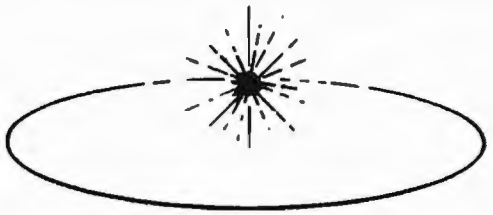

REPORT ON SPACE SCIENCE FAIR

CLEVELAND
PUBLIC
AUDITORIUM

NOVEMBER 23
DECEMBER 2
1962

Sponsored by
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AND THE PLAIN DEALER

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The Space Science Fair was arranged to accommodate attendees of all ages of interest by dividing the Fair into the following six principal areas:

EXHIBITS - on the Main Floor arena, hallway, lobby, and on the Lower Level
POPULAR SPACE LECTURES
MOTION PICTURES - in the Balcony theatres and Lower Level
SPACE SCIENCE INSTITUTE for junior and senior high school students
EDUCATIONAL SERVICES available from NASA for teachers
CAREER GUIDANCE counselors from Cleveland area colleges

Exhibit materials, motion pictures, and lecturers were contributed by the aerospace industries, educational institutions, and the many NASA centers. Lewis personnel organized the exhibit materials into subject areas, which were arranged to display the key features of the areas. Subject treatment in depth was achieved at the exhibits with formal and informal lectures, demonstrations, slide sequences, and short motion pictures.

Popular lectures by the Spacemobile staff were extremely valuable in providing overall perspective on the space program. Those who heard the Spacemobile lectures stated that it improved their understanding of the main exhibits. Approximately one-quarter of the visitors to the exposition attended these lectures.

Full-length motion pictures shown in seven theatres established in the balconies of the Cleveland Public Auditorium covered a broad range of subjects from basic science and technology to space flight operations. In this way, added breadth of subject was attained. These high-quality motion pictures were ideally matched to the educational goals of the exposition.

The Space Science Institute presented two 1-hour lectures to qualified students chosen by their schools for aptitude and interest in science. One lecture surveyed the space program to provide general orientation. A second lecture, chosen by the student from among seven subjects, presented one phase of space science in detail. The students viewed the exhibits for a 2-hour period following the lectures. About 11,000 students attended the Institute. An additional 38,000 students viewed the exhibits without benefit of the Institute lectures during school hours.

The NASA Education Office provided educational services to teachers for classroom programs in space science. Over 3000 teachers registered for this service. Local universities staffed a career guidance office for students.

The success of the Space Science Fair is a tribute to the inspired support provided by the Lewis staff. The undersigned wish to express their thanks to those who extended this help so willingly and so well.

I. Irving Pinkel
Executive Chairman
Space Science Fair

James J. Modarelli
Exhibits Director

As part of their obligation to inform the public, NASA and The Plain Dealer conducted a Space Science Fair in Cleveland, Ohio from November 23 to December 2, 1962.

Exhibit materials were obtained from NASA centers, the military services, universities, and the aerospace industry and were integrated with explanatory displays to provide a coherent treatment of space exploration and related research. Every effort was made to obtain authentic exhibits that would give the attendees a satisfying contact with the devices that are making space history.

Public response was excellent; people of all ages attended in record numbers. Attendees came largely from the Midwest with representation from states as far away as Iowa and New York. Schools sponsored 49,000 students, who attended during school hours. Their desire to understand was evidenced by their keen interest and attention and by the sober atmosphere that prevailed. Over 375,000 people visited the Fair in the ten day exhibition period.

The enthusiasm of the NASA and The Plain Dealer staff and the contributions of the military services and aerospace industry were key to the success of this educational venture. To all who participated, may we express our gratitude and appreciation.

Abe Silverstein
Director, Lewis Research Center

Thomas V. H. Vail
Vice President, The Plain Dealer

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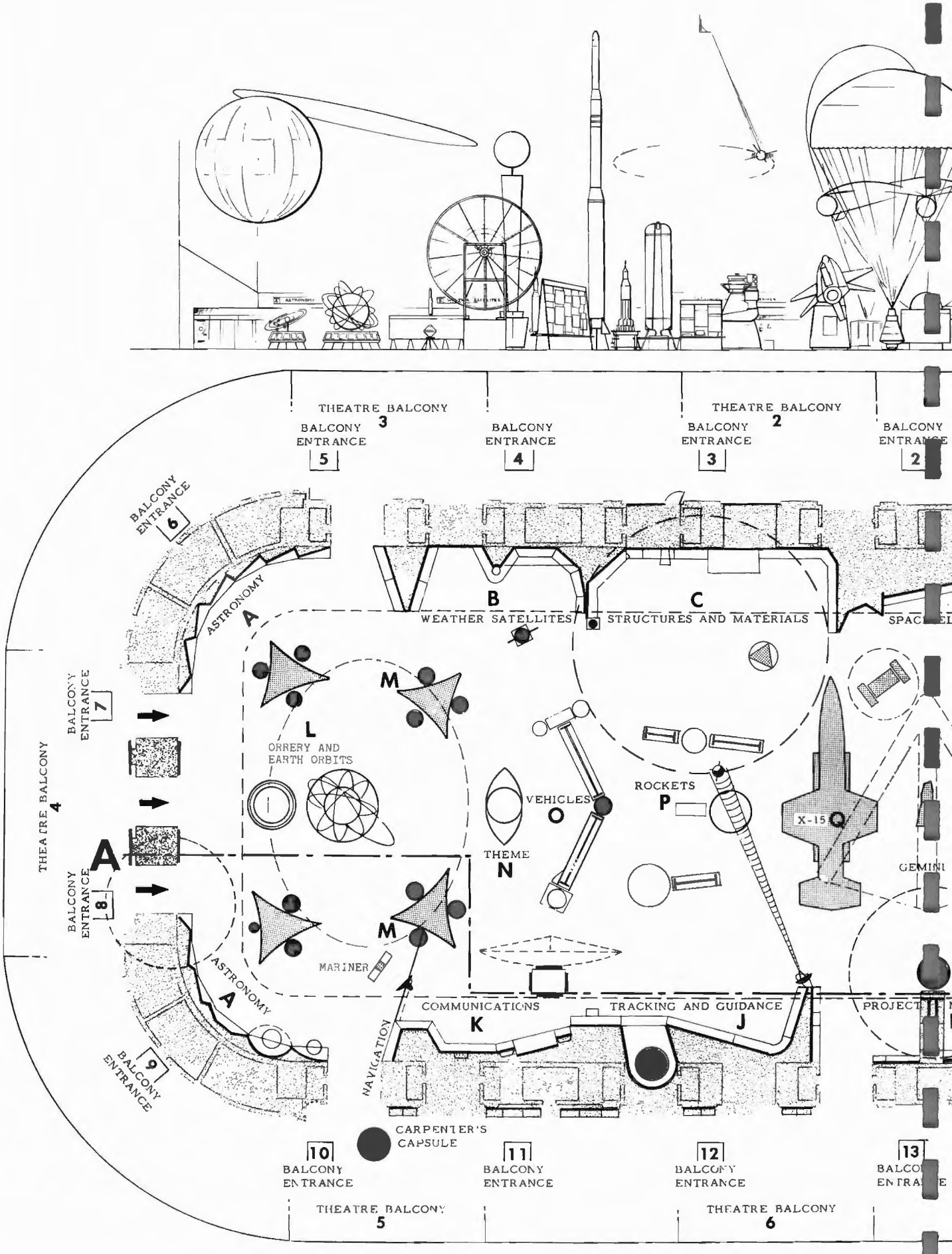
THEATRE BALCONY 3
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ASTRONOMY
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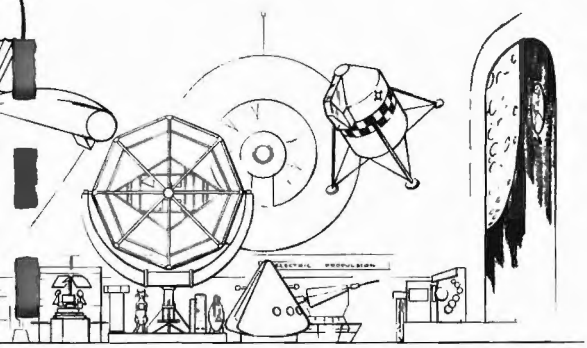
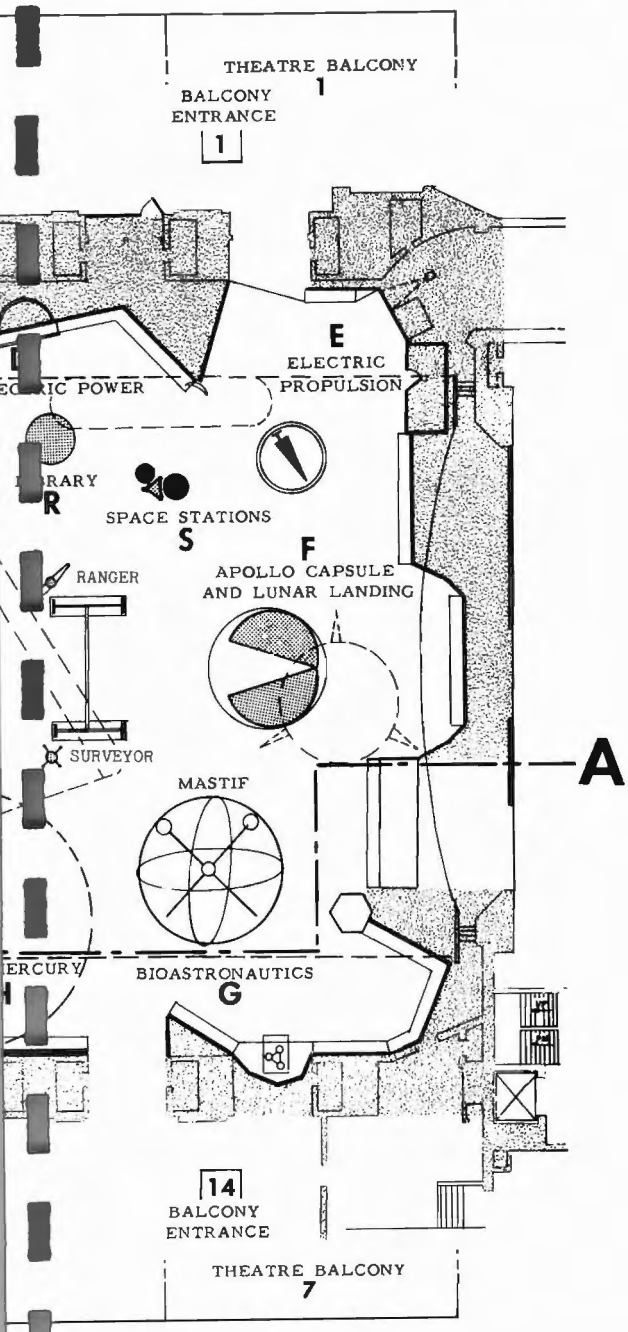
FLOOR PLAN AND ELEVATION





The exhibit floor plan was designed to allow several types of review by the visitor:
(1)Review of the highlights of the Space Science Fair by those visitors with limited time or interest involved only those items located in the central portion of the arena.
(2)Cursory review of all exhibits and areas consisted of reading only the first two or three upper-case words of the captions and scanning the exhibit and hardware.
(3)Thorough review for maximum depth and understanding, of course, involved complete review of all exhibits, study of the diagrams and entire captions, and asking questions of the technical hosts located in each area.

In an effort to avoid solid partition effects in the central area, "look-through" exhibits (see pp. 34 - 37) were employed. Because of the unusually high ceiling (80 ft), the central exhibits were designed to 12- and 15-foot heights, rather than to the usual 8 feet.

Backlighting was also used in the central area so that controlled spot lighting of the important exhibits could be achieved.

Color coding was incorporated into all exhibits and was arranged so that each major area was distinctively different from adjacent areas. In all, eight different color combinations were used in conjunction with white interspersed throughout.

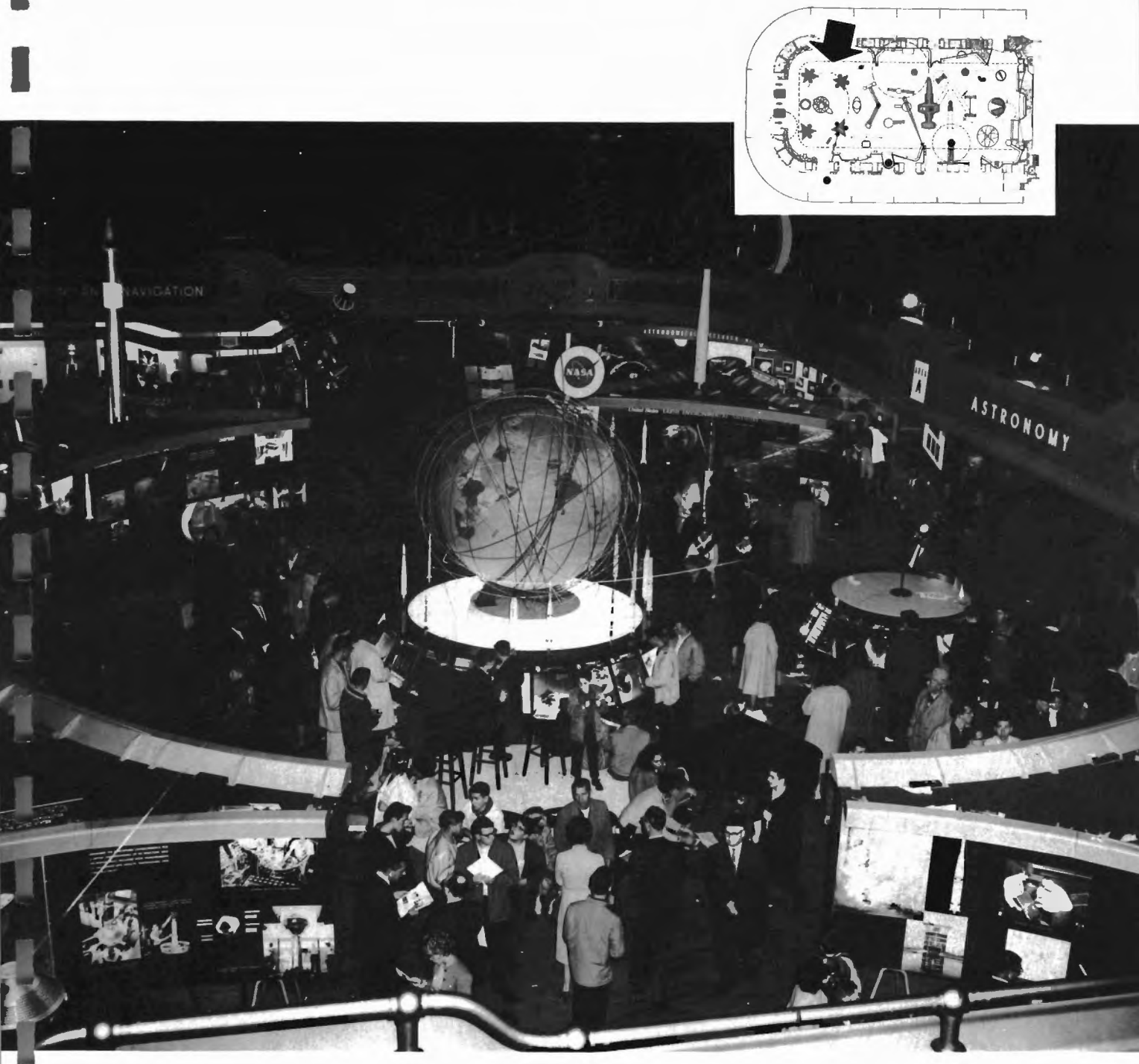
Every effort was made to present the material in a concise and understandable manner while maintaining scientific accuracy.

Frequent use was made of live demonstrations and of audience participation to emphasize important points.

STATISTICS AND OVERALL VIEWS

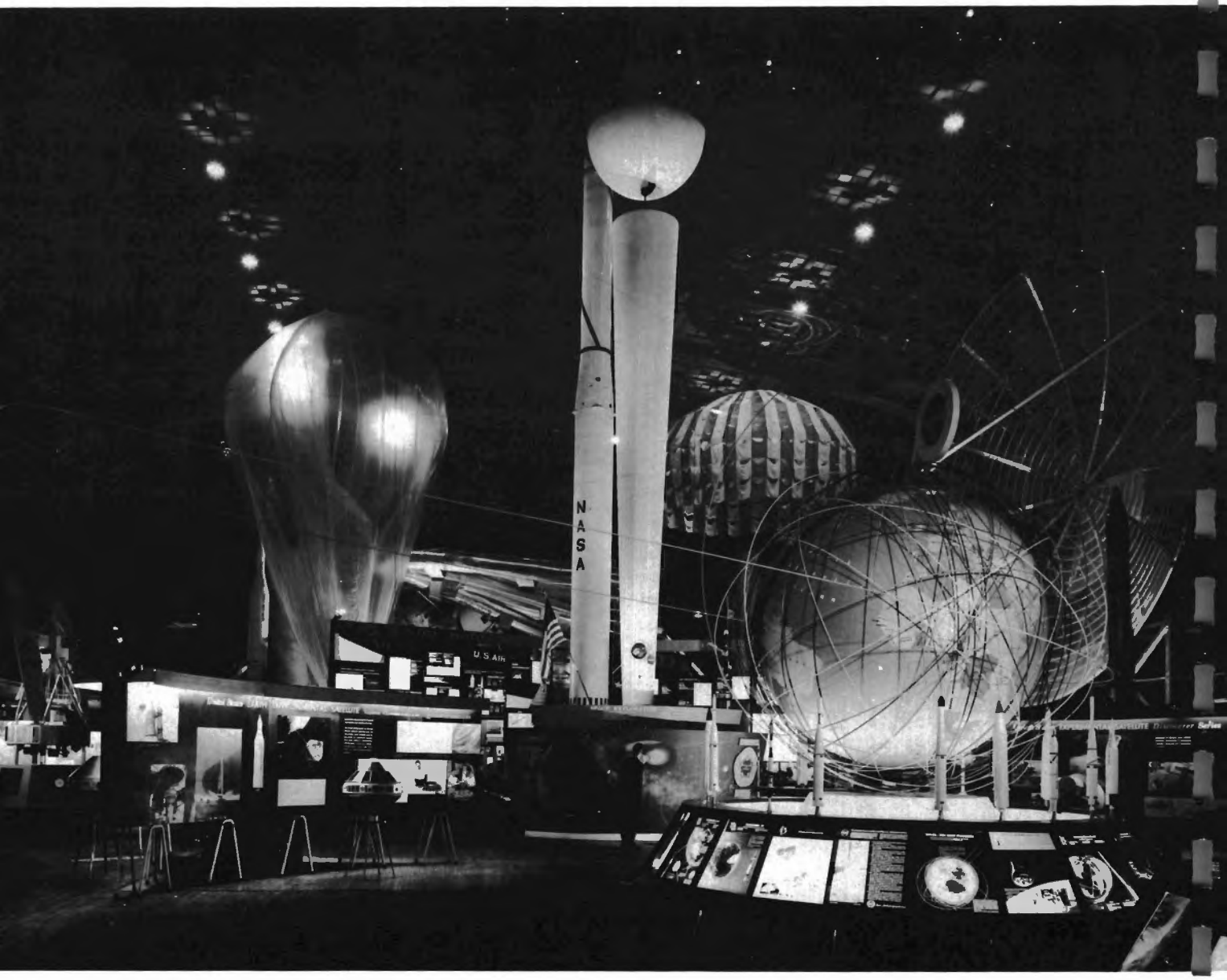
The main arena with an area of 30,000 square feet exhibited nine major areas:
(1)Theme, "SPACE, for the benefit of mankind" (Area N)
(2)Space Successes (Areas L, M)
(3)Launch Vehicles (Area O)
(4)Man on the Threshold of Space (Area Q)
(5)Man in Orbit (Area H)
(6)Manned Lunar Exploration (Area F)
(7)Manned Flight Beyond the Moon (Area E)
(8)Technical Library (Area R)
(9)Related Activities (Areas A, B, C, D, G, J, K, P, S)

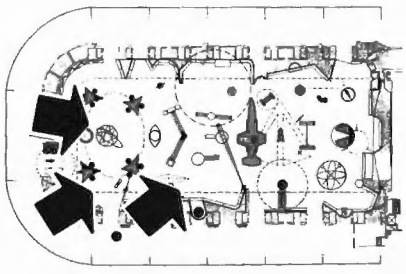
Other exhibits areas included
OUTER LOBBY (544 sq ft): Martin moon base exhibit and portraits of Congressional Space Committee members and Space Science Fair executive committee members
FIRST-FLOOR CORRIDOR (1260 sq ft): Aurora 7 Mercury capsule and explanatory panels.
LOWER-LEVEL LOBBY (500 sq ft): MA-2 capsule, Agena B vehicle (full scale), Titan (1/10 scale), Discoverer spacecraft (full scale), and X-15 on B-52 (small model)

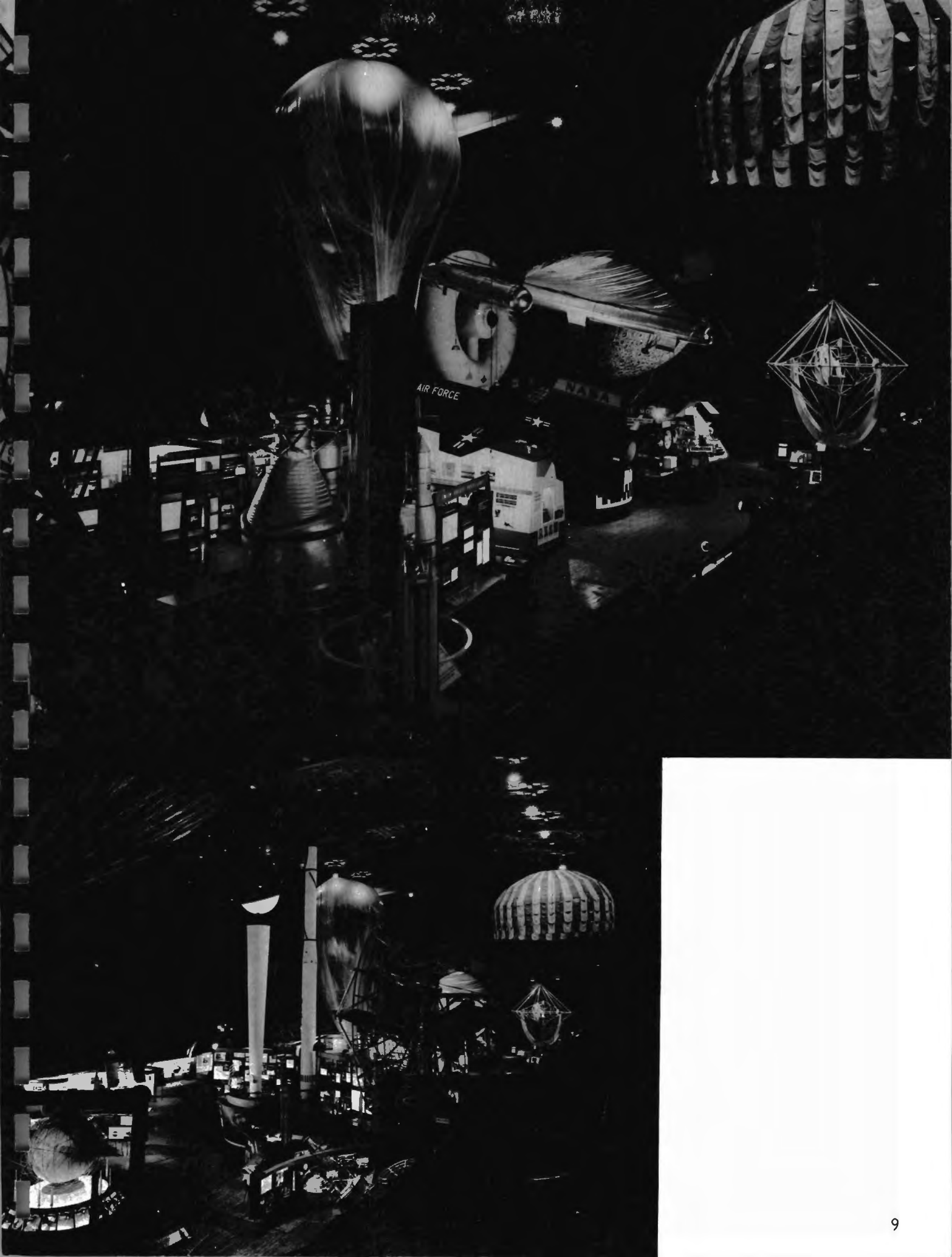


Free admission tickets, distributed by The Plain Dealer and NASA, served primarily as an attendance record for insurance purposes ($.01 paid for each attendee by The Plain Dealer). Total attendance for the 10-day fair was 375,758 and broke all records at the 42-year-old Cleveland Public Auditorium.

NASA-PLAIN DEALER SPACE/SCIENCE FAIR
CLEVELAND AUDITORIUM
NOV. 23 TO DEC. 2
GENERAL ADULT ADMISSION


NASA




AIR FORCE

ASTRONOMY (SUN-EARTH RELATIONSHIP) AREA A

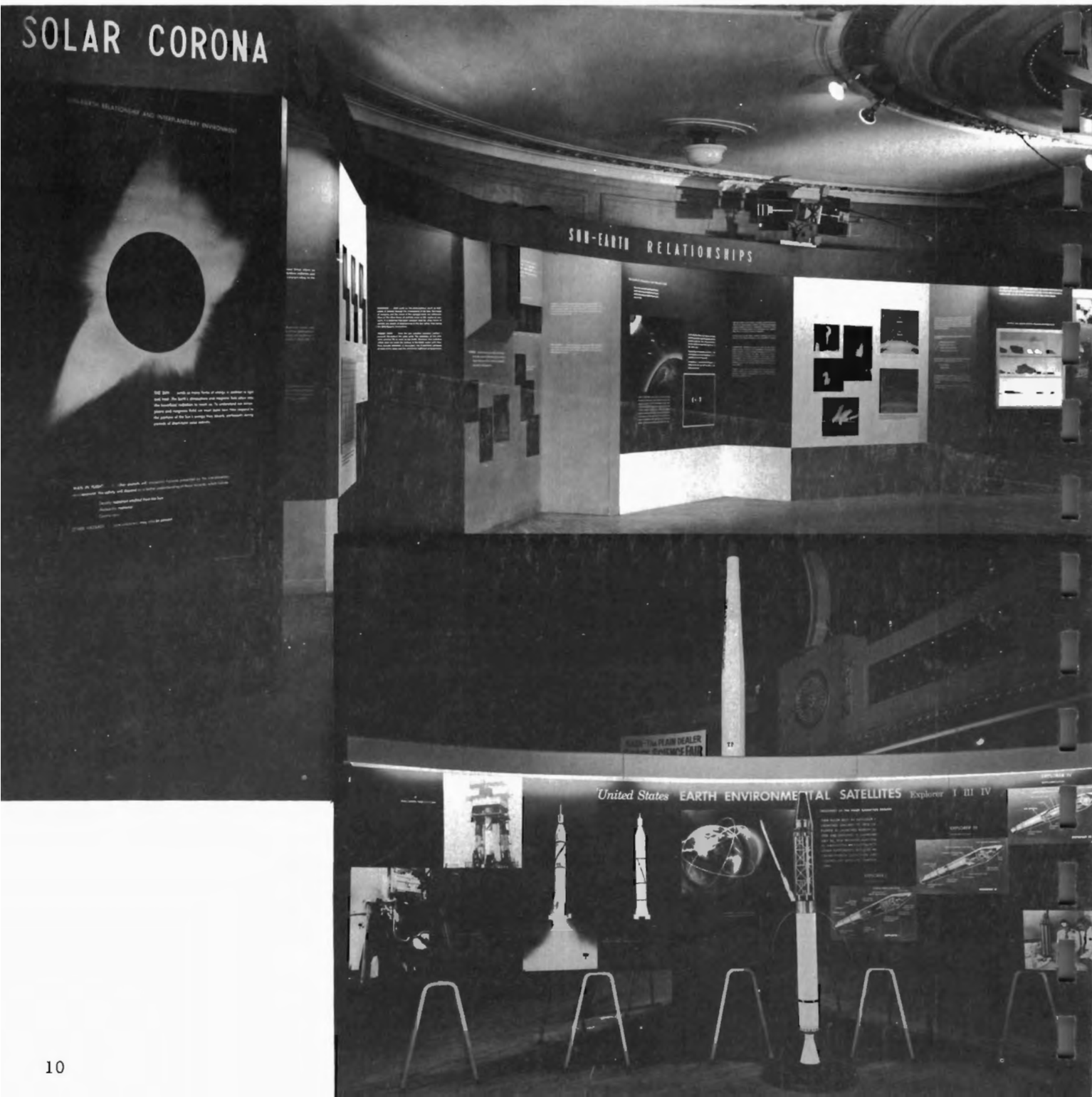
Because activity throughout the solar system is influenced by the sun, our present knowledge of the effects of the sun on the earth and interplanetary space were reviewed. Reasons for further research of sun-earth relations especially from spacecraft were indicated with emphasis on manned space flight. A discussion of meteoritic material and cosmic rays, additional hazards in interplanetary space, was also presented.

LIVE DEMONSTRATION: Operating cloud chamber.

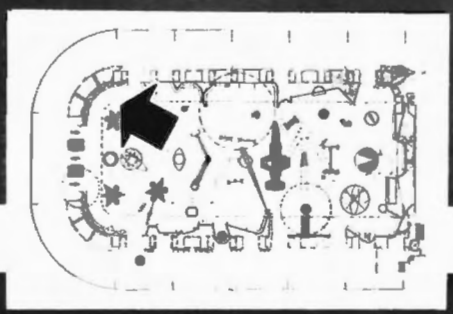
MODELS: Full-scale Explorer I, VI, VII, and VIII; Vanguard I, II, and III; 1/6-scale OGO; and meteor samples.

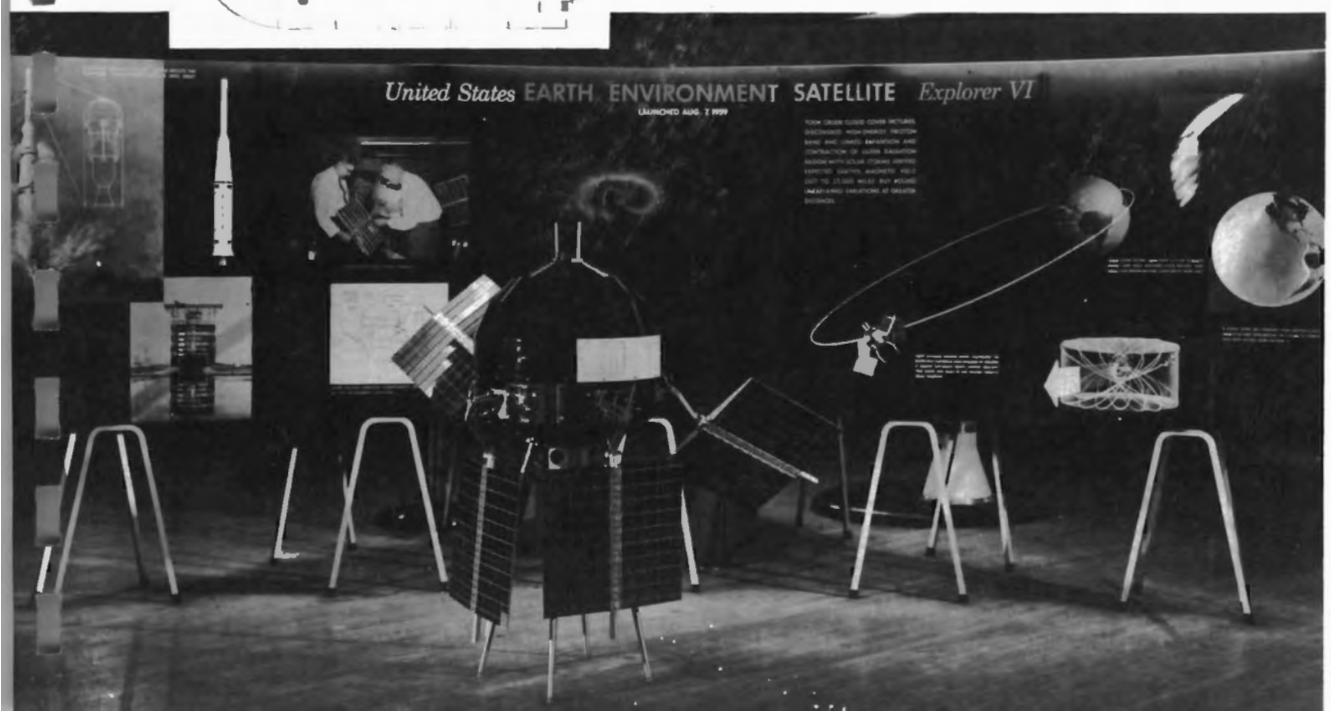
MOTION PICTURES: Continuous film on solar flares (3 min, color, sound).

TECHNICAL HOST: One




SUN-EARTH RELATIONSHIPS




United States EARTH ENVIRONMENT SATELLITE Explorer VI

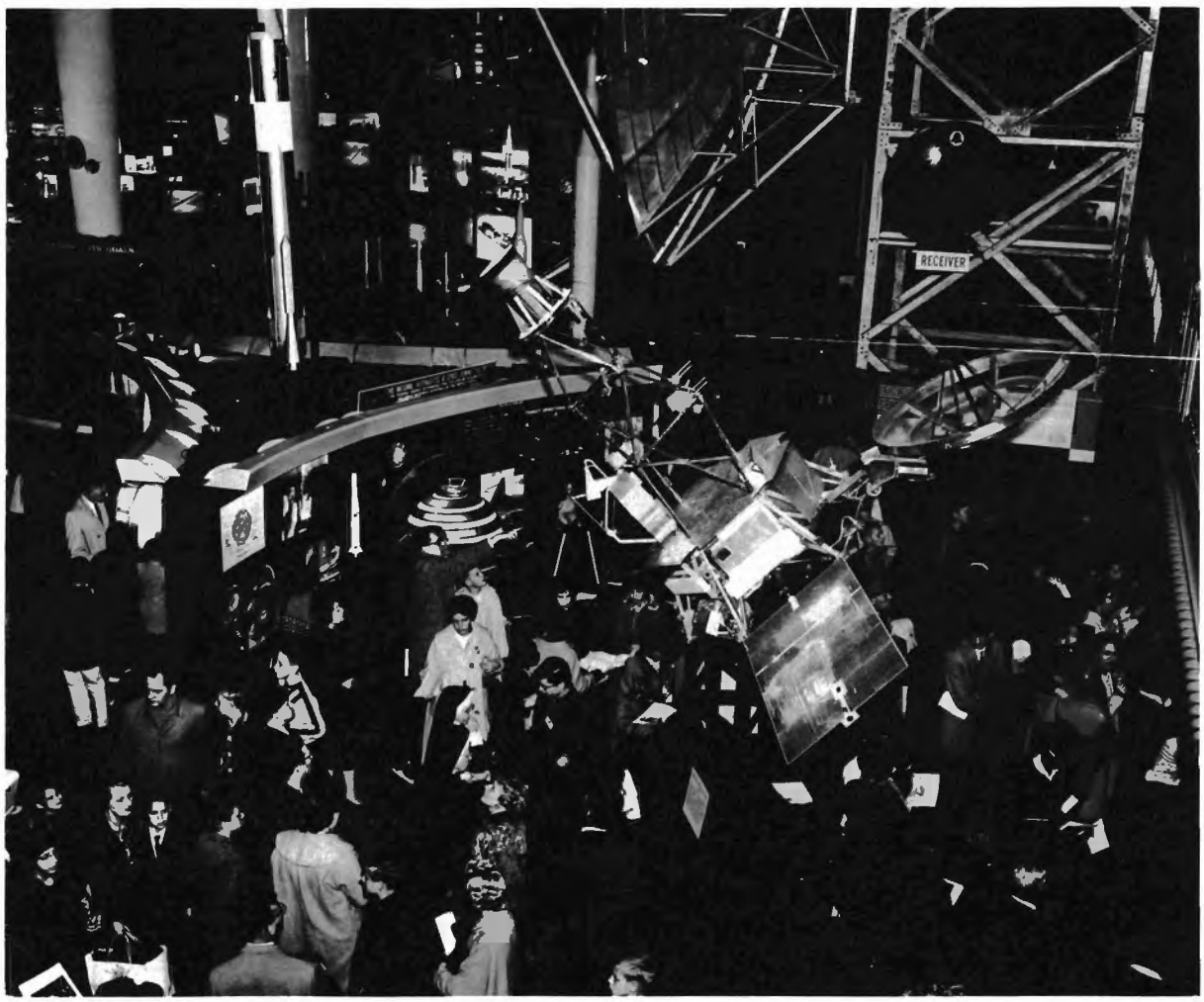
ASTRONOMY (WITH SPACECRAFT) AREA A

The advantages of astronomical research from satellites and space probes were explained. A better understanding of both the universe and the solar system has been hampered by the presence of the atmosphere of the earth. The benefits to be obtained from the extension of observations into previously inaccessible regions of the electromagnetic spectrum were shown along with the space vehicles proposed for such studies.

LIVE DEMONSTRATION: Operating full-scale OSO.

MODELS: Full-scale OSO, OAO, and Mariner II; 1/10-scale models of four typical sounding rockets.

TECHNICAL HOST: One




FOR ORDERLY REVIEW
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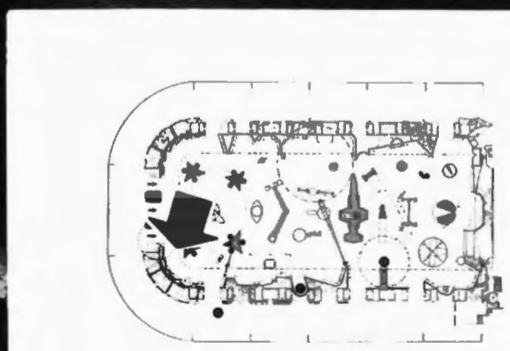
AL RESEARCH WITH SPACECRAFT

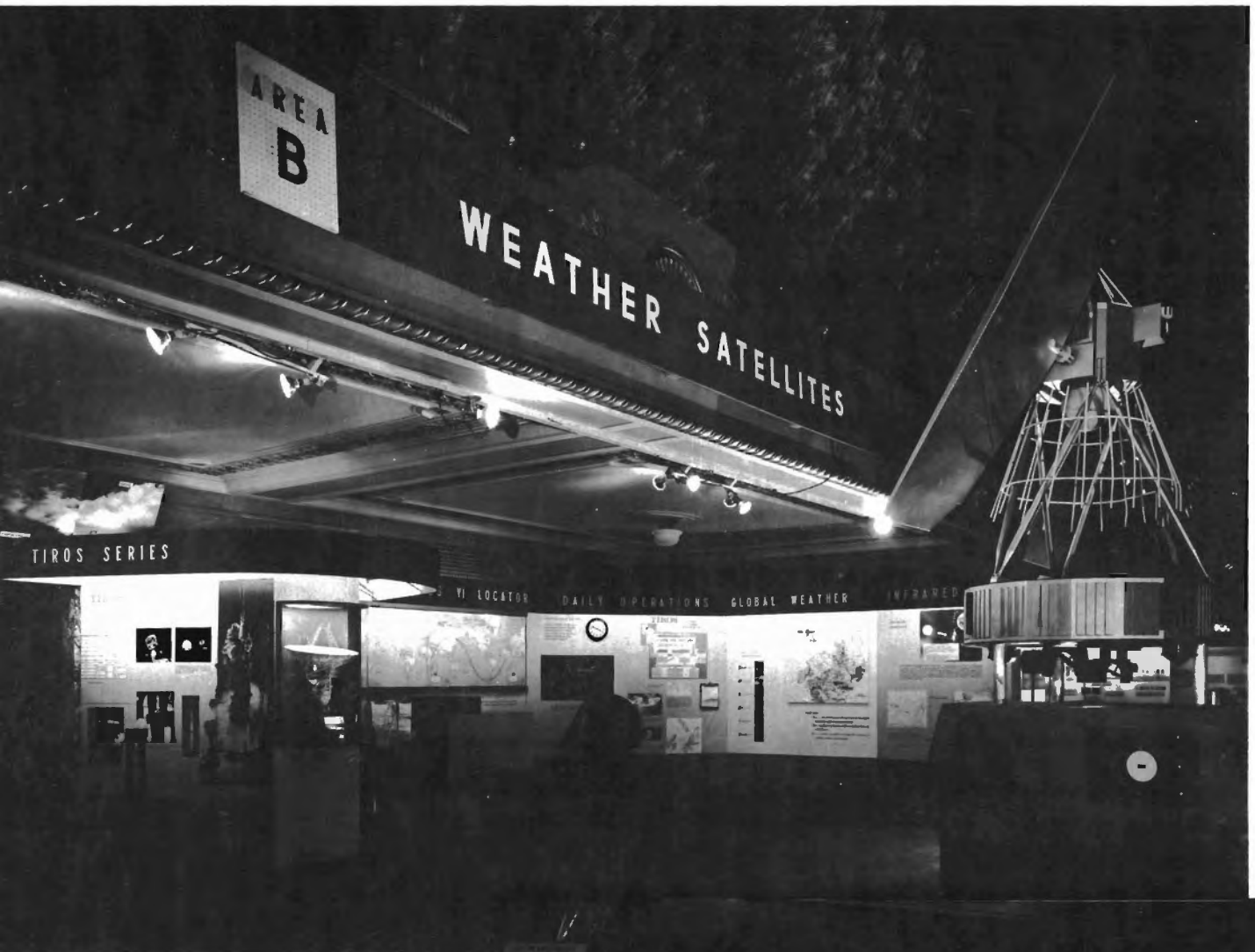

Orbiting Solar Observatory

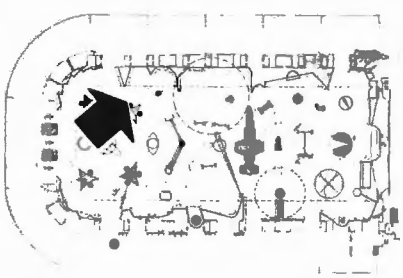


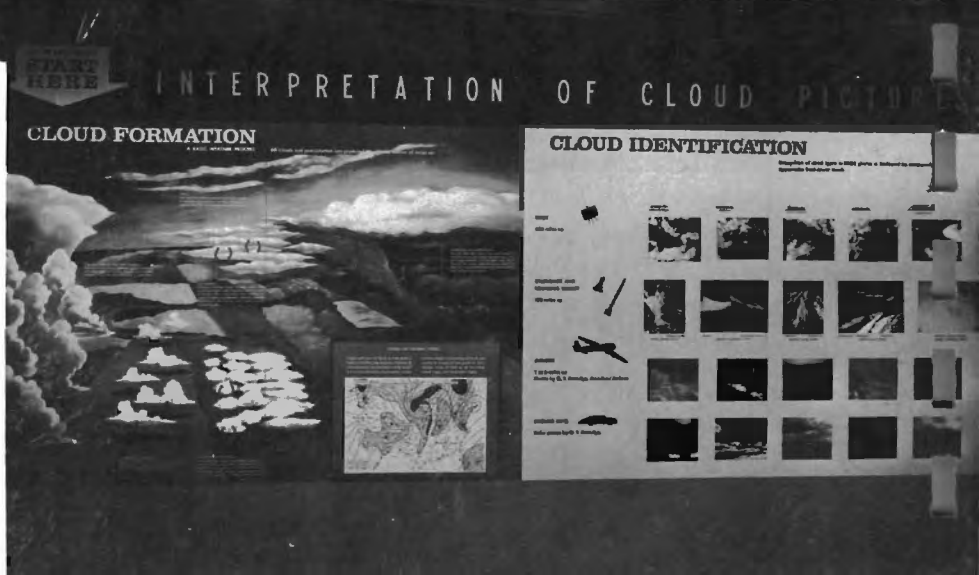

United States SPACE PROBE Pioneer IV

WEATHER SATELLITES AREA B

Explanations of the use of cloud pictures in weather forecasting were shown in addition to descriptions of Tiros and Nimbus. Data transmission, interpretation, and dissemination were also explained.
LIVE DEMONSTRATIONS: Posting of current Tiros weather bulletins, Tiros orbital details, operating photo facsimile receiver producing Polaroid Tiros cloud pictures from prerecorded magnetic tapes. (photographs were given to some visitors.)
MODELS: Full-scale Tiros and Nimbus and small-scale Nimbus data acquisition antenna.
TECHNICAL HOSTS: Two








TIROS SERIES
TIROS
TIROS VI LOCATOR
DAILY OPERAT
NIMBUS
TIROS

STRUCTURES AND MATERIALS AREA C

The importance of structures and materials and associated problems in space applications were described. Main subjects included structural design for high temperatures; minimum weight structures; unstable forces; nonrigid, inflatable, and mechanical structures; soft-landing techniques; and meteoroid hazard in space.

LIVE DEMONSTRATIONS: Lecture (10 min) with operating demonstrations every 1/2 hour on (1)high-temperature problems, the effect of high and low temperatures on materials, and explanation of soft-landing air bag and frangible tube; (2)micrometeoroid instrumentation, micrometeoroid penetration, and expandable structure micrometeoroid penetration satellite.

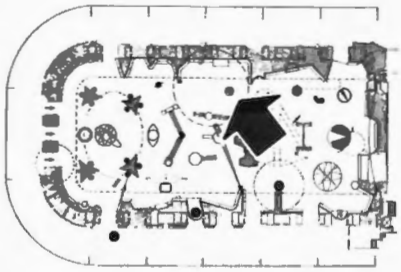
MODELS: Saturn (1/48-scale), X-15 (24 in.), fuel-sloshing tank, S 55 micrometeoroid penetration satellite model (1/2-scale), S 65 expandable structure micrometeoroid penetration satellite (1/2-scale); operating vibration model of launch vehicle, operating air pressurized Atlas model, 26 samples of various materials and structures.

