



Apollo 12 launch window opens Nov. 14 - 32 hours on the moon

At their pre-quarantine press conference, astronauts Conrad, Bean, and Gordon discussed with newsmen the highlights of the upcoming launch of Apollo 12, set for November 14, with a backup launch date of November 16.

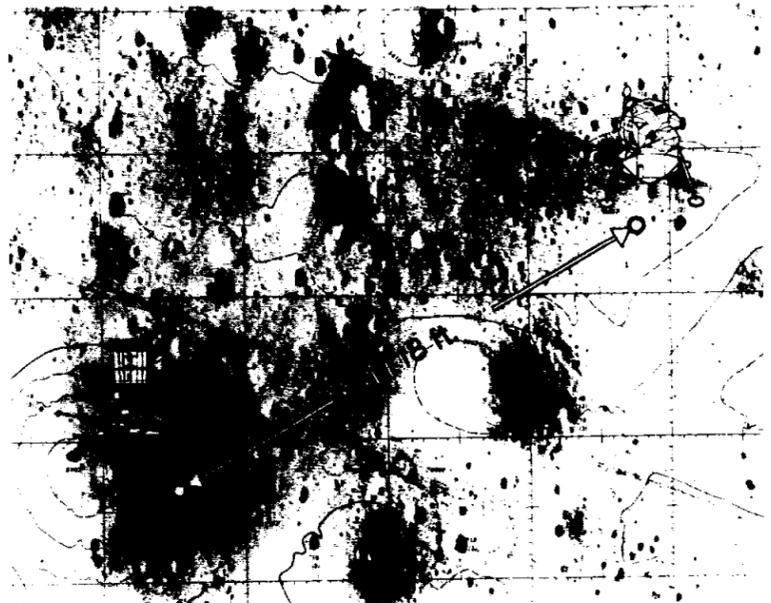
Mission Objectives

Command pilot Charles Conrad, Jr., pointed out that while Apollo 11's primary mission was to show that it was possible to land on the Moon and return safely to Earth, Apollo 12 will be directed more toward accurate landing, and rigorously documented geological experiments on the lunar surface. Elimination of some "bugs" in the hardware, which showed up on Apollo 11, and the introduction of new high-speed data processing programs which give the crew the ability to change the landing site of the LM will make the more precise landing possible. The LM will be losing altitude much less rapidly than Apollo 11 did on its descent to the lunar surface, and this also should give a greater opportunity for visual sightings and a more accurate landing.

Visit to Surveyor

The main reason why greater accuracy is desirable on this mission is because it is hoped that some "bonus" information from Surveyor III will be returned with the crew.

Two different EVA periods are to be included during the longer stay-time (32 hours) and one of these periods includes a visit to the site of Surveyor III. While this visit is termed of "secondary" importance as a



"INTREPID" RESTS ON SITE 7—a landing here will allow astronauts Bean and Conrad to walk to the site where Surveyor III landed on April 20, 1967.

mission objective (documented geology and ALSEP deployment being of primary importance) it is hoped that the LM can be maneuvered to Site 7, in the "Ocean of Storms", or to an area even closer to Surveyor, 1,000 feet short and 500 feet to the right of the craft. This would be close enough for Conrad and Bean to make the trip over to Surveyor, collecting documented rock samples as they go. Once there they would photograph the craft itself and its immediate vicinity with great care, then retrieve a portion of cable, some aluminum tubing, glass insulation panes, and a 17-lb television camera from the side of the Surveyor. From these samples the scientists hope to learn of the effects of 2½ years of exposure which the various plastics, electronic parts, insulation, lubricants, etc., have undergone.

ALSEP

The visit to Surveyor III, however, is of secondary importance. It is, for that reason, left for last. The first EVA, 3½ hours in duration, will determine whether it will be possible to extend the second EVA period to 4 hours. The television camera will be set up, and the five ALSEP experiments deployed, along with the antennas, and a nuclear-powered thermoelectric generator which will be the power source for the ALSEP experiments themselves and for data transmission back to Earth.

From their experiences with the two longer periods of activity on the lunar surface, astronauts Conrad and Bean hope to find out more general things, too. They hope to determine how much time is required for "overhead"

—preparation time, egress and ingress time, clean-up, and so forth. They will also learn more about how much the physically taxing labor can be expected of a fully-suited astronaut before he becomes just plain "pooped".

