NPS Form 10-900
(Oct. 1990)

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NAT. REGISTER OF HISTORIC PLACES
NATIONAL PARK SERVICE

United States Department of the Interior
National Park Service

234

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in *How to Complete the National Register of Historic Places Registration Form* (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name Lockheed PV-2 Harpoon #37396

other names/site number #N7265C, "Hot Shot"

2. Location

street & number 3867 N. Aviation Way N/A ☐ not for publication

city or town Mount Comfort N/A ☐ vicinity

state Indiana code IN county Hancock code 059 zip code 46140

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this ☑ nomination ☐ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ☑ meets ☐ does not meet the National Register criteria. I recommend that this property be consider significant ☑ nationally ☐ statewide ☐ locally. (☐ See continuation sheet for additional comments.)

James C. Horn 3/4/2009
Signature of certifying official/Title Date

Indiana Department of Natural Resources
State or Federal agency and bureau

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. (☐ See continuation sheet for additional comments.)

Signature of certifying official/Title Date

State or Federal agency and bureau

4. National Park Service Certification

I hereby certify that the property is:

☑ entered in the National Register. Signature of the Keeper: Patrick Andrus Date of Action: 4/23/2009
☐ See continuation sheet

☐ determined eligible for the National Register.
☐ See continuation sheet

☐ determined not eligible for the National Register.

☐ removed from the National Register.

☐ other, (explain:)

Lockheed PV-2 Harpoon #37396
Name of Property

Hancock County, IN
County and State

5. Classification

Ownership of Property
(Check as many boxes as apply)

- ☑ private
- ☐ public-local
- ☐ public-state
- ☐ public-Federal

Category of Property
(Check only one box)

- ☐ building(s)
- ☐ district
- ☐ site
- ☑ structure
- ☐ object

Number of Resources within Property
(Do not include previously listed resources in the count.)

Contributing	Noncontributing	
0	0	buildings
0	0	sites
1	0	structures
0	0	objects
1	0	Total

Name of related multiple property listing
(Enter "N/A" if property is not part of a multiple property listing.)

N/A

Number of contributing resources previously listed in the National Register

0

6. Function or Use

Historic Functions
(Enter categories from instructions)

DEFENSE: air facility

Current Functions
(Enter categories from instructions)

TRANSPORTATION: air-related
RECREATION & CULTURE: museum

7. Description

Architectural Classification
(Enter categories from instructions)

OTHER: monoplane twin engine bomber

Materials
(Enter categories from instructions)

foundation
walls METAL: aluminum
roof
other OTHER: plexiglas
SYNTHETICS: rubber

Narrative Description
(Describe the historic and current condition of the property on one or more sheets.)

Lockheed PV-2 Harpoon #37396
Name of Property

Hancock Co., IN
County and State

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for the National Register listing.)

- ☑ **A** Property is associated with events that have made a significant contribution to the broad patterns of our history.
- ☐ **B** Property is associated with the lives of persons significant in our past.
- ☑ **C** Property embodies the distinctive characteristics of a type, period, method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- ☐ **D** Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark "x" in all the boxes that apply.)

Property is:

- ☐ **A** owned by a religious institution or used for religious purposes.
- ☐ **B** removed from its original location.
- ☐ **C** a birthplace or grave.
- ☐ **D** a cemetery.
- ☐ **E** a reconstructed building, object, or structure.
- ☐ **F** a commemorative property.
- ☐ **G** less than 50 years of age or achieved significant within the past 50 years.

Areas of significance
(Enter categories from instructions)

MILITARY
ENGINEERING

Period of Significance

1945

Significant Dates

1945

Significant Person
(Complete if Criterion B is marked above)

N/A

Cultural Affiliation

N/A

Architect/Builder

Lockheed Aircraft Corporation

Narrative Statement of Significance
(Explain the significance of the property on one or more continuation sheets.)

9. Major Bibliographical References

Bibliography
(Cite the books articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS):
- ☐ preliminary determination if individual listing (36 CFR 67) has been requested
- ☐ previously listed in the National Register
- ☐ previously determined eligible by the National Register
- ☐ designated a National Historic Landmark
- ☐ recorded by Historic American Buildings Survey #_____
- ☐ recorded by Historic American Engineering Record #_____

Primary location of additional data:
- ☐ State Historic Preservation Office
- ☐ Other State agency
- ☐ Federal agency
- ☐ Local government
- ☐ University
- ☒ Other

Name of repository:
American Military Heritage Foundation

Lockheed PV-2 Harpoon #37396
Name of Property

Hancock County, IN
County and State

10. Geographical Data

Acreage of Property Less than 1 acre

UTM References
(Place additional UTM references on a continuation sheet.)

	Zone	Easting	Northing
1	16	593780	4410560
2			
3			
4			

☐ See continuation sheet

Verbal Boundary Description
(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification
(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title Penny Litz, President / Paul Diebold

organization American Military Heritage Foundation date 9-8-08

street & number P.O. Box 29061 telephone 317-883-4721

city or town Indianapolis state IN zip code 46229

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps

A **USGS map** (7.5 0r 15 minute series) indicating the property's location.

A **Sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs

Representative **black and white photographs** of the property.

Additional items
(Check with the SHPO or FPO for any additional items)

Property Owner

(Complete this item at the request of SHPO or FPO.)

name American Military Heritage Foundation

street & number P.O. Box 29061 telephone

city or town Indianapolis state IN zip code 46229

Lockheed PV-2 Harpoon, Bureau No. #37396, FAA registration #N7265C, Vega Model 15 is a well preserved, operational representation of a medium maritime anti-submarine patrol bomber airplane used by the U. S. Navy and the U. S. Marine Corps during World War II in both the South and North Pacific. It was manufactured by Factory "A" at the Lockheed Aircraft Corporation in Burbank, California in 1945.

