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Ground-Based Remote Intercept in the Far East

Introduction

Radio communications above approximately 20 MHz, because of their wavelength and the curvature of the earth, are normally limited to the radio horizon as determined by the elevation of the transmitting and receiving antennas. Although there are many exceptions, transmissions above this frequency are normally "line-of-sight" and, as such, require small amounts of power to communicate over the desired path.

For these reasons (short range and low power), these communications have posed a long-standing challenge to the Sigint community: where to locate facilities to effectively intercept these signals. We have made numerous attempts through the years to solve the inherent problems, ranging from small two- or three-man efforts to huge undertakings. Some succeeded, others failed. Some were landbased, others were airborne or shipborne. Some cost relatively few dollars, others many millions. And some—the *Liberty, Pueblo,* EC-121—resulted in extensive loss of life and property.

The EXPLORER Program

The Vietnam conflict added emphasis to the problem. The enemy was using single-channel and multichannel radio equipment in large quantities in the high-HF and low-VHF segments of the spectrum, but our interception of these communcations was severely hindered by the topography of the country and the line-of-sight and low-powered characteristics of the equipment being used. These transmissions passed highly desirable tactical and logistical communications that the Intelligence Community clearly needed. But to fill this need, intercept efforts had to be dangerously close to enemy transmitters.

A number of techniques were tried in attempts to remedy this situation. One involved a balloon, which lifted antennas to a desired altitude to extend the radio horizon. The theory worked, but the balloon did not. Another effort called for the use of airborne platforms, but they were limited in the time they could remain with the target, and consequently could not provide the necessary continuity of coverage. Other efforts, including interception by airborne platforms high over the Gulf of Tonkin and relayed to ground sites in South Vietnam for near real-time analysis and reporting, proved to be unsatisfactory for a number of reasons.

During the part of the war when the American presence was at or near its peak, a fair degree of protection was afforded Sigint teams in forward areas—enough, in fact, to permit the location of Sigint units in areas where interception of line-of-sight tactical and logistical communications could be attempted with a fairly high likelihood of success. But later in the war, as the U.S. presence was diminishing, these already vulnerable locations became increasingly exposed to enemy attack, and Sigint teams were gradually withdrawn from them. Clearly something had to be done to insure continuing interception of these highly desirable line-of-sight communications.

That "something" evolved from a suggestion by the NSA representative in South Vietnam, who proposed locating remote-controled intercept systems on isolated hilltops where they could be controlled from relatively safe, well-established Sigint sites in rear areas. The first of these systems, developed during the early months of 1970 by a team of NSA engineers and technicians, was aptly covernamed EXPLORER.

The site selected for the first EXPLORER effort was Hill 950, overlooking Khe Sanh in South Vietnam's

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Military Region I. The hill had a history of use by Sigint units, having been used by elements of the U.S. Marine First Radio Battalion during the deployment of the Marines in Military Region I. But as the pullback of U.S. forces from South Vietnam continued, the site was afforded less and less protection, and the Sigint effort had to be terminated. Thus, at the time the EXPLORER system was to be deployed on Hill 950 it represented a tenuous Allied foothold deep in enemy territory, manned only by a Special Forces unit as a radio-relay site, with a complement of four U.S. and 31 Montagnard soldiers.

Because of this risky defense posture, a number of conditions had to be met: the system would have to be "low profile," to avoid arousing enemy interest in the hilltop location; it would have to be practically free of noise, to avoid covering sounds made by enemy soldiers attempting to infiltrate at night; it would require minimum manning, to avoid increasing the U.S. contingent at the site; and it would require an absolute minimum of maintenance, to preclude as many trips to the site as possible.

The system developed to meet these requirements consisted of four receivers at the remote site, which in turn were controlled by four voice-intercept operators at the ASA Field Station at Phu Bai. The operator controlled the system through a unit which duplicated all the functions of a standard intercept receiver. The commands from this control unit were combined in the command multiplexer with those from the other control unit and sent by secure radio to the remote site. There the signal was received, and the commands were demultiplexed and then routed to the proper intercept receiver. The audio output of this receiver was then relayed back to the control site by secure radio, where it was available both at the operator's headset and as an input to a tape recorder. At the control site, the system operated the same as any standard group of voice-intercept positions. Since the time delay between the operator commanding a function, the receiver executing that function, and the relay of the receiver's audio output back to the operator was less than a quarter of a second, it was not apparent to the operator that his intercept receiver was some 60 miles distant.

