NADC Reflector

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Computational Fluid Dynamics

A flowing force in airframe design at NADC

By Mary Ann Brett

The Aerodynamics and Aircraft Performance (AAP) Branch in the Air Vehicle and Crew Systems Technology Directorate is currently applying state-of-the-art Computational Fluid Dynamics (CFD) with advanced computer programs solving "Edler" and "Navier Stokes" equations, in designing more efficient and safer Naval aircraft.

Campbell Henderson, who has headed the Branch for three years, defines CFD as "the computer solution of the equations governing fluid motion." At NADC, the fluid is air and the motion is its action on aircraft surfaces. Henderson said CFD is used by the Center mostly in the early conceptual and preliminary airframe design stages. Ultimately, CFD determines and analytically presents a visual representation of the air stream flow over the entire surface of the aircraft, illustrating airflow separations or departures from the frame. "Obtaining this information once necessitated extensive and

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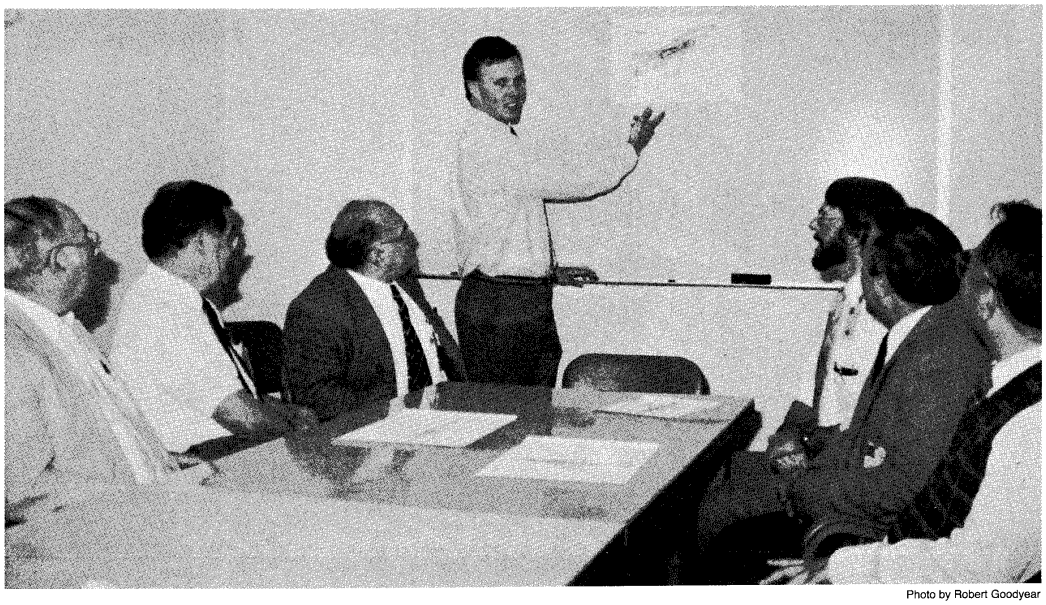

Photo by Robert Goodyear

The Computational Fluid Dynamics Team: Campbell Henderson, Dr. Richard Llorens, Samuel Greenhalgh, David Findlay (standing), Dr. Douglas Hall, Dr. Edward Feinberg and Dr. Wei Tseng.

Big effort in small business gets Navy award

By Mary Ann Brett

The Center's Small Business Office, headed by John Scott, recently received the Secretary of the Navy Small and Disadvantaged Business Omnibus Award. This prestigious, Navy-wide award was presented to Scott by the Director, Contract and Business Management, Office of the Assistant Secretary of the Navy (Shipbuilding and Logistics) E. Grey Cammack during a breakfast ceremony in Mobile, Alabama. Additionally, selection for the omnibus Award puts NADC in contention for the Department of Defense Small Business Award.

Last fiscal year, NADC exceeded its goal of 35% by awarding 52% of its total direct purchasing dollars to small business. More than $100 million went to small business contracts and for the first time the Center awarded more dollars to small businesses than to large ones.

Continued on Page 2

Foreground: NADC's John Scott, Dep. for Small Business (SB), Center Commander CAPT Curtis Winters, and Diane Heal, SB Specialist display Omnibus Award. Background: Don Hathaway and Ray Quinn, Directors for Small and Disadvantaged Business Utilization for SECNAV and NAVSUP, respectively, Ernest Cammack, Dir, Contracts and Business Mgmt. OASN and CDR Wayne Vanderslice, NADC's Supply Officer.

(See page 7-8 for details)

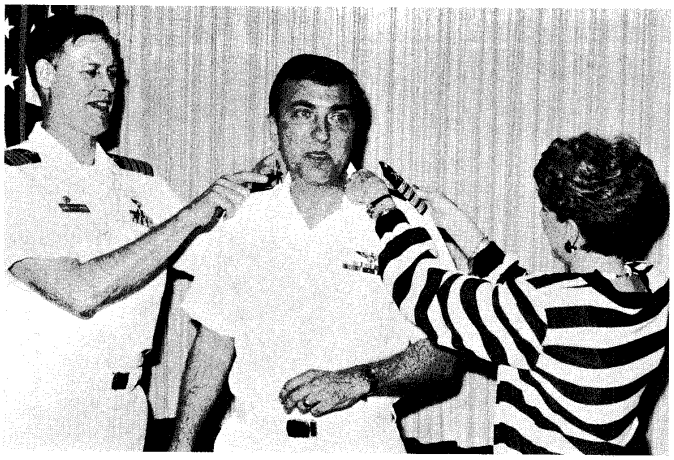

Photo by NADC Photo Lab

Newly promoted CAPT Wayne Savage (left) sports comical expression as Center Commander CAPT Curtis Winters and Mrs. Jane Savage help with the 4-stripe shoulder boards.

Verona passes bar exam

By JO2 Todd Lufkin

The Naval Air Development Center's Susan Verona recently passed the Patent Bar examination.

Photo by JO2 Todd Lufkin

Susan Verona

To be a patent attorney you must have an engineering or science degree and a law degree. Verona has both, receiving her bachelor's in metallurgical engineering from Lafayette and her law degree from Villanova.

Verona has been on Center for 2½ years and came specifically to practice patent law. She explains that her job is to get patents for the inventions developed at NADC to protect the Navy's interest.

Her plans for the future are uncertain since it is early in her patent career. "I'm interested in getting more skill in writing patents," she explained, "it takes a long time to become proficient."

Damage detector developed

By JO2 Todd Lufkin

NADC is currently testing a low cost, lightweight device for field inspection of impact damage and resulting flaws in aluminum honeycomb sandwich and laminated composite materials used in naval aircraft. These inspections assure that composite structures provide the same level or structural reliability as comparable metal structures. The device is the Shadow Moire Out-of-Plane Interferometric (SMOOPI) Damage Detector.