The PV-2 was a redesign of the PV-1 Ventura but shares the same fuselage and engines as its predecessor design. In general it is a land based, monoplane, mid wing design with the Lockheed signature twin tail, aluminum skinned frame, with twin radial engines.

Structure: The plane is aluminum skin over aluminum and steel frame except for the nose which is of composite material because it housed the radar. The fuselage is built in three pieces bolted together: Nose, mid body, and tail (aft), totaling about 51 feet long. The fuselage is oval in cross section and roughly 6' wide and 8.5' high at its greatest extent. The center section of the wing is built into the mid body. All spars, ribs, skin, etc. are original except for small repairs.

Wings: The center section is embedded into the fuselage with two removable outer wing panels and wingtips. All is original except for the wing tips which were modified to accept granular dispersal equipment when it was converted to an agricultural sprayer in the 1960's. Such conversions were typical for military surplus aircraft.

The wing is one of the major redesign features: The Navy wanted the PV-1 to be able to carry more fuel and heavier armament. Many of the PV-1's were part of the "Empire Express" – a name given to the long range, armed and photo reconnaissance route flown from the Aleutian Islands to the Japanese held Northern Kurile Islands just below the Russian Kamchatka peninsula. The PV-1 Venturas did not have adequate fuel to fly that far and crews were improvising by adding and carrying additional tanks of fuel unsafely inside the aircraft to assure that if they didn't return to base that it wasn't because of fuel exhaustion. Lockheed came out with a crossfeed retrofit, but eventually the PV-2 Harpoon was born out of this problem.

After production of the first 35 it was determined that there was a major flaw in the new wing (wrinkling during flight) and the new fuel tanks leaked. The first 35 were repurposed to trainers and re-designated PV2C. The final wing design was 74 feet 11 inches long and there were 470 straight PV-2s manufactured of which the subject of this nomination is number 333. The wing root is wide and the wings are parabolic in shape.

Tail: The tail assembly has the signature Lockheed twin-tail design: one rectangular horizontal stabilizer with two rudder assemblies, i.e., vertical stabilizers, rudder, and tail flap. Each stabilizer/rudder is roughly oval shaped and stands 10' tall. Tip-to-tip, the entire tail area is just over 25' wide. Rudders are metal frames covered with a doped (shrinkable synthetic) aircraft fabric which is more fragile than aluminum and more likely to suffer damage. During a 2005 air show, a tug accidentally backed into the left rudder of this Harpoon tearing the skin and denting and bending several ribs which were replaced and repainted in accordance with FAA guidelines.

Landing Gear and Brakes: Landing gears are single strut, underneath the wing in line with the engine and are fully retractable into nacelles and wing body. Retraction and braking are accomplished hydraulically. Tail wheel is controlled form the flight deck, is fully retractable and casters 360 degrees as needed. Brakes, wheels, tires are replaced as needed and as called for in periodic maintenance. PV-2 tires are unavailable and DC-3 tires are on the plane currently.

Doors and Windows: A crew door is located on the left side of the fuselage just aft of the trailing edge of the wing. Rare bomb bay doors underneath are original to aircraft. Many door sets did not survive after conversion and today are hard to find for re-installation; those still in existence and not installed on aircraft are targets for thieves.

Two laminated plate glass windshield panels are curved to conform to the fuselage contour. There is a sliding window on each side where the pilot and co-pilot sit. A Plexiglas pilot's escape hatch is overhead the pilot seats. An astro hatch or celestial dome is farther aft. Plexiglas has been replaced over the years, frames are original. Two camera windows are cut-outs in the fuselage and are mounted with Plexiglas panes. A cut-out window for a camera is aft the crew door on the left side of the fuselage and is mounted with Plexiglas panes.

Power Plant: Two Pratt & Whitney R2800-31 radial, double wasp, 18 cylinder (36 spark plugs), air cooled engines with single-stage two-speed superchargers power the aircraft. Each engine has a 10 ½ foot, Hamilton Standard Hydromatic, three-blade, automatic, full feathering propeller. Propellers have a service life and must be replaced over time. The anti-icing system is no longer in use on the propeller

Engines and associated parts, i.e., carburetor, blower, oil coolers, etc. are routinely maintained in accordance with Pratt & Whitney manuals and FAA guidelines. Engines are not original as delivered, but are repaired, replaced or overhauled with original manufacture parts still using the correct part numbers. At the time of this writing the left engine is at an overhaul shop in Idaho for repair.

Fuel and Oil: Each engine has a separate fuel and oil system with self-sealing tanks. Currently this PV-2 is configured with a total of 6 tanks – 3 per wing, the largest being 248 gallons outboard of each engine supplemented by two smaller tanks inboard of the engines.

Performance, weight, pay load: Maximum speed when aircraft was new was 282 mph at 13,700 feet – a decline in performance compared to the PV-1 because of the heavier payload and increase in wing surface area. This was still a very fast aircraft for its weight and era. Cruising speed could exceed 200 mph, service ceiling was 23,900 feet. It is not currently operated at that speed and is not operated near the ceiling.

Typical empty weight is between 20,000- 21,370 lbs., full loaded max. take-off gross weight is 33,000 lbs., however it was not unusual during wartime operations to overload the aircraft by as much as 3,000 lbs.

Electrical: A 24-volt, direct-current, negative-ground, single-wire with two engine-driven generators and one storage battery provide power for various systems.

Hydraulic System: This system operates the landing gear, brakes, flaps, bomb bay doors, gyro pilot, bow gun chargers. Crew could use the auxiliary hand pump for emergency power source in case of engine failure. All are operational today except the bow gun chargers.

