

# *Open House*

Marshall Space Day

## 1966

MARSHALL SPACE FLIGHT CENTER

HUNTSVILLE, ALABAMA

OCTOBER 15, 1966

# NASA

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION



# OPEN HOUSE

*On The Occasion  
Of NASA'S  
Eighth Anniversary  
And The  
ANNUAL INCENTIVE  
AWARDS CEREMONY*

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### CAMERAS ARE PERMITTED

There will be no restriction on the use of cameras during Open House. Pictures may be taken at all areas.

### EMERGENCY NUMBERS

Ambulance . . . . . 877-5110  
Security Guard . . . . . 876-5680  
Wrecker service and  
minor auto repair . . . . 876-7195  
Elevator and  
electric service . . . . . 876-5610

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# Welcome!



Welcome to the Marshall Space Flight Center, home of the Saturns. This Center is one of NASA's bases for the exploration of space near the earth, the moon, the planets and beyond. The engineering laboratories, test facilities and offices which you will tour today form a national asset valued at \$330,000,000. Our people are an even more valuable resource. You will see some of them -- the men and women who work throughout the week behind the desks, at the drawing boards and with the test instruments.

The brick, concrete and steel structures and their lightning-fast computers, sensitive instruments and other expensive equipment, valuable as they are, could be replaced within a short time. But our people are priceless. The scientists, engineers and technicians with space-related skills and talents have come here from all over the country -- and the world. Some of our 7,000 civil service employees have been designing, building and testing rockets for three decades.

A representative group of these Marshall Center employees are being honored today at our annual Incentive Awards Ceremony. They will be recognized for long and faithful service, superior performance, ingenuity and efforts to increase efficiency and reliability and to reduce cost and waste.

We are also observing today the eighth anniversary of the National Aeronautics and Space Administration, which was formed in October, 1958. The nation has come a long way in space in a short time -- but the most glorious promises still lie ahead of us.

The vision and energy of all our people are responsible for the Marshall Center's record of achievements in the past. And in the days to come they will help to maintain American leadership in space. I hope that you share with me a strong pride in our people and this great new American enterprise.

## INCENTIVE AWARDS

*Program* 10:00 A.M.

*Wernher von Braun*

Wernher von Braun  
Director

Music - - - - -	Florence State College Band MARS Choral Group
Invocation - - - - -	Dr. Alvin H. Hopson, Pastor First Baptist Church Huntsville
Opening Remarks and Introduction of Guests - - - - -	Mr. Harry H. Gorman Deputy Director, Administrative
Remarks - - - - -	Dr. George E. Mueller Associate Administrator for Manned Space Flight, NASA
Address - - - - -	Dr. Wernher von Braun Director
Presentation of Awards - - - - -	Dr. Wernher von Braun
Benediction - - - - -	Dr. Alvin H. Hopson
Music (National Anthem) - - - - -	Florence State College Band



# The Annual Incentive Awards

■ The following Marshall employees will participate in the awards ceremony as representatives of all people who have received awards at Marshall during the past year.

## 30 YEAR EMBLEMS

Marvin G. Cooley  
Albert B. Erwin  
Robert H. Kessler

Technical Services  
Test  
Quality

## 25 YEAR EMBLEMS

Roy L. Chatham  
Frances C. Curry  
Jimmie L. Dew  
Frances Davidson  
Ward T. Gilbert  
Jewel M. Hall  
Martin G. Harris  
Earl D. Hicks  
John W. Holladay  
William F. LaHatte  
Eugene N. Montana, Jr.  
William P. Morrow  
Vincent P. Murphy  
Mason E. Quillin  
Dewey C. Simmons  
Harry G. Sluss  
Henry L. Strong

Technical Services  
Technical Services  
Advanced Systems  
Research Projects  
Technical Staff  
P&VE  
Engine Office  
Management Services  
Astrionics  
Saturn I/IB Office  
Financial Management  
Technical Services  
Purchasing  
Manufacturing Engineering  
P&VE  
Financial Management  
Financial Management

■ The following Federal Awards were presented to Center Employees during the period from November 6, 1965, through October 15, 1966.

## NASA HONORARY SERVICE EMBLEMS

For faithful service to the National Aeronautics and Space Administration and the Government of the United States of America.

## 40 YEAR SERVICE AWARDS

James W. Smith  
Isaac Whitson

Aero-Astroynamics  
Astrionics

## 30 YEAR SERVICE AWARDS

Andrew L. Bradley  
Josef O. Brookshire  
Paul E. Dumire  
James M. Finlaw  
Frank J. Henrie  
Carl L. Pool  
Lona L. Rasberry  
Royal L. Scott  
Verdell Smith

Astrionics  
Financial Management  
Manufacturing Engineering  
Michoud  
Michoud  
Project Logistics  
Manufacturing Engineering  
Management Services  
P&VE



## 25 YEAR SERVICE AWARD

### ● Operations Management

John R. Ellis, Jr.

### ● Propulsion & Vehicle Engineering

Amos D. Archambault  
Fred G. Edwards  
Luther K. Gibbs  
Lester B. Holmes  
Solomon N. Lane

Harvey Mossawir  
Carl C. Mowell  
John E. Owens  
Everett D. Price  
Sam Shulman

### ● Quality

Clifford H. Boykin  
James D. Chamberlain  
James R. Chittam  
Kenneth P. Coleman  
Chalmus B. Dollins

Delton I. Godwin  
Eugene S. Henning  
William E. Maley  
Oscar J. Sheetz  
Herbert M. West

### ● Research Projects

Spencer G. Frary

### ● Technical Systems

Earl M. Butler

### ● Test

Claude W. Bailes  
James R. Bain  
John B. Carrington  
Henry C. Dyer  
Joseph H. Kramer  
Eddie K. Lamb  
Daniel D. League

Searcy R. McDonald  
William McNamee, Jr.  
Ellis L. Merritt  
Russell L. Peck  
Alfred Russell  
George C. Towry  
Lee M. Zawasky

## 25 YEAR SERVICE AWARDS

### ● Executive Staff

Charles W. Eutsler  
Morton Landau

Gervaise L. Wyss

### ● Facilities & Design

Charles G. Breland  
Alvin C. Britt  
Ivan E. Hirschburg

Jesse C. Horn  
David L. Husbands, Jr.  
Richard B. Smith

### ● Financial Management

Ed R. Burruss

### Management Services

Linton A. Barnes  
Elbert M. Cooper  
Carl Fortner

Hugh J. King  
James K. Levie, Jr.

### ● Manpower Utilization & Administration

James F. Hayes

Georgia L. Walls

### ● Purchasing

Foster M. Ferguson  
Daniel V. Finnegan  
Robinson A. Gray  
Mildred W. Head  
Wroten A. Lenoir  
Charles C. Linn

William J. Miller  
Jefferson C. Neutze  
James B. Roberts  
Homer M. Smith  
Otis L. Smith  
Gordon R. Walker



# ● Technical Services

Virgil H. Blake  
Cloyd R. Cooter  
David E. Cramer  
Louis C. Crouch  
Harvey E. Guice  
James E. Hatfield  
Raymond G. Heller  
J. W. Herring  
William H. Lambert, Jr.

William M. Lee  
Robert E. Morrison  
Charles J. Payne  
Earl Pelham  
John G. Sanford  
Fred A. Smith  
Jim M. Spradlin, Jr.  
Mathew Thomas

# ● Contracts

James H. Boyle  
Ramsey B. Collingsworth  
Earl H. Eubanks  
Wallace P. Foxworth  
William D. Goldsby

John H. Hyer  
Alfonso C. Jolliff  
Melvin Sundstrom  
Thomas B. Swaggerty  
Manley S. Williams

# ● Engine Office

John E. Miller

John B. Moore

# ● Facilities Projects

Elmer L. Brown, Jr.

# ● Michoud Assembly Facility

Hosea B. Abernethy, Jr.  
John Q. Adams  
William M. Biley  
William E. Carter  
Edwin M. Day  
Ferris R. Fox  
Ransom B. Harris  
Spears A. Manning

Elbert W. Martin  
Turner C. McNeese  
Bernard L. Peuler, Sr.  
Charles A. Rougan  
Abraham Rubin  
Edwin F. Serpas  
Paul R. Spitzfaden

# ● Mississippi Test Facility

Barney C. Arender  
Glen B. Keith  
Clarence Hutson  
Terry H. Malone

James E. Maxwell  
Lelyn W. Nybo  
William E. Winterstein

# ● Resources Management

John A. Farrer  
Eugenia T. Lamb

Winfred G. Stevens

# ● Saturn IB/Centaur Office

Melvin Johnson

Wesley W. Scott

# ● Saturn V Office

James T. Bull  
Fernander R. Kirby

Samuel Yarchin

# ● Aero Lab

Harrison K. Brown  
Glenn E. Daniels

Carroll L. Hasseltine

# ● Astrionics

George D. Adams  
Coy C. Banks, Jr.  
Andrew L. Bratcher  
William J. Britz  
Charles M. Chambers  
Stephen J. Dobbs  
Grover F. Daussman  
William S. Edens, Jr.  
Carlos C. Hayes  
Viel A. Herron

Dale K. Lamb  
Edwin L. Moore  
Ernest L. Orem  
Edward F. Powell  
Theo T. Starkey, Jr.  
Finis B. Stroud  
Victor A. Tyler  
E. Ray VanOrden  
Howard E. Weeks

# ● Computation

Chester A. MacComber

# ● Manufacturing Engineering

Merle S. Andres  
Ray E. Baker, Sr.  
Thomas A. Barnett  
Robert J. Carmody  
John Cresap  
Robert M. Freeman  
Elmer A. Gunter  
Wilmer E. Hall  
Clifford M. Helton  
James C. Hollis  
Steve S. Mankoski

James W. McKee, Jr.  
Willis E. Neisler  
William R. Potter  
Calvin T. Redden  
John C. Rowden  
William E. Sanders  
William F. Schmitt  
Jack G. Smith  
Richard M. Standard  
Lucian Williamson  
Charles B. Winn

# 20 YEAR SERVICE AWARDS

## Office of Director

Reba E. McAlexander

Marion Melton

## Executive Staff

Marvin L. Bullington  
Hans S. Maus

Ernest L. Schneider

# ● Facilities and Design

Hannes Luehrsen

# ● Financial Management

James O. Rikard  
John E. Sharkey

Lewis E. Snyder

# ● Management Services

Gerd W. de Beek  
Gladys B. Ivy  
Cecil R. Loveless

Robert E. McCord  
Lillard N. Sharpe  
Charles O. White

# ● Manpower Utilization

Howell R. Riggs

Walter F. Wiesman

# ● Purchasing

Ruth C. Drake  
Bert E. Johnson  
Olga S. Samples

William L. Troupe  
Raymond Weems

# ● Technical Services

Maylond T. Bishop  
Carl A. Biss  
Sim L. Caldwell  
Oscar S. Campbell  
Theodore C. Helberg  
Edwin A. Kerchhuber  
James P. Lutz

Estiel R. Mathis  
Richard A. Merritt  
Calvin L. Michael  
Glenn D. Sanders  
John B. Townsend  
Sallie M. Weeks  
Herbert L. Woolf, Jr.

# ● Industrial Operations Director

Edmund F. O'Connor

# ● Contracts Office

Melton E. Buchholz  
Milan D. Burns  
Thomas L. Burton  
Robert L. Crossman  
Erwin L. Foote  
Frederick C. Kersten

James B. McPeters  
John H. McCombs  
Carmela A. Paul  
Orene H. Pruitt  
Nestora Ramirez

# ● Engine Office

Frank P. Boffola  
Alvin Steinberg

Dan C. Williams

# ● Facilities Projects

Howard P. Lloyd

# ● Michoud

Jack B. Byrd  
Marvin R. Green, Jr.  
Earl L. Jensen

Ernest F. Lejune  
Murry J. Lirette  
Grayson E. Viles



● **Mississippi Test**  
Henry F. Auter  
Obed E. Batson, Jr.

● **Project Logistics**  
Romely R. Joyner

● **Resources Management**  
Alfred J. Finzel

● **Saturn I/IB Office**  
Richard C. Callaway, Jr.  
Friedrich Dhom

● **Saturn V Office**  
Ernestine Bullington  
Elizabeth R. Collins  
Friedrich Duerr  
Robert E. Dunbar  
Edgar King, Jr.  
James J. McLaughlin

● **R&DO Director**  
Hermann K. Weidner

● **Advanced Systems**  
Jimmie L. Dew

● **Aero-Astro dynamics**  
Oscar C. Holderer  
Helmut J. Horn

● **Astrionics**  
John E. Ackerman  
Dorrance L. Anderson  
Wilhelm Angele  
Josef Boehm  
John M. Caudle  
Harvey J. Chapman  
William O. Clark  
Gerhard P. Draue  
Robert F. Ferguson  
Hans J. Fichtner  
James P. Garner  
Otto A. Hoberg  
Hans H. Hosenthien  
William L. Howard  
Don M. Knott

● **Computation**  
Roy J. Cochran  
Richard A. Kramer, Jr.

