NAVAL AVIATION

NEWS

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NAVAL AVIATION NEWS

FIFTY-EIGHTH YEAR OF PUBLICATION

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COVERS -- Front, Blue Angels fly over their 30th Anniversary runway as envisioned and illustrated by R. G. Smith, eminent artist of the McDonnell Douglas Corporation. PH3 Jim Preston of the Flight Demonstration Squadron photographed the team over NAS Alameda. Preston took the picture through the partly opened cargo door of Fat Albert, the unit's Hercules.

editor's corner

Animal Corner. USS *Lexington's* mascot is named Charlie. He has resided near the Allegheny Pier at NAS Pensacola for five years now, having moved from the Fort Walton Beach Gulfarium as a yearling in 1970. Charlie is a bull sea lion who, according to the encyclopedia, normally acquires a family of up to 100 cows. Since seals are uncommon to the area, Charlie lacks female companionship. But the 1,200 sailors aboard CVT-16 are his devoted friends even though they call him the "king without a harem."

For more on our animal friends read about *Romeo* the Rooster in the "Letters" section. And stay tuned for the August issue which will have a picture of the bear adopted as a mascot by another *Lexington*, in the 1930s.

Phrases to remember. There's a sign over the bar at the NAS North Island BOQ. It reads "Old pilots never die—they just buzz off."

Help! Two questions: Where or how did the phrase "flight skins," as it pertains to flight pay, originate? Also, can anyone tell us when the Naval Flyer's Creed first appeared. We talked to one pilot who got his wings in WW II and says the Creed appeared on the back of a card he received designating him a Naval Aviator. Advise please.

Hold that Tiger. Here's an A-7A of USS *Midway*-based VA-93 putting teeth to the wind on recovery. PHAN Steve Strobelt took the picture.

Under arrest. Mr. Bascom Grooms, arresting gear and launch devices mechanic at NAS Key West, traps a T-28 in the photo. He designed and

built the display which is used for demonstrations and, more importantly, as a training aid. Grooms, who rigs and maintains emergency runway arresting gear, constructed it to show precisely how Key West's equipment works. The cable really retracts, too.

That was a lady? Yes—at sea no less *and* helping with a routine FOD (foreign object damage) walk-down. Seems USS *Independence* was on a daylight transit from Palma de Mallorca to Barcelona, Spain. Some dependents were in the Mediterranean visiting their kin based on CV-62 and received permission to ride the carrier on the brief trip. Twenty-six dependents made the voyage.

Memories. Kiddy Karr, Naval Aviation Pilot #1, has written several articles for *NANews* and is working on a new one for us depicting one day in a WW I fighter pilot's life. In a recent letter, Kiddy traced highlights of those days in France and Italy. He laced his recollections with names like Tellier, Hisso engines, Sopwith, *Kitten*, French 55th, Amiens and Soissons, Bristol, Macchi 5 and Lewis guns, and then made a simple but somehow moving comment, "A merchant may die a millionaire but in his whole lifetime he couldn't rack up the memories a Navy pilot can in a couple of months."

NAVAL AVIATION NEWS did you know?

New DCNO(Air Warfare)

Vice Admiral Forrest S. Petersen, formerly Vice Chief of Naval Material, became Deputy Chief of Naval Operations (Air Warfare) on May 1, 1976.

He relieved Vice Admiral William D. Houser who retired on April 30 after 34 years of service. VAdm. Houser served as DCNO(Air Warfare) from August 5, 1972, until his retirement.

Airspeed Indicators

The December 1975 issue of *NANews* discussed the development and application of an omnidirectional low-range airspeed system for helicopters. In addition to the Pacer System *Loras*, the Navy is evaluating similar systems at the Naval Air Test Center, Patuxent River, Md.

One of these is the *Lassie II* (low airspeed sensing and indicating equipment) manufactured by Elliott Flight Automation, Ltd., of England and marketed in the U.S. by E-A Industrial Corp. of Chamblee, Ga. The *Lassie II* is a standard pitot-static probe gimballed to allow rotation in two axes. The probe is then mounted on a helicopter so that it will be immersed in the rotor downwash during low-speed hover operations. The resultant downwash aligns the probe with the local relative wind (vector sum of helicopter velocity and rotor induced velocity) and provides adequate dynamic pressure at low airspeeds. The angle of the probe and the differential pressure are measured to calculate relative wind direction and helicopter velocity. Rate of change of static pressure is measured to determine rate of climb. These velocities are then resolved and displayed in the cockpit as longitudinal, lateral and vertical airspeed.

Another of the omnidirectional airspeed sensors being evaluated at NATC is the J-TEC model VT-1003 manufactured by J-TEC Associates, Inc., of Cedar Rapids, Iowa. The J-TEC system measures airspeed by noting the frequency of vortices shed from a cylindrical post immersed in the airstream. From previous empirical aerodynamic studies it has been determined that the frequency of vortices shed from a cylinder immersed in a fluid is proportional to the velocity of the fluid, regardless of fluid density. When the fluid is air, and Reynolds number is small enough that viscous effects can be ignored, it has been found that the vortex-shed frequency varies linearly with velocity for any fixed cylinder diameter.

In the J-TEC system the vortex frequency, and hence velocity, is determined by counting the pressure pulses from the shed vortices as they pass through the beam generated between an ultrasonic radiator and receiver. To achieve an omnidirectional airspeed measuring capability the VT-1003 spaces six of these elements around the circumference of a central support and measures the airspeed in each element. These six airspeeds are then mathematically resolved into longitudinal and lateral airspeed.

Still another airspeed system is the Orthogonal Airspeed Sensor manufactured by the Rosemount Engineering Company of Minneapolis. The Rosemount system looks much like the standard pitot static probe. The sensor is a stationary, hemispherically-ended cyclinder consisting of four internal chambers. Each chamber has pressure sensing ports located on the cylindrical portion of the probe, the ports being 90 degrees to each other. To provide longitudinal and lateral airspeed the probe must be mounted on an aircraft with the long axis of the probe parallel to the aircraft vertical axis. Two of the pressure ports are then aligned fore and aft and two left and right.

Following evaluation of the different systems at NATC, and assuming that at least one of the systems is sufficiently accurate and otherwise suitable, the Navy will be in a position to procure an omnidirectional low-range airspeed system for helicopter and V/STOL operations.

NAVAL AVIATION NEWS did you know?

NASA/Navy Expedition

NASA and the Navy joined in an expedition to Newfoundland in February during which ocean surface conditions were measured simultaneously from a Navy C-54 *Skymaster* and a NASA spacecraft 520 miles overhead. The team was made up of engineers, technicians and scientists from NASA's Wallops Flight Center in Virginia and the Naval Research Laboratory, Washington, D.C. Its mission was to obtain measurements of actual surface conditions using instruments aboard the C-54. The information was then correlated with remotely sensed data acquired by NASA's GEOS-3 satellite which was launched in April 1975.

Eight to ten times daily, the satellite's altimeter operates over a major portion of the North Atlantic. Each pass produces 10 to 15 minutes of altimeter data. This is received by various tracking stations and transmitted to the Goddard Space Flight Center in Greenbelt, Md. It is then sent to a computer which produces estimates of the sea state measured. The sea state values are plotted and a composite map is made for each day. These maps are used for comparing data from aircraft and Navy and National Oceanic and Atmospheric Administration forecast maps.

Viking COD

The carrier onboard delivery (COD) version of the *Viking*, the US-3A, is not scheduled to make its first flight until mid-July, but the Naval Air Test Center, Patuxent River is already conducting crew and passenger bailout feasibility tests. The antisubmarine aircraft test directorate made test drops on March 19 and 20, in which Commander Jim Baker, Aircrew Systems Branch, and LCdr. Harvey Gregoire, Naval Aerospace Medical Institute, Pensacola, bailed out of the S-3A. Lt. Mike Cahill and Colin Cline have been supervising these tests. "There are ejection seats for the pilot, copilot and two operators in the S-3A," explains Cline. "However, we were

tasked to study passenger and crew egress capabilities specifically through the side door since that is where everyone would have to exit from the COD."

According to NavAirSysCom, present plans are to keep the pilots' ejection seats in the prototype but omit them in production models. A final decision on the ejection seat question will be made before production models are started.

The US-3A will be designed as a ship-visiting rather than a shipboard aircraft. It will be similar in outward appearance to the S-3A. About the only noticeable differences will be an additional window on each side, and two large cargo pods hanging from the bomb racks. The sonar boom and some antennas will be removed. The US-3A will carry five passengers, one loadmaster, pilot and copilot.

F-8 After 16 years of faithful service, *Old Frazier,* an F-8 *Crusader,* has found a home at the Naval Air Rework Facility Norfolk. The aircraft has been

mounted in a grassy field adjacent to the F-8/F-14 rework hangar.

During its active career, *Old Frazier* was assigned to duty on both coasts and served in every capacity for which the F-8 was designed. The aircraft was retired from active service in 1973.

Tomahawk A tactical version of the *Tomahawk* cruise missile was successfully launched from an A-6 *Intruder* at the Pacific Missile Test Center on April 26. The primary purpose of the test was to evaluate its structural integrity and flight handling qualities.

The second successful air launch was made from an altitude of 11,500 feet, and involved a tactical version of the cruise missile powered by a turbojet cruise engine. After release, the *Tomahawk* was airborne for 41 minutes. Throughout the 305-mile flight, it was under the control of its autopilot with positive override command by a contractor airborne test conductor who rode in the righthand seat of the *Intruder.* The flight ended with wing retraction and deployment of the missile's parachutes and flotation bags which are designed to facilitate recovery of the test missile.

In February, the strategic version of the *Tomahawk* was successfully launched from a submerged torpedo tube and boosted itself out of the water.

The *Tomahawk* is a long-range weapons system with strategic and tactical applications and is designed to fit into submarine torpedo tubes. It can be launched from a variety of existing submarines, surface ships, tactical and strategic aircraft, and land platforms.

KC-130 Trainer The KC-130 operational flight trainer was dedicated at MCAS El Toro in March. The computerized device, first in the Marine Corps inventory to utilize integrated visual systems, represents more than four years of work.

The simulator consists of three main elements: the simulator itself mounted on a six-degree freedom of motion system; a visual system; and the computer complex which "flies" the simulator in response to a student's control inputs. Maj. Thomas O'Malley, OinC of the flight simulator school, says that the system has more than 500 different malfunctions programmed into it. The device will also be used by Navy and Coast Guard.

grampaw pettibone

It's an Old Story

An instructor and his student were scheduled for a practice night instrument training flight in a TS-2A *Tracker*. The IP had considerable experience in the S-2 with over 1,000 hours in model. The weather was forecast to be clear with visibility greater than 15 miles. Briefing, preflight, start and departure were uneventful.

The first portion of the flight was conducted as briefed and the instructor entered the night GCA pattern. Following some practice GCAs, he requested a simulated minimum fuel state precision approach. GCA acknowledged the request while the aircraft was on the downwind leg. On the crosswind leg, GCA informed the pilots that the precision radar was down and to expect a surveillance approach.

The student, complying with the normal procedures, called for the landing checklist which was then completed. While approaching the glide path, the pilots were given a ten-second gear warning in compliance with the minimum fuel state approach originally requested. The instructor pilot did not expect this because of the previous change from a precision to a surveillance approach. On final, four miles from touchdown, the instructor simulated an engine failure by closing the starboard throttle. The

student raised the gear and reset the flaps to one-third. After some delay, he called for the inflight secure checklist. It was completed at two miles.

The IP noticed that the aircraft was lined up considerably left of course and so informed the controller. The instructor told the student to take over visually, and the student corrected toward the center line. The IP became concerned with a rapid sink rate which had developed and the maneuvering required to align the aircraft for landing. The tail wheel struck the runway first, followed by the prop tips and fuselage as the aircraft landed *wheels-up*. The barrier-hook-assembly mounting pad engaged the arresting gear. The aircraft came to rest slightly off center line, approximately 1,800 feet from the runway threshold. The surprised pilots secured the cockpit switches and evacuated the aircraft through the overhead hatches. There was no fire.

Grampaw Pettibone says:

Again! Again! Again! What an old story. We can print stories over and over again and still they occur!

A break in the habit pattern coupled with some distraction and you got it—*wheels up!*

This instructor, a dedicated lad, was burnin' the candle at both ends, including graduate school. All the more reason to be attuned to anything which tends to distract from the primary duty of safely flyin' your machine. I've written volumes on wheels-up landings, but I predict we'll have another.

Don't let it be you!

Starved S-2

Two young TS-2A pilots on a cross-country training flight departed a Gulf Coast NAS late one afternoon for the return flight to their home air station. Things progressed uneventfully for nearly two and one-half hours and then the port engine began backfiring.

Things evidently became pretty confused about this time, because neither pilot remembers exactly the steps he took for the next few minutes. They do know that a portion of the engine exploded through the cowling before they could get it feathered.

The pilot reported his trouble to the center and received a clearance and vector for a GCA at a nearby Air Force base.

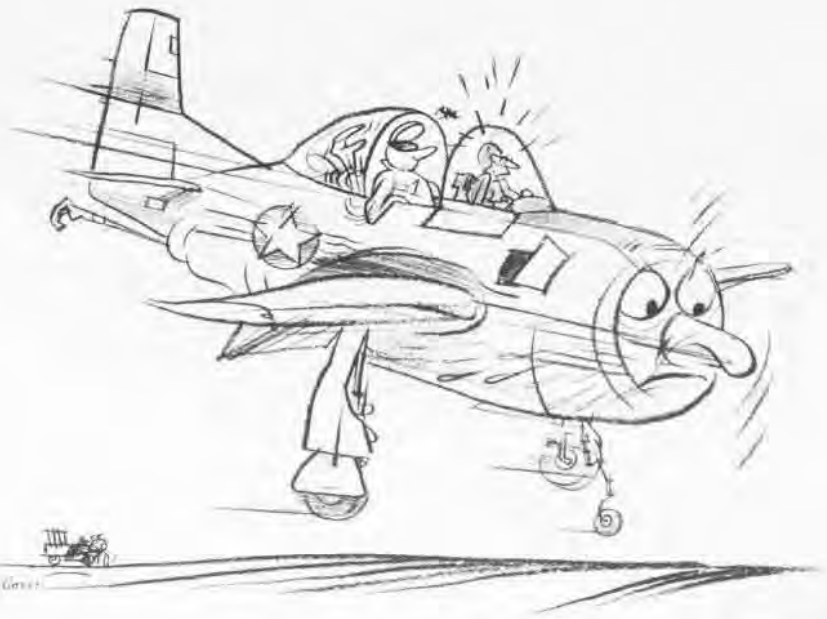
Just after turning to the assigned heading inbound to the AFB, the co-pilot noted the power on the starboard engine to be 2,000 turns and 32 inches. After the pilots checked the prop control and throttle and found them both full forward, they felt they were losing that engine too.

