

LewisNews

ber 19, 1986

NASA Task Force Begins Space Station Review

Associate Administrator for the Office of Space Station Andrew J. Stofan recently formed two teams to review Space Station design and work package assignments and functions.

A Space Station Configuration Critical Evaluation Task Force, headed by W. Ray Hook, Manager, Space Station Office at Langley, is conducting a technical review of Space Station architecture and systems. An Executive Technical Committee, headed by Stofan, is overseeing the task force's work and assessing the impact of any design modifications on individual NASA center and contractor roles.

Approximately 55 people are serving on the task force. Several hundred more are taking part in the technical evaluation, including: NASA personnel from the work package centers and from outside the program; Phase B contractors; and representatives from user groups and the international partners.

The task force is critically examining all aspects of the current Space Station baseline configuration including: the amount of extravehicular activity required for assembly and maintenance of the station; launch capacity of the shuttle fleet when again operational; assembly sequence of the baseline configuration; any resultant impact to the use of the station; potential impact on international partners and overall technical performance and integrity of the station.

Within the task force, a set of task groups has been established to develop systems designs and configuration options.

Representing Lewis on the task force are: Tom LaCroix (Space

Station Project Analysis Office) who is serving on the Cost Estimate Task Group; John Dunning (Power System Integration Office) who is serving on the Configuration/System Task Group; and Gerald Barna (Chief, Advanced Programs and Planning Office) who is serving on the Safety Assessment Task Group.

The 15-member Executive Technical Committee headed by Stofan includes: deputy directors from JPL and Langley; project managers from the work package centers; and representatives from engineering organizations at the five prime Space Station centers, the flight crew office, and the user community. This committee

will examine work package assignments from the standpoint of changes required by the design alterations.

Lewis is represented on the Executive Technical Committee by Ronald Thomas (Director, Space Station Systems Directorate) and Steven Szabo (Chief, Space Transportation Engineering Division).

Results of the overall evaluation will be factored into the requests for proposals to be released to industry in the fiscal year beginning Oct. 1, 1986. Selection of contractors to design, build and test Space Station hardware is scheduled to take place in 1987. □

Midwest Space Development Conference Planned Oct. 17-19

"Educating People about Space" is the theme of the second annual Midwest Space Development Conference set for Oct. 17-19 at the Holiday Inn in Strongsville.

The conference is being organized by a 23-member committee representing various local groups with a common interest in space. According to conference coordinator Jim Wood, the goals of the conference are to educate people about space and promote space development. Last year's conference attracted 125 participants from states throughout the Midwest and East. The committee hopes to double that figure this year.

The conference features a variety of sessions on Saturday and Sunday led by speakers from Lewis, Wright State University, National Commission on Space,

Ohio State, Space Studies Institute, High Frontier, Rocketdyne, Case Western Reserve, and TRW. In addition, Conference attendees can register for a "Spacefest" on Friday evening and tours to Baldwin-Wallace Astronomical Observatory, and Lewis' Teachers' Resource Room.

Speakers from Lewis include Acting Director Dr. John Klineberg, who will be the featured luncheon speaker on Saturday, Dr. R. Lynn Bondurant, chief of the Educational Services Office, and Shirley La Croix of the Office of Space Commercialization.

For more information, contact Midwest Space Development Conference, 2720 W. 40th St., Lorain, OH 44053. Phone: (216) 282-6329. □

Space Station Task Force Recommends Design Modifications

The Critical Evaluation Task Force has completed its evaluation of the Space Station baseline configuration and has recommended design modifications and changes in work package distribution to NASA Administrator James Fletcher. The recommendations were discussed by Fletcher and Associate Administrator for the Office of Space Station Andrew Stofan at a Sept. 25 press conference.

The Space Station design now being considered incorporates "resource nodes"—expanded versions of the pressurized interconnects linking the laboratory and habitat modules. Originally planned as passageways, these enlarged nodes would provide up to 4000 cubic feet of work space so that command and control functions that were originally to be outside could be maintained in a shirtsleeve environment. Command and control functions in the laboratory and habitat modules would also be accommodated in the resource nodes, leaving more room for lab equipment and life systems.

The design presented to the Administrator also incorporates an initial power level of 37.5 kilowatts, a relocated servicing facility (for satellite repair), room for early payloads, and a relocatable Space Station remote manipulator arm provided by Canada that will ultimately be augmented to become a mobile servicing center.

The design features a significantly revised assembly sequence

which calls for up to three remote manipulator arms, including the Shuttle's, to cut extravehicular activity (EVA) required for assembly almost in half. EVA maintenance hours would be cut 30 percent, since equipment that was going to be located on the booms and truss structure will be moved into the resource nodes. The servicing center for satellite repair and facility maintenance would be brought closer to the modules for easier access and shorter EVA.

According to Stofan, 17 Shuttle missions are required for assembly, with permanently manned status after eight. He said it would be about a year after the first Space Station Shuttle flight in 1993 before the station would be permanently manned. A total of 31 flights over four years would be required to complete assembly and logistics including the polar and co-orbiting platform launches.

The initial cost analysis of the design modifications shows a possible cost of as much as \$200 million.

While Fletcher indicated a positive overall reaction to the modified design, he has asked for more complete data on the cost impacts of the modifications and further analysis of the management plan for systems integration within the overall Space Station program. Fletcher also requested Stofan to further explore the potential for using expendable launch vehicles, particularly during Space Station launch and

