

It began as “the McNamara Line” across Vietnam. It led to the seeding of the Ho Chi Minh Trail by air with 20,000 sensors.

Igloo White

By John T. Correll

BY THE spring of 1966, Secretary of Defense Robert S. McNamara had soured on the air campaign against North Vietnam.

The Operation Rolling Thunder air strikes, which had begun in March 1965, had not accomplished much. The strategic results might have been better, except that US airmen were severely constrained in where and what they could bomb.

The targets were selected, one by one, by the White House. Strikes on major military targets around Hanoi and Haiphong were seldom approved.

The campaign was a “measured and limited air action” to signal US “determination and commitment” to Hanoi. Administration officials did not want to provoke “a wider war.” They feared that stronger use of force might lead to a confrontation with the Soviet Union or China.

Weapons, supplies, and troops streamed south from North Vietnam, along the Ho Chi Minh Trail. North Vietnam’s military activities were not seriously interrupted.

McNamara was opposed to any increase in bombing of the North. In his view, the United States was not at war with North Vietnam. He saw the conflict as one of insurgency in the South. The US objective, he said, was not to overthrow or destroy North Vietnam but rather to stop its infiltration and aggression in the South.

Within six months of the start of Rolling Thunder, McNamara was rethinking the role of the air campaign in the overall US effort.

He was looking for an alternative.

The idea that McNamara seized upon came from professor Roger



An airman gets ready to hurl a seismic sensor from an HH-3 helicopter over Vietnam to form part of the electronic infiltration barrier approved by Defense Secretary McNamara.

Fisher of Harvard Law School, a part-time consultant to McNamara and John T. McNaughton, the assistant secretary of defense for international security affairs.

In January 1966, Fisher wrote to his friend, McNaughton, to suggest that a 160-mile barrier be built across Vietnam and Laos. It would consist of minefields, barbed wire, ditches, and “military strong points flanked by a defoliated strip on each side.” If the barrier could stop the infiltration, the bombing of North Vietnam could be stopped, too.

The Jasons

Six weeks later, McNaughton passed the idea on to McNamara with only slight revisions.

Around the same time, McNamara was approached by several top scientists from MIT and Harvard who envisioned possibilities for a technical solution in Vietnam.

McNamara asked the military for

comment. The Joint Chiefs of Staff were against the whole thing, saying it would take six or seven Army divisions to clear and secure the terrain and up to 48 months to complete the barrier. Gen. William C. Westmoreland at Military Assistance Command Vietnam, Adm. U.S. Grant Sharp at US Pacific Command, and all of the other senior commanders in the Pacific were also opposed.

McNamara went ahead anyway. He asked a group of university scientists called the Jasons to undertake a summer study looking into the feasibility of the proposal.

The Jasons were organized in 1959 by the Institute for Defense Analyses, a think tank near Washington, D.C. The “Jasons” name was suggested by the wife of one of the founders, who thought the group’s original name, Sunrise, sounded like a shaver.

The summer study was conducted by 47 Jasons, augmented by 20 IDA analysts. They presented their re-

port in person to McNamara on Aug. 30. They said the bombing of North Vietnam had had “no measurable direct effect on Hanoi’s ability to mount and support military operations in the South.”

The report proposed building an antipersonnel barrier across Vietnam below the Demilitarized Zone and an antivehicular barrier, consisting of mines and battery-powered sensors, along the Ho Chi Minh Trail in Laos.

“The construction of the air-supported barrier could be initiated using currently available or nearly available components, with some necessary modifications, and could perhaps be installed by a year or so from go-ahead,” the Jasons said.

US aircraft had been flying interdiction missions in the Laotian panhandle since December 1964. Air Force and Navy airmen were forbidden to strike at the sources of supply in North Vietnam, so they chased down trucks, one by one, on the jungle trails.

The Starbird Task Force

McNamara sent the Jason study to the Joint Chiefs of Staff for evaluation, but he did not wait for their response before setting the project in motion. On Sept. 15, he appointed Army Lt. Gen. Alfred D. Starbird, a research and engineering officer, to head Joint Task Force 728 to develop the barrier.

Starbird was given a target date of Sept. 15, 1967, to achieve initial operational capability. The date was later extended but only to Nov. 1, 1967.

In a follow-up memo to President Lyndon B. Johnson in October 1966, McNamara said that Rolling Thunder had neither “affected infiltration or cracked the morale of Hanoi.”

McNamara proposed an infiltration barrier, which he said “would lie near the 17th parallel—would run from the sea, across the neck of South Vietnam (choking off the new infiltration routes through the DMZ), and across the trails in Laos.”

