Chapter 6 – (S//SI) Xerxes' Arrows: SIGINT Support to the Air War, 1964-1972

(U) The air war against North Vietnam, which started in late 1965, had been a gleam in the eye of Johnson administration officials for several months before the first bomb was dropped. On 1 March 1964, William Bundy, a deputy assistant secretary for defense in the Kennedy administration, had proposed bombing North Vietnam and mining Haiphong harbor. He argued that the bombing campaign would achieve several results beneficial to Saigon and Washington: stop the infiltration of supplies down the Ho Chi Minh Trail to the Viet Cong, stiffen the backbone of the government in Saigon, and demonstrate to the world – especially the communist bloc – that the United States had the will and gumption to prosecute and win the war. In the same month, McGeorge Bundy, William's brother, and national security advisor to President Johnson, wrote what would be the blueprint for the air campaign, the National Security Advisory Memorandum (NSAM) 288, which called for a program of gradually escalated bombing of military targets in North Vietnam, and particularly, to retaliate against Hanoi for Viet Cong attacks against American personnel and installations in the South.

(U) Surprisingly, for all this planning, nothing was done against North Vietnam for some time. The only bombing missions outside of South Vietnam were flown over Laos against selected points on the Ho Chi Minh Trail. Even at that, most of the strikes were done by the tiny Royal Laotian Air Force (RLAF) and its small fleet of T-28 (Nomad) single-prop, fighter-bombers. The United States limited itself to armed reconnaissance flight missions, code named Yankee Team, over the trail, searching for likely targets for the RLAF bombers. After a Yankee Team RF-8A (Crusader) was shot down on 6 June 1964, near Xiengkhouang, Laos, the USAF flew a retaliatory

(U) American T-28s in formation over South Vietnam

raid against the suspected AAA site. Still, there was no air campaign like the one being urged on the Johnson administration by the JCS in Washington and General Westmoreland from Saigon.

(U) What the Johnson administration lacked was a potent enough rationale for air intervention against North Vietnam. On 2 August 1964, Hanoi had obliged by attacking the U.S. destroyer *Maddox* in the Gulf of Tonkin. The purported second "attack" on 4 August gave Washington its first reason to retaliate directly against the DRV – which it did on 5 August against Hanoi's naval facilities. The real benefit of the second "incident," at least for LBJ's political agenda, was the passage of the Tonkin Gulf Resolution. Yet, even with this carte blanche in hand, Washington delayed the air campaign. The indecision was partly political. President Johnson worried about the effect that a hot, shooting war might have on the Great Society legislation and the approaching presidential election. The other cause for the hes-

itation was strategic. In this case, the issue was what approach to take in an air war against North Vietnam so as to keep the conflict "contained" and under Washington's control.[1]

(U) Washington Plans the Air War, 1964-1965

(S//SI) In Washington, a working group, which had convened in the fall of 1964, had studied the air war problem, and had arrived at three options. Option A envisioned doing nothing more than continuing along then present lines. This presumed that the Saigon government, which was to experience a pair of coups in the next two months, could resist the current Viet Cong military and political onslaught. Washington believed that Saigon was on the ropes militarily, and that it could not control the situation in the countryside, or for that matter, even in the cities or around military installations. Option B was for a full and fast air offensive against targets throughout North Vietnam. This meant redeploying large numbers of air force attack wings and naval carrier groups to Southeast Asia – an escalation of the conflict which could be interpreted as a direct threat to North Vietnam. Except for presidential advisor Walt Rostow and Air Force Chief of Staff, General Curtis LeMay, this option was not favored by anyone, even the JCS, for a variety of reasons. One problem was the difficulty in sustaining such an operational tempo without having in place a logistics system of bases for staging, supplying, and maintaining the air assault. Another was the possible aggressive reaction from Beijing or Moscow. Rostow considered the risk of Chinese or Soviet intervention not to be realistic, even if the United States bombed throughout the DRV right up to the Chinese border.[2] He may have been alone in this opinion. The JCS and the intelligence community remained wary of the spectre of Chinese intervention. During and after the Tonkin Gulf crisis, NSA had specifically directed all field sites to report any reaction at all by the PRC.[3]

(U) Option C was a sort of compromise, a "go-slow" version of an air assault, which assumed that Washington, by fine-tuning the size and intensity of attacks, could simultaneously exert control over the tempo of the war and push Hanoi into a withdrawal of its support of the communists in the south. Option C called for a two-phase air war. The first, which would begin relatively soon after adopted, entailed a campaign against the communist supply effort down the Ho Chi Minh Trail in Laos. Previous efforts at using the RLAF to stem the flow had failed. The Laotian premier, Souvanna Phouma, had been worried about appearing too close to the Americans; at the same time, the results of the RLAF strikes had been equivocal at best. Furthermore, the Laotian Air Force's ability to substantially increase its interdiction campaign, even with additional aircraft transfers and pilot training, was limited due to the usual shortage of trained support and maintenance personnel and facilities.[4]

(U) The second phase called for strikes against selected targets in North Vietnam. This phase was intended to "signal" that Washington would no longer tolerate Hanoi's support of the southern communists. Success also hinged on Saigon's ability to improve its effectiveness in prosecuting the war. Washington assumed that the South could maintain internal order and actually participate in the air assault on the DRV. Yet, this original intent of including South Vietnam in the air campaign soon would be modified. Instead, the air war's main purpose was to prop up the government of South Vietnam and to improve its morale.[5] Here, then, was the first time Washington clearly defined an escalation of the war as the only way to remedy Saigon's near collapse.[6]

(U) At a meeting on 1 December 1964, President Johnson chose option "C." At a press conference two days later, Ambassador Maxwell Taylor hinted broadly that he had been authorized to improve Saigon's war efforts and that this might involve "new tactics and methods," but he

did not mention anything about the planned bombing operations.

