NPS Form 10-900
(7-81)

United States Department of the Interior
National Park Service

National Register of Historic Places Inventory—Nomination Form

For NPS use only
received
date entered

See instructions in *How to Complete National Register Forms*
Type all entries—complete applicable sections

1. Name

historic Space Environment Simulation Laboratory (SESL)

and/or common Space Environment Simulator Laboratory (SESL)

2. Location

street & number Lyndon B. Johnson Space Center ___ not for publication

city, town Houston ___ vicinity of **congressional district**

state Texas **code** 48 **county** Harris **code** 201

3. Classification

Category	Ownership	Status	Present Use	
___ district	_X_ public	___ occupied	___ agriculture	___ museum
___ building(s)	___ private	___ unoccupied	___ commercial	___ park
_X_ structure	___ both	___ work in progress	___ educational	___ private residence
___ site	**Public Acquisition**	**Accessible**	___ entertainment	___ religious
___ object	___ in process	_X_ yes: restricted	___ government	___ scientific
	___ being considered	___ yes: unrestricted	___ industrial	___ transportation
		___ no	___ military	_X_ other: Inactive

4. Owner of Property

name National Aeronautics and Space Administration (NASA)

street & number

city, town Washington ___ vicinity of **state** D.C. 20546

5. Location of Legal Description

courthouse, registry of deeds, etc. National Aeronuatics and Space Administration (NASA)

street & number Real Property Management Office Code NXG

city, town Washington **state** D.C. 20546

6. Representation in Existing Surveys

title None **has this property been determined eligible?** ___ yes ___ no

date ___ federal ___ state ___ county ___ local

depository for survey records

city, town **state**

7. Description

Condition		Check one	Check one
X excellent	___ deteriorated	X unaltered	X original site
___ good	___ ruins	___ altered	___ moved date _____
___ fair	___ unexposed		

Describe the present and original (if known) physical appearance

The Space Environment Simulation Laboratory (SESL) is in building 32 at the Lyndon B. Johnson Space Center (JSC) in Houston, Texas. The SESL contains two large man-rated chambers, instrumentation and data systems, and support facilities.

Chamber A is the largest of the JSC thermal-vacuum test facilities. Its usable test volume and high-fidelity space simulation capabilities are adaptable to thermal-vacuum tests of a wide variety of test articles.

The major structural elements of the chamber are the rotatable floor, the 40 foot diameter access door, and the dual manlocks at the floor level and at the 31 foot level.

The chamber floor, which is 45 feet in diameter, can be rotated by manual control $\pm$ 180° about its vertical axis at continuously variable angular velocities up to a maximum of 0.8 rpm.

Test articles are normally inserted into the chamber by means of overhead cranes and a dolly and track structure that extends from the high-bay area into the chamber. Two 100,000 lb cranes are used outside the chamber and four independently operated 50,000 lb cranes, lowered through removable sections of the top head, are employed inside the chamber.

The dual manlocks provide a means for the test crew to move from ambient air pressure to the thermal-vacuum environment and back. They also provide for the maintenance of rescue crewmen at convenient intermediate pressures during manned test operations. When the inner door is bolted, either of the manlocks can be used as an altitude chamber for independent tests.

In Chamber A, a test article can be irradiated from either the top or the side with high-fidelity solar simulation. The solar simulation modules can be arranged in various dimensional configurations to meet most requirements. This chamber can also generate thermal plasmas simulating those found in low Earth orbit.

Chamber B, the smaller man-rated chamber, has the same basic capability as Chamber A and can accommodate a variety of smaller scale tests more economically and with faster response. Major structural elements of the chamber are the removable top head, the fixed chamber floor, and a dual manlock at the floor level.

The load-bearing floor area is 20 feet in diameter and will support a concentric load of 75,000 lb.

Two rolling bridge cranes with a capacity of 100 000 lb. are used to remove the chamber top and to insert large test articles.

The dual manlock provides easy access to the test articles as well as a means of transporting test crewmen to the test environment and back during manned tests. The manlock can also be used as an altitude chamber for independent tests. In addition, one manlock is equipped with a water deluge system and other features that permit its use for manned operations with oxygen-rich residual atmospheres.

A solar simulation array, mounted on the top head, is modular in design to facilitate changes in location and beam size to accommodate test requirements.

The solar simulation modules are on-axis with xenon lamp sources. The source and collection optics are outside the chamber, with the collimating optics inside the chamber. Solar incident angles other than vertical can be achieved by installing mirrors in the chamber to redirect the solar beam.[1]

Only Chambers A and B are within the boundary of the National Historic Landmark.

8. Significance

Period	Areas of Significance—Check and justify below				
___ prehistoric	___ archeology-prehistoric	___ community planning	___ landscape architecture	___ religion	
___ 1400–1499	___ archeology-historic	___ conservation	___ law	___ science	
___ 1500–1599	___ agriculture	___ economics	___ literature	___ sculpture	
___ 1600–1699	___ architecture	___ education	___ military	___ social/ humanitarian	
___ 1700–1799	___ art	X engineering	___ music	___ theater	
___ 1800–1899	___ commerce	___ exploration/settlement	___ philosophy	___ transportation	
X 1900–	___ communications	___ industry	___ politics/government	X other (specify) Space Exploration	
		___ invention			

Specific dates 1965-Present **Builder/Architect** NASA

Statement of Significance (in one paragraph)

The Space Environment Simulation Laboratory (SESL) has a significant association with the manned spacecraft program of the United States. The SESL was designed, built, and used to conduct thermal-vacuum testing for all United States manned spacecraft of the Apollo-era. The large size of both chambers in the SESL meant that full scale flight hardware could be tested for a variety of design and development problems involving such factors as operating temperatures, fluid leak rates, changes in absorptive or emissive properties of thermal coatings and other materials. This testing was absolutely essential to man rate flight hardware. The safety of the astronauts and the success of the manned space program depended on information that resulted from these tests in the SESL.

Since it was constructed in 1965, the SESL has tested all Apollo command and service modules, Apollo lunar modules, spacesuits for extra-vehicular activity, the Skylab/Apollo telescope mount system, various Space Shuttle systems, the Apollo/Soyuz docking module, and various large scale scientific satellite systems such as the parabolic reflector subsystem of the Applications Technology Satellite. The thermal vacuum testing done at the SESL since 1965 has been a significant factor contributing to the success of both the manned and unmanned space program of the United States.

Footnotes

1. Thermal Vacuum Laboratories User Guide (Houston, Texas: Lyndon B. Johnson Space Center, 1981), pp. 4-5.

9. Major Bibliographical References

See continuation sheets

10. Geographical Data

Acreage of nominated property Less than 1 acre

Quadrangle name League City **Quadrangle scale** 1:24,000

UMT References

	Zone	Easting	Northing		Zone	Easting	Northing
A	15	297700	3271740	B			
C				D			
E				F			
G				H			

Verbal boundary description and justification

The boundary of the Space Environmental Simulation Laboratory is defined by the outside perimeters of both Chambers A and B located within Building 32 at the Lyndon B. Johnson Space Center.

List all states and counties for properties overlapping state or county boundaries

state	code	county	code
state	code	county	code

11. Form Prepared By

name/title Harry A. Butowsky

organization National Park Service **date** May 15, 1984

street & number Division of History **telephone** (202) 343-8168

city or town Washington, D.C. 20240 **state**

12. State Historic Preservation Officer Certification

The evaluated significance of this property within the state is:

___ national ___ state ___ local

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

State Historic Preservation Officer signature

title date

For NPS use only

I hereby certify that this property is included in the National Register

date

Keeper of the National Register

Attest: 379 date

Chief of Registration

Bibliography

Brooks, Courtney G., Grimwood, James M., and Swenson, Loyd S. Chariots for Apollo: A History of Manned Lunar Spacecraft. Washington, D.C.: National Aeronautics and Space Administration, 1979.

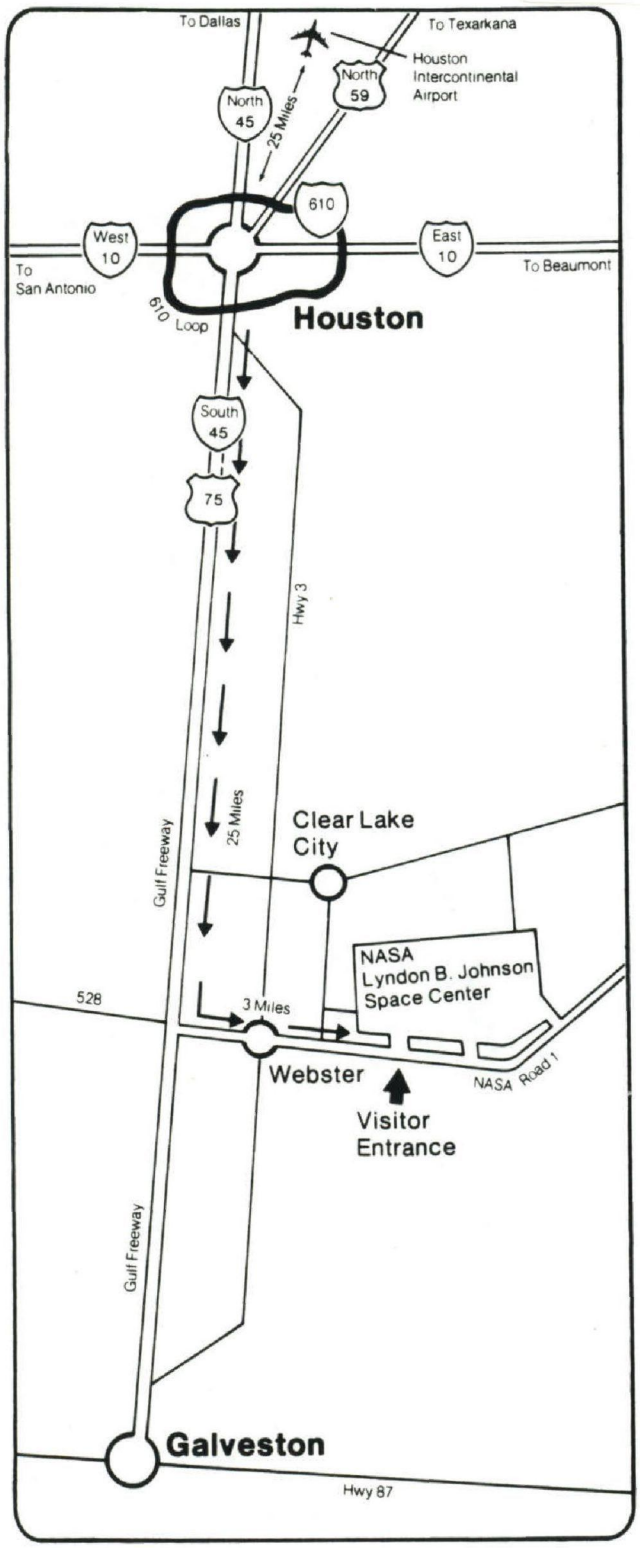
Brooks, Courtney G., Ertel, Ivan D., and Newkirk, Roland W. The Apollo Spacecraft: A Chronology Vol. 1V. Washington, D.C.: National Aeronautics and Space Administration, 1978.