The detector consists of a lightweight battery power source, a 4-inch × 5-inch moire screen and a pistol grip and is capable of detecting surface anomalies of .0001 inch. It has several advantages over existing inspection techniques. It is a fast, simple, accurate, portable, inexpensive device that can be used in the field by personnel with minimal training and eliminates the tedious scanning procedures required to inspect large structures.

A variety of methods already exist to detect internal damage. Ultrasonics and x-rays are most common. Other methods showing varying degrees of applicability include thermographics, laser holography, acoustic emission monitoring and simple hammer tappings. However these methods tend to be laborious and unreliable in the field where results are affected by temperature, humidity and vibration.

Dr. Shih L. Huang, Arthur Scotese, Armando Gaetano and engineering co-op student Glenn Werczynski of the Aero Structures Division of the Air Vehicle and Crew Systems Technology Department created the detector as part of the Center's Independent Exploratory Development effort. Scotese explained that SMOOPI works on the interference fringes created by the superposition of two grids (a master grid and a specimen grid) or the shadow moire technique.

"Moire is the term used to describe a wavy pattern," he explained. These shadows are distorted by the out-of-plane elevation or depth of the surface. When viewed with SMOOPI, moire fringes are created which represent the topology of the specimen's surface (similar to a contour map). A damaged area can be quickly identified; then ultrasonics can be used at selected locations to further define the nature of the damage.

SMOOPI was recently demonstrated at the Naval Air Systems Command in Washington, D.C. and was favorably received. Field evaluations are being planned at various naval depots on the F-14, AV-8B and F-18 aircraft.

Scotese received his BS in mechanical engineering from the Pennsylvania Military College (now Widener University) and his MA in engineering science from Penn State.

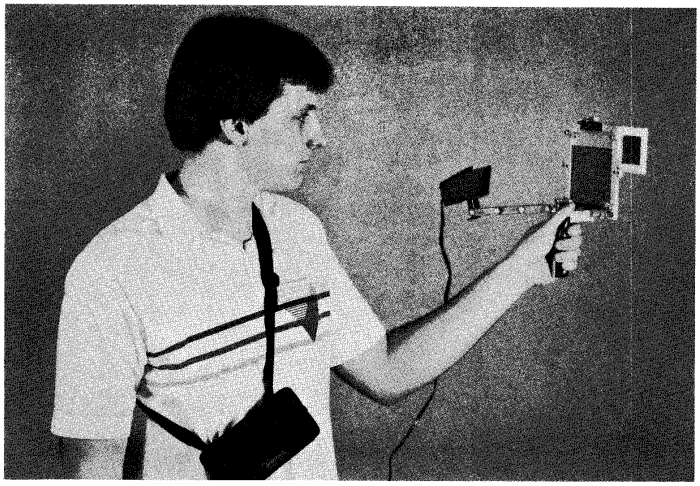

Photo by NADC Photo Lab

Glenn Werczynski with SMOOPI Damage Detector

Navy Relief '88 in swing

In commemoration of the Battles of the Coral Sea and Midway, Navy Relief Society will conduct its annual Fund Raising Campaign from May 4 through June 6. CDR John Shelby, Head of the Engineering Support Group, will be the 1988 Navy Relief Campaign Chairman for the Center.

The Navy Relief Society has been a principal source of emergency assistance to members of the Navy and Marine Corps as well as their dependents and survivors since 1904 and is supported entirely by voluntary contributions from members of the Naval Service and their civilian friends.

Numerous fund-raising activities will be held in support of the campaign. The NADC Chief Petty Officer Association will be steam cleaning car engines at the Hobby Shop every Thursday from 21 April-2 June between the hours of 1100-1300 for the low cost of $5.00 per car. Check *The Log* and TV monitors for additional activities. SUPPORT A WORTHY CAUSE.

Small business award

(continued from page 1)

Nearly $1.2 million was awarded to women-owned firms and more than $17 million went to disadvantaged firms. The Center's small business R & D awards were the highest among the Space and Naval Warfare Systems Command laboratories.

NADC is the only Department of Defense research and development activity in Pennsylvania. The Small Business Office, together with the Technology Transfer Office, continues to provide business/technical assistance to the Pennsylvania business community. These offices also interface with the Pennsylvania Ben Franklin Partnership to promote economic growth and develop high tech businesses.

According to Scott, his office will continue to identify defense high-tech opportunities for small business firms.

Security Reminder

Secret Material must be entered in the Center's control system at the time of origination or receipt on Center. Working papers must be dated when created, marked on each page with the highest classification of information they contain. When working papers are to be retained more than 90 days, filed permanently, or released outside the command all accounting, control and marking requirements prescribed for a finished document are mandatory. Refer to Paragraph 0807, NAVAIRDEVCENINST 5510.13C.

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Sailor and Blue Jacket of the quarter named

By JO2 Todd Lufkin

The Naval Air Development Center's Sailor of the Quarter (SOQ) for the first quarter of 1988 is AW2 Paul Benn. This is his second time as SOQ, which is a first at NADC. The 27-year-old sailor has been in the Navy for eight years and has been on Center for two years.

Benn was shocked to learn that he had been named SOQ for a second time. "I was surprised to be nominated and really didn't think that I would make it again," he stated. "Being nominated makes my chain of command look good," explained Benn, "they are supporting me and it's only fair that I support them and do the best I can to win."

A native of Boise, Idaho, he has been stationed on the USS CORAL SEA (CV 43); various training commands; Patrol Wing One in Kadena, Japan: VP-19 in Moffett Field, Calif., then NADC.

Since being SOQ before, Benn now works in Vertical Flight, having moved from Schedules, and is attending Montgomery County Community College at Blue Bell, where he is a sophomore majoring in business.

He recommends that a person make a plan and stick to it; whether it be short or long term. Benn's short-term goal is two-fold: to make rate and get his degree. His long-term goal is to be an entrepreneur. "I would like to set up a store that sells video tapes or CDs," he explained, "but that's only after I put in my time with the Navy and achieve what I can."

HM3 Elvin Santiago was recently named the Naval Air Development Center's Blue Jacket of the Quarter (BJQ) for the first quarter of 1988. Santiago has been on Center for a year-and-a-half and in the Navy nearly seven years.

"I was pleasantly surprised when I heard of my selection because I really didn't expect it," he stated, "I was straightforward with my answers and told the board my feelings—not what they may have wanted to hear."

Santiago explained that he originally joined the Navy to travel and to persue his education. "I've travelled extensively in the Mediterranean and am close to attaining my Associate Degree." He became a hospital corpsman because "it sounded like a good environment to do a lot of practical learning." The BJQ also stressed that medicine is so open with many options and is people-oriented.