● **Manufacturing Engineering**  
Jessie B. Adair, Jr.  
Robert W. Allbritain  
Robert R. Becks  
Arthur L. Bowen  
Thomas E. Bowling  
Everett A. Brouillette  
Clinton A. Craig  
Aubrey S. Drummond  
Otto K. Eisenhart  
Johnny S. Garrard, Jr.  
John S. Hale  
Bruno K. Helm

● **Operations Management**  
Richard W. Cook

● **P&VE**

Henry C. Andrews  
Herman F. Beduerftig  
Herbert R. Bergeler  
Paul C. Duren  
James H. Farrow  
Herbert W. Fuhrmann  
Inez C. Gardiner  
James H. George

Harold J. Hurst

Jack E. Swearingen

Leonard R. Hall  
Nathaniel G. Raley

Robert M. Pactz  
John W. Prager  
Raymond P. Rice  
Arthur L. H. Rudolph  
Louis C. Thompson  
Laura A. Wilson

Adina L. Karkainen

Elmo Tucker

John W. Lemay  
Carl H. Mandel  
William J. Matkin  
Hans W. Milde  
Millard A. Mitchell  
Calvin J. McAllister  
Ludie G. Richard  
Fred D. Roe  
Werner K. Rosinski  
James M. Shields  
Bobby F. Walls  
George L. Wbmac  
Jack T. Wood  
Phil Youngblood

Ivan M. Wiley

William A. Hudson  
Ralph Jarrell  
Charles W. Lawter  
Tully L. Logan  
Dewey H. Meeks  
Don C. Neville  
Max E. Nowak  
Ollie F. Pierce  
Buford C. Stidger  
Truett N. Vann  
Morris W. Williamon

Jay C. Fryman

William H. Haney  
Walter S. Hargett  
Stanley C. Harris  
Emil A. H. Hellebrand  
Bruno K. Heusinger  
Walter W. Jacobi  
Gustav A. Kroll  
Ivis R. Mantooth

Fonzie O. Martin  
Bernard L. McBay  
Hans R. Palaoro  
Hans G. Paul  
Juan Pizarro  
Kenneth W. Reed  
Maxsul F. Robinson  
James R. Sandlin

William A. Schulze  
Nathan Showers  
William W. Varnedoe, Jr.  
Werner Voss  
Joseph M. Walters  
Robert E. Webber  
Arnon E. West  
Clarence O. Wilkerson

● **Quality**

James P. Bates  
Weldon A. Berry  
Robert L. Bradford  
Charles H. Clark, Jr.  
Gerald N. Doughty  
William Fenner, Jr.  
Joe Hamil, Jr.  
Richard E. Hall  
Harry L. Hill  
Joseph S. Hillenbrand

Ernst K. Klaus  
Robert W. Lochridge  
John C. Moore, Jr.  
Arnold C. McDougal  
Donald R. Oswald  
Werner G. Tiller  
David S. Walker  
Ervin B. G. Whitaker, Jr.  
John D. Wild

● **Research Projects**

Gerhard Heller

Ernst Stuhlinger

● **Test**

Erich K. Ball  
Kenneth N. Bliss  
William P. Bucklew  
James F. Chumley  
Price Clanton  
John D. Curry  
John E. Duffy  
Gordon W. Finlay  
Donald L. Hammer  
Gunther H. F. Haukohl  
John A. Hautb  
Henry F. Helton  
Joseph W. Janoski  
Harry M. Johnstone, Jr.  
Erich Kaschig  
Teddy M. LaMunyon  
Robert E. Morring

William J. Mullins  
Sim B. Parton  
James H. Phillips  
Ores M. Preston  
Gerhard H. R. Reisig  
Werner H. Sieber  
Albert E. Schuler  
Russell C. Shaw  
John O. Smith  
Bernhard R. Tessmann  
Ara W. Thompson  
Harold E. Thompson  
Joe D. Traywick  
Fritz A. Vandersee  
Walker A. Waller  
John D. Wyatt

In addition to the above, Center employees received 323 fifteen year emblems, 384 ten year emblems, 56 five year emblems, and 74 one year emblems.

## SUSTAINED SUPERIOR PERFORMANCE AWARDS

For superior performance of job duties.

\$600

Clyde D. Baker	Aero	Howard D. Burns	Saturn V
James E. Bradford	Saturn V	Carl D. DeNeen	Logistics

\$500

Calvin B. Blevins	Saturn V	John M. Price	Astrionics
Benjamin J. Herman	Logistics	Donald B. Riggins	Saturn V
Robert W. Lockridge	Quality		

\$450

Harold L. Best	Computation	Michael A. Pagliuso	Michoud
Comer H. Bryan	Quality	Gerald D. Ridgeway	Purchasing
Charlie Gibbs	Test	Robert L. Saidla	Test
Arnold G. Hildebrand	Test	Robert S. Savage	P&VE
William C. Lindsey	Test	Jerrell M. Thomas	P&VE
William A. Moseley	Quality	Ronald G. Weesner	Engine Office
Gordon M. Newcomber	Michoud	Frank J. Wyman	Michoud

\$425

Guy B. Jackson	Public Affairs	Richard B. Pratt	Public Affairs
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\$350

Robert J. Carmody	Manufacturing	Earl W. Jones	Purchasing
Duron Crider	Purchasing	Wallace J. Jordan	Quality
David C. Christian	P&VE	Charles L. Rushing	Manufacturing
James R. Currie	Astrionics	James C. Sams	Quality
Alfred H. Fulmer	P&VE	Edward M. Sanford	P&VE
Jonathan B. Haussler	Aero	Jonathan R. Scheidt	Quality
Melton T. Herrin	Computation	Lovell D. Tice	Quality
Miriam S. Hopkins	Aero		



### \$300

Edward W. Ball	Test	Robert G. Mills	P&VE
William A. Bosher	Astrionics	Robert S. Stimler	Test
Roy A. Borrough	Test	Kenneth L. Swaim	Manufacturing
Myrtle W. Freeman	Computation	Joseph T. Tucker	Resources
William Hooper, Jr.	Saturn V	Billy Carl Walley	Test
Gardner S. Maples	Test	Robert A. White	Astrionics

### \$250

Rexford D. Atchley	P&VE	Althea H. Schwarzwald	Michoud
Fredrick C. Kersten	Contracts	James S. Strong	P&VE
Joseph G. Robertson	Manufacturing		

### \$200

Brenda C. Baeder	P&VE	Hilda A. Garofalo	Michoud
Susan D. Bauduc	Michoud	Angela N. Lawrence	Aero
Rose M. Berthelot	Michoud	Brenda H. McAlister	Saturn V
Mary Blanchard	Mississippi Test	Stella McHenry	P&VE
Theresa I. Bohlke	Michoud	Opal L. Meek	Manufacturing
Mary P. Bucklew	Research Projects	Nan A. Renfrow	Michoud
Maria M. Burkhardt	Michoud	Guendolyn W. Smith	Michoud
Patricia M. Dunn	Saturn V	Flora W. Weaver	Aero
Sytha J. Fedrowisch	Quality		

### \$150

Anita J. Hargrove	Aero	Brenda J. Lavender	Astrionics
Sandra Q. Hughes	Aero		

### GROUP ACHIEVEMENT AWARDS

In recognition of outstanding teamwork and group efforts.

#### Seven Hundred-Fifty Dollars

##### Contracts Office

Paul E. Anderson  
Milan D. Burns  
Albert E. Chesley

Alfonso C. Jolliff  
Herbert A. Kitchens

##### Contracts Office

Ronald D. Backer  
Ronald R. Bringham  
Edward L. Caldwell

Daniel R. Clough  
James H. Goldsmith

### OUTSTANDING PERFORMANCE RATINGS

For outstanding performance in all aspects of assigned duties.

Clyde D. Bean	Aero	Sarah C. Swann	Technical Ser
William A. Bosher	Astrionics	Matthew W. Urlaub	Saturn V
Earl H. Eubanks	Contracts	Robert A. White	Astrionics
Stanley L. Fraggie	Management Serv	Phil Youngblood	Astrionics
Ludie G. Richard	Astrionics		

### SUGGESTION AWARDS

For contributions to the efficiency, economy, or other improvement of Government operations.

#### Over \$500

Betty R. Biggerstaff	Computation	Edward T. Mallory	Staff
Virginia H. Coe	Management Serv	James A. Malone	Manufacturing
Robert D. Groeneveld	Engine Office	William S. Porter	Saturn V
Richard H. Jackson	Staff	Jack A. Roach	P&VE
George T. Garrett	Computation	Willi Segewitz	P&VE
Paul V. Kennedy	Test	Walter W. Tribble	Resources
William B. Long	Operations		

#### \$250 - \$500

Charles Breland	Facilities	Diethard Lindner	Astrionics
James D. Byrd	P&VE	Fred Manley	Facilities
Hollis A. Cupp	Manufacturing	Dodge Old	Test
Gordon N. Dison	Contracts	James B. Randolph	Manufacturing
J. B. Dunn	Technical Serv	William G. Smith	Management S

#### \$100 - \$250

Ronald N. Abraham	Saturn V	Huey F. Hope	Facilities
John E. Ackerman	Astrionics	Jerry D. Huffman	Computation
Vernon G. Caillouet	Manufacturing	Wallace J. Jordan	Quality
Marvin G. Cooley	Technical Serv	Frank P. Lively	Contracts
Gordon N. Dison	Contracts	Eupie I. Palmer	Test
Robert C. Fortenberry	Manufacturing	Jacob B. Russell	Michoud
Reginald A. Fujimoto	Michoud	Benjamin M. Saunders	Astrionics
Frank M. Harper	Manufacturing	Edward J. Shelton	Manufacturing

### INVENTION AWARDS

For scientific or technical contributions which have significant value on the conduct of aeronautical and space activities and contribute to the improvement of Government operations.

- Astrionics Co-Inventors - \$250  
William J. Abernathy John A. Sealy  
William J. Reed Lowell G. Snoddy

"Apparatus & Method for Making Precision Circular Spot Recesses"

#### Co-Inventors - \$500

Wilhelm Angele Donelson B. Horton  
"Fine Adjustment Device" (Supplemental Award)

#### Co-Inventors - \$900

Michael T. Borelli Hans H. Hosentien  
Harry J. Daniels  
"Adaptive Tracking Notch Filter System"

#### Co-Inventors - \$200

Carl H. Mandel Herman E. Thomason  
"Azimuth Laying System"

\$300 Alonza J. Davis "Fiber Optic Vibration Transducer & Analyzer"

#### ● Manufacturing Engineering

\$300 Robert J. Carmody "Fiber Optic Vibration Transducer & Analyzer"

200 Billy K. Davis "Method & Apparatus for Monitoring & Controlling Metal-Arc Welding Processes"

#### Co-Inventors - \$5,000

Leslie E. Foster Robert J. Schwinghamer  
"Magnetomotive Metal Working Device"

#### ● P&VE

#### Co-Inventors - \$200

Josef F. Blumrich Carl A. Loy  
"Tank Construction for Space Vehicles"

\$300 James D. Byrd "Preparation of Polybenzoxazoles"

\$500 Jay H. Laue "Multi-Mission Module"

\$120 Philip C. Miller "Low Temperature Aluminum Alloy"

#### ● Quality

\$600 Frederic E. Wells "Positive Displacement Flowmeter"

#### ● Test

\$700 Fritz Kramer "Device & Method for Suppressing Sound & Heat Produced by High-Velocity Exhaust Jets"

#### ● Engine Office

\$200 Richard L. Brown "Gimbaled, Partially Submerged Rocket Nozzle"

#### ● Saturn V

\$100 Claude J. Bowen "Connector Fitting With Locking Means"

#### ● Facilities & Design

\$100 James B. Huff "Three-Wire Receptical Testing Instrument" (Supplemental Award)





## NON-FEDERAL AWARDS GRANTED CENTER EMPLOYEES

† Diesel Medal in Gold      Dr. Wernher von Braun  
For pioneering contributions to rocketry and space technology.

† Herman Oberth Award      William R. Lucas - P&VE  
For outstanding individual scientific achievements in the field of astronautics and for the promotion and advancement of the aeronautical sciences.

† Institute of Printed Circuits, President's Award  
Wilhelm Angele - Astrionics  
For outstanding contribution to the electronics industry.

† Scientific Apparatus Makers Association, Recorder - Controller Section Award

James T. Powell - Astrionics

For contribution as an instrument engineer to aerospace instrumentation technology, as reflected in content of paper "Saturn Flight Instrumentation," published in November 1964 issue of the ISA Journal.

† Excellence Award of the Visual Communications Industry

Linton A. Barnes - Management Services

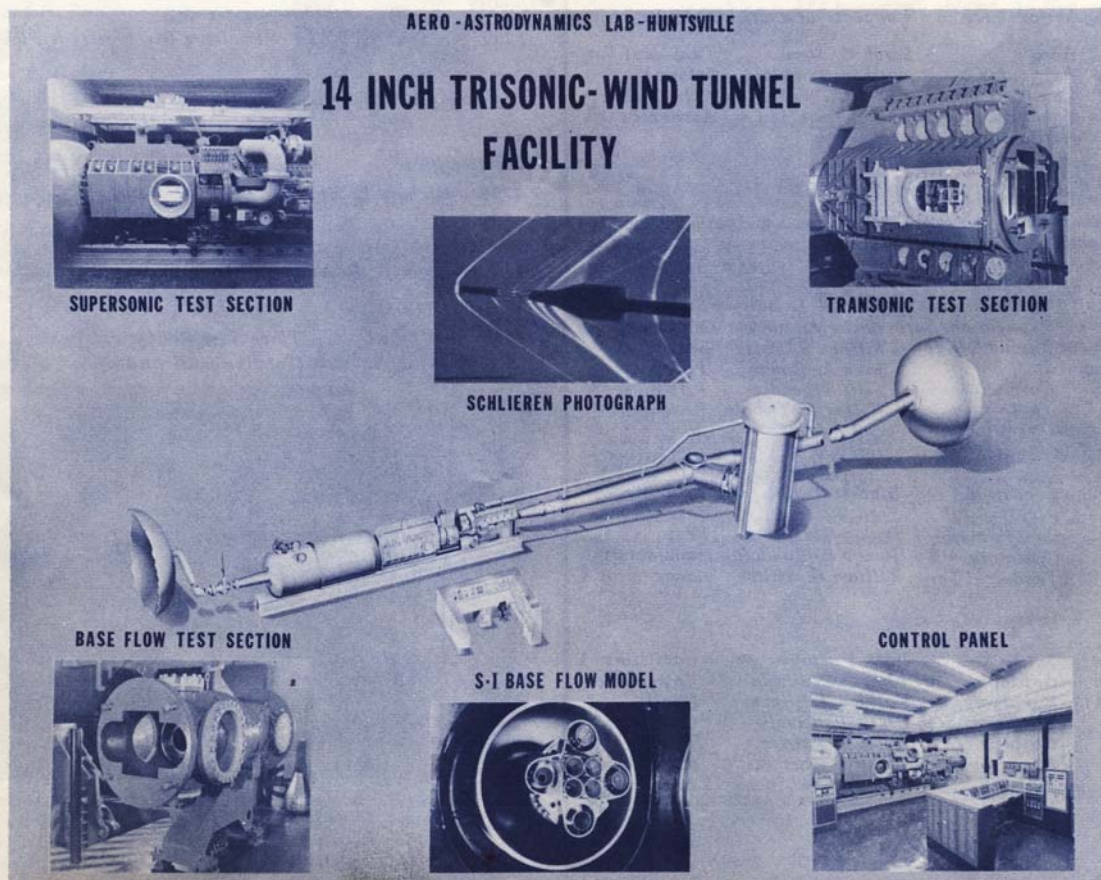
For outstanding and meritorious service and significant contribution to the development and advancement of the visual communications industry.

