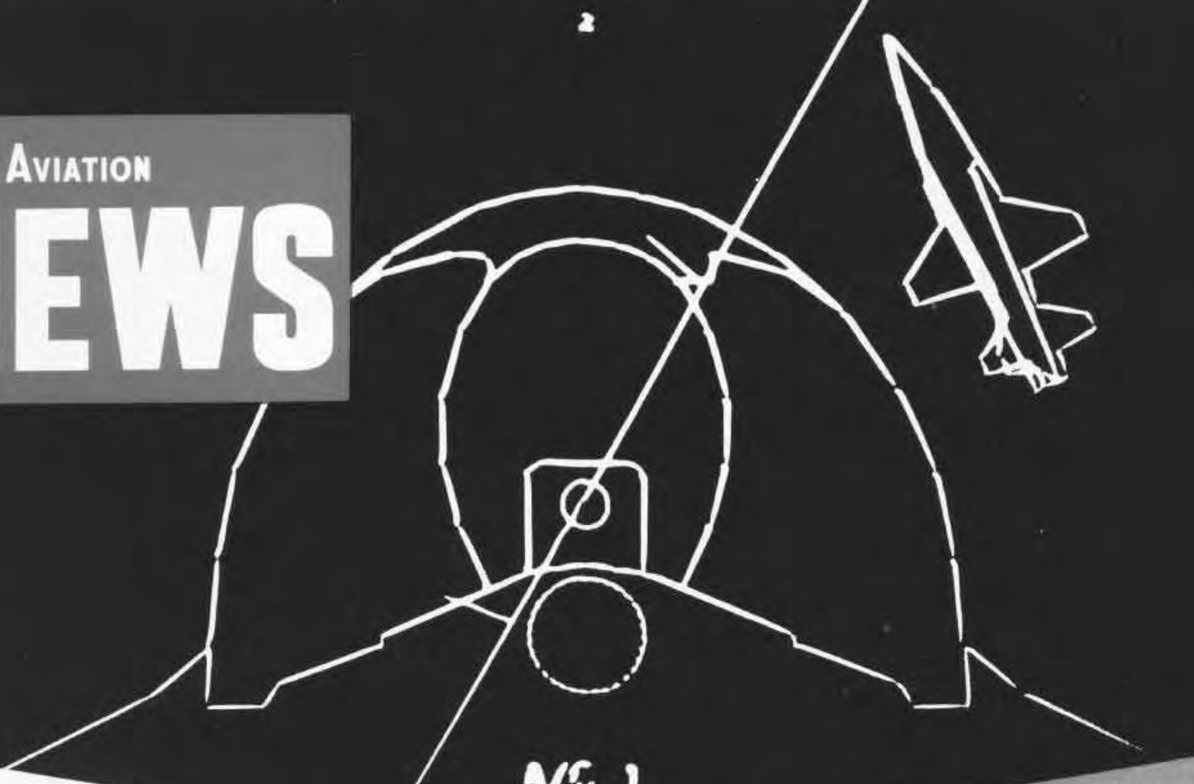
NAVAL AVIATION NEWS



ACMR/I

USN/USAF

March 1978


4
DANGER

COVERS – ACMR composite on front cover was arranged by NANews' Charles Cooney. Graphics and photos were supplied by Northrop Corporation and NavAirSysCom's ACMR office (see feature on page 8). Back cover view of Sixth Fleet ships steaming toward Gaeta, Italy, after an exercise in the Tyrrhenian Sea in the spring of 1976, was submitted by Commander Sixth Fleet public affairs office. Carriers are Saratoga and Independence. These VC-10 TA-4Js rising from the runway at Guantanamo Bay, Cuba, were filmed by McDonnell Douglas' Harry Gann last year.

editor's corner

Max R. Schwartz served in VF-2 in the early 1930s and has avidly followed Naval Aviation ever since. He sent us some written matter which won't win a Pulitzer Prize but has a way of capturing the spirit of the flying Navy 40 years ago.

The Trail of the Covered Wagon was published aboard our first flattop, USS *Langley*, it being a converted collier fitted with a deck on top to accommodate flying machines. In a March 1931 issue, date-lined Balboa, Canal Zone, there was a subdued lament for the perils of carrier flying:

A bare skeleton of a plane stands on the well deck as evidence of what was our first, and we hoped our last, forced landing at sea. This accident occurred Tuesday when plane 1-S-2 with Lt. Miller and Radioman First Class Aycock ran out of gas and was forced to land in the water. The providence that watches over us saw fit to provide ideal conditions of position and weather. There were no injuries.

One week later we were all startled to find that Chief Aviation Pilot (CAP) Harshman, flying 2-F-2 did not return. He became separated from the rest of his squadron under such conditions that no anxiety was felt for his welfare. However, when no word came about his plane we all began to wonder what had happened. Search by surface and air craft was started immediately.

There are two possibilities – that he landed in the water and will be picked up, for his flotation gear will keep him afloat a long time; or that he flew ashore and landed on the beach, in which case it will be some time until we hear from him.

The unsuccessful search covered 3,000 square miles. It remains now that there is a third possibility. Harshman may have landed inland and is fighting his way through the jungle.

A bard from VS-1 immortalized his squadron mates with verse.

Lt. Schwartz, our radio bug,
Kicks rudder on number three.
When the radio ceases to function
He says, "That's not the way it should be."

Lt. Noble, our Exec,
Takes good care of our number four.
Still claims it was not a mistake
That he strafed the Omaha.

Last but not least comes Lt. Conn
With his trusty number nine.
He gathered up all of the yellow sheets
To see that the boys get in their time.

Mr. Schwartz also sent a copy of "The Observer of the U.S. Aircraft Carrier Lexington," date-lined En route San Pedro, Calif., March 1932. Fleet Problem XIII had just been concluded.

On the 15th the *Saratoga's* planes were credited with sinking some cruisers and one submarine but the *Lexington* did better. Just before sunset we executed what was a masterful exercise. The *Lex* moved to the windward of the *Sara* and launched her planes before sunset. The planes caught *Sara* with her aircraft on deck except for six in the landing circle.

The battle between the *Lexington* and *Saratoga* fighting planes gave all hands a picture of what may sometime actually happen. The sudden descent of many *Lexington* planes upon our sister *Sara* while the latter was engaged in landing aircraft is a picture of what may sometime actually happen. The anxious waiting for overdue scouting planes as fog and mist come crawling in or darkness comes on is surely to be experienced in time of war.

Lives there a Navy flyer who wouldn't, had he the chance, go back in time and fly a sortie or two in Fleet Problem XIII?

Schwartz kept some interesting crash landing notes from his VF-2 days. A few are quoted below. The planes were F2Bs or F3Bs with the exception as noted.

CAP "Spick" Driscoll, Crashed off Point Loma. Wrench left in engine while undergoing major overhaul at Naval Aircraft Factory.

Lt. F. L. Baker, La Jolla. Plane caught fire and was lost at sea. Lt. Baker in hospital, face badly burned except for area covered by helmet and goggles.

CAP L. Hoffman, North Island. Landing strut broke on takeoff. Plane crashed. There is much trouble with crystallized struts. Rough carrier landings snap them.

Ltjg. H. R. Horney, near San Diego State College. Crashed on landing due to gelatinous substance in fuel tanks.

CAP G. A. Reese, also San Diego State College. Landed to help Lt. Horney whose airplane was upside down. Reese also crashed on landing, engine stopped for same reason.

XFJ-2, CAP V. W. Harshman (he must have made it through the jungle) at Border Field. Plane caught fire in flight, burned fabric off lower wing. Pilot landed and put out fire. Airplane trucked to NAS San Diego, transferred for return to manufacturer, Berliner-Joyce. [Take that, Berliner-Joyce!]

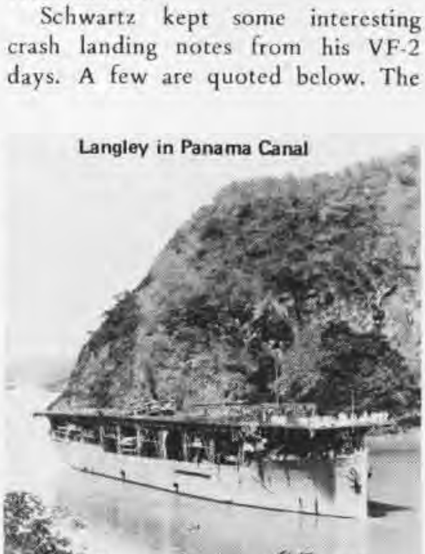
CAP Driscoll, off Point Loma. Flotation bags inflated in flight cutting off visibility and flow of air over control surfaces. Airplane lost.

LCdr. J. J. "Jocko" Clark, off North Island. Airplane recovered by salvage crew of the *Mary Ann*.

CAP F. L. Brown, off Point Loma. Tow target was shot away, came back and wrapped around wings, fouling ailerons. Pilot bailed out. Airplane recovered. It was quite a pile of junk on a truck.

The good old days!

Langley in Panama Canal



. . . and during flight operations.

NAVAL AVIATION NEWS did you know?

Update II The first two production models of the Navy's newest land-based antisubmarine aircraft, the P-3C Update II *Orion*, arrived at the Naval Air Test Center, Patuxent River, Md., in September. One is undergoing a Navy technical evaluation (NTE) by the antisubmarine aircraft test directorate. The other was delivered to VX-1 for further checks of various systems. Succeeding Update IIs will be delivered to operational squadrons at NAS Brunswick, Maine.

Except for the infrared detection system turret, which drops out of the nose, the Update II is structurally unchanged. Internally, however, the new *Orion* boasts the latest refinements in antisubmarine and ocean surveillance capabilities. Day or night the new detection system can locate and identify targets without betraying the presence of the aircraft. It zeros in on the heat emitted or reflected by the target and presents a TV-like picture to an operator located

midway in the aircraft. The operator can rotate the turret about 400 degrees (200 either to the left or right of the nose) to keep the target in view at all times. With the electronic reference system, the aircraft can stand off and plot the movements of the target. The crew can then engage the target with a *Harpoon* missile from the stand-off distance.

The test directorate Update II was housed in the shielded hangar at Patuxent River while undergoing electromagnetic compatibility testing. It was then taken to Bermuda for a week of navigation testing on the NASA tracking range. The NTE is expected to be completed this month.

Avionics Technician Training Major changes have occurred in entry-level training programs for avionics technicians in an effort to provide more capable technicians to the fleet at the lowest possible training costs. The traditional method of determining whether the A1 curriculum needs revision had been to interview fleet personnel who returned to NATTC Memphis for instructor duty or B school. The third class petty officer examination requirements were used as a guide to determine minimum course content. The traditional course emphasized theoretical training and a broad technical background, followed by job-specific training in NAMTraGru Class C1 courses or on-the-job training.

It was recognized during the early Seventies that job-specific training throughout the training pipeline would yield benefits. Surveys of avionics technicians concentrated on the tasks they actually performed. The data gathered was analyzed to determine where emphasis should be applied during training. The job task inventory was divided into categories to indicate where training for each of the tasks could best be accomplished, in A1 or C1 courses.

An analysis of methods, conducted under the Chief of Naval Technical Training, determined that the most effective method for the new training course would be self-paced instruction. Student progress is monitored to ensure that progress is commensurate with his or her potential. Students are required to demonstrate the skills or knowledge described in each course objective before proceeding to the next phase of instruction. Many of the progress tests are performance examinations where demonstration of ability to do, rather than know, is required.

Managers and supervisors in aviation maintenance activities can help improve the curriculum by becoming familiar with current course objectives and providing feedback on the graduates' performance. Specific recommendations for changes in curriculum are solicited and should be forwarded, via chain of command, to CNO (OP-592) with copies to the Chief of Naval Technical Training and NATTC Memphis.

LAMPS MK III

In the LAMPS MK III full-scale development program, the Navy has selected Sikorsky Aircraft Division as the helicopter airframe contractor and the General Electric Company as the engine contractor. The MK III system uses a helicopter to extend shipboard ASW targeting capabilities. It includes the helicopter airframe and avionics systems, associated shipboard electronic and support equipment, and a ship recovery assist, secure and traverse (RAST) system. RAST enables designated ships to safely launch, recover and secure LAMPS helicopters in rough seas.

IBM was selected in 1974 as the system's prime contractor.

VP Supports Research

The Office of Naval Research sponsors a variety of scientific research projects in oceanographic prediction. For three years, P-3s under Commander Patrol Wings, Pacific have been observing the ocean thermal structure in the central Pacific. The P-3s have dispensed airborne expendable bathythermographs (temperature measuring devices) monthly at fixed locations, collecting thermal structure data from the sea surface down to a few hundred meters.

The study is sponsored by ONR and is also an integral part of the North Pacific Experiment which is designed to provide an understanding about the large scale interactions between the ocean and the atmosphere. The P-3 data is also being used by the Pacific Fleet forecasting services.

The knowledge gained through this research, when coupled with remote sensing such as satellites, will enable naval tacticians and the fleet forecasting services to better interpret sea surface topography charts. It will also enable prediction of changing patterns of ocean circulation in much the same way that meteorologists now observe and predict atmospheric circulation.

Blues Are Recruiting

The United States Navy Flight Demonstration Squadron (*Blue Angels*) will be selecting three demonstration pilots, one of whom will be a representative of the Marine Corps, and a Naval Flight Officer (1320) to serve as events coordinator. Selections will be made by September 1978 but interested officers are

encouraged to submit their applications as soon as possible.

An applicant for demonstration pilot or events coordinator should be a tactical jet pilot or Naval Flight Officer with 1,500 hours of flight time, a regular naval officer, and rotating to or on shore duty. Letters of application should be endorsed by commanding officers and forwarded to the Navy Flight Demonstration Squadron with copies to the Chief of Naval Air Training and the Chief of Naval Personnel (Pers-433A), or Commandant of the Marine Corps (Code AA).

Each letter of application should include the officer's experience and qualifications. Interested applicants should contact Capt. Dan Keating, USMC, by telephone (autovon 922-2853/2854, commercial 904-452-2583/2584) or by writing to the Blue Angels, Naval Air Station, Pensacola, Fla. 32508.

Aurora

The Fleet Combat Direction Systems Support Activity, San Diego, is providing computer program support for the Canadian Forces' new CP-140 *Aurora* long-range patrol aircraft project. A field support team from San Diego recently installed a CMS-2Y system in the Canadian CP-140 ground support computer complex at Sperry Univac, Valencia, Calif. Captain R. E. Poore, then executive officer, now C. O., headed the delivery team and presented the CMS-2Y system tape to Canadian Forces' Brigadier General A. Pickering, *Aurora* detachment commander.

The *Aurora,* scheduled to replace the current *Argus* aircraft by 1980, is designed to meet Canadian defense and civil mission roles into the next century. It will have capabilities for antisubmarine defense, maritime and arctic surveillance, search and rescue, ice reconnaissance, pollution detection and resource inventory. As a weapons system, it will be able to operate with Canadian and NATO forces. With four turboprop engines, the *Aurora* will take a crew of 11 on flights of up to 17 hours, over 4,000 nautical miles, and then land on the short runways of the northern Canadian bush.

Two basic systems are being combined. The engines and airframes will be nearly identical to the P-3 *Orion,* while the acoustics, radar and communications will be similar to those of the S-3A *Viking. Aurora's* onboard computer is a Univac AN/AYK-10 navigation/tactical real-time general purpose multiprocessor. Magnetic tape units will store and load software program data, including diagnostic system tests and inflight training data, as well as operational computer programs. From the ground, *Aurora* squadrons will be assisted by two computer installations: a ground support computer complex and a data interpretation and analysis center. The center will play a command, control and communications role, in addition to performing photo interpretation and analysis, and data reduction and evaluation.

grampaw pettibone

Maintenance Error

Two student pilots and their instructor pilot launched in a TS-2A for a night-safe-for-solo check flight. The flight was routine until the landing gear was raised after a touch and go. The wheel position indicator showed the starboard main mount unsafe with the gear handle light on. The handle was recycled normally with no change. Determining that the starboard main landing gear would not extend by using the normal hydraulic system, the instructor attempted to pump the gear down with the emergency hydraulic system. When this failed, he executed high-G maneuvers in order to try to get the gear to extend.

After repeated unsuccessful attempts to lower the stubborn main mount, he decided to execute an intentional gear-up landing, making an arrestment under the control of an LSO. Problems hampering the situation were reduced weather visibility and the pilot's inexperience at operating under the control of an LSO.

It was decided that the approach would be executed with the taxi light off so as not to hinder the LSO's capability in accurately determining aircraft sink rate. Since the taxi light was not used, the instructor experienced difficulty in determining his altitude during the last 50 feet of descent. The radar altimeter was unreliable and the barometric altimeter was inaccurate at that low an altitude.

