

Staff Men Are Part of SST Study Group

Seven Lewis employees have been serving as members of the United States Supersonic Transport Source Selection Evaluation Group.

As announced by Maj.-Gen. J. C. Maxwell, director, Supersonic Transport Program, the group consists of Government experts in the field of aeronautics. Its sole purpose is to fairly and accurately evaluate industry proposals for the development of the U. S. supersonic transport.

CHOSEN TO SERVE because of their "qualifications, integrity, and demonstrated excellence of job performance," to provide technical evaluation of various engine con-

siderations were: David N. Bowditch (inlets), Leonard E. Stitt (exhaust systems), Thomas B. Shillito (engine noise), Lonnie Reid and Joseph Herrig (fan and compressors), Jerold D. Wear (combustors), and Francis Stepka (turbines).

Lewis personnel and specialists from other Government agencies conducted their investigations from early September through late October. Their assignment included duty in Washington, D. C. and visits to General Electric in Cincinnati, Pratt and Whitney in Florida, and Lockheed and Boeing in California and Washington.

IN ADDITION to the formal evaluation studies, Herrig, Wear, and Stepka have been selected to serve on a Supplementary Engine Evaluation Task Force to monitor full scale engine and component testing which is expected to be concluded about December 15.

Representatives from this task force will make visits to engine manufacturers (General Electric and Pratt and Whitney) during November and December.

As General Maxwell stated, "The program is of significant national interest and represents a major milestone in the history of commercial aviation."

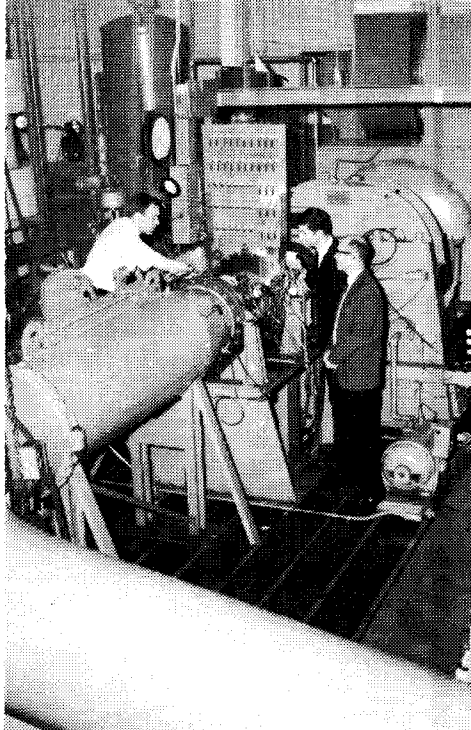
LeSAC Presents 'Patriots' Mixer

"Patriots" mixer is the title bestowed on LeSAC's dance for employees to be held from 9 p.m. to 1 a.m. tonight (Thursday, November 10) at the Ad Building auditorium.

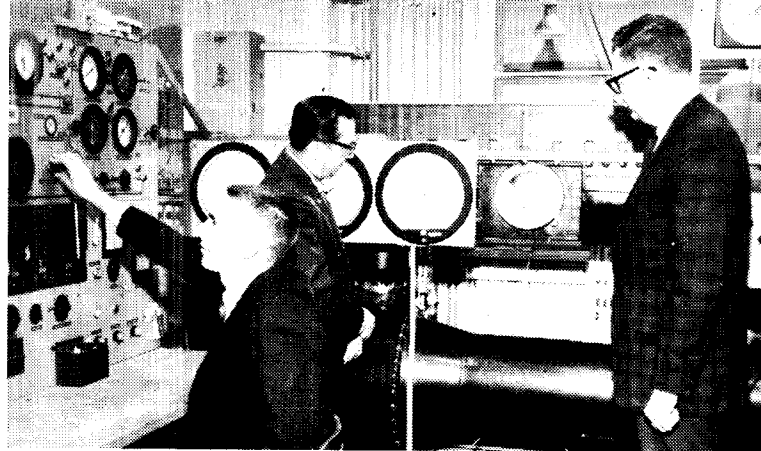
Friday is a holiday — Veterans Day — and employees are invited to launch the long weekend at this party.

Eddie Platt's orchestra will provide the music. Informal dress is suggested.

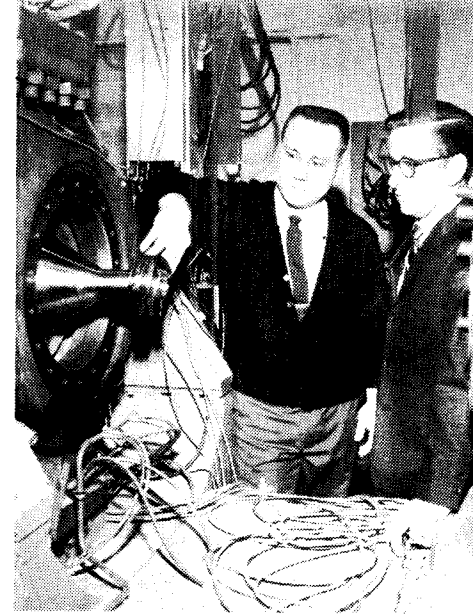
Tickets, priced at \$1.50 for employees, spouses, or dates, and \$3 for all others, are available from LeSAC area ticket sellers and at the door tonight.



Shown by the Lewis water tunnel, used to develop high pressure axial flow pumps and to show flow phenomena, Dick Soltis (left) explains to Don Urasek and Don Sandercock, head of Analysis Section, how cavitation moves in a tandem blade inducer (the first stage of a pump).



Royce Moore adjusts conditions in the test venturi for Bob Ruggeri and Cavour Hauser, head of Pump Section. Cavitation studies with various test fluids in this rig have helped predict the cavitation performance of pumps in liquid hydrogen.

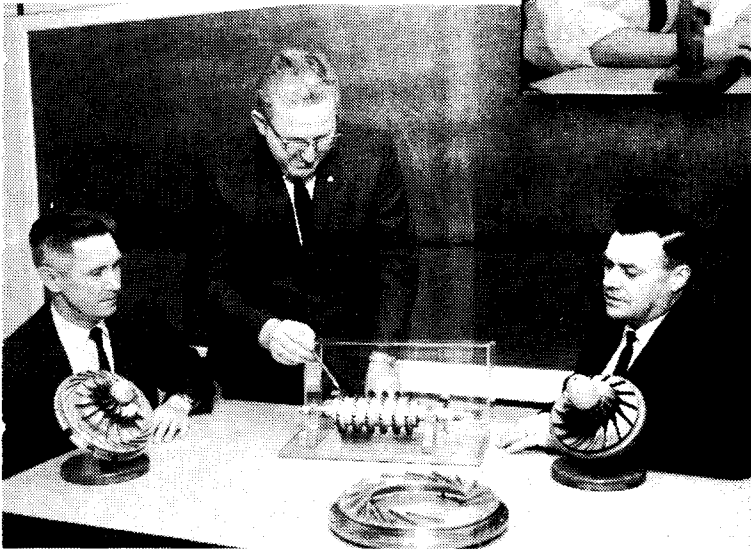


George Kovich (left) discusses with Phil Meng the pump inducer test model in the Hot Water Pump Test Facility, used to help study cavitation performance.



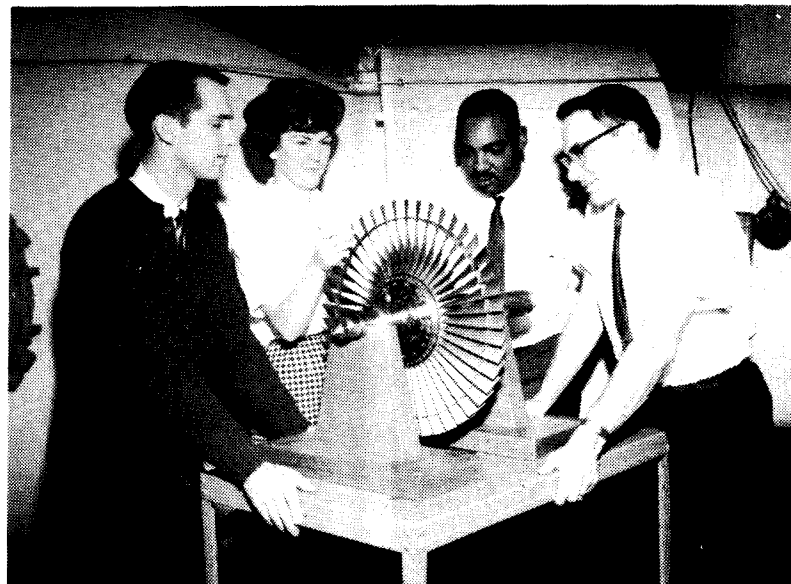
Photos by Martin Brown

At left, Bill Benser, Tom Gelder, L. J. Herrig, and Ron Steinke discuss improved compressor stall margin and performance made possible by applying blade slots and other advanced concepts.



Walt Osborn and Mel Hartmann, branch chief, look on as Cal Ball (center), head of Compressor Section, discusses the design of a small axial flow compressor which has greater efficiency than the larger centrifugal compressors on the table.

Gen Miller points out to Dave Janetzke, Lonnie Reid, and Jim Crouse the blade shapes used in a high speed transonic compressor rotor, soon to be tested in the 15,000 h.p. Test Facility.



CENTER CLOSE-UPS

Pump and Compressor Branch

Greater efficiency is the keynote to research being conducted by the 32-man, one-woman team comprising the Pump and Compressor Branch, Fluid System Components Division, under the direction of Mel Hartmann, branch chief.

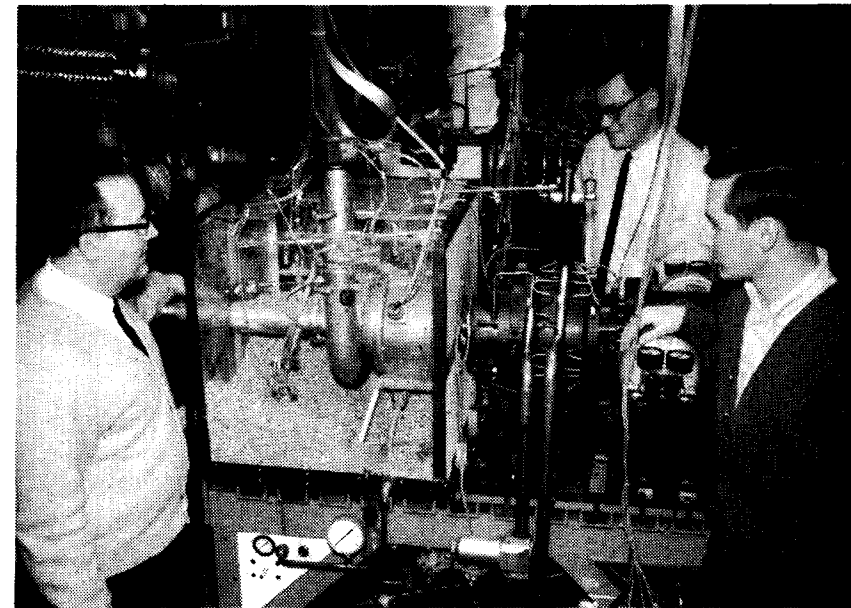
ONE OF A SERIES

Investigations range widely as the researchers strive for maximum performance from as light-and-as-small-as-possible components. Among recent accomplishments, the Branch has made significant progress in solving the cavitation

problem in pumps. In the compressor area, strides are being made in designing efficient components for Brayton Cycle space power generation systems.

As less research is required of components for chemical and nuclear rocket engines, attention is now turning more to problems of compressors to be used in airbreathing engines. The efficiency experts are studying how high-speed compressors may be improved through new blade shapes, use of high lift devices, and variable blade geometry.

Ed Tysl, Carl Weigel and Larry Heidelberg stand by a test rig which measures the performance of small centrifugal compressors in either air or argon.





Lewis tutors for the Vocational Information Program (V.I.P.) at Cleveland's Kennard Junior High School are (from left to right, seated) Easter M. Scott, Juanita L. Antoine, and Janet M. Maurer. Standing (left to right)

are Jerry H. Malone, John L. Power, Charles Mitchell, Lonnie Reid and John P. Riehl. Missing from picture: Lester Clemons, Jr. (Paul Riedel photo)

As tutors

Employees extend hands to junior high youths

Nine Lewis employees have been very important persons in helping to make the Vocational Information Program (VIP) at Cleveland's Kennard Junior High School a success.

Easter M. Scott, Juanita L. Antoine, Lester Clemons, Jr., Lonnie Reid, Charles Mitchell, John P. Riehl, John L. Power, Janet M. Maurer and Jerry H. Malone have been donating their services as tutors in a unique program which seeks to prepare eighth and ninth grade students for vocational careers. Milton C. Lipes has assisted with developing the curriculum as well as served as part-time instructor in the VIP classes.

The VIP idea is the brainchild of Stephen T. Rose, a retired Shaker Heights industrialist who has masterminded the program since

its inception in 1966. He recognized an urgent need to help those students who, for various reasons could not attend college, but who could be productive in occupations not requiring a college degree. He set out to do something about it.

From an original group of 10 students and a few tutors, the VIP program now provides tutorial assistance to some 30 students at Kennard with plans for expansion to another junior high school for the coming school year. The unique program has been recognized nationally for its many successes in a long neglected, yet critical area, of education.

With the enthusiastic endorsement of Cleveland's Superintendent of Schools, Paul Briggs, and a prestigious task force from the Cleveland business community,

Rose envisions the VIP program in all of Cleveland junior high schools within the next few years.

Much of the credit for the success of the program can be traced back to the tutoring sessions. The hour-long sessions are held on Saturday mornings under the guidance of a school counselor. Each tutor works with a single student, concentrating on basic English or mathematics, but he also fosters the other aims of the program such as counseling the student on finding and keeping jobs, and exposing him to, as well as informing him about a wide selection of trades and vocations. Tours to cooperating business firms provide the exposure. The VIP student sees exactly what it is like and what it takes to be a machinist, printer, chef, laboratory technician, architect assistant and a variety of other occupations.

Through 'summer internship,' also made possible by business firms, some of the students are placed in work situations in their chosen career fields.

An orientation meeting for the VIP tutors will be held tomorrow, September 25, at 10 a.m. at Kennard Junior High School. If you are interested in becoming a tutor, call John Power, PAX 5237 or PBX 203. The only requirement, Rose said, is "that the tutor shows a genuine interest and concern for the success of our society's youths."

