The Reflector

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NADC Dedicates New Laboratory Complex for Flight Controls

A new laboratory complex was dedicated last month in the memory of George Tsaparas of the Naval Air Systems Command. The lab, which is located in the basement of building two, is designed for the development, test and evaluation, integration and system demonstration of air vehicle technologies.

Tsaparas had a long and extremely close working relationship with the Naval Air Development Center. His work as AIR-340D and acting AIR-340 encompassed flight control innovations, data multiplexing and reduction of cockpit clutter through state-of-the art display technology.

Tsaparas was responsible for the automatic throttle controls that are installed on all carrier based aircraft. He introduced digital flight controls, the building block approach to direct drive actuators, the skewed gyro concept for fly-by-wire aircraft and the first integrated inertial and air data sensor system concept.

From left to right; Captain James B. Anderson, Helen Tsaparas, Glenn Tsaparas and Steve Hurst.

Another one of Tsaparas' major contributions to aircraft technology was the initiation of development on the 270 volt DC generator and the application of digital multiplexing and solid state technology to power distribution, control and protection.

His work in the area of display technology has resulted in the highly efficient cockpits that can be found in the F-14 and F-18.

An overflow crowd came to see Tsaparas' wife, Helen, and his son Glenn accept a commemorative plaque, and cut the ribbon to open the lab complex.

The new lab takes a systems approach to the development of controls. In the complex, areas are set aside for electrical and environmental control system, flight controls, flying qualities,

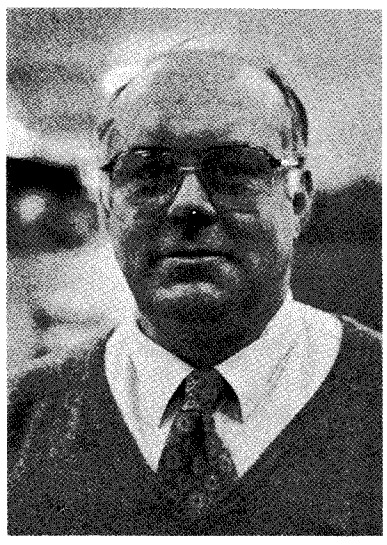
(continued on page 2)

Three Investigators Get IR/IED Awards

A small ceremony was recently held to honor some special people for their unique contributions in exploratory development and independent research. Three NADC people, Dr. Lloyd C. Bobb, Samuel Greenhalgh, and Francis A. Karwacki, are doing fundamental work in areas that could have great impact to the Navy.

Greenhalgh

Greenhalgh, a former citizen of the United Kingdom, was singled out for his independent research on the Aerodynamic Properties of Inextensible Flexible Membrane Lifting Surfaces. In general terms, Greenhalgh's work involves developing fundamental equations that will define how nonstretchable fabric wings get their lift.



Samuel Greenhalgh

Working with the wind tunnel facility at Princeton University, Greenhalgh designed a testing program to measure the dynamic lifting forces that are produced on a mylar wing section. There are various applications for fabric wings because they are foldable, lightweight and inexpensive. Fabric wings are in use today. They can be seen in Parafoil (inflatable fabric) parachutes and Ultralight aircraft. Greenhalgh's research may eventually lead to more efficient wing designs for use by the Navy for such things as targets and decoys.

Greenhalgh works at NADC on a part time basis. He also holds a position as a full time professor of physics, mechanical engineering and engineering graphics at Bucks County Community College. Greenhalgh additionally holds a visiting fellow position with Princeton. His undergraduate and master's degrees in mechanical engineering are from the University of Pennsylvania. He also has a degree from the University of Manchester, his hometown in England. Greenhalgh has a diploma from the Von-Karman Institute of Experimental Fluid Dynamics in Brussels.

Karwacki

Francis A. Karwacki, CNTD, was honored for his Independent Exploratory Development on a project titled "Development of a Nuclear Magnetic Resonance Apparatus." The device that Karwacki has been working on for the past three years is a Nuclear Magnetic Resonance (NMR) gyro.