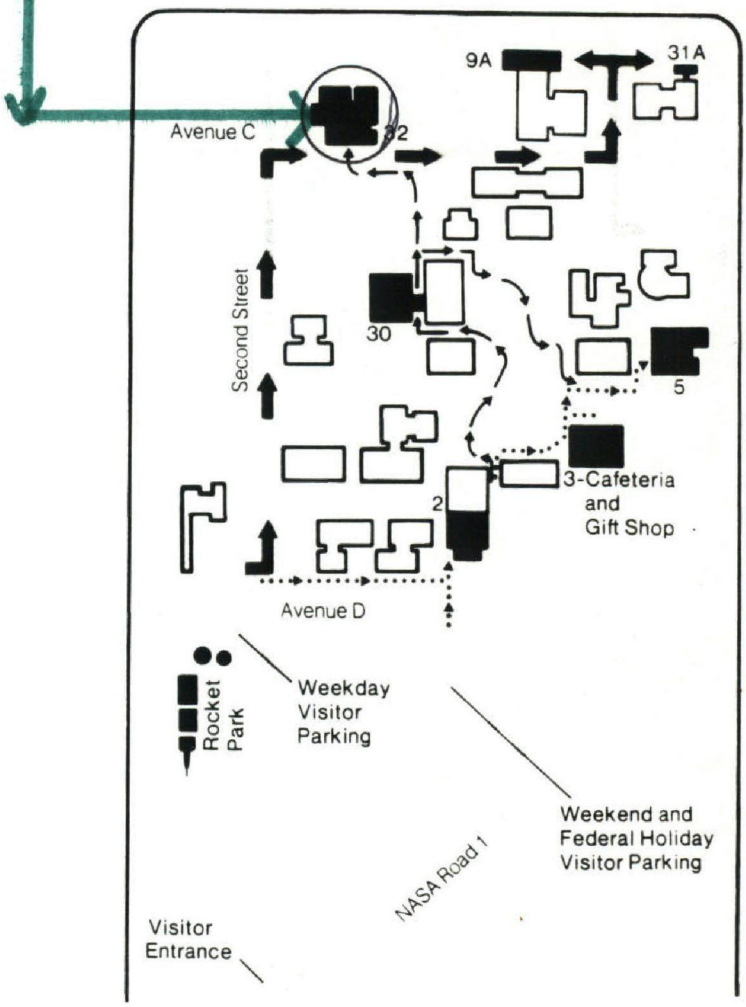
Major Test Facilities of the Engineering and Development Directorate. Houston, Texas: Manned Spacecraft Center, 1966.

Technical Facilities Catalog Vol. 11. Washington, D.C.: National Aeronautics and Space Administration, 1974.

Thermal Vacuum Laboratories User Guide. Houston, Texas: Lyndon B. Johnson Space Center, 1981.

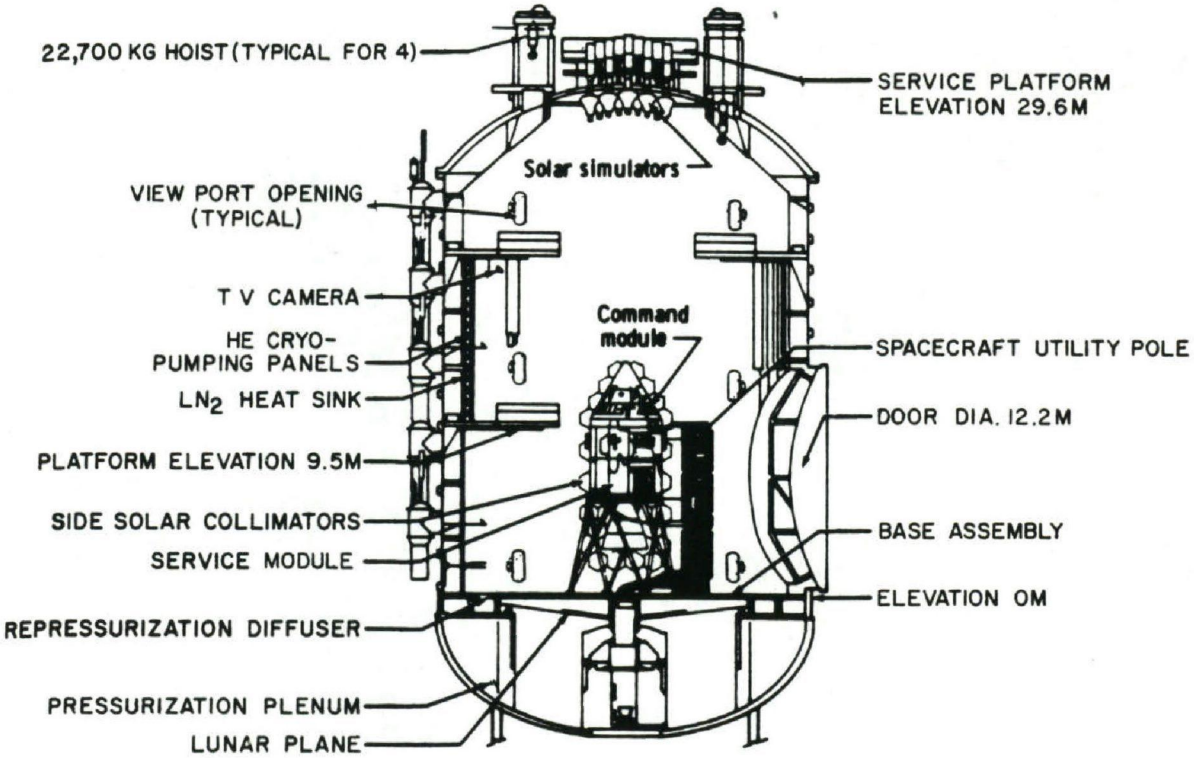
Space Environment Simulation Laboratory
Building 32
15/297700/3271740





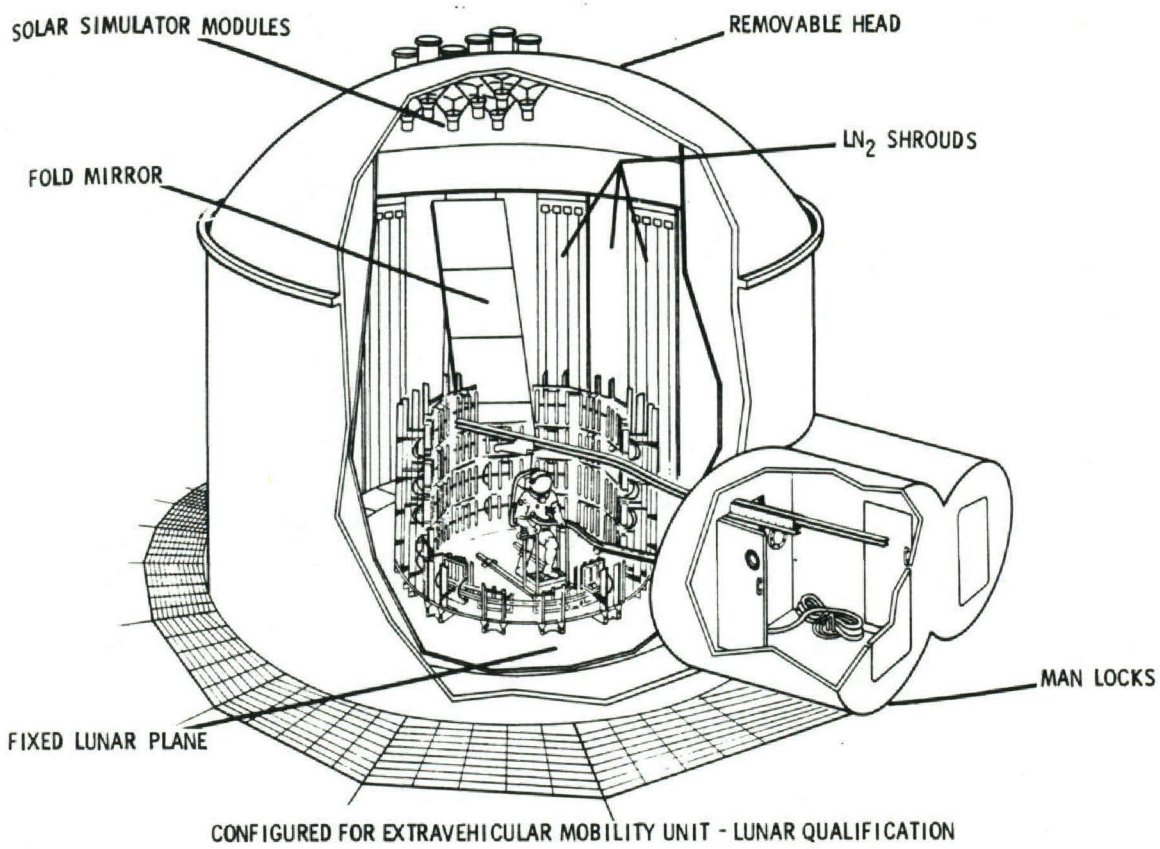
Bldg.
- 2 - Visitor Center
- 3 - JSC Cafeteria and Gift Shop
- 5 - Mission Simulation and Training
- 9A - Space Shuttle Orbiter Training
- 30 - Mission Control Center
- 31A - Lunar Sample Building
- 32 - Space Environment Simulation Laboratory

Space Environmental Simulation Laboratory Chamber A



Source: Technical Facilities Catalog Vol. 11, 1974, p. 8-103.