Heating and Ventilating: System was supplied hot air from engines by wing and stabilizer anti-icing ducts and fresh air by a scoop on the right side of the fuselage. Duct outlets and damper controls are at crewmember stations. Also there was provision for electrically heated flight suits – not installed today. The heating system is not in use today. Aircraft is not operated in extreme cold weather; crew members are cautioned to dress appropriately and passengers have been known to wear sleeping bags during flight.

Anti-icing system: PV-2s were intended for operation in an area notorious for its poor flight conditions. The plane was originally delivered with: 1. Wing and stabilizer anti-icing – accomplished by heating the leading edges with hot air supplied by engine exhaust heat exchangers; 2. Propeller and windshield anti-icing – 16 gallon alcohol tank provided alcohol; 3. Windshield defrosting – hot air; 4. Carburetor anti-icing utilizing hot unfiltered exhaust by pass air; and 5. Pitot static head anti-icing – electrical heating element built into head.

Today, the only anti-icing systems in use are carburetor and pitot static head anti-icing.

Interior: The PV-2's were not pressurized. Interiors were painted with zinc chromate a green preservative aircraft paint standard for WWII aircraft. Some original paint is visible; however, any repainting is done with a more modern non-toxic product. This summer the peeling paint in the landing gear nacelles and bomb bays were scrapped and repainted.

Originally there were removable insulated pads for cold weather – not installed today. A toilet is located aft of the crew door on the floor and is not in use today.

All interior structure is original; however, all former military equipment was stripped from interior including guns, ammunitions, crew stations, etc., in the course of demilitarization and conversion to agricultural sprayer.

This was typical after WWII for military airplanes to be sold to civilian operators and converted to fire bombers, sprayers, and used to transport passengers and cargo. Some unscrupulous operators were smugglers, in fact one owner admitted to "running" televisions to Mexico in the 1960's.

Currently 5 passenger seats from a P2V Neptune are installed and are used by members when the aircraft goes to air show.

Flight controls: Flight control surfaces are dual and operated via cable; the stand is located between co-pilot and pilot station and contains the controls.

Crews: Operated with 4, 5, or 6 crew members or combination of Pilot, co-pilot, navigator, radioman, navigator, radar man, turret gunner or combination of duties. Aircraft was often operated single pilot; today it is flown with two pilots.

Radio operator's table was installed on the left side of the fuselage, in what is the crew chief position today. The table and radio operator's document bin was attached to the structure aft of the pilot's seat. The document bin is still in place today and used by the AMHF.

Navigator's station (table, bin, radio compass, and clock) was located on the left now occupied by a removable passenger seat.

Radar operator's position was classified at the time. Information about this is scant; however, we do know it was on the right.

Armament: PV-2's were heavily armed for ASW operations. Two bow and three chin (nose) .50 caliber power operated machine guns could be triggered by the pilot for shipping attacks or strafing. The Brownings themselves were removed during demilitarization, but in recent years, volunteers have replicated the gun placements by installing gunmetal-finished metal tubing. For defense from below and behind, PV-2s were designed with a bathtub or tunnel gun, consisting of ventral protuberance framed into the structure of fuselage, with a downward-facing opening for two Browning .50 caliber machine guns at its stern end. Plexiglas windows were incorporated into the framing surrounding the gun window for visibility. This position remains evident, the bathtub or tunnel area is still in place, however, the gun mounts and guns were removed after the war and a Plexiglas window fitted to the opening to seal it off. The gunner would kneel on a reinforced area of the deck to aim and shoot the twin .50's. Just forward of the tunnel gun, the dorsal of the fuselage has one Martin turret with two more .50 caliber guns – this device is currently installed in the aircraft; it does not operate electrically because of lack of parts, but an electrician is currently working on it so that it can be operated by hand. The Martin turret is of the exact type originally fitted to this precise location on the plane, however, the turret is a recently restored feature (this turret was never part of this particular plane). On the PV-1 and PV-2, the Martin turret operator could rotate 360 degrees horizontally and guns could be elevated roughly to 80 degrees vertically.

The bomb bay has internal racks for bombs, depth charges or torpedo. Four high velocity anti-aircraft rockets (HVAR) were installed under each wing. Volunteers fabricated hollow replicas of the HVAR rockets and installed them in the proper location, in order to restore the plane to a wartime appearance.

Exterior: The plane is currently painted in two-tone Navy color scheme: white on underbelly and underneath wings, light blue on sides of fuselage, dark blue on top of frame and wings – camouflaged for flying. Navy Stars and Bars are painted on each side of the fuselage and underneath the right wing.

Original paint scheme was very similar; colors were of a grayer tone. It is easiliy identified as a Navy aircraft.

Under the pilot side window are small black pictures of battle ships implying that this aircraft may have sunk that number of ships. This is not true because this aircraft was accepted by the Navy in March 1945 and the war was over in August 1945 – it never saw combat. The ships were added by former members for visual effect.

Under the copilot window is a drawing of a black whaling harpoon piercing the Japanese flag.

Nose Art: Local Indiana artist David Lord painted the existing art at least 15 years ago. It is not known if there was art upon delivery. Currently each side of the nose has a picture of a scantily clad blonde female straddling a bomb with one word "Hot" and "Stuff" on each thigh.

The story/legend goes that many years ago a Louisiana Barbeque restaurateur had an interest in sponsoring the Harpoon financially; however, he passed away quickly before anything but the art work could be done. The AMHF's Harpoon has since become known by the artwork and the name "Hot Stuff" on the air show circuit.

A color photograph of Hot Stuff is on the back jacket of a book dedicated to WWII nose art: *Nose Art*, Jeffery L. Ethell and Clarence Simonsen, printed 1991 and 2003, ISBN 0-7603-1369-5, Cover photos by Michael O'Leary, published by Zenith Press.