The theory behind Karwacki's gyro is that information on vehicle rotation can be obtained from the dynamic angular motion of certain atomic nuclei. Interest in the development of a Nuclear Magnetic Resonance Gyro comes from its potential to be a small, extremely accurate and highly reliable strapdown gyro. It also has the capability of accommodating large input rates without sensitivity to accelera-

Francis Karwacki

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Change in Navy Tuition

Navy people who are eligible for education benefits under the GI Bill can no longer use the Navy's tuition assistance program to help pay for off duty schooling.

According to an article in the 10 October issue of NAVY TIMES, nearly 182,000 active duty sailors still covered by the GI Bill are affected by the policy change, which went into effect as of 1 October. The move was a result of the 17 percent reduction in fiscal year '84 program funds.

Only those who joined the Navy before 31 December 1976 are eligible for GI Bill education benefits. These people must now use their GI Bill education benefits, or other Navy campus programs, to help defray tuition costs while on active duty.

The cost-saving measure does not affect Program for Afloat College Education (PACE) students, or sailors in any other Navy campus program.

The tuition assistance program now becomes an off-duty education program only for those Navy people not covered by the GI Bill. It allows enlisteds working toward a high school diploma to have 100 percent of their tuition reimbursed. E-5s and above with less than 14 years of service have 90 percent of off-duty high school or college education costs picked up by the Navy, and other enlisteds and all officers receive 75 percent reimbursement for courses.

Birthday Message

"As we celebrate our Navy's 208th Anniversary, it is appropriate to step back and remember the source of our strength and superb performance. Without a question it is you, our wonderful Navy professionals.

We are a spirited Navy which is alive and ready to sail with the next tide. We are—as always—on watch and on station around the world, from the Caribbean to the Mediterranean, from the shores of Lebanon to the Eastern Pacific off Latin America. We are building to 600 ships and there is a noticeable bounce in our step. No matter whether you wear the uniform-of-the-day, or the uniform of reservist, retiree, civilian or Navy family member, it is you who puts action to our national commitment of "Peace Through Strength." A Navy's true strength is not measured by counting ships or aircraft, but is found in the quality of its people. It is your spirited professionalism which makes our Navy great.

While details of our passage through this coming year and the ones that follow cannot be foretold, our heading and course are clear and true: We must be strong and we must be ready whenever and wherever the Navy team is needed.

I thank you for your dedicated support and tireless performance over the past year. I know you will continue to stand a tight watch on our nation's security and ensure our navy remains a ready force for peace. Happy Birthday and God bless you all.

CNO

Navy's Energy Program Works

fuel for the fleet ... every drop counts

The United States Navy pays a high price for energy. The Navy and Marine Corps used 84.2 million barrels of oil equivalent (BOE) in 1982, at a cost of over $4 billion—228 percent more than in 1975 (then-year dollars). Energy cost increases have slowed and fuel is more widely available, but prices for petroleum and other energy sources are still high.

Oil plays a critical role in the maintenance of readiness because the current generation of weapons systems, and mobile and stationary equipment use petroleum fuels. Continued free use of the seas can be maintained only if sufficient fuel is available for the operation of ships, aircraft, and their supporting facilities. Petroleum fuels provide 70 percent of all Navy energy, and cost $3 billion last year.

Programs that are improving energy efficiency in operations and reducing energy waste are apparent throughout the fleet and the shore establishment. In 1982, the hulls of nearly 250 ships were cleaned with scrubbing equipment to remove friction causing marine growth. The hull cleaning program saved over 600,000 barrels of fuel during 1982. Research and development of antifouling paints to eliminate marine growth on ship hulls is progressing well. Anti-fouling paints applied four years ago to USS OUELLET (FF 1077) continue to resist marine growth fouling. Paints applied to the hulls of USS SPRUANCE (DD 963) and USS SAMPSON (DDG 10) over two years ago are also performing well.

Water conservation aboard ships has the potential to save large amounts of fuel by reducing the load on ship desalination plants. This is being accomplished through new shower heads, improved laundry and galley procedures, and maintenance procedures. Already, reduced flow shower heads have been installed on approximately 100 ships. Installation will continue until all ships are converted to this energy/water efficient system.