Space Environmental Simulation Laboratory Chamber B

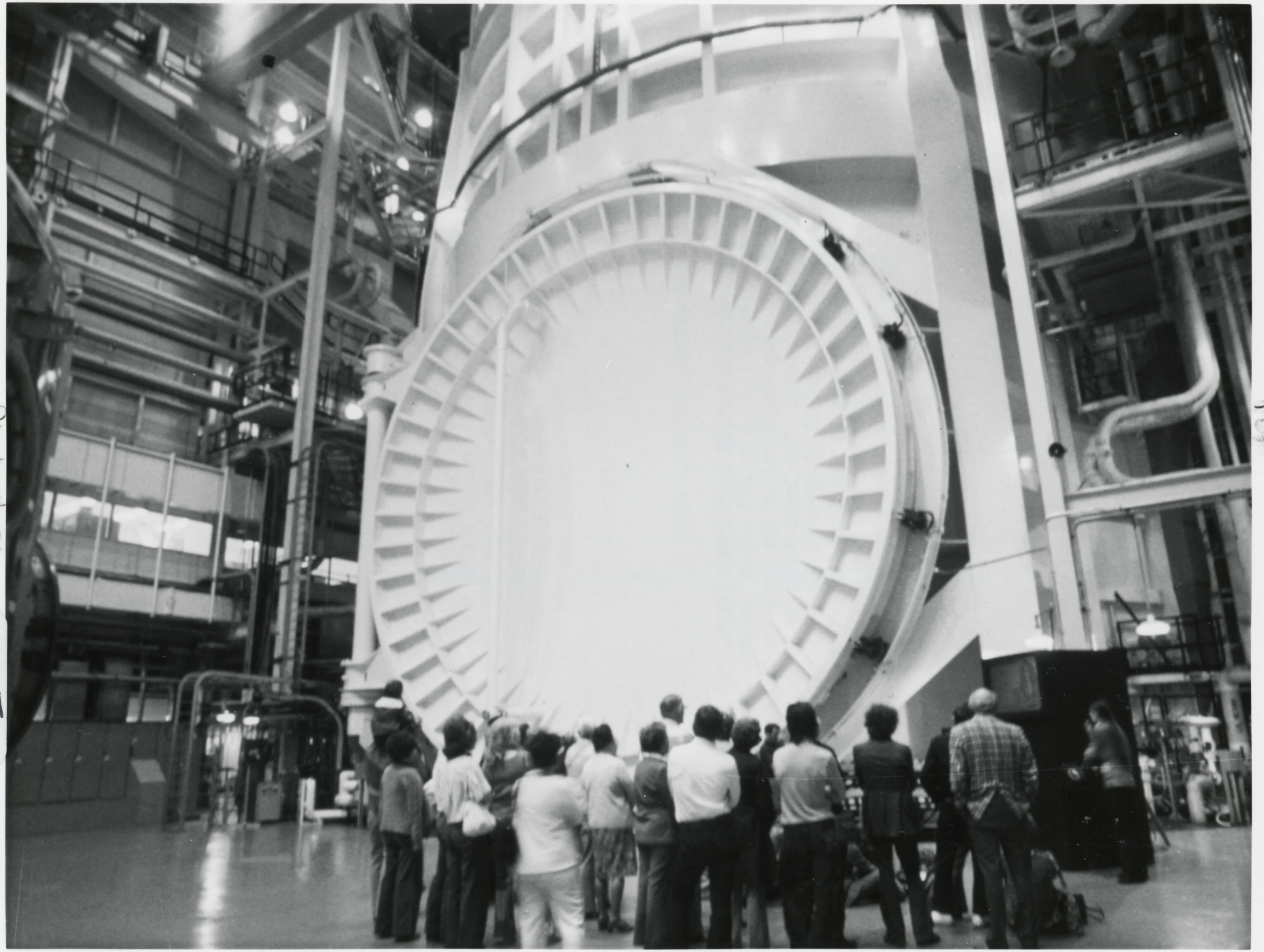


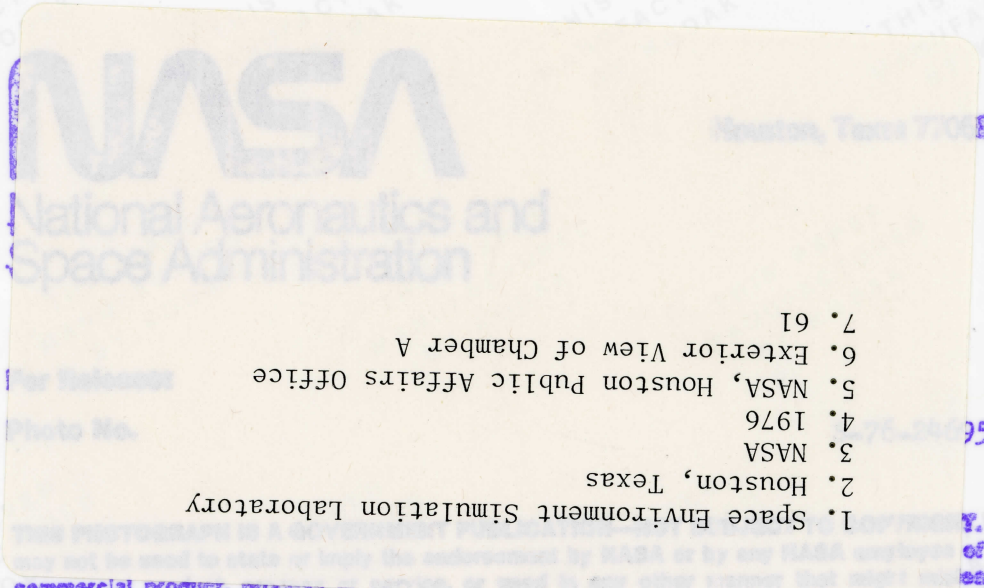
Source: Technical Facilities Catalog Vol. 11, 1974, p. 8-107.

NASA National Aeronautics and Space Administration

S- 76- 24695

Lyndon B. Johnson Space Center
Houston, Texas 77058





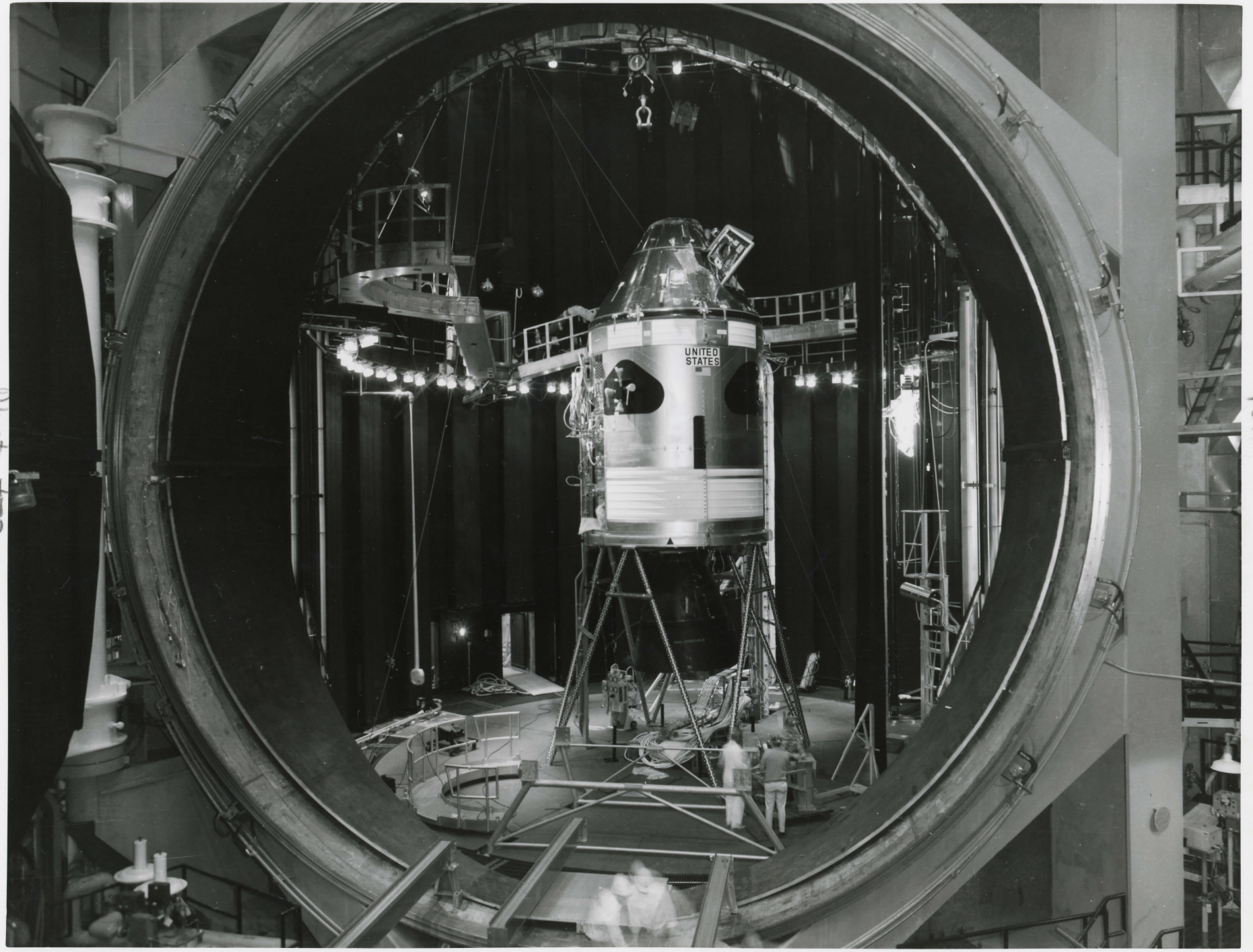
COLOR

20 JULY 1976 S-76-24695

JOHNSON SPACE CENTER, HOUSTON, TEXAS

SPACE ENVIRONMENT SIMULATION LABORATORY (BLDG. 32) AT JSC -- Sixty-five tourists listen as JSC escort Beverly Whitnell explains the various functions of the space environmental space laboratory (SESL). The large facility, housing several vacuum chambers in support of NASA hardware testing, is one of two JSC facilities which visitors can tour on a reserved, guided basis. Several other facilities are open to the public on a self-guided, walk-through basis.

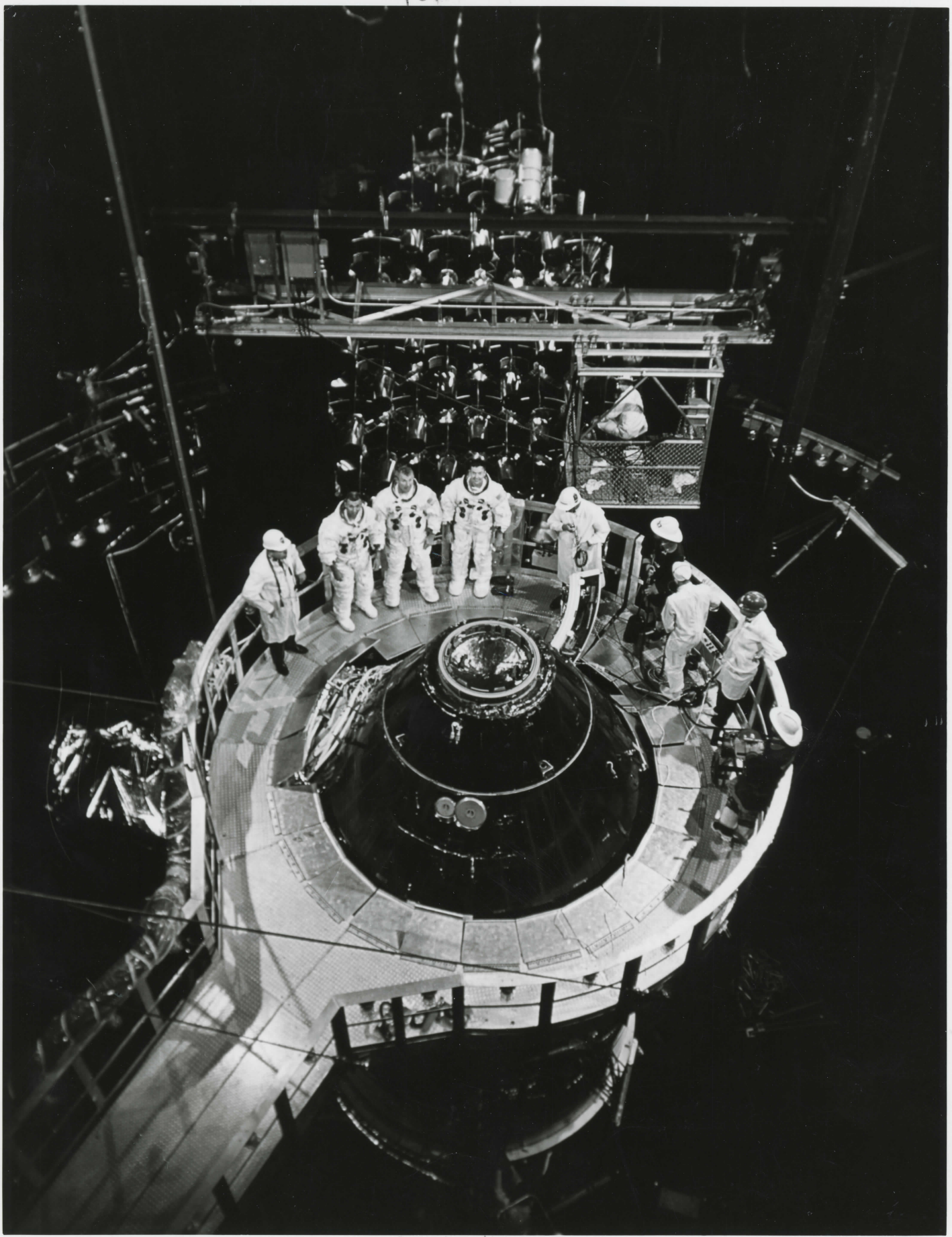
NASA
S-68-34421



45 SPACE

1. Space Environment Simulation Laboratory
2. Houston, Texas
3. NASA
4. 1968
5. NASA, Houston Public Affairs Office
6. Interior View of Chamber A with Apollo Spacecraft
7. 62