Integrity: "Hot Stuff' is an operating airworthy WWII aircraft and has a high standard of integrity to warrant listing. Its materials are virtually original except for repairs and replacements of parts with limited life. Replacements are done with original part numbers and original equipment. It is immediately identifiable as a WWII aircraft both outside and inside even with the majority of the original interior components uninstalled. Workmanship, although not artisan, is factory mass produced as with all WWII aircraft (time was of the essence).

1. Location: Aircraft is not at location of manufacture, no other aircraft are there either and the subject was intended to be moved to another location. Many historic events occurred in flight or over water and locations once associated with this aircraft are not in "friendly" hands. For example, the Kurile Islands, the target for raids by PV-1's and PV-2's once held by Japan now belong to Russia. Air bases in the Aleutians are not in use.

2. Setting: The fully operational aircraft is parked outside in the elements at the Mt. Comfort Airport in Mt. Comfort, IN, a reliever airport for the Indianapolis International airport and under the jurisdiction of the Indianapolis Airport Authority. Not every airport ramp and runway can support the Harpoons' weight so that has to be taken into consideration when deciding where to land and park it. The IAA is generous to the organization and does not charge a monthly parking fee plus they donate two small T-hangers for equipment storage free of charge.

This airport is appropriate for two reasons: Mt. Comfort Airport is a local, fully operating airport without a lot of commercial traffic other than corporate jets and general aviation and can support the Harpoon's weight. As such members who maintain the aircraft have fewer restrictions when accessing the airport after hours and on weekends. All members are volunteers and are employed

off-site. If the aircraft were located away from the Indianapolis area, this organization would no longer be in a position to maintain it in flying condition especially free of charge. The airport must be in reasonable driving or flying distance - some members have their own airplanes.

Also, it would not be prudent to locate a flying craft at any historical site just for historical purposes especially if it could not be put to its fullest use.

Secondly, the Indianapolis area is appropriate for this aircraft because coincidently it is also the location of the U.S.S. Indianapolis Museum. It was a PV-1 Ventura out on a routine patrol that found the U.S.S. Indianapolis survivors after 4 days in shark infested water. As no PV-1's are in Indiana and none are known to be flying, the PV-2, a look alike aircraft, and the museum occasionally have the opportunity to co-display as a unit. It is a great visual pairing of ship artifacts and of the aircraft associated with saving over 300 of the remaining U. S. S. Indianapolis sailors from certain death.

Materials: Materials used to manufacture this aircraft are still original on the aircraft except for minor repairs to fairings, replacement of hardware, i.e., screws, zeus fasteners, re-doping of rudder skin to meet FAA maintenance requirements. All spars, ribs, and skins are original except for fabric on rudders.

Design: All structural components of airframe are original; engines are not the ones that the plane rolled out of the factory with but are still original manufacture engines. They are 60 years old and continue to be repaired and overhauled with parts still available.

Internal equipment, i.e., oxygen system, toilet, armament, crew stations are missing, cockpit is still original except usual for the usual replacement of instruments. The location of some of the flight instruments have been reincorporated into a "basic T" arrangement to facilitate a more efficient instrument scan by the pilot which is the way all aircraft instrument panels are arranged today. Typical WWII aircraft instrument panels were arranged haphazardly and hard for the flight crew to monitor.

Workmanship: The plane was mass produced as were all aircraft during WW II.

Feeling: As soon as one crawls/steps inside through the crew door, the integrity of "feeling" is present. As a still-operable WW II aircraft, the plane is a strong evocation of its time period.

Association: This specific aircraft was number 333 out of 470 and as such was delivered to the U. S. Navy in March 1945 – the war was over August 1945. It never saw combat which is the reason why it is in such good structural shape and airworthy today.

Section 8 – Statement of Significance

Lockheed PV-2 Harpoon #37396 is an intact, very rare example of a special purpose WW II aircraft, the anti-submarine patrol bomber. Built in 1945, #37396 was deployed to VPB-136, to Whidbey Island Naval Air Station, Puget Sound, Washington in July, 1945. It saw no combat action during WW II, but is significant as rare example of WW II aviation technology. Harpoon #37396 meets Criteria A and C, for its association with military planning, technology, and tactics during WW II, and as a rare survivor of its type. Over 3,000 PV-1 and PV-2 Ventura / Harpoon aircraft were built during the war. Of these, only 104 PV-2 variants were built, and #37396 is the only complete, operable one left in the U.S. In Wisconsin, a group is restoring a PV-2, and in the State of Washington, a PV-2 wreck site exists.

Alaska's Aleutians, the Forgotten Front
Imperial Japanese military leaders embarked on their campaign to create an Asian "sphere of prosperity" with the invasion of Manchuria in 1931. Despite international and American protests, the Imperial Japanese Army's conquest continued in the late 1930s. A massive Japanese invasion force crossed and began to seize territory in China in 1937. Conflict with British and U.S. interests was inevitable, and when leaders of Japan, Italy and Germany signed the Tripartite Pact in September of 1940 in Berlin, the moment many feared was realized. The pact was a direct warning to America to stay out of the conflict under way in Europe and Asia.

Covertly or otherwise, the U.S. was already entangled in the conflict. Claire Chennault became an advisor to the Chinese Air Force in 1937; ostensibly he was a consultant to the Bank of China and officially listed as a "farmer." Chennault's American Volunteer Group flew American-made P-40 Tomahawks and had become a persistent thorn in the side for the Japanese military by 1940. American embargoes on steel and other materiel of war heightened tensions, not to mention FDR's Lend-Lease proposal, passed by Congress in March, 1941. Lend-Lease, from the Japanese perspective, strengthened British colonies that stood in the way of expansion.