(U) On 14 December, Operation Barrel Roll began when about a dozen Air Force fighter bombers hit communist transportation points in Laos. Three days later, U.S. naval aircraft, staging from carriers in the Gulf of Tonkin, hit targets in central Laos. From the start, these air strikes were not publicized unless an American aircraft was downed. At this early stage, the Johnson admin-istration was trying to downplay the significance and extent of its policy change. At the same time, Johnson approved an intensification of OPLAN-34A, stepping up the insertion of commando units into North Vietnam.

(U) However, Hanoi and the Viet Cong refused to get the "message" from the air strikes. The day after Barrel Roll began, news arrived in Saigon of a massive ARVN defeat in the An Loa valley, where 600 troops were beaten decisively by a Viet Cong force. On Christmas Eve, two Viet Cong agents, dressed in ARVN uniforms, parked a car filled with explosives outside the Brinks Hotel in Saigon, used to house American troops and advisors. In the blast, two Americans were killed and sixty-five more Americans and Vietnamese injured.

missing. The wonder was how the VC could infil-trate almost a thousand troops to an area so close to Saigon without being discovered. Just as dis-heartening was the performance of the ARVN forces. Backed by helicopters and tanks and staffed with American advisors, Saigon's troops seemed unable to handle communist tactics and ambushes. President Johnson still resisted calls for air strikes and an infusion of American ground forces. However, he quietly approved retaliatory air strikes "following the occurrence of a spectacular enemy action." His aides, preparing for a pretext to start the air assault campaign, said it was like waiting for the next streetcar to come along.[7]

(U) That streetcar's name was Pleiku, and on the night of 6/7 February 1965 it arrived with a crash of mortar rounds and satchel charge explo-sions. Pleiku was a market town in the Central Highlands, a commercial center for the Montagnard Thuong tribe. It also was home to Camp Holloway with a U.S. Special Forces detachment. Nearby was an airstrip filled with American helicopters, transport, and combat air-craft. Early in the morning, a VC unit opened up with mortars and assaulted the perimeter wire. Bunkers were attacked, and the aircraft, lined up along the tarmac, were hit by demolition teams.

(U) The tempo of Viet Cong attacks accel-erated in late December when they seized the village of Binh Gia only forty miles southeast of Saigon. Vietnamese troops, supported by tanks and helicopters were ambushed and outfought by the VC. After a week-long bat-tle, there were over 500 ARVN casualties. There were also five Ameri-cans dead and three

(U) Pleiku Airfield after the communist attack

When the fighting was finished, eight Americans were dead and another 126 were wounded. Ten U.S. aircraft were destroyed and fifteen were damaged. Presidential national security advisor, McGeorge Bundy, visiting Saigon on a fact-finding tour, rushed north to survey the damage. On the phone to Washington, he described the scene of destruction and urged President Johnson to strike back.

(U) The retaliation came on 8 February when almost fifty U.S. navy aircraft from the carriers *Coral Sea* and *Hancock* dropped bombs and rockets on the PAVN barracks at Dong Hoi, a Ho Chi Minh Trail staging area forty miles north of the DMZ. The raids were the start of Operation Flaming Dart 1. The next day, the USAF and Vietnamese Air Force (VNAF) launched a raid on the transport and communications center at Vinh Linh. On 11 February, the USAF, USN, and VNAF massed over 160 aircraft to raid the staging points and barracks at Chan Hoa and Chap Le, 150 and 40 miles, respectively, north of the DMZ.

(U) For the next two-and-a-half weeks the bombing was halted while the Johnson administration considered its next move. On 24 February

President Johnson finally approved a sustained air campaign against North Vietnam. No longer would air strikes be predicated on any retaliatory policy; it was a full campaign to damage Hanoi's ability to support the southern communist movement. The air assault was called Rolling Thunder, and on 2 March 1965 it began (after a postponement on 26 February due to poor weather) when forty-five USAF F-105s and B-57s hit ammunition dumps at Xom Bong. Meanwhile, sixty-five VNAF aircraft bombed the Quang Khe naval base. The air war in Indochina was now on in earnest.

(S//SI) As for SIGINT, its role in the air was limited to enhancing the defensive posture of U.S. air strikes. That is, by monitoring the DRV air defense network, it could provide tip-offs to U.S. aircraft of tracking by Hanoi's nationwide system of radars and visual observation sites. SIGINT also could detect the activation of defense systems, such as surface-to-air missiles, AAA, and fighter reactions. Finally, it could warn individual flights of immediate threats from the North Vietnamese. In doing this, the U.S. SIGINT system faced a formidable task that would last for years. It would be a struggle that would see periods of success highlighted by notable victories. At the same time, though, the North Vietnamese proved adept at modifying their tactics and procedures. This flexibility would challenge U.S. SIGINT constantly to improve its methods and systems in order to keep up with Hanoi's reactions.

