In HM-12, NAS Norfolk, women make up 25 percent of squadron personnel. Shown here, left to right, are AA Soon Rozett, ADAN Nan Davidson, AD2 Constance Woodworth, AD3 Shirley Burrows and AA Judy Bryson. (Photo by JOC K. Harrison)


BURROWS

naval aviation news

Sixty-Third Year of Publication

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COVERS — Front, Lt. Bernadette Baldy flies the C-130 Hercules at NAS Patuxent River. Back, Midshipman Second Class Cindy Mason keeps a watchful eye on the altitude dial during the pressure chamber test, a part of NROTC training. (Photos by JOC K. Harrison and PH1 T. Mitchell)

Features

Departments

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From the

EDITOR'S NOTEBOOK

Top, the first Silver Eagle was Harold H. "Kiddy" Karr who was designated Naval Aviation Pilot No. 1 on January 22, 1920. Karr, now deceased, was a frequent contributor to Naval Aviation News. Above, the last Silver Eagle on active duty was Master Chief Air Controlman Robert K. "Nap" Jones. Master Chief Jones retired last month.

Recently I attended the annual dinner of the Washington, D.C. wing of the Silver Eagles, an organization of Naval Aviators who began their careers as enlisted pilots. My host, Lou Petersen, has been retired from the Navy for years but still flies a Grumman HU-16 flying boat for the Smithsonian Institution. His duties with scientific research teams take him to all parts of the world. But first and foremost he is a Naval Aviator.

I had been told that there would be enough sea stories at the dinner to fill the historical feature requirements of *Naval Aviation News* for the next five years, and that was no idle boast. I sat down at the table just in time to hear John Beaton launch into a story about a flight in a Douglas R5D in which he lost an engine. With three good engines remaining there was no cause for alarm but the situation was, nevertheless, officially an emergency. Flying to a nearby naval air station, Beaton called the tower and was cleared for a straight-in approach to the duty runway. On short final with gear down and locked, checklist complete, he was startled to see several red flares fired by the runway watch directly ahead of his aircraft. Adding power to the three good engines, he pulled up his gear and started around again. "What's the problem?" he asked the tower. The tower operator could not raise the runway watch and was also in the dark as to what had happened. The crash trucks were hurriedly repositioned and Beaton was cleared to land on the intersecting runway. Upon taxiing in to Operations and shutting down, he found the duty officer and the runway watch waiting for him. The latter was a conscientious young lad who explained it all like this:

"This was my first time out there alone. The man I relieved said that I should be alert to any unusual landing situation which might result in an accident, and not to hesitate to fire my flares. When I looked up and saw that one of the propellers on your airplane was standing still, I knew that was unusual, so. . . ." Beaton did not indicate what he might have said to the young man but everyone at our end of the table had a good laugh.

The conversation moved to carrier operations during WW II. One gentleman recalled taking a swan dive from a carrier flight deck when a combat damaged aircraft crashed on landing and hurtled toward him. "Luckily," he said, "I fell onto the deck below and only suffered a broken foot."

Some remembered serving under Admiral William F. Halsey and one recalled his experiences as a PBY pilot in the South Pacific during the Solomons campaign. Others had vivid recollections of Pearl Harbor on December 7, 1941.

One story followed another and, as I looked around the room, I thought that this group might easily be mistaken for a gathering of successful businessmen, pillars of the community. And indeed they are. But all are much more. Despite more recent successes, each considers his Navy wings a symbol of a crowning achievement.

"Of course, we are an organization without much of a future," one member pointed out. "Unfortunately, we cannot replenish our numbers." Still there are no signs of an early demise for this dynamic group, which is drawn together periodically to reminisce and to renew a commitment to the brotherhood of Naval Aviation. When William Shakespeare wrote, "We few, we happy few, we band of brothers," he must have had the Silver Eagles in mind.

Grampaw Pettibone

A List for All Seasons

April showers in the spring, when a young man's fancy turns to love – the clear blue skies of summer – autumn's falling leaves – and the ornaments and glitter of winter's white snow are seasons for all to enjoy, to be sure. And old Gramps, in the autumn of his years but a mere child at heart, delights in each season. But, as I look over some recent seasons past, I find that April showers have taken on the steady drizzle of magnesium – the clear blue skies of summer are overcast with panels, parts, pods, sonobuoys and jettisoned ordnance – the falling autumn leaves frequently contain DZUS buttons and stress fasteners. Also, the Halloween witch has been nearly strangled and snatched from her broom by a jettisoned tow banner cable. The white glitter and tinsel of winter is very likely to be that of 12-gauge steel or aluminum sheeting. The ornaments which were supposed to be hung by the chimney with care, were scattered randomly 'round the countryside with great abandon! All this may give new meaning to the tune "I Fall to Pieces" but it doesn't put a song in anyone's heart.

Old Gramps has just finished sorting through a three-inch stack of computer printouts listing well over 1,000 reported such objects lost from aircraft during the last 15 months. Another list shows over 5,000 objects lost during the period 1975-1980. Please note the word "reported" because Old Singed Whiskers here knows – through anonymous calls and notes – that these lists may represent roughly only two-thirds of the actual losses.

Reporting the in-flight losses may not seem so significant; however, they are vital to the identification of troublesome areas, fatigued parts and poor engineering design, which may prevent further losses. And we appear to need all the help we can get.

Approximately 75 percent of these incidents were attributed to known or suspected material failure. A significant portion of this 75 percent also listed aircrew, maintenance, or supervisory personnel as possible or known contributing causes. One-fourth of all these losses were credited solely to personnel or supervision error. It is interesting to note that the narrative accounts of the reports show that, in many cases, the panels or parts subsequently lost in flight were noted to be difficult to secure, or did not fit properly during the preflight inspection.

A good maintenance department should be just as aware of and concerned about parts that fail outside the aircraft as those inside. With the help of Benny Suggs this team should attempt to identify a remedy to the problem, if possible. An excellent case in point is provided in the 12-18 October 1980 issue #42-80 "Weekly Summary" which identified a problem with AH-1T fuel caps lost in flight. They designed a fix by painting alignment marks on the fuselage and fuel cap which verify the cap is locked when the marks are aligned and the cap is tight.

Can your safety, QA or trend analysis department identify the problem areas for the aircraft model you operate? Does your unit have a program to periodically check the fasteners, hatches and various panels for fatigue and proper fit? Have you designed or assisted in a fix to your problems? If so, old Gramps would like to hear about them and share the idea with others. If not, let's get hot!

Fortunately, we haven't injured anyone with this celestial trash dump – or have we? Could any of our unexplained aircraft losses have been attributed to damage resulting from lost or jettisoned parts? One near disastrous incident came mighty close as an A-4 target tow pilot dragged his target and tow cable off in the sea while trying to fly under a thunderstorm after being stuck by lightning – with tow cable acting as a lightning rod.

It's high time we ground these

ILLUSTRATED BY Osborn

airborne parts distributorships and DIVORCE ourselves from this jett-i-setting love affair. With DIVORCE meaning Detached In-flight Vehicular Objects Require Correcting Expeditiously!

Some Gramps Philosophy

Dearly Beloved:

We are gathered here for the pure purpose of flying – and enjoying it! I would like to take this opportunity to point out just how much akin this flying game is to entering into a marriage agreement. First of all, you gotta get down on your bones and beg the old man for an airplane, as scarce as flight time is today.

Then comes the license counterpart where you energetically bounce into maintenance control to review the yellow sheets. Keep in mind, when you sign, that you are saying "I do" or "I'm gonna" for the duration of this flight. And in signing you have solemnly promised to love, honor and cherish the old bird in sickness and health for as long as you both shall live/fly. The latter terms are not necessarily interchangeable since some flights are of much shorter duration than intended or desired.

Then we get to the part in the program where the man says, "Should any person here know any reason why this team should not be joined, let them speak now or forever hold the pieces." This is where you come in, Skipper, or you, Safety Sam, or Mr. CDI, QA, Maintenance Chief, Supervisor, Plane Captain and, even you, Mr. or Ms. Aircrewman. More than one wise partner has backed out at this point, a temporary disappointment, perhaps, but they lived to fly another day.

Now for the preflight. Unlike marriage, you should insist upon a thorough inspection of the machine to ensure that "what you see is what you get," and that all the vital parts, whether they be something old, something new, something borrowed or something blue, will remain attached during the performance of the entire mission. If, for any reason, you are not certain about some of the parts, then you'd best consult the birds or the bees. To you, that's Natops, maintenance pubs, and/or the wise old maintenance chief. He, like any protective father, takes a mighty dim view of chaps who, after an improper preflight, has the gall to bring his machine back to the line sans panels or vital parts. You just try returning a new bride to poppa with missing panel or parts adrift and you'll likely be looking down both barrels of a double muzzler.

Should your trusty machine not be ready for flight, another word of caution is in order lest ye be tempted. Fellow aviators take "that same dim view" of a wingman who lays lustful looks upon his machine.

Like marriage, the rewards for those aviators who perform these rituals with tender love and care (professional planning and execution) are most satisfying. Additionally, they foster lifelong longevity and, if nothing more, avoid confrontation with the most dreaded stress panel of all – the mishap board and its potential divorce decree.

Old Gramps wishes these unions every success for long and satisfying relationships. These can only be attained through dedicated efforts and attention to detail. We can ill afford an aviation divorce rate comparable to that of today's liberal society.

PH1 Terry C. Mitchell

Midshipman Cindy Mason's flight in a TA-4 Skyhawk of VF-126, NAS Miramar, ended the aviation phase of NROTC summer training. Her instructor pilot, Lt. Mary Lou Jorgensen, looks on as Cindy is strapped in.

High Flying Ladies

By Sandy Russell

Women are in Naval Aviation to stay. Once the subject of heated controversy, women are showing up everywhere in the previously all-male preserve. There are still some restrictions dictated by law and a few problems which are always present when breaking new ground, but women have largely scaled the barriers of prejudice by demonstrating that they can perform in a variety of aviation functions as well as men.

But despite the growing number of women in Naval Aviation, the phenomenon is still new to American society and continues to prompt questions from men and women, military and civilian alike:

- What kind of a woman wants to be a Naval Aviator?
- What kind of background does she come from?
- What is her motivation?
- Does it promise a challenging career?
- How is she treated by her peers?
- Can a woman be a Naval Aviator and have a successful marriage, too?
- How many women who have received their wings are still on active duty and where are they now?

Many of the same questions are asked of women who have become Naval Flight Officers, enlisted technicians and crewmen, and others who work in Naval Aviation. To find the answers we have gone directly to the source.

Women began entering the Navy's flight program in early 1973 when Secretary of the Navy John W. Warner announced that aviation training for women would start that spring (see *NANews,* July 1977). Eight women were selected to begin the test program, which was established to promote equal rights and opportunities for women throughout the service. Six of the original group received their Wings of Gold. In 1975, CNO authorized a second class of flight training for women and, again, six earned their wings. Eight of the graduates from those first two classes were still on active duty at the close of 1980.

Lieutenant Commander Judy Neuffer Bruner and Lieutenant Lin Vaught Hutton are working in Washington, D.C. LCdr. Bruner is in the legislative branch of the Deputy Chief of Naval Operations (Air Warfare), which handles congressional enquiries dealing with budget requests regarding Naval Aviation. Lt. Hutton is a detailer in the Naval Military Personnel Command, assigning aviators to their first tours after the training command.

A member of the Recruiting Command staff, Lieutenant Jane Skiles O'Dea runs the command's maintenance and training programs for its T-34Bs. She instructs prospective recruiters in the blue and white aircraft with "Fly Navy"

Photos by JOC Kirby Harrison

tail markings. Assigned additional duty at Training Air Wing Six, NAS Pensacola, Fla., she also heads a quality assurance team working on 50 aircraft.

Lt. O'Dea's name tag on her flight suit reads "High Flyin' Lady," and that she is. The first Navy woman to qualify as a flight instructor, she has served in that capacity for three years — over two of which were in primary training at NAS Whiting Field, Fla., in T-34Cs. She says, "I love instructing. I could become a professional flight instructor and be quite happy. It's hard work but very rewarding. I feel that, particularly in these years of a shortage of aviators, there's a great need for somebody to be doing the jobs women are doing. The Navy's hurting for pilots."