December 7, 1941 brought the United States immediately into the war. Devastating Japanese air strikes at Pearl Harbor and Clark Field, Philippines allowed the Japanese to quickly dominate the

Pacific theater. Coincidentally, perhaps, the Pearl Harbor attack used two types of warfare that would become major focuses of the Pacific conflict: airpower and submarine/antisubmarine tactics.[1]

The Battle of Coral Sea, May 7-8, 1942, marked the first time the Japanese Imperial Navy was held in check. The Japanese were forced to turn back an invasion fleet bound for New Guinea, and lost a carrier and valuable air crews. U.S. losses were great as well, but, with ever-growing ranks of airmen, planes, and ships, the U.S. could claim a strategic victory.

Japanese naval planners continued to center thoughts on a concept called the "all-out battle," a long-sought after naval battle that would bring all U.S. and Japanese naval forces into a single engagement, resulting in total IJN dominance of the Pacific. Seizing Midway Island would certainly draw the entire U.S. Pacific Fleet out of its now well-protected lair at Pearl Harbor.

Japanese plans lured the U.S. Navy, but thanks to intelligence intercepts and code-cracking efforts, Admiral Nimitz had much advance knowledge of the Japanese order of battle. The U.S. Pacific Fleet sprung its own trap on the Imperial Japanese Navy. From June 4 – 7, 1942, U.S. Navy airmen sank four Japanese carriers, while the Japanese destroyed one U.S. carrier, a clear and decisive American victory.

But in the Aleutians, the Japanese took the upper hand. On June 3, 1942, a Japanese carrier-borne aircraft boldly flew out of the fog and bombed an American installation at Dutch Harbor on the Aleutian Island of Unalaska. Dutch Harbor, only 2,000 miles away from both San Francisco and Honolulu; was a good "jumping off point" to the United States.

On June 6, a special landing party and 500 Japanese Marines went ashore at Kiska, on the 7th they landed on Attu. By the 11th they had substantial forces on both Kiska and Attu. Never since the War of 1812 had any enemy ever occupied American soil.

The Japanese strategy in the Aleutians was to lure U.S. strength away to the north, secure the north flank of their holdings in the Pacific by seizing islands, and potentially threaten the Continental U.S. with bombing raids. It was as part of this Aleutian Front that the Harpoon-type aircraft came to be developed.

[1] The Japanese Imperial Navy deployed several midget submarines during the Pearl Harbor attack. One managed to gain entrance to the harbor and fire torpedoes before being rammed; another was shelled and sunk by USS Ward in waters adjacent to the harbor entrance, well before the air raids commenced.

As seen by this brief summary of the early stages of the conflict, the unprecedented scale of the Pacific Theater required naval air operations of an increasingly complex nature during the war. One of the most vital efforts was patrolling. Indeed, failure to properly patrol the Pacific north of the Hawaii was among the most glaring errors of the United States before Pearl Harbor. It was the U.S. Army Air Corps' responsibility to patrol the waters around Hawaii, however, a lack of proper training and equipment curtailed efforts.

Shortly after, the U.S. Navy was tasked with patrol and antisubmarine missions for nearly all U.S. shores and theaters of operation. The Navy, however, had to purchase its own land-based aircraft and train its own patrolling crews. Blimps were used in some areas, but they often proved ineffective over open seas. The PBY Catalina, an excellent float plane, was suitable for patrolling and was much used. However, the PBY was highly vunerable to nearly any form of attack; it lacked armament, and only by field modification could it carry bombs, depth charges, or torpedoes. Four-engine B-24 Liberators were often used by the U.S. Navy for patrol and antisubmarine duties. These were better armed for defense, but could not strafe attack. Aircraft like the PV-1 and the PV-2 evolved from the need to have an all-purpose medium bomber that could patrol for long distances, strafe, bomb, or engage enemy aircraft.

Lockheed Harpoon, Its Lineage and Development

Allan and Malcolm Loughead founded a small aviation company in 1912 in Santa Barbara, CA, hoping to design personal aircraft. The two brothers' company failed before the Depression, and Allan started another company, Lockheed, in 1926. Allan sold out to a Detroit firm in 1929, and the Depression bankrupted the fledgling company. Other investors bought the firm from receivership, but the Lockheed name was retained.

Talented aviation designer Clarence "Kelly" Johnson made his mark in aviation at Lockheed beginning in the late 1930s. Favoring a twin tail rudder, Johnson's sleek designs included the L-10 Electra.[2] Aviatrix Amelia Earhart chose the Electra for her ill-fated around-the-world flight in 1937. The Electra was the immediate ancestor of the PV-2. When the RAF sought a coastal patrol plane from U.S. firms in 1938, Lockheed officials offered a modified version of the Super Electra passenger liner, which was accepted by the British. The order for hundreds of "Hudson" bombers, as the RAF named them, was the first large scale order for Lockheed. Other variants of the Super Electra include the Lodestar, a freight and liaison transport version of the passenger liner.

[2] The twin tail design had practical value as well, including ease of handling at low speeds, redundancy (if one rudder is damaged, the other may still function), and in military applications, it allowed turret gunners to have a greater field of fire, unrestricted by a central rudder. In the B-26 Marauder, for example, the top turret had to be restricted to 180-200 degree forward-facing arc due to the massive rudder.

In 1941, Lockheed engineers continued to improve the Electra/Hudson lineage. The Ventura was sturdier, better armed, and faster. Wright radial engines had been used on the Hudson and its variants, but now, Pratt & Whitney engines became the power plant for the lineage. U.S. Army Air Corps accepted the plane as the B-34 Lexington, while the British called it Ventura Mark I. Envisioned as a medium daylight bomber, the RAF quickly withdrew the Ventura from action due to heavy losses. In late 1942, the U.S. Army Air Corps turned over their Venturas to the U.S. Navy, for use as coastal patrol, bomber, and ASW roles. Shortly thereafter, land-based U.S. Navy and U.S. Marine squadrons were running missions from Alaska using their new Venturas.

