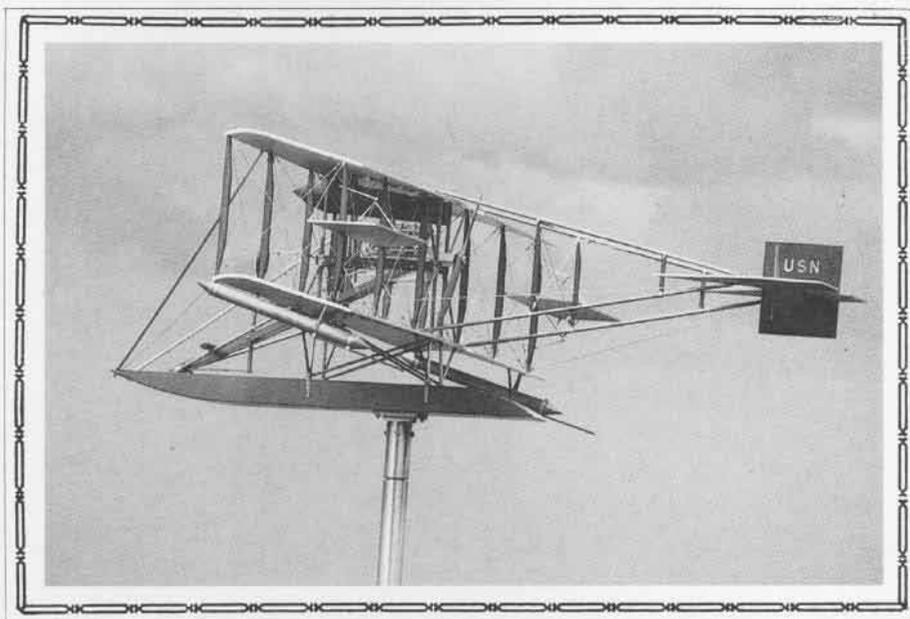
The model sits on a shaft of four and one-half inch stainless steel pipe, to

which vanes are attached for stability, driven 50 feet into the bed of Keuka Lake. Mounting the model on its ball-bearing race, some 12 feet above the lake's surface, proved to be a tricky and exacting job.

Taking into account the strong winds that howl across Keuka Lake in the winter, the model builders did some theoretical computations to make sure that the model would not become airborne. In a 75-mph wind, the replica will generate an estimated 500 pounds of lift. This means, as Joe Meade pointed out in his remarks at the dedication ceremony, that the model has a takeoff speed of somewhere in excess of 200 mph.

There is a land portion of the memorial which features a concrete plaza, obelisk and flag pole. The local chapter of the OX-5 Club of America aviation pioneers plans to finish the structure with marble and four bronze tablets denoting eras in the life of Curtiss.

The 75th Anniversary of Naval Aviation celebration will soon be over. It has been marked by air shows, speeches, many fine articles in magazines, several books, a Bob Hope TV special, a documentary film, special exhibits in museums, and a host of bumper stickers, mugs, lapel pins and other memorabilia. But there will be no more lasting tribute to the birth of Naval Aviation in 1911 — and the genius of Glenn Curtiss — than the A-1 model, seemingly in flight over Keuka Lake. It is also a perpetual tribute to the dedication and pride of the people of Hammondsport, N.Y. ■



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# Future of Naval Aviation?

How would you envision U.S. Naval Aviation by 2011, the year of its 100th anniversary? Naval Aviation News posed this question in its May-June 1986 issue to a variety of people who have contributed much to the community's growth and vitality. The following letter is another opinion concerning this development.

Secretary of the Navy John F. Lehman



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**W**hile prognostication would be better left to the seers and soothsayers, some future trends in Naval Aviation can be projected confidently in light of programs under way and emergent technology.

For instance, in the 21st century our ability to operate all-weather, day and night, will be nearly total. Targeting and navigation will be simplified and much more accurate through the use of satellite navigation and terrain mapping. The new generation of tilt-rotors will enhance carrier support with the potential for replacing the S-3, EA-3, E-2, SH-3, KA-6 and CH-46 with one type of aircraft. Similarly, the unducted turbofan engine will provide land-based aircraft, such as the P-3, with major benefits in range and endurance. Lighter-than-air ships, matched with an *Aegis*-equivalent radar, could fill out the early warning air defense picture.

There is no reason C<sup>3</sup>I [command-control communications and intelligence] cannot approach its ultimate promise of integrated real-time presentation of the same data to the command authority and the mission aviator. The linking of all intelligence sources, and those of our allies, will not be easy, but the problems are more bureaucratic than technical.

Remotely piloted vehicles (RPVs) will significantly increase the survivability and the efficiency of our tactical aircraft. RPVs, operating over the target areas, monitoring the daily operation of the enemy day and night with IR sensors, can familiarize pilots intimately with threat areas prior to launch. During strikes, the "fog of war" will be significantly reduced by real-time coverage of the battle area. Such RVPs also will enhance the use of standoff weapons.

Simulators will, of course, continue to improve and the

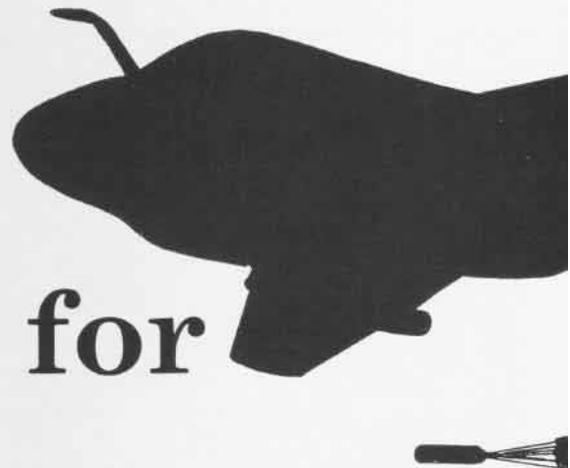
availability of digitized maps of the earth will allow realistic practice missions to every potential target. Software, by 2011, should be close enough to the real world to not only allow realistic training, but tactics development as well. It can also provide us with a partial solution to an old problem of naval TacAir. We are always tasked on short notice to target areas for which we cannot prepare or practice. Attack simulators on the carrier allow aircrews to practice various approaches to the strike while the ship steams to the launch point.

A few things, however, will remain the same. Just as there will always be a need in warfare for the combatant on the ground, there will always be a requirement for penetrating and, at least for a time, controlling enemy air space.

Warfare has not changed much over the years. We must be able to carry out amphibious landings, and a nearby source of air support will be critical to success. The requirement to support troops on the ground will persist as will the need to prosecute submarines with air, surface and subsurface assets. This will require aircraft carriers on scene. Land-based air can augment at-sea forces, when geographic and political constraints allow, but the carrier battle groups (probably the same number as we've programmed for the 1990s — 15) will still be the most flexible response to contingencies outside the U.S. boundaries.

Finally, the man-in-the-loop will continue to be as important as he was 75 years ago. For each advance in technology, our foes will have a counter technology. Our edge will be the well-trained adaptable operator in the cockpit supported by a competent and motivated sailor. The man has always made the critical difference. ■

# CAPTOR, Quickstrike and Advanced Sea



## Modern Mines for

By JO2 Timothy J. Christmann

**I**t was the first day of WW III. The Soviet Oscar-class attack submarine lumbered through Davis Strait en route to the Atlantic Ocean to hunt American ships and submarines. Although the war was only eight hours old, the 146-foot, 14,000-ton cruise missile submarine had been busy. It sank the 1,100-ton Danish frigate Olfert Fisher in Melville Bay, crippled the 4,200-ton Canadian frigate Halifax near Lancaster Sound, and managed to survive a depth charge attack from a Canadian CP-140 Aurora patrol plane off Baffin Island.

Now all was calm.

On the bridge, the submarine skipper leaned back in his chair and took a swallow of coffee. Another 10 miles and the Oscar would exit the dangerously narrow strait and enter the deeper, wider Labrador Sea. He couldn't wait. A chokepoint like Davis Strait was no place for a submarine in war — particularly so close to the United States, an enemy with formidable antisubmarine warfare capability. However, the skipper knew the U.S. Navy was busy fighting flotillas of Soviet warships worldwide. He figured one sub in Davis Strait was the least of their problems.

He figured wrong.

Responding to information provided by the Canadian Navy earlier that day, four P-3C Orions from Patrol Squadron (VP) Eight flying out of Keflavik, Iceland, dropped a number of MK 60 encapsulated TORpedo (CAPTOR) mines in patterns along the strait's 700-mile-wide mouth and departed.

The 1,980-pound, 12-foot, cylindrical-shaped weapons, each attached by

*cable to a flat, round anchor, fell hundreds of feet to the bottom. Once settled, one of the mine's passive hydrophone mechanisms detected the Oscar swimming some 1,200 feet below the surface. The mechanism, which is programmed to locate the acoustic energy reflected off a variety of enemy submarines, immediately prepared for battle.*

*In a matter of seconds, the detection device relayed information pertaining to the submarine's position and bearing into the guidance seeker of the mine's MK 46 encapsulated torpedo. Once the necessary data was received, the lid of the mine popped open and the torpedo leaped toward Oscar at 40 knots.*

*Sonar operators aboard the Soviet submarine heard the sound of the torpedo's advance, but by then it was too late. The MK 46 darted through the cold, dark depths and punched a gaping hole in the submarine's belly. Torrents of water inundated reactor spaces, swallowing crewmen, collapsing bulkheads, bending pipes and short-circuiting wires. The Oscar quickly flooded and sank to the bottom.*

**A** year ago, Senator Sam Nunn (D-Ga.), of the Senate Armed Services Committee, asked Admiral James D. Watkins, then Chief of Naval Operations, what he thought would be the Navy's toughest challenge in the future.

"[Our] biggest challenge will be under the seas," Adm. Watkins replied. "In the past 10 years, the Soviets have made

truly impressive strides in the quality of their submarine force. First their submarines are becoming quieter. Second, they have an impressive array of weapons with vastly increased standoff ranges [i.e., cruise missiles]. [And] finally their submarines are becoming more survivable [i.e., hulls made with titanium]."

But, for most of the last 10 years, while Soviet submarines were being improved, one of the best U.S. weapons to counter them — the sea mine — was largely ignored.

"Within the Department of Defense, and certainly within the Department of the Navy, it has been recognized that mine warfare has been the most neglected warfare area," said Captain Charlie L. Bonham, head of the Mine Warfare Branch in the Office of the Chief of Naval Operations. "Mines and mine countermeasures equipment have been given less priority than more exotic weapons like missiles."

In 1981, the Government Accounting Office, an investigative arm of the U.S. Congress, published a report stating "the Navy's ability to perform offensive mining missions is limited in several areas and is inadequate in light of the potential threat [i.e., new Soviet submarines]."

Today the situation isn't so grim.

Although a preponderance of the Navy's current mine inventory is still comprised of 1950 and 1960 vintage weapons, two sophisticated aerial-laid mines have joined the stockpile over the past several years. These are CAPTORs, considered the free world's most advanced deep-water (below 1,200 feet) mine; and Quickstrike series shallow-water (up to 600 feet) weapons.

An A-6E Intruder releases a MK 60 enCAPsulated TORpedo (CAPTOR), considered the free world's most sophisticated deep-water mine.

# an Aging Stockpile



*Quickstrikes* are MK 82, 83 and 84 standard aircraft-laid bombs that have been equipped with target detection devices (TDDs) which enable them to hunt ships and submarines. A fourth *Quickstrike*, specially designed to carry a 1,350-pound warhead (the biggest in the Navy's mine inventory), is being produced.

Like their aerial-laid, shallow-water MK 50 series predecessors, CAPTORs and *Quickstrikes* can be dropped by most aircraft that can carry bombs. Prominent aerial mine-laying platforms include the A-6E *Intruder*, A-7E *Corsair II*, S-3A/B *Viking*, P-3C *Orion* and the U.S. Air Force B-52D *Stratofortress*. Other potential Navy mine layers are the F/A-18 *Hornet* and C-130 *Hercules*.

In order to be released from these planes, MK 50s, CAPTORs and *Quickstrikes* are rigged with parachutes, tail fins and nose fairings to reduce impact against the water, and to provide stability and lessen drag in flight. Once submerged, they can typically remain active for a year before the batteries of their TDDs wear out.

## Advanced Sea Mine

In addition to CAPTOR and *Quickstrike*, the U.S. Navy and Great Britain are collaborating on a medium-depth (over 600 feet) weapon called the Advanced Sea Mine which may be delivered by the mid-1990s.

For many years, the U.S. Navy has had several false starts trying to develop a medium-depth mine, which its inventory currently lacks. It didn't want to construct

another bottom mine (like *Quickstrike*) because such an immobile weapon is limited to the damage radius of its own explosive energy, typically within 100 feet.

