

United States Department of the Interior
National Park Service

For NPS use only

National Register of Historic Places
Inventory—Nomination Form

received

date entered

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

1. Name

historic Saturn V Dynamic Test Stand

and/or common Dynamic Structural Test Facility

2. Location

street & number George C. Marshall Space Flight Center not for publication

city, town Huntsville vicinity of congressional district

state Alabama code 01 county Madison code 089

3. Classification

Category	Ownership	Status	Present Use
<input type="checkbox"/> district	<input checked="" type="checkbox"/> public	<input type="checkbox"/> occupied	<input type="checkbox"/> agriculture <input type="checkbox"/> museum
<input type="checkbox"/> building(s)	<input type="checkbox"/> private	<input type="checkbox"/> unoccupied	<input type="checkbox"/> commercial <input type="checkbox"/> park
<input checked="" type="checkbox"/> structure	<input type="checkbox"/> both	<input type="checkbox"/> work in progress	<input type="checkbox"/> educational <input type="checkbox"/> private residence
<input type="checkbox"/> site	Public Acquisition	Accessible	<input type="checkbox"/> entertainment <input type="checkbox"/> religious
<input type="checkbox"/> object	<input type="checkbox"/> in process	<input checked="" type="checkbox"/> yes: restricted	<input type="checkbox"/> government <input type="checkbox"/> scientific
	<input type="checkbox"/> being considered	<input type="checkbox"/> yes: unrestricted	<input type="checkbox"/> industrial <input type="checkbox"/> transportation
		<input type="checkbox"/> no	<input checked="" type="checkbox"/> 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 Aeronautics 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 Historic Properties Report (Draft) has this property been determined eligible? yes no

date July 1983 federal state county local

depository for survey records U.S. Army Redstone Arsenal

city, town Huntsville state Alabama

7. Description

Condition

excellent
 good
 fair

deteriorated
 ruins
 unexposed

Check one

unaltered
 altered

Check one

original site
 moved date _____

Describe the present and original (if known) physical appearance

The Dynamic Structural Test Facility was built in 1964 to conduct mechanical and vibrational tests on the fully assembled Saturn V rocket. The facility is 360 feet high and 122 feet by 98 feet at the base. It has a maximum center bay size of 74 feet by 74 feet, has a main derrick at the top of the structure capable of handling 200 tons at a 70 foot radius. The facility is connected by a cable tunnel to the East Test Area which provides instrumentation for testing. An elevator provides access to 15 of the 16 levels.

When in use the test vehicle rests on hydrodynamic supports which provide a maximum of 6 degrees of freedom of movement which is required when large space vehicles are dynamically tested. Vibration loads can be induced in the pitch, yaw, or longitudinal axis to obtain resonance frequencies and bending modes. Vertical mating procedures between stages can also be investigated and checked out.

After completion of testing for the Saturn V program the Dynamic Structural Test Facility was modified for testing the Space Shuttle. At the present time this facility is on a standby basis, but because of its unique capabilities to dynamically test large space vehicles, it will be retained for use in future NASA programs.

8. Significance

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

Specific dates 1964–Present **Builder/Architect** NASA

Statement of Significance (in one paragraph)

The Dynamic Structural Test Facility is significant because of its connection with the testing and development of the Saturn V rocket.

The Saturn V rocket was one of the most reliable rockets ever built. Upon its success depended the fate of the Apollo program and the Skylab program. The success of the Saturn V was because of two factors: (1) the stringent reliability and quality assurance programs developed to oversee the manufacture of the Saturn V, and (2) exhaustive ground testing.

The ground testing program was crucial to the success of the Saturn V. Once launched a Saturn V could never be recovered for testing. Any flaw in the vehicle could result in the loss of the vehicle and the loss of the lives of the astronauts riding the Apollo Command Module.

The Saturn V had to work and perform its job successfully every time. There was no margin for error. Due to this fact as much as 50 percent of the total effort and money in the Saturn V program was devoted to ground testing the vehicle. Every component of the vehicle was tested again and again separately and in partial and full assembly.