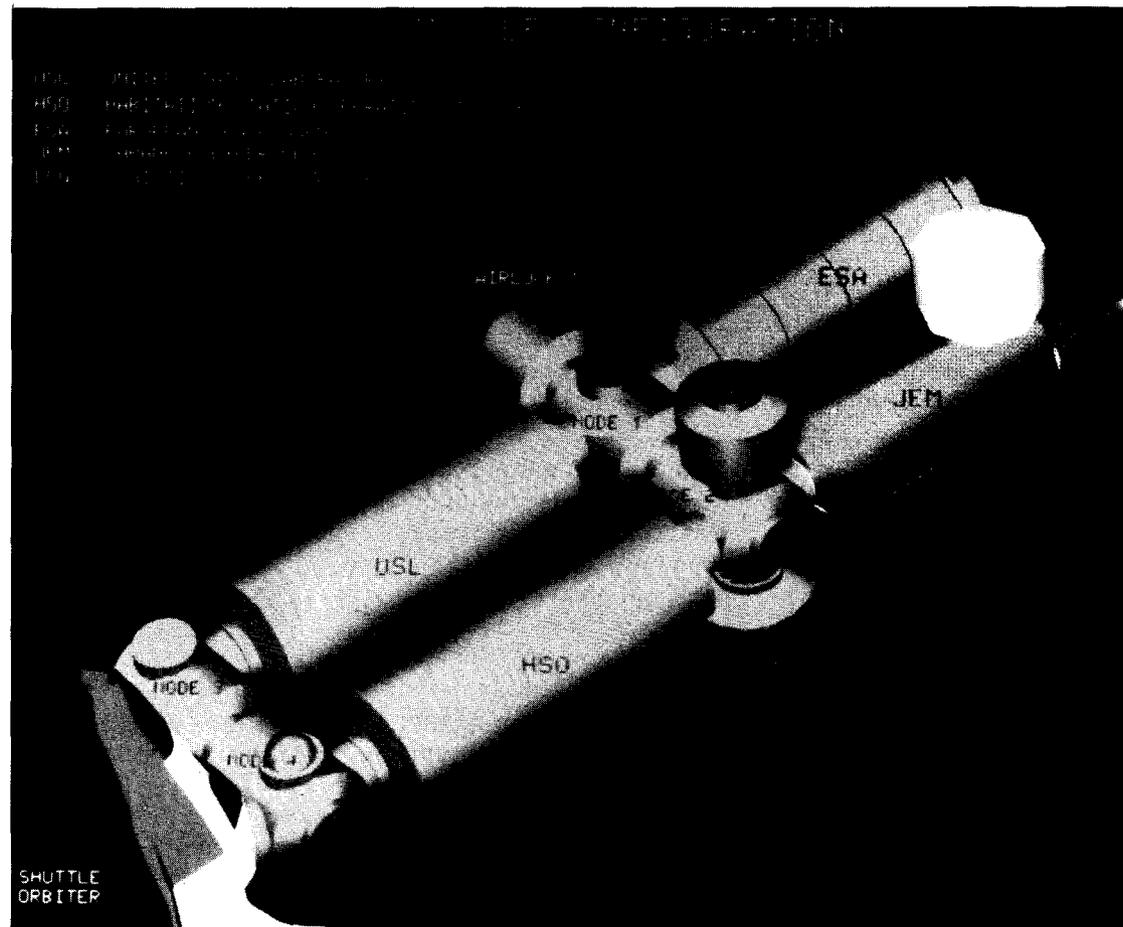
assembly.

In addition to design changes, the Critical Evaluation Task Force proposed modifications to the work package assignments. Under the new arrangement, responsibility for the laboratory module, habitation module, logistics module, and the resource node structure would be assigned to Marshall Space Flight Center. The external truss,

distributed subsystems, EVA systems, airlock and resource node outfitting would be assigned to the Johnson Space Center. Responsibility for Space Station platforms, attached payload accommodations, the robotic servicer, and NASA's role in servicing would be assigned to the Goddard Space Flight Center. Lewis will retain responsibility for the power system.

Fletcher said the proposed work package alignments envision stability in personnel at both Centers.

NASA plans to issue preliminary requests for proposals from contractors in November, with the first manufacturing expected to begin next summer.



The Space Station design now being considered incorporates four enlarged "resource nodes" (shown in bottom left and center) which would provide up to 4000 cubic feet of work space. This change would enable command and control functions originally planned outside to be maintained in a shirtsleeve environment. The resource nodes would also accommodate command and control functions for the laboratory and habitat modules, leaving more room for lab equipment and life systems.

Space Station Systems Directorate



Ronald L. Thomas
Director



Thomas H. Cochran
Deputy Director

This is our third "Year In Review" article for Space Station and 1986 has proven to be as interesting and exciting as the previous two years. Our Phase B definition studies will end this month, and our major power system advanced development efforts are producing good results.

Several major decisions were made in FY86 that directly affect Lewis:

1) The change control board accepted Lewis' recommendation to baseline a hybrid power system that uses both photovoltaic arrays with Nickel Hydrogen batteries and solar dynamic with thermal storage;

2) The Space Station change control board accepted the Lewis-recommended 20 kHz for the power distribution system;

3) Agreement was reached in the work package distribution and Lewis was assigned the end-to-end power system, including power generation, storage, distribution, and control; and

4) The Space Station change control board baselined hydrogen oxygen propulsion and resistojets—both of which were strongly advocated by Lewis.

The Space Station Directorate went through a major reorganization near the end of FY86. When the Space Station Directorate was first formed, we had planned to reorganize for the Phase C/D development phase as we neared the end of the Phase B definition phase. This reorganization was accomplished with inputs from all the managers at an all-day organization retreat and several subsequent meetings. After the new organization was approved by the Center Director, a process enabled all Space Station staff members to help determine where they would work in the new organization. This process worked quite well; over 90 percent of the staff were placed in the organization position they preferred.

Also during 1986, Andy Stofan accepted the job of leading the Space Station effort as the Associate Administrator for Space Station in Washington. We were sad to see him leave Lewis, but have enjoyed working closely with him in his new Space Station role. Stofan successfully guided the Space Station Program through a very difficult review period with Congress. Many of our staff spent a month or more at Langley supporting this major Space Station review and assessment.

At present, a major effort is being expended in writing the Space Station Phase C/D development phase RFP's (request for proposals) for each of the four work packages. Draft RFP's have already been sent to industry and it is now planned to release the Space Station final RFP's in early 1987. It is planned to have industry under contract before the end of FY87 to begin the Space Station development phase.

It is interesting to reflect on the many changes that occurred last year. I believe it was a good year and that these changes will result in even better things for Lewis. Lewis' success to date in the Space Station arena is due in large measure to the dedication and hard work put forth by many of our Lewis staff.

Project Control Office

The Project Control Office (PCO) is the reorganized Division Office formerly known as the Planning and Management Information Office of the Advanced Programs and Planning Office. In 1986, the PCO provided management support for the Space Station Systems Directorate. It played a key role in developing technical plans for budget and operating plan submissions. Scheduling activities were provided for the Space Station Electrical Power System. With reorganization, the Office gained responsibility for configuration management, contract administration, and data administration.

The PCO actively supported the reactivation of the Space Power

Facility (SPF) at Plum Brook for solar dynamic power module testing. The PCO contributed to the development of program advocacy and to the preparation of budget documents for the FY89 CoF Project.

The Lewis Space Station Control Board reviewed approximately 200 proposed changes this year for impact on the Space Station power and resistojets propulsion work done at Lewis.

The Documentation and Distribution Library provided on-line searching and signing-out of approximately 900 Space Station documents. A key operator for copying services was added to support the needs of the Directorate.

Lewis served as pilot center and designed the structure for the NASA Documentation Storage System (NDSS)—a central electronic storage for all Space Station documents.

TMIS (Technical and Management Information System) is an integrated system of technical management processes, automated data processing, hardware and software, communications, procedures, and people providing management and engineering support, communications, administrative support, and a management information system to the Space Station Project. Approximately 100 personal computers were purchased to implement this system at Lewis this year. Lewis designed and implemented a 56Kb high-speed TMIS network which connects the four NASA Work Package Centers and Litton. Lewis also provided the documentation for the TMIS RFP—to be awarded next year.

Systems Engineering And Integration Division

The Systems Engineering and Integration (SE&I) Division is responsible for providing overall systems engineering, analysis trade studies, and systems integration for the electric power system. This includes: 1) systems engineering and analysis to support Level A; 2) coordination of the power system architecture control documents, Interface Control documents, and Baseline Configuration Documents with Level A and the other work packages; 3) Integration activities with the internationals; 4) support of engineering cost studies; and 5) integration of software activities. The SE&I Division was formed during the recent Space Station Directorate reorganization from the Power Systems Integration Office and Power Systems Engineering Branch.