In his career, the 25-year-old Santiago has been stationed at Orlando, FL, for boot camp; San Diego, CA, for corps school; Beaufort, SC; Aviation Medical School, Pensacola, FL; VAW-121, Norfolk, VA; the USS DWIGHT D. EISENHOWER (CVN-69), Sewell's Point Clinic, Norfolk, VA and then NADC, where he works at the Biomedical Support Branch of the Air Vehicle and Crew Systems Technology Department.

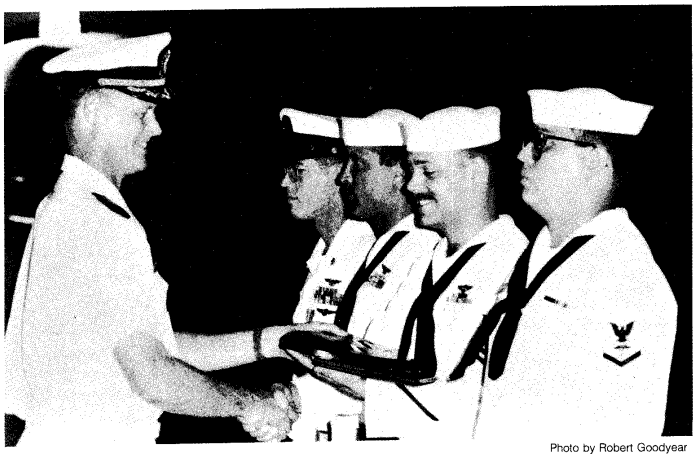


Photo by Robert Goodyear

Center Commander CAPT Curtis Winters presents SOQ plaque to AW2 Paul Benn; Blue Jacket of the Quarter, HM3 Elvin Santiago at far right.

A native of the Bronx, NY, the BJQ explained that he is "basically a city person, but the area is a rich environment for raising a family." He and his wife Jacqueline have two children, Adrian, 3, and Anthony, 2. Any spare time finds Santiago playing basketball or racquetball. But his primary interest is spending time with his sons, "It's important for the boys to have a full-time mother and father now that they are in their impressionable years."

Santiago advises his fellow shipmates to do their jobs and do them right the first time, "That way you can take pride in your work and won't have the feeling someone's looking over your shoulder or out to get you."

This BJQ plans on making a career in the Navy and hopes to go to Aviation Physiology school in Pensacola, FL. "I'd like to retire to Puerto Rico," he stated, having lived there for four years with his father. "However, he added, Florida wouldn't be bad either.

Computational fluid dynamics at NADC

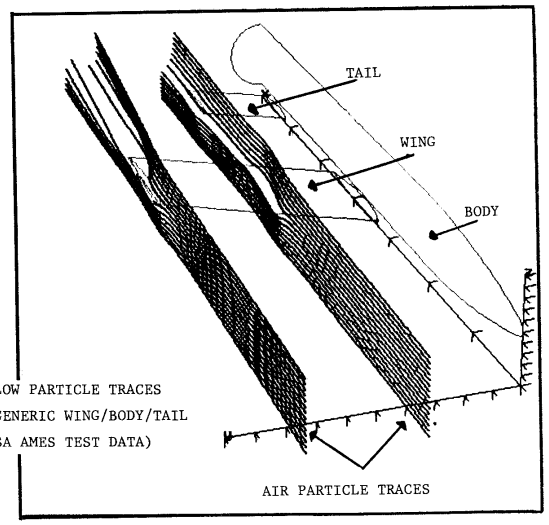
(continued from page 1)

expensive wind tunnel testing," said Henderson. "CFD is now sufficiently complementary to wind tunnel testing, that time in the tunnel is significantly reduced resulting in a sizeable cost savings."

"Design takes various levels," said Henderson. "in conceptual design we need to know the aircraft's mission and approximate payload. Experience gives us some preconceived knowledge of the best general configuration but not the details. We vary all the important parameters and analyze each alternative, finally arriving at the optimum solution.

Henderson explained the theory behind CFD. "When you design a wing," he said, "you have to know the aerodynamic loads imposed on that wing and how they are distributed." The equations governing fluid dynamics obey the laws of conservation of energy, momentum and mass. The solution of these equations determines the forces and moments (moments = forces × distance) for a given object flying through the air.

By developing a computer geometry model for a specific aircraft shape, flow solutions can be obtained, in turn providing values such as pressure, velocity, and density. Integrated over the entire surface, this information yields values of aircraft lift, drag, and pitching moments. Equipped with these values, Henderson's team can determine what control deflections are needed for steady or maneuverable flight. We're aiming to minimize drag, go farther with a given engine, reduce fuel consumption and, generally, increase efficiency and safety.



Produced with NASA Ames plot 3D software on the NADC Asset Lab Iris 4D turbo graphics workstation.

The AAP Branch is currently applying CFD to several analysis projects. The first is a high-performance, thick airfoil for housing surveillance equipment in the wing of the High Altitude Long Endurance (HALE) remotely piloted vehicle. Henderson explained the thicker the wing the more difficult it is to maintain good aerodynamic performance. To accommodate the requirement for long endurance, the wing span needs to be very large compared to the chord. In fighter aircraft this would be prohibitive because of the need for maneuverability.

On the X-31A, a highly maneuverable experimental aircraft, Henderson's group is to determine the flow properties entering the engine inlet and through the engine duct. On the tilt-rotor V-22 "Osprey" aircraft, the download imposed during the low speed transition region was calculated. Henderson added that a program using CFD is scheduled to develop advanced rotor technology for the next generation of tilt rotor aircraft. Studies will address improving the rotor (more thrust per horsepower), the wing, and predicting air flow behind the rotor including how and when the flow impinges on the horizontal tail and body.

Henderson also noted there is on-going research to develop better analytical methods for certain flow characteristics on the highly swept delta wings as well as the optimum placement of submerged missile and weapons stores. He explained modern airplanes are aiming to submerge weapons into the cavity(s) of the airframe so less drag penalty is suffered. However, when the cavity is opened to release the store, a turbulent air flow enters the cavity. "We need to analyze that flow," said Henderson and compensate for its effects to ensure the weapon doesn't hit the aircraft."

To accomplish these varied tasks, Henderson's group has used several CFD computer programs. These programs have grown in complexity from "PANAIR," which addresses the subsonic and supersonic air flow ranges but not the effects of viscosity, to "VS-AERO," subsonic only but does address viscosity, to "TEAM," subsonic, transonic and supersonic plus the more complete Euler governing equation of motion, and finally, the "Navier Stokes" program which encompasses all the previous regimes.

Although computational fluid dynamics is not a new science in terms of theory, according to Henderson, its evolution has been limited to computer capacities because of its extreme complexity. Only recently has CFD been fully processed by modern super-computers and made practical for use. "Problems which once took months to solve," Henderson said, "are now being addressed in a matter of hours and with increased accuracy."