The pilot-in-command advised ap-

ILLUSTRATED BY Osborn

proach control that he had lost both engines. After being told that he was still 15 miles from the AFB, he started looking for a place to put the S-2 down. He was aware he was near a city by the lights he could see. After lining up to one side of a highway, he selected a darkened area that he figured was a plowed field. Actually it was the city reservoir.

At an airspeed of about 95 knots and an altitude of 100 feet, the landing gear was lowered. On impact the aircraft immediately flipped inverted and water rushed in. With mud and water rapidly filling the cockpit, both pilots released their lap belts and shoulder straps, then made their way to the main entrance hatch. They both stepped out on the wing uninjured and were soon picked up by a helicopter from the AFB.



Grampaw Pettibone says:

Sufferin' catfish! These lads worked like beavers to booby-trap themselves and did a darn good job of it. Material failure of the number 8 cylinder in the port engine caused the emergency, but it sure didn't cause the accident.

Things must have been awfully confused in that cockpit for both lads to ignore the checklist completely and trust everything to memory. With 6,000 feet to play with and the bad engine safely secured, just what was so pressing that the emergency checklist couldn't be used to ensure that things were squared away as they should have been?

These little airplanes are pretty trustworthy beasts, but they'll rebel everytime you shut off that supply of go juice to the power pack. I'll just bet there were a couple of red faces when the accident investigators found the starboard fuel selector in the OFF position. Just wonder if these fellows ever heard this one: "The hurrier I go, the behinder I get." (July 1965)

Ace-leroo on Final

An instructor and his student were scheduled for a familiarization flight in a T-28 *Trojan*. The instructor had 1,000 total hours, 600 in the T-28. The weather was forecast to be excellent. Briefing of the student was thorough.

The preflight, start and takeoff were uneventful. The flight was completed but the instructor, who had opened the canopy for awhile, was unable to close it. Returning to home field, in view of his canopy problem, he was going to conduct a practice precautionary emergency landing (PPEL).

Meanwhile, the instructor made several attempts to recycle the canopy without success, while forgetting to close the cowl and oil cooler doors. The approach to the high key position and the PPEL pattern checkpoints seemed to be normal to both pilots and observers on the ground.

The instructor was aware that his sink rate would be increased due to the open canopy. However, he did not notice that his cowl flaps and oil cooler doors were open until reaching the 90-degree position in the pattern. At this point, he closed them.

As the aircraft rolled on to final, both pilots noted that altitude and airspeed were normal. The runway duty officer (RDO) and tower observer also confirmed this. Feeling comfortable in the approach, the instructor tried to signal the RDO and point out his canopy difficulties. As the RDO was on the right side, the instructor put his left hand on the control column and pointed to the canopy with his right.

He made no attempt to slow the rate of descent. The student pilot in front did not become involved until just prior to the landing, at which time he grabbed the stick and pulled back in an effort to slow the rate of descent. Although the student's actions were too late to appreciably affect descent rate, they did alter the T-28's attitude from a nose-low to a nose-high position. This allowed the stresses to be concentrated through the main landing gear rather than through the nose gear as the aircraft struck the runway.

The plane bounced into the air and settled back onto the runway. Both the tower and the RDO made transmissions to the aircraft. The instructor pilot responded that everything seemed normal and that assistance was not required. Roll out and taxi back to the squadron line were normal. Both front and rear accelerometers showed ten Gs, the maximum indication for the gauge. Inspection revealed substantial damage, placing the mishap in the major accident category.

Grampaw Pettibone says:

Great gallopin' gremlins! What a maneuver. This driver was so "hot" that he wanted to do a little flying "lefty." If it weren't for the student, I believe the impact would have been much worse. What's the big concern over a canopy malfunction, anyhow? Seems to me that I would be more bothered about not being able to "open" one instead of closin' one.

At any rate, with no other problems, this gent allowed himself to become preoccupied and didn't mind the store. You gotta fly your machine — *First!* What good is it for the RDO to know about your problem when you are in landing transition, or should I say — landing crash!

POLISHING

. . . and left echelon rolls . . . and knife edge passes . . . and farvels and . . .

The U.S. Navy's Flight Demonstration Squadron is well into its 30th anniversary season. The Blue Angels took to the air for the first time in June 1946. Since then more than 125 million spectators around the world have witnessed their unsurpassed brand of flying excellence. Each year during a two-month prelude to the air-show season, the squadron goes through an intense all-hands training evolution. NAF El Centro, Calif., is the Blues' winter home.

They're up before the sun on the start of a workday unlike any other in Naval Aviation. In BOQ rooms they shower, shave and pull on the tailored, light-blue flight suits. A quick but sufficient breakfast follows. Then, fore and aft caps peaked, they make their way to the ready room, a few hundred yards across the tranquil air base. Time clicks toward six thirty. The desert sun, hidden below the horizon, has painted lingering clouds a radiant red.

The ready room is housed in a wooden, beige-colored structure capped with a half-cylinder roof. Similar build-

By Commande

DIAMONDS

ings sprawl across and characterize the operational side of the base. The room itself is spartan but spacious. Inexpensive deep blue curtains cover the windows. The furniture includes a pair of vinyl-covered chairs and facing couches. There's a coffee pot, sump light on, styrofoam cups, TV set — with a video tape backup — and a blackboard.

Outside, as subtle as the changing tide, the sky has begun its transition from grey-black to the grey-blue of a new morning. A fingernail moon hangs over the mountains.

In the dim light, maintenance crews are already at work. The six *Skyhawks* wait, wingtip to wingtip, silent sentinels. The muffled growl of a service vehicle and the staccato barking of a human voice are the only sounds which momentarily crack the hush of daybreak.

In the ready room, Barbara Walters is articulating news headlines on the tube — it's after nine in New York. Three of the pilots are watching. The commanding officer of the U.S. Navy's Flight Demonstration Squadron enters and takes his seat. Ms Walters is quickly turned off.

The skipper, Commander Casey Jones, checks his watch

Rosario Rausa

Diamond pilots talk formation at early morning El Centro brief. Left to right, Skipper Jones, Taco, JP, with models, and Dog.

and with uncommon alacrity for the hour, announces, "OK, it's six thirty-two — let's brief it."

Marine Captain Bill "Dog" Holverstott and Navy Lieutenants Al "Taco" Cisneros and John "JP" Patton shift slightly in their chairs. There is no stiffening of postures, no isometric bracing. But the *Blue Angels* have begun another patented exercise in relaxed concentration.

At this point in the winter training evolution, these diamond pilots work apart from the soloists. Lieutenants Denny Sapp and John Miller will brief a little later and practice their flight routines separately. In a few days, six-plane work begins. But for the time being, Sapp, in his second year, functions as a kind of secondary flight leader and assists in the grooming of John Miller, new to the team as the Number Six *Blue Angel*.

Today's hops will occur over the El Centro field. Until now the *Blues* worked above the parched floor of a restricted area a few miles away. Because it's the 1976 team's first flight in view of the squadron's maintenance men, there is a flavor of anticipation in the atmosphere. Just about every *Blue Angel* will tell you that the troops are their most salient judges.

The Boss commences a verbal journey through the impending flight. He defines the sequence from walk-down to shut-down as each of the flyers projects himself beyond the briefing spaces into his cockpit. In what might be called a classic exercise in spacial orientation, they make a "think trip" through each moment of motion.

The brief is not unlike one in a regular squadron. But some expressions distinguish it from the mundane. Terms like farvel, compress it, tuck away break and smoke-on reflect activities germane to the *Blue Angels*.

And there are some noticeable absences. None of the pilots use kneeboards. Slot-man Patton explains, "Once we start the takeoff roll my eyes are riveted to One, Two and Three and stay that way till we're back on the ground. We wouldn't have an extra second to scan a kneeboard anyway."

The *Blues* don't wear G suits. The continuous inflation-deflation would be decidedly distracting. Beyond the personal equipment, there are no telephones ringing abrasively as might be the case in some ready rooms. No teletype machines chattering away with fox corpens, divert field weather and other data.

The absences reflect the unfettered nature of *Blue Angel* operations and hint at one of the joys in being a *Blue*. These carefully selected pilots are assigned, as Taco asserts, "to honor a standard that is expected by superiors, and to demonstrate it." In pursuit of that goal, they are not encumbered by extraneous matters.

The *Blue Angel* experience, therefore, is an exercise in pure unadulterated flying.

In the briefing, basics are emphasized — airspeed, power, Gs. And, before the brief ends, there's a Natops and safety question of the day.

Dog Holverstott, who is the safety officer, has the last word. "Remember," he begins, "no maneuver starts without acknowledgements from each wingman . . . there may be a tendency in an actual air show to stay with an undesirable situation longer than we would in a training environment, like here at El Centro. So, think about it. Say you're canopy to belly, upside down, and you get a problem. Have it in the back of your mind where you are and where you'd go to get clear. How long do you stay with an undesirable situation? Well, they pay us to make decisions like that."

With such nourishing food for thought, the brief ends

and the pilots file out to the hangar and the A-4Fs. It's 0738.

The sun, a burning bronze disc, is in its upward arc through the California sky.

Nonchalant exchanges with the crew follow as the pilots sign out for the airplanes. The four then saunter toward the still silent sentinels. Then, subtly, a transformation occurs. The flyers become erect military figures.

The walk-down begins with them marching abreast, then peeling away individually toward the aircraft, saluting the crew chiefs and briskly climbing aboard. Seconds later the engines are ignited. Fuel and air clash in controlled explosions inside the *Skyhawks*. Tapered shafts of shimmering heat shoot out the tails.

On signal, like puppets with a single master, the clamshell canopies are pulled shut. The taxi-out begins.

Slowly, the jets diminish en route to the distant approach end. As they shrink, the drone of the power plants becomes a gentle hiss. The ground force lingers along the fringe of the parking apron. They have seen hundreds of *Blue Angel* takeoffs but the excitement of the start of a show never dims. In fact it seems to mount. On a nearby UHF monitor, the Boss' voice is relaxed, "Run 'em up. . . ." The far away din grows into a powerful ominous roar. "Off the brakes now." It's 0802.

Like thoroughbreds at the gate, the *Skyhawks* jolt momentarily. Then, four bullets welded together, they accelerate gracefully. "Up we go," announces the Boss and the flight leaves the ground. JP, out on the flank, calls "Gear," and 12 wheels fold forward and up, chased swiftly inside the machines by the closing wheel well doors. "OK, JP coming left." Patton slides in behind Lead. The diamond is formed.

The bullets whine high and away behind the "crowd." They swing through the sky in a wide oval-shaped turn for the inaugurating formation pass. The Boss banks the team steeply in a left-wing-down turn. A precisely aligned diamond shape is presented to the onlookers. It's somewhat of an illusion because of the angle between crowd and aircraft. JP has actually slid up behind Dog on the right

wing to achieve the proper disposition.

They pass along a theoretical center line which parallels the audience, then away from view. A moment or so later, the Skipper brings them back with a matter-of-fact "Coming left . . . diamond roll."

Each command by Casey Jones prompts a staccato string of acknowledgements from the wingmen. With rifle shot brevity, they sound off. "Dog, Taco, JP."

Then Lead flies them through a gentle, attractive aileron roll.

After the changeover roll comes one of the more difficult events — the line abreast loop. Done properly, the *Skyhawks* wheel through the 360 degrees as if they were impaled, wingtips through wingtips, by a single rod. Heads are twisted uncomfortably 90 degrees. Two, Three and Slot must hold fast through the circle. Any deviation from rank can be discerned without difficulty by the average viewer.

JP probably has the toughest task on this one for he is one plane removed from Lead and literally must fly formation on both Lead and Taco, adjacent to him. "If I can't see the Boss," says JP, "that means I'm on Taco alone and I can't guarantee I'm in proper perspective with the Skipper."

Adds Dog, "We try to use a total sight picture for reference. I'm generally watching the wing root and the area forward of that. If I stared at the wiggling wingtip of my neighbor, I'd fly a wiggling formation on it." The *Blues* deal in inches. To be sure, each pilot is laboring constantly with every amount of physical and mental energy at his disposal. The cockpits are air conditioned, but if they weren't you can bet there would be a whole lot of sweating going on.

The diamond roll and loop are executed with elegance and grace. The left echelon roll, a feature event which has helped distinguish *Blue Angel* excellence from that of other top demonstration units, is completed with mid-season form.

Only the true aviation aficionado can appreciate this difficult endeavor — the abbreviated arc through which the tail-end Charlies must fly while maintaining position.

For the farvel, the *Blues* approach at low altitude. About two miles out, the wingmen spread away momentarily from the Boss who flips his A-4 over without displacing it from its track. Like an elastic band, the formation then retracts. By the time they cross the center point, the wingmen are hugging the inverted lead aircraft in good shape. But there was difficulty at the outset of the maneuver, some momentary jostling. The reason will become clear later, in the debrief. Seems that once he tipped onto his back, Casey found himself looking straight into the sun for a few unsettling microseconds.