The Power System Integration Office (PSIO) managed the integration of the electric power system with the overall Space Station Program. In this role, it was the prime interface and coordinator with other Space Station Level C Centers (MSFC, JSC, GSFC), supporting centers such as LaRC and KSC, and with the Level B overall program management office located at JSC. As with the previous year, this past year was one of intense activity for this Office.

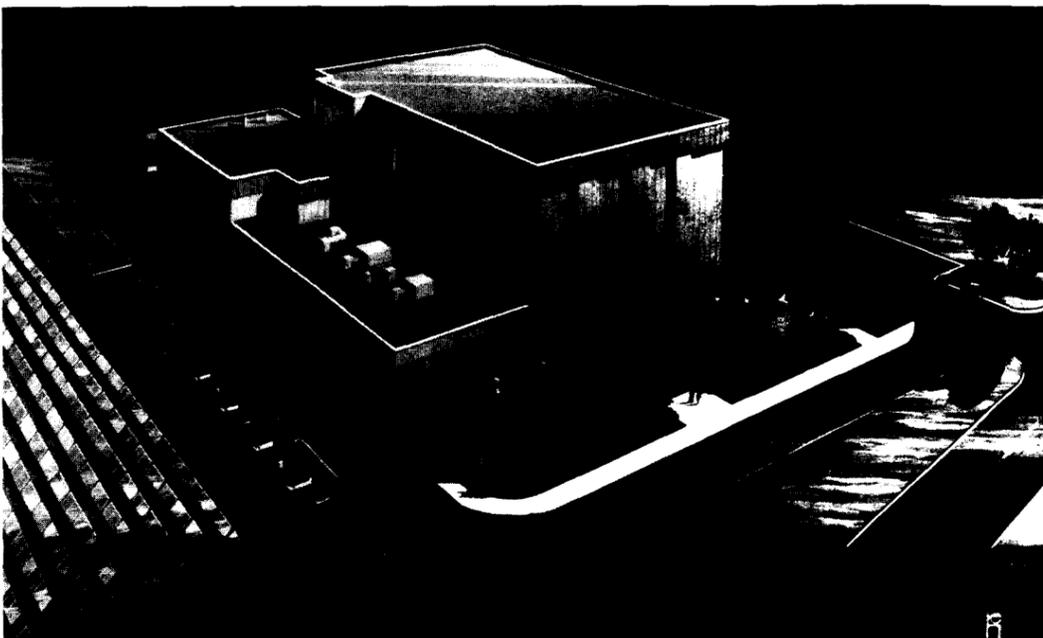
Members of the Office served on all major Space Station technical panels and working groups and represented Lewis at Level B on a continuing on-site basis. The PSIO worked with the other centers in preparing the Engineering Master Schedule for the ongoing Space Station Phase B activity. The PSIO coordinated the preparation and dissemination of power system data to other centers as required by the Engineering Master Schedule. Valuable technical information exchange meetings were conducted between Lewis and other NASA centers to assure proper integration of the power system with the other Space Station systems and elements. PSIO worked with other centers and Level B in revising, updating, and baselining the Space Station Program requirement documents. Substantial effort was devoted to the development, negotiation, integration, and baselining of the Architectural Control, Baseline Configuration, and Interface Control documents for the Space Station.

The Systems Engineering Branch participated in all activities relating to the overall analysis and assessment of the Space Station Power System. These activities included the analyses and trade studies leading to the selection of a hybrid power system (photovoltaic/solar dynamic) for the station, including preparation of presentations to the Level B control board to defend the selections. The Branch played the major role in developing the life cycle analysis which supported selection of the hybrid power system. Efforts of the branch also included the preparation/organization of development/hardware costs and life cycle costs in support of various meetings and reviews. Members of the branch participated in Phase B contractor reviews and monitored/assessed systems studies performed by the contractor.

Photovoltaic Power Module Division

The newly formed Photovoltaic (PV) Power Module Division is now preparing for Phase C/D of the Space Station Program. The PV Module Division is responsible for the two PV modules that will provide 37.5 kW of electric power, the initial increment in the buildup of the Space Station power system. (The solar dynamic modules will be added later to complete the initial operating configuration of 87.5 kW.) PV arrays and batteries will also be provided to WP-03, GSFC, to integrate into their polar and co-orbiting platforms, which are also part of the overall Space Station Program.

The PV modules will be launched on the first two of the series



Construction of the new Power Systems Facility (PSF) is scheduled to begin this spring, with full operation targeted for the fall of 1989. The 28,000 sq. ft. facility, adjacent to the existing solar arrays in the West Area, will be used to test the Space Station electrical power distribution system, using prototype hardware and simulators.

Stofan, Aldrich, Nelson To Address 24th Space Congress April 21-24

“Space—The Challenge And The Commitment” is the theme of the 24th Space Congress scheduled for April 21-24 in Cocoa Beach, FL. The program will feature three key leaders in America’s space program.

The conference will open with a keynote address by Congressman Bill Nelson of Florida’s 11th District. As Chairman of the House Subcommittee on Space Science and Applications, he will play a vital role in the evolution of this country’s space policy. Nelson flew as a payload specialist on Mission 61-C, the

last Shuttle flight before the Challenger accident. Arnold Aldrich, Director of the National Space Transportation System, will lead a panel discussion on the Shuttle’s return to flight.

Andrew Stofan, Associate Administrator for Space Station, will discuss the current status and development schedule for the Space Station.

Other topics covered will include: European technology development; free-world expendable launch vehicles; Space Station technologies; Space Station servicing; DOD space projects;

second generation STS/launch vehicle technology; contracts and management; computers; space commercialization; and technology spinoffs.

The Congress is sponsored by the Canaveral Council of Technical Societies, a group composed of Cape Canaveral affiliates of 26 national, technical, and professional societies and an advisory group.

For more information write: Twenty-Fourth Space Congress, P.O. Box 1333, Cocoa Beach, FL 32931. Phone: (305) 867-6444.

New Logo Ideas Sought For Space Station

At the request of Associate Administrator Andrew Stofan, the Office of Space Station is seeking ideas for a new logo for the Space Station. Employees at all the Centers are invited to contribute.

The new logo should be bold and simple enough to be used on a variety of printed materials and items such as lapel pins, decals, and cloth patches. Too elaborate a design may not lend itself to some of those purposes.