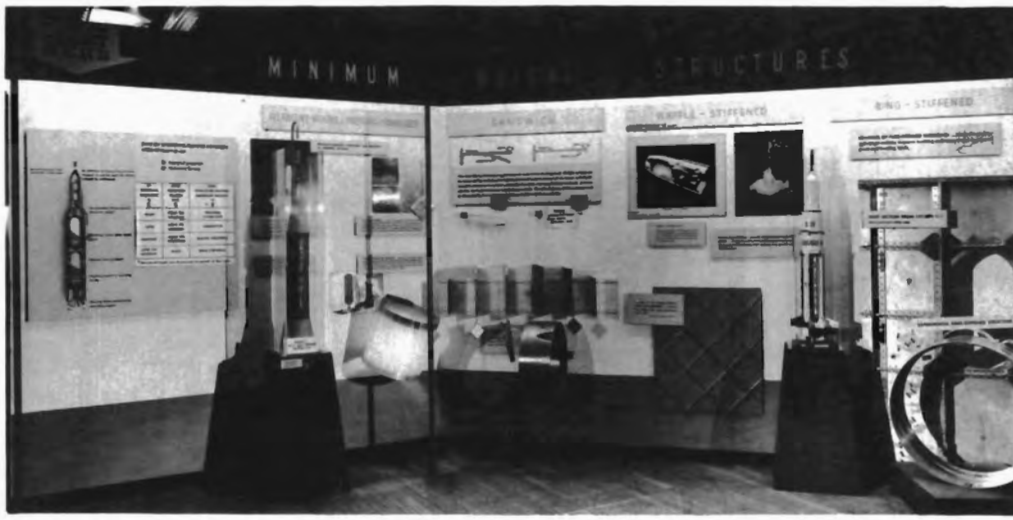
MOTION PICTURES: Continuous film on space structures (4 min) color, sound: continuous film on aerodynamic heating (2-1/2 min) black and white.

TECHNICAL HOSTS: Two

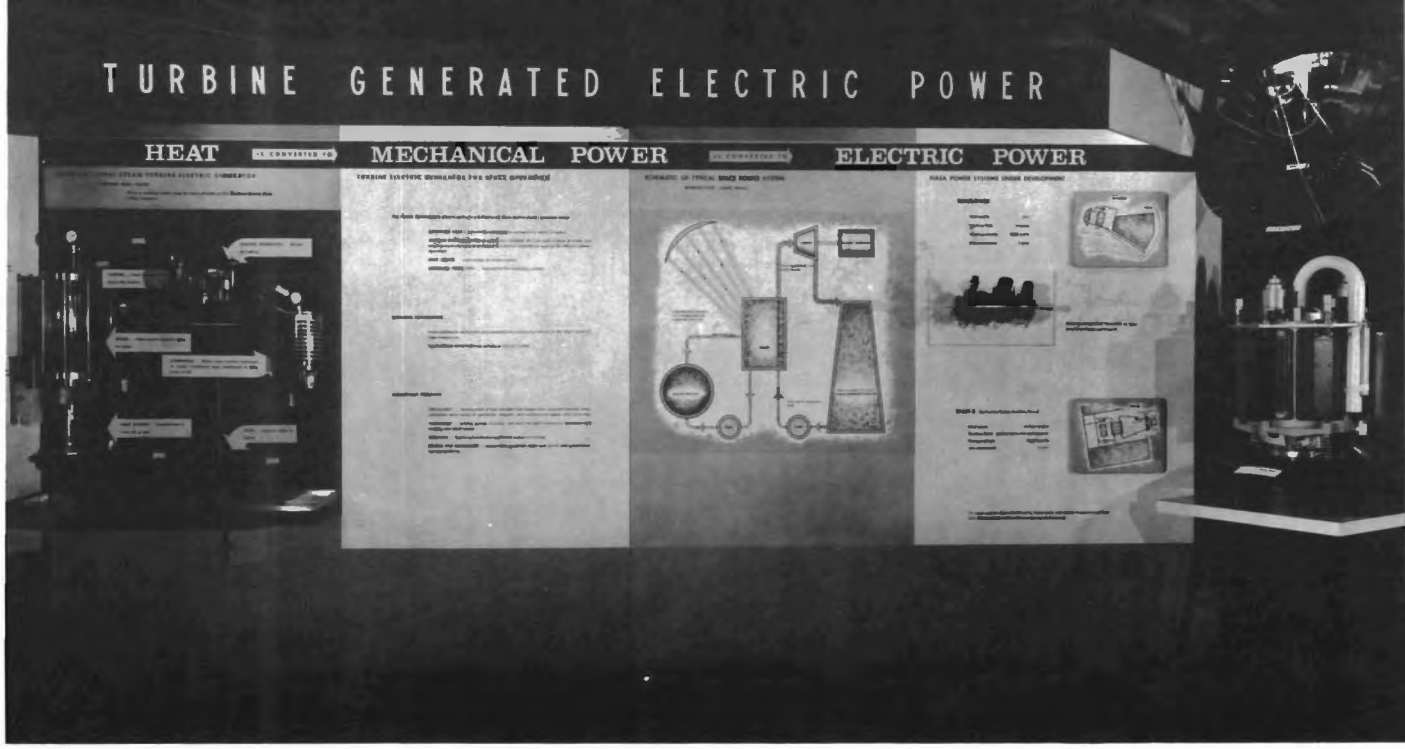
TECHNICAL LECTURERS: Two

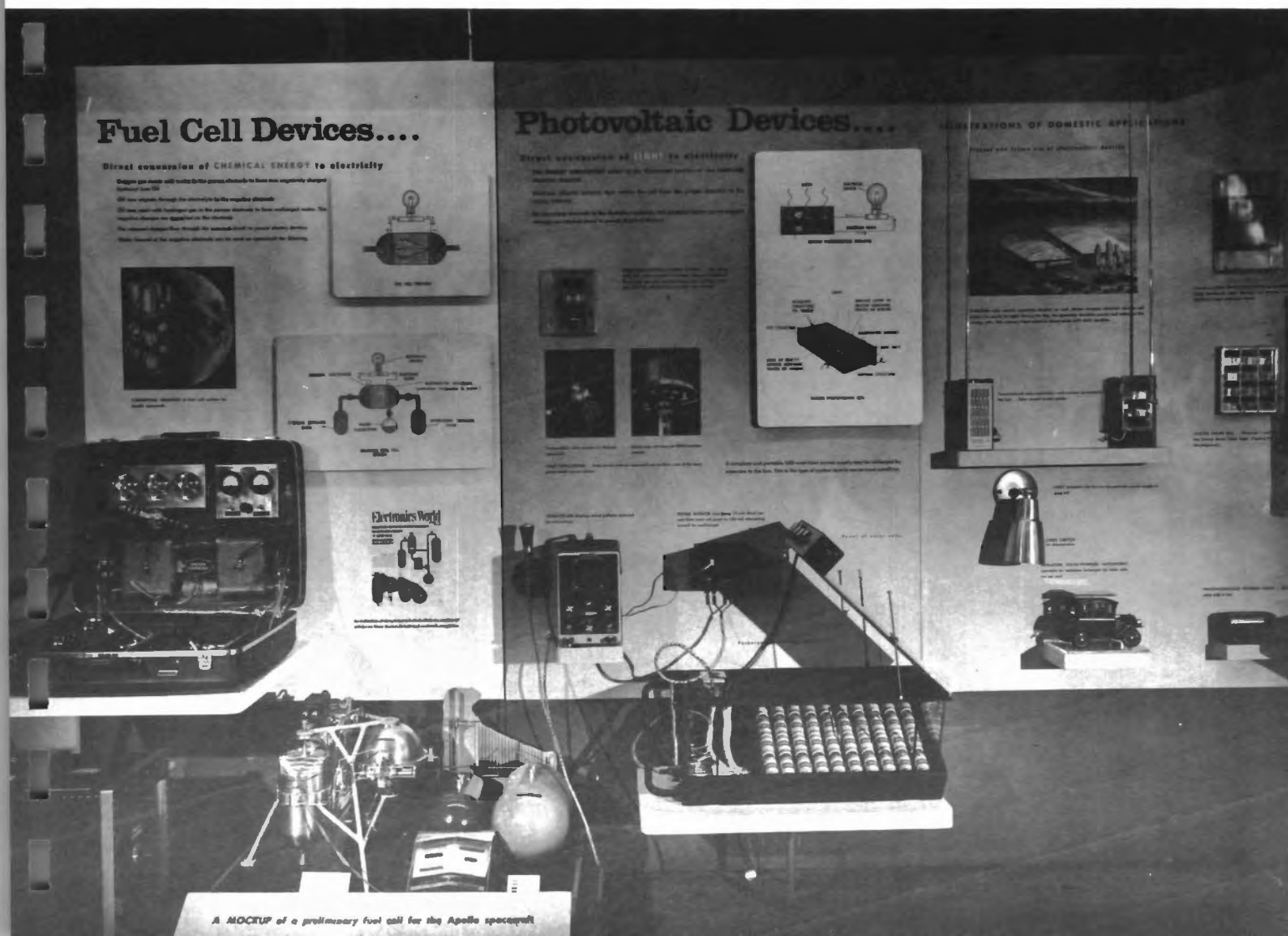

AREA C
STRUCTURES AND MATERIALS




MINIMUM
STRUCTURES


UNSTABLE FORCES
DESIGN FOR HIGH TEMPERATURE





A MOCKUP of a preliminary fuel cell for the Apollo spacecraft

ELECTRIC PROPULSION (FLIGHT BEYOND THE MOON) AREA E

The basic principles of ion, plasma, and fusion rockets were explained. A possible future application to a hypothetical manned interplanetary space flight was illustrated in a step-by-step sequence of nine frames of color artwork.

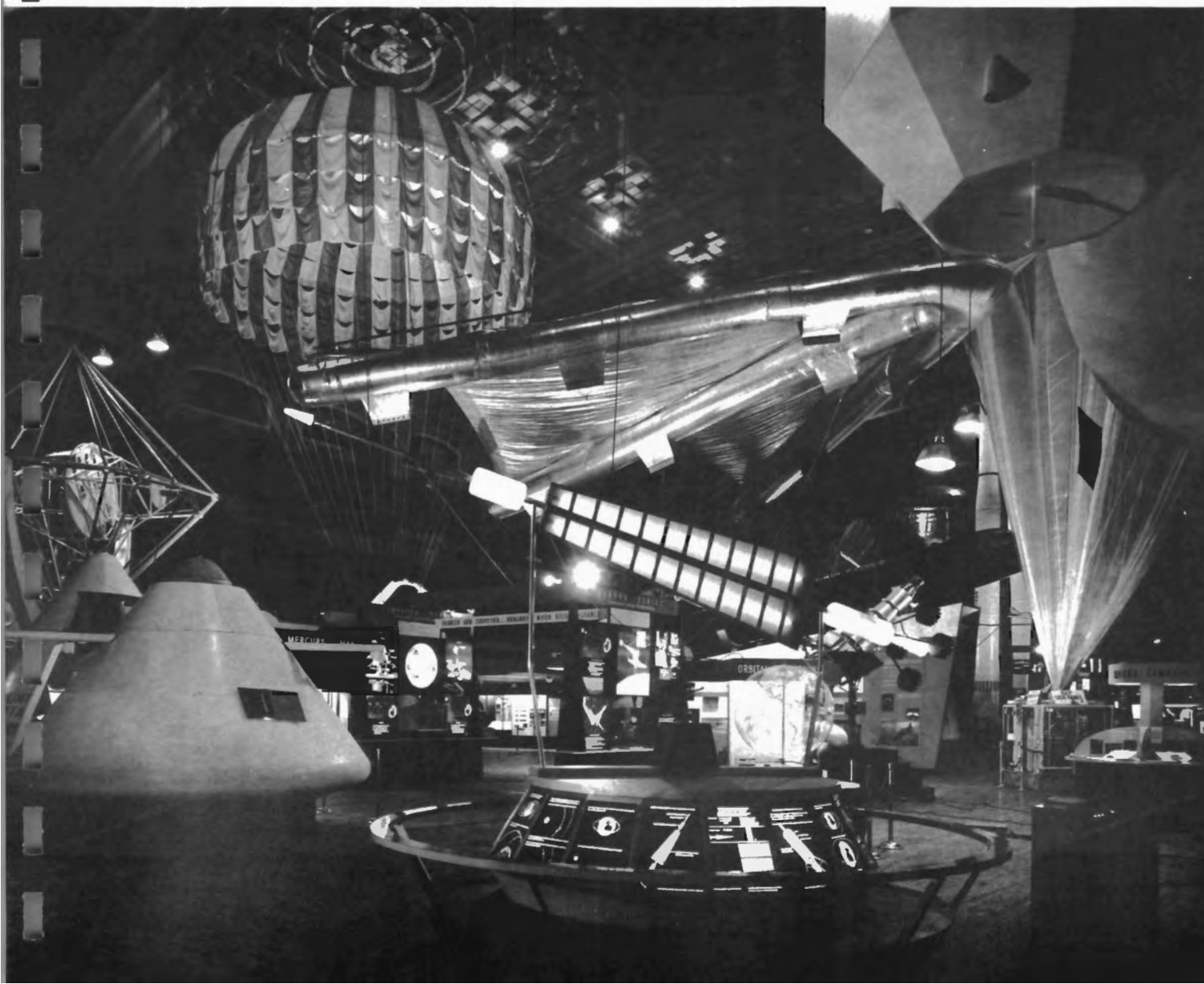
LIVE DEMONSTRATIONS: Ion acceleration and magnetic containment of thermonuclear fusion reaction.

MODELS: Ion propulsion system for Syncom II communication satellite; hypothetical scale models of nuclear turboelectric, radioisotope electrostatic, and thermonuclear fusion space vehicles; full-scale model of SERT. Actual research hardware included four ion engines.

MOTION PICTURES: Continuous animated film of ion rocket powered hypothetical spacecraft flight to Mars and return (3 min, color, sound). Two slide projectors provided more detailed explanations of ion, radioisotope, and fusion basic principles.

TECHNICAL HOSTS: Two


START
HERE



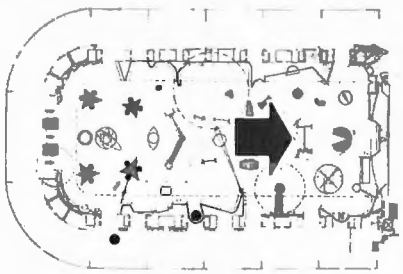
LUNAR EXPLORATION AREA F

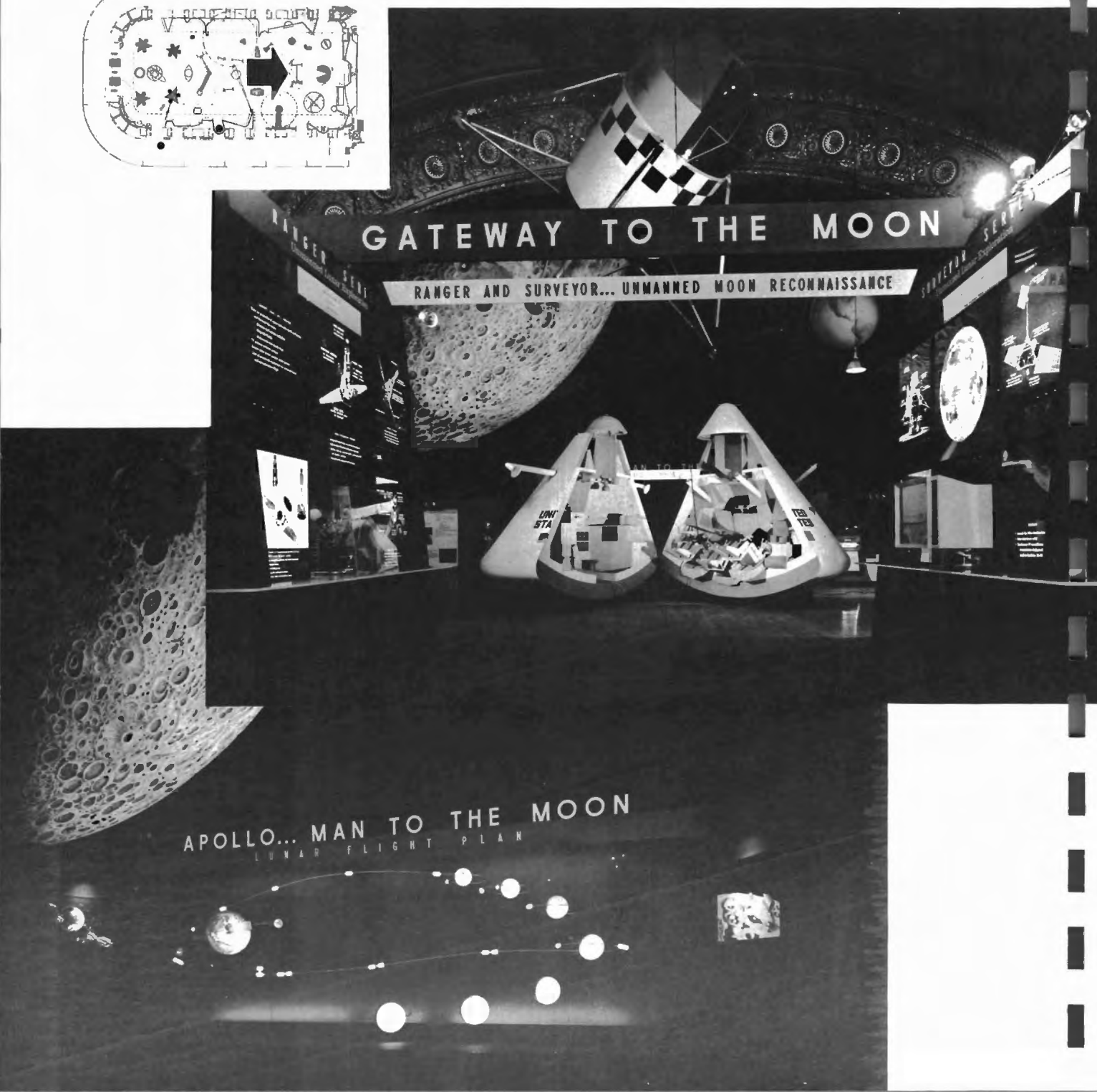
The need and the missions of the Ranger and Surveyor unmanned spacecraft series were explained. Project Apollo flight plans were illustrated by an animated schematic panel with two synchronized slide projectors. The entire exhibit was set against a 30-foot diameter moon stage backdrop with an 8-foot-diameter earth.

MODELS: Full-scale Apollo command module and lunar landing bug; full-scale Ranger and Surveyor; small-scale hypothetical lunar base; cutaway 1/96 scale Apollo launch vehicle.

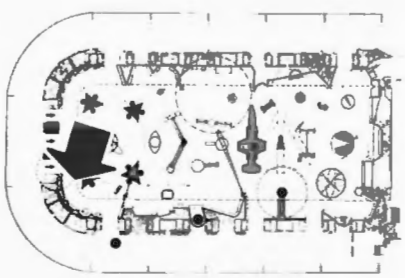
MOTION PICTURES: Continuous film of Ranger and Surveyor (3 min, color, silent); two slide projectors describing Apollo flight plan.

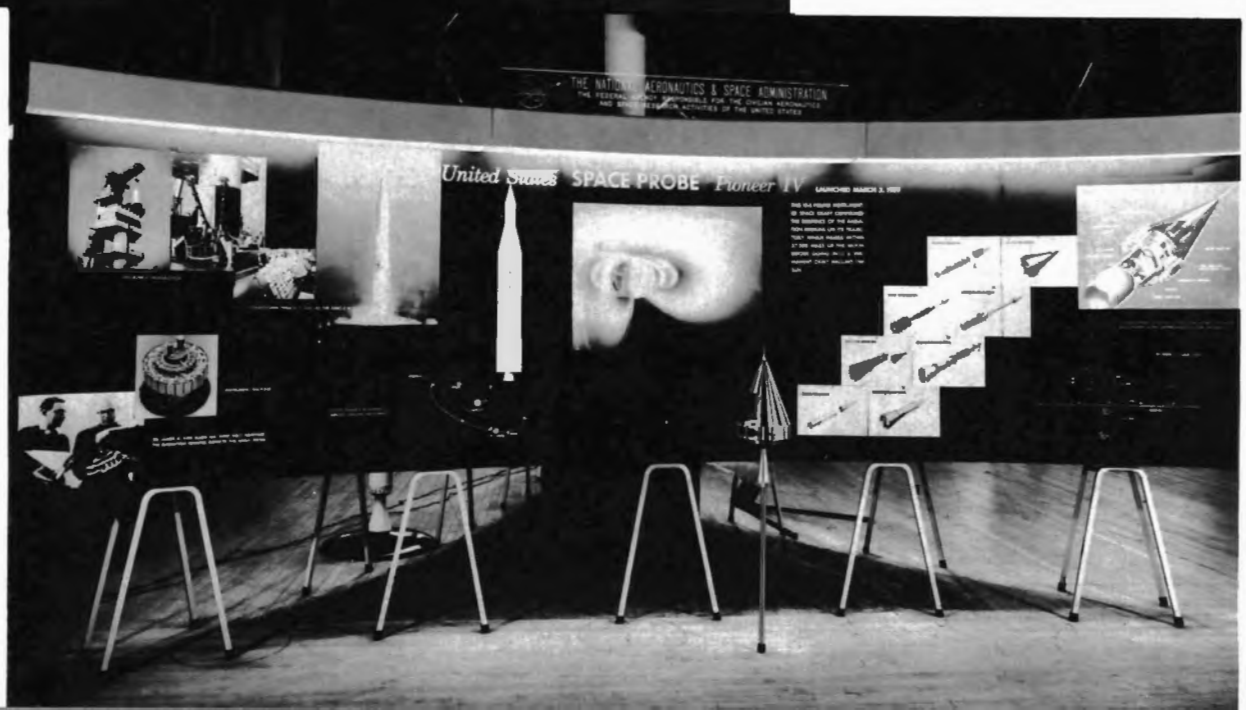
TECHNICAL HOSTS: Three





Orbiting Solar Observatory





WEATHER SATELLITES AREA B

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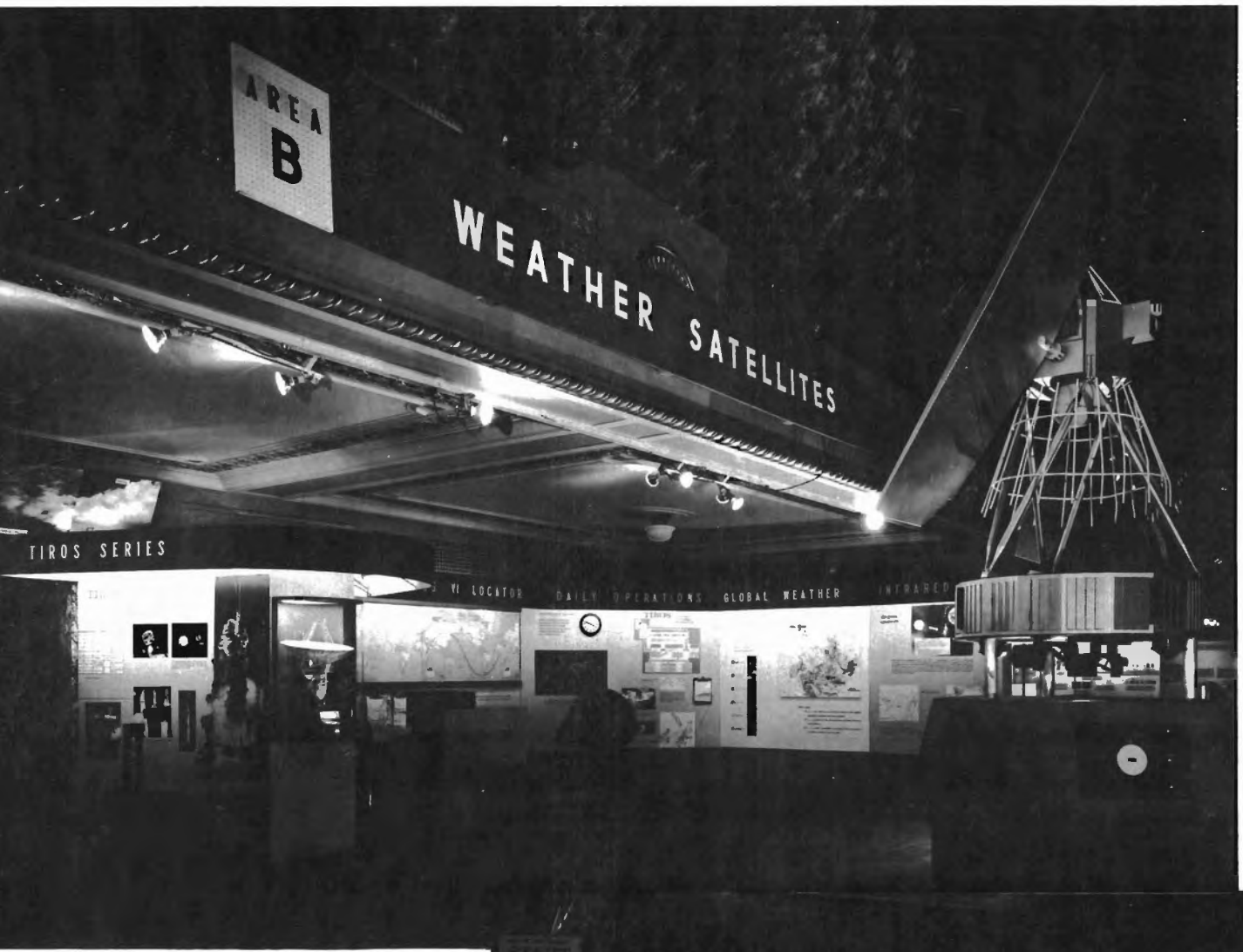
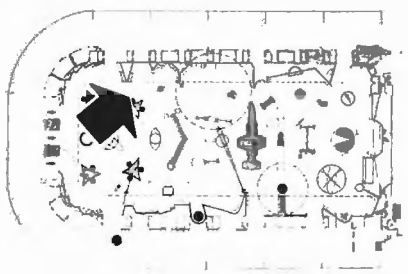
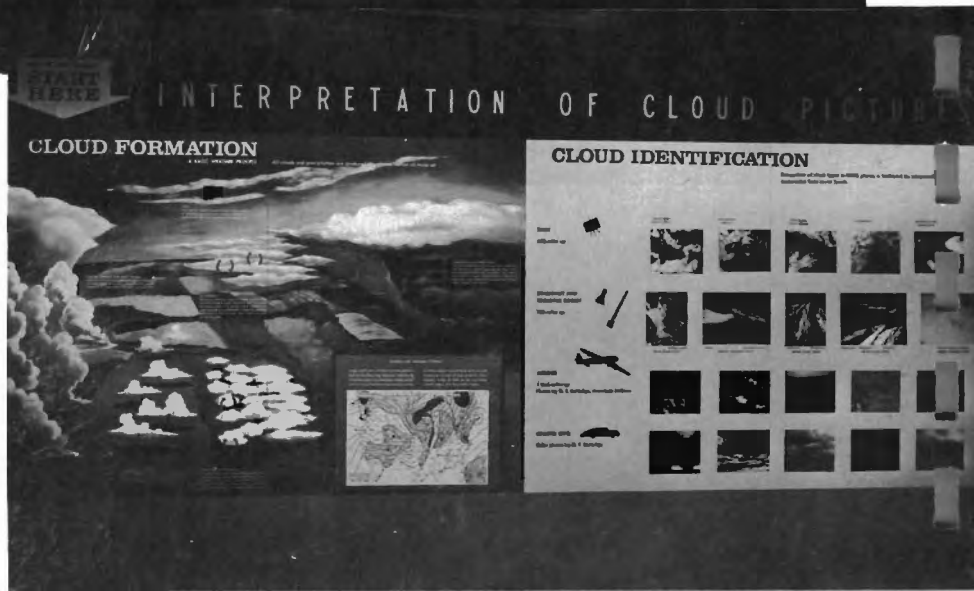
LIVE DEMONSTRATIONS: Posting of current Tiros weather bulletins, Tiros orbital details, operating photo facsimile receiver producing Polaroid Tiros cloud pictures from prerecorded magnetic tapes. (photographs were given to some visitors.)

MODELS: Full-scale Tiros and Nimbus and small-scale Nimbus data acquisition antenna.

TECHNICAL HOSTS: Two








SURVEYOR


SURVEYOR SERIES
Unmanned Lunar Exploration


GATEWAY TO THE MOON
RANGER SERIES
SPACE STATIONS
RANGER

BIOASTRONAUTICS AREA G

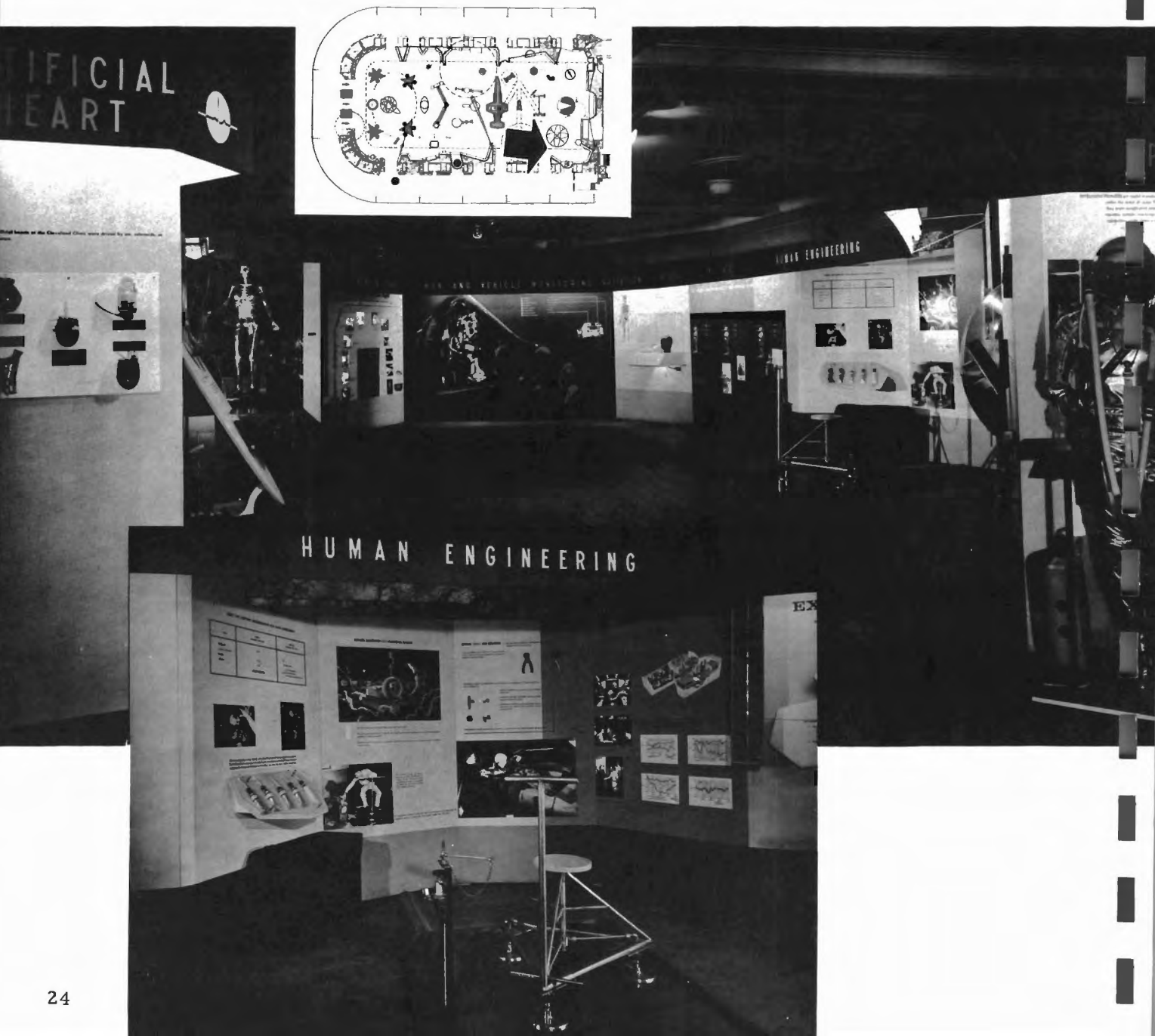
The problems faced by manned space exploration included explanations of radiation, metabolic cycles, human stresses, man and spacecraft instrumentation, human engineering, astronaut training, instruments to determine whether life exists on other planets, and one example of space applications, the artificial heart.

LIVE DEMONSTRATIONS: Full-scale multi-axis training device (MASTIF) that operated continuously by electric power with the jet operation explained by a small-scale, audience-participation-model; operating air-bearing "scooter" to illustrate mechanical manipulation problems under weightless conditions; and a research model of a mechanical artificial heart.

MODELS: Transparent full-size human model with lights and synchronized sound track to highlight metabolic problems in space, X-15 spacesuit, Mercury spacesuit, Gulliver life detection device, and samples of space food containers.

TECHNICAL HOSTS: Two, one wearing a Mercury spacesuit.

MOTION PICTURES: Continuous film on the devices used to simulate man's physical and psychological experiences in space. 12 min, color, sound.



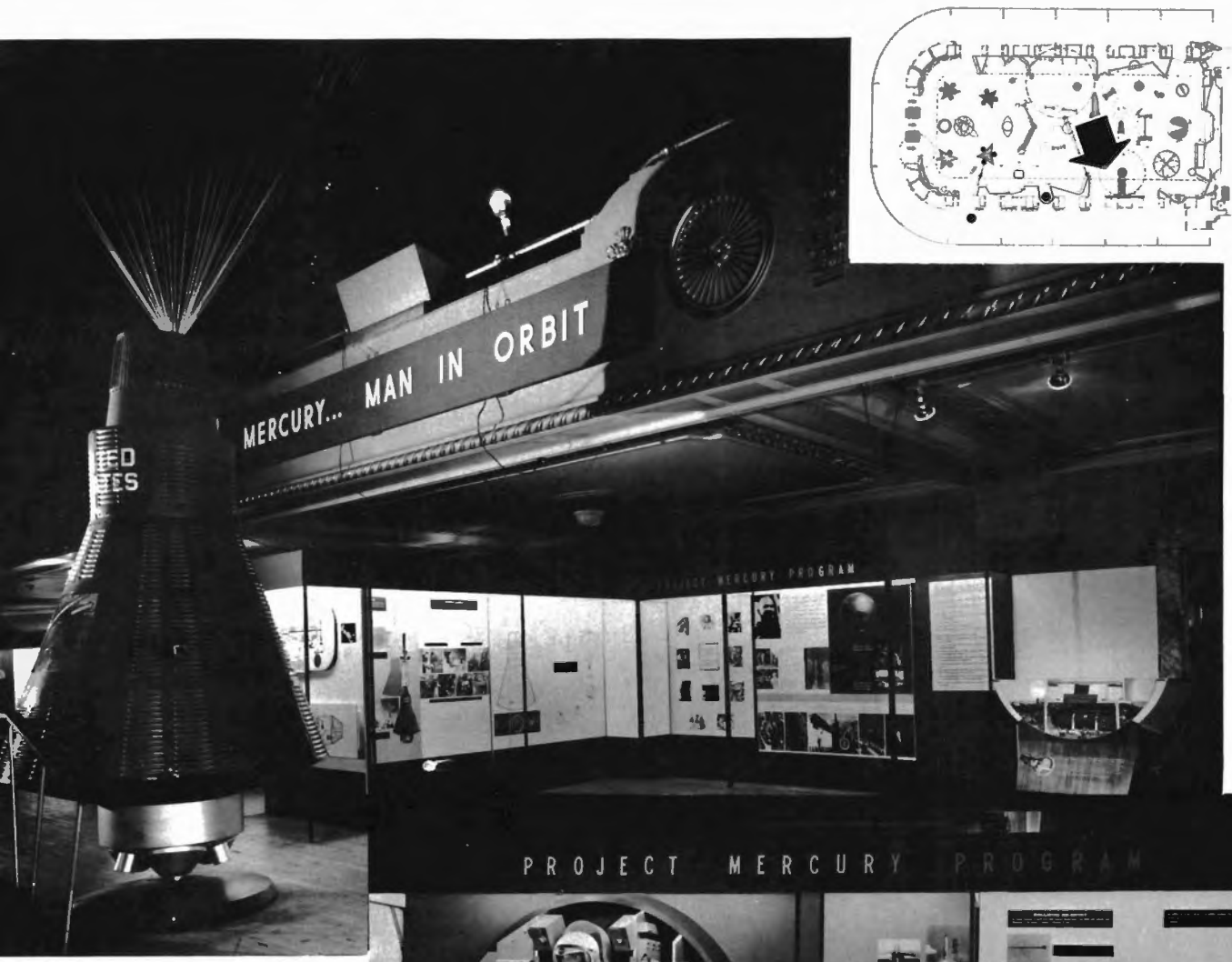

ARTIFICIAL
HEART

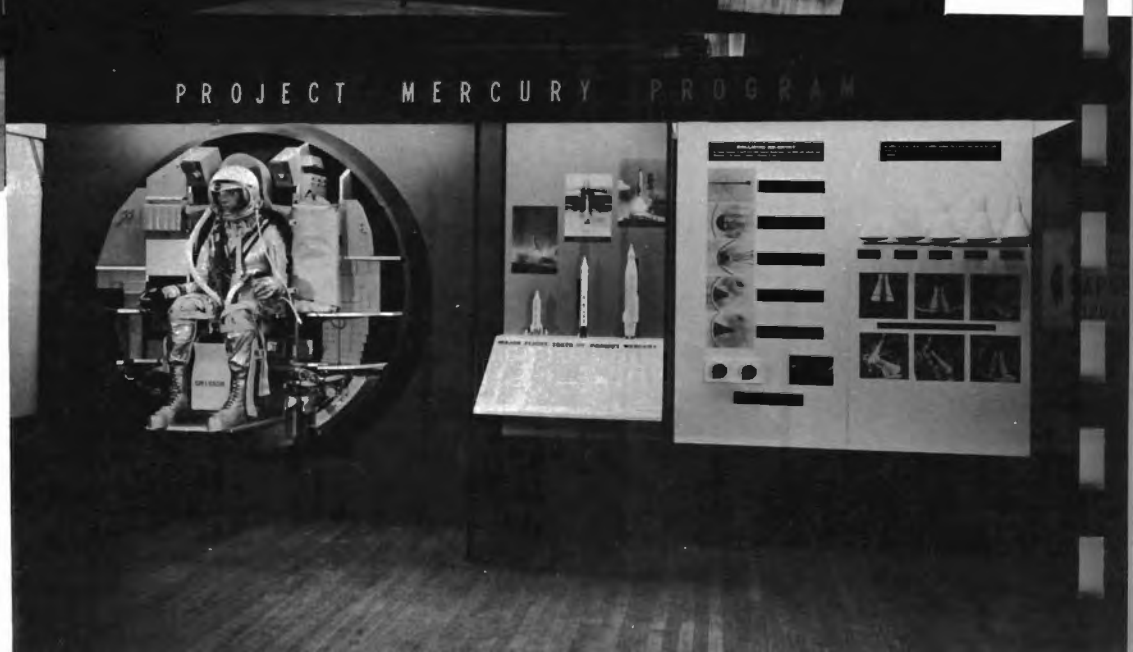
MAN IN ORBIT AREA H

The Project Mercury program, the astronauts, and Project Gemini and its missions were described.

MODELS: Mercury capsule mockup with parachute (full scale), Gemini capsule mockup with Ragallo wing (full scale), operating centrifuge (scale model), rocket sled (scale model)

TECHNICAL HOSTS: Two






Gemini, the "second generation" manned United States spacecraft
UNITED STATES
GEMINI-NEXT STEP INTO SPACE
AREA H

TELEMETRY, TRACKING AND GUIDANCE AREA J

The importance of knowing the exact location of a spacecraft and of the need for tracking, communication, and guidance were explained along with basic principles and techniques employed in this area.

LIVE DEMONSTRATIONS: A 3-foot articulated antenna tracked an operating satellite swinging in a 70-foot circle from the arena ceiling. Transmitted signals were sent via a telemetry system from the satellite to a ground receiving station and were displayed on an oscilloscope. Doppler tracking was explained, and actual audio sounds from satellites and astronaut and cosmonaut voices were heard. A reaction-control jet star-seeker research rig on an air bearing demonstrated a satellite guidance problem. Other three-axis guidance systems employing gyros were explained and demonstrated.

MODELS: Two telemetry packages and three gyroscopes

TECHNICAL HOSTS: Two


VEHICLE ORIENTATION...aligns the vehicle as it travels its flight path. The star seeker aligns the vehicle with a star or other light emitting body . . .
it is useful for:
Orienting spacecraft to obtain maximum sunlight to energize solar cells for electric power.
Vehicle orientation for celestial navigation.
PRINCIPLES OF THE STAR SEEKER
FOR ORDERLY REVIEW
START HERE
TELEMETRY
Telemetry...
This station is receiving data from the orbiting satellite using an
DISPLAY EQUIPMENT

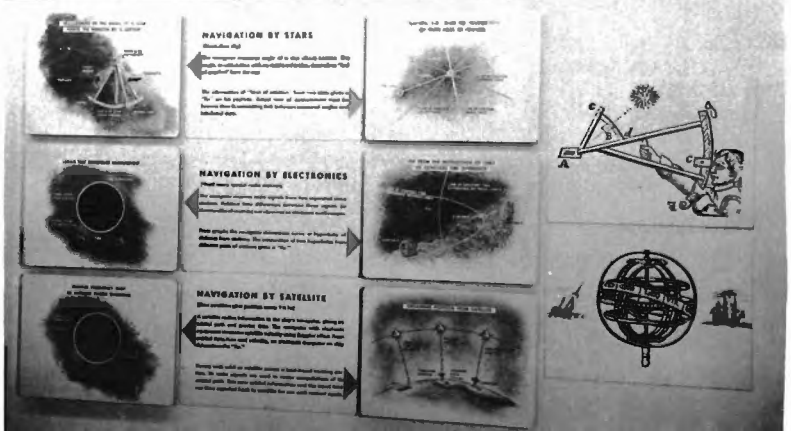
COMMUNICATIONS AND NAVIGATION AREA K

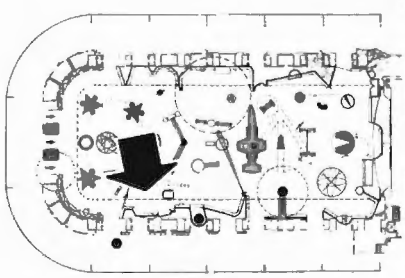
Active and passive communications satellites were explained and demonstrated. Early navigation techniques were illustrated and compared with navigation by satellite. Explanations of traveling wave tube, maser, signal strength, and degree of amplification necessary for satellite communication were offered.

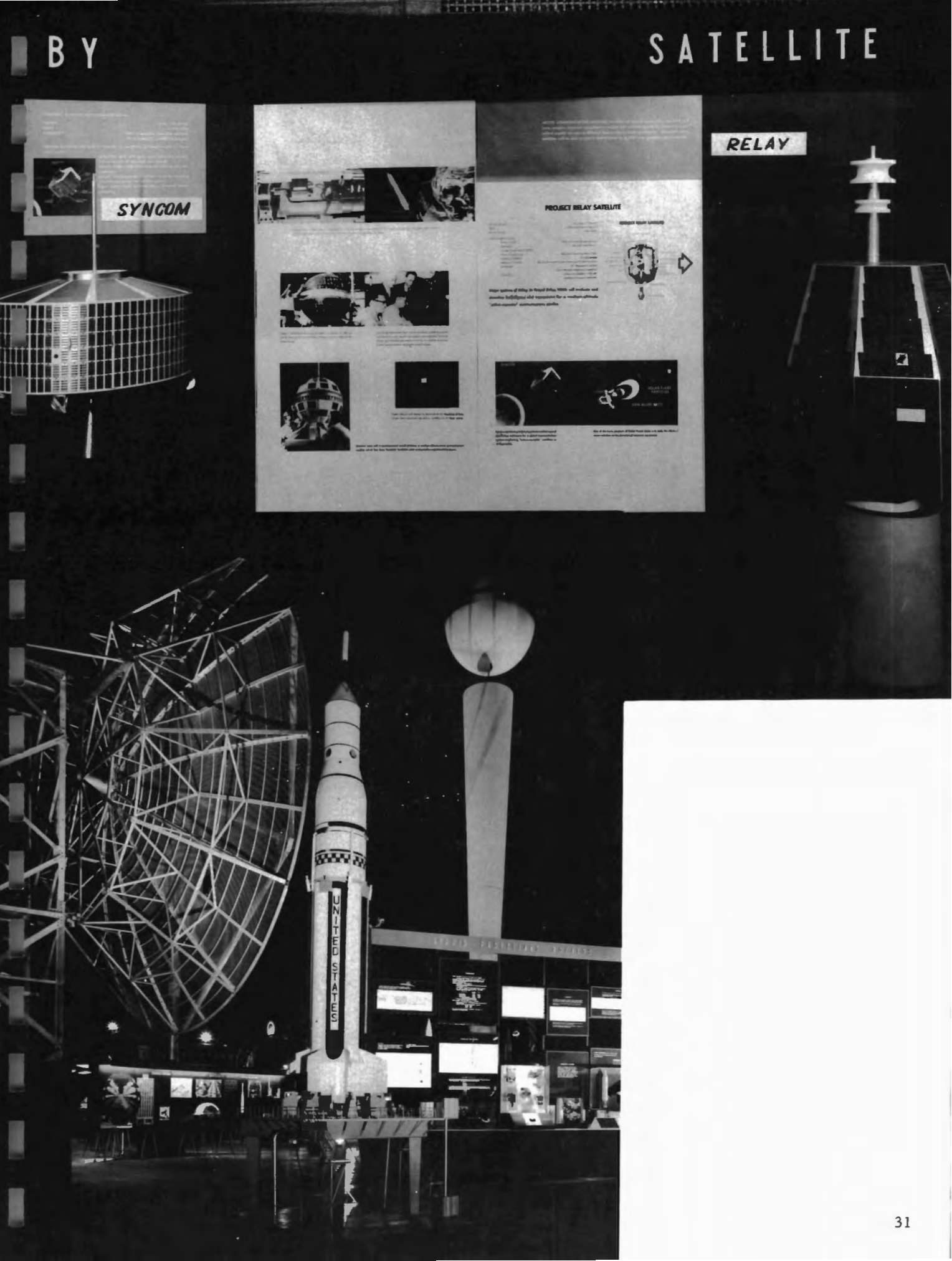
LIVE DEMONSTRATIONS: Television pictures of attendees were transmitted to a 25-foot-diameter Echo sphere and reflected to receiving equipment that converted signals for display on a 24-inch television screen.

MODELS: Tracking antenna (35-ft diam.), Echo 1 satellite (25 ft), full-scale Transit, Telstar, Relay, and Syncom.