The Dynamic Structural Test Facility at Marshall represented the last step in this testing process before a Saturn V was accepted for full flight status. Once all of the components were accepted and tested the Saturn V was assembled and brought to the Dynamic Structural Test Facility to test the entire vehicle under dynamic load conditions. Mechanical and vibrational tests on the flight vehicle and on separate flight configurations were conducted until the data indicated that the Saturn V was clean and ready for flight status. Testing conducted in this facility permitted NASA and industry engineers their last chance to detect and correct any problems or flaws in the fully assembled flight vehicle. The success of the Saturn V program and the fact that no Saturn V ever failed in flight is indicative of the contribution of this facility. Major problems capable of causing a failure of the vehicle were discovered and corrected before the Saturn V ever reached Launch Complex 39 at the Kennedy Space Center. When the Apollo 11 moon flight lifted off the pad in July 1969 the astronauts and NASA were confident that the Saturn V would complete its job and launch the Command and Lunar Landing Module into a safe moon-bound trajectory.

9. Major Bibliographical References

See continuation sheets

10. Geographical Data

Acreege of nominated property Less than 1 acre

Quadrangle name Madison

Quadrangle scale 1:24,000

UMT References

A

1	6	5	3	1	0	6	0	3	8	3	1	9	6	0
Zone			Easting					Northing						

B

Zone		Easting					Northing							

C

Zone		Easting					Northing							

D

Zone		Easting					Northing							

E

Zone		Easting					Northing							

F

Zone		Easting					Northing							

G

Zone		Easting					Northing							

H

Zone		Easting					Northing							

Verbal boundary description and justification

The boundary of the Saturn V Dynamic Test Stand is defined by the outside perimeter of Building 4550 at the Marshall Space Flight 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

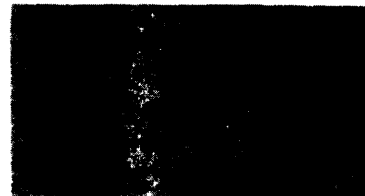
Attest:

date _____

Chief of Registration

**United States Department of the Interior
National Park Service**

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Continuation sheet

Item number

9

Page

1

Bibliography

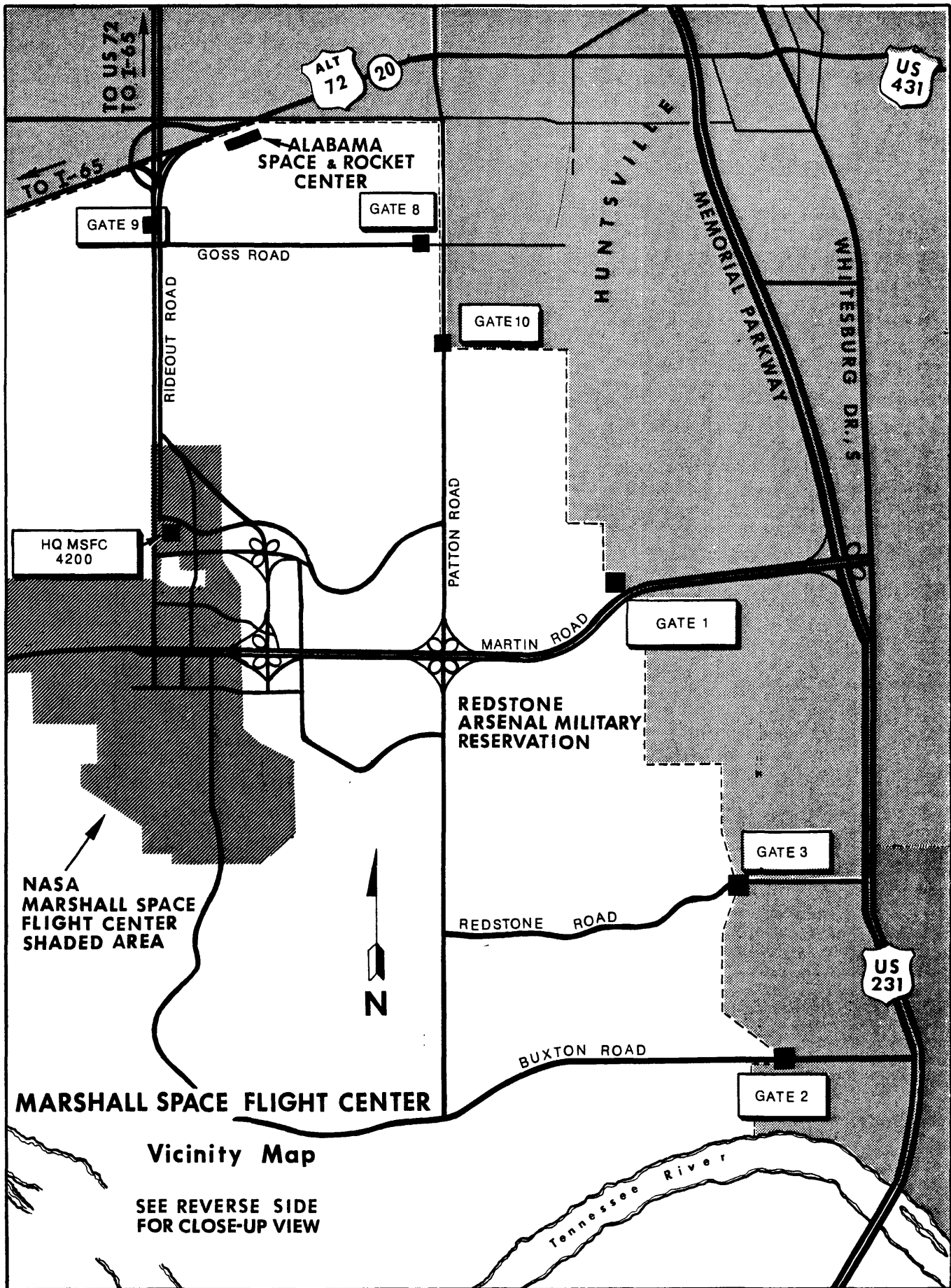
Bilstein, Roger B. Stages to Saturn: A Technological History of the Apollo/Saturn Launch Vehicles. Washington, D.C.: National Aeronautics and Space Administration, 1980.