# Aero-Astrodynamics Laboratory

## EXHIBITS LOCATED IN BUILDING 4732

Some of the many missions of the Aero-Astrodynamics Laboratory include:

1. Conducting research and development activities in the fields of aerodynamics, astrodynamics, guidance and control theory, and related sciences to establish the best design for launch and space vehicles.
2. Evaluating overall launch vehicle mission capability in terms of variables such as payload, total weight, and configuration.
3. Establishing mission concepts for new vehicle systems, performing and considering complete systems analysis.
4. Coordinating overall technical evaluation of flight tests.
5. Coordinating and establishing natural environmental criteria for vehicle design.
6. Operating and developing experimental test facilities as required.





# *Advanced Systems Office*

EXHIBIT IN LOBBY OF BUILDING 4200

The broad function of the Advanced Systems Office is to conceive advanced concepts and techniques for future space exploration systems, and pursue the more promising concepts from the determination of feasibility to the refinement of the concept for practical implementation.

The technical work of the office is divided into essentially four major functional areas: Advanced Launch Vehicles, Earth-Orbital Operations, Lunar Missions, and Planetary/Nuclear Missions. The exhibits present some typical concepts being investigated for each of the major functional areas, and are found in the lobby of building 4200.

## *Computation Laboratory*

The Computation Laboratory is responsible for conducting high-speed digital computation, simulation, and data reduction in the fields of space vehicle research and for devising improved methods and systems.

The lab operates one of the largest concentrations of computation equipment in the world in furnishing a business-type service to the administrative and management segments of the center - - personnel reports and records, labor distribution, supply and inventory, financial reports and security.

Equipment includes electronic digital computers, analog computers, a frequency spectrometer, wave analyzer systems, a vibration analysis system, analog-

to-digital conversion equipment, a digital timing system, printers, flight table and computer, analog simulator, a hybrid computer, repetitive operation computer, time history recorder, analog and digital tape recorders, micro-film recorder, and telemetry playback equipment.

Major computers in the laboratory are two IBM 7094 computers, two IBM 7010 computers, seven GE 235 systems and one Burroughs 5500 computer. In 1967 the installation of a large-scale, centralized, third generation multi-task computer will replace almost all of the present digital computers by the introduction of remote access to the central facility by communication lines.

The lab has 174 civil service employees.

Due to current construction, the lab will be open only to computation lab employees.





# Astrionics Laboratory

Astrionics is the Laboratory that performs the research and development of components and systems in the areas of guidance, control, electrical networks, vehicle borne tracking, measuring telemetry and range safety devices, and associated electrical ground support equipment for multistage launch on space vehicles.

BE OUR GUEST: To acquaint you with the laboratory, display areas have been established and are outlined below with locations shown on opposite page in the corresponding numbers.

## GUIDANCE AND CONTROL DIVISION

1. Saturn Ground Computer and Display System
2. Saturn Guidance and Control Simulation
3. Fluid Control System Research Laboratory
4. Saturn Launch Vehicle Digital Computer Hardware
5. Saturn Control System Hardware

Room A-110  
Room A-116/120  
Room A-118  
Room A-115  
Room CC-115

## INERTIAL SENSOR AND STABILIZER DIVISION

6. Slip Ring Research and Development
7. Electronics - Breadboard, Gyro Development
8. Stabilizer Platform Models and Air Bearing
9. Dunn Stand (Sidereal Testing)
10. Isolation Pad Room, Gyro and Accelerometer and System Flight Calibration

Room A-105-1  
Room A-104-2  
Room AA-122-3  
Room AA-117  
Room AA-115-2

PLEASE

OBSERVE

## INSTRUMENTATION AND COMMUNICATION DIVISION

11. Recoverable Camera System
12. Saturn Telemetry System
13. Saturn Flight Television System

Room BB-117  
Room B-135  
Room B-229-1

NO ADMITTANCE

## ELECTRICAL SYSTEMS INTEGRATION DIVISION

14. Saturn Emergency Detection System Display
15. Saturn Flight Electrical Hardware
16. On Board Fuel Cell Development

Room CC-207-2  
Room CC-241  
Fuel Cell Lab

SIGNS

## FLIGHT DYNAMICS BRANCH

17. Flight Simulation of Saturn Vehicle
18. Digital Computer Flight Simulation Demonstration
19. Hybrid Analog-Digital Simulation

Room A-225  
Room A-220  
Room A-226

## APPLIED RESEARCH BRANCH

20. Laser Demonstration, CO<sub>2</sub> Laser, Beam for Tracking

Optical Tunnel

## ELECTRO-MECHANICAL ENGINEERING BRANCH

21. Electro and Mechanical Design Display

Room CC-225

## PROTOTYPE DEVELOPMENT BRANCH

22. Plastic for Electronic Packaging
23. Air Bearing Platform
24. Flat Conductor Cable and Connector Technology
25. Microelectronic Circuit Fabrication
26. Numerical Control Machining

Room C-100  
C-Hall  
Room C-104  
Room C-105-4  
Room C-110-2

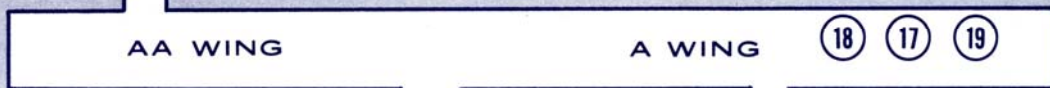
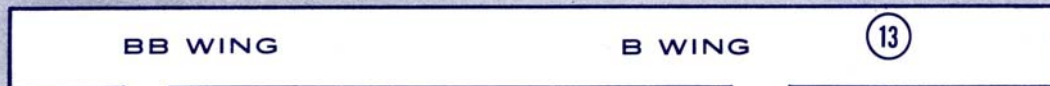






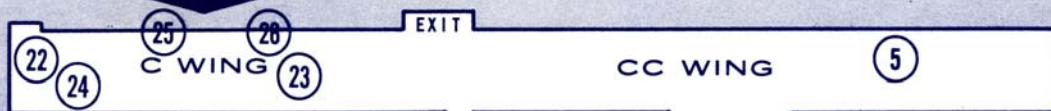
BUILDING 4487

ASTRONICS FLOOR PLAN

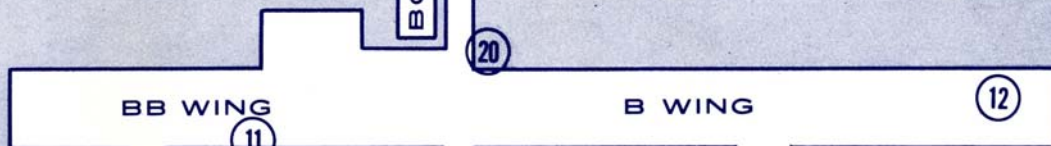


SECOND FLOOR

FIRST FLOOR



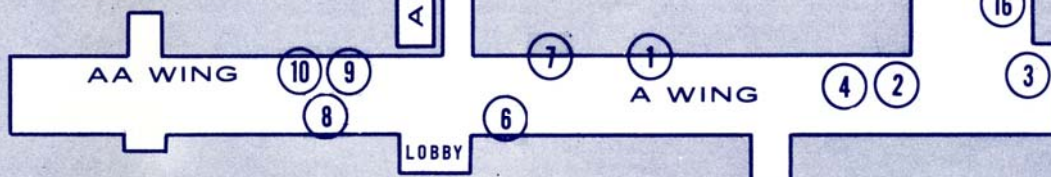
BC WING



BLDG 4436



AB WING



ENTRANCE



# Propulsion & Vehicle Engineering Laboratory

PERFORMS AEROSPACE RESEARCH AND DEVELOPMENT IN :

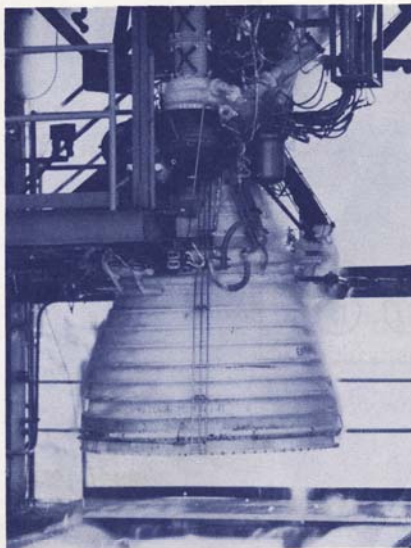
● STRUCTURES

● PROPULSION

● MATERIALS

● SYSTEMS ENGINEERING

● ADVANCED STUDIES



J-2 ENGINE FIRING

## PROPULSION RESEARCH & DEVELOPMENT

1. Movie of SA-203 Liquid Hydrogen Experiment - a ten minute narrated movie showing SA-203 lift off and weightless behavior of  $\text{LH}_2$  during flight. Shown every 15 minutes.
2. Saturn Mechanical components - Actual components such as regulators, feed-ducts, valves, pressure switches, hydraulic reservoirs are displayed and individually labeled.
3. Zero Leakage Study - Saturn vehicle connectors and seals are displayed.
4. Solid Propellant Motors Display - Models and actual solid motors for ullage and retro uses are displayed.
5. Super Insulation Display - Insulations developed for propellant tanks and engine lines are displayed.
6. Zero Gravity Experiment - Zero-G packages for drop-tower experiments are displayed.
7. Saturn Liquid Engine Display - Several full size engines are on display including RL-10, H-1, J-2, Aerospike. Also, engine hydraulic gimbal systems are on display.
8. Propellant Surface Profile Study - Plexiglass tanks filled with water; air bubbles are released in water to simulate surface disturbances. Demonstrations held every 20 minutes.
9. Vortex Formation Study - Plexiglass tanks filled with water and drained simulating Vortex formation in fuel tank. Demonstrations held every 20 minutes.
10. Saturn IB/V Instrument Unit Environmental Control System - full size display.

11. Bubbles/Vibration Study - Plexiglass container filled with liquid demonstrates the effects of vibration on bubble formation. Demonstrations held continuously.
12. Propellant Slosh Study - Plexiglass tank filled with water is oscillated showing slosh phenomena. Demonstrations held continuously.

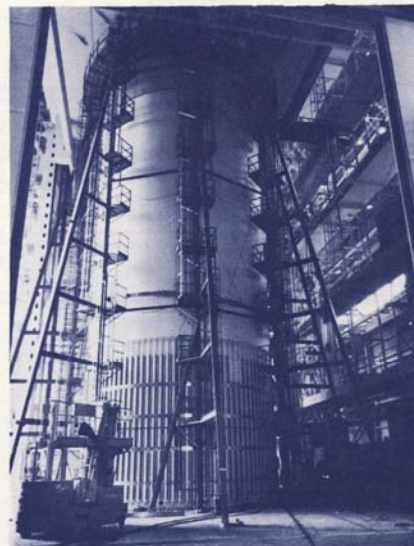
## STRUCTURES RESEARCH & DEVELOPMENT

1. IU Impedance Test - A full scale instrument unit is used in measuring the response of the structure to a force input.
2. Vibration and Acoustic Research Facility - Simulates the vibration and acoustic environments of the Saturn V test specimen.
3. Titanium Cross Beam Test - Full scale S-IC thrust structure cross beam is used to determine the weight savings utilizing titanium.
4. S-IC/S-II Interface Test - Full scale hardware of the S-IC and S-II are mated together to test the interface joint. Aerodynamic heating is simulated and the hardware is loaded to failure.
5. Flutter Panel Specimen - Simulated aerodynamic flight loads were imposed on this structure in a wind tunnel to determine if it would flutter during flight.
6. Box Beam Test - Loads and deflections are placed on specimens of same configuration but of different materials.
7. 3,000,000 Pound Universal Testing Machine - Has capability of testing specimens in both tension and compression to the design capacity.
8. S-IC Short Oxidizer Tank Structural Test - This tank will be filled with water and approximately 11,000,000 pounds of load applied to qualify new design.
9. Lunar Flight Vehicle Strut Drop Test - Evaluates the functional characteristics of a lunar vehicle energy absorber assembly.
10. 70-inch Tank Slosh Test - Determines the first and second resonant slosh frequency, shaker forces, bearing forces and tank displacements while shaking in longitudinal and transverse directions.
11. Instrument Unit Structural Test - Flight type hardware of the Saturn IB/V Instrument Units are tested to actual flight loads.

## MATERIALS RESEARCH & DEVELOPMENT

1. Nuclear Magnetic Resonance Spectroscopy and Electron Para-Magnetic Resonance Spectroscopy Equipment (the separation of protons)
2. High Voltage Electrical Exhibits - Demonstrations of glow discharge in a vacuum chamber, ladder electrode, and high temperature stable insulation. Demonstrations held continuously.