Henderson has worked at NADC for eleven years. He has a Bachelor of Science from Princeton University in Mechanical Engineering and the equivalent of a Master's degree in Aeronautical Engineering.

Fire department ablaze with responses on and off Center

By Mary Ann Brett

The NADC Fire Department, organizationally located in the Air Operations Division, received an "outstanding" rating during a recent inspection by the Northern Division Fire Marshal. The inspection, conducted every 18 months, addressed areas such as maintenance of equipment, the fire prevention techniques program, training proficiency, administrative record keeping and command support.

Among the equipment evaluated was the new Hazardous Material (HAZ-MAT) trailer and command post which was so well accepted it is being considered as a model for the Navy.

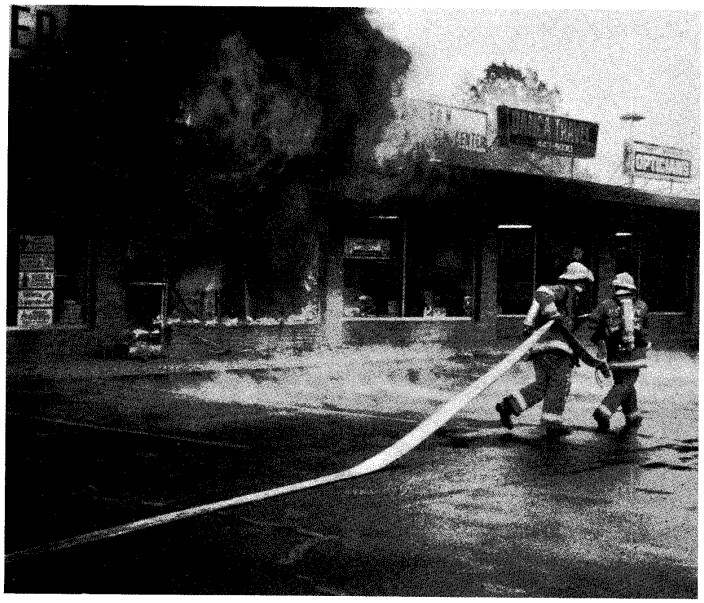
In addition to their responsibilities at the Center, The Fire Department participates in mutual aid agreements with several of the neighboring townships and boroughs. These are more than nominal agreements as NADC fire fighters responded to 8 ambulance calls and 42 structural fire calls within the last six months.

NADC's Fire Department also holds community programs illustrating treatment of hazardous materials, breathing apparatus, flammable/combustible liquids as well as college programs demonstrating aircraft crash and fire rescue techniques.

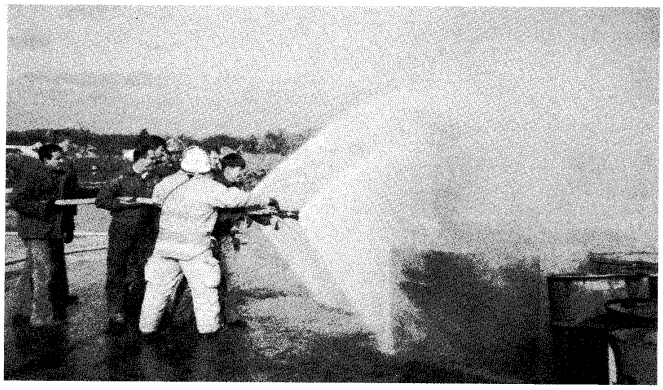
Fire Department's New Hazardous Material (HAZMAT) trailer and command post demonstration at the Center.

Fire Department responds to a 2-car collision in Shenandoah Woods housing area.

Mutual Aid takes NADC fire fighters to a residence in Northampton.



A blazing retail store fire in Warminster requires NADC's assistance.



Fire Department trains military and civilian personnel on proper Hazardous Material handling procedures.

First Crew Systems S & E awardees named

By Mary Ann Brett

The Air Vehicle and Crew Systems Technology Department recently established and announced their first (to be annual) scientific and engineering awards for outstanding accomplishment. The winners were Dr. James Sheehy, Edwin Rosenzweig and Dr. Thomas Donnellan.

Photo by NADC Photo Lab

Dr. Donald McErlean (left) presents S&E award to Dr. James Sheehy.

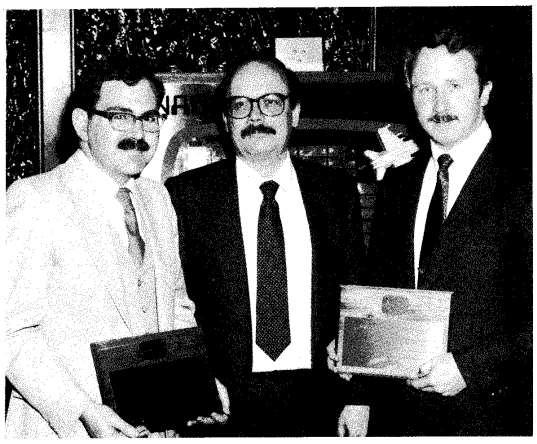


Photo by NADC Photo Lab

Award winner Edwin Rosenzweig, selection committee member Dr. William Scott and award winner Thomas Donnellan.

"Effects of Glare"

Sheehy, an Engineering Research Psychologist who has worked at the Center for three years, was commended for his innovative research on the effects of glare on human visual performance.

According to Sheehy, until recently all laser eye protection (LEP) programs were driven by damage criteria. Damage criteria is the amount of energy required to enter the cornea and cause minimum permanent damage to the eye. In contrast, Sheehy created a data base concentrating on temporary visual performance rather than permanent damage. His research has emphasized and quantified the effectiveness of low level glare in disrupting visual performance. "In fact," said Sheehy, "our data demonstrates low-level glare has the same impact on mission success as permanent eye damage. Glare is a relatively inexpensive weapon and its use has emphasized the urgent need to provide pilots with effective countermeasures," Possible applications, especially by low technology waring powers in third world environments are obvious.

Sheehy has a Master of Science degree in Human Factors Engineering from Rennsselaer Polytechnic Institute and a Ph.D. in Visual Psychophysics from Penn State University. His research is being used by the Navy, as well as other services, and has helped establish NADC as one of the prominent authorities for both LEP and the biological effects of coherent glare.

"Composite Repair"

Rosenzweig, an Aerospace Engineer, and **Donnellan,** a Materials Engineer, were recognized for developing a non-autoclave/staging process technique to support more rapid repair of composite materials. Their development has become the basis for all new bonded field and depot level repair concepts used by the Navy.

Until recently, repair techniques for the advanced composite materials in growing use on Navy aircraft were impractical, if not impossible to implement in the real world battle environment. Rosenzweig and Donnellan recognized that easier, quicker, less costly, and more reliable repair processes were required to support these materials, as well as the needs of the maintenance community.