Breakthroughs with radar technology during WW II revolutionized anti-submarine warfare. Sporadic experiments in the early 20th century revealed that large objects deflect radio waves that can in turn be measured to "see" an object from a great distance. Marconi suggested such a device could be made in 1922, but he did not assemble a working prototype until 1933. By accident, U.S. Navy researchers discovered the ability of radio waves to locate aircraft in 1930, but it was the British who, in 1935, first purposely demonstrated that radio energy can detect an aircraft at a distance, and had a working system to do so.

During the war, American scientists greatly improved the magnetron, the device at the heart of a radar unit, so that aircraft could accurately detect submarines and bomb them. The standard H2 S bombing radar and its variants was fitted to many ASW patrol aircraft, such as the PV-2 Harpoon (including #37396). Because of the radar unit and the plexi nose cone covering it, additional forward armament had to be fitted above and below the nose, rather than in the nose, as with the B-25 Mitchell or A-26 Invader ground attack variants.

Always outgunned, but never without wits, land-based U.S. airmen and their crews in the Pacific had learned many hard lessons that insured survival and success early in the war. One of these was the use of "packet guns" on bombers. Maintenance crews learned to augment forward firepower by field installation of fixed .50 caliber Brownings. Thus equipped, medium bombers could strafe ground and shipping targets, and even give Zero pilots something to think about when attacking head-on. Packet guns were likely first field-installed in B-26 Marauders and B-25 Mitchells. Such seat-of-the-pants engineering was officially frowned upon at first. But officers realized the potential and manufacturers quickly modified designs to accept more machine guns. B-25 Mitchell gunships, fitted with an M-4, 75mm cannon and additional machine guns, were in combat by July, 1943. The U.S. Navy followed this trend and added firepower to its patrol and attack planes. At about this

time, Lockheed eliminated a bombardier position in their PV-1 late model bombers and factory-installed three forward-firing .50 caliber machine guns.[3]

Lockheed's final variant in the long line of Electra/Hudson/Ventura bombers was the PV-2. Several design issues had to be considered in this last configuration: eliminating the need for jury-rigged additional fuel tanks, decrease wing loading (increase lift) by adding more wing surface, take advantage of new power plants, and increase forward firepower. Adding more wing surface allowed larger fuel tanks. Structural problems with the wing design took months to solve. For additional speed and payload, the superb Pratt & Whitney R2800-31 radial engine was in production. This engine type was developed specifically for the Lexington/Ventura/Harpoon aircraft – a great rarity during WW II. Most engineers had to plan aircraft around existing power plants. A different version of the R2800 powered the 400 mph Vought Corsair fighter; it would assist the performance of the Ventura.[4] Finally, a total of five fixed Brownings would give the Harpoon as much punch as a fighter. U.S. squadrons in the Aleutians began to receive their new PV-2 Harpoons in 1944 and early 1945.

In its roles as a harassment raider, shipping attacker and ASW patroller, the Ventura and Harpoon served well. It had a low rate of loss to enemy attack, and its longer range allowed for safer operation. The lineage of the Ventura demonstrates the tendency of U.S. manufacturers to improve, update and perfect existing designs as field conditions called for changes. The PV-2 embodies improvements dictated by combat experience and a change in deployment to the harsh conditions of the northern Pacific.

Venturas, Harpoons, and the Battle for the Aleutians

The PV-2 Harpoon and its predecessor, the PV-1 Ventura, helped turn the tables on the Japanese Aleutians strategy; U.S. Navy air crews were able to attack from the once Japanese-held bases of the Aleutian Islands. Already, American twin engine, twin-tailed bombers had stunned the Japanese homeland. Doolittle led sixteen B-25 Mitchells on the famous April 18, 1942 attack on Toyko. The ensuing public embarrassment caused the military government to withhold air forces and other

[3] Bombs were aimed and released by the pilot for these later model Venturas and for the Harpoon. Sometimes, crew members marked the pilot's Plexiglas windshield with hash mark "bomb sights." Pilots were instructed to bracket a shipping target with several bombs; even a miss could inflict adequate damage to an unarmored merchant ship.
[4] Technically, the Harpoon was slightly slower than the Ventura, because of the added weight of additional armament and fuel capability.

personnel to counter the threat. While B-29 squadrons would attack the heart of Japan in 1944-45, the Ventura/Harpoon units would press home attacks on the Japanese islands from the north.

The Aleutians were well located for land-based patrols. This group of 120 volcanic, barren, harsh islands stretch from the Alaskan peninsula to within less than 100 miles from the Russian peninsula, Kamchatka. Attu, located on the westernmost American Aleutian Island was just 750 miles from the northern most Kurile Island – held by Japan.

Following Japanese capture of Attu and Kiska, the U.S. began to respond to the threat. On the 11th and 12th of June, the United States fought back with slow-flying PBY Catalina sea planes and a squadron of B-24's. The deadly serious game of cat and mouse didn't end for a year – until the very bloody Battle of Attu in April 1943 finally ended the Japanese occupation. Thousands of soldiers committed suicide with hand grenades; and the Japanese once again stealthily crept back in under the cover of fog, gathered up the remaining 5,000 troops and went home. Just prior to this victory, Fleet Air Wing-4 was assigned to the Aleutian front at Adak with a squadron of PV-1 Venturas.

The Japanese had been mapping the Aleutian Islands and Alaska territory for years, and although it was never known for sure what their intentions were, they potentially had set themselves up to wreak havoc on Canada and the United States if it had worked to their advantage.

In the fall of 1943, after the Battle of Attu, the Commander-in Chief wanted to know the strength of the Japanese military in the northern Kurile Islands before deciding on an American invasion. The first photo reconnaissance mission was flown on November 16, 1943 by a PV-1 Ventura and a crew from VB-136.