Top



NASA

389

Photo # 73

68-37433

MANNED SPACECRAFT CENTER

HOUSTON, TEXAS

OFFICIAL PHOTOGRAPH

COLOR

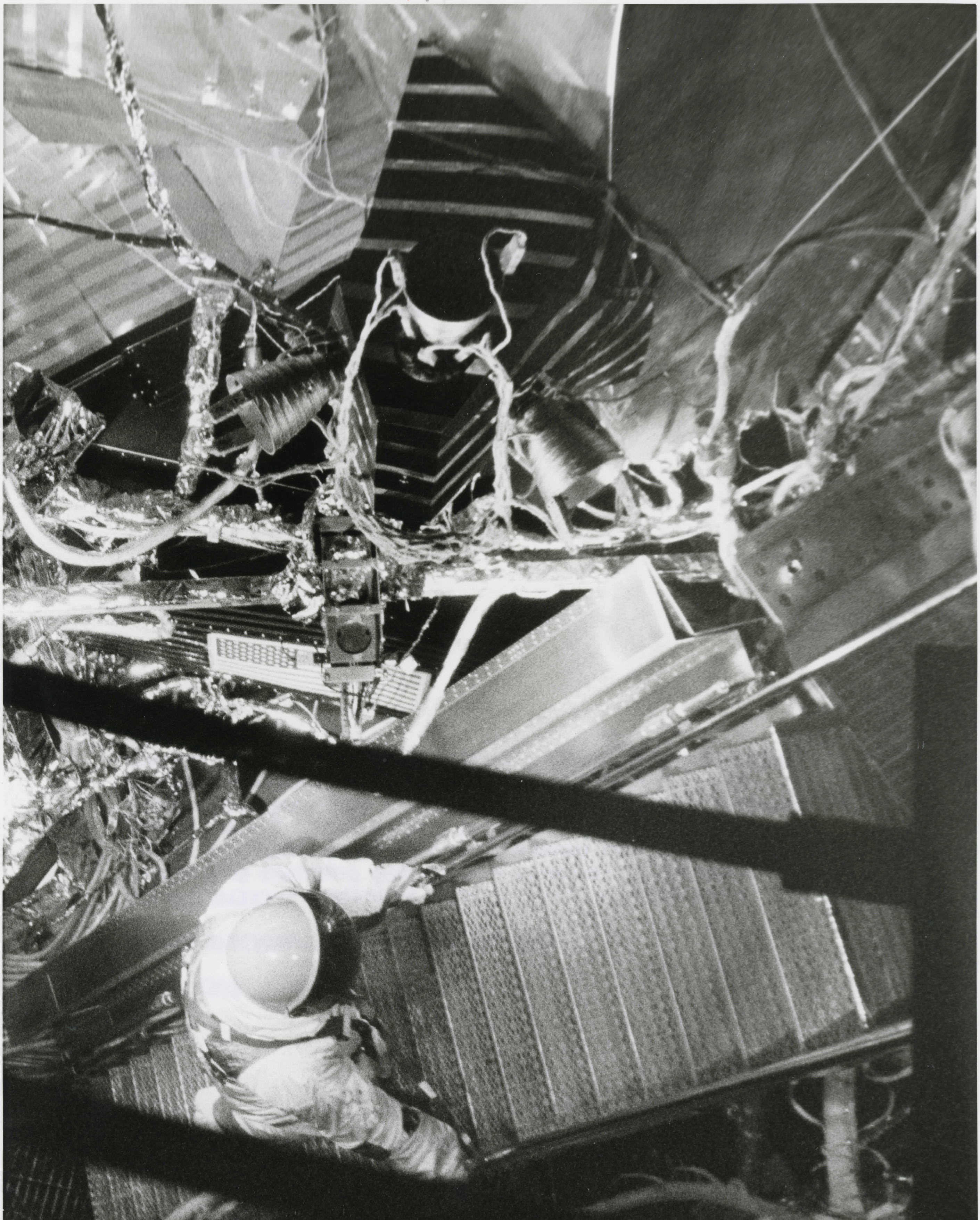
11 JUNE 1968 S-68-37430

MANNED SPACECRAFT CENTER, HOUSTON, TEXAS

APOLLO 2TV-1 TEST------High-angle interior view of Chamber "A," Space Environment Simulation Laboratory, Building 32, showing three test subjects preparing to ingress Apollo Spacecraft 2TV-1 for a "run-through" in preparation for the scheduled 8-day manned thermal-vacuum test. The three suited test subjects (left to right) are Astronaut Joe H. Engle, Astronaut Vance D. Brand, and Scientist-Astronaut Joseph P. Kerwin.

1. Space Environment Simulation Laboratory
2. Houston, Texas
3. NASA
4. 1968
5. NASA, Houston Public Affairs Office
6. High-angle interior view of Chamber A showing three astronauts preparing to enter Apollo Spacecraft,2TV-1.
7. 63

TOP



NASA
S-68-32005

PHOTO#74

391

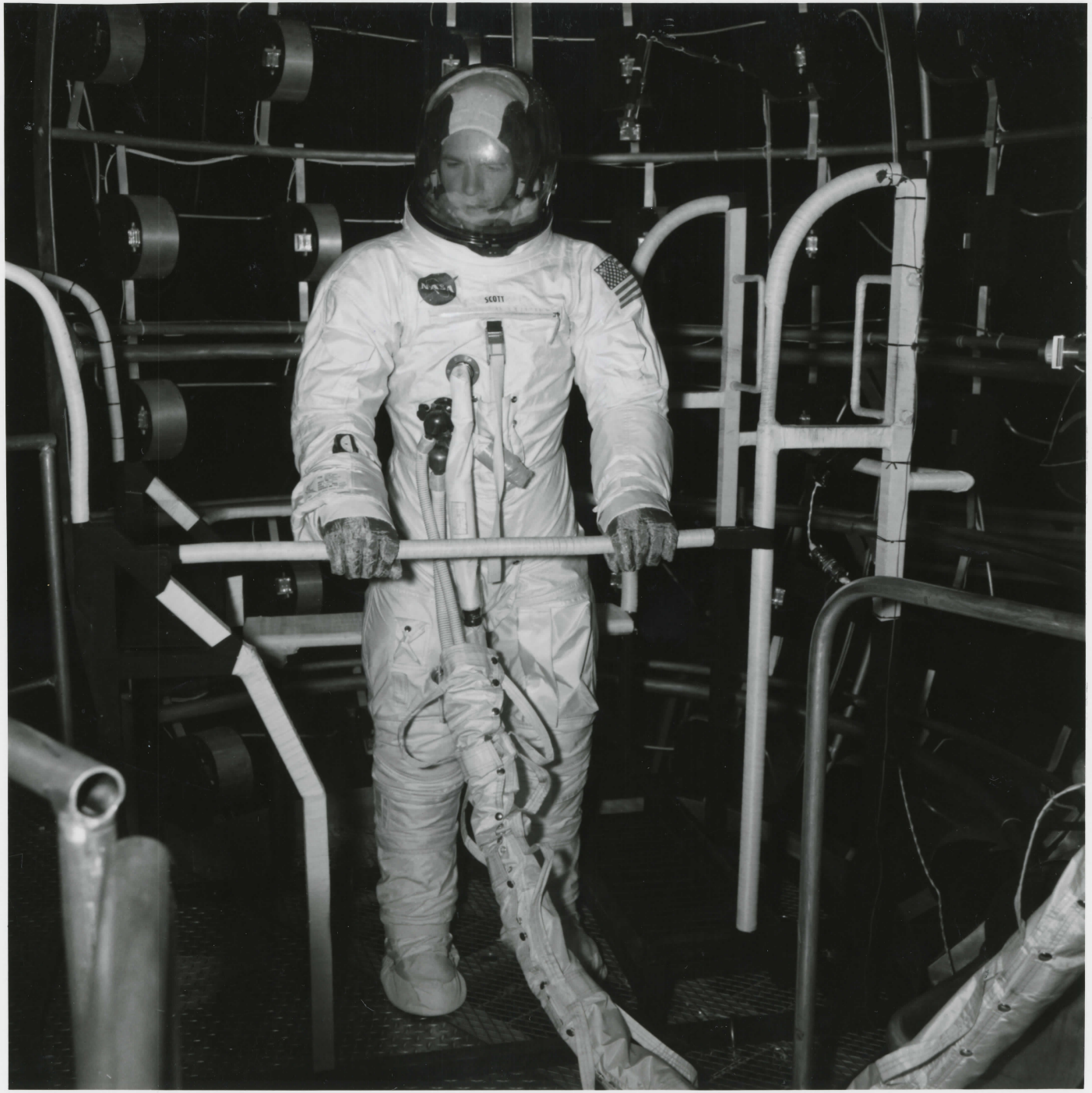
B & W

2 MAY 1968

MANNED SPACECRAFT CENTER, HOUSTON, TEXAS

LTA-8 TESTING----Astronaut James B. Irwin entering Lunar Module Test Article-8 (LTA-8) in a rehearsal of ingress-egress procedures to be used in subsequent manned thermal-vacuum testing of the vehicle in Chamber B of MSC's Space Environment Simulation Laboratory, Building 32. The ingress-egress demonstration was conducted May 2, 1968, with the chamber and test vehicle at ambient temperature and pressure.

1. Space Environment Simulation Laboratory
2. Houston, Texas
3. NASA
4. 1968
5. NASA, Houston Public Affairs Office
6. Astronaut James B. Irwin entering Lunar Module Test Article-8 in Chamber B
7. 64



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
HOUSTON, TEXAS 77058

FOR RELEASE:

PHOTO NO. S-68-55152

COLOR

12 DEC 1968

MANNED SPACECRAFT CENTER, HOUSTON, TEXAS

APOLLO 9 TRAINING----Astronaut David R Scott, command module pilot of the Apollo 9 (Spacecraft 104/Lunar Module 3/Saturn 504) space mission, is seen inside Chamber "A," Space Environment Simulation Laboratory, Building 32, participating in dry run activity in preparation for extravehicular activity training scheduled in Chamber "A." The purpose of the scheduled training is to familiarize the crewmen with the operation of EVA equipment in a simulated space environment. In addition, metabolic and workload profiles will be simulated on each crewman. Scott will receive training in the vacuum chamber on December 20th on contingency operation of the intravehicular pressure suit in simulated space thermal-vacuum conditions.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

LEAGUE CITY QUADRANGLE
TEXAS
7.5 MINUTE SERIES (TOPOGRAPHIC)

6943 II NW (PASADENA)
6943 II NE (LA PORTE)
7043 III NW (MORGANS POINT)
6943 I SW (FRIENDSWOOD)
7043 III SW (BACLIFF)
6943 I NW (ALGOA)
7043 V NW (TEXAS CITY)

95°07′30″ 29°37′30″ 95°00′ 29°30′

Space Environment Simulation Laboratory
UTM References:
15/297700/3271740

Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1975. Field checked 1976. Map edited 1982
Selected hydrographic data compiled from NOS/NOAA chart 11326 (1981)
This information is not intended for navigational purposes

Projection and 10,000-foot grid ticks: Texas coordinate system, south central zone (Lambert conformal conic)
1000-meter Universal Transverse Mercator grid, zone 15
1927 North American datum
To place on the predicted North American Datum 1983 move the projection lines 21 meters south and 21 meters east as shown by dashed corner ticks

Fine red dashed lines indicate selected fence lines
Red tint indicates areas in which only landmark buildings are shown
A portion of this map lies within a subsidence area
Contouring based on 1973 adjustment of verical control

UTM GRID AND 1982 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
GN MN 1°01′ 18 MILS 6° 107 MILS

Water stages in this area vary with meteorological conditions
Approximate limits of occasional inundation shown by dashed blue lines where mean high water is undetermined for lack of visual evidence
Dotted blue lines indicate the approximate limits of low water

There may be private inholdings within the boundaries of the National or State reservations shown on this map

SCALE 1:24 000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

CONTOUR INTERVAL 5 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
DEPTH CURVES AND SOUNDINGS IN FEET-GULF COAST LOW WATER DATUM
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE MEAN RANGE OF TIDE IS NEGLIGIBLE

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

TEXAS
QUADRANGLE LOCATION

2995–411

ROAD CLASSIFICATION
Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Unimproved road
Interstate Route U. S. Route State Route

LEAGUE CITY, TEX.
N2930–W9500/7.5

1982

DMA 6943 II SE–SERIES V882

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1982

DEPARTMENT of the INTERIOR
news release

NATIONAL PARK SERVICE

For Release January 8, 1986 Anita Clevenger 202/343-7394

INTERIOR DESIGNATES 22 "MAN IN SPACE" NATIONAL HISTORIC LANDMARKS

Secretary of the Interior Don Hodel today announced that he has designated 22 properties in Alabama, California, Maryland, Mississippi, New Mexico, Ohio, Texas and Virginia, as national historic landmarks representing the early years of the American space program.

