

Trigger for Atomic Holocaust

Aircraft Detection on the DEW Line



Royal Canadian Air Force officer T.H. Collins stands before a doppler antennae towering over the DEW Line Main Station at the Hall Beach in 1955. Photo courtesy Dept. of National Defence DND-CPU-PCN 1660.

The isolated antenna of the Distant Early Warning (DEW) Line are enduring images of the Cold War in Canada. Stretching across the 70th parallel from Alaska to Greenland, the DEW Line was the northern bastion of a huge air defence system built in the 1950s. In Canada, the system included 4 main stations, 18 auxiliary stations, and 20 smaller intermediate sites. Two stations, the BAR-1 Auxiliary radar station and the BAR-B I-Site, operated from locations in what is now Ivvavik National Park in the northern Yukon Territory. The cultural resource management of these sites provides an opportunity to evaluate the aircraft detection technology.

This extraordinary arctic military facility detected transpolar aircraft activity for continental defence. Designed to alert defending fighters and give six hours warning, the rapid development of military aircraft soon cut the DEW Line's warning time in half. Once ICBMs supplemented Soviet bombers in the early 1960s, the warning shrank to minutes; and air and civil defence efforts became pointless. The DEW Line was limited to confirming attacks and triggering massive nuclear retaliation.

Air traffic monitoring in remote areas offered unique challenges to system designers in the early 1950s. Because air traffic was infrequent in northern areas, console operators spent long, tiresome periods without any contact. The extra staff needed to cover remote areas was expensive. To overcome these difficulties, designers equipped the DEW

Line with two kinds of electronic detection gear, a powerful gap-filler radar and a doppler radio detection system known as the "McGill Fence," developed under the leadership of McGill University physicist John S. Foster.¹ The fence operated on the DEW Line and the Mid-Canada Line, another link in the air defence system on the 55th parallel.

Transmitting and receiving gear connected to a set of 100-meter radio masts equipped each DEW Line station. Radio transmissions

between stations emitted lobes of electromagnetic radiation reaching from the ground to 30,000 meters. Station recording devices detected passing airplanes when they disturbed the energy field. The system provided intrusion warning, tracked aircraft, supplemented radar sightings, and covered gaps between radar stations. The system was an innovative and inexpensive solution to the need for automatic air traffic notification.

Although theoretically attractive, the "McGill Fence" was notoriously unreliable. Field reports on the "Fence" noted that operators were "cancelling the alarm without even inspecting the scope for target presence." Sam Lightman, a radar technician responsible for the doppler in the early 1960s reported, "We either got nothing, or we got geese. We never, ever got aircraft. It was a hopeless system. It was also a tremendously temperamental system, it was almost impossible to keep the damn thing running, I don't exactly know why. I think it was because the receivers were hideously sensitive and it was just awful."² As the need for aircraft detection diminished in the early 1960s, the doppler systems were taken out of operation. All DEW Line I-sites were closed in 1963. Two years later, the Mid-Canada Line was also abandoned. The large antenna and wire webs used for the "McGill Fence" on the BAR-1 and BAR-B sites were removed in the mid-1960s.

Besides the passive notification provided by the "McGill Fence," each DEW Line station was equipped with powerful long-range search radar. These units, capable of tracking aircraft to 30,000 meters and almost 500 kilometers away, provided overlapping radar coverage.³ The rotating antenna was sheltered within the protective white hard shelled geodesic radome popularly attributed to Buckminster Fuller. Transmitting and receiving equipment and the consoles were housed in the building train immediately below the antenna tower.

Radar technician Bob Virgin at the console of BAR-1, April 1993. Photo courtesy Johnson collection, Parks Canada.