3. Metallic Material Exhibits
4. Materials Fatigue and Tensile Testing Machines
5. Thermal Properties Displays
6. Corrosion, Ultrasonic Cleaning Demonstrations. Demonstrations held continuously.
7. Gold Plating Demonstration. Demonstrations held continuously.
8. Salt Spray - Simulation of Corrosive Environment
9. Electron Microscope and X-ray Diffraction Equipment
10. Metallography Exhibits and Display of a Typical Microstructure
11. Welding Exhibit - Shows various alloys and weld specimens
12. Dry Film Lubrication Demonstration - Demonstrations held continuously
13. Electron Beam Welding Demonstration. Demonstrations held continuously
14. Non-Destructive Testing Equipment
15. Chemical Analysis Laboratories includes equipment such as emission spectrograph, infrared spectrophotometer, gas chromatograph
16. Ceramic Exhibits
17. Polymeric Materials Displays
18. Environmental Test Chambers
19. Cryogenic insulation and rubber and plastics processing equipment - includes rubber mills, mixers, presses, autoclaves, molding and extruding equipment



S-IC STRUCTURAL TEST



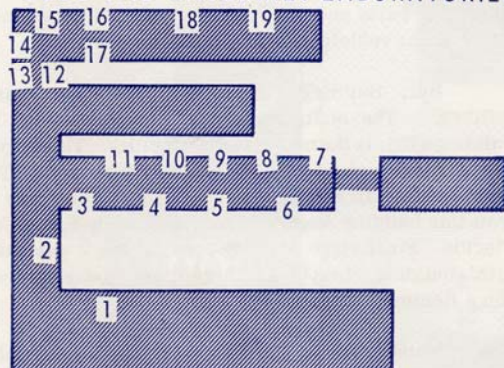
# PROPULSION & VEHICLE ENGINEERING LABORATORY

## FACILITIES and EXHIBITS:

BLDG 4610 P & VE HEADQUARTERS AND ENGINEERING BUILDING

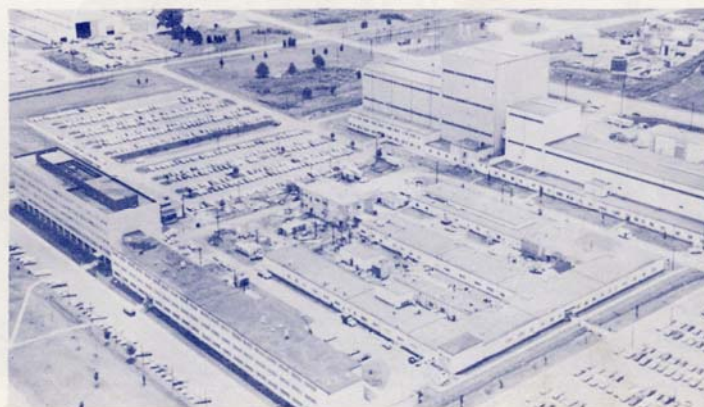
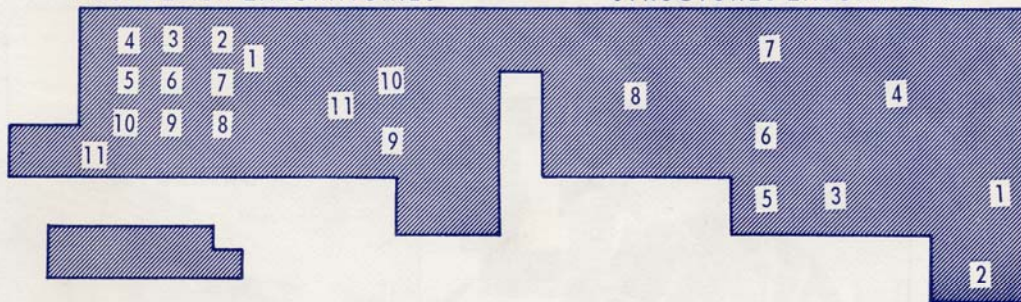


BLDG 4612 MATERIALS LABORATORIES



BUILDING 4610

PROPULSION LABORATORIES BLDG 4619 STRUCTURES LABORATORIES

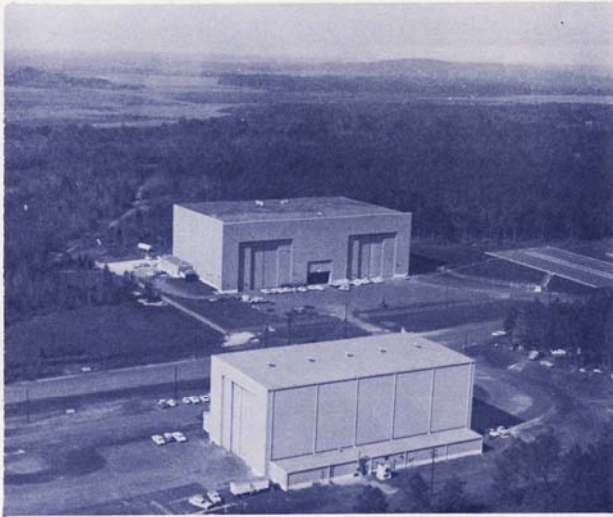




# Manufacturing Engineering Laboratory

Personnel from the Manufacturing Engineering Laboratory have pioneered in the fabrication and assembly of the Jupiter C that launched the Free World's first satellite, the Redstone, the Jupiter, the Juno II, the modified Redstone (the Mercury-Redstone for man's first suborbital flight), the Saturn I and the Saturn V S-IC first stage.

In the early days under the Army Ballistic Missile Agency, the laboratory was affectionately known as the "Fab Lab." Many changes have taken place since the Fab Lab days. Old timers will hardly recognize our facilities today. Building 4707 is the birthplace of the Redstone, Jupiter and Saturn I tankage.



Today in this building future rocket hardware is under development. New structures, composite structures (honeycomb materials) mark the type of materials that may be relied upon for the concepts of a future era.

Building 4705 is a proud building historically. Final assembly of many successful rockets was accomplished here. As you walk through the big center door, you are retracing steps made by three presidents -- President Eisenhower, President Kennedy and President Johnson. Generals, ambassadors and royalty from the far corners of this world have toured the building. All of the first group of astronauts visited this building. One of this building's greatest honors was the visit of the men who are fighting so valiantly in Viet Nam, the men of the Green Beret! In Building 4705 there is a variety of welding equipment, concepts of future tankage for rocketry, milling machinery and a machine shop for precision machining of parts and the machining of wind tunnel models of future flight vehicles.

But, Building 4705 is no longer the "assembly building." The multi-purpose vehicle technology facility, Building 4755, is the new assembly facility. This huge hanger has a clearance of 70 feet under the cranes. The first flight-vehicle first stage of the huge Saturn V was shipped from this building August 26 to the Kennedy Space Center in Florida. First stage of the second Saturn V was assembled in this building. Displays in this building today also will give you a fleeting glimpse of the future.

Members of the Manufacturing Engineering laboratory hope you enjoy your visit today. We are proud to be a part of Huntsville's historical heritage in the Space Age.





TO 4755

PARKING

4760

4705 · 06 TIE IN

4707

4711

4712

MANUFACTURING  
ENGINEERING  
LABORATORY

PARKING

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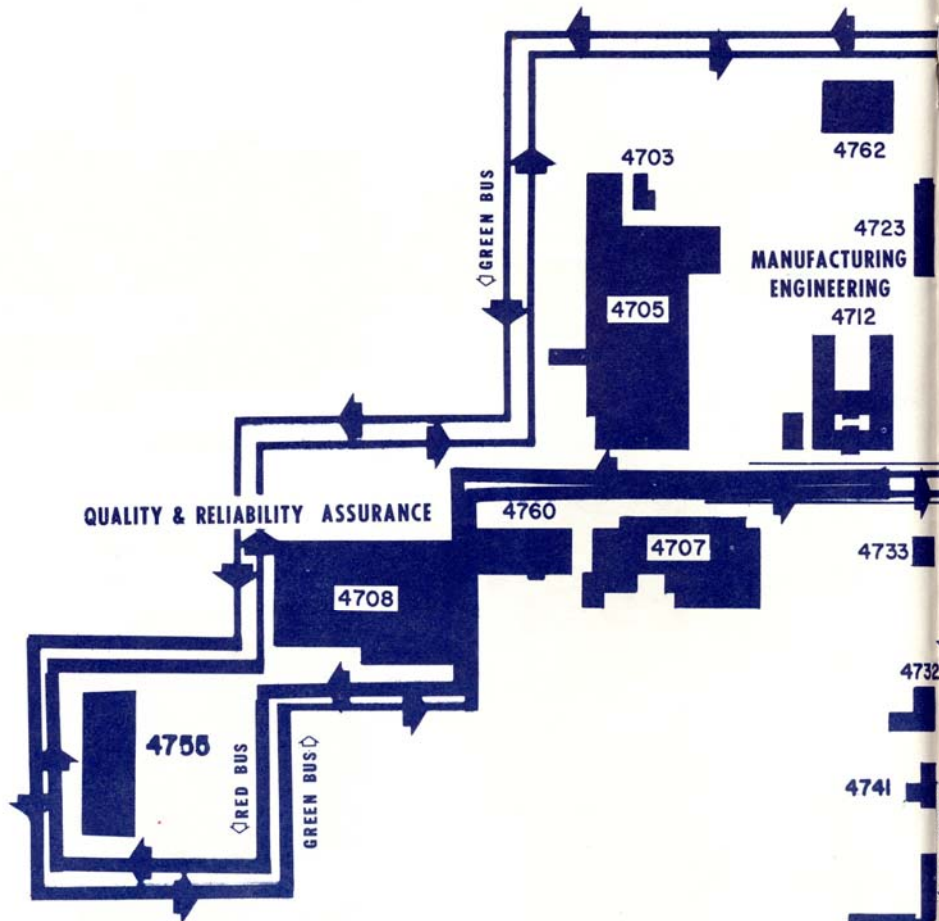
RIDEOUT ROAD





# BUS ROUTES

## OPEN HOUSE



**BUSES DISPLAYING RED OR GREEN MARKINGS TRAVEL ROUTES INDICATED EVERY 7 MINUTES.**

**DRIVERS WILL STOP AT ANY POINT ALONG THE DESIGNATED ROUTE.**

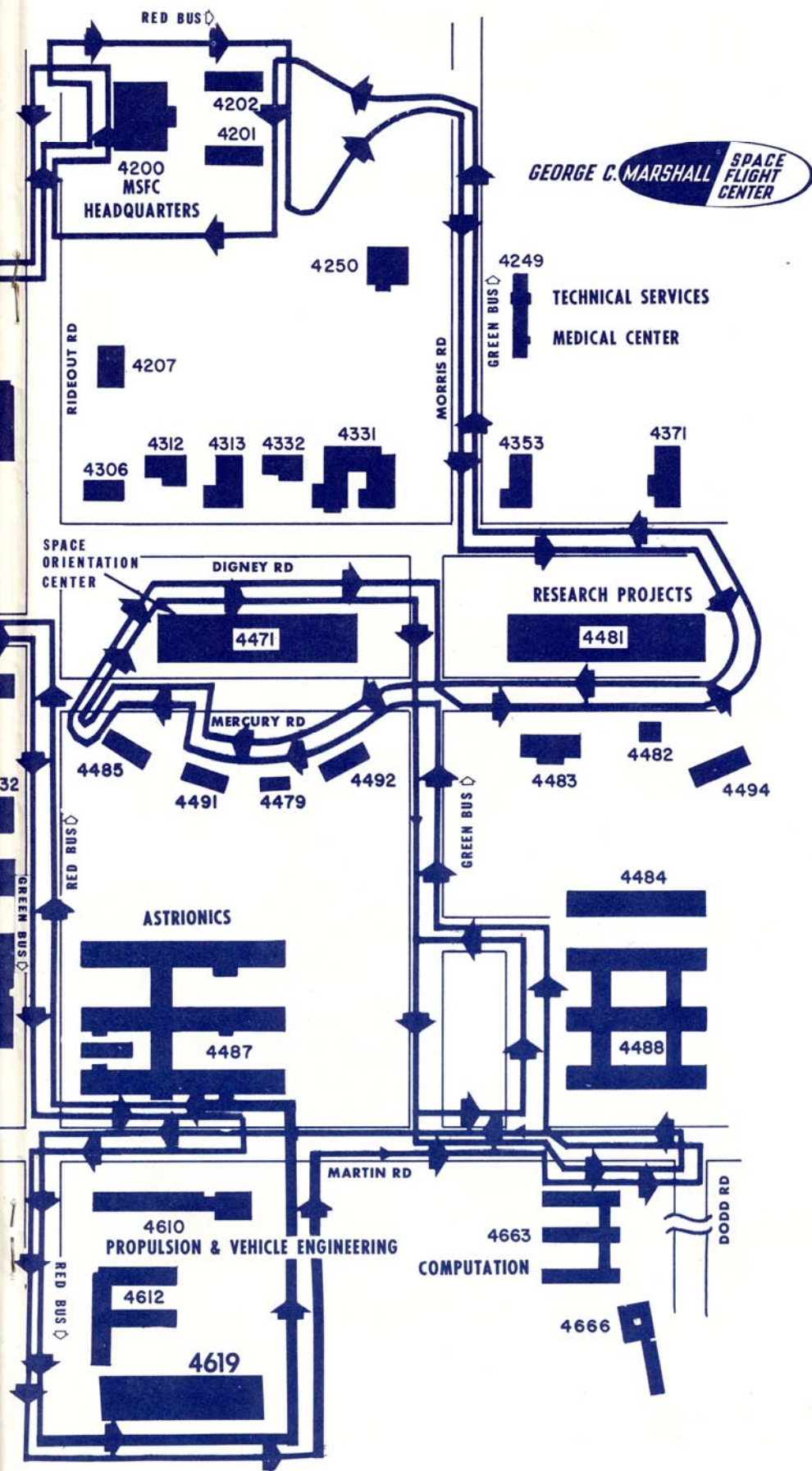
**EMERGENCY SERVICE MAY BE OBTAINED BY CALLING 876-3181.**

**ROUTES AND DIRECTIONS OF TRAVEL ARE INDICATED BY THE BROAD LINES WITH ARROWS.**

**MEDICAL CENTER AND FIRST AID BLDG. 4249.**

**CAFETERIAS AT BLDGS. 4200, 4610, 4708, AND 4487.**







# Industrial Operations

Open House presentations for Industrial Operations will be in Building 4201, directly east of the Marshall Center's headquarters, Building 4200.