(U) North Vietnam's Air Defense System

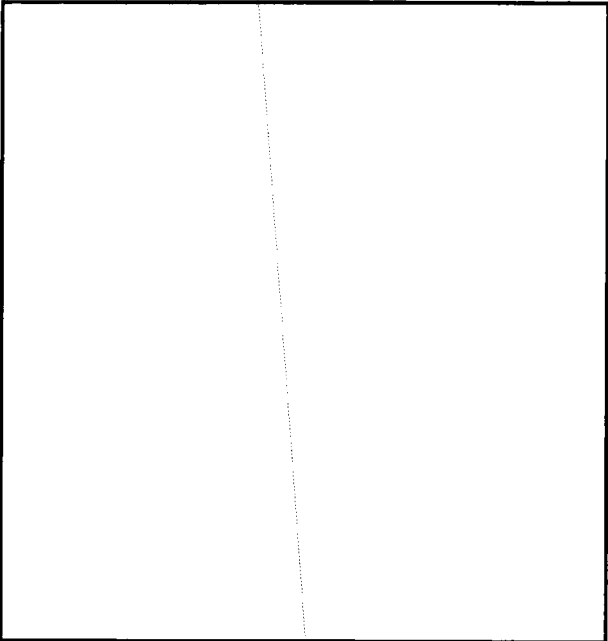(U) In attacking the DRV in 1965, the air force, marine, and naval air arms of the United States
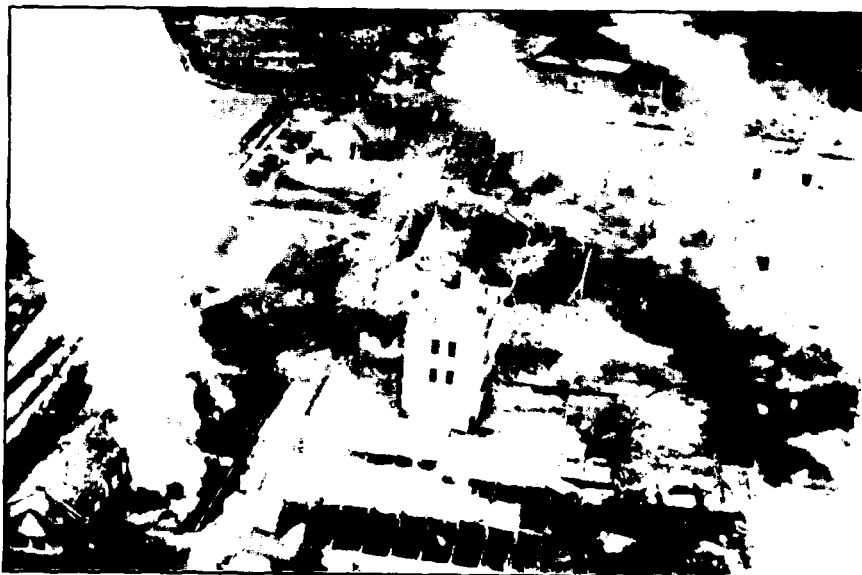
(U) Results of early Rolling Thunder strike at Linh Dong supply depot

would be going up against an air defense system which had barely come into being a few years earlier. Yet, by war's end, the North Vietnamese air defense system evolved into a sophisticated structure which required the United States to develop extensive and steadily enhanced efforts in intelligence and countermeasures to neutralize it. Even then, each side would have to struggle to regain a superiority that often would be fleeting.

(TS//SI) The DRV's air defense network's

It was composed of about forty or so visual observation posts scattered throughout the country whose job was to report aerial activity. Their reports went to a so-called filter center in Hanoi, which in turn would send the tracking information to a sector headquarters which controlled antiaircraft artillery (AAA) units.[8] Hanoi's inventory of antiaircraft artillery included typical communist hardware such as 12.7mm, 37mm flak and, interestingly, the famous German 88mm antiaircraft guns with a Wurzburg targeting radar obtained from China in late 1954.[9]

(S//SI) Messages carrying information on aircraft were sent via high-frequency manual morse communications.

They took the form of what is known as a proforma message, that is, a single line of digits or letters representing categories of information on the flight: direction, altitude, speed, identity, and type of aircraft. Tracking messages of individual flights could take as long as thirty minutes to pass through the system from initial observation to the point where the filter center would issue orders for continued tracking.

Interestingly, the basic framework of the DRV air defense network and its communications would remain fundamentally in place through all of the various upgrades and additions during the years of the air war. This would allow American cryptologists to

exploit Hanoi's communications for tactical applications during the years of the air war.