"We want something with a propelled warhead and a fairly large radius, like CAPTOR [whose classified range is significant]," said Dr. Raymond Widmayer, technical advisor for mine warfare in the Office of the Chief of Naval Operations. "The Brits have a similar requirement for this type of medium-depth mine...and they have two valid candidates. [In fact] they have selected two contractors to conduct a parallel advanced development of these mines and will eventually select one [which will

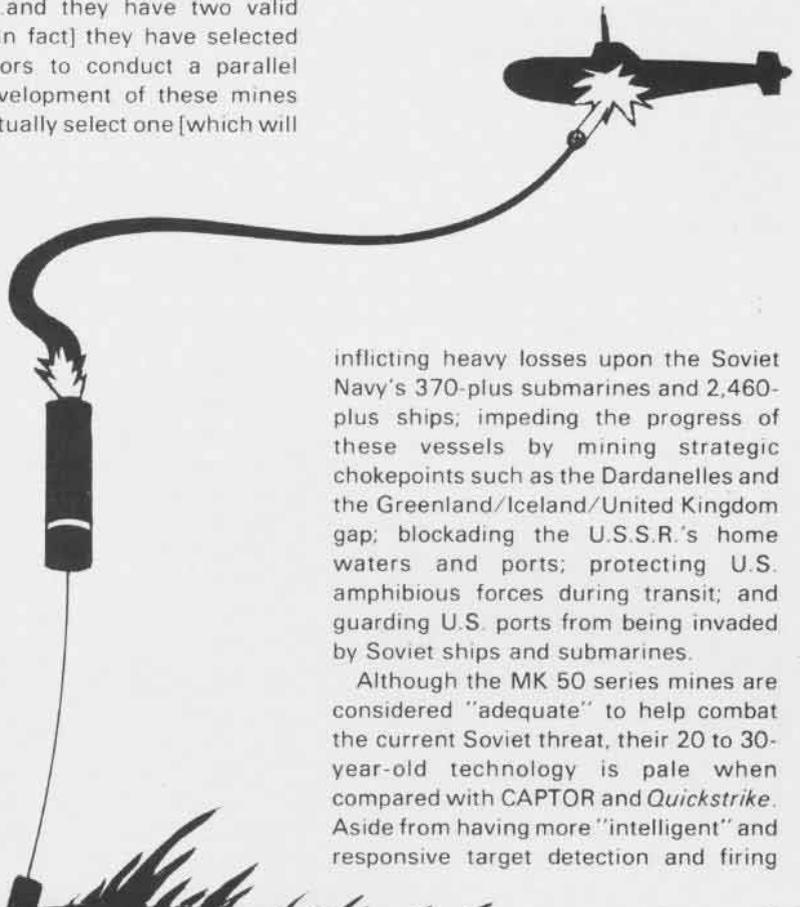
be called the Advanced Sea Mine] for full scale development. The U.S. Navy is [involved with] this program."

CAPTOR, *Quickstrike* and the Advanced Sea Mine will replace the aging MK 50 series mines over the next 25 years and will provide tremendous leverage if the U.S. and the Soviet Union went to war in the 21st century.

The variety of crucial tasks these mines would be responsible for include:

inflicting heavy losses upon the Soviet Navy's 370-plus submarines and 2,460-plus ships; impeding the progress of these vessels by mining strategic chokepoints such as the Dardanelles and the Greenland/Iceland/United Kingdom gap; blockading the U.S.S.R.'s home waters and ports; protecting U.S. amphibious forces during transit; and guarding U.S. ports from being invaded by Soviet ships and submarines.

Although the MK 50 series mines are considered "adequate" to help combat the current Soviet threat, their 20 to 30-year-old technology is pale when compared with CAPTOR and *Quickstrike*. Aside from having more "intelligent" and responsive target detection and firing



capability, the new mines are easier and safer to prepare and stow aboard aircraft. They (particularly the *Quickstrike* series) are also powerful enough to destroy large cruiser-plus-size Soviet submarines like the 14,000-ton *Oscar* and 25,000-ton *Typhoon*.

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## ***“The main reason for mines being in existence today is the submarine.”***

— Dr. Widmayer

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“The main reason for mines being in existence today is the submarine,” said Dr. Widmayer. “They are our main targets.”

CAPTOR, which has been in research and development since 1961, is strictly an underwater killer. It is unique because it not only has capability to detect a number of enemy submarines, but the capacity to launch a MK 46 torpedo that swims to a target as though it were fired from a submarine tube. Such technological superiority, however, doesn't come cheap. In fact, the Navy didn't plan to procure CAPTORs beyond FY 85 because the mine's price tag was too steep for the budget. But Congress deemed them essential and provided additional funding for 150 in FY 86.

Although mines aren't as inexpensive as they used to be, they are still considered a very cost-effective conventional weapon when compared to the destructive potential per dollar.

### **Mine Enhancements**

In order to keep pace with the quieter running Soviet submarines of the future, Dr. Widmayer said the target detection devices on CAPTOR and *Quickstrike* will be continually enhanced into the 21st century.

“Plus, we would like to give CAPTOR a bigger bang,” he said. “The MK 46 torpedo only has a 96-pound warhead...it is a very effective warhead, but [against] targets like *Typhoon* we would prefer it [was even more powerful].”

“The stronger a ship is, the more resistance it has to explosive damage,” said Widmayer. “That is why the newer Soviet submarines have titanium hulls. They are strong fortresses, and it takes a lot of energy to damage them.”

Unlike the primarily antisubmarine warfare CAPTOR, *Quickstrike* series

mines have the diversity and power to destroy everything from 60-ton patrol boats to 25,000-ton submarines and 45,000-ton aircraft carriers in rivers, canals, channels and harbors. They can be equipped with a combination of magnetic/seismic firing mechanisms that react to changes in the earth's magnetic field caused by the passing of the ship or submarine.

“Typically a mine [like *Quickstrike* or MK 50 series] is nothing but a can filled with explosives,” said Widmayer. “It has a TDD which is like a fuse to a bomb. The TDD essentially detects the presence of a target and tells the mine to go bang.”

When it goes bang, it generates a massive bubble of gas that separates the water and suspends the targeted ship or submarine from bow to stern. When the bubble breaks, the pressure of the water rushing back into the void snaps the hull.

“[The explosion] also causes a shock wave that hits [a vessel] like a wall,” said Widmayer.

As far as submarines are concerned, however, a mine doesn't have to crush its hull to be effective.

“A mine explosion develops a shock factor [by] displacing a submarine hull in a very short period of time,” said Widmayer. “Everything in the hull wants to stand still, but the hull is moving so there is a tendency to rupture pipes, move equipment around, bend shafts...and cause the submarine to make noise. [At that point] the effectiveness of the submarine is shot and it is as good as dead. This is what we call mission abort kill.”

According to Widmayer, U.S. mines are hard to detect, let alone sweep and destroy. Bottom mines like *Quickstrike* frequently bury themselves, and CAPTOR is so sophisticated it ignores minesweeping equipment.

But U.S.S.R. mines, particularly new deep-water weapons, would pose the same menace to American ships and submarines.

The difference between the two countries is that the Soviet Union reportedly has the largest mine stockpile in the world, numbering around 300,000.

“[The U.S. Navy] also has a considerable inventory, particularly when you include our allies, of older mines,” Admiral William Crowe, Chairman of the Joint Chiefs of Staff, told members of the Senate Armed Services Committee last year. “In all fairness, when we state that the Soviets have so many mines, we are talking about mines

dating back from WW I to today. We dread and fear that capability. When we have an obsolete mine, we tend to discount it as if it is not worthwhile. That is not totally true. Old mines will kill you. They are not as good as CAPTOR mines, and they are not as good as what we prefer, but we and our allies do have mines. The question is whether they will be in a condition to go, and whether we will be able to employ them the way we want.”

Admiral Wesley McDonald, who retired as Commander in Chief, U.S. Atlantic Fleet last year, said during the same committee hearing. “We [the Navy] have weaknesses in the number of mines

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## ***“[Mining] can provide tremendous leverage without...killing someone.”***

— Dr. Widmayer

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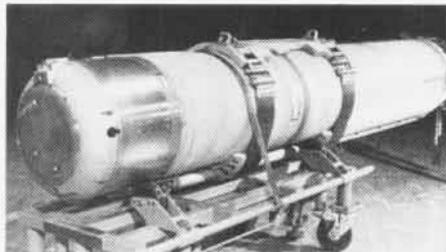
Although round, horned WW I-vintage mines are considered obsolete, many still populate the underwater ordnance stockpiles of the U.S. and U.S.S.R.

that we think we should have. But nevertheless...I think we can impede Soviet actions in certain areas of the world."

He added that the Soviets' ability to mine the NATO area is "very significant," and that in a war it would be a "real challenge" to get reinforcements to Europe before the Soviets mine harbors in the North Sea.

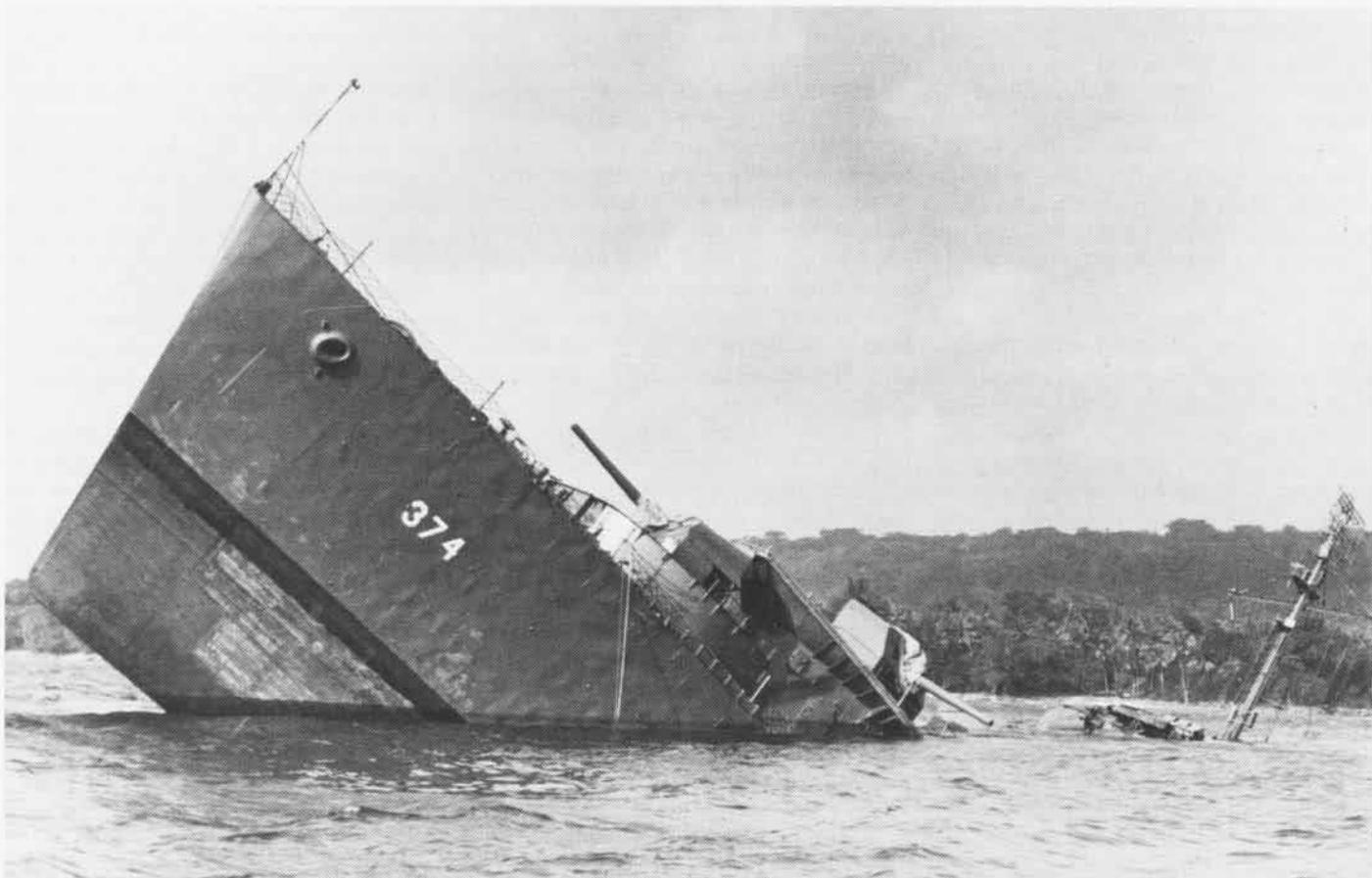
The Soviet Union and the United States are the only two countries in the world with the capability of conducting massive mining operations with aircraft, ships and submarines. Although the Soviets have more ships and submarines\* to lay mines, the United States is favored in the aerial-mine laying role. Aircraft carrier and land-based Navy and Marine Corps squadrons could seed strategic areas with mines quickly and in large quantity. Also the U.S. Air Force B-52Ds, perhaps the world's largest mine-laying aircraft, would prove indispensable in such operations.

Mine-laying platforms aside, the Soviet Union's geography would put the country at a severe disadvantage in a mine-laying war with the United States. Three of its four fleets must transit narrow waterways like the La Perouse Strait in order to reach large bodies of



Above, a C-130 Hercules demonstrates its ability to drop mines. Left, a deep-water CAPTOR. Bottom, the USS Tucker (DD-374) suffered the same fate as hundreds of other vessels during WW II that collided with mines. The Tucker was sunk August 5, 1942, near Espiritu Santo.

\*Theoretically, any submarine can drop mines by way of its torpedo tubes. Also, submarines are considered the best platform for laying mines surreptitiously.



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## The enemy doesn't have to hit CAPTOR. It hits the enemy.

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water. If U.S. or allied mine-laying forces seeded those waterways at the outbreak of hostilities, much of the Red Navy would be immobilized.

Yet a country doesn't have to be a superpower like the United States and the Soviet Union to benefit from mine warfare. Thirty-six years ago, North Korea used sampans and junks to seal Wonson Harbor with more than 3,000 mines to prevent an armada of 250 U.S. Navy ships from landing. The invasion was delayed eight days until Navy minesweepers (two of which were sunk) cleared the harbor.

The use of sea mines dates back to the Revolutionary War when inventor David Bushnell tried to sink British ships with

wooden kegs filled with explosives. And, according to Admiral Charles F. Horne III, former Commander of the Mine Warfare Command, in Charleston, S.C., "...since the Civil War, naval mines have been responsible for the sinking or damage of more ships than any other single weapon system."

One of the first and most notable aerial-mining campaigns occurred during WW II when U.S. Army Air Force B-29 bombers saturated Japanese waters with some 12,000 mines resulting in 515 ships sunk, 560 damaged. One of the last significant aerial campaigns occurred in 1972 when Navy and Marine Corps A-7E *Corsair IIs* and A-6E *Intruders* dropped 11,000 mines at Haiphong and many other North Vietnam ports (see sidebar).