The pilot relied solely on the LSO's commands. He briefed all crew members on their respective duties during and after the landing. After practicing several LSO-controlled approaches, the final one was executed. The LSO commanded the cut. The engagement with the arresting gear resulted in an unintentional inflight arrestment. The majority of the damage was sustained as the aircraft impacted the runway

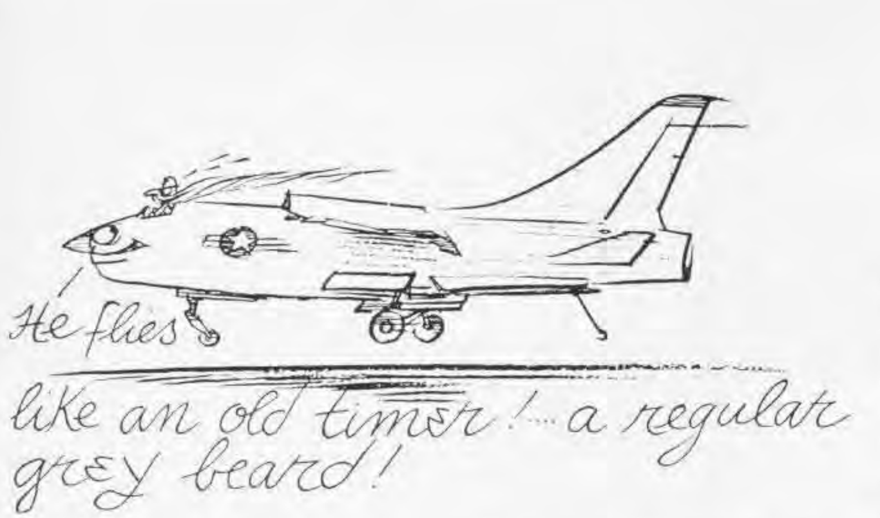
after the inflight arrestment. The crew safely exited by jettisoning the main hatch. There was no post-crash fire.

Post-accident inspection of the aircraft revealed that the bolt that connects the starboard hydraulic actuating cylinder to the inboard gear door did not have a cotter key. This allowed that nut to back off, permitting the hydraulic cylinder to only partially activate the gear door. The bolt had been removed and inspected during phase maintenance and replaced without a cotter key.

Grampaw Pettibone says:

Jumpin' Jehosaphat! This reminds me of some prose. "Once a maintenance task is begun, never leave it 'til it's done: be the labor great or small, do it right or not at all." Even though some confusion existed during the phase inspection relating to the subject bolt, the bottom line is that the cotter key was not replaced. This flight crew worked like beavers with the aid of ground support to get out of this booby-trapped situation. It's easy to Monday-morning quarterback but all in all they were deliberate and planned their actions to try and take best advantage of the time and fuel remaining prior to the final approach. Pilots entrust their lives to the maintenance crew. Nuff sed!

ILLUSTRATED BY Osborn



Real Sharp

Two F-8A *Crusader* pilots departed a Marine Corps air station on the West Coast for an in-type instrument check flight. Shortly after takeoff, the chase pilot declared an emergency owing to fluctuating oil pressure, and the lead pilot escorted him back to the field. After the chase plane had landed safely, the escort pilot executed a wave-off, cleaned up and headed toward the sea in a climb.

As the aircraft passed through 20,000 feet in burner at .95 indicated Mach, the canopy glass exploded. Fragments of the canopy shattered the pilot's visor, causing a laceration of his right cheek and eye with loss of vision in the right eye.

The pilot immediately observed the effects of wind blast in the cockpit. He quickly realized the canopy had failed, but determined that the aircraft was functioning normally with no indication of smoke or fire. He lowered his seat to prevent accidental wind-blast ejection, reduced speed by coming out of burner and cutting power to idle, dropped the speed brakes and began a normal descent.

A Mayday transmission was made on guard, but the pilot was unable to receive clearly the answering station because of wind-blast noise. He then contacted El Toro tower, gave it his situation and requested a straight-in approach with the crash crew standing by. Approach control requested the pilot to change frequencies for radar control and approved the straight-in approach. The Morest gear was not available on this 6,300-foot runway, but the pilot was able to stop the aircraft by cutting power and applying brakes. The overrun chain gear was available but not needed.

The crash crew was waiting for the aircraft when it came to a stop and immediately warned the pilot that the face curtain was partially pulled. After the safety pin was inserted, the crash crew assisted the dazed pilot from the cockpit. The only damage to the aircraft was the broken canopy glass.

Grampaw Pettibone says:

Yipes, how hairy can it get! This lad has got what it takes! Cast-iron guts, brains, and skill are a mighty hard combination to beat. Now here is a lad with less than 600 hours total flight time and only 27 hours in model, yet he handled this emergency like a real old timer.

The board concluded that "he did an incredible job of flying and landing the aircraft on a short runway without arresting gear while beset by extreme physical stresses plus loss of vision in his right eye." Amen. Couldn't have said it better myself.

Makes ol' Gramps mighty proud to place this youngster's name near the top of the Real Pro Roster. (May 1964)

People Eater

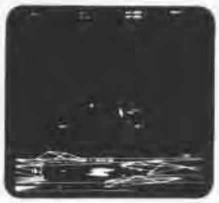
Following a routine night carrier landing, an F-14A was de-armed and then taxied to its final parking spot slightly forward of the island. The flight deck director signaled for chocks and chains and for the pilot to secure the starboard engine. It was secured and two plane captain trainees began to chain the aircraft down.

As the final tie-down chains were being applied to the nose gear, one of the trainees attempted to get the flight deck director's attention by waving his lighted flashlight. Unable to get the director's immediate attention, the trainee walked forward in a crouched position partially under the port engine nacelle on the tunnel side, waving his flashlight.

With the port engine at idle power, the trainee then stepped in front of the port intake and was immediately ingested head first. The flight deck director saw this and gave the pilot the engine-off signal. The pilot immediately shut down the engine. A flight deck corpsman was called and the ingested plane captain trainee was removed from the intake. He survived the incident.

Grampaw Pettibone says:

Dumb-dumb-dumb! In my day, careless folk walked through props. Nowadays careless men get sucked up by these new fangled air scoopin' machines. FOD comes in all forms, including people. Trainees should not be allowed to wander around the flight deck unsupervised. Flight deck hazards and safety procedures must be continually stressed but more importantly, understood. Dad burn it, aeroplane engines demand respect. Whether you work around piston-pumper, turbo-prop or air-suckin'-type engines, be alert to the hazards and understand the "why" behind procedures. That way we'll see ya around . . . .



Gotcha Again

"In the past decade, aviation has advanced so much that concepts once considered impossible are today commonplace. Instinct flying of the WW I fighter pilots has gone the way of WW I stick-and-wire planes. Today, an approaching aircraft is detected by long-range radar. A high-speed computer determines its flight characteristics and path and compares that to scheduled military and commercial flights to determine if it is a 'friendly.' The information is presented to operators via large displays and radarscopes. The computer scrambles the intercepting fighter and vectors it to the approaching aircraft. The interceptor acquires the target with its own attack radar and fires its air-to-air guided missiles without ever having established visual contact. Everything is standoff and safe. The day of the dogfight is over . . . .

"All this is according to the book. In reality, it is not this way. Weapons have not yet been built that take into consideration all aspects of air-to-air combat, and the greatest computer of all, a well trained human being, must make the final decisions. The dogfight is very much with us.

"The key element – a well trained human being – created the need for the Air Combat Maneuvering Range.

"Today's pilot must correlate his own and the target's velocity, range and acceleration, plus his aspect angle, in order to determine if he is within the missile-firing envelope, i.e., that volume of space surrounding a target in which a missile may be successfully launched to realize a kill.

"What was needed was a real-time correlation of all these parameters, presented in a sufficiently authentic manner so the pilot-under-instruction could relate to it. ACMR is the answer."

The foregoing is quoted from an article titled "Gotcha" by R. H. Crangle which appeared in the August 1972 *NANews*. It is still valid and the need and the answer to that need remain the same. Much has happened in the ACMR world in the intervening five years. The Air Force has joined the program and, through the Naval Air Systems Command joint acquisition office, is acquiring identical systems called ACMI (air combat maneuvering instrumentation) systems. In addition, a number of new systems are operational or planned. To bring our readers up to date on the ACMR/ACMI program, *NANews* has again called on R. H. Crangle, the NavAir man who has directed the project since its start eight years ago.

From the lead A-6, CAG Barbwire calls for the right and left A-18 triads to split off for bombing attacks on two of the enemy's missile cruisers. The remainder of the formation presses on for the carrier. The Skipper, Racer and I will provide radar coverage for the right-hand A-18s until we reach the target area. But we'll stay with the main body and also cover the right forward quarter . . . starting to get threat radar warning indications on the nose . . . they know we're here . . . they'll be launching V/STOL interceptors now . . . .

Off to the left front of the formation, an A-18 pulls up in a climb, calling "Shotgun left" as he fires an anti-radiation missile at an unseen emitter. The UHF crackles again – this time it's from the Skipper's aircraft.

"Contact, two bogies on the nose, closing 1,100 knots."

"Contact, 1,100 knots. You've got the eyeball."

"OK burner now. Let's get 'em."

"They're in two-mile stacked trail, trail man low."

Don't get sucked . . . max burner . . . dump the nose . . . Skipper's six is clear . . . .

"This is Barbwire. Cleared to fire. Repeat, cleared to fire. Barbwire out."

"OK, 10 miles on the nose. Lead man 2,000 low . . . ."

My RHAW [radar homing and warning] gear goes crazy, drowning out the last part of Lead's transmission . . . Ah . . . It's a Sam . . . .

"Singer low, 12 o'clock, Racer!"

"Rog, same here. Check Knockers Up."

"Five miles. Fox 1 lead bogey!"

We've got the trail guy locked . . . Check Sparrow selected . . . .

"Fox 1, trail bogey!"

"Singer high, let's come port!"

"Shotgun right."

Don't lose sight of the Skipper doing this Sam break . . . hope that Ironhand shuts him down quick . . . there go the A-6s in hot on the carrier . . . A-18 just pulling off the cruiser . . . looks like good hits . . . .

"Skipper break right, missile!!" . . . *That was close!* "Where did that bogey come from?"

"Keep him turning and I'll get a shot!"

Here comes his belly . . . Check Sidewinder selected . . . good growl . . . .

"Fox 2!"

Got him! . . . Only four more and I'm an Ace. . . .

"Good shot! The strike group is headed north. Let's bugout."

"Rog, coming out your starboard side low."

"Visual. Your six is clear. Fuel is 6.0."

"Six clear. Our fuel reads 5.5."

Looks like another trick-or-treat pass at the boat if we can't find a tanker . . . .

"Tanker Posit."

Just like cops . . . never there when you need 'em . . . oh well, at least we'll be first down the chute . . . maybe we won't have to stand up during the ACMR debrief of this fiasco.

That's right. The fictional scenario just presented will become reality in the future with the advent of the At-Sea ACMR and expanded ACMR capabilities including no-drop bomb scoring and minelaying, electronic warfare, anti-radiation missile and total alpha strike training.

But before we light the afterburners and accelerate into the future, let's go idle and speedbrakes, recapping ACMR background and development.

The requirements for an Air Combat Maneuvering Range were first articulated in the air-to-air missile systems capability review of 1969. Headed by Captain Frank Ault, the committee identified a number of material, procedural and pilot training deficiencies which contributed to the lower than desired kill ratios achieved in air-to-air combat in Southeast Asia between 1965 and 1968. This report emphasized that virtually no way then existed to adequately train aircrews or determine their readiness for air combat. No useful tool was on hand to teach the pilot in the air what is described in the tactical manuals as the missile-firing envelope. Very little attention was being given to a number of firing parameters which must be satisfied in order to make a successful delivery and achieve a kill. As a consequence, CNO directed that an ACMR be designed and constructed which would correct the deficiencies.

In the winter of 1970 the proposal of Cubic Corporation of San Diego was selected from a group of five competing proposals. A contract was awarded on May 4, 1971, for the first ACMR, to be built and installed at MCAS Yuma. Eighteen months later the system was delivered and on December 17, 1973, was declared operational.

In October 1974 a contract was awarded to Cubic

AIS pod mounted on LAU-7 launch rail, above. Opposite center, aerial view of an F-5 being tracked by an F-14. Photo courtesy of Grumman Aerospace. Small photos are of range mission data which is at the finger tips of the instructor at the DDS control console.

Corporation for a second range located near Kitty Hawk, N.C. Control facilities for this East Coast range are at NAS Oceana, Va. An equal, but separate, control site has been set up at Langley AFB to permit joint service use. Differing from the range at Yuma which was totally a land installation, the East Coast version has three land and four overwater tracking stations which are mounted on ocean towers. These towers were constructed and installed at a cost of $12 million.

Subsequent to the completion of the Yuma range, the Air Force declared the ACMR suitable for acquisition and a joint USN/USAF memorandum of agreement was signed. The Navy was established as the bi-service executive agent. Called Air Combat Maneuvering Instrumentation by the USAF, the systems have been procured for and are now operational at Nellis AFB, Nev., and at Tyndall AFB, Fla. Ranges have also been contracted for the U.S. Air Force, Europe (to be located in Sardinia, Italy) and for U.S. Air Force, Pacific (to be located in the Philippines and shared by deployed Navy squadrons).

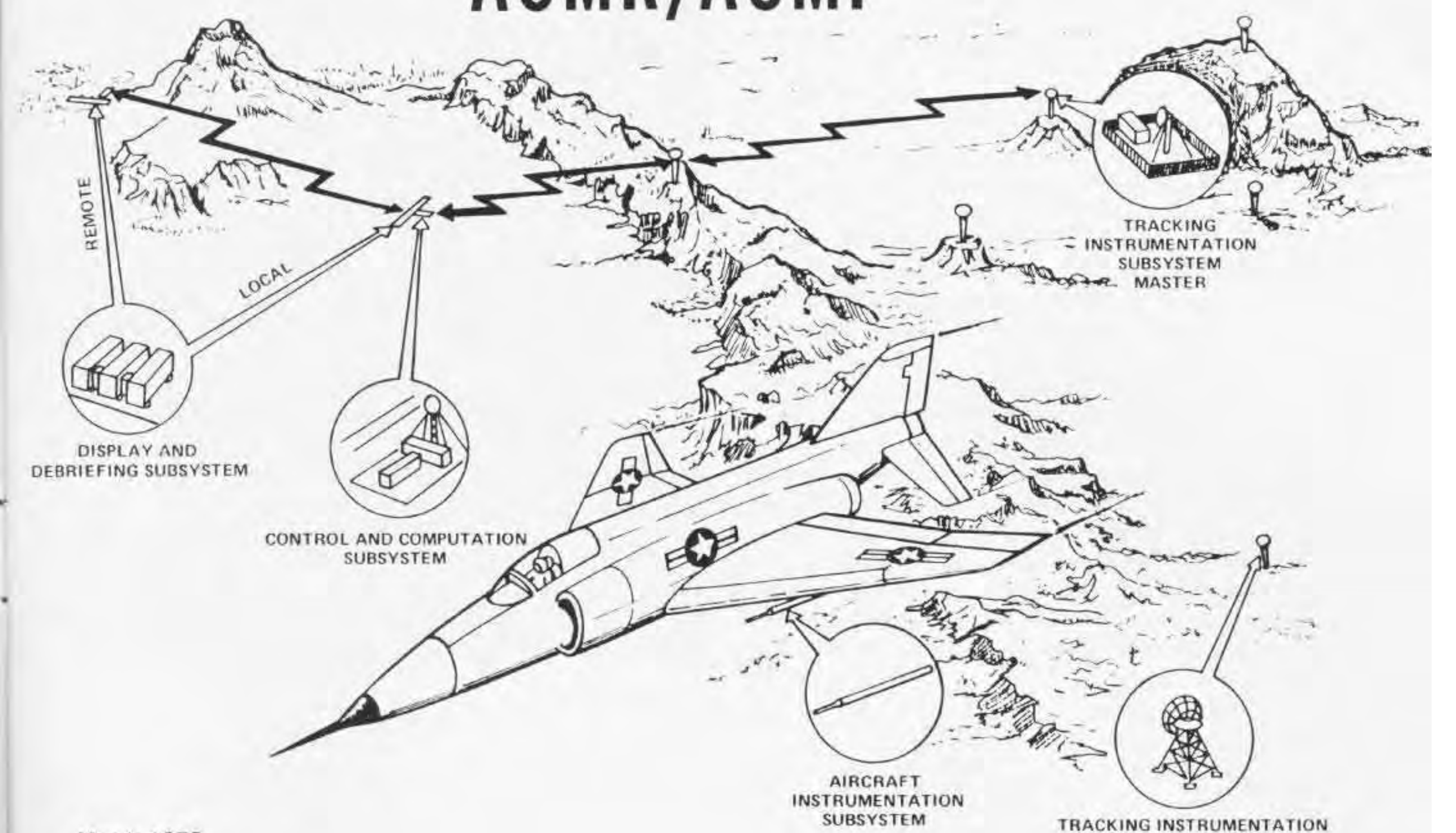
A typical range covers more than 700 square miles with a network of unmanned, solar-powered tracking stations remotely located from the control and display stations. The present ACMR is composed of four major subsystems.