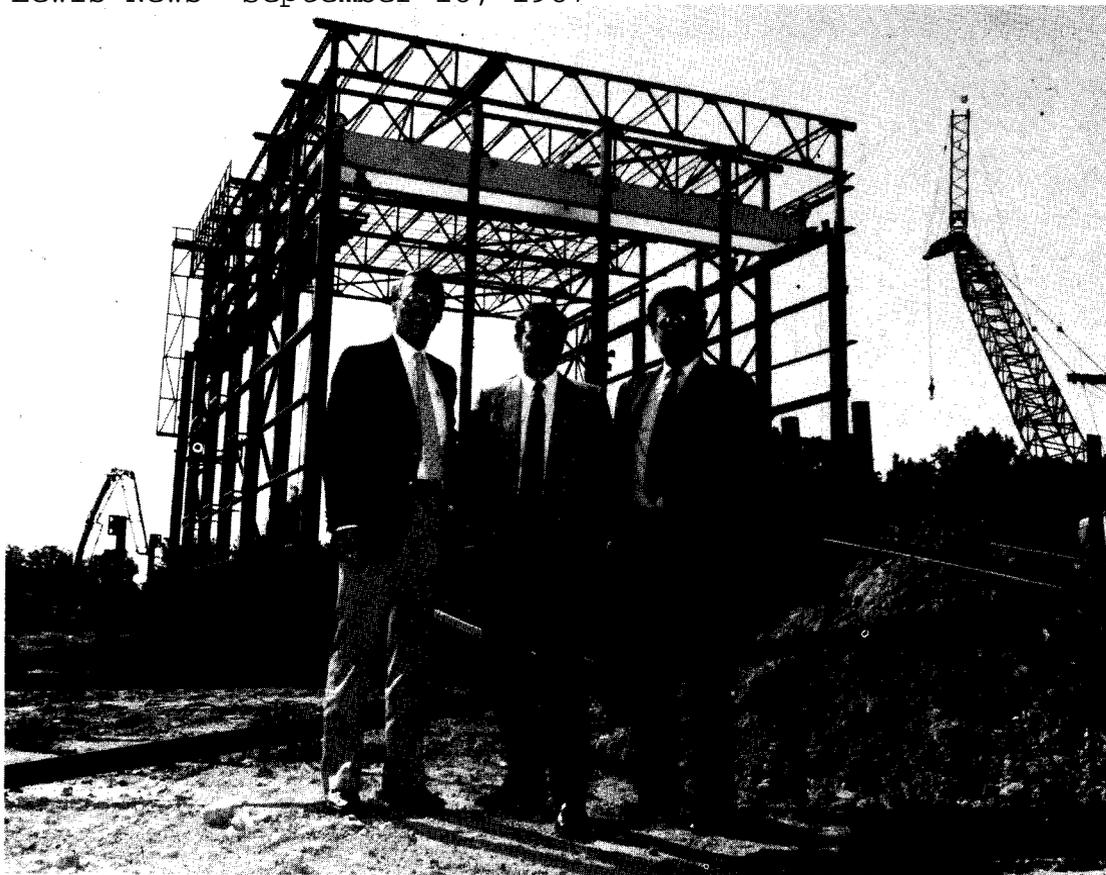
The logo will represent a project that will evolve and grow over several decades. Faddish designs, or those that are

configuration-specific, could be out of date quickly.

If you have a Space Station logo idea, please send it to Sandra Crowley, MS 500-115 by Aug. 12. Logos should be submitted on 8-½" x 11" paper and include no more than four colors. Attach a brief paragraph describing the symbolism and meaning of your concept.

The two best logo designs will be sent to Graphics for final artwork. Designs from all the Centers will be presented to the Space Station Management Council in late August or early September.

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STOFAN VISITS POWER SYSTEMS FACILITY CONSTRUCTION SITE: While in town for the Cleveland National Air Show, former Center Director Andrew Stofan, (center) currently Associate Administrator for Space Station, visited the site of the future Power Systems Facility. Lewis' first major new building since 1980 will be used to develop and test the power system for the Space Station. Accompanying him on the site visit were Center Director Dr. John Klineberg (right) and Ron Thomas, director, Space Stations Systems.

Stofan, Oakar, Klineberg Emphasize Importance Of Space Station To Lewis

In a message broadcast to Lewis employees immediately after the Dec. 1 press conference at Goddard, Associate Administrator for Space Station Andrew Stofan and Ohio Congresswoman Mary Rose Oakar emphasized how important Lewis' role in the Space Station program is to our nation, to Ohio, to Cleveland, and to the Center's future. Center Director Dr. John Klineberg stressed the importance of the Space Station assignment during interviews with representatives of Cleveland-area media.

Long-Term Benefits

"It's extraordinarily prestigious for our region that Lewis Research Center was chosen to be the electrical power lead for the Space Station," said Oakar. "It also ensures that Lewis won't have to feel threatened in the manner it has been in the past."

Stofan said the Space Station assignment "carves out a long-term role for the Center" and establishes Lewis as the world's leader in space power generation. This expertise will be vital as NASA moves beyond the

Space Station and requires advanced power systems for other missions.

Stofan, who served as Center Director at Lewis from 1982 to 1986, recalled that Lewis' involvement in the program was the direct result of a strategic decision made by senior staff in 1982 to seek a key role in NASA's next major project. Winning the assignment to develop the Space Station power system was very important, Stofan said, because it assured the Center of participation in a program that extends over 20 to 30 years.

Involvement In Manned Spaceflight

Dr. Klineberg pointed out other benefits: "For the first time in Lewis' history, we are an integral part of manned spaceflight." He told reporters that in addition to creating new jobs, the Center's role in this high-profile national project will enhance Cleveland's image as a center of high technology.

Stofan said that with the announcement of the four work package contractors, all of the Space Station contractors have

now been selected: "We're off and running."

Oakar pointed out that Congress has already invested in the Space Station program by approving funding for it in NASA's FY 87 budget. She expects Congressional support to continue, and thanked fellow Ohio Congressman Louis Stokes for his hard work and efforts on the House Subcommittee on HUD and Independent Agencies which reviews NASA's budget.

An Outstanding Job

"I send my very best to all of my good friends at Lewis," Stofan said. He added that the Center employees working on the Space Station "have done an outstanding job so far."

Oakar also praised the employees here: "I am very proud of the good work that the people at Lewis do." She called Lewis' Space Station work "a real bonanza for our area."

In an interview carried live on Channel 3 news, Dr. Klineberg pointed out that when the Space Station powers up for the first time, "The world will really know we're here."

NASA Heading For 'A Banner Year'

Despite the "gloom and doom" messages coming from Washington and the press, NASA's prospects for the future are very bright. That was the point emphasized by NASA Administrator Dr. James Fletcher during a special ALERT Colloquium, Fri., Feb. 12.

"We're heading for a banner year," said Dr. Fletcher. Critics who say NASA and the civil space program are "drifting into oblivion" are wrong, he said, noting that public support has never been stronger. President Reagan has reaffirmed this support by issuing a comprehensive new national space policy designed to clarify the roles of different government agencies and the private sector and to guide the United States' activities in space well into the future.

A Major New Thrust

The policy clearly establishes that, for the first time, the United States has a long-range goal of expanding human presence and activity beyond Earth orbit into the solar system.

"This is a goal of enormous significance, with potentially historic future implications," said Dr. Fletcher. The new policy also creates opportunities for U.S. commerce in space and continues the United States' commitment to a permanently manned Space Station.