Perhaps the most ornate entry in the *Blue Angel* sequence is the fleur-de-lis. Today's versions go pleasingly well. But if it is the most ornate, surely the delta loop

'The Blue Angel experience . .

is an exercise in pure unadulterated flying.'

break is the most theatrical. Normally performed with all six *Blues*, it conjures drama even with only a quartet on stage.

The team races gracefully across the sky and begins an upward arc. Up, up, up, goes the formation, aiming skyward. It peaks and tips gently over into a downward curve, aimed directly at the ground.

Suddenly, the formation bursts apart. Each plane splits away. Smoke-trails blossom behind the plummeting profiles. They look like darts flung simultaneously and with great force toward earth.

But there is a symmetry to this maneuver. Each aircraft is evenly spaced from the others. And, at frightening proximity to the terrain, each plunge is terminated. In unison, the planes rise up and curl through three-quarter loops. These half cuban eights bring the flyers into convergent tracks toward a center point. Then, whoosh, whoosh, whoosh, whoosh! They whip by each other in an eye-blurring, heart-stopping crisscross. It doesn't look like it, but their lateral separation is abundant. In a few days there will be two more whooshes by that center point.

Since every training and air-show flight is recorded on video tape, the *Blues* will have an opportunity to study just how all that crisscross went. The machine's stop-action feature unveils any departure from precision. For the general viewer, however, it looks like all the jets whizzed across at the same time.

Interspersed with these elaborate gestures of airmanship are the delta roll and a new maneuver for the 1976 team — the double V loop. Three aircraft form individual Vs, one behind the other, and enscribe a circle in the sky.

The flight nears its conclusion with a tuck under break. The flyers whirl through three-quarter rolls, dispatching cosmetic patterns of smoke, then work their way back to each other for the division landing. This is an especially taxing maneuver. As Taco admits, "Getting the interval right is not easy, in fact, it's an awful lot of work."

The *Skyhawks* merge and turn smoothly inbound for the finale.

They swoop slowly toward the runway. Like trained falcons alighting on the master's hand, the leg-like landing wheels reach out for the concrete surface. In the slot, Patton touches down first. "JP's down," he reports, signaling it's OK for Lead and company to effect their landings.

Taxi-back is routine and the crew chiefs direct the birds into the chocks. Shut-down is simultaneous. It's 0836 and the singing engines sigh away. A welcome quiet sweeps across the ramp. The clam shells open in unison. Dog, Taco and JP gaze at the Skipper. Each pilot has his hands forward, lightly grasping the windscreen. The Boss' upward flip of joined fingers means OK, let's climb out. And four left legs effortlessly precede the four trim figures as the *Blue Angels* come back down to earth.

The walk back is formal until they pass the perimeter of the parking ramp. Finally the unseen pressure dissipates

and the pilots regain a relaxed stride. A first class petty officer, observing the approaching foursome, turns to a small gathering of the crew and says flatly, "Pretty good for the first time this year."

After a brief break, the pilots are back in the blue-curtained room, debriefing. The post-flight sessions are held in closed-door confidence where they get down to some very technical and energetic discussions on how things went, right or wrong. The video tape is analyzed in detail.

The camera tells no lies. In athletics the real-time flurry of action might conceal a missed block which will show up nakedly in the Monday morning movies. It's the same with the *Blues*.

There is no fixing of blame. These are extraordinarily mature professionals, totally devoted to the pursuit of perfection. No one is immune from a mistake and each, at one time or another, will commit one — although it's been a proven and traditional truth that errors are not common events. Still, the team is only halfway through the training phase.

Boss Jones is in his first year. He is not above seeking and accepting counsel from, say, John Patton, the third-year *Blue Angel* veteran.

"How about that rendezvous after the tuck under break?" Jones asks.

"We're OK," replies JP, "but I think we might be hurrying to get the gear down. We've got plenty of time from the one eighty on, so I think we can hold it a bit before going dirty."

Jones comments, "I have the feeling I might be taxiing a bit too fast."

"Feels good to me, sir," replies Dog. The others nod in agreement. And so it goes.

Moments later, they're briefing for the second go. The same attention to detail, the same relaxed concentration are there. The soloists have finished their sequence and are inbound to the line as the diamond members get ready for their second walk-down of the day.

The next show is a favorable repeat of the first and is followed by an unhurried debrief.

Lunch is next and by 1400 another phase of training, nearly as vital as piloting the *Skyhawks*, begins. It's exercise time. And we mean exercise. Handball, tennis, golf, jogging, whatever. Each *Blue* has his own physical conditioning program. Although their right arms are naturally strengthened by the continuous flying with nose-down trim, the balance of their bodies requires a rigorous regimen. Each man has his own preference for athletic interests but for the next two to four hours all are sweating away, toning muscles and coordination.

In the air, they are under the stress of G forces off and on throughout the 30 to 35-minute demonstration. Since anti-gravity suits aren't worn, that pressure is exerted directly on the body. Flying with nose-down trim, incidentally, enhances the "feel" of the plane and constitutes a steady 10 to 12-pound pull on the stick.

Beyond the flying demands which require strength and endurance, traveling from one sight to another nearly every weekend of the season will take its toll. And the *Blues* know they must be ready for that.

Not long after dinner, darkness settles over the southern flank of California. The *Blue Angels* are thinking of soon calling it a day. In the weeks that follow, as they polish the diamonds and the delta vertical breaks and the knife edge passes, they will pursue that standard of excellence which is the heritage of the Navy's Flight Demonstration Squadron. Being a *Blue Angel* is an esteemed professional achievement and each must labor with all his capabilities to sustain that standard and that heritage. And they must be up before the sun tomorrow.

solos . . .

They race toward each other, treetop high, seemingly bent on mutual annihilation. Lt. Denny Sapp calls, "Hit it!" and, at the last instant, he and Lt. John Miller execute "yug" maneuvers, roll their *Skyhawks* 90 degrees and whip, canopy to canopy, safely by one another. They quickly roll back level and whisk away. The knife edge pass is complete.

But what's a yug? It's an abrupt nose-up pull on the stick followed by enough neutral stick to establish a zero G load on the plane. This causes the aircraft to fly through an abbreviated ballistic path.

Like all of the *Blues*, the solos practice high and loose in the initial stages of training. Progressively they tighten up and move closer to the earth.

"It may look hairy," admits Miller, "but that knife edge pass is one of the easier things we do." Among those things are the back-to-back roll, the inverted pass and, new this year, the tuck over break. In that one, the pair fly along a flight line which parallels the crowd in section, inverted. They then roll 270 degrees into the breakup for landing. It's pretty to see.

As lead solo, Sapp helps groom Miller for the latter's job as Number Six. Sapp flew that position last year.

He explains, "If, after working our way down from 2,000 feet to, say, 500 feet and then, for one reason or another, we scare ourselves, we'll go back to altitude, loosen up and start all over again."

Sapp is quick to assert, "*Blue Angels* are not stunt pilots and we do not do stunt flying. Ours are well calculated flight maneuvers which have been pre-planned with total regard for safety. John and I have our own sides of the flight line and know, absolutely, that we're not going to hit each other on one of the crossing events."

In the first portion of an air show, Five and Six keep the crowd humming in between diamond formation events. During the final half, they convert the diamond into a delta.

What are the most difficult items on their agenda?

"They all take practice," claims Miller, "but getting the timing down and going inverted without displacing the aircraft from its track are stiff challenges."

Their eyesight must be extraordinarily good. Can you imagine bearing down, nose-to-nose toward a friend in a specklike *Skyhawk*, with a closure speed of around 700 knots?

Whoosh! Or should we say — Whew!


Sapp


Miller

the troops . . .

Senior Chief Hector Alvarez, the *Blue Angels'* top enlisted man and maintenance chief, describes his crew as "self-starters." They have to be. The massive pressures inherent in meeting air-show requirements demand self-generated and total commitment. They must get the A-4s up and ready, on time, without fail, always.

True, the squadron's *Skyhawks* don't require certain elements of support found in the fleet such as weapons handling or the grooming of elaborate fire control systems. If a carrier-based aircraft goes down, every effort is made to get it up. But if that effort fails, the squadron loses a sortie. So be it. They'll make up the loss, hopefully, on the next go.

The *Blue Angels can't* lose a sortie. And they don't. The 70-strong maintenance force won't let that happen. On those rare occasions when a radio conks out before a *Blue Angel* takeoff, or one of the planes suffers a flat tire taxiing out or back in, a trouble-shooting contingent responds.

Says PRC Ronn Penn, Alvarez's assistant, "We can change a tire in five minutes, a radio in ten. Once we replaced a starter unit in 12." Usually, the crowd will never notice. Adds Penn, "Here at El Centro we get *our* act

Each training and air-show flight is captured by the camera on video tape, left. Above, left to right, maintenance officer and professional air-show watcher, Deeter; top enlisted man, CPO Hector Alvarez; and crew working on a Skyhawk.

together. Once we go on the road we *keep* it together."

Even during training, the troops wear their air-show uniforms — blue trousers, short-sleeved blue shirts and polished safety shoes. Some members are more visible, as far as the audience is concerned, than the "hangar" force. A crew chief and two others are married to each A-4F. They are part of the formal activity at the shows — the walk-down, start, taxi-out, return and shut-down portion of a flight.

Behind-the-scenes labor, especially in the training phase and between weekend shows at the Pensacola home base, is obviously as important. The planes are waxed weekly, spot-painted almost daily. Adds Chief Alvarez, "We pay special attention to control rigging and scrutinize the airframes thoroughly after every hop. Since each pilot flies the same bird, he is literally 'form-fitted' to it. That plane's crew is able to note and correct, as necessary, any deviation from the norm the pilot is used to."

Blue Angel Skyhawks are about eight or nine years old and have seen heavy fleet duty. They differ only slightly from standard versions. The accelerometer gauge is oversize, a spout on the underside emits 10-10 oil for smoke trails and highly polished aluminum edges on the intakes and leading edges are for cosmetic purposes. The squadron inventory includes *Fat Albert*, the *Hercules* support plane which is manned by a Marine crew and serves as a first-class airborne AIMD shop as well as transport. Number Seven is a TA-4 flown by the narrator, Lt. Nile Kraft. A pair of spare "show birds" are on hand at Pensacola.

For some, the *Blue Angel* experience yields rewards other than the deep-seated satisfaction after a particularly good demonstration. "Where else could an AK get flight time in a jet, close to 100 hours a year, no less," declares AK1 Bill Simms. He and AME2 Pete Thornton are crew chiefs for the two-seat *Skyhawk*, and alternate traveling with Lt. Nile Kraft, the monitor, to show sites. They ensure that support requirements are satisfied before the balance of the team arrives.

Lt. Mike Deeter heads the maintenance department and is in his third *Blue Angel* year. The pressures don't seem to bother him, probably because he knows that his weighty responsibilities are mutually and aggressively shared by a volunteer force of self-starters. In fact, Deeter has time for the satellite chore assigned him by Skipper Jones. Although a 1520 designated officer and a non-aviator, he has become a professional air-show watcher.

Says the C.O., "Mike has an acute sense of observation. He watches all our practice flights in addition to demonstrations before an audience, takes notes and briefs us where we make mistakes." Even skilled aviators couldn't detect the miniscule flaws that Mike Deeter records.

He, Alvarez and other senior members of the team help handpick the troops. BuPers is not inundated with volunteers for the squadron. So, a concerted effort is made to find the best talent available and encourage people to join up.

Chief Alvarez admits that sailors might be turned off when they consider the travel involved and see us "ragging" the airplanes all the time. The days are often hard and long.

"We use our fleet or training command contacts to solicit personnel," explains Deeter. "Then we interview candidates at the many bases where we're scheduled to

AME2 Pete Thorton settles into TA-4's rear cockpit for hop to air-show site. Specht lends a hand to AMH2 Cliff Schuyvers.

appear. Once accepted, a man works a probationary one-month period before being permanently assigned."

Blue Angels' advancement prospects are the same as their fleet counterparts. But they receive a lot of cross-training in other ratings not usually available in all units. Yeomen can run the huffers, AKs will change tires, and the AZs know how to paint airplanes. This experience yields career dividends.

In recent years, enlisted personnel have been integrated into recruiting and public affairs duties. They may accompany the pilots on visits to orphanages, schools, hospitals and civic gatherings. They help sell the Navy to young men and women across the country.

For road trips, usually 21 men travel on *Fat Albert* (*NANews*, December 1975) and support a show. The remainder work at Pensacola. Alternating the duty allows the troops to spend more time with their families.

Importantly, there is an extraordinarily good rapport between the officers and enlisted men. Chief Penn explains, "I have never worked with better officers. There are no swelled heads among them and no doubt the other troops agree."

Alvarez asserts, "Our pilots and crew take more pride in their aircraft here than anyplace else in the Navy. We have to. And I don't mean that just because we do things like removing our shoes before climbing onto a wing."

Lt. Deeter amplifies, "Our purpose is singular: we must set a standard of excellence, not only for the civilians who watch us but for our own Navy personnel as well."

A civilian who is part of the excellence, however, is Dale Specht. He is the *Blue Angel* technical representative assigned to the squadron by the McDonnell Douglas Aircraft Corporation. In his second year with the team, Dale has had plenty of carrier duty as a rep aboard the *Forrestal* and *Independence*. He's had 20 plus years maintaining airplanes and knows the *Skyhawk* like the back of his hand. He not only lends technical expertise, he's been known to get the back and front of his hands dirty helping crewmen on repair actions.

What credentials must the *Blue Angel* have? The administrators, Lt. Leo Boor, who handles personnel matters, and CWO-2 Al Pulley, the supply officer, have self-evident backgrounds, as do their enlisted staff aides. Captains Steve Petit and Steve Murray fly *Fat Albert* with an experienced all-Marine crew.

The maintenance specialists are an elite collection of professionals. Says Alvarez, "Motivation is vital. You have got to want to be a *Blue*. One of our men, for example, lost 75 pounds in three months to meet our appearance requirements. That's motivation."