These engineers developed a pre-staging technique to make repair materials latent. They then integrated their technique with another innovative process called non-autoclave curing. Although previous repair processes required special freezer facilities, when jointly applied, these new processes enabled room-temperature storable patches and laminates to be prefabricated from commercially available 'prepreg' materials. "Prepreg," explained Rosenzweig, is industry's adapatation of the word preimpregnated. In this case, fibers on which resins have been preimpregnated."

In addition to the improvements listed above, this repair procedure reduced training requirements, repair times and costs and the need for costly and damage prone component removal and disassembly, It also minimized the need for autoclaves and dramatically improved the quality of field repair inspections.

Rosenzweig has worked at the Center for 16 years. He has a Bachelor's degree in Aerospace Engineering from Penn State University and a Master's degree from Drexel University in Mechanical Engineering.

Donnellan began working at NADC in 1977 as a co-op student with Drexel University. He received his Bachelor's degree in Materials Engineering there and subsequently a Master's and Doctor of Science degree in Materials Science from the Massachussetts Institute of Technology.

If the SOC Fits

By Robert Janes

SECNAVINST 5370.2H, entitled "Standards of Conduct and Government Ethics," is the primary Navy instruction in the area of the Standards of Conduct (SOC). This instruction is available in General Files (extention 2763) and should be consulted for guidance on any SOC questions. The Office of Counsel (Code 095) is likewise available to provide advice and guidance on these matters, and I urge any of you with SOC questions to call our office on extension 3000.

One of the enclosures to the SOC instruction, entitled the "Bedrock Standards of Conduct," provides a concise summary of the entire instruction. Those bedrock standards of conduct are:

1. Avoid any action, whether or not specifically prohibited, which might result in or reasonably be expected to create the appearance of:
   - Using public office for private gain,
   - Giving preferential treatment to any person or entity,
   - Impending Government efficiency or economy,
   - Losing complete independence or impartiality,
   - Making a Government decision outside official channels,
   - Adversely affecting the confidence of the public in the integrity of the Government.
2. Do not engage in any activity, or acquire or retain any financial interest, which results in a conflict between your private interest and the public interest of the United States related to your duties.
3. Do not engage in any activity that might result in or reasonably be expected to create the appearance of a conflict of interest.
4. Do not accept gratuities from defense contractors.
5. Do not use any official position to influence any person to provide any private benefit.
6. Do not use inside information to further a private gain.
7. Do not use your rank, title, or position for commercial purposes.
8. Avoid outside employment or activity that is incompatible with your duties or that may bring discredit to the Navy.
9. Never take or use Government property or services for other than officially approved purposes.
10. With limited exceptions described in the instruction, do not give gifts to your superiors or accept them from your subordinates.
11. Conduct no official business with persons whose participation in the transaction would be in violation of law.
12. Seek ways to promote efficiency and economy in Government operation and public confidence in its integrity.

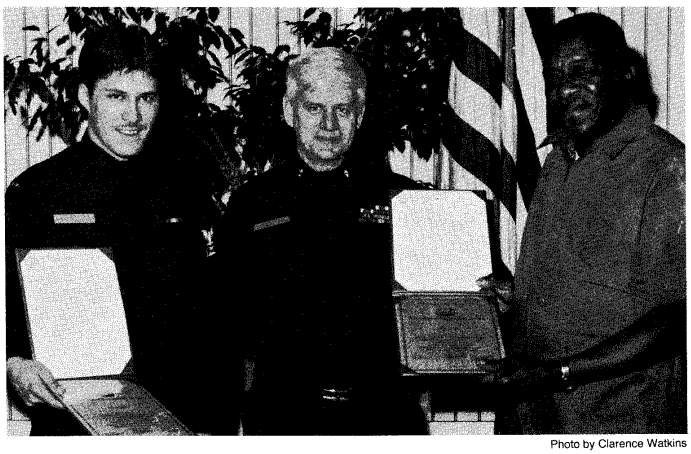


Photo by Clarence Watkins

First quarter Galley awards presented

Galley personnel MS2 David Pauley, records keeper, and Tom Fullard, contractor, are awarded first quarter Food Service Achiever Awards by CDR John Shelby, Head of the Engineering Support Group, during a recent breakfast ceremony at the Galley.

Great softball expectations for 1988

By Mark Lilly

Well, it's springtime again at the Naval Air Development Center. A time for that annual rite of the warm season known as softball. A number of changes have been made over this past winter. One of them is that the byline for these articles has changed. My predecessor has since departed the Center leaving what has been conveyed to me as a gaping vacancy in the *Reflector's* Sports Department. Since I wrote the articles for the NADC Football League last Fall. I was selected by the Sports Department Editor to fill that void—and I probably will, pending renegotiation of my contract.

I'd like to discuss some of the changes in the league's structure, organization and rules that were made since the last game of 1987 was played. First of all, League Commissioner Jim Kearney made one of the more controversial moves of the off-season by establishing a 6-member ruling party that has been titled The Board of Directors. The Board makes all rule changes, makes modifications to operating procedures, and makes final decisions concerning any changes to the league's by-laws. The Board is comprised of some of the stronger personalities in the League. They are: Jim Kearney, CEO, Fred Kuster, Tom Weiss, Bill Vaughan, John Bowes, and Joe Spiecker.

One of the first actions attempted by the Board of Director's was to split 1987's twenty team league into an A and B division—with the A division composed of the top ten finishing teams of 1987 and the B division comprised of the bottom ten. However, this idea was shelved after the rest of the league protested vehemently and the league's team count fell to 18. The league then reverted back to one division where each team gets to play all other teams in the league once, regardless of the quality of the opposing team.

Two other changes made during the off-season were to outlaw drinking and to keep the umpiring responsibilities entirely in-house. Another change from last year was the decision to use league members to umpire the games, instead of contracting out to an umpire's league. This should help the league to have more control over the umpire's attendance since there were so many no-shows in 1987.

The league lost three teams when Pacer, the Devils and the Dawgs disbanded before the 1988 season. However, the league added the Intimidators giving a net loss of two teams over the number comprising the league in 1987.

Now, I would like to talk a little about some expectations for the 1988 season and some of the events which occurred during the first two weeks. Some of the teams who figure to finish prominently in the 1988 season are the Falloon, Misfits, Bandits and 8th Inning.

The Falloon are led by fireballer Greg Heydet and a power-house lineup that includes the likes of Weiss, Mike Bubb and Glenn Willis who manhandle some of the biggest bats in the league. The Misfits have a reliable pitching staff and a couple of the better softball players on Center in Jeff Price and Steve Hynes. The Bandits picked up 1987 All-Star pitcher Rick Brodeen from the now-defunct Pacer team. The addition of Brodeen, coupled with one of the more prolific offenses in the league should keep them in contention for the title this year. The 8th Inning should finish in the top four this year behind one of the better pitchers in the league and an offensive lineup that contains 6 or 7 guys who can put the ball out of the park in any given at-bat. Note: The 8th Inning team manager has asked me not to mention any of his teamates names because personal acclamations violated his team concept doctrine.