Mother of two daughters, Jane and her civilian husband have made workable family arrangements to suit their lifestyle, demonstrating that a woman can combine a career in military flying with a family.

Lieutenant Lynn Spruill, the first woman Navy pilot to carrier qualify in a fixed wing aircraft, has been quality assurance and maintenance control officer with Norfolk-based VRC-40. She recounts some changes in the role of women in Naval Aviation since she went through flight training: "Quantity, certainly, more opportunities, more mission roles, jet transition." She knows about jet transition firsthand and is qualified as a T-39 twin-jet transport pilot.

Lieutenant Rosemary Conatser Mariner, VX-5's safety officer, flies A-7s out of Naval Weapons Center, China Lake, Calif.

Lieutenant Mary Lou Jorgensen serves as instrument instructor pilot in TA-4s and as aircraft division officer of VF-126 at NAS Miramar, Calif.

Lieutenant Commander Barbara Allen Rainey, the first Navy woman to receive her wings, and Lieutenants Chris Giza and Joellen Drag Oslund are now reservists. LCdr. Rainey, the first woman pilot in the Naval Reserve, is attached to VR-2470, a fleet auxiliary squadron at NAS Dallas, Texas.

Lt. Giza serves as assistant maintenance officer at VR-58, NAS Jacksonville, Fla., flying the DC-9.

Lt. Oslund was the Navy's first woman helicopter pilot and as a reservist now flies H-3 *Sea Kings* with HC-194, a support squadron at NAS North Island, Calif. Her husband, Lieutenant Commander Dwayne Oslund, is the aircraft handling officer on *Belleau Wood* (LHA-3). Joellen Oslund is an enthusiastic reservist and proud of her role as a "weekend warrior." She says, "We get as much flight time as the active duty side, and the expertise and morale of our squadron are very high. The Reserve manages to keep an equivalent operational tempo with generally fewer material and personnel assets." Lt. Oslund plans to remain in the Naval Air Reserve indefinitely, commenting, "I want to stay in a flying billet as long as possible. I love Navy flying."

Lt. Jean Rummel was assistant admin officer in NAS Alameda's VR-55 until transferring into the Naval Reserve in January 1981.

Lt. Catherine Gehri Mills arrived in VRC-30, NAS North Island, around the first of this year, after completing a tour in Spain.

Since the first few classes of women went through flight training, the attitudes of male students have changed markedly. Student aviators Ensigns Marjorie L. Morley and Jennifer A. Lewis agree that they faced no special problems, as women, in training at the Aviation Schools Command, Pensacola, but emphasize that a student must be highly motivated.

Ens. Lewis was in ROTC in college and says of flying, "I think it takes a certain type of person. Not everyone is cut out to do this kind of work. Growing up in a military family gave me more of an idea what to expect."

A Naval Academy graduate, Morley advises, "You really need to have the desire to fly — that's what it takes to get through training. At the Academy, there's a program which allows those interested in flying to try it to see if they like it, have the aptitude for it — and mostly to determine if they don't like it. I already had a few hours in a small plane. I just love to fly!"

Another student aviator, Ensign Catherine H. Osman, went through OCS, then completed a tour in Washington, D.C., before going through aviation indoctrination at Pensacola. She is training at VT-6, NAS Whiting Field, and hopes to fly helos.

Besides becoming pilots, there are other fields in aviation which are open to women officers, such as aviation maintenance, air intelligence, air traffic control, the aeronautical engineering duty officer and Naval Flight Officer (NFO) programs. A prospective NFO, Ensign Tracy A. Kugler, tells why she chose this field.

"I chose aviation in the first place because my father was a Naval Aviator, so I had been exposed to the aviation community. Its atmosphere and the personalities of the people in it appealed to me. My eyesight is not good enough to be a pilot, but I enjoy the job an NFO does — using the radar and electronic equipment and the tactical planning. Even if I could have been a pilot, I think I still would have tried for NFO."

Ens. Kugler would like to get into the VP community because she believes its mission contributes more toward preventing war than coming up with solutions after war has begun. Her advice to women coming into the Navy's flight program is: "Don't have the attitude that everyone is going to be against you because you're a woman. Do the best you can and people will warm to you because they know you're trying." She adds, "I don't view myself as a woman working in a male-oriented environment. I'm here to do my job, and this is the job I chose."

Midshipman Cindy Mason, a student at the University of Missouri, participated in a training program designed to give future naval officers a look at four of the warfare specialties available to them after they receive their commissions in the Navy or Marine Corps. During the summer between their sophomore and junior years, students enrolled in NROTC spend four weeks in a concentrated orientation program which exposes them to the submarine, surface, Marine Corps and aviation communities. Mason was one of 39 women in the aviation phase during July 1980, along with 78 men.

Students in the aviation class were assigned to ComNavAirPac, NAS North Island, and received training in swimming, aviation physiology and aptitude tests, aircraft simulator flights, lectures, presentations and films. It ended with a flight in a Navy aircraft. Mason flew in a *Skyhawk* from VF-126, piloted by Lt. Mary Lou Jorgensen, at NAS Miramar where students spent time with the fighter and attack communities and completed physiology training.

Perhaps the aviation phase was summed up best by another midshipman, Christy Spitznagel, when she said, ". . . now that I've experienced it, I am not about to sit down to a nine-to-five job."

Lieutenant Junior Grade Patricia A. Denkler, VT-6, and

Top left, Lt. Lynn Spruill was the first woman Navy pilot to carrier qualify in a fixed wing aircraft. Bottom left, Lt. Karen Thornton and Ltjg. Neil Seeley of HC-6 discuss an upcoming flight at NAS Norfolk. Above, Ltjg. Beth Hubert is the first woman to become NATOPS qualified as pilot in command in the A-6 Intruder. Presently attached to VRF-31, she plans to apply for the astronaut program.

Ensign Pamela L. Duncan, VT-2, are both instructors in the T-34C *Mentor* at NAS Whiting Field. They went through Aviation Officer Candidate School at Pensacola, and Ltjg. Denkler sums up male attitudes while she was there. "After the first month, everybody knows that you're pulling your weight, too, and just plain respect for each other takes over."

Both women have Naval Aviation in their family backgrounds. Denkler's father and brother flew F-4s, and Duncan's brother presently flies P-3s out of NAS Moffett Field, Calif.

Pat Denkler has been flying since 1975. Before joining the Navy, she had flown only tailwheel-type aircraft and had lots of aerobatics experience in biplanes. Now, she teaches aerobatics and formation flying at VT-6. She also serves as the squadron public affairs officer. She feels that this job has kept her in touch with what is going on in the Navy in general and has helped her develop the "officer-like qualities which are ever important in the Navy."

The two instructors have been well accepted by male students and have received excellent support from their skippers and peers. Both plan to make the Navy a career, as long as doors keep opening up. From a practical standpoint, it all depends on what the future holds for women in the Navy.

Pat Denkler and Pam Duncan are two of five female aviators who were chosen to be selectively retained graduates (SERGRADs) after receiving their wings. A SERGRAD is an above average aviator who volunteers to remain in the flight training program as an instructor after graduation. The other three women in this program are assigned to squadrons at NAS Corpus Christi, Texas. Lieutenant Junior Grade Wendi Bryan is with VT-31, while Ensign Mary Freeman and Lieutenant Junior Grade Shelley Pennington are members of VT-27.

An officer selected for the SERGRAD program can expect to spend an additional 14 to 18 months in the training command instructing future Naval Aviators. With continued good standing as naval officers and aviators, male selectively retained graduates are guaranteed preferential assignment to a warfare specialty. Due to legal roadblocks that bar female service in combat units, women SERGRADs are not ensured a warfare specialty at this time. Explaining why she volunteered for the program, Ltjg. Wendi Bryan says, "I enjoy instructing, and I find it very rewarding. In fact, it's a good opportunity for me to bide my time to see if they open up any new positions for women."

Lt. Karen Thornton, an HC-6 pilot at NAS Norfolk, joined the Navy in 1976. Her first tour after OCS was in communications at Naval Communication Station, Guam. "I thought Naval Aviation was an exciting field," she remembers, "but it was my X.O. on Guam who provided encouragement. He was a former aviator and he made it seem really within my reach. It's hard now to believe this wouldn't be my life . . . and the job satisfaction has been terrific."

On June 6, 1980, Ensign Brenda E. Robinson became the first black female to earn her Wings of Gold. Ens. Robinson went through Aviation Officer Candidate School at Pensacola, primary flight training at Whiting Field, and then completed advanced instruction with VT-31, Corpus Christi. She is presently assigned to VRC-40, Norfolk, and flies the C-1A *Trader*. Robinson hopes to become carrier-qualified in the near future.

Lieutenant Bernadette Baldy flies the C-130 *Hercules* at VQ-4, NAS Patuxent River, Md. Lt. Baldy was in the ROTC program at Notre Dame and received her officer's commission in 1976. She completed a three-year tour as a foreign protocol specialist in Washington, D.C., before entering the flight program, choosing aviation because she felt it would be the greatest challenge and the most exciting field for a naval career. She followed several members of her family into the military. Her father is a retired Army officer and her brothers are distributed throughout the military services. One brother flies SAR missions off *Belleau Wood* (LHA-3), in the H-1 *Huey*, and a cousin is a P-3 *Orion* pilot.

As one of the first three Navy women to attend SERE (survival, evasion, resistance and escape) school, Lt. Baldy spent two weeks in training at Fairchild AFB, Wash. — five days of which were in the wilderness, and one day in a POW camp. In her class, she was the only woman and the only Navy officer. Later, in the POW camp scenario, she turned out to be the senior ranking officer. She says the experience was interesting and informative.

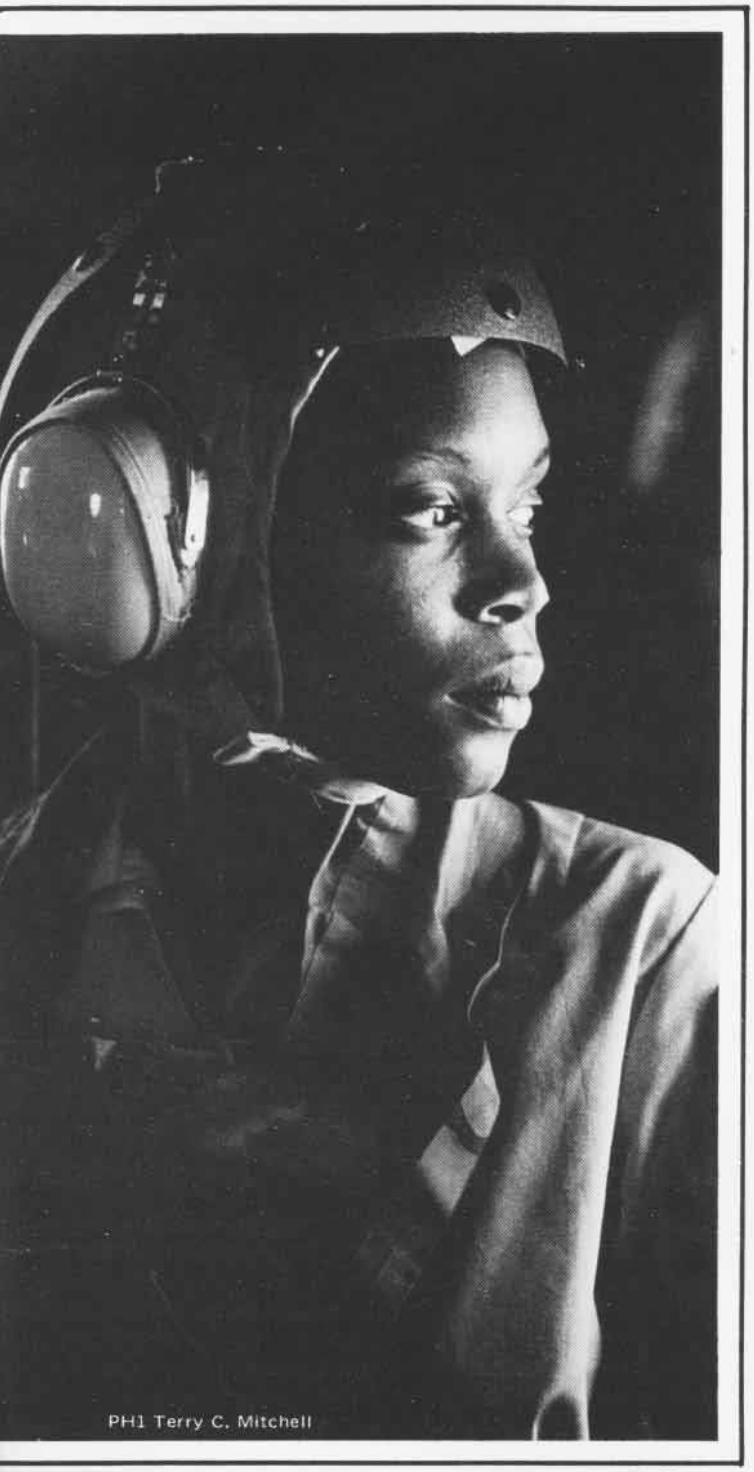
During her naval career, Lt. Baldy has not encountered any ill feelings or discrimination directed at her because she's a woman. Asked what she would tell women coming into the flight program now, she advises, "Flight training is like any other aspect of life. You have to work as hard and as long as it takes to achieve your goal; in this case, that was receiving my wings."