Films and presentations on Saturn launch vehicle programs will be shown throughout the day in Building 4201's

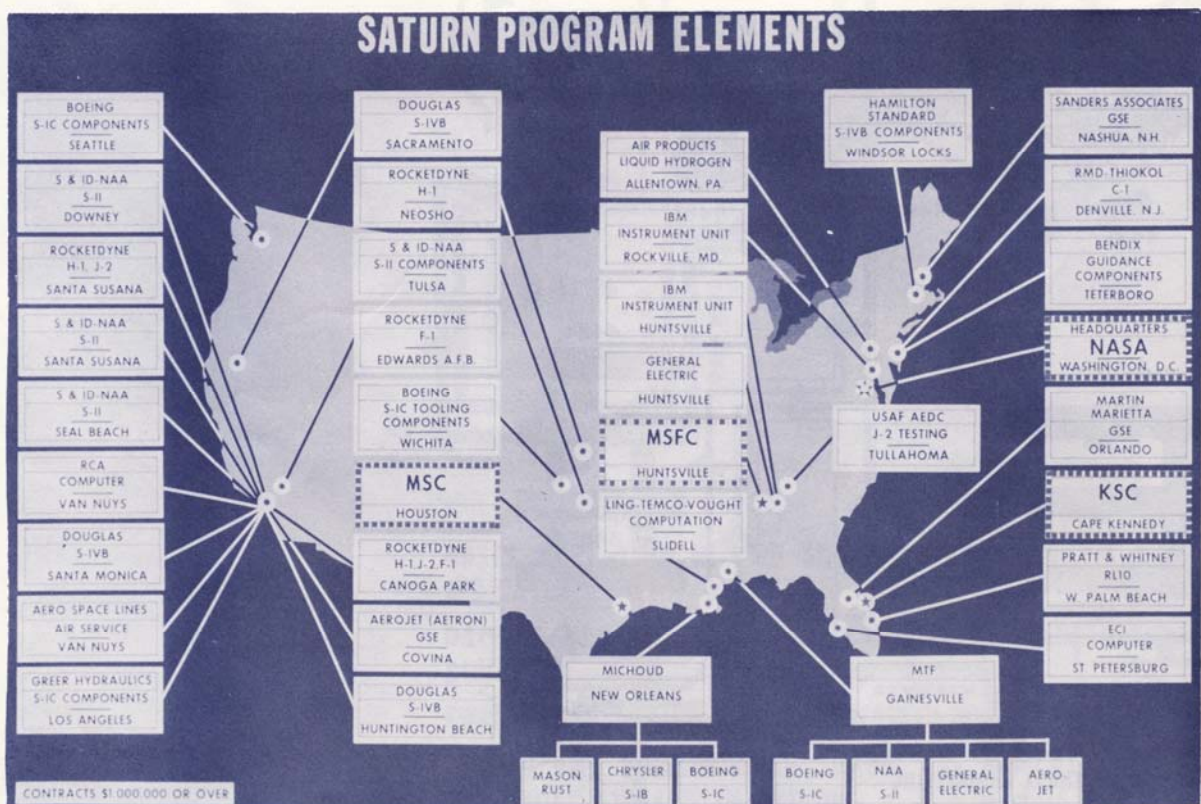
Director's Conference Room -- Room 604

Saturn IB Program Control Center -- Room 428

Saturn V Program Control Center -- Room 325

Exhibits and models will be on display in the lobby and fifth floor of Building 4201. Exhibits feature Apollo Manned Flight Awareness, Data Management, Engines for Space Flight, Apollo Applications, and Project Logistics.

Industrial Operations manages the Saturn launch vehicle programs, which are wide in scope and quite complex because of the size, dollar value and national dispersion of vehicle elements.



During the fiscal period July 1, 1966 - June 30, 1967, Industrial Operations personnel are managing a total of 40 contracts -- each exceeding \$1 million. These contracts represent 88 per cent of the total \$1.6 billion MSFC budget. To manage the vast Saturn industrial programs contracted to private business in 48 of our 50 states, there are approximately

1,200 employees assigned to Industrial Operations. About 550 are assigned in locations other than the Marshall Center. This includes employees of field installations, such as Michoud Assembly Facility and Mississippi Test Facility; representatives at other NASA field centers, such as Kennedy Space Center; and resident personnel at prime contractor facilities.



Industrial Operations is supported by four staff offices: Contracts, Facilities, Logistics, and Resources Management.

The Contracts Office oversees all Saturn contracts. There are more than 140 major contracts, totaling nearly \$5 billion.

Industrial Operations' Facilities Project Office is responsible for all Saturn-oriented facilities. These facilities are widespread and include, for example, the test stands in Mississippi, the NASA Rocket Engine Test Site, Edwards, California, and test stands at Santa Susana, California.

The Project Logistics Office is responsible for propellants and pressurants, and spare parts and maintenance associated with all Saturn programs. This office also has responsibility for the water and air transportation of Saturn stages.

A fourth staff office, the Resources Management Office is responsible for allocation of budget and manpower resources, program management information, scheduling, configuration and data management.

#### PROGRAM OFFICES

The program offices are relatively small organizations within the Marshall Space Flight Center but their purpose is large. These offices plan and direct Saturn launch vehicle programs within approved technical, schedule and resources limitations.

Program offices are of two types -- those that manage staff functions and those that manage hardware.

Staff management offices are aligned to take care of certain functions common to the total program. Most staff offices are "mirror images" of similar offices located in NASA

Headquarters in Washington, D. C. They transmit and interpret program instructions which affect the hardware offices and, in turn, the hardware itself. These functional staff offices include: Program Control, Reliability and Quality Assurance, Test, Systems Engineering, and Flight Operations.

To keep Marshall and NASA management up-to-date on the status of Saturn launch vehicles, various methods are used. These include reviews, schedules, charts and reports. A summary status of programs is kept in special Program Control Centers and updated regularly. Periodic program reviews provide an opportunity for the program manager to review his program in depth with his key managers and to see results, trends and problems as they arise so that necessary corrective action may be taken.

Hardware management offices, also known as project offices, are responsible for conducting all phases of hardware development -- usually by contracting with industrial firms for design, manufacture and test. Industrial Operations program offices are: Saturn IB, Saturn V, Engines, Apollo Applications, and Mission Operations.

#### SATURN IB PROGRAM OFFICE

The uprated Saturn I (Saturn IB) is similar to the Saturn I but is larger and more powerful. It will become the first man-rated Saturn vehicle and will soon send the Apollo spacecraft in earth orbit with men aboard. The present Saturn IB program calls for launching 12 vehicles during the 1966 through 1968 time period. Three of these have been successfully launched this year.

The Saturn IB office is supported by four project offices: the S-IB Stage, the S-IVB Stage, the Instrument Unit, and Vehicle Ground Support Equipment.

## **SUPER GUPPY AIR TRANSPORT**





## SATURN V PROGRAM OFFICE

Using concepts tested and proven in the Saturn I and IB, Saturn V is being developed to carry American astronauts in the Apollo Spacecraft to the moon's surface and for other near-earth and deep-space missions. Presently 15 flights are planned for the Saturn V launch vehicle. One of the first major milestones was achieved with the rollout of a complete facility checkout vehicle at Florida's Kennedy Space Center last spring.

The Saturn V program is supported by five project offices: the S-IC Stage, the S-II Stage, the S-IVB Stage, the Instrument Unit, and Vehicle Ground Support Equipment.

## APOLLO APPLICATIONS PROGRAM OFFICE

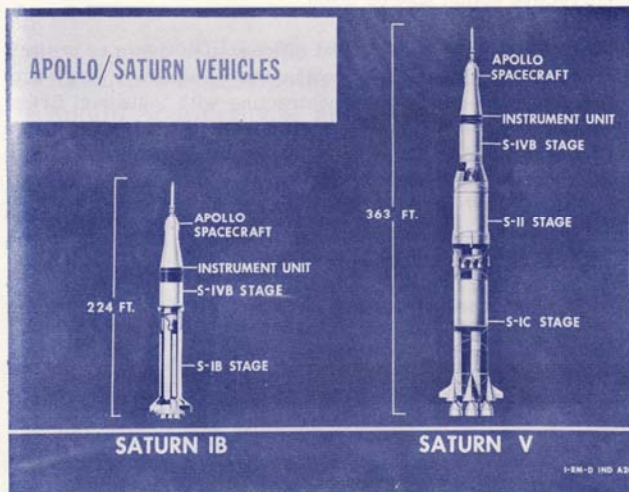
Industrial Operations' newest program office, Apollo Applications, was created to manage Apollo related programs and will be responsible for the experiments, space systems, and applications activities assigned to Marshall.

## MISSION OPERATIONS OFFICE

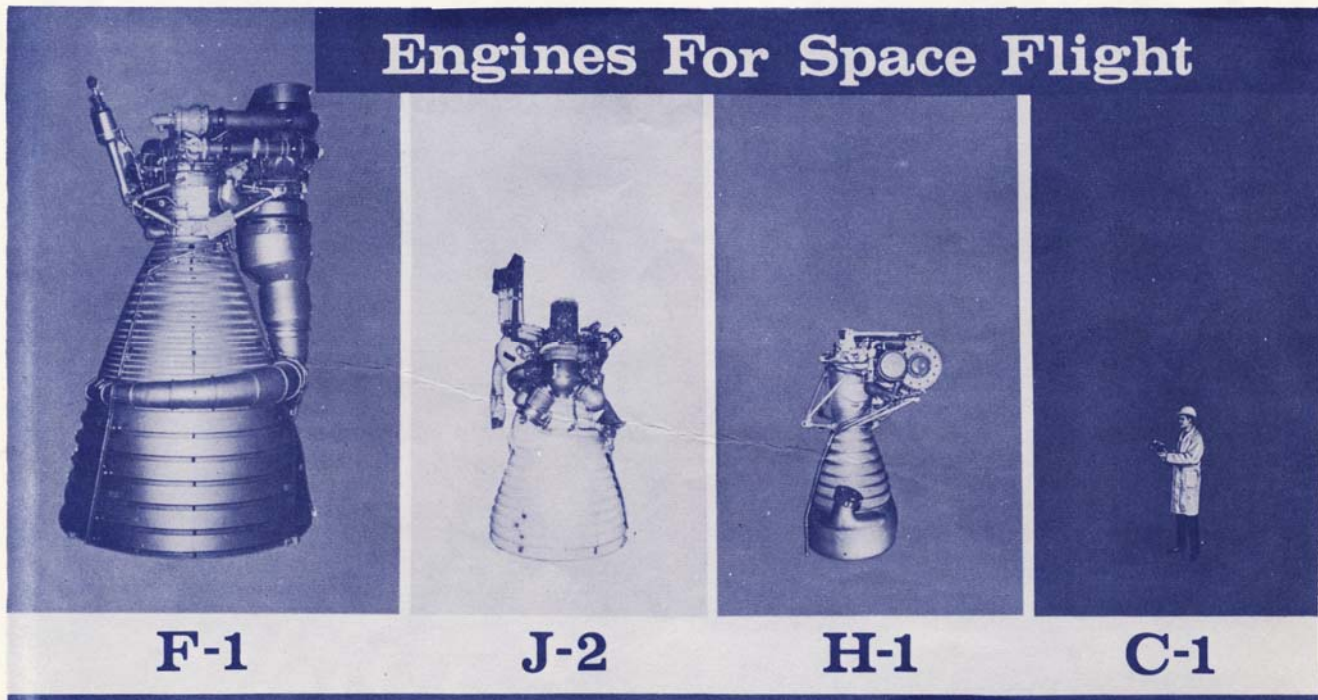
Mission Operations Office is a relatively new element. Its primary objective is to provide Kennedy Space Center and Manned Spacecraft Center, Houston, assistance in launching and flying the large Saturn launch vehicles. The office serves as an active link between the vehicle designers and the space flight operations personnel. To do this, Mission Operations Office functions somewhat like the control tower at any large airport. It watches and directs the vehicles and keeps track of their flight proficiency. In the Mission Operations here at Marshall, this is done by television, telephone, and radio.

## ENGINE PROGRAM OFFICE

The Engine Program Office manages the development and production of engines used on Saturn vehicles. Eight H-1 engines and one J-2 engine power the Saturn IB launch vehicle, while five F-1 engines and six J-2 engines will be used on the Apollo/Saturn V launch vehicle for the manned lunar landing program. Both the H-1 and F-1 engines burn liquid oxygen and kerosene, and are used as booster engines. The J-2 engine burns a high-energy combination of liquid hydrogen and liquid oxygen, and is used only for upper stages. The C-1 engine is a small engine under development for various launch vehicle and spacecraft applications, including thrust vector control.



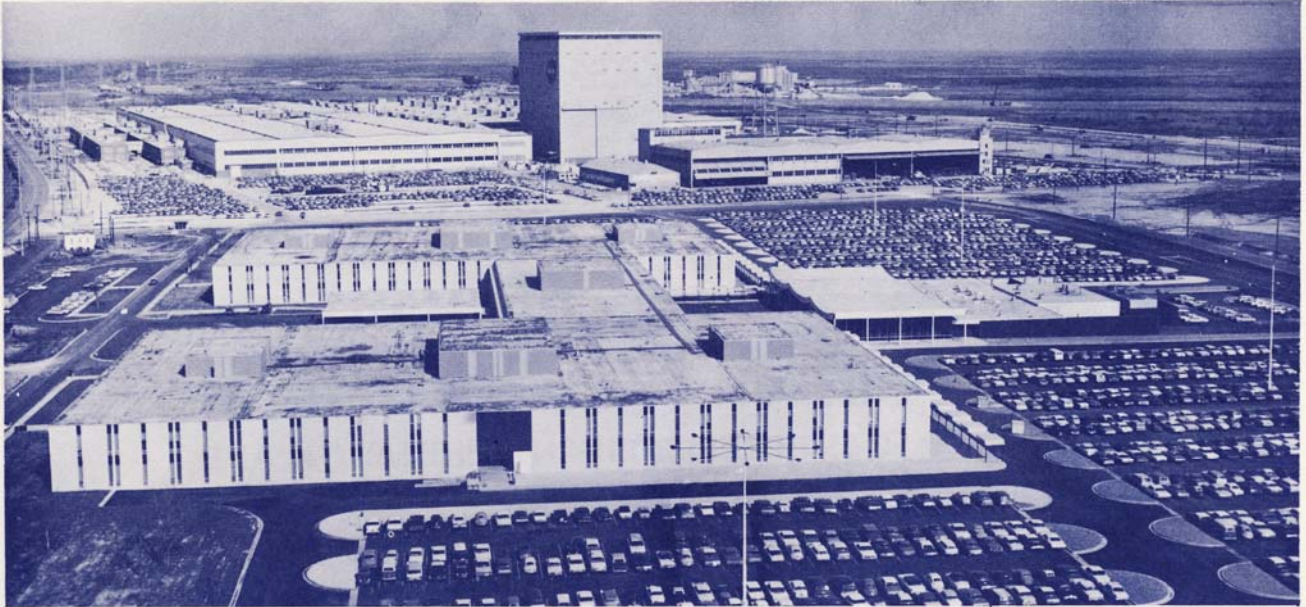
## Engines For Space Flight





## FIELD INSTALLATIONS

The Industrial Operations also directs two government-owned facilities used for the manufacture of the first stages of the Saturn IB and the Saturn V and for testing large rocket stages.