Back in the CM

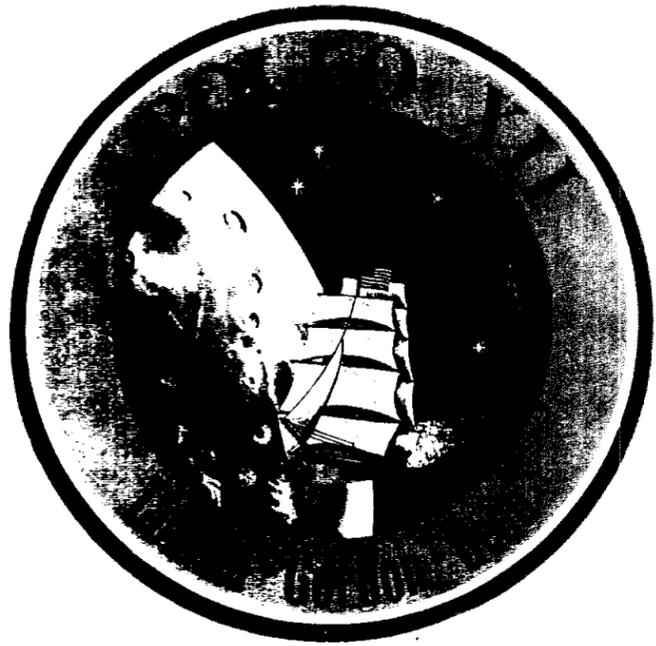
Astronaut Gordon, meanwhile, will be performing multispectral photography experiments, in addition to piloting the CM itself. Concentrating on future landing sites, he will photograph the lunar surface using three cameras, each with a different color filter, and a fourth camera with infrared film. These photographs are vital for crew training for future missions. He will also, of course, be preparing for rendezvous with the LM, and for jettisoning the LM ascent stage.

The decision to deorbit the LM ascent stage after rendezvous with the orbiting CM was made for several reasons. First, it will "clean up" the lunar atmosphere by leaving one fewer piece of equipment in orbit. Second, it will help scientists on Earth calibrate one of the ALSEP experiments: the passive seismometer. The LM will hit about 15 kilometers from the seismometer.

Lunar Samples distributed

A total of 10 pounds of lunar material has been distributed to scientists from around the world since the first release began at the Lunar Receiving Laboratory last month.

Dr. Dan Anderson, curator of the LRL, reported on Oct. 14 that 4,744 grams (about 10.44 pounds) have been released.



THE CREST OF APOLLO 12

SMOOTH SAILING TO CONRAD, GORDON, BEAN

The Apollo 12 astronauts announced in their pre-quarantine press conference on October 11 that "Yankee Clipper" and "Intrepid" will be the call signs for the Apollo 12 command and lunar modules, respectively.

The names, which will be used to distinguish the craft when they are separated, were selected by the Apollo 12 crew from the more than 3000 entries submitted by employees of North American Rockwell Space Division, and Grumman Aerospace Corporation.

George T. Glacken, a senior flight test engineer at NR, said that he submitted the name because "Yankee clippers of old majestically sailed the high seas with pride and prestige for a new America, and so shall this Yankee Clipper in space."

"Intrepid" was submitted by Robert A. Lambert, of Grumman's Operations Planning and Scheduling Department. Space Programs, said the name "denotes this nation's resolute determination for continued exploration of space, stressing our astronauts' fortitude and endurance of hardship in man's continuing experiences for enlarging his universe."

The selection of two such nautical call signals, and the design chosen for the crew patch, are particularly apt since all three crew members are members of the U.S. Navy.