"These designations represent the best, most intact and most important examples of the technology which will interpret for future generations the early years of the American space program," Hodel said.

The Interior Department's National Park Service, as directed by Congress (P.L. 96-344), studied approximately 350 sites associated with the early space explorations for preservation and interpretation. "A Man in Space Theme Study" was initiated to consider resources relating to the following general subthemes: technical foundations before 1958; the effort to land a man on the moon; the exploration of the planets and solar system; and the role of scientific and communications satellites.

The Historic Sites Act of 1935 authorizes the Secretary to designate as national historic landmarks properties identified as having significance to the Nation. National historic landmarks are entered in the National Register of Historic Places upon designation.

DOI

(Attached is a list of the 22 national historic landmarks by category.)

For further information contact Dr. Harry Butowsky, Historian, telephone: 202/343-8155.

DESIGNATED NATIONAL HISTORIC LANDMARKS

National Advisory Committee for Aeronautics Wind Tunnels

1. Variable Density Tunnel, Langley Research Center, Hampton, Va.
2. Full Scale Tunnel (Langley)
3. Eight-Foot High Speed Tunnel (Langley)
4. Unitary Plan Wind Tunnel, Ames Research Center, Moffett Field, Calif.

These sites represent the technological base of aeronautical research created by the National Advisory Committee for Aeronautics facilities.

Rocket Engine Development Facilities

5. Rocket Engine Test Facility, Lewis Research Center, Cleveland, Ohio
6. Zero-Gravity Research Facility (Lewis)
7. Spacecraft Propulsion Research Facility (Lewis Plum Brook Operations Division)

These represent the important role of the Lewis Research Center in developing hydrogen as a fuel for the Centaur and Saturn V rockets.

Rocket Engine Test Stands

8. Redstone Test Stand, George C. Marshall Space Flight Center, Huntsville, Ala.
9. Propulsion and Structural Test Facility (Marshall)
10. Rocket Propulsion Test Complex, National Space Technology Laboratories, Bay St. Louis, Miss.

These facilities represent the role of the Marshall Space Flight Center in the building and testing of actual space flight rockets.

Rocket Test Facility

11. Saturn V Dynamic Test Stand, George G. Marshall Space Flight Center, Huntsville, Ala.

This facility illustrates another facet of the building and testing and man-rating of the Saturn V Rocket.

Launch Pads

12. Launch Complex 33, White Sands Test Facility, New Mexico

Launch Complex 33 was designated because of its close association with the testing of the V-2 rocket and the origins of the American Rocket Program.

Apollo Training Facilities

13. Lunar Landing Research Facility, Langley Research Center, Hampton, Va
14. ~~Rendezvous Docking Simulator (Langley)~~
15. Neutral Buoyancy Space Simulator, George C. Marshall Space Flight Center, Huntsville, Ala.

These facilities were designated because of their association with training programs necessary to prepare American astronauts to land on the moon.

Apollo Hardware Test Facility

16. Space Environment Simulation Laboratory, Lyndon B. Johnson Space Center, Houston, Texas

This Laboratory is important because it was used to man-rate and test the integrity of the Apollo Command and Service Module, Lunar Module, and spacesuits under simulated space conditions here on Earth.

Unmanned Spacecraft Test Facilities

17. Spacecraft Magnetic Test Facility, Goddard Space Flight Center, Greenbelt, Md.
18. Twenty-Five-Foot Space Simulator, Jet Propulsion Laboratory, Pasadena, Calif.

These facilities illustrate the extensive ground support testing facilities needed to accomplish the American unmanned space program--the exploration of the near and deep space environment.

Tracking Stations

19. Pioneer Deep Space Tracking Station, Goldstone Tracking Station, Calif.

The station was the first antenna to support NASA's unmanned exploration of deep space.

Mission Control Centers

20. Space Flight Operations Facility, Jet Propulsion Laboratory, Pasadena, Calif.
21. Apollo Mission Control, Lyndon B. Johnson Space Center, Houston, Texas

These sites are the very heart and soul of both the American Manned and Unmanned Space Programs.

Other Support Facilities

22. Rogers Dry Lake, Edwards Air Force Base, Edwards, Calif.

Although a natural resource, Rogers Dry Lake was designated because of its association with flight testing of advanced aircraft that opened the way to space.

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

Log #15173

Memorandum

TO: The Secretary

FROM: ACTING DEPUTY Assistant Secretary for Fish and Wildlife and Parks

9/16/85

SUBJECT SUMMARY: Request to Designate as National Historic Landmarks 22 properties in the Man in Space National Historic Landmarks Program Theme Study

DISCUSSION: The National Park System Advisory Board, meeting on May 3, 1985, recommended that the twenty-two properties in the Man in Space theme study named on the attached list be designated as National Historic Landmarks. In accordance with regulations, the Board examined the studies supporting nomination and found that the subject properties meet the criteria of the National Historic Landmarks Program. Except as noted in the attached report on the Advisory Board meeting, the Board voted unanimously to recommend designation of these properties.

Brief descriptions of these properties and comments of interested parties are contained in Appendixes A and C respectively of the attachments. A summary report of the Advisory Board meeting is being prepared and will be transmitted to you when completed. In its absence, actions of the Board relevant to the following recommendations are described here and in the attached "Recommendations of National Historic Landmark Designations by the National Park System Advisory Board ...."

OPTIONS:

1. To designate the 22 properties on the attached list as National Historic Landmarks.

Your Advisory Board found that these properties meet the prescribed criteria and recommended that they be designated National Historic Landmarks. The criteria are the sole legal basis for designation.

2. To designate only those properties whose owners have not objected to designation.

Air Force objections to designation of the two Man in Space properties under its jurisdiction, Space Launch Complex 2W at Vandenberg Air Force Base and Rogers Dry Lake at Edwards Air Force Base have been resolved. Representatives

Prepared by: Laura Feller ext: 343-8167

of the National Park Service and the Air Force have reached mutually acceptable agreements on these two nominations. As a result, we are not requesting designation of SLC 2W at this time, and the Air Force has agreed to support designation of Rogers Dry Lake with a revised boundary.

In a letter of July 22, 1985, the National Aeronautics and Space Administration objected to designation of all properties under its jurisdiction. Those are the remaining Man in Space properties other than Launch Complex 33, which is administered by the Army. (This letter is in Appendix B.) While contending that some of its properties do not meet the Landmarks Program criteria, NASA appears primarily concerned about adverse effects on its operations. I believe that such concerns are unwarranted. In any case they should not influence your decision, which should be guided solely by your determination that the properties either do or do not meet the criteria.

3. To designate none of the 22 properties.

This option, like the partial non-designation option above, would require your finding that the properties do not meet the Landmarks Program criteria.

RECOMMENDATION: In light of the discussion above and the recommendation of your Advisory Board, I recommend that you approve Option 1.

Option 1: Approve Ann McLaughlin Date 10-3-85

Option 2: Approve _____ Date _____

Option 3: Approve _____ Date _____

Attachments

Properties in the Man in Space Theme Study
Recommended for Designation as National Historic Landmarks

1. Variable Density Tunnel (Langley Research Center, Hampton, VA)
2. Full Scale Tunnel (Langley)
3. Eight-Foot High Speed Tunnel (Langley)
4. Unitary Plan Wind Tunnel (Ames Research Center, Moffett Field, CA)
5. Rocket Engine Test Facility (Lewis Research Center, Cleveland, OH)
6. Zero-Gravity Research Facility (Lewis)
7. Spacecraft Propulsion Research Facility (Lewis Plum Brook Operations Division)
8. Redstone Test Stand (George C. Marshall Space Flight Center, AL)
9. Propulsion and Structural Test Facility (Marshall)
10. Rocket Propulsion Test Complex (National Space Technology Laboratories, MS)
11. Saturn V Dynamic Test Stand (Marshall)
12. Launch Complex 33 (US Army White Sands Test Facility, NM)
13. Lunar Landing Research Facility (Langley)
14. Rendezvous Docking Simulator (Langley)
15. Neutral Buoyancy Space Simulator (Marshall)
16. Space Environment Simulation Laboratory (Lyndon B. Johnson Space Center, Houston, TX)
17. Spacecraft Magnetic Test Facility (Goddard Space Flight Center, Greenbelt, MD)
18. Twenty-Five-Foot Space Simulator (Jet Propulsion Laboratory, Pasadena, CA)
19. Pioneer Deep Space Station (Goldstone Deep Space Communications Complex, CA)
20. Space Flight Operations Facility (Jet Propulsion Laboratory)
21. Apollo Mission Control Center (Johnson)
22. Rogers Dry Lake (Edwards Air Force Base, CA)

2/9/05

2-11-05

H3415(2280)

FEB 12 2005

Ms. Perri E. Fox
Planning and Integration Office
Lyndon B. Johnson Space Center
2101 NASA Parkway
Houston, Texas 77058-3696

Dear Ms. Fox:

Thank you for your recent letter requesting a modification to the official name used for the Space Environment Simulation Laboratory National Historic Landmark (NHL).

We agree that the name you propose (Space Environment Simulation Laboratory, Chambers A and B) more fully indicates the extent of the historic property that was designated an NHL in 1985. Within the next few weeks we will make the necessary changes to our records to reflect this name change. As you may know, the National Park Service regional offices coordinate activities associated with NHL plaque requests, so you may wish to contact Tom Keohan in our Denver office at your convenience. I understand that you have previously discussed this matter with him, and he will be ready to assist you.

If you have any additional questions or comments please contact NHL historian Robie S. Lange at 202-354-2257 or via e-mail at robie_lange@nps.gov.

Sincerely,

Carol D. Shull

Carol D. Shull
Chief, National Historic Landmarks Survey
Keeper of the National Register of Historic Places

cc: Shull/Sprinkle/Lange/Henry/Space Environment Simulation Laboratory (NHL file)
Intermountain Region
Texas SHPO

BASIC FILE RETAINED IN 2280
FNP:R.Lange:bp:202-354-2212:02/10/05:F:/nr-nhl/lange/SpaceEnvironmentSimulationLab.ltr

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
2101 NASA Parkway
Houston, Texas 77058-3696

CERTIFIED MAIL

January 21, 2005

Reply to Attn of : JA161-05-002

Ms. Carol Shull, Chief
National Register Program and
Keeper of the National Register of Historic Places,
National Historic Landmark Survey,
National Center for Cultural Resources,
1201 Eye Street, NW
Washington, D.C. 20005

Subject: Name Change for the Space Environment Simulation Laboratory

Dear Ms. Shull:

NASA Johnson Space Center (JSC) is requesting a new bronze name plaque for the Space Environment Simulation Laboratory, Chambers A and B, a National Historic Landmark located at the Johnson Space Center in Houston, Texas.

Please change the name designation of the National Historic Landmark, Space Environment Simulation Laboratory to Space Environment Simulation Laboratory (Chambers A and B). This name change will clarify that the historic designation applies to Chamber B as well as Chamber A. The National Historic Landmark sign and stand were placed on and near Chamber A and have led to the misconception that the designation does not apply to Chamber B.

The Space Environment Simulation Laboratory (SESL) consists of two large thermal vacuum chambers; Chamber A and Chamber B. During the early part of the space program, Chamber A (the larger of the two chambers) was used for Apollo Command/Service Module testing. Chamber B was used to test the Gemini Modular Maneuvering Unit (MMU), Apollo Extravehicular Activity (EVA) Mobility Unit, and the Lunar Lander. These tests were crucial in sending the first explorers to the moon and returning them safely to Earth. Presently, both chambers are maintained at operational readiness and are used in support of the Space Shuttle, Space Station, and Advanced Programs.