Plum Brook opens...

(Continued from page 1)

Facility, the Reactor, the Spacecraft Propulsion Research Facility (B-2), H Control Site and K Site. A model of the Gemini 7 capsule will be on display at K Site, and four engine models will be in SPF. The moon rock and Apollo 15 film will be shown as well. The Plum Brook picnic grounds will be open to accommodate those who wish to bring food, or you

can buy snacks there. Clevelanders can reach Plum Brook in about an hour's driving time from the Lab on the Ohio Turnpike, getting off at Exit 7, and proceeding North on Route 250 about 4 miles to the Plum Brook Entrance left off Botay Road.

Sunday public drive-throughs are October 3, 10 and 17.

In memory

Friends at Lewis were saddened to learn of the death of Helen Siodla.

Group selects relevant courses

A large number of employees have taken courses on-site and even outside of Lewis, but very few seem to know that the group working behind the scenes to make them available is the Lewis Training Committee.

The committee is composed of 10 members from the directorates, two from the Training Section, and one each from Lewis' EEO committee and Plum Brook. It was created shortly after 1958 to implement the 1958 Government Employees Training Act.

The prime responsibility of the training committee, according to Edward A. Richley, its chairman, is to formulate policy and establish criteria and guidelines for the overall Lewis training programs.

The committee's recommendations are forwarded to the Training Section headed by Robert J. Usher. His section handles the administration of the training programs, along with providing guidance and assistance to employees in selecting training programs best suited to their needs.

Some of the on-site educational programs available here under the auspices of the training committee are the new Instruc-

tional Television programs, offering courses from Case Western Reserve University; the well established Toledo University program; (incidentally, today is the final day to register!) the Lewis on-site advanced study non-credit program, and numerous other special programs.

The committee has initiated a series of efforts aimed at publicizing the types of courses offered as well as a number of other actions prompted by a recent employee training survey.

"For example, we plan to list members of the training committee in the telephone directory, and also use the bulletin boards for announcements of various training programs," Richley said.

In addition, the committee is now compiling a training guidebook for each employee which is scheduled for distribution before the end of the year. Called the "Employee Development and Training Guidebook," it lists such information as the Lewis training organization, general training requirements and application procedure, training opportunities, and technical services training.



Members of the Lewis Training Committee are (from left to right seated) Robert W. Schmidt, Edward A. Richley, chairman, Lonnie Reid and Bert Probst. Standing left to right are Glen Hennings, Edward W. Otto, Robert J. Usher and Donald A. Petrash. Missing from picture: Robert A. Meyer, Gertrude R. Collins and Glenn R. Zellars. (John Marton photo)

Program begins 10th year

Many contribute as Lewis exceeds cost reduction goal

The 1972 Cost Reduction Awards are being presented by Director Bruce T. Lundin in ceremonies October 27 at Plum Brook and November 7 at Lewis.

Lewis achieved 105% of its goal, reporting a total savings of over \$5.2 million. Lewis becomes the only OAST center to exceed its goal.

Cost reduction ideas may be submitted to the division Cost Reduction Representatives who will assist in writing up on the proper forms. For additional information or assistance, contact Lewis Cost Reduction Officer, Ronald E. Everett, PAX 8402. Astericks indicate former Lewis employees.

Lewis Cleveland recipients

Peggy L. Yohner and Bert Henry, Computer Services, "Installation of Hewlett Packard Digitizer;" Lawrence R. Madigan, Management Services, "Rehabilitation of Used Magnetic Tapes;" Margaret Simpson*, Management Services, "Correspondance Distribution Changes;" James S. Fear, Airbreathing Engines, "Combustor-Assembly Fixture;" Philip Z. Blumenthal, Wind Tunnel and Flight, "Scanivalve System for Pressure Data Acquisition in 8 x 6 SWT and 10 x 10 SWT;" Calvin L. Ball, David C. Janetzke and Lonnie Reid, Fluid System Components, "Application of Microfilming Computer Output for Reporting Compressor Data;" George Kovich, Fluid System Components, Richard A. Bauerlein, Test Installations, "Timer and Control Device Single Stage Compressor Facility;"

James E. Triner, Thomas J. Riley, Spacecraft Technology, "Improved Initial Ultra High Vacuum Pumping Process;" Adolph C. Spagnuolo, Power Systems, "More Efficient Cooling Method;" Jefferson E. Es-sary, Arthur G. Birch-enough, Power Systems, "Power Measurements for Brayton Loop W5A;" Alfred S. Valerino, Power Systems, "Air Conditioning Unit in WIAA, ERB;" James E. Vrancik, Power Systems, John P. Roberts, Test Installations, "Reduction in Operating Cost of Cold Trap in Vacuum Facility;" Roland Breitwieser, Nuclear Systems Division, "Fabrication of Tungsten and Tantalum Heat Pipe Wicks;" George Foerster, Louis C. Iwanczyk, Engineering Design Division, "Use of Computer-Plotter to Make Drawings;" Joseph M. Lamberti, Physical Science, "Characterization of Solid State Ra-

diation Detectors at Cryogenic Temperatures;" Joseph M. Lambert, Lawrence A. Nagy, Stanley J. Obloy and Charles R. Nichols, Physical Science, "Automation of the NASA/LeRC Helium Liquefiers;" James L. Morgan, Physical Science, "High Pressure Helium Gas Storage for Liquefaction Plant;" Gerald B. Beremand, Materials and Structures, "Furnace Replacement;" Charles A. Gyorgak, Materials and Structures, "Automated Test Specimen Facility;" Sidney C. Hill, Materials and Structures, "Liquid Nitrogen Supply;" Tito T. Serafini, Materials and Structures, "Alternator Insulation Evaluation Tests;" Charles J. Boros, Test Installations, "Locking Mechanism for Quency Water System;" Robert R. Graham and Raymond Petrim, Test Installations, "Combustion Air Inlet Hydraulic System;"

Jerry Stevens, Test Installations, "Design Improvement to Readout System for a 690 Hybrid Computer;" Clarence F. Woide, Test Installations, "Reconditioning Patchboards;" Mylo J. Krejsa, Test Installations, "Service Air Conversion at BML;" Wilbur F. Dodge, Elmer E. Haseley and Ernest F. Hund, Facilities Operations, "No Loss Storage of Liquid Methane;" Thomas J. Ocilka, Facilities Operations, William M. Prati, Titan/Centaur Project Office, "Universal Reusable Assembly for Miniature Pressure Transducer and Steady-State Pressure Tube; John E. Watson, Engineering Design, "Compressible Flow Computer;" John Chovan, Facilities Engineering, "Combustion Air Line (66" and 84" I.D.) Modes of Design;"

Earl P. Morgan, Facilities Engineering, "Use of a Dry Air Supply System in Place of GN₂ Bottle Supply System;" Russell A. Corso, Atlas/Centaur Project Office, William K. Tabata, Titan/Centaur Project Office, "Deletion of RL-10 Engine Center of Gravity Measurement;" William A. Groesbeck, Titan/Centaur Project Office, "Deletion of Design Evaluation Test on LO₂ Vent Valve for D-1T Centaur;" Alvin C. Hahn, Titan/Centaur Project Office, "Revision of Requirements for a Titan Vehicle Positioning Set;" Jack G. McArdle, Titan/Centaur Project Office, "Modification of a Centaur Interstage Adapter for Test;" Jack G. McArdle, Steven V. Szabo, Jr. and Kenneth W. Baud, Titan/Centaur Project Office, "B-2 Test Tank Mod-

ularized Valve and Propellant Duct Changes;" George S. Public, Titan/Centaur Project Office, "Acquisition of Army Rail Flat Cars for MTR Conveyance ITL-41;" "Repair of Liquid Helium Transfer Line Section at LeRC for ETR Complex 36;"

George S. Public and Bedford H. Neal, Titan/Centaur Project Office, "Deletion of Fixed Nitrogen Recharger Installation, etc.;" Robert W. York, Titan/Centaur Project Office, "Use of NASA In-house Design for Titan/Centaur Thermal Barrier;" Thomas L. Seeholzer, Titan/Centaur Project Office, "Elimination of the Shroud Sell-Off Interface Simulator;" C. Robert Finkelstein, Titan/Centaur Project Office, "Revision of Requirements for a Titan Vehicle Positioning Set;" Maynard I. Weston and Virden C. Beckman*, Titan/Centaur Project Office, "Deletion of Vehicle Electrical Checkout Set (VECOS) Capability to Convert from THID to THIC."

Group Awards (Lewis)

Improved Electronics Systems Branch, Atlas/Centaur Project Office, "Eliminate Present Propellant Utilization Vehicle-Born Electronic Package (PUVEP) from Centaur Propellant Utilization System and Modify Centaur Servo Inverter Unit in Place of It;" Atlas/Centaur Project Office, "Reassessment of Spares Requirements;" Titan/Centaur Project Office, "Reduction in Centaur Materials Costs."

Plum Brook

Robert H. Linhart, Engineering Division, "PBX Communications."

Group Awards (Plum Brook)

Rocket Systems Division, Facilities Service Division, "Installation of GHeLine from Railroad Siding to Test Stand B-2;" Rocket Systems Division, "Automated Computer Sequence Control of B-2 Facility Functions Added to Engine Functions Computer Sequence;" SPF Process Unit, Facilities Service Division, "SPF Vacuum System Intercooler Repair."

RAM briefing

RAM briefing — Three European firms and the General Dynamics Corp. recently briefed NASA officials at Marshall on their study of Research and Applications Modules (RAM). RAM is a set of manned or man-tended craft which would be launched by the Space Shuttle for a variety of scientific and technological investigations.

Reid leads Phantoms to NASA cage crown

The Phantoms, with captain Lonnie Reid leading the way, swept to the NASA Basketball League championship, routing the Celtics, 51-38 to end the season.

Reid, playing an outstanding offensive and defensive game, scored 17 of his team's 26 first-half points and went on to register 23 for his night's work.

Frank Humenik and Charles Stone paced the losing Celtics with 14 and 13 points respectively.

The Phantoms finished in

second place during the regular season, but swept the two games needed to meet the regular season champs, and win it all.

On the way to the championship, the Phantoms edged past the same Celtics, 52-51, to notch the playoff portion of the schedule.

The league players selected the all-star team for this year. Its members include Lonnie Reid and Len Westfall of the champion Phantoms, and Frank Humenik of

the runner-up Celtics.

Rounding out the rest of the all-star first team are Vincent Scullin of the Falcons, and James DeRaimo of the Wallopers.

The second team chosen by the players are Charles Towne and John Rhode of the Celtics; Eli Green and Mack Thomas of the Wee Bombers; and Bill Middendorf of the Wallopers.

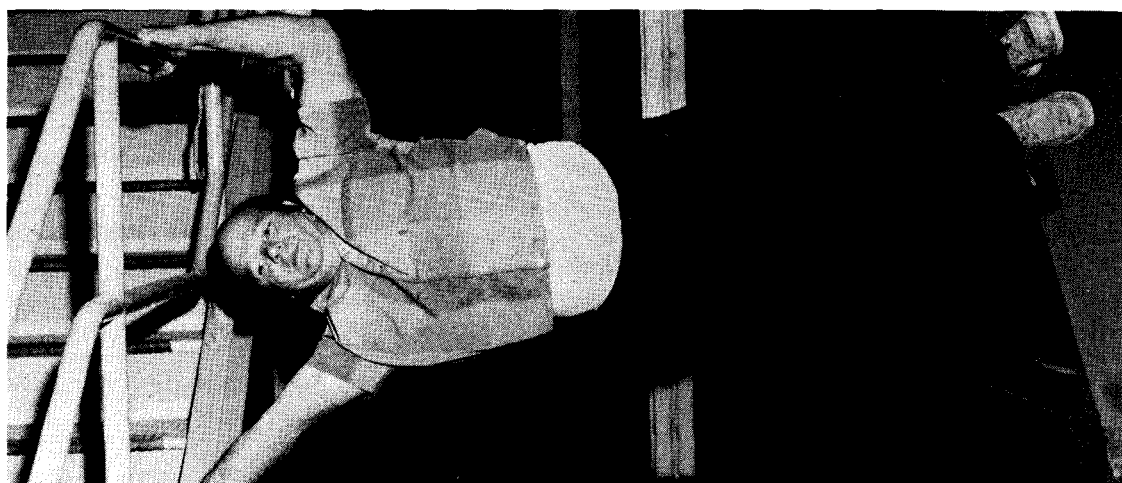
Frank Humenik was voted the league's most valuable player.



CHAMPS — Members of the champion Phantoms basketball team are (kneeling left to right) John Morley, Richard J. Parker and Thomas Finnegan. Standing (left to right) are Charles Calvert, Leonard Westfall, Lonnie Reid, captain, Stuart Loewenthal and Royce Moore. Missing from picture: Max J. Miller. (Paul Riedel photo)



ALL-STARS — Members of the all-stars voted on by the players are (kneeling left to right) James DeRaimo, Mack Thomas, and Frank Humenik. Standing (left to right) are Leonard Westfall, John Rhode, Lonnie Reid, Vincent Scullin and Charles Towne. Missing from picture: Eli Greene and William Middendorf. (Paul Riedel photo)



Hanging around!

Who says a person has to be in great shape, young, or some kind of a nut to suspend himself parallel to the floor for five or six seconds in a grueling exercise called the "Flag?" Virgil Kirkendall is in great shape, but not so young, and he is far from being a nut. He has been suspending straight out from objects like a flag instead of downward from them for the past 23

years. "I wanted to show my children that the old man still had it. The training may have come in handy if the Middleburg Heights City Council meetings had resulted in violence as a few of them nearly did when I was a councilman," he says facetiously. He also has one up on Tarzan. Even the "King of the Jungle" never swung sideways! (Martin Brown photo)

Staffers earn Master's degree

Two Lewis employees were awarded advanced degrees from Toledo University in graduation ceremonies held at the College earlier this month.