TECHNICAL HOSTS: Two

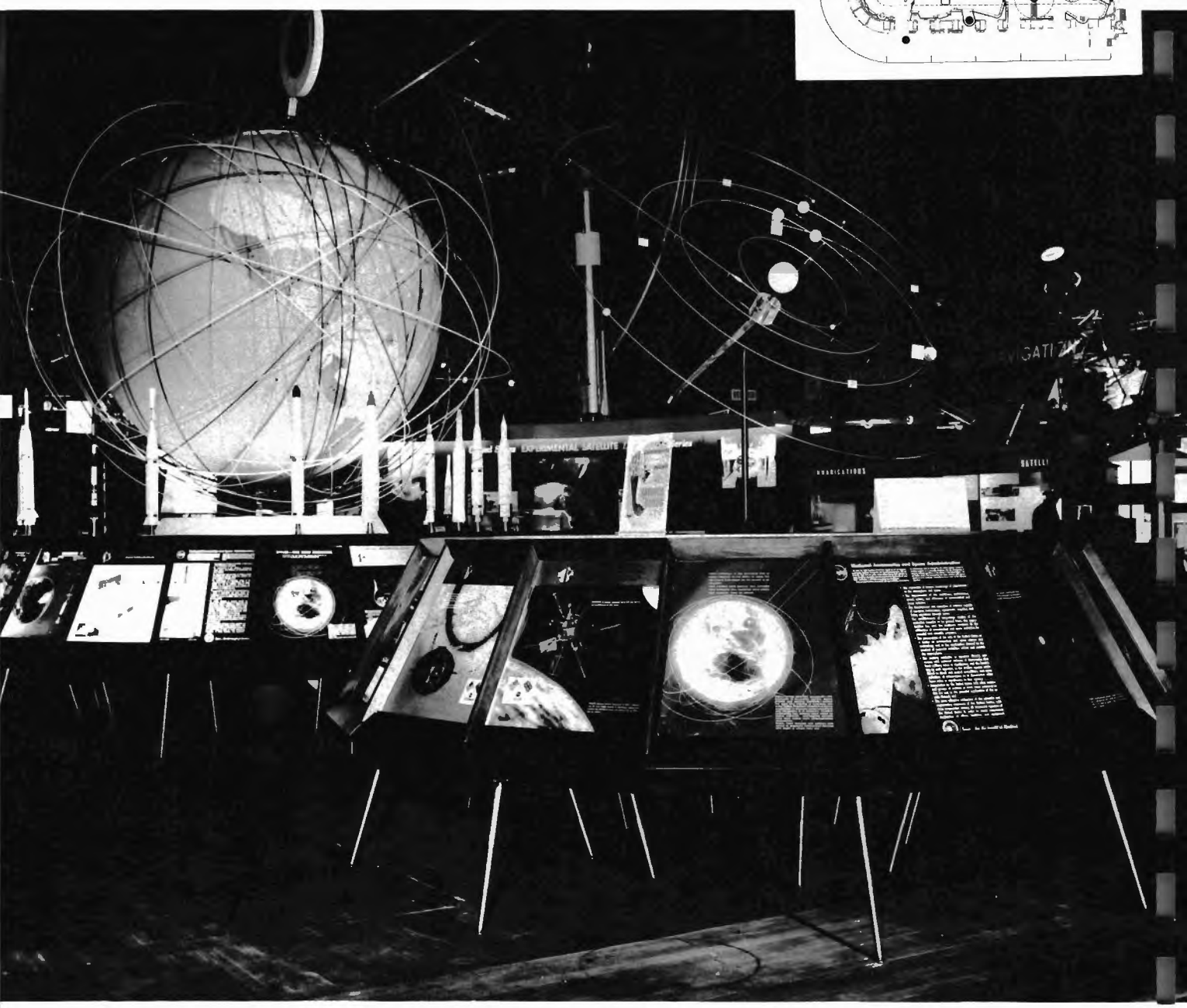


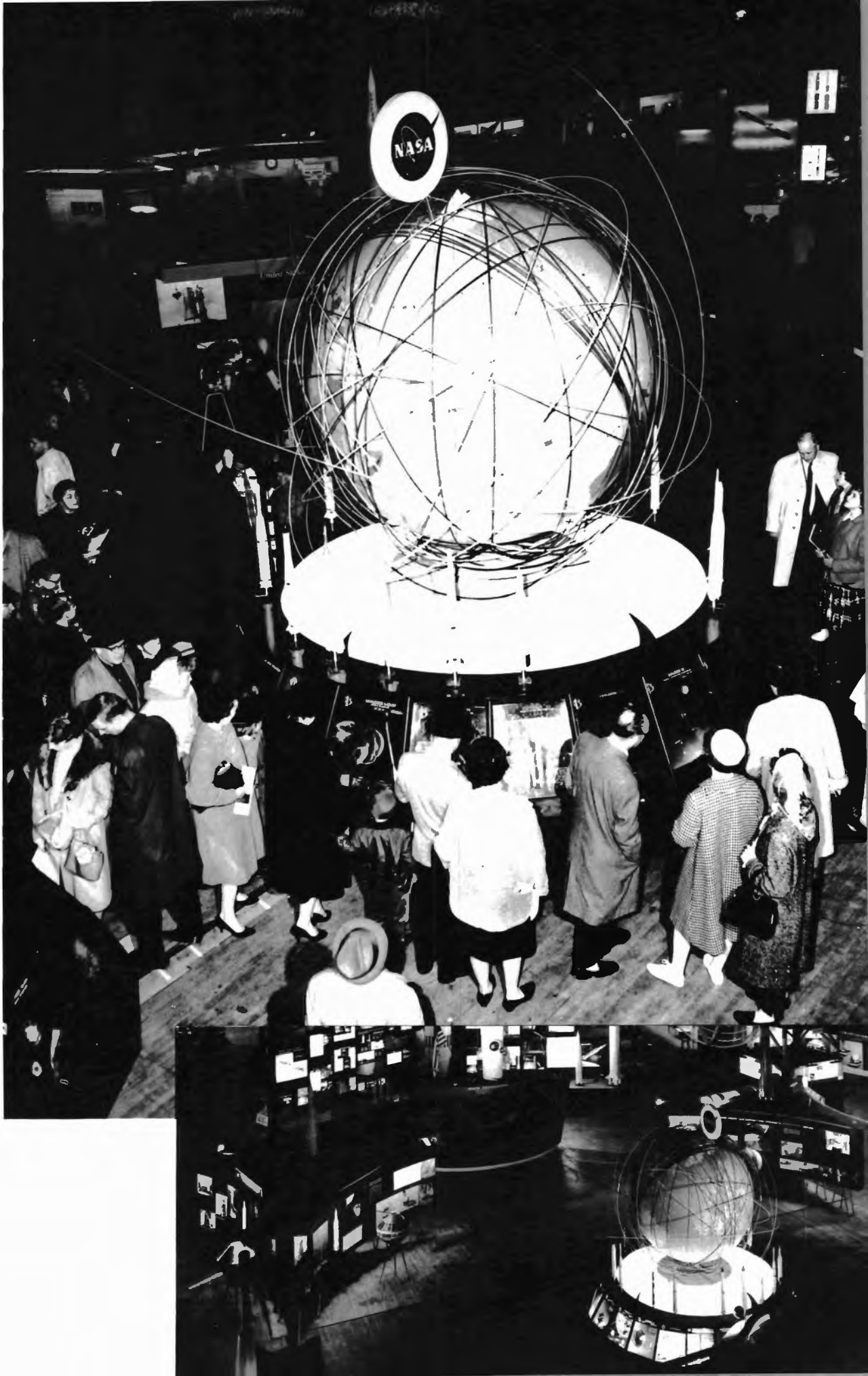



BY
SATELLITE
SYNCOM
PROJECT RELAY SATELLITE
RELAY
UNITED STATES

SUCCESSFUL SPACECRAFT AREA L AND M

Statistics were presented on all successful earth satellites on a back-lighted island exhibit featuring an 8-foot-diameter world globe. Successful space probes were similarly presented on a companion island exhibit that featured a planetarium with a tiny model of Mariner II, which was advanced daily along its flight path towards Venus.



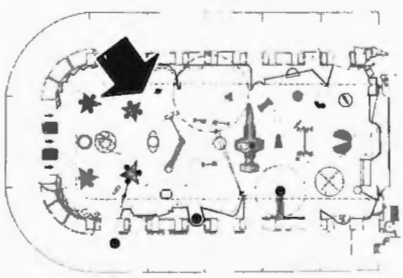

NASA

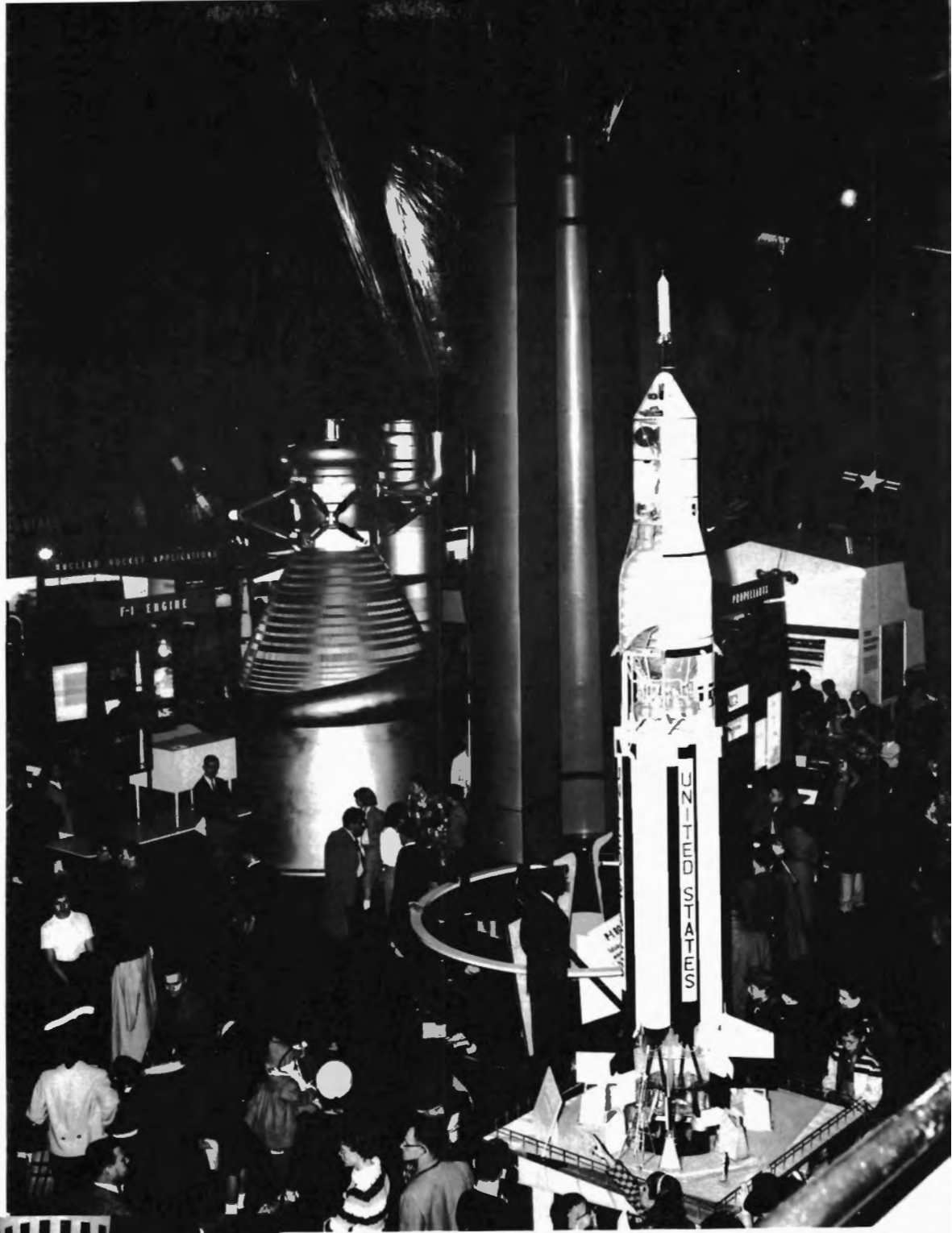
LAUNCH VEHICLES AREA O

Highlighted by a full-scale Scout, the Launch Vehicles section featured the NASA family of launch vehicles with explanations of the need for the different types and their capabilities.

MODELS: Vanguard, Juno II, Jupiter C, and Thor-Able shown as a group of early launch vehicles in comparison with Scout, Thor-Delta, Thor-Agena B, Atlas-Agena B, Atlas-Mercury, Atlas-Centaur, Saturn C-1, and Saturn C-5 (all 1/24 scale).

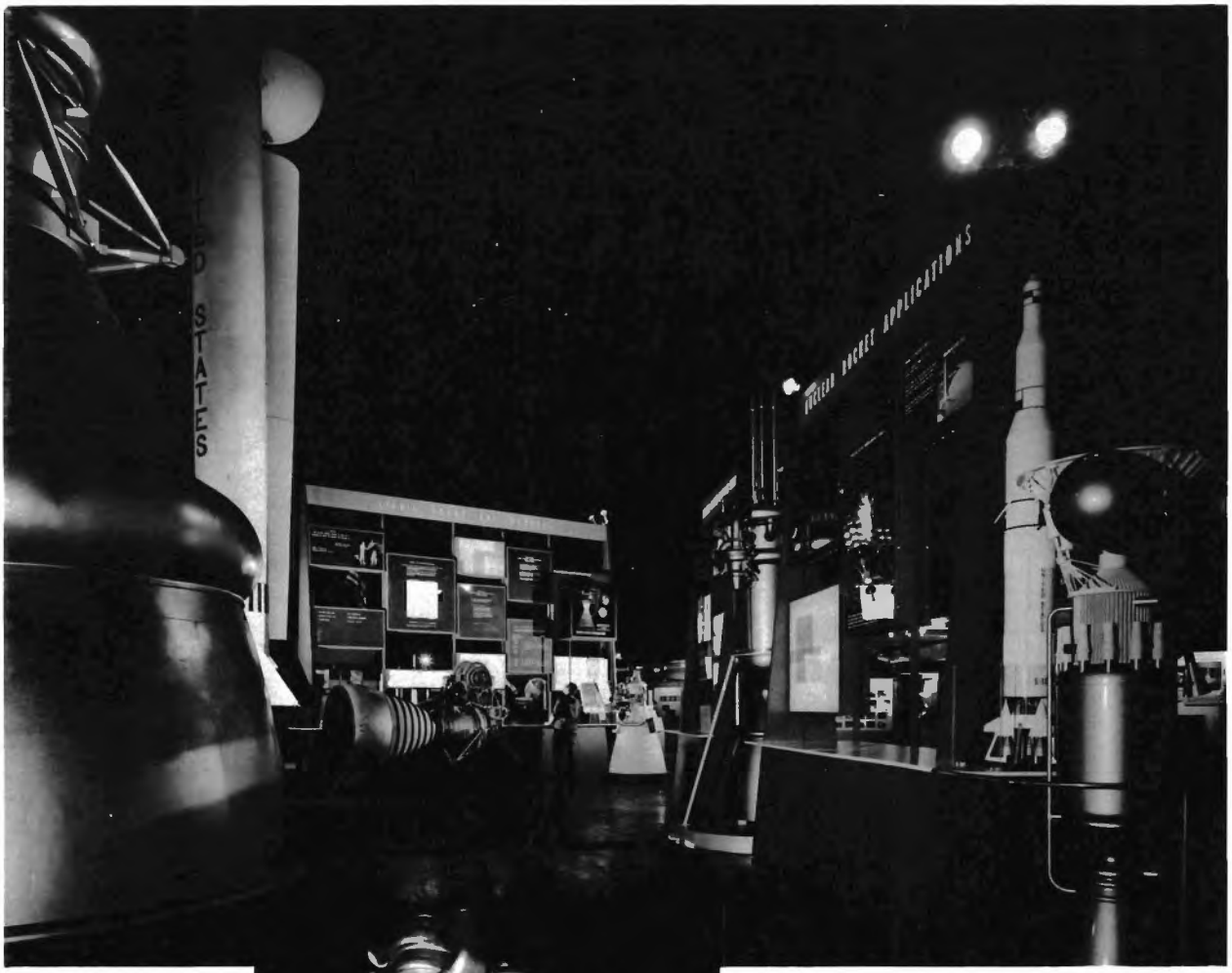
TECHNICAL HOSTS: Two

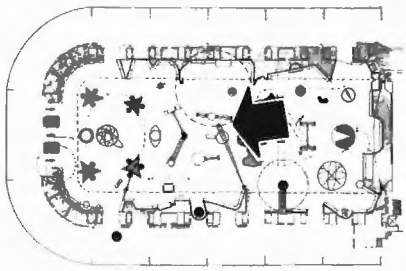



F-1 ENGINE
UNITED STATES

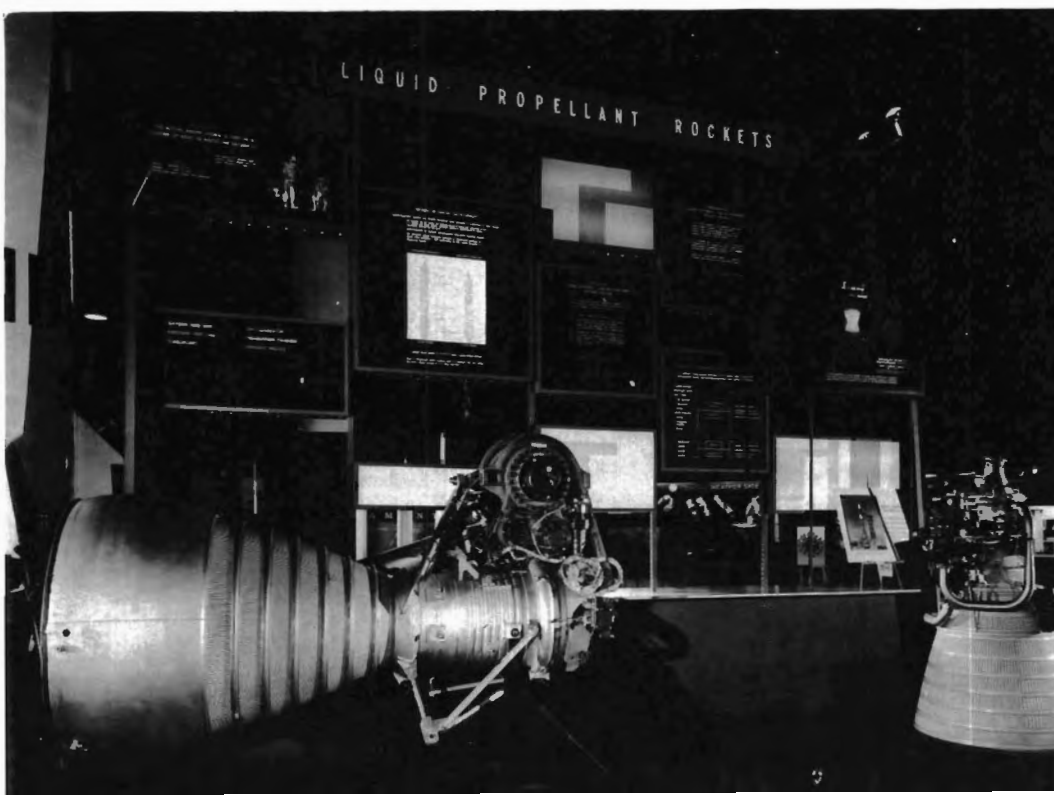
ROCKET PROPULSION AREA P

Basic principles and applications of both liquid- and solid-propellant rockets as well as nuclear rocket propulsion were explained.
LIVE DEMONSTRATIONS: Hybrid operating rocket engine; audience participation gimbaled engine and reaction-control Mercury capsule movable on one axis; five types of sectioned operable Saturn valves.
MODELS: F-1 engine, RL-10 engine, H-1 engine rocket, P-1 solid rocket cutaway engine (all full scale), 1/10-scale Saturn C-1, small-scale hypothetical nuclear rocket spacecraft, filament-wound fuel tank, solid-propellant samples, examples of radiation damage to typical materials.
MOTION PICTURES: Continuous film on F-1 (5 min, color, sound)
TECHNICAL HOSTS: Two






NUCLEAR ROCKET APPLICATIONS
NUCLEAR ROCKET RESEARCH TOOLS


LIQUID PROPELLANT ROCKETS

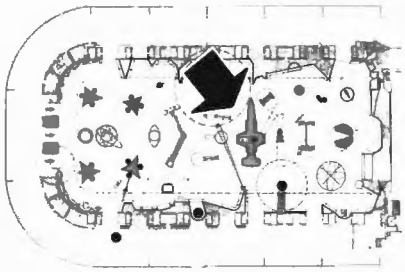
MAN ON THE THRESHOLD OF SPACE AREA Q

The use of manned balloons and the X-15 aircraft as research techniques for providing basic design data for space applications was described.

MODELS: Stratolab II Gondola and inflated balloon, X-15 aircraft, XLR 99 rocket engine, X-15 ejection seat (all full scale), Collier trophy, and 3-dimensional model of typical X-15 flight plan.

MOTION PICTURES: Continuous film on typical X-15 flight (2-1/2 min, color, sound).

TECHNICAL HOSTS: One



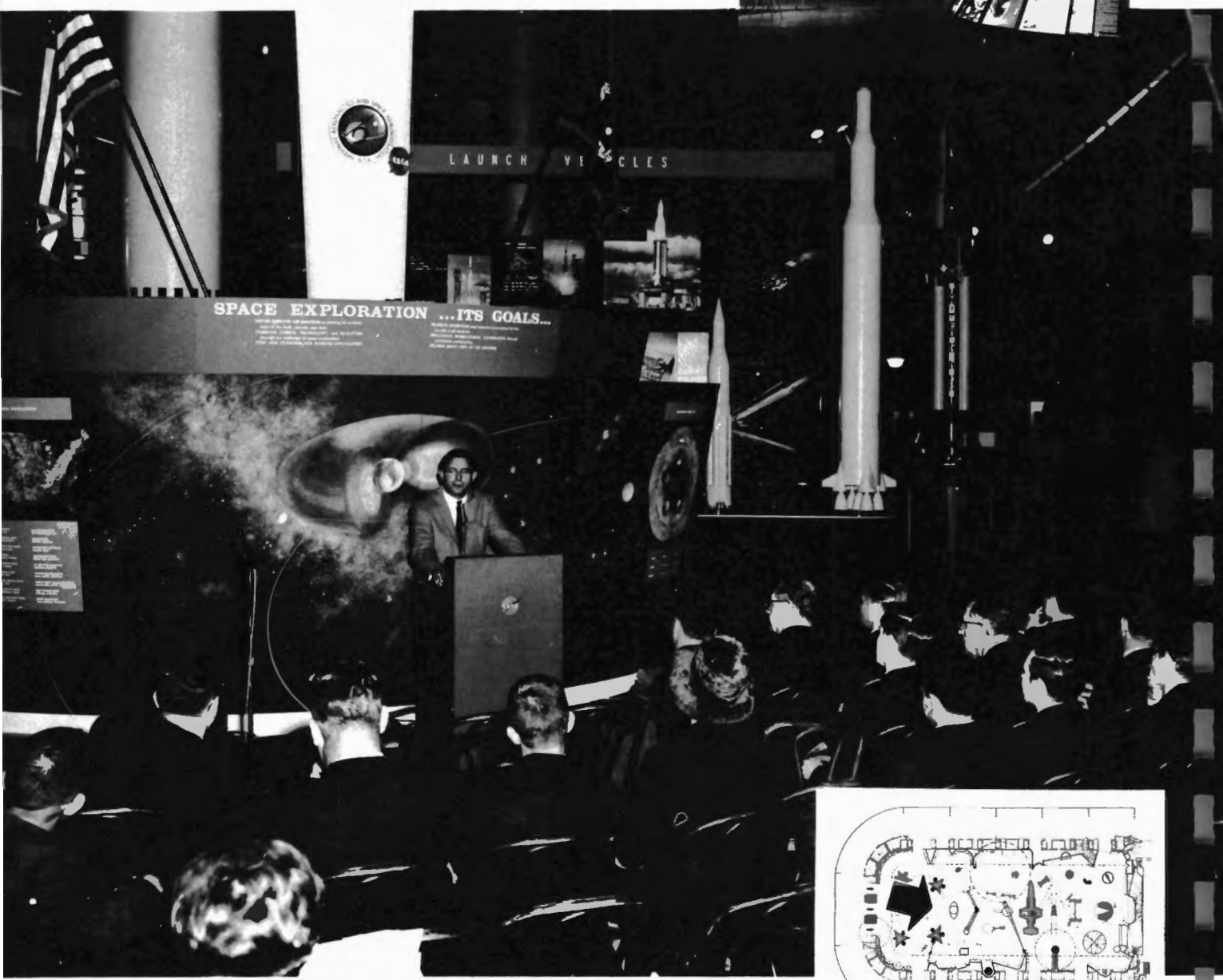

MANNED BALLOON FLIGHT

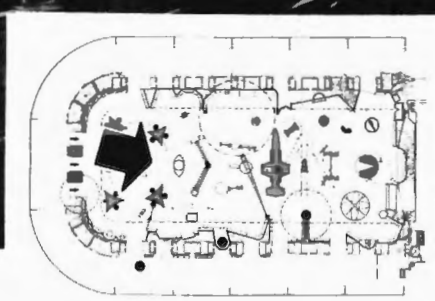
THEME AREA N

Cut-out lettering 20 inches high of "SPACE - for the benefit of mankind" was mounted on a rotating 9-foot diameter Fiberglas sphere atop a tapered column. The base featured an artist's conception of the Earth, its radiation regions, and orbits of Mercury, Venus, and Mars.

On the left of the base, a list of NASA installations was given and their locations were indicated on a cut-out map. On the right, a philosophical diagram was shown of the "Nation's Space Team."

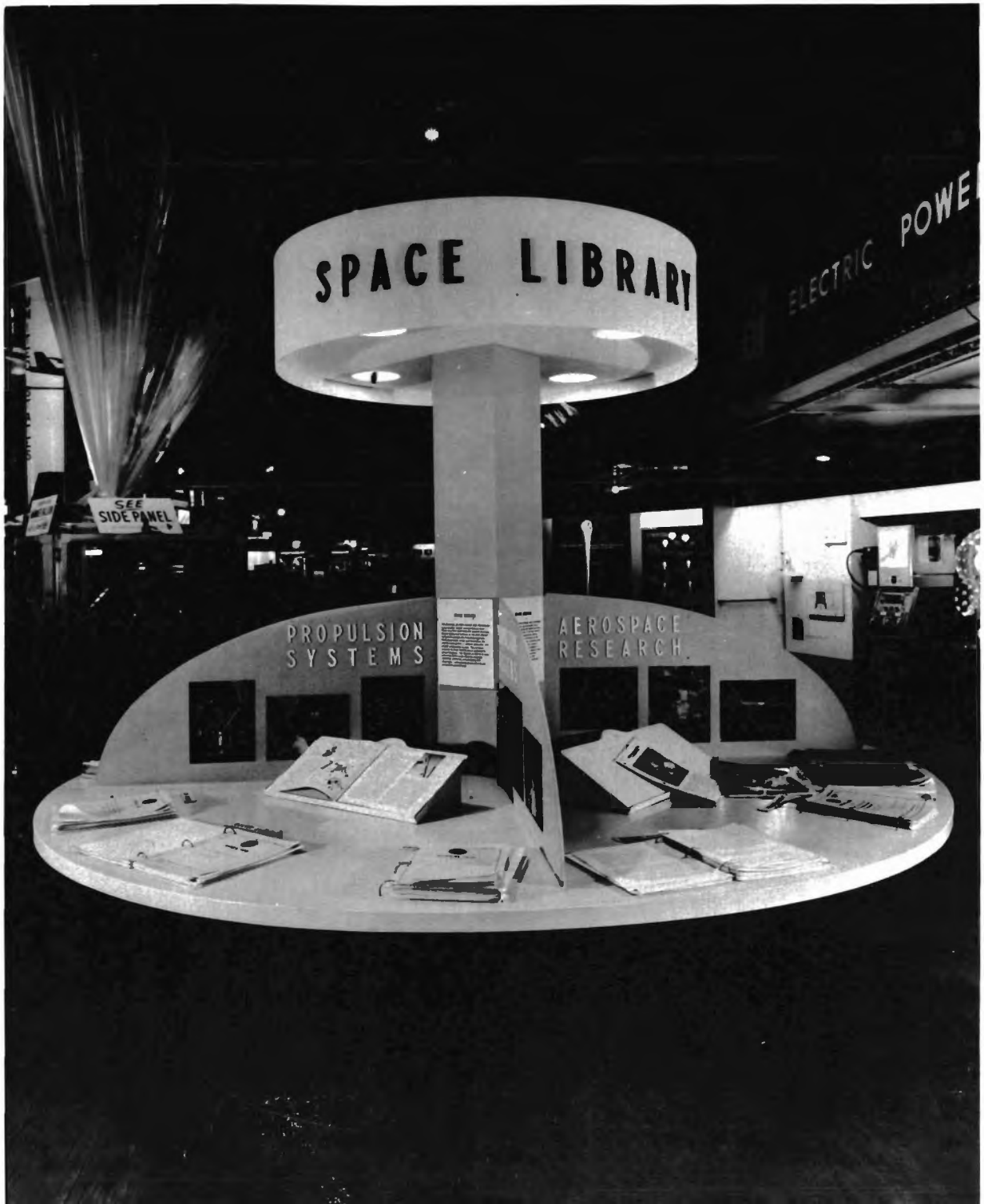
Bas-relief representations of the NASA seal and insignia were mounted on the column and flanked on either side with the American and NASA flags.





The technical library was intended to provide an opportunity for students and the public to look at typical technical reports. A librarian was available to answer questions and to emphasize that data from space research activities ultimately appear in technical reports for national and international distribution. The following literature was also distributed to interested persons:

"Space, The New Frontier" - NASA
"Man Must Take Environment into Space" - James E. Webb
"Impact of Progress in Space on Science" - Hugh L. Dryden
"Administration and Management of Space Exploration" - James E. Webb
"History of Propulsion" - reprint from Marquardt Corp.



The purpose of parking orbits, use of space stations, and the problems of rendezvous were explained.

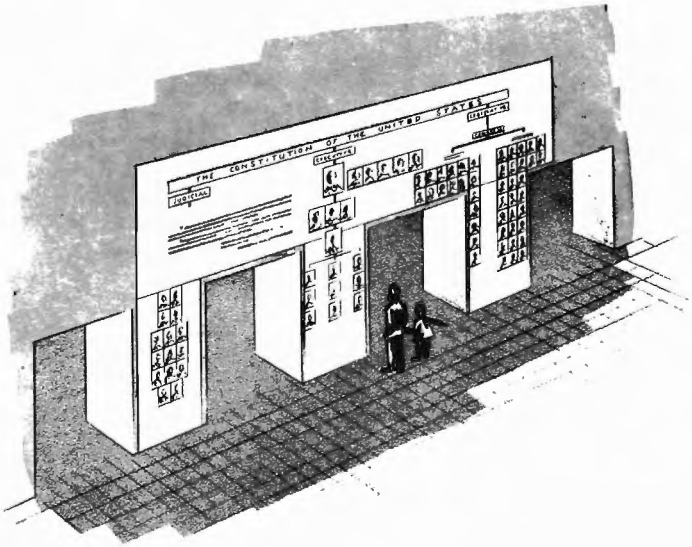
LIVE DEMONSTRATIONS: Plexiglas sphere (4-ft diam.) with two variable controls to simulate two orbiting spacecraft. Visitors operated controls and in trying to achieve rendezvous, noted that change of speed also results in change in orbital altitude.

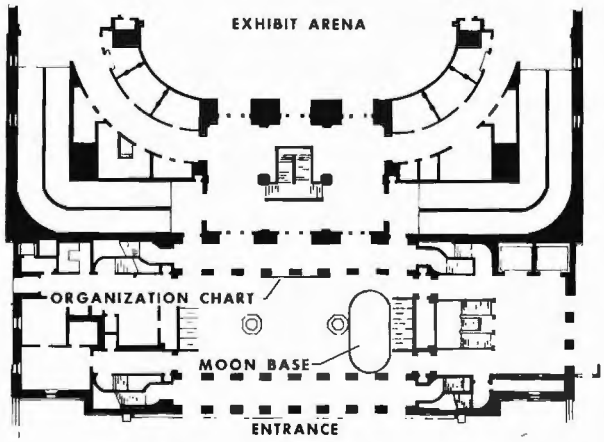
MODELS: Inflatable space station (full-scale 60-ft diam.) with cutaway explanatory model

TECHNICAL ATTENDANTS: Two

Portraits of government officials closely associated with the nation's space program were arranged on an organization chart. In addition, portraits of the Space Science Fair committee were shown.

Included in the lobby area was an inflated structure (15 by 27 ft), which housed ultraviolet lighted exhibits of hypothetical moon base installations.





LOWER LEVEL EXHIBITS

The lower level accommodated the classrooms for the Institute, the Public Lectures, and the 900 seat theater.

For the benefit of those waiting to attend the events in this area, "Ham's" Mercury capsule and four Air Force exhibits relating to NASA projects were provided.

Astronaut Carpenter's Mercury capsule and supporting explanatory panels on the Mercury Program and the astronauts were displayed in the hallway adjacent to the main arena. Entrance was through the archway located in the "Man in Orbit" area. The location proved to be ideal for the Aurora 7 capsule because it was extremely popular and the long lines of attendees in the hallway did not disrupt exhibit viewing space in the main arena.

SPACE SCIENCE PUBLIC LECTURES

Professional "Spacemobile" lecturers delivered 50-minute presentations to an estimated 110,000 persons. The lectures were scheduled every hour and were enthusiastically received. Visitors to the Space Science Fair were encouraged to attend the lectures prior to viewing the exhibits and demonstrations.

Since the primary objective of the Fair was to stimulate interest in space science for junior high and high school students, special 1-hour technical lectures were presented. More than 300 schools scheduled 17,000 gifted students, who chose one of seven lecture subjects. In addition, they all attended a 1-hour lecture of a general nature.

A total of 38,000 above-average students (not nominated for the Institute) were permitted to view the exhibits and motion pictures during school hours.

The general public was not encouraged to visit the Fair during the five day Institute (9:00 a.m. to 4:00 p.m.) so that students might have a better opportunity to study the exhibits.

Color coded tickets were used to control Institute and Fair student attendees.

MOTION PICTURES

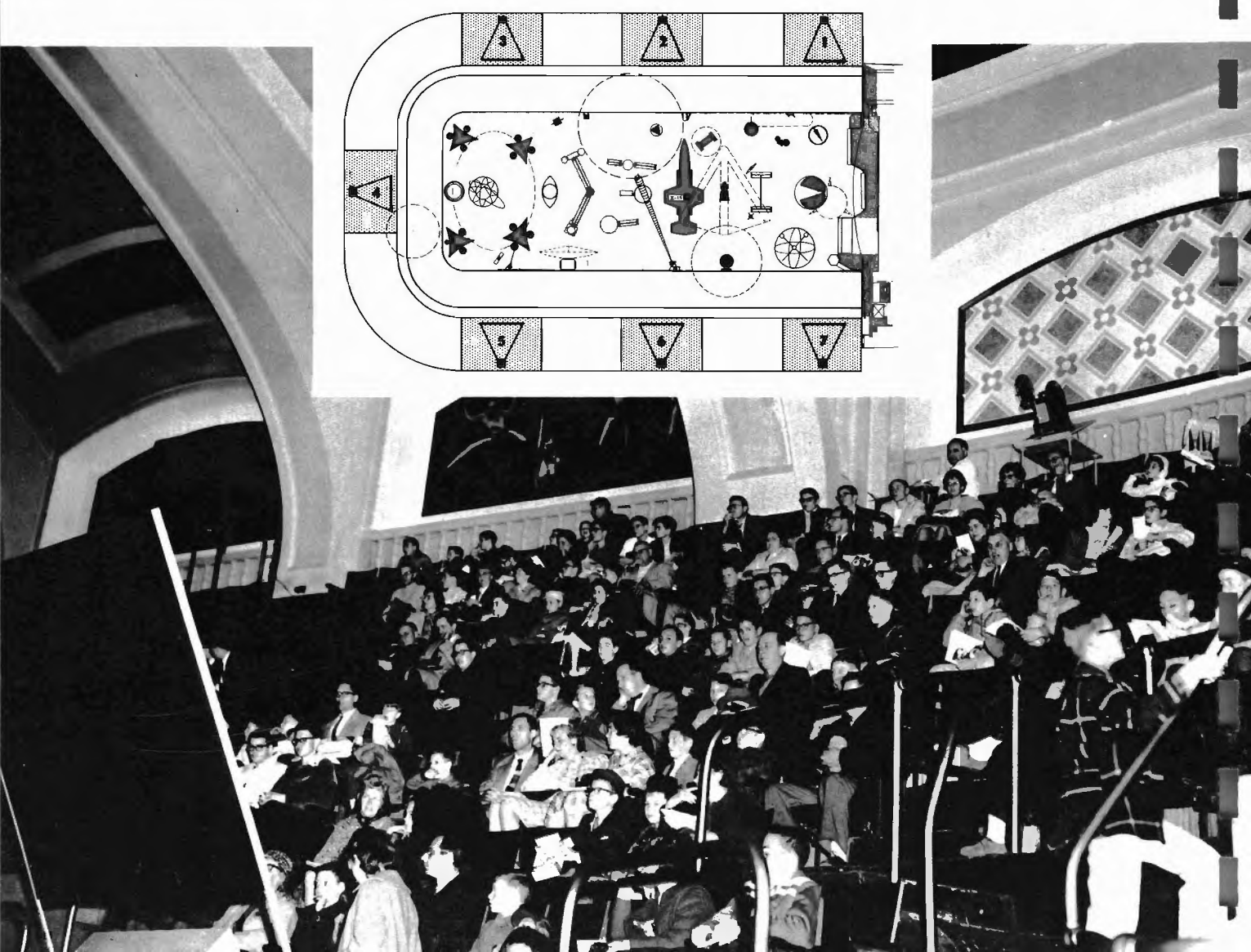
An estimated 54,000 persons viewed 25 films about various aspects of space exploration and technology.

These motion pictures, such as "Friendship 7," and "Mastery of Space," were projected continuously at seven locations in the balcony surrounding the main exhibition area. An additional 900 seat theater was provided for the last three days of the Fair in the area previously utilized for classrooms.

In addition to providing a place to rest and, at the same time, to see interesting films, the theaters permitted the guides the opportunity to channel the visitors to the balcony and relieve temporarily the congestion on the exhibition floor.

The following motion pictures were shown:

Universe (30 min)
Project Gemini (16 min)
X-15 (30 min)
Persuasive Push (20 min)
Mastery of Space (58 min)
Friendship 7 (58 min)
Time and Space (30 min)
The Big Bounce
Discoverer Satellite Orbital Recovery (20 min)
Saturn, Super Rocket (15 min)
Your Share in Space (20 min)
Tiros II (16 min)
Schirra's Flight of Sigma 7 (20 min)
Able Star (20 min)
Celestrial Mechanics in the Lunar Program (10 min)
Story of Thor (20 min)
Research for Space (30 min)
Father of the Space Age (20 min)
Heart of a Missile (20 min)
Telstar (10 min)
Aerobee-Zero Gravity Project (8 min)
Aurora 7 (30 min)
Echo (30 min)
Exploring the Magnetosphere (22 min)
Titov (58 min)

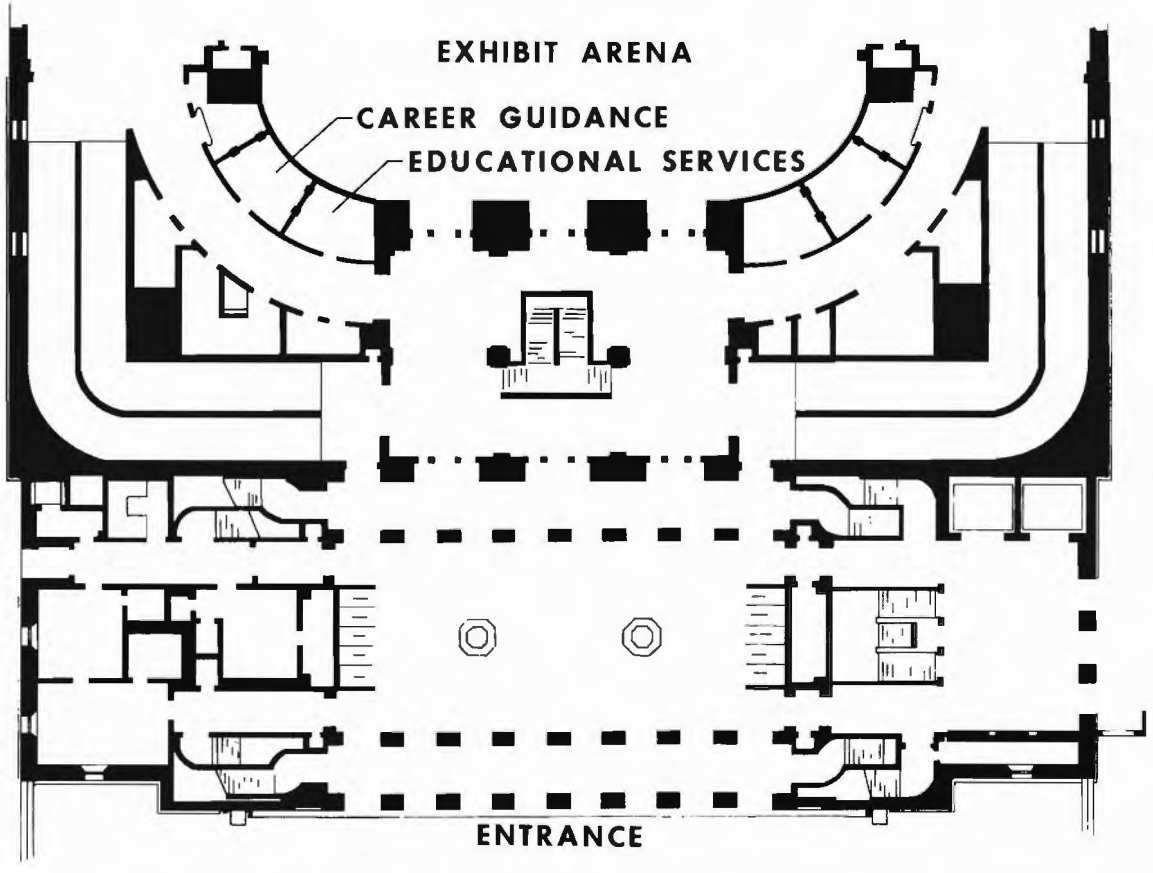


More than 3600 school teachers visited the Educational Services Office at the Space Science Fair and received the NASA standard teacher's kit. Over 3000 registered to receive material as it becomes available.

Specially prepared single-page fliers were also distributed at the Educational Services Office as well as on the exhibit floor. They were

Mercury and Gemini programs
MASTIF fact sheet
MA-6 capsule and launch photographs
Communications satellites
Meteorological satellites
Ranger-Surveyor spacecraft
Delta, Agena B, Scout, Saturn C-1 fact sheets
Electric propulsion hypothetical Mars flight

Reprints distributed included
"Communication by Satellite," Leonard Jaffe, International Science and Technology, Aug. 1962
"Missions for Nuclear Instruments," A. G. W. Cameron, Nucleonics, Oct. 1962
"The Story of Propulsion," courtesy Marquardt Corp.
General true-false quiz
Launch vehicle quiz
Spacecraft quiz
Project Mercury quiz



CAREER GUIDANCE

Over 60 counselors from Lewis and local colleges and universities assisted in the Career Guidance Office. More than 3000 inquiries concerning space science and technology careers were received during the 10-day Space Science Fair.

Much of the success of the Space Science Fair, which attracted 375,000 persons, must be attributed to local, regional and national news media cooperation extended before and during the ten-day program.

In addition to newspaper coverage by more than 100 Ohio papers, Cleveland-area radio and television outlets also contributed heavily to coverage of the Science Fair. Radio, in particular, afforded outstanding coverage in the areas of public information and educational programs. One station devoted its entire educational efforts to the Science Fair for one week, interviewing NASA scientists and engineers daily on various aspects of the Fair.

Television proved most effective in spot news reporting and with "lighter" afternoon shows where NASA representatives, using models of spacecraft and satellites, explained the Science Fair's objectives. One TV show was telecast live from the Fair on opening day. Two others were taped, one by a station's meteorologist, who tied the show in with the Science Fair weather satellite demonstration.

Both wire services moved considerable copy on a regional and national basis.

The impact of the Space Science Fair on foreign news sources is evident in the number of foreign media queries received. These primarily concerned public information efforts, exhibits, and educational programs held in conjunction with the Fair.

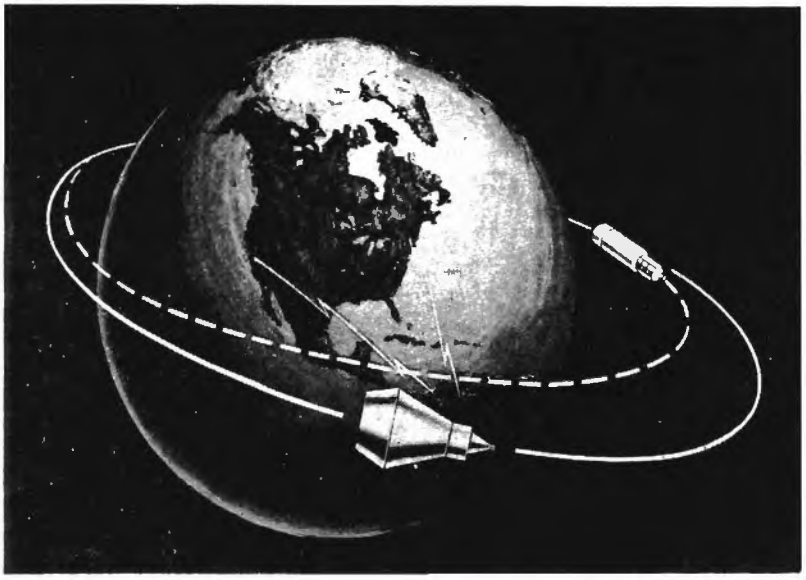
Throughout the Fair, NASA staffed and operated a news center adjacent to the exhibit area. This operation was augmented by press officers from other NASA centers. Without their assistance, it would have been virtually impossible to service news media requests and activities.

We believe such educational programs as the Space Science Fair are excellent tools with which to convey to the public the importance of the national space program. At the same time, they also provide the basis for much-needed educational programs.

H. J. McDevitt, Jr.
Public Information Director

CLEVELAND PLAIN DEALER
June 14, 1962

NASA and Plain Dealer Stage Space Science Fair



A spacecraft in orbit, on its way to the moon, is the American dream of the decade. That story will materialize here this fall in the Space Science Fair, sponsored by NASA and The Plain Dealer, when Public Hall for 10 days becomes a showcase of the space age. *(Other Photos on Picture Page)*

Huge Exposition in Fall Includes Seattle Exhibits

By KARL ABRAHAM
Plain Dealer Science Writer

A dazzling Space Science Fair will be presented by the National Aeronautics and Space Administration and The Plain Dealer in Cleveland's Public Hall this fall.

The unprecedented 10-day exposition on America's conquest of space will open Nov. 23. Everyone is invited—it is free.

This exposition will be the largest ever presented by any American newspaper in cooperation with the federal space agency. It reflects months of planning with top officials at NASA headquarters in Washington.

Space experts and displays of spacecraft and rockets will come to Cleveland from all over the United States to stage the most comprehensive exhibit ever put together by NASA.

It will be twice as large as the Seattle World Fair exhibit and will include all of the space vehicles shown there, from accomplished Project Mercury capsules to Apollo vehicles still in the model stage but destined to land on the moon.