The website link for the Space Environment Simulation Laboratory (Chambers A and B) is:
http://ctsdtests.jsc.nasa.gov/

If you have any questions regarding this request, please contact Mr. Abdul Hanif at telephone 281-483-2355, or by e-mail at abdelaziz.hanif-1@nasa.gov

Cordially,

Perri E. Fox

Perri E. Fox
Chief, Planning and Integration Office
JSC Federal Preservation Officer

cc:
Mr. Tom Keohan,
Historical Architect
Heritage Partnerships Program
National Park Service (NPS)
Cultural Resources IMDE-CNR
P.O. Box 25287
Denver, CO 80225-0287

"HANIF, ABDELAZIZ (JSC-JA) (NASA)" <abdelaziz.hanif-1@nasa.gov>

01/27/2005 03:29 PM
CST

To: "'Robie_Lange@nps.gov'" <Robie_Lange@nps.gov>
cc: "HALLIGAN, MARY (JSC-EC4) (NASA)" <mary.halligan-1@nasa.gov>
Subject: RE: SESL National Landmark, Proposed name change

Dear Ms. Lange,
Thank you for your message. The information on Building 32, SESL is:

SESL is one part of Building 32. At time B32 was built, SESL was the focus of the building. When SESL was temporarily deactivated in the early 80's, other organizations moved into building 32. When SESL was reactivated, it became part of Crew and Thermal Systems Division (CTSD), which also includes buildings 7, 29, 33, 34, and 360. SESL is probably a little over 50% of the building now. Building 32 also includes a Robotics Lab, a Prototype Development lab, a Hyperbaric Chamber, a Hypobaric Chambers, and a large office area (not associated with SESL).

The other (smaller) test facilities mentioned on the website are located in buildings 7 (Human-Rated Altitude Chambers & Special Purpose Facilities) and 33 (Smaller Environmental Chambers). The Large Thermal vacuum Chambers on the website, http://ctsdtests.jsc.nasa.gov/chambers.html show Chambers A & B in B32. I can ask our web designer to put the building numbers on the web pages to make it clearer. You may want to use the web page http://ctsdtests.jsc.nasa.gov/chambers.html instead of the main page. I hope this helps clear things up. If you have any more questions, feel free to ask Ms.Mary Halligan,Facility Manager - Building 32 HB &32A 281-483-9181.
Thank you,
Abdul

-----Original Message-----
From: Robie_Lange@nps.gov [mailto:Robie_Lange@nps.gov]
Sent: Thursday, January 27, 2005 1:45 PM
To: HANIF, ABDELAZIZ (JSC-JA) (NASA)
Subject: SESL National Landmark, Proposed name change

Mr. Hanif:

We have received Perri Fox's recent letter concerning the proposal to change the NHL name of the Space Environment Simulation Laboratory to include the phrase "Chambers A and B." So I may better understand the circumstances of this suggestion, could you help me understand whether it is more accurate to say that the Space Environment Simulation Laboratory is Building 32, or whether the SESL is merely one part of Building 32 (and if so, is it substantially more or less than 50% of Building 32)? I could not tell from the website whether the other (smaller) test facilities mentioned were located in Building 32 or elsewhere.

Regards,
Robie Lange

Robie S. Lange
National Historic Landmarks Survey, NPS

202-354-2257; 202-371-6447(fax)

Tom Keohan
02/02/2005 04:46 PM
MST

To: Robie Lange/WASO/NPS@NPS
cc: Greg Kendrick/DENVER/NPS@NPS, Lysa Wegman-French/DENVER/NPS@NPS
Subject: Re: Proposed NHL Name Change--Space Environment Simulation Laboratory

Robie,

We have been working with the LBJ Space Center for this name change and fully support the request and would welcome your approval. Thanks for looking at this. Please cc us on your response for our files. Thanks again!

Thomas G. Keohan ♦ Historical Architect ♦ Heritage Partnerships Program
Intermountain Regional Office ♦ National Park Service
12795 W. Alameda Parkway " Denver, CO 80228
303-969-2897 Voice " 303-987-6675 Fax

Lysa Wegman-French

Lysa Wegman-French
01/28/2005 01:01 PM
MST

To: Tom Keohan/DENVER/NPS@NPS
cc: Greg Kendrick/DENVER/NPS@NPS
Subject: Proposed NHL Name Change--Space Environment Simulation Laboratory

Hi Tom --

Since this is your area, I'm forwarding this message to you to respond.

Lysa

Lysa Wegman-French, historian
National Park Service, Intermountain Support Office
P.O. Box 25287, Denver, CO 80225-0287
12795 W. Alameda Parkway, Denver, CO 80228-2838
303-969-2842, fax 303-987-6675
lysa_wegman-french@nps.gov

----- Forwarded by Lysa Wegman-French/DENVER/NPS on 01/28/2005 01:03 PM -----

Robie Lange
01/28/2005 02:38 PM
EST

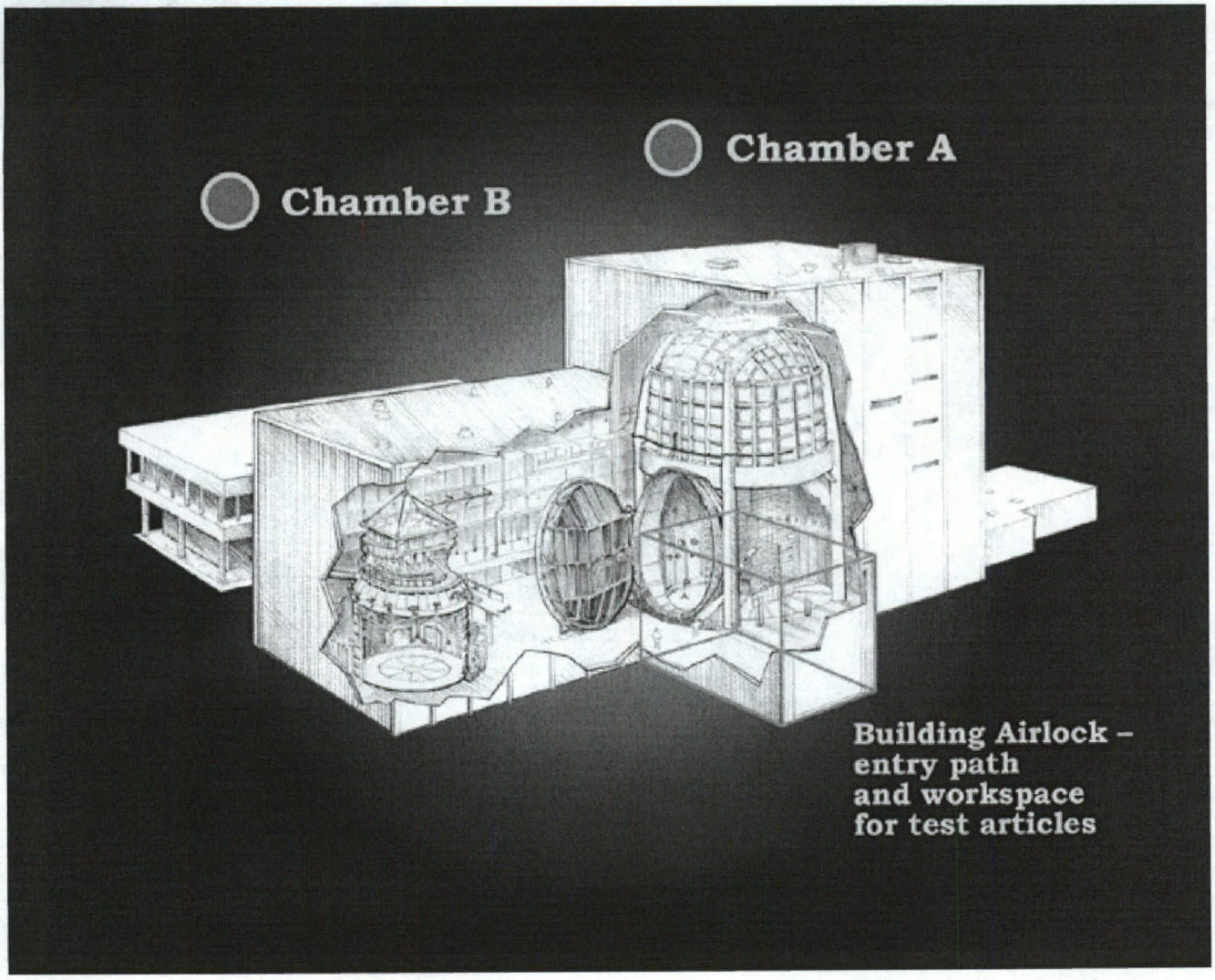
To: Lysa Wegman-French/DENVER/NPS@NPS
cc: John Sprinkle/WASO/NPS@NPS
Subject: Proposed NHL Name Change--Space Environment Simulation Laboratory

Lysa:

We received a letter from the LBJ Space Center requesting a name change for their Space Environment Simulation Laboratory. They want to add "...,Chambers A and B" to the NHL name, and get a new plaque to reflect that change. Since the 1980s nomination is oddly limited to the two chambers, and not the building they are located in, the further clarification of the name would still be accurate. Unless you folks can suggest why this is not acceptable we would be inclined to accept their request (of course the request for a new plaque would go through your program). Any concerns?

Robie

Robie S. Lange
National Historic Landmarks Survey, NPS
202-354-2257; 202-371-6447(fax)


Chamber A
Chamber B
Building Airlock –
entry path
and workspace
for test articles

Robie Lange
01/27/2005 02:44 PM
EST

To: abdelaziz.hanif-1@nasa.gov
cc:
Subject: SESL National Landmark, Proposed name change

Mr. Hanif:

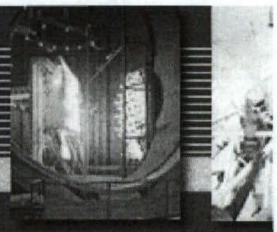
We have received Perri Fox's recent letter concerning the proposal to change the NHL name of the Space Environment Simulation Laboratory to include the phrase "Chambers A and B." So I may better understand the circumstances of this suggestion, could you help me understand whether it is more accurate to say that the Space Environment Simulation Laboratory is Building 32, or whether the SESL is merely one part of Building 32 (and if so, is it substantially more or less than 50% of Building 32)? I could not tell from the website whether the other (smaller) test facilities mentioned were located in Building 32 or elsewhere.