Lt. Baldy's ultimate career goal is to hold a command position, but she adds, "I want to make a meaningful contribution to the Navy. If I can feel that I've done that, I will have reached my goal."

Many women in non-aviation billets help support the flying community. Ensign Teresa L. Ray, VT-6's assistant legal officer, is one of them. She says that three of her uncles were career military men and that is what influenced her to join the Navy — she liked the lifestyle. After graduation from college, she taught school for a while but decided the military had more diversity. When asked if she ever wishes she had gone into flying herself, Terry smiles and comments, "No, I'm very content to be the only officer on the staff who doesn't fly. But I enjoy the aviation-related atmosphere. At OCS, the only background I got was surface, so I didn't realize how big the aviation community is until I came here."

At right, NROTC midshipmen participate in a demonstration flight in an H-46.

PH1 Terry C. Mitchell



NROTC midshipman during familiarization flight in the H-46 at HS-8, NAS North Island.

Also assigned to VT-6, YN3 Georgina King works in the public affairs office and YN2 Pamela Martenson is in charge of officers' records in the admin department. Both joined the Navy because of its education and advancement opportunities, and the fact that the military is financially secure in these times when jobs can be hard to find. "Being able to move from job to job, place to place, without losing seniority and still working toward retirement" is a big plus, says Petty Officer Martenson.

HM2 Marion E. Segerstrom works in the admin department of the NAS Whiting Field hospital. She also cites financial and medical benefits as good reasons for reenlisting, adding, "I can get a lot out of the field I'm in right now, so I'm going to stick with it."

Of the Navy's overall enlisted force of about 458,000, there are approximately 6,200 women in aviation rates. Their contributions are vital to the successful mission of the aviation community.

AA Beverly S. Dunford describes herself as VT-6's gas station attendant, fueling and servicing T-28s before flights. She chose aviation because her father and brother are aviators. She says, "I think every female should try the military. Initially, it's only four years of your life. It has unlimited opportunities and you can go anywhere. You learn how to handle responsibility and you mature. I have to make second class petty officer first, but I would like to go into the LDO program eventually. I'll need some college, too, and I'm working on that." Her advice is, "Put your sights high. Don't let people put you down for what you want to do."

AMSAN Sheryl Wilson of HC-6 joined the Navy in April 1979. She comments on her career choice: "I like a challenge and aviation seemed to be the thing for women. I want to stick with it. Aviation is the future. The women who have problems are the ones who expect to keep their nails long and don't want grease on their hands." Wilson had previous Air Force experience and two years of college. She recalls telling a new chief when he asked how many women were in the unit, "None, until after working hours."

Echoing Wilson's sentiments, AT2 Roberta Gahn, a line supervisor in HSL-30 at Norfolk, emphasizes, "We're not *women* in aviation, we're *people* in aviation." Gahn had two years of college studying electrical engineering when she joined the Navy three years ago. She qualified as an aircrewman in July 1980.

Another of HSL-30's 12 women in aviation rates is getting out of the Navy soon, but has used her Navy experience to good advantage. AT1 Ann Mallard is filling an E-7 billet as a phase one coordinator, and going to school studying computer science in her spare time. She says, "It was nice to find that most of my Navy schools credit could be counted toward college credit."

The integration of women into the many facets of Navy life has not been without problems. Commander John M. Quarterman, commanding officer of HM-12, Norfolk, discusses some he has encountered. "We went from 11 to 44 women within three months. It's a problem. We can't put our heads in the sand and ignore it. We had no place to house them, a shortage of small helmets, and even the small sizes were too big for some of the new women." Shoes presented a challenge, too. "Five of the women had to have size 3 or smaller. We finally found a manufacturer through an orthopedic shoe company in Boston. Even the smallest foul-weather jackets didn't fit some of the women."

Improperly fitting flight gear for women, small men and

JOC Kirby Harrison

Left, illustrates range of shoe sizes Navy must now keep in stock. AA Soon Rozett, who wears a 2½ takes a break with AMHAA Mike Webb, sporting size 10 aviation boots. Below, AC1 Jannine Weiss controls aircraft approaching Lexington. Above, prospective aviator Ens. Jennifer Lewis attends class during preflight indoctrination phase of flight training.

Ens. Dorothy Lilly

foreign students is a problem that is navywide, but steps are being taken to correct it. For example, Lieutenant Commander J. C. Patee, aviation medicine safety officer in TraWing-6, is involved in a project to modify the MA-2 torso harness to accommodate smaller frames. He coordinates efforts with representatives in the Naval Air Systems Command and Naval Weapons Center, China Lake. Unfortunately, such programs take time and, because such a small percentage of personnel is involved, it is expensive to have gear specially manufactured for so few. The Navy doesn't have all the answers but is working to resolve the problems.

When *Lexington's* designation was changed from CVT-16 to AVT-16, it was a change in legal status as well, allowing women crew members to be assigned aboard. No other aircraft carrier has women as part of ship's company.

In January 1980, Supply Corps officer Ensign Dawn Adams reported for duty. One by one, seven other officers joined ship's company until, in July, the first of a complement of 130 enlisted women arrived. The number of enlisted women will probably remain fairly constant but, within the next year, six more women officers are anticipated.

After AC1 Jannine Weiss completed carrier air traffic control operator's school in Memphis, Tenn., she reported to *Lex* and became the first female to control aircraft approaching a carrier. Weiss finds air traffic control work at sea much more exciting and challenging than ashore. The pace is quicker and there are more variables at sea.

In a few months, the women aboard *Lex* have made

PH1 Terry C. Mitchell

Clockwise from above, midshipmen practice floating with heavy flight gear during the survival portion of NROTC aviation training program. From NAS Whiting Field: Ens. Pam Duncan preflights a T-34C at VT-2; ACAN Janet Thanasas in tower; a member of the line crew spots incoming helo; and Ltjg. Pat Denkler is flight instructor and public affairs officer with VT-6.

tremendous headway, several involved in flight deck operations. ABEAA Penny Lyons, now working with the arresting gear machinery below deck, looks forward to going topside.

Recognizing that there are powerful emotions involved in the integration of women into the Navy work force in nontraditional roles, the Navy launched a workshop for women through its human resources management program. Lieutenant Ernest Rice and NC1 Robert Brown, from the Human Resources Management Center, Mayport, Fla., traveled to Pensacola to work with small groups of women assigned to *Lex*. After those who had already spent months aboard detailed their experiences, a realistic picture evolved of what new female sailors would face. This proved invaluable, since not knowing what to expect is the biggest worry the women have.

After reporting aboard and being confronted with the reality of hour after hour of hard work to keep the ship up to standards, and cramped quarters without any frills or privacy, the women needed a place to air frustrations. The three-day workshop provided a better understanding of how human nature resists change and how tension in an unfamiliar situation is inevitable. By understanding the conditioning that shaped their outlooks, the women can then let much roll off their backs. The workshop asks individuals to question the attitudes they project and fortifies them with a knowledge of Navy policy, regulations, and provisions of the law that pertain to women.

PH2 James Carnahan

Photos by PH2 James Carnahan, PH3 John Black and PH3 Greg Rodriguez

Lexington's staff has made a serious commitment to make the experiment a success. Captain William H. Greene, Jr., commanding officer, credits his petty officers with providing strong leadership, particularly the 20 or so female petty officers assigned aboard. They provide role models for more junior women and share with them their years of experience in the military environment. "By trial and error, we're making it work," he says. "In some ways, as a command, we've had to walk on eggshells, letting people air their feelings and trying to keep the largest number happy while recognizing everyone's rights. In other ways, we have had to ride roughshod over all objections, obviate all discussions and simply require that orders be followed. We've a mission to perform, after all."

In the early days, as women began to filter into Navy life, male resistance was not especially subtle. But this soon changed to an attitude of acceptance and eventually to respect as females proved themselves. Women held their own and broke down the barriers.

Today, when retention is one of the Navy's chief concerns, women aviators are excelling in staying power. Of the 45 women who received wings, 41 were still on active duty at the end of last year. Even in Aviation Officer Candidate School, the classes containing women have a lower attrition rate than male classes, according to Captain R. L. Rasmussen, commanding officer of the Aviation Schools Command.

The consensus among women in Naval Aviation is that motivation, competence, adaptability, dedication and perseverance are the key factors for acceptance and success in a Navy career. The Navy is recognizing the contributions made by women and is increasingly drawing on womanpower as a vital resource.

FAWPRA

Napoleon once observed that an army travels on its stomach. A similar case can be made for the idea that aviation units stand or fall on the availability of good maintenance. This becomes especially critical when combat or combat support operations are involved. Fleet Air Western Pacific Repair Activity, Cubi Point plays a major role in aircraft maintenance, dating from the latter years of the Vietnam War.

By the mid-1960s, the war in Vietnam had concentrated increasing numbers of naval aircraft in Southeast Asia. Inevitably, many sustained combat damage and many others required extensive repair which was beyond the capability of squadron maintenance. Prior to this time, such aircraft were flown or shipped to either a FAWPRA in Japan or to one of the naval air rework facilities (NARFs) in the United States. This meant that badly needed aircraft were out of operation for months at a time. It was also an expensive procedure and, to make matters worse, some of the larger land-based aircraft could not be loaded aboard most ships.

In 1965, the special techniques for repair and analysis of aircraft damage (STRAAD) program was instituted. This concept involved placing a small team of highly qualified aircraft structural repair specialists in a location central

Top left, aerial view of Naval Air Station, Cubi Point. Top right and above, stripping paint from an RF-8G.

Cubi Point

to the aviation units to be supported to provide required repair services when and where needed. The result was to decrease the out-of-service time to weeks or even days for the majority of aircraft damaged. The costs of shipping aircraft to the U.S. or Japan were also greatly reduced or eliminated.

In February 1970, the repair program was expanded to include corrosion control, painting and the ability to incorporate work specified by technical directives. With STRAAD team personnel as a nucleus, FAWPRA Cubi was established on February 6, 1972, as one of several repair activities under ComFAirWestPac.

FAWPRA Cubi is located aboard Naval Air Station, Cubi Point, R. P., and its efforts are directed by OinC Captain Roger E. Sheets. Organized as a depot-level structural repair facility, it employs mixed military and civilian management and a foreign civilian work force augmented by TAD personnel from NARFs in the United States.

In carrying out its mission, FAWPRA Cubi provides:

- Planner and estimator services throughout Southeast Asia and the Indian Ocean, aboard either aircraft carriers or air stations, to determine the extent of damage and the most economical method and site of aircraft repair.
- Depot-level corrosion control and paint services to fleet aircraft, including a complete strip and paint capability.
- Manufacture of selected structural components. These parts are usually fabricated in-house or by other manufacturing facilities in the Subic-Cubi complex.
- Engineering of nonstandard repairs for damaged or unserviceable aircraft and aircraft structural components.
- Engineering investigative and consulting services.