Dr. Abe Silverstein
Chairman

Thomas V. H. Vail
Cochairman
Photo by Fabian Bachrach

THERE WILL BE movies about space, special speakers, special programs for young people and schools.

Dr. Abe Silverstein, director of NASA's Lewis Research Center here, is chairman of the fair.

Thomas V. H. Vail, vice president of the Forest City Publishing Co., publisher of The Plain Dealer, is cochairman.

NASA WILL FURNISH all the displays and space experts to answer questions and provide special programs.

The Plain Dealer will provide special free educational materials for high school and college students, and distribute free tickets of admission.

Dr. Silverstein said: "The various educational programs at the fair are designed to explain the exciting career challenges which exist in NASA as well as associated U.S. industry."

VAIL SAID The Plain Dealer was cosponsoring the fair as a public service to Greater Cleveland and the entire midwest United States.

"The Plain Dealer is very proud to cosponsor a program which will bring to the people of Ohio the greatest collection of space equipment ever assembled," he added. "We are exerting every effort to help the public toward a greater understanding of our space program and of the marvelous work being done by our own Cleveland NASA Lewis Research Center."

★ From First Page

Representatives of many of the nation's major universities will come to Cleveland during the exposition to counsel high school students planning college preparation for science and technology.

THE EXPOSITION is scheduled to open the day after Thanksgiving so that high school and college students may attend while school is recessed.

The 30,000 square feet of exhibits will occupy all of the Public Hall's main arena, reflecting contributions in space achievements by 10 NASA centers.

Visitors will be able to examine at leisure the Apollo spacecraft replica of a vehicle destined to land three men on the moon by 1970.

A DETAILED, accurate and full-size model of the space capsule used by American astronauts in current Project Mercury flights will be there, as well as many scientific satellites launched by the United States.

For 10 days the eyes of the space world will focus on Cleveland. Thousands of families will travel here to see the Space Science Fair.

Special arrangements are being made for transportation and housing, and science educators will be able to plan class trips and "school days" at the exposition.

A CONTINUOUS showing of official NASA motion pictures of important space accomplishments and research in rocket propulsion, vehicles and re-entry heat shields, fuels, etc., will be provided.

Space scientists close to special projects will describe the most recent activities in the nation's race to space.

The staging of the Space Science Fair here reflects the ascending importance of the Lewis Research Center in NASA's programs and the vital involvement of industries and educational institutions here in the space effort.

On a scale never before made possible, everyone will be able to take a close, first-hand look at the dramatic and exciting accomplishments of the space age.

The NASA-PD Space Fair

The Plain Dealer, as it stated on the front page yesterday, is extremely proud to participate with the National Aeronautics and Space Administration in presentation of a 10-day Space Science Fair in Public Hall in November and December.

The program already promises to be the most comprehensive exposition ever put together by NASA, twice as large as the Seattle World Fair exhibit, which will be brought here.

While our principal job as a newspaper is to set before you a broad coverage of day-to-day news developments, we shall be serving a vital function in helping to bring to you and other visitors a view in depth of the space age up to now, and the directions it likeliest is to take.

This presentation of the broad range of problems and accomplishments of space scientists should fill you in so that the day-to-day news happenings will have a deeper and readier meaning.

And NASA's participation will bring Greater Clevelanders a better appreciation of this community's good fortune in having the agency's great Lewis Research Center here. Much of the scientific work which has put this nation in its foremost position in air and outer space accomplishment has been done right here.

The opening of the fair—on Nov. 23, the day after Thanksgiving—will be timed for the benefit of a large and most important section of our population, the young people.

They will be seeing great things that have been accomplished. Some of them will be encouraged to study and work harder so they can join the ranks of American scientists. And all of them, we hope, will be more appreciative of the changes and the challenges which their generation is going to have to face.

The Plain Dealer is most happy to help in the staging of the fair as a major effort in the field of public service, and in that interest, admission will be free so that all, at whatever economic level, may attend.

NASA Chief, Glennan Join in Space Fair

By KARL ABRAHAM
Plain Dealer Science Writer

The two men who have directed the National Aeronautics and Space Administration since its inception will serve as honorary chairmen of the NASA-Plain Dealer Space Science Fair this fall.

James E. Webb, administrator of NASA, and Dr. T. Keith Glennan, president of Case Institute of Technology and NASA's first administrator, have accepted invitations to fill these posts, it was announced by Dr. Abe Silverstein, director of the Lewis Research Center, and Thomas V. H. Vail, vice president of The Plain Dealer, who are co-chairmen of the exposition.

James E. Webb

Dr. T. Keith Glennan

NATIONAL, STATE and local leaders comprising an advisory committee to the fair were also announced.

They are U.S. Sen. Frank J. Lausche, U.S. Sen. Stephen M. Young, Gov. Michael V. DiSalle, Mayor Anthony J. Celebrezze, U.S. Reps. Michael A. Feighan, Charles A. Vanik, Frances P. Bolton, William E. Minshall and Charles A. Mosher, Hassel Tippit, chairman of the Cleveland Chamber of Commerce, and Sebastian Lupica, the new executive secretary of the Cleveland AFL-CIO Federation.

The Space Science Fair will include the largest exhibit of rockets, space vehicles and space research equipment ever assembled by NASA.

It will begin Nov. 23 in Cleveland's Public Hall. During the 10 days of the exposi-

Continued on Page 19, Col. 2

Webb and Glennan Added to Roster of Space Fair

★ From First Page

tion The Plain Dealer and NASA will present many special programs for the public and special educational events for students.

IN ACCEPTING the honorary chairmanship, Administrator Webb said:

"I am very pleased to serve in this capacity with my good friend and able predecessor, Keith Glennan, an old and continuing friend of NASA.

"The exhibit will serve as a forum for a dynamic presentation of NASA's program.

"With the on-the-scene guidance and direction by Dr. Siverstein, I am confident that the exhibition will make a tremendous contribution to public understanding of American efforts and progress in the peaceful exploration of space.

"We welcome this opportunity to take our program before the people of Cleveland and northern Ohio."

DR. GLENNAN said:

"It is a distinct pleasure for me to serve as an honorary chairman of this Space Science Fair in Cleveland.

"I am sure that this exposition will dramatically highlight American progress in the age of space. The scientific horizons which open up through the kind of exhibits and programs that will be available will affect the lives of every one of us.

"It is essential for every Clevelander who wants to understand the times in which he lives to visit this exposition, perhaps not once but many times. It will truly be an introduction to man's future.

"And we in Cleveland can take a special pride in the contributions of our great Lewis Research Center and of our educational institutions to the exploration of space."

THE FORMATION of the advisory committee signaled the beginning of increased work on the Space Science Fair.

On announcing the members of the committee, Vail said:

"It is a great privilege to be able to announce a committee composed of such prominent men in the Cleveland area who have contributed so much to American efforts in space.

"It is a tribute to this community and to this state to have in our own back yard so many prominent people in education, in science and in politics, to say nothing of our own Lewis Research Center at the airport.

"All this adds up to great things for Cleveland, for Ohio and for America. We look forward to a fabulous Space Science Fair and to the contribution of our distinguished committee."

DR. SILVERSTEIN elaborated on the exhibition and science programs. He said:

"People of all ages are interested in the space program, and the Space Science Fair is being arranged so that people of all ages and talents can have a satisfying contact with it.

"In brief, the objectives are: to introduce NASA and its space program to the public; to give a progress report on the work accomplished; to reveal present plans and future goals; to present insight into the methods employed by NASA in its research and development supporting space exploration; to convey a sense of value and pride in the U.S. space effort; to raise student interest in the study of science generally, and in participation in the space program in particular.

"As a special feature of the Space Science Fair, a science institute, which will include illustrated lectures in science and technology, will be provided for the junior and senior high school students who attend. It is hoped that the fair will serve as a source of education and inspiration for the whole community."

SEVERAL MEMBERS of the advisory committee also commented on the Space Science Fair.

Said Sen. Lausche:

"I am profoundly pleased that this scientific exposition is being presented to the citizens of the Greater Cleveland area through the joint sponsorship of The Plain Dealer and the National Aeronautics and Space Administration.

"THE CLEVELAND exposition was provided to give the citizens of that area a great opportunity to see in substance a replica of what has been reported to be the greatest scientific space exposition in the world now being held in Seattle.

"It will also stimulate a greater participation, I hope, in our state in the work of space research which portends such great activity in all phases of life in the future."

Sen. Young said:

"The space age is an age of change and challenge. The drama of manned space flight is possible only because of the technological genius of men in the Lewis Research Center and other NASA installations.

"I am delighted that The Plain Dealer and the space administration have joined in the sponsorship of this science fair and I consider it a privilege to serve on this advisory committee. Cleveland, and indeed all Ohio, will benefit from this exposition.

"Space exploration is complex. Through such exhibitions as this one, however, this new world can become more comprehensible to the people."

Mayor Celebrezze commented:

"AN EXHIBITION of the nature of this one being sponsored by The Plain Dealer and the National Aeronautics and Space Administration is of the greatest importance to the citizenry.

"Cleveland, as the home of the Lewis Research Center, is as logical a location as there is in the nation for such a space fair."

REP. MINSHALL said:

"Cleveland and Ohio have long been one of the nation's chief contributors to the conquest of air and space. Ohio fathered the Wright Brothers—and John H. Glenn; Cleveland has long been the wellspring of America's scientific and technological know-how.

"The National Aeronautics and Space Administration, our famed educational institutions and our industry have added much of the brain-power and hardware which have made our progress in aerospace a reality.

"It is a distinct honor and privilege to serve on the advisory committee for this space fair, sponsored by The Plain Dealer and NASA. This project will spotlight and bring into true focus Cleveland's part in the national space effort."

CLEVELAND PLAIN DEALER
July 1, 1962

TO WIDEN UNDERSTANDING—

NASA-Plain Dealer Space Fair Hailed by Webb, Agency Chief

By PHIL G. GOULDING
Plain Dealer Bureau

WASHINGTON—Administrator James E. Webb of the Federal Space Agency last night hailed the "important role" of the forthcoming Space Science Fair under joint sponsorship of NASA and The Plain Dealer.

The exhibition, largest such showing ever to be presented, will open the door to better understanding of the civilian space program, Webb said in an interview.

In co-operation with The Plain Dealer, the National Aeronautics and Space Administration, which Webb directs, will bring to Public Hall all of the space vehicles now at the Seattle World Fair and enough more equipment to make the Cleveland exhibit double the size of the showing in the Northwest.

THE NASA-PLAIN DEALER EVENT, free to the public, will open Nov. 23 and continue for 10 days. Dr. Abe Silverstein, director of NASA's Lewis Research Center in Cleveland, is chairman and Thomas V. H. Vail, vice president of the Forest City Publishing Co., publisher of The Plain Dealer, is co-chairman.

In the interview Webb warned that the American space program and the American city face the same challenge: the need for greater integration of government, industry and university effort.

He said Cleveland's big space fair should prove a significant step toward such co-ordination.

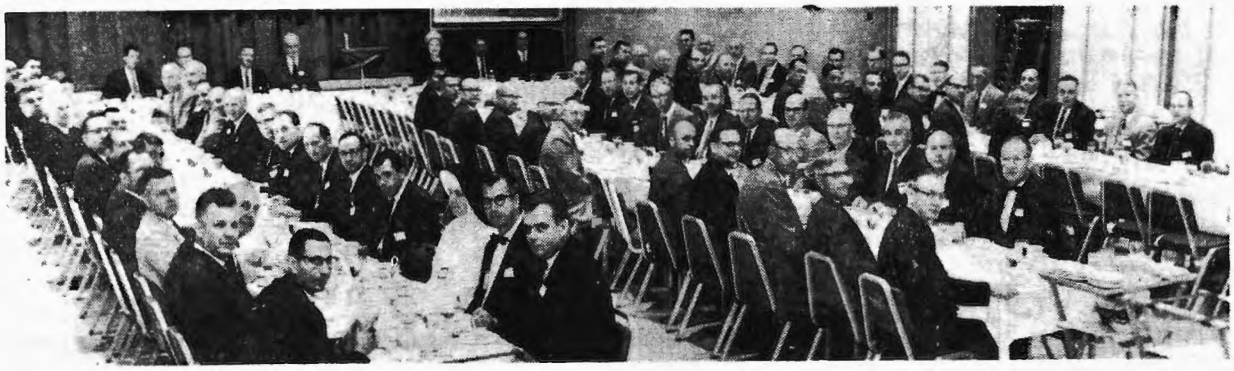
IN ADDITION TO THIS and to promoting better understanding of the space program, the fair may have an even greater potential, Webb suggested. He felt the exposition might be a means of recognizing the new role which universities should play in the formulation and execution of communitywide planning and projects.

Cities which utilize the talents of their universities will thrive, he predicted, while those which think of the institutions as segregated from daily life and economic growth will wither.

Webb said he hoped that NASA and Plain Dealer people involved in planning the Space Fair would seize this "great opportunity" to include the universities.

The administrator is a man of tremendous enthusiasm who holds the mythical all-time Washington championship in fast speaking. Talking with him is like crossing a raging brook. If your attention strays for one moment you are swept out of sight.

HIS ENTHUSIASM centered for a moment on Silverstein, who left a top-echelon position in Washington to return to Cleveland as head of the Lewis Center.



Educators from northern Ohio attended a special luncheon here yesterday to learn about the Space Science Fair and Space Science Institute. Plain Dealer Photos (Richard J. Misch)

NASA-PD VENTURE

Space Fair Report Is Given Educators

More than 70 educators from northern Ohio received a special preview report yesterday on the Space Science Fair and the Space Science Institute being sponsored this fall by the National Aeronautics and Space Administration and The Plain Dealer.

The space show, first of its kind in the United States, will be held in Public Hall from Friday, Nov. 23, through Sunday, Dec. 2, from 10 a.m. to 10 p.m. daily.

The event will be free to the public, with tickets available through The Plain Dealer.

Irving Pinkel, chief of the fluid systems components division of NASA's Lewis Research Center here, and Mrs. Margaret Byrne, education service director of The Plain Dealer, explained the purposes of the show at a luncheon meeting at the Cleveland Engineering & Scientific Center, 3100 Chester Avenue N.E.

Pinkel told the educators NASA had been so busy for the last four years that the public had been forgotten. The space fair and institute, he said, is "one of the things being done to meet NASA's obligation to the public."

The well-known physicist described the program features being planned for the space fair and institute.

AMONG THE FEATURES will be the actual "hardware" of space vehicles and satellites, with models being displayed where the equipment itself is not available.

Each section of the show will have an "imposing theme piece," Pinkel said, adding that efforts were being made to get a Thor-Able booster into the hall and a Telstar communications satellite, among others.

PINKEL SAID ONE of the most important features of the show would be the Space Science Institute which would be held in classrooms set up on the exhibition floor under the main arena of Public Hall.

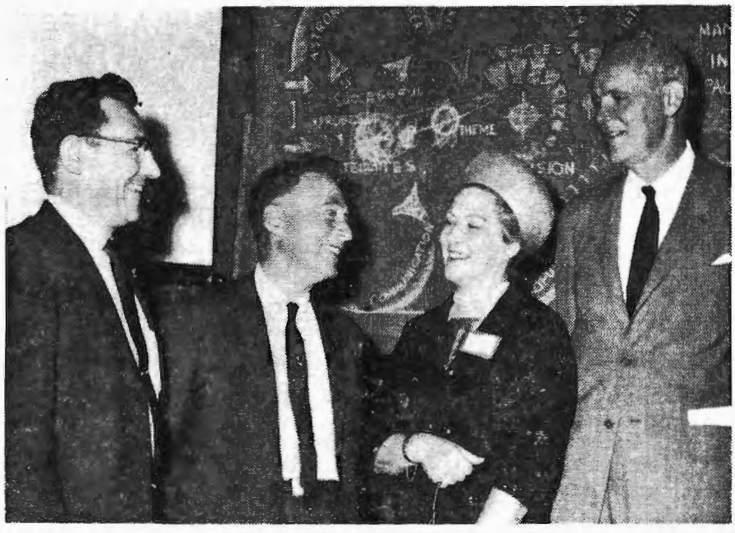
Two-hour lectures will be offered in the classrooms for junior and senior high school pupils, to be followed by two-hour tours of exhibits in the main arena.

A number of evening lectures, probably four, are being planned for adults, he said.

MRS. BYRNE TOLD the educators the show was being oriented toward education. She said it would give children a "forward view" and would inform them of new professions and job opportunities which are part of the space age.

Children not attending the show with school groups will be welcome at any time when accompanied by adults, Mrs. Byrne pointed out.

WRIGHT BRYAN, editor of The Plain Dealer, who welcomed the educators, said that the show would be "larger and better" than the space exhibit at the World's Fair in Seattle.



James J. Modarelli | Irving Pinkel | Margaret Byrne | Wright Bryan

Modarelli and Pinkel, NASA officials here, discuss the Space Science Fair and Space Science Institute with Mrs. Byrne, education service director of The Plain Dealer, and Bryan, editor of The Plain Dealer.

Bryan said it would be the first place in the United States any such presentation has been made.

THOSE ATTENDING the space show luncheon included:

Melvin Bixler, Stark County Board of Education; Dr. Clyde Vanaman, elementary supervisor, Mahoning County; Alured C. Ransom, supervisor, Portage County; Wayne Whyte and Robert Bell, secondary supervisors, Lorain County; George Linn Jr., coordinator for gifted, Huron County; Ralph Factor, high school supervisor, Erie County; F. B. Louys, superintendent, Trumbull County.

Walter Jones, high school supervisor, Trumbull County; K. G. Keick, Cuyahoga County; Lorin H. Briggs, superintendent, Hubbard; Edward Masonbrink, superintendent, Mentor; R. A. McCormick, principal, Wellington; H. Robert Wert, principal, Windham; Kenneth Bradford, State Department of Education; Otis House, science department head, Andrews School for Girls; Richard Ward Day, headmaster, Hawken School; Dr. Irene S. Hall, Laurel School.

Harold Cruikshank, headmaster, University School; Gene Pillot, North Royalton; K. E. Lowen, superintendent, North Olmsted; Loren Early, executive head, Olmsted Falls; Paul Briggs, superintendent, Parma; Russell R. Fair, executive head, Richmond Heights; James A. Harper, principal, Richmond Heights; Dr. Thomas F. Banahan, elementary director, Shaker Heights; Richard N. Boers, science department head, Solon.

. Alan Shankland, superintendent, South Euclid-Lyndhurst; Harold E. Drake, superintendent, Strongsville; Ernest Kozma, assistant superintendent, Strongsville; Harold Kuhn, superintendent, Warrensville Heights; Anthony Columbaro, Westlake; Paul E. Smith, superintendent, Salem; Wallace C. Glenwright, superintendent, Sandusky; Charles Kreider, science department head, Wadsworth; Wiley S. Garrett, assistant superintendent, Warren.

Milan Stefanik, Willoughby; Robert Shreve, Youngstown; William Dellard, Bedford; Clarence Rice, superintendent, Brooklyn; Paul Gallagher, superintendent, Berea; M. Neil Wheatcraft, Chagrin Falls; Alva R. Dittrick and Harry Richie, Cleveland; Ralph Adams, principal, Cuyahoga Heights.

Dr. Theos I. Anderson, superintendent, Cleveland Heights; Robert L. Holloway, secondary education director, Euclid; Lewis F. Mayer, superintendent, Fairview Park; Olus H. Schaaf, superintendent, Garfield Heights; Paul E. Spayde, assistant superintendent, Lakewood; Sister George Mary, secondary education superintendent, Catholic schools.

Dr. W. A. Wollam, assistant superintendent, Alliance; James McDowell, science department head, Ashland; Harry Bauschlinger, Barberton; Robert Regula, principal, Bellevue; Glenn W. Zeller, superintendent, Conneaut; John Moore, Cuyahoga Falls; George Miraben, assistant superintendent, Elyria; Dr. Gebhard, superintendent, Geneva; Dr. Clyde Scott, director of instruction, Lorain.

E. R. Malone, superintendent, North Canton; James N. Ross, principal, Norwalk; Robert W. Duncan, superintendent, Oberlin; Howard S. Netzly, superintendent, Orrville; Russel Hobard, superintendent, Painesville; Lilliard E. Law, superintendent, Alliance; Ralph D. Sollars, Niles; John W. Fedor, curriculum director, Campbell; George Cebula, physics department head, Campbell; James Loughridge, Medina.

Kenneth Zuercher and Floyd Maurer, science teachers, Wooster; John R. Lea, superintendent, Wayne County.

THE PLAIN DEALER
Cleveland, O.
Nov. 16, 1962

Orbit Capsule Due at NASA-PD Fair

One of the capsules in which an American has orbited the earth will be displayed at the NASA-Plain Dealer Space Science Fair next month, it was announced yesterday.

A spokesman at Cleveland's Research Center of the National Aeronautics and Space Administration said either Friendship 7, Aurora 7 or Sigma 7 would be brought to Cleveland.

When the exposition opens on Nov. 23, visitors will be able to see first-hand what reentry temperatures of almost 2,500 degrees Fahrenheit did to the heat shield at the base of the Mercury capsule.

CLEVELAND PLAIN DEALER
October 21, 1962

TWO OTHER ITEMS of actual "space hardware" representing current major deep space efforts also will be brought to Cleveland from NASA's Jet Propulsion Laboratory at Pasadena, Calif.

These are the Ranger - instrumented moon probe, one of which is now on its way toward a near miss of the moon. Ranger V was launched Friday from Cape Canaveral.

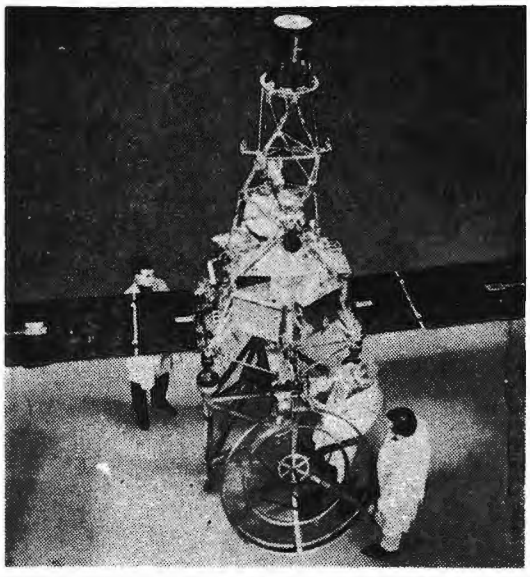
The other space vehicle will be a Mariner. The Mariner II probe is now on its way to Venus, destined to fly within 20,900 miles of it on December 14.

THESE THREE exhibits will be only a small part of the many to be presented at the fair, including an actual 72-foot-tall Scout rocket, full-scale models of the new F-1 rocket engine and the Apollo and Gemini space capsules.

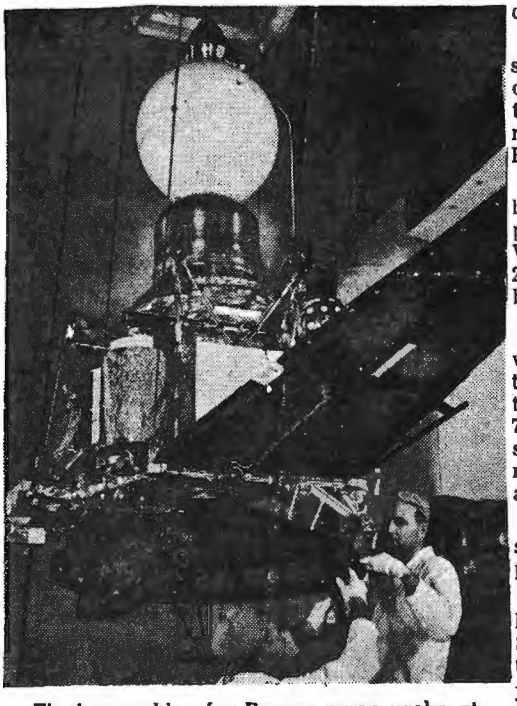
Wherever possible, actual space hardware will be displayed.

In addition to the exhibits, NASA will conduct a special Space Science Institute of lectures and demonstrations for junior and senior high school students having a special interest in science. A General Information Workshop will be held for other students.

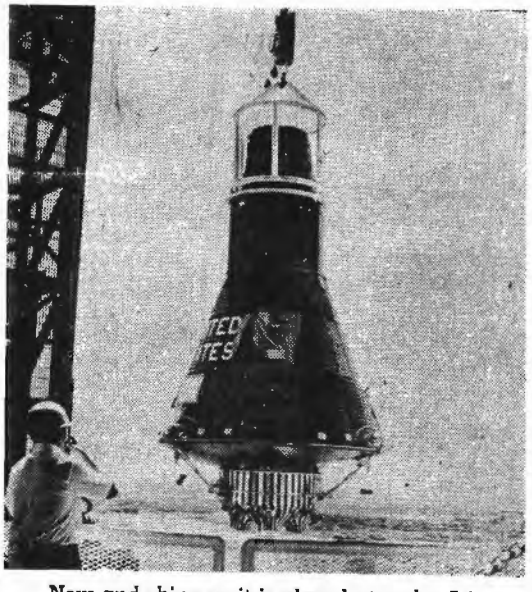
The Space Science Fair will be open from 10 a. m. to 4 p. m. during schooldays for the student programs and will be open to the general public from 4 p. m. to 10 p. m. Monday through Friday, and from 10 a. m. to 10 p. m. Saturday and Sunday. It will run for 10 days, closing on Dec. 2.



This is Mariner, the Venus probe. One of its kind is en route to Venus, and another is to be displayed at the Space Science Fair beginning Nov. 23.

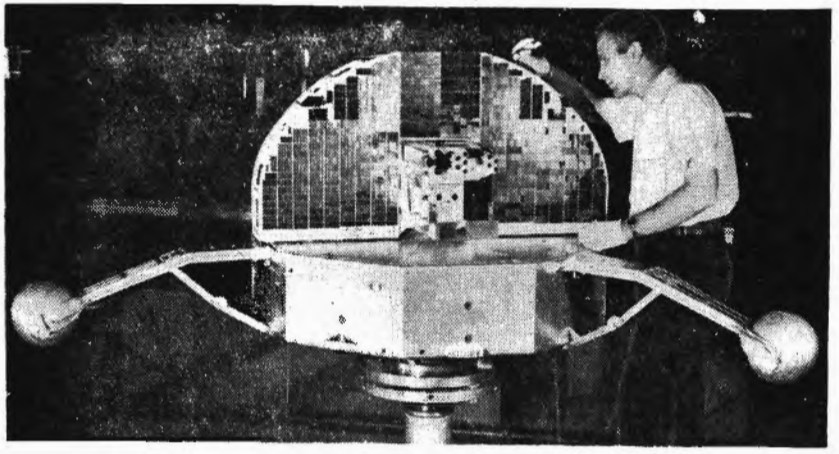


Final assembly of a Ranger moon probe at the Jet Propulsion Laboratory. An actual Ranger will be brought here next month.



New and shiny as it is placed atop the Atlas booster rocket, the appearance of Mercury capsule Sigma 7 soon changed. One of America's three orbited capsules will be brought to Cleveland for the Space Science Fair.

CLEVELAND PLAIN DEALER October 24, 1962



OSO weighs 440 pounds, and its spin is controlled by extension and retraction of the three metal balls. Array of solar cells on top provides electric power.

AT NASA-PD FAIR—

Sky Observatory Models Due

By KARL ABRAHAM
Plain Dealer Science Writer

The United States last March 7 launched an Orbiting Solar Observatory (OSO), and in 1964 it plans to launch an Orbiting Astronomical Observatory (OAO).

The OSO is still transmitting information about the sun.

Detailed models of both these aids to astronomical research will be exhibited at the NASA-Plain Dealer Space Science Fair in Public Hall from Nov. 23 to Dec. 2.

The OSO's scrutiny of the sun and its constant outpouring of radiation is of interest not only to astronomers but to the engineers who must build manned spacecraft for lunar and planetary explorations.

THERE ARE TIMES when solar radiation is so intense that it threatens the lives of unshielded persons. The earth's atmosphere provides shielding on earth.

The shielding requirements in space depend on the kind and intensity of radiation emitted by the sun, and the duration of such bursts. OSO is now reporting on X-rays, gamma rays, ultra-violet, neutron, proton and electron bombardment in space, as well as interplanetary dust particles.

While the earth's atmosphere is a protection against harmful radiation, it also forms a blindfold of sorts for astronomers studying the stars.

STARS NOT ONLY radiate visible light but also ultra-violet light, which man cannot see. Because almost all of it is absorbed by the atmosphere, instruments that can detect and measure ultra-violet light from stars would be much more effective in space.

This is the purpose of OAO, an astronomical telescope and spectrometer that will make a detailed map of the sky's sources of ultra-violet light. OAO is the first of a series of orbiting astronomical laboratories, and will be used to develop improved designs for later ones.

Tomorrow: Back to the gas bags.

CLEVELAND PLAIN DEALER
October 25, 1962

Space Fair to Include Variety of Equipment

By KARL ABRAHAM
Plain Dealer Science Writer

At 10 this morning the countdown on the NASA-Plain Dealer Space Science Fair stands at "minus 30 days and counting."

Each day from now until the exhibition and educational programs begin in Public Hall Nov. 23, The Plain Dealer will carry a story about the particular items of space age hardware and space research equipment to be shown at the exposition.

INDIVIDUAL EXHIBITS in the 10-day fair range from large space rockets to rocket engines, television bounced off a small-scale Echo satellite, models of many of the nation's already launched satellites, spacecraft for the upcoming manned exploration of the moon, and other aspects of space exploration.

The National Aeronautics and Space Administration has assembled, from its research and development centers, many examples of space technology and research for present and future NASA programs.

Some exhibits are small, like the real ion rocket visitors will be able to pick up and examine. One like it is shortly to be flight-tested from Cape Canaveral.

OTHERS ARE BIG, like the 72-foot-tall Scout rocket and the full-scale model of the X-15 rocket plane.

Many exhibits deal with fundamental research into the nature of cosmic rays, effects of meteoroid impact on objects in space, activity of the sun and radiation in interplanetary space.

Life support systems, astronaut training devices, communications and tracking systems are included.

It will be the largest such exhibition ever staged by the National Aeronautics and Space Administration.

Tomorrow: "OSO" and "OAO."

CLEVELAND PLAIN DEALER
November 3, 1962

Six From Minnesota to Attend Space Fair

A high school physics teacher and five students will be journeying from Albert Lea, Minn., to Cleveland for the Space Science Fair at Public Hall Nov. 23-Dec. 2.

They will make the trip in a station wagon with the teacher, R. G. Anderson, sharing the driving chores with a senior student over the 750-mile route to Cleveland.

Anderson will be accompanied by two seniors, a junior, a sophomore and a freshman.

THE STUDENTS are from a science club which meets regularly in Albert Lea, in south-central Minnesota near the Iowa state line.

Anderson told The Plain Dealer yesterday he learned about the space show in Minneapolis last week at a teachers' meeting.

The group plans to record the fair on film slides, which will be shown in Albert Lea on their return and for several years to come, Anderson said.

SPONSORS of the Space Science Fair are the National Aeronautics and Space Administration and The Plain Dealer.

Because of a special space science institute and a general information workshop for young people Nov. 26-30, adults will not be admitted until 4 p.m. those days.

Admission to the 10-day exposition will be free. It will be open from 10 a.m. to 10 p.m. daily.

SCHOOL OFFICIALS from Ohio and other states who are interested in having student groups attend the Space Science Fair may contact The Plain Dealer's Education Service Department, 1801 Superior Avenue, Cleveland, 14.

Space Fair to Show Star Seeker at Work

By KARL ABRAHAM
Plain Dealer Science Writer

Keeping a deep space probe or interplanetary vehicle pointed in the right direction is one of the most critical problems of space technology.

The solar power supply of Ranger V failed, ruining the recent mission to land a capsule on the moon, because the solar cells failed to point to the sun.

Guidance, by using such bright objects as the sun, moon, earth or stars, is essential to long space missions. A space vehicle must be pointed in the right direction when its rockets are fired or when its radio antennas broadcast to earth.

VISITORS TO THE NASA-Plain Dealer Space Science Fair Nov. 23-Dec. 2 will have a chance to see a "star seeker" in action. The star will be simulated by a tiny, moving flashlight bulb, and the "seeker" will hunt it down and remain fixed on it.

This device has been designed to illustrate the principle of space guidance using stars. It is so delicate a machine that its moving parts are suspended on "air bearings."

It consists of a set of four light-sensitive cells. If all four cells are not pointing at the light source, each of them receives a different amount of light. The unit contains a memory unit which compares the amount of light received by the cells.

IT THEN SENDS signals to drive a mechanism to move, a step at a time, toward the light. The device literally "hunts" the light, sometimes overshooting its mark and then returning, until it has centered itself on the light source.

Such a star-finding device is now being incorporated in the Stratoscope II project in which a 36-inch reflecting telescope will be sent aloft in a balloon. In order to keep the telescope aimed at the proper stars to be studied, a searching device will keep it aimed at bright "reference" stars.

An orbiting astronomical observatory would use similar equipment.

TOMORROW: Astronaut 54, where are you?

MANSFIELD NEWS JRNL.
November 29, 1962

Area Groups Will Attend Space Fair

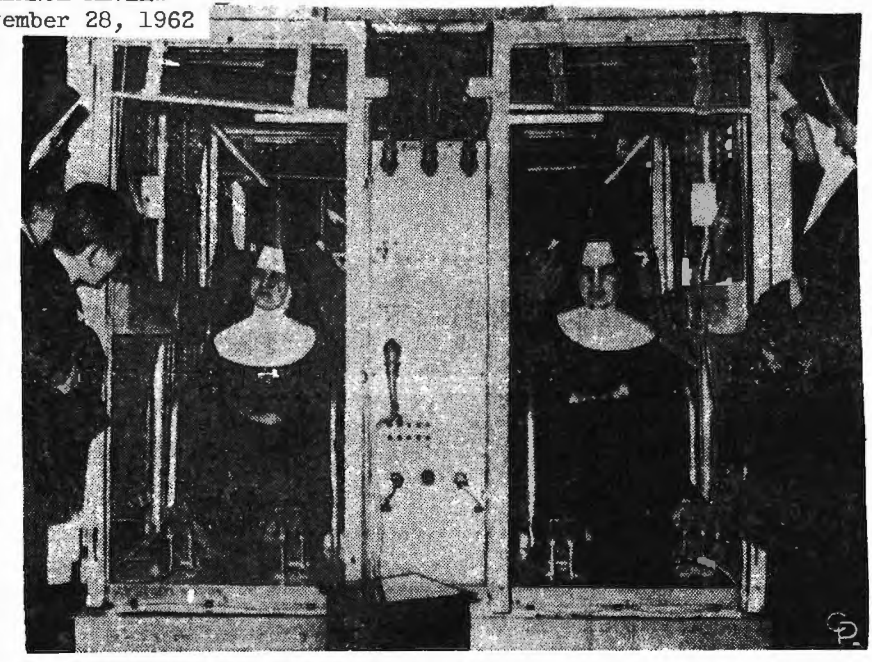
Sixty - five members of Mansfield Senior High School's Science Club and 25 students from Ontario High School are among the thousands of school pupils from throughout Ohio visting Space Science Fair in Cleveland's Public Hall this week.

The Mansfield delegation, accompanied by Kenneth Watson, Science Club adviser, and Assistant Principal George Sherman, will visit the Fair tomorrow.

★

Ontario's group, including 19 who will attend a workshop on biological astornautics and six who will attend a workshop on space design, are at the Fair todav.

ALLIANCE REVIEW
November 28, 1962



HEAVENWARD—Sister Mary Virginia (left) and Sister Mary Ralph take a fancied flight to the clouds in a balloon capsule that carried two Navy scientists 21½ miles above Earth. The display is part of the Space Science Fair in Cleveland, sponsored by NASA.

CLEVELAND PLAIN DEALER
November 7, 1962

Interesting Lectures a Part of Space Fair

Astrophysics . . . planetary physies . . . bioastronautics spacecraft propulsion . . . these are some of the heady subjects to be delved into by junior and senior high school students at the Space Science Fair in Public Hall Nov. 23-Dec. 2.

Planning the space mission . designing the spacecraft . . . scientific measurements, space communications and spacecraft navigation . . . these will be other special lectures for young people at the space show.

The National Aeronautics and Space Administration will be offering these talks to heighten the interest of students in the world of space and in space-age careers.

THE 10 - DAY exposition, which is expected to attract 300,000 persons, is being sponsored by the NASA and The Plain Dealer.

What will young people learn from the lectures?

In the astrophysics class, for example, they will be told about the birth, evolution and natures of the stars and how solar systems, like our own, originate. They will be told how we learn about the stars by studying the radio waves and the light that come from them and how satellites, probes and moon-based observatories can help us learn much more about the universe.

In the bioastronautics lecture, these questions will be raised: Are there some forms of life on other planets? What forms of life can survive in space? What are the effects of the space environment, especially cosmic radiation, on living organisms? How can we protect human beings against these effects? Can we sustain human life for long periods by growing plants, such as algae, inside the spacecraft?

ADMISSION to the Space Science Fair will be free. Hours will be from 10 a.m. to 10 p.m. daily.

However, because of the special courses for students, adults will not be admitted until after 4 p.m. from Monday through Friday, Nov. 26-30.

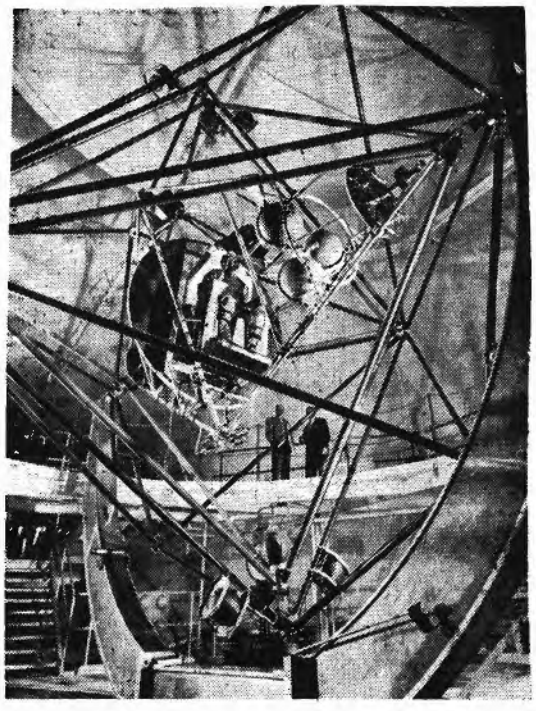
School teachers and educators from Ohio and other states, interested in arranging for student groups to attend the Space Science Fair may contact The Plain Dealer's Education Service Department, 1801 Superior Avenue, Cleveland, 14.

IRONTON TRIBUNE
Ironton, Ohio
December 3, 1962

SCIENCE FAIR

CLEVELAND (AP) — The 10-day Space Science Fair here sponsored by the National Aeronautics and Space Administration and the Cleveland Plain Dealer drew an attendance of 375,738, a NASA spokesman says.

The spokesman said a decision will be reached early next week on whether to continue the fair in some other city. The fair closed Sunday.



Lewis Research Center's MASTIF used by astronauts in training for orbital space flight control of the Mercury capsules.

Weightless State A Problem in Space

By KARL ABRAHAM
Plain Dealer Science Writer

Weightlessness in space flight, caused by the fact that the pull of gravity in one direction is matched by a centrifugal force pulling in the opposite direction, makes some weird things happen.

For the astronaut it means there is neither "up" nor "down" but only some reference direction like "earthward" or "moonward" or toward some fixed star. Yet, he must be able to turn his spacecraft so that it points in a particular direction.

WHEN THE MERCURY astronauts first began training, they came to the Lewis Research Center in Cleveland to "fly" the MASTIF (Multiple Axis Test Inertial Facility), which simulates the small rocket attitude control system devised for the Mercury capsule.

This device will be displayed at the NASA-Plain Dealer Space Science Fair in Public Hall, Nov. 23 through Dec. 2.

It was in this training machine that the astronauts learned to change the position of the capsule for such maneuvers as re-entry. The astronaut must remain oriented while the MASTIF tumbles.

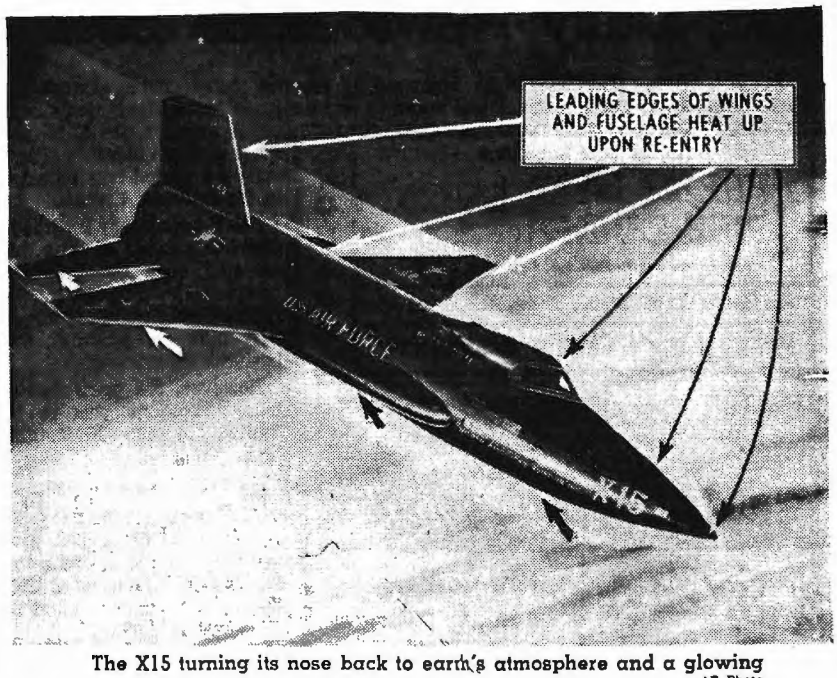
ANOTHER WEIGHTLESSNESS problem concerns design of tools to be used in space work, such as repairs and adjustment of equipment during prolonged lunar or interplanetary missions.

A man trying to turn a bolt with a conventional wrench would find himself turned instead, while the bolt remained fixed.

An entire kit of special tools has had to be developed for space use, and these also will be displayed and demonstrated, with other aspects of work in the life sciences related to space technology.

Tomorrow: Space capsule with wings.

CLEVELAND PLAIN DEALER
November 9, 1962



The X15 turning its nose back to earth's atmosphere and a glowing re-entry. AF Photo

Space-Edge X15 Is Maker of Records

By KARL ABRAHAM
Plain Dealer Science Writer

Although it will never go into orbit, the X15 probably is one of the great accomplishments of the space age. Currently it is the nations only craft capable of both flight through the atmosphere and some maneuverability in near space.

A full-scale model of this 50-foot-long, stubby-winged rocket airplane, its XLR99 rocket engine and the space suit worn by the X15 test pilots will be a part of the NASA-Plain Dealer Space Science Fair, Nov. 23 through Dec. 2 in Public Hall.

THE RECORDS that have been set by the X15 are impressive: speed, 4,105 miles per hour; altitude, 314,750 feet or about 59.6 miles. It has withstood re-entry heating in excess of 1,150 degrees Fahrenheit.

The XLR99 engine powers the X15's flight after the aircraft has dropped from its B52 bomber "mother ship." The engine has a thrust of 57,000 pounds, greater than the Vanguard rocket used to boost America's second satellite into orbit.

During its flight within the atmosphere, the X15 uses normal supersonic aerodynamic controls. Near the top of its ride toward space, where the air is too thin to affect the controls, a system of tiny jets, similar to those in the Mercury capsules, is used.

ONE OF THE MORE important results obtained from this flying space research laboratory is the basic information for construction of the X20 (formerly designated the Dyna-Soar), which the Air Force has under contract. The X20 is intended to be rocket launched from the ground. It is to maneuver in space and orbit and then make a dry landing after atmospheric glide descent.

One of the X15's test pilots, Neil A. Armstrong, recently was picked for the new team of astronauts now in training for the Project Gemini two-man earth orbit missions and the later Apollo trips to the moon.

Tomorrow: Pockets full of rockets.

BEREA NEWS
November 29, 1962

SPACE FAIR BOOSTS AREA

The Space Science Fair in downtown Cleveland this week is a tremendous boost to our area — thanks to our neighbors at N.A.S.A. Its prime purpose, of course, is to inform. However, the national attention given the Fair and the emphasis put on it by so many people locally speaks well for our area's future.

It helps offset remarks some months ago regarding the lack of technical skills in Ohio and should help in our state's quest for space research contracts. And how many new "space" careers were launched this week after touring the fair?

The Plain Dealer deserves tremendous credit for its part in developing this event. Another plus — it further indicates to us that a newspaper is still a mighty, vital force in a community.

CLEVELAND PLAIN DEALER
November 10, 1962

Rocket at Space Fair to Barely Fit in Hall

By KARL ABRAHAM
Plain Dealer Science Writer

The Public Hall's main exhibition arena has a ceiling 80 feet, 6 inches high. That is barely high enough for the real four-stage rocket the National Aeronautics and Space Administration plans to erect there in two weeks.

As part of the NASA-Plain Dealer Space Science Fair, NASA will asemble one of its Scout vehicles in the center of the exhibition. The rocket itself is 72 feet tall, and will be on stand. Its nose will come within a few feet of the ceiling.

SCOUT IS AMONG the smaller of the NASA launch vehicles, and therefore the other nine major ones will be displayed in the form of accurate models drawn to one twenty-fourth scale. They will form a key exhibit in the exposition that opens November 23.

All four of the Scout stages are solid-fueled rockets, each with a distinctive name: Algol, Castor, Antares and Altair.

Scout launched Explorer IX, and it is to play a key role in the flight testing of new electric propulsion systems.

THE SCALE MODEL rockets, their real size, and their launch missions—past and future—include:

- Thor-Abel, 79 feet, Transit, Composite, Anna and Courier satellites.
- Thor-Delta, 81 feet, a variety of scientific satellites.
- Thor-Agena, 86 feet, Discoverer, Echo, Nimbus and the Orbiting Geophysical Observatory satellites.
- Atlas-Mercury, 93 feet, manned orbital missions up to 24 hours.
- ATLAS AGENA-B 102 feet, Ranger lunar probe, Mariner Venus probe, Discoverer, Midas and Samos military satellites.
- Atlas-Centaur, 105 feet, Surveyor lunar probe.
- Titan II, 103 feet, two-man Project Gemini earth orbits.
- Saturn C-1, 162 feet, Earth orbit rendezvous missions and Voyager interplanetary probes.
- Saturn C-5, 325 feet, three-man Apollo mission to the moon. The model of this launch vehicle will be about 13½ feet tall.

Tomorrow: The new rocket engines.

Miss Betty Grambo of The Plain Dealer's Education Service is shown with Space Science Fair tickets being prepared for mailing. Plain Dealer Photo (Ray Matjasic)

Space Fair Tickets Mailed to Schools

Tickets are being mailed to junior and senior high schools in Ohio for student groups that will attend the Space Science Fair at Public Hall Nov. 23-Dec. 2.