Lonnie Reid of the Fluid System Components Division earned a Master's degree in mechanical engineering while Kent S. Jeffries was awarded a

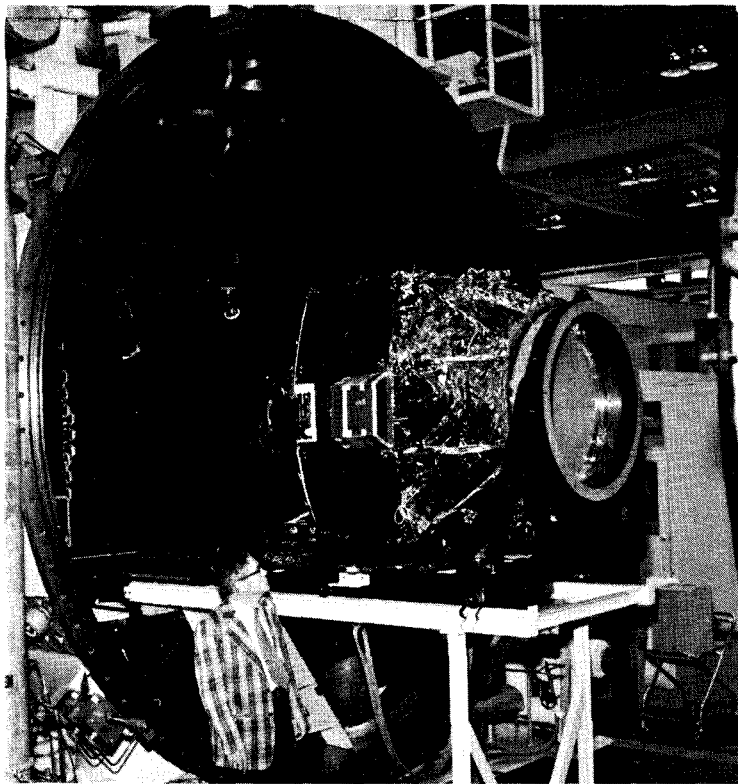
Master's degree in engineering science. Both employees were supported financially by the Lewis Training Section of the Personnel Division.

Reid began his career at Lewis in 1961 shortly after graduating from Tennessee State A&I University with a Bachelor's degree in mechanical engineering.

At Lewis, Reid is involved in performing aerodynamic design and analysis of research fans and compressors which are applicable to advanced jet engines.

He lives at 21516 Halworth Rd., Beechwood, with his wife, Christine, and their four children.

Jeffries has been employed at Lewis since 1962. He holds a Bachelor's degree in mathematics

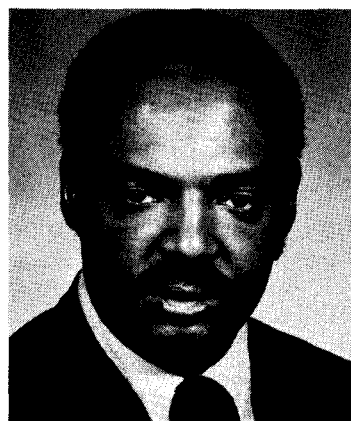


CTS ends tests

Two weeks of thermal-vacuum tests ended on December 16 for the Communications Technology Satellite (CTS) in this large space chamber at Lewis. "The engineering model of the spacecraft performed well," said William Hawersaat, Deputy Project Manager here.

It was exposed to temperatures ranging from -10 degrees to 60 degrees C. and to a space-like vacuum. It worked fine, too, during a simulated eclipse — a one hour period when the heat lamps in the chamber were

turned off and the spacecraft, without power from its solar cells, ran solely off its batteries. During the test, managers here also arranged to send TV and telemetry between the spacecraft and the new ground station in the 8 by 6-foot wind tunnel building. Lewis developed the high power, high efficiency transmitter tube which sends the signals and which will be carried on the flight model spacecraft, now planned for launch in late 1975. (John Marton photo)

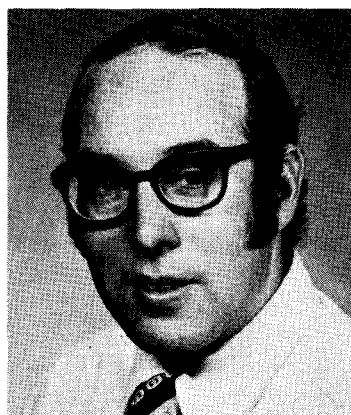


REID

from Principia College of Illinois, and has done graduate work at Washington University at St. Louis, Missouri.

A major part of Jeffries' duties here involves analyzing power systems by digital computer simulation.

He lives at 4591 West 226th Street, Fairview Park, with his wife, Barbara, and their two children.



JEFFRIES

May 14, 1976



Harrison Allen Jr., (left) and Lonnie Reid make plans to implement the MINE project at Tennessee State University and Tuskegee Institute. (John Marton photo)

Two minorities colleges selected for new project

Two predominantly black universities, Tennessee State University and Tuskegee Institute, have been selected to participate in Lewis' "Minority Involvement in NASA Engineering" (MINE) Project.

The two universities were selected among six schools across the country that were being considered for the new project. The MINE project is aimed at developing a wide variety of programs and activities that will be of benefit to both the Lewis Center and the universities.

Lewis Center engineers Harrison Allen, Jr. and Lonnie Reid, a graduate of Tennessee State, will be the Center Program Managers when the MINE Project is implemented at the universities in early June.

Specifically, the project calls for the Lewis Center to assemble on-going NASA-university affairs programs aimed at benefitting the school, its faculty, and its student body. The programs will be based on tried and proven methods conducted at other universities that have participated in similar joint government-university programs.

"In implementing the project at the universities we will try to make the challenges and opportunities of careers in science and engineering better known to minority and women students and at the same time strengthen these universities in fields of technology," explained Harrison Allen, Jr., Assistant Chief, Technology Utilization Office.

According to Allen, the two universities will receive grants to pursue research and technology projects that are relevant to NASA's missions. Upon request from the universities, the Lewis Center will furnish instructors and lecturers. In addition, the universities will have use of surplus government equipment, and the use of Lewis Center research facilities for certain projects.

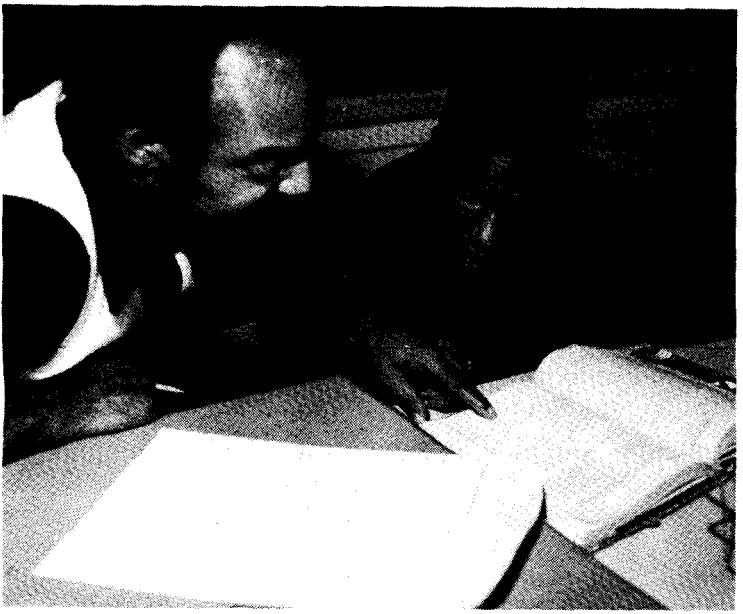
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Minorities colleges...

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Both the faculty and students of the two universities are eligible for several NASA fellowship programs. Faculty members may apply for Summer Faculty Fellowship and Post Doctoral Residence Research Associateship programs. Students are eligible to apply for the National Aerospace Fellowship and Cooperative Education programs.

“The MINE Project is designed to establish a continuing active relationship of some three to five years between the Lewis Center and the two universities. Thus the Center will have an opportunity to continually interface with the students from their freshman to senior years and have a chance of selecting future scientist and engineers who are considering employment with NASA. Through the MINE Project, the Lewis Center hopes to increase its recruitment of minority and women employees,” Allen said.



Lewis engineer Lonnie Reid helps student Rashid Gray with a math problem.

Lewis employees participate in unique tutoring program

Some 20 Lewis employees, retirees and employee spouses are very important persons in helping to make the Vocational Information Program (VIP) at Cleveland's Kennard Junior High School a success.

They donate their services as tutors in a unique program aimed at preparing eighth and ninth grade students for wide ranging vocational careers.

Retiree Juanita Antoine, a longtime tutor, continues to assist the program in an administrative capacity.

VIP is the brainchild of Stephen I. Rose, a retired Shaker Heights industrialist who has masterminded the program since its inception in 1966. After recognizing that high school students who did not plan to attend college urgently needed help in finding jobs, he set out to fill that need.

From an original group of 10 students and a few tutors, VIP today provides tutorial help to some 60 Kennard and Central Junior High School students, plus alumni who attend from nearby high schools.

An affiliated program for eighth and ninth grade girls continues in full operation at Thomas Jefferson Junior High School under the sponsorship of Zonta, a professional women's organization. Next January, a new VIP class of eighth grade girls will begin at A.B. Hart Junior High School in Cleveland.

Much of the credit for the success of the program can be traced back to the tutoring sessions. They are held Saturday mornings from 9:45 to 11 at Kennard, 2510 East

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Tutoring...


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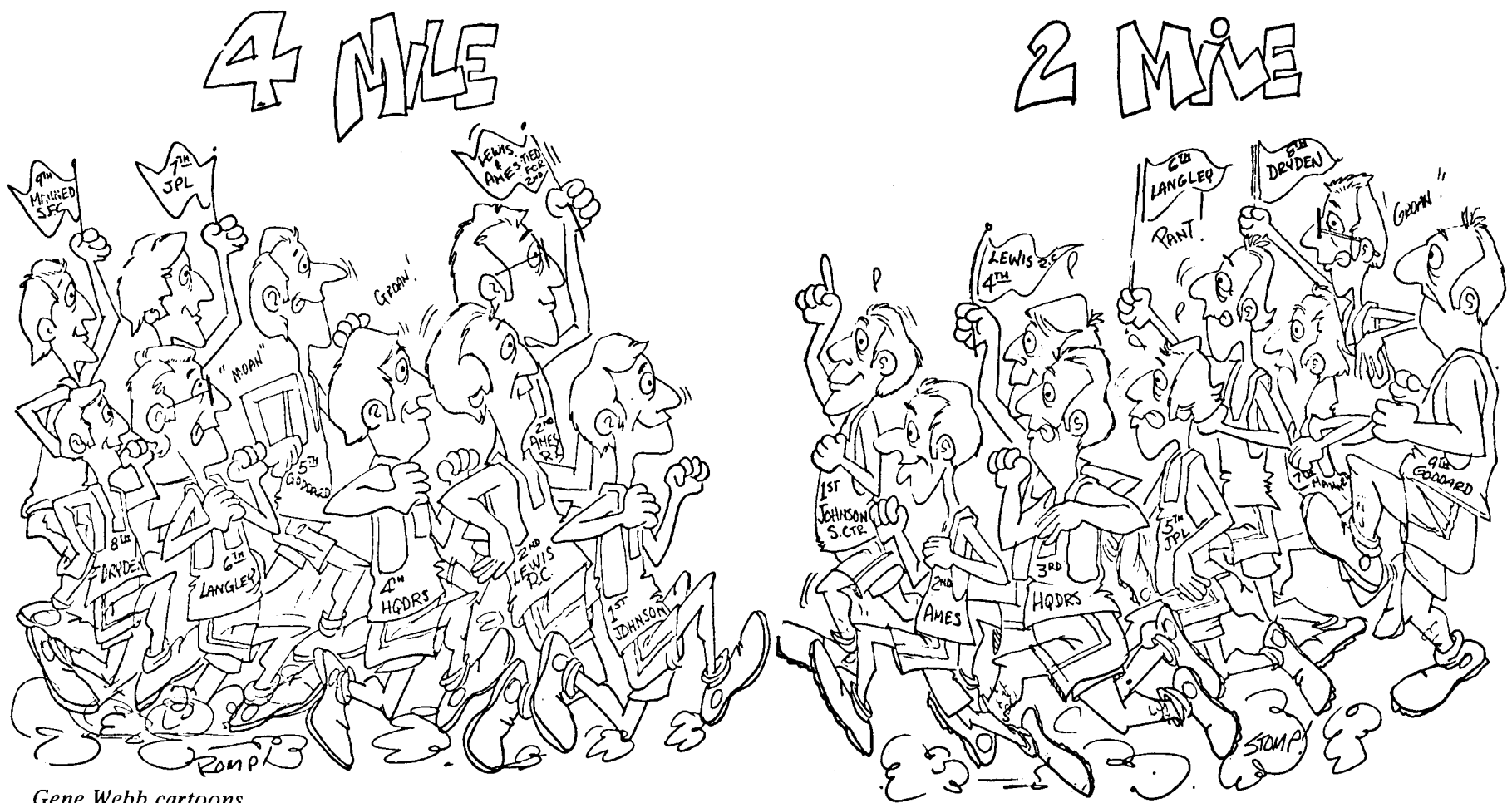
46th Street. Tutors work with a single student, concentrating on basic English or mathematics, but also acting in many ways as a big brother or sister.

Most of the tutors did not have tutoring or teaching experience when they started. Through informal counseling and guidance from the more experienced tutors, they have become comfortable and competent in their tutoring role.

More new tutors are needed for the coming school year. Any employee, retiree or family member interested in becoming a tutor or learning more about the program should contact John Power, PAX 4258; William Gordon, PAX 8086; Walter Love, PAX 8271; or Annie Easley, PAX 2232.

An orientation meeting for all tutors, old and new, will be held tomorrow (September 18), 9 a.m. at Kennard School.





Gene Webb cartoons

Center finishes second in 4-mile, NASA-wide race

In addition to being the leading Center in several significant research areas, Lewis also held its own against eight NASA Centers and Headquarters in a recent NASA-wide jogging competition.

The Center tied for second place with Ames for overall points in the four-mile event and slipped to fourth place in the two-mile event.

Forty-six men and seven women competed for Lewis in the two-mile race while 29 Lewis men and four women challenged and finished the grueling four mile race.

David Rolandelli placed first in his age group in the two-mile event with a running time of nine minutes and 49 seconds. He competed against 43 runners from Lewis and the other Centers.

Bonnie McBride outdistanced all female runners in her category as she finished first in the four-mile race with a running time of 34 minutes and 46 seconds, and second in the two-mile race. Karen Povinelli finished second in her category in the four mile event.

James Modarelli won a first for Lewis in his age category in the two-mile event. John Kring also placed first in his category, finishing ahead of 24 others who competed in the four mile race. Kring's running time was 23 minutes and 50 seconds. Kring also emerged fourth in his age category in the two-mile event.