"Also," he goes on, "we look for 3.8 to 4.0 sailors. Experience level is not critical."

One *Blue Angel* pilot voiced vivid testimony to the maintenance skills in the squadron. "I never worry about the mechanical condition of my aircraft. I must concentrate totally on flying and I can do this because I have absolute trust and confidence in our maintenance force. I know that plane is up and ready when it's supposed to be."

Those interested can apply on Special Request Form 1306. Candidate's squadrons are asked to forward one copy of the form to BuPers, another direct to the Flight Demonstration Squadron, NAS Pensacola, Fla. 32508.

Bauer & Kraft

No, they're not a vaudeville team, but they're in show business, all right.

Next to the boss, Lt. Jim Bauer reportedly has the toughest job in the *Blue Angel* squadron. As Events Coordinator, he spends much of his time on the phone — at least 15 calls a day. It's his formidable task to organize air-show support requirements and ensure that each and every detail is tended to. If the title "public affairs" applies to anyone, it applies to Naval Flight Officer Bauer.

"Last year," says Bauer, "it took me 15 minutes to do what I can now handle in five. I'm improving."

"The toughest part of this job," he admits, "is getting the sponsors to fully appreciate our requirements and seeing to it that our needs are met in a timely manner.

"The commitments for a typical air-show weekend are so many and tightly scheduled that ETAs must be strictly adhered to. If, for example, the pilots are addressing a civic group at one end of town and there's a parade going on between them and the airfield, a police escort has got to be available as planned. Otherwise we're in trouble."

At the start of winter training, Bauer flew with Lt. Nile Kraft in the TA-4 on a multi-day round robin to locales on the 1976 schedule. Hopefully, preliminary meetings with officials on the trip will iron out major details.

"Then," says Bauer, "it's a matter of following up. I usually work a couple of months in advance. By the time the *Blues* lift off, say at Daytona Beach on April 22, my job is 95 percent complete — for Daytona Beach, that is. Let's see, that means I'd be concentrating on Green Bay, Wisc. (June 26) and there's 12 shows in between and . . . ."

Nile Kraft — he of the mellifluous voice and, yes, they call him the cheese man, is a former A-7 driver in his first year with the *Blues*. He will fleet up to a diamond pilot position next year. In this bicentennial season, he flies media personnel on indoctrination flights. His biggest job, though, is to describe the aerial ballet as it unfolds before vast gatherings of people.

At El Centro, Kraft works on his narrative and often accompanies the video cameramen and Mike Deeter out to the simulated center point in the team's practice area. While the entourage watch and film the *Blue Angels* at work, Nile's voice booms through the air, sans microphone, practicing dialogue . . . "Commander Jones will now lead the formation through the difficult line abreast loop. This maneuver requires . . . ."

flight surgeon

I take care of the usual medical problems for all hands," says LCdr. Tim Peterson. "But I'm also looking for a change in mood and attitude, especially among the pilots, as the season progresses.

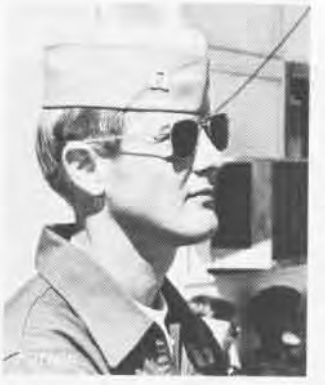
"They operate in a high stress environment; therefore there are more opportunities for friction or personality conflicts. However, these pilots are what I would call super-achievers. They possess a single-minded ability to concentrate on detail as far as flying is concerned. Also, the selection process eliminates those who would have difficulty working and getting along with team members over the long, arduous haul of training and the air-show season.

"These men are not prone to ego trips," adds the doctor. They're not happy-go-lucky sorts, but they're not worriers. Nor are they inclined to 'live for the moment.' They're very skilled pros, adept at allowing each other privacy when appropriate. They have great mutual respect for each other, yet each can be fiercely independent. Each knows the need to break away from the group on occasion."

During a rare picnic break at El Centro, the inevitable touch football game was in its full throes of competition when a howl rose up from a stack of players on the ground. "Get the Doc!" someone yelled and, almost magically, the lanky flight surgeon emerged from a group near the barbeque grill.

"As soon as I saw that ball fly through the air I knew I'd get some business today," said Peterson. Fortunately, the sailor sustained only a minor knee injury.

All in a day's work.



want to be a Blue?

The *Blue Angel* selection process takes place over a several month period. In addition to flight time (1,500 hours tactical jet) and shore rotation requirements, the potential demonstration pilot must have a lot going for him.

BuPers receives requests from individual pilots along with commanding officer endorsements. Generally, there are about 40 applicants for two positions each year. The Bureau will cut that number in half based on review of fitness reports. Blue Angel pilots themselves will examine the credentials of the remaining 20 or so.

About half of the 20 will be scratched for a variety of reasons — personality, drinking habits, or some form of behavior which might be unsuitable in the fishbowl atmosphere of *Blue Angel* life.

Could a pilot with outstanding marks in all categories, but with average flying ability, make it? The answer is no. The *Blue Angel* pilot must be above average in the cockpit. The *Blues* cannot accept the pilot who is satisfied with less than an OK number three wire pass every time. That's not to say the applicant must be an absolutely unerring flyer. But he must possess a reputation for trying to be the best on a continuing basis.

The competition is obviously tough. Less than 200 pilots have made the grade since the team was first organized in June, 30 years ago. That's the way it has to be.

'. . . to honor a standard that is expected by superiors, and to demonstrate it.'

'. . . they pay us to make decisions like that.'

the Boss . . .

Commander Keith "Casey" Jones is in his first season as the top *Blue Angel*. He relieved Commander Tony Less who successfully guided the *Blues* through their first two years in *Skyhawks* and through the transition period when the team was organized as a squadron. Casey's is the most demanding job in the outfit. As could be expected, he and his predecessors have had exemplary credentials.

"Of course the flying is the most difficult part of the assignments," explains Cdr. Jones. "Here at winter training, it's a building block process for all of us. The leader has to be smooth and continuously considerate of the wingmen. You have to judge the wind conditions and make appropriate adjustments to ensure that the maneuvers are executed for best audience viewing. You are the 'eyes' for the whole formation.

"In a fleet squadron (Casey was skipper of VA-153), the C.O. is usually the most experienced pilot in the unit. For me that doesn't hold true during training since I'm new this year. Later in the season and next year will be different.

"I rely on the junior pilots who have been with the team longer. It's a good relationship. I make no conscious effort to be aloof, and there has never been a problem of overfamiliarity.

"We're formal and conform to Navy standards, as you would expect. However, at civic functions we relax the formality.

"Some would say being a *Blue* leader is an awesome responsibility but I don't feel overwhelmed. Although I've never had a lifelong ambition to be a *Blue Angel*, I am extremely proud to have been selected and feel equal to the job."

The *Blue Angel* leadership is in very good hands.

Rising from the flat expanse of restricted area R-2510, is a hump of hard-packed earth about as big as a family size igloo. It has served for years as a simulated center point for the team's practice flights.

A small contingent of observers, the video cameramen included, normally position themselves near that hump to view and record the pilots at work.

In March this year, after one session in the sky over that center point, the diamond swung west toward the mountains. It reversed for a low altitude fly-by before going home — a sort of aerial "so long for now."

At the instant the flight crossed the mound, JP, in the slot, pressed his signal smoke switch. A vapor-like puff blossomed. It hung momentarily over the hump like an exclamation point while the Skyhawks escaped over the horizon.

Somehow that gesture said a lot about the Blues. It demonstrated confidence with flare. It said, "We're the Blue Angels and we are very good at what we do." It also affirmed, "But we work damn hard at it."

Photos by Harry Gann, Manager, Aircraft Information, Douglas Aircraft, PH3 Jim Preston, Blue Angels, and the author.

THE LOG ...

1911 Ltjg. John H. Towers, Naval Aviator #3, reported for instruction in flying at the Curtiss School, Hammondsport, N.Y.

1913 The Secretary of the Navy approved detailing Assistant Naval Constructor J. C. Hunsaker to MIT to develop a "course of lectures and experiments in the design of aeroplanes and dirigibles, and to undertake research in that field."

1915 The Navy let its first contract for lighter-than-air craft to the Connecticut Aircraft Company, for one non-rigid airship, later designated DN-1.

The Secretary of the Navy approved a course at Pensacola to give formal instruction in balloons.

1917 The First Aeronautic Detachment, commanded by Lt. Kenneth Whiting, arrived in France aboard USS *Jupiter*. It was the first U.S. military unit sent to France in WW I.

The first contract was let for base construction of patrol stations along the Atlantic Coast.

1918 NAS Pensacola began taking upper atmospheric weather soundings on wind velocity and direction to provide information needed for navigational training flights. Recording instruments were carried aloft by a kite balloon.

1919 A contract was made for construction of a revolving platform at Hampton Roads to be used in developing techniques and equipment for landings aboard ship.

The General Board urged adoption of a broad program to establish a naval air service "capable of accompanying and operating with the fleet in all waters of the globe."

1921 Two CR-1 Curtiss racers were ordered, the first of the series with which Navy flyers captured many world speed records.

1925 The Naval Air Detail under LCdr. R. E. Byrd of the MacMillan Expedition sailed from Boston with three Loening amphibians aboard SS *Peary*. They were headed for North Greenland to begin an aerial exploration of a 30,000-square-mile area.

1926 The last elements of the Alaskan Aerial Survey Expedition left Seattle for Alaska. Its work, in cooperation with the Department of the Interior, was to accomplish the first aerial mapping of Alaska.

An Act of Congress provided that command of aviation stations, schools and tactical flight units be assigned to Naval Aviators; that the office of an Assistant Secretary of the Navy be created to foster naval aeronautics; that command of aircraft carriers and tenders be assigned to either Naval Aviators or Naval Aviation Observers.

1928 USS *Lexington* anchored in Lahaina Roads, Honolulu, at the end of a speed run from San Pedro, Calif., in 72 hours and 34 minutes.

1933 A contract was issued for development of special radio equipment for making blind landings aboard carriers.

Under the National Industrial Recovery Act, the President allotted $238 million to the Navy for new ships, including two aircraft carriers.

1934 USS *Ranger* was commissioned at Norfolk.

After completing normal operations, the ship went full speed astern and aircraft were landed into the bow arresting gear.

1937 Patrol Squadron Three, with 12 PBY-1 *Catalinas*, flew nonstop from San Diego to Coco Solo, Canal Zone, completing the 3,292-mile flight in 27 hours, 58 minutes.

A contract was given to the Martin Company for the XPBM-1 two-engined patrol plane, initial prototype of the PBM *Mariners*.

1938 Routine use of radiosondes began at NAS Anacostia to obtain data on weather conditions in the upper atmosphere.

1939 *Saratoga* and the tanker *Kanawha* completed a two-day underway refueling test off the coast of Southern California demonstrating the feasibility of refueling carriers at sea.

1940 The Naval Expansion Act authorized an increase in aircraft carrier tonnage of 79,500 tons over limits set in 1938 and increased the authorized aircraft strength to 4,500 useful planes. Congress then revised its previous action and set the ceiling at 10,000.

CNO announced plans for an expanded flight training program.

1941 USS *Long Island*, first Navy escort carrier, was commissioned at Newport News. She was a flush deck carrier converted in 67 days from a cargo ship.

The Naval Aircraft Factory reported that development of airborne television had progressed to a point where signals transmitted by this means could be used to alter the course of the transmitting plane.

Navy contracted with Northrop Aircraft for the design of a gas turbine developing 2,500 hp at a weight of less than 3,215 pounds. This began the development of the turboprop engine.

1942 The Battle of Midway began. *Yorktown*, *Hornet* and *Enterprise* participated, together with Navy, Marine and Army air units based on Midway. This battle turned the tide of the Pacific War.

Loran was given its first airborne test in a K-2 airship at NAS Lakehurst. The success of that test led to Navy's use of Loran.

Congress authorized an increase in airship strength of the Navy to 200 lighter-than-air craft.

A contract was awarded to Goodyear for a prototype Model M scouting and patrol airship with 50 percent greater range and volume than the K class.

The Naval Aircraft Factory was directed to partici-

JUNE

pate in developing high altitude pressure suits.

Following an inspection of Sikorsky's VS-300 helicopter, it was recommended that helicopters be obtained for antisubmarine convoy duty and lifesaving.

1943 The Commander in Chief, U.S. Fleet established a project for airborne testing of high velocity, forward-shooting rockets. The results of the tests were so favorable that operational squadrons were equipped with forward-firing rockets before the end of the year.

1944 Airships of ZP-14 completed the first crossing of the Atlantic by non-rigids.

Allied invasion of Normandy — Navy Observation Squadron Seven, with units of the British Fleet air arm and Royal Air Force, flew gunfire spotting missions.

CNO announced plans for drastic reduction in the pilot training program.

The parachute experimental division was established at Lakehurst to develop and test parachutes and survival gear.

1945 A ramjet engine produced power in a supersonic test flight. It achieved a range of 11,000 yards.

1946 A contract was issued to North American Aviation, Inc., for the design and construction of three SZJ-1 aircraft. This began the active development of a long-range, carrier-based bomber capable of delivering nuclear weapons.

1947 CNO approved new aircraft carrier characteristics to be incorporated in an improvement program by which *Essex*-class carriers were to be modified to meet new operating requirements.

Development of low-drag bombs was begun, with the goal of an external store shape to house conventional bombs, machine guns, rockets, etc., to be adapted for use as an external fuel tank.

1948 Flight training was opened to men 18 to 25, with at least two years of college, under a plan that was in essence a reactivation of the aviation cadet program.

A contract was given to the Federal Telecommunications Laboratory for development of a surface beacon and airborne receiver capable of determining the direction of aircraft from a surface station — the beginning of Tacan.

1950 The President announced that he had ordered sea and air forces in the Far East to support Republic of Korea forces and ordered the Seventh Fleet to take steps to prevent an invasion of Formosa. A few days later, he directed a naval blockade of the Korean coast.