"Mining is a very effective force multiplier," said Widmayer. "A relatively low amount of money can provide tremendous leverage without actually going in and killing someone."

In fact, the economic effects of a mining alone could prompt the settlement of an international dispute that otherwise may go on indefinitely

(i.e., the mining of North Vietnam).

Also, there is a psychological aspect to mine warfare which isn't inherent in any other weapon.

"[For instance] if you dropped cement blocks into someone's harbor and told him you mined his harbor, he is going to go out and look for those mines," said Widmayer.

In 1980, for instance, an anonymous caller told a radio station in Sacramento, Calif., that the city's channel had been mined. Some maritime insurance companies immediately informed ship owners that their policies would not be honored if they navigated the channel. For the next 24 hours, Navy minesweepers combed the mineless waterway and reasoned the threat was a hoax. Insurance companies reissued their policies and, shipping on the channel returned to normal.

Contrary to cartoon depictions, modern mines aren't black balls with horns. Although some of these round, obsolete WW I weapons still exist in the mine inventories around the world (including the U.S. and U.S.S.R.), today's underwater ordnance is cylindrical,

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# Mining Haiphong Harbor

By JO2 Timothy J. Christmann

**E**arly in May 1972, President Richard M. Nixon summoned Admiral Thomas H. Moorer, then Chairman of the Joint Chiefs of Staff, to the White House. The United States faced a serious dilemma in Southeast Asia, and Nixon knew U.S. naval air power would help solve it.

At the time the President called his top military advisor, 13 North Vietnamese divisions buttressed by hundreds of Soviet-built tanks and artillery pieces, had rolled to within 60 miles of Saigon the capital of South Vietnam. The offensive, which began four weeks earlier, had been launched to discredit Nixon's Vietnamization Plan\* and gain an advantage in the ongoing peace negotiations between the United States and North Vietnam.

Nixon told North Vietnam to withdraw its troops, but it refused. He responded by ordering an increase in air bombings as well as naval shore bombardments to assist the Army of South Vietnam in its struggle. The additional bombing and shelling,

however, proved indecisive.

A more drastic measure was necessary — one that would, among other things: stop the North Vietnamese forces, not provoke direct military involvement by the Soviet Union and China (as feared), be acceptable to antiwar demonstrators in the United States, end the war on honorable terms for the United States, and help release 591 American prisoners of war.

President Nixon had options that would satisfy at least one of each of these goals including: a nuclear attack, an amphibious assault in the southern part of North Vietnam, massive bombing to the invader's homeland, namely Hanoi and Haiphong\*\*, a naval blockade, the reinsertion of thousands of troops that the President had evacuated over the preceding two years, or mining a number of harbors along the enemy's coast, specifically Haiphong.

All of these options had advantages and disadvantages, but mining North

Vietnamese harbors seemed to be the best strategy. Unlike nuclear and conventional bombs (which destroy people and material), a naval blockade (which ultimately involves meeting naval and merchant ships), and an amphibious assault (which must meet opposing forces to be effective), mines are harmless if left unchallenged. They are passive weapons which produce a blockade that helps to end a dispute without actual combat.

Haiphong was the chief target because since 1964 when the United States got embroiled in the Vietnam conflict, this bustling seaport had been allowed to import 80 percent of its supplies — mainly from the Soviet Union and China — to support its economy and military.

"We let Chinese trawlers loaded with supplies steam right through the American fleet and deliver them to the Viet Cong," said Adm. Moorer, now a senior associate of Georgetown University's Center for Strategic and International Studies in Washington,

typically 10 feet long and 21 inches in diameter.

"The old round mines are still effective," said Widmayer. "The only problem is that you have to hit them to make them explode. So, consequently, you need a lot of them."

That is why one CAPTOR is as good as 100 older mines. The enemy doesn't have to hit it. It hits the enemy.

In addition to developing and producing CAPTOR, *Quickstrike* and the Advanced Sea Mine, the Navy plans to build 31 new minesweepers to replace 17 older vessels, and procure 44 MH-53E minesweeping helicopters by the 21st century.

Although it will still be far behind the Soviet Navy in the quantity of mines and mine-laying platforms, Capt. Charlie Bonham believes the U.S. Navy will have a qualitative edge by the year 2000.

"If today I had a choice of having the Soviets' or U.S. Navy's mine warfare capability, I'd take the Soviets'," he said. "But tomorrow the U.S. will have the mine capability that I'd prefer. We're building good systems and our future looks bright." ■



The A-6E Intruder, pictured here dropping parachute-rigged MK 50 series mines, is one of the prominent deliverers of undersea ordnance. Other chief mine-laying aerial platforms include the A-7E Corsair, S-3A/B Viking, P-3C Orion and the U.S. Air Force B-52D Stratofortress. Potential minelayers are the F/A-18 Hornet and C-130 Hercules.

D.C.. "It was just crazy. I think both the Johnson and Nixon administrations were about eight years late [in mining Haiphong]. I first recommended mining Haiphong in 1964 when I was Commander in Chief of the Pacific Fleet. Matter of fact, I went to Washington to try and get action in this regard because it was clear that the North Vietnamese were getting a majority of their supplies by sea."

These supplies included arms (everything from rifles to surface-to-air missiles), ammunition, oil, trucks, generators, steel and cement. Moorer, as well as other proponents for mining North Vietnam, thought such a tactic was the simplest and most effective one the U.S. could have conducted.

Adm. Moorer, who was schooled in the strategic and tactical use of mines as a lieutenant commander in WW II, said there were many reasons, most of them political, that prevented naval aircraft from mining the enemy's coast.

Nevertheless, in May 1972, after consulting with Moorer in the White House, Nixon decided North Vietnamese ports had to be mined.

On May 9, three A-6A Intruders and six A-7E Corsairs II from USS Coral Sea (CV-43) dropped 36 MK 52-2

mines in Haiphong Harbor. The mission took one hour.

During the following eight months, Navy and Marine Corps aircrews dropped more than 11,000 MK 36 type destructor and 108 special MK 52-2 mines in a number of North Vietnamese

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*"...failure to mine Haiphong immediately was the difference between winning and losing in Vietnam."*

— Adm. Thomas Moorer

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ports, including Haiphong, Hon Gai, Cam Pha, Vinh, Thanh Hoa, Quang Khe and Cam Pha.

"After we did that, not one ship entered or left the [ports] until the U.S. Navy went in and took the mines out almost a year later," said Adm. Moorer.

Although mining can't take all the credit for the eventual peace arrangements (massive Air Force, Navy and Marine Corps bombardment certainly helped urge the North Vietnamese to the bargaining table), it

did play a crucial role. The mine blockade reduced the enemy's sea supplies by more than one million tons. It also curtailed the North Vietnamese invasion and prompted the release of American POWs.

"The mine is not a spectacular weapon, but it is most effective," said Adm. Moorer, who served as Chief of Naval Operations from 1967 to 1970 and Chairman of the Joint Chiefs of Staff from 1970 to 1974. "Just think what the United States could have saved if we would have mined Haiphong Harbor eight years sooner.

"Had the North Vietnamese been deprived of their [main sea] supply line there would have been a different outcome to the war," he added. "In my opinion, the failure to mine Haiphong immediately was the difference between winning and losing in Vietnam." ■

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\*The Vietnamization Plan was designed to train and equip the Army of South Vietnam to fight North Vietnam and bring American troops home.

\*\*U.S. Navy, Marine Corps and Air Force planes helped accelerate the negotiation process between America and North Vietnam by heavily bombing targets like Hanoi and Haiphong throughout 1972.

# H-34

By Hal Andrews

In 1950, the role of antisubmarine warfare (ASW) helicopters in the Navy was well enough defined so that the first designed for that purpose was ordered, the Bell HSL-1 (see *NAViews*, September 1980). With its large, complex design, the Navy's Bureau of Aeronautics subsequently looked at potential alternatives, ordering prototypes of a Sikorsky-proposed design for an ASW helicopter in June 1952. To be powered by a 1,525-horsepower Wright Cyclone engine, it would have twice the payload of the Sikorsky S-55/HO4S helicopters then being used for ASW, thus overcoming one of their major limitations.

The fact that this design became Sikorsky's largest production model proved the wisdom of Sikorsky's proposal and the Navy's decision to buy the design. It was used for many other purposes in addition to ASW. More than 1,800 were built at Sikorsky, as well as many others in England and France. The Navy/Marine Corps versions didn't always achieve the popular recognition of some other helicopters, perhaps because they were neither the biggest or fastest in their day.

In addition to their pioneering role in ASW where they achieved some recognition as part of Task Group Alpha after its formation in 1958, they were prominent as astronaut recovery helicopters for early Project *Mercury* flights, and later as mainstays of Marine operations during their first years in Southeast Asia combat. A small group of Army VH-34s and Marine HUS-1Zs served the President and the executive

office for VIP travel beginning in 1957. It is clear from the large number delivered to the Navy and Marines (nearly 1,000) that they were widely used in many everyday missions.

Based on experience with the S-55 series (HO4S/HRS/H-19) helicopters, Sikorsky incorporated their basic features in the new S-58 model. Along with the single main rotor and tail rotor configuration, these included the large cabin directly under the rotor and the pilots seated above and behind the forward-mounted engine. The traditional high-mounted tail boom was replaced by an extended fuselage with the tail rotor carried well up on a tall, swept-back vertical tail. The landing gear configuration reverted to that of Sikorsky's first production helicopter, the R-4, with two main mounts forward and a tail wheel — a pattern for subsequent single-rotor helicopters. For carrier stowage, the tail folded forward, the fuselage being hinged on the left side just behind the tail wheel. The four main rotor blades folded aft. The large cabin provided space for the sonar operators and their gear.

With its straight-forward design, the XHSS-1 program proceeded to flight stage in less than two years, and the first flight occurred on March 8, 1954. Production contracts for HSS-1s had already been placed, with orders following for a similar, non-ASW-equipped model, the HUS-1, to be used for Marine assault transport duties.

Initial HSS-1 fleet deliveries went to HS-3 in August 1955, and the "Hiss" (in preference to the official *Seabat*) replaced earlier HO4Ss in HS squadrons as rapidly as deliveries permitted.

HSS-1



XHSS-1



HSS-1F



UH-34J



Production from the start was split between the HSS for the Navy and the similar, non-ASW-equipped, cargo/troop-carrying H-34A for the Army, ordered prior to the Marines' HUS (officially the *Seahorse*), which joined them on the line later.

While the ability of the HSS-1 to conduct ASW dipping searches for extended periods represented a significant improvement in helicopter ASW effectiveness, their operation in this role was restricted to good visibility conditions — essentially day VFR. However, Sikorsky and the Navy had been working toward solutions of the night ASW problem. A combination of automatic stabilization equipment (ASE), Doppler radar and radar altimeter for approach and hover, and a cable angle sensor tie-in when the sonar was in the water during hover made it possible to perform the ASW dipping mission without being restricted to day VFR conditions. The approach and hover coupler system, along with a longer cable for the sonar, was installed in the HSS-1N, which replaced the HSS-1 in production and entered squadron service in 1958. While the new automatics had some growing pains, another step toward today's all-weather ASW capability had been taken. The ASE was also installed in the HUS-1s to give them day/night capability.

The remaining major step in helicopter effectiveness was the replacement of the piston engine with the gas turbine. Two HSS-1s were modified as flight test beds, incorporating a dual installation of the then-new, Navy-sponsored General Electric T58 turboshaft engine, flying initially in 1957. A new design was required to take full advantage of the new

power plant, however. With initiation of the S-61 (HSS-2/SH-3) design, the R-1820 continued to power all of Sikorsky's production S-58 models.

In addition to Army interest, commercial operators purchased civil S-58s, mostly for metropolitan airways use. Replacing the military sonar/cargo/troop cabin was a well-appointed, 12-passenger cabin. A great deal of foreign interest in the design also developed. In England, Westland was licensed to build the S-58, redesigning its production models from the start for turboshaft engines. In France, Sud-Aviation (subsequently part of Aerospatial) produced the piston-engine version, later also developing a turbine-powered model. Other countries were supplied from Sikorsky's production line.

Both the HSS and HUS saw wide Navy and Marine Corps service — 379 of the former and 548 of the latter were delivered before production was completed in 1968. By this time, the 1962 redesignations had placed all HSS/HUS models in the H-34 series, becoming SH-34G/H/Js and UH-34D/Es, respectively, with a handful of Coast Guard HUS-1Gs which were designated HH-34Fs.

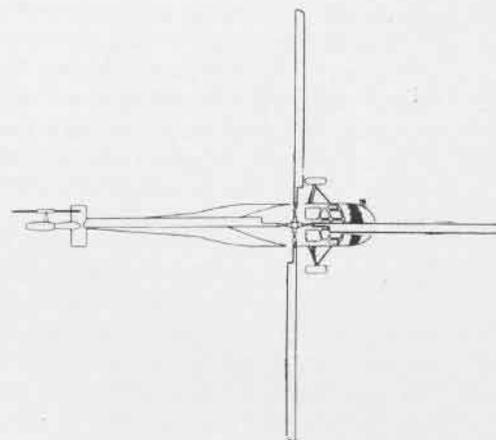
HUS/UH-34s were also used extensively for Navy utility missions, including service with VX-6 in Antarctica. As the SH-3Hs replaced the SH-34s, their ASW gear was removed and they became UH-34s as well. Many served out their years in the Training Command.