McNamara went on, “This interdiction system (at an approximate cost of \$1 billion) would comprise to the east a ground barrier of fences, wire, sensors, artillery, aircraft, and mobile troops; and to the west—mainly in Laos—an interdiction zone covered by air-laid mines and bombing attacks pinpointed by air-laid acoustic sensors.”

The barrier, McNamara said, “would

be persuasive evidence ... that our sole aim is to protect the South from the North.”

Starbird’s task force was given the cover name of Defense Communications Planning Group, which was meant to sound as bland and as nondescriptive as possible. The project was called Project Practice Nine. The Vietnam portion was Dye Marker. The Laos segment was Muscle Shoals, and the technology for it was Igloo White. Igloo White would be the name by which the entire program would be best remembered.

MACV commander Westmoreland met with Starbird and concluded that the plan was “a noble idea” but “also highly theoretical.” In his memoir, *A Soldier Reports*, Westmoreland said, “As any experienced military man would know, the concept had a basic flaw in that no fence—electronic or otherwise—would be foolproof without men to cover it by fire, which raised the specter of tying down a battalion every mile or so in conventional defense.”

The McNamara Line

In January 1967, the White House, in National Security Action Memorandum No. 358, gave Project Nine

the “highest national priority” for expenditures and authorization.

The program was freewheeling and free-spending. It was a heady atmosphere for the scientists. They went to the front of the line for materials and services. Whatever they asked for, they got.

“If DCPG said it needed 10,000 chocolate cream pies from the Army by noon the next day, it would get them and without any questions,” said a project member quoted by Paul Dickson in *The Electronic Battlefield*.

Along with its more solid work, Project Nine generated several exotic schemes that were soon discarded. One such notion was to train pigeons to carry munitions, land on North Vietnamese trucks, and explode on touchdown. Among other difficulties, the pigeons couldn’t tell a communist truck from a noncommunist one.

Another bizarre idea was to develop sensors that resembled dog excrement. It was canceled after it was learned that there were no dogs on the Ho Chi Minh Trail.

The task proved to be more difficult than the Jasons had figured. Existing technology was not sufficient. The project required further devel-



The most widely used sensor for Igloo White was the air-delivered seismic detection sensor, which detected ground vibrations caused by enemy troops or vehicles. It was small and light, appearing much like the surrounding foliage.



Nakhon Phanom, Thailand, was home to the Igloo White Infiltration Surveillance Center. Security was so strict at the ISC that access was limited room by room, and project airmen did double duty as janitors.

opment and engineering on the sensors, aerial delivery, monitoring equipment, processing and display, and other equipment.

Sketchy stories about a barrier in Vietnam showed up in the press in 1966 and 1967, but the Pentagon professed to have only a limited interest in any such idea.

Meanwhile, McNamara was increasingly vocal in his criticism of the air campaign. “I don’t believe that the bombing up to the present has significantly reduced, nor any bombing that I could contemplate in the future would significantly reduce, the actual flow of men and material to the South,” he said at a Senate Armed Services Committee hearing in January 1967.

Work on the Dye Marker barrier in Vietnam began in the summer of 1967. The job fell to the Marines, in whose area of responsibility in Quang Tri Province the barrier was supposed to be built. It did not go well. The Marines, who disagreed vigorously with the concept, had to divert to it troops and resources that they could not readily spare.

McNamara revealed the project to the public at a press conference on Sept. 7, 1967, where he announced that a plan was under way to build an electronic barrier south of the DMZ. (In fact, the project was nearly a year old and parts of it were almost complete.) Syndicated columnists Rowland Evans and Robert Novak reported that the Air Force and the Navy were particularly opposed.

The press conference stimulated several popular names for the barrier, but the one that stuck was “the McNamara Line.”

Igloo White

In January 1968, the Dye Marker sensors and other equipment, intended for deployment along the DMZ, were commandeered for the defense of the Marine outpost at Khe Sanh. The sensors were very effective in tracking the enemy at Khe Sanh—even the Marines said so—but, when the siege lifted in April, work on the barrier did not resume.

By then, McNamara was gone, having left office Feb. 29, 1968. The demise of Dye Marker was not made formal and public until March 1969, when Secretary of Defense Melvin R. Laird announced the cancellation of the barrier project, saying, “It did not work out as expected.”

All that remained of the McNamara Line was Igloo White. Ironically, the part that survived belonged to the Air Force, the service that had been most opposed to McNamara’s idea to begin with.