Points were awarded for the first ten finishers. Other Lewis employees who were awarded points in their respective categories in the two mile race

were Jim Janos, seventh place; Brian Bowles 10th place; Wayne Bartlett, ninth place; Dean Miller, 10th place; Brian Blue, sixth place; and Lonnie Reid, ninth place.

Lewis women finishing in the top ten positions in the two mile race were Karen Povinelli, fourth place and Kathy Povinelli, ninth place. Kathy also finished ninth in the four mile event.

Lewis men finishers in the top ten in their respective category in the four-mile event were Brian Bowles, fifth place; Michael Bowles, sixth place; Wayne Bartlett, sixth place; Dean Miller, ninth place; Randy Thompson, fifth place; Brian Blue, eighth place; Lonnie Reid, fourth place; and Jim Diedrich, eighth place.



Lewis runners who participated in the Skylon International Marathon are (left to right) Lonnie Reid, John Glasgow, Bernard Hamrock, James Diedrich, Jonathan Kring and Robert Stubbs. (Martin Brown photo)

Runners finish marathon race

Six Lewis employees finished the recent grueling Skylon International Marathon race which started in Buffalo, New York and ended at Niagara Falls, covering a distance of 26 miles and 385 yards.

The Lewis runners, among some 2,500 persons who entered the race, were Bernard Hamrock, James Diedrich, Jon Kring, Lonnie Reid, Robert Stubbs and John Glasgow.

Diedrich earned an award

for finishing fourth in his age group. Hamrock's, Diedrich's and Reid's results qualified them to run in the next Boston Marathon—the granddaddy of all marathons.

Youth symposium draws 900 students

Where would Lewis place 900 engineers, scientists and other technical persons if they decided to work here?

If the comments and enthusiasm displayed by that many students at a recent three-day symposium here are any indication, Lewis will have a deep reservoir of talent to select from for many years to come.

The students, mostly minority and female high school age teenagers, were invited here to participate in a unique learning experience aimed at

encouraging them to select engineering and science as a career.

Coordinated by the Lewis Equal Employment Opportunity Office, the students heard comments from Deputy Director Dr. Bernard Lubarsky, astronaut Air Force Major Guion S. Bluford and other Lewis and NASA personnel.

During the symposium, students were involved in hands on types of workshops, a new twist for this type of program which has been held at other NASA Centers and cities throughout the

country.

Panel members explained a wide range of research being conducted at Lewis. The panelists were Dr. Julian M. Earls, Annie Easley, Dr. Phillip Hodge, Frederick Simon, Harrison Allen, Jr., Lonnie Reid and Orlando Gutierrez.

"I was really impressed with the quality of questions asked. They were really in-depth and impressed our panel members," said Harold Ferguson, Chief, EEO Office.



Symposium speakers (left to right) Peter Chen, Harrison Allen, Jr., Annie Easley, Phillip Hodge, Frederick Simon, Lonnie Reid and Orlando Gutierrez.



Deputy Director Dr. Bernard Lubarsky speaks to students.

By
Miles
N.
Miles

Dear Miles,
I have always (since taught to do so in Junior High School) run on the balls of my feet rather than with a heel-first-roll-the-foot motion. I would like to take up jogging and ball-of-the-foot running seems to me the best way to go, much more shock absorbing than heel running especially on hard surfaces.
Please comment on various foot motions and who should use which.
Ball-of-the-Footer

Dear Ball-of-the-Footer,
Relations with the ground should be a natural act performed by consenting feet. Running on your toes is unnatural, except at fast speeds.
A German track expert, Toni Nett, has analyzed slow motion photography of many top runners. Footplant technique was found to be universal despite widely differing running styles. The point of initial contact varies only with speed; long-distance racers naturally land on the heel, middle-distance racers land on the mid-foot and only sprinters race on the ball of the feet. A health-oriented or pleasure-oriented jogging program must last long enough to do some good, not twenty five seconds! You would have to make a conscious effort to run any way other than heel first or flat footed. Toe running is only appropriate for dashes, maneuvering, and catching rental cars in airports.
You're absolutely right to be concerned about the shock effect of the foot hitting the ground. If you do land on the ball of your foot, however, the jolt will be felt abruptly by the tensed muscles of the nonconsenting lower leg and foot. With many repetitions, the trauma to the muscles, tendons, and small foot bones would readily lead to injuries. It's been known for years that toe runners are prone to shin splints. The transmitted shock could also irreversibly damage the spinal column.
Miles N. Miles

RELAY WATCHERS GUIDE
The important maneuver in the sport of relay watching is to be there when it happens. Lewis' 100-Year Relay happens in the West Area starting at 5:30 p.m., Wednesday, June 28. (For safety reasons, the Relay was postponed from June 15.) Most of the action (start, finish and many hand-offs) takes place in front of the Guerin House where the final results will also be posted.
No parking will be permitted near the Guerin House or along the relay route. Park by B-301 or B-302 and hoof it to the start line or the quarter mile handoff points. Course maps are available from the runners.
You needn't be 100 years old to know what's going on. Each team has only four runners to run five laps around the one-mile course. Every runner must run at least a mile and can run only once. Team strategy dictates where they hand off.
Teams all start in the same place, but at different times. The "zero-handicap" reference time is 5:40 p.m. and corresponds to a fictitious team barely 100-years old with no females. For real teams, the first runner takes off ahead of "zero" by the total amount of the team handicap. That's four seconds per year (over 100 years) and 90 seconds per female.
Teams are numbered in order of decreasing handicap. So, except for last minute substitutions, they launch off in numerical order. By "Zero" time, handicaps are used up and teams are scattered along the course. As faster teams make up ground, the numbers passing any spectator shift toward the final standings.
The finish is real. Yes, you may cheer right then and there! If someone beats another by a nose at the finish line, his team earns the place he finished. No computation is needed to determine the final standings.
"Net time" is the significant team time. It's just the time elapsed since zero, and represents the run time minus handicap. Barring technological failure all net times will be posted at the finish area.
Who has the advantage? The old? The young? The men? The women? Answer: None of the above. The well trained have the edge, despite age or gender.
See you and hear you next Wednesday, rooting your runners to glory.

LEWIS

August 18, 1978

Vol. 15 No. 17

Honor roll of retirees

Retirement is a significant milestone in a person's life, and the Lewis News considers a retirement to be major news. Consequently, the News is printing this special Honor Roll of recent retirees, and wishes them continued good fortune and happiness as they embark on new adventures and endeavors.

Facilities Operations and Maintenance Division: Nathan P. Rickmers, Lonnie R. Harris and Carl O. Barr.

Test Installations Division: Andrew J. DeFrank, Roy M. Ayres, Michael J. Kalamas and Gale L. Butler.

Wind Tunnel and Flight Division: Irene Ferman and Kirby W. Hiller.

Applications Division: Howard A. Shumaker.

Procurement Division: John R. Danicic.

Physical Science Division: Warner B. Kaufman and Rayjor W.H. Webeler.

Materials and Structures Division: Robert A. Lad and Judson W. Graab.

Fabrication Division: Robert W. Reich, Edward A. Holmok and John L. Malcolm.

Vehicles Engineering Division: Donald B. Zelten.

Space Propulsion and Power Division: June G. Masek.

Equipment and Supply Division: James L. Storer.

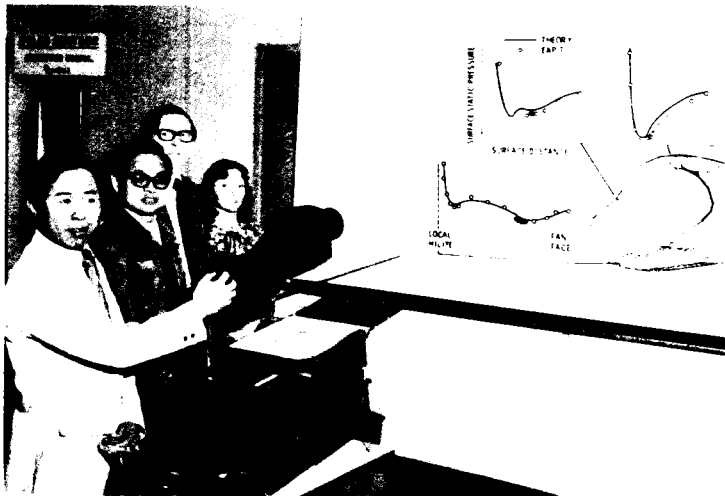
Transportation Division: Donald J. Connolley.

Reliability and Quality Assurance Office: Frank J. Barber.

Research and operations



Albert Johns, Robert Williams, Robert Corban and Paul Burstadt await start of research test in 10 x 10 control room.



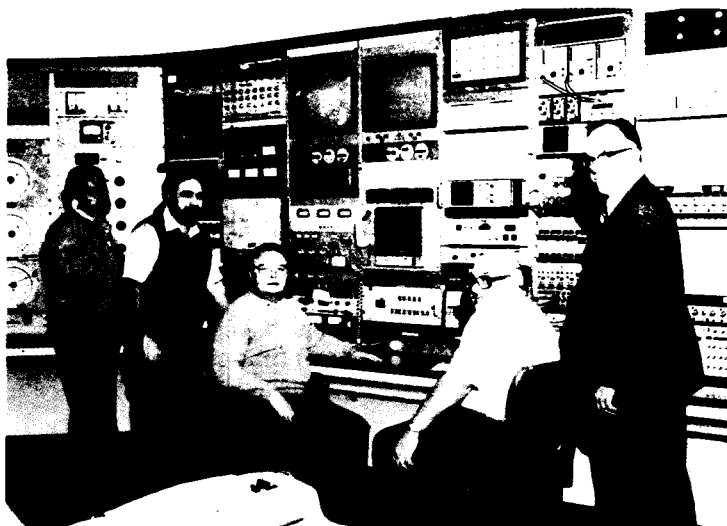
Danny Hwang, Hsiao Kao, Norbert Stockman and Linda Schuller perform aerodynamics analysis work.



Otho Artis, Vance Farrow, Leo Reid, Richard Fulton and Ronald Soe are data room staff in PSL 3 & 4.



Robert Solomon, George Bobula, George Readus, John Carpenter, Donald Nealen, Kent Smith and Leonard Bunyak observe tests in PSL 3 & 4.



David Medwid, Benjamin Dastoli, Richard Burley, Richard Woollett and Harold Zager check 9 x 15 control room prior to tests.



Royce Moore, Michael Pierzga and Reid are members of fan rotor team.

Computer Services



Theodore Fessler, Clarence Pierce and James Rose form nucleus of Computer Programming support group.

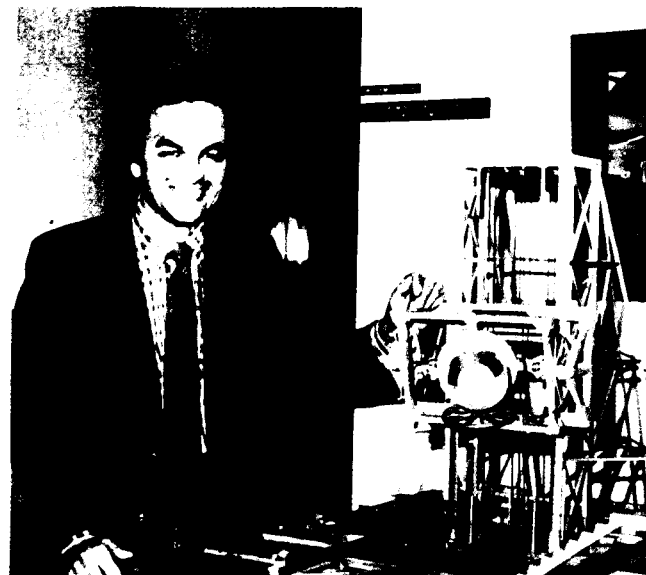


Angela Haferd, Gerald Lenhart, Ellen Nachman and Peter Michaelis process data.

(Continued from page 3)
of the recent successes and progress highlights are:

- *In development work on inlets, Lewis V/STOL researchers have demonstrated high propulsion-system performance at angles of attack of up to 120°, which amounts to tilting the engine and nacelle, or deflecting the exhaust nozzle, until the thrust is perfectly vertical, and then tilting or deflecting an additional 30°. They have also shown that the useful angular range of conventional inlets can be doubled through use of boundary-layer control devices such as leading-edge slots and blowing;
- *Lewis V/STOL engine-system program personnel have demonstrated successful operation of a variable inlet guide vane (VIGV) for thrust modulation and control, on a full-scale TF-34 engine;

Controls Research



James Mihaleow works on motion simulator.



Gary Cole and Anastacio Baez work on propulsion controls.

KEY TO . . .



Facility and Design Engineering



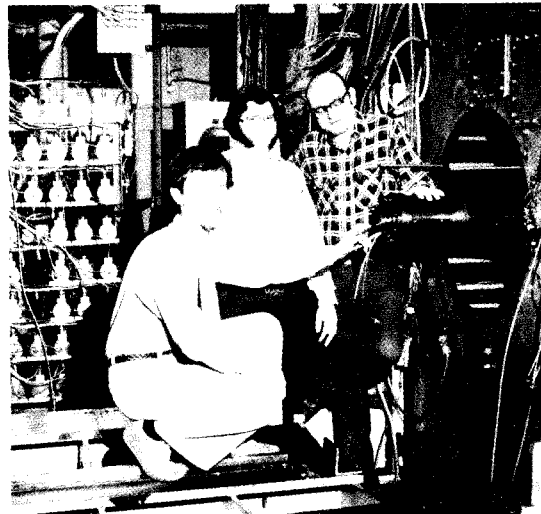
Paul Asmony, Robert Allen, Leland Anderson and George Foerster are part of the engineering design team for test facilities.



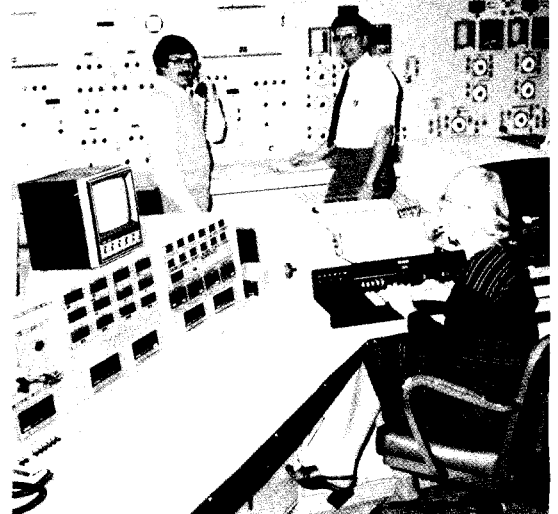
Eliseo DiRusso and Fredrick Yarris are part of the engineering design team for research rigs.