The various S-58 models have long been out of the Navy/Marine inventory. As they became surplus, a civilian twin T58 conversion was certified and S-58Ts can still be seen flying typical helicopter missions. ■

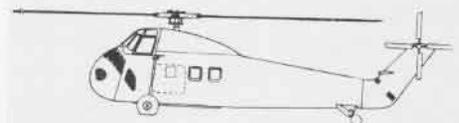


SH-34J

Length	65'7"
Height	15'8"
Rotor diameter	56'0"
Power plant	
One Wright R-1820-84B	1,525 hp
Maximum speed	126 kn
Combat range	225 nm
Service ceiling	16,200'
Armament: Two MK 24s or one MK 101 bombs.	



HUS-1



**A**lthough the recent movie *Top Gun* portrays a glamorous version of the Navy Fighter Weapons School (NFWS) at NAS Miramar, Calif., it hits the mark in emphasizing the school's importance and the high caliber of the naval aircrews who attend.

Squadron C.O.s recognize the quality of the school's syllabus and its instructors, and strive to send as many of their top aircrews to NFWS as possible. "Taking advantage of any Top Gun quota available to VF-31 was one of my highest priorities in achieving fighter readiness," explains Commander Rick Ludwig, former skipper of Fighter Squadron (VF) 31, NAS Oceana, Va. "I even went to our CAG during a major sea period, *Forrestal's* shakedown, and told him I wanted to send two of my top aircrews and two of my best jets to Top Gun. To complicate matters, our aircraft were undergoing a major modification at the same time and we had to give up a plane or two for that as well. However, the payback in readiness from sending a crew to Top Gun is too great to pass up."

Ludwig, a former Top Gun instructor and executive officer (February 1980 to October 1982), assumed command of NFWS in late summer. The veteran combat fighter pilot with 5,400-plus hours and 1,000-plus traps feels, "If you pick the right crews, if they understand what you expect after they complete the syllabus, and then if you make the right use of them, the return will be great."

He explains that in addition to undergoing outstanding training in fighter weapons and tactics, they will receive a wealth of knowledge from the absolute authority in fighter aviation and be trained to impart that knowledge to the rest of the squadron. Also, the highly professional demeanor of the Top Gun instructors rubs off on their students and the returning aircrews set the example for the rest of the squadron on the way business should be conducted. "You can see the rest of the guys try to emulate them," he says. "The Top Gun exposure is infectious."

"We try to put our Top Gun graduates in ops department billets where they can influence training. They'll give lectures and set the example in conducting the mission as well as in briefing and debriefing. We also use them to 'murderboard' others in the squadron who are expected to deliver training lectures." In the murderboard process,

# TOP GUN

## The Standard in Fighter Excellence

By Lieutenant Commander Bob Frantz, USNR-R



RIO Lt. Dave Baranek took this photo of himself looking out the canopy of an F-5 at a Top Gun adversary A-4 Skyhawk.

Lt. Dave Baranek

an instructor typically goes before three or four mini boards, usually consisting of a staff member who previously gave the lecture and training department representatives, prior to a presentation to the full staff.

Selecting the right crew to represent the squadron is critical and Cdr. Ludwig first explains who he *doesn't* want to send. "Top Gun should not be used as a remedial course in air combat maneuvering (ACM); so I'm not going to send a crew that needs an ACM tune-up. Also I refuse to use it as an incentive to keep a guy in the Navy."

"I'm looking for the guy with above-average aviation skills. But that doesn't necessarily mean he has to be the 'ace of the base' pilot or radar intercept officer (RIO). He's got to have career potential so we have an opportunity to get a return on

his training and he should have experience in the squadron, at least a cruise under his belt, so he's aware of the importance of the skills he's going to gain."

Ludwig continues, "He must possess the traits of a credible instructor and be capable of displaying self-confidence in front of a group. Obviously, he should have good speaking skills and be capable of presenting material logically and clearly. Top Gun will fine tune his teaching and learning skills."

Cdr. Ludwig was the top East Coast ACM pilot in 1984 based on achieving the top kill ratio against F-5 and A-4 adversaries in VF-43's fleet fighter air combat readiness program (FFARP) and his *Tomcatters* achieved the highest kill ratio, 10 to one, ever attained in FFARP.

He feels that instructor qualities are

more critical than ACM ability in his crew selection.

"What good is sending a crew if they can't pass on to the squadron what they've gained at Top Gun?" he says. "Start with an above-average aviator, let him do enough ACM and he's going to get good at it. Eventually he'll see all the moves. However, it's a lot harder to train somebody to be a good teacher if he doesn't have instructor qualities.

"Another contribution Top Gun makes is its quarterly publication, the *Top Gun Journal*," Ludwig says. "The school is constantly devising and refining tactics to meet new threats and this publication is a good way of disseminating tactical information. We make sure everybody reads it."

Skipper Ludwig feels being a Top Gun graduate can have a positive effect on an aviator's career. It earns him squadron respect and identifies him as an above-average aviator. Most importantly, it puts him in the running as a candidate for Top Gun staff instructor when rolling to shore duty.

The *Red Rippers* of Fighter Squadron 11, based at NAS Oceana, Va., and their C.O., Commander Mike Robinson, share Rick Ludwig's enthusiasm for using Top Gun to enhance fighter readiness. Robinson calls Top Gun "the best training a crew could receive. If I could, I'd send everybody!...The professionalism and enthusiasm of Top Gun is contagious."

When possible, Robinson sends his aircrews to NFWS with VF-31's. He explains, "Although both squadrons strive to maintain squadron section integrity as much as possible, the demands of fleet air defense make it beneficial to do a great deal of integrated operations on the ship. Going out together also provides economies for our maintenance departments because we can share the maintenance duties. We can maintain four airplanes with not many more people or much more effort than it takes to maintain two."

Robinson emphasizes that the best jets and sharpest mechanics are sent to NFWS. It's imperative that the aircraft perform well and all systems are up.

Prior to reporting to VF-11, the experienced fighter RIO served as readiness officer on the staff of Commander, Fighter Wing One. He comments, "In that job, I became intimately familiar with the wealth of training opportunities available to a squadron C.O. to help him develop

combat readiness. I never had to drum up business for Top Gun. The Top Gun image and reputation of being the standard in fighter excellence is such that I personally never met a skipper who didn't want to send people to Top Gun."

During VF-11's last Oceana period prior to moving aboard *Forrestal* for deployment, the squadron's Top Gun-trained crews helped orchestrate a week-long training exercise designed to counter a current threat. The *Red Ripper* C.O. elaborated, "Helped by the knowledge and motivation developed at Top Gun, and assisted by VF-43 adversaries who simulated the threat, our guys developed tactics and conducted training on how to counter the ever more prevalent forward-quarter BVR [beyond visual range] missile threat. Once the after-action report of what was learned is generated and sent to fleet squadrons and Top Gun, hopefully, the entire fighter community will benefit."

Commander Dan Shewell, Top Gun's C.O. before Ludwig, traces NFWS's reason for being to lessons learned during the initial stages of the Vietnam War. "Historically, the U.S. had enjoyed an air-to-air combat kill ratio of 10:1. This was not the case in Southeast Asia from 1965 to 1968 when the approximate U.S. Navy kill ratio in Vietnam fell to a low 2.5:1. As a result of a Naval Air Systems Command study, VF-121, then the West Coast F-4 replacement air group squadron, was tasked with training the entire Navy and Marine Corps fighter community in ACM tactics. The plan was to provide graduate-level training in fighter tactics to one or two aircrews from each squadron who would in turn train their parent command. It proved to be a very successful method for training combat aircrews, directly contributing to the impressive 13:1 air-to-air kill ratio by 1972." The nickname "Top Gun" was applied to this program and the first class began on March 3, 1969. The Navy Fighter Weapons School was commissioned as a separate command in July 1972.

Shewell, known at Miramar by his call sign "Dirty," was in the initial F-14 cadre and the first F-14 pilot to win a Battle E efficiency award in air-to-air gunnery. His previous command, the Fighting *Renegades* of VF-24, won the 1985 Commander Fighter Airborne Early Warning Wing, U.S. Pacific Fleet fighter derby. Dirty is a graduate of the third Top Gun class (3-69). He says that the school has matured a great deal since its early

days with great emphasis now being placed on tactical development for fighter employment in the power projection role and maritime air superiority.

In October 1985, NFWS underwent an organizational change and now reports directly to the Chief of Naval Operations. Top Gun's mission has also changed considerably. In effect, all the services that Top Gun has provided on an ad hoc basis over the years are now CNO-mandated functions of the school. This move will mean greater training to Navy and Marine Corps fighter aircrews. There are plans to increase the current staff of 22 flight crew billets — consisting of 14 Navy pilots, three Marine pilots, one USAF exchange pilot, and three Navy and one USMC RIO — with five Navy and one Marine pilot. An E-2 naval flight officer and one Marine air intercept controller will also be added to further enhance the air controller course.

Top Gun presently offers five formal instructional courses: a postgraduate power projection Top Gun class, an adversary instructor course, an air intercept controller training course, fleet air superiority training (FAST) and overland air superiority training (OAST). In FY 87, NFWS plans call for five traditional Top Gun classes made up of 10 to 12 fighter aircrews, four adversary pilots, and four to six air intercept controllers. The remaining seats will be filled with as many ground school students as possible.

The five-week course consists of about 75 hours of academic instruction, including aircraft maneuvering fundamentals, weapons, and threat and fighter tactics. Between lectures, the student aircrews fly 31 sorties and have the opportunity to pit their F-14s, F/A-18s, and F-4s against Top Gun F-5 and A-4 adversary aircraft. The F-5 and A-4 were chosen because their size and performance closely simulate the early generation threat. In April 1987, Top Gun will receive F-16s which will provide an excellent new-generation threat simulator desperately needed to provide realistic aircrew training for today's threat.

Running concurrently and overlaid with the power projection course are the adversary instructor and the air intercept controller courses. The duration of the adversary course is three weeks. The objective is to improve fleet readiness, provide standardization and define roles of the adversary instructor in order to train adversary pilots who can truly



Classmates descend the stairs in the Top Gun hangar at NAS Miramar. On the wall are silhouettes of aircraft which have made MiG kills, mostly Vietnam-era, including the date and crew members' names. The 1981 shoot-down of two Soviet-built SU-22s by two VF-41 Tomcats is also depicted.

replicate the current threat aircraft and threat tactics. During the three weeks, the adversary pilots receive 27 lectures and fly with the Top Gun class under the auspices of a Top Gun instructor.

The air intercept controller course runs a full five weeks. It includes Navy and Marine Corps officers, and ground-based, shipboard and E-2 airborne enlisted controllers.

In addition to lectures, they are provided realistic aircraft training. Also integral to the syllabus at Top Gun is the maritime air superiority (MAS) training course called FAST. The FAST team provides 10 to 12 presentations per year to both East and West Coast communities.

Shewell explains, "Our FAST course focuses on MAS and how fighters can be best employed to counter the CV battle group threat. It is a one-week lecture and simulator-based course structured for those people defending the battle group, the F-14, F/A-18, E-2 aircrews and carrier group participants. Extensive use of jamming is made and the culmination of the course is a multithreat battle problem in which the participants must counter this sophisticated threat."

A recent addition to Top Gun's offering is a one-week senior officer refresher course. Initially aimed at prospective air wing commanders, NFWS has included F-14, F/A-18, F-4 and E-2 Navy and Marine Corps prospective X.O./C.O.'s. The one-week, nonflying course is a consolidation and overview of the power projection and FAST courses.

Cdr. Shewell is particularly excited about the command's new overland air superiority training course. He calls it "an excellent opportunity to provide an air wing with tasking for fighter employment into integrated strike tactics." The course is designed to be conducted early in the

air wing's deployment to Fallon.

In addition to its quarterly *Top Gun Journal*, the command disseminates information through the publication of the *Top Gun Manual*, an overview of the power projection course; the *FAST Manual*, an overview of the MAS course; the *Adversary Instructor Handbook*, a cookbook for fleet adversaries; and the *Training Officer Handbook*, which Top Gun graduates use to help them develop and implement their parent command's turnaround training program.

Formal and informal collateral, ad hoc and ancillary assignments and opportunities for Top Gun are numerous. They include lectures and adversary services to Navy and Marine Corps squadrons on both coasts as well as detachments to deployed forces in Hawaii, Japan and the Philippines. They serve as the standardization authority for the East and West Coast fleet fighter air combat readiness programs and the new F/A-18 strike fighter air combat readiness program (SFARP).

Top Gun staff instructors serve on numerous aircraft, weapons systems and tactical advisory boards and maintain liaison and information exchange programs with Navy, Marine and Air Force units, including the Naval Strike Warfare Center, NAS Fallon, Nev.; Air Test and Evaluation Squadron Four, NAS Point Mugu, Calif.; and the Air Force Fighter Weapons Schools, Nellis AFB, Nev.

Top Gun also maintains one of the best tactical intelligence libraries in the Navy fighter community. It serves as a repository for the wealth of information researched, developed and collected by the Top Gun staff.

The demands of the fighter community and expansion of its training and tactics development programs place a heavy

burden on the staff. Top Gun's C.O., who without reservation admits to having "the best post-squadron command job in fighter aviation, bar none," comments on the caliber of his people.

"My staff consists of the most dedicated and professional people I have ever had the privilege to serve with. Yes, it is true they are handpicked and represent the finest aviators anywhere in the world today. In previous commands, it was not too difficult to break out the top three lieutenants but, here, it's impossible. They're all top performers. Thank God I don't have to rank lieutenants on their fitness reports.

"Burnout is what we have to guard against, Shewell says. "We hold 'staffexes' to evaluate other than normally scheduled events. If we didn't do that, some guys who would meet themselves coming and going."

Cdr. Shewell explains that it is not unusual to see an instructor preparing for a new lecture spending in excess of 100 hours of off-duty time, three to five months in advance, researching, reading, studying, rehearsing and visiting intel sources often not available to the fleet. He says Top Gun has earned the reputation of providing lectures second to none and ensuring that the most accurate, factual and useable information is professionally presented. Before the lecture is delivered to a class, it must successfully pass a murderboard.