The workload at the repair activity is unpredictable, since it is determined by the number of deployed aircraft carriers and squadrons, and the number of aircraft needing depot-level maintenance. Between May 1979 and May 1980, FAWPRA Cubi repaired more than 1,000 aircraft components and painted 12 aircraft. Added to these figures are hours spent on technical research and investigation for the fleet as technical information assistance.

FAWPRA Cubi provides services to fleet units operating in the Indian Ocean as well as in Southeast Asia. Since October 1979, the activity has provided field team services to Indian Ocean-deployed carriers, amounting to over 1,126 man-days. These teams have made a significant contribution to the readiness of the deployed air wings.

CHALLENGE FOR THE 1980s

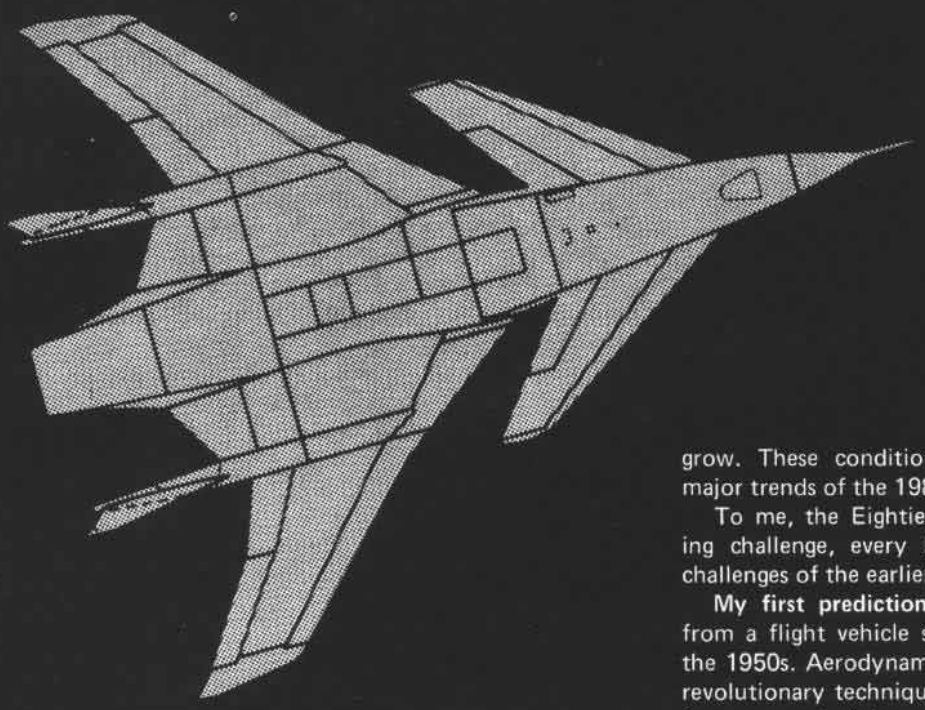
Where we have been – Where we are going

This article has been adapted from a presentation by RAdm. Wissler delivered to the Society of Experimental Test Pilots in Beverly Hills, Calif., on Oct. 25, 1980.

Rear Admiral John G. Wissler
Commander, Naval Air Test Center
Patuxent River, Maryland

The 1950s were a phenomenal period of turbulence and innovation, and Naval Aviation, literally, jumped from props to supersonic jets in less than a decade. Prototypes proliferated, production deadlines posed no serious problem, and the industry produced a wide spectrum of good, bad, and indifferent airplanes. Some went into production; others, such as the F7U *Cutlass* and the F2Y *Sea Dart*, were, technically speaking, well ahead of their time and, practically speaking, not very usable. Aviation testing during that period was, at best, an inexact art, part macho and part intuition, where we wrote the handbooks after we did the testing. Slide rules and photo panels were literally the leading edge of test and evaluation (T&E). Out of that boiling cauldron, however, came the aircraft that have made up the bulk of our combat strength for the past two decades.

The 1960s began as a totally different decade from the standpoint of aircraft development. The early 1960s were



mostly a shakeout period of improving and cleaning up the designs that had survived the 1950s. The latter half of the 1960s saw the emergence of two management phenomena. The first was the serious attempt by top level management to correct the chaos of the Fifties with very highly structured program management. Probably the epitome of that period was the F-111 program, which is generally considered to be one of the most overmanaged and unproductive programs that came out of that era. The second trend was driven by the Vietnamese war, where combat requirements forced much greater emphasis on operational qualities and timely delivery. As we entered the decade of the Seventies, the military aviation industry was driven by these two conflicting approaches. On the one hand, formalized and lengthy program reviews and program management; on the other hand, the pressing need for accelerated and early deployment of the equipment.

Testing in the 1970s led to redefinition of some of the fundamental relationships between the military tester and his industrial counterpart. As testing was consolidated into single locations utilizing cooperative test teams, some confusion naturally arose concerning the roles of the various players. Some of these roles, such as that of the Board of Inspection and Survey, were modified by unforeseen developments. Although some headway was made in coordinating facilities, aircraft and test plans, the pace was decidedly slower than anticipated. The problems associated with testing automated support equipment continued to grow. These conditions set the stage for predicting the major trends of the 1980s.

To me, the Eighties present a fascinating and demanding challenge, every bit as unique and different as the challenges of the earlier decades. How is it so unique?

My first prediction for the 1980s is that this decade, from a flight vehicle standpoint, will look very much like the 1950s. Aerodynamics are again on the move in terms of revolutionary techniques and equipments. Instead of going from props to jets as we did in the 1950s, we'll be going from the comfortable world of present-day jets to far more advanced equipments. Unfortunately, our testing techniques have also plateaued at a comfortable level for the last several years and, professionally speaking, we are starting the 1980s behind the power curve.

We have some major unknowns ahead of us in trying to match our testing techniques to the new generation of aerodynamics. Why do I say that? Look for a moment at the Air Force/NASA highly maneuverable aircraft technology (HiMAT), which is flying at the present time. Then look at the aerodynamic innovations installed on the HiMAT aircraft. Next, consider the new design approaches already

HIMAT TECHNOLOGY

- SUPERCRITICAL AIRFOIL
- VARIABLE CAMBER
- CLOSE COUPLED CANARD
- WING-TIP WINGLETS
- AEROELASTIC TAILORING
- ACTIVE CONTROL SYSTEM
- RELAXED STATIC STABILITY
- ADVANCED STRUCTURAL MATERIALS
- ADVANCED FABRICATION PROCESSES

Top, the F7U Cutlass was, technically speaking, well ahead of its time but, practically speaking, not very usable. Above, the F-111. This aircraft was the product of highly structured program management.

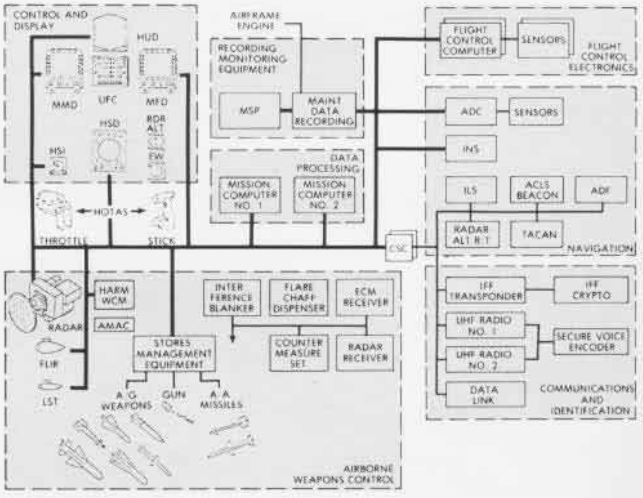
on the drawing boards and the automated aerodynamic control devices for these aircraft, as well as the complex chain of interactions which will be mandated by these devices. Look at supposedly established systems, such as flight controls, and then reflect for a moment on the F/A-18 fly-by-wire multiple computer flight controls which are indicative of future aircraft design. Think of the software requirements involving flight control characteristics that the programmers have to work into their first, second and higher order formulae. Consider how long it takes to analyze, design, construct and build new programmable, read only memory computer chips which, on the F/A-18, contain the aircraft flight control laws and can be "reprogrammed." Then reflect on how totally inadequate conventional flight testing techniques are going to be for any reasonable approach to testing the next round of aircraft. Certainly one of the big questions that faces us in the test world is how much and what part simulators should play – not in pilot training but in testing procedures.

The STOL (short takeoff and landing) world is on the edge of the same degree of challenge. This challenge is exemplified perhaps by the QSRA (quiet short-haul research aircraft) type aircraft landing aboard USS *Kitty Hawk* (CV-63). It is also evident in the development of new techniques such as are now being explored with conventional aircraft taking off from ski jumps. In the VSTOL (vertical short takeoff and landing) world, there are literally dozens of design variations, and the 1980s may well be the decade when VSTOL comes into its own, perhaps with follow-on aircraft and follow-on designs similar to the XV-15 or the X-wing. Clearly, across the board, the testing techniques that we are using at the start of the Eighties are not going to be economically or technically adequate to complete the decade. As the professionals in this field, we have our work cut out for us.

Prediction No. 2 is that, in spite of the exotic and spectacular nature of the aerodynamics revolution ahead, systems test requirements will far overshadow aerodynamic testing in terms of day-to-day business. As a matter of fact, even today, by most straightforward market parameters, only about one-fifth of our testing is actually aerodynamic testing. The other four-fifths are involved in the rest of the aircraft and support systems. Computers obviously play a big part in systems – and when we talk computer, we talk software. The growth of complexity of software in the past decade or two, which has been astronomical, has not been accompanied by an equal advance in systems testing sophistication.

We used to talk simple, independent systems, such as radars or radios. Now we talk complex, interconnected systems, with airplanes like the F/A-18 that have on the order of a dozen computers on board, tied to several

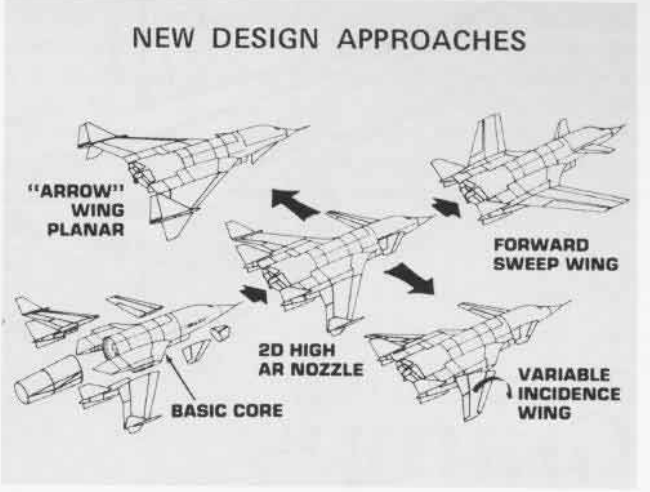
F-18 AVIONICS



sensors, and a whole host of other equipments with the focal point in the cockpit area. The complications of the interactions between the various systems have already reached the point where much of the development and testing of those interactive equipments has to be done on various simulators.

When you switch to the other warfare communities, such as antisubmarine warfare, the specific components change but the systems are just as complex. Antisubmarine warfare is more than a one-on-one conflict between airborne sonar and a submarine. It is an entire range of different sensors, vehicles, systems and communications across the entire ocean, a range which takes you very rapidly into the arena of C^3 and intelligence. From C^3I it is a natural transition back into early warning aircraft, the tactical community, and the electronic warfare community. All of these systems are now so closely intertwined that much of their testing is going to have to be done, and is being done now, by all forms of simulation and stimulation devices. Such testing involves an inordinate amount of just pure, hard analytical paper work. Some measure of the market impact is to look at the classic relationship between hardware and software cost trends. There is no question in my mind that this trend will continue and that most of our bread-and-butter testing in the community will be done on systems.