The initial system was completed, tested, and deployed to South Vietnam in May 1970, and became operational in June. Once installed, it required no Sigint-cleared personnel on the hill; the Special Forces men handled day-to-day operation of the system (fueling the generators, for example). EXPLORER quickly became a major contributor of Comint, and by July it was producing some 1300 to 2000 minutes of intercept each day, making it the second major producer of VHF intercept in Southeast Asia. The targets covered included communications of both tactical and logistical enemy units deployed within 50 miles of the remote site.

The success of this first EXPLORER system quickly led to a request for additional systems. EXPLORER II was deployed during February 1971 in [redacted] Once again the remote site was a hilltop held by a small Special Forces contingent, and used by them as a radio-relay site. The system, similar to the original EXPLORER, consisted of four receivers remotely controlled from an ASA facility [redacted]

In March 1971, capacity of the first EXPLORER system was doubled to eight receivers, all controlled from Phu Bai. This expansion was required when it became obvious that the signal environment in the vicinity of Hill 950 was too dense to be covered adequately by the original system. But this expanded system did not operate long; it was just beginning to prove its worth when on 5 June 1971 the North Vietnamese and Viet Cong, following on the heels of a general South Vietnamese

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Location of EXPLORER II.

withdrawal, attacked Hill 950. After 12 hours of heavy fighting, the Special Forces group was forced to withdraw. Before leaving, though, they destroyed the EXPLORER system with thermite panels to prevent it from falling into enemy hands. One American was killed in the battle and two were captured (one of whom died in captivity). Half the Montagnard force was lost.

The loss of the system, though a severe setback, in a way proved the value of the concept. No Sigint-indoctrinated personnel or information was lost, and the system was destroyed beyond compromise. A manned effort, similar in scope, would have required at least 40 or 50 Sigint personnel on site, and very probably would have resulted in significant losses of these people as well.

Replacement of the EXPLORER system, which had become a major producer of Comint in South Vietnam, was given high priority, and two systems of four intercept receivers each were constructed and shipped to South Vietnam in August 1971. A return to Hill 950, however, was deemed impossible from a physical-security standpoint, and an extended search was conducted to locate appropriate sites for the two systems. Fire-support bases Sarge and Alpha Four, again near the DMZ, were selected, and a system was installed at each base in December. But EXPLORER III, as these replacement systems were called, was operational for only some four months. The massive enemy Easter offensive of March 1972 took the DMZ fire-support bases as its first victims, and with them the EXPLORER III remote systems. A direct hit by a rocket destroyed the equipment at Sarge and caused the first and only EXPLORER-related casualties involving Sigint personnel—two ASA enlisted men who had taken shelter within the equipment bunker. The Alpha Four system was destroyed by an on-site maintenance man just before evacuation of the base. While this effort caused the first loss of Sigint personnel, the remote-collection technique had nevertheless again proven its worth by providing sustained collection of line-of-sight communications from deep in hostile territory with minimal risk to personnel and classified material.

EXPLORER Sites.

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withdrawal of U.S. forces was at its peak by this time, and Allied Control at both the remote and control sites became ever more tenuous. In September 1972, the system was withdrawn when security and logistical support problems reached unacceptable levels.

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[redacted]

Conclusion

The EXPLORER Program initiated a trend in Sigint collection that promises to enjoy widespread future expansion. It is a safe and economical method for acquiring line-of-sight tactical communications, providing high-quality intercept at low risk to the persons involved in acquiring it. And it also may apply to much larger remote-collection efforts in future years. In fact, future planning envisions significant portions of the Sigint community's future intercept effort handled by systems employing remote intercept and relay techniques. But

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perhaps the best way to conclude this article is to quote from an Army Security Agency message of December 1972, commemorating the first anniversary of the [redacted] After citing impressive examples of production statistics [redacted] the message concludes that the [redacted] system is "the most recent advancement in the art of (tactical) radiotelephone intercept that is available for use by the forces of the free world."

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