(TS//SI) The expansion of the DRV's air defense system continued _____ As a result of an increase in the number of radar stations, the North Vietnamese increased their filter centers, adding one for the southern regions at Vinh, and another to the northwest at Na San. The number of AAA battalions had increased to ten, although communications serving these units had not been recovered by late 1962. No fighter aircraft were in the North Vietnamese inventory. Two airfields were determined to be able to support jet aircraft. In this case, it was assumed that jet fighters from the PRC would actually use the strips.[11]

(S//SI) Functionally, the DRV's air defense command and control communications were composed of four main capabilities. First, there was an air warning (AW) capability which employed radar and, to a limited degree, the old visual surveillance system which gave Hanoi early warning information on air strikes. Secondly, there was an air surveillance capability which provided preflight and in-flight information on

DRV aircraft to the warning system. There was an air defense capability which included the AAA force, and the SA-2 surface-to-air-missile system which arrived in the DRV in the spring of 1965. Finally, there was the capability to control jet fighter aircraft.

(S//SI) It was the Gulf of Tonkin crisis that spurred a dramatic increase in the nature and activities of Hanoi's air defense. Most notable was the arrival of first jet aircraft into its operational air force inventory. Within two days of the crisis, thirty-six Chinese MiG-15 (FAGOT) and MiG-17 (FRESCO) jets arrived at Phuc Yen airfield. These probably were flown in by Chinese pilots. However, two weeks later, Vietnamese pilots were taking the jets up for familiarization and training flights.

(S//SI) The second result of the Gulf of Tonkin crisis was the establishment of an air warning liaison network between the Chinese and Vietnamese systems. Two communications links were set up: Hanoi to Kuangchou on 2 September 1964, and Hanoi to K'unming on 10 September. This liaison net provided coverage over the area of Hainan Island, the Gulf of Tonkin, the DRV, and Laos.
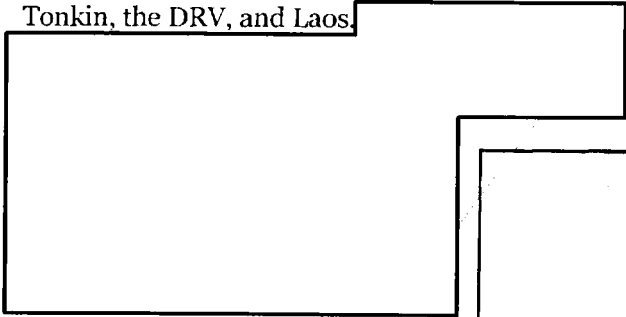
(S//SI) As the air war progressed, the North Vietnamese kept improving and adding to their air defense system. By 1967-68, the system was manned by about 110,000 personnel, of whom 90 percent were in the air surveillance, missile, and flak units. Intelligence estimates credited

Hanoi with over 150 radar sites, almost 150 SA-2 sites (though not all were active), some 8,000 AAA weapons of all calibers, and 105 MiG-17s and MiG-21s (Fishbed), though usually anywhere from a third to half of the fighters were based at Chinese airfields.

(S//SI) The Air Defense Headquarters at Bac Mai Airfield was the senior command for North Vietnam's air defense operations. It operated under the General Staff of the People's Army of Vietnam (PAVN). The Air Defense Headquarters worked closely with the North Vietnamese Air Force Headquarters also at Bac Mai, and many of the operations of the two headquarters were closely integrated. This integration was completed by January 1966 when the mainline high frequency facilities of all command elements employed a common signals operating plan.[13]

(S//SI) At the heart of Hanoi's system were two sections: the Air Situation Center and the Air Weapons Control Staff. The Air Situation Center received and processed air defense information from its own and Chinese Communist air surveillance networks. It issued advisories to the Air Weapons Control Staff and other parts of the air defense system. This same information would be passed to the Chinese Communist air defense system via the liaison links established in 1964.
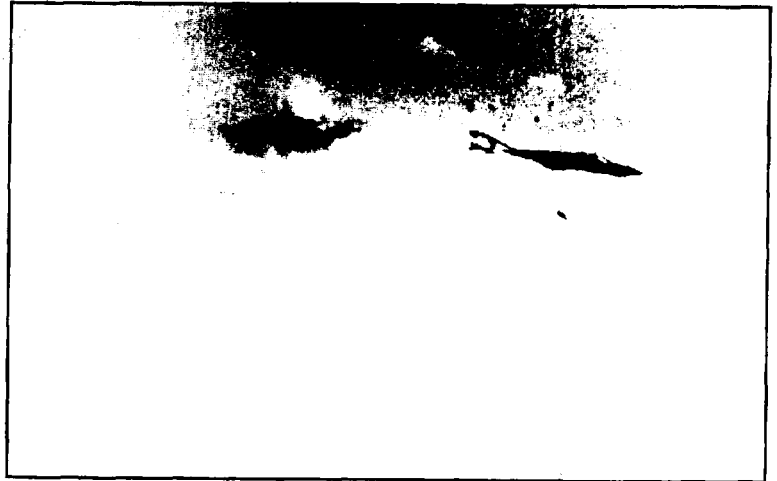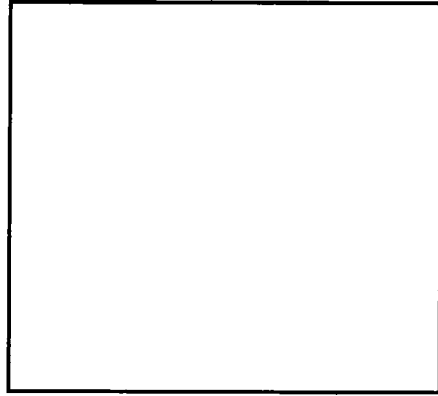
(U) Reconnaissance version of F-4 hit by a North Vietnamese SA-2