Probably the biggest surprise of this young season has been the fast start of the Renegades softball team. After making an unbelievably quick withdrawl recovery, the Renegades started out of the gate red hot, posting a 3-0 record, beating traditionally strong teams like the 8th Inning and the Druids and then beating the Intimidators who will probably make the playoffs behind the highly touted pitching of Ken Beebe. The fast start can be attributed to some key off season acquisitions by manager Steve Spadafora and the strong play of athletes like Scott Lassen, Bill Brower, and Scott Hollyway.

The remaining four playoff spots will be filled by members from the following group: the Nightriders, CSC, Bearcats, Druids, and the Rebels. As for the remaining seven teams, you guys have everything to gain by proving me wrong.

Golfers swing in the wind

Blustery 20 knot winds, temperatures in the 50's, and lightning-fast greens kept all but a few of NADC's golf nuts from defeating Montgomeryville Golf Course on Tuesday, April 12th. "It was worse than Augusta!" moaned Fred Kuster, as he tearfully fired down a post-round suds in the clubhouse. Out of 54 players, only four were able to post net scores below par 70.

Low net went to Ted Calkins, with a blistering 65; 2nd, 3rd (tie) and 4th low nets were earned by Bill Mulley, Jr. (68); Tony Madera (69) and Tom Karr (69); and Roger Jenkins (71). Pete Brown captured low gross with an 82, while three players tied for 2nd low gross with 85's (Scott Perry, Fred Grau, and Frank Sheedy).

In the new better-ball competition, Tom Karr and Mark Drager won first with a net 59. Second place went to Tony Madera and Joe McCandless (61), and 3rd to Rudy Virga and Bob McAvoy (64).

Longest drive went to Tom McGovern (318 yards) and closest-to-the-pins were earned by Walt Blizzard (#5, 33ft); Leon Domzalski (#7, 3ft, 5in); Walt Green (#11, 10ft, 1in,); and Scott Perry (#17, 6ft).

Welfare and Rec trip news

June 18 Bus Trip Washington, DC (U.S. Capital Bldg., National Geographic Explorers Hall, Custis-Lee House, Arlington Cemetery, guided tour of monuments, dinner). $28.

Aug. 13 Baltimore, MD (Lunch Cruise, Free time to enjoy the inner harbour). $32.

For more information/reservations call Margaret Vigelis, X3067.

Mixed Bowling News

By Tom Reiter

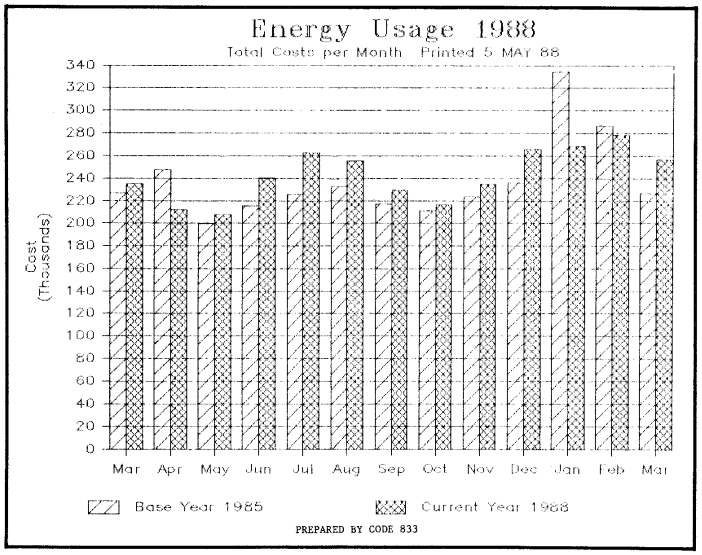
With only one night remaining in our season, (by the time you read this it'll be over), the A Division looks clinched with **Les Smith's** Neiners (43-21) holding a four game lead over **Helene Goldstein's** Eleventh Frame (39-25); but you never know, an Eleventh Frame sweep would cause a tie breaking rolloff. In the B Division, **Lorraine Kittner's** Nine Pins (38-26) are two games up on **Rich Eppright's** White Winos (36-28). **Dave Whitenack's** Destroyers (35-29) could sneak in if all the pins fall right. Whoever wins their Division will meet the challenge of our first half winners, the Alley Cats (**Bob Geyer**) and the Goofers (**Al Knobloch**). If there are no Divisional ties, we'll have our four team, League Championship rolloff on the 18'th of May. The annual awards banquet will be held at the Blair Mill Inn, June 17'th.

As all parents of Little Leaguers know, the bench IS important. I'd like to acknowledge supporting bowlers who haven't received any ink and deserve a mention this season. The number is their season's high score not their weight.

Neal Polin 179
Patty Aspinall 165
Ted Weathers 198
Mike Troyanosky 179
Carlton Brown 179
Chris Miller 184
Mike Kreuter 182
Bill Halpern 222
Bob Andrews 223
Bob Reichert 175
Lester Smith 169
George Delisi 195
Bill Bradley 178
Dave Gumkowski 214
Ed Beach 215
Dave Harrison 186
Dave Rose 190
Bill Mulley 194
John Lommock 195
Mark Thomas 200
Bob Kittner 198
Leo Markushewski 246
Bill Pohle 200
Tom McHugh 187
Deb Sztubinski 149
Marguerite Hoefling 184
Helen Halko 187
Debbie Tiley 123
Bob Connison 196
Stephanie Shelmet 167
Harold Wyzansky 202
Audrey Dinkins 176
Miriam Lentz 192
Mack Cox 192
Earl Bair 203
Vicky Schwartz 165
Sol Fink 191
Judy Jerdan 195
Maria Cusanelli 190
Dolores Mitchell 169
Jack Horning 202
Melissa Honert 176
Tom Gould 191
Steve Thoman 204
Rich Stickney 205
Ed Fields 200
Char Pohle 178
Jeff Mansfield 215
Bonnie Long 164
Kathy Barnes 190
Sandy Weathers 167
Ed White 193
Terry DeDominicis 144
Dorothy Gramlich 178
Jane Weber 154
Ann MacNamara 155
Claire Bayer 183
Mary Baron 131
Jean Canton 167
Steve Shelikoff 170
Debbie Wood 178
Ted Calkins 186
Lee Bourgeoult 177
Peg Clark 161
Jill Johnson 179
Carolyn Kolb 195
Julie Dancha 169
Rae Routzahn 146
Dottie Hall 154
Anne Hoyt 177
Lois Savage 175
Lisa Johnson 156

Planned your vacation yet?