This route from the Aleutians to the Kuriles became known as the "Empire Express" and changed from photo missions to bombing missions in early 1944 – done by PV-1 Venturas and later in the war by PV-2 Harpoons as they rolled out of the factory. The "Empire Express" continued with bombing raids sending at times 4-8 PV-1's out into the night earning them the nickname, "The Bats."

Flight conditions were tough, and left no room for pilot error. On March 25, 1944 five PV-1 Venturas headed off in the snowy night heavily overloaded with fuel and ordinance towards Paramushiro for another harassing bombing raid. One crashed on take-off, one got lost and turned back after several hours, and three pressed on. Of the three, only two returned to base. The

missing aircraft, Bomber 31, was lost for 55 years until its remains were uncovered on the Russian peninsula of Kamchatka.[5]

Because of events like this, it became glaringly apparent that the Ventura needed additional fuel tanks to go on these long ranged missions and the Navy wanted to add more armament to the already overloaded aircraft. But in order to add more fuel tanks and equipment, the wing had to be redesigned to carry the weight, and the PV-2 Harpoon was born. Full production began in March 1944 and the Harpoons with their greater flying range started arriving in the Aleutians in February 1945.

The following is an excerpt from a first person account written by Bedford, Indiana resident, Robert Medlock, an ordinance man in VPB-139 and mailed to the American Military Heritage Foundation in August 2006 for their archives. Medlock's account typifies the dangerous missions expected of Ventura/Harpoon squadrons during WW II.

> *On March 1, 1945 a six-plane section departed Whidbey Island Naval Air Station for Attu. Two days later the remaining nine Lockheed PV-2 Harpoons departed Whidbey. On March 12, VB-139 officially relieved Squadron VB-136's duties in the Aleutian Islands. It was still wintertime when we arrive on Attu and the snow was so deep that it came almost up to the top of our Quonset hut barracks. It would snow so hard and the wind would blow so hard that the snow would seem to be coming down sideways.*
>
> *Our squadron began flying patrols and sector searches two days later. These routine missions continued until March 28.*
>
> *It is now mid March 1945 and I find myself a United States Navy Combat Air-crewman stationed in the Aleutian Islands and based at Attu. My assignment is top turret gunner on Harpoon #28. My combat aircrew number is eleven and my squadron number is VPB 139.*
>
> *We will be taking off and landing on steel matted runways that look like a washboard and they are rough as a cob. To compound the danger, a lot of our landings will necessitate an instrument let down and an instrument approach to the runway. On every take off it will be necessary for us to be two thousand pounds over weight.*
>
> *Then on April 6, a four plane flight attacked Kokutan Zaki with bombs and rockets. It was on this flight that Squadron VPB-139 and the PV-2 Harpoon became official members of the "Empire Express."*

[5] This event was re-created using #37396 "Hot Shot" for a NOVA / PBS documentary, *The Last Flight of Bomber 31.*

Planes of the Empire Express flew bomb-rocket-strafe missions over the Japanese Kurile Islands almost on a daily basis. Some of the targets hit were located on the West Coast of Shimushu and Paramushiro. Japanese shipping was attacked on the Sea of Okhotsk and Paramushiro Strait. Other target installations were hit at Hayaks Gawa, Kataoka, Kokutan Zaki and Minami Zaki.[6]

PV-2 Harpoon squadrons were flying missions right up to the end of the war. Medlock recalls the emotional last day of the war in his letter. The day was August 15, 1945, and VPB-135 flew their appointed mission to raid Shimushu despite a last minute warning that the war was officially over.[7]

Routine ASW patrol in the Pacific was another common assignment for Ventura/Harpoon squadrons. A PV-1 from squadron VPB-152, based on Peleliu Island, was on one such patrol on August 4, 1945, when the crew spotted the oil slick of the *U.S.S. Indianapolis* and signaled for assistance. The *Indianapolis*, having delivered the first atomic bomb to Tinian, had been torpedoed and sunk days before; only 318 of the crew of 1,196 survived.

PV-2 Harpoon #37396

After production, PV-2's began relieving worn out PV-1's from the Aleutians to Guadalcanal, Kaneohe Bay, HI, Marshall Islands, Funafuti Island and the Gilbert Islands. In all, 16 Navy PV-1 Ventura and PV-2 Harpoon squadrons participated in the war against Japan. They also provided American protection along the eastern seaboard.

Bureau number 37396 was accepted by the U. S. Navy in March 1945 and was assigned to VPB 136 at Whidbey Island Naval Air Station in July 1945. Though accepted into service and ferried to a front line squadron at Whidbey Island, the plane was never flown on a mission. The war was over August 1945. Harpoons continued to be manufactured until later in the year and were subsequently delivered post war to foreign governments, such as the Italian and Portuguese Air Force and to private civilian operators as surplus. Ironically, Harpoons were among the first aircraft to equip the Japanese Maritime Self Defense Force after July 1951.

Hot Stuff was used in the reserves for a few years and then retired in October 1953 and stored at Litchfield Park and then stricken from the record on December 1956. In 1957 it was sold to Master

[6] Medlock, letter to AMHF. VB-136 was the squadron to which #37396 was assigned; these actions represent the use to which the plane would have been put had not the war ended.
[7] Ibid

Equipment Company as civilian N7265C and stored again unconverted until 1966. In August 1979 it was registered to RALCO and converted into a fire ant sprayer.

RALCO was the name of an agricultural company owned by Indiana native, Ralph Johnson, who purchased 22 surplus Harpoons from the Navy for his ag spraying business in Wyoming. Johnson whose family is still in the farming business in northern Indiana was a 1930 graduate of Purdue University. He is still alive and turned 102 years old this past June 2008. In May 2008, Purdue University honored Mr. Johnson and his contributions to aviation and agriculture with an honorary doctorate degree.