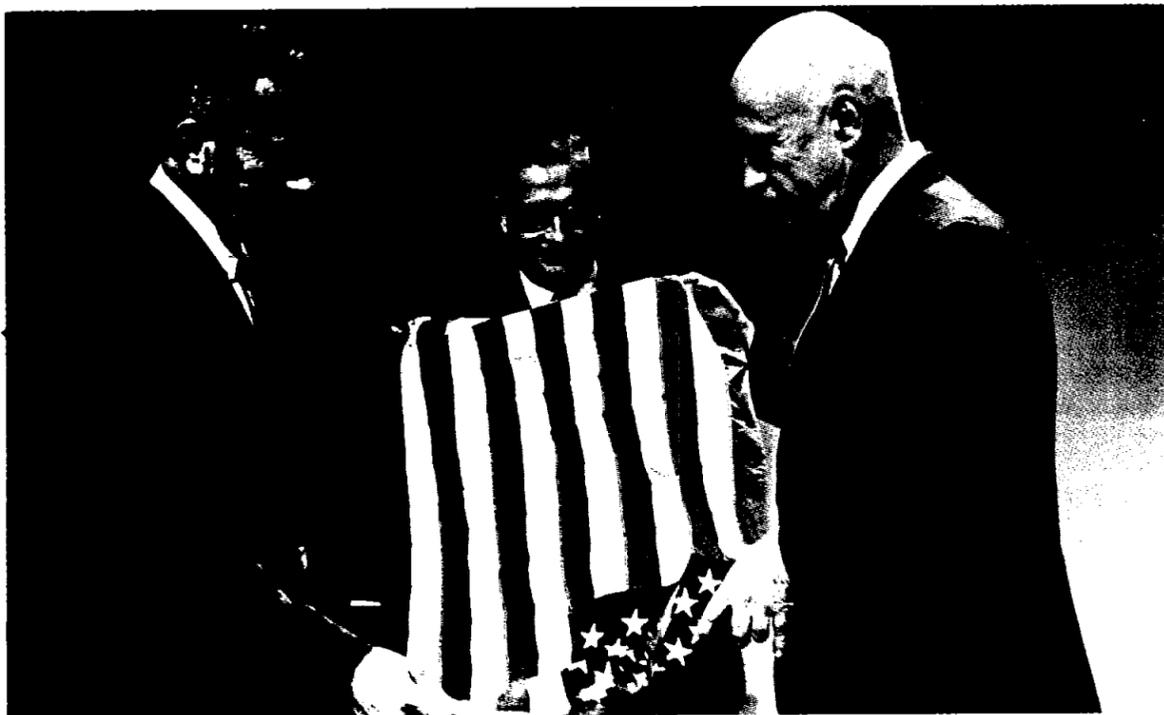
Don't Forget: PICNIC tomorrow

The annual MSC Employees Activities Association picnic will be held tomorrow, Saturday, from 10 am to 3 pm, rain or shine. The site, as in past years, will be the Galveston County Park.

Wear your western duds, and come on out for barbecue beef and links, baked beans, and all the trimmin's.

Tickets are priced at \$1.50 for adults, \$1 for the 7-13 group, and \$.50 for young 'uns 1-6.

If you're feeling like fun, this will be the place. There will be goat-sacking and greased pig-grabbing contests, a western band and a rock band, and equipment for do-it-yourself sports events.



WELL-TRAVELED FLAG

NASA Administrator Thomas O. Paine looks on as the only flag to be returned from the Apollo 11 Lunar Module is presented to MSC Director Gilruth by Deke Slayton, on behalf of the Apollo 11 astronauts at the Honor Awards Ceremony of October 2.

THE ASTRONUTS

courtesy of TRW's gordon a. south



Your Job In Focus

4% Retirement \$ Increase

The Civil Service Commission has announced an increase of 4 percent in civil service annuities effective November 1, 1969. The increase is based on a rise in the cost of living as reflected by the Consumer Price Index (CPI). It will apply to annuities that begin on or before November 1, but will not apply to annuities that begin after that date.

The Personnel Division advises employees who may be considering retirement within the next few months and want to take advantage of this increase to contact their Personnel Representative for assistance.

EAA Bulletins

BASKETBALL SEASON—There will be an MSC/EAA League organization meeting on Wednesday, October 29, at 5:15 pm in room 316 of building 2. Each team should have a representative present. MSC and active military personnel are eligible to play. This year we will form two leagues: Competitive, and Recreational. If interested in officiating, contact Sgt. Bill Brown at HU 7-1400, x 484. Other questions, call D. Doherty, x 2741.

FOOTBALL NOTES—After four weeks of play, the *Tigers* lead Division I of the Flag Football League, with a 5-0 record, followed closely by *FCSD*, with a 4-1 record. *The Roaches*, and *747th Air Force* are tied for the Division II lead, with identical 3-1 records. Best-played games to date were the *Tigers* 6-4 victory over *FCSD* and *747ths* win over the *Air National Guard* by a 24-20 score.

The Winnahs!