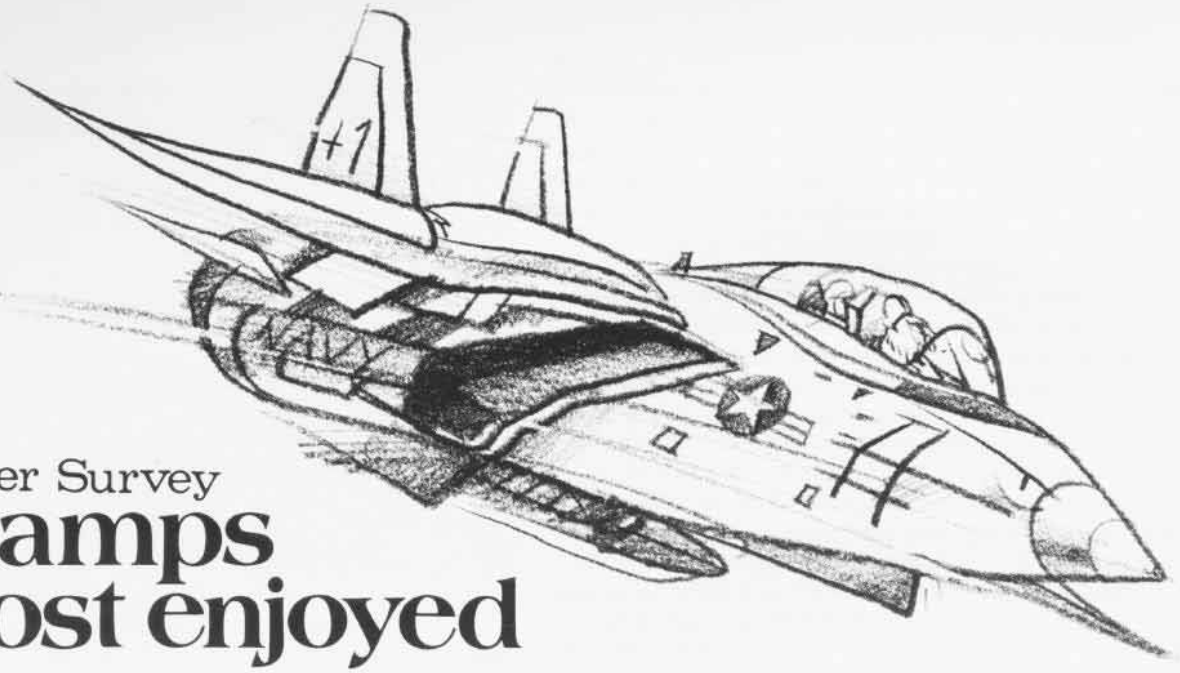
The F/A-18 Hornet. We now talk complex, interconnected systems with computers, sensors and a host of other equipments.



Which takes me into the third prediction for the Eighties — that economic considerations will drive both the acquisition policies which determine our T&E program and our test techniques which we use to do our business. One only has to look at the curve of increasing aircraft costs to realize how dramatically dollars have driven decisions this decade and how much more they will affect our decisions in the next decade. We aren't too many decades away from being forced into Calvin Coolidge's famous remark, "Let's buy one aircraft and let 'em take turns flying it."

Successful test managers these next 10 years will have to concentrate much more diligently on the economics of testing by getting the information cheaper, better and faster than we ever have before. This means far more serious concentration on such things as selecting cheaper aircraft to test selected systems, using simulation and stimulation techniques, enhancing flight productivity with tankers and other support devices, developing a variety of new pods and instrumentation devices, and making much greater use of computer analysis. This also implies much greater use of long-range computer data transmission to take properly formatted data to the engineer wherever and whenever he needs it. The race will be won by the test managers who can deliver test productivity with the right combination of infrastructure, capital investment, and innovative teams.

So there you have my three major management predictions for the 1980s. The first is that aerodynamics advances will once again be revolutionary, and test techniques will have to become revolutionary to stay with them. The second is that interesting as it may be to us as aviators, aerodynamics testing will be overshadowed by a much greater emphasis on systems testing. And third is that the productive dollar costs of both the equipment being tested and the testing equipment will be the dominant factor in any succussful management operation — much more so in this coming decade than ever before.



Reader Survey

Gramps most enjoyed

ILLUSTRATED BY Osborn

It's that time again, the "other" in every other year when our readers get a chance to voice their likes and dislikes, and opinions or lack thereof.

We received 1,459 responses to the 1980 reader survey, from cards enclosed in the July issue. It was a 4.2 percent response, compared with the 1978 survey when 381 readers replied, for a 1.2 percent feedback figure. It was encouraging, especially since military publications must rely on such surveys to judge reader interests and the magazine's overall popularity. Commercial publications have the advantage of advertising, paid subscriptions and newsstand sales by which to make their judgments.

In addition to the size of the 1980 response, it was especially gratifying to note the wide range of our readership. One card came from a Volkswagen board member in Wolfsburg, West Germany, and another came from a stockbroker in Zurich, Switzerland. Cards came from vice admirals and airmen, civilian air controllers and even the Australian Air Force.

Statistics from the rank/ratings and age levels show a majority of *Naval Aviation News* respondents are from middle management levels of both officer and enlisted. This leads us to feel that a majority of our readers are committed to Naval Aviation as a career. And this opinion is supported by the fact that one of the largest demands of our readers is for more stories on research, test and development.

A substantial number asked for more stories of a current nature. One reply pointed out that "It's nice to have articles on old aircraft, but one cannot live in the past forever."

An air operations officer said even more bluntly, "The bulk of your readers, I'll bet, could care less about old people and their old airplanes."

Well, air ops officer, you're wrong. While 544 persons specifically expressed a desire to see more on research, test and development, there were 406 who wanted more stories and photos of a historical nature.

Stories on history are not just for entertainment value, nor are they merely to feed a desire for nostalgia. History is a valuable tool of the learning process and as Admiral R.L. Conolly once observed, "To ignore history is to deprive one's self of past experiences, of all the fruits of experimentation, of the distilled wisdom of the past." If history is at the same time entertaining, that in no way detracts from its value.

Nevertheless, there is an obvious need for up-to-date reporting of events and features geared to the present and future, if we are to serve the purpose of informing our public.

And so we will continue to try to balance stories of a contemporary nature with those of historical value.

And while we're on the subject, a public affairs lieutenant wrote, " . . . since it is a current news magazine, the articles on the old aircraft are too long for a publication of this size. More up-to-date info is appreciated."

In all honesty, we are not a current news magazine, if for no other reason than that it is logistically impossible, given the monthly publication schedule and two-month lead time necessary for writing, layout and printing.

But we have made and will continue to make every effort to use the three departments (*People, Planes, Places, Touch and Go,* and *Did You Know?*) to keep up with news stories as well as shorter items of interest. And we will make every effort to carry stories and photos/art which will keep readers abreast of current developments in Naval Aviation. With this in mind, we encourage those of you handling public affairs for aviation units to use the telephone in reporting events. We can and do take stories by phone. Reading a short release by phone can save as much as two weeks.

Many readers asked why we couldn't expand the use of color photos, and one even suggested a color foldout centerspread. We assume he meant color photos of aircraft. A fighter squadron pilot put his finger on the problem when, along with his own suggestion for more color, he added, "I know it would cost a lot of money . . . ." 'Nough said!

Happily, though, we are able to comply with a request that we make the magazine longer. You may have noticed that we expanded several recent issues from 40 pages to 48. We'll continue to put out 48-page issues from time to time and we are looking into the possibility of going to a larger, more standard size of 8-1/2 x 10-7/8 inches.

Obviously, Grampaw Pettibone is the most widely read part of the magazine and the most popular even though one respondent suggested, "We don't need to tell our civilian readers about our screwups!"

Most of our readers know that even Naval Aviators make occasional errors. We want to make sure they also know that aviation safety is a continuing concern in the Navy. It's mighty difficult to discuss safety without airing some of the problems actually encountered. We think others need to know so they can avoid making some of the same mistakes. That's what Gramps is all about.

A flight operations manager at an airport wrote, "Grampaw Pettibone's sage advice and wisdom applies to all aviators, civil and military."

And another reader wrote that Gramps is " . . . nearly everyone's favorite, saving many lives and millions of dollars."

There were many requests that we do stories on one or another specific subject. Some ideas are already being pursued. Others are still under consideration. These suggestions are very helpful to us in planning future issues.

We want other story ideas, photographs and finished stories from individuals and especially from naval unit public affairs personnel. Our staff is small, funding for travel is not always available, and we are therefore often dependent on contributions from outside authors, artists and photographers. And that is as it should be. Material from the field helps to keep the total effort relevant. But please query our editor in advance, before embarking on a major story or photo feature, to be sure the material will meet editorial needs. While we reserve the right to edit material received, we give bylines and photo credits.

Finally, we thank all our readers who responded to the survey, as well as those loyal readers who for one reason or another were unable to do so. Every card was counted and, whether it was a plaudit or criticism, the information was valuable in helping us to make *Naval Aviation News* serve you better.

Reader Survey Statistics

Total cards received 1,459

	Rank/Rate	
Navy	VAdm.	2
	RAdm.	3
	Capt.	73
	Cdr.	93
	LCdr.	122
	Lt.	116
	Ltjg.	21
	Ens.	12
	WO	1
	MCPO	7
	SCPO	16
	CPO	50
	PO1	93
	PO2	98
	PO3	25
	E-3	10
	E-2	6
	E-1	5
	Sea Cadet	1
USMC	Col.	5
	Lt. Col.	5
	Maj.	20
	Capt.	14
	1st Lt.	1
	E-6	7
	E-5	2
	E-4	1
USAF	Col.	1
	Lt. Col.	1
	MSgt.	4
USA	SSgt.	1
USCG	LCdr.	1
	Ens.	1
	SCPO	1
	CPO	1
Civil Air Patrol		1
Retired Navy		90
Foreign military		3
Student		28
Civilian		271

Age Group	
Below 17	11
17-25	148
26-34	314
35-46	325
47-58	176
59-75	49
Over 75	6

How often do you read *NANews?*	
Every month	1,087
Frequently	123
Occasionally	57

Is the magazine readily available to you?	
Yes	912
No	48

Which of the magazine's features do you enjoy most?	
Grampaw Pettibone	303
Features	152
Naval Aircraft	146
Historical articles	118
People, Planes, Places	71
Did You Know?	36
Editor's Corner	19
Insignia	15
Letters	3

Did you find the magazine educational?	
Yes	1,179
No	9

I would like to see more articles on:	
Research, test, development	544
Squadrons	518
Photo features	438
History	406
Air stations	295
Human interest	287
Ships	249
Humor	230
Aviation support facility	145
Others	89

It should be noted that a total of numbers from any one category may not equal the total number of cards received, since many respondents did not completely fill out all the blanks.

naval aircraft

The notion that a high-wing, cabin monoplane configuration is appropriate for a fighter airplane has always seemed peculiar. For a nice, sedate private two or four-place personal airplane, yes, but not for a high-performance fighter. However, in the summer of 1932, Curtiss designers turned to this configuration to incorporate the company's latest technology – thin, all-metal, externally-braced monoplane wings with slots and flaps – into a competitive design to meet the Navy's Special Fighter requirements.

The resulting design was one of those picked by the Navy's Bureau of Aeronautics for experimental development, flight test and final competitive selection to replace the outmoded F4Bs in Navy fighter squadrons. Retractable landing gear, close-cowled twin-row radial engines and enclosed cockpits were features included in these experimental types. Like the other Special Fighter prototypes, the Grumman XF2F-1 and Boeing XF7B-1, the XF13C-1 featured minimum armament: two .30-caliber machine guns and no bomb-carrying provisions.