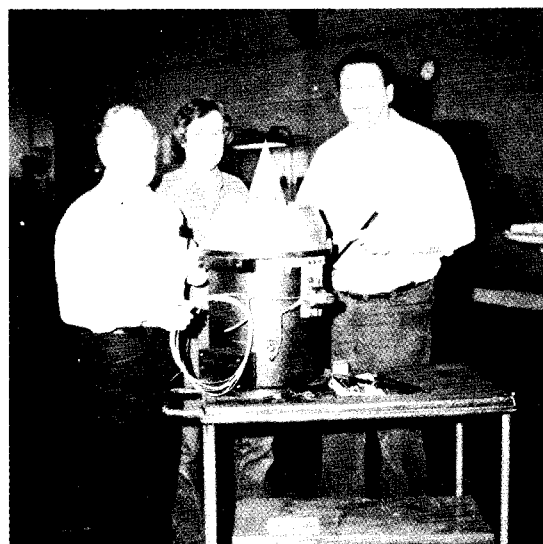
Facility Preparation and Operation



Mark Laessig, Charles Richter and Charles Hnatek discuss fan stage operations.



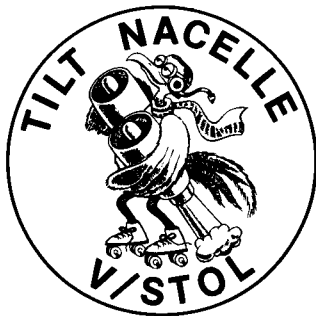
Anthony Reddish, Victor Hudach and Margaret Smith prepare for tests in 10 x 10 Wind Tunnel.



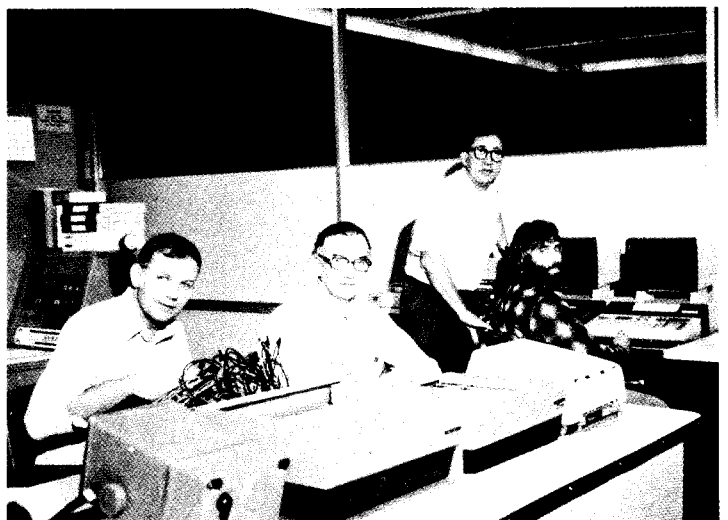
Charles Alderman, Michael Johnston and Mauri Raita prepare thrust deflector for test.



Kenneth Baskin, Anton Ribich, Clifford Naugle and Henry Smith ready static stand for thrust deflector test.



Stanley Krawchuk, William Korhely, Fred Guska and Dennis Thompson make mock-up of model fan in 10 x 10 shop.



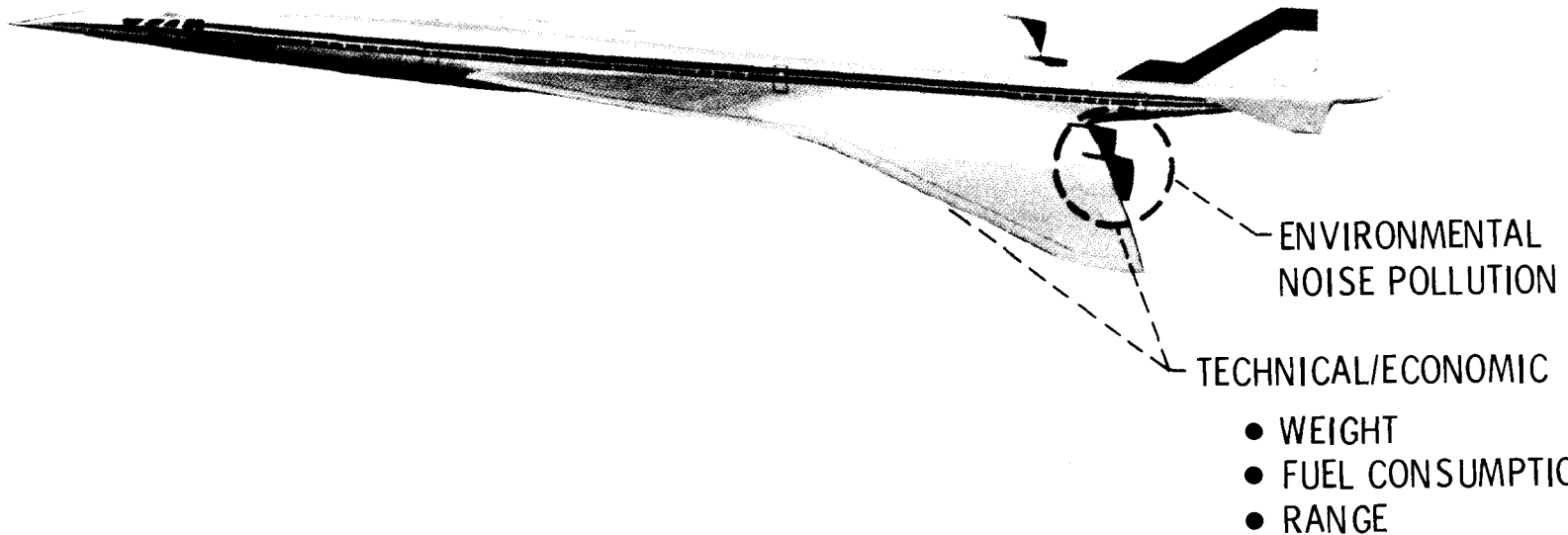
Charles Stauffer, Steve Gonczy, Frank Zelko and Robert Gray provide electronic support to tests in 10 x 10 Wind Tunnel.



THE SUPERSONIC PROPULSION PROGRAM AT LEWIS



SCR/VCE AREAS OF CONCERN



POST SST - Remember "Expo 67" and the mock-up of the U.S. SST in the U.S. pavilion? It was to be the first U.S. commercial supersonic transport capable of flight at almost three times the speed of sound. Four years later in 1971, Congressional support for continuation of the program was withdrawn because of political and economic pressures. What has happened since?

Well, the generic-type research on supersonic cruise aircraft has been continued by NASA, on a low key. The goal has been to maintain a state of technology readiness for the re-introduction of an Advanced Supersonic Transport (AST) vehicle when the need arises.

LEWIS' ROLES - Since 1971, NASA has continued the efforts toward this goal, under the Supersonic Cruise Research (SCR) program. This program is an inter-center effort, with Langley Research Center conducting research in support of the airplane, and Lewis responsible for work related to the propulsion system. Key SCR contact at Lewis is Dick Weber, Head of the Mission Analysis Office.

The other part of the team effort at Lewis is the Variable Cycle Engine (VCE) project, under the leadership of Al Powers, Manager of the Supersonic Propulsion Office (SPO), Engine Systems Division.

The SCR/VCE team effort is being carried out by a number of groups and



Discussing a potential VCE concept are (from left) Charles Zola, James Gauntner, Richard Weber, Laurence Fishbach and Leo Franciscus.



Howard Wesoky (left), Deborah Howley, G. Paul Richter, Leonard Stitt, Albert Powers and Jack Whitlow plan VCE propulsion research. Missing from picture: Donald Bresnahan and Susan Hanslik.

is divided into the following major categories:

- Conducting engine studies and development programs aimed at identifying and demonstrating promising engine concepts for a supersonic cruise aircraft, and identifying the necessary technology advances to make them practical.

- Predicting the noise characteristics of these advanced engines and developing unique systems or components to make them environmentally acceptable.

- Researching ways to reduce fuel consumption and minimize the pollution caused by the engine exhaust.

- Testing unique inlets and exhaust nozzles needed for supersonic engines. Air intake requirements for low speed (thick rounded lips)

conflict with high speed designs where sharp leading edge surfaces are desired.

- Researching advanced high-strength, low-weight composite and titanium materials required for operating at the elevated temperatures of supersonic cruise aircraft. The in-house work in the areas is supplemented by extensive contracting with industry.

Defining the propulsion system for a supersonic cruise airplane is a very challenging task, since the airplane must operate efficiently over an unusually wide range of conditions—takeoff, climb, supersonic cruise, subsonic cruise and hold—with tolerable noise and emissions. The propulsion effort is being carried out by the Mission Analysis Office. Their efforts provide guidance for the (continued on pages 4 & 5)

Supersonic Propulsion Team...



(continued from page 3)

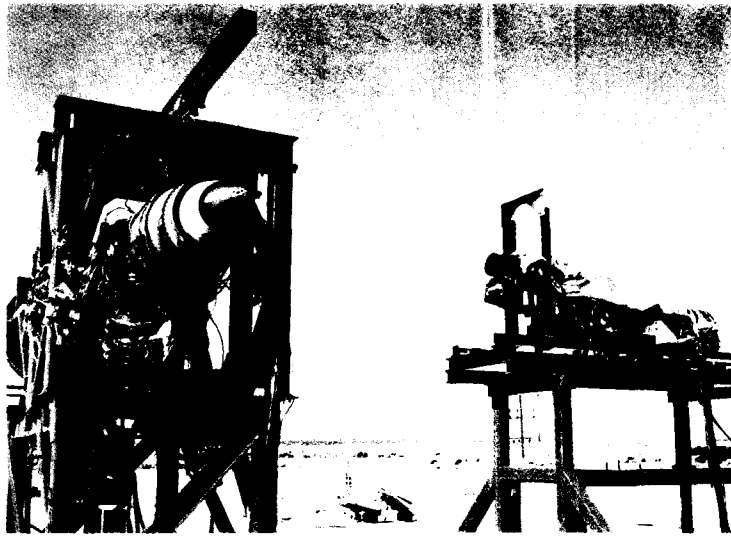
remainder of the SCR/VCE team effort.

As a result of the often conflicting requirements, studies have identified the VCE as a promising approach. The VCE can vary its mode of operation throughout the flight in order to operate most efficiently at each point.

The major effort of the development of (1) promising VCE concepts resulting from these engine studies and (2) the necessary related technology advances is the responsibility of the Supersonic Propulsion Office.

Activity within the office is conducted primarily through contract with major U.S. engine manufacturers, such as General Electric and Pratt & Whitney Aircraft.

The office staff of five engineers is supplemented



Shown is an early General Electric double bypass acoustic test vehicle with laser velocimeter.

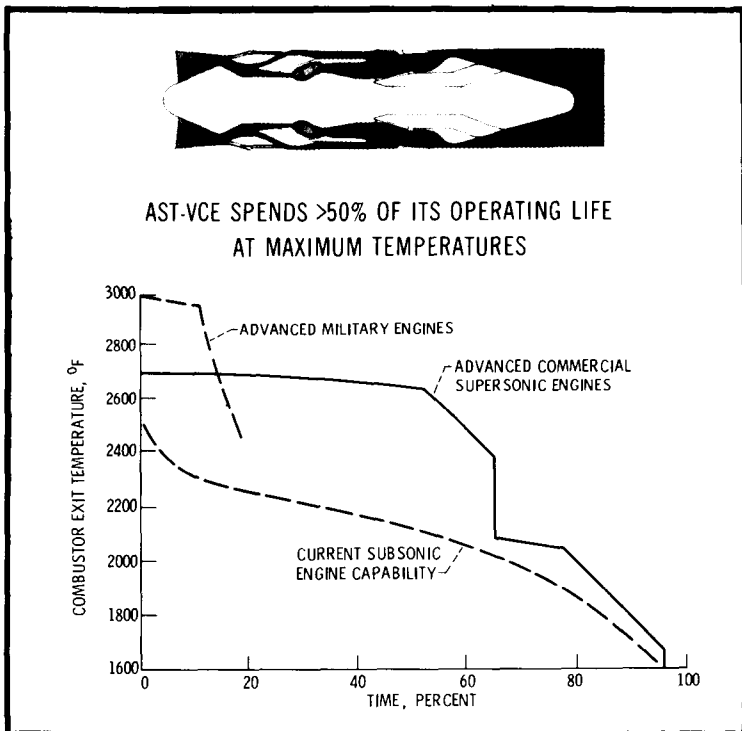
Both P&WA and GE have incorporated into their respective engine concepts advanced features which have significantly improved performance over the past decade.

For example, turbo-fan engine exhausts typically flow with the high velocity

It is expected to produce dramatically lower noise levels at take-off compared with the irritating noise level of the first generation SST. Other concepts, including suppressors, ejectors, and thermal shields are expected to provide additional noise reduction.

To address the area of improved fuel consumption and reduced exhaust pollution, the Combustor Branch of the Aerothermodynamics and Fuels Division is supporting the SCR/VCE team through several combustor-related activities. The branch provides technical management of a major effort at P&WA which covers a duct-burner concept. The concept heats the fan air in the outer annulus to achieve the high velocity desired, and incorporates improvements to increase performance efficiency, while reducing emissions.

The AST propulsion system also faces a unique operating condition due to the air flow conditions entering the engine at supersonic cruise speeds. The "ram" pressure/heat generated by high speed causes temperatures within the engine to be several hundred degrees higher than those in subsonic aircraft engines.



by numerous personnel within Lewis in such areas of expertise as engine aerodynamics, combustion and acoustics, materials, procurement specialties and reliability and quality assurance.

The Fluid Mechanics & Acoustics Division provides a three-branch support to the SCR/VCE Team. The Fan and Compressor Branch provides review and consultation on the aerodynamic design and performance of special fan and compressor components. It also manages the technical aspects of basic technology and design study programs contributing to VCE Technology development.

The Propulsion Systems Acoustics Branch and the Jet Acoustics Branch carry out the complex task of analyzing the potential noise characteristics of the VCE concepts and offer possible methods for reducing them.

gas in the center of the jet with the lower velocity fan flow in the outer annulus. Inverting the high velocity stream to the outer portion of the exhaust has been shown to be significantly beneficial for noise reduction. This concept has been incorporated in the engine designs being considered.