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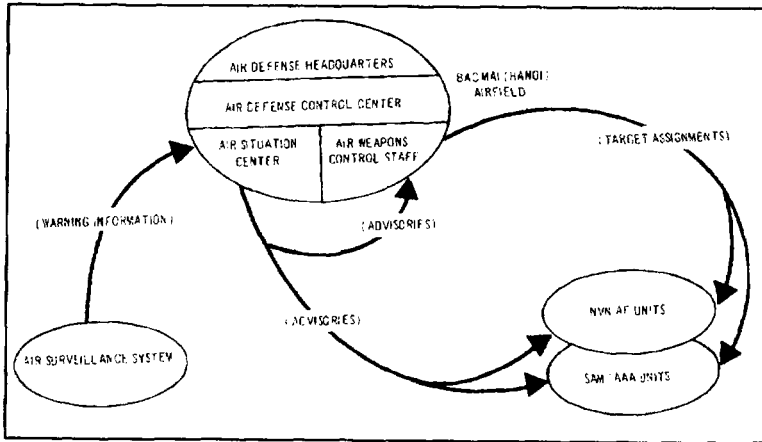
~~(S//SI)~~ Simplified representation of the DRV's air defense system

~~(S)~~ The Air Weapons Control Staff acted as a clearing house for the surveillance information. Staffed with representatives from the various elements of Hanoi's air defense system, the staff would assess the situation reports received from the surveillance system, plot the threat tracks, and assign targets to defensive forces, SAM units, AAA batteries, or the various fighter regiments.

~~(S//SI)~~ To control this elaborate structure, the Air Defense Headquarters employed a variety of communications. Although it relied primarily on radio, it also used landlines, especially when communicating with fixed installations. Its advisories were sent over medium-frequency/high-frequency (MF/HF) voice and manual morse links. These advisories included tracking on "friendly" and "hostile" aircraft over North Vietnam. For control of ground-based weapons systems, the Air Defense Headquarters used a variety of systems: single-channel very-high-frequency (VHF) voice These systems linked the headquarters with the Ground Controlled Intercept (GCI) staffs, as well as SAM and AAA units.

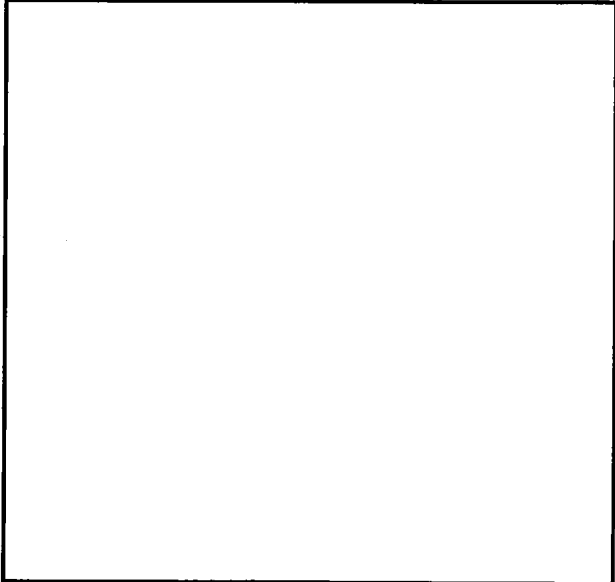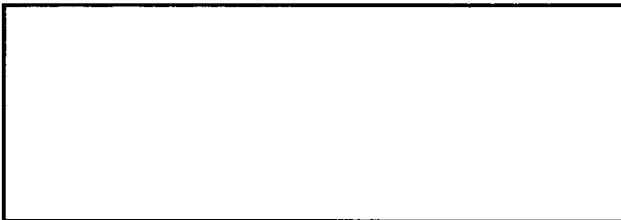~~(TS//SI)~~ Like all other of its military services, the air defense units used a variety of cryptographic systems to protect their communications. However, most messages passing over the communications system used low-grade encryption or encoding systems or were in plain language. This latter situation was due to the need for getting information quickly through the air defense system.

(S//SI) Other parts of the air defense SOI proved exploitable by the Americans. A frequency generating system, similar to the callsign system, was easily recovered. Virtually every new tactical code and cipher system developed by the Vietnamese fell to the analytic axes of the Americans.[17] By the end of 1966, SIGINT revealed information about Vietnamese tracking of hostile and friendly aircraft over Laos, North Vietnam, and the Gulf of Tonkin, SAM order-of-battle details, bomb damage reports, airfield status, and other data.

(S//SI) Two elements of Hanoi's air defense system were of particular interest to American cryptologists because of the potential for exploitation, which, in turn, could substantially aid the prosecution of the U.S. air offensive against North Vietnam. These two were the tracking systems used by the North Vietnamese SAM and AAA units for locating and acquiring targets and the ground controlled intercept communications network used to direct MiG interceptors against attacking American aircraft.