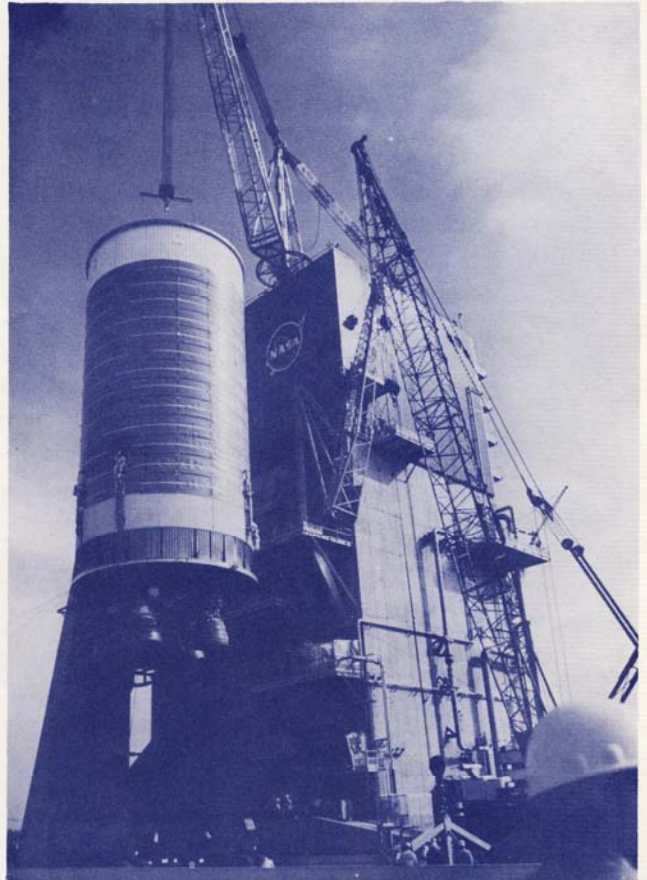


### MICHLOUD ASSEMBLY FACILITY

While government-owned and managed, Michoud is operated by four main contractors: Boeing Company Launch Systems Branch manufactures, first stages (S-IC) for the Saturn V; Chrysler Corporation Space Division produces Saturn IB first stages (S-IB); Mason-Rust, NASA's support services contractor at Michoud; and Ling-Temco-Vought Range Systems Division, responsible for computers, data transmission and related electronic equipment in support of the Saturn booster manufacturing programs at Michoud and the Mississippi Test Facility. The main Michoud complex in New Orleans covers 900 acres. It is 15 miles east of downtown New Orleans but within the city limits off U. S. Highway 90. It is on the water route from Huntsville to the NASA-Kennedy Space Center. Some 11,500 government and contractor personnel are now employed at Michoud, representing an annual payroll in excess of \$85 million.

### MISSISSIPPI TEST FACILITY

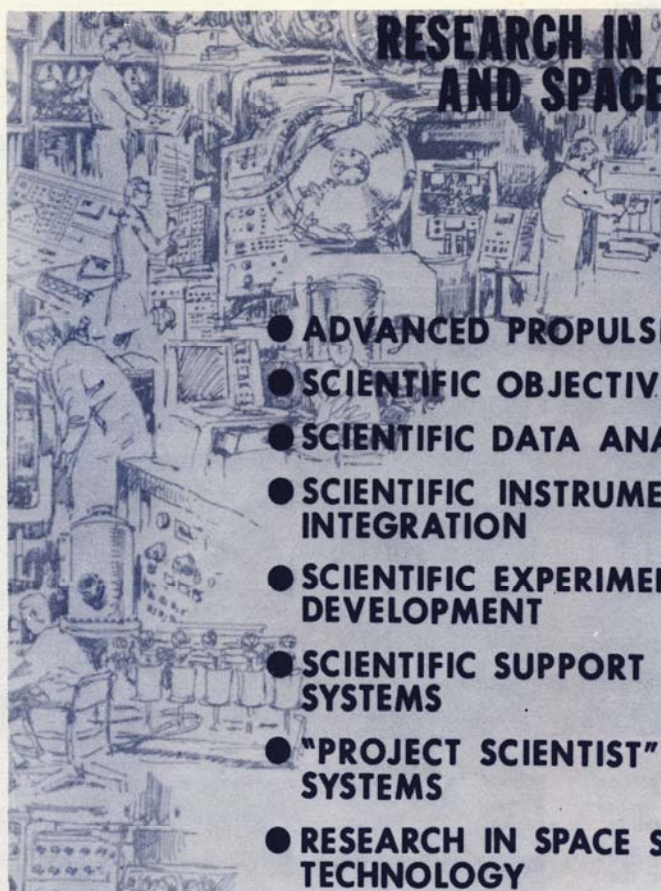
The Mississippi Test Facility, valued at \$300 million, provides rocket-testing stands, test control and test support units, scientific laboratories, utilities and the industrial complex capable of testing the world's largest known launch vehicle stages and engines. Located between Picayune and Bay Saint Louis, Miss., and 45 miles northeast of downtown New Orleans, MTF was chosen because of the natural waterway entries to the site, the availability of sufficient land at reasonable cost, the nearness of the Michoud Assembly Facility, and the area's proximity to the Kennedy Space Center launch facilities. In addition, the pine and cypress forest and marshland have a relatively small number of residents. The NASA test area includes 13,427 acres, approximately five miles square, in Hancock County, Mississippi. An acoustical buffer zone of 128,344 acres (leased or owned by the government) surrounds the test area.



*The Saturn S-II Stage is lifted into the static test stand at the Mississippi Test Facility.*



## Research Projects Laboratory



**RESEARCH IN SPACE SCIENCES  
AND SPACE TECHNOLOGY**

- ADVANCED PROPULSION STUDIES
- SCIENTIFIC OBJECTIVES SYNTHESIS
- SCIENTIFIC DATA ANALYSIS AND EVALUATION
- SCIENTIFIC INSTRUMENTS ANALYSIS AND INTEGRATION
- SCIENTIFIC EXPERIMENTS INITIATION AND DEVELOPMENT
- SCIENTIFIC SUPPORT FOR MSFC-DEVELOPED SYSTEMS
- "PROJECT SCIENTIST" SUPPORT FOR PAYLOAD SYSTEMS
- RESEARCH IN SPACE SCIENCES AND ADVANCED TECHNOLOGY

This laboratory is located in Buildings 4431, 4475, and 4481. During open house it will be open only to lab employees and families.

## *Gemini VII Spacecraft on Display*

The Gemini VII spacecraft that carried Astronauts Borman and Lovell on the historic 14-day flight of 206 orbits will be on display at Marshall Center during Open House. The capsule will be located on the grounds in front of Building 4200.

## *Uprated Saturn I- Saturn IB*

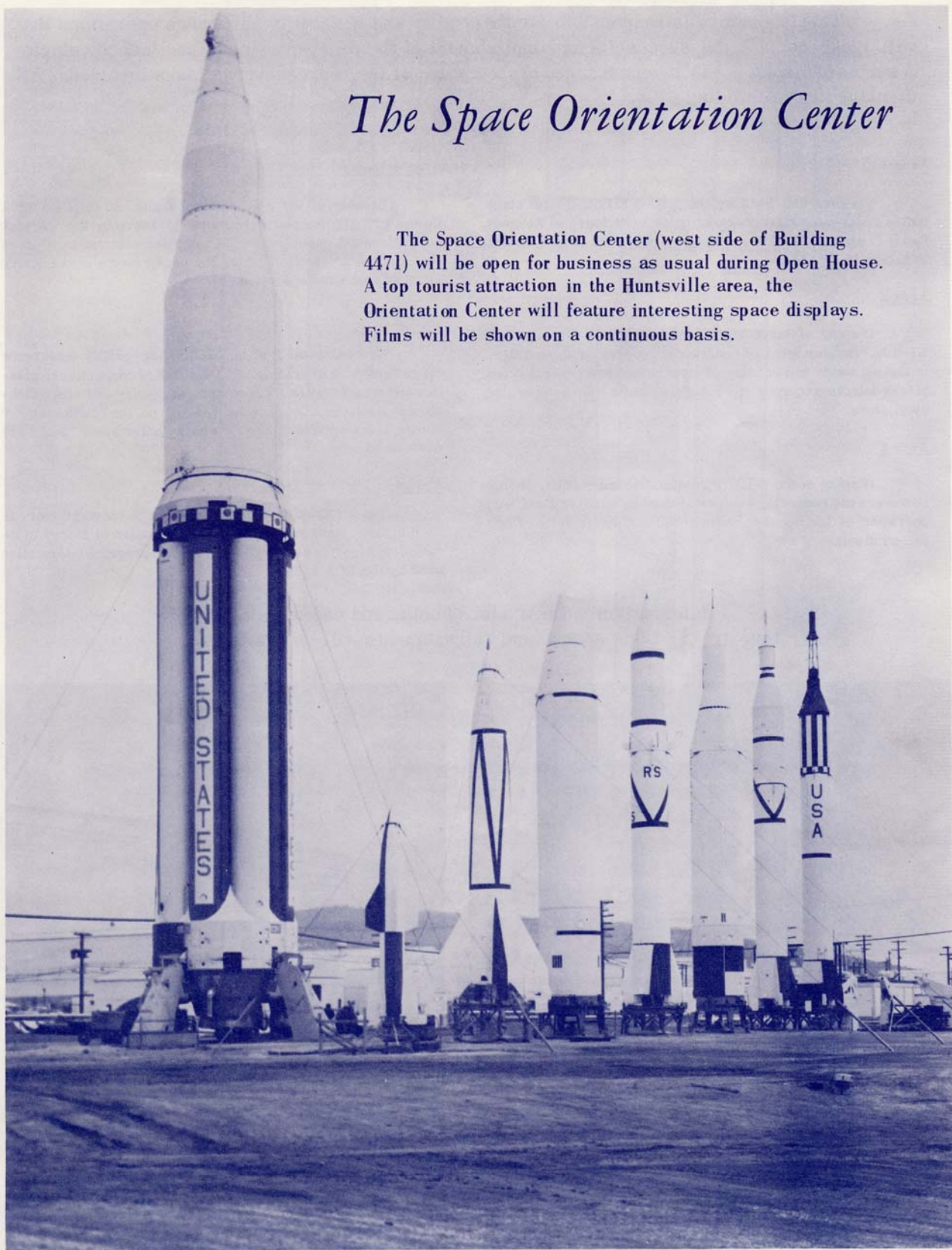
A full-scale version of the Uprated Saturn I launch vehicle will be located at the south end of Rideout Road during Marshall Center Open House day. All the stages are test versions and are in actual use in the Uprated Saturn test program.

The Uprated Saturn I will soon be carrying three astronauts to orbit aboard the Apollo spacecraft.



## *The Space Orientation Center*

The Space Orientation Center (west side of Building 4471) will be open for business as usual during Open House. A top tourist attraction in the Huntsville area, the Orientation Center will feature interesting space displays. Films will be shown on a continuous basis.





# Quality Laboratory

This laboratory is responsible for the quality and reliability assurance operations that will make certain the successful accomplishment of the flight mission by the launch vehicle. A series of displays has been arranged to show some of the representative tasks involved. All displays are in Building 4708.

## Area 1

Visitors can walk by the S-IC-2 Saturn V first stage that is undergoing final checkout prior to delivery to Kennedy Space Center in Florida. It will be used in the second launch of Saturn V.

## Area 2

Display of large rocket engines (F-1, J-2, H-1 and RL-10), various types of nondestructive test equipment used in testing welds and bonding of structures, and several types of leak detection equipment. Several exhibits may be operated by visitors.

## Area 3

Display of the S-IC Telemeter Ground Station. Radio receivers and recording equipment used to monitor functional operation of the booster during checkout and in actual flight are on display.

## Area 4 (Second Floor)

Display of the S-IC Control Room and the RCA 110A Computer. The desired test operation is set up by the operator on the control panels; then the computer automatically gives the commands, and monitors the performance of the Saturn stage in real time operation.

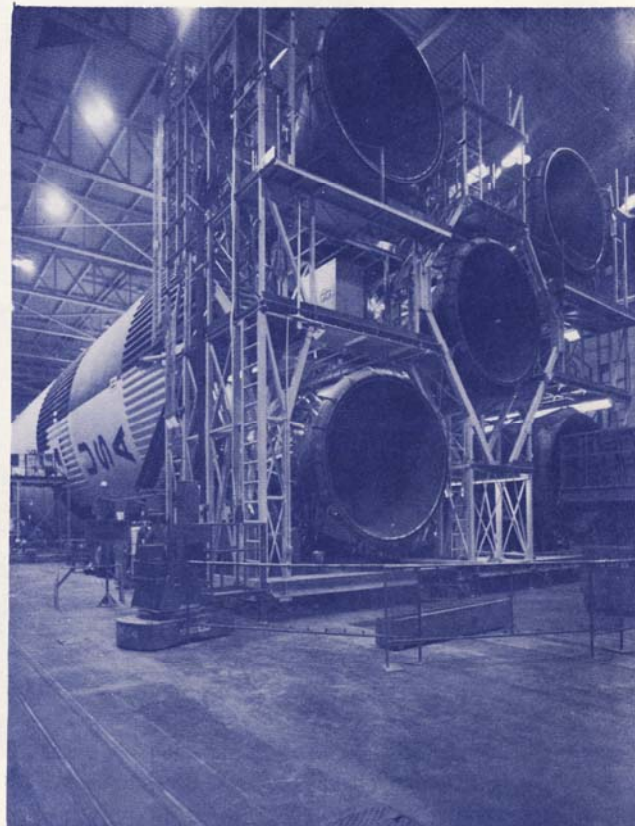
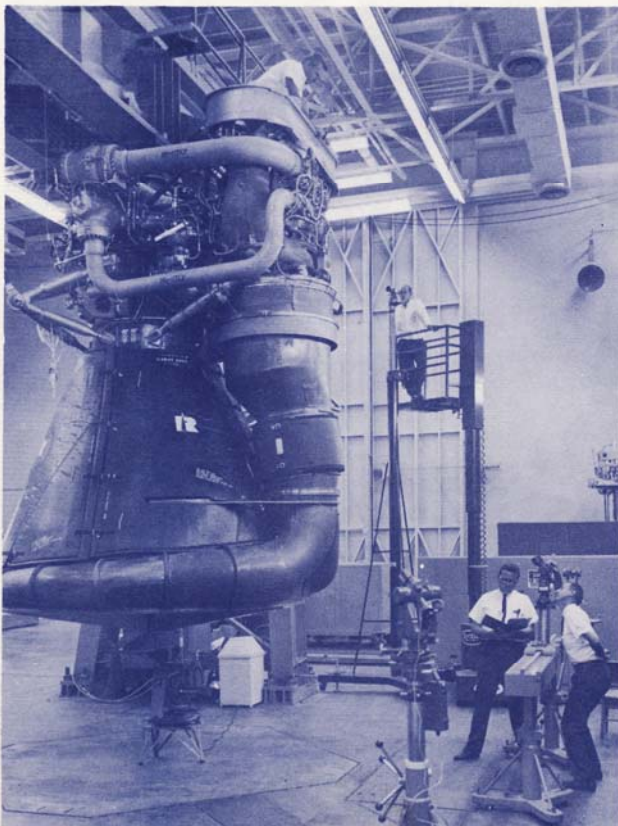
## Area 5

General exhibit area, displaying quality assurance operations related to soldering, welding of connections, plastics and encapsulation, TM equipment display and other electronic displays. Check your hearing on the "audiometer." See the ultra-vacuum chamber where "outer space" tests are performed.