While the opening of the space show is less than two weeks away, there is still time for educators to arrange for students to attend the greatest exhibit of spacecraft and satellites ever assembled for public view.

MORE THAN 200 schools already have contacted The Plain Dealer's Education Service to obtain tickets for the space science institute and the general information workshop.

Families wanting tickets to the Space Science Fair should ask The Plain Dealer carrier on their street. Carriers will have the tickets today and next Thursday, Friday and Saturday.

An attendance of 300,000 may be reached for the 10-day exposition sponsored by the National Aeronautics and Space Administration and The Plain Dealer.

Hours will be from 10 a.m. to 10 p.m. daily. Admission will be free.

THERE WILL BE special educational events for student groups from Monday through Friday, Nov. 26-30. Accordingly, on those days only,

Continued on Page 5, Col. 3

Tickets for Science Fair

★ From First Page

adults will not be admitted until 4 p.m.

Visitors to the Space Science will be given dozens of pieces of literature prepared by the NASA dealing with a variety of space-age topics.

Value of the "hardware" models that will be on display will run into many millions of dollars. Some of the exhibits will be rare one-of-a-kind items vital to the U.S. space program.

CLEVELAND PLAIN DEALER
November 12, 1962

You Can Be 'on Camera' of a Satellite

By KARL ABRAHAM
Plain Dealer Science Writer

Echo I has been America's most observed satellite. It also has been the one with the most irregular behavior.

Its purpose is to act as a kind of mirror of radio signals, sent from earth, bounced off its aluminized plastic skin and returned to earth.

Visitors to the NASA-Plain Dealer Space Science Fair beginning November 23 in Public Hall will have a chance to see their own television images bounced off a small-scale Echo.

REDUCED FROM its real 100-foot size to a 35-foot model, the exhibit Echo will be used as a mirror of television signals in a closed circuit. Visitors will be "on camera."

Echo I was launched from Cape Canaveral on Aug. 12, 1960. The balloon weighed about 163 pounds, and initially went around the earth once every 118.3 minutes. As of a few days ago, when the Sohio Tracking Station in Warrensville Heights calculated the orbit period, it had dropped to 115.5 minutes.

Strange things have been happening to the orbital path of the balloon. When it was launched in 1960 its perigee (closest approach to earth) was 954 miles, and its apogee (greatest distance from earth) was 1,030 miles.

EVER SINCE it has been going through half cycles of from five to six months during which its perigee and apogee change considerably. It is like taking a circle and squeezing it into an ellipse.

A few days ago Echo I's perigee was only 580 miles, and its apogee about 1,200 miles. Last May 1 the orbit was nearly circular. On Oct. 21, it was almost elliptic.

The change in orbit results from the pressure of solar radiation—the so-called solar wind—which blows one side of the obrit toward the earth and the other side away from it, although the center remains fixed. Echo I has become badly wrinkled, punctured with meteoroid holes, but should remain in orbit another three years or so.

Tomorrow: Traffic jam in space.

Science Fair Will Outline Space Costs

Taxpayers wanting to know why the United States is spending so much in its Herculean space effort would do well to drop in on the Space Science Fair at Public Hall from Nov. 23-Dec. 2.

The National Aeronautics and Space Administration is confident that the 10-day exposition will do much to explain the magnitude of the tasks which are before this nation in the space age.

HOWEVER, THE Space Science Fair was primarily conceived and developed because of growing concern in the world of space technology over the diminishing numbers of American youth who are pursuing the physical sciences at the collegiate level.

That is why the NASA is devoting much of the Space Science Fair to educational programs for talented junior and senior high school students.

The NASA hopes that thousands of young people coming to the 10-day exposition will be persuaded by what they see and hear to prepare themselves for careers in space technology.

Accordingly, NASA is preparing a special space science institute and a general information workshop daily from Monday through Friday, Nov. 26-30. On those days only, adults will not be admitted to Public Hall until 4 p.m.

Space Fair

★ From First Page

The space show, first of its kind ever held, is being sponsored by the NASA and The Plain Dealer.

Any family wanting tickets to the Space Science Fair should ask The Plain Dealer carrier on their street on Thursday, Friday and Saturday.

OHIO EDUCATORS interested in sending student groups to the Space Science Fair should contact the Education Service Department of The Plain Dealer, 1801 Superior Avenue, Cleveland 14. Space Science Fair will be 10 a.m. to 10 p.m. Admission will be free.

BELLEVUE GAZEITE
Bellevue, O.
Nov. 28, 1962

Girls Show Interest In Space Science Fair

CLEVELAND (UPI) — The space age apparently appeals to the fair sex as well as tomorrow's potential male scientists.

Space Science Fair sponsored by the National Aeronautics Space Administration has attracted thousands of girls so far. Some 7,870 boys and girls attended Tuesday in organized groups.

Educators have been concerned for years of the lack of interest in science by girls. Many believe the reason is that scientific courses in school and college take several years to complete and girls do not find that attractive.

Still, this did not stop the young ladies who came armed with notebook, pencil and many questions.

Donna Yeakel came all the way from Leavittsburg in Trumbull County, one of 80 physics and chemistry pupils who made the trip in two buses.

CLEVELAND PLAIN DEALER
November 14, 1962

A-Energy Is Termed Space Key

By KARL ABRAHAM
Plain Dealer Science Writer

Without atomic energy the exploration of space would not have much of a future beyond travel to the moon.

The first of a new series of rockets that liberate energy by means other than the burning of chemical fuels is just around the corner.

While the National Aeronautics and Space Administration and the Atomic Energy Commission are developing nuclear rockets for the future, the intermediate stage is that of using nuclear energy to produce electric power.

This electric power can then be used to operate an electric rocket. Such an electric rocket, or ion engine, will be displayed at the NASA-Plain Dealer Space Science Fair, Nov. 23 to Dec. 2 in Public Hall.

NEXT YEAR, NASA hopes to conduct the first flight tests of two ion rockets, one built by Cleveland's Lewis Research Center, the other by the Hughes Aircraft Co. The Lewis engine uses mercury as a propellant and the Hughes engines uses cesium.

In a chemical rocket the energy to drive particles out the exhaust of the engine is liberated during the burning reaction of the fuel and some oxidizing agent like oxygen.

However, in the electric rocket, the energy will come from an nuclear-electric generator. This energy in electrical form will be used to create powerful electric and magnetic fields, and these fields will apply a pressure to drive particles out of the engine.

IN THE CASE of the ion rocket, the fuel is a vapor of mercury or cesium atoms which have had some of their electrons removed so that they become positively charged mercury or cesium ions.

Such charged particles can be set in motion by an electric field, and ejected from the rocket to provide thrust.

It is a very low level of thrust, on the order of fractions of a pound, compared to millions of pounds for chemical rockets. However, the chemical rocket may burn millions of pounds of fuel in a few minutes while the electric rocket may operate for weeks or months on a few pounds or propellants. For longer trips the electric rocket is best.

Tomorrow: Energy in Space

Student Registrations Mounting for PD-NASA Space Exposition

With the opening of the Space Science Fair less than 10 days off, Ohio junior and senior high schools are speeding their registration efforts for student groups.

More than 300 schools from around Ohio already have arranged to send students for special educational programs at the fair—a space science institute and a general information worshop.

Because of the education benefits from these programs, many schools are making exceptions to their usual rules against field trips in school hours.

RESERVATIONS for the space science institute and general information workshop may be made through the Education Service Department of The Plain Dealer, 1801 Superior Avenue, Cleveland 14.

The Space Science Fair will be held at Public Hall from Nov. 23-Dec. 2 under the auspices of the National Aeronautics and Space Administration and The Plain Dealer.

Hours will be from 10 a. m. to 10 p. m. daily and admission will be free.

Because of the special programs for students, adults will not be admitted to the space show until 4 p. m. on Monday through Friday, Nov. 26-30.

PLAIN DEALER carriers again will be distributing free tickets to the Space Science Fair tomorrow, Friday and Saturday.

Any family may obtain tickets by asking The Plain Dealer carrier on their street.

In cities where there are no carriers, tickets may be obtained from The Plain Dealer distributor.

Tickets also will be available able to the public at The Plain Dealer booth inside the Lakeside Avenue entrance to Public Hall.

The 10-day exposition, first of its kind ever, is expected to attract as many as 300,000 persons.

WILLARD TIMES
November 15, 1962

Willard Students to Attend Science Fair

Four busloads of Willard high school students, 175 in all, will journey to Cleveland Nov. 23 to visit the Science Fair in Public Hall.

The following week, eight boys from L. W. Zulauf's physics class will also attend the Fair.

The Fair, open to the public, is sponsored by the National Aeronautics Space Administration and Cleveland Plain Dealer. Admission is free.

SANDUSKY REGISTER
November 15, 1962

STUDENT TRIP

Forty Bellevue High students will attend the Science Fair sponsored by NASA in Cleveland Monday, Nov. 26.

The Bellevue group will include physics students and the senior advanced math students. Herbert Wolfe, Wilbur White, and Vilas Deane of the science and math departments will have charge of the party.

CLEVELAND PLAIN DEALER
November 15, 1962

Lewis Lab Official Will Brief 16 Heights PTAs on Space Fair

Sixteen Cleveland Heights Parent-Teacher Associations will get a special briefing on the Space Science Fair next week from Eugene J. Manganiello, deputy director of Cleveland's Lewis Research Center.

Some 900 parents are expected to be present at Wiley Junior High School at 8 p.m. Monday when Manganiello reviews plans for the exciting, educational space show at Public Hall from Nov. 23-Dec. 2.

Free tickets to the 10-day exposition will be distributed.

THE SPACE SCIENCE Fair, first of its kind ever held, is being sponsored by the National Aeronautics and Space Administration and The Plain Dealer.

Missile and satellite exhibits from all over the country are being readied and others will be airlifted to Cleveland in the last week before the fair opens.

The show will be open from 10 a. m. to 10 p. m. daily and admission will be free.

From Monday through Friday, Nov. 26-30, there will be special educational programs for junior and senior high school students. On those days only, adults will not be admitted to Public Hall until 4 p. m.

FINAL DISTRIBUTION of tickets will be made today, tomorrow and Saturday by Plain Dealer carriers. Any family may obtain tickets by asking the carrier on their street.

Free tickets also will be available to the public at The Plain Dealer booth at the Space Science Fair inside the Lakeside Avenue entrance to Public Hall.

Ohio educators interested in bringing student groups to the Space Science Fair should contact the Education Service Department of The Plain Dealer, 1801 Superior Avenue, Cleveland, 14.

WADSWORTH NEWS BANNER
November 15, 1962

In Cleveland

Name Students For NASA Space Fair

EXTENSIVE EFFORTS are under way to display details of space projects and planning to the public of northern Ohio by the National Aeronautics and Space Administration in the Cleveland Public Auditorium, November 23 through December 2.

This Space Fair is the first of such elaborate and comprehensive character anywhere in the United States. Twice the space given to this expanding field of technology at the Seattle World's Fair will be available at the Cleveland exhibit. Every major space vehicle or system either already used or being planned for the future will be displayed.

* * *

THE EMPHASIS of the Fair is educational, both for students in school, as well as adults. Wadsworth Senior High and Junior High students are being selected to attend a Space Institute during several school days. Over 125 students will accompany teachers to become involved in intensive treatment of a half dozen specific aspects of space science. They will attend lectures on these topids by NASA personnel.

The public is invited and urged to attend this Fair during evenings and week-ends. To assure entrance, one should obtain general admission tickets, prior to going, from Mr. Kreider at the Senior High school. However, tickets can be obtained at the Box Office, Public Auditorium, in case of last minute decision to attend. Admission is free. Parents are urged to attend this event with their children. Being jointly sponsored by the Cleveland Plain Dealer and NASA, it is doubtful if such opportunity will be presented to northern Ohio again for many years.

Exhibits Tell What Makes Satellite Fly

By KARL ABRAHAM
Plain Dealer Science Writer

A Ranger moon probe recently failed because its solar panels failed to turn their working faces toward the sun, thus depriving the spacecraft of electric power.

In manned space flight the need for a dependable and adequate power supply to operate heating, air conditioning, air regeneration, guidance, communications and perhaps propulsion systems is obvious.

One of the special exhibits of the NASA-Plain Dealer Space Science Fair in Public Hall from Nov. 23 through Dec. 2 will be about energy sources in space.

THESE HAVE already come a long way from the conventional batteries and gas-operated turbine generators with which the space age started.

One of the early triumphs of space technology was to adapt the photoelectric cell—a thin wafer that converts sunlight directly into electric current, as in a photographer's light meter — to power radio transmitters and other instruments in satellites.

Nuclear energy has provided two kinds of devices. In one a radioactive isotope manufactured in a reactor is used as a source of heat to run a small turbine generator in space. A nuclear reactor small enough to fit into a spacecraft which provides heat for power generation, is still being developed.

SOLAR CELLS use the light energy of the sun, but another series of devices using large reflectors or collectors of solar heat has been developed. Attempts are also being made to convert solar heat directly into electricity without going through the heat-boiler-turbine-generator cycle.

And a new class of electric-chemical generators called fuel cells is being developed for the manned lunar landing missions. In these cells two gases—for example, oxygen and hydrogen — combine chemically to form water and in the process produce a current.

Tomorrow: Space armor.

CLEVELAND PLAIN DEALER
November 16, 1962

Joseph Walker, Record-Setting X15 Pilot, Coming to Space Fair

Joseph A. Walker, chief NASA test pilot assigned to the X15, will come here for the giant Space Science Fair at Public Hall which opens next Friday.

This was announced yesterday by the National Aeronautics and Space Administration, which said Walker would be at the space show Nov. 29.

A former Clevelander, Walker began his career with NASA as a physicist at the Lewis Research Center here.

HE REMAINED at Lewis from 1945 until 1951, when he transferred to NASA's Flight Research Center at Edwards, Calif.

On April 30 of this year Walker flew the X15 to an altitude of 246,700 feet.

On June 27, he flew the X15 to a speed of more than 4,100 miles an hour, the fastest ever flown in the rocket aircraft.

ONE OF THE EXHIBITS at Public Hall will be a full-scale model of the X15 brought here with the co-operation of the Air Force.

The 10-day Space Science Fair will continue through Dec. 2.

Joseph A. Walker

Hours will be 10 a.m. to 10 p.m. daily and admission will be free.

The fair, first of its kind ever held, is sponsored by the NASA and The Plain Dealer.

PLAIN DEALER carriers will make final distribution of free tickets to the Space Science Fair today and tomorrow. Any family can obtain tickets by asking the carrier on their street.

Free tickets also will be available during the show at The Plain Dealer booth in the

Pilot of X15 Coming for Space Fair

★ From First Page

Lakeside Avenue lobby of Public Hall.

NASA is emphasizing to educators a special space science institute and general information workshop for junior and senior high school students. This program will be offered Monday through Friday, Nov. 26-30. On those days only, adults will not be admitted to Public Hall until 4 p.m.

Inquiries about the space science institute and the general information workshop may be made to the Education Service Department of The Plain Dealer, 1801 Superior Avenue, Cleveland, 14.

MAHONING DISPATCH
November 16, 1962

PLAN SPACE FAIR FOR CLEVELAND

A 10-day Space Science Fair will be held at Cleveland Public Hall Nov. 23-Dec. 2 under sponsorship of the National Aeronautics and Space Administration and The Cleveland Plain Dealer.

It is planned to acquaint the public, and especially school-age children, with the country's programs for scientific exploration of space. The Ranger and Mariner, two of the most advanced spacecraft, will be on display.

Other displays include several other U.S. spacecraft and scientific satellites such as Tiros, Echo, Pioneer V and manned vehicles like X-15, Mercury, Gemini and Apollo. There will also be a space science institute and a general information workshop.

Ohio school officials who are interested in arranging for student groups to attend the Space Science Fair may contact The Plain Dealer's education service department, 1801 Superior Ave., Cleveland 14.

Hours of the exposition will be 10 a.m. to 10 p.m. daily. Admission will be free.

BOWLING GREEN
DAILY SENTINEL
November 17, 1962

Dr. Abe Silverstein, director of the National Aeronautics and Space Administration's Lewis Research Center in Cleveland, said it was the responsibility of the state to provide the initiative — particularly in education — that would create the right kind of environment for expanding space industries.

ELYRIA CHRONICLE TELEGRAM
November 16, 1962

EHS pupils to attend space fair

Seventy-five pupils from Elyria High School will attend the NASA-Plain Dealer Space Science Fair Nov. 26.

NASA scientists will give lectures and explain the exhibits. The seven lectures will be astrophysics, geophysics, bio-astronautics, aerospace instrumentation, spacecraft design, space propulsion, and space mission planning.

The trip was arranged by George Miraben, assistant superintendent of schools; Joe Asire, Ed Allen, and George Sandrew will accompany the students.

Machines Copy Space Punishment

By KARL ABRAHAM
Plain Dealer Science Writer

The research laboratories of the National Aeronautics and Space Administration have invented some unusual machines to inflict on materials punishment they would bear in space.

The search for better materials—from simple structural pieces to delicate solid state physics devices—is one of the great struggles of space research.

A machine that can fire man-made micrometeorites will be among the articles on display at the NASA-Plain Dealer Space Science Fair, Nov. 23 to through Dec. 2 in Public Hall.

THE IMPACT, penetration or slow erosion by tiny particles called micrometeorites is a great threat to spacecraft. If weight were no limitation, heavy shielding could be provided. However, it costs too much to send dead weight into space.

The Ames Research Center near San Francisco has developed a gun that can shoot tiny particles into test surfaces at many thousands or tens of thousands of miles per hour. The gun is used to test the reaction of materials destined for spacecraft skin use.

MATERIALS must retain not only their strength but properties such as electrical conductivity, light and heat absorption or reflectivity, etc.

Spacecraft often are showered with intense radiation emitted by the sun. To withstand these space hazards, electronic and solid state physics devices that are much more reliable than those normally used on earth are being developed.

Tomorrow: Instant spacecraft.

CLEVELAND PLAIN DEALER
November 17, 1962

Dr. T. Keith Glennan

Dr. Abe Silverstein

Dr. Hugh L. Dryden

Speakers at Space Commemorative Dinner on Sunday, Nov. 25.

Glittering Banquet Will Be Space Science Fair Event

A Space Commemorative Dinner, one of the most glittering affairs here in many years, will be held Sunday, Nov. 25, as an outstanding event of the Space Science Fair.

Guests will be approximately 1,000 gentlemen and their wives, prominent in science, business, industry, cultural and civic life in northern Ohio.

The Space Commemorative Dinner will be in the dazzling new ballroom of Hotel Sheraton-Cleveland, its premiere event.

INVITATIONS to the black-tie dinner have been sent out. Tickets are $7.50 a person.

Speakers will include Dr. Hugh L. Dryden, deputy administrator of the National Aeronautics and Space Administration; Dr. Abe Silverstein, director of NASA's Lewis Research Center here, and Dr. T. Keith Glennan, president of Case Institute of Technology and former head of NASA. Another nationally prominent speaker is to be announced.

The audience will receive first-hand reports on progress being made by the United States in the space race.

THE EVENING will start with cocktails in the newly redecorated Sheraton Room and then will move on to the hotel's spectacular new ballroom for dinner.

The oval ballroom, its decor white, gold and crystal, will be accented with table decorations of gold baskets, massed with pachysandra and red carnations, the state flower of Ohio.

In this candlelit atmosphere a delicious dinner, with wine, will be served.

AFTER DINNER, guests will be taken in chartered buses for a conducted tour of the Space Science Fair, where they will see the greatest array of spacecraft, satellites and other space-age "hardware" ever assembled.

The Space Science Fair opens Friday at Public Hall and continues through Dec. 2 under sponsorship of the National Aeronautics and Space Administration and The Plain Dealer.

Hours will be from 10 a.m. to 10 p.m. daily. Admission will be free.

Student groups are coming to the show from more than 350 schools all over Ohio and other states, including Michigan, Minnesota and Pennsylvania.

All types of cameras, movie and still, will be allowed.

CLEVELAND PLAIN DEALER
November 17, 1962

Foldable Sections Used in Spaceships

By KARL ABRAHAM
Plain Dealer Science Writer

Once objects have been placed in earth orbit or are coasting in interplanetary flight, they no longer carry their own weight. They are, in a sense, weightless.

This circumstance has led many aerospace researchers to propose that satellites, deep space probes, earth-orbiting space stations, etc., could perhaps be sent up "folded in a can" and unfolded in space.

Unfoldable structures—of which inflatable types like Echo balloon satellites are but one variety—will be displayed at the NASA-Plain Dealer Space Science Fair in Public Hall Nov. 23 through Dec. 2.

THE BASIC IDEA is that rigid components, like electronic systems, motors, etc., could be sent up later through a rendezvous technique. The same goes for people.

All those parts of the space vehicle that are pliable, that can be folded, telescoped or in other ways made to take up a minimum of space, could be incorporated in the original vehicle.

The primary task of such inflatable or extensible structures is to provide shelter against the space environment and to contain an atmosphere if a life-support mission is involved.

MANNED SPACE stations are not the only application of unfoldable structures, however. Even rigid spacecraft structures may have some foldable parts, such as large radio or radar dish antennas, solar light or heat collectors, shadow shielding from radiation, etc.

One of the most important stages of the manned exploration of the moon will come at the very end, when the astronauts must land on earth. An inflatable Rogallo wing or paraglider, which will be flight tested during Project Gemini earth orbits, is to be used to bring Apollo to a safe, dry landing.

Foldable structures of very light weight and large surface area also are of scientific value in experiments upon the so-called "solar wind" and other astrophysical phenomena.

THE HALLE BROS. AD.
CLEVELAND PLAIN DEALER

Ride Special Halle Bus to and from the NASA Space Exhibit

The exciting, informative NASA Space Exhibit opens at Public Auditorium on Friday, Nov. 23. From 4:00 p.m. to 9:00 p.m. ride the special Halle bus to and from Public Auditorium. No charge, of course!

COLUMBUS SUN
November 18, 1962

Science Fair At Cleveland

A Space Science Fair, to be held at the Cleveland Public Auditorium Nov. 23-Dec. 2, will give Ohio and the entire midwest an opportunity to learn about and actually see many of the exciting developments being made in this field.

CLEVELAND PLAIN DEALER
November 18, 1962

Space Fair to Have Model of Gemini

By KARL ABRAHAM
Plain Dealer Science Writer

The limit of America's present manned space flight capability is a one-day flight by one man in a Mercury spacecraft. Late next year a new spacecraft called Gemini is to be flight tested for a week's flight by two men.

Gemini is the project that will bridge the gap between the Mercury flights and the trip by three men to the moon in Project Apollo.

A FULL-SCALE and detailed mockup of the Gemini capsule will be displayed at the NASA - Plain Dealer Space Science Fair, this Friday to Dec. 2 in Public Hall.

The two-man Gemini capsule has been closely patterned after the Mercury capsule to reduce development time by taking advantage of the testing experience of much of the Mercury capsule.

Gemini is about one foot wider at the base than Mercury and slightly higher, but its additional internal volume is sufficient for two astronauts to sit side by side.

ITS ASSIGNED MISSIONS are far more important than merely extending the length of time a man can spend in space.

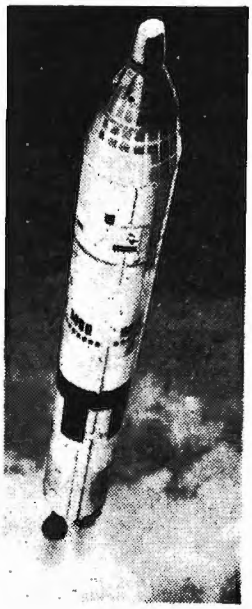
It will serve as a basic testing laboratory for equipment and maneuver techniques destined for Project Apollo.

When Gemini was first conceived, the method of going to the moon still included a rendezvous of two spacecraft in earth orbit and a joining of them for the lunar trip.

THE RENDEZVOUS now has been shifted to the moon as the first step of the return trip to earth. However, astronauts still will be practicing earth orbit rendezvous with the Gemini capsule.

The Gemini spacecraft also will give the United States an opportunity to send men into the so-called weightless condition for a period of time equal to that of the lunar mission as a safeguard against unexpected ill effects. None are now anticipated, on the basis of American and Soviet earth orbital missions.

Tomorrow: Three men to the moon.



In artist's sketch, Titan II launch vehicle lifts Gemini capsule and its two astronauts (note twin portholes) toward extended earth orital flight.

CLEVELAND PLAIN DEALER
November 18, 1962

Space Fair Dinner Will Hear Kennedy on Closed-Circuit TV

President Kennedy will address the Space Commemorative Dinner next Sunday via closed-circuit television, it was announced yesterday.

The dinner will be a highlight of a civic program for the Space Science Fair, which opens Friday at Public Hall and continues through Dec. 2.

LOCAL TELEVISION and radio stations will be among the news media covering the memorable evening.

The dinner will start at 7:30 in the dazzling new ballroom of Hotel Sheraton-Cleveland.

After the program, guests will be taken in chartered buses to Public Hall, where they will see the largest and most comprehensive show of America's advancement into space ever held.

Sponsoring the Space Science Fair are the NASA and The Plain Dealer.

ATTENDANCE at the 10-day exposition is expected to reach 300,000, including thousands of pupils from junior and senior high schools all over Ohio.

A black-tie affair for community leaders from throughout northern Ohio, the Space Commemorative Dinner will mark the debut of the hotel's new ballroom.

Leaders of business, industry and commerce, men prominent in the civic, educational, social, cultural and political life of Ohio will be present, and their wives.

Invitations already have been mailed. Tickets are $7.50 a person.

The dinner program will commemorate America's achievements in space science.

AN AUDIENCE expected to number 1,000 will hear first-hand reports of this nation's progress in the vital space race.

Continued on Page 13, Col. 4

BUCYRUS TELEGRAPH-FORUM
November 17, 1962

Schools To Send Pupils To Space Fair

Arrangements are being made by several schools of Crawford County to send student groups to the NASA-Space Science Fair which openes next Friday in Cleveland's Public Auditorium.

Although no admission is being charged for the event, those visiting are required to have tickets. The tickets are available locally, free of charge, at City News and Gifts.

The exhibition will be open ten days and will be twice as large as the National Aeronautical Space Administration display at the Seattle World Fair.

Included in the exhibit is an X-15 rocket plane, Mercury orbital capsule used in manned space flight, the Mariner and Apollo, as well as the full-size two-man Gemini capsule, a seven-story Scout rocket, the Ranger, Surveyor and Prospector spaced rafts. designed for investigating the lunar surface, a satellite tracking dish and models of the Explorer, Vanguard and Discoverer satellites.

L. C. Wertz of City News indicated tickets were available to individuals or groups. He is the only local distributor.

Space Fair to Hear Kennedy

★ **From First Page**

Other speakers will include Dr. Hugh L. Dryden, deputy administrator of the National Aeronautics and Space Administration; Dr. Abe Silverstein, director of NASA's Lewis Research Center here, and Dr. Keith Glennan, president of Case Institute of Technology and former head of NASA.

"The Space Science Fair is by far the most significant and exciting educational program ever conducted on the subject of space technology." Dr. Silverstein said yesterday.

"The fair has two principal objectives:

- "To stimulate the interest of our youth with the challenges of the U.S. space program, thus encouraging them to pursue studies related to space technology.
- "To acquaint the public of the nation's progress and future plans for the scientific exploration of space.

"Since the Lewis Research Center here in Cleveland is NASA's principal center for advanced research on propulsion and propellants, much of the work going on at Lewis will be demonstrated and displayed during the science fair."

How to Obtain Tickets to Fair

Free tickets to the Space Science Fair will be available during the show, Nov. 23—Dec. 2, at The Plain Dealer booth in the Lakeside Avenue lobby of Public Hall.

Tickets also may be obtained at the customer service desk of The Plain Dealer, 1801 Superior Avenue, Cleveland 14. Persons also may request tickets from the customer service desk by mail, enclosing a self-addressed, stamped envelope.

DAILY SENTINEL-TRIBUNE
Bowling Green, O.
Dec. 4, 1962

Space Science Fair Draws 375,000 In 10 Days In Cleveland

CLEVELAND (UPI) — The Space Science Fair ended a 10-day run here Sunday with more than 50,000 persons turning out for the final day.

Total attendance for the show, which exhibited the nation's accomplishments in space science and technology, was more than 375,000. Officials had expected about 300,000.

The sponsoring National Aeronautics and Space Administration (NASA) is considering taking the show on the road. The exhibits and models were sent here from NASA centers across the country.

AKRON BEACON JOURNAL
November 18, 1962

Wings And Wheels

Space Fair Will Call Akron Fliers

By HELEN WATERHOUSE

Akron aviation fans will be well represented at the 10-day space fair opening in Cleveland's Public Auditorium Friday and running through Dec. 2.

Scientists and engineers under the direction of leaders in the National Aeronautics and Space Administration — NASA —will lecture on space subjects and demonstrating with large scale models of satellites and manned spacecraft.

Arlene Davis

Women pilots from here will take in the "Women in Space" programs on Nov. 28, sponsored by "Zonta International" at the Statler Hilton Hotel. Headliners on that program will be pilots Jacqueline Cochran, Jerrie Cobb and Blanche Noyes with Cleveland's Arlene Davis acting as chairman of the day.

AKRON BEACON-JOURNAL
November 19, 1962

Fair Is Free To Youngsters

Youngsters can get free tickets and transportation to the Space Science Fair which opens in Cleveland's Public Hall next Friday from the Hobby Education Foundation of America office in the Akron YMCA.

The space show is co-sponsored by the National Aeronautics and Space Administration (NASA). Joseph A. Walker, chief rocket plane test pilot for NASA, will be at the show Nov. 29.

CLEVELAND PLAIN DEALER
November 19, 1962

Space Fair Will Attract U.S. and Foreign Newsmen

A big turnout of news media representatives from many sections of the United States, plus a scattering of foreign newsmen, is expected here for the Space Science Fair which opens to the public at noon Friday.

National television network magazine representatives will be at Public Hall to cover the 10-day exposition which will continue through Dec. 2, according to Harry J. McDevitt, public information director here for the National Aeronautics and Space Administration.

THE SPACE SCIENCE Fair already has been publicized by major newspapers across the country, McDevitt said.

Some 200 news, science and technical writers are expected to come here to report on various aspects of the significant and exciting event.

A complete press headquarters, including telephones, typewriters and Western Union wires, will be in operation at Public Hall beginning at 9 a.m. Wednesday.

A PRESS PREVIEW of the Space Science Fair will be offered at 10 a.m. Friday under the direction of Dr. Abe Silverstein, head of NASA's Lewis Research Center here.

Then, at noon, the doors will be opened to the public. For the remainder of the fair, hours will be 10 a.m. to 10 p.m. daily.

The Space Science Fair is being sponsored by NASA and The Plain Dealer. It will offer the greatest display of spacecraft, satellites and other space-age paraphernalia ever assembled for public view anywhere.

AN EXTRA BENEFIT for high school pupils visiting the fair will be guidance for college and vocational careers, arranged by the Cleveland Technical Societies Council.

The council will maintain a career guidance office throughout the Space Science Fair in Room 132 of Public Hall. The counseling will be available to all high school pupils.

Scientists and engineers from Greater Cleveland in-

Continued on Page 11, Col. 2

Free Tickets Available

Free tickets for the Space Science Fair, Friday to Dec. 2, will be available during the exposition at The Plain Dealer booth in the Lakeside Avenue lobby of Public Hall. Show hours will be 10 a.m. to 10 p.m. daily.

Tickets also may be obtained at the customer service desk at The Plain Dealer, 1801 Superior Avenue N. E., Cleveland 14. Persons wanting to get their tickets by mail should write the customer service desk, enclosing a self-addressed, stamped envelope.

Space Fair

★ From First Page

answer questions and supply literature to pupils, as well as their teachers.

On Tuesday and Wednesday, Nov. 27 and 28, college representatives will be in Room 132 to talk over entrance requirements and offer college and career counseling to students and their families. This will be from 11 a.m. to 9 p.m.

Thousands of junior and senior high school pupils from around Ohio and from several other states are coming here in organized groups to attend the fair. They will take part in a special space science institute and a general information workshop.

CASE INSTITUTE of Technology, Fenn College and John Carroll University are cooperating in this program, according to M. C. Wakefield dustries will be on hand to of the Cleveland Technical Societies Council.

The NASA plans to make a one-hour color movie of the Space Science Fair which will be available for showing all over the country.

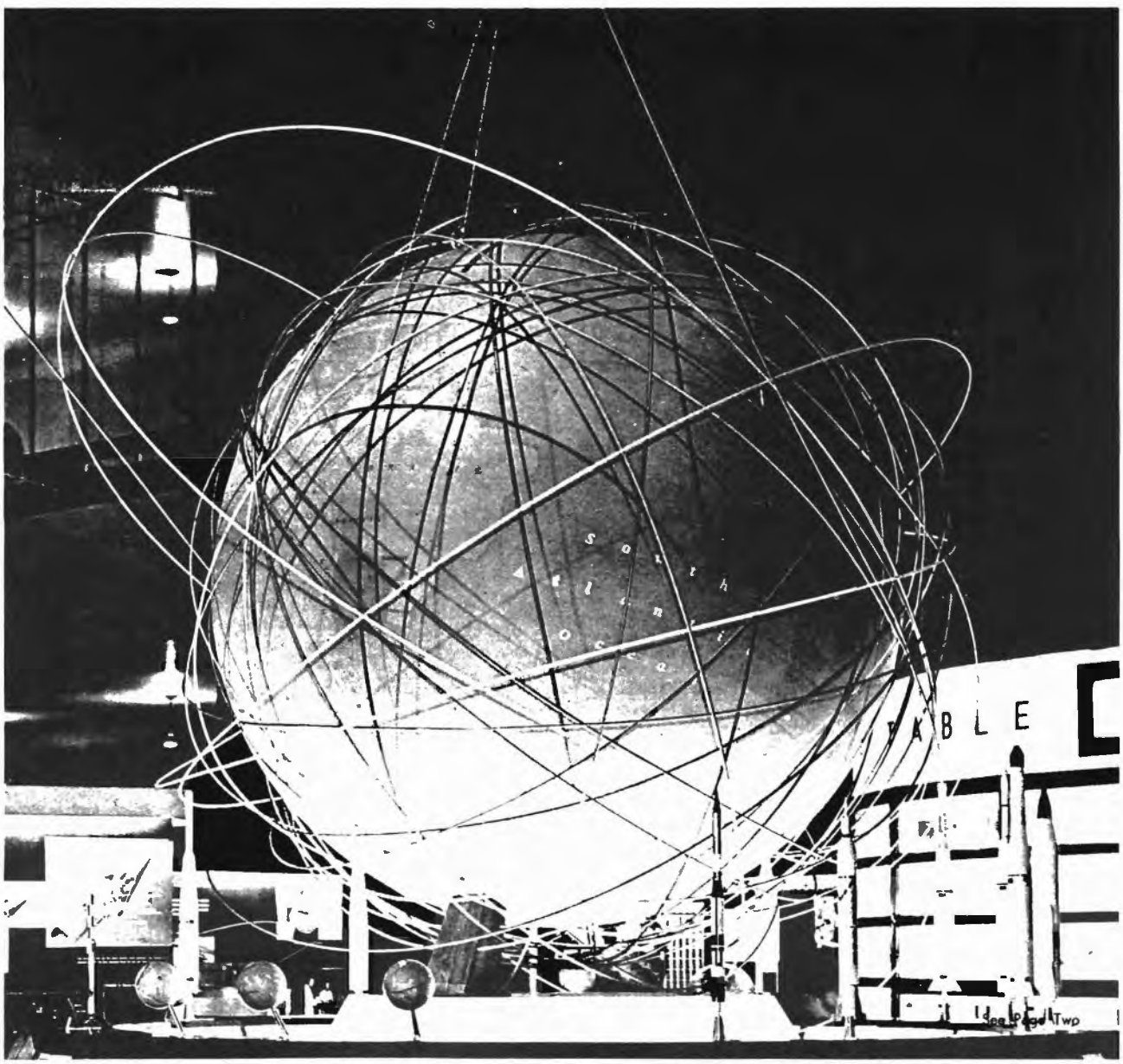
THE PLAIN DEALER
Sunday Magazine

Sunday November 18, 1962

Space Fair Issue

Guide to the Exhibits • Center Pages

Articles by T. Keith Glennan
And Dr. Abe Silverstein



NASA-Plain Dealer Space Science Fair, Public Hall, Nov. 23 - Dec. 2

NASA's Lewis Center—

Sunday Plain Dealer, Nov. 18, '62

Research Launching Pad

By Dr. Abe Silverstein **Director, NASA Lewis Research Center**

FOR the past two decades, Cleveland has been the focal point for the science of aerospace propulsion and power generation research.

The Lewis Research Center, established in 1941 under the National Advisory Committee for Aeronautics, forerunner of the National Aeronautics and Space Administration, has been principally concerned with these two highly important areas of space technology since its inception.

Long before the U.S. entered the Space Age, Lewis scientists and engineers had been involved in research to improve propulsion systems for America's fighter and bomber aircraft during World War II. The Cleveland team added power and altitude to the P-38 and P-47 fighters; the B-17 and B-29 bombers; the famed P-51, and many others.

At the close of World War II, Lewis began work on gas turbine and jet propulsion systems.

Work on space technology projects at Lewis started shortly after the war when research began on high-energy fuels for use in new jet supersonic aircraft. Other engineers were concerned with jet noise suppression studies, thrust reversal devices for jet aircraft, turbojet afterburners, supersonic inlets, turbine cooling and transonic compressors.

Man's first supersonic flight in 1947 opened up a whole new era in propulsion systems, eventually leading to manned orbital flights at speeds greater than 17,000 m.p.h. —all in a period of 15 years.

Post-World War II years were astoundingly productive. Although scientists at Lewis had primarily concerned themselves with propulsion requirements for aeronautics, the transition was swiftly made to space technology programs, with emphasis on new and powerful engines to propel rocket vehicles off the earth.

Today the Lewis Research Center, with its nuclear research reactor and rocket test site at Plum Brook in nearby Sandusky, is an acknowledged leader in research involving aeronautics, nuclear, electric and chemical power sources, as well as advanced ideas concerning thermal and solar energy conversion systems.

The Lewis laboratory now has a staff of some 4,000 employees—including about 1,300 professional scientists and engineers—

The director of Lewis Research Center entered the space program through a wind tunnel. Designing one was an early assignment for Dr. Abe Silverstein after he joined the forerunner of NASA in 1929. He was the head of the Full-Scale Wind Tunnel staff at Langley Research Center during the early years of World War II and came to Cleveland in 1943. Here he has directed research in a lot of wind tunnels, from Altitude to Supersonic — playing a vital role in the Jet Age that has become the Space Age. He has been director at Lewis for a year and lives in Fairview Park. Dr. Silverstein is chairman of the NASA-Plain Dealer Space Science Fair.

at work in virtually all areas of space. Unique tools of research are employed to study flight propulsion problems from the chemistry of fuels to the operation of full-scale rocket engines. These studies are conducted under simulated conditions of high-speed and high-altitude flight and space environment.

Since propulsion is the obvious key to space exploration, the majority of the Lewis effort is concentrated in the three major propulsion fields—chemical, electric and nuclear. Considerable effort is also applied to power generation, both for electric propulsion and auxiliary power requirements. Other Lewis programs involve research on new materials for use in rocket engine components and spacecraft; high-energy fuels requiring less weight for added payloads; environment studies simulating actual space conditions, and a broad spectrum of fundamental scientific research.

THE nation's first man-in- space program, Project Mercury, drew heavily from research efforts at Lewis, whose scientists provided basic information on solid fuel rockets and design of the spacecraft's escape system. Lewis engineers also constructed and operated a "multiaxis test facility" to aid in training Mercury astronauts in the techniques of controlling the capsule during periods of tumbling.

More recently, important studies leading to the design of the 1,500,000-pound thrust Saturn launch vehicle were conducted at Lewis using the center's 8-by-6-foot supersonic wind tunnel, a valuable research tool over the years, together with a larger 10-by-10 foot tunnel which generates speeds more than three times faster than sound. Models of rockets and high-speed aircraft—like the B-70—have undergone strenuous research in Lewis wind tunnels to prove their design.

Interplanetary space travel, rapidly becoming a realistic part of our space future, is an everyday topic of discussion at the Lewis lab whose scientists are developing high-energy fuels for upper stages of Saturn and Centaur and propulsion systems for long-range, long-duration planetary voyages.

Beyond the high energy chemical rockets are the nuclear and the electric propulsion devices. In Project Rover, a joint NASA-AEC program, the Lewis staff is dealing with propellant systems dynamics and nuclear engine control components associated with NERVA (nuclear engine for rocket vehicle applications). In the electric propulsion area Lewis scientists are conducting

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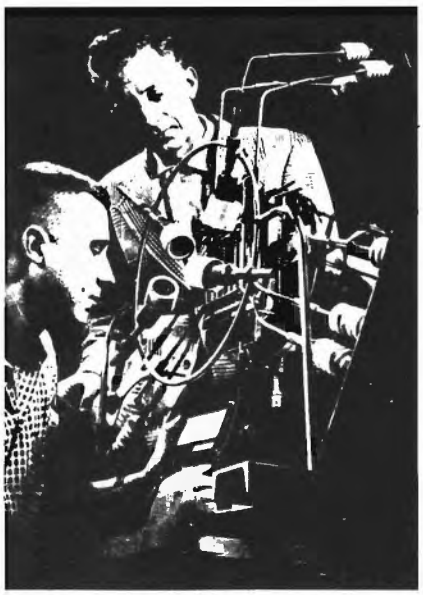


An engineer and a technician check out an ion engine designed to propel an interplanetary space vehicle, such as will be seen at the Space Science Fair.

(Cont'd. on next page)

Sunday Cleveland Plain Dealer
Nov. 18, 1962

(Cont'd. from previous page)

NASA Research

CONTINUED FROM PAGE 15

research on the thruster or engines and the power generation systems. In addition they are managing contracts with industry in these areas.

Propulsion systems using nuclear and electric power will some day become ordinary, just as we have observed the rapid transition from reciprocating engines, to jet power plants, to powerful rocket propulsion systems.

Lewis Plum Brook Station houses a nuclear reactor capable of studying the problems of converting nuclear energy for use in space propulsion systems. The NASA has been granted authority by the Atomic Energy Commission to operate the 60 megawatt reactor at full power. Plum Brook now employs more than 400 persons and is growing. A rocket test site at the facility enables engineers to conduct full scale tests with "live" engines.

Recently Lewis was assigned responsibility for the Centaur and M-1 programs. Centaur is being developed as the nation's first high-energy rocket system. It will be used to place satellites in high earth orbits, to launch interplanetary probes and to soft-land instruments on the moon.

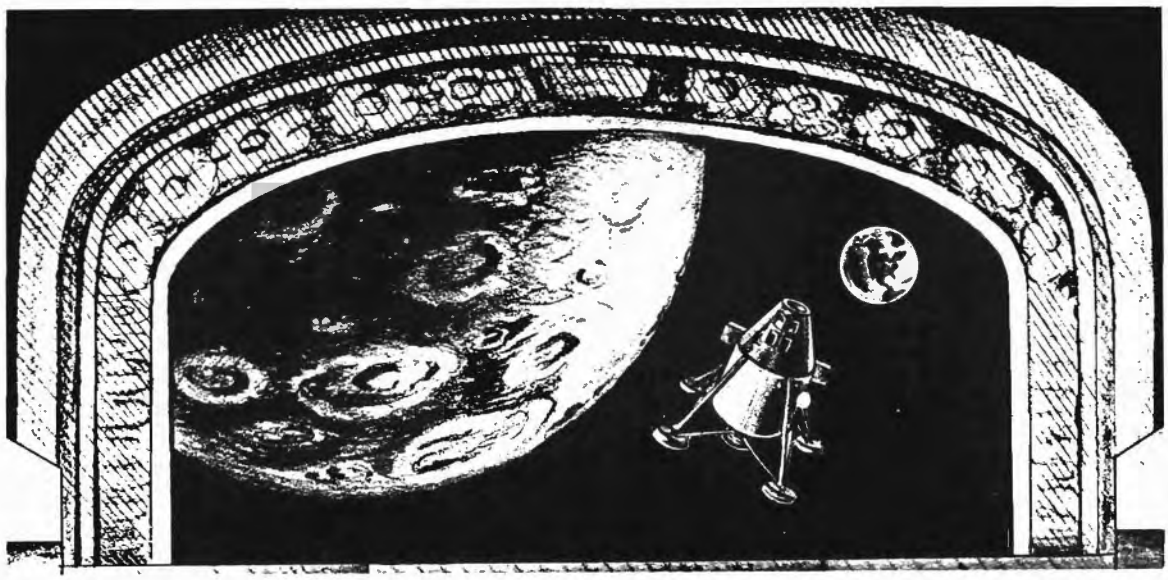
The M-1 engine, a much larger version of the liquid hydrogen/liquid oxygen RL-10, which powers the Centaur vehicle, will develop 1.2 million pounds of thrust. It is planned for use in the Nova vehicle which will launch future space missions.

Lewis Research Center is involved in many important research areas related to Project Apollo, NASA's manned lunar landing program aimed at placing a crew of astronauts on the moon during the decade. Work is going on in areas such as studies of zero gravity affects on propellant handling, meteoroid protection for tank structures, materials at low temperatures, propulsion system control, and auxiliary power systems.

TO STAY abreast of the ever-changing Space Age, the Lewis scientific structure has been reorganized to include both research and developmental responsibilities. This will develop a strong, active link between basic research areas and the actual design of flight systems and vehicle applications. The new managerial structure gives Lewis the capability to achieve a true space technology program.

The construction program at Lewis during the past year saw the completion of new laboratories for studies of energy conversion, electric propulsion, and materials and structures. This year a $40 million construction program will be started at Plum Brook, including new facilities for research in space and lunar propulsion, nuclear rocket dynamics and hydrogen heat transfer. Planned for the Lewis site is a $4.7 million development engineering building.

We have witnessed remarkable progress in aeronautics and space technology during the past two decades. The next 10 years will usher in an even more remarkable era of scientific achievement, and the Lewis Research Center will continue its contributions toward making this era of benefit to mankind.



THE SPACE FAIR

Next Stop, the Moon -- Get Aboard

THE ROAD MAP to the moon, and beyond, will be unfolded Friday for you to read. It's the Space Science Fair in Public Hall, sponsored by The Plain Dealer and the National Aeronautics and Space Administration.

The 10-day exhibition, largest ever of its kind, will be open from 10 a.m. to 10 p.m. until it ends Sunday, Dec. 2. And it's free. You need a ticket to get in, but that ticket is for the asking.

Every awesome and expensive step that man is taking to break free from the confines of his Earth will be outlined in detailed exhibits, the most comprehensive ever assembled by NASA.