Regards,
Robie Lange

Robie S. Lange
National Historic Landmarks Survey, NPS
202-354-2257; 202-371-6447(fax)

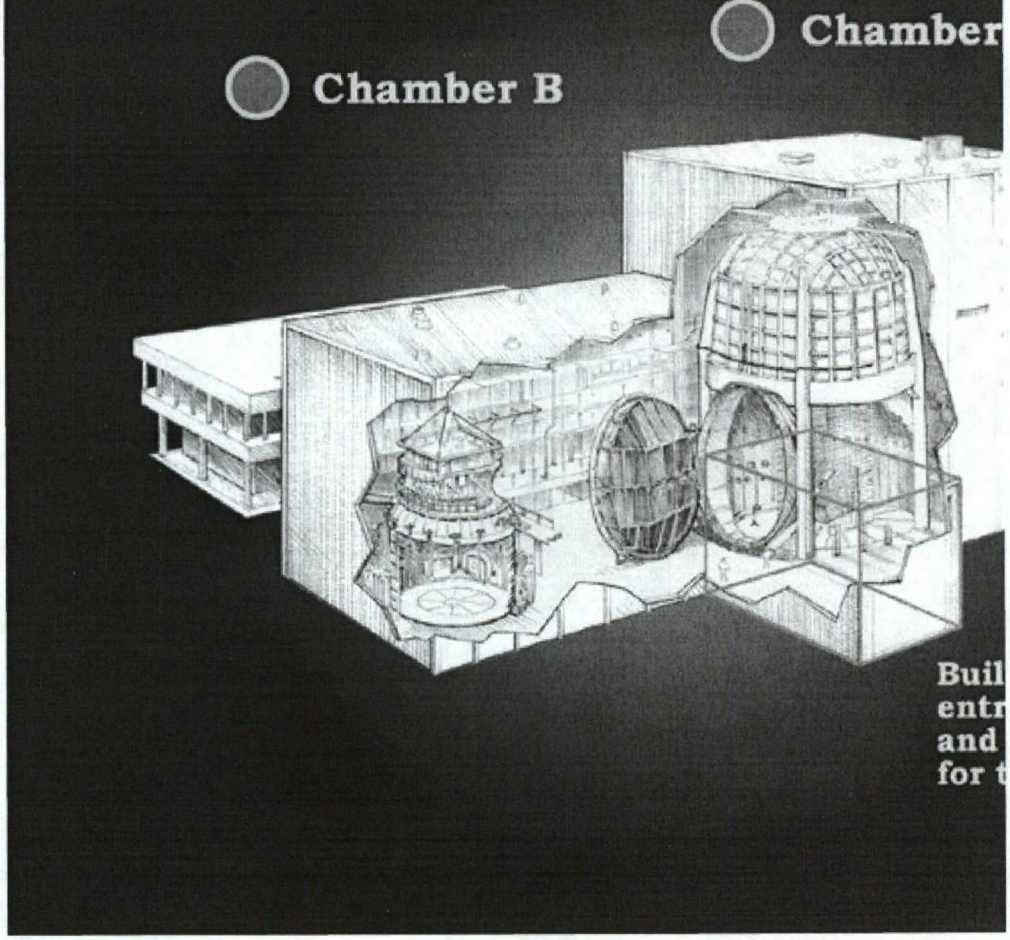
Large Thermal Vacuum Chambers

"Our Product is a Safe and Effective Test"



CTSD STB

HOME
Becoming Our Customer
Testing Benefits & Services
Large Thermal Vacuum Chambers
Smaller Environmental Chambers
Human-Rated Altitude Chambers & Special Purpose Facilities
Special Test Capability Examples
Contact Us



Description

The two largest chambers at JSC provide full scale testing of large systems a high fidelity simulated space environment. In addition to the chambers, a high buildup and preparation for installation into the chambers. The building entry a controlled environment work space for large test article buildup and preparatic overhead bridge cranes each with a main hook capacity of 45,000 Kg (100,00 lbs) auxiliary hook. Test support cooling and heating equipment systems prov high fidelity thermal simulation testing. Mechanical and electrical shops, custc test control room support the operations of these world class unique facilities. articles containing small sealed amounts of anhydrous ammonia is available.

Chambers

Chamber A Thermal-Vacuum Test Complex with Solar

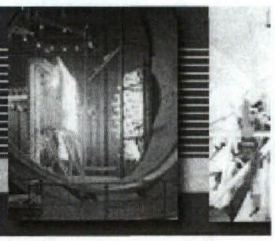
Chamber B Human-rated Thermal-Vacuum Test Complex with Solar

Curator: Victor M. Escobedo Jr. Responsible NASA Official: Reagar

Web Accessibility and Policy Notices

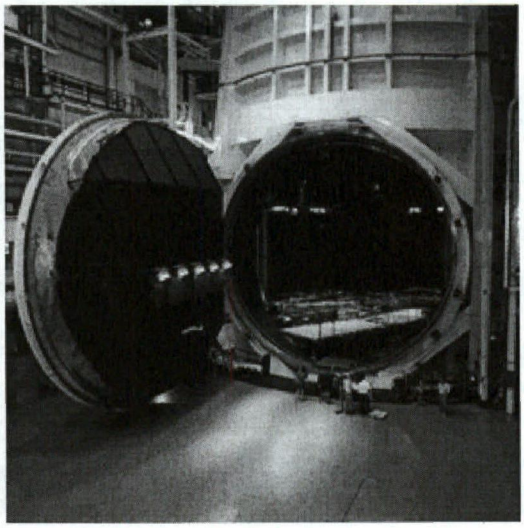
Last modified: 10/07/2004 16:29:30

CTSD Systems Test Branch
Test Facilities and Capabilities
"Our Product is a Safe and Effective Test"



CTSD STB
HOME
Becoming Our Customer
Testing Benefits & Services
Large Thermal Vacuum Chambers
Smaller Environmental Chambers
Human-Rated Altitude Chambers & Special Purpose Facilities
Special Test Capability Examples
Contact Us

Chamber A



Chamber A is the largest of the JSC t
Its usable test volume and high fidelit
are adaptable for thermal-vacuum tes
articles.

The major structural elements of the
diameter floor, the 12.2 m (40 ft) dian
dual crewlocks at the floor level and a

Test articles are normally inserted int
mobile crane. Two 45,000 kg (100,0C
outside the chamber and four indepe
(50,000 lb) cranes, lowered through r
head, are used inside the chamber.

The dual crewlocks, when configured in a human-rated mode, provide a mear
from ambient air pressure to the thermal-vacuum environment and back. The
maintenance of rescue personnel at convenient intermediate pressures during
the inner door is bolted, either of the crewlocks can be used as an altitude cha

Additional test support equipment includes mass spectrometers, infrared cam
The chamber contains a sensor system to monitor for ammonia or freon at an
confinement system which may be used to contain customer-generated plasn
levels provide ample pass throughs for electrical, instrumentation, and gasses

General Characteristics

Outside dimensions: 19.8 m (65 ft) diameter x 36.6 m (120 ft) high

Working dimensions: 16.8 m (55 ft) diameter x 27.4 m (90 ft) high

Test article weight: 68,100 kg (150,000 lbs) concentric load maximum

Access:

- 12.2 m (40 ft) diameter side-hinged door
- Dual crewlocks at floor level and 9.4 m (31 ft) level, measuring 2.4 m hig
  3.4 m wide, and 3.9 m long (8 x 11 x 12.8 ft)

- Door at 18.9 m (62 ft) level
- Catwalk platform at 9.4 m (31 ft) and 18.9 m (62 ft) levels

Vacuum Systems

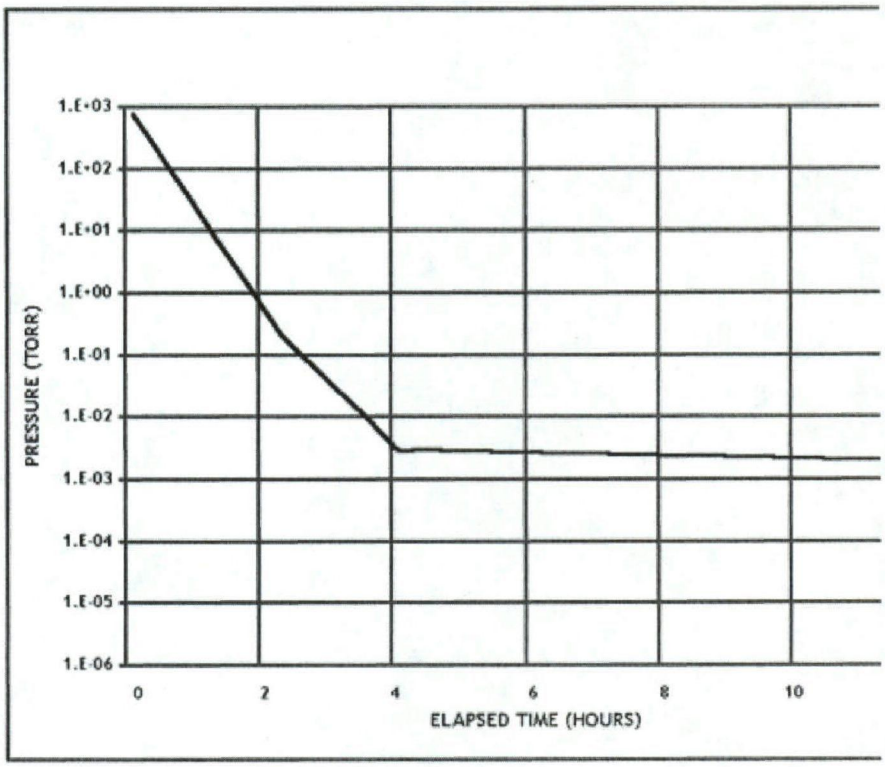
Types of pumps: Staged roughing pumps, valved and trapped oil diffusion p cryopumps

Pumpdown time: 10 -12 hours to test conditions

Pumping capacity: 2 x 10^7 liters/sec condensibles and 3 x 10^5 liters/sec non pressure
Note: Usual chamber inleakage less than 8 x 10^5 liters/sec of air at 1 x 10^{-6} tc

Repressurization: Controllable from 90 sec minimum; chamber dryout using shroud and floor at vacuum

Chamber A Pumpdown Curve



Heat Sink and Special Thermal Simulators

Full chamber shroud: Subcooled 90 K (-298 F) LN2 shroud 330,000 W total 1615 W/m^2 (150 W/ft^2) maximum heat flux, can be heated to 312 K (102 F) w

Wall emissivity: 0.95

Special simulators: Albedo and planetary radiation, as required.

Solar Simulation

Note: The Solar Simulation system is currently inactive and would require rea

Side Sun: 1 to 37 xenon modules configured in various shaped arrays bound m (65 ft) and maximum width of 6.1 m (20 ft)

Decollimation: 90-min half angle

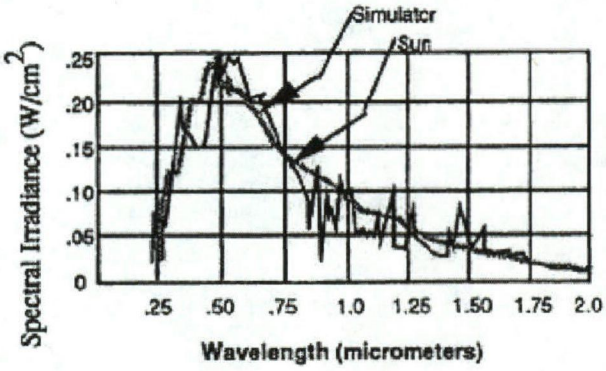
Intensity: 622 to 1353 W/m^2 (58 to 126 W/ft^2) controllable

Uniformity: +/- 5 percent measured with 930 cm^2 sensor

Measurement: Real-time traversing radiometer system

Solar incident angle: Solar Incident Angles other than horizontal can be ach redirect the solar beam

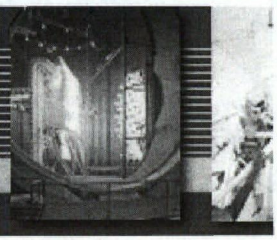
Spectrum of Xenon Solar Module



Plasma Containment

Magnetic fields: To 2 gauss through field coils consisting of six turns mounte 20 m (0, 6.5, 65 ft) levels above the chamber floor.

