

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

FOR NPS USE ONLY

RECEIVED

DATE ENTERED

**NATIONAL REGISTER OF HISTORIC PLACES
INVENTORY -- NOMINATION FORM**

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

1 NAME

HISTORIC Goddard Rocket Launching Site

AND/OR COMMON

Goddard Rocket Launching Site

2 LOCATION

STREET & NUMBER Pakachoag Golf Course, Upland Street

___ NOT FOR PUBLICATION

CITY, TOWN

Auburn

CONGRESSIONAL DISTRICT

Third

STATE

Massachusetts

___ VICINITY OF

CODE
025

COUNTY
Worcester

CODE
027

3 CLASSIFICATION

| CATEGORY | OWNERSHIP | STATUS | PRESENT USE | |
|--|---|---|--|--|
| <input type="checkbox"/> DISTRICT | <input type="checkbox"/> PUBLIC | <input checked="" type="checkbox"/> OCCUPIED | <input type="checkbox"/> AGRICULTURE | <input type="checkbox"/> MUSEUM |
| <input type="checkbox"/> BUILDING(S) | <input checked="" type="checkbox"/> PRIVATE | <input type="checkbox"/> UNOCCUPIED | <input type="checkbox"/> COMMERCIAL | <input type="checkbox"/> PARK |
| <input type="checkbox"/> STRUCTURE | <input type="checkbox"/> BOTH | <input type="checkbox"/> WORK IN PROGRESS | <input type="checkbox"/> EDUCATIONAL | <input type="checkbox"/> PRIVATE RESIDENCE |
| <input checked="" 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 type="checkbox"/> MILITARY | <input checked="" type="checkbox"/> OTHER: golf course |

4 OWNER OF PROPERTY

NAME Pakachoag Golf Corporation

STREET & NUMBER

129 Pakachoag Street

CITY, TOWN

Auburn

___ VICINITY OF

STATE

Massachusetts

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE,
REGISTRY OF DEEDS, ETC. Worcester County Registry of Deeds, Worcester District

STREET & NUMBER

County Court House

CITY, TOWN

Worcester

STATE

Massachusetts

6 REPRESENTATION IN EXISTING SURVEYS

TITLE
none

DATE

___ FEDERAL ___ STATE ___ COUNTY ___ LOCAL

DEPOSITORY FOR
SURVEY RECORDS

CITY, TOWN

STATE

7 DESCRIPTION

| CONDITION | | CHECK ONE | CHECK ONE |
|---|---------------------------------------|---|---|
| <input checked="" type="checkbox"/> EXCELLENT | <input type="checkbox"/> DETERIORATED | <input type="checkbox"/> UNALTERED | <input checked="" type="checkbox"/> ORIGINAL SITE |
| <input type="checkbox"/> GOOD | <input type="checkbox"/> RUINS | <input checked="" type="checkbox"/> ALTERED | <input type="checkbox"/> MOVED DATE _____ |
| <input type="checkbox"/> FAIR | <input type="checkbox"/> UNEXPOSED | | |

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

The site from which Robert H. Goddard launched the first successful liquid-fueled rocket in 1926 was then an open field on the Asa Ward farm, located in rolling hill country near the northeastern boundary of Auburn, Massachusetts. In 1929-31, the farm was converted to the 54.2-acre Pakachoag Golf Course, a commercial venture still owned and operated by the Ward family. Conversion from farm to golf course has had little impact on the immediate setting of the site; however, the course is now surrounded by suburban residential development.

The launch site itself is located about 1,000 feet southeast of Upland Street (the northwestern boundary of the course), midway between the tee and the green on the ninth fairway. It is marked by a simple granite obelisk approximately four feet high carrying the following inscription: "SITE OF LAUNCHING OF WORLD'S FIRST LIQUID PROPELLANT ROCKET BY DR. ROBERT H. GODDARD - 16 MARCH 1926."

In July, 1960, the American Rocket Society erected a second marker indicating the site of the launch, described as "this significant achievement in the evolution of astronautics." A simple granite rectangle approximately five feet high and two-and-one-half feet wide, it stands just off Upland Street at the northwestern corner of the golf course. Because of regular maintenance of the course the site and both markers are in excellent condition.

(Note: the second marker is not included in the Landmark boundaries for the launch site but does contribute to its interpretation).