NFWS is a dynamic organization not only because it responds to fleet needs, but because it responds to direct input from the students as well. Cdr. Shewell elaborates, "Every lecture is critiqued by each student. When a class graduates on a Friday morning, they're gone by 1030, but the staff usually remains to review the critiques until 1830. Based on these observations, lectures and hops are modified to improve our training objectives."

Captain Pat Moriarity, USMC, a RIO with 1,800 hours in the F-4, is preparing to give the lecture dealing with F-4 radar attacks, electronic countermeasures and electronic counter-countermeasures. He admits that for his first lecture, he is spending hundreds of hours preparing for his murderboard. "I'll be evaluated on subject knowledge; conformance to time constraints; ability to command the audience; appearance; physical presence; use of my voice and ability to generate enthusiasm; use of audio or visual aids and handout material; and on avoidance of cliches and distracting mannerisms. The interactive nature of

the critique, especially where the staff will debate various aspects among themselves, ensures that the class will receive a state-of-the-art presentation. This also serves as an excellent mechanism for keeping the entire staff current in the broad spectrum of subjects that the school teaches."

Moriarity, who misses F-4 flying, calls his assignment, "The best tactical desk job in the Navy because, although I enjoy F-5 flying and will learn a great deal about the ACM environment in it, it does not have a radar mission."

In a lecture entitled "Teaching and Learning," Lieutenant Greg Dishart, who has already acquired in excess of 2,500 tactical hours, explains why the presenter should have a "neuter" appearance. "We discourage wearing ribbons, 'Midway Magic'-type belt buckles and even watches. We don't wear ribbons because we don't want students spending time trying to decipher them and we don't want the amount of ribbons used as a gauge for instructor credibility. The presentation should be evaluated on the subject matter and the ability of the lecturer to explain or relate it."

A former Top Gun training officer, Commander Michael Bucchi, soon to be C.O. of VF-33, explains why murderboard sessions are tough and unforgiving. "In almost any discipline when a question is asked and the instructor doesn't have the answer, an acceptable response is to note the question, research it and get back to the person who posed it. At Top Gun, of course, if the lecturer flat out doesn't know the answer, he has to do the same thing, but it's not really acceptable. The Top Gun instructor is expected to be the absolute authority in his field."

Considering the caliber of the personnel and the effort applied, one is not surprised at the professionalism of the lectures. What is surprising, in a macho environment such as fighter aviation, is the artistic quality of the presentations. The creative use of graphics and music command attention and add interest to the lectures.

Pilots in the instructor under training (IUT) program must qualify in Top Gun's two aircraft as well as having their lectures certified by the murderboard. Lieutenant Mike Jones, from VF-31 with 1,600 hours, 1,250 in the F-14, and 300 traps, calls the IUT syllabus extremely rigorous. "I'm spending a couple of hundred hours preparing my low-altitude tactics lecture and at the same time

qualifying as an ACM instructor in the A-4.

"You have 20 hops in the first airplane, in my case the A-4, and about 15 in the second," he says. Each hop involves about five to six hours, including an extensive brief and debrief, and most involve flying the airplane to the edge of the envelope in ACM against a fully qualified instructor. Next you fly as the instructor's wingman in sorties against the class. After 25 to 30 of these hops in each aircraft and eight or nine months after the process begins, you're about ready to take on the load as a fully qualified staff instructor.

"The workload is formidable, but this is where I want to be," Jones continues. "When I came here as a student in September 1984, the staff did the job right and I wanted to emulate them. Now I have a chance to impact fighter readiness and grow as a fighter pilot. I have access to the resources and am at the focal point for development of fighter tactics."

Lieutenant Dave Baranek is within six months of completing his tour and although 12-hour-plus days are the norm for him, he has filed for a six-month extension. A RIO kept out of pilot training because of visual problems, Baranek explains that since his days as a high school Naval Junior Reserve Officer Training Corps student he has wanted to be a Navy fighter pilot and eventually a Top Gun instructor.

Baranek runs Top Gun's FAST program and teaches F-14 combat intercepts. He feels strongly that "Top Gun should not be regarded as just an ACM school, although dogfighting is really the fun part. The name of the game is fighter power projection and battle group defense."

Considering the amount of preparation for each lecture and the reputation the Top Gun library has earned as a repository for fighter information, it is not surprising that heavy demands are made on the air intelligence staff. Lieutenant Russ Novak, the command's air intelligence officer, explains, "The guys giving the lectures are recognized experts in each field and the NFWS Tactical Intelligence Library, as it's formally called, is the primary work space for preparing their presentations. In addition to filing the data alphabetically and by subject keywords, we have most of the audiovisual equipment they'll need."

Although Lieutenant Pete "Maverick" Mitchell, the star of the movie *Top Gun*, is probably exactly the type of person that a

squadron skipper doesn't send to NFWS, the Paramount portrayal has generated tremendous publicity for the command, the fighter community and the Navy in general. Hardly a day passes when Top Gun isn't visited by journalists or photographers. The local media in particular has been flooded by interviews and features on the command, its staff and other Miramar-based fighter crews. The officers club, always busy on Wednesday nights, has reached the point where the base public affairs office has set up an invitation procedure as much for crowd control as security.

Cdr. Shewell believes, "Although the movie has a lot of Hollywood in it, it is also the best flying I have ever seen in a motion picture. And it is a terrific recruiting vehicle at a time when pilot retention is not at an all-time high."

Spaces at Top Gun, immaculately maintained, reflect the pride of the command. Walls in the hangar passageway display plaques and photos from grateful graduates. One classroom exhibits a group photo of every class ever to graduate and on a wall in the C.O./X.O.'s outer office hangs a photo of every staff instructor ever to serve. A good deal of the expense for the upkeep and improvement of the spaces has been borne by the staff. They recently paid to carpet and panel the classroom and duty office. Cdr. Shewell feels strongly that additional space, including classroom and briefing rooms, is needed, particularly considering Top Gun's mission growth.

On Friday, May 30, 1986, Class 04-86 graduated. The commanding officers of VFs 74 and 103 flew from NAS Oceana to see their crews graduate. VF-74 presented Top Gun with a large framed photo of a Libyan *Flogger*. Appropriately, in the same shot is a clearly marked VF-74 *Tomcat* at the *Flogger's* six o'clock.

During the brief ceremony, the class viewed a professionally produced slide presentation set to music consisting of air-to-air and candid shots taken around the aircraft and Top Gun spaces. Contrary to the Paramount production, there is no Top Gun trophy for the top crew. The skipper congratulates each aviator and hands him the coveted Top Gun patch and his diploma.

The diploma, like Top Gun itself, is dignified and to the point. It simply cites the aviator's name and states, "...for successful completion of postgraduate study in fighter power projection, fighter tactics and weapons systems employment at Top Gun." ■

# The A-6F

## Advanced Medium-Attack Aircraft of the 1990s

By JO2 Timothy J. Christmann

The A-6F Intruder will look identical to the A-6E except for a few external changes that will feature two extra weapon stations for carrying air-to-air missiles.

**W**hen the A-6 *Intruder* turned 20 on February 10, 1983, 350 personnel assigned to Attack Squadron (VA) 42 at NAS Oceana, Va., held a birthday party and wished the venerable aircraft another 20 years.

Their wish will come true.

Grumman, creator of the combat-proven *Intruder*, is currently building what may be the last member of the A-6 family — the A-6F — at its plant in Calverton, N.Y. The upgraded *Intruder* is scheduled to replace the A-6E target recognition attack multisensor (TRAM) aircraft as the most advanced all-weather, medium-attack plane in the world, beginning in FY 90. The Navy plans to begin test flying the A-6F in mid-1987 and, since the aircraft will be evaluated at Naval Weapons Center, China Lake, Calif., a West Coast squadron will receive the first batch of new planes. About 120 A-6Fs will be delivered to the Navy and 30 to the Marine Corps by 1995. That year, the Navy hopes to produce the Advanced Tactical Aircraft (ATA).

Although little is known about the *Intruder's* successor, the ATA will reportedly perform the A-6F's medium-attack specialties as well as fleet air defense and electronic warfare — jobs currently handled by the F-14 *Tomcat* and EA-6B *Prowler*, respectively.

Until the ATA is available, however, the A-6F will more than meet the Navy's medium-attack needs, according to Commander Bruce Wood, A-6 Program Coordinator for the Deputy Chief of

Naval Operations (Air Warfare). He added that the new *Intruder* has enhancements that make it more survivable, maintainable and reliable than its predecessor. It also has the same engines and many of the same avionics used aboard the F/A-18 *Hornet* and F-14D *Tomcat*.

Most of the A-6F's modifications are internal. So, except for a few external changes, the A-6F looks identical to the A-6E. The most obvious change to the airframe is the addition of one weapon station on each wing. These stations, which will be used to carry air-to-air missiles like *Sidewinders* and advanced medium-range air-to-air missiles (AMRAAMs), have been added to





*Sidewinder* on any of the A-6E's five weapon stations (two on each wing and one on the belly) reduces the plane's maximum 18,000-pound payload.

"The good thing about the A-6F is that we won't have to give up a bomb

station to carry [at least two] air-to-air missiles," said Wood.

Just because the A-6F will be able to tote two short-range *Sidewinders* or AMRAAMs, this doesn't mean *Intruder* aircrews will look forward to challenging modern Soviet interceptors such as the MiG-31 *Foxhound*. But if such a meeting should occur, the A-6F

— although outmatched — would be far from a sitting duck, according to Wood.

"If the enemy knows you have [missiles like the *Sidewinder* and AMRAAM] he's going to give you respect," added Wood. "He's going to shoot at you from farther away and that will give you time to react."

If an enemy aircraft is within five miles, A-6F *Intruder* aircrews could launch a 9.5-foot, 165-pound *Sidewinder*, which is the most successful air-to-air missile ever built. U.S. Navy and Air Force pilots used it to shoot down most of the enemy MiGs it faced in Vietnam, and the Israeli Air Force has destroyed more than 60 Soviet-built Syrian planes with the missile over the past two years.

If an enemy aircraft is between 30 to 60 miles away, A-6F *Intruder* aircrews will be able to launch AMRAAM, which

will begin replacing the AIM-7M *Sparrow* medium-range missile in 1989. The 11-foot, 300-pound AMRAAM is superior to *Sparrow* because it has an active radar seeker which allows the missile to lock onto a target by itself. In comparison, aircraft that launch the semiactive *Sparrow* must keep the missile's target illuminated with radar until impact. This not only increases aircraft vulnerability, but also limits the pilot to dealing with one enemy plane at a time.

With AMRAAM, which will be used on seven U.S. Navy, Air Force and NATO aircraft, the A-6F pilot can shoot the missile and immediately pursue other targets. This capability is crucial, particularly for U.S. and NATO AMRAAM-equipped fighters, because it

will enable them to fire multiple AMRAAMs at a cluster of Warsaw Pact aircraft on a single pass. This potential is also noteworthy because the Soviet Union and her allies outnumber the U.S. and NATO by 3,000-plus fighter-interceptors, fighter-bombers and ground attack aircraft.

#### Other Weapons

Aside from *Sidewinder* and AMRAAM, the A-6F will be equipped with additional standoff weapons, i.e., *Harpoon*, the high-speed anti-radiation missile (HARM) and *IIR/Laser Maverick*.

With standoff weapons like these, A-6F pilots and bombardier-navigators will be able to hit enemy ships, radar installations, surface-to-air missile (SAM) batteries and other targets with minimal risk of being hit in return.

"The common theme that A-6 guys have screamed about for the last 10 years has been the need for standoff weapons," said Cdr. Wood. "We don't want to fly over an enemy's head. You give your enemy too many opportunities to kill you when you do that. [A-6 aircrews] would rather stand back and lob something at an enemy.

reduce the *Intruder's* vulnerability to enemy interceptors and lessen the plane's dependence on fighter escorts.

"The A-6 needs escorts [i.e., F-14 *Tomcats* and F/A-18 *Hornets*]," said Cdr. Wood. "We don't always get them, because of the ranges we travel and the weather we have to fly in, but the aircraft needs [protection]."

#### Sidewinder & AMRAAM

The A-6E has been able to carry AIM-9M and AIM-9L heat-seeking *Sidewinders* since its inception. But the disadvantage of hanging even one

Also, we want [technology] that will make us able to identify the target precisely so that when we do lob a weapon, it will hit them."

A-6E *Intruders* have been toting the over-the-horizon (50-mile-plus) antiship *Harpoon* since the late 1970s. But it wasn't until A-6Es from Attack Squadrons 85 and 34 sank two Libyan combatants in the Gulf of Sidra in March that the 12.5-foot, 1,100-pound missile was proven in combat.

HARM, considered the most sophisticated anti-radiation missile in the free world, received acclaim when Navy and Marine Corps A-7E *Corsair IIs* and F/A-18 *Hornets* silenced Libyan radar emitting surface-to-air missile sites in March and April. The 13-foot-long, 800-pound, missile will be employed on the *Intruder* for the first time in 1988.

*Laser Maverick* is a short-range (10-12 mile) missile that has a 290-pound warhead capable of destroying the most heavily armored targets on the battlefield (like tanks). The weapon, which is smart enough to lock onto a target itself, will be essential for Marine Corps A-6E and F aircrews performing close air support operations.

*IIR Maverick* is identical to *Laser Maverick* except it sports a guidance

section that enables it to hunt ships. Both supersonic *Mavericks* are about eight feet long and weigh around 650-pounds. They will be installed on the *Intruder* in the late 1980s.

Since the *Intruder's* main task is dropping ordnance at low altitudes (around 300 feet) and at under 500 knots, it is more vulnerable to surface-to-air missiles and anti-aircraft artillery guns than most tactical aircraft. The A-6F won't erase this vulnerability, but it will be able to handle the threat better than the A-6E.