In addition to the new national space policy, Dr. Fletcher noted that significant progress is being made in returning the Shuttle to flight, developing the Space Station, designing an Advanced Launch System to provide low-cost heavy-lift capabilities, and establishing a mixed fleet comprised of unmanned launch vehicles (ULV's) and the Shuttle.

Dr. Fletcher pointed out that although the new space policy calls for private sector responsibility for ULV's, the privatiza-

tion of launch services will free up more NASA employees for R&D, which is what the Agency does best.

Other NASA and joint programs that are moving ahead steadily include the National Aerospace Plane Program, the Civil Space Technology Initiative, production of the replacement orbiter, and the development of an advanced solid rocket motor for the Shuttle.

"Morale at NASA Centers is upbeat," said Dr. Fletcher. Although each Center is proud of its work and pulls together as a team, this teamwork is not coming at the expense of NASA as a whole: "The Center Directors are working together better than they ever have before."

Lewis Role

As NASA lays out its plans for the years ahead, said Dr. Fletcher, "It's nice to know that Lewis will be playing a major role."

Lewis is already helping NASA obtain unmanned launch vehicle services from the private sector and is responsible for the second largest work package of the Space Station.

Dr. Fletcher said the Center's increasing involvement in programs such as the Space Station represents an enormous challenge to Lewis while maintaining its current levels of R&D activities.

Lewis will play a major role in the Pathfinder program to develop the technology needed to expand human presence beyond Earth orbit.

Dr. Fletcher doesn't expect this element of the national space policy to change significantly when a new President is inaugurated next January. Having worked for four Presidents, Dr. Fletcher has observed that policies get changed only gradually and only if there is broad public support for such changes.

But setting up a policy—no matter how visionary or bold it is—won't make its goals a reality, stressed Dr. Fletcher. Translating the goals of the national space policy into reality will require broad public support and a sustained national commitment of will and resources.

"The same dedication that took Americans to the moon will continue to take our spacecraft to worlds beyond," said Dr. Fletcher. "Let all of us at the NASA family continue to demonstrate to the American people that we can build on our achievements and move into the next century with a bold program designed to lead, not to lag. In meeting that challenge, I am confident that the men and women of Lewis will do their part as they always have."

Responding To Questions

Following the Colloquium, Dr. Fletcher answered questions from the audience, and later from reporters.

Asked about Andrew Stofan's upcoming retirement from his post as Associate Administrator for Space Station, Dr. Fletcher noted that Lewis' former Center Director originally agreed to serve as Associate Administrator for only a short time.

"I wish he could have stayed for a couple of more years, but he did fulfill his commitment to me," said Dr. Fletcher. "And, Lewis did get a very good Center Director in his place."

Dr. Fletcher admitted that it can be frustrating dealing with others in various segments of Government who have different ideas of how the Space Station should be designed.

"Political pressure isn't always bad," commented Congresswoman Mary Rose Oaker, who attended the Colloquium. She said politics helped keep Lewis from being closed and helped Lewis get the lead for the



During an ALERT Colloquium Feb. 12, NASA Administrator Dr. James Fletcher urged all members of the NASA family, "to continue to demonstrate to the American people that we can build on our achievements and move into the next century with a bold program designed to lead, not to lag. I am confident that the men and women of Lewis will do their part as they always have."

Space Station power system development.

Dr. Fletcher also answered questions about the Industrial Space Facility and how it might positively affect the Space Station, the mixed fleet concept, and

the prospects for dramatic increases in NASA's budget in the future.

More details on the President's new national space policy will be published in the next Lewis News.

Stofan To Retire April 1

Associate Administrator for Space Station and former Lewis Center Director Andrew Stofan will retire from NASA on April 1. Since being appointed Associate Administrator June 30, 1986, Stofan directed the Space Station program through a difficult period.

"The Space Station has made a tremendous amount of progress in the last year-and-a-half, and I give Andy and his team a lot of the credit for getting this program through some very tough times," said NASA Administrator Dr. James Fletcher. "Andy has had a brilliant career with NASA and we are sorry to see him retire. NASA and this country owe Andy a debt of gratitude for his years of dedicated work to the nation's civil space program, and we wish him the best."

While Stofan was the associate administrator, the Space Station Office was reorganized to include the establishment of the Space Station Program Office in Reston, VA. And, eight major contracts were awarded, including those for the design and development of the Space Station, for technical and engineering support to the Program Office, for the software support environment, for the technical and management information system, and for the preliminary definition and design of the flight telerobotic servicer.

Stofan also directed the program through a major cost

review, which culminated in an Administration-approved plan to develop the Space Station in two phases, and through a major technical and cost review by a committee of the National Research Council, which validated the baseline configuration for the Space Station. Significant progress in technical and programmatic agreements between NASA and the international partners for the development, use, and operations phase of the Space Station program also was made during this time.

Stofan's NASA career began when he was hired as a research engineer at Lewis in 1958. From 1966 to 1978, Stofan managed a variety of technical projects at Lewis. During that time, he served as manager of the Titan/Centaur Project Office and director of launch vehicles.

In 1978, Stofan was appointed deputy associate administrator for the Office of Space Science at Headquarters and held the title of acting associate administrator for that office from 1980 until 1982 when he was named Lewis' Center Director.

Stofan has received numerous awards, including the Exceptional Service and Distinguished Service Medals, the Presidential Rank of Meritorious Executive, and the Presidential Rank Award to Distinguished Executives.

Highlights of the ALERT Colloquium featuring Andrew Stofan will be published in the March 4 issue.

Weyers Named Director, Space Flight Systems

Vernon J. Weyers has been named the new director of the Space Flight Systems Directorate. He succeeds Larry Ross who was appointed the Center's Deputy Director last September.

In his new position, Weyers is responsible for managing NASA's large and intermediate class expendable launch vehicles, the Advanced Communications Technology Satellite (ACTS), COLDSAT (a cryogenic propellant management technology satellite), and microgravity science and space experiment projects. Weyers' responsibilities also include analysis, support, and planning activities for advanced space systems.

Prior to his new assignment, Weyers was chief of the Systems Engineering and Integration Division for the Space Station



Systems Directorate. He also directed the daily activities of the Station program and support contractor Cleveland field office and served as the primary interface for the Lewis Space Station office with all NASA Space Station program offices, prime and support contractors, and international participants.

During his 25 years at Lewis, Weyers has served as manager of

the Shuttle/Centaur Project Office and project manager of a joint project with the Bureau of Reclamation for design, development, test, and operation of two large wind turbines near Medicine Bow, WY.

Originally from Freedom, WI, Weyers earned his bachelor of science degree in electrical engineering at the University of Wisconsin and his master's degree in electrical engineering from the University of Toledo.

Weyers shared an aerospace award to the NASA/Industry Centaur Team, and group achievement awards for his work on the Apollo, HEAO Launch Vehicle, and Wind Energy Project Office teams.

Weyers and his wife, Maureen, live in Berea. They have three children.