Aircraft Instrumentation Subsystem (AIS) equipment is housed in a pod which mounts on an aircraft's standard LAU-7A launcher. The electrical interface with the aircraft weapons system is essentially that of *Sparrows* and *Sidewinders*. The pods are fitted with a standard pitot-static probe and have a housing similar to a *Sidewinder*, without wing or tail surfaces. Continuous measurements of inflight air pressures are converted to angle of attack, angle of sideslip, airspeed and Mach number data. A strapdown inertial reference unit supplies pitch, roll, heading, acceleration and velocity information. The AIS closes the loop with the other major subsystems and provides position, velocity, acceleration and altitude data to the displays. It also provides weapon data and firing functions.

In addition to requiring *Sidewinder* similarity to simplify carriage and interface problems, the initial AIS pod design was predicated on "no aircraft changes." Accordingly, the pod has access only to the signals available at a *Sidewinder* station and, where close by, to AIM-7 signals via an interconnecting cable. It has always been desired that all weapons and other aircraft systems data be available

Ocean tower, top, rests in 100 feet of water off Kitty Hawk, N.C. Each leg is pinned to the ocean floor with 250-foot steel pilings driven into the Continental Shelf. Bottom photo is an unmanned tracking station at Yuma ACMR. Right, above, Lt. Bill Redmond tells Miramar VF-124 pilots where they scored in a mock battle held one hour earlier. Right, graphic display of range elements.

ACMR/ACMI


REMOTE
LOCAL
TRACKING INSTRUMENTATION SUBSYSTEM MASTER
DISPLAY AND DEBRIEFING SUBSYSTEM
CONTROL AND COMPUTATION SUBSYSTEM
AIRCRAFT INSTRUMENTATION SUBSYSTEM
TRACKING INSTRUMENTATION SUBSYSTEM REMOTE UNIT

through the ACMR system. However, the nature of the signals and the extensive aircraft changes which occur on a continuing basis preclude this. The F-16/F-18 generation aircraft and beyond will employ serial digital data busses which will allow easy access to all signals via a simple interface. The next generation AIS pod is designed to interface with this data.

The Tracking Instrumentation Subsystem (TIS) consists of a master station and a network of unmanned remote interrogator/receiver stations spread throughout the range area. Each remote unit can identify and track all participating aircraft within its line-of-sight. Tracking data is transmitted to the master station, processed and sent to the computation subsystem. TIS can simultaneously identify and track up to eight high performance aircraft in all attitudes, and up to 12 additional aircraft in position. Planned developments will accommodate many more aircraft, both high performance and position only.

The Display and Debriefing Subsystem (DDS) is a control center where all data is displayed and range activity evaluated. Consoles at each end of a large van permit real-time mission control and debriefing flexibility.

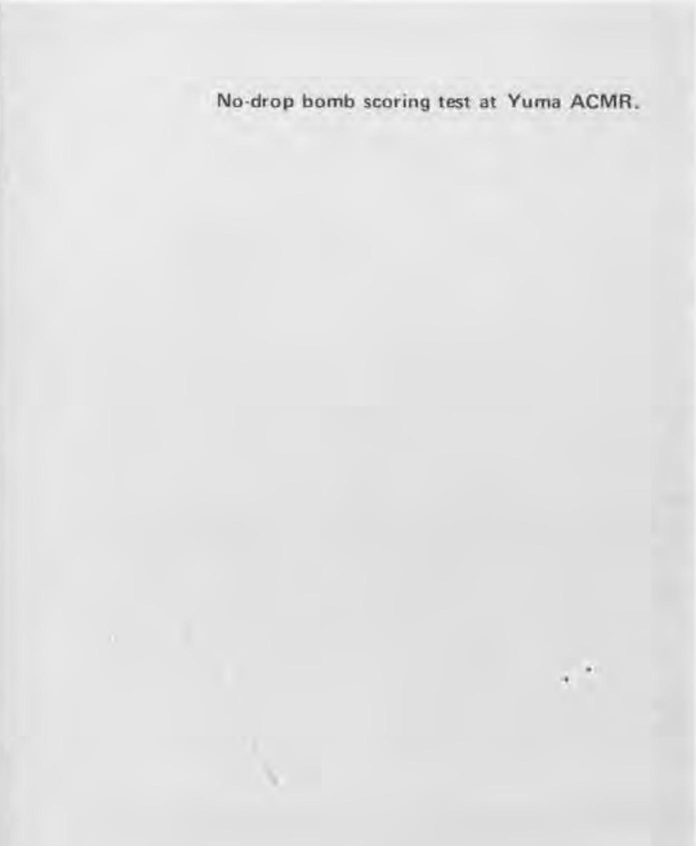
A three-dimensional representation of range activity shows the location, altitude, attitude and flight paths of all aircraft and the range terrain. Every mission may be viewed in real time from virtually any angle desired. Tracks of maneuvering aircraft are presented as variable moving images with time-history ribbons. Variable intensity ground tracks augment the display's three-dimensional character. In addition, a plan view or pilot's view may be selected.

All data is recorded on magnetic tape for post-exercise replay and debriefing on CRTs or 4-foot x 4-foot four-color screens at the East Coast ACMR. Hard copies can be printed of any data or display picture as requested.

Remote installations, identical to the primary DDS, are in use at NAS Miramar, linked to the MCAS Yuma facility, and at Langley AFB, linked to the NAS Oceana facility.

The Computation and Control Subsystem (CCS) computes aircraft position, velocity, acceleration, attitude and attitude rates by processing the range observations from the tracking information subsystem and the data downlinked from the aircraft instrumentation subsystem. Position data for the escort aircraft is computed using range observations only. The result of the computation is a real-time output to the display and debriefing subsystems, providing aircraft status, interaircraft parameters and missile simulations.

The ACMR has five training modes which can be used to support aircrew training in missile firing envelope recognition, simulated *Sparrow* and *Sidewinder* firing, and practice in evasive maneuvering. The first mode to be used in a live



No-drop bomb scoring test at Yuma ACMR.

exercise is designated before the exercise begins. Additional mode selections can be made during the exercise so that aircrews can use all five modes in a single operation. This permits aircrews to follow a logical and effective progression in developing air combat skill.

Modes 1 and 2 are based on fixed weapons envelopes. These firing boundaries are characterized as "rule of thumb" parameters by the Navy Fighter Weapons School.

Modes 3, 4 and 5 use full dynamic missile simulations. In Modes 3 and 4, simulations are run faster than real time and therefore assume that the target continued the maneuver it was performing at missile launch. In Mode 5, simulated missile flight duration corresponds to actual missile flight time and the firing results reflect post-launch target defensive maneuvering effects.

Both Modes 1 and 3 are nonfiring modes which provide a continual radio tone when an aircrew is flying the envelope. Modes 2, 4 and 5 are firing modes and require a trigger squeeze to initiate envelope calculations or missile simulations. In Modes 2, 4 and 5, Kill/No Kill indications are displayed for each simulated missile fired. Reasons for miss are also displayed if there is a No Kill indication.

The missile simulations (Modes 3, 4 and 5) are mathematical aerodynamic models which integrate the missile equations of motion by small time intervals for the entire missile time of flight. In effect, the model calculates at a rate 30 times faster than real time what the actual missile would be doing during its flight, and includes weight, thrust, drag, fin deflections and seeker head dynamics and limitations. The missile is actually "flown" to the target in very small steps. The closest point of approach to the target is found, and "hit" or "miss" is based on a predetermined maximum lethal miss distance. Some experimental simulations go a step further. After determining the missile-target intercept geometry and dynamics, the computer assigns a probability of kill for that missile, based on expected warhead effects and target vulnerability studies, rather than a display of a definitive hit or miss. Other experimental innovations include infrared and radar target and radar clutter models, and individual aircraft fire control effects.

Since its inception, ACMR capabilities have steadily increased. Examples are expanded tracking capacity from four to eight high-dynamic aircraft (an additional 12 in position only) and simultaneous missile simulations, from two to four. Displays have advanced from black and white cathode ray tubes to 4-foot by 4-foot color screens which enhance debriefing of aircrews. Many hardware and software modifications have been made to improve performance.

ACMR has also been discovered by the test and evaluation community. The air combat evaluation/air intercept missile evaluation (ACEVAL/AIMVAL) joint test recently concluded a year-long effort at the Nellis AFB air combat maneuvering instrumentation facility to determine requirements for short-range air-to-air missiles for both the Navy and Air Force in the 1980s, and to develop future fighter tactics.

Such a comprehensive evaluation would have been impossible without ACMR. Incidentally, the aircraft used for this test (F-14s, F-15s and F-5s) were extensively modified to increase the information accessible to the ACMI. Many of these aircraft will be retained by the services in their modified configurations for use in future programs.

The concept and capabilities of the ACMR provide unlimited possibilities for extended applications. To ensure that its full potential is realized, NavAirSysCom has had, since 1969, a contract with SRI International, Menlo Park, Calif., whose technical expertise is well known and respected in the range instrumentation world. Navy technical skill is provided by such activities as: Naval Air Development Center, Fleet Analysis Center, Naval Weapons Center, Naval Research Laboratory, Naval Ocean Systems Center, etc. Close cooperation is maintained between the Navy, the system manufacturer (the Cubic Corporation) and the technical advisers to guide development into new areas.

ACMR technology provides the air combat training and tactics development communities with a tool for objectively evaluating air combat maneuvering. A readiness evaluation system is under development to allow assignment of quantitative measurements to ACM activities. The system has already been applied to certain test engagements at Yuma. The days when the "best" fighter pilot was either the senior pilot in the flight or the fastest talker are surely numbered.

The capability of sending ACMR to sea is being developed. The need for such a capability, for deployed air wing training, has long been recognized. The concept includes incorporation of the computation and control subsystem and display and debriefing subsystem aboard the carrier with the master tracking instrumentation subsystem station.

Two or more remote tracking stations will be deployed aboard escort and support ships or carried by air wing planes. This concept requires an extension of current ACMR technology, especially in regard to the ability to track highly dynamic aircraft with a distance-measuring tracking system. The system, itself, is comprised of elements in constant motion with respect to each other.

NavAirSysCom, SRI and the Cubic Corporation are now engaged in testing At-Sea technology on the newly operational East Coast ACMR. Planning calls for the first At-Sea ACMR to be deployed in a West Coast carrier and to be operational in late 1981. The first Atlantic Fleet range would follow two years later.

Tests using a simulated *Shrike* anti-radiation missile, electrically interfaced with the aircraft instrumentation subsystem pod carried by attack aircraft, have been under way since late 1976 on the West Coast.

For these tests, the computer program has been modi-

Large screen display used at East Coast ACMR.

fied to include *Shrike* envelope calculations. New displays have been incorporated to show aircraft position, target radar location and main beam, and a moving "footprint" (possible impact area) of the missile on the terrain. This missile footprint is "frozen" at the time of simulated missile launch. Flight and target data are shown on the ground displays in real time.

The target pulse repetition frequency heard by the pilot through his headset is duplicated in the display and debriefing subsystem. The tests at Yuma have confirmed the feasibility of incorporating the concept into the latest versions of the ACMR.

Following participation in these tests, the C.O. of VA-192 wrote, "The evaluation was an unqualified success from our vantage point. The need for a training atmosphere of this type closer to home is acute. While cost considerations have prohibited live firings of *Shrike* by every squadron pilot, the requirement for competence in the weapons system has remained unchanged. The training received during the evaluation was far superior to any training we have thus far experienced and provides all the benefits of firing a live weapon without expending the round." It is planned to extend this concept to other anti-radiation missiles in the future.

Tests have also been completed at Yuma to determine the feasibility of adapting the range to accurate scoring of simulated bomb impacts without actually expending training ordnance.

In no-drop bomb scoring, the bomb release signal is downlinked to the ACMR computer, which calculates the bomb trajectory and impact point using weapon weight and aerodynamic characteristics, and the measurement of aircraft position and velocity at the moment of simulated bomb release.

Accurate no-drop bomb scoring offers the advantage of greater training realism, since training targets in use today are subject to damage by successive bomb drops and soon lose their realism. The no-drop concept, using ACMR, would also mean that a greater number of locations would be available for air-to-ground training. In addition, ACMR's ability to view the world through the pilot's eyes provides tremendous potential for all types of air-to-ground weapons training. Based on preliminary test results it is estimated that the no-drop bomb scoring system will achieve an accuracy of 3 to 4 mils.

The ultimate extension of ACMR design is the integration of air-to-air, air-to-ground and ground-to-air training within a realistic electronic warfare environment to provide training on a total integrated warfare complex in an alpha strike exercise. Ranges which now offer limited realism in electronic warfare instruction may be modernized to incorporate electronic warfare emitters that can be programmed to simulate enemy ground threats, including early warning, ground intercept and fire control radar systems. Additional threats will be simulated in the computation and control subsystem and presented to pilots via their existing radar homing and warning equipment. Integration of all of these capabilities will provide more realistic instruction, increase aircrew training opportunities and reduce cost.

Limited development testing has already been accomplished at the East Coast ACMR in the areas of electronic warfare, surface-to-air missile simulation, and precision no-drop minelaying for training on overwater ACMR systems. The first range to incorporate a full air-to-ground and electronic warfare capability is planned for Fallon, Nev., in 1982. It is to be followed by Pinecastle, Fla., two years later. Other ranges will also receive these additional capabilities.

Further developments will include increases in aircraft tracking capacity, a more capable and reliable aircraft instrumentation subsystem pod, and additional weapons simulations not only of our own weapons, but also foreign types. Understandably, many other nations have expressed interest in the ACMR, and foreign military sales are anticipated.

User enthusiasm has generated a high level of range utilization which promises to grow even more in 1978 with the return of pods assigned to the ACEVAL/AIMVAL program. This increased usage is due to the improved training provided by the ACMR. One squadron commander estimated that a pilot could be trained twice as fast using the ACMR compared to non-ACMR training, or that each ACMR hour represents two non-ACMR hours. In 1978 approximately 22,000 hours will be expended on ACMR flights. At an average cost of $1,850 per flight hour, this represents a saving of $40 million.

Now that the ACMR has been operational for four years, what does the fleet think of its new training tool? Here are some typical reactions.

"Use of the ACMR facilities greatly increased the pilot's ability to think and react in the ACM situation." NATC, Patuxent River, Md.

"ACMR provided highly useful real-time/replay information and proved a superb device for evaluating ACM." ComOpTevFor, Norfolk, Va.

"No bull as to who shot who, who was actually in firing envelope, etc., what tactics employed." ACEVAL/AIMVAL pilot.

"ACMR provided highly useful real-time/replay product at the end of the line . . . . We spend less time and energy through the ACMR . . . . When you're talking about ACMR qualifications, what you're really talking about is quality training." Lt. Bill Redmond, instructor pilot, VF-124, NAS Miramar.

Who can say what future applications may be found for this adaptable and flexible system which has been called "the greatest thing for fighter training since the airplane." In the words of Commander Tactical Wings, Atlantic, "The surface has only been scratched for other uses."

ACMR has arrived and GOTCHA is the word!

PEOPLE PLANES AND PLACES

VP-5's *Mad Foxes* of Jacksonville received the CinCLantFlt Golden Anchor Award for FY 1977 in the deploying unit category. ComPatWing-11 nominated the squadron for its record of accomplishments in retention and career motivation. VP-5 is commanded by Cdr. William R. Spearman.

Midway's recent Indian Ocean deployment found her aircraft consuming thousands of gallons of fuel and her 4,200-man crew eating 13,000 meals daily. Thus, resupply of provisions, parts and consumables presented the ship's supply officer, Cdr. James M. Quarles, and his crew with a monumental task.

Twelve days out of Perth, Australia, an unprecedented underway and vertical replenishment took place.