In addition to carrying HARM to strike radar-guided air defense facilities, and chaff rockets and flares to distract SAMs, the A-6F will carry a HALON fire-extinguishing system which emits a gas to smother flames that could erupt in the engine or avionics bay.

"The Navy is also hardening the fuel system on the A-6F by rerouting fuel lines through the tank rather than outside the tank like the A-6E," said Cdr. Wood. "Plus we are making the fuel lines out of titanium instead of stainless steel to make them more rugged."

He added that the survivability features have been tested against the impact of .23 millimeter shells.

### New Radar

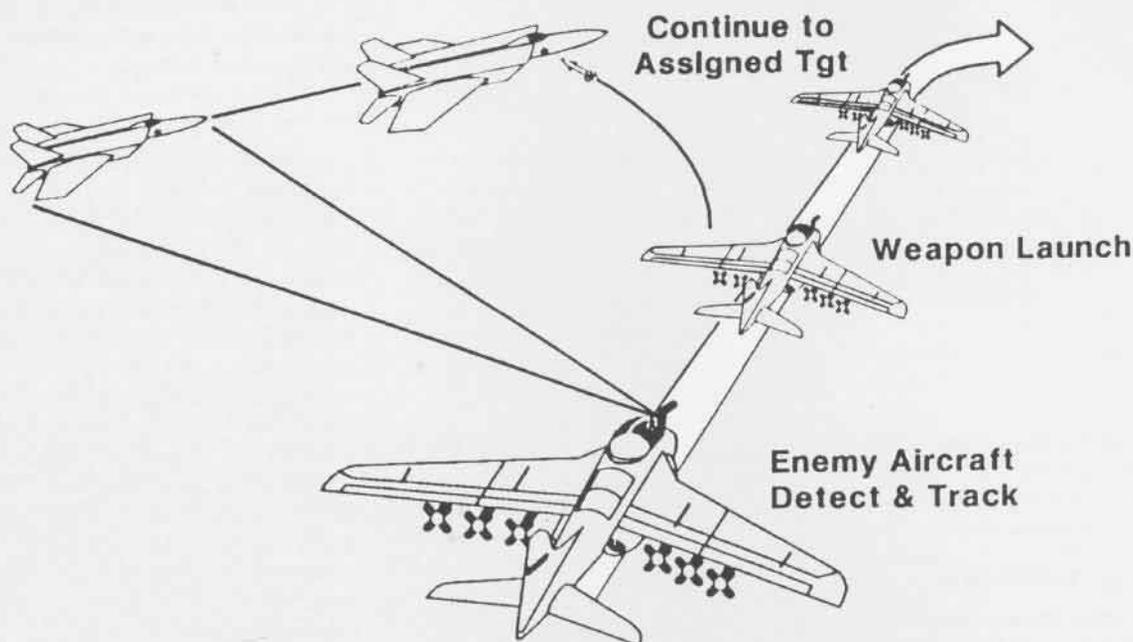
To help reduce vulnerability, the A-6F will have an ALR-67 radar warning system and airborne self-protection jammer (ASPJ) which allow the aircrew to search and identify incoming aerial targets.

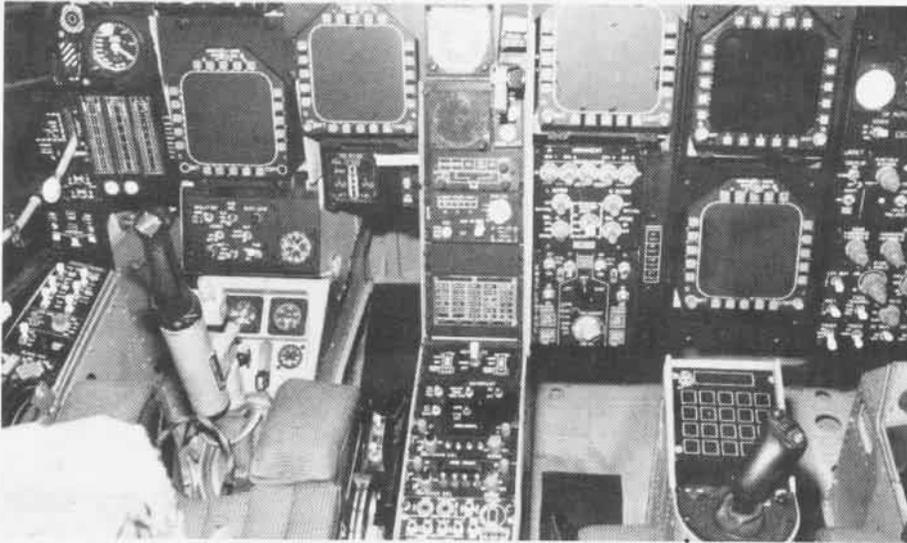
"We don't have that full capability on the A-6E today," said Cdr. Wood, an A-6E bombardier-navigator with 4,600 flight hours and 886 carrier landings. "Today, A-6Es rely on warnings from E-2C *Hawkeyes*, fighter aircraft, ground-based radar facilities, and ships to tell us if a [bogey] is in the area."

He added that in addition to the ALR-67 and ASPJ, the A-6F will have a new multimode radar which will, among other things, have double the A-6E's range for air-to-air and surface target detection, tracking and recognition. It will also have an increased resistance to jamming.

In the cockpit, the A-6F will have five multifunction displays as opposed to the head-down displays on the A-6E. The five A-6F displays, which monitor things like forward-looking infrared radar (FLIR), are superior to the A-6E's because any of the five can be used to substitute the others if a malfunction occurs. Also, the A-6F has a heads-up display (HUD) that its predecessor lacks. HUD, which is installed in the

## AIR-TO-AIR SELF ESCORT





The A-6F Intruder cockpit will feature five multifunction displays which can be used to substitute each other if a malfunction occurs. The A-6F will also have a heads-up display (HUD) which will allow the pilot to monitor his speed, altitude, etc., without taking his eyes off the windscreen.

A-7, F-14D and F/A-18, is comparable to having an automobile speedometer, fuel gauge and clock projected on the windshield. It simply allows the pilot to monitor his speed, altitude, weapons load, etc., without taking his eyes off the windscreen.

Cdr. Wood said that much of the A-6F's technology comes from the F/A-18 and F-14D, because the equipment in the *Hornet* and *Tomcat* are "extremely reliable." In addition to the multifunction displays, the A-6F's generators, batteries, tactical computer, two-way data link, environmental control systems, inertial system, autopilot, antiskid braking systems, etc., are also incorporated in the F-14 and F/A-18.

According to Cdr. Wood, the Navy decided many years ago that it can't have unique pieces of gear for each airplane. Such a process not only increases the number of spare parts and slows down fleet supportability, but it forces maintenance technicians to be less diversified.

"We began buying equipment that can be used in a variety of aircraft," said Wood. "So when all six different types of airplanes go aboard a carrier, instead of having six different maintenance shops fix inertial sets, there will be one shop that fixes them all. Theoretically, one sailor can fix everyone's inertial set instead of having six sailors go to six different schools to learn how to fix only their squadron's set. It's a common sense approach."

### New Engine

In addition to enhancements in avionics, the A-6F will use a derivative of the same engine that powers the F/A-18. The smokeless, non-afterburning General Electric F404 engines, which Secretary of the Navy John Lehman calls "the best fighter engine in the world," will replace the 25-year-old Pratt & Whitney J52s currently used on the A-6Es.

"The F404 has all the things an *Intruder* pilot likes," said Cdr. Wood. "It has more thrust [about 13 percent]; it's more reliable and more maintainable."

He added that although the F404 won't improve the A-6's range, which is currently between 400 and 1,500 nautical miles, depending on the weapons load, it will break down less, require fewer parts and be easier to maintain.

Today, the J52 engines are removed from the *Intruder* and overhauled every 750 operating hours, no matter if the A-6E has been idle over that period or at full throttle, said Cdr. Wood. The F404, however, has a device called the engine condition monitoring system which helps maintenance technicians decide whether the engine should be overhauled or not.

"With the change in technology, I would guess the A-6E will see a 50-percent improvement in overhaul time with the F404," said Wood. "We won't have to remove them as often as the J52."

In addition to new engines, the A-6F

will be equipped with an auxiliary power unit that will enable the pilot to start the plane with a push of a button. This capability, which is also on the F/A-18, is a lot easier than being hooked up to electrical power and an air source in order to start. Depending on the intensity of operations on the flight deck, today, A-6E aircrews may wait as long as a half hour before they are able to get started and launched.

### A Hard Act to Follow

The A-6 was created, in large measure, from aviation shortcomings experienced in the Korean war. The North Korean militia operated in darkness, fog and torrential rainstorms without worrying about attacks from grounded American aircraft.

The North Vietnamese, however, didn't have this luxury.

By the early 1960s, Grumman, the same company that built the rugged *Wildcat*, *Hellcat* and *Avenger*, constructed a 29,000-pound aircraft that could deliver a conventional or nuclear payload equivalent in weight to 10 Volkswagen Beetles. The plane not only was able to fly in *any* weather conditions, but could locate and destroy stationary or moving targets.

On July 1, 1965, VA-75 flew A-6A *Intruders* into combat for the first time. The planes were used to successfully destroy highway bridges near Bac Bong. After that day, the A-6A went on to prove that no carrier aircraft in the world could put more bombs on target. It pummeled enemy targets so heavily that in one spectacular night attack near Haiphong, the North Vietnamese thought they were being hit by B-52 *Stratofortresses*.

Since the 1960s, the A-6 has endured more than 400 airframe and system improvements. The latest major improvement was adding FLIR/laser equipment for precise targeting, ship identification at night and laser-guided weapons delivery on the A-6E. Also, all of the models built since the A-6A have been used in combat.

Today 12 U.S. Navy and five Marine Corps squadrons fly the *Intruder*. Although they aren't the most attractive planes being flown by either service, the durable A-6 has a lot of strength and stamina. At 23, it has logged more than 1.6-million flight hours and achieved some 260,000 carrier landings.

The ATA will have a hard act to follow. ■

**H**elicopter flight training has taken a quantum leap since the HLT (helicopter landing trainer) became available," according to Lieutenant Eric Hinz, Helicopter Standardization and NATOPS Officer at the Naval Air Training Command, NAS Corpus Christi, Texas. Officially designated IX-514, the ship provides a platform to shipboard-qualify student helo pilots before they join the fleet.

Home-ported next to USS *Lexington* at NAS Pensacola, Fla., the craft has been reconfigured to full-fleet certified specifications from the operational control tower to the fire-fighting aspects. The HLT, which was originally a 125-foot-long yard freight utility craft (YFU), was redesigned by the Naval Sea Systems Command (NavSeaSysCom)

and Naval Air Systems Command to be a self-powered craft to provide small deck landings. The deck, which is similar to those of *Spruance*-class destroyers and measures 84 feet by 32 feet, will enable Navy and Marine Corps helo pilots to become familiar with the same type of shipboard landing area they will use once they join the fleet.

The first recommendations for the small deck landing trainer came from fleet replacement squadrons during annual curriculum review conferences beginning in 1977. After further studies by the Navy, the idea was presented to the Chief of Naval Education and Training and the Chief of Naval Operations in February 1984. Ideas ranged from using a naval reserve fleet frigate to anchored barges, until the NavSeaSysCom decided that the YFU was the most practical ship

available to meet the needs. Plus, the cost to configure this vessel was about two-thirds less than the annual price for helicopter training aboard *Lexington*.

The HLT's present-day role is a far cry from that of its original designation as YFU-79. In Vietnam, the ship was used for transporting equipment and supplies and was armed with 50-caliber machine guns. Once the U.S. pulled out of Vietnam, YFU-79 and her sister craft were removed from active service and sent to Guam for storage. In mid-1985, the YFU was towed to Mobile, Ala., stripped down and rebuilt from the hull up to accommodate the needs of student helo pilots. The only original pieces of equipment on the ship are the engine blocks, which have been completely restored.

The HLT is powered with two 365-hp

# NEW SHIP FOR HELO TRAINING

By Sherri R. Jones



A student pilot lands a SeaRanger on the deck of the HLT while the ship is underway.



Art Giberson

An LSE directs a TH-57C on board the HLT during flight training in Pensacola Bay.

Detroit diesel engines and has a fuel capacity of 5,000 gallons. At speeds of eight knots, she consumes approximately 50 gallons of fuel per hour, far less than *Lexington* for the same amount of training. It is estimated that the HLT will cost \$100,000 to \$150,000 per year.

"This is very conceivable, and she should pay for herself after the first year," said Lt. Hinz.

The HLT has 16 permanently assigned crew members. During flight operations, this complement increases with the addition of a helicopter control officer, landing signalmen enlisted, a hospital corpsman and two rescue swimmers. They are from Helicopter Training Squadrons (HTs) 8 and 18, as well as NAS Pensacola.

With this new addition to helicopter training, the instructors in HTs 8 and 18 can ensure that student pilots will join the fleet with actual experience under their belts. In the past, the squadrons had to rely on *Lexington's* schedule to perform deck landings. The HLT has eliminated the scheduling conflicts and has allowed the squadrons to develop a regular schedule of hops on Tuesdays and Wednesdays, leaving Thursdays available as a backup. The instructors no

longer have to waiver the students' deck landing qualifications as they did in the past because *Lex*, for a variety of reasons, wasn't available.

According to Captain Steve Stedfelt, USMC, HT-8's flight operations officer, "The HLT has allowed us to diversify our training to show the students' shipboard environment. For the helo students at NAS Whiting Field, Fla., this was a blessing from the gods."

One instructor takes three students aboard the HLT for landing qualifications, during which each will perform five landings. While one student attempts his first landing, the other two observe and learn how the deck crew works together. Capt. Stedfelt, a helo pilot with more than 600 shipboard landings, admits that he would have appreciated this training when he went to the fleet. "The confidence builder alone is probably immeasurable. The beam in the students' eyes when they make their first successful landing is enough to show that this ship is being used for a very good purpose," Stedfelt said.