During an ALERT Colloquium Feb. 19, Associate Administrator for Space Station Andrew Stofan discussed the changing political climate in Washington, expressed optimism about continued support for the Space Station, and praised the new national space policy. Employees welcomed Lewis' former Center director with loud applause and gave him a standing ovation after his speech.

\$11.5 Billion Requested For NASA In FY 89

In the Fiscal Year 1989 (FY89) budget submitted to Congress on Feb. 18, President Reagan has requested \$11.5 billion for NASA. This is a substantial increase over the \$9 billion appropriated for NASA in FY 88.

At a press conference discussing the budget request, NASA Administrator Dr. James Fletcher said the increased budget is needed for two reasons: "First, the Space Shuttle will be flying again. NASA will have to meet the costs of building the Shuttle flight rate up to approximately seven missions in FY 89 and to approximately ten missions in FY 90. Second, the Space Station will be moving into full-scale hardware development. The FY 89 budget provides the normal buildup in funding required in the second year of a major development program."

He said the FY 89 budget recognizes that these increases are essential to carry out our national commitment to return the Space Shuttle to flight and the President's recommendation, now approved by Congress, to proceed with the development of a permanently manned Space Station.

The NASA budget also reflects the high priority given in the Federal budget as a whole to science and technology. The budget recognizes how crucial science and technology are to the nation's future, said Dr. Fletcher: "This is clearly not the time to freeze or cut back in this vital area."

The NASA FY 89 budget carries forward

a robust program in space science, which includes preparing major astronomy and planetary missions, providing expendable launch vehicles for a number of future science missions, and initiating a major new "Great Observatory" project, the Advanced X-Ray Facility (AXAF). The budget also provides \$156 million to continue the expanded Civil Space Technology Initiative (CSTI) begun during FY 88, and a \$79 million increase in aeronautical research and technology.

NASA's FY 89 budget also supports the President's new national space policy. In support of the long-range goal to expand human presence and activities beyond Earth orbit, the budget includes \$100 million to start a "Pathfinder" program to develop the technology needed for sound decisions on future missions.

Among the \$285.1 million requested for Construction of Facilities are two projects at Lewis: \$14.5 million for rehabilitation and modifications to the 10x10 Supersonic Wind Tunnel and \$6.1 million for refurbishment of the Electric Power Laboratory.

"The President has wisely given NASA the budget that's needed for FY 89," said Dr. Fletcher. "I am confident that Congress, like the Administration, will continue to recognize the importance of what we are doing and the built-in needs for the higher funding level we have budgeted for FY 89."

Stofan Praises Space Policy, Commitment To Space Station

"I have no doubts that the United States will go ahead with the Space Station," said Associate Administrator for Space Station Andrew Stofan during a visit to Lewis Feb. 19. Although a few members of Congress have tried to eliminate the Space Station, and others want to change it, he said, "The majority of Congress has been very supportive." Stofan said he expects this Congressional support to continue because there is widespread public support for the Space Station.

He also is encouraged by President Reagan's strong commitment to the program. Stofan said that with the recently announced national space policy, which includes a long-range goal to expand the human presence beyond Earth orbit, "The Space Station is not only a logical step, it's a necessary step." The permanently manned space facility will be needed to qualify humans for long-duration space travel.

President Reagan has backed up his commitment to the Space Station in his FY 89 budget request, said Stofan. Not only has the President asked for nearly \$1 billion for it in FY 89, but he has also asked Congress to approve a total three-year Space Station appropriation of \$6.1 billion for FY 89, FY 90, and FY 91.

"NASA will work very hard to make this happen," said Stofan. It would make the program much easier to implement and allow the contractors to plan their work more effectively. He admits that it may be difficult to get approval of the three-year appropriation, but is encouraged by indications that the White House will be actively involved in supporting

NASA's budget request this year. "We're going to Congress in our strongest position ever," said Stofan.

Technological Leadership

During a press conference, Stofan admitted that the United States is about seven or eight years behind the Russians in establishing a permanently manned presence in space, but pointed out that the U.S. Space Station will be far more technologically advanced than the Soviets' Mir space station.

But, Stofan cautioned, if the Space Station is delayed by budget cuts, by the time it is built it could be comparable or lag behind what the Soviets will have in orbit.

Stofan also pointed out that the funding requested for the Space Station is very small in comparison to the \$1 trillion federal budget requested for FY 89.

"The Space Station is a symbol of the technological leadership of this nation," said Stofan. Building it will send a message to the world that we intend to keep pushing the frontiers of science and technology and will not abdicate our leadership among space-faring nations.

He said the Space Station will be like a Lewis Research Center in orbit and will provide enormously valuable technology that will benefit the nation's economy as a whole. Predicting exactly what some of the technological spin-offs will be is impossible, said Stofan, because "sometimes spin-offs come in ways we least expect them."

The Space Station is also important as a hallmark of interna-

tional cooperation and sets the tone for potential future cooperative projects. Because the international partners are making the Space Station a key element of their space programs, delays caused by budget cuts and politics will have significant international implications.

During the press conference in the morning and the ALERT Colloquium in the afternoon, Stofan was enthusiastic about the new national space policy as a whole. Because it establishes a vision of the future, he said the new space policy "is the greatest thing I've seen happen to NASA in 25 years." He said, "encouraging the commercialization of space is

a super idea," and praised some of the ideas that contractors have proposed for commercializing the Space Station.

Retirement

Discussing his upcoming retirement from NASA, Stofan emphasized that recent newspaper articles about his being bitter were misleading. He said when he left Lewis to become Associate Administrator he agreed to serve only long enough to get the Space Station program on its feet. Now that the eight contracts have been signed and the Program Office in Reston, VA, has begun operations, Stofan says he has accomplished what he set out to do

and is leaving behind a very capable organization.

He is looking forward to a career in the private sector and expects to stay in the aerospace field.

When asked about the most memorable moments of his 30-year NASA career, Stofan said being Center Director at Lewis was his most enjoyable assignment: "It was challenging, exciting, and fun."

During the ALERT Colloquium, Stofan emphasized that it wouldn't be his last visit to Lewis. "I have such fond memories," said Stofan. "The people here are absolutely super."

NASA Scholarship Applications Available

Dependents of NASA employees and retirees may apply for scholarship awards from the NASA College Scholarship Fund, Inc., a Texas-based nonprofit corporation. Now in its sixth year, the Fund was established with a substantial gift from Pulitzer Prize-winning author James Michener. Michener said he made the gift because he holds the people of NASA in high esteem for their good work through the years and believes it is important for education to go forward in this country.

For the 1988-89 school year, the Scholarship Fund provides two \$1500 awards renewable to a maximum amount of \$6,000 over six calendar years. Applicants must be pursuing a course of study in the science or engineering fields that will lead to a recognized undergraduate degree at an accredited college or university in the United States.

In addition to being a dependent of a NASA employee or retiree, all applicants must be graduated from an accredited public, private, or parochial high school or be currently enrolled in college with good academic standing. An applicant must have a combined high school grade point average of at least 2.5 on a 4.0 scale, or the equivalent.