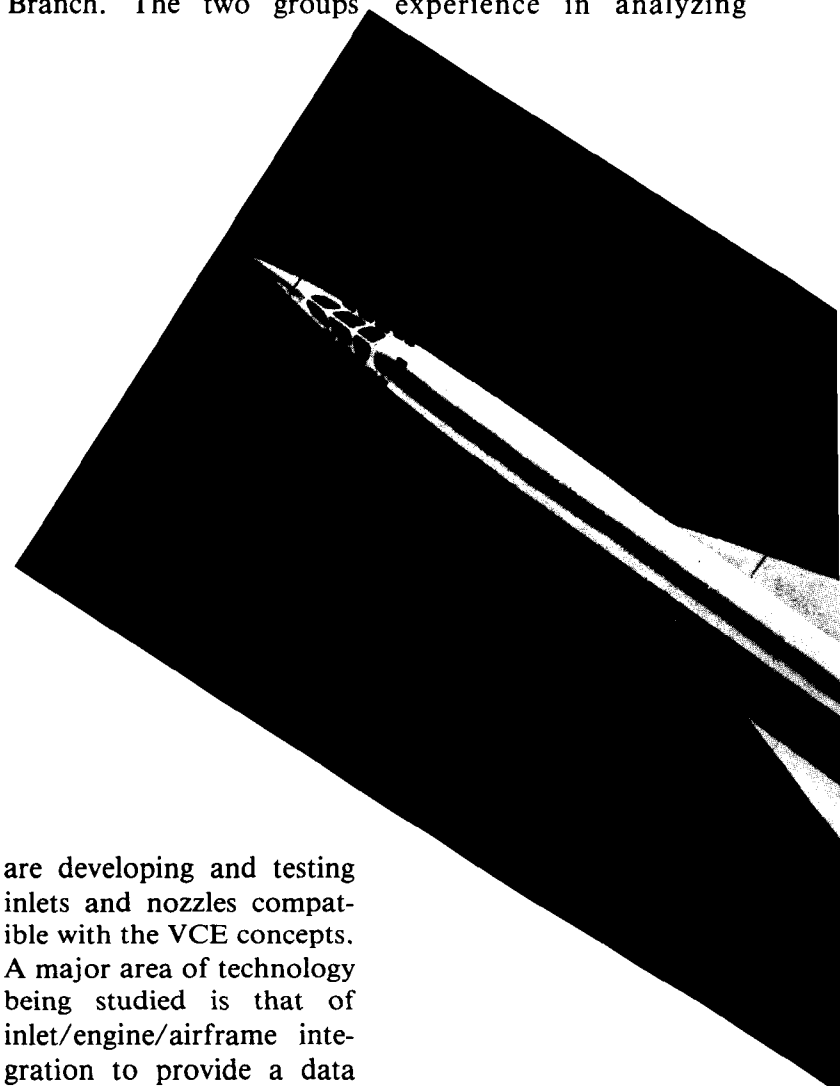
Joseph Herrig (left) and Lonnie Reid review aerodynamic design of core engine driven fan for the General Electric VCE test bed engine.

Thus, the "hot section" (combustors and turbines) for VCE's must be designed to higher operating temperatures.

The Propulsion Systems Division also provides multi-branch support to the SCR/VCE team through the Wind Tunnel Operations Branch and the High Speed Aerodynamics Branch. The two groups

blades. The increased stiffness of these composites should also improve the capability of the blades to withstand bird strike impacts during takeoff and landing operations.

The Reliability and Quality Assurance Office brings to the SCR/VCE team the experience in analyzing



are developing and testing inlets and nozzles compatible with the VCE concepts. A major area of technology being studied is that of inlet/engine/airframe integration to provide a data base for improved supersonic aircraft operations over wide variations in speed.

The Metal Matrix Composites Section of the Materials Division has conducted a program for the SCR effort, emphasizing the improvement of the foreign object damage (FOD) resistance of fan blades.

Composites such as those containing boron fibers in an aluminum metal matrix have resulted in weight savings of 35% (compared with titanium) in prototype fan

prime contractors' efforts in several areas. Program objectives are being achieved through careful selection, checkout, and continued surveillance of suppliers of parts to the prime contractors. New and advanced measuring techniques at the contractors have also added to success in fabricating and testing efforts.

The R&QA personnel, working in concert with the contractors, have achieved significant improvements in SCR/VCE component integrity and costs.



Pratt & Whitney aircraft group VCE F100/test bed mounted in Boardman, Oregon test stand.

10th 100-Year relay race

by Maj. Allen Willoughby

Scores of others have done it. You can too! Tote the baton for your group in Lewis' Tenth 100-year Relay coming up on Thursday, October 7. You've a month to get in shape. Bring your family to run also, or just to cheer and join the 100-Year picnic which follows immediately after. Need relay or picnic forms? Call the Air Force Liaison Office at PAX 2150.

Lewis' Ninth 100-Year Relay, one of the largest and hottest, brought some new and some familiar faces to the victory circle. The Wind Chasers of Fluid Mechanics and Acoustics Division

recaptured the Lewis Division Award after an absence of two relays. Lonnie Reid anchored with a sterling two miles in 11:15! Frank Moore, new to the Wind Chasers, joined Bruce Clark and John Adamczyk for a sharp 6:07 mile of his own. With handicap, Bruce and Frank broke the 4-minute mile barrier!

Lewis' 8th Relay division winners, the Left Behinds of Space Communications Division, earned the remarkable distinction of being the most improved team yet relinquishing their championship. Their improvement was modest but laudable because of the heat and their already fast pace.

Congratulations again to Ed Haugland, Joe Brown, Ed Wintucky and Jack Weigand. All teams who return from a former 100-Year Relay with the same four runners are eligible for Most Improved Team.

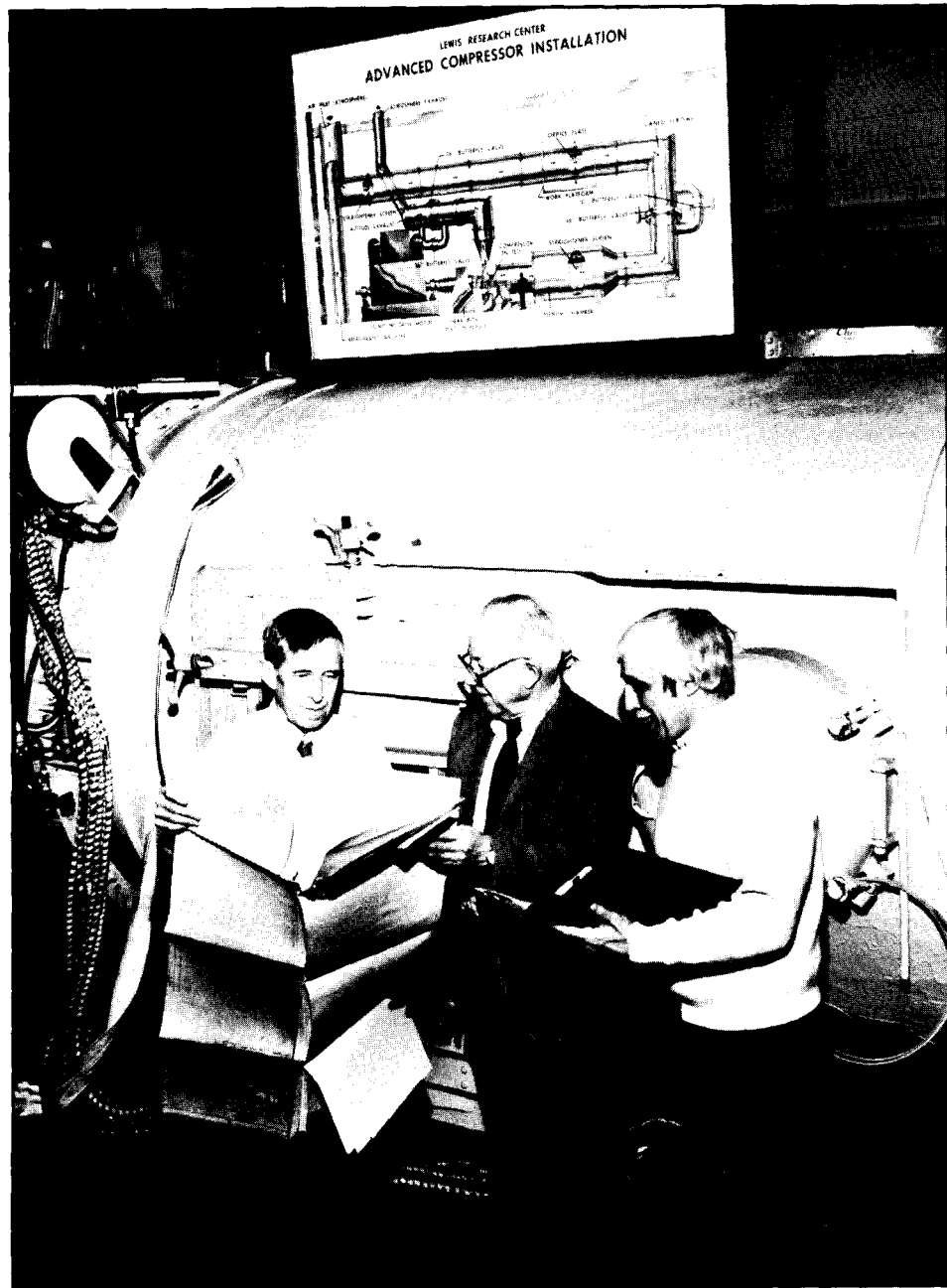
The Lewis Volleyball Club's Net Hangers (Don Costello, Arlette Rosenbaum, Jerry Marquis and Tim Hogan) captured the newest award, the Club trophy. Get your club or social group in gear to make them sweat harder if they wish to repeat as club winners.

Jim Van Vleet of Launch Vehicles, with his wife, Sue, and children John, age 19 and Sue, age 16, won the Family trophy for the second time.

Aircraft Engine Stall Recovery and Prevention Research Program on Track at Lewis

The stalling of a modern jet aircraft engine in flight occurs rarely today. Most stalls that do take place will clear themselves with only a brief loss of engine thrust.

But a small number of engine stalls degenerate into what is known as "nonrecoverable" or "hung" stalls. These occur mostly in military aircraft during evasive maneuvers or when the plane's armament is being fired.



Walter Kreim (left), Jack Wagner (center) and Walter Cunnan discuss hardware installation in W-7 test cell.

In the hung stall, the plane's jet engine settles into an operating mode in which its compressor is rotating slowly, power output is low and internal temperatures begin to climb dangerously high. In this condition, the engine cannot be accelerated out of its stall. Typically, it must be shut down and restarted to return to normal operation.

Lewis Research Center, in cooperation with the U.S. Air Force and outside contractors, has been involved since 1981 in a program to:

1) achieve a thorough understanding of the hung stall phenomenon so as to prevent its occurrence in new engine designs, and

2) determine suitable strategies that will enable engine systems to recover from this condition.

Principal responsibility for the Lewis project rests with various branches under the Aeronautics Directorate with assistance from the Engineering and Technical Services Directorate.

"When our final reports are made in 1986, we expect to be able to recommend design features that could eliminate hung stalls in aircraft engines of the future," said Dr. Fred



Michael Pierzga operates Dynamic Signal Analyzer.

Teren, Chief of the Dynamics and Controls Branch, Aerodynamics and Engine Systems Division.

Much attention focused on nonrecoverable stall in the mid-1970's when it began to occur on the F-15

aircraft, just then becoming operational. The Air Force launched a crash program designed to find a cure for the immediate problem. This was followed by a more comprehensive effort to influence new engine designs.

The Air Force program focused on low-bypass ratio turbofan engines



used in its fighter planes. Lewis was asked to participate in the program by testing a higher bypass engine, the TF-34, designed by General Electric and used in the A-10 attack jet.

Lewis agreed to this request, and, with the concurrence of the Air Force and the aircraft engine industry, expanded the program. Research at Lewis is placing major emphasis on analytical and mathematical modeling, control studies and testing at both the component and full-scale engine levels.

Because the compressor is the key element of an engine system in nonrecoverable stall, its stalled behavior must be known. Compressor design and testing has historically focused on its normal operation. Much effort has been devoted to improving its routine unstalled

detailed information about the modern, multi-stage compressor operating in and out of stall. The experiments, to be conducted in the Engine Research Building, will begin soon.

In-stall testing will require a change in test procedures. Because of the high temperatures and stresses encountered in stall, data must be



Calvin Ball (seated) discusses grant activity with Lonnie Reid.

acquired quickly before damage can occur. To this end, the test rig is being modified for more rapid data acquisition. Faster control valves are being built to limit the time spent in stall. Also, high response sensors and recording systems are being designed to measure the transient stall phenomena.

In conjunction with the Lewis experiments, the Fan and Compressor Branch also has grant programs with Professors E.M. Greitzer of the Massachusetts Institute of Technology and F.K. Moore of Cornell University. Both are working on compressor post-stall concepts and are assisting in formulating Lewis' research directions.

In a related program the high pressure compressor of the NASA/General Electric E-cubed



Fred Newman and Loretta Shaw study compressor hardware.

performance. However, very little information exists in the available literature concerning in-stall performance. That data which exists is for low-speed compressors and may not be applicable to modern high-speed machines.

To achieve the necessary knowledge, the Fan and Compressor Branch has initiated an experimental research program aimed at obtaining



engine will be tested in GE's Lynn, Mass. Compressor Test Facility. This is a high-speed, advanced technology compressor which achieves a 23:1 pressure ratio in only ten stages. It



Pete Batterton (left) and Roy Hager inspect E³ compressor blades.

represents a unique opportunity for evaluation of in-stall behavior of an advanced, high pressure ratio multistage compressor.

The Dynamics and Controls Branch is sponsoring contracts with General Electric and the Pratt & Whitney Division of United Technologies, two major engine manufacturers, to design control strategies that will help an engine system recover from an otherwise nonrecoverable stall. The recovery strategies will be evaluated on the F-100 and TF-34 engines in PSL.

Several related in-house activities

attempting to effect recovery. Tests of this nature provide the basis for an in-depth understanding of the processes involved.

