## UNITED STATES DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

# NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

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RECEIVE	n			
16061761	*			
DATEEN				

INVENTORY	NOMINATION	FURM DATE E	NIEKED	
SEEII	NSTRUCTIONS IN HOW T	O COMPLETE NATIONA	AL REGISTER FORMS	
	TYPE ALL ENTRIES	COMPLETE APPLICABL	E SECTIONS	
1 NAME				
HISTORIC GO	ldard Rocket Launchi	ng Site		
AND/OR COMMON	_			
	oddard Rocket Launch	ing Site		-
2 LOCATION				
STREET & NUMBER	Pakachoag Golf Cour	se, Upland Street		
CITY, TOWN			NOT FOR PUBLICATION  CONGRESSIONAL DISTRI	ICT
	burn	_ VICINITY OF	Third	
STATE	chusetts	CODE 025	county Worcester	CODE 027
3 CLASSIFIC		<u> </u>		
J GLASSII IC.	211014			
CATEGORY	OWNERSHIP	STATUS	PRES	ENT USE
DISTRICT	PUBLIC	X_OCCUPIED	AGRICULTURE	MUSEUM
BUILDING(S)	<u>X</u> PRIVATE	UNOCCUPIED	COMMERCIAL	PARK
STRUCTURE	вотн	WORK IN PROGRESS	EDUCATIONAL	PRIVATE RESIDENCE
XSITE	PUBLIC ACQUISITION	ACCESSIBLE	ENTERTAINMENT	RELIGIOUS
OBJECT	IN PROCESS	X_YES: RESTRICTED	GOVERNMENT	SCIENTIFIC
	BEING CONSIDERED	YES: UNRESTRICTED	INDUSTRI <b>∆</b> L	TRANSPORTATION
		NO	MILITARY	X_OTHER: golf cours
4 OWNER OF	PROPERTY			
NAME Pakach	oag Golf Corporation			
STREET & NUMBER	Pakachoag Street			
CITY, TOWN	rakachoag Street		STATE	<del></del>
Auburn		VICINITY OF	Massachusetts	
5 LOCATION	OF LEGAL DESCI	RIPTION		
COURTHOUSE,				
REGISTRY OF DEEDS, I	ETC. Worcester County	Registry of Deeds	, Worcester Distr	ict
STREET & NUMBER	County Court Hous	se		
CITY, TOWN			STATE	
	Worcester		Massachu	setts
6 REPRESEN	TATION IN EXIST	ING SURVEYS		
TITLE				
non	e			
DATE		FEDERALS	STATECOUNTYLOCAL	
DEPOSITORY FOR				
SURVEY RECORDS				
CITY TOWN			STATE	



#### CONDITION

**CHECK ONE** 

**CHECK ONE** 

**X**EXCELLENT \_\_GOOD

\_\_FAIR

\_\_DETERIORATED
\_\_RUINS

\_\_UNEXPOSED

\_UNALTERED

XALTERED

▲ORIGINAL SITE

\_\_MOVED DATE\_\_\_\_\_

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).

#### AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW PERIOD LANDSCARE ARCHITECTURE

PREHISTORIC	ARCHEOLOGY-PREHISTORIC	COMMUNITY PLANNING	LANDSCAPE ARCHITECTURE	RELIGION
1400-1499	ARCHEOLOGY-HISTORIC	CONSERVATION	LAW	X_SCIENCE
1500-1599	AGRICULTURE	ECONOMICS	LITERATURE	SCULPTURE
1600-1699	ARCHITECTURE	EDUCATION	MILITARY	SOCIAL/HUMANITARIAN
1700-1799	ART	ENGINEERING	MUSIC	THEATER
1800-1899	COMMERCE	EXPLORATION/SETTLEMENT	PHILOSOPHY	TRANSPORTATION
<b>∡</b> 1900-	COMMUNICATIONS	INDUSTRY	POLITICS/GOVERNMENT	OTHER (SPECIFY)
<b>41</b> 1000		<b>X</b> INVENTION		

SPECIFIC DATES

1926

BUILDER/ARCHITECT

not applicable

DELICION

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, 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 BIBLIOGR	?HICAL REFE	RENCES		
Emme, Eugene M. Aero	onautics and Astro	nautics, An Ame	erican Chronology of	Science
and Technology in	the Exploration of	of Space (Washir	ngton, D.C., 1960).	
Goddard, Esther C. a 3 volumes (New Yor	ind G. Edward Penr	ay, eds. The I	Papers of Robert H.	Goddard,
Lehman, Milton. This		ife of Robert F	I Coddard (Now York	. 1062)
Ley, Willy. Satelli	tes, Rockets and	Outer Space (Ne	ew York, 1963).	., 1905).
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10 GEOGRAPHICAL I				
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VERBAL BOUNDARY DESCR	IPTION The boundar		onal Historic Landm	namle
designation for the of 200 feet, centere the range of the contents of the cont	Goddard Rocket La	unching Site ar obelisk marking	e defined by a circ	cle with a radi
· ·	·			
LIST ALL STATES AND	COUNTIES FOR PROPER	TIES OVERLAPPING ST	ATE OR COUNTY BOUNDAR	IES
STATE	CODE	COUNTY	С	ODE
STATE	CODE	COUNTY	C	ODE
	ettig, Historian,		Project; original dford, Historians,	
Historic	Sites Survey, Nat	ional Park Serv		
STREET & NUMBER			TELEPHONE 202-523-5464	
CITY OR TOWN	treet, N.W.		STATE	
Washingto	n		D.C.	
12 STATE HISTORIC	PRESERVATIO	N OFFICER C	ERTIFICATION	
THE EVAL	UATED SIGNIFICANCE OF	THIS PROPERTY WITH	IIN THE STATE IS:	
NATIONAL	STAT	ΓE	LOCAL	
As the designated State Historic P hereby nominate this property for criteria and procedures set forth by	inclusion in the National I	Register and certify that	t it has been evaluated accord	
FEDERAL REPRESENTATIVE SIGNA			Landmark Design stod:	11/13/66
TITLE			DATE Box ndery C	- Cital O
FOR NPS USE ONLY				sol to
I HEREBY CERTIFY THAT THIS	PROPERTY IS INCLUDED	IN THE NATIONAL REC	DATE Arch. Surve	ne diffe
DIRECTOR, OFFICE OF ARCHE	OLOGY/AND HISTORY PI	RESERVATION 7	DATE Doundary 201	.1:
KEEPER OF THE NATIONAL RE	GISTER			
<u> </u>			Director, Gr.	
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Form No. 10-300a (Rev. 10-74)

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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.

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CONTINUATION SHEET 2 ITEM NUMBER 8 PAGE

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 baromemter, 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

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