Also, for applicants who are dependents of current NASA employees, the employee must have worked at NASA for two years or more as of January 1988.

Applicants will be ranked on the following criteria:

- Academic preparation, including all high school grades, any college grades, high school graduation class rank, and pattern of courses;
- School and community activities;
- Performance on recognized

tests such as the SAT or ACT;

- Written recommendations (limit of three) from instructors or other knowledgeable individuals not related to the applicant (e.g., teachers, counselors, community leaders); and

- A one-page statement of academic purpose by the applicant.

How To Apply: At Lewis, application forms are now available from Larry Scudder, (3-5304, MS 500-115) or Harold Wharton (3-2999, MS 15-2). All completed forms, transcripts, scores, or materials must be mailed directly to: NASA Johnson Space Center, NASA College Scholarship Fund, Inc., Mail Code BY5, Houston, TX 77058.

All completed forms and attached grades/scores must be received by the scholarship committee by March 25, 1988.

Analex Open House



Photo by Angela Coyne

Analex Corporation recently held an open house to dedicate its new building located in Aerospace Park. The building now consolidates Analex and Aerospace Design & Fabrication (ADF) into a more convenient and efficient setting. Pictured left to right are: Ed Richley, chief executive officer, ADF; Larry Ross, Center director; Jim Patterson, chief executive officer, Analex; Andy Stofan, Analex president; and Henry Slone, chief operating officer, Analex.

A Historic Look At Lewis' Strategic Planning Efforts

By Kristin E. Knauer

As we join together to bring our strategic plan of "Challenging the Future: Journey to Excellence" to life, it is important that we step back in time to examine why this plan holds such relevance today.

Our strategic planning efforts, as we know them today, originated a decade ago, when Lewis was faced with some serious problems in terms of its role in the total NASA picture. Lewis had played an active role in aeronautics in the 1960's, but throughout the decade of the 1970's (the Apollo years), Lewis' role began to dwindle.

Feeling the pinch of dollars and public support in the 1980's, the entire NASA Agency was struggling for an identity and a focus. Lewis was forced to downsize and the number of employees was practically cut in half. In order to remain viable, Lewis decided to gradually drift out of the mainstream to pursue areas of research with more direct domestic application. As a result, Lewis teamed up with the U.S. Department of Energy and other energy organizations to study solutions to the nation's

energy crisis.

"Many of us had heard the rumors that the Center was in danger of closing in the early 80's. When Andy Stofan returned as Center Director in 1981 many people believed that he came with the charter of saving NASA Lewis Research Center," explained Dick Clapper, chief of the Office of Human Resources Development, who has seen the origin and consequent success of strategic planning at Lewis.

Not surprisingly, the survival of Lewis was Stofan's number one priority, but he knew that the task was not going to be easy. "We needed to take the actions necessary to ensure the Center's present and future survival. We initiated a strategic planning process to institute a process of continuous review and to nurture a participative management culture," said Andrew Stofan, former Lewis director, who now serves as chief executive officer of Analex Corp.

During those troubled times, strategic planning was driven by three distinct motivators. "Lewis needed to first formulate a survival plan involving a re-entrance into mainstream ac-

tivities. Secondly, there was great urgency to change the culture of Lewis from one of a benevolent autocratic style to one of participative involvement. Lastly, Lewis needed to be more involved in its community," Clapper explained. These three programmatic objectives culminated in the 1983 strategic plan that put Lewis back on solid ground.

The first strategic planning exercise launched the Center on its first "journey to excellence" and was instrumental in Lewis getting a role in the Space Station *Freedom* project. "When the first suggestion was made in 1982 that Lewis become involved in the SSF project, people on the outside laughed. They didn't think we had anything to offer. Today, we are a key player in the project. This is really a great example of what can be accomplished when we agree to a goal and put things in place to reach it. This ideal is what we're striving toward now with the 1992 strategic plan," Clapper said.

Former Lewis Director John Klineberg said, "Effective strategic planning is even more necessary during times of rapid change than during gradual



Photo by Marvin Smith

Lewis Little Folks shared their Halloween costumes and songs with Ad. Bldg. employees on Oct. 30. After trick-or-treating door to door, the costumed children presented a special program in the auditorium. Barbara Perkowski (left), Office of Interagency and Industry Programs, and Nancy Wolf, Engineering Directorate, are pictured here passing out goodies to Brian Kerslake. His parents: Susan Kerslake (right), Space Electronics Division; and Thomas Kerslake, Systems Engineering and Integration Division, joined in on the costumed fun.

change..." Due to severe fiscal constraints imposed by Congressional budget cutting, 1986 was going to be a year of challenge and rapid change. In the beginning of 1986, we began to work on a new strategic plan that focused on the accomplishments at Lewis since 1983 and goals and objectives for the future. "The 1983 strategic plan was very inspiring for all at Lewis because it highlighted what we can accomplish when

we work together toward common goals. It also demonstrated that we could preserve the integrity of our overall mission in the face of programmatic uncertainty," Clapper explained.

In the latter part of 1986, the executive council decided that it was time to develop a new strategic plan because we had reached many of the goals outlined in the previous plan. Consequently, a team was

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Lewis NEWS

JOURNEY TO EXCELLENCE

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Reception recognizes 30 years of launch vehicles

ON November 27, 1963, just days after the assassination of President John F. Kennedy, Lewis sustained the President's vision with the first successful launch of the Atlas/Centaur expendable launch vehicle. The launch was the first step towards launching seven Surveyor softlanders to the Moon, which proved that the Nation could put a man on the Moon.

To commemorate this launch, the Launch Vehicle Project Office (LVPO) hosted a reception on November 30 at the Visitor Center. Current and former Center employees gathered to celebrate Lewis' 30-year history of launching planetary probes, observatories, communications

satellites, and weather satellites.

Addressing the gathering of more than 80 people, John Gibb, LVPO chief, commented on how good it was to renew acquaintances. "Seeing you all here today brings back a lot of good memories. It's good to see former coworkers and colleagues."

Those in attendance were not just rocket scientists. The launch vehicle team has always included members of procurement, technical services, engineering, and research organizations. Now that Lewis uses matrix support, teamwork has become even more important.

Reflecting on his own experiences in launch vehicle programs, Center Director Larry Ross spoke of how much he and so many others learned about management. "When you think about it," said Ross, "we were applying the principles of Total Quality before it was called 'Total Quality.' We knew who our customers were and the metrics were uncomplicated: launch the payload on time and on target."

Ross received many nods of agreement as he recalled weeks of post-flight data evaluation after every mission. Continuous Improvement was integral to all planning and operations.

Following Ross' comments, Analex President Lawrence Gooch presented Ross with an original oil painting of an Atlas-H launch as a gift from the Analex Corporation. In the early 1980's, Gooch was director of Launch Vehicle Integration for Air Force Special Projects. He recalled that when the Air Force needed a new version of the Atlas, Lewis was the place to go. Lewis successfully developed and delivered all five Atlas-H vehicles to the Air Force. "Lewis takes care of its customers," Gooch said.