A full understanding of the process is achieved when models can be created which will accurately predict the recovery process. To this end the Engine Research Branch is creating engine dynamic models of both the



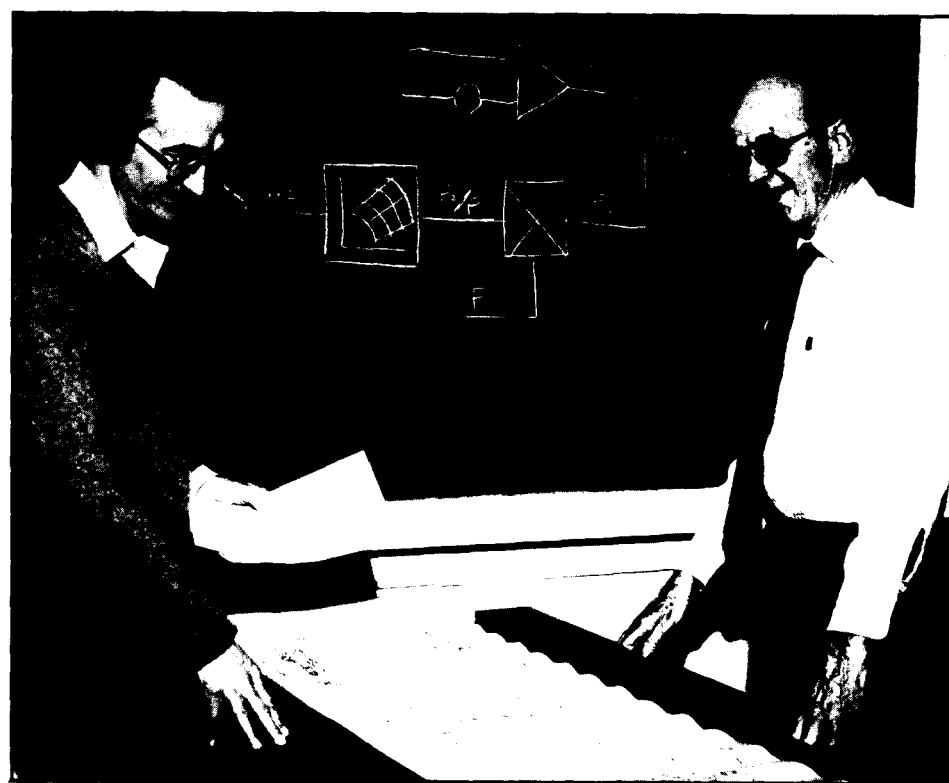
Fred Teren (right) and Leon Wenzel review a contractor's progress.



Sue Krosel and Bill Bruton interpret transient simulation data.

are also being pursued. It is Lewis policy to check out new controls on real-time engine simulations before running them on engines. Models are required which accurately represent individual component and engine system behavior, both in stall and in normal operation. To that end, real-time models are being formulated on the hybrid computer, which is ideally suited to operate in real-time.

The Engine Research branch is conducting full-scale engine tests of the TF-34, a high bypass ratio turbofan engine and the F-100, a low bypass ratio engine in the Propulsion System Laboratory (PSL). In these tests the engines are stalled by a variety of methods at various operating conditions. If the engine does not recover, the stall is repeated changing certain parameters



George Bobula (left) discusses engine simulation details with Clint Hart.

TF-34 and F-100 turbofan engines for the stall recovery phenomena. Knowledge gained from the test program is integrated into these models. The modeling effort makes use of both the hybrid computer facility and the conventional digital computation capability at Lewis.



A second experimental phase with the TR-34 will begin in 1985 to determine additional aspects of the phenomenon and allow further



John Taylor (seated) and Francis Chiamonte utilize hybrid computer to analyze data.



Kevin Melcher (left) and Gerald Saddler operate an engine simulation on the hybrid computer.

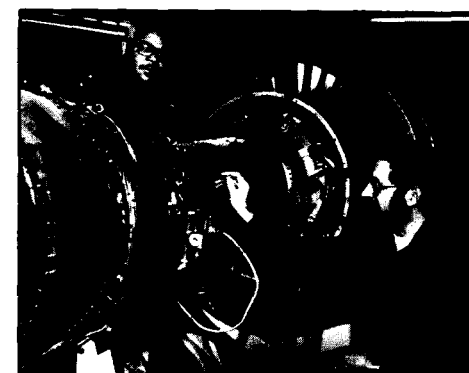
development of the analytical models. Test support will be provided through a contract with General Electric.

The TF-34 engine being tested has been used in several other programs at Lewis. These have included an exhaust gas mixer test, variable inlet guide vane test, and inlet pressure and temperature distortion tests. For the stall recovery testing, several special systems and instrumentation were required to complete the PSL installation. These efforts were carried

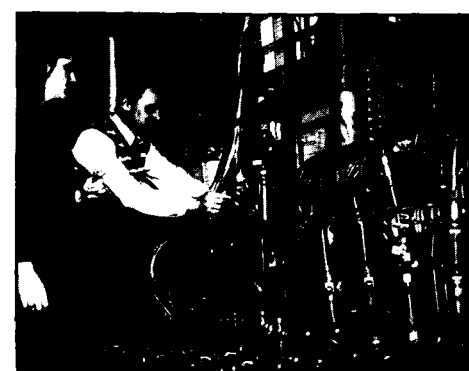


Bruce Block (left) and Kevin Stancik inspect engine instrumentation.

development of engine dynamic models which can reliably predict the stall recovery characteristics of the engine systems. These models are created based on component dynamic models which are established from first principles combined with experimental observation. These are done as coordinated efforts with component specialist groups such as Compressor, Combustor, Turbine and Controls branches. □



Lively Bryant (left) and Bob Solomon examine TF34 compressor.



Maureen Burns and Bob Tacina study combustion rig in ERB.



Ron Soeder (standing), Martin Ginley and John Moss reduce data at computer terminal.



Charles Mehalic (left), Mahmood Abdelwahab and Thomas Kirchgessner discuss engine installation in PSL.



Team runs second in Marine Marathon

Earlier this month, Center employees Lonnie Reid, Julian Earls and John Moss finished second as a team entry in the Marine Corps Marathon in the nation's capital.



In training (l to r) Earls, Reid and Moss run about 60 miles per week.

The running trio completed the 26-mile, 385-yard Olympic distance in times of 2-hours-59 minutes-40 seconds, 2 hours-59 minutes-42 seconds and 3 hours-35 minutes-44 seconds, respectively.

Lonnie's best marathon time is 2 hours-48 minutes. Earl's previous best was 3 hours-2 minutes and Moss' personal record is 3 hours-17 minutes.

Reid and Earls finished in the top five percent (585th and 587th, respectively) of the 12,000 runners representing all 50 states who competed in the Ninth Annual Marine Corps Marathon.

This past April, Lonnie and Julian successfully completed the Boston Marathon. And the trio plan to compete in next spring's Boston



OUTSTANDING ALUMNUS-
Lonnie Reid, head of the Aerodynamic Section, was named Tennessee State University's Outstanding Mechanical Engineering Alumnus of 1985 for his significant contributions to engineering and technology. Reid received the award at the university's Alumni Seminar held recently.

Lewis Newslines

NEW ROLE FOR REID—Announced last month was the selection of **Lonnie Reid** as **Chief** of the **Computational Applications Branch** in the Internal Fluid Mechanics Division. In this capacity, he will be responsible for applied computations for aerospace propulsion systems. Reid, who joined Lewis in 1961, served most recently as Head of the Aerodynamics Section, Altitude Wind Tunnel Project Office, and has specialized in fluid flow and compressor aerodynamics.

Lewis Newsmakers

Reid Named Acting Chief Of Internal Fluid Mechanics Division

Lonnie Reid, former chief of the Turbomachinery Technology Branch of the Propulsion Systems Division, has been named Acting Chief of the Internal Fluid Mechanics Division. He replaces Brent Miller who is now the Director of the Computer Services Division.

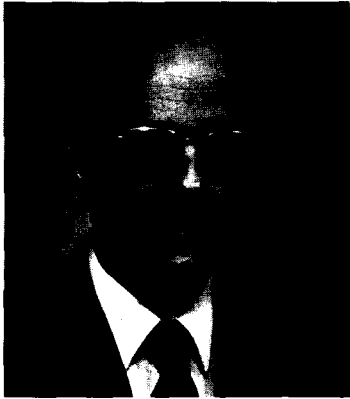
Dr. Louis Povinelli will continue to serve as deputy chief of the Internal Fluid Mechanics Division.



Reid

Lewis Newsmakers

Distinguished Alumnus Title Conferred On Space Propulsion Chief



Dr. Larry Diehl, chief of the Space Propulsion Technology Division, has received the title "Distinguished Alumnus" through a vote by the College of Engineering, Ohio State University. The award is presented annually to alumni of the College of Engineering in recognition of their distinguished achievement and eminent contribution to the advancement of their profession.

The award will be presented to Diehl at an awards luncheon at the end of the month.

Lewis Employees Invited Across the Globe To Teach Courses And Present Speeches

Dr. Marvin Goldstein, head of the Office of Chief Scientist, traveled to the University of Exeter, Exeter, England, April 4-7, to participate as a lecturer at the 31st British Theoretical Mechanics Colloquium. Goldstein spoke about "Nonlinear Evolution of Externally Excited Instability Waves on Free Shear Layers." The BTMC meeting is the largest Applied Mathematics meeting in Britain.

Two people have been invited to lecture at the University of Tennessee. Wayne Thomas, deputy chief of the Aerospace Engineering Branch, will present "An Overview of NASA Lewis," for the short course entitled "Aerospace Ground Test Facilities and Flight Testing," for the university's Space Institute on April 24. The course is offered for the U.S. Air Force. Dr. Robert Dreshfield, of the Advanced Metallics Branch, will participate as a lecturer of an Aeropropulsion short course, to be held at the university on May 15-19.

John Ferrante, a research scientist in the Office of Chief Scientist, has been invited to present the lecture "Interfacial Bonding and the Stability of the STM Tip" at the IBM Europe Institute seminar SXM: Ultramicroscopy, Physics and Chemistry on the Nanometer Scale. The seminar will be held August 14-18 in Zurich, Switzerland.

Two Serve On Board Investigating Langley National Transonic Facility Mishap

Joe Yuska, deputy director for the Engineering Division, served as chairman of the board on the committee investigating Langley's National Transonic Facility mishap. Lonnie Reid, head of the Turbomachinery Technology Branch, also served on the board, which presented its findings to NASA Headquarters on April 10.

money, carry it somewhere other than your wallet. Remember, 90 percent of muggers will not have a weapon.

Ezzo said that rape is not about sex, it's about power, control, and anger. "Sex is the weapon," she said. "It doesn't matter how old you are, how you are dressed, if you are a man or woman. Rape is a human issue — not a woman's issue."

An important defense is not to be too trusting, Ezzo said. "Many times, assailants are people who are well-dressed

who has been victimized to contact the Rape Crisis Center, no matter what crime has been committed against them. "It's never too late to talk about it," she said. "They understand." She also encouraged people to volunteer at the Rape Crisis Center. "It's a great group of people and a rewarding experience," she said.

The presentation was attended by approximately 200 individuals. The program was videotaped and will be available at the Learning Center.

Exceptional Service Medal And Exceptional Engineering Achievement Medal Recipients

"The kind of research and the kind of technology work you do so well here in aeronautics and space will pave the way for our future."

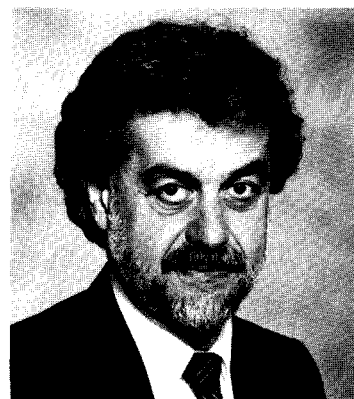
—NASA Administrator Richard Truly



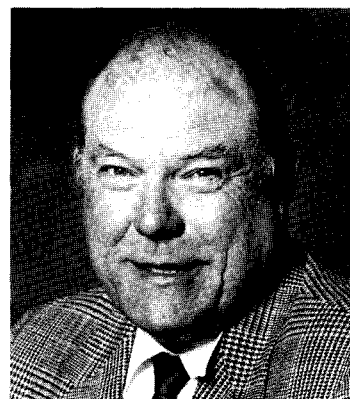
Lawrence E. Macioce
Exceptional Service Medal



James D. McAleese
Exceptional Service Medal



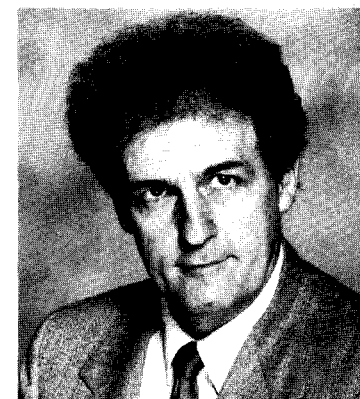
Francis J. Montegani
Exceptional Service Medal



William C. Nieberding
Exceptional Service Medal



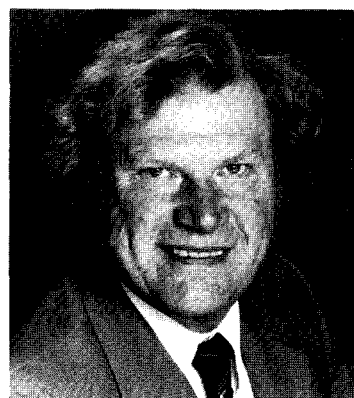
Lonnie Reid
Exceptional Service Medal



Robert G. Rohal
Exceptional Service Medal



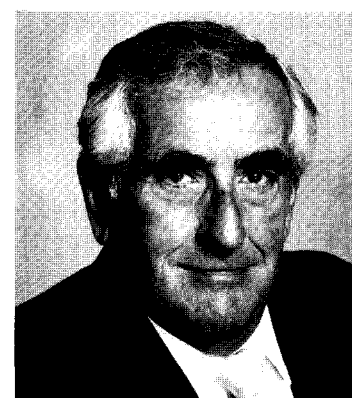
Roger R. Schulte
Exceptional Service Medal



Robert R. Smalley
Exceptional Service Medal



Ronald J. Sovie
Exceptional Service Medal



Carl A. Stearns
Exceptional Service Medal



William C. Strack
Exceptional Service Medal



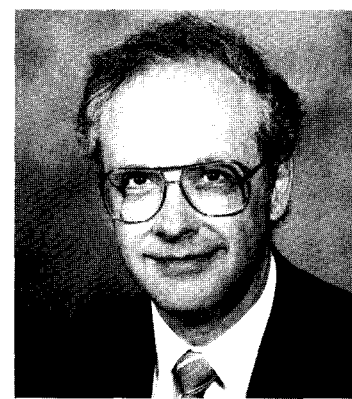
Vernon J. Weyers
Exceptional Service Medal



John J. Adamczyk
Exceptional Engineering
Achievement Medal



John F. Groeneweg
Exceptional Engineering
Achievement Medal



Robert J. Simoneau
Exceptional Engineering
Achievement Medal



Dennis P. Townsend
Exceptional Engineering
Achievement Medal

People

Internal Fluid Mechanics Chief

Named: Dr. Lonnie Reid has been appointed to Senior Executive Service by the NASA Administrator. Dr. Reid will serve as Chief, Internal Fluid Mechanics Division (2600). In this position, he will lead the Center's efforts to advance the state-of-technology in internal computational and experimental fluid mechanics for advanced aerospace propulsion systems.