Additional fuel savings will be achieved aboard ships by optimizing fuel-air mixtures in boilers through the use of oxygen analyzers. Approved for fleet use, the Navy is procuring 394 oxygen analyzer units to be installed as part of the fleet modernization program.

Naval aircraft are saving energy through operational changes, airframe modifications, and through the use of computers. P-3 aircraft conserve fuel by taxiing to the runway on two engines, and loitering on station, decreasing cruise-in fuel flow, and by using more ground support equipment. Aerodynamic drag is reduced through slight modifications to the airframe and smoothing rough surfaces.

Aircraft performance advisory computers and flight performance advisory systems have been developed to assist pilots in making optimal fuel saving decisions in flight. The Naval Air Development Center along with NAS Moffett Field, NAS Jacksonville, NAS Willow Grove, NAS Whidbey Island, NAS Oceana, and the Naval Air Test Center, are all participating in efforts to develop new energy conserving methods for aircraft.

T-45s, the newest addition to the aircraft trainer fleet, will help the Navy save about 680,000 barrels of fuel each year. These exceptional aircraft use a third as much fuel as the current trainers do.

Energy savings at shore facilities have been achieved through the retrofit of existing buildings, energy efficient design and construction of new buildings, the use of more efficient equipment, and the care and attention of the naval community as a whole.

Energy Conservation Investment Program (ECIP) funding from 1976 through 1983 amounted to $326 million. Since 1976, 271 projects were completed. About 89 projects are under construction. This investment will save the Navy 2.4 million BOE, valued at $71 million.

Energy Technology Applications Program (ETAP) projects handle retrofits that fall below the ECIP funding threshold of $200,000. Through 1982, approximately 300 ETAP projects were funded at a construction cost of $9 million. Energy savings from these projects were 135,000 BOE valued at $4.3 million.

(IR/IED from page 1)

tion. By the time such a device goes into production it is expected to have lower acquisition and lifecycle costs than those of a Ring Laser Gyro with comparable performance.

The NMR IED is a 3-year program with two phases. The first phase was directed at improving performance parameters by analyzing key aspects of NMR gyro design. This phase also included the development of Mr. Karwacki's new gyro design, which was based upon his prior analysis. The current phase is being devoted to the fabrication and integration of all of the gyro system hardware and software. It will also include experimental gyro parameter measurements as well as performance evaluation.

Two unique design concepts were conceived as a result of the phase one analysis and development. The first being a transverse AC-pumped NMR gyro design. The second, a unique magnetic field device designed with the assistance of Joseph T. Griffin (now of TSD), co-inventor. Patents have been applied for and are pending for these two design concepts.

Mr. Karwacki views the IR/IED program as being very significant to the attainment of NADC's goals. He said, "The IR/IED program gives the individual a chance to grow in his field of study." He then went on to say, "I really appreciate the support from my supervisors and people in other areas of the Center." He also had words of praise for his co-workers, "They helped me solve some of the 'sticky' materials and electronics problems that surfaced during the development of the NMR gyro—they deserve a special vote of thanks."

A ten year employee at NADC, Karwacki holds an AS in electronics from Philadelphia Community College, a BS in Physics from LaSalle, an MS in Physics from Drexel and is currently doing work towards his PhD at Lehigh.

Bobb

Dr. Lloyd C. Bobb, SATD, found NADC's Independent Research Program an extremely valuable source of money to pursue an idea that he thought was worthwhile. Bobb's project is based on the use of fiber optics in the development of sensors. His work holds the promise of small, inexpensive and extremely sensitive devices for the measurement of magnetic fields.

Benefiting from fiber optic research already done by the communications industry, Bobb has designed a series of sensors using fiber optics and small laser diodes that are on microchips.