As Lewis begins its fourth decade in launch vehicle projects, a new set of customers have put their trust in Lewis. The launch vehicle team is planning for a new round of launches. Future launches include several Geostationary Operational Environmental Satellites (GOES) weather satellites, the Solar and

Heliospheric Observatory (SOHO), the Cassini planetary exploration mission, which will study Saturn and its moons, and the Earth Observing System (EOS) family of satellites, which provide a database for the Earth's climatological characteristics. ♦

—By David M. DeFelice
Community Relations Office



Photo by Chris Lynch

Meyer Reshotko, Launch Vehicle Project Office, and John Kramer, Engineering Directorate (ADF), view the original oil painting of the Atlas-H and reminisce about past experiences.



Some of Lewis' Centaur personnel 20 years ago. What are they doing today? Pictured (sitting, left to right): Tom Cahill, deputy manager, Power Systems Office; Norm Weisberg, retired; Sandy Hippensteele, Administrative and Computer Services Directorate secretary; Steven Szabo, deceased (served as head of Engineering Directorate); (standing, left to right) Ed Muckley, chief, Mission & Vehicle Integration Office; John Catone, retired; Larry Ross, Center director; Harold Jones, retired; Dick Geye, retired; Andy Stofan, retired (past Center director); and Joe Ziemianski, chief, Propulsion Systems Division.

Employees learn how the U.S. government operates

If you were going on a 12-month assignment to NASA Headquarters in Washington, D.C., what would you take with you: Your "best" suit, a camera, comfortable shoes? How about expectations of how the Agency operates?

Seven Lewis employees, who recently completed assignments at Headquarters under the Professional Development Program (PDP), each entered the program with expectations. But they discovered that discarding those preconceived ideas and keeping an open mind resulted in a fulfilling work experience and a greater understanding of NASA.

Propelling Glenn Forward: Our Center Directors

Stofan's Management Skills Raise Glenn's Profile

This is the fifth in a series of articles spotlighting NASA Glenn's center directors.

Andrew Stofan, Center Director from 1982-1986, helped Glenn gain greater visibility and respect within NASA. An internationally recognized researcher and manager, Stofan transitioned Lewis into mainstream NASA and brought in many new projects for the center.

Throughout his 30 years at NASA, Stofan held numerous managerial and administrative positions. His technical expertise was bolstered by a healthy dose of "charisma and confidence" that gained him the admiration of the rank and file within the agency and contracting organizations.

Stofan began his career as a research engineer at Lewis Research Center in 1958 and later joined the Propellant Systems Section of the original Centaur Project Office, where he began a steady climb through the tiers of management to become Director of Launch Vehicles in 1974. Much of the Titan-Centaur vehicle's success can be attributed to Stofan's leadership of NASA, the Air Force and aerospace industry teams. By 1978, Stofan was called to Headquarters to serve first as the Deputy Associate Administrator for the Office of Space Science, and then as Associate Administrator.

Stofan returned to Cleveland in 1982 as Lewis' fifth Center Director

charged with the task of implementing Lewis' first strategic plan. The center had never had major roles in Manned Space Flight projects, but Stofan saw these big programs as an opportunity to make Lewis more visible within NASA. Stofan aimed for five major projects for the Center: the power system for the space station, the Advanced Turboprop Program, renovations of the Altitude Wind Tunnel (AWT) for expanded icing research, the Advanced Communications Technology Satellite Program and the Shuttle/Centaur Program. Amazingly, he secured funding for all but the AWT renovations. Most of the programs in the first strategic plan are still thriving.

In addition to implementing the center's strategic plan, Stofan instituted a new management style. He advocated participative management over the autocratic management style of the 1970s. His outstanding work managing advanced research and technology programs for NASA earned him the 1985 Presidential Rank Award for Distinguished Executives.

Following the Challenger tragedy in January 1986, NASA asked Stofan to return to Headquarters as the Associate Administrator for the Space Station Office where he led the negotiations of the international technical agreements and the U.S. contract to build the station until



Above: Former Center Director Stofan in 1998.

Left: present day at his home on the slopes of Steamboat Springs, Colo.

his retirement on April 1, 1988. He continued to work in the aerospace industry for the next 10 years.

Today, Stofan compares the potential transition with the Constellation program as similar to the period when he became Center Director. "It's a good time to do a bottom to top review and reassess the center's strengths and weaknesses to develop a strategic plan for positioning Glenn favorably into the future," he said. "It's important to be fully participatory in this process—management's role is to organize and guide, but staff does the work."

Stofan and his wife, Barbara have settled into a new lifestyle and home 7200 feet up into the mountains of Steamboat Springs, Colo., where he can daily enjoy one of his favorite past times—downhill skiing. He also enjoys golfing and building furniture. The couple travel extensively, including a recent trip to Maui to celebrate their 75th birthdays; to Ohio three times a year to Hiram College for Board Meetings where he has served as a trustee for the past 25 years; and to Virginia and New York to visit their daughters and five grandchildren. His daughter, Dr. Ellen Stofan, is a planetary geologist known for her work on Venus and Titan. His other daughter, Lynn, is an attorney.

Facilities Used to Explore Methane Capabilities

Continued from page 3

In addition to the methane thermal control testing in SMiRE, Glenn's Altitude Combustion Stand is the site of extensive testing of an Aerojet built, 100-pound/force liquid oxygen/liquid methane reaction control engine, currently being conducted by the Propulsion and Cryogenic Advanced Development (PCAD) project, also funded under ESMD's Exploration Technology Development Program.

"Glenn's unique testing facilities and current test activities are demonstrating technologies expected to reduce the cost and expand the capabilities of future exploration missions," Doherty said. "All proof of our center's viability within the agency—and to the future of our nation's space program."

—BY CASSIE BARNES, LERCIP INTERN
& S. JENISE VERIS

—BY CASSIE BARNES, LERCIP
INTERN & S. JENISE VERIS

Community Celebrates Centaur Anniversary Through Special Events



C-2013-5535



C-2013-5433

Photos by Bridget Caswell

The Greater Cleveland community joined NASA in celebrating the 50th Anniversary of the first successful launch of the Centaur rocket during three events, Nov. 22 and 23, at the Great Lakes Science Center in Cleveland. The celebration kicked off Friday, Nov. 22, afternoon as students participated in a Glenn-sponsored challenge to design an air-propelled vehicle with a 25-gram payload to travel along the ground from a launch site to a rendezvous point. That evening, NASA Associate Administrator Robert Lightfoot joined representatives from the aerospace community in a special dinner program organized by the Ohio Aerospace Institute. Center Director Jim Free emceed the event. The following afternoon, Nov. 23, former Center Director Larry Ross and former Chief of the Advanced Space Analysis Office Joe Nieberding shared some of their experiences as engineers working in the early days of the Centaur development at Space Saturday. Pictured, above left, former Center Director Andrew Stofan at the Nov. 22 program. Top, right: students compete in the design challenge.