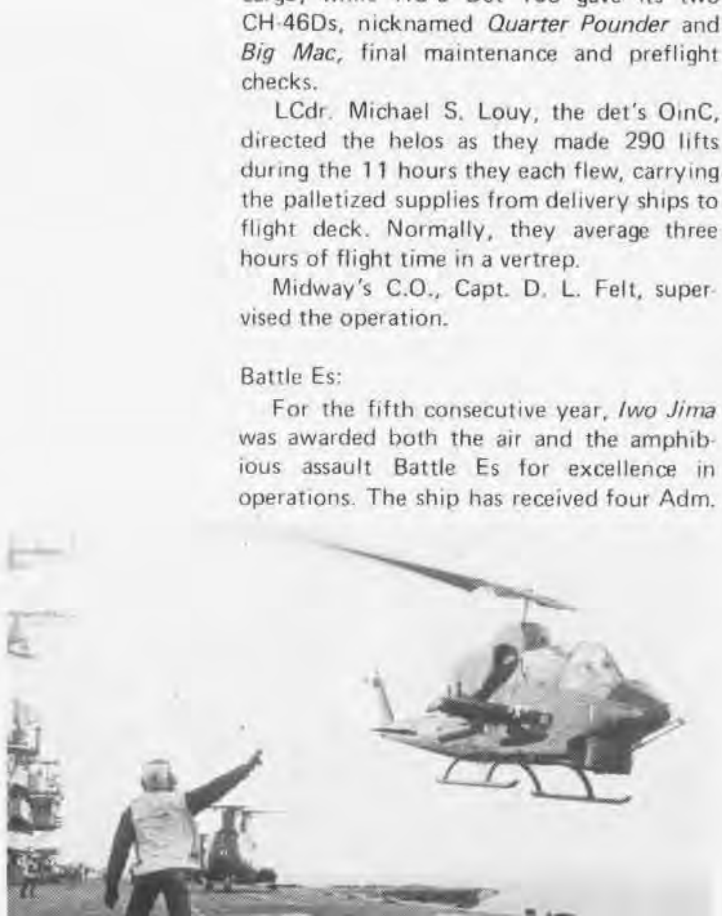
A 320-man working party was briefed on where to store over one million pounds of cargo, while HC-3 Det 106 gave its two CH-46Ds, nicknamed *Quarter Pounder* and *Big Mac,* final maintenance and preflight checks.

LCdr. Michael S. Louy, the det's OinC, directed the helos as they made 290 lifts during the 11 hours they each flew, carrying the palletized supplies from delivery ships to flight deck. Normally, they average three hours of flight time in a vertrep.

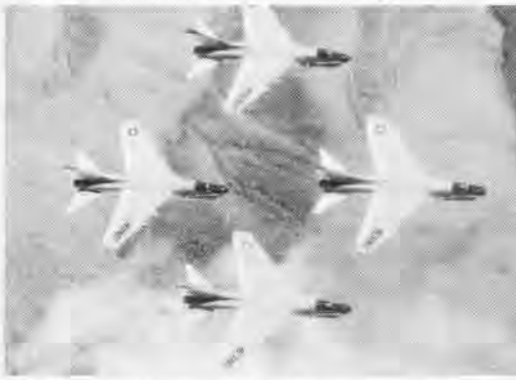
Midway's C.O., Capt. D. L. Felt, supervised the operation.

Battle Es:

For the fifth consecutive year, *Iwo Jima* was awarded both the air and the amphibious assault Battle Es for excellence in operations. The ship has received four Adm. James H. Flatley Memorial Awards for aviation safety and has counted about 87,000 accident-free landings.



VA-147 *Argonauts* won the ComNavAirPac Battle E for the competitive cycle January 1, 1976, through June 30, 1977, demonstrating superiority in safety, in com-



mand inspections and in competitive exercises among A-7E squadrons on the West Coast. C.O. is Cdr. Gary L. Harter.

One of the Navy's oldest active squadrons, VRF-31, Norfolk, was awarded the 1977 ComNavAirLant Battle E in the support squadron category. C.O. Cdr. Charles F. Williams stated that "This is not merely a unit award, but a recognition of consistent professionalism on the part of each individual squadron member. I couldn't be more proud of you."

The *Topcats* of VS-31 at Cecil Field are winners of the 1977 ComNavAirLant Battle E as the top combat-ready squadron in the East Coast VS community. Led By Cdr. Hank L. Phillips, Jr., the squadron flies S-3A *Vikings.* Special recognition for contributing to the Battle E goes to the VS-31 maintenance department headed by LCdr. Harry B. Allen and two of his chiefs, AVCM K. G. Lentz and AFCM B. G. Anderson.

Commanded by Cdr. Pat Kober, CVW-3 captured four of the seven carrier-based ComNavAirLant Battles Es for the second time in five years. The squadrons involved were: Cecil Field-based *Gunslingers* of VA-105, Norfolk's VAW-123 *Screwtops,* Oceana's VF-31 *Tomcatters* and, for the second consecutive time, Jacksonville's HS-7 *Shamrocks.*

RAdm. Robert F. Schoultz, ComCarStrikeForSixthFlt, participated in the *Iles D'Or* Exercise with NATO forces in the unusual role of *Intruder* crewman. The admiral viewed air operations firsthand from the right seat of a KA-6D tanker while it transferred fuel to F-4 *Phantoms*. C.O. of VA-75, Cdr. Ken Werhan, piloted the aircraft during the flight which took place in the Med. The squadron was operating from *Saratoga*.

A recent milestone was marked for the air department aboard *Raleigh* (LPD-1) when Lt. W. H. Walston made the ship's 13,000th accident-free helo landing under the guidance of ABHAN R. G. Burgoon. *Raleigh*, participating in *Display Determination 77*, is commanded by Capt. G. L. Riendeau.

Blue Angels personnel have, until recently, had one thing in common since the inception of the squadron 31 years ago – they all have been men. Soon to be the first woman on the team is Point Mugu's AE2 Penny Edwards, whose good record and ambition earned her a position in the maintenance crew. "I've always wanted to be part of the *Blue Angels* because they are a top-notch team," she says.

Being first is not new to Edwards – she was the only woman in her class at Aviation Electrician's A school and graduated first. Although the work will not be easy, AE2 Edwards is looking forward to her new assignment. As she says, "It's the chance of a lifetime."

The skipper of VP-22, Cdr. D. K. Moore, represented the *Blue Geese* during a ceremony recently when the squadron was congratulated by Capt. Harvey Gray, ComPatWing-2, for "outstanding and sustained achievement" in its 24 years of accident-free operations. The 195,189 hours accumulated during those years were all flown in Lockheed aircraft. Mr. Paul S. Norton, Lockheed director of Navy sales, presented the squadron with a commemorative oil painting and a personal message from the president of the company.

It's not often that a *Firebee* is hit by a missile. Flight crews come close often, but pilot LCdr. Pete Hunt and RIO Lt. "Butch" Cassidy of VF-302, NAS Miramar, scored a direct strike on a BMQ 34 *Firebee* with a *Sparrow III* recently while flying an F-4N *Phantom II* at PMTC.

The success of a missile firing is largely determined by maintenance department efforts. All systems of each aircraft are thoroughly checked before it is designated a "shooter." The radar system must be tuned to peak performance and the missile firing systems operating perfectly. All this requires many hours of work before the actual exercise.

Teledyne Ryan presented two plaques in recognition of the team effort.

A member of VXE-6's Penguin Airline checks over the giant, 19½-foot-long aluminum skis worn by the squadron's LC-130 *Hercules*. Weighing one ton each and coated with teflon on the bottom to repel sticky

snow, the skis are among the largest ever made for aircraft. They are part of the Lockheed ski-*Hercules'* ski-and-wheel landing gear system which enables the plane to operate either from paved surfaces or from ice and snow. VXE-6 operates seven of the ski-birds, making supply flights to remote stations across Antarctica during the five-month wintering over period.

Two VR-24 aviators reached a milestone in a CT-39G on a flight from Rome to London. LCdrs. Pete Ford and Frank Bachman flew their 2,000th hour in the *Sabreliner*. In a ceremony held at NAF Sigonella,

VR-24 C.O., Cdr. R. E. Weaver, presented a certificate from the Honored Order of Sabre Knights (a society of type-rated pilots) in recognition of the achievement.

The first production model of the Marine Corps' AH-1T *Cobra* has started service acceptance trials at NATC Patuxent River.

Boasting an increase of more than 200 percent in its armament payload, the AH-1T gunship is designed to travel farther, stay over the target longer and fight harder than the AH-1J. Changes to the airframe include an uprated drive train and rotor system, an increase in rotor diameter from 44 to 48 feet and an improved P&W Twinpac engine, the T400-WV-402. The greater diameter rotor system also increases the length of the aircraft 20 inches in the tail boom. The fuselage is 12 inches longer forward of the main rotor.

The Marine Corps plans to purchase 57 AH-1Ts by the end of FY 1979.

A team of military and civilian personnel from Australia is working at NATC Patuxent River to learn how to operate that country's first P-3C tactical support center (TSC). The TSC is an automated facility which provides a direct link between antisubmarine aircraft and the operational commander. Australia is purchasing 10 Update II P-3C *Orions*.

The project team includes officers of the Royal Australian Air Force which has the

antisubmarine and maritime patrol missions in Australia. The two senior RAAF personnel at NATC are Flight Lts. Peter Jupp, in charge of the Australian detachment, and John Downey, P-3 tactical coordinator.

Navy has 18 tactical support centers in operation. They grew out of the need for a computerized facility on the ground to handle the increased capabilities of P-3C *Orions* and S-3A *Vikings*.

The center, by directly interfacing with the patrol aircraft or other tactical and coordinating agencies, can provide real-time operational assistance through the ASW mission. The center and its personnel perform all necessary functions to brief and debrief ASW flight crews and to monitor and control their activities while on station. The Australian TSC (to be called a mission support facility) will be located at RAAF Edinburgh, near Adelaide, in South Australia.

In the photo, perhaps unaware a third party is peeking over their shoulders, Jupp and Lt. Peter Patrick, NATC, examine some paper work concerning the TSC being purchased by the Australian government.

Whiting Field has its own version of the *Marathon Man*.

Lt. Phil Camp, a recent addition to the VT-6 instructor corps, can be seen almost daily running on the grounds of the air station. In the last 10 years, he has run in 16 marathons. This is no small accomplishment when you consider that a marathon is over 26 miles long.

In his most recent outing at the Second Annual Marine Corps Marathon in Washington, D.C., Camp finished second out of a field of more than 3,400 competitors, and took first place in both the military division and the 30 to 39-year-old division. The 30-year-old lieutenant ran a remarkable time of 2 hours, 20 minutes, 9 seconds, his second fastest time. He holds the unofficial Navy record of 2 hours, 18 minutes, 7 seconds set in the 1976 Mission Bay Marathon, run annually in San Diego and he finished 16th in the 1976 Olympic trials held in Eugene, Ore., with a time of 2 hours, 20 minutes, 27 seconds.

With the addition of Lt. Camp, VT-6 may have one of the finest four-man distance teams in the Navy. Along with LCdr. Jerry Bunch, Lt. Kron Littleton and Ltjg. Rick Smedberg, the team would probably outclass most, if not all, of the competition.

NAS Bermuda provided rescue assistance to an injured Cuban officer aboard a passing freighter recently. VP-26, on deployment from Brunswick, launched a P-3 in search of the ship which was located about 120 miles from Bermuda. The *Orion*, piloted by Lt. Phillip E. Cather, with copilot Ltjg. Steven E. Nelson and tactical coordinator LCdr. Reau E. Folk, provided directions to the base helicopter as the freighter had no navigational equipment.

The UH-1, piloted by Lt. William D. Young and copiloted by Ltjg. Thaddeus E. Boggs, with crew members AE1 Patrick M. Conlon, AD2 Jerry J. Lemke and HM1 Pierre G. Decalonne, reached the ship but had difficulty lifting the injured man aboard because it was hard to maintain the proper hovering distance above the ship's cargo booms and antennas.

Finally getting the patient aboard, the helicopter crew took him to the Bermuda Botanical Gardens where he was transferred to a nearby hospital for surgery on an injured hand.

VA-25 was given the honor of placing its squadron markings on the memorial A-1 *Skyraider* near the main gate at Lemoore.

Designed and built to carry large loads of ordnance great distances and to remain on station long periods of time, *Spads* served

the Navy for 20 years. They were used during the Korean and Vietnam conflicts for close air support, road reconnaissance, interdiction and rescap missions.

Changes of command:

CVW-15: Cdr. L. W. "Snuffy" Smith relieved Cdr. Bert Terry.

H&MS-26: Maj. Kenneth C. Carlon relieved LCol. Richard G. Sousa.

HS-84: Cdr. D. Tom May relieved Cdr. V. Edward Chrisman.

CVW-11: Cdr. Phillip R. Wood relieved Capt. Rene W. Leeds.

NAS Lemoore: Capt. Leroy B. Keely relieved Capt. James B. Busey IV.

RVAH-1: Cdr. Thomas F. Johnston relieved Cdr. Robert L. Larson.

VA-27: Cdr. Dick Pottratz relieved Cdr. Dale A. Iverson.

VA-37: Cdr. Robert J. Spane relieved Cdr. Richard W. Hamon.

VA-83: Cdr. Robert J. Naughton relieved Cdr. John M. Waples.

VA-113: Cdr. M. J. Webber relieved Cdr. Hank Lesesne.

VA-122: Cdr. M. W. Patrick relieved Capt. Ken Dickerson.

VA-147: Cdr. Gary L. Harter relieved Cdr. Paul B. Austin.

VA-203: Cdr. Frank Hughes relieved Cdr. James Seeley.

VAW-117: Cdr. J. Compton French, Jr., relieved Cdr. Grady F. Ghrer.

VAW-121: Cdr. David E. Beyman relieved Cdr. James A. Wagner.

VC-3: Cdr. William E. Steep relieved Cdr. Joseph Tranchini.

VC-7: Cdr. David P. Gauthier relieved Cdr. Richard E. Dellwo.

VC-13: LCdr. William "G" Goff, Jr., relieved Cdr. Patrick J. Burke.

VF-124: Cdr. Howard L. Young relieved Cdr. D. S. Strole.

VF-161: Cdr. John M. Nash relieved Cdr. Thomas C. Koehler.

VP-5: Cdr. William R. Spearman relieved Cdr. J. D. Piccioni.

VP-10: Cdr. Wayne Gullett relieved Cdr. P. W. Wright.

VP-17: Cdr. Robert S. Richmond relieved Cdr. John C. Murphy.

VP-24: Cdr. Donald G. Gentry relieved Cdr. Lynn H. Grafel.

VP-56: Cdr. Robert C. Leslie relieved Cdr. Roger F. Donodeo.

VR-52 Det Washington, D.C.: Cdr. William R. Hendricks relieved Capt. Richard A. Gill.

VR-53 Det Memphis: Cdr. Dale Schaefer relieved Cdr. Jim Moyer.

VS-28: Cdr. Jerry E. Goodman relieved Cdr. Jack B. Austin.

VT 86

By Lt. J. P. Werson

In 1973 when I went through VT-86 in Glynco, Ga., the squadron was responsible for training Naval Flight Officers in radar intercepts, jet navigation, airborne tactical data systems and airborne electronic warfare.

After a fleet tour in VF-51, I received orders back to VT-86, this time as an instructor. Meanwhile, the unit had moved to NAS Pensacola in 1974 and was under the command of Commander, Training Air Wing Six.

When I arrived, I found a highly organized and standardized program in operation. As a student, I failed to realize the complexities of squadron life which I now admire and respect. The amount of work that goes into training a student is really tremendous.

My first few weeks were spent getting "up to speed," learning how and what to teach. After completion of the instructor-under-training syllabus, I was designated an RIO instructor.

The prospective NFOs, Navy and Marine Corps, come to VT-86 after a thorough introduction to aviation at VT-10. The main goal of the squadron is to train these officers to meet the demands and challenges of operating the sophisticated weapons and electronic systems of tactical Navy and Marine aircraft. VT-86 is now responsible for advanced RIO and tactical navigation (formerly advanced jet navigation) training.

RIOs are slated to fly in F-14 *Tomcats* or F-4 *Phantom IIs*. The syllabus consists of intercepts practiced on the ground in the 15C4 simulator, airborne intercepts, airways navigation, air tactical maneuvering and TA-4J familiarization flights. It usually takes 17 weeks to complete the course.

The tactical navigation syllabus is designed for navigators slated to fly in the A-6, S-3, RA-5C, RF-4, EA-6 and EP-3. It consists of radar navigation and analysis in the 1D23 simulators, airborne low level navigation, airborne radar navigation and analysis, airways navigation, air tactical maneuvering and TA-4J fam flights. The syllabus requires 10 weeks.

In October 1977, the RIO and TN syllabus was revamped to encompass the best possible instruction program based on cost, time and needs of the student and the fleet.

The first step takes place in the classroom. Both RIO and TN students receive extensive instructions on the ground prior to stepping into an aircraft. They get information-filled training guides supplemented with lectures.

During and after the academic stage, students proceed to the mandatory simulator phase. This helps them transition from radar theory to airborne radar flights.

RIO students run their intercepts on the ground (before doing corresponding intercepts in the air) using the 15C4, which features a working model of the APQ-94 radar used in the flight phase. (APQ-94 is the intercept radar used in the F-8 *Crusader*.) By computer programming, the instructor teaches the students specific types of intercepts.

The basic objective in any intercept is to position the fighter aircraft in front of a hostile aircraft and then maneuver it to arrive in the bogey's stern position. The RIO relies solely on the information provided by his radarscope to accomplish the intercept.

The 22 simulator intercept periods are run in sequence, each period requiring approximately 30 minutes. The simulator, as well as airborne intercept, periods are divided into four sequential phases: *Sidewinder* only, re-attack, conversion and unknown bogey heading. Each phase requires the student to employ different intercept techniques. After completing seven simulator periods the RIO candidate is eligible to fly his 16 airborne intercept hops in the T-39D *Sabreliner*.