Taking fibers that are eighty microns (one micron equals one millionth of a meter) in diameter Bobb, using the known properties of light and magnetics, utilizes the idea of coating the fibers with metals that are sensitive to magnetic fields. These metals react in such a way that they stretch in the presence of a magnetic field. By laying one fiber that is coated next to another fiber that is not coated and illuminating both with the same laser through a special coupling, readings at the other end of the fibers can be taken. These readings are based on the difference in the time it takes for the light to travel the lengths of the two fibers. Since the coated fiber would stretch in the presence of magnetic field, the time it took for the light to travel its length would be longer than the uncoated fiber.

Lloyd Bobb

An interference pattern results when the two light waves are measured together. This measurement can be correlated to the intensity of the magnetic field.

Because the components of the device are so small, an extremely sensitive magnetometer could be built in the space of a cigarette pack, Bobb stated. The simple physics of this device also holds the promise of other sensors such as temperature, pressure and motion sensors, being made from the same concept.

Bobb tapped the resources of NADC and other activities, like Drexel University and the Naval Research Laboratory. He said that without the efforts of everyone on Center, from the people in Supply who contract, procure and receive the equipment, to the materials people who helped with the coatings and the supervisors who supported the research, the project just wouldn't have happened.

Bobb came to NADC indirectly from the Frankford Arsenal. He worked at Picatinny Arsenal before coming here. A resident of Willow Grove, Bobb used to drive by NADC and think it would be nice to work here. His wish came true five years ago. Bobb holds three degrees in physics, a BS from Penn State, a MS from Penn and a PhD from Temple.

Navy Space Command Established

ADM. James D. Watkins, Chief of Naval Operations, emphasized the requirement to use the potential of outerspace during remarks made at the inauguration of the Naval Space Command, Dahlgren, VA, 1 Oct, in which Capt Richard H. Truly assumed duties as the first commanding officer.

The CNO touched upon Greek mythology, during his opening, when he said, "Like the ancient tale about the Greek warrior-Prince Odysseus, who escaped the clutches of the mythical superpower Cyclops by blinding the giant and depriving him of his keenest sense, any power today would surely be found lacking in strength, open to defeat, if it lost use of one of its most cherished "senses." Today—and in the future—certain "senses' are critical to our Navy's survivability and capabilities . . . These senses at sea are being sharpened by movement of sensors from masthead to the edge of space. Our Navy is relying upon space-based systems to perform vital command, communications, control and surveillance functions.

". . . Just as we require use of the seas to maintain our freedoms, so now we increasingly need the unimpeded use of space to ensure the security and well-being of our nation and our allies."

ADM Watkins concluded his remarks saying, "Now we will move out to meet challenges before us, for we cannot afford to have the space power of another nation ever rob us of our goal of sea power. We are a seafaring nation . . . this nation will maintain leadership in space."

New Lab (continued from page 1)

fluidic controls, actuators, armament systems and hydraulics. A full scale TA-7C airframe mockup can be reconfigured to simulate any aircraft, from a single engine to multi-engine. In addition full weapons system integration can be accomplished using the video and digital multiplex system already on Center.

The Reflector

Naval Air Development Center

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All correspondence should be addressed to Editor, Reflector, Code 091, Naval Air Development Center, Warminster, PA 18974 (441-2980).

CAPT James B. Anderson — Commander, NADC
Robert S. Buffum — Technical Director
Joseph P. Cody — Public Affairs Officer
David Polish — Editor

Supply, CV/ASWM and Canadian Liaison Office Have New Faces

Major Dale Tremblay jumped at the chance to come to NADC. The jump, however, was a big one as Tremblay came to NADC from Saskatchewan, Canada. His current post at the Center is that of Canadian Liaison Officer. The reason he jumped was that he wanted the chance to see, first hand, the state-of-the-art engineering that takes place at NADC. Another reason was that he had been taking courses at the Rochester Institute of Technology and he came to like the northeastern section of the United States.

Major Dale Tremblay

As a Liaison Officer, Tremblay's assignment is to look at programs that are of mutual interest to Canada and the United States. Two of the major Canadian programs of interest are the Aurora and CF-18.

The Aurora is the Canadian version of the P-3 Orion. Tremblay explained that there are many areas of commonality between the two aircraft. For example software programs that drive the computers are exchanged between the two countries.