1952 Aviation Medical Acceleration Laboratory was dedicated at NADC. Its human centrifuge was used as a research tool for investigating pilot reactions to accelerations in high-speed flight at various temperatures and altitudes.

Combined elements of the Navy, Marine Corps and Air Force virtually destroyed the electric power potential of North Korea. It was the largest single air effort since the end of WW II.

1954 An S2F-1 was catapulted from *Hancock* in the first test of the C-11 steam catapult.

1955 Electronic Countermeasures Squadron One, the first Navy squadron of its type, was commissioned at NAS Iwakuni.

1957 Two F8U *Crusaders* and two A3D *Skywarriors* flew nonstop from *Bon Homme Richard* off the California coast to *Saratoga* off the east coast of Florida, first carrier-to-carrier transcontinental flight.

A *Stratolab* balloon under the sponsorship of ONR and BuAer made a successful flight to investigate the interior of a thunderstorm.

A program to gather daily weather data over the Pacific, North America and the Atlantic by the use of transonde balloons was inaugurated with the release of the first balloon from NAS Iwakuni.

1958 NRL was requested to modify the system it had developed to detect, identify and predict the orbits of nonradiating objects in space. Out of this came the Navy space surveillance system.

A TF-1 from VR-21 delivered a J-34 engine to *Yorktown* 300 miles at sea, the first delivery of an aircraft engine by COD.

1959 A ZPG-3W, first of four airships designed for use in air warning patrol, was delivered to Lakehurst.

1960 Navigation satellite *Transit 2A* was placed into orbit. In addition to further developing the Doppler navigation techniques, it confirmed practicability of using satellites for precise geodetic survey.

1961 SecNav approved plans for terminating the lighter-than-air program.

Transit 4A was put into a nearly circular orbit, the first space vehicle to be equipped with a nuclear-powered generator.

1964 A VXE-6 *Hercules* made an unprecedented midwinter penetration of Antarctica to evacuate an injured man.

1971 Marine Aviation units completed redeployment from Vietnam to bases in U.S., Okinawa and Japan.

Navy selected McDonnell Douglas as a prime contractor to develop the all-weather, antiship missile, *Harpoon*.

1972 The F-14 *Tomcat* made its first arrested landing, aboard *Forrestal* off the Virginia coast.

HC-2 and HSs 15, 74 and 75 flew relief and rescue missions during Pennsylvania flood.

1973 A BQM-34A equipped with an integral target control system was successfully tested at NMC.

NAVAL AVIATION 65 in '78

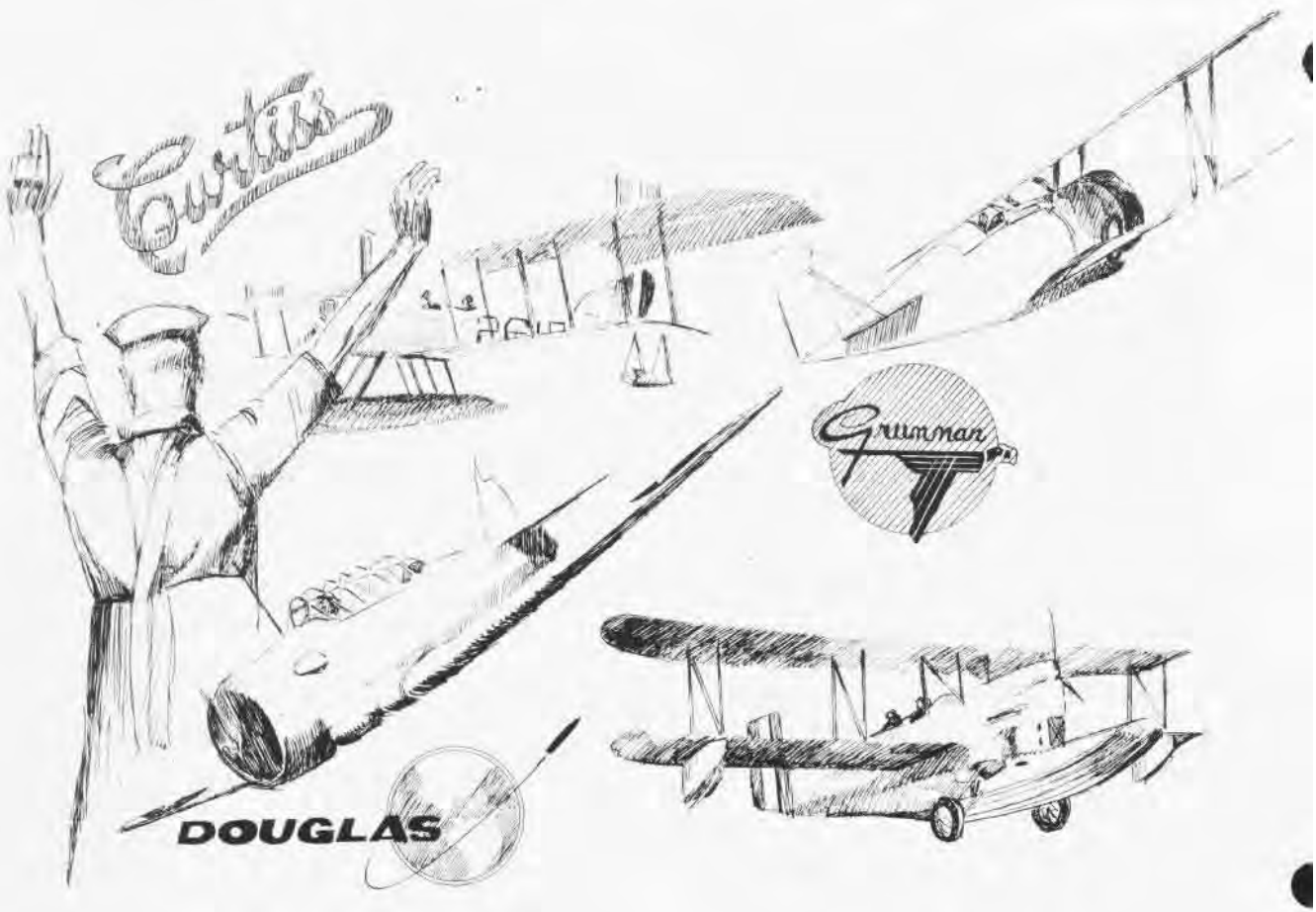
June 1916

'From the tables

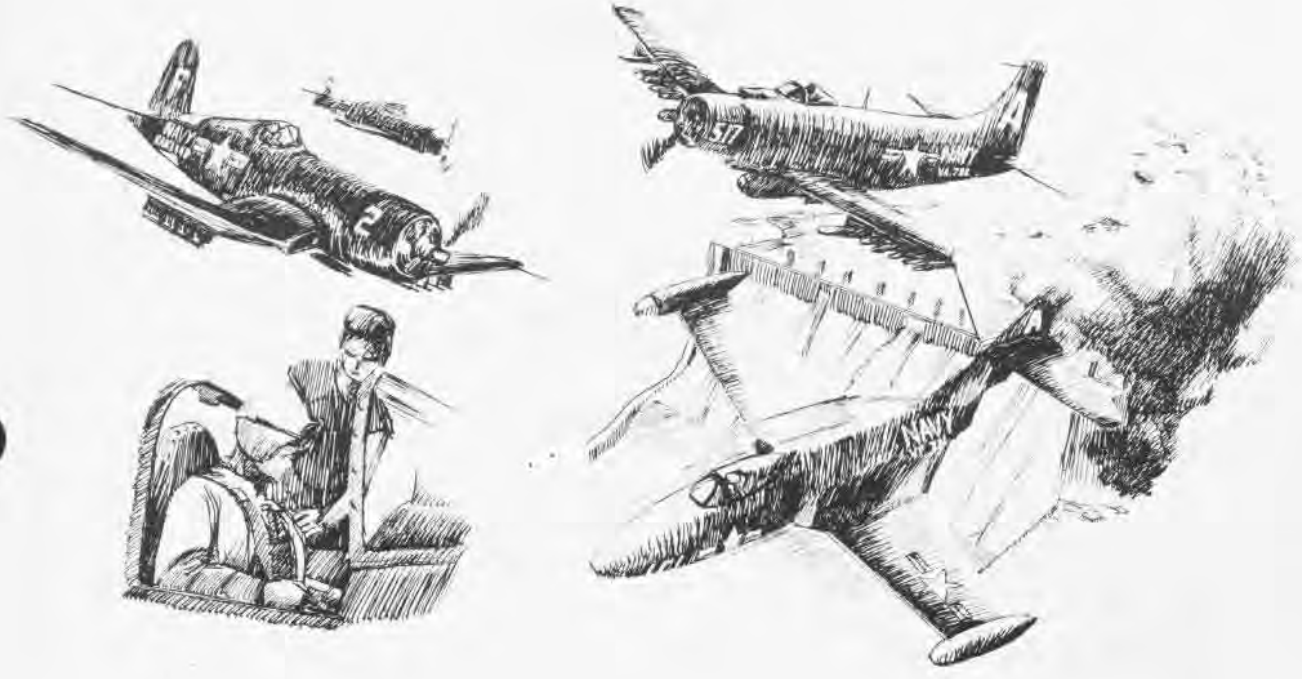
Story and Illustrations by
Lt. Peter Mersky, USNR

It started in June 1916 with the possibility of war with Mexico. Young F. Trubee Davison, a sophomore at Yale, organized the first Naval Air Reserve Unit. With three seaplanes and a great deal of enthusiasm, Davison and his group learned to fly from the Thames River in New London, Conn. By the time war with Germany was declared in April 1917, the Yale Unit had been transferred en masse onto the Navy's rolls. One youngster of 19, Lt. David Ingalls, became the only American Navy ace, flying with the RAF's No. 213 Squadron. When the war ended, the ranks of Naval Aviation had grown to 37,407, over 30,000 of which were reservists serving from England to Italy.

After every war, nations want peace and a return to normalcy. America was no exception and, by 1923, the Naval Reserve Flying Corps existed only on paper. But because of the efforts of a few far-sighted men, two reserve bases were established in that year, one at Squantum, Mass., the other at Fort Hamilton, N.Y. By the time America entered WW II in December 1941, names like Oakland, Long Beach and Grosse Ile had come to symbolize the U.S.'s air reserve strength. The exploits of America's carrier units have been told many



down at ...'



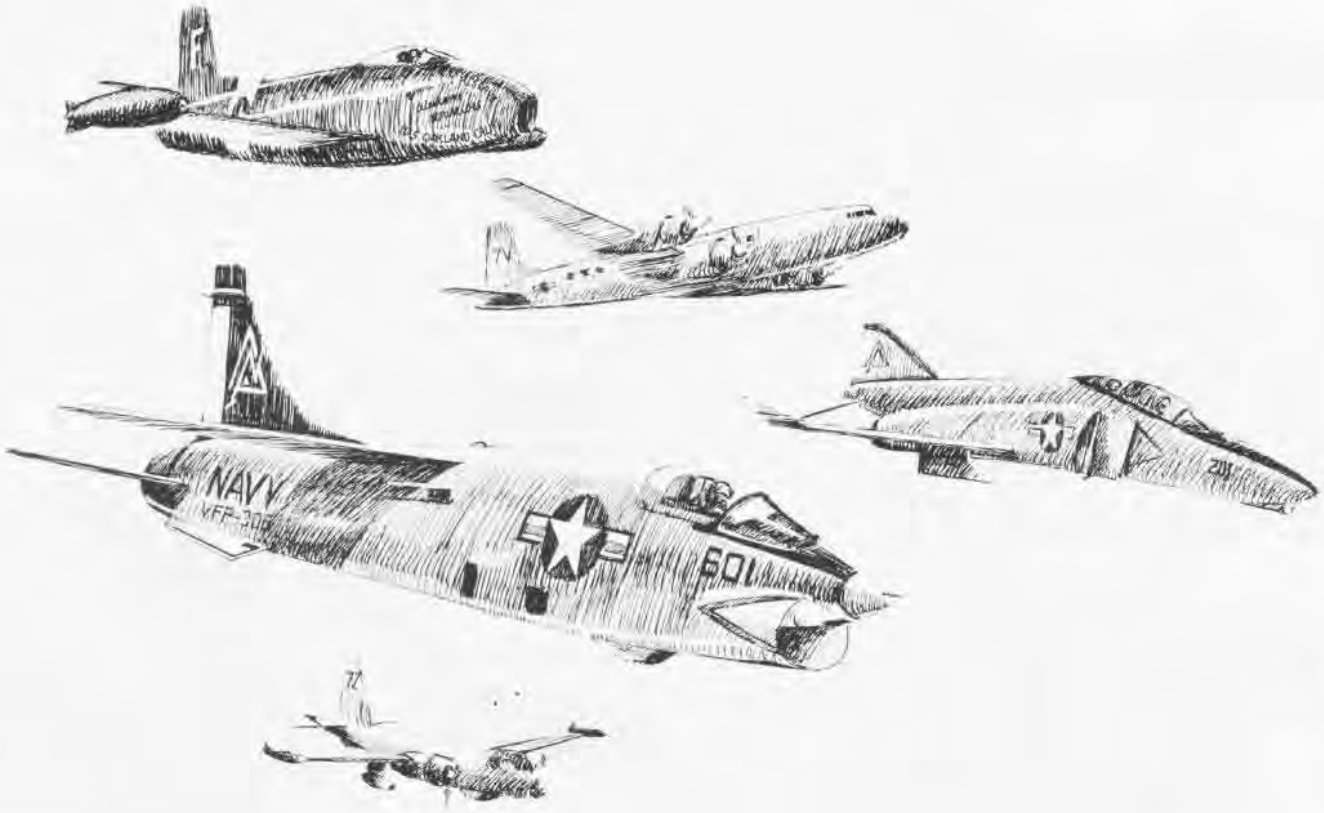
times: the recalled reservists melded right into the regular units. At the time of the Japanese surrender in 1945, 83 percent of the Navy's fleet manpower were reservists. For Naval Aviation this represented more than 50,000 pilots and several hundred thousand skilled aviation specialists.