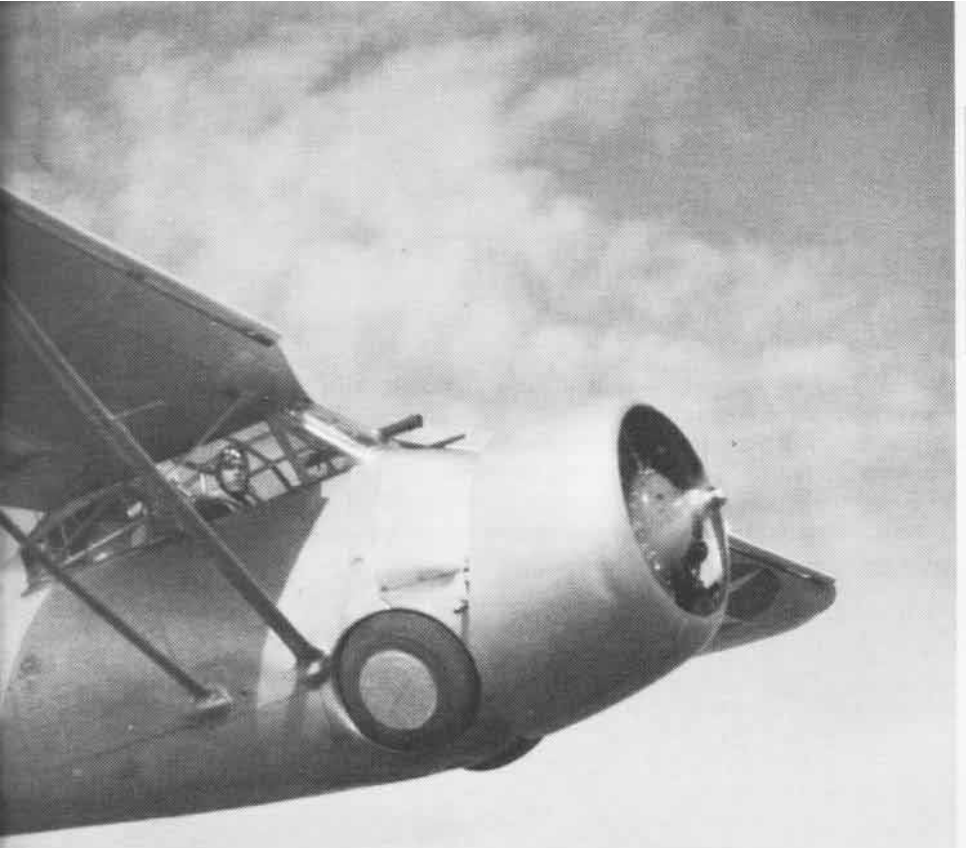
The Curtiss contract had a special provision – recognizing the transition stage of fighter design at that time. A set of biplane wings were to be built, replacing the strut-braced monoplane wings of the basic design, to produce the XF13C-2 biplane. Comparative flight tests could then be performed. The biplane wings were fabric-covered and did not incorporate flaps or leading edge slots.

Mock-up construction proceeded in the fall of 1932, with the mock-up inspection held before the contract was signed in late November. While the cabin arrangement, with a single entrance door on the righthand side and the pilot's eyes at wing root level, was favorably commented on in general as to all-around vision and convenience, many detail changes in the overall design were requested. Of particular importance were lowering the bottom wing on the biplane, which attached to the same fuselage fittings as the monoplane wing struts, and the cabin floor and revision of the cabin emergency exit arrangements.

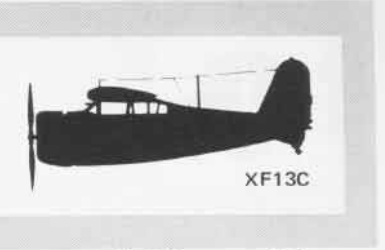
In February 1933, the revised mock-up was inspected, while detail design of the airplane proceeded. By April 1933, after the final mock-up was inspected and approved, it was evident that completion of the XF13C, with both sets of wings and all its novel features, would be delayed. A five-week extension for delivery, from early September to mid-October 1933, was granted. It turned out to be December before the XF13C flew, in -2 form as a biplane. This was done since only two half-hour flights at full throttle were required as the -2 version, after which the biplane wings were removed and delivered to the Navy for further tests. Overall flight testing then concentrated on the monoplane, and the biplane wings remained in storage until they were scrapped. While the 250-mile-per-hour, guaranteed-level-flight maximum speed was never reached, the XF13C-1 was considered ready for trials in February 1934, and it was ferried to Anacostia. The trials were successfully completed there and at Hampton Roads, over the next three months, resulting in a generally favorable evaluation with recommendations for the usual number of fixes. However, in May, Grumman was awarded a contract for production of the competing F2F. Interest continued in the XF13C-1 for possible production and, in early June, it went back to Buffalo for incorporation of most of the recommended changes. In mid-July, it returned to Anacostia for check flight and final acceptance as a service type. It was then assigned to VB-2B at NAS Norfolk for service evaluation, including carrier operations on *Saratoga*. Squadron carrier operations were cut short when the XF13C-1 was off-loaded at Guantanamo in October, shipped back to Norfolk and flown to Wright Field for Army Air Corps evaluation in November. The fleet reports were highly complimentary except that full fighter armament (one .50-caliber and one .30-caliber machine gun, plus two bombs) was considered essential, along with a vertical tail of less height to allow overlapped parking of a squadron of F13Cs.

XF13C-1

In January of 1935, the Bureau decided to give Curtiss a contract to make the necessary modifications, as well as the installation of an uprated R-1510 engine and controllable-pitch propeller, so that the revised airplane could be evaluated competitively with Grumman's XF3F-1 then under development. February saw the airplane back in Buffalo for the changes, with flight tests of the modified XF13C-1 commencing in May. The changes were considered sufficient to warrant redesignation as the XF13C-3 after testing was under way. In spite of a significant increase in landing and stall speeds, it went back to Anacostia in May but was returned to Curtiss at the beginning of June for changes to reduce these speeds. A fixed slot on the previously unslatted inboard portion of of the wing leading edge and increased chord elevators were effective in reducing the speeds, and the XF13C-3 was back at Anacostia for service acceptance trials at the end of July. From this time on, engine problems repeatedly delayed the trials, and an oil cooling deficiency finally led to another return to Buffalo in July 1936. By this time, production was no longer of interest, experimental acceptance trials were completed in the fall and the airplane delivered to the NACA (predecessor of today's NASA) at Langley Field for flight research in December. Following completion, it was delivered to the Marine Corps at Quantico, went to the Naval Aircraft Factory for an engine overhaul in April of 1938 and subsequently faded from the scene.



Curtiss XF13C



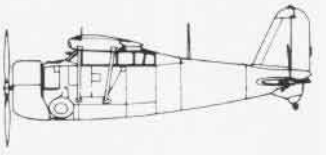
Span	-1, -2, 3	35′
Length	-1, -2	25′8″
	-3	26′3″
Height	-1, -2	12′9″
	-3	12′
Engine		
-1, -2	Wright XR-1510-94	600 hp
-3	Wright XR-1510-12	700 hp
Maximum speed		
-1		241 mph
-2		218 mph
-3		232 mph
Service ceiling		
-1		23,800′
-2		23,900′
-3		24,100′
Maximum range		
-1		847 miles
-2		863 miles
-3		726 miles
Armament		
-1, -2	two .30 machine guns	
-3	one .30 and one .50 machine gun	

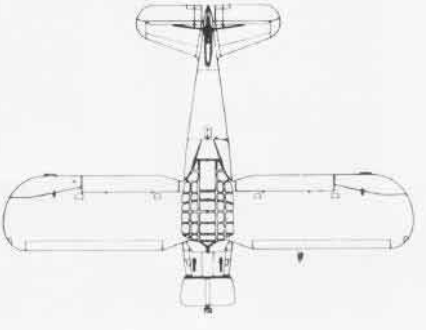
XF13C-1 modified

XF13C-1

XF13C-2

XF13C-3





DID YOU KNOW?

LAMPS MK III Team at Sea

For the first time, in November, a ship at sea, USS *McInerney* (FFG-8), and a sensor-equipped SH-60B *Seahawk* helicopter operated as a single totally integrated system. The two units of the LAMPS MK III system completed several tests, using both ship and air communications equipment. The ship and helicopter will have two major roles: guarding against hostile submarines and providing surveillance and targeting data on surface vessels. When operational about mid-1984, ship commanders will be able to operate airborne sensors, using MK III's unique data transmission feature which will handle voice and digital data simultaneously, and direct the delivery of weapons from an aircraft flying many miles away.

A series of successful tests were conducted in 1980. Two of the prototype SH-60B *Seahawks* completed three critical test demonstrations. A vertical hard landing demonstration at NATC Patuxent River was the first of several airframe structural evaluations and an important shipboard prerequisite. The side drift landing was also demonstrated, designed to simulate the rigors of flight operations from small ships in high sea states.

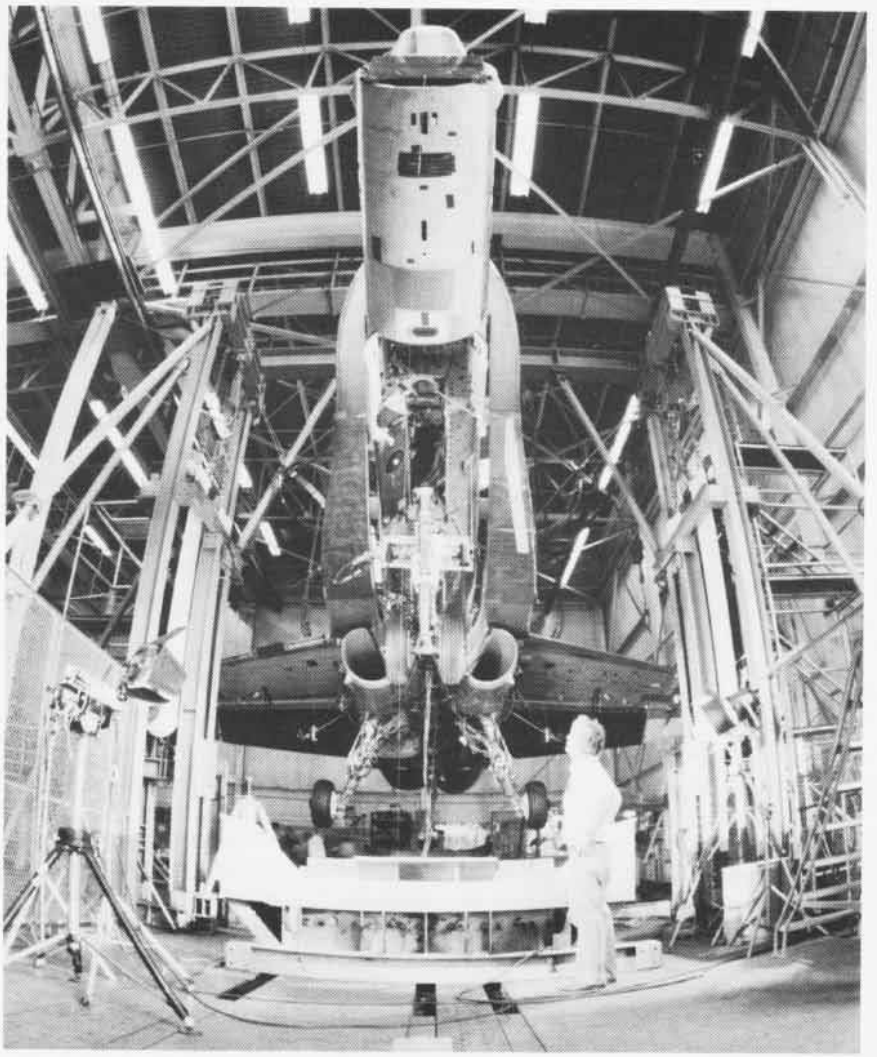
For seven weeks last summer, at the Naval Air Engineering Center at Lakehurst, N.J., the *Seahawk* and the recovery, assist, securing and traversing (RAST) system worked together for the first time, using the RAST elevated fixed platform at Lakehurst. The RAST system facilitates handling procedures for the *Seahawk* and allows helicopter operations even during heavy sea states. Sikorsky pilots and later Navy pilots landed the SH-60B over 100 times, trying different

landing approaches and hover heights. Navy pilots also landed the *Seahawk* at night to evaluate the visual landing aids planned for the ship.