Canada's CF-18 is the designation for the U.S. Navy's A/F-18. Tremblay is looking at NADC's reconnaissance modifications to that aircraft. His background helps in this area. Tremblay did postgraduate work in photographic science and engineering at the Rochester Institute of Technology.

Tremblay's undergraduate degree in mechanical engineering is from the Saskatchewan Technical Institute in Moose Jaw, Canada. He served as a maintenance officer for the Argus ASW aircraft and has experience in fighter planes like the F-104, CF-5 and CF-18.

When asked about what it takes to be selected as a liaison, Tremblay said, "you should be an extrovert and like working with people." "Also you have to be performing your duty assignments very well." "Only those who do well are selected for liaison positions," he added.

One of Tremblay's personal goals during his three year tour at NADC is to learn more about computers. "Because," he said, "all new aircraft are controlled by them and if you understand how computers work, then you can have a better understanding of the entire aircraft.

LCDR William Mugg is a product of the Navy through and through. He doesn't have what most people would call a home town because his father, who is a retired Navy Captain, moved his family around so much that they were never in one place long enough to call it home. Mugg, the new CV-ASWM Program Director, comes to NADC from the Naval Air Rework Facility in Pensacola, Florida, where he served as comptroller.

LCDR William Mugg

Mugg's background is in engineering with a 1971 MS degree in aerospace engineering from North Carolina State University. His undergraduate studies were done at Annapolis. After Mugg received his masters he took pilot training in rotary wing aircraft. He had two tours in Norfolk and several deployments in the Mediterranean. One interesting tour took Mugg to the University of Colorado as a ROTC instructor.

As a newcomer to NADC, Mugg is impressed with the people here. "There are many very intelligent and competent people here and I am looking forward to working with as many of them as I can," he said.

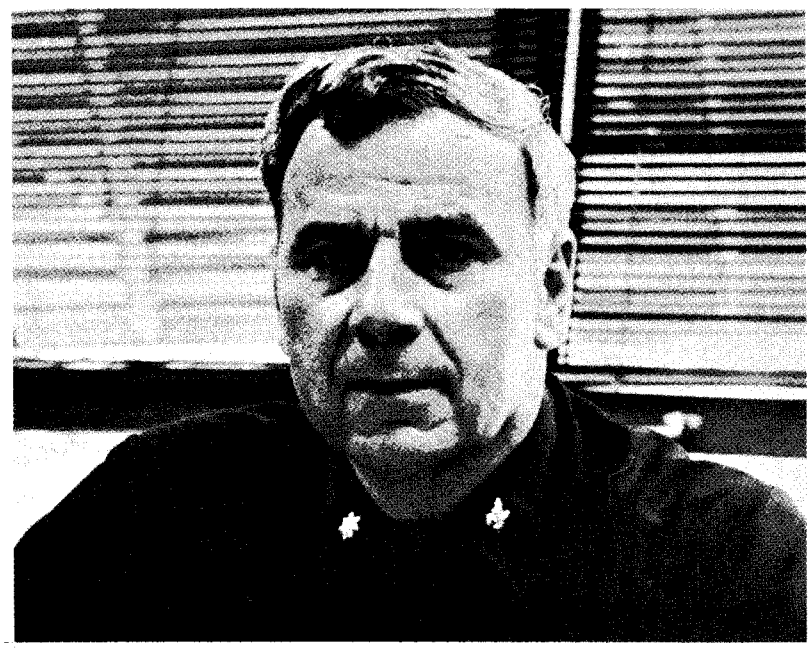
In his role as CV-ASWM Program Director, Mugg says he'll let the technical people do their jobs without him getting into the "nits" or detailed areas. "I hope to be here through the introduction of the new mission software and hardware refinements," he stated. Although that would mean an extension of his present tour Mugg feels that the scheduled changes are worth staying around for.