The prospective NFO in the TN syllabus runs seven navigation/analysis flights in the 1D23, a working model of an aircraft cockpit. It contains radios, navaids and instruments, and was originally designed for training students at VT-10. When VT-86 moved to Pensacola, a ground-mapping radar was added.

Radar nav/analysis requires the student to navigate from point A to point B using significant radar ground returns as his sole navigational aid. The TN student flies three low level nav flights in the T-39 while concurrently running his radar nav hops in the 1D23. Low level nav requires a student to navigate around a route by using visual terrain references as his only aid.

After completion of his low level flights, the student flies eight radar nav/analysis flights in the T-39 using the APQ-126, the radar used in the A-7 *Corsair*.

The flight phase is structured as closely to fleet needs as possible. One hour and 45 minutes prior to launch time, the student is briefed by his instructor. Normally there will be three RIO students or two TN students per flight.

The flights generally last two hours, after which a thorough debrief takes place to help the student understand his strong and weak areas. Also incorporated into the RIO/TN flight phase are airways nav, TA-4J familiarization and air tactical maneuvering (ATM) flights. The ATM flights are the last four hops of each syllabus.

Airways navigation requires a student NFO to navigate using electronic navaids within the aircraft (TACAN, VOR, ILS). These are channelized to correspond to individual ground stations and provide magnetic bearing and distance from the station to the aircraft.

TA-4J familiarization hops accustom the prospective NFO to a tactical jet environment. Air tactical maneuvering flights introduce him to tactics used by fleet squadrons to evade and/or take the offensive against hostile enemy aircraft.

After completing training, the Naval or Marine Corps student is designated a Naval Flight Officer and receives his Wings of Gold. He is then ordered to a specialized fleet replacement squadron which will give him specific training in the aircraft he will fly.

The syllabus today is dynamic and standardized. VT-86 features outstanding maintenance personnel. There are about 200 enlisted personnel onboard with 62 staff and 100 student officers. The squadron maintains 12 TA-4Js and 18 T-39Ds which on a normal day fly 30 sorties and accumulate 60 flight hours.

The Naval Flight Officer has taken on more responsibility as aircraft become more complex and as the needs of the Navy increase. The training NFOs receive at VT-86 is a vital part of the process.

TARGET

Everyone knows that marksmanship training against a mobile land target (MLT) is a good way for fleet pilots to develop air-to-surface strike skills. For many years, Navy training ranges have used WW II drone QM-56 tanks for this purpose, but now only a half-dozen of the original 80 tanks remain semi-operational.

By 1975, the Navy realized it needed a new mobile land target, one that was inexpensive to develop and run, highly maneuverable and able to simulate a land target in actual combat conditions. The Naval Weapons Center (NWC), China Lake, Calif., had pioneered a "dune buggy" concept in 1973 for the Navy's War-at-Sea Program. The question was, could this concept – a dune-buggy-type vehicle capable of simulating the movements of a high-speed attack boat – be modified to provide a modern, flexible mobile land target platform?

In September 1975, the Naval Air Systems Command requested assistance from NWC in determining the feasibility and criteria for a new ground target. In response, Bob Barsaloux, head of the operations support office of the range department, and Bob Williams, an electronics engineer in the air operations branch, launched a quick-reaction program to develop an updated Dune Buggy II mobile land target. In late 1975, the prototype was demonstrated to representatives of NavAirSysCom and commanders of the Navy's five major naval air training ranges. The mobile land target program was born.

Initially, a contract was let with a private manufacturer for five ruggedly built dune buggies. The first one was delivered in April 1976. Concurrently, an in-house effort was under way to develop the unique drone control system used in the mobile land target. The previously separated electrical, mechanical, and hydraulic units were packaged into a single, common-source system. In addition, remote start-stop, emergency stop and proportional steering capabilities were incorporated. Also developed were actuators, electronic gear and special augmentation devices to make sure that aircraft radars could see and lock onto the MLT at the beginning of a bombing or rocket firing run. By May 1976 the first MLT had been produced.

The result is an extremely versatile dune-buggy-type vehicle that costs only one-tenth as much as the QM-56s, gets 30 miles to the gallon compared with the three obtained with the tanks, more closely simulates actual combat maneuvers, and travels at speeds ranging from 5 to 50 miles per hour.

Controlled from a remote vantage point, the MLT is not limited to any prescribed course or track. It can be turned, made to go forward or backward, started or stopped, accelerated or decelerated at the discretion of the operators. It also contains a built-in automatic emergency stop capability for use in case of a system malfunction.

The next phase of the program required test and evaluation of the vehicle's operational capabilities at naval training ranges – first on a demonstration basis and then in full-scale daily operations with fleet squadrons.

The dune buggy MLT received its baptism of fire in May 1976, on a desolate desert range at NAS Fallon, Nev. Navy pilots from NAS Lemoore, Calif., flew six sorties with A-6 *Intruders* and A-7 *Corsairs*, dropping over 80 Mk 76 bombs and shooting 20 2.75-inch rockets against two MLTs. The targets simulated slow-moving trucks and personnel carriers, tanks and attack vehicles moving at mid-speed. They also served as higher speed attack patrol boats and light attack jeeps. Range operators and pilots involved were enthusiastic about the results. After three days a major improvement in the accuracy of the pilots' bombing and rocket firing was apparent.

One incident during the tests confirmed the MLTs' abilities. A 2.75-inch rocket fired from an A-7 hit just

BUGGIES

under the front of one of the targets, bouncing it into the air and causing a cloud of dust that obscured the MLT. Out of the dust it crawled, its operating light still blinking as it moved on down the range.

A week after the Fallon test, two more MLTs were assembled and taken to the Naval Weapons Test Facility at Boardman, Ore. Pilots from training squadrons based on NAS Whidbey Island, Wash., sharpened their bombing skills for four days, dropping over 130 Mk 76 practice bombs against the MLTs operated by Boardman Range personnel. (These MLTs are still going strong at Boardman, with over 600 bombing sorties flown against them and over 3,000 practice bombs dropped during the past year.)

MLTs were also put through their paces at MCAS Cherry Point, N.C., and the Pinecastle Electronic Warfare Range at Ocala, Fla.

The Marine Corps tests were conducted under humid and rainy weather conditions on a remote island bombing range located over four miles off the eastern seacoast. Two machines operated successfully in swamps, bogs and high grass. Two incidents occurred during these tests which thoroughly demonstrated the durability and maintainability of the MLTs. In the first incident, one of the novice Marine operators inadvertently turned an MLT in the wrong direction and drove it into a 12-foot-deep range access salt water channel. After being retrieved, it was repaired that night and was ready to go the next morning. The second incident involved the same MLT. As the operator was remotely driving it off the range, he ran it into a four-foot-deep bog. It sank, engine first, to the top of the main head braces after sending a geyser of mud and water 20 feet into the air. Cleaned, it operated normally.

Evaluation at Pinecastle followed a two-week period during which it rained an average of three inches a day. For five days (mostly during rain) pilots from NAS Oceana, Va., and other military air fields flew bombing sorties against the sturdy and elusive mobile land target. Again, only local range personnel operated the remotely-controlled dune buggies during the tests.

These successful demonstrations were followed by a period of planning and designing update.

In November 1976 confirmation of funding was received and engineering documentation and specifications for an improved interim mobile land target (IMLT) were completed. Plans call for procurement of 17 IMLTs, with the five major Navy training ranges receiving three each. The other two will be used at the Air Force Tactical Fighter Weapons Center, Nellis AFB, Las Vegas, Nev.

Current investigations indicate that new aircraft augmentation equipment, an out-of-line-of-sight television control system and other improvements will increase the value of the vehicles. At MCB Twenty-Nine Palms, Calif., the MLT has been used to tow targets which were fired on by M-48 and M-60 tank crews.

In 1976 a joint service conference was held at NWC. Representatives from nearly every military service range discussed requirements for the next generation of multi-use moving land targets. The leading role in this program was assigned to the Naval Weapons Center.

Those attending the conference witnessed demonstrations in which Navy and Marine pilots (with extensive combat experience) from NWC's aircraft department, VX-5 and VMA-321 dropped bombs and fired 2.75-inch and 5.0-inch *Zuni* rockets at the targets for over three hours. The flyers praised the IMLT as an outstanding, realistic device for training.

It is expected that by FY 83 there will be over 180 Dune Buggy II MLTs providing pilots moving-target marksmanship training at 20 military ranges throughout the world.

By Coy Jones

touch and go

Harrier Training

Approximately 180 enlisted men, 11 flight instructors and 10 student pilots departed MCAS Cherry Point, N.C., last October and headed for MCAS Beaufort, S.C.

Granted, not a far away, exotic place to spend four or five weeks on deployment. But these Marines were on a mission as vital to the Corps as any that an aviation squadron might be assigned – to prepare and develop the required skills and techniques needed to fly the AV-8A.

According to Capt. Willy McAtee, VMAT-203 flight officer, "By deploying to Beaufort the new pilots are able to dedicate their entire time to learning the capabilities of the *Harrier*. They are able to eat, sleep, talk and train in the environment where their undivided attention is focused on the V/STOL aircraft.

"One of the other big factors in bringing the squadron to Beaufort is that the flight patterns are not as congested as those at Cherry Point."

"The first step in transitioning to the AV-8," explained Capt. McAtee, a *Harrier* pilot with two years of experience, "is one week of flight school in helicopters after receiving wings. A pilot then attends various ground schools and is introduced to the TAV-8A, a two-seat version of the single-seat aircraft. After 12 hops in the TAV-8A, the pilot then solos on nine more flights. After finishing this phase of the training, the pilot is introduced to instrument and, then, formation flying. The entire process takes about six months before a *Harrier* pilot is assigned to a squadron."

VMAT-203 Commanding Officer Lieutenant Colonel J. E. Iles said, "The entire squadron performed well. The student pilots did extremely well . . . all aspects of their training couldn't have been better. The weather was exceptional and the air traffic was at a minimum, enabling them to fly a maximum amount."

He added, "The troops did an outstanding job while they were at Beaufort. They put in many hours keeping the birds in the air, training our aircrews." **SSgt. Brad Heck**

Fleet Air Keflavik

At NS Keflavik, Iceland, the P-3C dominates the runway. Its engines whine in a high-pitched strain as the pilot holds the aircraft back. Takeoff clearance comes from the tower, and the *Orion* vibrates and shudders while the engines are revved in preparation for the long run to liftoff.

Within moments the *Orion* is airborne and another Patrol Squadron Keflavik flight mission is in operation.

Every mission flown doesn't simply begin and end with a flight, however. A far more complex combination of man and metal works through the preflight preparation, mission planning and post-flight debriefing. Fleet Air Keflavik is the stationary brain behind the airborne body.

The job at Fleet Air is a mixture of long, hard hours and many challenges. Operating a three-hat command, the staff weaves the missions of the Iceland Sector Antisubmarine Warfare Group and NATO Fleet Air Wing, Northern Atlantic into its own basic day-to-day and overall tasks.

The Iceland ASW Group directs antisubmarine operations and surveillance of surface forces in the North Atlantic, including the functions of the tenant patrol squadron. The NATO Air Wing is responsible for NATO-assigned aerial patrols.

Seventeen officers and 66 enlisted personnel run Fleet Air Keflavik assisted by seven officers from other commands. In spite of long working hours, morale is high.

An integral part of operations is the tactical support center. The computerized TSC supports the P-3C and ASW group. The first TSC was established in 1969 when P-3s were deployed to Keflavik.

As mission controllers for PatRonKeflavik, the TSC staff schedules the squadron's operational flights and provides continuity from squadron to squadron. Since every action of the airborne P-3C is recorded and stored on magnetic tape, TSC computers can recall an entire mission.

TSC members also convert the handwritten logs and records of NATO flight crews to digital tape which can then be replayed on a television-type direct-view console in the same manner as the P-3C data.

The center works hand in hand with the intelligence department, sharing data gathered from *Orion* flights and providing other data to each other. The staff participates in NATO maritime exercises — exercises which test the coordination, abilities and readiness of NATO military forces.

The center also becomes involved with visiting NATO maritime aircrews exchanging information on methods, equipment and aircraft.

Fleet Air Keflavik also has authority and operational control over NATO maritime aircraft visiting or operating out of Keflavik, including the United Kingdom, Norway, France, Canada and The Netherlands.

Other tasks include mail drops to Jan Mayen (an isolated island 600 miles northeast of Iceland where the Norwegian long-range navigation station is located), ice reconnaissance between Iceland and Greenland, and support for medical evacuation and ship emergency search and rescue.

The watchdog of the day-to-day operations at Fleet Air Keflavik and in the North Atlantic area, the operational command keeps close contact with various other command and military services in the area.

The handling of a three-hat command is not an easy task for anyone. The work is hard. The hours are long. Even at 0200, when the wheels of a P-3C touch down on the runway after a flight, many of Fleet Air Keflavik's people are merely continuing an eight-hour day. They know the importance of their work — and it goes on with optimism, pride and a high degree of morale.

JO1 B. A. Cornfeld

touch and go

Red Flag

Located several hundred miles from MCAS El Toro is a "laboratory" that enables fighter pilots to participate in a realistic war scenario. Nellis Air Force Base outside Las Vegas, Nev., provides a perfect training area for flyers to acquire the most realistic simulated air combat experience possible.

Three El Toro squadrons, VMFA-314, VMA(AW)-242 and VMGR-352, recently completed a three-week visit to Nellis where they took part in a Red Flag operation – an "air battle" which pits F-4 *Phantoms*, F-5 *Tigers*, F-15 *Eagles*, F-111s and other planes against each other high above the Nevada desert. The primary purpose of Red Flag is to provide new pilots with the experience which will increase their chances of survival should they become involved in an actual combat situation. According to Maj. J. S. Mosbey, USAF exchange officer serving as VMFA-314 operations officer, those who fly more than 10 missions in the exercise increase their chances of survival in combat by 50 percent.

This was the first time the exercise was extended to cover a three-week period so that night flights could be scheduled. These provided A-6E crews of VMA(AW)-242 the opportunity to take part in beacon and radar bombing.

Each day began with an extensive debrief attended by pilots and crews which covered the results of the previous day. The scores of confirmed and possible "kills" were discussed along with the lessons learned and solutions to problems encountered. After each debrief the participants shared tactical suggestions and other information, and the squadrons were assigned roles as either friendly or aggressor forces.

Although most of the aircrews switched their roles from day to day, the Air Force's 64th and 65th Fighter Weapons Squadrons were always the aggressors, introducing tactics used by communist bloc nations. These Red forces flew F-5 *Tigers* which were camouflaged and designated with bold red numerals resembling those used on MiG-21 *Fishbeds*.

Marine Aerial Refueler Transport Squadron 352 worked around the clock to provide inflight refueling for the F-4s of VMFA-314. During the exercise, VMGR-352 maintained one aircraft at Nellis and rotated crews on a weekly basis.

While the airborne exercise was taking place, elsewhere in the desert aviation physiology personnel from El Toro, LCdr. Jerry Patee and Lt. Thomas Fleischman, observed the techniques used by the other services in a search and rescue exercise.

Capt. Chuck Hoelle, Jr., VMFA-314, summed up the exercise by rephrasing an old sports adage, "In a Red Flag exercise it is not who the winners or losers are, but how well the tactics were executed."

Sgt. David Karr

Model Man

Robert Pendery has been out of the Navy for 30 years and lives many miles from the sea. Yet he spends part of every day amidst naval destroyers, submarine chasers and relic naval aircraft.

Pendery lives in Dayton, Ky., and is an avid model builder who has built exact replicas of Navy ships and aircraft since he served more than three years during WW II as Specialist (X) 2nd Class, building models for the Navy.

His replicas have been used by Navy Recruiting and have been displayed on the Free-

dom Train at Columbus, Ohio, and at many other events. The Secretary of the Navy invited him on two VIP cruises to show the Navy's appreciation for his contributions.

Mr. Pendery's recent effort is a replica of one of the last Boeing F4B4s, serial no. 9256. It took him 2½ years to research and build the fighter from scratch.

The F4B4 has been his favorite since he first saw it in 1932. "I think it is the most beautiful airplane of all time – truly a pilot's airplane," he says.

The model, built on a scale of two inches to one foot, has a five-foot wing span, weighs 10 pounds with radio and is powered by a Super Tiger 60. Rivet detail was obtained by using a hypodermic needle and Elmer's Glue. Photos from the Boeing Company, showing the fuselage in a jig at the factory with all the paneling and other details, helped significantly. The wings are fabric covered with rib tape over each rib and weep holes at the end of each rib. The model has built-in shocks on the landing gear, arresting hook, cockpit items, etc. The tail assembly consists of about a thousand pieces which represent corrugated metal. The colors used are those which appear on the F4B4 now on display in the National Air and Space Museum, Washington, D.C.