FAST-PITCH CHAMPS—The Lone Stars sewed up first place in the MSC/EAA Fast-Pitch tournament. Top row, left to right are: P. Pampolino, M. Springfield, M. Schwartz. Middle row: B. Renegar, G. Weber, B. Snodgrass, L. Ratcliff, and J. Brown. Bottom row: W. West, K. Westerfeld, A. Liebhardt, and B. Brown. Not in photo: B. Kappenberger, L. Meeks, W. Dodson, D. Beck.



SLOW-PITCH CHAMPS—Tops in the Slow-Pitch tournament were the Animals. Top row, left to right, are: L. Norbraten, I. Johnson, G. Ricks, R. Duncan. Middle row: A. Morrey, E. Svrcek, B. Corbett, R. Wadle, H. Kolkhorst. Bottom row: D. Lostak, R. Kruse, R. Swalin. Not pictured: Mgr. J. R. Elk, Asst. Mgr. H. Becker.

SAVINGS PAY



Samuel Hardee, Jr. received the NASA Cost Reduction Achievement Certificate, for saving NASA over \$56,000 through modification to a proposed nuclear particle distinction system.

Cooper joins FCOD keeps wings



Astronaut L. Gordon Cooper, 42, has been named Assistant for Space Shuttle Program in the Flight Crew Operations Directorate at MSC.

Cooper, an Air Force colonel, will be responsible for the flight crew training program, astronaut inputs into design and engineering, and the directorate's part in hardware development and testing in connection with the Space Shuttle.

He will report directly to Donald K. Slayton, Director of Flight Crew Operations.

Cooper will remain on flight status and will continue to be eligible for selection to spaceflight crews. His prior assignment was to the Apollo Applications section of the Astronaut Office.

HONORABLE VISITORS



Apollo Program Manager George Low welcomes the President (Speaker) and members of the Japanese House of Representatives and members of the Japanese Consulate, who visited MSC early this month. They represent the more than 350 foreign visitors who tour MSC each month.

ROUNDUP

NASA MANNED SPACECRAFT CENTER HOUSTON, TEXAS



The **Roundup** is an official publication of the National Aeronautics and Space Administration Manned Spacecraft Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for MSC employees.

- Director Dr. Robert R. Gilruth
- Public Affairs Officer Brian M. Duff
- Editor Sally LaMere
- Staff Photographer A. "Pat" Patnesky

Come shoot turkeys

"Something for Everyone" is the theme of the turkey shoot to be held Saturday and Sunday, October 18 and 19, at the Pearland Sportsman's Club range located four miles north of Alvin on FM 528. The shooting festival offers turkeys, hams, and other prizes in a variety of contests.

Some of the contests are designed to require an element of luck in addition to skill. Other events are true tests of marksmanship. Contests for pistols, rifles, and shotguns are planned. One of the most popular events will probably be the 100-yard Turkey-head shoot.

Target shooting for both .22-caliber and high-power rifle shooters will be available. The high-power bench rest competition will allow target rifles and scopes.

Shooting hours will be from 9 am to 6 pm on Saturday and

from 12:30 to 6 pm on Sunday. Refreshments will be available at the range.

MSC employees are also invited to "Sighting-In Days" on October 25, 25, and November 1 and 2. Targets, a spotting scope, and qualified assistance will be furnished for \$1 per gun.

For information, call B. Miller, 944-7381.

AFGE Drive

Bob Thrower, President of the American Federation of Government Employees Local 2284, is available today to discuss the AFGE annual membership drive at MSC. Any Federal Employee interested in union membership and support may obtain additional information and literature from a union representative, located in buildings No. 1 and No. 2, from 11:00 to 1:00 o'clock, or the Ramada Inn, NASA Rd. 1, from 11:00 to 1:00 or 4:30 to 5:30.

20 YEAR MEN



Dr. John Dornbach
Earth Resources



Stanley Brown
Space Physics

Revolutionary manufacturing processes possible in weightlessness of space

A relatively small group of men within NASA and industry are busy developing ways to manufacture new products outside the restrictive environment of earth, where the force of gravity severely limits man's ability to work with certain materials.

Manufacturing in the space environment would take advantage of two basic concepts: (1) the absence of buoyancy, with the related thermal convection-free environment, and (2) the molecular forces of materials when they are in a liquid state.