After the war, the inevitable winding-down brought reorganization and a new nickname—Weekend Warriors. Once a month, for two days, the reservists left their families and came together to maintain and fly the aircraft at their local squadrons. Old bases were shut down, new ones opened. The pioneer base at Squantum was closed in 1953 and the new station at South Weymouth was commissioned. Other areas gained their own reserve stations—Memphis, Atlanta, New Orleans and Dallas among them.

Air Reservists flew the same aircraft they had flown during WW II: *Hellcats, Corsairs, Avengers* and *Harpoons*. By 1950, however, the jet age had arrived with the introduction at Oakland of the North American FJ-1 *Fury*, a tubby single-engine aircraft, which in reality was no more than a transitional type. But the jet had come to the reserves.

It is not widely appreciated that Naval Air during the Korean War was largely a reserve show. Reserve squadrons sometimes formed entire air wings. Flying *Corsairs* and ADs, newer *Panthers* and *Banshees*, as well as the less glamorous but essential transports and ASW aircraft, the reservists once again fought alongside their regular Navy counterparts. Seventy-five percent of the sorties were flown by reservists and at one point, early in 1953, 42 squadrons had been recalled. Perhaps the best account of a reservist's experience during this often confusing war is contained in *The Bridges at Toko-Ri* by James Michener.

Post-Korean reserve activities included periodic transitioning to new



aircraft and the routine of daily operations, spiced with call-ups.

The 1961 Berlin Crisis resulted in many reserve units from all services being recalled. The Naval Air Reserve provided ASW and transport planes.

When the Gulf of Tonkin incident in 1964 brought the United States directly into the Vietnamese War, the first two pilots lost were reservists. Throughout that conflict, the men and women of America's air reserve served once or more with the regular Navy.

And in 1968 during the *Pueblo* crisis, several tactical units were ordered to active duty.

With the war in Southeast Asia still going on, the Air Reserve was again revamped in 1970. The tactical portion was organized into CVWRs 20 and 30, with squadrons of attack, fighter, light photographic and tanker aircraft. No longer would separate squadrons be called up in an emergency; the air wing concept had come to the reserves. Now whole wings could be deployed, CVWR-20 to the Atlantic Fleet and CVWR-30 to the Pacific.

Today, the reservists, many of them with combat experience in Vietnam, fly A-7s, F-4s and RF-8s, carrying on the training and experience they gained in the fleet. The VP community is also trading in its Korean vintage P-2s for turbine-powered P-3s.

For one weekend a month and two weeks a year, officers and men of these squadrons maintain and fly their planes and carry on other squadron functions, just as their active fleet counterparts. Often a reservist spends additional hours "out at the squadron" instead of home with the family. Augmented by a small nucleus of active duty personnel, the reserves continue to provide a major backup to the fleet, just as they have for 60 years.

Update . . .

The Naval Air Reserve reflects the continuing effort to modernize reserve hardware units, to allow better integration with fleet units and to support total force requirements in the event of mobilization.

The reserve VF community will be equipped with F-4B/Ns by the end of FY 78. Five of the six VA squadrons are now equipped with A-7A/Bs. Transition from A-4Ls to A-7Bs is scheduled for the last reserve VA squadron in FY 78. Ten reserve VP squadrons are presently flying P-3 *Orions* and the last of the SP-2H squadrons is scheduled to transition to P-3s by FY 80. Conventionally-powered E-1Bs will be replaced by turbine-powered E-2s during FY 77. It is anticipated that the reserves will acquire EA-6s during FY 78-80.

The reserve helicopter community is equipped with SH-3A/Gs which, along with SH-3Ds, are still flown by some fleet squadrons. However, as the fleet gradually modernizes to the H configuration, the reserves will be equipped with Ds and ultimately with SH-3Hs beginning in FY 81. In addition to ASW expertise, there is within the reserves a wealth of experience gained in Southeast Asia, in combat search and rescue and riverine operations. HC-9 was recently established and is flying the HH-3A. HA(L)-4 and HA(L)-5 are scheduled to be established during FY 77. They will be equipped with HH-1K *Huey* gunships.

The Reserve Merchant Ship Defense System is a research and development project. It is programmed to evaluate placing a mobile containerized van complex aboard a commercial container ship for support of a helicopter detachment. The detachment would provide an antisubmarine warfare capability on-site during convoy operations (page 30). This could provide an additional method of employing HS antisubmarine forces for existing reserve HS squadrons in addition to actively participating in the evaluation.

With the demise of reserve C-118 transports projected for the end of FY 77, the Air Force has been directed to assume responsibility for Navy air transport requirements. C-9 assets, existing within Navy, will be utilized to support Navy base and command support logistics requirements. To aid in this effort, one reserve squadron, VR-55, was established on April 1 at NAS Alameda. Another will be formed later this year. Each unit will be equipped with three C-9Bs.

By Commander Bill Newton

PROJECT

After many years of studies and software analyses, fabrication has finally commenced on an advanced aviation support facility for use by Navy aircraft. Present work is limited to the construction and testing of an engineering prototype designed to support four Sikorsky SH-3 ASW helos and 80 personnel. Later development could include experiments under way with other aircraft and even missions beyond the current sea-lane/convoy protection role.

The basic concept of the reserve merchant ship defense system (RMSDS), or Project *Arapaho*, is premised on wide availability of suitable merchant ships which, without modification or advance notification, could be hastily recruited for emergency supplemental maritime defense. With aircraft, for example, or selected Naval Air Reserve squadrons embarked, *Arapaho*-equipped cargo ships could provide a measure of indigenous protection to vital international sea lanes — air capability now restricted due to the diminished number of commissioned carriers and the relatively few LAMPS-operating surface combatants. This could be accomplished with 10 to 15 percent payload compromise to the host merchantman and a modest investment in aviation maintenance and spares support for the deploying detachment.

The RMSDS design is the work of John J. McMullen Associates, Inc., an internationally recognized marine architectural firm and winner of a NavAirSysCom contract in 1975. It consists of steel modules which dimensionally resemble the same standard cargo containers (20- and 40-foot units) they will temporarily replace aboard ship. These will be outfitted as aviation servicing, spares and maintenance areas, living compartments, magazines, reefers, power supply and communication modules. They will, in effect, resemble the normal fixed compartments aboard any commissioned ship and will feature the latest in convenience and safety provisions.

The modules will be arranged to form a hangar which, with a light truss-type overhead, will be capable of housing four folded SH-3s at a time. A pair of twin landing pads, each measuring 100 x 64 feet and constructed from individual steel grating panels, will be more than capable of withstanding aircraft and vehicle loads. Aviation fuel will be pumped from a temporary fuel farm of leased storage and servicing tanks located aft on the main deck. An individual power supply (two 250-kw diesel generators) will accommodate all aircraft starting, servicing and personnel needs. Fresh water for washdowns and personnel use will be taken from the ship's surplus capacity or tanked aboard if necessary.

All installation, servicing, repair, upkeep and aviation operating functions will be performed by Navy personnel with no assistance needed from the regular ship's company. Every effort has been made to develop an almost totally autonomous physical facility that can be rapidly trucked from a CONUS air station to a commercial pier, quickly brought aboard ship, assembled and made ready for air operations within hours. All components will be compatible with the standard commercial cranes and handling equipment found at container ports around the world.

Plans call for trial deployment from an East Coast port late this year. Reserve ASW Helicopter Squadron 75, Lakehurst, N.J., will provide aircraft and operating personnel. The chartered merchant container ship will be underway for eight days with possible offload/onload at a destination port to demonstrate mobility, safety, timing and general compatibility. The aircraft will be confined to day-VFR operations. Emphasis will be on launch and recovery feasibility, safety, servicing compatibility and personnel support adequacy. On its return, the squadron will resume its regular functions at Lakehurst and the facility will be transported to the Naval Air Development Center for further assessment ashore.

Under the direction of CNO, the NavAirSysCom technical manager has been charged with implementation of the joint Navy-Congressional planning that preceded the manufacturing decision. NADC Warminster received authority from NavAir to serve as the principal engineering source, based largely on its lengthy involvement in LAMPS and related air ASW functions. The Military Sealift Command was assigned the task of selecting and contracting for a typical American-flag container ship for use during the underway phases. Other participants include NAEC Lakehurst, Naval Air Logistics Support Center, Patuxent River, the Coast Guard, various reserve units and commands, and a number of Federal regulatory groups. The Office of Naval Research Branch 313, Chicago, is the principal analytical/research element of the naval reserve and is performing necessary collateral evaluations. The operational test and evaluation force will conduct a separate assessment designed to better define overall project merit.

The U.S. Merchant Marine presently operates some 150 "intermodal" ships, about 80 of which show immediate potential as *Arapaho* host hulls. These are largely container ships of heavy displacement and high speed, mostly constructed within the past ten years, highly automated and defined as extremely high-value targets in any maritime emergency. Their safe, rapid arrival at destination ports will be a matter of considerable importance in any one of dozens of wartime scenarios. In addition to these, member nations of NATO operate, in regular day-to-day commercial service, several hundred merchantmen with equivalent adaptability to such use. Present plans really are an extension of earlier merchant ship defensive measures which resulted in armed guard crews, deck guns, antiaircraft weapons and even catapulted fighter planes being installed on freighters and tankers. The logical expansion to more modern rotary-wing ASW should be a worthwhile addition to conventional protective alternatives.

The real factors behind this program began to emerge a decade ago. At that time, substantial numbers of new, large, fast container ships started to enter the world's inventories. Differing markedly from their break-bulk counterparts, they offered large amounts of clear, unobstructed acre-

ARAPAHO

age topside — free of booms, cranes, stanchions and antennas that had heretofore restricted any thought of serious aircraft basing, at least in any number. They had been designed to support heavy container loads — 70 percent in hatches and 30 percent stacked atop each other on the main deck.

Each 40-foot container can weigh up to 37 tons, and hundreds are regularly carried on exposed main deck spaces. This not only allowed adequate airspace, but also guaranteed sufficient strength and stability for landing and handling of fairly heavy aircraft. Another factor was the development and introduction of new V/STOL aircraft designs, which, although of fixed-wing configuration, could safely and effectively launch and recover vertically. The combination of this potential, plus the fiscal difficulty in procuring adequate commissioned ships for such missions as air defense of sea lanes, brought the idea to fruition.

Congressional support has focused on fuller, more productive use of the naval reserve, especially the opportunity to actually deploy mobilized units such as HS-75 on very short notice in a meaningful way. It has also underscored the prospect of foreign sales potential, especially with nations whose economic status precludes consideration of commissioned aviation ships. The return on investment inherent in *Arapaho* and the potential use of resources offer a basis for full examination of the concept's advantages as well as its limitations. If it proves not only feasible but operationally effective to extend aviation basing from commissioned to leased ocean-going hulls as well, Naval Aviation will have achieved a major breakthrough.

By James J. Mulquin

OLD SALTS &

By Richard J. Sullivan, Cdr., USNR (Ret.)

Go out and practice water landings in the PBY? Duck soup! This hop would be a breather and I really needed one. Commander Marsh, the other student I was scheduled to go out with, had previous time in the PBY. And this was only a water landing familiarization hop anyway. Test Pilot Training School — as the U.S. Navy Test Pilot School at Patuxent River, Md., was called in those days— scheduled just enough of these little diversionary exercises as relief valves in the pressure-cooker schedule which normally faced the student.

The six-month Test Pilot Training School was the standard way to begin a tour of duty at the Naval Air Test Center. It was the Navy's method for taking experienced fleet flyers and developing them into engineering test pilots. Upon successful completion of the school, the new test pilots would begin a two- or three-year tour at one of the five units within the test center.

I had been in school for about six weeks and was finding the going very tough for a young lieutenant. Four hours of academics every morning and two test flights each afternoon made a full schedule. But that was only half of it. We had difficult homework every night and, to top it off, we had to turn in a complete flight report for every test sortie. Plus, we were checking out in a half-dozen different aircraft we had never flown before. So, a PBY water fam flight which didn't require test data or a report was a welcome relief.

Anyway, Cdr. Marsh and I got into our gear and walked over to the flight line. We signed the yellow sheet, did our preflight, and climbed into the cockpit. The commander took the left seat, I took the right. This was a PBY-5A amphibian, normally hangared and maintained as a landplane because of the convenience. However, after takeoff it could be operated as a seaplane as soon as you raised the wheels and lowered the wing-tip floats. That is just what we did. We went through our checklists, taxied out and took off. We raised the wheels, climbed to about 1,500 feet, eased over to the seadrome area adjacent to the airfield, and then lowered the wing-tip floats.

"I'll try a few first to start things off," the commander called over to me. The big headsets we wore were normally needed for both radio communications and intercom with the crew, but across the cockpit we rarely used the intercom. It was easy since we could uncover our inboard ear by skewing the headset.

When I called the tower requesting bounce landings in the seadrome area, we were advised to land east. Winds were quoted as 090 degrees at eight knots. Cdr. Marsh took up a heading of 270 degrees, setting up a downwind leg for a lefthand pattern, while I went over the landing checklist. We reported "turning base," and made the routine, wide 180-degree descending turn to final approach on an easterly heading.

When we rolled out of our bank, we were at about 200 feet. There was a slight ripple on the water. The commander had set up a beautiful rate of descent at about 250 feet per minute. Everything seemed almost boringly satisfactory. This would be just like the first water fam flight I had made two weeks before with young Tom Kay, a lieutenant on the TPT staff. It was fun that first time, just flying it on gently at 80 knots with all the room in the world for corrections. The hull clippety-clipped through the waves so gradually, as the plane kissed the water's surface, that it seemed nothing could be easier than this smooth and graceful maneuver.