To help with all of your personal travel arrangements, call Denise at SATO Travel, ext. 2729, Mon. thru Fri., 8 AM to 4 PM



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VIEWPOINT

Question: What NADC site are you most interested in showing your family?

Prepared by Margaret Vigelis.

Photos by JO2 Todd Lufkin.

"I will take my family to visit the CV-ASWM lab because it closely simulates the ASW module located aboard aircraft carriers. I have often tried to explain the lab and I feel they would appreciate seeing it."

Marie Coyle

"My family would like to see the computers and the airplanes, those are the fun things according to my children."

Karl Geist

"My son would be interested in seeing the model aircraft flights. Even though he is only two, he is fascinated with flying objects- especially airplanes and helicopters. 'Plane' is one of the most used words in his vocabulary."

Adrienne Harrington

"I would like my visitors to tour the VP software lab, the hangar area and flight line, a static display of P-3C aircraft and possibly the control tower."

LCDR Rich Flanigan

Use knowledge to unlearn prejudice

By Jo2 Todd Lufkin

"An illogical, irrational and erroneous set of concepts about groups, which are then applied to individuals," is how Morton Metersky of the Systems Engineering Division of the Battle Force Systems Directorate (BFSD) defines prejudice.

"Prejudice is learned and so, perhaps it can be unlearned," he explained. Taking this assumption further, Metersky met with Cathy Hanling of the Systems Requirements Branch of BFSD and together they came up with the "Prejudice Reduction through Knowledge" program. This program, with the support of the Anti-Defamation League's "A World of Difference," has offered films, workshops and a monthly information bulletin called "Know Your Neighbor." The idea was favorably received and strongly supported by Department Head Edward Yannuzzi and put into effect at the beginning of the fiscal year.

Each month the information bulletin covers a different theme the Indian sub-continent, Black Americans, Jews, Christians, etc. and is distributed to members of BFSD. Future newsletters will examine China, and the impaired.

"I believe that if we disseminate knowledge about culture and religion, then maybe, just maybe, we can attack the foundations of prejudice," explained Metersky, "If only one person is affected, then we will have succeeded."

As part of the program, an April workshop entitled "Prejudice Reduction" was held in the auditorium. Approximately 20-30 BFSD employees attended. "This was an attempt to bring prejudice into public view and hopefully reduce it," he stated.

June 22, the BFSD EEO committee, in conjuction with the EEO office, will sponsor a multi-denominational clergy panel who will discuss the topic "Addressing Prejudice from the Pulpit." The moderator will be Dr. Franklin Littell, Noted Christian and member of the U.S. Holocaust Commission.

"Imagine if the program were Center-wide," Metersky stated, "we could constantly expose people to information about religion, culture, etc. and maybe they would start to question their prejudicial attitudes. We need to attack the foundations of prejudism and not just show the results of its practice."

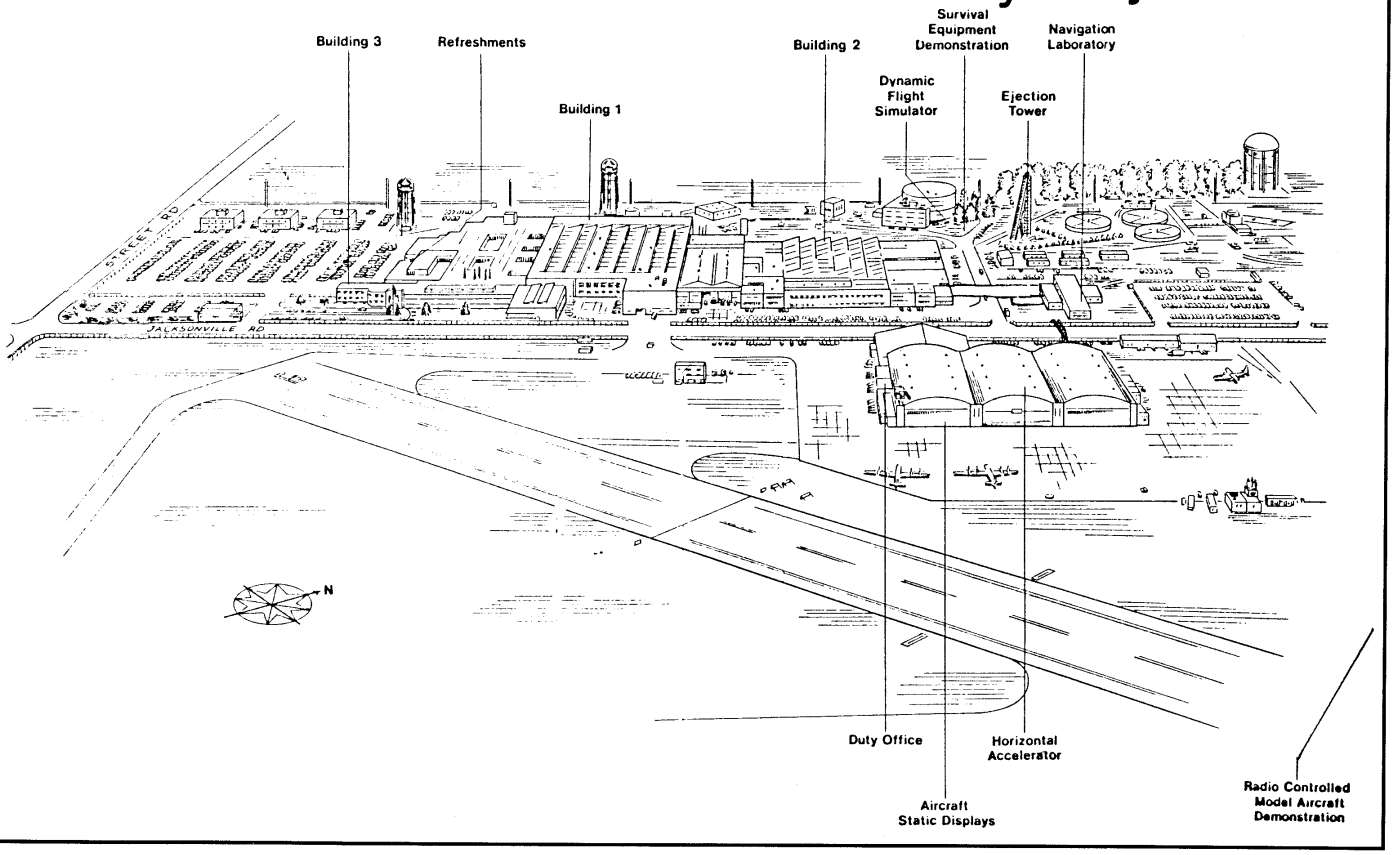
Family Day Attractions

Display/Exhibit	Location
Helicopter video AIL Lab walk through VS Lab tour & video presentation (every 30 miniutes from 1000) video: "Simulated S-3 ASW Mission"	Seahawk Room
VP Laboratory—Walk through of VP Lab where software for P-3 ASW a/c is developed and tested	Bldg 1, S-17
TACAIR Office—Video program-"No Points for Second Place" (The REAL Top Gun)-1 hr. run every hour from 1000, (F-14 development and its capabilities), static display of BQW-74C aerial target used for test & develop of audio-air weapons systems used for fleet training	Bldg 1, P-5
Basic Laboratory—Communication Load Module Demo-20 min. video war game every half-hour, 1000	Bldg 1, Col T-10
Inertial Guidance Facility Display & presentation	Bldg 1 1 J-23
Cafeteria will be open for fast food-1000-1400	Bldg 108
Club will feature a buffet and DJ-1000-1400	
Choral group will perform in the auditorium-1300-1400	