Curator: Victor M. Escobedo Jr. Responsible NASA Official: Reagar
Web Accessibility and Policy Notices
Last modified: 10/07/2004 16:28:59



Human-Rated Altitude Chambers & Special Purpose Facilities

"Our Product is a Safe and Effective Test"

CTSD STB

HOME

Becoming Our Customer

Testing Benefits & Services

Large Thermal Vacuum Chambers

Smaller Environmental Chambers

Human-Rated Altitude Chambers & Special Purpose Facilities

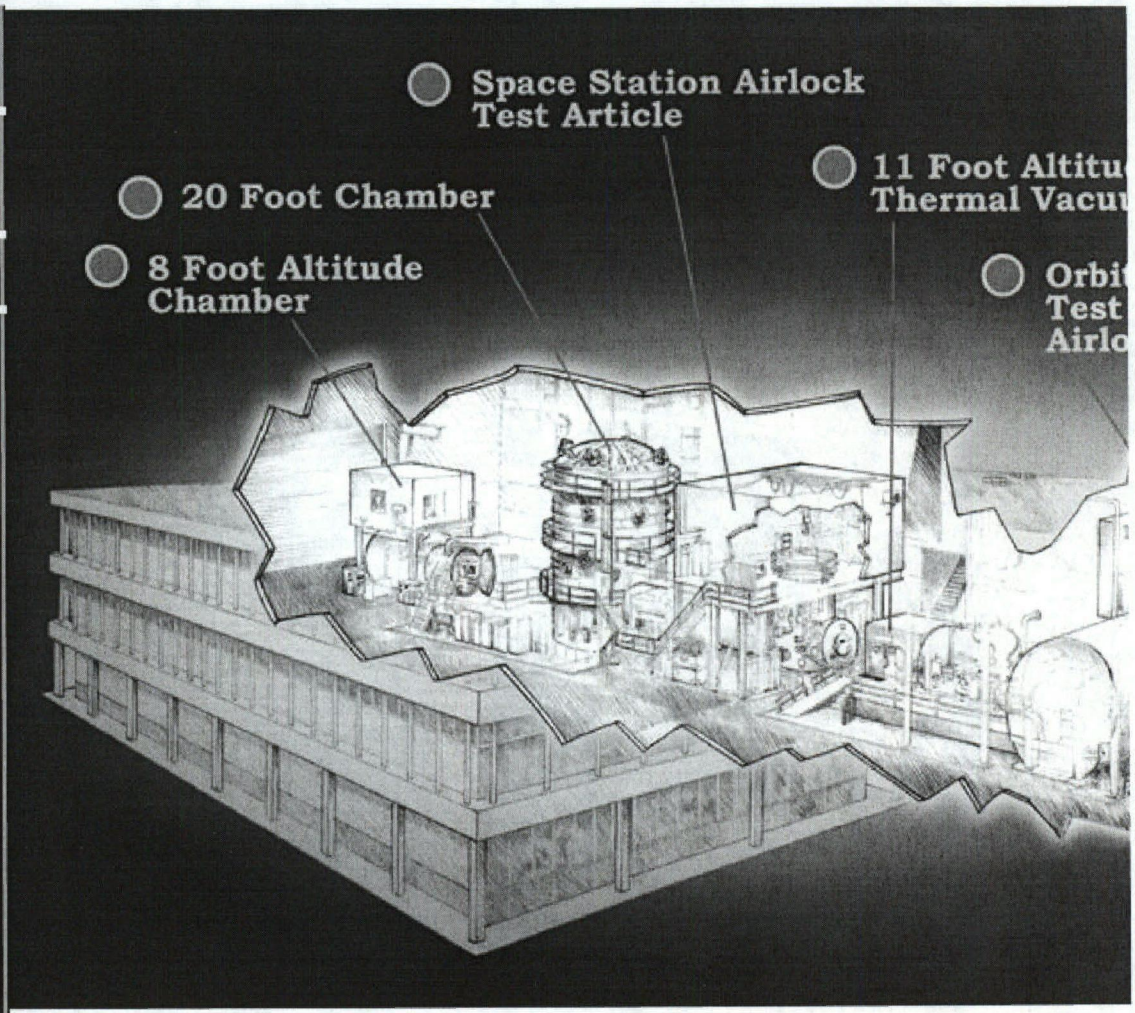
Special Test Capability Examples

Contact Us

Description

The six altitude chambers, two thermal-vacuum chambers, and necessary su in Crew and Thermal Systems Division are utilized primarily for development, testing of life support systems for humans in the hostile environments of spac chambers is configured for a particular type of testing. However, within the ch chamber complex may be used to perform other types of tests.

The unique capabilities of each of the chambers are listed on following pages available upon request.



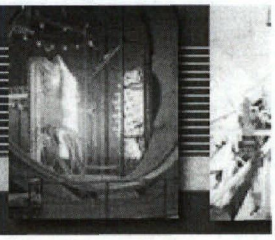
Chambers & Facilities

8-foot Chamber
20-foot Chamber
Variable Pressure Growth Chamber
11-foot Altitude and Dual Glove Thermal Vacuum Chambers
Orbiter Environmental Test Article and Airlock
Orbiter Active Thermal Control Subsystem
Chamber V Thermal-Vacuum
Space Station Airlock Test Article (SSATA)
Chamber B

Curator: Victor M. Escobedo Jr. Responsible NASA Official: Reagar
Web Accessibility and Policy Notices
Last modified: 10/07/2004 16:32:00

Smaller Environmental Chambers

"Our Product is a Safe and Effective Test"



CTSD STB

HOME

Becoming Our Customer

Testing Benefits & Services

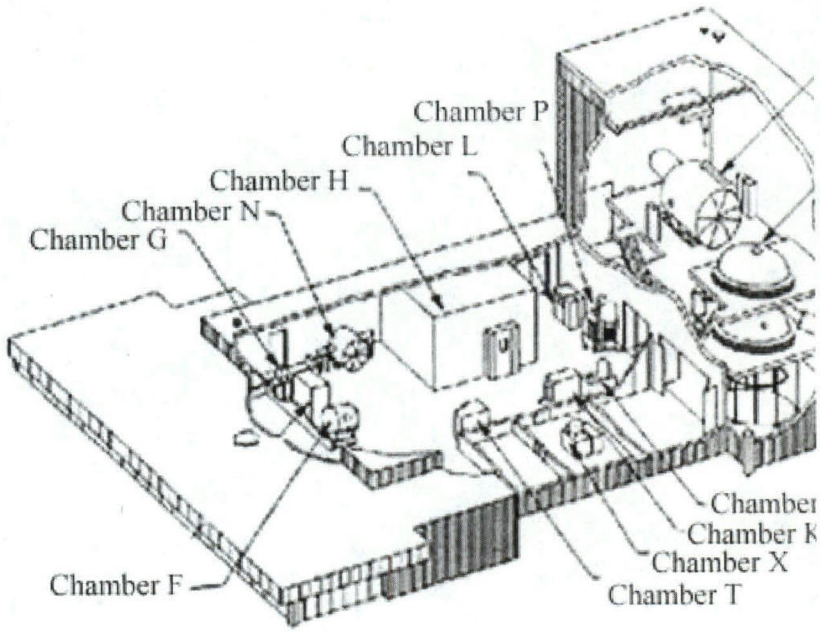
Large Thermal Vacuum Chambers

Smaller Environmental Chambers

Human-Rated Altitude Chambers & Special Purpose Facilities

Special Test Capability Examples

Contact Us



Description

The six small thermal-vacuum chambers, three ambient pressure/ temperatur chamber offer a wide range of performance capability which can be matched requirements of smaller test articles or large test article components and subs facilities is further enhanced by a variety of auxiliary equipment, which can be of heating and cooling shrouds, mounting fixtures, and exterior to interior mec

Typical uses of these chambers have included: development, engineering eva testing of spacecraft components; subassemblies and experiments; preflight t flight hardware; development and calibration of instruments for use in the larg spacecraft seal studies; photographic film emulsion studies; and optical surfac

Chamber	Usable Dimensions	Temp Range	Vacuum
E	1.4 x 1.4 x 2.9 m (4.6 x 4.6 x 9.5 ft)	100°K to Test Specific (-280°F)	1×10^{-6} torr
G	0.4 x 0.4 x 0.6 m (1.4 x 1.4 x 2 ft)	100°K to Test Specific (-280°F)	1×10^{-6} torr

H	2.4 x 2.4 x 4.5 m (8 x 8 x 15 ft)	172 to 366°K (-150 to +200°F)	N/A
I	0.5 x 0.5 x 0.6 m (1.6 x 1.6 x 2 ft)	Ambient	1×10^{-5} torr
K	0.9 x 0.9 x 0.9 m (3 x 3 x 3 ft)	211 to 450°K (-80 to +350°F)	N/A
L	0.9 x 0.9 x 0.9 m (3 x 3 x 3 ft)	263 to 366°K (+14 to +200°F)	N/A
N	0.9 x 0.9 x 0.9 m (3 x 3 x 3 ft)	100°K to Test Specific (-280°F)	1×10^{-5} torr
P	1.5 x 1.5 x 1.2 m (5 x 5 x 4 ft)	Ambient to 450°K (350°F)	1×10^{-6} torr
T	0.7 x 0.9 x 0.7 m (2.5 x 3 x 2.5 ft)	116 to 450°K (-250 to +350°F)	N/A
V	0.5 x 0.5 x 0.6 m (1.6 x 1.6 x 2 ft)	Ambient	1×10^{-5} torr
X	0.3 x 0.3 x 0.6m (1 x 1 x 2 ft)	100°K to Test Specific (-280°F)	1×10^{-7} torr

---

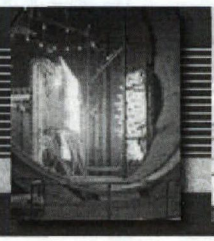
Curator: Victor M. Escobedo Jr. Responsible NASA Official: Reagar

Web Accessibility and Policy Notices

Last modified: 10/14/2004 09:53:08

Special Test Capability Examples

"Our Product is a Safe and Effective Test"



CTSD STB

HOME

Becoming Our Customer

Testing Benefits & Services

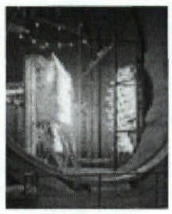
Large Thermal Vacuum Chambers

Smaller Environmental Chambers

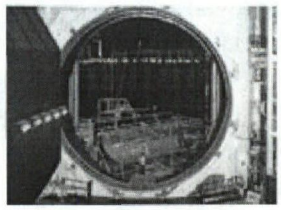
Human-Rated Altitude Chambers & Special Purpose Facilities

Special Test Capability Examples

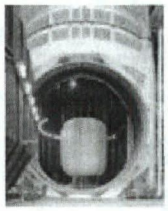
Contact Us



Apollo Command and Service Module Test (Chamber A)



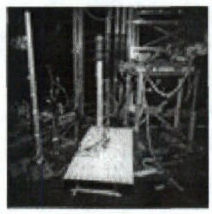
Sp
Sul



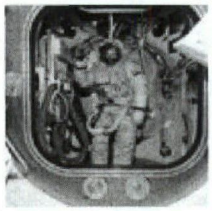
TransHab Shell Inflation Test - performed deployment and inflation of TransHab Full Scale Shell Development Unit in a vacuum environment (Chamber A)

E

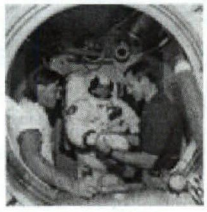
Testing of the ISS treadmill at zero-G on NASA's KC135 "Zero-G" aircraft

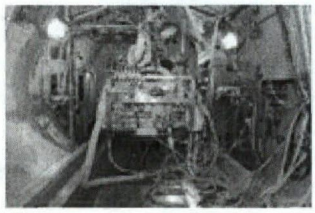


R
Va
sin
tc

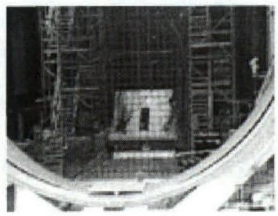


Manned Orlan Space Suit Test (SSATA Chamber)





Space Shuttle Extravehicular Mobility Unit (EMU) Life Support System equipped with remote controls being tested in a vacuum environment chamber (8 Ft. Chamber)

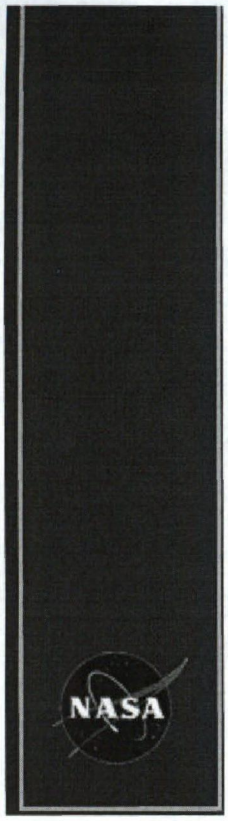


La

Curator: Victor M. Escobedo Jr. Responsible NASA Official: Reagar

Web Accessibility and Policy Notices

Last modified: 10/07/2004 16:32:16


NASA