The ingrained habits of some 2,500 hours of pilot time penetrated my

complacent frame of mind as Cdr. Marsh proceeded through his final approach. I checked the gauges and thought, airspeed 80 knots? We're not doing 80 knots. We're doing 65! This thing stalls about 60! We'd be stalled right now if we had any kind of load. What's this guy doing? I wondered.

His right hand was gripping the pair of throttles which extended downward from the overhead mount in the PBY. His left hand had a firm grip on the yoke. His vision was somehow divided between the airspeed indicator and the space just forward and below the nose of the plane. It seemed he stopped looking at the altimeter after we passed through 100 feet.

Just when we should have begun to hear the sound of the waves, he cut the throttles to idle and held the yoke full back, using both hands. Almost immediately we hit the water, once. Then we hit it again. Then we hit it again — and again. The impact of the skips finally decreased until we stopped breaking clear between bounces. We slowed down and halted. The commander had never eased up one iota on the two-handed grip and full-back position of the yoke until we were well down off the step and barely moving forward.

I sat there for a moment wondering if I dared have the mechanic go aft to check for hull damage. But the commander growled, "Well, come on. What are you waiting for? Give me the checklist and call the tower for takeoff."

Too dumbfounded to do anything else, I did as he ordered. The next thing I knew we were up on the step, lifting off and climbing smoothly back up to pattern altitude for another go at it. As we climbed and started our turn at the upwind end of the pattern, I kept thinking about the flight with Tom Kay two weeks before. We must have made at least six water landings apiece and every one was as gentle and smooth as any I had ever experienced. All we did was set up a 200-250 fpm rate of descent, hold a steady 80 knots and fly it on. Every touchdown had been a tender caress.

Well, maybe my pilot's next landing would be a little better. He was probably rusty. But as we turned base, made our wide descending turn and rolled out on final, the commander did not appear to be rusty at all. He was smooth, relaxed, methodical — in excellent control of altitude and airspeed.

Wait. Airspeed? There we were again at 65 knots, at least 100 feet up in the air. But we did have a very smooth rate of descent even though we were practically at stall speed. Then, just about the time we should have been touching down, he did it again. He hacked the throttles back in a full-stall splash onto the water. Again we bounced two or three times while the commander held onto that yoke in the full-back position. I noticed this time that, for all our bouncing, our nose-high attitude remained constant throughout the cycles until we slowed, stayed down and stopped.

It began to dawn on me that Cdr. Marsh was not particularly surprised at the way the plane splashed in and bounced its way to a stop each time. He made four more landings using the same technique each time. With each succeeding landing I realized that the bounces were not really very rough. However, it seemed to be a foolish technique. It would be so easy to squeak it on every time if we just flew a little faster. Then we could let it skim a long way across the water on the step until it gradually slowed down and settled in off the step.

Finally, after six of these tail-down, full-stall splash landings, Cdr. Marsh leaned back and said, "O.K. You take her off and try a few."

This was just what I expected, of course, and everything would have been fine except the commander was putting me in an awkward position. What should I do? Fly it on in a graceful touchdown or stagger through one of those controlled crashes that he had been doing? Nuts. There was only one thing to do. Just set it down as smoothly as it would go and sweat out the commander's reaction.

Well, Tom Kay's fly-on technique worked like a charm, exactly as it had two weeks before. I held it at 80 knots on final, very carefully set up a 200-fpm rate of descent and even eased it back a hair further just before touchdown. The plane went onto the water so gently you could hardly tell when it touched. It sailed along on the step for a long way, then slowly began to decelerate, sink down off the step and slow to idling speed. A vague something nagged at the back of my mind concerning the ease with which this old boat would land if you used proper procedures.

The puzzle was about to be solved.

"What the hell do you think you're doing?" erupted the suddenly volcanic Cdr. Marsh.

"Well," I started, "Tom K. . . ."

"Do you want to get yourself killed?" he pressed.

Now, what is he talking about, I thought. A gorgeous landing like that and he's concerned about something dangerous?

"Well, sir, I was just following the techniques that Tom Kay showed me when we flew this plane before."

The mixture of bewilderment and some resentment must have showed on my face. He began to lower his voice to a shout.

"You guys don't know what this aircraft is for! This is a search and rescue plane. You're supposed to be able to make an open-sea landing, stop and rescue people in the water. You try a landing like that in any kind of swell in the open sea and somebody will have to rescue *you*."

"Oh?" from me. (So that's what's bothering this old goat. O.K. I'll show him a full-stall landing if that's all he wants. Big deal.)

"Now let's get up there again, drag this thing in at 65 knots and have it all through flying by the time it hits the water."

"Aye, aye, sir."

So up and around we went and within ten minutes we were back on final approach to another landing. This time I copied everything Cdr. Marsh had done on his landings, except that I planned to set it down more gently and avoid the bounces. The approach was fine. I had 65 knots airspeed, and I cut the throttles at touchdown. But then the excitement started.

The old reflexes from a thousand landings in the P2V, a patrol bomber landplane, thrust themselves abruptly into the picture. Instead of holding the yoke full aft to keep the wing stalled, I eased it forward just a smidgen at touchdown, a technique used to roll the P2V firmly onto the runway. The PBY behaved quite differently. In fact, this monster seemed to take the relaxing of the back pressure on the yoke as a sign of weakness or lack of authority. It immediately seized the opportunity to get the upper hand. As the plane hit the water, it rocked forward in a sharp nose-down pitch which produced a spontaneous reaction from me. I yanked the yoke full back and held it as hard as I could. Then came the next surprise.

Reaching the bottom of its downward pitch into the water, the nose immediately reversed and pitched upward sharply. The adrenalin began to pump as I realized we were now back in the air in an uncomfortably nose-high attitude. My responses on the yoke were totally spontaneous, like putting my hand out to cushion a fall. As the nose kept coming up I pushed the yoke forward. Much too quickly we splashed back into the water, pitching downward sharply as we hit. In the same moment that I reacted by pulling the yoke full aft again, the nose reached the bottom of its downward pitch which was even deeper than the first one.

By the time I had the yoke firmly back in my lap, the next pitch-up was taking us clear of the water while the nose attitude was going even higher than on the first pitch-up. Again I pushed the yoke forward, but again my spontaneous reaction was late. I was not damping but amplifying the oscillations. Each one was worse. I realized that we were into something I had only heard of and read about.

This was the feared porpoise oscillation!

As we pitched down and dived in again, now with a heavy shudder in the airplane structure, Cdr. Marsh pushed both throttles full forward. The nose reached the bottom of its oscillation and pitched upward sharply, throwing us up out of the water. The engines roared and reached full power just before the nose reached its highest point. As we pitched down into the water again, it seemed as if we had only aggravated the problem by adding engine power. Surely this was the deepest plunge we had taken. If the next pitch went any higher, we were going to fall back in so hard or so steep that the hull would not hold together through it.

Cdr. Marsh hollered, "I've got it," at about the time we splashed back in with full power. I released the yoke to him during the downward pitch, as we were both holding it full aft anyway. During the next pitch-up, Marsh did not push the yoke forward appreciably. By the time the nose reached its full up-pitch he was ahead of it and already had the yoke full aft for the coming pitch-down cycle of the oscillation. As we came down and hit the water again, we dug in as sharply as before but it appeared that the commander might be able to get the thing under control.

The next pitch-up was high again but the following splash was, at last, slightly milder. We bounced about three more times but less deeply each time. We finally staggered away out of the stall region and picked up flying speed. As we climbed out, some of the color began to return to Marsh's usually ruddy face.

We made five more landings that day. I made them all myself. They were all full-stall landings. I bounced each time, but I held the yoke full back and had a very short runout on the water. I never again lost control. I made all the landings exactly the way Cdr. Marsh did.

You know, you have to pay attention to a salty old barnacle like him. He might know something about flying.

An LSE directs a Navy helicopter aboard the combat stores ship *San Jose* after 18-hours of replenishment ops in

WestPac. *San Jose*'s mission is to provide supplies to the fleet.

For the past three years, AQC Gerald Roy has played a crucial part in VA-304's four straight Silver Bomb Awards. His contribution as head of the *Firebirds'* ordnance division was such that squadron pilots regarded him as their "secret weapon" and responsible for their never having a bomb fail to drop in competition during the ComLAt WingPac bombing derbies.

Cdr. P. H. Lineberger, C.O. of VF-103, has logged his 300th *Saratoga* arrested landing. Four *Slugger* pilots have accumulated 100 or more *Saratoga* landings: Cdr. W. T. Inderlied III, Lt. G. J. Saunders, Lt. B. J. Gregor and Lt. R. D. Berger.

Three VA-56 pilots aboard *Midway* have passed their 1,000 A-7 flight-hour mark: Cdr. Gary Starbird, C.O., Lt. John Rowney and LCdr. Mike Boston.

Lt. Louis Lalli, a bombardier-navigator with VA-35, has become the first *Nimitz* centurion, making his 100th landing in a KA-6D piloted by Capt. Bryan Compton, *Nimitz* C.O.

Wolfpack aircrewmen of VF-1 were recently awarded 14 E certificates. Cdr. D. S. Strole, C.O., accepted them on behalf

of the recipients, in background, and the maintenance technicians responsible for a successful competitive exercise.

The second of two new WP-3D *Orions* has been received by NOAA (National Oceanic and Atmospheric Administration). The $7 million flying laboratory, when fully instrumented in 1977, will join a squadron of research aircraft performing a broad range of environmental missions including studies of severe storms, cumulus clouds and hurricane modifications, air-sea interactions, air quality, weather and climate.

VP-46 has completed 12 years of accident-free flying in the P-3. The *Grey Knights* have accumulated over 104,340 hours which is equivalent to one aircraft flying continually for 11 years, 10 months and 20 days or a distance of more than 31,302,000 air miles, about 1,450 times around the earth at the equator. The maintenance effort alone, in achieving VP-46's record, exceeds 1,774,000 man-hours. Whew!

A T-29B of VT-29 flies along the shoreline of Corpus Christi and into the squadron's 18th year of accident-free flying, a

remarkable record. The squadron has surpassed 158,500 hours while training 7,000 NFOs, 5,000 pilots and 2,000 enlisted Marine navigators in airborne celestial and electronic navigation.

TacRon-23 deployed two detachments to NAS Fallon for a 14-day, back-to-back active-duty period to expand the squadron's close air support capabilities. In amphibious assaults, CAS is 23's primary

mission, with forward air control a secondary. The training qualified and requalified 28 personnel in CAS. They integrated into operations so effectively that active-duty personnel were reassigned to other tasks.

The 355th Army Transportation Company recently provided a lift for the Navy in the form of two CH-54 *Skycranes* which

moved vintage jet fighters from Bainbridge to Philadelphia. The fighters, an F9F *Panther* and an all-weather F4D *Skyray*, shown here, are the latest additions to the Navy and Marine Corps' Bicentennial display at the Naval Base in Philadelphia.

Enterprise has won the E for PacFlt carriers in the 1974-75 competitive cycle. This is the third consecutive award and fourth overall for *Big E*.

VMAT-102 has received the Meritorious Unit Commendation for the period January 1, 1972, through January 11, 1975. The squadron flew more than 50,000 accident-free hours in the A-4, primarily training first-tour aviators.

VP-22 has won the Coastal Command Trophy. The *Blue Geese* sustained the highest airborne ASW proficiency in PacFlt during the competitive cycle. ADJC R. B. Duering was singled out for the Navy Achievement Medal for his contribution to the squadron's performance by implementing and conducting engine trend programs which enhanced aircraft availability.

VP-45 has won the "Hook-'Em" trophy for exceptional ASW performance while operating with the *Sixth Fleet* in the Mediterranean.

At VA-93: Lt. Leo Kappel has made his 300th carrier landing in an A-7. Two *Raven* pilots accumulated 1,000 hours in the A-7: Cdr. Wally Wright and LCdr. Dave Fitch.

AOCS Carl Stutts of NATC Patuxent has flown in almost every plane the Navy owns that has more than one seat. In his 23 years' service, he has more than 2,000 flight hours in the AD-5, A-3D, F9F-8T, P-2V, P-3V, A-6, F-4, OV-10, TA-4 and various helicopters.

ADJ1 Nathan E. Swapp of VQ-2 at Rota has made his 500th arrested landing in an A-3 *Skywarrior* aboard USS *Independence*.

Changes of command:

Cdr. E. A. O'Neal became the first C.O. of VAQ-138 *Yellowjackets*, the 10th EA-6B squadron. The squadron has a complement of 24 officers and 190 enlisted. Its mission is tactical strike group support with electronic countermeasures.

VS-32, Cecil Field: Cdr. R. R. Proctor

relieved Cdr. H. P. Mouser.

HS-85, Alameda: Cdr. C. C. Compton relieved Cdr. T. C. Sholl.

VT-5, Pensacola: Cdr. R. E. Ludwig relieved Cdr. C. W. Addison.

VC-10, Guantanamo Bay: Cdr. K. A. MacGillvray relieved Cdr. W. W. Miller.

VA-94, Lemoore: Cdr. S. R. Briggs relieved Cdr. H. A. Eikel.

VA-122, Lemoore: Cdr. K. A. Dickerson relieved Cdr. R. L. Grant.

VF-33, *Independence:* Cdr. T. E. Davis relieved Cdr. J. M. Welch.

VMA-331, Cherry Point: LtCol. R. B. Savage, Jr., relieved Maj. R. L. Wood.

VA-52, NAS Whidbey Island: Cdr. Daryl Kerr relieved Cdr. Kip Banta.

VP-5: Cdr. A. C. Gross, Jr., relieved Cdr. H. L. Midtvedt.

Cdr. Gordon Wileen, RVAH-6 X.O., has logged 6,000 accident-free flight hours piloting the A-1H/J, T-2, A-4 and RA-5C.

HSL-37, the newest LAMPS squadron in the Pacific, has deployed its first operational detachment. Deployed were one aircraft, the OinC, three pilots, eight maintenance personnel and two ASW operators. Detachments usually cruise on fast frigates but also deploy on cruisers having a LAMPS capability.