(S//SI) The tracking system actually consisted of three separate formatted messages. The first, originated by radar stations, consisted of a six-group message which indicated the azimuth and range (from the radar station), time of detection, altitude (in hundreds of meters), and the number and type of aircraft. The second format was a directional report which used a series of arbitrary numbers to designate points on a compass from the radar site. This information was transmitted by either HF manual morse or voice to the radar station's filter center. The filter center received all of the information on the tracks from the radar sites and converted it into the

third format – a fine grid locator. This format, [   ] employed a series of numbered grid blocks, which registered a progressively refined grid square, going from a 60 x 60 kilometer grid to a 2 x 2 one, as the Vietnamese air defense system reported more detail on the location of target aircraft. The grids were based on center points radiating out from Hanoi in the north and Vinh in the south.

(S//SI) Once this information was assembled at the filter center, it was relayed to the North Vietnamese Air Defense Headquarters. The headquarters reevaluated the tracking data and then transmitted the information to the SAM, AAA, and fighter units. The time that it took the North Vietnamese to turn around the tracking information, that is, from radar tracking to advisory to defense unit, had, by 1965, shrunk to less than five minutes.[18] Considering that effective North Vietnamese radar coverage extended, in some cases, to as far as 150 miles beyond its borders, Hanoi had the capability to detect approaching hostile aircraft with plenty of time to alert its various defenses.[19]

(S//SI) The second element, the ground-controlled intercept (GCI), was the tactical command and control communications (C3) system used by Hanoi to vector its fighters against approaching American strike and escort aircraft. Simply put, this system consisted of a controller on the ground who relayed target and strike information to a flight of defending North Vietnamese interceptors. A senior controller at Bac Mai Airfield, headquarters for North Vietnam's air defense system, assigned targets to subordinate controllers located near the major MiG air bases in the DRV. Using the Air Defense Headquarters advisories, these controllers issued instructions to scramble the MiGs when hostile aircraft closed within about 150 kilometers of Hanoi.[20]

(S//SI) The senior controller exchanged tracking information with his subordinates via

_____to alert and initially vector the intercepting MiGs. The GCI controllers at the various MiG bases, which included the North Koreans at Phuc Yen, Gia Lam, and Kep, and the Russians at Phuc Yen, used VHF voice communications to direct the MiGs to the threat area. There could be as many as four controllers at an airfield, all of whom had specific functions. There was an airfield controller who handled flight activity around an airfield, which, on occasion, could include GCI. There was also a tower controller who directed takeoff and landing operations for aircraft. A third controller, the direction finding (DF) controller, provided navigational information to pilots, especially those returning from combat activity. These controllers were responsible for directing returning missions back to their airfields.

(U) Finally, there was the GCI controller whose main mission was to direct the fighters to the area of the hostile aircraft. The GCI controllers were the heart of the North Vietnamese fighter defense system. The controller was able to tell the MiGs the locations of the attacking aircraft and was able to position them behind the U.S. aircraft so as to set them up with the advantage of surprise and position. The GCI controllers often were able to warn MiGs when they might be attacked, making it difficult for U.S. pilots to ambush MiGs. Later in the war, some senior Vietnamese pilots would double as controllers, bringing their combat experience with the Americans to the positioning of their pilot charges.

(U) Hanoi's controllers had the advantage of the information from its extensive radar coverage of the region. Knowing also the locations of its own aircraft, they could see the entire combat situation come together on their own plotting boards and radar screens. Since American radar coverage could penetrate only partway into North Vietnam, Hanoi had a distinct advantage in the air war that commenced in early 1965. The

Americans needed a way to overcome this imbalance. SIGINT, it seemed, might provide the solution.

(S//SI) In Search of a Target: The Early Days of SIGINT Support to Air Operations, 1962-1965

(TS//SI) Since as early as 1962, there had been an AFSS intercept site on Monkey Mountain overlooking Danang harbor that had been tasked with VHF collection against the North Vietnamese air force and air defense forces. However, there was a problem: there simply was not much of anything in the way of Hanoi's air defense communications to collect. In those early days, the DRV's air force was a motley collection of captured French and Chinese-supplied transport and reconnaissance aircraft whose early contribution to the Indochina war had been limited to the role of air cargo transport for Pathet Lao forces during the 1962-63 fighting.[21]

(TS//SI) The completely frustrating point for the USAFSS operation in South Vietnam, going as far back as the contingency plan of mid-1960, was that the mission it had planned for, that is, the exploitation of the enemy's communications in an air war, had not developed. This lack of an active mission bedeviled the site's operations for much of its first year-and-a-half. What the airmen were really doing those first days was making the best of the decision to locate them in areas where the primary consideration was not hearability of the enemy's signals, but administrative concern. The airmen had to scramble to justify their work and hold on until the air war started.[22] It was understood by the USAFSS command and the Air Force's liaison element, the 2nd Air Division, that the moment an air war developed, a COMINT capability in support of tactical air operations would be needed, and immediately at that.[23]

(S//SI) Ironically, the buildup of the SIGINT capability against the DRV's air defense and air communications systems tracked the similar

buildup of these latter forces.