The Space Age burst upon us so suddenly, and developed so fast, that the average citizen scarcely realizes it is actually here. It has been only five years since the Russians put the first small satellite into orbit, and here we are planning to send men to the moon. Progress has been so rapid, and the subject so complex, that Mr. Average Man, busy with his own problems of making a living, simply hasn't been able to keep up with the expanding science of space.

The Space Science Fair is a sort of capsule report—a pretty big capsule it is—on where we stand today on the edge of space. There will be many things at the fair that you probably will not completely understand even though everything will be explained in layman language. You will do well to bring along your high school son, if you have one. The chances are that he knows more than you do, for this fantastic space age we are just entering is his.

Those who haven't received their free tickets may pick them up at The Plain Dealer booth in the lobby of Public Hall, East Sixth Street and Lakeside Avenue, after the Space Science Fair opens.

Here are some of the things show visitors will see:

- Apollo, the NASA spacecraft designed to carry a three-man crew on lunar missions.
- Mercury capsule which actually carried one of our American astronauts in earth orbit.
- Models of the Explorer, Vanguard and Discover satellites.
- Mariner, a NASA interplanetary space probe.
- X-15 rocket plane.
- Full-size two-man Gemini capsule which will be used to develop the technique of the rendezvous and docking of two objects in space.
- Scout rocket towering seven stories.
- Ranger, Surveyor and Prospector spacecraft designed for investigating the surface of the moon..

And that's far from all.

The 30,000 square feet of exhibit area in the Main Arena will be twice as large as the Seattle World Fair area occupied by NASA. Most of the space vehicles shown in Seattle will be here, from Project Mercury devices to Apollo vehicles still in the model stage but destined to land the first American astronauts on the moon.

The Space Science Fair will show how NASA's research and development supports space exploration. Some displays will illustrate the unmanned space missions already accomplished and the information obtained. This data, as it affects life on earth and furthers space exploration, will be interpreted. The scientific instruments that provide this data (scientific payload) will be explained.

There'll be models of preliminary manned explorations to the thresholds of outer space, such as the X-15 experimental rocket plane. The man-in-orbit theme in this section will include a detailed, full-sized model of the space capsule used by American astronauts in the Project Mercury flights; the Project Gemini capsule, a two-passenger spacecraft capable of remaining in orbit a week or longer, and a replica of the Apollo which has the assignment of landing three Americans on the moon by 1970.

APOLLO, our man-on-the-moon project, will be explained in detail. You'll have the opportunity of learning the principles of preliminary unmanned reconnaissance, manned landing and return; about vehicles, trajectory and choosing landing sites; about life

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Next Stop, the Moon

CONTINUED FROM PAGE 7

support systems and the medicine of space.

Propulsion, of course, is the key to space flight. Models of chemical, nuclear and electric rockets will explain the operating principles.

How electric power is generated in space by fuel and solar cells, sunflower concepts and nuclear sources, direct and indirect, will be demonstrated.

Viewers can examine the principles employed to make space measurements of radiation and magnetic fields; functioning flight instruments making characteristic measurements; transmission of data to earth, the memory system for accumulating and transmitting information and pictures on command from earth.

The joint effort by NASA and The Plain Dealer is aimed at introducing NASA and its space program to the public; to give a progress report to Greater Cleveland and the world on the space science work accomplished; to reveal present plans and future goals, and to bolster your pride in the U.S. space effort.

A major academic objective of the Space Science Fair is the stimulation of student interest in science in general, and in participation in the space program in particular. A special science institute with illustrated lectures in science and technology has been planned for junior and senior high school students and their instructors.

About 60,000 students from a dozen northeastern Ohio counties will be routed through the exhibition from Monday, Nov. 26, through Friday, Nov. 30. Of this total, some 15,000 advanced students will be guided through the science institute for a one-hour orientation in the Music Hall, a one-hour specialized lecture, and two-hour excursion of the sprawling exhibit in the Main Arena.

The balance of the students attending the Space Science Fair in school-sanctioned groups will take in the Main Arena exhibits with explanations by experts in the space field.

Representatives of many of the nation's major universities will be in Cleveland during the exposition to counsel high school students planning college preparation for science and technology.

Dr. Abe Silverstein, director of NASA's Lewis Research Center here, is chairman of the Space Science Fair. Thomas V. H. Vail, vice president of the Forest City Publishing Co., publisher of The Plain Dealer, is co-chairman.

James E. Webb, administrator of NASA in Washington, and Dr. T. Keith Glennan, president of Case Institute of Technology and NASA's first administrator, are honorary chairmen.

Careers in Space

Sunday Plain Dealer
Nov. 18, 1962

BY T. KEITH GLENNAN
President, Case Institute of Technology

WHEN the first Russian Sputnik went into orbit just five years ago, man crossed more than the frontier of the earth's atmosphere. He crossed a mental frontier in which all the resources of the human mind will be required to solve problems most of which are unknown in their complete dimensions. Man crossed, too, a frontier opening up new careers for America's youth.

The most glamorous space careers, of course, are those of the astronauts — the men who have rigorously prepared themselves for ventures, not only into space, but even to the surface of the moon. There are, however, less glamorous but almost equally exciting new opportunities for scientists, administrators, engineers, technicians, even for clerical workers, machinists and electricians.

The demands of our space programs have created these jobs, not only in government laboratories and installations, but on campuses and most importantly, with the industrial contractors and subcontractors who are building the hardware for the space age. Careers in fields entirely unknown even five years ago are opening up. New opportunities in fields quite unrelated to space are by-products of our space program.

A few figures may demonstrate the scope of some of the programs and career opportunities that currently exist. It has been established that the electronics needs of NASA alone will reach $5 billion over the next three years. Robert C. Seamans Jr., who is in charge of the Apollo moon program, expects to require the skills of a payroll of some 24,000 individuals.

THE cost for developing Apollo (under the Manned Spacecraft Center at Houston, Tex.) through 1970 is estimated at from $10 billion to $15 billion. About 90 to 95% of this sum is expected to go into contracts to industry.

The Marshall Space Flight Center in Huntsville, Ala., largest of the NASA centers, is currently letting contracts at a rate of about $600 million a year. Within the next several years, the Marshall budget is expected to double. The Cape Canaveral Space Port is expected to cost the United States well over $1 billion by 1970. Such expenditures mean an expanding horizon of opportunity.

What kind of jobs are available? Specialists in every branch of science and engineering are urgently demanded—from many varieties of mechanical engineers to men expert in energy and power systems, materials and structures. Space investigation demands the talents of physicists, astronomers, experts in computer use, aeronautical engineers, rocket specialists and metallurgists.

One of the most exciting aspects of the space program, in terms of careers, is the cooperation of engineers, chemists and physicists and mathematicians in studying problems of biology and medicine. When the first manned Amer-

CONTINUED ON PAGE 12

Case students preparing themselves for engineering careers, possibly connected with space.

(Cont'd. on next page)

The Sunday Plain Dealer - Nov. 18, 1962
(Cont'd. from previous page)

Careers in Space

CONTINUED FROM PAGE 10

ican satellite circled the earth in orbit, Col. John Glenn's life depended upon an artificial environment, the development of which required the highest talents of sanitary engineers, physiologists and medical experts.

One of the new fields brought into being by our space program is that of systems engineering, such as in the need for combining propulsion, guidance and structure into a single functioning unit as in a rocket. The systems engineer doesn't attempt to build the best possible components, but the best possible working systems.

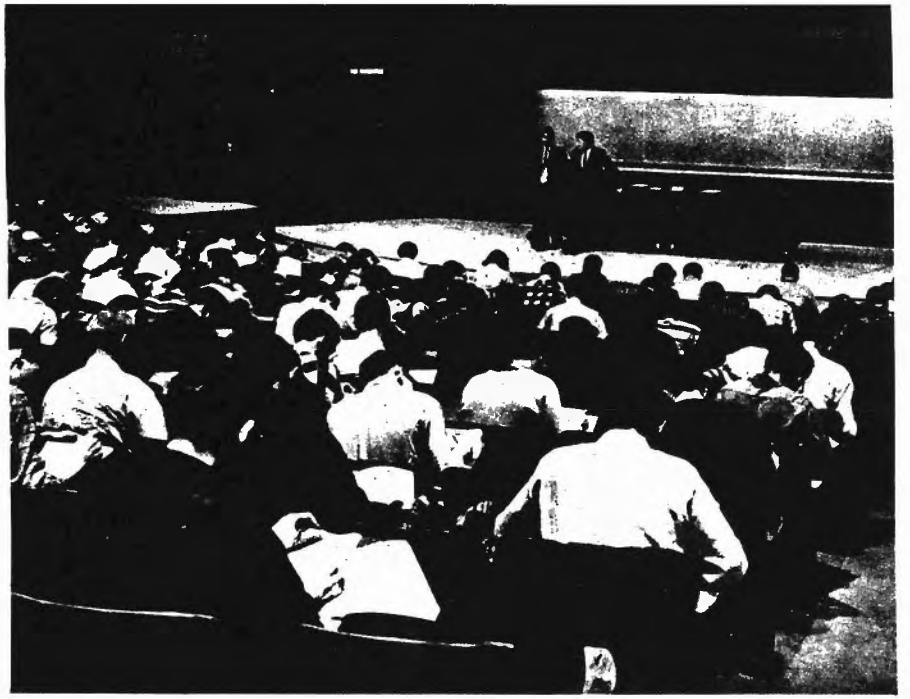
And not the least of the talents required is that of the manager. Money in the amounts suggested here does not spend itself. Management people possessing some understanding of the technological base on which the entire program is to be erected will be required in government and industry in great numbers. Only with good management by capable people can we achieve the goals that have been set.

There is one common denominator for all these careers: the need for sound educational preparation. This involves every step of the educational process from grade school to high school to college level and beyond. If there is any single key to a career in space, it is education. A strong background in mathematics is absolutely essential for nearly all professional careers in space. So, also, is a solid grounding in the basic sciences of physics and chemistry. Not to be forgotten is a concern with the engineering disciplines and the study of individual and group behavior.

Because the problems created by the space age are so new, they tend to require men and women whose training has been basic rather than specialized. Many of these problems are far broader than those of the traditional disciplines. One of the results of the demands of these problems has been that they require people who can cooperate in interdisciplinary groups. They bring to bear the backgrounds of many sciences and engineering fields.

To sum up, the space program offers a host of exciting new careers for the young men and women who are willing to work for the best possible education as a preparation for exploring man's new frontier.

So loaded with honors is T. Keith Glennan, president of Case Institute of Technology, that—were he ever to be a passenger in a space craft which he has done so much to develop—he would have to leave most of them behind to make the weight. At last count he had 13 honorary degrees. At Case's controls since 1947, he was on leave in 1950-52 to be U.S. Atomic Energy commissioner. He was on leave again in 1958-61 to serve with distinction as NASA administrator. He is a Yale graduate (1927), an indication that you don't have to be a Harvard man in Washington. Dr. Glennan is an honorary chairman of the NASA-Plain Dealer Space Science Fair.



A class in a space science subject at Case Institute.

CLEVELAND PLAIN DEALER
November 19, 1962

Space Fair to Show Moon Probe Models

By KARL ABRAHAM
Plain Dealer Science Writer

The big goal today of America's space program is the sending of three men to the moon. In the first Project Apollo mission, two will land while one remains in orbit around the moon.

Apollo therefore requires two manned capsules: a command module or main Apollo capsule that looks like a rounded pyramid and a luner excursion vehicle that looks like and is called the "bug."

MODELS OF BOTH will be displayed at the NASA-Plain Dealer Space Science Fair that opens Friday in Public Hall and will continue through December 2.

These two capsules and a "service module" that consists of rockets to be used in approaching and departing the moon will be sent directly from earth to the moon.

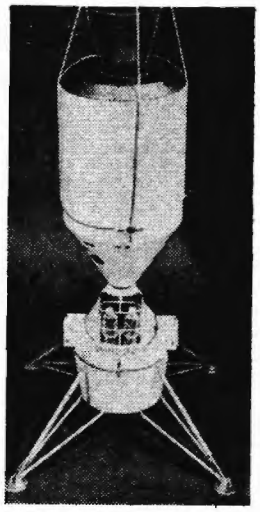
The flight plan now set for Apollo is the following:

AN ADVANCED Saturn booster, a three-stage rocket with a co nbined thrust of 8.7 million pounds will send the Apollo spacecraft first into a temporary parking orbit around earth and then away toward the moon.

Once on its way to the moon, the third stage will be dropped, and the "bug" now at the tail end of the craft, will be placed at the nose, next to the Apollo capsule, so that two of its three astronauts can enter for the lunar descent after an orbit around the moon is reached.

WHILE TWO MEN descend to the moon, the third remains in the Apollo capsule, and after lunar exploration is completed, the two explorers return to the Apollo capsule, enter it in moon orbit, discard the "bug" and cast off for earth.

The service module is discarded en route to earth, and the Apollo capsule by striking the outer atmosphere as a proper angle is slowed by air friction.



A scale model of the Apollo spacecraft reveals the rocket assembly and service module (top), Apollo command capsule (center), and lunar "bug" with two men inside as the spacecraft approaches lunar orbit.

At lower altitudes a combination parachute and glider opens to permit the capsule to make a skid landing on dry land, probably somewhere in the desert of the Southwest.

WAPAKONET DAILY NEWS
November 19, 1962

Sterling School's request to use a school bus for the 55 7th and 8th graders to attend the NASA Science Display in Cleveland was approved. These students will go Dec. 1 under the supervision of Richard Kinney, science teacher at Sterling Jr. High.

CLEVELAND PLAIN DEALER
November 20, 1962

Special Food Designed for Spacemen

By HELEN ROBERTSON
Home Economics Editor

Intensive research is being conducted on all phases of feeding men in space.

Beatrice Finkelstein, research nutritionist of the Aerospace Medical Research Laboratories at Wright-Patterson Air Force Base, near Dayton, reports on some of the problems in the November issue of the Journal of Home Economics.

This information is being published in The Plain Dealer in connection with the Space Science Fair, which opens at noon Friday in Public Hall.

EARTHBOUND MAN must have a constant supply of oxygen. The higher he goes above the earth, the less oxygen and less air pressure he finds. To survive he must carry an earthlike environment with him.

He also must have plenty of protein, fats, starches, vitamins, and minerals to keep him alert and physically fit. How much of these things is needed is being explored in experiments.

Radiation protection for the space traveler is another matter of concern. Dietary changes that might afford protection from the effects of low-level radiation are being studied.

SPACE FLIGHT calls for concentrated and precooked dehydrated foods packaged in lightweight, flexible containers. The food must be easily reconstituted in flight with purified, reclaimed water. The foods must be packaged to allow eating under conditions of weightlessness. Further, there must be variety and the foods must be tasty.

A series of semisolid foods and liquids packaged in flexible tubes has been developed. A valved aperture in the spaceman's helmet permits foods to be passed into the mouth.

It has become apparent, however, that bite-sized foods should be added to these special foods, to give variety. The coatings of these foods are important. They must keep the food from crumbling, maintain moisture content and prevent spoilage.

When Scott Carpenter traveled in his Aurora 7, he carried three-quarter-inch cubes of chocolate and date-nut mix for his meals in orbit. But the cookies crumbled badly. The difficulty, it seems, was in the packaging. A heavy camera was placed on top of them. That, we are promised, will not happen again.

NEWARK ADVOCATE
Newark, Ohio
Dec. 4, 1962

Producing Film Of Space Science Fair

CLEVELAND (AP) -- The National Aeronautics and Space Administration says it is producing a complete motion picture documentary of the 10-day space science fair, which attracted more than 375,000 persons before closing Sunday night.

The film will be made available to schools and colleges during 1963.

CLEVELAND PLAIN DEALER
November 20, 1962

Public Hall Being Turned Into 'Space World' for Fair

(Photos on Picture Page)

Public Hall was taking on a look of Cape Canaveral yesterday with the first exhibits being moved in for the Space Science Fair opening to the public at noon Friday.

Even the first items of space-age hardware brought into the arena lent an exciting atmosphere to Public Hall.

THE NEXT 48 HOURS will completely transform the hall into a "space world" certain to enthrall up to 300,000 visitors who are expected to turn out for the 10-day exposition.

Greatest public space-age show ever held, the fair is being sponsored by the National Aeronautics and Space Administration and The Plain Dealer.

One of the Space Science Fair's most dramatic exhibits—already in place suspended from the roof of Public Hall—is a huge Rogallo wing which has been developed for future astronauts to "fly" back to earth.

THE PARAGLIDER, as the Rogallo wing is sometimes called, will be used within two years on America's two-man Gemini space flights.

A mockup of a Gemini capsule will be suspended from the paraglider, for added realism and thrills.

Another sure thriller for crowds at the Space Science Fair will be an opened 63-foot Mercury parachute, the same kind which has safely brought back to ocean landings the astronauts from five manned U.S. space flights.

Suspended from the chute's shroud lines will be a Mercury capsule. The giant chute was suspended from the ceiling of Public Hall and the capsule will be attached today.

ALSO MOVED IN yesterday was the multiple-axis rotating rig developed at Cleveland's Lewis Research Center to simulate movements of a spaceship in flight.

America's first seven astronauts, in connection with their training, came to Cleveland three years ago to learn how to "fly" the rotating rig which twirled them around three ways simultaneously.

An NASA Scout rocket also arrived yesterday. The missile was in three sections, which will be assembled to make a towering display in the arena.

OTHER EXHIBITS, including a number of satellites, are yet to arrive. They will be airlifted to Cleveland from across the country.

Regular hours for the Space Science Fair will be 10 a.m.

Continued on Page 8, Col. 5

Public Hall Gets Look of Space World

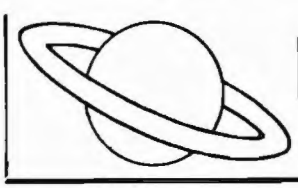
★ From First Page

to 10 p.m. daily. Admission will be free.

Student groups from hundreds of schools around Ohio will be coming here to look at the exhibits and to take part in an educational space science institute and a general information workshop.

The Space Science Fair will continue through Dec. 2.

WOOSTER DAILY RECORD
November 20, 1962



IN SPACE

With Wayne County Astronomical Society

WCAS Calls Cleveland Space Fair Way To Update Knowledge

To those people, especially the oldsters, arriving at the Space Science Fair at Cleveland's Public Hall this weekend and the following 10 days, amazement will be the reaction to the air-travel developments of the last 20 years.

These technical advances have led us through the propellor-reciprocating engine era, the jet engine era, into rockets propelled by liquid fuel, solid fuel, and now nuclear and ion engines are being developed for deep space probes and interplanetary exploration.

* * *

THE AMAZING part of this progress in space not that the first Russian Sputnik was launched only five years ago, but that, after a slow start, the United States has launched, and still has in orbit over 44 satellites, many of which are continually sending back information (by telemetry) which is adding to our knowledge of space.

The exhibits at the Space Fair will be very complete. Included will be a full-size seven story tall, Scout rocket an actual Mercury capsule that carries a US astronaut around the earth; Appolo, the NASA spacecraft designed to land a three man team on the Moon in this decade; a full-size Gemini two man capsule which will be used to develop the techniques of rendesvous and docking of two vehicles in space; the X-15 rocket plane; the Mariner, an NASA interplanetary space probe, and many, many other developments and projects with which we must necessarily deal as we progress in the space age.

* * *

OF INTEREST, especially to the high school and college student, is the possibility of exciting and rewarding careers in space. Included would be the actual astranauts, scientists, administrators, engineers, technicians, machinists, electricians and clerical workers. Space careers will be numerous and expanding.

It is only necessary to realize that NASA's electronic needs alone will reach $5 billion over the next three years and the Appolo moon program expects to need the skills of 24,000 persons.

The most exciting aspect of our space effort is found in the team effort of engineers, chemists, physicists and mathamaticians as they cooperate to solve problems of biology and medicine that are presented by weightlessness and the closed-circuit survival of humans as they probe the mysteries of space.

* * *

TO SUM UP, Dr. T. Keith Glennan, president of Case Institute of Technology says "The space program offers a host of exciting new careers for the young men and women who are willing to work for the best possible education as a preparation for exploring man's new frontier."

The WCAS chartered bus from Wooster to the Space Fair, Sunday, Nov. 25 at 8 a.m., still has a few empty seats. If you wish to make arrangements to go, please call Miles Specht or William Spratley.

Miles Specht, Advisor

TIFFIN ADVERTISER TRIBUNE
November 21, 1962

TO DISPLAY LUNAR EXCURSION MODELS

Space Fair Visitors to Get Project Apollo Data

CLEVELAND -- Project Apollo, the nation's program to place a team of astronauts on the moon during this decade, will be well represented during the Space Science Fair here from Nov. 23 through Dec. 2.

Full-scale models of the Apollo spacecraft's command module and lunar excursion module will be displayed during the Fair, sponsored by the National Aeronautics and Space Administration and the Cleveland Plain Dealer to acquaint the public of the nation's space exploration programs.

Project Apollo will be a progressive sequence of three basic missions--earth orbital flights, flights to and around the moon and, finally, manned lunar landings on the surface of the moon. All three phases will be discussed at the Science Fair.

An animated exhibit model will trace a flight to the moon.

Complicated Procedure

As currently planned a single Saturn C-5 booster, generating 7.5 million pounds of thrust in its first stage, wigll launch the 13-foot wide, three-module Apollo vehicle. The five-ton command module, which houses the three-man crew, is 12 feet tall. The 23-ton service module will carry propulsion systems for mid-course corrections and return to earth flights in its 23-foot length. The 15-ton, 20-foot tall lunar excursion model, sometimes called a "bug," will carry two astronauts from lunar orbit down to the moon's surface while the mother ship remains in orbit.

After an exploration period on the moon extending up to four days, the two astronauts will rejoin their companion in orbit. This will be accomplished by a complicated process of rendezvous and docking. After the lunar excursion module has successfully joined together with the mother ship in lunar orbit, it will dock or attach itself to the command module, permitting the moon explorers to reenter the main vehicle. The lunar excursion module, not needed for the return trip to earth, will be left in lunar orbit as the two remaining modules depart for the 240,000 mile trip back to earth.

As the returning spacecraft approaches its reentry point in the earth's atmosphere, the service module will be jettisone dat about 500,000 feet altitude. The command module, now flying alone, will execute a half "turn over" to make its fiery reentry with the blunt end forward.

As the craft nears its predetermined landing spot, braking parachutes will be jettisoned and the pilot will fly the vehicle to a soft earth landing with the aid of an inflatable Rogallo Wing or similar braking aid.

All this by 1970? Yes, but there is much to be done before then — unmanned satellite studies of the moon, instrumented space probe landings on the moon, development of reliable components for the Saturn C-5 rocket system.

Visitors to the Space Science Fair will see many models of both the actual and planned spacecraft that will accomplish pre-Apollo missions. They will also gain a broad, comprehensive view of the complexity of Project Apollo, its impact on our economy and our very way of life.

LORAIN JOURNAL
November 21, 1962

On The School Beat

Students Will Visit Space Fair

By JOANNE PETTICORD

Friday the NASA Space Science Fair will open at Cleveland's Public Auditorium with many Lorain schools planning on visiting this educational exhibition.

More than 300 Ohio schools have already arranged to send students to the special educational programs at the fair — a space science institute and a general information workshop.

Monday and Tuesday approximately 300 Admiral King High School students will make the trip. Three bus loads each day of chemistry and physics scholars will travel in with teachers and parents for a day at the Institute.

At 7:30 a. m. Wednesday 218 Lorain High School chemistry and physics students will board five buses and proceed to Cleveland. The students have already chosen lectures they wish to attend covering areas such as: astrophysics, geophysics, aerospace instrumentation, space craft design and space propulsion.

Almost 100 junior high school students in the system's gifted pupil program will also make the trip. Hawthorne students will use the board-owned bus Monday, Irving on Tuesday, Longfellow on Wednesday and Whittier on Thursday.

The students will see the past, present and future of communications in the space age at this science extravaganza. Included in the displays will be a Mercury spacecraft, a model Gemini and Apollo spacecraft and many other fascinating advances in American scientific explorations.

MT. VERNON NEWS
November 21, 1962

Gemini Model to be Shown at Cleveland

CLEVELAND — A full - scale, detailed mockup of the new two-man Gemini spacecraft will be publicly displayed for the first time at the NASA - Plain Dealer Space Science Fair, Nov. 23-Dec. 2 in Public Hall.

The limit of America's present space flight capability is a one-day flight by one man in a Mercury spacecraft. Late next year or in 1964 the Gemini is to be flight-tested for a week's flight by two men.

Gemini is the project that will bridge the gap between the relatively short Mercury flights and the longer and farther trip by three men to the moon in Project Apollo.

To reduce development time the two-man Gemini capsule has been closely patterned after the Mercury capsule by taking advantage of the testing experiences of the Mercury flights.

Gemini is about one foot wider at the base than Mercury and slightly higher, but its additional internal volume is sufficient for two astronauts to sit side by side.

Its presently assigned missions are far more important than merely extending the length of time a man can spend in space.

It will serve as a basic testing laboratory for equipment and maneuver techniques destined for Project Apollo.

CLEVELAND PLAIN DEALER
November 21, 1962

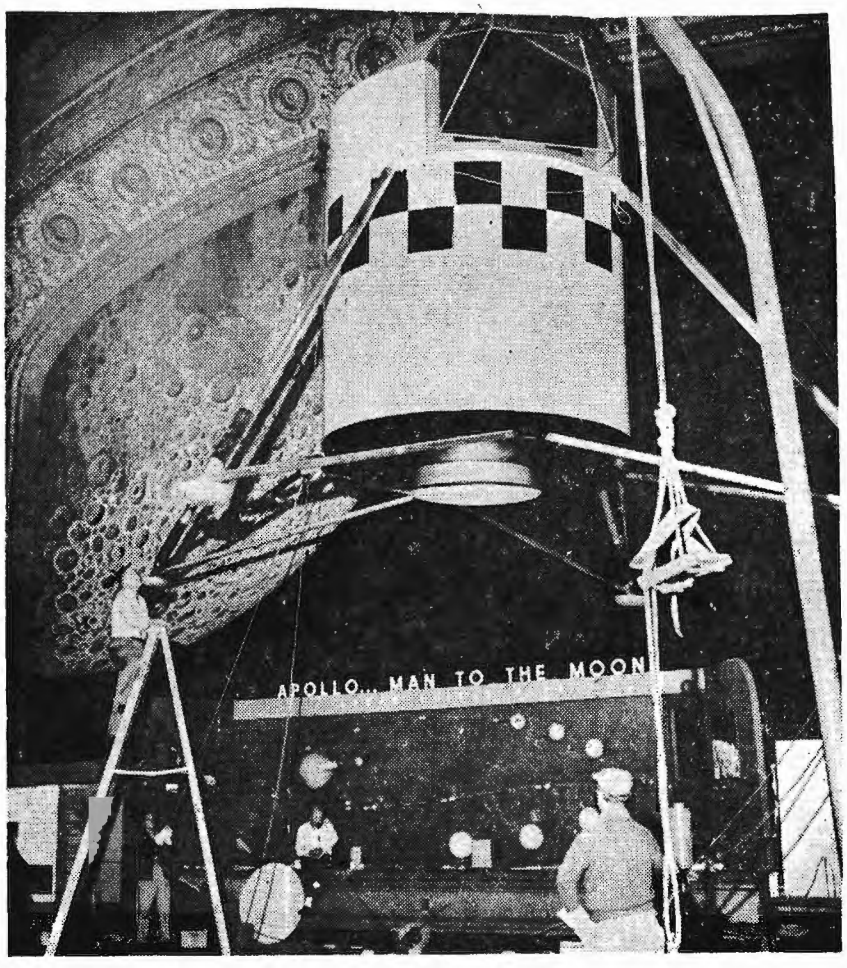
KYW to Cover the Space Show

Channel 3 is planning 2½ hours of live television coverage of the NASA - Plain Dealer Space Science Fair Friday and Sunday from Public Hall.

KYW's "Mike Douglas Show" will originate from the hall Friday from 12:30 to 2 p.m. Douglas and his co-host, singer Julius LaRosa, will tour the space age exhibits, sing and interview guests.

Sunday night at 9, Douglas and Bill Jorgensen will tour the fair for an hour, interviewing visiting experts and scientists.

CLEVELAND PLAIN DEALER
November 21, 1962



C. G. Moon of NASA climbs a ladder for a look at a model moon ship.
Plain Dealer Photo (Ray Matjasic)

Moon Craft Model Drops In for Fair

America's moon vehicle, in mockup, made a soft landing yesterday in Public Hall, a stellar attraction of the Space Science Fair opening to the public at noon Friday.

Two American spacemen, in a lunar ship such as this, will be landing on the moon in an epic journey in the next decade.

Even with the Space Science Fair two days away, Public Hall already is shaping up with an exciting show which promises to be the most spectacular held in Cleveland since the old National Air Races.

YOUNG PEOPLE of all ages from 7 to 70, give or take a few years, will be thrilled at the sights in Public Hall; let there be no mistake about that.

The life-size model of the moon landing craft is certain to be one of the real eye-poppers of the Space Science Fair.

Visitors thronging the 10-day exposition will see the Project Apollo landing vehicle suspended from the roof near the south end of the main arena of Public Hall.

TWO OF THE APOLLO spacemen will some day debark from this vehicle on the surface of the moon, while a third astronaut waits for them in lunar orbit.

When the moon men are ready to leave, they will blast off in the upper section of the landing vehicle. The base will serve as a launching tower.

Then, in their smaller vehicle, they will rendezvous with the orbiting spaceship for the return to Earth.

The moon vehicle mockup in Public Hall will afford the public an idea of the size of the Saturn missile which will boost it into outer space.

ALSO IN THE AIR at Public Hall yesterday, but still minus its stubby wings, was a full-size model of the X15, America's space-probing rocket plane which has flown faster than 4,000 miles an hour.

A towering symbol of the space age, a tall Scout missile has been erected near the center of the arena, its nose reaching within a foot of Public Hall's skylight.

The Space Science Fair has been hailed as the greatest array of spacecraft, satellites and other space paraphernalia ever assembled for public view anywhere.

ALL THIS, plus educational features including space-age movies, will be free to the public.

Jointly sponsoring the Space Science Fair are the National Aeronautics and Space Administration and The Plain Dealer.

TIFFIN ADVERTISER TRIBUNE
November 21, 1962

AREA STUDENTS TO SEE SPACE SCIENCE FAIR

Science students from the city's Catholic and public schools will travel to Cleveland Friday to attend the opening of the gigantic Space Science Fair in municipal auditorium, sponsored by the Cleveland Plain Dealer and the National Aeronautics and Space Administration.

The exhibit will last through Sunday, Dec. 2.

Tickets for the opening of the exhibit may be obtained by Tiffin and area students, free of charge, at the Advertiser-Tribune or the Tiffin News Agency on North Washington street.

One group trip is planned for approximately 30 ninth grade general science from Calvert high school. Miss Alice Reiter of the Calvert faculty will accompany the students. Other Calvert students and students of the city's public schools will be making the trip, individually, or with parents and friends.

This fair represents a major educational effort to acquaint Americans with the nation's programs for the scientific exploration of space.

Although the Science Fair will include one of the largest displays of space technology ever planned by the space agency, special emphasis is being placed on Ohio Junior high and senior high students.

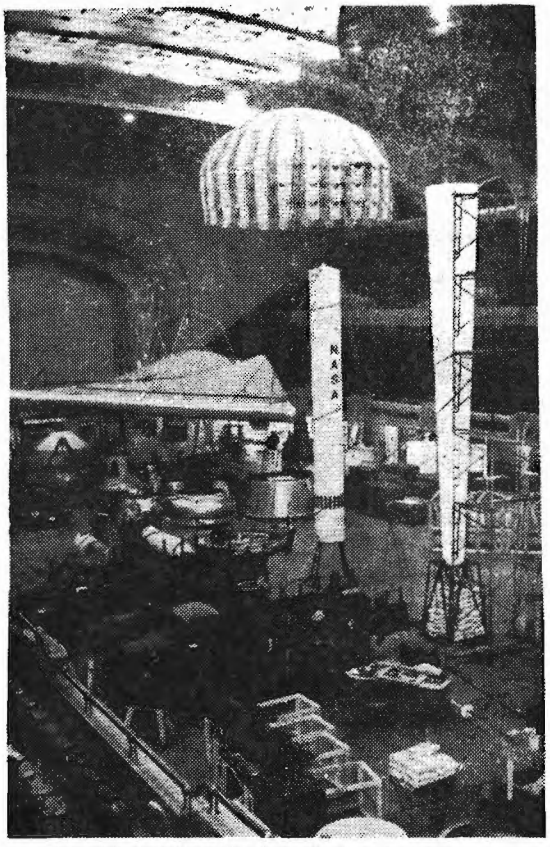
More than 300 schools throughout Ohio are participating. Students and their science teachers will receive briefings from aerospace scientists and engineers on a number of subjects relating to space, such as astro-physics, geophysics, bioastronautics, aerospace instrumentation, spacecraft design, space propulsion and space mission planning.

Following the approximate two-hour lectures, the students will be taken on a tour of the space technology exhibit in Cleveland's Public Auditorium.

Since these special student lectures and tours will be conducted during the school week -- Nov. 26 through 30 -- the public will not be admitted on these days until 4 p.m. However, the general public is invited from 10 a.m. to 10 p.m. during the two weekends the Science Fair will be open.

Admission is free.

WOOSTER DAILY RECORD
November 21, 1962



CLEVELAND'S PUBLIC Auditorium entered the space age this week with preparations for the Space Science Fair. A full-scale Scout rocket was among exhibits. Standing 72 feet, the Scout towers over a full-scale Gemini sparecraft attached to its inflatable Rogallo Wing in the background. Between Gemini and Scout, a full-scale Mercury spacecraft is suspended from its brightly colored landing parachute. The Space Science Fair opens this Friday.

LIMA CITIZEN
Lima, O.
Dec. 5, 1962

Space Fair Picture Available To Schools

CLEVELAND (AP)—The National Aeronautics and Space Administration says it is producing a complete motion picture documentary of the 10-day space science fair, which attracted more than 375,000 persons before closing Sunday night.

The film will be made available to schools and colleges during 1963.

BELLEFONTAINE EXAMINER
November 21, 1962

SPACE - SCIENCE FAIR IS OPENING NOV. 23

CLEVELAND — A full-scale, detailed mockup of the new two-man Gemini spacecraft will be publicly displayed for the first time at the NASA-Plain Dealer Space Science Fair, Nov. 23 to Dec. 2 in Public Hall.

The limit of America's present manned space flight capability is a one-day flight by one man in a Mercury spacecraft. Late next year the Gemini is to be flight-tested for a week's flight by two men.

Gemini is the project that will bridge the gap between the relatively short Mercury flights and the longer and farther trip by three men to the moon in Project Apollo.

The Space Science Fair, sponsored by the National Aeronautics and Space Administration and The Plain Dealer, will be an exciting 10-day exposition featuring displays of spacecraft and rockets from all over the United States.

Admission will be free. Hours will be 10 a.m. to 10 p.m. daily.

YOUNGSTOWN VINDICATOR
November 22, 1962

Cleveland Space Show Has Mockup of Gemini

Cleveland, Nov. 21—A full-scale, detailed mockup of the new two-man Gemini spacecraft will be publicly displayed for the first time at the NASA-Plain Dealer Space Science Fair, Nov. 23 to Dec. 2 in Public Hall.

The limit of America's present manned space flight capability is a one-day flight by one man in a Mercury spacecraft. Late next year the Gemini is to be flight-tested for a week's flight by two men.

Gemini is the project that will bridge the gap between the relatively short Mercury flights and the longer and farther trip by three men to the moon in Project Apollo.

Time-Saving Steps

To reduce development time the two-man Gemini capsule has been closely patterned after the Mercury capsule by taking advantage of the testing experiences of the Mercury flights.

Gemini is about one foot wider at the base than Mercury and slightly higher, but its additional internal volume is sufficient for two astronauts to sit side by side.

Its presently assigned missions are far more important than merely extending the length of time a man can spend in space. It will serve as a basic testing laboratory for equipment and maneuver techniques destined for Project Apollo.

When Gemini was first conceived, the method of going to the moon still included a rendezvous of two spacecraft in earth orbit and a joining of them for the lunar trip.

Scene Is Shifted

The rendezvous has now been shifted to the moon as the first step of the return trip to earth. However, astronauts will still be practicing earth orbit rendezvous with the Gemini capsule.

The Gemini spacecraft also will give the United States an opportunity to send men into the so-called weightless condition for a period of time equal to that of the lunar mission as a safeguard against unexpected ill effects. None is now anticipated, on the basis of American and Soviet earth orbital missions.

The Space Science Fair, sponsored by the National Aeronautics and Space Administration and The Plain Dealer, will be a 10-day exposition featuring displays of spacecraft and rockets from all over the United States.

Admission will be free. Hours will be 10 a.m. to 10 p.m. daily.

THE CLEVELAND PRESS
November 22, 1962

Space Science Fair Is Designed to Keep U. S. Citizens Informed

By CHARLES TRACY
Aviation Writer

The Space Science Fair opening tomorrow noon for 10 days in Public Hall is an important educational effort to acquaint the public with U. S. space programs.

Free to everyone, it is sponsored by National Aeronautics and Space Administration and the Plain Dealer, aimed at students from junior high ages on up.

Abe Silverstein, director of Lewis Research Center here, which assembled exhibits, said NASA is by law required to keep the public informed of progress.

"It is essential that young people be encouraged to study science to provide professional people required for the nation's future, not only in space but for many requirements. The show is part of our effort to accomplish these objectives," said Silverstein.

Press Aided Program

Last August NASA and The Press gave 14,000 students a chance to see what space scientists do in laboratories and wind tunnels at Lewis Research Center during Youth Days. Spacecraft and equipment was displayed and explained in two days of continuous demonstrations.

I. Irving Pinkel, a division chief and 23-year veteran at Lewis, is fair project officer. He collected exhibits from space labs across the nation. Many were made here in weeks of preparation by Lewis employees.

Most displays were in place on the hall's main floor today assuring workers a Thanksgiving holiday.

These Are Hours

Hours of the show are: tomorrow, noon to 10 p. m.; Saturday and Sunday, 10 a. m. to 10 p. m.; Monday through Friday, 4 p. m. to 10 p. m. for the public, with student lectures from 10 a. m. to 4 p. m. Lectures and movies are in downstairs halls.

Thirteen major exhibits cover space flight from the X-15 rocket plane to Apollo, the man-on-the-moon project. Urgency of current research limits use of actual "hardware." Many models and mock-ups are used.

Three real rocket engines shown are the H-1, capable of 188,000 pounds thrust for use in a cluster on the Saturn rocket; the XLR-99 of 57,000 pounds thrust, which flew the X-15; and the RL-10 of 30,000 pounds thrust for the Centaur rocket.

Full-Size Model

The X-15 research plane is a full-size wooden model, as is the big F-1 rocket engine for the Advanced Saturn. Joe Walker, NASA X-15 pilot, will visit the show Nov. 29. He has made 16 flights reaching the greatest speed of any airplane pilot—4104 mph. His space suit is displayed.

An actual Scout rocket, used for putting small payloads into space, towers 75 feet above the hall floor. Full-scale models of the Apollo, Gemini, Mercury, Tiros and Telstar spacecraft are exhibited.

A Rogollo wing to be used for lowering the two-man Gemini capsule back to earth, hangs from the ceiling. There are models of all current rocket boosters and numerous other displays of nuclear power, tracking, and medical aspects of spaceflight.

CLEVELAND PLAIN DEALER
November 23, 1962

Wonderland of Space Age Open at Noon

A 21-rocket salute to the Space Science Fair, which opens its doors at Public Hall at noon today!

Months of planning, preparing and plain hard work are behind and the Space Science Fair now belongs to the public for the next 10 days.

Rockets, space vehicles, satellites—these and many other fascinating exhibits are jam-packed into the main arena of Public Hall to make up a dazzling show visitors will be remembering for a long time to come.

Greatest event of its kind ever held anywhere, the Space Science Fair is being sponsored by the National Aeronautics and Space Administration and The Plain Dealer.

The 10-day exhibition is expected to attract as many as 300,000 persons.

THE FAIR WILL BE open today from noon to 10 p.m. For the rest of the show the hours will be from 10 a.m. to 10 p.m. daily.

With huge holiday-weekend crowds expected downtown, Traffic Commissioner Sam C. Skerotes is urging the use of in the immediate vicinity of Public Hall are filled up early. Parking spaces are likely to be more plentiful in areas which have been cleared for Erieview and in other lots not close to Public Hall.

This three-day weekend and the weekend of Dec. 1-2, the closing days, are expected to attract the biggest throngs. There should be a lot more elbow room in Public Hall for those who can visit the show next week, Monday through Friday.

The Space Science Fair was conceived and designed to bring the space age clearer and closer to the public.

IT IS BEAMED at acquainting the public more fully with the U.S. space program.

It will serve as a progress report on space science to Greater Cleveland and the world.

It will bolster pride in American space achievements and add to our hopes and expectations for future space tasks.

The Space Science Fair also has a basic educational purpose. This has been acknowledged by educators from more than 400 schools around Ohio who will be sending student groups to the exposition next week.

MORE THAN 40,000 students have signed up for courses in a space science institute and for a general information workshop.

There will be a press preview of the Space Science Fair at Public Hall at 10 this morning. Taking part in the press conference will be Dr. Abe Silverstein, director of NASA's Lewis Research Center and cochairman of the fair; Thomas V. H. Vail, vice president of The Plain Dealer and co-chairman of the fair; Dr. T. Keith Glennan, president of Case Institute of Technology and former head of NASA; Irving Pinkel of the Lewis Research Center, technical chief of the fair, and Harry J. McDevitt, information director at the Lewis Research Center.

Newsmen from all over the country and several foreign nations are expected.

LORAIN JOURNAL
November 23, 1962

SPACE SCIENCE FAIR

CLEVELAND (AP) — Rockets, space vehicles, satellites and many other exhibits will be on display today as the 10-day Space Science Fair opens at Cleveland's Public Hall.

COLUMBUS EVENING DISPATCH
November 23, 1962

Space Exhibit At Cleveland

CLEVELAND (AP)—Rockets, space vehicles, satellites and many other exhibits will be on display Friday as the 10-day Space Science Fair opens at Cleveland's Public Hall.

The event is being sponsored by the National Aeronautics and Space Administration and the Plain Dealer

UPPER SANDUSKY
DAILY CHIEF UNION

Science Fair Opens

Cleveland, Nov. 23. (AP)—Rockets, space vehicles, satellites and many other exhibits will be on display today as the 10-day Space Science Fair opens at Cleveland's Public Hall. The event is sponsored by the National Aeronautics and Space Administration and the Plain Dealer.

PORTSMOUTH TIMES
November 23, 1962

CLEVELAND (AP) — Rockets, space vehicles, satellites and many other exhibits will be on display today as the 10-day Space Science Fair opens at Cleveland's Public Hall. The event is sponsored by the National Aeronautics and Space Administration and the Plain Dealer

PAINESVILLE TELEGRAPH
November 23, 1962

Trip to Space Fair Scheduled

Approximately 40 Harding High school students will make a field trip to Cleveland Monday to attend the Space Science Fair being sponsored at Public Hall by the National Aeronautics and Space Administration.

The group will be made up of the chemistry and physic classes and part of the biology class. The trip will be made by chartered bus. The bus will leave the school at 11 a.m. The fair tour will be from 1 to 3 p.m.

The students will be accompanied by Miss Thelma Hill and Ernest Stirm of the High school faculty and W. R. Branthoover, principal.

STEUBENVILLE HERALD-STAR
November 23, 1962

Space Fair Opens

CLEVELAND (AP) — Rockets, space vehicles, satellites and many other exhibits will be on display today as the 10-day Space Science Fair opens at Cleveland's Public Hall. The event is sponsored by the National Aeronautics and Space Administration and the Plain Dealer.

NEWARK ADVOCATE
November 23, 1962

Space Fair Opens

CLEVELAND (AP) — Rockets, space vehicles, satellites and many other exhibits will be on display today as the 10-day Space Science Fair opens at Cleveland's Public Hall. The event is sponsored by the National Aeronautics and Space Administration and the Plain Dealer.

MARION STAR
November 23, 1962

Space Fair Opens

CLEVELAND (AP) — Rockets, space vehicles, satellites and many other exhibits will be on display today as the 10-day Space Science Fair opens at Cleveland's Public Hall. The event is sponsored by the National Aeronautics and Space Administration and the Plain Dealer.

CHILLICOTHE GAZETTE
November 23, 1962

Space Science Fair Opens at Cleveland

CLEVELAND (AP) — Rockets, space vehicles, satellites and many other exhibits will be on display today as the 10-day Space Science Fair opens at Cleveland Public Hall. The event is sponsored by the National Aeronautics and Space Administration and the Plain Dealer.

LANCASTER EAGLE-GAZETTE November 23, 1962

SPACE FAIR OPENS

CLEVELAND (AP) — Rockets, space vehicles, satellites and many other exhibits will be on display today as the 10-day Space Science Fair opens at Cleveland's Public Hall. The event is sponsored by the National Aeronautics and Space Administration and the Plain Dealer.

The Marvels of Tomorrow . . . TODAY!

NEW PHILADELPHIA DAILY TIMES
November 23, 1962

SPACE EXHIBITS

CLEVELAND (AP) — Rockets, spac · vehicles, satellites a n d many other exhibits will be on display today as the 10-day Space Science Fair opens at Cleveland's Public Hall. The event is spon sored by the National Aeronautics and Space Administration and the Plain Dealer.

COLUMBUS STAR
November 23, 1962

SPACE FAIR OPENS

CLEVELAND (AP) —. Rockets, space vehicles, satellites and many other exhibits will be on display today as the 10-day Space Science Fair opens at Cleveland's Public Hall. The event is sponsored by the National Aeronautics and Space Administration and the Plain Dealer.

CLEVELAND PLAIN DEALER
November 23, 1962

PORT CLINTON DAILY NEWS
November 23, 1962

70 Welty Students In Cleveland To See Science Fair

Seventy Welty junior high school students left this morning in two chartered buses for Cleveland where they will spend the day at the "Space Age" Science Fair at Cleveland public auditorium.

The youngsters who will return his evening, were accompanied by two members of the Welty faculty, Principal William Fishel and Miss Edith Milar.

The exposition opened a 10-day stand at noon today.

BUCYRUS TELEGRAPH-FORUM
November 23, 1962

150 Students To See Science Fair Next Wednesday

A total of 150 students from Bucyrus High School's junior and senior high grades will go to Cleveland Wednesday to attend the Space Science Fair.

Students will be accompanied by members of the faculty with chartered buses leaving the high school at 7:30 a.m. Expenses of the trip are being shared by the group.

Reservations were taken on a first come-first-serve basis with Alex Kish, assistant principal, handling the junior high grades. Senior high students signed up for the trip in Principal Robert Latta's office.

The Space Science Fair, being held in Cleveland's Public Auditorium opens this weekend under the sponsorship of the National Aeronautical and Space Administration and the Cleveland Plain Dealer. Included in the ten-day exhibit are actual spacecraft, as well as replicas of satellites.