The bombing halt of 1968 marked the end of Rolling Thunder and a change in the direction of the war. The focus of the bombing effort shifted to interdiction of the Ho Chi Minh Trail, and Igloo White, newly operational, was there to help.

Igloo White consisted of three parts: the sensors, the orbiting aircraft to relay the signal, and the In-

filtration Surveillance Center at Nakhon Phanom Air Base in Thailand.

The sensors—a network of some 20,000 of them—were planted mostly by Navy and Air Force airplanes, although some of them were placed by special operations ground forces. They were dropped in strings of five or six to be sure that at least three sensors in each string would survive and be activated. The sensors operated on batteries, which ran down after a few weeks, so replacement sensors had to be dropped.

Most of the sensors were either acoustic or seismic. There were two kinds of acoustic sensors, both derived from the Navy’s Sonobuoy, to which microphones and batteries were added. These sensors could hear both vehicles and voices.

The Acoubuoy (36 inches long, 26 pounds) floated down by camouflaged parachute and caught in the trees, where it hung to listen. The Spikebuoy (66 inches long, 40 pounds) planted itself in the ground like a lawn dart. Only the antenna, which looked like the stalks of weeds, was left showing above ground.

The ADSID (Air-Delivered Seismic Intrusion Detector) sensed earth motion to detect people and vehicles. It resembled the Spikebuoy, except it was smaller and lighter (31 inches long, 25 pounds). It was the most widely used sensor in the program.

The challenge for the seismic sensors (and for the analysts) was not so much in detecting the people and the trucks as it was in separating out the false alarms generated by wind, thunder, rain, earth tremors, and animals—especially frogs.

There were other kinds of sensors as well. One of them was the “people sniffer,” which chemically sensed sweat and urine.

Batcats and Big Computers

The nerve center for Igloo White was located at Nakhon Phanom, which the Americans called “NKP,” in eastern Thailand, across the Mekong River from Laos.

The Infiltration Surveillance Center was the biggest building in Southeast Asia. The project broke ground in July 1967 and was in operation before the end of the year. It had several names (including “Dutch Mill” and “Operating Location No. 1”), but the most popular one was Task Force Alpha.

Security in the center was tight. The people who worked there were limited in which rooms they could enter. The janitors were all off-duty Task Force Alpha airmen in the grade of E-5 or above.

About 400 Air Force people were assigned to Task Force Alpha, and a brigadier general was in charge. In the operational chain, the center reported to 7th/13th Air Force at Udorn AB, Thailand.

The darkened war room contained rows of scopes. Its walls featured large situation displays. Two IBM 360-65 computers—the most powerful then available—collated and processed the sensor data for use by the target analysts. The computers also contained extensive electronic maps of the Ho Chi Minh Trail and knew the precise locations of the sensors. When something tripped one of the sensors, the computers knew instantly where it had happened.

The sensor signals were too weak to reach NKP directly, though, so aircraft orbited the trail, 24 hours a day, monitoring the sensors on their radio receivers and relaying the information to Task Force Alpha.

From 1967 to 1970, the aircraft flying the orbits were EC-121Rs from the 553rd Reconnaissance Wing at Korat AB, Thailand. The EC-121 was a variant of the Lockheed Constellation airliner. It had four propeller-driven engines and three distinctive tail fins. The EC-121R differed from Air Defense Command's airborne



Sensor signals were too weak to reach the ISC directly, so aircraft, such as this EC-121R—call sign Batcat—monitored the sensor line 24 hours a day, relaying data back to Nakhon Phanom.

warning and control version of the EC-121 in that the radomes had been removed and special electronics and antennas had been installed.

The 553rd RW—its call sign was “Batcat”—flew its first operational mission on Nov. 25, 1967. The EC-121R carried a crew of 17 or 18, including a combat information center crew of six or seven working the Igloo White gear in the back of the aircraft.

It was a long duty day. To provide round-the-clock coverage of the sensors, the Batcats orbited the Ho Chi Minh Trail in eight-hour shifts. With

transit times, the flights lasted about 10 hours. Briefing and debriefing made the missions still longer.

The 121s sent a live feed of the sensor alarm data to the computers at Task Force Alpha. (Airmen working the scopes at NKP could not listen directly to the sensor microphones, but the mission crews on the aircraft could and did.) Input from the audio sensors was also recorded and kept on tape.

For several reasons, the Batcat crews simultaneously tracked and analyzed the sensor data they were relaying. Doing so maintained continuity if the link to NKP was lost or in case a Task Force Alpha computer or other piece of equipment crashed. In addition, several parts of the trail were outside the range of the relay equipment. At those locations, the aircrews processed the sensor signal data manually and called it in to 7th Air Force.