[redacted] Vietnamese flight train-
ing during this time probably corresponded with
similar U.S. and European civilian air patrol
units, paramilitary schools, and semiprivate fly-
ing clubs. Most of the training was fairly basic:
takeoff and landing, local area flying, and basic
air navigation. In July 1960, six Yak-18 (MAX)
Soviet single-engine propeller trainers were
added to the program and provided some addi-
tional experience. The Air Sports Club probably
served as a center for selecting high-potential
candidates for advanced training outside of
Vietnam, most likely in the Soviet Union and
other select Warsaw Pact countries.[24] North
Vietnamese aviation continued its slow expan-
sion through 1960. A number of new aircraft were
acquired and four new airfields were opened. The
DRV military air arm further expanded during
the Laotian airlift of 1961-62. A number of IL-14
transports and MI-4 helicopters were delivered or
turned over by Moscow to Hanoi.

(S//SI) Beginning in early summer 1962 and
continuing into the next year, SIGINT analysts
had been receiving reports and intercepting com-
munications which indicated that there was sub-
stantial joint activity between the Vietnamese and
Chinese along their common border.

[redacted] Throughout 1963 and into
1964, a number of high-level conferences involv-
ing political and military delegations of the two
countries were held.

(S//SI) In late 1963, when a regiment of
Chinese MiG-17s arrived at the Chinese base at
Mengtzu, near the border of the two countries, it
seemed that the arrival of jet fighters into Hanoi's
inventory was imminent. In May 1964, it was
learned that a high-level North Vietnamese dele-
gation was preparing to meet with Chinese
Communist leaders an Mengtzu.

(S//SI) In August 1964, the first reaction by
the cryptologic community to the Gulf of Tonkin
crisis was to reorganize the collection coverage of
the communist air and air defense systems. Not
surprisingly, up to August, collection and report-
ing of the North Vietnamese [redacted]
[redacted] air missions were done separately. In
the field, the USAFSS site at Clark Air Force Base
in the Philippines (USA-57) was processing the
intercept of Hanoi's air communications, [redacted]
[redacted] At NSA, the DRV
air problem was handled in the same office as the
military and naval entities,

(S//SI) Within days of the crisis, the first MiG
jets arrived in North Vietnam. Shortly after their
arrival, [redacted] proposed that the processing of
the Vietnamese air and air defense communica-
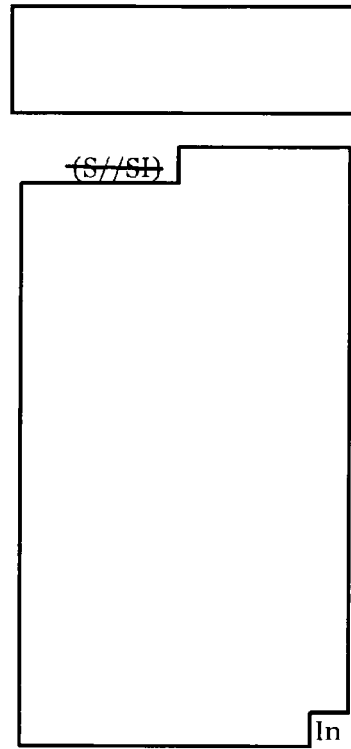tions be transferred from Clark Air Base [redacted]
[redacted] Over the next few months, NSA, the AFSS,
[redacted] discussed the
various possibilities and outcomes of the pro-
posed merger. The arguments from the crypto-
logic viewpoint against the merger were persua-
sive – the interrelationship of the DRV air SOI
and cryptography with the other elements of
Hanoi's forces. However, the continuing evidence
of the liaison and cooperation between the air
forces of the two countries proved too much to
ignore. By January 1965, NSA approved merging
the processing of the North Vietnamese [redacted]
[redacted] while intercept control was given specifi-
cally to the J-3 section. By late January the order
for the transfer of the Vietnamese air analysts
from Clark [redacted] was approved. By April
[redacted] had assumed duties as the second-ech-
elon processor of North Vietnamese air defense
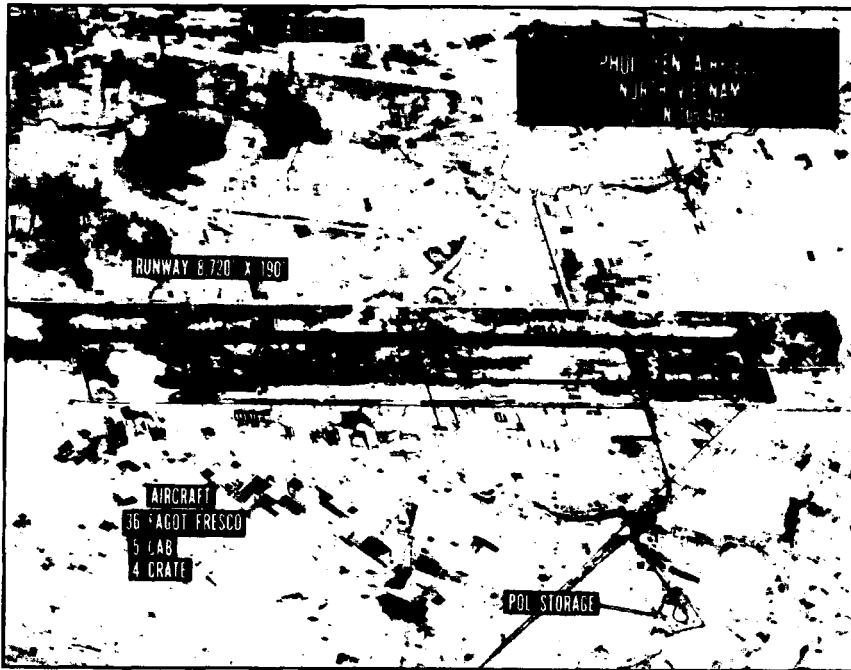
(S) Phuc Yen airfield, 7 August 1964, with thirty-six MiG-15/17 aircraft newly arrived from the PRC