As NADC's new Supply Officer, CDR Milton Weaver brings 23 years of Navy experience to the job. A 1960 Naval Academy graduate, Weaver served as an unrestricted line officer on USS Saratoga (CVA-60) and USS Barry (DD-933) before transferring to the Supply Corps in 1964. Subsequent tours included USS Truckee (AO-147), NAS Norfolk, NAVSTA Keflavik Iceland, ASO Philadelphia, USS Coral Sea (CVA-43), NSD Subic Bay Philippines, and Staff COMNAVAIRPAC.

He comes to the Center from a second tour at ASO Philadelphia where he was Head, Aviation Supply Control Center, responsible for maintenance of a world-wide data base of critical high priority Navy/Marine Corps requisitions. Data base validation and intensified expedite action at ASO resulted in a reduction from 16,000 to less than 10,000 outstanding requisitions over a two-year period.

Weaver welcomes the opportunity to work at NADC and is impressed with the diversity and professionalism of the Center employees. He is conscious of the responsibilities of the Supply Department and the far reaching impact the department has on all aspects of Center operations. Well aware of the importance and high visibility of the Contracts Division with the Directorates, he is equally concerned with ensuring that all supply disciplines are well oiled and running smoothly. These disciplines are comparable, in responsibility if not in size, to major air stations and are the heart of daily Center functions. Included are issue control; packing, shipping and receiving functions; warehousing and shop stores; fuel operations; and the management of the Enlisted Dining Facility. Without a sound Material Control Division, Center aircraft would not be mission capable to perform Directorate projects—after all, Weaver said, an "aircraft is merely a collection of spares flying in close formation."

It is with all supply disciplines in mind that Weaver intends to further improve the excellent support already being provided to the Center customer. Weaver stated, "I want to make sure we are up to speed on all the supply standards and set specific goals so the results can be measured."



CDR Milton Weaver

BOSS Program

ADM Steven A. White, Chief of Naval Material, has announced a spare parts pricing initiative called project "BOSS" (Buy Our Spare parts Smart).

The BOSS initiative, which began in August, encompasses Secretary Weinberger's ten-point plan for improving spare parts procurement. It further stresses personal letters to the Chief Executive Officers of the Navy's top contractors emphasizing spare parts pricing, establishment of procedures for reporting suspected overpricing cases, strengthening incentive programs to reduce costs and disciplinary procedures for improper performance. It also calls for allocating funds to support a project to break out spare parts from prime contractors to ensure competition, lower prices, and alternate sources of parts from firms with lower overhead cost.

The BOSS project calls additionally for providing data from Navy industrial activities on sources of stock material which has been bought on local markets at cheaper prices, and, on a trial basis, listing military specifications and military standards in the "Commerce Business Daily" procurement announcements.

Cafeteria Recipe of the Month

The following recipe is provided by the cafeteria as requested by an NADC employee. Your recipes for the Recipe of the Month contest are due. Send them to Bob Green, Cafeteria Manager.

Veal Paprika

Veal cubes
1½ lbs. 1 inch square
Bacon fat
2 tablespoons
Finely chopped onion
2 med onions
All purpose flour
1½ tablespoons
Canned tomatoes
2½ cups
Salt
2 teaspoons
Water
½ cup
Paprika
1 teaspoon
Sour Cream
½ cup
Mustard
1 tablespoon

Brown meat in bacon fat; put into shallow dish with tightly fitting lid.

Brown onion in remaining fat; stir in flour. Add mustard, tomatoes, a little salt and half a cup of water; stir until boiling. Pour over meat just to cover. If extra wetness is needed, add tomato juice and cover. Cook in preheated 350°F oven about 45 minutes, until veal is tender. Stir in paprika and sour cream. Mix well. Reheat without boiling, season to taste before serving. Yields 4 servings.

Commander Salutes

AD1 Christopher J. White, for his assistance during the visit of RADM Kollmorgen.

Karl Schraut, John W. Supp, Jr., Edward J. Sweeney, James E. Zoog, and Danny Chun, all from SCD, for their support to the NAVAIR S-3 Program Office in reviewing the software documentation for the S-3B aircraft.