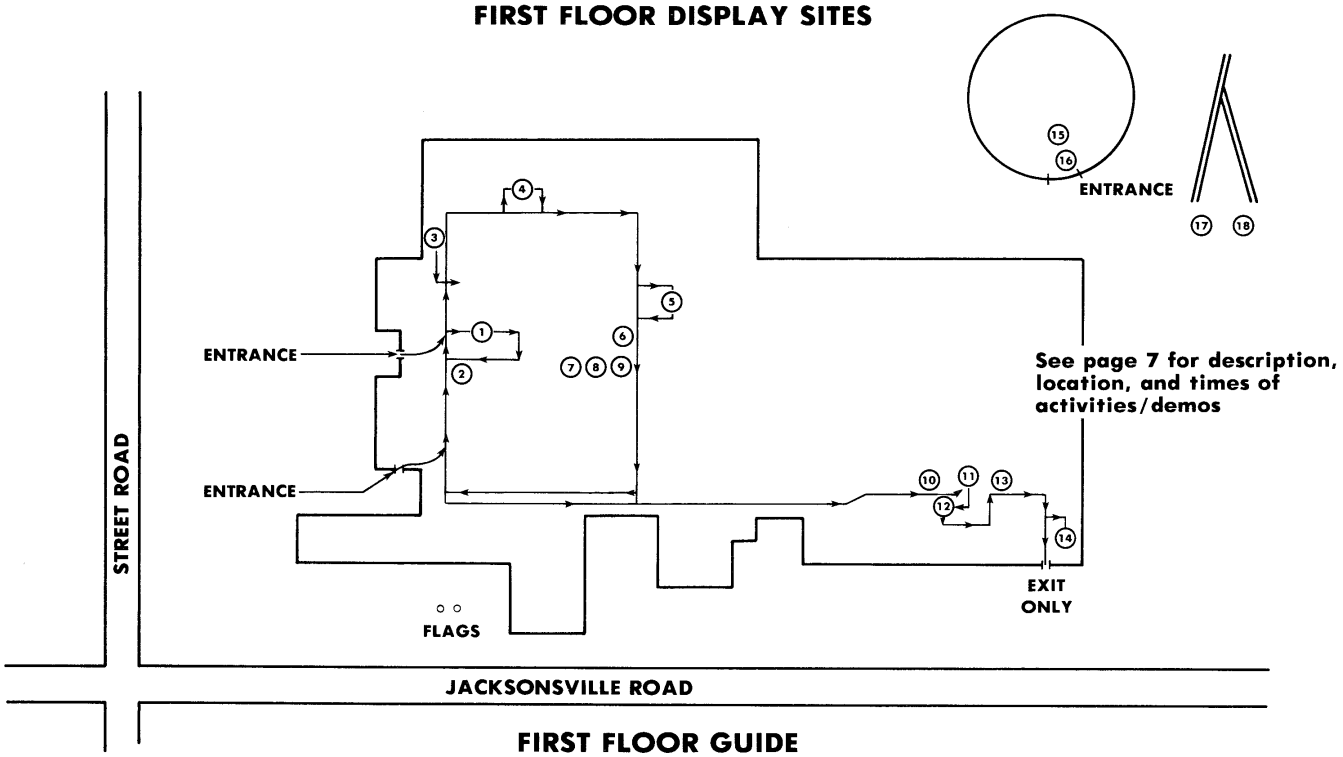
Display/Exhibit	Location
Scorsby Laboratory "Suitcase gyro" demo GPS-video certificates	Bldg 1-1 H-6
Acoustic Tank Sonobuoy dem-every 10 minutes, 1000	Bldg 3, Fl3, V-33
Magnetic Media Lab Display and tour	Bldg 1, H-19
Danny Ross Lab Acoustic signal processing & display tech	Bldg 1, I-20
Noise demo	Bldg 2, 2L19
Centrifuge Every 20 min between 1000-1400	Bldg 70
Ejection Tower, Flare 1100 & 1300 *weather permitting*	Outside Bldg 70
Gun Demo, Life Raft inflation (one after the other)	Outside Bldg 70
Static displays	Bldg 70-lobby
Three 8-min videos shown continuously.	Bldg 70-auditorium
Attendance certificate	Bldg 125 Central Hall

Display/Exhibit	Location
NAV/COMM Theater (movie on current projects)	Bldg 125 Conf Rm 27
Talking computer	Bldg 125 Conf Rm 27
Gyroscope demo	Bldg 125 Conf Rm 27
Ship's motion Simulator	Bldg 1, N-22
TACAIR Systems Development Facility (TSDF) real-time simulator display continuous	Bldg 3, Fl 2, J1-35
Sun Workstation graphic applications demo or Marine Corps Digital Comm Terminals continuous	
Presentations at 1015, 1115, 1215 & 1315	
Systems Tech Group Facility Bldg 1, Fl 2, K-19	Bldg 1, Fl 2, K-19
Computer game on big screen TV	Auditorium
See yourself on TV	TV Studio
A-7 & T-2 sight display, helicopter & P-3 open	Apron-Hanger Bay 1, Bldg 4

When, What and Where: NADC Family Day 1988



FIRST FLOOR DISPLAY SITES



See page 7 for description, location, and times of activities/demos

FIRST FLOOR GUIDE

1 Vertical Flight Office
2 Welfare & Recreation Store - Hats, T-shirts, etc.
3 Tactical Aircraft Project Facility
4 P-3 Aircraft VP Program Facility
5 Structural Test/Aircraft Composites
6 S-3 Aircraft VS Program Facility
7 BASIC Laboratory
8 Danny Rosso Laoratory
9 Magnetic Media Laboratory
10 Aero Materials Display
11 Movie on NADC (large screen)
12 TV Studio
13 Crew Station Evaluation Facility
14 Sonar Tank Test Facility
15 Life Raft and Signal Flare Display
16 Life Support Equipment Display
17 Dynamic Flight Simulator
18 Ejection Seat Tower