The model took "best of the show" ribbon in a competition in Cincinnati, Ohio, in the spring of 1977. Mr. Pendery plans to enter national competition this spring.

A New Life

The use of aircraft to bomb fires is not new. But of particular interest to Navy flyers is the newest addition to the flight line in this war against the elements – the venerable old *Stoof!*

Stockpiled at North Island a few years back, a group of TS-2As from the training command was given a last minute reprieve and leased from the Navy by the California Division of Forestry for conversion to air tankers. Painted green and gutted of all but essential equipment, their bomb bays were fitted with special 800-gallon tanks and the associated plumbing which allows the planes to refill with retardant in 3½ minutes.

Resembling a close air support mission, fire-fighting operations are usually under the control of a ground commander. A Forest Ranger in a spotter plane calls in the tankers, by numbers, with precise instructions on where to drop.

The retardant, or "slurry," looks deceptively like a spray as it leaves the aircraft, but when released at 50 feet and 130 knots it can mangle a bulldozer.

What do the veteran fire-fighting pilots think of the *Stoof?* They like the two engines which develop pretty good power for climbing out of canyons on a hot day. They can usually squeeze 180 to 200 knots out of the TS-2As, giving them a good reaction time. They think the cockpit is too hot, even with the overhead hatches open and, since they fly with a crew of one (no exceptions!), they feel that the visibility out of the starboard side could be a little better. The systems are thought to be unnecessarily complex for their needs, a complaint which will probably take care of itself as local det maintenance takes its toll and devises simpler fixes.

Soon after the *Stoofs* arrived at Air Attack Base Holister, Orin Carr, veteran pilot, flew one into a smoke-filled canyon and came out the other end dragging 400 feet of power line imbedded in the main spar of its wing. Luck, divine intercession, and reflexes honed by uncountable hours in the cockpit all came together to stave off disaster. A piece of the twisted cable hangs on the wall in the pilots' lounge as a tribute to the S-2.

LCdr. Charles N. Sapp, Jr.

NAS Key West

Key West's year-round, nearly perfect flying weather and its strategic location as the southernmost outpost in the continental United States have made it an important site for naval air operations. When Navy Commodore David Porter first saw the area more than 150 years ago, he called it the Gibraltar of the Gulf. He envisioned it as the place "to watch and guard our commerce passing from the Mississippi," as well as the "key to the commerce of Havana." Because of its location it served as a base for much naval action long before the arrival of Naval Aviation in the area.

Fifteen men on the Dead Man's Chest –
Yo-ho-ho, and a bottle of rum!
Drink and the devil had done for the rest –

During the early 1800s, pirates ravaged the waters throughout the Caribbean from the West Indies into the Gulf of Mexico. Scarcely a ship passed through those waters without at least one desperate adventure with the so-called privateers. Between 1815 and 1823 nearly 3,000 cases of piratical aggression against merchant ships were reported, many involving robbery, murder or torture. Piracy spread from the Bahamas along the northern Atlantic coast of Florida to the coast of Central and South America. The only answer to counteract this threat was a continual naval patrol.

In 1822 a strong West Indies squadron was created under Commodore James Biddle. Its frigates and sloops were too heavy to go close inshore and much of the work was done in open boats, the men sometimes absent from their ships for several days scouring the bays and lagoons in search of hidden buccaneer vessels and camps. Yellow fever ravaged the crews.

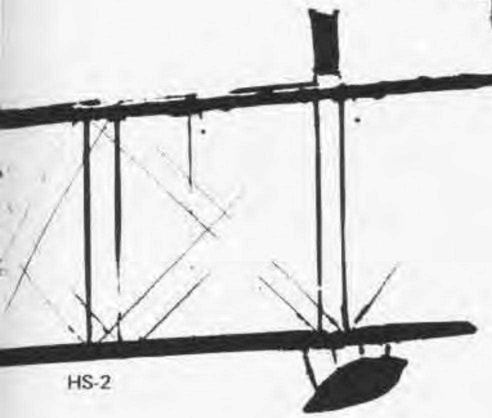
Commodore David Porter was sent out in 1823 with a squadron of light-draft schooners and heavy barges, plus a little ferry boat from New York, *Sea Gull*, which was assigned to tow other craft into inlets in pursuit of the pirates. Porter established a naval depot and a base of operations at Key West. He discovered that the British also had a patrol and made a zoning agreement with them. The American courts often released captured privateers for lack of evidence, but, oddly enough, after the agreement, the pirates were usually seized in the British zone and could therefore be taken to Jamaica and hanged.

The base at Key West functioned as a coaling and supply depot until the Civil War. It was the only southern port in Union hands throughout the war and played a vital role in the strategic blockade of the Confederacy. Great quantities of contraband were amassed at Key West and it was from there that major Union Navy and Army amphibious operations were launched.

The base lay dormant for some years after the Civil War, except for a brief time in 1881 when some construction work was done by a party headed by Lt. Robert E. Peary, later an Arctic explorer and discoverer of the North Pole.

Key West resumed a significant role during the Spanish-Cuban activity of the 1890s. The battleship *Maine* departed from the base on her last cruise, headed for Havana Harbor. Her dead and wounded were returned to the base. The first action of the Spanish-American War was seen by military observers on Key West's shores when USS *Nashville* (PG-7) met the Spanish steamer *Buena Ventura*, fired across her bow and took the first prize of the war.

The end of the war was followed by another period of inactivity except for the commissioning of a naval radio station in 1907. Then, in 1912, Henry Flagler, a railroad tycoon, completed a



(81° 48' West 24° 34' North)

By Helen F. Collins

railroad line creating an umbilical cord to Key West from the southern tip of Florida. A killer hurricane that swept the Keys in 1935 ended the rail service but opened the way for the highway which now carries more traffic than the railroad ever could. As you travel south today on U.S. 1 from Florida City, you come at last to a bridge that puts you on Key Largo, northernmost and largest of all the Keys. Then, as you travel southwestward, the Keys curve in a one-hundred-mile arc. They are strung out along the highway which follows Flagler's old railroad route much of the way and uses many of the original bridges. Finally, you reach Key West.

When Flagler built the railroad, Naval Air was in its infancy and the future of military aviation was unfolding. With excellent flying conditions and access to the sea lanes, as well as the new easy access by rail to the mainland, Key West was an ideal site for a naval air base and seaplane patrol operations.

A desperate war was being waged in Europe. On April 6, 1917, the United States joined the combatants. On December 18 NAS Key West was commissioned. Its first commanding officer was Lt. Stanley V. Parker,Coast Guard, Naval Aviator No. 57. He flew the station's first flight on December 22 in a Curtiss N-9 seaplane, A-348.

With WW I in full swing, German U-boats were cruising off the coast of the U.S. taking their toll in lives and shipping. Key West was headquarters for the Seventh Naval District, which supplied and maintained the forces afloat, accomplished minor ship repairs, patrolled the coast and kept German submarines out of the Gulf and away from Mexican oil.

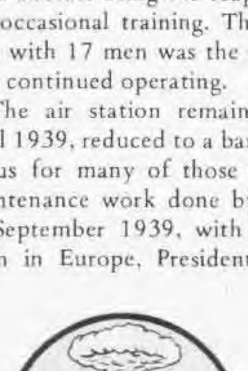
Seaplanes, submarines, and airships for observation duty arrived at Key West. Yachts were converted for destroyer patrol, submarines were serviced, a naval magazine was constructed, as well as a hospital, and radio operations were coordinated with the fleet. An elementary flight training station was established with about 25 to 30 small twin-cockpit seaplanes, in which more than 500 aviators received instruction. The implements for modern, three-dimensional warfare had made their debut at Key West – surface forces, submarines, and seaplanes and blimps.

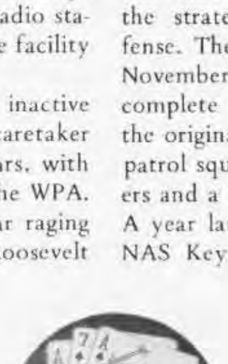
The end of the war in November

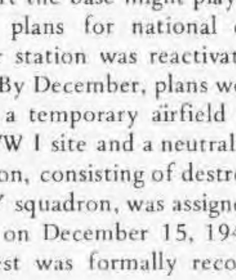
1918 brought an end to the station's operations and it was decommissioned on June 15, 1920. Only sporadic use was made of the few facilities left, with aircraft using the seaplane ramps for occasional training. The radio station with 17 men was the sole facility that continued operating.

The air station remained inactive until 1939, reduced to a bare caretaker status for many of those years, with maintenance work done by the WPA. In September 1939, with war raging again in Europe, President Roosevelt proclaimed a limited national emergency. The President and Chief of Naval Operations Admiral William Leahy journeyed south to Key West to determine what part the base might play in the strategic plans for national defense. The air station was reactivated November 1. By December, plans were complete for a temporary airfield on the original WW I site and a neutrality patrol squadron, consisting of destroyers and a PBY squadron, was assigned. A year later, on December 15, 1940, NAS Key West was formally recommissioned to serve as an operating and training base for fleet aircraft squadrons.

When Pearl Harbor plunged the U.S. into war, Naval Air expanded. Major land acquisitions were made which included Meacham Field for blimp operations and Boca Chica Field for land-based aircraft. The Seventh Naval District was quartered at Key West again, in early 1942, and in May the Naval Air Operational Training Command was established, with the air station becoming subordinate to it.







Navy blimps, over Boca Chica Field in the 1940s, were used in antisubmarine warfare, above. Vigilante on a recon flight, right.

Meacham Field was used jointly by the Navy and the Army Air Corps as an aircraft ferrying point to the Caribbean. It was also used for Coast Guard operations and Navy planes shifted from wheels to floats there. The Army terminated its operations in early 1943 and, by April, a blimp squadron had established a base for lighter-than-air operations and training. This continued until 1946 when, the war over, the field was declared excess.

In early 1943 during German submarines were slipping in close and sinking Allied shipping within sight of land. The peak was reached in May when these undersea raiders torpedoed 49 ships off the coast of Florida. By September, with air operations stepped up, the monthly losses had dropped to one.

In March 1945 all satellite fields were combined into one aviation activity under the designation NAS Key West. The station did not suffer retrenchment as did many other installations after WW II. Because of its location and flying weather, it was maintained as a training and operational area with activities that included ASW and night fighter intercept training, and test and evaluation operations.

As Naval Air moved into the jet age in 1950, several TO-2 *Shooting Stars* joined the Fleet All Weather Training Unit that was based at the air station. The original facilities, scarcely separated from the swamps all around them, had grown into a modern air station operating the first of a new generation of military aircraft. In 1962, CNO Admiral George Anderson, stopping over at the air station on the first leg of a Latin American tour, commented that NAS Key West was host to every basic type of naval aircraft, from blimps to jets, propeller-driven aircraft, helicopters and seaplanes.

The Cuban Crisis in 1962 made Key West a major operational base as the United States faced a threat at its front door – only 90 miles from Cuba. The military buildup included elements of the Army, Air Force and Marines, as well as Navy units. Reconnaissance and operational flights began October 22 in support of the blockade around Cuba. The sound of reconnaissance patrol squadrons zooming overhead could be heard day and night – a reminder of the role Commodore Porter had seen for the base more than a century before.

Shortly after the blockade was lifted on November 20, President Kennedy, the Joint Chiefs of Staff and key officers of all the services visited Key West to review the military installations and the forces stationed there during the crisis. Since then various units from each of the military services have been permanently assigned to the air station.

As the result of a DoD shore realignment, the surface Navy left Key West in March 1974 and all naval activities in the area came under the jurisdiction of the commanding officer of NAS Key West. The site of the old naval station was renamed Harry S. Truman Annex in February 1975 in honor of the 33rd president who spent numerous vacations in the Key West area. As a result of his many visits, Quarters A at the old naval station was designated the Little White House.

Today, NAS Key West's more than 4,000 acres take in Boca Chica Field (2,882.10 acres) which is the air station proper; Sigsbee Park, Fleming Key, Truman Annex (within the city of Key West), Trumbo Point Annex (Howard Trumbo was the engineer on the Flagler railroad project), Fuel Island, Poinciana Plaza, Peary Court, Demolition Key and smaller areas. Captain James E. McCardell has been the air station's commanding officer since August 1976.

Reconnaissance Attack Wing One arrived onboard in January 1974 with its RA-5C *Vigilantes* to provide a tactical, photographic and reconnaissance capability for attack carriers of both the Atlantic and Pacific Fleets. When nuclear weapons made their appearance at the close of WW II, the Navy looked toward carried-based aircraft to carry the new armament. From this concept came the development of heavy attack squadrons with the capacity to conduct high altitude attacks on distant targets and return to their mobile bases. When the recon-

naissance capability was added to achieve a dual role, the heavy attack squadrons were redesignated reconnaissance attack.

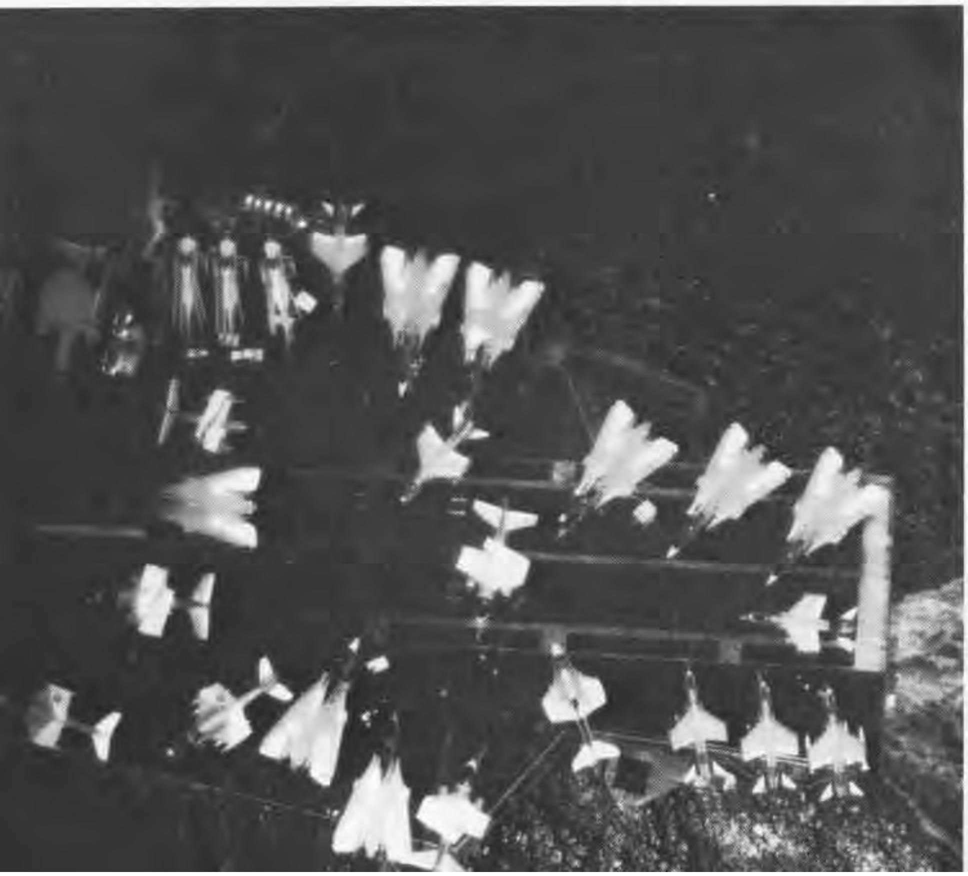
The wing had been established in 1951. Its transition to the *Vigilante* in 1964 marked the shift from heavy attack to reconnaissance. The RA-5C, third version of the Mach 2 twin-jet, carrier-based *Vigilante* series, is totally dedicated to tactical reconnaissance.

Five RVAH squadrons are based at Key West: RVAHs 1, 6, 7 and 12 are fleet squadrons which deploy to both Coasts. RVAH-3 is the RAG squadron.

The Naval Intelligence Processing System Training Facility was commissioned in 1969. It is an outgrowth of the Integrated Operational Intelligence Center (IOIC) which was part of RVAH-3. (The Center, together with the *Vigilante*, comprised the integrated operational intelligence system which provided the tactical commander with a full background of intelligence information about a target area.) The Facility, under the administrative control of Commander, Reconnaissance Attack Wing One, provides operational support to squadrons while they are at NAS Key West. It instructs both squadron and ships company personnel in IOIC responsibilities afloat and in the manning of NIPS centers. Its curriculum consists of five courses: photographic interpretation, electronic evaluation, storage and retrieval, and electronic data and photographic processing.

Until last August, VF-101 Det Key West was the East Coast fleet replacement training squadron for the F-4 *Phantom II*. It was a permanent detachment of Oceana's VF-101 which instructed replacement pilots in both the *Phantom II* and the F-14 *Tomcat*. Because F-14 training required more support than was afforded under VF-101's dual role, VF-171 was commissioned at Oceana to take over the *Phantom II* instruction, with VF-101 remaining responsible for the F-14. Since the Key West detachment is administratively under the F-4 training squadron, it was redesignated VF-171 Det Key West with the specialized mission of instructing F-4 aircrews in air combat maneuvering.