October Promotions

Constance Cosgrove, Catherine E. McGowan, Paul Terpeluk, Richard W. Black, William R. Darmofal, George A. Lazzari, Martin A. Leonardo, Rosemary Convery, David J. Farina, William L. Gelatka.

Also Michael V. Mele, John W. Wilks, William E. Bradley, Joseph C. Gentile, Kevin J. Lawlor, Leon E. Smith, Ernest A. Wykes, David E. Zeidler, Michael J. Deshield, Alexander J. Kuhn, Jr., George McClellan, John A. Monastra, Jr., John D. Cyrus, Jorge Dominguez, Thomas E. Milhous, Alfred G. Piranian, Kathleen T. Tustin, John J. Tyburski, Carol A. Beckett, Salvatore J. Scelsi, Betty Eisold, Charles M. Harless, Jr., Kathleen M. McCloskey.

Deputy CNM for Acquisition Visits

RADM W. D. Bodensteiner receives a briefing on NADC's Software and Computer Directorate from Lou Naglak, SCD Director.

Oldest and newest member of NADC's military population cut the Navy Birthday cake. ATAN Joseph Boyette and CDR Thomas Mumford do the honors.

Navy Celebrates 208th Birthday

By the looks of the crowd around the cake, it must have been good.

Canadian Vice Chief of Defence Tours NADC

VADM Mainguy, center, tours NADC's Dynamic Flight Simulator. David DeSimone briefs.

NADC had a very distinguished visitor this past month, Vice Admiral Daniel N. Mainguy. He is the Vice Chief of the Defence Staff at the National Defence Headquarters in Ottawa, Canada. This position is the second highest position in the Canadian chain of command.

Accompanied by Robert Brown, Senior Trade Commissioner for Canadian Consulate General's office, Mainguy received a command brief from Captain Anderson. He also got a chance to see the Dynamic Flight Simulator.

Readers Comment on The Reflector

As part of an ongoing process the external mailing list for the Reflector has recently gone through an updating survey. Over 600 forms were sent out. An overwhelming majority of about 90% wished to continue receiving the Reflector.

As the surveys were returned it was noticed that many favorable comments were written on the forms. Some of them follow.

"I appreciate the up-to-date info and contact. Thanx," Jack Meyers. "I enjoy every copy." Beryl Everist. "Thank you for sending the Reflector. I save them and put them in a binder. I have some as far back as 1956." Joe Jamen. "I greatly appreciate this service. After 25 years at NADC I look forward to any news from NADC. *Please* keep it coming." Phil Singer. "Good job! Enjoy every issue!" Cliff Rigsbee.

It's nice to know that the people out there really do like reading this newspaper and that it is sort of link between the past and the present.

Ship Honors Germantown

The Secretary of the Navy, John F. Lehman, Jr., has announced that a new U.S. Navy Dock Landing Ship will be named Germantown (LSD-42), in honor of the historic Germantown community of Philadelphia, PA. Secretary Lehman made the announcement in Philadelphia during the German-American Tricentennial Celebration, 6 Oct.

Germantown was the scene of a revolutionary war battle between troops of the Continental Army commanded by General George Washington, and the British Army under Lt. Gen. Sir William Howe. Dock landing ships traditionally are named for historic sites.

LSD-42, second of the Whidbey Island class amphibious ships, will be the second ship to bear the name Germantown. The first was a 19th century sloop-of-war commissioned at the Philadelphia Navy Yard on 22 August 1846. Designed to replace the LSD-28 class, this new class will be the first U.S. Navy combatants to be powered by medium speed diesel engines. These engines will reduce fuel consumption by more than 2.5 million gallons per ship per year over a conventional steam plant of similar power, saving, at today's costs, 1.3 million dollars per year, or more than 39 million dollars over the planned 30-year life of the ship.

Germantown will be 609 feet long, with a beam of 84 feet and will displace 15,745 tons. She can accommodate 55 officers and 859 enlisted personnel, including embarked troops. LSD-42 is scheduled to be launched in late summer 1984 at the Lockheed Shipbuilding and Construction Company, Seattle, WA.

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