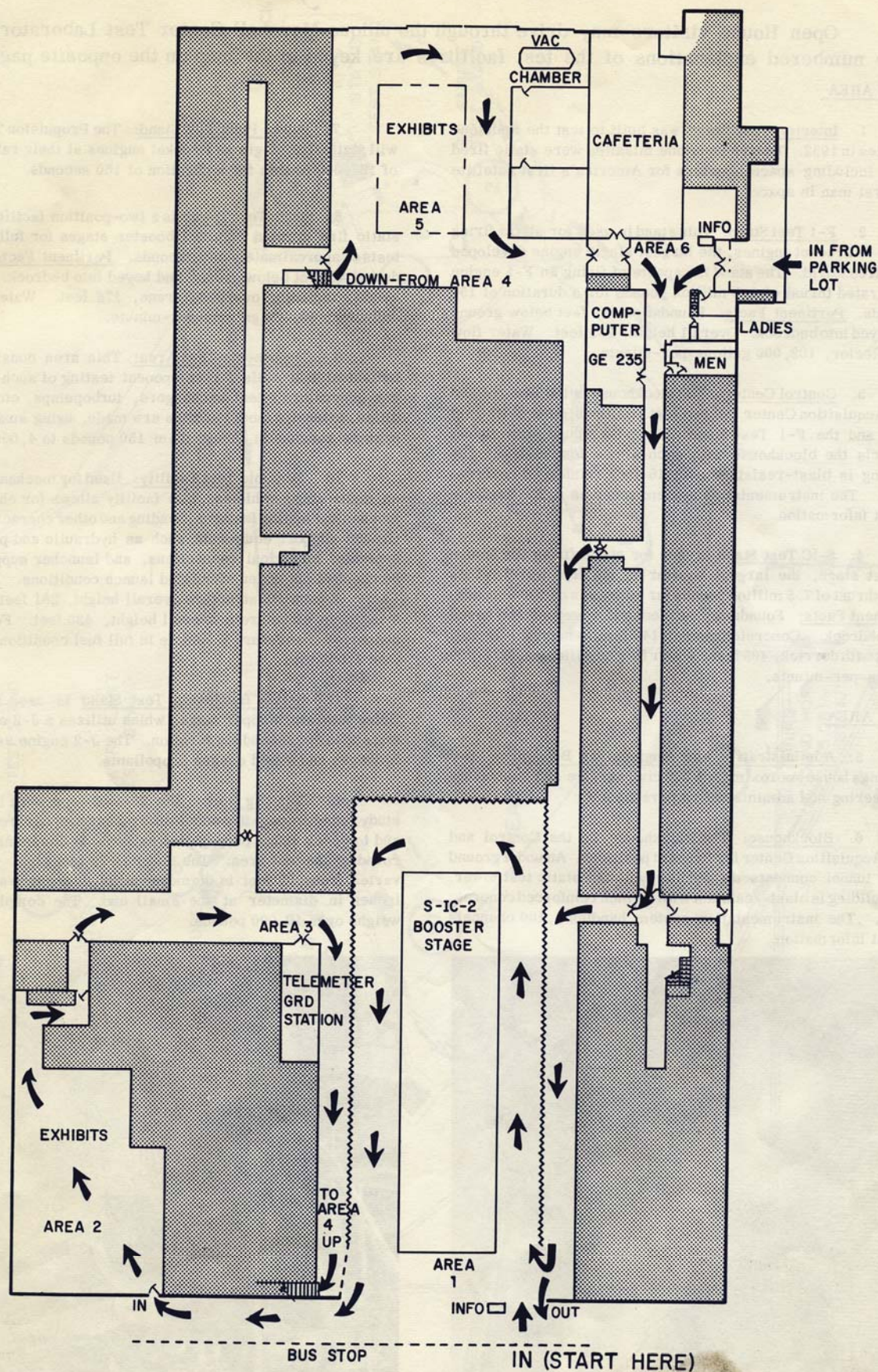
## Area 6

The GE 235 Computer, with its high speed printer, is on display. Management control information is stored in its memory. Also it is used to develop the test program information used by the RCA 110A.

Information and assistance booth, and cafeteria are in this area. Light snacks and refreshments will be available.







R-QUAL BLDG. 4708



# Test Laboratory

Open House visitors may drive through the unique Marshall Center Test Laboratory. The numbered explanations of the test facilities are keyed to the map on the opposite page.

## WEST AREA

1. Interim Test Stand was built to test the Redstone missiles in 1952. Twelve Redstone missiles were static fired here, including space boosters for America's first satellite and first man in space.

2. F-1 Test Stand: This stand is used for static firing single F-1 rocket engines, the largest single engine developed in the free world. The stand is capable of firing an F-1 engine at its rated thrust of 1.5 million pounds for a duration of 150 seconds. Pertinent Facts: Foundation, 40 feet below ground and keyed into bedrock. Overall height, 239 feet. Water flow on deflector, 102,000 gallons-per-minute.

3. Control Center: The blockhouse is the Control and Data Acquisition Center for two test positions - the S-IC Test Stand and the F-1 Test Stand. An underground cable tunnel connects the blockhouse with each of the test stands. The building is blast-resistant with 18-inch reinforced concrete walls. The instrumentation system receives 1,200 channels of test information.

4. S-IC Test Stand is used for static firing the Saturn V first stage, the largest booster in the free world, at its rated thrust of 7.5 million pounds for a duration of 150 seconds. Pertinent Facts: Foundation, 40 feet below ground and keyed into bedrock. Concrete towers, 145 feet in height. Overall height with derrick, 405 feet. Water flow on deflector, 320,000 gallons-per-minute.

## EAST AREA

5. Administrative and Engineering Building: Two buildings house approximately 300 civil service and contractor engineering and administrative personnel.

6. Blockhouse: The blockhouse is the Control and Data Acquisition Center for five test positions. An underground cable tunnel connects the facility with the static test tower. The building is blast-resistant with 18-inch reinforced concrete walls. The instrumentation system handles 1,100 channels of test information.

7. Power Plant Test Stand: The Propulsion Test Stand will static fire single H-1 rocket engines at their rated thrust of 188,000 pounds for a duration of 160 seconds.

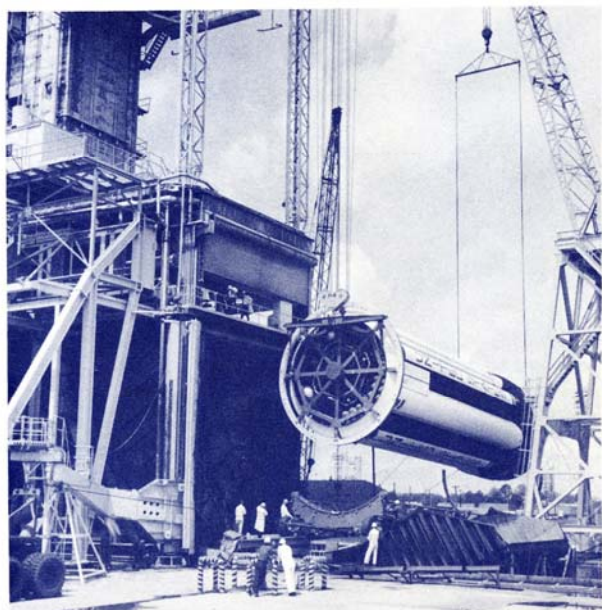
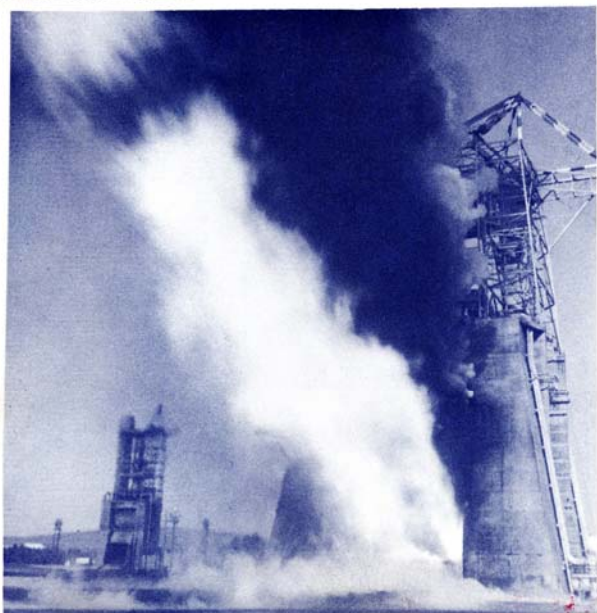
8. Static Test Tower is a two-position facility used to static fire uprated Saturn I booster stages for full duration tests of approximately 140 seconds. Pertinent Facts: Foundation 45 feet below ground and keyed into bedrock. Overall height, including overhead crane, 176 feet. Water flow on deflector, 50,000 gallons-per-minute.

9. Components Test Area: This area consists of 17 individual test cells for component testing of such items as gas generators, heat exchangers, turbopumps, etc. In addition, extensive model studies are made, using small rocket engines ranging in thrust from 150 pounds to 4,000 pounds.

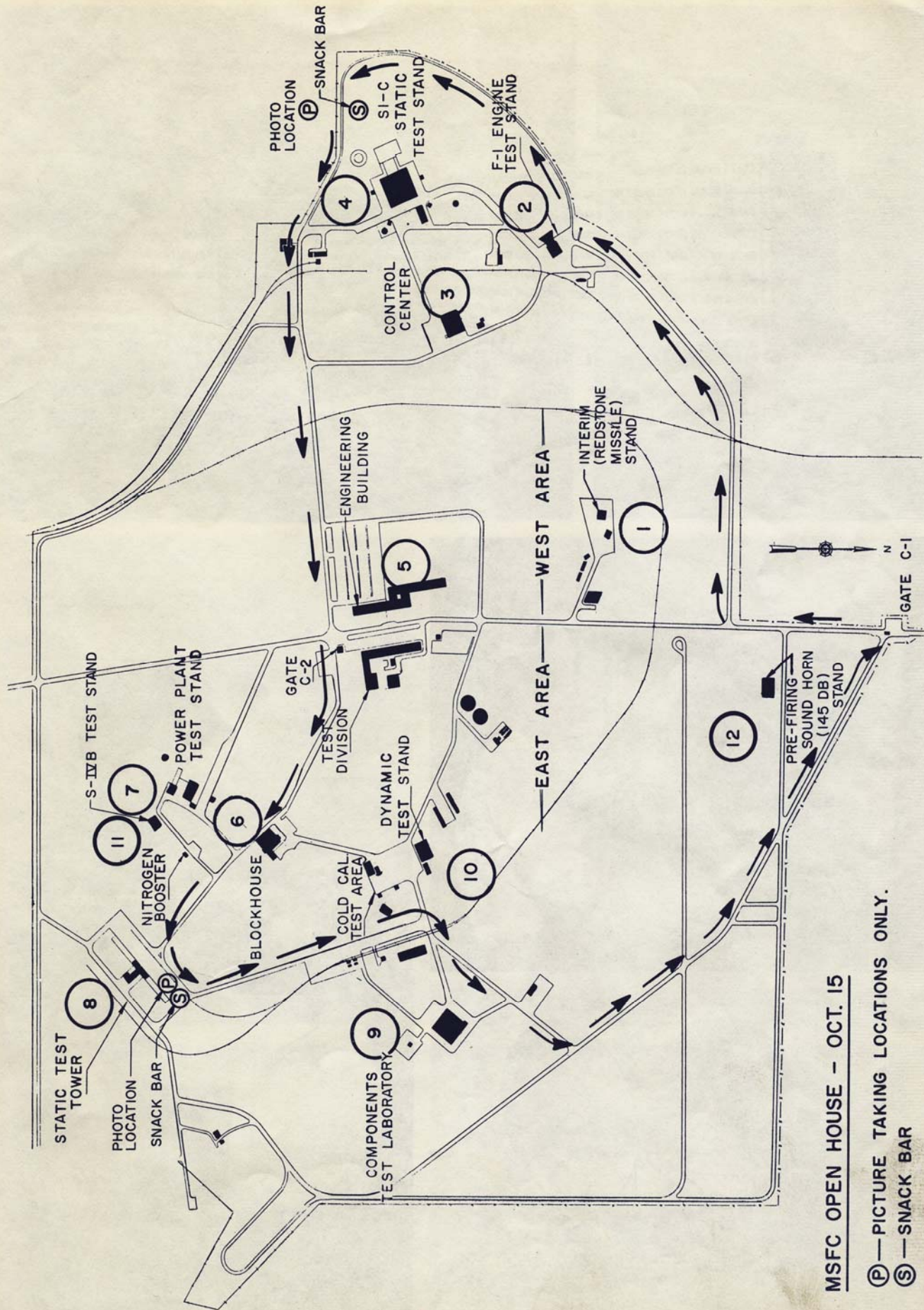
10. Dynamic Test Facility: Used for mechanical tests on multi-stage vehicles, this facility allows for checkout of mechanical mating features, bending and other characteristics. Ground support equipment such as hydraulic and pneumatic systems, electrical connections, and launcher supports can be checked out under simulated launch conditions. Pertinent Facts: Saturn IB structure overall height, 281 feet. Saturn V dynamic structure's overall height, 430 feet. Foundation supports entire Saturn V vehicle in full fuel condition -- more than 3,000 tons.

11. S-IVB Battleship Test Stand is used for static firing the Saturn upper stage, which utilizes a J-2 engine, in tests up to 500 seconds in duration. The J-2 engine uses liquid hydrogen and liquid oxygen propellants.

12. The Big Horn: The 26-foot-long horn is used to study sound propagation under different atmospheric conditions and to check sound propagation patterns in communities surrounding the test area. The tower is 75 feet high. The horn varies from 15 feet in diameter at its mouth to less than 10 inches in diameter at the small end. The complete horn weighs over 10,000 pounds.