The at-sea exercises aboard *McInerney* were conducted during builder's sea trials and gave the Navy a two-month-early look at the system. The *Seahawk* and RAST will be working together at sea aboard *McInerney* early in 1981, where there will be the additional variables of wind and sea state to take into account.

Hornet structural testing

Structural testing on the F/A-18 *Hornet* strike fighter is proving the aircraft's strength and resistance to fatigue. The drop test allows F/A-18 engineers to simulate landings on aircraft carriers, one of the most severe tests a fighter aircraft must pass. Structural engineers can simulate the roll, pitch, yaw and rate of descent or sink speed on the test article by varying angle and height at the time of release.



Commissionings

The guided missile frigate *Samuel Eliot Morison* (FFG-13) was commissioned October 11, 1980, at Boston, Mass. She is named in honor of the late Rear Admiral Samuel Eliot Morison, one of the nation's most distinguished naval historians, whose works include the 15-volume *History of United States Naval Operations in World War II*. In addition to surface-to-air and surface-to-surface

missile systems, the ship will be equipped to operate two manned helicopters, which will extend the ship's antisubmarine attack range and over-the-horizon detection capabilities.

USS *George Philip* (FFG-12) was commissioned in November 1980 at NS Long Beach, Calif. She was named for the commander of USS *Twiggs* which was lost in action off Okinawa in 1945. George Philip was posthumously awarded the Navy Cross for heroism during 84 consecutive days of combat.

Status of Voyager Spacecraft on January 1, 1981

	Voyager 1	Voyager 2
Distance from Earth	900,514,000 miles	742,188,000 miles
Distance to Saturn	—	137,654,000 miles
Distance traveled since launch	1,406,975,000 miles	1,220,431,000 miles
Velocity relative to Earth	63,863 mph	45,917 mph
Velocity relative to Sun	48,000 mph	36,770 mph
Date of Saturn encounter (closest approach)	November 12, 1980	August 25, 1981

Communications Link

Communication channels between the Navy and the Air Force are being monitored by Naval Flight Officer Commander Bob Downey as the 552nd Airborne Warning and Control Wing's Navy liaison officer. Cdr. Downey is directly responsible to the wing commander at the Tactical Air Command, Tinker AFB, Okla., and is also assigned duties under the Director of Naval Command, Control and Information Systems in the Pentagon.

The position was recently created for the exchange of information and services between the Air Force and Navy. Tactical datalink elements enable the E-3A to interface with the Navy anywhere on a no-notice basis. The E-3A *Sentry* has used its sophisticated on-board computers in conjunction with the Atlantic and Pacific Fleets, Navy operational aircraft including F-4s and F-14s, and has worked closely with the E-2 *Hawkeye* carrier-based airborne early warning aircraft.

This joint program provides mutual overall readiness training at minimum cost to units involved. Training missions are building familiarization with common frequencies, reference points and recently developed interoperability procedures.

VTXTS Study

The U.S. Navy has awarded study contracts for the development of the Navy's proposed undergraduate jet pilot training system, known as VTXTS. Alternate concepts studies will be done using two different aircraft as the jet trainer component in a total training system by McDonnell Douglas and British Aerospace.

One study will focus on the British Aerospace *Hawk*, a single-engine trainer now in service with the Royal Air Force. A version of the *Hawk* compatible with U.S. aircraft carrier operations is being proposed, which will have strengthened landing gear, an arresting hook, an avionics suite and cockpit crew station compatible with future U.S. Navy tactical aircraft.

The other study will look at the use of new McDonnell Douglas Corporation aircraft designs as part of the total training system. Both single and twin-engine designs are being studied.

During the VTXTS program, data will be developed on a total training system, evaluating alternative methods of training and identifying the technology needed and costs involved in the new system.

This is the second in a series of articles on each of the first twelve men to be enshrined in the Naval Aviation Hall of Honor.

EUGENE B. ELY

By Helen Collins

His contemporaries called him a super-skilled pilot, a daredevil and an adventurous knight of the air, who claimed that given enough power he could fly a barn door. Curiously, his flying career lasted less than two years. Yet, during that incredibly brief career, the pioneer civilian aviator gave wings to the Navy. His name was Eugene B. Ely.

Born in Iowa before the advent of the automobile, Ely became fascinated in his teens with that new gadget, the internal combustion engine. This fascination led him to become a skilled mechanic and he also gained a reputation as an expert driver. He arrived in San Francisco in 1904 and worked as a mechanic for a motor car company, setting up his own car rental business not long after. Ely was cited for bravery for emergency driving during the earthquake and fire of 1906. Later, he ran an auto stage line from northern California to Oregon.

It was during this time that his inquiring mechanical mind was drawn toward aviation, and that interest naturally led him to the flying school which Glenn H. Curtiss had established. Here he became thoroughly acquainted with the new science of flight and was quickly recognized for his competence. It was said that "no one had a clearer or cooler head and that no one more thoroughly understood the mechanical requirements of aerial navigation."

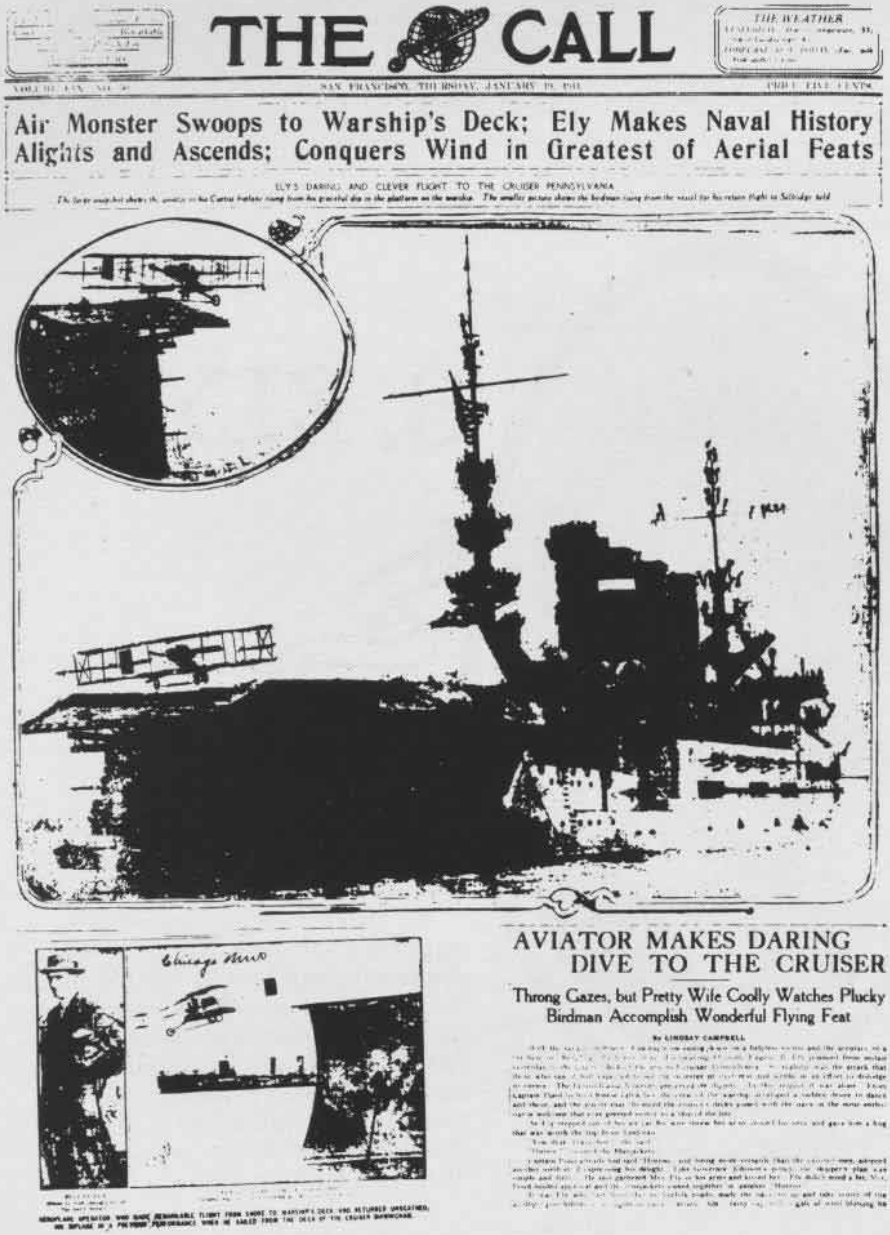
Curtiss induced Ely to join the Curtiss Exhibition Company in 1910 and he became one of the leading demonstrators of Curtiss-built aeroplanes. It was in this capacity that he performed his epoch-making feats of flying to and from the decks of Navy ships.

Ely made the first flight from a Navy cruiser, *Birmingham*, at Hampton Roads, Va., on November 14, 1910. The object of the flight was to demonstrate that an airplane could be launched from a ship.

A temporary platform was erected on *Birmingham's* bow. The size of the ship permitted only an 85-foot run and a 30-foot drop, and the platform was sloped forward to accelerate the takeoff. Plans were made to steam forward into the wind to augment the force of the air with the speed of the ship and thus assist Ely in making the flight from the short runway.

Ely assembled and tested his Curtiss biplane on the racetrack at Jamestown, Va. The plane was then transferred by tug to the Norfolk navy yard and placed aboard *Birmingham*. Accompanied by four torpedo-boat destroyers carrying Assistant Secretary of the Navy Beekman Winthrop and other naval officers, the cruiser left Norfolk and steamed about 30 miles down Chesapeake Bay.

At one o'clock there was fog over the lower bay and light rain was falling. It was feared that Ely would have to postpone his flight. However, despite the wind and the rain, Ely decided to attempt it and, watching a favorable opportunity between squalls, he had his engine started and ran the



THE CALL

THE WEATHER

Air Monster Swoops to Warship's Deck; Ely Makes Naval History Alights and Ascends; Conquers Wind in Greatest of Aerial Feats

ELY'S DARING AND CLEVER FLIGHT TO THE CRUISER PENNSYLVANIA

AVIATOR MAKES DARING DIVE TO THE CRUISER

Throng Gazes, but Pretty Wife Coolly Watches Plucky Birdman Accomplish Wonderful Flying Feat

By LINDSAY CAMPBELL

Ely is congratulated by Capt. Pond after landing aboard USS Pennsylvania.

plane down the incline. It left the platform, dipped down and touched the water with a splash. Spectators supposed the flight had come to an abrupt end. Instead, the machine rose again and continued on its way toward Willoughby Spit, about two and one-half miles away where it landed without incident. Ely attributed his downward plunge to a faulty movement of the control wheel.

The cover of the *Scientific American* for November 26, 1910, featured a full-page illustration of this first flight from ship to shore, and his flight was widely acclaimed.

According to a Navy report on Ely's flight, the experiment showed that platforms could be installed on shipboard for aeroplane launches without interfering seriously with the other features of a ship, and that "this experiment and the advances which have been made in aviation seem to demonstrate that it is destined to perform some part in naval warfare of the future. It appears likely that this will be limited to scouting."

The experiment was a qualified success since the plane had dropped sharply after leaving the sloping wooden platform and had bounced off the water, cracking the propeller. But Ely was able to stay airborne. Despite the mishap, it was a historic first and Ely was the hero of the day. But he was not satisfied. His dream was to land aircraft on ships, as well as take off from them.

Two months after his spectacular exploit in Hampton Roads, Ely was on the West Coast engaged in a follow-on adventure, an experiment to demonstrate the value of aircraft in warfare by flying from shore and landing aboard a ship. The ship this time was the cruiser *Pennsylvania* anchored in San Francisco Bay.

The platform Ely designed for *Pennsylvania* was an advance over the one he had in taking off from *Birmingham*. The simple concept was basically the same — a wooden platform extended from the cruiser's after-superstructure to a few feet over its stern (in *Birmingham* it had been mounted forward). It angled down toward the stern with a pitch of about five degrees, which served two purposes.