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.

Draft Historic Properties Report: Redstone Arsenal, Alabama with the George C. Marshall Space Flight Center. Silver Spring, Maryland: Building Technology Incorporated, 1983.

Master Plan George C. Marshall Space Flight Center. Washington, D.C.: National Aeronautics and Space Administration, 1980.

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



MARSHALL SPACE FLIGHT CENTER, ALABAMA

FACILITIES SITE MAP

4700 AREA

- 4702 Shop Building
- 4703 Storage Building
- 4704 Hydraulic Press Fac.
- 4705 Machine Shop & Neutral Buoyancy Simulator
- 4707 Shop & Assembly Building
- 4708 Engr & Development Lab.
- 4711 Developmental Processes Lab.
- 4712 Office Building
- 4714 Mech. Equip. Building
- 4715 Storage Building
- 4716 Test Control Building
- 4723 Training Fac.
- 4727 Shop & Office Building
- 4728 Shop & Storage Building
- 4731 Storage Building
- 4732 Bionic Wind Tunnel Fac.

- 4733 Impulse Base Flow Fac.
- 4734 Vacuum Pump House
- 4738 Fabrication Dev. Building
- 4740 Water Pollution Contr. Fac.
- 4744 Compressed Air Fac.
- 4746 Office Bldg.
- 4747 Air Compressor Bldg.
- 4752 Multipurpose High Bay Fac.
- 4755 High Bay Assembly Fac.
- 4759 Model Shop Building
- 4760 Surface Treatment Facility
- 4764 Chemical Storage Bldg.
- 4767 Heat Treatment Fac.
- 4774 Storage Building
- 4775 High Reynolds Fac.
- 4776 Experimental Acoustic Test Fac.