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 checked="" 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 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 type="checkbox"/> OTHER (SPECIFY) | |
| | | <input checked="" type="checkbox"/> INVENTION | | | |

SPECIFIC DATES

1926

BUILDER/ARCHITECT

not applicable

STATEMENT OF SIGNIFICANCE

This National Historic Landmark commemorates the launching of the world's first successful liquid-fueled rocket by Dr. Robert H. Goddard on March 16, 1926, from his outdoor laboratory, an open field on the Asa Ward farm at Auburn, Massachusetts. In 1929-31 the farm was converted to the Pakachoag Golf Course. Goddard's launch site, now marked by a granite obelisk midway between the tee and the green on the ninth fairway, is accessible to the public during regular operating hours of the course.

HISTORICAL BACKGROUND

Robert H. Goddard was born in Worcester, Massachusetts, on October 5, 1882. In his youth he was fascinated with the thought that a rocket could be constructed and sent to the moon or even Mars. He pursued his interest in space as a student at Worcester Polytechnic Institute, where he received his B.S. degree in 1908, and at Clark University, Worcester, where he earned his M. A. and Ph. D. degrees. Throughout his undergraduate and graduate work, Goddard filled notebook after notebook with calculations concerning rockets. In 1914 he was granted two U.S. patents which remain basic documents in the field of rocketry. One was for the design of the nozzled combustion chamber (allowing the introduction of liquid fuel into the chamber), the other for the design of a multistage rocket for high altitude flight.

Goddard began actual experimentation with rockets as an honorary fellow and instructor in physics at Clark University (also 1914). At his own expense, he made systematic studies of propulsion and proved both mathematically and in the laboratory that rocket propulsion would function in a vacuum. Reaching the end of his personal financial resources in 1916, he submitted a report on his work to date and on the potential of rockets to the Smithsonian Institution and received a grant of \$5,000 for further research.

Between 1914 and 1917, Goddard was granted seventy patents for rockets and rocket apparatus. During World War I he left Clark University to work on two projects for the U.S. Army Signal Corps: a rocket for long-range bombardment propelled by a solid-fueled engine charged intermittently like a repeating-rifle; and the progenitor of the "bazooka" rocket mortar of World War II. The latter was successfully demonstrated at the Aberdeen Proving Ground in early November 1918. However, the

9 MAJOR BIBLIOGRAPHICAL REFERENCES

- Emme, Eugene M. Aeronautics and Astronautics, An American Chronology of Science and Technology in the Exploration of Space (Washington, D.C., 1960).
- Goddard, Esther C. and G. Edward Penray, eds. The Papers of Robert H. Goddard, 3 volumes (New York, 1970).
- Lehman, Milton. This High Man: The Life of Robert H. Goddard (New York, 1963).
- Ley, Willy. Satellites, Rockets and Outer Space (New York, 1963).

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY 0.0000 acre

UTM REFERENCES

| | | | | | | | |
|---|------|-------------|---------------|---|------|---------|----------|
| A | 1 9 | 2 6 7 3 4 0 | 4 6 7 7 6 4 0 | B | | | |
| | ZONE | EASTING | NORTHING | | ZONE | EASTING | NORTHING |
| C | | | | D | | | |

VERBAL BOUNDARY DESCRIPTION The boundaries of the National Historic Landmark designation for the Goddard Rocket Launching Site are defined by a circle with a radius of 200 feet, centered on the granite obelisk marking the launch site, thus covering the range of the March 16, 1926 rocket flight.

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 Polly M. Rettig, Historian, Landmark Review Project; original form prepared by Horace J. Sheely and S. Sydney Bradford, Historians, 8-18-66

| | |
|--|--------------|
| ORGANIZATION | DATE |
| Historic Sites Survey, National Park Service | 5/19/75 |
| STREET & NUMBER | TELEPHONE |
| 1100 L. Street, N.W. | 202-523-5464 |
| CITY OR TOWN | STATE |
| Washington | D.C. |

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.

FEDERAL REPRESENTATIVE SIGNATURE

TITLE

DATE Boundary Certified:

| | | |
|--|-----------------------------|----------|
| FOR NPS USE ONLY I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER | DATE Boundary Certified: | 11/13/66 |
| | DATE Arch. Survey: | 8/1/76 |
| | DATE Boundary Re-evaluated: | |
| | DATE Direction Change: | |

DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION

ATTEST:

KEEPER OF THE NATIONAL REGISTER

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

**NATIONAL REGISTER OF HISTORIC PLACES
INVENTORY -- NOMINATION FORM**

FOR NPS USE ONLY

RECEIVED

DATE ENTERED

CONTINUATION SHEET

1

ITEM NUMBER

8

PAGE

2

Armistice temporarily ended active interest in the military application of rockets, and Goddard resumed his post at Clark.