His sentiments are echoed by others. Lieutenant Colonel Jack Wagner, USMC, HT-18's commanding officer, added "Before, any student helo pilot could hit

the *Lex* deck [because of its large landing area]. Now, when they land the helo on the postage stamp-size HLT deck, they know they will be able to land on any deck in the fleet.

"I was able to take the first students out to the *Lex* back in 1972 and I was lucky enough to repeat that by taking the first students aboard the HLT," added Wagner. "Right now, the students do not make any night landings. However, I wouldn't be surprised if that doesn't change in the near future and the HLT starts to host the HC, HS and HSL communities for carrier qualifications."

Since all fleet pilots have to maintain minimum semiannual qualifications, a study is currently under way to build two more HLTs, one for each coast. Operational ships will then be relieved of the responsibility of keeping helo pilots current. The HLTs are under the cognizance of the Fleet Modernization Program and operate at a substantial cost savings for the Navy, according to Commander Kris Tande, HT-8's executive officer. And, Cdr. Tande said, "the HLT will allow us to provide not only a more qualified pilot, but a safer pilot."

# STATE OF THE ART

## Supersonic Targets

Beech Aircraft Corporation was awarded a \$29 million Navy contract for 205 AQM-37C supersonic missile targets to support training and test-and-evaluation exercises for air-to-air and surface-to-air weapon systems. This is a follow-on to an existing order for 56.

The AQM-37C is an unmanned, remotely-controlled vehicle, which is 12.5 feet long and carries a payload of 50 pounds. Improvements over the AQM-37A include a multi-band active radar augmentation system in the nose which simulates a wide variety of missile systems, a new digital autopilot, telemetry, and a command control system for maneuvering and dive control. Launched at high altitude from jet aircraft, the AQM-37C is capable of varied cruise altitudes and speeds, ranging from Mach 3.0 at 80,000 feet to Mach 0.87 at 1,000 feet.

## Hypervelocity Missile

LTV Aerospace and Defense Company was awarded \$23 million for development and flight testing of its hypervelocity missile (HVM) under a joint Air Force, Army and Marine Corps program.

The HVM, designed by the company's Vought Missiles and

Advanced Programs Division, travels at speeds exceeding 5,000 feet per second and uses the kinetic energy of direct impact to defeat armor and other targets. The advantages over conventional missiles are its size, lethality, high firepower and cost. The HVM will be guided by a fire control system that uses a forward-looking infrared sensor for target acquisition and tracking, and a carbon dioxide laser to steer the missile during flight. Demonstrations are scheduled for late 1987.

## AH-1W Super Cobra Rollout

The first production AH-1W *Super Cobra* attack helicopter was delivered to the Marine Corps last March at Bell Helicopter Textron, Inc., Hurst, Texas. The Marine Corps has ordered 44 of the new helicopters and will convert 37 existing AH-1Ts to the AH-1W configuration.

The *Super Cobra* features twin 1,690-shaft horsepower General Electric T700-401 engines, which provide a 65-percent increase in installed power over the earlier *Sea Cobra*. The engines were also designed for extended corrosion resistance when used in the harsh salt water environment. Other improvements in the AH-1W include the Rockwell laser-guided *Hellfire* missile system, enhanced survivability, and cockpit design features.

# awards

## Pirie Award

AC1(AW) Gary F. Dundon of Norfolk-based USS *Coral Sea* (CV-43) received the 1985 Vice Admiral Robert B. Pirie Award as the Navy's top air traffic controller. Dundon credits embarked CVW-13 and the carrier's flight deck crew for his success. He says, "... Ideally, we like to have one minute from the time one jet lands to when the arresting gear is ready for the next one, and we often have less. There is a real sense of cooperation and teamwork here."

The annual award was established in 1975 by Eaton Corporation, which produces air traffic control processing and display systems.

## Noel Davis Trophy

The 1985 recipients of the Noel Davis Trophy for mobilization readiness are reserve squadrons VA-304, VC-12, VF-202, VP-64, VR-58 and HAL-4. Donated to the Navy by Harry F. Guggenheim, the trophy was first presented in 1927. It symbolizes "the best" in the Naval Air Reserve Force.

The award is named in honor of Lt. Cdr. Noel Davis, a pioneer Naval Reserve aviator who was killed in a plane crash while preparing for the first New York to Paris flight — 24 days before Charles Lindbergh's successful solo transatlantic crossing.

## Towers Award

NAS Corpus Christi's VT-28 received the 1985 Admiral John H. Towers Flight Safety Award. It is presented annually

to the training squadron judged by the Chief of Naval Air Training to have the most outstanding record in flight safety. Sponsored by the Order of Daedalians, the award honors Adm. Towers as one of Naval Aviation's foremost pioneers.

## Goldthwaite Award



TA-4Js from VT-21 fly in formation over South Texas.

The 1985 Vice Admiral Robert Goldthwaite Award for training excellence was presented to the *Fighting Redhawks* of VT-21, NAS Kingsville, Texas. During the competitive period — July 1, 1984, through September 30, 1985 — the squadron met all production goals, designated 100 new Naval Aviators and established the lowest operating cost of all advanced jet squadrons.

The award, sponsored by Rockwell International, is named in honor of VAdm. Goldthwaite who contributed significantly to the Naval Air Training Command during his 45-year career.

# PROFESSIONAL READING

By Commander Peter Mersky, USNR-R

Heatley, C. J., III. *The Cutting Edge*. Tomasson, Grant & Howell, Charlottesville, Va. 22901. 1986. 152 pp. Illustrated. \$38.00.

This picture book is for anyone who experienced carrier ops, whether as a crewman or aviator, or for those who wish they could. This volume says it all.

There are no captions to the photos, but each community has at least two pages of well-written text describing activities and a selection of color photographs. There is also a section of drawings and statistics on the aircraft depicted.

Of course, the meat of this beautiful book is the large, striking photos of every type of aircraft in use by carrier aviation. F-14s, A-7s, A-6s and F/A-18s, as well as A-4s and F-5s from Top Gun, fly through brilliant blue skies or over large expanses of cottony clouds.

Various phases of flight operations receive attention: loading, launching, aerial refueling, dogfighting, and even tracking Russian snoopers.

There have been several picture books published in the last few years showing carrier aviation and all with a lot of fine photography. But *The Cutting Edge* is the best, bar none.

Dorr, Robert F. *Vought A-7 Corsair II*. Osprey Publishing, Ltd. 1985. 200 pp. Illustrated.

Surprisingly little has been written about the veteran A-7 *Corsair II*, even though it has served in the fleet for 20 years, through heavy combat, and has enjoyed a reasonable record of export. That has been rectified to some extent by Dorr's book. With a good selection of color and black and white photos and well-written text, this gives a well-detailed account of Vought's tough, capable light attack bomber.

There is good Vietnam coverage for both Navy and Air Force service. While regular fleet service is covered, as well as the Air National Guard, there is very little on its use by the Naval Air Reserve — the first auxiliary force to operate the *Corsair*, from the mid-1970s to the present.

Development of the A-7 is covered well and there are several personal accounts of combat action, which always make a book like this good reading.

Morris, Charles Lester. *Pioneering the Helicopter*. Helicopter Association International, Alexandria, Va. 1985. 161 pp. Illustrated.

It is difficult to imagine the aeronautical world without the unique services of the helicopter. The helo has been with us in a practical form since 1945 and has made many contributions to military and civilian aviation. This book is actually a modern reiteration of the 1945 edition and should be of interest to many readers, not only those with a specific interest in helicopters.

There is excellent primary source research material here concerning design, development and initial production of the first-generation helicopters. Most of the events discussed took place in the early 1940s, when the U.S. was deeply involved in WW II.

This deceptive little volume belongs in many libraries. It details an important area of aviation history and goes far in showcasing the events and personalities that developed one of the modern world's indispensable modes of transportation.

Potter, E. B. *Bull Halsey: A Biography*. U.S. Naval Institute, Annapolis, Md. 21402. 1985. 421 pp. Illustrated. Indexed. \$19.95.

William F. Halsey was one of the instruments with which the U.S. Navy beat the Japanese in the Pacific in WW II. This book details his early career as a midshipman at Annapolis, service in destroyers during WW I and the 1920s, his quick education as an aviator in 1934, and his rapid rise through the senior ranks to Fleet Admiral in WW II. His career during specific actions is also covered, including the 1942 raids in the Marshalls, Tokyo raid in April with Jimmy Doolittle's B-25s, and Guadalcanal and the disappointment at missing the climactic Battle of Midway in June 1942.

The biographer also chronicles the men surrounding Halsey — Spruance, McCain, Nimitz and King — as well as junior supporting personnel who are included to round out the story of a sailor-warrior and his times.

de Arcangelis, Rear Admiral Mario. *Electronic Warfare*. Sterling Publishing Co., Inc., Two Park Avenue, New York, N.Y. 10016. 1985. 319 pp. Illustrated. \$19.95.

This small formatted book is a unique history of that relatively new military science known as electronic warfare (EW). A historical detailing of EW from the 1904-1905 Russo-Japanese War, through early WW I usage, to Vietnam and the Falklands and numerous wars in the Mideast, this book covers all.

EW figured prominently in the demise of the German Battleship *Bismarck* in May 1941 and the infamous "Channel Dash" of the German cruisers *Scharnhorst* and *Gneisenau* the previous March. Early developments in radar and the role of the British Chain Home system played in the Battle of Britain are also discussed. Incidents such as the capture of USS *Pueblo* in January 1968 and the shooting down of an EC-121 by the North Koreans is detailed in short but lucid discussions which should add to the reader's understanding of such occurrences and their importance in the military and political areas.

All in all, a useful and unique book. Squadron intelligence officers should include this in their libraries as background for briefings.

Trotti, John. *Phantom over Vietnam*. Berkley Books, New York, N.Y. 10016. Original hardcover edition published by Presidio Press. 1984. 234 pp. Illustrated. \$3.50.

This beautifully personal wartime autobiography does for the Marine jet aviator what Richard Drury's *My Secret War* did for the Air Force and its secretive Sandies. It brings to light all the thrills, joys and ultimate frustrations of flying combat in the smoking, 25-ton *Phantom*. Trotti actually does put the reader in the cockpit of his F-4, a feat which few books fully realize. Even though the reader feels he has been through a whole 12-month tour, Trotti only details three or four missions with colorful sidelights.

Having read hundreds of books dealing with combat operations, especially in a first-person narrative style, I feel that *Phantom over Vietnam* is one of a rough dozen efforts which takes the reader into flight and into combat. It is a personal, from the gut level treatment, and Trotti knows his subject intimately.

## Established

On June 13, the personnel of MWSG-27 Bravo Detachment and MABS-31 officially retired their colors during ceremonies at MCAS Beaufort, S.C. These two units combined forces to form the third largest and newest squadron at Beaufort known as Marine Wing Support Squadron (MWSS) 273.

## Records

Several units marked accident-free flight time: HMH-463, 20,000 hours; HMM-162, 30,000 hours and 6 years; HMT-303, 3 years; HSL-43, 10,000 hours and 1.5 years; HT-8, 200,000 hours and 9 years; NAS Bermuda, 8 years; VA-12, 20,000 hours and 4 years; VA-128, 100,000 hours and 13 years; VA-203, 47,785 hours and 13 years; VF-101, 31,140 hours and 2.5 years; VMA-513, 10,000 hours; VMFA-323, 20,000 hours and 5 years; VMFA-451, 33,000 hours; VMFAT-101, 10,000 hours; VMGR-352, 100,000 hours and 12 years; VP-40, 134,131 hours and 19 years; VP-47, 86,000 hours; VP-48, 130,000 hours and 17 years; VQ-4, 157,000 hours and 14 years; VS-33, 121,000 hours and 25.5 years; VS-37, 15,000 hours; VT-6, 175,000 hours and 4.2 years; and VT-25, 60,000 hours.

The following individuals marked personal career milestones:

HC-11: ADCS Dave Penn logged his 5,000th aircrew flight hour in the H-46.

HSL-43: Lt. Frank Pagano joined an elite group by surpassing 1,000 flight hours in an SH-60B *Seahawk*.

VA-34: Cdr. Richard G. Coleman, C.O., logged his 700th arrested landing on board *America*. He is believed to be the only pilot to accumulate 700 traps aboard this carrier.

VA-72: Skipper Cdr. A. F. Richardson amassed over 4,000 flight hours in the

A-7 *Corsair*; Lts. Bob Zimmerman and Mark Fletcher each achieved 100 arrested landings on board *America*.

VA-86: Cdr. J. L. Fitzpatrick logged his 1,000th arrested landing, aboard *Nimitz*.

VAQ-131: Cdr. Victor E. Dodds, C.O., surpassed 3,000 hours in the EA-6B *Prowler*.

VMA(AW)-242: After completing training operations with the *Bats*, Capt. Ray Priest logged his 1,000th hour in the A-6E *Intruder*.

VMA-331: Maj. Jim Higgins accumulated more than 500 hours in the AV-8B *Harrier*.

VMFA-251: Maj. Michael Humberd, X.O., marked his 4,000th flight hour in the F-4 *Phantom*.

VS-24: Centurian awards were presented to Lt. Ray Farmer and Ltjg. Mike Fox after completing 100 arrested landings on board *Nimitz*.

VS-28: Cdr. R. J. LaTurno, C.O., and Lt.Cdr. Mike Brower became double centurians on board *Forrestal*.

VS-30: The skipper and X.O. of the *Diamondcutters*, Cdrs. Sam Houston and Philip D. Voss, respectively, both achieved their 500th carrier landing while aboard *Saratoga*.

VS-32: Cdr. Travis Kent, C.O., logged his 500th S-3A *Viking* arrested landing on board *America*.