In taking off, the downhill motion imparted a bit more momentum to the plane, thus helping it to gain flying speed. In landing, downhill became uphill and helped to check the plane's speed.

Ely was a daring man but not a reckless one. He took several safety precautions. For personal safety, he wore a well-padded football helmet and wrapped an inflated bicycle inner tube around his torso. Under the wings of the plane were two seven-foot pontoons for flotation. In the event of contact with the water, a planing device was installed forward to prevent the aeroplane from diving. Canvas was stretched from the sides of the platform outboard of the ship to catch the machine and cushion the impact if it swerved off the platform. Ely was faced with a much greater problem in landing on *Pennsylvania* than in taking off from *Birmingham* — how to bring the plane to a stop in the limited length of the platform. The uphill pitch would help but it wasn't enough.

Ely's ingenuity provided the answer. He devised an arresting system which in principle is the same as that used on aircraft carriers today. It consisted of a series of lines stretched across the platform, weighted at each end by sandbags. Hooks to catch the lines were suspended beneath the plane. As an automobile race driver, Ely had used identical hooks to stop a car by picking up lines attached to bales of hay.

It worked almost exactly as planned. Ely missed the first few lines mainly because of ship updraft, something later carrier pilots would also have to deal with, but he caught the next ones and was brought to a halt with room to spare.

The aircraft carrier was an idea whose time had come.

When Ely touched the deck, he was going at the rate of about 35 miles an hour, but so gradually was the speed checked by the dragging sandbags as they were picked up in succession that he came to a standstill without mishap or damage to the machine.

Pennsylvania's commanding officer, Captain Charles Pond, expressed the opinion that "the performance of Ely spells a new chapter in aerial history. To say what effect Ely's demonstration will have on naval development, of course, is debatable. The necessity for having every ship equipped with apparatus for receiving airships seems remote. One ship connected with every fleet will probably be so equipped in the future."

Many years later, the gunnery officer who had been on board *Pennsylvania* during the landing experiment wrote to the Assistant Secretary of the Navy, Honorable Henry L. Roosevelt: "I was in the *Pennsylvania* at the time as gunnery officer, when we were ordered to Mare Island to have the flight deck put on over the quarterdeck and after turrets. The captain, old Charles Pond, was disgusted because it made his cabin dark. The executive, Christopher Fewel, was likewise disgusted because it wrecked the quarterdeck . . . . We walked up and down the platform with Ely discussing ways and means, and among other things how he expected to stop his plane once his wheels had touched." They suggested the use of sandbags, provided he could have a claw or hook attached to his plane. Ely said that was a simple step he had used in his auto racing and that he would get a blacksmith to do it on the field.

The gunnery officer's letter went on, "When the day came . . . . Ely approached along the port side as our planes do today in the landing circle, got in the groove, touched his wheels. His hook caught the arresting gear and he brought up some 30 or 40 feet short of the awning that we had spread as a barrier. To all intents and purposes that landing was similar to the landings made aboard carriers today." And so, while Ely's techniques may seem crude in the modern age, they nonetheless embodied all the essentials of modern carrier operations.

Ely was not content to make only experimental and scientific flights. He was also eager to establish new speed records, and so he entered many races, winning his full share. Although Ely had a reputation for being a prudent flyer, the thrills of stunt flying prompted him to take many risks.

In October 1911, he participated in a series of flights at the Georgia State Fair at Macon. Ely started his final flight on the 19th. He circled the field at a great height and then descended rapidly to make a low pass in front of the amphitheater. The aircraft failed to level out and the lower end of the cross frame struck the ground. The impact threw Ely from his seat and within a few minutes he was dead.

On the day of the tragic accident, Mrs. Ely was in New York arranging passports for a trip to Russia, to St. Petersburg, where the last czar of Russia wanted to see Ely fly. It was there in New York that she received word of Ely's death.

Official acknowledgment of Ely's contributions to Naval Aviation did not come for many years. Finally, in 1930, there was an exchange of correspondence between Rear Admiral W. A. Moffett, Chief of the Bureau of Aeronautics, and Ely's father, Army Colonel Nathan D. Ely, in which RAdm. Moffett agreed that Ely's accomplishments should receive the recognition they deserved. He therefore recommended that Ely be acknowledged as having laid the foundation of carrier development. With the approval of the Navy Department, a representative of the Committee on Naval Affairs in the 71st Congress submitted a bill to authorize a posthumous award. The bill was passed, and on February 16, 1933, President Hoover presented the Distinguished Flying Cross to Col. Ely in official recognition of his son's accomplishments.

In delivering the citation, RAdm. Moffett said of Ely, " . . . he demonstrated that airplanes were not confined to land utility but that they could be flown from ships at sea. The modern aircraft carrier is the logical materialization of that demonstration. His landing on USS *Pennsylvania* in San Francisco Bay two months later was a further demonstration of the possibilities for use of landplanes on shipboard.

"Not only is recognition due him, however, for thus creating a dream of the future which has borne the fruits of reality, but for his experimentation which brought him in the end to an untimely death . . . ."

Naval Aviation and Calibration

Calibration is one of the behind-the-scenes forces in the modern arsenal of Naval Air weapon systems and is frequently misunderstood. But the Naval Aviator in his P-3 *Orion* over the Gulf of Alaska must depend on calibration, whether he is aware of it or not. He must have confidence in his instruments, for weapon systems and weapon platforms have come a long way from eyeball navigation and seat-of-the-pants flying.

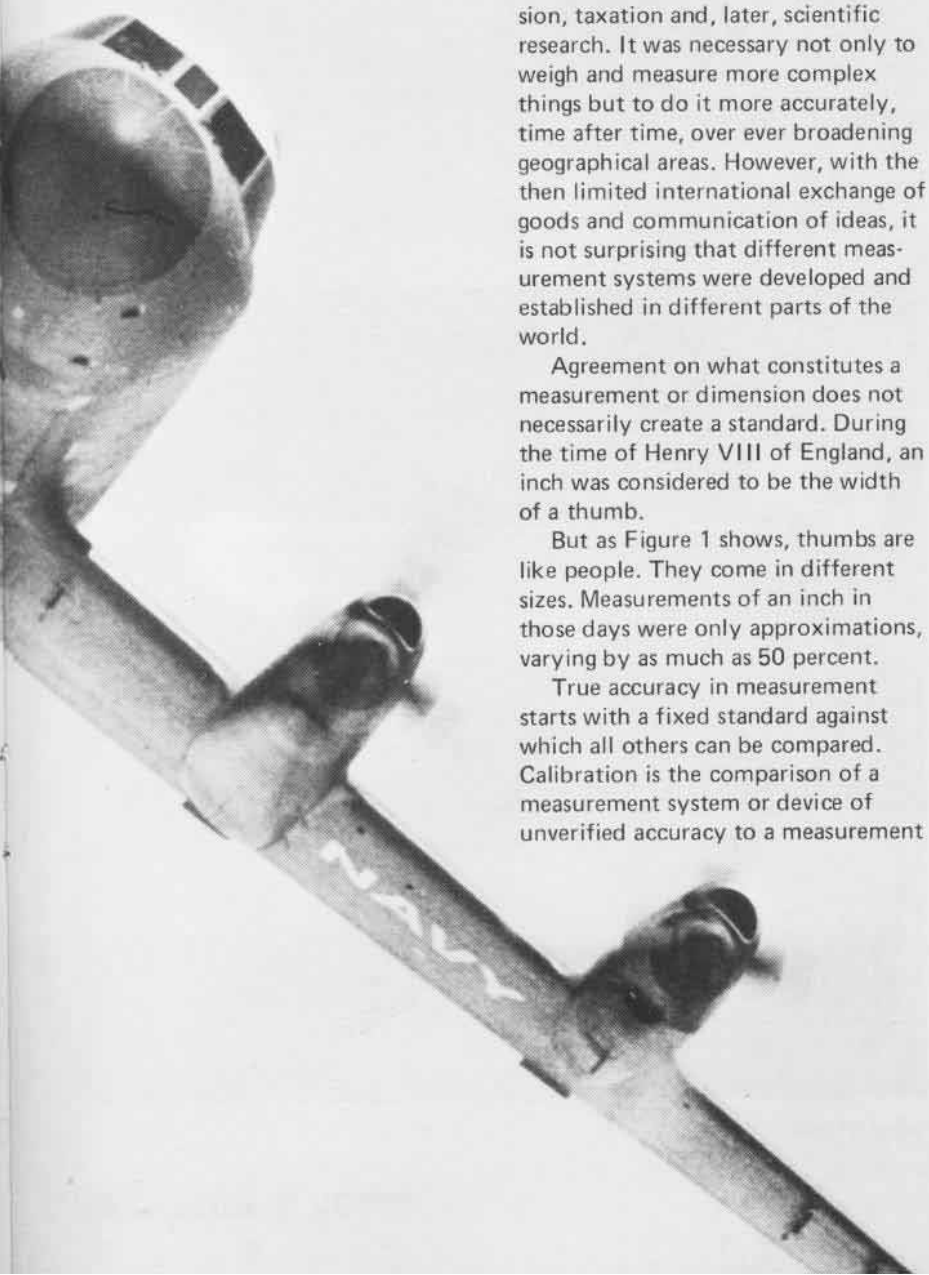
The inertial navigational system of the P-3 is a precise, state-of-the-art instrument. A one-thousandth-of-an-amp error in one setting will cause a 17-degree-per-hour gyro drift. But when the crew of the P-3 sets off from Whidbey Island on a long hop to Adak, they feel confident they will arrive — that the navigational system does not contain that small error which would cause them to miss the small Aleutian island.

Calibration and its parent science metrology (science of measurements), like the sophisticated weapon systems they support, have evolved over a long time. Man has always had a need for measurement accuracy. Someone has called it the world's second oldest profession, for among the earliest tools invented by man were weights and measures.

Primitive societies used rudimentary measures for many tasks: constructing dwellings, fashioning clothing and bartering food and raw materials. Man turned first to parts of his body and his natural surroundings as instruments for measuring.

Early Babylonian, Egyptian and biblical records indicate that length was first measured with the forearm, hand or finger. Time was measured by the periods of the sun, moon and other heavenly bodies. When it was necessary to compare sizes of containers such as gourds, they were filled with plant seeds which were then counted. In this way, seeds and stones served as standards. For instance, the carat, still used as a unit of measure for gems, was derived from the carob seed.

As societies evolved and became more complex, weights and measures kept pace. Numbering systems and mathematics were developed to support whole systems of weights and



measures needed for trade, land division, taxation and, later, scientific research. It was necessary not only to weigh and measure more complex things but to do it more accurately, time after time, over ever broadening geographical areas. However, with the then limited international exchange of goods and communication of ideas, it is not surprising that different measurement systems were developed and established in different parts of the world.

Agreement on what constitutes a measurement or dimension does not necessarily create a standard. During the time of Henry VIII of England, an inch was considered to be the width of a thumb.

But as Figure 1 shows, thumbs are like people. They come in different sizes. Measurements of an inch in those days were only approximations, varying by as much as 50 percent.

True accuracy in measurement starts with a fixed standard against which all others can be compared. Calibration is the comparison of a measurement system or device of unverified accuracy to a measurement system or device of known and greater accuracy.

A formal system was adopted in the United States in 1901, when the National Bureau of Standards (NBS) was established by an Act of Congress to strengthen and advance the nation's science and technology for the public benefit. NBS and the Naval Observatory are now the agencies of the government that have custody of the nation's basic physical and time standards, respectively. They also provide the common references for all measurements made within the scope of the Navy's calibration program.

The establishment of standards is only the first step. To be effective, the system has to make the accuracy of those standards available to anyone who needs them. And since users have different accuracy requirements, the system has to be one of gradations or ranks, as in a hierarchy. Such a hierarchy – and it is an efficient one – exists in the Naval Aviation community.

The Navy metrology and calibration program (METCAL) was created in response to problems arising from a lack of agreement on uniform measurement and calibration criteria. The lack of uniformity resulted in malfunctions, excessive return of equipment, high rejection rates and similar problems.

In 1956, the Bureau of Ordnance initiated a standardized measurement program which assures that uniform


NAVY