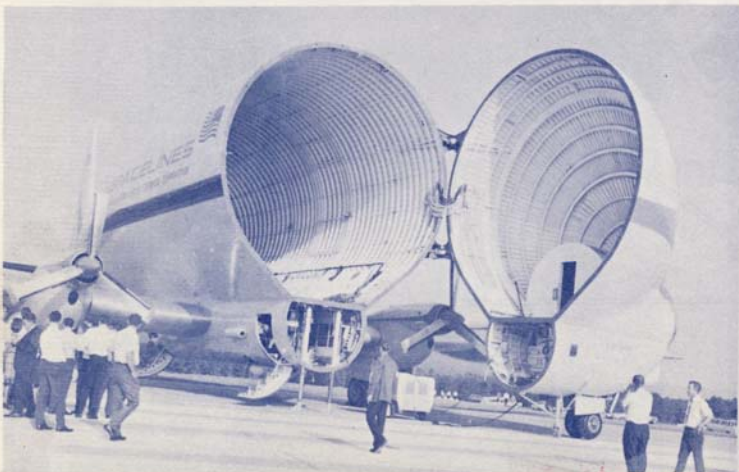
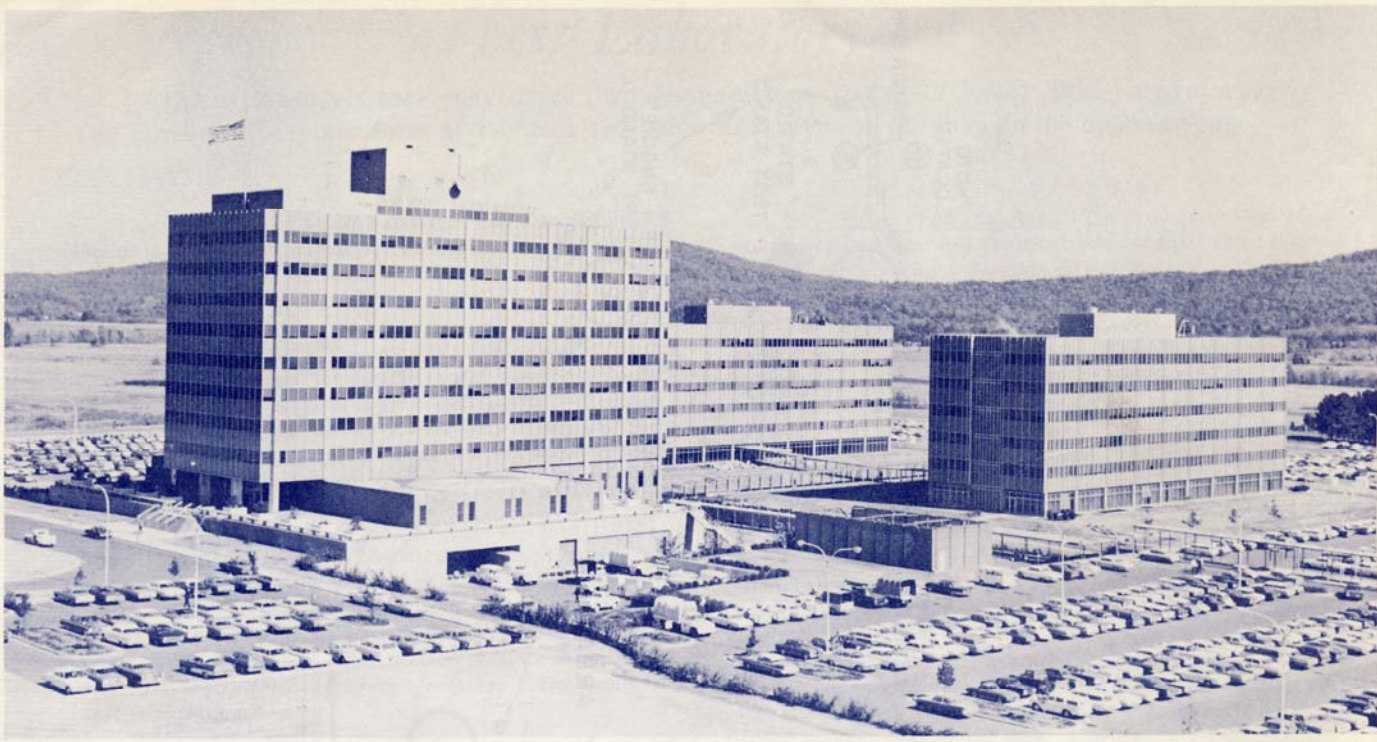


# MSFC OPEN HOUSE - OCT. 15

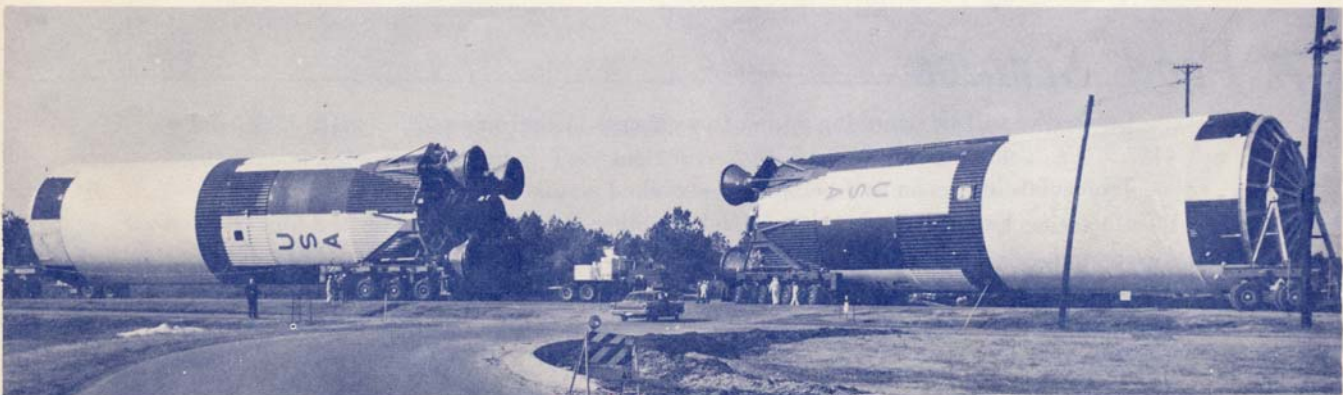
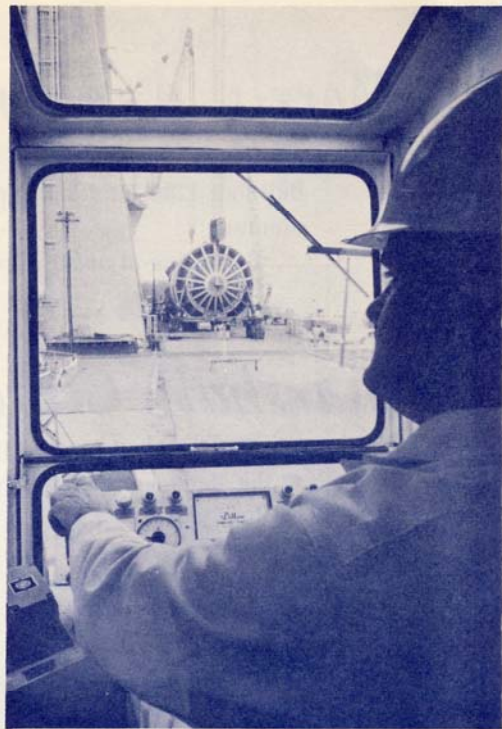
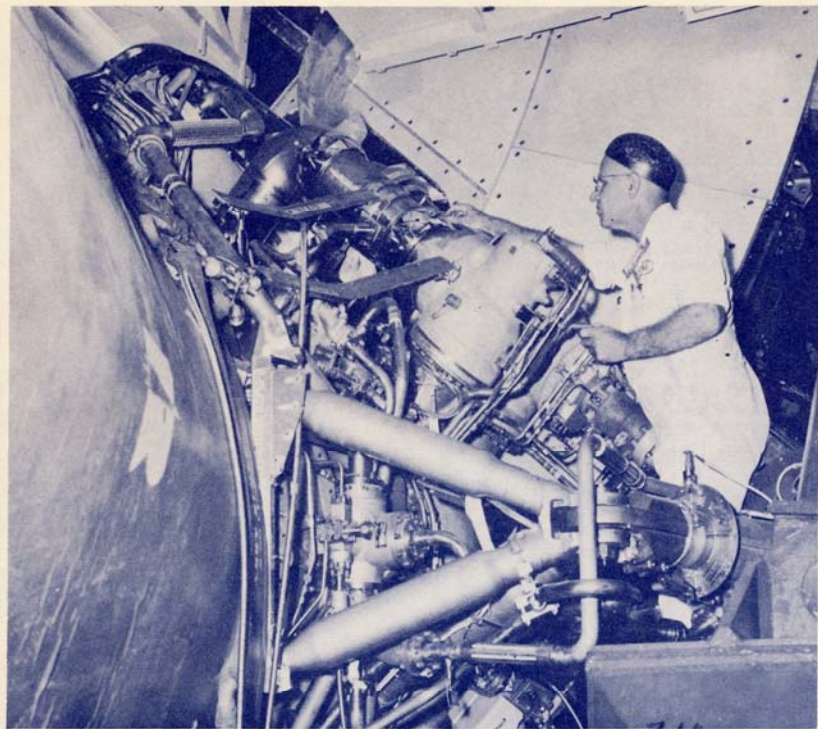
⒫—PICTURE TAKING LOCATIONS ONLY.

⒮—SNACK BAR











## ■ *Morris Auditorium Building 4200*

General educational lectures on space will be presented in Morris Auditorium, Building 4200, at 9 a.m. and 11 a.m. and 1 p.m. The lecture-demonstrations last 40 minutes.

Beginning at noon, films on space will be presented between lectures.

## ● *Marshall Center Exhibits Van*

The Marshall Space Flight Center Exhibits Van, shown for the first time locally at the Madison County Jaycee Fair, will be at Open House. It will be parked in front of Building 4200.



## ★ *Food Service*

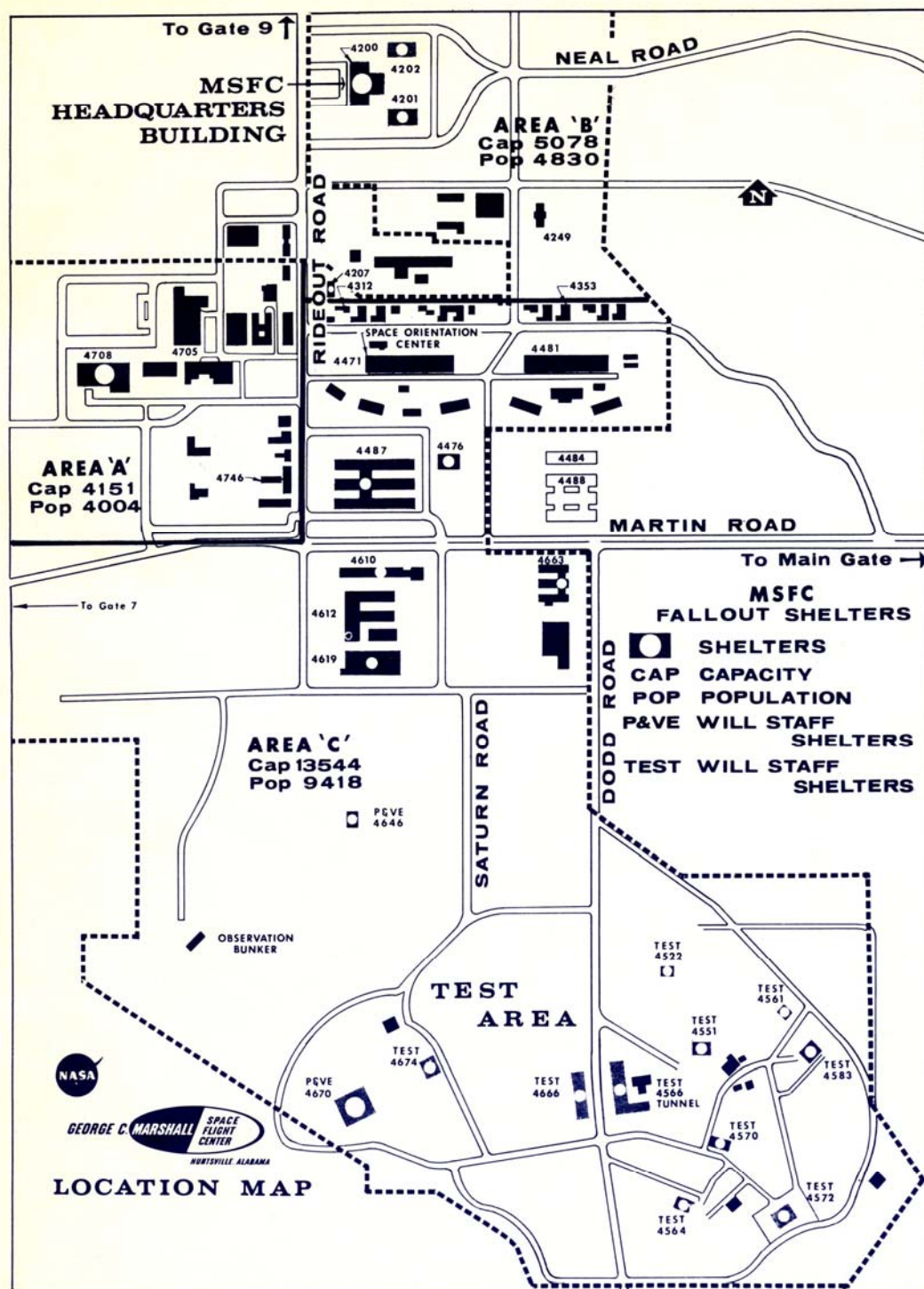
Cafeterias will be operating during Open House in Buildings 4200, 4610, 4708, and 4487.

Two mobile canteens will be open, one parked across from Building 4705 in the Manufacturing Engineering Laboratory and the other at Building 4200 for the Incentive Awards Ceremony.

Two soft drink refreshment centers will be located near Building 4471, the Space Orientation Center, and two other refreshment centers will be located in the Test Laboratory.



# Civil Defense Emergency Shelters



The Marshall Space Flight Center provides emergency shelters adequate for its employees and their dependants. The map above indicates where employees and families should go in case of emergency. These shelters are stocked and maintained on a continuing basis.

Your MSFC automobile decal and badge will permit fast admittance to each area. Should a shelter be full when you reach it, you will be directed to another shelter. Employees should stay at shelters and arrange for dependents to come to them if emergency occurs during work time.