VS-37: Skipper Cdr. Hugh J. McCullom reached two personal career milestones by surpassing 6,000 accident-free flight hours and making his 200th arrested landing aboard *Constellation*.

## Rescues

Rescuing people stranded on mountains is usually considered part of a search and rescue (SAR) unit's job. But, on May 7, MCAS Yuma's standby SAR division realized that this call for help was unique as well as difficult to handle.

Not only was a man trapped on a mountain at over 6,000 feet above sea level, but he weighed over 500 pounds and had serious injuries. The Arizona Department of Public Safety (DPS) helo

unit asked the Marines to assist.

Getting to the patient was not a major concern to the SAR crew, which consisted of Capt. Jim Silliman, SSgt. Ray Smith and HM3 Scott Reuther. However, hoisting the large man into the UH-1N *Huey* was a real challenge. The DPS officers on the scene had already secured the patient onto a litter. After rappelling down to the patient and evaluating his injuries, HM3 Reuther assisted in short-hauling the two men for about four miles to level ground. Once the aircraft landed, the patient was placed inside the helo and transported to a civilian hospital in Tucson, Ariz.

## Honing the Edge



Maj. D. R. Zoerb, an Air Force exchange pilot with VFA-131, flies his F/A-18 Hornet in an escort position on a Libyan MiG-23 during operations near Libya.

VFA-131 achieved many milestones during its first seven-month deployment to the Med aboard *Coral Sea*. In particular, the *Wildcats* were awarded both a Navy Unit Commendation and the Navy Expeditionary Medal for their part in the combat operations around Libya.

The squadron completed 370 scheduled sorties and achieved the most *Hornet* flight hours among the four F/A-18 squadrons in CVW-13. Additionally, the *Wildcats* completed the first East Coast deployment of the *Hornet*, with 2,700 accident-free flight hours and 1,200 arrested landings.

While deployed, VFA-131 participated



Imitating scenes from "Top Gun"? No, this F/A-18 Hornet from the Strike Aircraft Test Directorate, NATC Patuxent River, Md., makes an inverted pass near Solomons Island to test the aircraft's fuel system performance during an extended-inverted flight routine. This is one of many tests the aircraft will undergo before the Navy's Flight Demonstration Squadron begins training with the aircraft. In 1987, the Blue Angels will debut with F/A-18s, which replace the A-4 Skyhawks they have flown since December 1973.

in the following joint exercises: *Display Determination '85*, a NATO operations exercise with the Turkish Air Force, the U.S. Air Force and CVW-17 embarked aboard *Saratoga*; *Isle D'Ore* with the French and British navies; *PHIBLEX '86* with the Tunisian Navy and U.S. Air Force; and *Sardinia '86*, an amphibious exercise with France, Italy and Spain.

**Et cetera**

In the past three years, the NARF Alameda, Calif., TF-34 engine program has grown from \$6.3 million to \$7.2 million and its component program from \$36.2 million to \$52.7 million. During that period, more than 75,000 man-hours were expended to execute the program.

This massive rework effort keeps the Navy's S-3 *Vikings* and the Air Force's A-10 *Thunderbolt IIs* in the air ready to meet the operational requirements of both services in defense of this nation.

Both aircraft use two high bypass turbofan TF-34 jet engines. This project is a perfect example of effective inter-service cooperation. According to

Clifford W. Lastiri, Engine Planning and Control Branch, "This program is a good indication of how two military organizations, Navy and Air Force cooperate . . . to support each other's weapons systems."

PH1 Bob Bennett



Even though the crewmen of *Enterprise* and VAW-11 were deployed halfway around the world in Naples, Italy, their hearts were still at home. On May 23, Spouse Appreciation Day, the men set up this photographic display to show how much they care.

In order to promote friendship between the U.S. and Japan, a "sister" squadron agreement was established between VAW-115 and the Japanese Air Self Defense Force's (JASDF) 601 Airborne Early Warning (AEW) squadron.

Meetings to establish this relationship began in March 1985 and, by December, both services' chain of command agreed to the arrangement.



Witnessing Cdr. Mike Bowman, C.O., VAW-115, signing the sister squadron agreement are (left to right) Lt. Col. Isao Yamoto, C.O., JASDF 601 AEW; Ltjg. Scott Huskins; Cdr. Ron Weber; Lt. Doug Miller and Lt.Cdr. Mike Maurer.

The Owls Head Transportation Museum, Rockland, Maine, paid tribute to the 75th Anniversary of Naval Aviation with a proclamation by Governor Joseph



Brennan, who cited July 5 and 6 as Naval Aviation Days in Maine. Over 8,000 people observed the many military and civilian static displays on the tarmac. The CH-53D *Sea Stallion* in the photo is from HM-12, NAS Norfolk, Va.

## Change of Command

*Canisteo*: Capt. Robert S. Cole relieved Capt. Dayton W. Ritt.

ComCarGru-7: RAdm. Lyle F. Bull relieved RAdm. Dennis M. Brooks.

CNTechTra: RAdm. David L. Harlow relieved RAdm. Robert C. Austin.

CVSW-1: Capt. F. J. Herron relieved Capt. R. M. Sanford.

HC-9: Cdr. Jon S. Gregory relieved Cdr. W. Stanwood Perry.

HM-12: Cdr. James Hughes relieved Cdr. Fred Massey.

HMM-164: LtCol. Paul E. Wilson relieved LtCol. Roger H. Dougherty.

HMM-266: LtCol. Craig R. Steinmetz relieved LtCol. John F. Dennis.

HMM-365: LtCol. Robert Magnus relieved LtCol. Michael P. Davis.

H&MS-10: Maj. D. D. Wyatt relieved Maj. J. D. McCord.

H&MS-11: LtCol. Martin Samuel relieved LtCol. Allen Thaut.

HS-1: Cdr. James A. Curtis relieved Cdr. Richard A. Catone.

HSL-33: Cdr. Hubert E. Archambo, Jr., relieved Cdr. Frederick R. Sautter.

HSL-41: Cdr. Joseph R. DeNigro relieved Cdr. Michael Coumatos.

HT-8: Cdr. J. R. Young relieved Cdr. H. W. Turner.

MAG-11: Col. Jerry R. Cadick relieved Col. Jeremiah W. Pearson.

MAG-18: Col. A. J. Allega relieved

Col. D. V. Shuter.

MAG-26: LtCol. A. C. Blades relieved LtCol. J. A. Gress.

MCAS El Toro: BGen. Donald E. P. Miller relieved BGen. William A. Bloomer.

MCAS Iwakuni: Col. Jack B. Hammond relieved Col. Donald J. McCarthy.

MWSG-37: Col. Paul M. Schafer relieved Col. Marion F. Stone.

MWSS-273: LtCol. R. Jonson relieved Maj. C. H. Corby.

NAMTraGru: Capt. Donald G. Robertshaw relieved Capt. Bernard J. Loonam.

NARF Alameda: Capt. William J. Tinston, Jr., relieved Capt. Roger W. Lloyd.

NAS Cecil Field: Capt. Philip H. Jacobs relieved Capt. Jack B. Austin.

NAS Oceana: Capt. J. E. Allen relieved Capt. L. F. Norton.

NAS Patuxent River: Capt. Stuart J. Fitrell relieved Capt. John M. Welch.

NATTC Millington: Capt. John F. Healy relieved Capt. Joe A. McElmurry.

NavAstroGru: Capt. Robert V. Morgan relieved Capt. Clarence O. Taff.

NR MobMaintFac-0273: Capt. George M. Fusko relieved Capt. Joe D. Hill.

NR NAF Misawa: Cdr. Carmie Henry relieved Cdr. Robert Morehead.

NWC China Lake: Capt. J. W. Patterson relieved Capt. K. A. Dickerson.

PMTC: RAdm. R. C. Gentz relieved RAdm. J. R. Wilson, Jr.

VA-72: Cdr. Gordon Stewart relieved

Cdr. Fields Richardson.

VA-83: Cdr. Richard J. Nibe relieved Cdr. Stanley Bloyer.

VA-86: Cdr. J. Michael Johnson relieved Cdr. John A. Fitzpatrick.

VA-174: Cdr. E. Evan Shipe III relieved Cdr. Charles A. Cook.

VA-203: Cdr. Thomas J. Verrengia relieved Capt. Timothy G. Palmer.

VAW-123: Cdr. W. Dennis Holbrook relieved Cdr. William C. Liebe.

VC-6: Cdr. Ronald B. Bauman relieved Cdr. Rich Richards.

VF-14: Cdr. Phillip Bower relieved Cdr. Curtiss Schantz.

VF-124: Cdr. Jay B. Yakeley relieved Cdr. John W. Snyder.

VMAT-102: LtCol. Daniel M. Brannon relieved LtCol. Jerry R. Agenbroad.

VMFA-323: LtCol. Dennis Krupp relieved LtCol. Don Beaufait.

VR-48: Cdr. Carl J. Ryan relieved Cdr. John I. Loving.

VS-24: Cdr. Rocco Tomanelli relieved Cdr. Stephen M. Dwyer.

VS-30: Cdr. Philip D. Voss relieved Cdr. Sam K. Houston, Jr.

VS-32: Cdr. John P. Bielik relieved Cdr. Travis Kent.

VS-41: Cdr. John S. Boyd relieved Cdr. Richard L. Hulse.

VX-1: Capt. R. R. Hanke relieved Capt. R. H. Stowell, Jr.

VXN-8: Cdr. Gary K. Iversen relieved Cdr. William F. Lorenz III.



The above insignia were recently approved by the Insignia Board.

## NACCS Needs Patches

The Naval Aircrew Candidate School (NACCS) instills pride and professionalism in future Navy and Marine Corps enlisted aircrewmen. The school would like to create an exhibit of squadron patches for display on its quarterdeck. Please show your support by sending your patch/memorabilia to: AX2 D. C. Lear, NACCS, Naval Aviation Schools Command, NAS Pensacola, FL 32508-5400, (904) 452-4640.

### George Goodspeed, Sr., Dies

George W. Goodspeed, Sr., of Chatham, Mass., died June 12 in a nursing home after a long illness. He was 88.

Mr. Goodspeed helped repair the disabled NC-4 seaplane after it made an emergency landing off Chatham en route to Halifax, Nova Scotia, where it would receive additional repairs before completing the first transatlantic flight in May 1919.

The Navy honored him at the Chatham Airport on May 11, 1986, during a reenactment of the famous first Atlantic crossing by air.

A licensed pilot, Mr. Goodspeed was involved in the creation of the Chatham Airport. He is survived by his wife and three children.

## Corrections to NANews, July-August 1986:

Page 29 — "1985 Year in Review," October 13 — The F/A-18 squadrons embarked in USS Coral Sea for the Hornet's first Med deployment were VFAs 131 and 132 vice 136 and 137. Two Marine squadrons, VMFAs 314 and 323, were also aboard the carrier for the cruise.

Page 7 — Ens. George Gay was the "sole" survivor from Torpedo Squadron Eight aboard Hornet during the Battle of Midway. There were two other survivors from the VT-8 Det based on Midway Island during the battle, Ens. Albert K. Earnest and Radioman Harry H. Ferrier.

Page 36, "CNO Safety Awards" — The following command was inadvertently omitted from the listing of CY 85 winners:

CG Fourth MAW: HMM-774 (second consecutive) and VMAQ-4.

## Reunions, Conferences, etc.

**VT-3 reunion**, September 19, Pensacola, FL. Contact VT-3 Public Affairs Office, autovon 868-7116/7580, commercial (904) 623-7116/7580.

**USS Kitkun Bay (CVE-71) Taffy 3 reunion**, October 23-25, Lexington, KY. Contact Frank Wheeler, P.O. Box 115, Turner's Station, KY 40075, (502) 947-5454.

**VT-5/USS Yorktown (CV-10)/USS Franklin (CV-13) reunion**, September 19-20, Crown Center, Kansas City, KS. Contact C. B. Spray, Rt. 6-Rt. 398, Lawrence, KS 66046.

**NAS Kaneohe Bay 1939-1950 reunion**, December 1-8, Hale Koa Hotel, Fort Derussy, HI. Contact Wally Hanna, 2722 Chestnut Ave., Carlsbad, CA 92008, (619) 434-2603.

**VXN-8 World Travelers' Ball**, September 27, Cedar Point Officers Club, NAS Patuxent River, MD. Contact Lt.Cdrs.

**USS Bon Homme reunion**, September 19-21, Ramada Inn, Tupelo, MS. Contact Ralph Pound, P.O. Box 1531, Tupelo, MS 38802, Home (601) 842-8247, Work (601) 842-0572.

Williams or Vincent, VXN-8, NAS Patuxent River, MD 20670, autovon 356-4711/4766 or (301) 863-4711/4766.

**NAS Grosse Ile reunion**, October 4, Officers Club, Grosse Ile, MI. Contact Harry A. Barriger, 27250 Wyle Dr., Mt. Clemens, MI 48045.

**Navy, Marine, Coast Guard enlisted pilots reunion**, October 16-19, Norfolk, VA. Contact Jack Hayes, 2434 Amber Ave., Norfolk, VA 23513, (804) 853-8883.

## VPI NROTC Alumni Association

A Virginia Tech NROTC alumni association is being established. For information, call Lt. Roger Demaree or Ens. John Harrell at (703) 961-7883 or write Virginia Tech NROTC Alumni Association, 417 Femoyer Hall, Blacksburg, VA 24061.



VAdm. Edward H. Martin, DCNO (Air Warfare), center, holds a painting of an A-1 Triad aboard the USS John F. Kennedy (CV-67), which was presented to the Navy in July as a salute to the 75th Anniversary of Naval Aviation. With VAdm. Martin are Mr. Alfred "Chief" Johnson, left, the artist, and Mr. Jack Bowers, president of Sanders & Associates, the company which commissioned the painting.



NAVAL AVIATION NEWS