The EC-121R did a good job, but it was expensive to operate and it exposed a large crew to enemy fire. Consequently, it was replaced by a smaller airplane.

The QU-22B Pave Eagle was a single-engine, propeller-driven aircraft, a modified Beech Model 36 Bonanza, designed to fly in either a manned or unmanned mode. All of the operational flights, however, had a pilot. There was no room for anyone other than a single pilot. The rest of the cabin was filled with electronic monitoring equipment.

The QU-22, sometimes called the



Running near the 17th parallel, the McNamara Line cut across the Ho Chi Minh Trail in Laos. After McNamara left, the USAF-maintained Igloo White portion aided in air interdiction of the Ho Chi Minh Trail.

“Quacker,” was based at NKP, considerably closer to the trail than were the Batcats at Korat. In September 1970, the 553rd RW commander certified that Pave Eagle was performing satisfactorily and that it could accomplish its combat objectives. The 553rd was deactivated in December and the QU-22s took over. The QU-22 program itself was canceled in 1972.

Plugged In

“We wire the Ho Chi Minh Trail like a drugstore pinball machine, and we plug it in every night,” an Air Force officer told *Armed Forces Journal* in 1971. “Before, the enemy had two things going for him. The sun went down every night, and he had trees to hide under. Now he has nothing.”

Seventh Air Force in Saigon, which had operational control of air strikes on the Ho Chi Minh Trail, ruled that Igloo White would augment, not replace, the other interdiction efforts. Strikes on the targets developed by sensors were controlled by an airborne command and control center, just as other strikes in Laos.

The sensors tracked the direction and speed of the truck convoys. From those data, it was easy to figure out where the trucks were going and when they were likely to get there. If circumstances warranted, strike aircraft might be on the scene in five minutes. The sensors continuously updated the location of the trucks as the strike aircraft approached.

At a Pentagon news briefing in February 1971, Brig. Gen. William G. Evans, Air Force special assistant for sensor exploitation, explained that the sensors were identifying a strike zone.

“We are not bombing a precise point on the ground with a point-target bomb,” Evans said. “We can’t determine each truck’s location that accurately with ground sensors, which are listening—not viewing—devices. Since we never actually ‘see’ the trucks as point targets, we use area-type ordnance to cover the zone we know the trucks to be in. ... [Thus] we have an interdiction system which can hurt the enemy, even when he seeks the cover of foliage, weather, or darkness.”

The sensor data were also used to develop non-time-sensitive targets such as truck parks and storage areas, which could be struck at any time.

Many kinds of aircraft flew missions against the Ho Chi Minh Trail. Among them were B-52s, B-57 light bombers, F-4s, and assorted Navy aircraft.

However, the most effective weapon of all against trucks on the trail was the AC-130 gunship. It had its own sensors, including low-light-level TV, forward-looking infrared, and the shadowy “Black Crow,” which could detect truck engines from 10 miles away. For the most part, the AC-130s found their own targets, but they also received and used information from Task Force Alpha.

The North Vietnamese were aware

of the Igloo White sensors and took countermeasures. They destroyed some and tried to induce false reports by others. Among other techniques, the North Vietnamese drove animals up the trail and hung buckets of urine in the trees to foil the sensors.

The acoustic sensors picked up some memorable moments, all of which were duly recorded by the EC-121 crews. In *The Electronic Battlefield*, author Dickson described a tape recording that was played for him:

“It contained a few critical minutes in a North Vietnamese truck park along the Ho Chi Minh Trail in Laos and was recorded during an Igloo White mission,” Dickson wrote. “The first sound heard is that of a single truck parked with its engine running. It can be heard for several minutes during which time the only other sound one can make out is distant artillery.

“Then a voice can be heard shouting excitedly. The first truck is now moving and others are starting and some drivers are using their horns. Suddenly, there is the unmistakable sound of a jet zeroing in, followed by a quick series of sharp explosions and the jet pulling away. Save for the sound of a few of the surviving trucks which are getting more and more distant, there is relative quiet for a few moments and then comes the sudden and loud *pockata-pockata* of anti-aircraft fire.”

The Air Force played another tape for a Senate committee. The sound of axes could be heard as an inept work crew chopped down a tree to obtain a sensor caught in the branches overhead. That was followed by the sound of a crash and screaming as the tree fell on them.

In another documented instance, a North Vietnamese NCO is heard telling a trooper to climb a tree to get the parachute from an Acoubuoy snagged in the foliage. He wanted to give the material to his girlfriend to make a dress.