Dr. Lonnie Reid

International Gas Turbine Institute Award: Arthur Glassman, Christopher Snyder and Gerald Knip, Jr. of the Propulsion Systems Branch were awarded the American Society of Mechanical Engineers Aircraft Engine Committee's 1989 Best Paper Award for their paper "Advanced Core Technology: Key to Subsonic Propulsion Benefits."

AIAA Honors Two and Elects Officers: The Northern Ohio Section of AIAA held a dinner meeting at which Neal Saunders, director of Aeronautics, and Brent Miller, chief of Computer Services Division, were honored with the title of Associate Fellow of AIAA.

Newly elected officers from Lewis are: Greg Smith, Sverdrup, Chairman; Andrew Hsu, Sverdrup, vice chairman. New council members are: Larry Ross, director; Kin Wong, Nozzle Technology Branch; Barbara Esker, Supersonics and Powered Lift Branch; Rene Fernadez, Inlets Technology Branch; Gary Harloff, Sverdrup; Charles Martin, Engine Research Branch; Lee Petrie, Sverdrup; and Margaret Proctor, Space Vehicle Propulsion Branch.

Supervisor's Club Officers: The newly elected officers of the Supervisor's Club are Joyce Bergstrum, president; John Kobak, vice-president; Gary Weegmann, treasurer; and Ed Kostyask, secretary.

Black Managers Forum

Managing Diversity In The Workplace

By Kristin E. Knauer

On Jan. 15, the American Management Association's 4th Annual Black Managers Forum commenced once again to celebrate the birthday of Dr. Martin Luther King, Jr. and to educate Lewis employees on the aspects of managing diversity and valuing workplace differences.

During the videoconference, a panel of experts in the field of human resources addressed the need for organizations to implement training programs that focus on topics such as race and gender differences, cross cultural communications, and a myriad of sensitivity training interventions. After the video presentation, a panel of Lewis managers assembled to give a more pertinent perspective on managing diversity in the workplace.

According to the *Workforce 2000 Report*, a study commissioned by the Department of Labor and conducted by the Hudson Institute, over the next eight years the American work force and the economy will be shaped by three demographic

trends: a shrinking labor force; increase in women, people of color, and immigrants in the labor force; and workers who are less trained and educated.

iversity, Inc. and member of the videoconference panel, even organizations with favorable Equal Employment Opportunity (EEO) and Affirmative Action

diversity. "EEO/AA are government mandated answers to social injustice," explained Harrison, "while managing diversity enables an organization

Harrison said that in order for an organization to successfully manage diversity it must migrate from a mono to a multicultural work environment so that cultural differences can be celebrated. This migration is aided by a training and development process which begins at the executive level but must be carried throughout the organization.

The panelists agree, however, that it is not easy to break the barriers that have evolved throughout the years. "There are walls which separate a mono and multicultural workplace," said Harrison. Some of these walls consist of biases about race and gender, jealousy, trust, political orientations, religious affiliations, cultural standards, competition, fear, value orientation, and hidden agendas. There is a misperception that a multicultural environment is physically dominated by women and people of color, said panelists. In truth, a multicultural environment has structure, systems, philosophies, strategies, and normative behaviors that meet quality and work needs of all employees.

Dr. Dallas Crable, lead consultant of Dallas Crable Associates, a human relations



Photo by Quentin Scwhinn

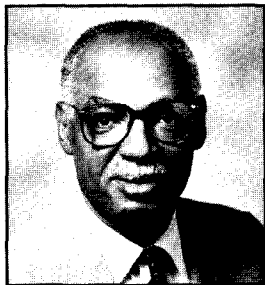
The panelists that represented Lewis in the discussion included: (from left to right) Dallas R. Crable, lead consultant of DCA Inc., a human relations development association.; Linda Dukes-Campbell, chief of the Office of Community and Media Relations; Dr. Lonnie Reid, chief of the Internal Fluid Mechanics Division; and Joe Wasdovich, manager of the Employee Assistance Program (EASE).

According to Ben Harrison, president of the Masters of Di-

(AA) track records need to address the need for managing di-

to competitively manage the quality of work life for all employees, not just some." Managing diversity is driven by demographic changes and by an organization's need to remain

Dr. Reid inducted into Hall of Fame



Dr. Lonnie Reid

On Sunday, Feb. 7, 1993, Dr. Lonnie Reid, chief of the Internal Fluid Mechanics Division, was inducted into the Ohio Science, Technology, and Industry Hall of Fame.

For the third consecutive year, COSI, Ohio's Center of Science and Industry, sponsored this prestigious Hall of Fame in recognition of the contributions of 20th century Ohioans, who, in making significant discoveries, have added to the understanding, advancement, and applica-

tion of science and technology.

Dr. Reid, who came to Lewis 32 years ago after graduating from Tennessee State University with a degree in mechanical engineering, is well known for his research on internal fluid mechanics for jet engines. Additionally, he has personally led and contributed to the integration of theoretical and experimental approaches to fluid dynamics.

"I consider myself very fortunate to be selected for such an honor," said Dr. Reid. "I think this award is a testimony to the kind of people that I have been fortunate to work with here at Lewis, as opposed to my individual achievements. I want to personally thank all of the Lewis family for their support and cooperation over the years and I thank senior management for nominating me for this award. The induction ceremony was a wonderful experience for me and my family, one that we will always cherish."

Dr. Reid proudly joins COSI's elite corps of scientists and industrialists which includes Thomas A. Edison, Orville and Wilbur Wright, and Charles F. Kettering. ●

Retirements



Behrendt



Boitel



Gibb



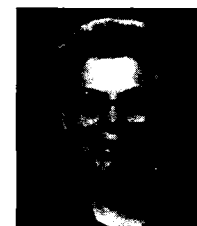
Green



Kanney



Kaszubinski



Lipker



Nichols



Nolder



Penczak



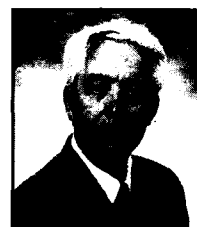
Reid



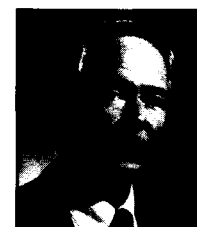
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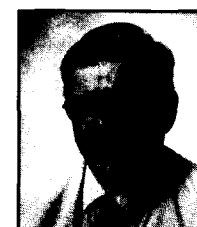
Saunders



Seidel



Sellers



Simonis

Donald Behrendt, physicist, Materials Division, retired on Jan. 3, 1994, with 36 years of NASA service.

Earl Boitel, supervisory aerospace technologist, Facilities Engineering Division, retired on Oct. 22, 1993, with 25 years of NASA service.

John Gibb, manager, Launch Vehicle Project Office, retired on Jan. 3, 1994, with 38 years of NASA service.

John Green, visual information specialist, Technical Information Services Division, retired on Jan. 3, 1994, with 26 years of NASA service.

Robert Kanney, general supply specialist, Aeropropulsion Facilities & Experiments Division, retired on Sept. 3, 1993, with 33 years of NASA service.

Leonard Kaszubinski, chief, Structural Systems Division, retired on Jan. 3, 1994, with 30 years of NASA service.

Bertha (Grace) Lipker, Duplicating Plant

foreman, Technical Information Services Division, retired on Jan. 3, 1994, with 23 years of NASA service.

Lester Nichols, chief, Interdisciplinary Technology Office, retired on Jan. 31, 1994, with 35 years of NASA service.

Mary Ellen Nolder, division secretary, Logistics Management Division, retired on Jan. 3, 1994, with 30 years of NASA service.

Linda Penczak, employee relations assistant, Human Resources Management Division, retired on Oct. 31, 1993, with 27 years of NASA service.

Lonnie Reid, chief, Internal Fluid Mechanics Division, retired on Oct. 30, 1993, with 32 years of NASA service.

Carl Rouge, physical science technician, Materials Division, retired on Jan. 3, 1994, with 27 years of NASA service.

Neal Saunders, director, Aeronautics Directorate, retired on Jan. 3, 1994, with



Singer



Snyder



Texler

34 years of NASA service. (see *Lewis News*, March 12, 1993)

Robert Seidel, electrical engineer, Electrical Systems Division, retired on Nov. 3, 1993, with 28 years of NASA service.

James Sellers, deputy chief, Electrical Systems Division, retired on Sept. 17, 1993, with 26 years of NASA service.

Helmut Simonis, production controller, Fabrication Support Division, retired on Jan. 3, 1994, with 32 years of NASA

service.

Joseph Singer, electrical engineer, Power Technology Division, retired on Jan. 3, 1994, with 33 years of NASA service.

Gerald Snyder, supervisory program analyst, Resources Analysis & Management Office, retired on Dec. 3, 1993, with 33 years of NASA service.

Richard Texler, division chief, Technical Information Services Division, retired on Jan. 3, 1994, with 32 years of NASA service.

Entrepreneurial spirit stimulated at Glenn

BY S. JENISE VERIS

Three small business owners—two Glenn employees and a retiree—who have successfully started their own high tech companies using Glenn technologies offered insight and anecdotes on the process in "Entrepreneurial Revelations." The October 24 gathering kicked off a series of five weekly lunchtime seminars designed to achieve a more entrepreneurial-oriented culture at Glenn.

A few "revelations" commonly shared about navigating business start-up included some tips: Determine your net (cash flow) needs before making any decisions about your employment status. A work order or project can't be counted until you have a signed contract or purchase agreement. Be willing to market your business. Hire someone to do your payroll. Understand the difference between form vs. function because it is the key to knowing when to focus on what for the survival of your business.

The presenters included Dr. Arnon Chait, a part-time materials research engineer in the Microgravity Environment and Telescience Branch and cofounder and president of ANALIZA, Inc., a biotechnology company dedicated to development

of drug discovery and biotech technologies; Dr. Lonnie Reid, former chief of the Internal Fluid Mechanics Division and now founder and president of AP Solutions, Inc., a computational analysis engineering research support group for gas turbine engine technology; and Matt Moran, a mechanical engineer currently on leave without pay from the Thermo-Mechanical Systems Branch to jump-start his new business, Isotherm Technologies, dedicated to the development of cryogenic systems for high-powered lasers, fuel cells, and "super-insulation" applications.

Four subsequent seminars in November dealt with questions including the following: Do I have an innovative idea? How do I protect my idea? How do I get funding? How do I best utilize NASA's technology transfer resources?

Glenn and Enterprise Development, Inc. (EDI), a not-for-profit subsidiary of Case Western Reserve University, hosted the



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Photo by Marvin Smith

Left to right, are Entrepreneurial Revelations panelists Dr. Arnon Chait, Dr. Lonnie Reid, and Matt Moran.

seminars for Glenn employees to encourage a more entrepreneurial approach to the commercialization of NASA technologies. EDI operates the Lewis Incubator for Technology (LIFT), which is co-funded by Glenn and the Ohio Department of Development. Additional support for LIFT is provided by the Great Lakes Industrial Technology Center.

"By holding this series of programs for our employees, we are trying to excite our employees into thinking about commercial applications for the technologies they are developing," said Center Director Donald Campbell. "As a result, we anticipate an increased number of NASA technologies that are successfully utilized in the marketplace, leading to an improved quality of life."

National Aeronautics and
Space Administration

John H. Glenn Research Center
Lewis Field

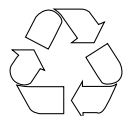
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AeroSpace Frontiers
is recyclable!



Retiree Spotlight

Reid stays in stride with NASA

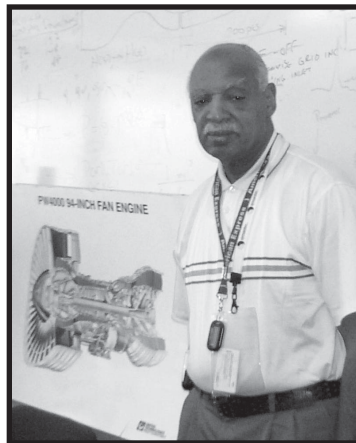
BY S. JENISE VERIS

While he no longer competes in marathons, Glenn retiree Dr. Lonnie Reid maintains a steady pace of intellectual stimulation by running his own company, AP Solutions, Inc. (APSI).

Reid, an expert in compressor design, retired as Internal Fluid Mechanics Division chief in 1993 with 32 years of NASA service. He then returned to Glenn as a contractor for nearly five years before discovering a niche that inspired APSI.

Continued on page 7

Reid in his office at Glenn.



Reid utilizes NASA technology

Continued from page 4

Reid founded APSI in March 1998 to provide technical expertise in modifying computational fluid dynamic codes developed by Glenn and to apply these codes to help commercial organizations improve products and/or reduce the time to market for new product. Reid fine-tuned processes and defined market share while a tenant of the Lewis Incubator for Technology's satellite facility for software, electronics and communications technology between 1999 and 2003.

"Under a Space Act Agreement with Glenn, we became an authorized user of the executable version—not the source—of the APNASA code, which is used by commercial aircraft engine manufacturers for design and analysis of multistage turbomachinery components," explained Reid. "If, in the process of using the code for a customer, we discover an advancement of benefit to others, NASA assumes the right to incorporate it in the source code. This transfer of NASA technology aids our nation's ability to compete globally, and provides a broader and stronger advocacy for NASA technology development as well as business opportunities for AP Solutions."

Reid and his staff of engineers have supported major aeronautics programs such as the Ultra Efficient Engine Technology, General Aviation and the Joint Strike Fighter fan design.

When Reid is ready to retire, again, he may return to teach at Cuyahoga Community College, or participate in tutorial programs to help prepare the next generation of engineers and scientists. ♦