The effects of buoyancy disappear in space, and mixed components of different densities will not unmix because there is no mixing by convection currents. It will be possible to melt and solidify materials without crucibles, containers, or molds, and, with a very, very low impurity content since the mechanically entrapped gases will be minimized. The turbulence within the melt during solidification, and the thermal gradient within the melt, both during melting and solidification will be very minimal because of the very low vacuum conditions. Glass formed by these methods would be so nearly pure that it would later be practically impermeable to gases, and could be used for such things as windows in high-temperature reactors, or as superb refractive lenses.

UNIQUE PRODUCTS

When gas in varying amounts is mixed into liquid metal, the gas bubbles will not rise to the top, as on earth. Because bubble size can readily be determined by mixing techniques and the adjustment of gas pressure, novel combinations of materials of drastically different densities and properties—like steel and glass — can be produced. Or, stable metal foams can be produced in space from any liquid and gas mixtures.

Structures with a new optimum strength-to-weight ratio, temperature compatibility and ductility can be developed. This neutral condition may make possible, for instance, stainless steel foam that would be light enough to float on water.

USEFUL ON EARTH

Hollow precision spheres and shapes, with tolerances impossible to attain with earthbound technology, can conceivably be manufactured in space. This is true because liquid material left floating in a gravity-less environment will eventually take the shape of a perfect sphere. Such hollow-spheres are already needed to move large radar antennas, rotate large aircraft wings, and support loads in jet engines—all areas where uniform hardness gradients would prevent failure due to disparate heat transfer.

By spinning free-floating spheres while they are chilling,

accurate ellipsoidal shapes can be produced to tolerances that are impossible on Earth. The application of electrostatic fields could also be used to distort molten metal into many shapes.

STRENGTH, BEAUTY, CONTROL

The extremely low temperatures of space may also enable us to control crystal formation—possibly resulting in amorphous glass or other materials. Or, by introducing a single nucleation point, unusually large single crystals, such as rubies for high-power lasers, would be possible. If all dislocations could be eliminated crystals of ordinary metals would exhibit strength which would exceed that of even the strongest steel alloys available today.

These examples are still several years in the future, but several space manufacturing experiments will be included in at least one mission of the Apollo Applications Program scheduled for 1971 or 1972.

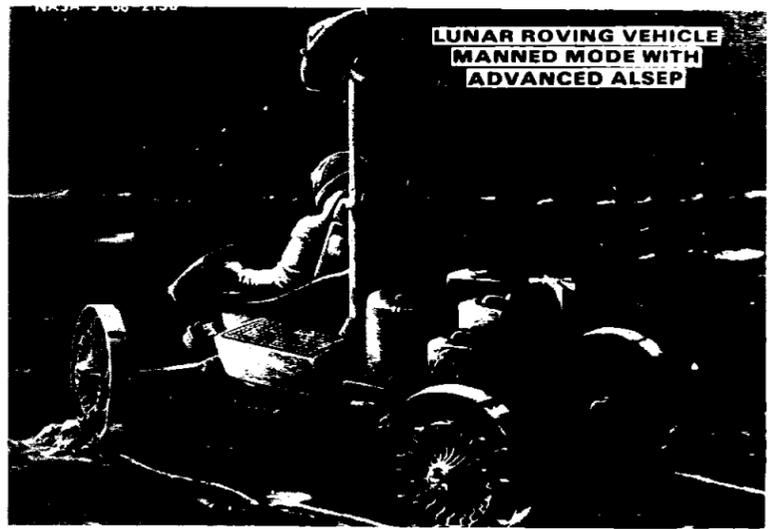
SPACE FACTORIES

Thinking beyond specific products that may be practical to manufacture in space, the idea of spaceplants is also a probability. There is an orbital altitude which coincides with the earth's rotation. This synchronous orbit is about 22,000 miles up and lies in the equatorial plane of the Earth. A space plant located in this orbit could be mapped with the same precision as New York or Houston.

Mr Hjernevik doing fine

Wesley L. Hjernevik, Associate Director of MSC, experienced an abrupt illness while in Washington, D.C. during the night of September 21. He was admitted to the George Washington University Hospital where he was found to have suffered a mild heart attack.

Mr. Hjernevik is reported by his physician to be in good condition and is convalescing rapidly.



ARTIST'S CONCEPT OF FUTURE ROVER

Rover competition narrows to two

The Bendix Corporation, Ann Arbor, Michigan, and the Boeing Company, Huntsville, Alabama, will be competing for the cost-plus-incentive-fee contract for design, development, test and delivery of four flight lunar roving vehicles.