NAS Key West is also host to the Fleet Aviation Specialized Operational Training Group, a Naval Air Development Center Detachment, Joint Air Reconnaissance Coordination Center, and elements of the Army, Air Force, Marine, Coast Guard and civilian branches of the government.



The air station tasks are many and varied. Besides its aircraft maintenance functions, it supports operational and maintenance training facilities and services, proficiency flying, firing ranges, weapons targets and gunnery areas. The station provides approach control for the Key West area, GCA for air station operations, and facilities support and services for ground control intercept operations. It maintains a search and rescue coordination center, supplying pilots and aircraft for SAR, and it conducts salvage operations for crashed aircraft. The air station serves as a forward base in support of CinCLant and CinC-NORAD forces. (NORAD is a joint U.S./Canadian command.) The station also provides facilities and services for Army, Navy, Air Force and Marine

elements and any CinCLant joint task force military operations.

Most personnel enjoy their tour at Key West with its boating, snorkeling, game fishing and other tropical recreational facilities. The climate is said to be excellent for sufferers from allergies, sinusitis, arthritis and heart ailments. Many become lyrical in their descriptions of Key West's charms – sun-splashed, rain-washed, the shifting colors of its days and its paper moon nights. But don't let all that fool you. At NAS Key West there is an alert awareness of its strategic position. It maintains a constant vigil.

Night reconnaissance photo of USS Kennedy was taken by an RVAH-7 crew, left. VF-101 Phantom on a training flight, above. Right, RVAH-1 Vigilante approaches carrier stern.

A History of Sea-Air Aviation

Wings Over The Ocean

part eight

By John M. Lindley

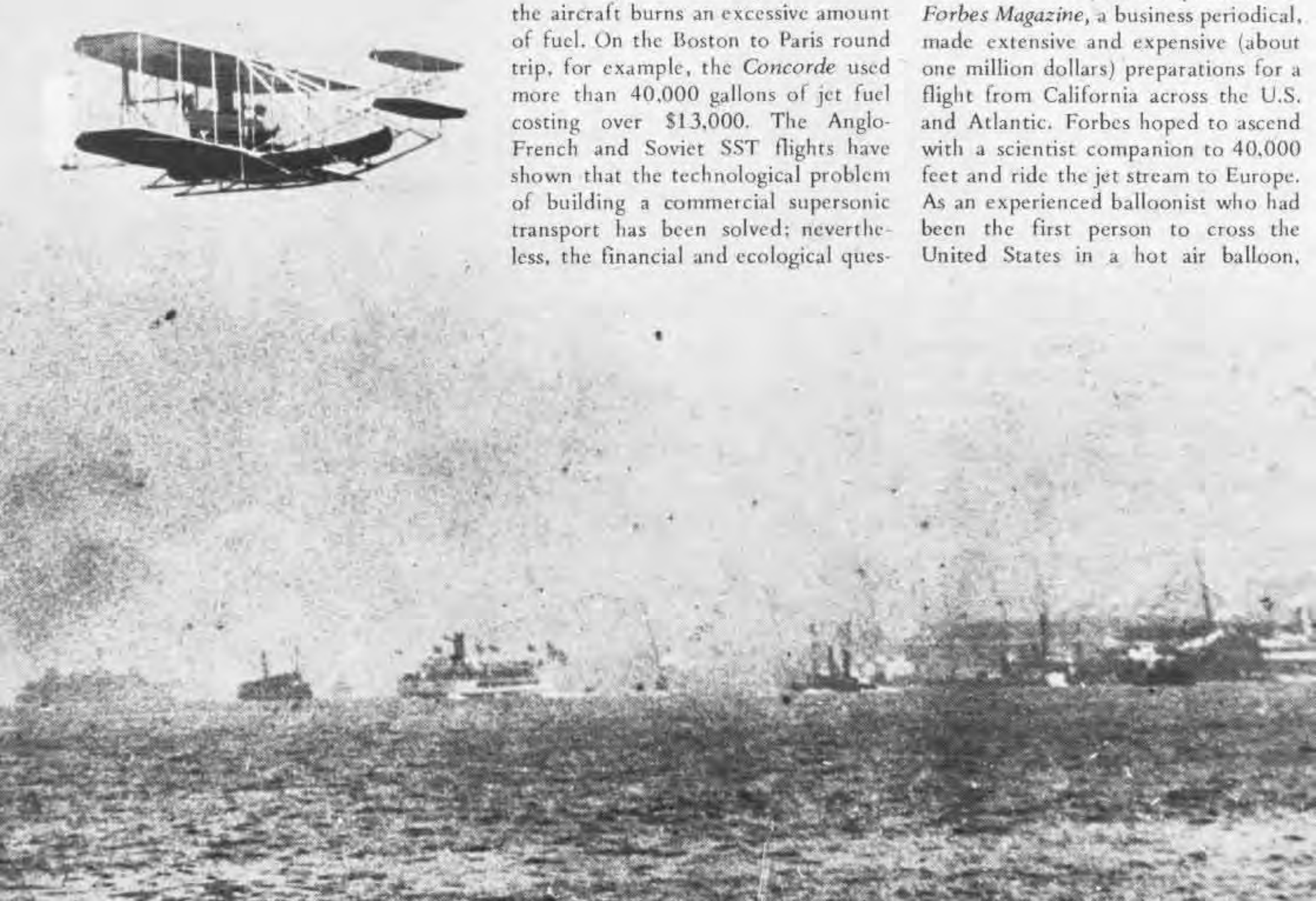
Despite this impressive performance, the future of the SST is uncertain. The major problems with the aircraft are not technological; rather they are financial and ecological. At present the SST is so costly to operate that its prospects for success, in the mainstream of airline activity without some sort of operational privileges, price supports or surcharge fares, appear to be dim. Supporters argue that the increased cost of a fare is justifiable in terms of the speedier ocean crossing and the consequent reduction in human physiological imbalance resulting from jet lag.

In the matter of environmental pollution, the future of the SST is equally uncertain. In the U.S. and Great Britain environmentalists have tried to block SST flights through legal action, contending the aircraft produces excessive noise pollution on takeoff or when it breaks the sound barrier near populated areas. Environmentalists have also argued that the exhaust at high altitudes threatens to destroy the ozone layer which blocks out much harmful ultraviolet light from the sun. Opponents also point out that the aircraft burns an excessive amount of fuel. On the Boston to Paris round trip, for example, the *Concorde* used more than 40,000 gallons of jet fuel costing over $13,000. The Anglo-French and Soviet SST flights have shown that the technological problem of building a commercial supersonic transport has been solved; nevertheless, the financial and ecological questions remain. Yet, even without the SST, modern airlines have now made it possible for every man and woman to follow the path of Daedalus. All that the individual needs is the cost of the air fare.

Paradoxically, just at the time when air transport has produced its fastest aircraft and thereby shrunk the distance between nations and peoples even more, free ballooning has made a resurgence in the United States and elsewhere.

Four English aeronauts tried to cross the Atlantic from the Canary Islands to the Caribbean in 1958. When a strong updraft forced them to valve too much hydrogen, the balloon lost its lift. The aeronauts tossed over their ballast and radio, but were unable to keep the balloon aloft. After 96 hours and 1,200 miles they were on the sea. Fortunately, their gondola was fitted as a boat which proved seaworthy. It took them 20 days to sail to Barbados, West Indies.

Since 1968 several more attempts, including at least two in 1975, have been made. In January 1975 Malcolm Forbes, the 55 year-old publisher of *Forbes Magazine*, a business periodical, made extensive and expensive (about one million dollars) preparations for a flight from California across the U.S. and Atlantic. Forbes hoped to ascend with a scientist companion to 40,000 feet and ride the jet stream to Europe. As an experienced balloonist who had been the first person to cross the United States in a hot air balloon,



Forbes emphasized that his flight was not a stunt but a scientific study of the jet stream. Unfortunately, a predawn accident on January 6, 1975, during launching operations caused indefinite postponement of the flight.

Another aeronaut, Robert Sparks of New Jersey, tried to make the first solo free-balloon flight across the Atlantic on August 21, 1975. After Sparks took off in his balloon from Cape Cod, Mass. he discovered he had a stowaway (his crew chief) and a slow leak in the gas bag which forced the balloon down on the ocean less than 200 miles from shore. A Coast Guard helicopter rescued Sparks and a cutter picked up the crew chief and gondola.

The efforts of Malcolm Forbes and Robert Sparks stand as witnesses to the longevity and vitality of the challenge of a "first" flight in sea-air aviation. Although the major oceans of the world are regularly transited by great jet liners and new supersonic transports, the dream of crossing the Atlantic by balloon is still unrealized.

The Beginnings of Naval Aviation

Wilbur Wright's last public flight was a portent of the future of sea-air aviation. In the fall of 1909 New York City staged an elaborate two-week anniversary celebration of the historic voyages of Henry Hudson's *Half Moon* and Robert Fulton's *Clermont*. As part of the festivities, the city fathers contracted with Wilbur

Flyer circles Statue of Liberty in New York harbor.

Wright for an exhibition flight over the Hudson River. Wilbur's fee was high, $15,000, because of the dangers involved. He knew that in flying over New York Bay and the Hudson River he might have to make an emergency landing on the water. For this contingency he had installed a canvas-covered canoe under the bottom wing of his flying machine. Another danger Wilbur knew he would face was the gusts of wind that came down the canyons between New York's skyscrapers. Any one of these gusts might throw his *Flyer* out of control forcing him into the water below.

The city fathers gladly agreed to pay Wilbur's fee. They wanted to show off the world's latest invention, flown by its co-inventor. Although the celebration began on September 25, Wilbur bided his time waiting for favorable weather. One day he took off from his camp at Governor's Island for a practice run. A short time later he took off again, made a daring circuit of the Statue of Liberty and then flew over the outward bound *Lusitania,* to the amazement to the liner's passengers and the crowds along New York's shoreline. With his practice completed, he announced that his next flight would be the one specified in his contract.

On October 4, the weather was bright and sunny, just what Wilbur wanted. He took off shortly after 10 a.m. and headed toward the western shore of Manhattan. Numerous vessels, including warships from Great Britain, France, Italy, Germany, the Netherlands, Mexico and the United States, signaled his departure with thundering blasts from their whistles. As Wilbur neared Grant's Tomb, his northern turning point on Manhattan, he banked left, passing over two British cruisers anchored in the river. He then headed across the Hudson to the New Jersey shore and banked left again to head back toward Governor's Island some 10 miles away. Down the New Jersey shoreline Wilbur flew at a speed in excess of 40 miles per hour. He passed over warship after warship. First two Italian capital ships, then two French dreadnoughts, then two from Imperial Germany. This was the first time that any airplane had flown over battleships.

On his way back, he first flew over the United States battleship *Louisiana,* commanded by Captain Washington Irving Chambers; then passed over the cruiser *Minnesota.* (Observing Wilbur's exhibition from the bridge of *Minnesota* was Commander William L. Sims, the future commander of U.S. naval forces in Europe in WW I.) He made the flight to Grant's Tomb and back in a total of 41 minutes. The *New York Times* the next day hailed the exhibition flight as being made under conditions "such as no aviator in the history of the world has ever attempted before." More realistic than the somewhat exaggerated prose of the *Times* reporter was the observation of Cdr. Sims. He told a reporter that "At the height Mr. Wright was flying, the ship would probably be able to get the range and destroy the airplane. At a greater altitude and going at the speed Wright flew, the aviator's chance of dropping anything on a battleship would be small."

Although Cdr. Sims' pronouncement that the Wright flying machine was vulnerable to naval gunfire and would have trouble with accuracy in aerial bombing was an accepted and widespread criticism of the military value of the airplane, it could not detract from the significance of Wilbur's flight over the international fleet of dreadnoughts. Wilbur had joined flight over the oceans with the possibility of aerial warfare. Just as Pegasus had served as Bellerophon's superior weapon in helping him to destroy the dreaded Chimaera, so also air power advocates like Brigadier General William "Billy" Mitchell would later contend that the flying machine was *the* decisive weapon of modern warfare.

Wilbur Wright, however, made no such bold claims in 1909. For him the central problem of the flying machine was not the merits or demerits of aerial bombing; rather it was flight control. In 1901 Wilbur had told the Western Society of Engineers that learning to fly was like riding a horse. You had to get on the horse, gain control over your mount and learn how to ride it. Similarly, he argued, you had to climb into the cockpit of an airplane, master the operation of its controls and coordinate the manipulation of the controls to fly it. In a much earlier day Bellerophon's means of controlling Pegasus had been the golden bridle. But what would be the "golden bridle" for the Naval Aviator?

If the successors of Wilbur Wright had been content merely to fly from one place to another over land or sea, then the golden bridle for them would have been the rudder, elevators and ailerons which provide stability and control. But not all twentieth-century aviators were content with just flying from place to place. These men recognized that the flying machine could also be a powerful weapon of war. For them the problem of control would involve more than mechanical devices. Naturally they would need to construct or develop the offensive armaments now associated with aerial warfare – bombs, machine guns, rockets. Armament alone would not, however, provide control. The enemy, whether on land, on the sea, or in another aircraft, would also have weapons. For the man of war in a flying machine, the problem of control in combat was crucial.

In the history of sea-air aviation the search for the golden bridle proved to be the quest for the formulation of ideas or principles which defined how naval aircraft would serve with the fleet. The flying machine was a new weapon of war. Without a definition of how it should be used in relation to the fleet, no naval commander could take full advantage of its capabilities as a weapon. Naval Aviation doctrine, as that body of ideas and principles is called, was the golden bridle of control for fleet air because it served, figuratively, as the compass heading for the naval force commander and his aviators. The definition of the relationship between Naval Aviation and the fleet expressed as doctrine gave the naval strategist a sense of the general direction that he should go in using his aircraft to the best advantage in combat. There might, of course, be times when the naval commander would deviate from the general guidelines or directions expressed in Naval Aviation doctrine; nevertheless, the acknowledged doctrine gave both pilots and ship commanders a sense of common purposes and goals. Thus the beginnings of Naval Aviation involved not only steady effort toward improving aircraft technologically, but also sporadic attempts to decide how these aircraft should be employed to take fullest advantage of their capabilities as weapons of war. This search for mechanical improvements and Naval Aviation doctrine began with the hot-air balloon.

Very shortly after the Montgolfiers discovered the hot-air balloon in 1783, observers remarked that the balloon had definite possibilities as a weapon of war, primarily for observing the movements of enemy forces. In the period of the Napoleonic Wars the belligerents pressed the balloon into service. The Danes, for example, tried in 1807 to break the British naval blockade of Copenhagen by dropping bombs from a hand-propelled dirigible. This effort failed. The year before, the British had tried towing kites from the stern of the brig *Pallas* to release propaganda leaflets which would then blow onto the French coast. Cartoonists of that era also depicted an invasion of England by a French army crossing the English Channel by ship, by tunnel and by balloons, though no such invasion was actually attempted.

The first widespread employment of balloons as a weapon of war came in the Civil War. Beginning in the summer of 1861, the Union Army hired civilian aeronauts to observe the movement of Confederate forces. The best-known Union aeronauts, John Wise, James Allen, John La Mountain and T. S. C. Lowe, usually worked with local Union commanders and the Topographical Bureau of the Army while making their reconnaissance flights. The principal areas of balloon operations were the Potomac and its tributaries and the waters around Fort Monroe in the Chesapeake Bay. Once aloft, the balloonists would either signal information to the ground with flags, especially when spotting Union artillery fire on Rebel defenses, or telegraph their observations to the local headquarters. The Confederates tried to hinder the constant surveillance of their movements by screening the deployment of troops; by using no campfires at night to foil attempts to estimate the size of their forces by counting campfires; or by attempting to shoot down the balloons.

Aeronauts began to experiment with towing their balloons on barges to increase the mobility of their aerial observation posts. In August 1861 John La Mountain went aloft in one of his captive balloons which was secured to the stern of the armed transport *Fanny* in the vicinity of Sewall's Point on Chesapeake Bay. T. S. C. Lowe convinced Gideon Welles, the Secretary of the Navy, to assign the Navy coal barge *George Washington Parke Custis* to him in November 1861. Lowe fitted the barge out as a balloon carrier which could be towed or poled along the Potomac or its tributaries. The barge was 122 feet long and covered with a flat deck that provided a large, level area for filling the balloons with hydrogen and for launching them. Beneath the flat deck, the aeronauts stowed all their equipment. This barge saw considerable service in the Peninsular Campaign in 1862.