At VF-11: *Red Rippers'* C.O., Cdr. R. K. Kauber, has passed his 5,000th accident-free hour, in 11 different Navy aircraft with 844 carrier landings. Ops officer LCdr. Sam Jackson has compiled 2,600 accident-free hours of which 2,000 were flown in the F-4.

Three Mayport-based ships operating with the Sixth Fleet — *Saratoga, Dale* and *Patterson* — made a five-day port visit to Split, Yugoslavia. *Saratoga* is the first U.S. aircraft carrier to enter a Yugoslavian port in 16 years.

Maj. J. R. Gibson, X.O. of VMAT-203, has logged a total of 1,000 flight hours in the AV-8A. Sorties in the *Harrier* are usually no longer than an hour.

LCdr. Frank Corah, VF-301, recorded the 159,000th arrested landing on board *Enterprise* just six days after the 158,000th was made by Ltjg. Robert Rivers of VFP-63.

After a 15-year absence, VMA-311 *Tomcats* have rejoined the 3d MAW at El Toro. They were previously stationed at MCAS Beaufort.

The *Sundowners* of VF-111 are approaching 12,000 accident-free flight

hours, both ashore and at sea. That's a *Sundowner* F-4 on the way up.

LCdr. Bruce Frye, OinC of VF-301, has been recommended for the Distinguished Flying Cross. He safely landed his F-4 *Phantom II* at NAS North Island after a 15-minute ordeal over the Pacific when the fire-crippled jet nearly went out of control. He touched down at 230 knots and hooked the cable successfully.

CAG-80 has been redesignated Helicopter Wing Reserve and will be based at NAS North Island. On July 1, 1976, the wing will assume admin and ops control of all NavAir reserve force helo squadrons. Under Cdr. P. E. Caine, it will consist of HSs 7, 75, 84 and 85; HA(L)s 4 and 5; and HC-9.

VA-97 has been awarded the ComNavAirPac E, for the 1974-75 competitive

cycle. The *Warhawks* won 64 out of 80 possible individual Es during weapons delivery exercises.

OMNIBUS A-4

A Navy technical evaluation of the newly equipped A-4M is nearing completion at NATC Patuxent River, Md. Omnibus changes, known as Engineering Change Proposal 1120 (ECP-1120), enhance Marine Corps close air support capabilities in the versatile A-4M.

Gearing up for a technical evaluation usually signals the appearance of different aircraft on the ramps and in the skies at Pax River. ECP-1120 airplanes look like any other A-4Ms at a glance, but a walk-around and a peek in the cockpit reveal clues to new technology within the familiar profile.

A laser spot tracker peers out from behind a small glass dome in the nose. Upgraded ECM equipments produce new "bumps" on the nose and a vertical fin "cap." More startling, a redesigned cockpit layout focuses attention on a head-up display giving the pilot command of a more flexible weapons system. These and a host of less visible changes culminate NavAirSysCom efforts to correct shortcomings identified in previous A-4 tests.

Testing of ECP-1120 changes spanned eight months, included 90 flights and involved several NavAir field activities and offsite test locations. Three distinctly unique test aircraft were evaluated. A highly-instrumented, prototype production version was used for contractor development tests and Navy technical performance tests. Mission suitability assessments and EMI checks utilized the first production-line ECP-1120 configured A-4M. The first NARF trial kit installation aircraft was included in the data base.

Having a head-up display (HUD) and small digital computer permits display of a continuously computed impact point (CCIP) for weapons delivery. Evaluating the performance of CCIP requires a HUD camera to measure the pilot's tracking and aiming errors. Also, an onboard instrumentation recorder samples all computer input variables so that computations and ballistics of the weapon can be verified. Finally, actual weapons releases on the NATC phototheodolite range yields precise time histories of aircraft position and accurate weapons scoring. Merging the range data with onboard instrumentation data allows a point-by-point determination of CCIP error sources.

Unique approaches to testing the ECP-1120 weapons system accuracy were used. An NATC-developed, general-purpose instrumentation pod was readily adaptable to existing wiring in the prototype. By modifying interfaces in the pod, instead of tearing the aircraft apart for wiring, significant time and money were saved.

Measuring impact accuracy for forward-firing guns and rockets usually requires a special target area in which the rounds can be visually (and manually) counted after each firing pass. This procedure is time consuming and results in few firing passes per flight. For the ECP-1120 tests, NATC used a target on a water range. On each firing pass, the impacts were recorded by a camera on the test airplane. In this manner, all scoring could be performed after the flight and the number of runs per flight were limited only by

CHANGES

the amount of ammunition carried. Additional flexibility existed because both guns and rockets could be evaluated on a single flight using the NATC camera and water-range technique.

Performing a tech eval means finding out what is good and bad — and why. Implementing this philosophy requires a step-by-step approach to understanding and testing the weapons system elements. First, the ECP-1120 equations were validated on a ground-based computer before the aircraft even arrived. This analysis yielded an envelope of performance in which the contractor's estimates of error sources should produce specification accuracy. Also, the critical or problem areas were identified. A flight test matrix could then be established to evaluate only the critical areas and typical fleet profiles. Significant savings in flights occur using this method over a shotgun approach to identifying and isolating problems.

Next, ground tests on the ECP-1120-equipped A-4M yielded hard data on the boresighting and alignment accuracy of the system. In parallel with these tests, an evaluation of the compatibility and adequacy of ground support equipment identified potential problems the fleet maintenance men might face.

Knowing how the weapons system should work, verifying proper installation/alignment and then performing actual releases on an instrumented range create a comprehensive picture of ECP-1120 technical performance.

Another area of unique test requirements arose in validating performance of the laser spot tracker (LST). In normal use, a forward air controller would designate the target with a hand-held laser. Laser energy reflected from the target would be detected by the A-4M LST and the pilot would follow LST steering commands to a weapons release point. To simulate a variety of targets and variations in characteristics of the hand-held laser, NATC uses a unique electro-optical test target. The amount of reflected laser energy can be precisely controlled, allowing tests of the full dynamic performance of the LST. Similarly the laser spot on the target can be "jiggled" or multiple spots can be created to assess LST performance in the presence of typical target conditions or when it is subjected to interference.

The A-4M pitot-static system currently provides inputs to three different air data computers. The ECP-1120 fin boom pitot-static system installation was developed and verified at NATC.

A major area of growth potential included in ECP-1120 is incorporation of both structural changes and electrical/signal wiring that would allow orderly incorporation of an angle rate bombing system (ARBS) in the future.

Both automatic weapons releases and CCIP, as well as automatic wind/target motion compensation, would be possible with ARBS. NATC served as the lead field activity for evaluating two prototype installations in A-4s.

By Richard D. Murphy

letters

Romeo the Rooster

Sometimes in the course of human events it becomes necessary to take a stand and make one's self heard. Such a time has now come. Now, I don't mind when they make fun of me and I don't mind when they make fun of a chicken, but now they're even making fun of our rooster, *Romeo*! You see, since 1966, the *Fighting Redcocks* of VA-22 based out of NAS Lemoore, Calif., have been the proud owners of an authentic, genuine, true-to-life fighting rooster. Our first proud bird, *Romeo I*, spent many an hour perched on MK82s during combat operations on Yankee Station. And when VA-22 returned from a cruise in early 1968, *Romeo I* traveled to Oregon for the Rogue River "Rooster Crow." The competition was fierce; nevertheless, *Romeo* emerged with a prize for having traveled the greatest distance. In the interim *Romeo II* has come and gone, much like a wave on a beach. But *Romeo III* lives, not only in the hearts of men, but also in my backyard. Security in the neighborhood has never been tighter. No one escapes the stare of this creature.

So, you can see that this A-7E squadron does not have a johnny-come-lately kind of a bird. This bird has a history almost as famous as the Liberty Bell. (As an aside, there are rumors still floating around that George Washington wanted a fighting redcock as the national bird. Don't laugh—Franklin wanted the wild turkey.) In any case, the American public in general and the Navy in particular may remember *Romeo* from a *Reader's Digest* article when VA-22 participated in the mining of North Vietnam in 1972. And more recently, *Romeo III* graced the pages of *Naval Aviation News*, just one and one-half years ago. Which all goes to show: If you seek a monument, look around. It may already be there.

A. M. Dundon, Cdr.
C.O., VA-22
FPO San Francisco 96601

Bogue

In the February "Letters" there was a query concerning USS *Bogue* (CVE-9) and embarked air groups. Here's the answer.

A *Bogue* reunion, which naturally includes the air groups, is planned for June 21-27 in Fort Lauderdale, Fla. Contact Julian R. Allen, 336 Balboa St., Hollywood Beach, Fla. 33019.

Rings on his Fingers

Egads! The article "The Aviation Machinist's Mate" in the January 1976 edition shows four pictures of the highly skilled, strong hands of the young ADJ3 Walt Wilson with not one, but *two* rings on *two* fingers on his left hand! Walt — and the rest of you mechanics — get those rings off when working on aviation engines, airframes — and all systems!

Tom Cushing
25 years an aviation mechanic
with all ten!
Naval Air Technical Services Facility
700 Robbins Avenue
Philadelphia, Pa. 19111

Although your publication is primarily a news and information magazine, I'm certain you are much concerned about safety. I was, therefore, quite surprised at the photographs accompanying the article on the AD rating in the January issue.

Six of the eight photos show ADJ3 Wilson wearing two rings and a watch while working on an aircraft. While the danger of mishap is more acute when working around operating machinery, a slip, a fall or spark could very well have serious consequences.

Even if the photos were specially posed for the article, an ADAN seeing the picture on page 35 would not know it was posed.

I usually find no cause for complaint in *NANews* and look forward to its arrival each month. That is why I was so surprised at such a glaring fault in an otherwise outstanding magazine and why I was prompted to write this letter—only my second to an editor in 23 years of Marine Corps service. I wonder what Grampaw P. would say if he were to read a report of Wilson losing a finger or two when he fell from a maintenance stand.

James E. Strasser, MSGT., USMC
NCOinC ATC Division
MCAS(H) New River, N.C. 28540

Ed's Note: Thanks folks, we goofed. And you can rest assured that Grampaw Pettibone had a piece of our hide.

Symposium

The Sixth Annual Aviation Boatswain's Mate Association Symposium will be held July 29-31 at NAS Oceana. All active, retired and former aviation boatswain's mates are invited to participate. For additional information contact Ltjg. J. J. Breslin, OinC, NALF Fentress, Va. 23322 or Cdr. R. F. Gillen, Ships Installations Officer, ComNavAirPac, NAS North Island, Calif. 92135.

Reunions

VPB-216 (1943-45 — PBM *Mariners*) will hold their first reunion October 8-10 at Hagerstown, Md. Contact Dick Gingrich, 468 E. Baltimore, Greencastle, Pa. 17225, or Bob Smith, 6468 W. 85th Place, Los Angeles, Calif. 90045.

Members of Torpedo Squadron 82 (VT-82) who served aboard USS *Bennington* (CV-20) in 1944-45 are holding their third triennial reunion September 17-19 at Virginia Beach, Va. For further information contact R. E. Dow, 48 Wyo[illegible] Drive, Worcester, Mass. 01600.

Other air group squadron personnel are also invited to attend.

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THE BLUE ANGELS
UNITED STATES NAVY FLIGHT DEMONSTRATION SQUADRON
Naval Air Station Pensacola, Florida 32508
FLIGHT SCHEDULE
1-6 MAR 1976

WALK DOWN	PILOT	CALL SIGN	NO.OF ACFT	TAKE OFF	ETE	MISSION
0745	CDR JONES	1	6 A-4F	0800	1+15	TRAINING
	HOLVERSTOTT	2				R-2510
	CISNEROS	3				TGT 103A
	PATTON	4				
	SAPP	5				
	MILLER,	6				
1100	CDR JONES	1	6 A-4F	1115	1+15	TRAINING
	HOLVERSTOTT	2				R-2510
	CISNEROS	3				TGT 103A
	PATTON	4				
	SAPP	5				
	MILLER	6				
1300	KRAFT	7	1 A-4F	1315	1+15	TRAINING
						R-2510
						TGT 103A

NATOPS QUESTIONS:

1. LOW ALTITUDE FLAME OUT
2. BLOWN TIRE, TAKEOFF/LANDING
3. BIRD STRIKE, LOSS OF CANOPY
4. BRAKE FAILURE ON LANDING ROLLOUT
5. STUCK THROTTLE
6. IN FLIGHT FIRE, ELECTRICAL-SMOKE & FUMES IN COCKPIT

SUBMITTED:

J. C. PATTON
LT, USN
OPERATIONS OFFICER

APPROVED:

K. S. JONES
CDR, USN
COMMANDING OFFICER

June	July	August	September	October	November
5-6 Manchester, N.H.	2-4 NAS Willow Grove	1 Suffolk Co., N.Y.	4 Erie, Pa.	2 NAS Memphis	6-7 NAS Cecil Field
9-10 Reading, Pa.	10-11 Offutt AFB	7 Butte, Mont.	5-6 Cleveland, Ohio	3 Lake Charles, La.	13-14 NAS New Orleans
12-13 Lexington, Ky.	17-18 Houston, Texas	8 Seattle, Wash.	11-12 Eau Claire, Wisc.	9-10 Harlingen, Texas	20-21 NAS Pensacola
19-20 NAF Detroit	20 Cape Canaveral	13-15 Abbotsford, B.C.	18-19 Toledo, Ohio	11 NAS Corpus Christi	
26 Green Bay, Wisc.	24-25 Dayton, Ohio	21-22 N. Kingstown, R.I.	25 NAS Patuxent River	16-17 NAS Point Mugu	
27 Moose Jaw, Canada	30-31 Suffolk Co., N.Y.	24 Cape Canaveral	26 NAS Oceana	23-24 NAS Miramar	
		28-29 NAS Atlanta		30 NAS Fallon	
				31 NAS Lemoore	

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