4200 AREA

- 4200 Office Building
- 4201 Office Building
- 4202 Office Building
- 4207 Communications Facility
- 4241 Shop & Storage Bldg.
- 4244 Storage Building
- 4249 Office Building
- 4250 Office & Shop Bldg.
- 4251 Equipment Shed

4300 AREA

- 4306 Office Building
- 4312 MSFC Security Hq
- 4313 Shop Building
- 4347 Solar Magnetograph Fac.
- 4348 Storage Building
- 4353 Photo Lab.
- 4373 Laboratory Building (Assigned to Army)

4400 AREA

- 4436 Storage
- 4467 Celestial & Optical Sensors Fac.
- 4471 Storage & Office Bldg.
- 4472 Shop Building
- 4475 Hazardous Operations Lab.
- 4476 Environmental Test Fac.
- 4478 Equipment Shed
- 4479 Storage Shed
- 4480 Paint Shop
- 4481 Space Sciences Lab.
- 4482 Transportation Support Bldg.
- 4483 Vehicle Maint. Shop
- 4485 Office Building
- 4487 Laboratory & Ofc. Bldg.
- 4490 Storage Shed
- 4491 Documentation Repository
- 4492 Elec. Sys. Lab Bldg. (On Loan to Army)
- 4493 Shop & Storage Bldg.
- 4494 Center Activities Bldg.
- 4495 Shop Bldg.
- 4498 Storage Building
- 4499 Storage Building

4500 AREA

- 4514 Propulsion Sys. Test Std.
- 4516 LOX Storage Fac.
- 4517 LH₂ Storage Facility
- 4518 Hydrogen Transfer Control House
- 4519 LOX Transfer Control House
- 4522 Propulsion Sys. Component Test Std.
- 4523 Test Stand Terminal Bldg.
- 4525 LOX Transfer Control House
- 4526 LH₂ Transfer Control House
- 4527 LH₂ Storage Tank
- 4530 Propulsion Sys. Component Test Std.
- 4540 Model Propulsion Sys. Test (Acoustic)
- 4541 Test Stand Control Bldg.
- 4549 Deionized Water Plant
- 4550 Structural Test Fac.
- 4551 Struct. Test Fac. Terminal Bldg.
- 4552 Water Reservoir
- 4553 Test Fac. Terminal Bldg.
- 4554 Test Fac. Support Bldg.
- 4557 Structural Test Fac.
- 4558 Structural Test Fac. Terminal Bldg.
- 4561 Shop & Lab Bldg.
- 4562 Water Reservoir
- 4566 Office Building (On Loan to Army)
- Pump and Boiler House
- Blockhouse and Cable Tunnels
- Propulsion & Struct. Test Fac.
- Test & Data Recording Fac.
- Cold Calibration Test Stand
- Boiler

4600 AREA

- 4605 Non-Destructive Evaluation Lab
- 4610 Office & Engr. Building
- 4612 Materials Lab
- 4613 Compressor Building
- 4614 Atmospheric Research Bldg.
- 4618 Hydraulic Test Facility
- 4619 Structures & Mechanics Lab.
- 4620 HP Pneumatic Facility
- 4621 Storage Building
- 4622 Liquid Hydrogen Fac.
- 4623 Laboratory Building
- 4628 Cryogenic Testing Fac.
- 4638 Support Building
- 4639 Support Building
- 4640 Support Building
- 4641 Support Building
- 4642 Support Building
- 4645 Hydraulic Equip. Support Bldg.
- 4646 Blockhouse
- 4647 Compressor Bldg.
- 4648 HP Test Facility
- 4649 Multipurpose High Bay Fac
- 4650 Shop & Calibration Lab
- 4651 Shop Bldg.
- 4653 Components Service Bldg.
- 4654 Office Building
- 4655 Multipurpose High Bay Fac
- 4656 Hydraulic Equip. Dev. Fac.
- 4657 LH₂ Vaporization Fac.
- 4659 HP GN₂ Facility
- 4660 Boiler Plant
- 4663 Computer Fac.
- 4665 Historic Redstone Test Site
- 4666 Office Building
- 4667 Pump House
- 4668 Water Reservoir
- 4669 Water Reservoir
- 4670 Propulsion & Struct. Test Fac.
- 4671 Test Facility Support Bldg.
- 4672 Cryogenics Storage Fac.
- 4673 Fuel Tank
- 4674 Blockhouse
- 4678 Office & Storage Bldg.
- 4692 Cross-Connect Bldg (Assigned To Army)
- 4696 Propulsion Test Fac.
- 4697 Observation Bunker
- 4699 Structural Test Fac.

Saturn V Dynamic Test Stand
Building 4550
16/531060/3331960

