Description of Saugatuck Gap Filler Annex for use in nomination to national and state historic registers.

Summary Paragraph

The Saugatuck radar Gap Filler Annex is a single story, two room, flat roofed concrete block structure of approximately 1000(?) square feet. The building houses an AN/FPS-18 radar and associated equipment with an adjacent 70[1](?) foot three legged tower supporting the radar antenna which is enclosed in a protective fiberglass dome on a platform at the top. The Gap Filler Annex is sited on 0.34 acres at the crest of Mt. Baldhead, a dune rising 230 feet above the Lake Michigan shore[2], immediately to the west. The gap filler was part of the huge Cold War era SAGE air defense system designed to protect the continental US from attack by detecting the approach of and intercepting Soviet bombers carrying atomic weapons across northern Canada. Of the original 131 gap fillers built, the Saugatuck site is one of three that have survived externally intact and may be the only one with the radar equipment remaining in place within the building. Building and tower presently appear substantially as they did at the time they were constructed, with the exception of some deterioration and the addition of the dome.

Narrative

The Semi Automatic Ground Environment (SAGE) air defense system was created in response to the general perception of an emerging Soviet threat heightened by the May 1947 introduction of the first Soviet bomber with intercontinental range, the Tu-4[3], and the subsequent successful test of their first atomic bomb in August of 1949. SAGE ultimately consisted of hundreds of long range radars across the northern US and Canada linked to 23 huge AN/FSQ-7 vacuum tube computers via the first wide area computer network ever implemented. It was quickly determined these radars had numerous blind spots due to terrain obstructing their view of possible low flying aircraft. To resolve these “gaps” in coverage, 131 gap filler radars were rapidly built across a two year span, Saugatuck’s Gap Filler Annex among them.

The Air Force entered into a lease of the land from Saugatuck on June 1, 1956[4] and construction of the building and tower began in August[5]. The radar, originally an AN/FPS-14, became operational July of 1958[6], initially sending radar scan data over more or less conventional phone lines to the 781st Aircraft Control and Warning (AC&W) Squadron, Battle Creek, MI via the first application of a modem outside an R&D environment. The antenna was not originally protected by a dome and could be seen slowly rotating at the top of the tower. The radar was designed to be controlled remotely and to run unattended with no provisions for a permanent crew.

In June of 1963, now under control of the rechristened 781st Radar Squadron (SAGE) Ft. Custer, MI, the FPS-14 radar was deactivated and removed from the Saugatuck annex[7] along with its antenna. It was replaced by an AN/FPS-18 radar which began operation December 14, 1963 with the new antenna enclosed in a protective dome. This FPS-18 radar is still in place in the building, nearly completely intact with its associated electronic equipment.

As the SAGE system was slowly shut down due to its inability to counter the new threat of attack from intercontinental nuclear missiles, the Saugatuck Gap Filler Annex was transferred to the 752nd Radar Squadron (SAGE) Empire, MI and eventually permanently deactivated April 1st, 1968[8]. The Air Force terminated its lease December 31, 1968[9] and the land reverted to the Village of Saugatuck which purchased the building, tower, and all the radar equipment for $250 in July of 1969[10].

Layout and structural details of the building and tower follow the standard plan for all of the 131 Gap Filler Annexes built, with minor modifications to accommodate the site. The building had two separate rooms with no communicating doorway. The smaller room to the east housed two diesel driven generators to supply power to the radar equipment in the event of loss of commercial electric service. The Air Force removed these when the equipment was sold to Saugatuck. Still in place are two motor/generator type rotary regulators which ensured the required voltages were available to operate the radar. The eastern wall and foundation of this room are suffering substantial deterioration and the wall is nearing possible collapse.

The larger room on the west side of the building contains two identical AN/FPS-18 receiver/transmitter pairs, deteriorated somewhat with surface rust from long years of exposure to a leaking roof and the affects of occasional vandalism, but remaining substantially intact. Also in this room are the FSW-1 Site Monitor and one of two basically identical halves of the FST-1 Coordinate Data Transmitter, the other half having been removed at some unknown previous date. The location of some portions of the removed equipment is known. The structure is basically stable though showing the effects of years on the dune.

The FPS-18 radar was of conservative design for its era, but well matched to the application. With a relatively short range of around 50 miles and coarse resolution, the emphasis was primarily on reliability. The FST-1, in contrast, represented the vanguard of digital technology, employing the latest hardware for signal processing and communication. This unit utilized a grid barrier storage tube and a modem, both leading edge electronic devices made available mere months before their use in this application.

The Saugatuck Gap Filler Annex now stands in a park at the top of Mount Baldhead with a popular scenic lookout just a dozen yards to the southeast overlooking the City of Saugatuck. Lake Michigan, ¼ mile distant to the west, stretches out to the horizon framed by dense pines, the sound of its waves washing the shore audible above the wind. The site is accessed by 304 stairs climbing the east face of the dune from a small park at its foot, with the Kalamazoo River just beyond and Saugatuck directly across. The stark white dome at the top of the antenna tower is an iconic landmark clearly visible against the sky for miles in all directions and is used as a navigational aid for mariners far from shore seeking Saugatuck or nearby ports.

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[1] News Palladium September 13, 1969, p. 7; Saugatuck Buys Radar
Four standard tower heights including 54 and 70 feet.
[2] Army Corps of Engineers Memorandum dated 18 June 1991, Enclosure 3 - 4 of 4;
floor elevation 808.0 feet. File “E05MI0140_01.08_0003_a ocr'd.pdf”
[3] History of Strategic Air and Missile Defense 1945-55, p. 9
[4] Army Corps of Engineers Memorandum dated 18 June 1991, Enclosure 1, Findings
of Fact, para 1. File “E05MI0140_01.08_0003_a ocr'd.pdf
[5] Commercial Record, September 28, 1956
[6] 781st AC&W Squadron History, microfilm reel K0388 p. 357
[7] 781st Radar Squadron (SAGE) History microfilm reel K0606, p. 940
[8] 752nd Radar Squadron (SAGE) History, microfilm reel K0603, p. 1667
[9] Army Corps of Engineers Memorandum dated 18 June 1991, Enclosure 1, Findings
of Fact, para 3. File “E05MI0140_01.08_0003_a ocr'd.pdf”
[10] Commercial Record, July 03, 1969 edition, p. 1. May not include $250 purchase price.
News Palladium September 13, 1969, p. 7; Saugatuck Buys Radar