In January 1986, The Historic Aircraft Memorial Foundation acquired the Harpoon and operated it as a war bird. The American Military Heritage Foundation, an Indianapolis based 501 c3 non-profit organization acquired it in January 1990 and has been operating it on the air show circuit every since.

It is the only known flying PV-2 Harpoon in the United States. There may be some still operating in other countries.

Design Significance of the Harpoon

The Lockheed PV-2 Harpoon meets Criterion C as a prime example of WW II military engineering. The Harpoons and Venturas were outstanding, versatile aircraft for their time. They demonstrated their capabilities in many roles as a fighter, bomber, torpedo bomber, photograph reconnaissance aircraft and target tug. They also did not need fighter escort, as other aircraft like the B-24, B-25 or B-17, in a sense it was its own escort.

During WWII airpower and reliability meant supremacy. One source sites the Pratt & Whitney R-2800 as the most significant aircraft engine built in the United States during World War II; the Ventura and Harpoon had R-2800 engines, but the Harpoon was the only plane to have the R-2800-31 engine.[8] The first airplane to use an R-2800 type was the F4U which also has the distinction of being the first United States military airplane to exceed 400 mph in level flight.

The unusually high maximum speed while carrying armament allowed them to outrun most any Japanese fighter at low altitude. There was some concern among flight crews that the Japanese may notice that the new PV-2 Harpoon, although much heavier armed, was ultimately slower and take advantage of the situation. Fortunately for U.S. flyers, the Japanese were likely too low on aircrews and planes to detect or utilize the slight shortcoming.

[8] Generally, see Graham White, R-2800 Pratt & Whitney's Dependable Masterpiece.

Although the aircraft was generally a typical design for WWII, it had one distinguishing property: wing loading. At 65 pounds per square foot, the Martin B-26 Marauders were the only other planes with similar high wing loading. The PV-2 was an effort to increase its payload, so as discussed earlier, wingspan surface was increased (increasing lift), but at an expense to power.

The Lockheed signature twin tail design, embodied in #37396, was a significant design trend in the 1930s and in WW II aircraft. As mentioned earlier, Kelly Johnson often employed the twin tail concept. At low speeds, because the tail aligns with prop wash, a twin tail offered sure handling. In combat, failure of one tail rudder could be compensated by using the other tail rudder to control the plane. Gunners had a greater field of view and fire.

Another interesting feature of the Harpoon is its small propellers. At 10 feet 7 inches they came extremely close to the fuselage. When propeller blades come too close to the structure, shock waves come off the blade tips and bounce off the fuselage skin, creating severe vibration which could shake the aircraft apart. In the PV-1 and PV-2 this was not the case, the theory being in the strength of the dash 31 propeller reduction gear. Other aircraft like the Rolls-Royce Merlin had problems with this nose case propeller phenomenon.

PV-2 #37396 embodies these significant design improvements. Restoration to wartime configuration, such as re-installation of a period Martin turret, has enhanced the ability of the plane to convey the military role the Harpoon played in the fight for the Aleutians.

Appendix

Names, Variants, Predecessors and Designations of the Lockheed PV-2

Name/Designation	Number produced	Number existing as wreck or whole
Lockheed Electra	149	7, one in U.S.
Lockheed Super Electra	233	unknown
Lockheed L-18 Lodestar	625	10-15 in airworthy condition in U.S.
Lockheed Hudson	2,584	under 10, all on static display in UK, Australia, New Zealand
Lockheed B-34 Lexington/ Lockheed B-37/RB 34B/ Lockheed PV-1 Ventura	3,094 for all variants	several in static display
Lockheed PV-2 Harpoon	535	3, including #37396 and a "shipwrecked" PV-2D in Washington State Pacific waters

NOTE: this chart is compiled from various internet sources and was created for purposes of determining the rarity of Lockheed Hudson/Ventura/Harpoon aircraft. It is not intended to be an absolutely accurate survey.

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Section 10 - Geographical Data, Verbal Boundary Description

The boundary consists of Lockheed PV-2 Harpoon #37396, including its airframe, power plants, and interior and exterior equipment.

Boundary Justification

The aircraft retains its integrity and association with development of U.S. airpower and aviation technology regardless of its location within the United States. Therefore, no land is included in the boundary, only the significant aircraft itself. The aircraft is currently maintained at a small airport and the intent of the owners is to operate and service the plane as a functional, airworthy aircraft rather than a static display piece.

United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

Photographs

The following information is common to all photos:
Name: Lockheed PV-2 Harpoon #37396
Location: Mount Comfort Airport, Hancock County, IN
Photographer: John Parka
Date: Photos taken May, 2008
Negative: Negatives stored: John Parka, 35 Chris Court, Apt. 2, Greenfield, IN 46140

Photo #	Description of View (note: compass direction of camera not given; plane can face any direction)
1	Left or port side of aircraft, general view exterior
2	Left front ¾ view, nose and port side view exterior
3	Front of aircraft, nose-on general view exterior
4	Right front or starboard view of aircraft, ¾ view exterior
5	Right or starboard side of aircraft, general view exterior
6	Right or starboard rear side of aircraft, ¾ view exterior
7	Rear or tail view of aircraft exterior
8	Left rear of aircraft exterior
9	Standing in the cockpit door, instrument panel and controls, facing forward, interior
10	Standing just outside cockpit door, looking forward at instrument panel, interior
11	Standing in front of passenger seats, 2nd behind crew chief station and cockpit, interior
12	Standing in passenger seat area, looking forward, interior
13	Standing in passenger sear area, looking forward, main entry hatch at left, interior.
14	Standing under Martin gun turret, looking aft to tunnel gun port and tail assembly, interior.