All the captive balloons used by Union forces were part of the effort to get accurate intelligence about the enemy. Besides spotting enemy movements, the aeronauts or army engineers also made maps of enemy fortifications and passed on information about the deployment of friendly forces to the commanders on the ground. Depending upon the wind, cloud and general weather conditions, these balloonists ascended to heights anywhere from 450 to 5,000 feet. The aeronauts not only had to contend with enemy gunfire, but also with uncertain or strong winds and wooded terrain which could damage the balloon's cover during ascent or descent.

European observers of the Civil War carried back news of the use of balloons to their native countries. Thus when the Germans besieged Paris in September 1870 during the Franco-Prussian war, the French established balloon service out of the beleaguered city. These balloons carried 163 persons and almost 3 million pieces of mail out of the French capital during the siege. One two-man balloon team tried to reach a French relief army at Tours, but strong winds carried the craft and its passengers out to sea. The balloonists finally came to earth at Telemark, Norway, nearly 1,000 miles from Paris.

Changing observers in a kite balloon (1919).

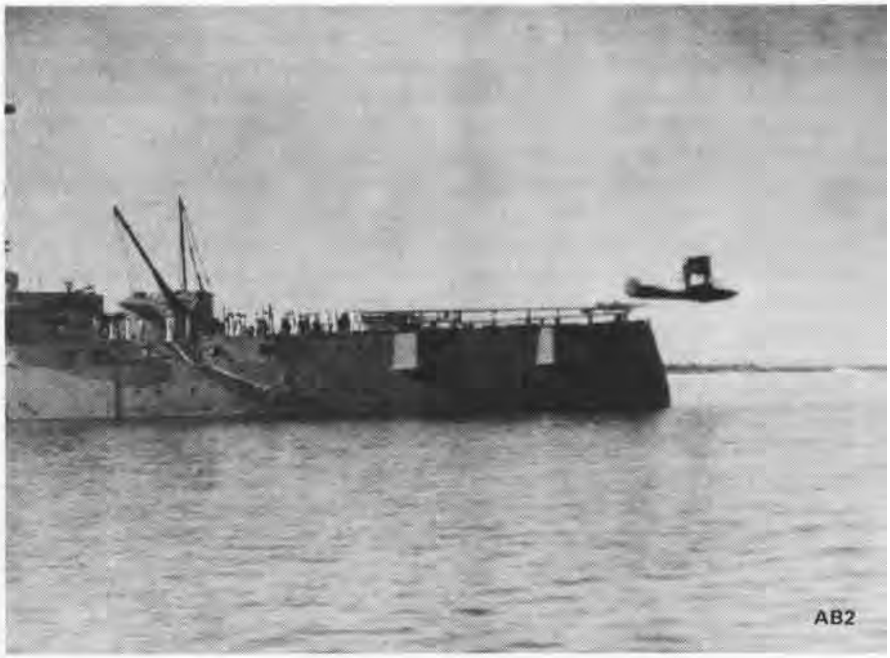
Although the results of balloon aeronautics in the nineteenth century were mixed and the problems related to transporting and filling the balloons with hydrogen sometimes outweighed their military benefits, the efforts to use balloons did serve the important purpose of introducing armies and navies to the possibilities of aerial weapons. Consequently the decade following the Wrights' first successful flights at Kitty Hawk was a period of widespread speculation and debate over the use of balloons, airplanes and airships as weapons of war. Since the study of previous wars and the rapid technological development of both airships and airplanes prior to 1914 left military theorists with no clear notion as to which aerial device would be the most useful and powerful, nearly all the major armies and navies of the world began experimenting with aeronautics. Because there were no guidelines or doctrine which defined the strengths or weaknesses of a given aerial weapon, each military or naval service seems to have considered, and in many cases to have tried out, nearly every available aerial device. For the navies of the world, these various experiments constituted the beginnings of Naval Aviation.

The U.S. Navy first expressed official interest in aviation when Theodore Roosevelt, then Assistant Secretary of the Navy, proposed, in March 1898, that the Navy investigate Professor Langley's work with his aerodrome to see if it might be adaptable to naval warfare. A board of naval officers studied Langley's experiments and recommended that the Navy should not at that time begin aviation experiments or fund others to make these studies for them.

In the following 10 years the Navy paid little official attention to developments in aviation. By 1908 Orville Wright had demonstrated the Wright *Flyer* at Fort Myer near Washington, thereby convincing the U.S. Army to begin work in aviation. Despite Orville's flights at Fort Myer and Wilbur's triumph at New York in 1909, the prevailing opinion was that the airplane had little military value, especially as an offensive weapon. The most that observers would grant was that it could only be used for scouting missions. A typical expression of this narrow judgment was Secretary of the Navy George von L. Meyer's response in 1911 to a newspaper reporter's question about the airplane: "That they will be used as fighting machines is very doubtful. It has been suggested that they could drop explosives on war vessels and forts. There are some barbarities, however, that are prohibited even in war. Besides, Germany has a gun that pumps lead into the air as thick as rain, and an aeroplane could be shot to pieces before it got near enough to do any damage."

Although the events of WW I would soon make the Secretary's comments about the barbarity of bombing seem ludicrous and naive, his observations are significant as an expression of Naval Aviation doctrine. Like Cdr. Sims, Secretary Meyer discounted the effectiveness of aerial bombing and stressed the defensive power of naval gunfire. In this sense, the Secretary was being a realist; he knew that early aircraft were so primitive and fragile that they could not carry bombs large enough to do any serious damage to a heavily armored warship, and that they were too slow to avoid defensive fire. Meyer and most professional naval officers realized that airplanes carrying bombs were no threat to warships when compared to shells fired from a dreadnought's 12-inch guns. Consequently the initial work in Naval Aviation largely concentrated on developing the airplane as a naval scout. Increased intelligence from an airborne scout and more effective gunnery spotting would produce greater accuracy from naval guns. In the age of the dreadnoughts, the prevailing naval doctrine was that the guns of the capital ship were *the* decisive weapon of sea warfare. It followed that everything in the fleet must be subordinated to the most effective use of the big gun. Accordingly, doctrine dictated that the airplane should be used to locate the enemy fleet and to report on its size, composition and formation.

In September 1910 Secretary Meyer directed Capt. Washington Irving Chambers, a line officer with some engineering skill serving as Assistant to the Secretary's Aide for Material, to handle all correspondence relating to aviation. Chambers worked hard to awaken interest in aviation within the Navy. When he learned, for example, that a German steamship line planned to try flying an airplane from the deck of one of its passenger liners, he persuaded his seniors to let him arrange for a flight from the cruiser *Birmingham*. An accident delayed the German attempt long enough for an eager volunteer pilot, Eugene B. Ely, to attempt such a flight. To facilitate Ely's takeoff, Chambers obtained use of the *Birmingham* and had an 83-feet-long ramp built on her bow. The ramp sloped down at a slight angle from the bridge of the vessel to the main deck at the bow where there was a mere 37 feet to the surface of the water.


AB2

After Ely and his mechanic had gotten the biplane onto *Birmingham's* ramp, the ship headed out from Norfolk into Hampton Roads. Bad rain squalls and hail delayed any attempt at a flight until mid-afternoon on November 14, 1910. Then as the sky cleared momentarily, Ely rolled down the ramp, dropped out of sight over the bow, hit the water briefly and then kept the plane going into the air. Gradually it gained altitude as Ely quickly headed it toward the nearest land, Willoughby Spit. He had planned to fly to the naval station at Norfolk, but water spots on his goggles and low visibility caused him to lose his sense of direction and forced him to seek out the nearest land.

Following this first takeoff from a vessel, Ely scored another aviation first when he landed on a slightly inclined platform on the stern of the cruiser *Pennsylvania*. Both Capt. Chambers and Ely were anxious for the young exhibition pilot to attempt this feat. Chambers arranged to have a platform (30-feet wide and 120-feet long) constructed on the stern of *Pennsylvania*. Ely and others on the scene at Tanforan race track near San Francisco gradually worked out a mechanical means for stopping the airplane before it overran the length of the landing platform. They rigged lines, which were raised several inches off the deck, at three-foot intervals across the ramp. Three hooks were mounted on the landing carriage of Ely's plane so that they would catch the athwartships lines and stop the forward momentum of the aircraft. Each of the lines across the platform was weighted at its ends with a 50-pound sandbag to make sure the lines would serve to brake the momentum of the aircraft.

With these preparations made, Ely took off from Tanforan on January 18, 1911, and flew over to *Pennsylvania* which rested at anchor in the Bay. Despite poor weather and a following wind, Ely passed over the stern of the cruiser, caught the eleventh line with his landing hooks, and came to a halt after a brief deck run. After a small celebration during which Ely's biplane was respotted on the ramp, he took off from the ship and flew back to his base ashore without mishap. Within a few months after this historic flight, the U.S. Navy made an initial commitment to Naval Aviation and purchased three airplanes, two from Glenn Curtiss and one from the Wrights.

Not all aviation experiments in these early years of flying were directed toward airplanes. Both the U.S. and French Navies seriously experimented with flying man-carrying kites from warships. Almost two weeks to the day after Ely landed on *Pennsylvania*, Lt. John Rodgers climbed aboard a string of 11 kites which were then streamed from the stern of *Pennsylvania* while she was underway at 12 knots. The kites lifted Rodgers into the air just as Samuel Perkins, the kite expert, had predicted. While some 400 feet above the deck, Rodgers made observations for 15 minutes which he then signaled to the bridge. By 1913 the French had improved communication by connecting the observation basket with the vessel by telephone. Strange as these experiments may seem today, the French hoped they could use the man-carrying kites to spot naval gunfire and to survey ship movements along a blockaded enemy coast.

The French also deserve credit for having first formulated the concept of the modern aircraft carrier. In 1909 a French inventor, Clement Ader, studied the problem of operating aircraft at sea. He concluded that for future over-ocean air operations: "an aircraft-carrying ship becomes indispensable. These vessels will be constructed on plans very different from those now in use. Firstly, the deck will be clear of all obstacles: flat, as wide as possible, without spoiling the nautical lines of the hull; it will have the aspect of a landing field. . . . The speed of this vessel shall be equal at least to that of cruisers and even exceed it. . . . The housing of the planes will necessarily be arranged below the deck. . . . This between-deck space will be reached by a freight elevator sufficiently long and wide to receive a plane with wings folded. . . . To one side there will be the service personnel workshop, charged with repair and maintenance of planes in constant readiness for take-off. . . . The deck field should be cleared of all obstacles . . . on launching aircraft the forward end should be completely free; on coming aboard the after part will be free."

Ader's description of an aircraft-carrying ship was a surprisingly accurate prediction of what the future aircraft carrier would be like. Paradoxically, the French Navy apparently ignored Ader's proposal in WW I when they made no effort toward development of the carrier beyond conversion of three merchant steamers to airplane carriers. The reasons for this are probably complex and obscure, but nevertheless surprising, given the early French leadership in Naval Aviation. Their navy was the first naval power to acquire aircraft – 12 planes in September 1910. Perhaps the French reluctance to implement Ader's ideas was a result of their Naval Aviation doctrine. They planned to use airplanes only for coastal defense and to use dirigibles for naval scouting. Consequently there was no compelling necessity for the French Navy, as there was for the British, to build a vessel which could carry substantial numbers of aircraft to sea.

The largest navy of the world in the first two decades of the twentieth century, the Royal Navy, began its aeronautical experiments with balloons and airships. After having experimented with these lighter-than-air craft, the Admiralty decided to abandon the building of rigid airships after the *Mayfly* crashed in 1911. Thus they had no rigids in service when war broke out in 1914. In the meantime a few officers had begun pilot training on their own initiative. One of these very early Naval Aviators was Lt. Charles R. Samson. He made the first successful flight from the deck of a British warship, HMS *Africa*, in December 1911. The Admiralty accelerated its program in aviation between 1911 and 1914 because it knew that other navies were making aviation experiments. As with the French, the Royal Navy assigned their Naval Aviation the task of supplementing or replacing the coast guard in defending England's shores. This assignment was consistent with the technical capabilities and performance of pre-war British aircraft.

To be continued

NAVAL AVIATION NEWS letters

Missing Wind Instrument

During what is now over 30 years since my retirement, I have been writing down anecdotes and stories of events in which I was involved during my ye rs in the Navy, with a vague idea of compiling them into a book some day.

I have been a constant reader of *Naval Aviation News* since the days when it was a mimeographed publication put out by Joy Bright Hancock, later to be Captain Hancock, Chief of the Waves. I am enclosing a story which may be of interest.

During my tour as assembly and repair officer at the Naval Air Station, Pensacola, Fla., in the mid-1930s, Commander George Murray came there for duty, first as Superintendent of Aviation Training, and later as executive officer of the station. It so happened that George Murray was the first Naval Aviator I met. Back in December of 1916, he had been sent by the Navy Department to observe flight tests of the Gallaudet seaplane at New London, Conn. I, too, had been sent from my job with the ELCO Boat Works to observe the flight tests for the Electric Boat Company, ELCO's parent company, which was considering financing Gallaudet. Later, in the mid-20s, we had also been on duty in the Bureau of Aeronautics together and had become good friends.

In any case, one day while I was at my desk in the A&R Department, Cdr. Murray came in, dropped a letter on my desk and said, "Ralph, do you know what he is talking about?" It was an official letter from the supply officer of the aircraft carrier *Lexington*, of which George had been executive officer just before coming to Pensacola. The letter stated that in a recent inventory on the ship, they found a receipt signed by Cdr. Murray for one (1) Wind Instrument . . . value $75. In their inventory they had been unable to locate this item — in fact, they had not been able to identify it! Would Cdr. Murray kindly tell them what it was, where it might be located or, in lieu thereof, remit $75 to clear up the books!

Cdr. Murray told me he had no recollection of the item or of any such requisition. Did I know of any aeronautical instrument of that name? I did recall that a number of years before, while I was in BuAer, we had purchased a number of anemometers (wind speed indicators) for making studies of the wind-flow over carrier flight decks. Did he recall signing for one of these? He did not, and he certainly did not intend to fork out 75 bucks for some unknown item he did not have!

In my facetious manner, I asked him whether by chance he might have signed for a trombone or a piccolo for the ship's band. He had not.

That gave me an idea. "How well do you know this officer?" I asked. "Oh, very well. He was supply officer on *Lexington* when I left her," said George. "O.K., I think I have a solution to your problem. It is based on the supply officer's statement that even he had been unable to identify the item. You go down to the local 5 & 10-cent store and buy one of those little whistle-type things which, when blown, give forth a vulgar sound variously known as the raspberry, a birdie, or a Bronx cheer. Box it up and ship it to him with a formal note stating — 'Returned herewith . . . One (1) wind instrument.' "

To me, the sad part of this story is that serious-minded and dignified George wouldn't do it, and just decided to ignore the whole affair.

Some years later, I ran into George Murray again, while I was A&R officer at Fleet Air Base, Coco Solo, Canal Zone, and George, then Captain Murray, was transiting the Canal as captain of the old *Langley*, the Navy's first aircraft carrier. I asked him whether the wind instrument matter had ever been cleared up. It had. George finally received a letter stating that it had been found. It was the anemometer installed on top of *Lexington's* mast!

I still think George passed up a wonderful opportunity.

Ralph S. Barnaby, Capt., USN(Ret.)
2107 Chancellor Street
Philadelphia, Pa. 19103

Ed's Note: *NANews* loves these anecdotes and asks you readers to emulate Captain Barnaby.

NAVAL AVIATION NEWS

SIXTIETH YEAR OF PUBLICATION

Vice Admiral Frederick C. Turner
Deputy Chief of Naval Operations (Air Warfare)

Vice Admiral F. S. Petersen
Commander, Naval Air Systems Command

THE STAFF

Captain Ted Wilbur	Head, Aviation Periodicals and History
Cdr. Rosario Rausa	Editor
Dorothy L. Bennefeld	Managing Editor
Charles C. Cooney	Art Director
JOCS Bill Bearden Helen F. Collins	Associate Editors
Sandy Nye	Assistant Editor
Cdr. Bob Cole	Contributing Editor
Harold Andrews	Technical Advisor

Published monthly by the Chief of Naval Operations and Naval Air Systems Command in accordance with NavExos P-35. Offices: Potomac Annex, Bldg. 6, 23rd and E Streets N.W., Washington, D.C. 20372. Phone 202-254-4696; Autovon 294-4696. Annual subscription: $12.85, check or money order ($3.25 additional for foreign mailing) direct to Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Single copy $1.25.

Editor's Note

We erred! LCdr. Jerry Weber, VFP-306, filmed the February inside front cover photo of three *Skywarriors* tanking, vice LCdr. Jerry Walker. Our apologies.

SQUADRON INSIGNIA

NAS Miramar is home for Fleet Composite Squadron 7. Led by Cdr. David P. Gauthier, the squadron flies A-4Fs and provides aircraft services to Pacific Fleet aviation and surface units. The VC-7 insignia features Pegasus, the mythological flying horse, towing a target day or night, in any weather, and symbolizes the spirit of the Redtails.


Naval Aviation
NEWS