THE CAMBRIDGE DAILY JEFFERSONIAN
November 23, 1962

PUBLICLY DISPLAYED

CLEVELAND — A full-scale, detailed mockup of the new two-man Gemini spacecraft is being publicly displayed for the first time at the NASA-Plain Dealer Space Science Fair, November 23 to December 2 in Public Hall.

CLEVELAND PLAIN DEALER
November 23, 1962

Moon Is a Symbol of Space Quest

By KARL ABRAHAM
Plain Dealer Science Writer

A sliver of a last-quarter moon, paled by daylight and perhaps obscured by clouds, will hang over Cleveland today when the NASA-Plain Dealer Space Science Fair opens in Public Hall.

That moon is a symbol of what technology hopes to accomplish and of what science hopes to discover, and it is the story of the science and technology of the space age that will be told today.

It is both a story of great power—of rockets more powerful in flight than the motors of a million automobiles, and of delicate sensitivity — seeking out a single star amidst the jewel chest of the heavens.

IT IS AN AGE in which the names of the gods and demigods of antiquity — Thor, Jupiter, Saturn, Atlas, Mercury —have been given to machines that only a few years ago were just as fictitious.

It is an age in which astronomers listen to the noise that may have been made by black stars before man walked the earth. Man even hopes to bank the fires of a nuclear inferno to take him to the distant planets.

Tens of thousands of Americans have schemed and hundreds of thousands of them have worked with hand and machine to build the things that are displayed in Public Hall.

Some are replicas of things far too big or expensive to be brought here.

IN THE MIDDLE of the last century Americans laid ribbons of steel rail to their frontier. Today they speak by radio almost to the planet Venus and they have cast a spot of light upon the moon —and seen it.

Gold, which once drove men to the West, now is plated on spacecraft to ride through the through the planetary sys- made solar chariot, and silver has gone from the buckles of a man's shoes to electronic extensions of his brain in deep space.

Over the stage of Public Hall hangs a model of a small craft to lower two men to the surface of the moon. To build the real one will cost the better part of a billion dollars.

THERE IS NO ASSURANCE that America will have—in the era after it lands men on the moon—enough trained manpower competent to extend the explorations.

Explorer, Vanguard, Tiros, Discoverer, Pioneer, Mariner, Mercury — these are the names of what has been accomplished. Gemini, Apollo, Saturn, Gentaur, Nova, Nerva, Surveyor, and many others are the objectives yet sought after.

And for perhaps the most important prizes earned so far in the race for space there are no names. For the knowledge about nature and about man, about what man can accomplish and where he fails, and for the continued changing of his ideas about the structure of his universe there are no project labels.

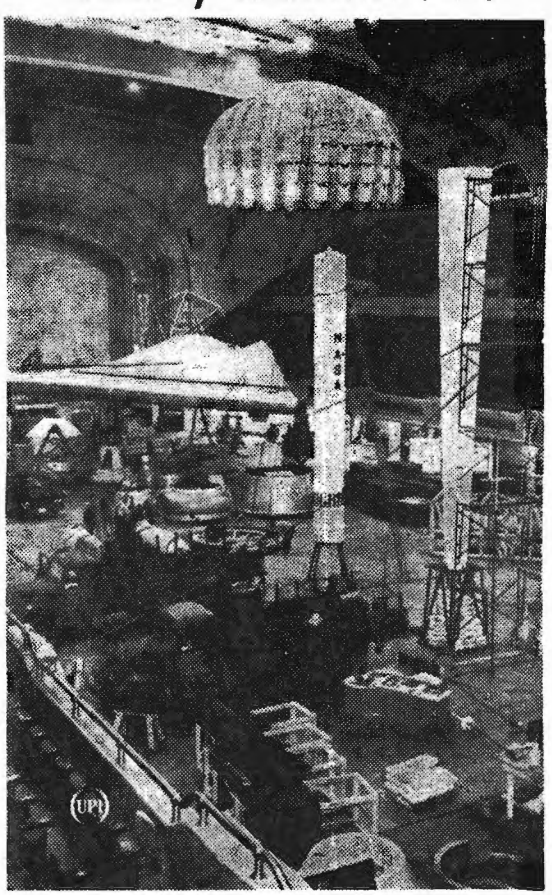
THE COLOR, shape and texture of the stuff of which the space age is made has a variety that taxes discription. Today it is spread out upon the floor and walls and ceilings of Public Hall.

It is there to be seen, touched, heard, set in motion or stopped, and now and then eve nto be carried off.

The Space Science Fair is a chronicle of the present and, it is hoped, something of a Pied Piper dancing into the future and taking the nation's future along a road where the signs read "Jupiter — turn left at the next asteriod," and not "Bomb Shelter — This Wav"

CINCINNATI ENQUIRER
November 23, 1962

Scout, Gemini . . .



SPACE ON STAGE—Cleveland's Public Auditorium entered the space age with opening today of the Space Science Fair. Being put up here is a 72-foot-high, full-scale Scout rocket. A full-scale Gemini spacecraft attached to its inflatable Rogallo Wing is in the background. Between Gemini and Scout, a full-scale Mercury spacecraft is suspended from its brightly colored landing parachute.

CLEVELAND PLAIN DEALER
November 23, 1962

SPACE SHOW COVERAGE—

Mikes, Cameras Coming to Fair

By FRED MOLLENKOPF

Television cameras and radio mikes will be trained on the NASA-Plain Dealer Space Science Fair which blasts off at noon today in Public Hall.

The fair is slated for national attention on the three television networks.

FRED MOLLENKOPF

KYW-TV will feed material today to NBC for use on tonight's Huntley - Brinkley news show (6:45).

ON THE LOCAL LEVEL, the fair will practically be launched by Mike Douglas. He and his co-host, Julius LaRosa, will do the Channel 3 Douglas show from 12:30 to 2 p.m. at Public Hall. They'll tour the exhibits, interview guests and do some singing to give a musical view of the fair.

Then, Sunday night, Channel 3 will pre-empt "Bonanza" so that Douglas and Bill Jorgensen can do an hour-long tour of the fair, interviewing experts and scientists.

Jules Bergman, science editor of ABC-TV, will be here next week to report on the show, according to the network's Cleveland affiliate, WEWS. CBS-TV will either use footage sent it by WJW or will send a team to cover the fair.

THOROUGH COVERAGE of the fair is planned by WHK, whose education director, Jim Lowe, hopes to do nine shows on it.

The second will be tonight at 10 when he interviews I. Irving Pinkel, chief of the fluid system components division at NASA's Lewis Research Center here.

Pinkel will explain what the fair is and what it offers.

LOWE WILL BASE the series on the fact that not enough young people are aiming at careers in space science and that events like the space fair will help make it a more attractive field.

He hopes to have interviews with out-of-town officials tomorrow night and Sunday night. Monday through Friday he'll tie his programs in with Space Science Institute Lectures to be given at the fair.

Subjects include astrophysics, planetary physics, spacecraft propulsion and planning space missions.

Each show will be 30 minutes except Sunday night's, which starts at 11 and lasts an hour.

ALL THREE TELEVISION stations plan space fair coverage for their local news shows. Channel 5 will film portions for future use on its "Caravan" segments of the "Five O'Clock Show" on Fridays. The "Paige Palmer" and "One O'Clock Club" shows featured the fair yesterday. Channel 3 will be running promotional spot announcements for the fair.

Bob Neal of WERE previews the fair on his show from Public Hall between 8:10 and 10 this morning.

WGAR has been asked by NBC's "Monitor" program to feed it fair information. The station also plans local news coverage.

WJW RADIO WILL cover the fair opening on its noon news today and the station's "Science Medical" program will have fair interviews at 4:30 this afternoon.

WJMO will also promote the fair with spot announcements.

KYW Radio's Martin & Howard morning show will feature a take-off entitled something like "Glen H. John, Boy Astronaut," while its nighttime "Program PM" will cover the fair seriously.

RECORD COURIER
(Ravenna)
November 23, 1962

Science Pupils Visit Space Fair

WINDHAM — Thirty-three local chemistry and physic students will visit the Space Fair, in Cleveland, Monday, Nov. 26. William Monte, department head and Robert Wert, principal will accompany the students.

The Space Fair is the first and of course largest, of it's kind in the United States and is being held at Cleveland's Public Hall, Nov. 23 through Dec. 2.

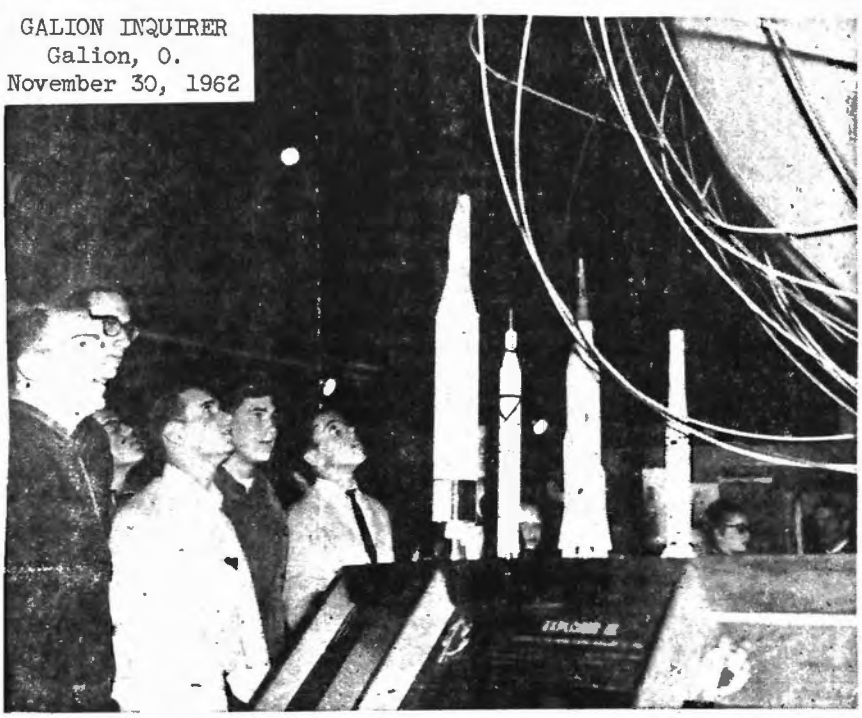
The major emphasis of the fair will be on educational values and purposes and is sponsored by the NASA and The Cleveland Plain Dealer.

Students will see displays ranging from an astronomers view of space, weather and navigation control to engines and vehicles for geophysical and manned exploration.

The problem of maintaining life on other planets will be demonstrated visually.

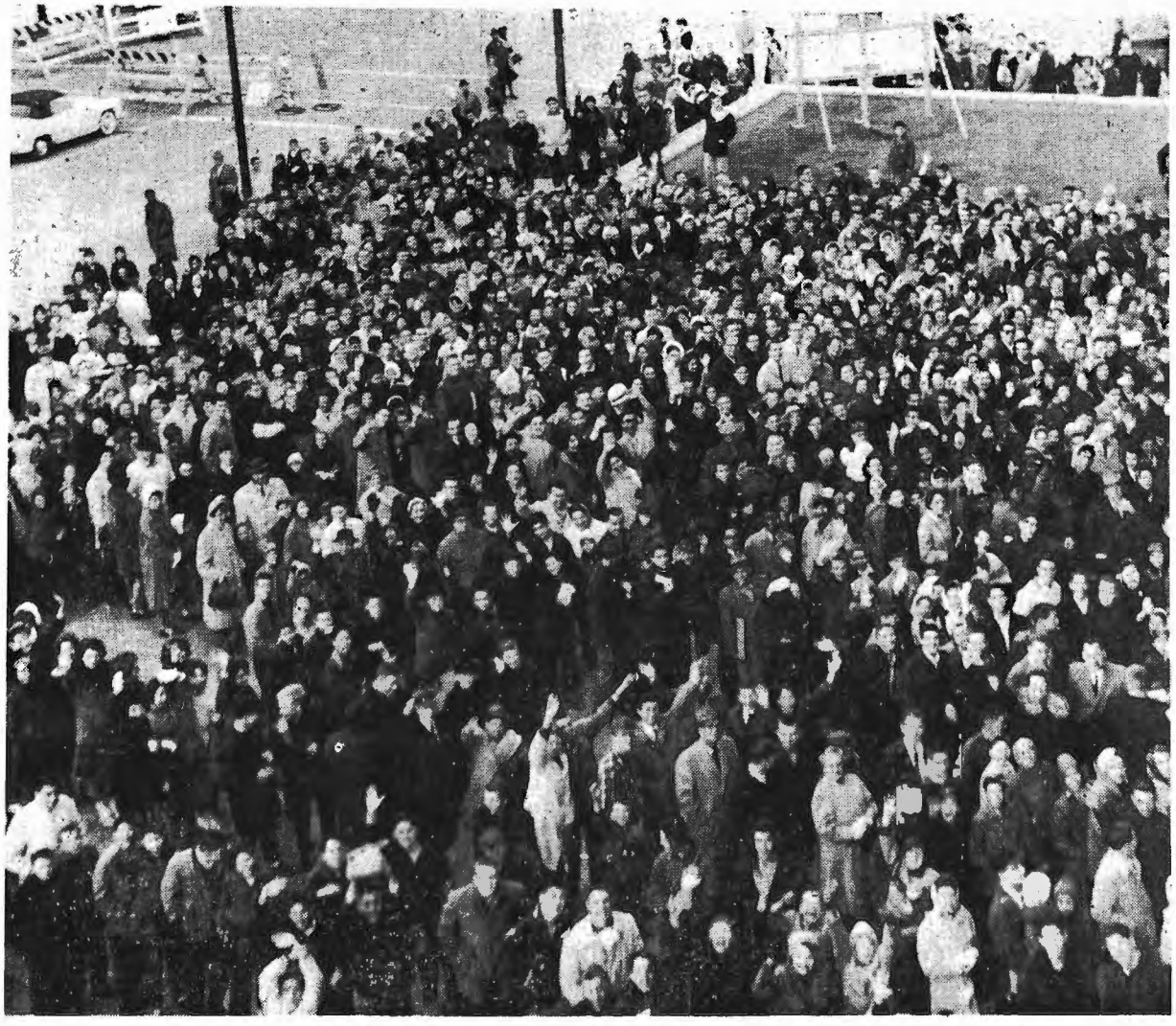
NASA personnel will explain the many phases to be viewed at each of the centers.

GALION INQUIRER
Galion, O.
November 30, 1962



LOOKING at the globe of the world at the NASA Science Fair are these members of the science club. They are, from left, Herb Newhouse, Dan Emerson, Steve McElhatten, Stan Grogg, Derek Kent, and Mike Fisher. The science club visited the fair all day yesterday. (Photo by John Renock)

31,000 Visit Public Hall for Opening of Space Science Exposition



Lines wait at doors for opening of show at Lakeside Avenue entrance to Public Hall and extend almost to St. Clair Avenue.

Exhibits Cover Research, Development

Every major development and research program of this nation's space effort is represented at the NASA-Plain Dealer Space Science Fair, which opened yesterday. Between noon, when the fair opened, and 10 p.m., when it closed for the night, 31,000 persons had visited the exposition in Public Hall. The exhibits ranged from Aurora 7, the three-orbit spacecraft of Astronaut M. Scott Carpenter, to models of advanced rockets yet to be built. Some displays are models. Others, when the dust of the fair has been removed from them, will eventually be launched into space. Special public lectures on current programs of the National Aeronautics and Space Administration and films of rocket firings and research projects are shown continually. From today through Dec. 2 the Space Science Fair will be open from 10 a.m. to 10 p.m. Tickets are free at a Plain Dealer booth in the lobby.

Plain Dealer Photos (Norbert J. Yassanye)

CLEVELAND PLAIN DEALER
November 24, 1962

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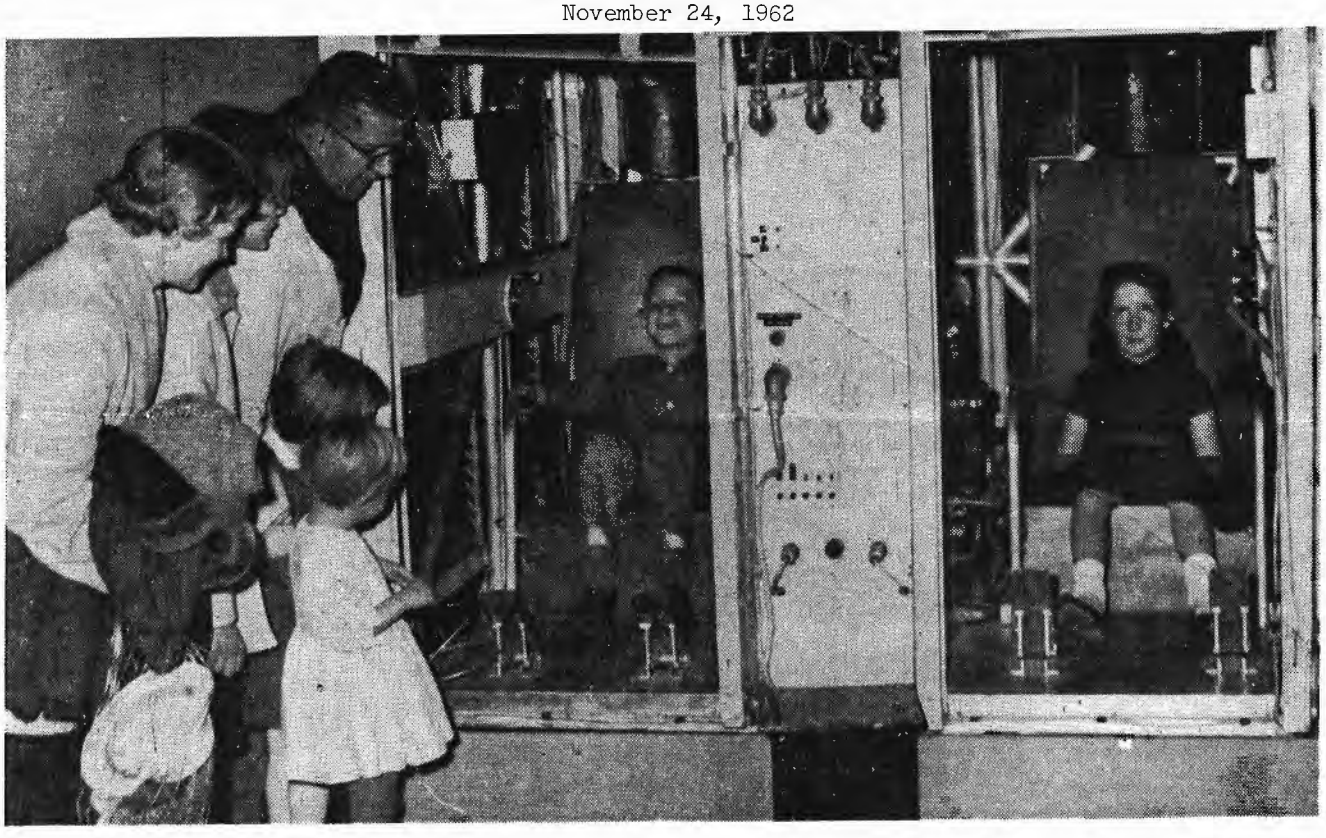
November 24, 1962



The Herman F. Ogrinc family of Moreland Hills watches Michael, 7, seated at left, and Mary Pat Dever, 8, of 24203 Knickerbocker Road, Bay Village, as they prepare for a fancied flight in the gondola of Stratolab, a balloon capsule that carried two Navy scientists 21½ miles above earth.

Films of Space Flights Divert Show Visitors

Space movies being shown in the balcony at Public Hall are serving Space Science Fair visitors in a way that was not expected.

Thousands of spectators are taking in the movies to get a chance to rest their feet.

The color movies of historic space journeys are being shown by NASA at seven locations in the upper balcony sections.

Lower balcony areas—where the movies are not in view—were sprinkled yesterday with persons who climbed that far for a rest, and to view the sparkling space show panorama in the main arena.

Showings of some 25 space movies lasting from 30 to 60 minutes are continuous throughout the Space Science Fair daily program.

SPACE PROBLEM—

'Weightless' Chair Pulls Crowd

A "space" chair is proving a real crowd-pleaser at the Space Science Fair.

A three-legged stool, the chair was designed to show the public one phase of the problem of weightlessness in space.

COMPRESSED AIR is forced through the chair legs, escaping through disks at the bottom. This forms a thin film of compressed air between the disks and the floor.

With friction at a minimum, the stool glides across the floor at the slightest touch.

Visitors to the Space Science Fair are invited to sit on the "weightless" chair. The sitter then is handed a wrench and is asked to tighten a nut-and-bolt combination on a fixed bar.

TRYING TO PERFORM the task, the sitter finds the chair gliding around under him.

All of which illustrates just one problem of an astronaut in weightless orbit who might have to make repairs or adjustments on the outside of a space station.

NASA scientists term this a question of "human engineering."

WHAT THE NASA people are doing is working on development of special tools that astronauts would use in space.

One solution might be to have equipment attaching the astronaut to the outside of the space station while he makes the adjustments or repairs.

If he tried to use an ordinary wrench to tighten a nut-and-bolt combination on an orbiting station, the astronaut would go flying off into space.

Some of special space tools are on display at the "human engineering" exhibit.

CLEVELAND PLAIN DEALER
November 24, 1962

Aurora 7 Arrives Here Just in Time for Space Display

Aurora 7 is here!

The Mercury capsule in which astronaut M. Scott Carpenter three times circled the earth on May 24 arrived in Cleveland just hours before the NASA-Plain Dealer Space Science Fair opened in Public Hall yesterday.

THE CAPSULE had left the NASA Manned Spacecraft Center at Houston, Tex., early Tuesday. Its 1,100-mile journey to the shores of Lake Erie required four days.

On May 24 Aurora 7 carried America's second orbiting astronaut over 76,025 miles of the earth's surface at latitudes of 100 to 166 miles in just four hours and 56 minutes.

The spaceship still bears the brands placed on it by the searing heat of re-entry into the earth's atmosphere. It also shows a slightly scorched American flag.

NASA workmen had been laboring through the night to put final touches on the spectacular exhibits at the Space Science Fair when the capsule arrived about 1 a. m.

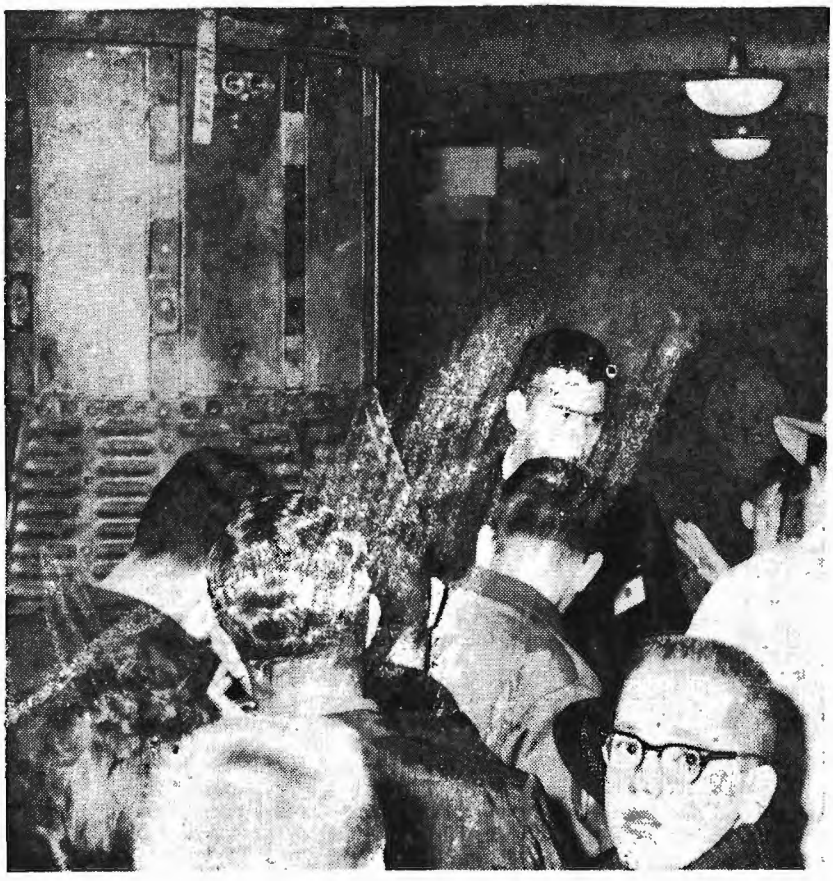
THERE WAS BARELY time to set it up in a corridor outside the main exhibit hall before the hall was opened to the public. The capsule, which weighed 2,480 pounds (with Carpenter in it) when it splashed into the Atlantic Ocean last May, takes a bit of handling.

Set against a backdrop of photographs of all the astronauts and their families, Aurora 7 immediately became one of the most popular exhibits at the Fair.

The escape hatch of the capsule has been removed, along with the bulky astronaut's couch, so that equipment of the capsule is open to view.

Aurora 7 gives Greater Clevelanders an opportunity to see, touch and learn about an object that has been in space with a man in it.

It will be on exhibit from 10 a. m. to 10 p. m. for the next nine days.



A scorched Aurora 7, the Mercury capsule in which M. Scott Carpenter orbited the earth three times, is a popular exhibit at the Space Science Fair. Plain Dealer Photo (Norbert J. Yassanye)

TOLEDO BLADE
November 24, 1962

Cleveland Science Show Features Space Exhibits

Electrically Propelled Rockets Expected To Top Present Vehicles

By RAY BRUNER
Blade Science Editor

CLEVELAND, Nov. 24—Dramatic exhibits foretelling man's flight into outer space millions of miles beyond the moon were shown at the opening yesterday of the National Aeronautics and Space Administration's gigantic space science show.

The exhibits included three types of electrically propelled rocket engines designed to attain speeds beyond the earth's atmosphere many times greater than any chemically-propelled space vehicles or missiles so far launched.

One of the rockets, propelled by ions, will be given its first trial run from Wallops Island, on the Atlantic coast, within the coming year. This was announced by Dr. Abe Silverstein, director of NASA's Lewis Research Center here, where electrically propelled rockets are under development.

Ions to propel the rocket will consist of electrically charged particles of either metallic cesium or mercury. Mercury or cesium vapor will be fed inside a chamber past a plate of tungsten metal which give the vapor particles of positive charge. As the positively charged particles leave the rocket at high velocity, they will be neutralized by a flow of electrons, or negatively charged particles.

The test from Wallops Island will be primarily to determine how well the charge is neutralized.

The second type of engine is the electrostatic rocket. In this the ions pass through an electric field inside the engine chamber. The electric field speeds them into space through a series of small holes. Conceived and designed by Harold R. Kaufman, an aerospace research scientist at the Lewis center, it has an efficiency as high as 80 per cent, making it the most efficient electric rocket engine tested to date.

Inside Rocket Chamber

The third type is an electromagnetic engine. In this, the propellant gas, such as helium, is ionized to form a plasma, which consists of a mixture of uncharged atoms and atoms from which electric charges have been stripped.

Inside the rocket chamber electrons and ions swirl in tremendous disorganization. The plasma then passes through a magnetic field. And, because it is an electrical conductor, the plasma is thrust out of the rocket at a prodigious speed.

At the science fair, which is the largest assembly for space vehicles, instruments and other equipment ever shown in one place, the Lewis center also displayed one of the most unusual types of rocket engines—the radioisotope rocket.

In this, the propellant is high speed beta particles, or electrons, from radioactive Cerium 144. The engine is expected to be capable of producing one kilowatt, or more than one horsepower, for every pound of engine weight. A sheet of cerium foil, lining the chamber of a rocket, 200 feet long and 40 feet in diameter, is expected to be capable of propelling a payload of eight men to Mars and back.

At the space show, models were exhibited to depict current concepts of turbo-electric space craft, propelled by nuclear fission, such as that being studied at the Lewis laboratory's Plum Brook nuclear facility near Sandusky.

Glimpse Into Future

Another glimpse into the future was the full-scale model of a space station. Shaped like a rubber tire and made of special fabric, it would have room for living quarters, shops and laboratories for a crew orbiting around the earth. When launched it would be packed in a rocket nose cone. Upon reaching orbit it would be released and inflated with air.

The exhibits included a full-scale model of the Gemini space capsule to house two men in orbit around the earth; scale models and designs of the Apollo to carry the first men to the moon; John Glenn's Mercury space capsule, which gave him the distinction of being the first U.S. astronaut in orbit, and a model of the mechanism of the first orbiting space astronomical observatory. Other exhibits showed how satellites, rockets and balloons are used to study the weather, space beyond the atmosphere, and the behavior of the sun, and various equipment, such as the human centrifuge, for testing the durability of astronauts under high gravitational forces.

The science fair, with exhibits, lectures and movies, which will continue at the public auditorium through Dec. 2, is primarily for public education and is directed to a great extent toward elementary, high school and college students. A half hour before it opened, the auditorium, which ordinarily seats about 10,000 persons, was jammed.

Space Program Called Largely Engineering

In a press conference, prior to the opening, Dr. T. Keith Glennan, president of Case Institute of Technology, and former NASA administrator, emphasized that the nation's space program was largely one of engineering. In fact, he said, it is "90 per cent engineering and about 10 per cent science."

Because of this and the current shortage of engineers, one of its major problems is finding engineers to do the work in face of a currently decreasing enrollment of engineers in colleges and universities.

Asked a familiar question that arises in the minds of many individuals, whether the billions spent on space might be used to a better purpose such as medical science, oceanography or nuclear physics, he said the currently widespread interest in space has stimulated new interest in these other sciences.

He said that such organizations as the National Institutes of Health, which carries on medical research "now has more money than qualified people to spend it," while the space program "has been a catalytic agent" for stimulating public support for oceanography.

"If Congress cut $100 million a year from its appropriation for space," he said, "I do not believe one dollar more would be spent in other fields of science as a consequence."

Destination — — the Moon

CLEVELAND PLAIN DEALER
November 25, 1962

By KARL ABRAHAM Plain Dealer Science Writer

IN EIGHT YEARS three Americans will have taken baby steps toward the stars.

The United States will send three men toward the moon, land two, and then return the trio safely to earth. These are the plans of the first phase of Project Apollo, which will cost the nation about $20 billion, some 10 times more than it paid for its Hiroshima nuclear bomb.

The round trip is equal in length to 20 trips around the earth and will last about a week, including a one-day stay on the lunar surface.

The Apollo launch vehicle will be about 325 feet tall, two stories higher than the Illuminating Co. Building in Cleveland. It will be launched from a complex of pads at Cape Canaveral, Fla., that is as long as the Lake Erie shoreline from Bay Village to Willowick.

The project to accomplish the manned lunar mission is stretched out from coast to coast among manufacturers and the vast complex of centers of the National Aeronautics and Space Administration.

Apollo is directed by NASA in Washington; astronauts train at the Manned Spacecraft Center in Houston, Tex., where the Apollo command module capsule also is being developed; booster rockets will be built at Michaud, just outside New Orleans, La., and will be tested near Pearl River, Miss., then sent via the Inland Waterway along the Gulf Coast and around Florida to Cape Canaveral.

On the launch pad the Apollo structure will have 43 tons of payload—a five-ton command module, 23-ton service module and 15-ton lunar excursion vehicle (the so-called "bug")—and 235 tons of tankage and rocket engines of the three-stage advanced Saturn rocket. The fuel load for all three stages will be 2,765 tons.

AT ignition, the five engines in the first stage will produce a thrust of 7.5 million pounds to lift the 6 million-pounds weight vehicle toward space. The second stage has one million pounds of thrust and the third stage 200,000 pounds of thrust.

The first and second stages raise the vehicle toward earth orbit, and a brief burning by the third stage injects it into the orbit. The spacecraft and third stage coast for part of an orbit until they reach the point of ejection from the orbit toward the moon. Then the third stage fires once more, and the en-

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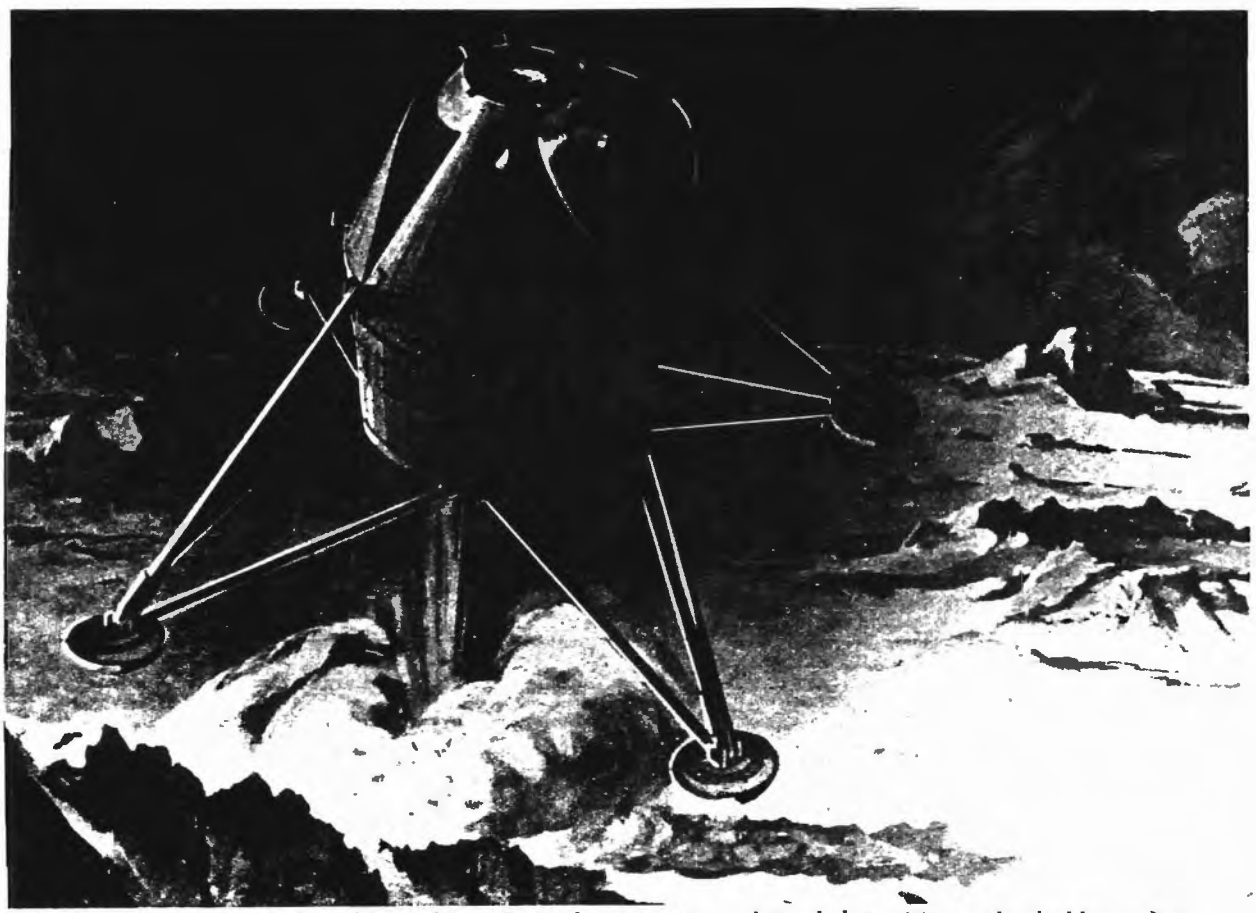
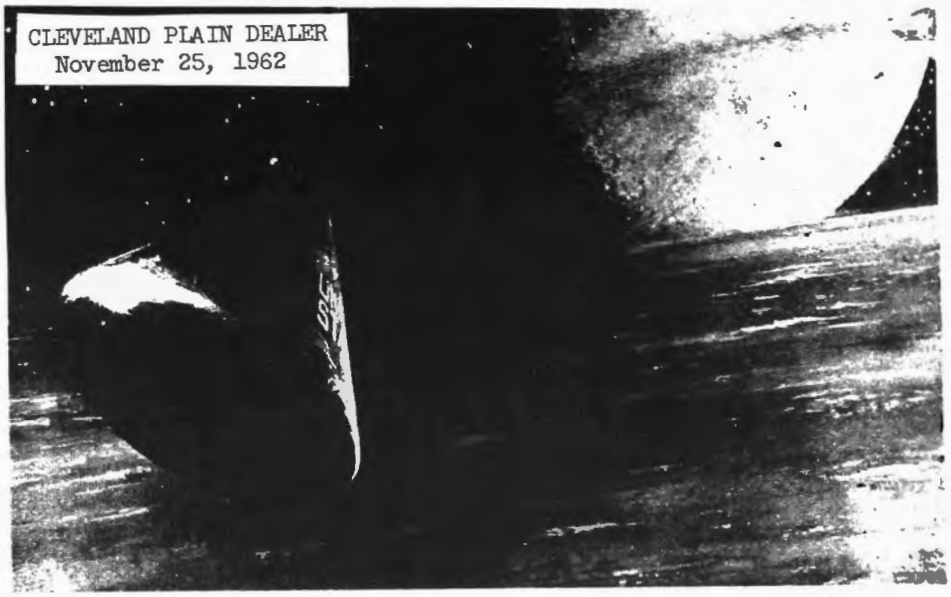


The lunar excursion vehicle or "bug" descends on the moon, its rocket exhaust raising a cloud of lunar dust.

CLEVELAND PLAIN DEALER
November 25, 1962



The Apollo Capsule's heat shield begins to glow as it encounters the earth's atmosphere on completing the three-man round trip to the moon.

Moon Shot

CONTINUED FROM PAGE 14

tire assembly moves toward the moon.

On the way to the moon the command module is in front, then the service module, then the "bug" and finally the third stage rocket. The first two segments are detached, turned around, so that the command module meets "nose to nose" with the "bug." The third stage rocket is then separated.

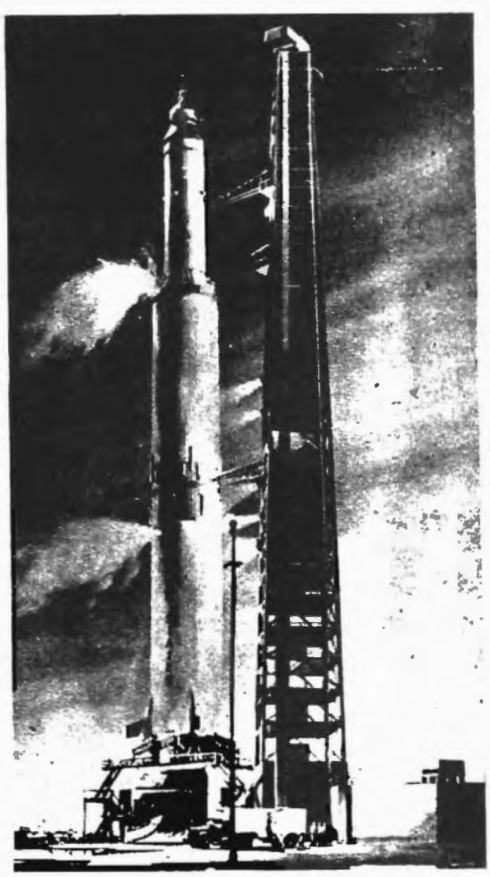
The vehicle now approaches the moon with the rockets in its service module pointing toward the moon. They are fired to slow the craft down for entry into a lunar orbit.

Then two of the three astronauts enter the "bug" and drop out of the orbit to land on the moon. Just what they will do when they get there, and whether they will leave the "bug" to walk around the moon, it not determined.

Eventually, the "bug" will raise them back toward the orbit of the command module, which they will re-enter for the trip back to earth. The "bug" will be left behind in lunar orbit.

The service module will supply rocket power to return to earth, and to slow the craft down as it approaches the earth's atmosphere. After a kind of retro-rocket maneuver, the Apollo capsule alone will re-enter the atmosphere, and at lower altitudes a combination parachute and glider will permit the capsule to glide to a dry landing, probably in the southwest United States.

An exhibit of the Apollo moon capsule may be seen at the NASA - Plain Dealer Space Science Fair which opened Friday at Public Hall.



Depicted on a launch pad that has yet to be built at Cape Canaveral, the 325-foot tall Saturn C-5 rocket prepares to launch the Apollo astronauts toward the moon.

Space Fete Set to Hear President

President Kennedy will keynote tonight's Space Commemorative dinner in Hotel Sheraton-Cleveland by closed-circuit television.

The dinner, one of the highlights of a civic program held in conjunction with the NASA-Plain Dealer Space Science Fair, will bring about 1,000 leaders of science, industry, business, cultural and civic life to the new ballroom of the hotel as its premiere event.

SPEAKERS AT THE invitational black-tie dinner include Dr. Hugh L. Dryden, deputy administrator of the National Aeronauties and Space Administration; Dr. T. Keith Glennan, president of Case Institute of Technology; and Dr. Abe Silverstein, director of NASA's Lewis Research Center here.

They will give the audience a first-hand report of America's present position in the race for space.

At the conclusion of the dinner program chartered buses will take the guests to the Space Science Fair for a conducted tour.

CLEVELAND PLAIN DEALER
November 25, 1962

Another 40,000 Visit Space Fair

Crowd Awed by Wonders of New Era

By JAN MELLOW

Nearly 40,000 men, women and future astronauts streamed into Public Hall yesterday for the Space Science Fair.

It was even a larger crowd than the 31,000 on the opening day, which itself had set something of an all-time attendance record, but it was better distributed and smoother moving.

The adults studied exhibits arranged by the National Aeronautics and Space Administration and The Plain Dealer, deeply but impersonally interested.

THE CHILDREN, however, stared and asked questions with obvious faith that they would someday be traveling in similar vehicles. Indeed, one 5-year-old inquired about a ticket to the moon.

As with any highly successful fair, there were acts that stopped the show completely.

That steady, even flow of visitors was praised by Cleveland Fire Department inspectors, who on opening day had to close the doors several times to allow the jam to thin out.

BUT IT WAS NOT so steady or even around several displays. In fact, it came to a sardine-pack halt entirely at least in three places.

One was the actual Mercury capsule in which Scott Carpenter orbited the Earth three times on May 24.

That was a popular spot for spectators to take photographs of each other — an amazing percentage of fairgoers carried cameras — but they found it almost impossible to get a picture that did not include half a dozen strangers.

AN ASTRONAUT training device, a gimbal rig, also blocked traffic.

The large original, used at the Lewis Research Center to train space travelers, had with it a smaller model which could be, and incessantly was, worked by youthful volunteers. The children were so determined to try their hand at controlling a deliberate tendency of the apparatus to tumble that they could not be lured, bribed or ordered away.

But prehaps the single most irresistible display, far ahead of Santa Claus, was a real, live man dressed as an astronaut.

THREE LEWIS employes took turns modeling the suit and answering questions.

They agreed later as to what was most often asked.

"Are you one of the astronauts?"

(No.)

"What's that dial on your sleeve?"

(A pressure gauge.)

"What is your suit made of?"

(Two layers, the inner nylon with rubber, the outer nylon with aluminum.)

"HOW MUCH does it weigh?"

(193/4 pounds.)

How much does it cost?"

($6,000, including helmet.)

"Can I buy one?"

(Not right now.)

"Aren't you hot?"

(The men's suits were connected to a portable air conditioner, or the temperature would have been unbearable.)

NASA AND Plain Dealer officials of the Space Science Fair were delighted not only by the numbers but by the quality of the crowd.

I. Irving Pinkel, Lewis scientist and technical chief of the fair, commended visitors for "taking the time to understand what is exhibited on the explanatory panels and asking intelligent questions of the NASA experts stationed at exhibits."

Pinkel said education and career-guidance offices had reported an "excellent response."

REACTION OF youngsters indicated, he said, "that we are stimulating their interest in space science and technology."

It seemed that the children were more up-to-date and more matter-of-fact than the adults, but still many fathers could be heard providing accurate information. For the most part, mothers just walked along, shaking their heads and occasionally peering at such items as the couches in the model of the Apollo, due to take three men to the Moon.

The show opened at 10 a.m., and in the first four hours had welcomed 14,500 visitors.

MANY WERE from outside Greater Cleveland, some from outside Ohio.

Public Hall authorities could not say for sure whether yesterday's crowd had established a new record, but figured that it must have.

For one thing, no such Space Science Fair as this has ever been presented before, anywhere, so there is nothing to compare it with.

ALSO, ADMISSION is free. Tickets are required, but can be obtained without charge at Public Hall.

Also, previous great attractions in the hall have covered a larger exhibition area.

A good part of the hall normally used, for instance, by the Home and Flower Show is devoted to lecture rooms for the scientific talks, and to areas where the mighty space machines were assembled. The exhibits themselves take up a lot of floor space where visitors might otherwise stand or walk.

TOO, THE space show is not the sort of thing one zips through. It can keep even a casual observer fascinated for two hours, and any serious student of science could stay all day. Many did.

Tomorrow, Public Music Hall will join the fairgrounds as school groups gather there from 10 a.m. to 4 p.m. for special programs. The enrichment of classroom work will continue all week.

Today's hours for the public will be from 10 a.m. to 10 p.m.

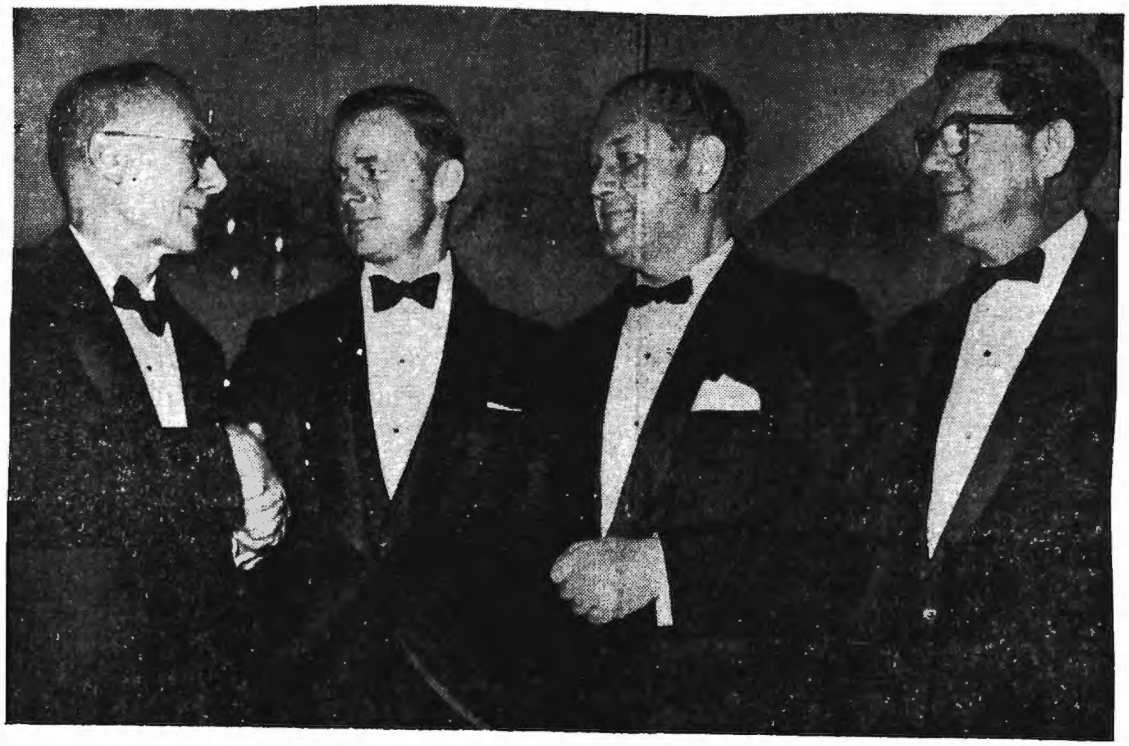
The crowd today will be led by 35,000 employes of Thompson Ramo Woolridge Inc.