Shortly after his return to the university (1919), Goddard's 1916 report along with a summary of his subsequent experimentation was published in the Smithsonian Institution's Miscellaneous Collections, Volume 71, under the title "A Method of Reaching Extreme Altitudes". Much of that highly detailed article, now regarded as a classic in the field, was of interest only to the scientific community, but Goddard's suggestion that a rocket could be sent to the moon quickly generated a heated journalistic argument concerning the feasibility of such a thing and earned him the derisive titles of "moon-rocket man" and "Moony".

Goddard continued his experiments with liquid propulsion during the 1920's, using the farm of a distant relation, "Aunt" Effie Ward (the Asa Ward farm), at Auburn, Massachusetts, as his outdoor laboratory. On November 1, 1923, he static tested a rocket engine fueled with liquid oxygen and gasoline, both supplied by pumps on the rocket. By December, 1925, this engine was operated independently of the testing frame. The practical culmination of Goddard's work came at Auburn on March 16, 1926, when he launched the world's first successful liquid-fueled rocket. The slim cylinder, ten feet in length, reached an altitude of 41 feet, flew for 2.5 seconds, and fell to the ground 184 feet from the launching frame.

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

**NATIONAL REGISTER OF HISTORIC PLACES
INVENTORY -- NOMINATION FORM**

FOR NPS USE ONLY

RECEIVED

DATE ENTERED

CONTINUATION SHEET 2 ITEM NUMBER 8 PAGE 3

Goddard's final launch from the Auburn site, on July 17, 1929, was also an historic first. The eleven-foot rocket carried an instrumented payload--an aneroid barometer, thermometer, and a camera triggered when the parachute opened; all three operated successfully and were recovered. This launch generated widespread publicity. The roaring rocket was heard throughout the town and some observers who thought it an airplane in flames called out ambulances. The wire services quickly spread the report that Dr. Goddard's moon rocket had exploded violently. Despite its negative nature, the publicity proved valuable since it brought Goddard to the attention of Charles A. Lindbergh, who was later instrumental in enlisting substantial support from the Guggenheim Foundation for the scientist's research.

Another small grant from the Smithsonian enabled Goddard to move his laboratory to Roswell, New Mexico, where on December 30, 1930, a rocket eleven feet in length achieved an altitude of 2,000 feet and a speed of 500 miles per hour. A little over four years later, on March 28, 1935, Goddard sent up at Roswell the first rocket equipped with a gyroscope, which rose to 4,800 feet and traveled a horizontal distance of 13,000 feet. Progress on his work was described in "Liquid Propellant Rocket Development", published by the Smithsonian in 1936.

During the late 1930's, Goddard again tried to interest the War Department in the military utility of his rockets, but with no tangible results. However, in 1941 the Navy became interested in jet-assisted take-off and rocket bombs and enlisted his services at the Naval Experiment Station, Annapolis. In addition, Dr. Clarence N. Hickman, who had been one of Goddard's assistants at Clark (1918), provided continuity on the development of the World War II bazooka. But it was not until 1943 and the appearance of the German V-2 missile, the technical details of which Goddard had largely anticipated (including gyroscopic control, steering by means of vanes in the jet stream of the engine, gimbal-steering, and power-driven fuel pumps), that the significance of his contribution to rocketry was fully recognized and his work seriously studied by American scientists. Goddard continued his work at the Naval Experiment Station until his death, following a throat operation, on August 10, 1945.

In 1929-31, the Ward farm, site of Goddard's original outdoor laboratory, was converted to the Pakachoag Golf Course. A commercial rather than a private course, it is still owned and operated by members of the Ward family. The rocket flight of March, 1926, is commemorated by two markers, one on the site of the launch and another about 1,000 feet to the northwest at the

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

**NATIONAL REGISTER OF HISTORIC PLACES
INVENTORY -- NOMINATION FORM**

FOR NPS USE ONLY

RECEIVED

DATE ENTERED

CONTINUATION SHEET

3

ITEM NUMBER

8

PAGE

4

edge of the course. The site is in excellent condition and appears to be little altered except for the nature of its plant materials.