The two-man lunar roving vehicle is planned for flight to the lunar surface starting in 1971, aboard the descent stage of the Apollo spacecraft lunar module.

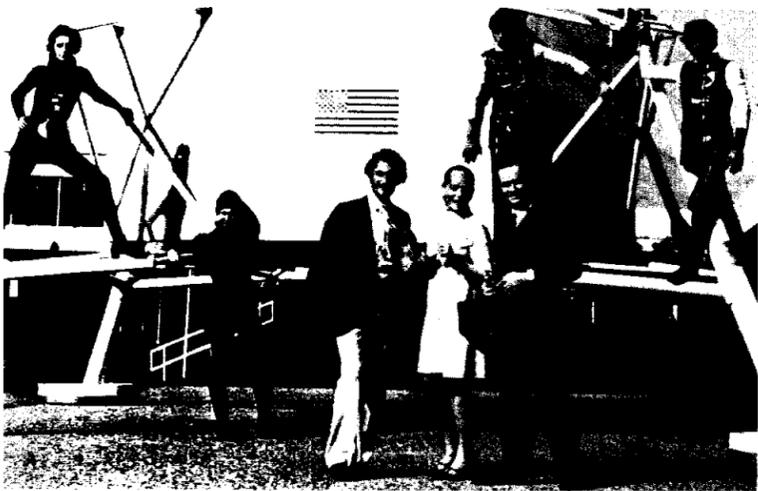
The four-wheeled, approximately 400-pound vehicle will provide transportation for two astronauts and their tools on the Moon's surface for the collection

of lunar samples and other equipment and experiments.

The rover, along with other Apollo system improvements, will extend the lunar staytime to about three days and provide surface mobility.

The moon car will be approximately 10 feet long and 8 feet wide. Electric motors will drive the vehicle, with power supplied by silver-zinc batteries.

The fully-loaded rover will be capable of a top speed of 10 miles an hour. Its range will be restricted to a radius of about five kilometers from the LM.



Mod Squad

Pierre Cardin, Paris designer, and his group are shown as they toured MSC last week.

Scientific colloquium starts the 23rd

One of America's most noted scientists in the field of Space Science will visit MSC on Thursday, October 23, at 3 pm in the auditorium, building 1, when

Dr. Alexander J. Dessler will speak at the MSC Scientific Colloquium series. He will discuss the magnetosphere — the region of space in which the earth's

magnetic field strongly influences the motion of charged particles, its configuration, and other physical processes such as the Van Allen radiation belt, geomagnetic storms, auroras, etc.

Dr. Dessler's presentation will not be highly technical, and all contractor and MSC personnel are cordially invited to attend.

Dr. Dessler received his doctorate in physics from Duke University in 1956. The hydro-magnetic theory of geomagnetic storms which he co-developed is now recognized as a decisive step in the development of modern geomagnetic theory. He is presently on leave of absence from Rice University. He holds patents on many space-related devices.

SUPERIOR PERFORMERS



Harry T. Briggs
Quality Assurance, Bethpage



Richard H. Holzapfel
Industrial Safety Office

Flyers launch ground school

The Aero Club, Inc. Tuesday will start its last 1969 Sanderson Private Pilot Ground School, at 5:15 pm in Bldg. 2, Room 517. Tuition will be \$20. The course is open to non-Aero Club members.

Register by attending the first session or call Bob Moncsko at 2457 or 932-2044.

Club memberships are \$50 down. Hourly wet rates for Club aircraft are: Bonanzas \$16 and \$17, Cessna 172's \$9 and \$11, and Cessna 150 \$8. Call Bob Ward at 877-3187 for Club information.



Apollo 11 astronauts pause in Amsterdam on their world tour. They are shown here with Mrs. Collins, and the Mayor of Amsterdam, Dr. T. Samkal-den.

The crew of Apollo 11 aren't the only ones on tour for NASA and the United States. Dr. Charles A. Berry just returned from a trip to Europe and South America which included brief visits to Moscow, Rome, Milan, Amsterdam, Brussels, Lisbon, and Mar del Plata. Dr. Berry was honored in Moscow by a gala reception at the U.S. Embassy, and at numerous receptions given for him by the USSR Academy of Sciences throughout Russia. His trip also included a number of awards, press conferences, interviews, and a private audience with Pope Paul.