AFTER THAT, Monday through Friday, the public will not be permitted in the hall until 4 p.m. The first six hours of each weekday will belong to the youngsters, who already accept the space fair as their own possession.

Of course, there were problems.

Lost children were a frequent complaint, as youngsters strayed away from parents to lose themselves in the crowd and in imagination. One woman, about 40, even reported losing her father.

Transportation also was snarled. With Lakeside Avenue N. E. closed for the extension of Public Hall, taxicabs and buses had to do an annoying amount of detouring, U-turning and other maneuvering.



Dr. Hugh L. Dryden, Thomas V. H. Vail Dr. T. Keith Glennan Dr. Abe Silverstein

Dr. Dryden, main speaker at Plain Dealer-NASA space dinner, chats with Vail, vice president of The Plain Dealer; Dr. Glennan, president of Case Institute of Technology, and Dr. Silverstein, head of Lewis Research Center. Plain Dealer Photo (Richard J. Misch)

CLEVELAND PLAIN DEALER
November 26, 1962

Record 44,750 See Space Fair

Favored with a sunny, mild day and two other major events helping bring crowds downtown, the Space Science Fair roared through its third great day in Public Hall yesterday.

Attendance for the day was 44,750, a new high for the 10-day exposition being sponsored by the National Aeronautics and Space Administration and The Plain Dealer.

Crowds were surging into Public Hall from 9 a.m. on.

THE MORNING CRUSH was largely composed of Thompson Ramo Wooldridge employes, their families and friends.

TRW, Cleveland's leading space industry, and its Aircraft Workers Alliance were having their own day at the fair.

Within an hour after the doors opened the main arena of Public Hall was a mass of humanity.

More crowds flooded into the hall after the windup of the annual Christmas parade and the Cleveland Browns-Pittsburgh Steelers football game.

Although Public Hall was at least as packed as a Mercury capsule, the crowds moved along more smoothly than on the fair's opening day Friday.

TRW AIDES estimated that their day at the Space Science Fair brought a turnout of as many as 15,000 employes, relatives and neighbors.

Ray Livingstone, a TRW vice president, and his wife Sylvia were there, greeting many employes and their families.

Joe Chester, president of the Aircraft Workers Alliance, and Jack Maria, AWA vice president, were on hand to supervise TRW activities for the day.

TO ENCOURAGE attendance at the Space Science Fair, the union offered 10 $25 savings bonds as door prizes The winners will be picked later this week.

A TRW engineer, Bob Shafranek, who helped design a Snap 2 auxiliary power unit for space use, explained its workings to his wife Eileen and their children, Susan, 10 Bobbie, 8, and Ricky, 4.

Jim Sears, another TRW engineer, posed for a picture with his son Ricky, 5, while other members of the family looked on. Sears worked on the design of an important plastic space nozzle.

Tapco employe Dan Morrison, who works in the model shop, said: "The fair is very valuable to me, personally. We can see where the stuff we make goes."

August Drechsler, a Tapco tool and diemaker, said: "The whole fair was well executed."

THREE CHILDREN from TRW families, Amelia Pates 7, Geoffrey Jenkins, 6, and Kevin Patton, 5, did not understand too much about it but they had their picture taken by a TRW fuel cell.

And so it was a splendid family day at the fair.

From today through Friday the Space Science Fair will offer special educational courses for junior and senior high schools students from around Ohio.

School buses will be converging on Public Hall, bringing thousands of advanced and talented science students who will be attending the space science institute and the general information workshop.

MORE THAN 40,000 students from more than 400 junior and senior high schools have enrolled for these special educational courses. This program will be from 10 a. m to 4 p. m. daily.

Other thousands of students will be coming to the Space Science Fair on their own after school hours.

The fair, greatest exhibition ever of spacecraft, satellites and other space-age hardware, is free to the public. It will continue through Sunday

Allen J. Lowe, managing director of Hotel Sheraton-Cleveland, at left, and Mayor Ralph S. Locher admire ice carvings of initials of National Aeronautics and Space Administration.

CLEVELAND PLAIN DEALER
November 26, 1962

SEEN BY 'PIONEERS'–

Sheraton Ballroom Glistens

By JAN MELLOW

Guests at the first banquet last night in Hotel Sheraton-Cleveland's new ballroom felt an appropriate sense of pioneering.

The room was not quite complete, but neither was the subject they had gathered to honor space travel.

Overhead were 16 chandeliers with 60 lights, resembling shooting stars. Also overhead, underneath the balconies, were some bare channel irons, to which acoustical tile will soon be fastened, and several large heating pipes covered with shining foil.

ALMOST 1,000 men and women gathered in the new ballroom for the space commemorative dinner sponsored by The Plain Dealer and the National Aeronautics and Space Administration.

Instead of being annoyed that the room was not finished in every detail, they seemed delighted.

"It fits so well," said a woman in mink and brocade.

Besides, as well-wishers kept on explaining to hotel executives, the fact that the room was not quite ready was a compliment to the visitors. They were in on the very start of something.

IN A PRACTICAL sense, the ballroom will be in permanent orbit long before the next U.S. space flight.

It will take only another two weeks or so for the rest of the "patina" to be applied to the walls, for the floor to be given its four coats of lacquer and for the graceful curving stairway to be carpeted.

"Patina" is a space-age term for a gold-colored, sequined wallpaper, which is to vinyl plastic what vinyl has been to paper, according to Edward F. MacMillan, resident manager of the hotel.

BEFORE THE DINNER, the former main ballroom at the Shearton-Cleveland was opened for cocktails and a fantastic centerpiece.

Even the old ballroom has changed. It is now the Gold Room, with parquet floors which the management will cover only in case of groups that might grind out too many cigarettes on the wood, and walls covered with an equally attractive but subservient "patina" to the new banquet hall.

That centerpiece was of ice. The letters N-A-S-A had been carved, one at a time, out of 400-pound blocks for each initial.

From the Gold Room to the new ballroom should have been a short walk, maybe a blink of an eye for an astronaut, except that the crowd was so large and so slow-moving.

EVERYONE WANTED to stand and stare not only at the Gold Room and its distinguished guests but also at the new Circus Bar, also on the mezzanine, and then at the rose-pink carpeting of the entrance to the new ballroom.

Cost figures were infinitesimal in comparison with a Mercury shot, but the Gold Room redecoration cost some $75,000 and the new ballroom might run some $3,500,000.

The whole ne wwing, with its parking garage below, ran $5 million.

CONCRETE STAIRWAYS from messanine to balcony the garage were blocked off, and up to the ballroom from but a glowing mural that will dominate those passageways was in full Christmas-tree light.

DAILY RECORD
November 27, 1962

KENTON TIMES
November 27, 1962

BUCYRUS TELEGRAPH-FORUM
November 27, 1962

MARTINS FERRY TIMES LEADER
November 27, 1962

NEW PHILADELPHIA DAILY TIMES
November 27, 1962

X-15 Test Pilot Joe Walker Will Attend Space Fair

CLEVELAND (UPI)—Joe Walker, the test pilot of the ulta-sonic speed X-15 plane, will visit the Space Science Fair here Thursday afternoon.

One of the exhibits is a full-scale model the research craft which Walker has flown 4,100 miles per hour—the fastest flight ever recorded for a plane under full control by the pilot.

Walker was employed at the National Aeronautic Space Administration's Lewis Research Center here before he was assigned to the agency's flight research center in California in 1951.

Walker is a native of Washington, Pa., but his wife, Grace, formerly taught school in Lakewood, Ohio.

Two pioneers in aerospace technology will speak tonight on aspects of manned space flight.

They are Col. John Staff whose work led to the jet ejector systems now used in space crafts and George M. Low, in charge of manned space flight missions such as projects Mercury, Gemni and Appollo.

CLEVELAND PLAIN DEALER
November 26, 1962

Lewis Lab's Rising Role Is Described

By KARL ABRAHAM

The Lewis Research Center of the National Aeronautics and Space Administration at Ceveland Hopkins Airport has nearly doubled both its manpower and annual expenditures in the last five years, according to Dr. Hugh L. Dryden, NASA's deputy administrator.

Dr. Dryden was the featured speaker at last night's space commemorative dinner in the new ballroom of Hotel Sheraton-Cleveland.

He said the laboratory now was responsible for two of NASA's largest programs: development of the Centaur rocket; and later on, larger liquid - hydrogen rocket engines. This year, project expenditures at Lewis will be nearly $170 million.

THE CONTRIBUTIONS of talent by Case Institute of Technology, Western Reserve University and Baldwin-Wallace College are proving valuable to NASA, Dr. Dryden said. The space agency this year supported research at Case with $300,000, he said, and further programs for Case are being studied.

Rryden concluded a press conference before the dinner by saying that a study was being made jointly with the Air Force of the possibility of sending animals on extended weightless flights in Discoverer satellite capsules to obtain more information on this aspect of space biology.

HOWEVER, Dryden said, the United States probably will not use animals in "dry runs" to pave the way for a landing on the moon.

"Man is an essential element in the Apollo mission," he added.

The "dry runs" of Apollo-type maneuvers would be made in earth orbit during the lattermost two-man Gemini flights and early Apollo trials.

In the early phases of the Mercury program, now nearing completion, animal flights were made.

Dryden said that the sending of three men to the moon would be sufficiently flexible to permit them either just to go around the moon and come back, or approach the lunar surface without actually landing.

DRYDEN reviewed the accomplishments of NASA since it superseded the National Advisory Committee for Aeronautics (which Dryden headed).

He said that Project Mercury was transformed from an idea into the Glenn orbital flight in 39 months and cost each American $1 a year for three years. Apollo will cost each American $20 a year for five years.

Speaking of international cooperation in space, Dryden said he hoped an agreement on some satellite activities could be reached with the Soviet Union. Dryden has negotiated a document with Soviet Academician Anatoly A. Blagonravov. Dryden doubted the Cuban crisis would have much effect on these negotiations.

FAIR, GAME, PARADE—

350,000 Jam Heart of City, Knot Traffic

More than 350,000 persons poured into downtown Cleveland yesterday afternoon.

And as they left, thousands more poured into Public Square hoping to miss the crowds on their way to evening events.

Traffic Commissioner Sam C. Skerotes said the afternoon crowd was one of the biggest crowds in history for downtown Cleveland.

He estimated about 300,000 persons turned out to watch the annual Christmas Parade and 53,601 to watch the Browns-Steelers football game. The Browns won 35-14.

Before the parade started, 19,509 persons turned out to see the NASA - Plain Dealer Space Science Fair in Public Hall, in its third day.

After the parade and football game ended, thousands of these spectators also went to see the Space Science Fair and to see the Christmas lights in Public Square.

THE POPULATION exploded in one of the craziest auto and pedestrian tieups Cleveland has ever seen.

Persons going home had to wait as long as half an hour to get to the Rapid Transit turnstiles in Union Terminal.

• Persons going to Public Square by Rapid Transit after 5 p. m. to see the lighted Christmas decorations had to elbow their way through the milling throng going the other way for as long as 10 minutes before breaking free of the crowd.

Cars crawled bumper to bumper, moving at only three miles an hour through the downtown area as late as 6 p. m.

But to top the traffic headaches off, a fire broke out in the Buckeye Building at 2082 E. 4th Street during the parade. After the parade, an estimated 5,000 persons congregated to watch the fire.

The fire forced Skerotes to call in 50 more policemen for traffic control, making a total of 200 downtown to handle the crowds, plus an additional 50 Civil Defense workers.

THE TRAFFIC JAM started about 4:15 p.m. when the parade broke up. By 4:30 p.m. it reached its height when the football fans emptied out of the Municipal Stadium to meet the parade crowd.

As soon as the parade ended on Euclid Avenue, police tow trucks emptied E. 4th Street of parked cars because of the fire.

Happiest people downtown were the restaurant and parking lot operators. Many of the restaurants, normally closed on Sundays, remained open and did a standing-room-only business.

CLEVELAND PLAIN DEALER
November 26, 1962

NASA Looks to City for Space Talent

By KARL ABRAHAM
Plain Dealer Science Writer

The rapidly increasing importance of the Lewis Research Center in the nation's space programs should also stimulate Greater Cleveland to become more active in these programs, a space agency official said here last night.

Dr. Hugh L. Dryden, deputy administrator of the National Aeronautics and Space Administration, said at the space science commemorative dinner in Hotel Sheraton-Cleveland:

"This community is to be congratulated on its early recognition of the importance of the space programs. NASA has had a very happy relationship with the Cleveland community since the pre-Sputnik days of the old Lewis Laboratory.

"WE HOPE THAT the broadening of the responsibilities of Lewis will provide you full opportunity to contribute your own talents."

Lewis recently has been given development responsibility for the Centaur rocket and for research and development of a new and larger liquid hydreogen rocket, the M-1, as well as electric and nuclear electric space propulsion devices.

In the last five years, said Dryden, both manpower and expenditures by Lewis have doubled so that it now has about 4,400 employes, an annual operating budget of about $50 million and supervision of development programs of almost $170 million this fiscal year.

GREATER CLEVELAND educational institutions here have provided talent for NASA, particularly Case Institute of Technology, Western Reserve University, John Carroll University, Fenn College and Baldwin-Wallace College. Also, Lewis employes are receiving post-graduate training at Case.

NASA support of research programs at Case now amounts to $300,000 a year and is expected to increase, he said.

After outlining to the dinner guests the past accomplishments, present programs and plans of NASA which are displayed at the NASA-Plain Dealer Space Science Fair in Public Hall, he concluded:

"WE HAVE JUST begun. Eventually we will explore the solar system."

"We live in a great moment in history," Dryden continued. "Man has lifted himself from the restrictions of his planet to enter into a new and strange environment.

"The exploration of space has begun. Who can set limits on its progress in the hands of our children and grandchildren?"

The first administrator of NASA, Dr. T. Keith Glennan, president of Case Institute of Technology, said that in the next year the national budgets for space exploration might rise from the current $3.7 billion to as much as $6 billion.

"The Lewis Research Center is destined to play an increasingly important role in the space effort," Glennan said.

"REMEMBER, ladies and gentlemen, your money is paying the bills and you owe it to yourselves to see where it is going. The space program is the pacing element in our society today, although it may be dimly seen at present."

Dedicated and imaginative effort by thousands have brought the program as far as it is in its first five years, Glennan said.

Dryden concluded a press conference before the dinner by saying that a study was being made jointly with the Air Force of the possibility of sending animals on extended weightless flights in Discoverer satellite capsules to obtain more information on this aspect of space biology.

HOWEVER, Dryden said, the United States probably will not use animals in "dry runs" to pave the way for a landing on the moon.

"Man is an essential element in the Apollo mission," he said.

The "dry runs" of Apollo-type maneuvers would be made in earth orbit during the lattermost two-man Gemini flights and early Apollo trials.

Dryden said that the sending of three men to the moon would be sufficiently flexible to permit them either just to go around the moon and come back, or approach the lunar surface without actually landing.

He said that Project Mercury was transformed from an idea into the Glenn orbital flight in 39 months and cost each American $1 a year for three years. Apollo will cost each American $20 a year for five years.

CLEVELAND PLAIN DEALER
November 27, 1962

Pupils Hunger for Learning at Space Fair

WHAT—Space Science Fair.
WHERE—Public Hall.
WHEN—Today through Sunday, 10 a.m. to 10 p.m.
SPONSORS—The National Aeronautics and Space Administration and The Plain Dealer.
ADMISSION—Free.

By ALBERT C. ANDREWS

It was the younger set's turn to wander big-eyed among the stars yesterday.

Pupils by the thousands turned out for the Space Science Fair at Public Hall, sponsored by the National Aeronautics and Space Administration and The Plain Dealer.

School buses from throughout northeastern Ohio disgorged loads of knowledge-hungry youngsters.

They clutched notebooks and textbooks, not even stopping for lunch. Instead, they munched hot dogs and popcorn while taking in the exhibits.

Stapp Speaks at 8 Tonight

Col. John Paul Stapp, veteran of 26 rocket sled rides, will speak on "Manned Space Flight" tonight at 8 in the ballroom of the fourth floor of Public Hall.

The ballroom holds 800 persons and admission will be "first come, first served."

With Col. Stapp will be George M. Low, NASA's director of manned spacecraft.

Col. Stapp, now chief scientist of the aerospace medical division at Brooks Air Force Base in Texas, volunteered for the sled deceleration experiments, which led to development of ejection seats for supersonic aircraft.

Attendance for the day was 21,200. This brought the four-day total to 133,500.

Yesterday's figure included 2,200 pupils who watched a space science show designed especially for science majors, and 5,200 who attended a general-information workshop.

These programs are open only to school groups for which advance reservations are made.

OTHER GROUPS and individual pupils are welcome at any time without reservation. They can attend lectures and motion pictures and visit all exhibits on the main floor.

Coming the longest distance yesterday were 60 outstanding science students from eight high schools in Flint, Mich.

They came by chartered United Air Lines plane, and the crew of two pilots, navigator and two hostesses joined in the tours to see what lies somewhat above the plane's normal altitude.

IN FLINT the talented teenagers meet each Monday for two hours in a science seminar, said Joseph M. Biedenbach, their leader. The top 60 of more than 400 were selected for the trip.

Biedenbach is with General

★ From First Page

Motors' AC Spark Plug Division, which established the seminar.

Other groups came from Bellevue, Warren, Sandusky and Huron as well as many Cleveland and suburban schools.

The special educational courses will be offered daily through Friday, from 10 a.m. to 4 p.m. More than 40,000 pupils from 500 junior and senior high schools have enrolled.

Admission to the fair is free. It runs through Sunday.

Free Tickets Available

Free tickets for the Space Science Fair, continuing through Sunday, will be available during the exposition at The Plain Dealer booth in the Lakeside Avenue lobby of Public Hall. Show hours are 10 a.m. to 10 p.m. daily.

Tickets also may be obtained at the customer service desk at The Plain Dealer, 1801 Superior Avenue N. E., Cleveland 14.

CLEVELAND PLAIN DEALER
November 28, 1962

Thrills of the Space Science Fair are pointed out to a group of girls from Magnificat High School, Rocky River, by Sister Gabriella, H.H.M., their teacher. Plain Dealer Photo (Norbert J. Yassanye)

Space Fair Shows Girls Are Scientific

By ALBERT C. ANDREWS

Anyone who thinks science is only for boys should take a close look at the visitors to 'he Space Science Fair at 'ublic Hall.

There is many a pony-tail ıirdo bent studiously over a ɔtebook and many a high-'ched query.

Delight that so many girls ɜ showing an interest was ɔressed by officials of the tional Aeronautics and ace Administration which sponsoring the fair with The Plain Dealer. The fair, free to the public, runs through Sunday.

Fair Facts

WHAT — Space Science Fair.

WHERE—Public Hall.

WHEN — Today through Sunday, 10 a.m. to 10 p.m.

SPONSORS—The National Aeronautics and Space Administration and The Plain Dealer.

ADMISSION—Free.

THE GIRLS and their male classmates totaled 7,870 yesterday in organized groups.

Attendance for the day was 26,020. This brought the total for the fair's first five days to 159,520.

Lack of interest in science among girls has been a concern among educators for several years. It has been lamented by top school experts, up to Dr. James B. Conant, president emeritus of Harvard University, who made a monumental study of American high schools.

One reason given is that many school and college science sequences take several years and require advance planning that the girls may not find attractive.

ALL THIS, THOUGH, did not deter the young ladies from swooping down on the Space Science Fair by the thousands.

One, for example, was Donna Yeakel, who came all the way from Leavittsburg, Trumbull County.

She was one of 80 physics and chemistry pupils who made the trip in two buses, and there were "lots of girls," she said.

Special lectures for students are available daily through Friday from 10 a.m. to 4 p.m., with reservations required. Much of the fair is open at any time to individual pupils or groups without reservations.

THE PLAIN DEALER
Cleveland, Ohio

Rocket Fired Every Day at Space Fair

By KARL ABRAHAMS
Plain Dealer Science Writer

Every few minutes a rocket is fired in Public Hall.

It doesn't go anywhere. It carries no payload. It doesn't even give very much thrust —about three pounds.

But it burns with a blue-white flame that can be spotted from the top of the balcony, and it screams like a trapped banshee.

AND AMONG the young in heart, regardless of age, who are not frightened away by such goings-on, it is "way out."

The rocket, a concept of the United Technology Corp., combines a solid and a gaseous fuel in the same rocket engine, which is a somewhat recent innovation.

The earliest rockets built by the ancient Chinese were solid fueled—made of a crude gunpowder. In the early 1900s liquid fuels were first used. Just a few years ago military needs spurred new solid rocket fuel development.

BIG ADVANTAGE of the liquid fuels is that they can be turned on and off as quickly as a water faucet. The solid rockets are easier to store but, once ignited, keep burning because they have an oxidizer mixed in with the propellant. Liquids rockets, on the other hand, store the oxygen and fuel in separate tanks and either can be turned off.

United Technology is one of the nation's largest solid-fuel rocket builders. It will provide two solid boosters to straddle the liquid main booster in the Titan III that will orbit the Air Force's manned X20 (Dyna Soar).

THE "HYBRID" ROCKET being demonstrated in Public Hall goes a step further. The fuel, in the shape of a hollow cylinder made of "Plexiglas," is solid. The oxidizer, in this case oxygen gas, is pumped through the middle of the tube. The fuel burns along the entire length of the cylinder and the gasses are expelled out the rear.

It can be turned on and off abruptly just by shutting off the oxygen, without which the fuel won't burn. The whole thing initially is ignited by a spark and a little propane gas.

Allen L. Holzman and Donald K. Matthews, research engineers who operate the demonstration, say it is the only rocket engine that has been approved for indoor exhibition firing by fire safety officials.

POTENTIAL USES of this kind of rocket include fine adjustments of the orbits of satellites and as "pack-on-the-back" type rockets needed for spacemen who must leave their vehicles to make repairs.

These pressure-suited astronauts will have to be able maneuver themselves freely in space with propulsion devices strapped to their backs.

PROMOTION

Space Fair Orbits As Sponsor Is Struck

By George Wilt

Even a strike closing Cleveland's daily newspapers couldn't ground the *Cleveland Plain Dealer's* Space Science Fair.

In spite of the fact that the suspension came right smack in the middle of the big community-service event co-sponsored by the Plain Dealer and the National Aeronautics and Space Administration, the fair continued to pack them in.

In fact, the 10-day exposition drew 375,738 curious students and adult visitors, breaking all previous city attendance records at Cleveland's Public Hall.

The comprehensive exhibits of spacecraft and rockets, the largest ever assembled by NASA for public examination, were presented in Cleveland without any admission charge. The 30,000 square feet of exhibit area in the main arena was twice as large as the Seattle World's Fair area occupied by NASA.

The joint effort by NASA's Lewis Research Center, located in Cleveland, and the Plain Dealer, was aimed at introducing the space program to the public; to give a progress report on the space science program; and bolster pride in the nation's space effort. The stimulation of student interest in science in general, and in participation in the space program in particular, was a major academic objective of the Space Fair.

Some 50,000 students from 15 northeastern Ohio counties were guided through the exposition. 11,000 advanced students attended the special Science Institute for a one-hour orientation in space exploration, and an hour-long specialized lecture and two-hour excursion through the sprawling exhibit. The balance of the students attending in school-sanctioned groups took in the exhibits only.

Spacecraft Exhibited

Some of the show stoppers included a full-scale, detailed mock-up of Apollo, the spacecraft designed to carry a three-man crew on lunar missions; two Mercury orbital capsules actually used in manned space flight; models of the Explorer, Vanguard and Discoverer satellites, the X-15 rocket plane; full-size two-man Gemini capsule; the seven-story high Scout rocket; and Ranger, Surveyor and Prospector spacecrafts designed for investigating the lunar surface.

A Space Commemorative Dinner, kicking off the exposition attracted 1,000 northern Ohio opinion makers, including Anthony J. Celebrezze, former Cleveland mayor and now Secretary of Health, Education and Welfare. A taped and filmed statement from President Kennedy was presented at the Dinner.

The Plain Dealer announced its plans to co-sponsor the Space Science Fair in June. One month before the show opened, they put its editorial support of the coming event into high gear. Under the direction of Philip W. Porter, managing editor, two stories a day were published about various aspects of the show, and details of space hardware.

NASA Coordination

NASA was responsible for the coordination, transportation and installation of all exhibits, and furnished about 150 personnel to man the show. The Plain Dealer bore the rental costs of the Public Auditorium and coordinated the entire promotion program for the successful public service.

A barometer of the appeal of the undertaking is the fact that over 100 Ohio newspapers carried a total of 473 articles about the Space Science Fair. The event was also extensively covered by local and national radio and television media.

It's a shame that the Plain Dealer can't tell its readers how successful their promotion turned out until the strike is over.

* * *

That lack of time seemed to be the pupils' primary complaint. Clearly, there just were not enough hours and minutes to see everything, or even to see many of the principal exhibits in great detail. The all-color space flight films, popular with almost everyone who stopped to watch, often had to be left in mid-movie so that a bus schedule could be maintained or because a buddy wanted to "take a quick look" at just one more of the complex fascinations downstairs.

Nevertheless, the pupils' perception and appreciation of this country's space achievements and their awareness of the magnitude of marvels to come was unmistakably evident. If there was frivolity on the part of a few, there was amazement, a growing understanding and a marked sense of awe among many members of the group.

One of the most popular exhibits . . . vying most closely with "Aurora 7" and the "moon base room" in that respect . . . was the X-15 and the array of illuminated explanatory material assembled in detail below it. Films, complete with soundtrack, related the hazard-rocked history of the entire X-series of manned missiles.

Watching and listening, slende Walter Moyer said quietly, "We owe those men so much."

He looked around, motioned in an encompassing gesture with his right hand.

"We have space capsules, the Project Mercury astronauts like John Glenn and Al Shepard, and this X-15, too . . . but a lot of men gave their lives to make it possible and maybe make it a little safer for the fellows who are flying now. It makes you think."

Young Moyer has special cause, perhaps, for this outlook. His father, Walter Richard Moyer, is a United Airlines mechanic at Cleveland - Hopkins airport. The Ridgeville High junior, now studying chemistry, has lived in Bradford, Pa., Phoenix, Ariz., and Buffalo, N. Y., prior to coming to Ridgeville with his family a few months ago. He says college will have to wait a year or so while he earns tuition money, but he seriously is considering a career in electronics. For him, the Space Fair tour will be an experience to talk about for a long time.

BOB TRIMBLE, another junior now in RHS chemistry classes, said the Cleveland fair is "bigger and in many ways more impressive" than a similar exhibit he attended two years ago while visiting relatives in Oklahoma City. The western exhibit did have one major "plus," however: Among several outdoor attention - getters was a real dandy . . . . a Mercury space capsule perched atop an authentic Redstone booster rocket. This was the combination that, on May 5, 1961, propelled Cmdr. Alan Shepard into the sub-orbital flight that gave the U.S. its first man in space.

Both Moyer and Trimble had to leave the "Friendship 7" film of John Glenn's orbital flight long before it was over, again because of the time limit. But in the early moments of the film, which showed the hectic pre-flight preparations in Mercury Control Center at Cape Canaveral, Moyer had a comment of approval when it was clear that the men manning the control consoles represented many nations, every race.

"Everyone has a stake in this and that's good," he remarked. "There should be more of this sort of thing . . . more programs where everyone can work together and more exhibits like this so that the public can get the picture. Seeing it lets you understand a lot more about just what our programs are and what the men go through."

When Glenn's spacecraft roared off the Canaveral launching pad, both Moyer and Trimble intently watched the flaming closeup and Trimble admitted, "That still gives me goosebumps, even when I know it came out O.K."

On the way home, with almost everyone in the bus carrrying his or her coat and the windows open in unseasonal defense against the warmth of a cloudless, late Indian Summer day, comments about "favorite exhibits" mingled with mild complaints about "leaving too soon." At least some of the pupils made on-the-spot decisions to try to remedy the latter . . . even before leaving the bus, some of them firmly announced their intention to return, "on their own," either today or for the fair's closing session tomorrow.

Apparently, they had not had enough. But one girl made a concession to an unheeded warning: "This time," she vowed, "I'll do what Mother wanted me to do today and wear my 'flats' . . . Ooh, these FEET!"

CHRONICLE-TELEGRAM - Elyria, Ohio - December 1, 1962

By JOY OWENS

CLEVELAND — At first glance, it looked like nothing quite so much as the biggest, grandest pre-Christmas toyland display ever devised. But the National Aeronautic and Space Administration's "Space Fair" in this city's Public Hall, although it inspired a toyland's wide-eyed, gaping-mouthed amazement from the incredulous thousands who jammed it from morning to night, represented no mere holiday galaxy of gaiety. And those same thousands of spectators. . .particularly the school groups whose pupils made up the morning and early-afternoon throngs from Monday through yesterday. . were well aware of that fact.

A Chronicle-Telegram reporter did a "double-take" of what NASA officials called the largest single-site exhibition of United States space achievements ever opened to the public. . .once "solo" and again yesterday in the company of 65 teen-aged chemistry and physics pupils from Ridgeville High School. Both were trips to remember.

Assistant Principal Robert Barnhart and chemistry-physics instructor Dave Hiscox were official "straw-bosses" of the four classes of RHS pupils who crowded aboard the tour bus at 7:26 yesterday morning and arrived, almost exactly one hour later, at Public Hall.

Briefly, the agenda included a mass lecture in the large auditorium by Uwe H. Von Glahn, chief of the flow physics branch of NASA's Lewis Laboratories here; small-group lectures on a variety of space-research themes in the sprawling building's basement approximately one hour later, then freedom to tour, as best they could, the huge main exhibition hall for the next two hours until the pre-arranged 1:30 p.m. departure time for the return trip to Ridgeville.

Von Glahn started the mass 9 a.m. lecture by flipping on a recording of a roaring Saturn booster rocket engine whose pulsating, 1½ million pounds of thrust produced the crescendo the physicist called "the whisper of tomorrow." From then until the pupils filed out of the crammed lobby and trooped to the waiting bus parked in The Stadium lot, it was a day that left the young participants as giddy as though they personally had ridden the tumbling "Mastif" that occupied an awesome amount of the exhibition hall.

WITH TWIN SCREENS and detailed color photos and charts to illustrate his talk, Von Glahn outlined the three major objectives of the United States' space program: The study of practical applications of earth satellites to problems of weather, communication and navigational research; production of scientific data on the environment of the earth's solar system and galaxy; the acquisition of knowledge in the man-in-space realm which already has produced orbital flights around the earth and which Von Glahn and his countless associates believe will one day open the door to lunar (moon) flights and even to inter-planetary travel.

In all three categories, Von Glahn described in considerable detail the achievements already on the books, the expected timetable for near-future additions to the program and some admitted "calculated guessing" of long-range possibilities not yet beyond the idea stage.

But 20 years ago, the late Dr. Robert Goddard (whose brilliant experiments in rocketry earned him little more than ridicule then, chagrined accolades now) declared with conviction, "Nothing is more irrevocable than an idea whose time has come."

His "idea" of space travel most assuredly has "come to its time"; the several hundred pupils from Lorain County, from all sections of Ohio and even from communities in Michigan, Wisconsin and Pennsylvania who were on hand yesterday morning for Von Glahn's opening lecture split into small groups to learn more about eight different but interlocking facets of that project.

In the section devoted to spacecraft design, NASA's Tom Moffitt discussed, without notes, the problems that must be solved to produce the hardward for orbital, lunar and interplanetary travel. Other NASA technicians, physicists, chemists and engineers conducted proceedings in each of their specialties; the pupils got their information straight from the "top brass." Moffitt, for example, is helping to design and produce the power-conversion system for electrically-powered spacecraft. Far-future flights to Mars, perhaps beyond, will demand a sophisticated system of converting heat from reactors into electricity that will propell space vehicles weighing 350,000 or even 700,000 pounds; Moffitt and his associates are at work in Lewis Lab daily, ironing the considerable "kinks" out of just such a system.

WHEN THE SMALL-GROUP specialty lectures ended, "school was out" for the formal, directed part of the program. From then on, the visitors were on their own, and got their first glimpse of the sprawling main exhibition hall and the jammed magnitude of it all that left them wondering just where to start and then, what to see next.

At the outset, Assistant Principal Barnhart had expressed the concern that a good number of his charges might not appreciate what they were seeing and hearing; that they would consider the tour nothing more than an opportunity to "cut out of classes, legally, for a day away from books." In some few instances, his concern may have been well-founded; among the majority of the pupils, however, there was a deep-seated and prevailing interest that even the inevitable confusion and the disappointments of a too-crowded schedule could not disguise.

Much of this group interest very probably stemmed from the fact these were technical-class pupils to begin with. Their current studies include chemistry, physics and math. Some. . .a minority . . .were sophomores; most were juniors and seniors. The space-age world they visited in miniature in Public Hall represented but a beginning of the intricacies of the world in which they will live and work and to which many of them probably will contribute much.

Ken Kusner, a senior physics pupil at RHS, already is at work making a telescope for next spring's nation-wide "Science Fair" competitions; he thinks he may further his studies at Case Tech.

Hellen Ross, a junior chemistry pupil whose father is a tool machinist at Ford's Brook Park plant, said she hopes to attend Ohio State University, teach mathematics "somewhere near home" for a few years and then, perhaps, move to California.

No matter what their interest, either from a classroom standpoint or "just curiosity," there was enough. . .and more. . .to satisfy the most casual visitor. But like most teenagers, regardless of their activity, there was nothing casual about the way most of the RHS group joined in trying to see everything in the hall virtually at the same time.

There were general-interest, space science and space technology displays of the rocket planes, satellites and capsules that have thrust America's belated space efforts into a fantastic countdown of achievements in the crowded years since Russia first launched Sputnik I in October, 1957.

Earth satellites, sounding rockets and space probes. . .the little, unmanned variety of weather, communication and reconnaisance craft that promise lasting benefits to the world's general standards of living, were ranged directly in front of the multiple entry doors. A world globe depicted the orbital paths of all scientific satellites and space vehicles launched during the past four years. Above it, a mammoth banner proclaimed the section's theme. . ."SPACE, for the Benefit of Mankind."

DIRECTLY BEHIND the globe, also in the "center lane", were a sleek, black, skyward-poised X-15 rocket ship and two manned balloon models. As was true with all the exhibits, the background data and proposed programs related to each were told on illuminated pictorial panels, on small-scale motion picture screens and by NASA technicians who were on hand at each individual exhibit to give brief lectures and to answer the inevitable multitude of questions.

Man-in-orbit spacecraft. . .the familiar present Mercury capsule and the two-man Gemini models . . .ranged ahead of the three-man Apollo vehicle designed and intended to carry passengers to the moon sometime in this decade. In an adjacent corridor, Scott Carpenter's heat-seared "Aurora 7" Mercury capsule drew almost endless lines of waiting teenage "inspectors." A photographic record of American man-in-space flights, from Alan Shepard's sub-orbital "first" for the U. S. to Wally Shirra's near-perfect six-orbit achievement, flanked the capsule. Included were individual photographs of the seven famed Mercury Astronauts and the new generation" spacemen who will tackle many of the post-Mercury projects.

The "Aurora 7", stripped of instrumentation, seemed incredibly small and it is easy to understand John Glenn's laconic comment about his cramped quarters inside "Friendship 7" . . . "You don't get into these things, you put them on."

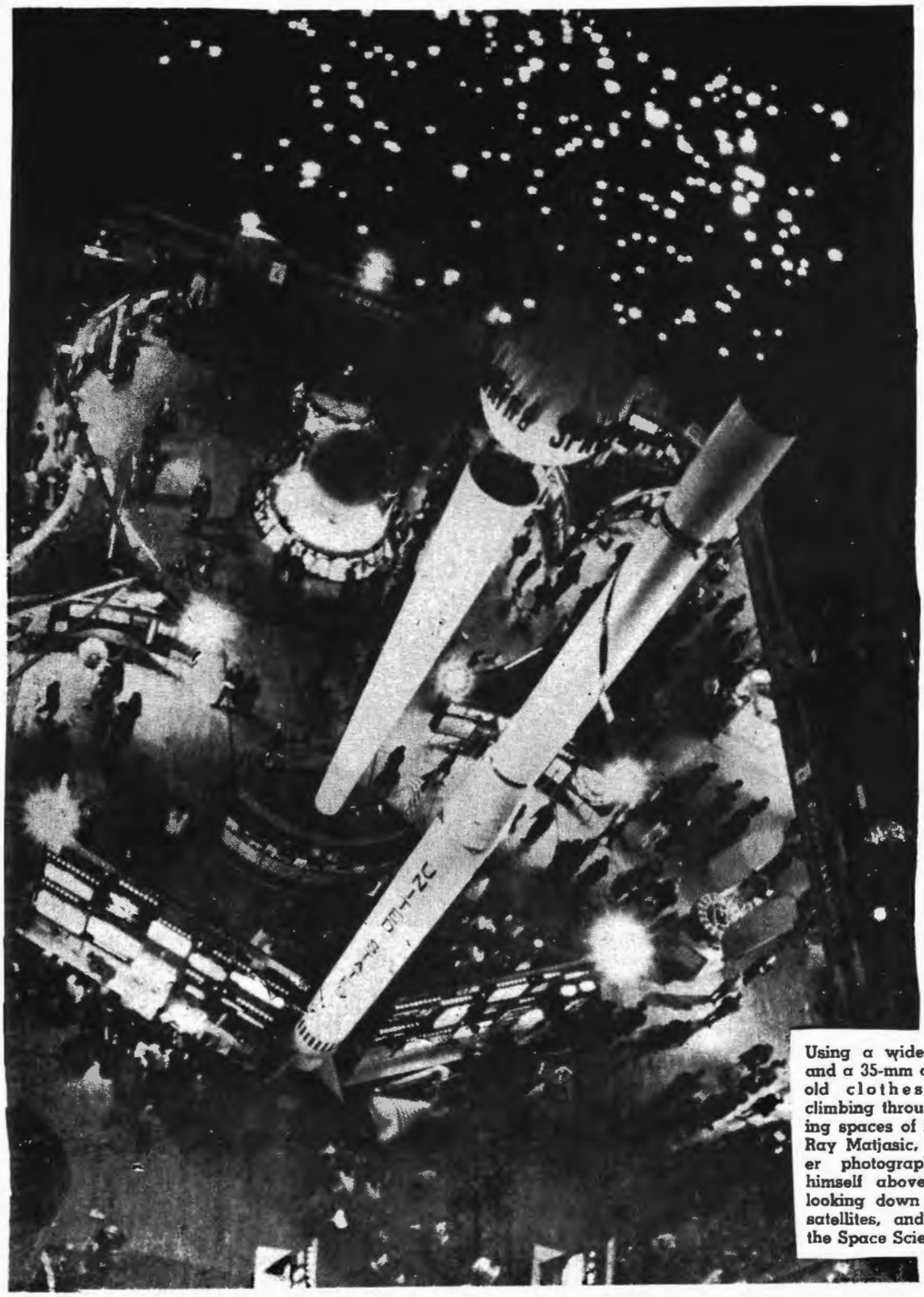
Flanking these central displays of unmanned and manned satellites and the X-15 were the various support systems and associated projects that round out the United States' space efforts. Weather satellites, displays of space vehicle structures and materials, power and propulsion demonstrations, bioastronautics (space medicine), tracking and guidance systems, general astronomy and communications layouts . . . all shared floor space and towered into the upper limits of the ceiling. Rockets on display included the towering 72-foot "Scout."

On the encircling balcony, seven screens and soundtracks provided seven small theatres where films of manned and unmanned space flights are shown continually throughout the day and evening.

THROUGH ALL THIS, more than 5,000 pupils and smaller numbers of adults . . . the latter technically not supposed to attend during "school hours" but never refused admittance . . . milled from one exhibit to another. Neither the crowding nor the confusion seemed to daunt the majority of youngsters; for the most part, they just kept on looking, listening and wishing for more time.

(Cont'd. on next page)

CLEVELAND PLAIN DEALER
November 29, 1962



Using a wide-angle lens and a 35-mm camera plus old clothes suited to climbing through the ceiling spaces of Public Hall, Ray Matjasic, Plain Dealer photographer, found himself above the stars, looking down on rockets, satellites, and people at the Space Science Fair.

CLEVELAND PLAIN DEALER
November 2?, 1962

Career guidance facts were asked by three high school girls from Leavittsburg, O., at the Space Science Fair. Explanations were given by two Thompson Ramo Wooldridge, Inc., staff members (from left), Robert Hamilton and Paul Schwegler. The girls, left to right, are Sandra Uncapher, Kathleen Case and Donna Yeakel.
Plain Dealer Photo (Norbert J. Yassanye)

Visitors Get Counseling at Fair

The Space Science Fair is not "here today and gone next week," in one respect.

Two offices at Public Hall are taking care of future needs of visitors.

ONE OF THEM, operated by the Cleveland Technical Societies Council, offers guidance counseling for students interested in technical education or work.

Staffing it are representatives of Case Institute of Technology, Fenn College, John Carroll University, Thompson Ramo Wooldridge, Inc. and the B. F. Goodrich Corp.

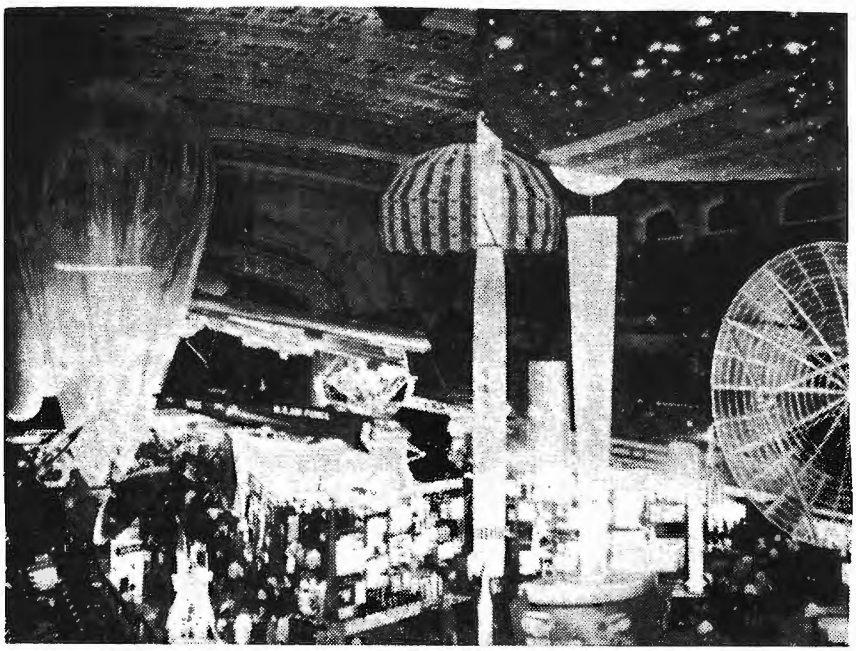
IN ANOTHER office, next door, the National Aeronautics and Space Administration is offering material for school teachers. NASA is sponsoring the fair with The Plain Dealer.

Teachers can sign up there for a kit of materials on the space agency or may have their names put on a mailing list for a fact sheet published regularly.

CLEVELAND CALL POST
December 1, 1962

EAST TECHNICAL High School students Diann Mauldin Gloria Reffin, Claudie Moore and Allen Washington get first look at outfitted "astronaut" at Space-Science Fair. *(Staff photo by Len Watkins)*

DOVER DAILY REPORTER
November 28, 1962



SPACE PANORAMA. This over-all shot of the Space Science Fair in Cleveland's Public Auditorium shows man's achievements in space technology. The night sky at the top right duplicates the stars seen by the naked eye. The large radar dish (bottom right) is one of the smaller units used in NASA's worldwide tracking network for Project Mercury. In the center is a Scout rocket, NASA's only solid propellant vehicle standing 72-feet high. Behind it are a full-scale model of a giant F-1 engine and NASA's research airplane, the X-15. A balloon and mercury recovery parachute frame the Rogallo wing which support a Gemini Capsule. The inflatable Rogallo wing will allow Gemini pilots to fly their 2-man spacecrafts back to controlled landings. The exhibit is so complex that only an eyewitness can do it justice.

SPACE GREETER. This 8-foot globe, depicting the space activity around the world, welcomes the flood of visitors at the Space Science fair in Cleveland's Public Auditorium. The fair, sponsored by the National Aeronautics and Space Administration and the Cleveland Plain Dealer, concludes its 10-day run Sunday. Successful orbits and space probes of all nations are scaled on the globe at their proper inclinations and transparancies around its base give details of objectives and results of each mission. The free exhibit, open from 10 a.m. to 10 p.m. Saturday and Sunday and from 4 to 10 p.m. weekdays, contains some phase of the nation's past, present and future space plans.

WASHINGTON C. H.
RECORD HERALD
Washington C.H.,O.
December 3, 1962

Space Science Fair Attracts 375,000

CLEVELAND (AP) — The 10-day Space Science Fair here sponsored by the National Aeronautics and Space Administration and the Cleveland Plain Dealer drew an attendance of 375,738, a NASA spokesman says.

The spokesman said a decision will be reached early next week on whether to continue the fair in some other city. The fair closed Sunday.

NEWARK ADVOCATE
Newark, Ohio
December 3, 1962

May Continue Fair In Some Other City

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DAILY REPORTER
Dover, Ohio
December 3, 1962

Space Fair Is Hit

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Aerojet-General Corp.
Aeronutronic Div., Ford Motor Co.
American Museum of Natural History
Astro-Electronics Div., R.C.A.
Atomic Energy Commission
Atomics International
Ball Brothers Research Corp.
B. F. Goodrich Co.
The Boeing Co.
The Budd Co.
Case Institute of Technology
Chicago International Trade Fair
Cleveland Clinic
Cleveland Health Museum
The Dann Co.
Dave Clark, Inc.
Douglas Aircraft Co.
Fairchild Strator Corp.
Garrett Corp.
General Electric Co.
Goodyear Aircraft Co.
Harshaw Chemical Co.
Hughes Aircraft Co.
Kennedy Antenna Div., Electronic Specialty Co.
Lear Siegler Co.
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National Carbon Co.
National Geographic Society
NASA Ames Research Center
NASA Flight Research Center
NASA Goddard Space Flight Center
NASA Headquarters
NASA Jet Propulsion Laboratory
NASA Langley Research Center
NASA Launch Operations Center
NASA Manned Spacecraft Center
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