One limitation was that not every branch and offshoot of the trail was wired. There were entire routes that Igloo White did not know about. Even at the peak of the bombing, the North Vietnamese were building one or two miles of new road a day. In 1972, North Vietnamese tanks appeared in South Vietnam, having come all the way down the trail without being detected, much less stopped.

In March 1970, President Richard



Using the EC-121R was too expensive and put a large crew at risk, so USAF turned to the QU-22B Pave Eagle, a Beech Model 36 Bonanza loaded with electronic gear and flown by a single pilot. It was also called the “Quacker.”

M. Nixon publicly acknowledged the US military involvement in Laos. As further details were disclosed, Igloo White came under considerable scrutiny.

Doubts and Quips

Did it work? Unquestionably, the sensors detected tens of thousands of trucks, and the strike aircraft destroyed many of them. Some of the anecdotal evidence is spectacular. In one instance, the bombs squarely hit a target—either a fuel or ammunition storage area—that had been found by the sensors, and the mushroom cloud from the secondary explosion rose 8,000 feet into the air.

Seventh Air Force reported that, during the 1968-69 dry season, 6,000 trucks were destroyed or damaged on the Ho Chi Minh Trail. (Traffic on the trail surged during the dry season, from November to May, and slackened or stopped in the wet season, from June to October.) The total reported for the 1969-70 dry season was 10,000, and for 1970-71, it was 20,000.

The published data does not say how many of these trucks were destroyed or damaged as the result of identification by the Igloo White sensors.

Not everybody believed 7th Air Force's numbers. For example, the sarcasm fairly dripped from an April 1971 commentary prepared by the staff of the Senate Foreign Relations Subcommittee on US Security and Commitments Abroad.

"These figures are not taken seriously by most US officials, even Air Force officers, who generally apply something on the order of a 30 percent discount factor," the staffers said. "One reason why there is some skepticism about the truck kills claimed by the Air Force is the total figure for the last year greatly exceeds the number of trucks believed by the embassy to be in all of North Vietnam."

The Central Intelligence Agency chimed in, saying that 7th Air Force's "numbers game" was refuted by the CIA's own "highly reliable sources," referring to its agents in the enemy ranks. The CIA and the Defense Intelligence Agency developed a formula that arbitrarily discounted 75 percent of the pilot claims.



Although USAF's AC-130 could find its own targets using onboard systems like "Black Crow," the gunship also made use of Igloo White data to locate and strike enemy vehicles, such as those seen in this image from an AC-130 strike.

However, if Air Force claims could be cast into doubt, so could the criticism. Intelligence data and CIA reports were not always accurate. As for comments by Congressional staffers, politics might be suspected to be a leading ingredient.

Then, as now, the bomb damage assessment process was flawed on both ends: Operations tended to claim too much; Intelligence tended to validate too little.

Two facts seem indisputable: The air strikes got a lot of trucks, but a lot of other trucks got through. The bomb damage claims may have been high, but perhaps not as high as the critics have alleged.

In a recent analysis, Air Force historian Eduard Mark has calculated "a rough correspondence between the number of trucks the North Vietnamese imported from their allies and the number of those the Air Force claims to have destroyed in Laos. This does not prove the validity of the claims; but there is at least not the kind of gross discrepancy that would discredit them *prima facie*. It is, accordingly, not unreasonable to take the claims for trucks destroyed as a basis for discussion."

Fade-Out

The war entered a different phase in the spring of 1972, when North

Vietnam launched a major military invasion. The North Vietnamese Army crossed the DMZ directly and in strength to challenge the South Vietnamese ground forces, who were increasingly on their own.

After a four-year hiatus, the bombing of North Vietnam resumed in Operations Linebacker I and Linebacker II. The weight of US air strikes, which had been concentrated on the Ho Chi Minh Trail, shifted to targets in North Vietnam. Troops and supplies were bombed north of the DMZ, before they could move onto the trail.

After January 1972, the Igloo White sensors detected a big drop in the number of trucks moving through Southern Laos.

US objectives had also changed. A major goal of the bombing was to push North Vietnam toward a negotiated settlement of the war. In aid of that, the air strikes concentrated on Hanoi, Haiphong, and military centers in the north.

Igloo White operations on the trail diminished in 1972 and then stopped altogether. The computers at Nakhon Phanom were packed up and shipped home to the United States.

There was, however, one last footnote. On March 29, 1973, 7th Air Force left Saigon and moved to NKP. It set up headquarters in the Task Force Alpha building, where it took on an additional role as the US Support Activities Group. It operated there in that capacity until it was deactivated on June 30, 1975. ■

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