communications. Meanwhile, at NSA Headquarters, the section in the Office of Southeast Asia that performed analysis and reporting of Vietnamese air force communications was blended in with the operations

(S//SI) Ground-based intercept of the DRV's air defense communications was done by Detachment 2 of the 6925th Security Group at Monkey Mountain near Danang. Danang collected North Vietnamese HF manual morse air defense, civil air, military air, and navigational communications,

the air war began in earnest in spring 1965, Danang would become the principal center for the ground collection of Hanoi's air and air defense communications. A small detachment of air force intercept operators worked at a nearby site at Son Tra on the same Monkey Mountain.
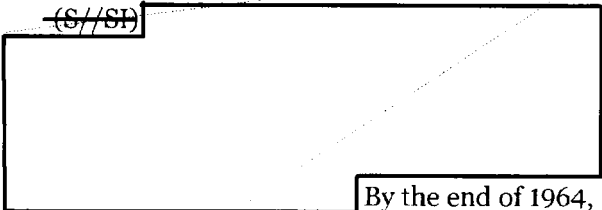
(S//SI)

In the summer of 1965, the air force began to transfer its mission to the newly established ASA intercept facility at Udorn. This would be finished by 1967.
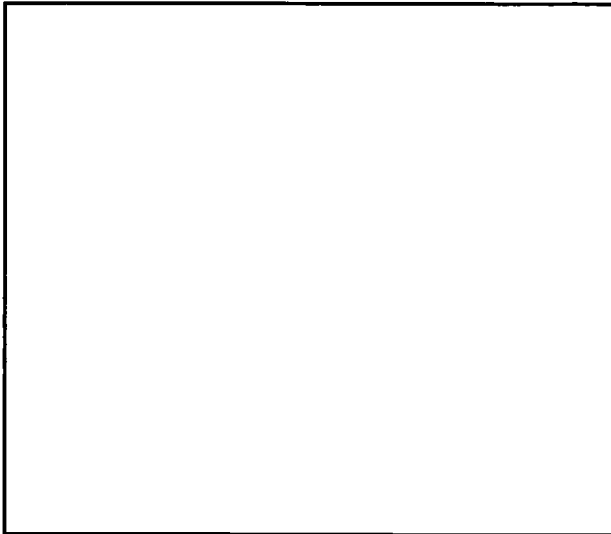
EO 1.4.(c)

(S//SI)

By the end of 1964, both the ASA and AFSS set up VHF hearability tests at locations near Phu Bai and Danang. The air force's effort failed to hear anything. The army's site at Phu Bai managed to isolate some signals in June 1965, but the test, known as Project Gasoline, was shut down because of interference from the nearby Armed Forces Radio Service transmitters.[29]

(S//SI)

They began recording the transmissions and forwarded the tapes to Phu Bai (now notated USM-

808) for transcription by the American Vietnamese-language linguists. The Americans were quickly overwhelmed by the quantity of intercept. Soon, Vietnamese COMINT personnel were brought in, under Project Dancer, to transcribe the take.

(S//SI) The ground collection of the North Vietnamese very high frequency radio communications, ☐ was never much more than a supplement to the airborne collection program. Hearability at the ground sites was subject to the vagaries of the electromagnetic environment. Atmospherics made collection a seasonal affair. Similarly, the increasing importance of the Phu Bai area as a communications hub for the American effort in Vietnam meant that interference from local transmitters degraded collection efforts. Slowly, the intercept effort declined. ☐

(S//SI) In the meantime, the airborne collection reconnaissance program (ACRP) gradually came to the task of intercepting the North Vietnamese VHF and UHF air defense communications. As we saw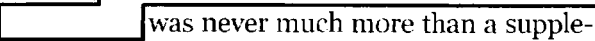 earlier, ACRP efforts were not new to Southeast Asia. As far back as the Laotian crises of the early 1960s, the AFSS had put in a collection mission, Rosebowl, to collect VHF communications supporting the communist airlift of supplies to antigovernment forces. However, the early missions revealed that the current platform, the venerable C-47, the mission orbit profiles, and crew fatigue all mitigated whatever intercept could be gained from the aerial platform. Changes were needed to produce effective SIGINT coverage.

(S//SI) The first platform sent to Southeast Asia at the time of the Gulf of Tonkin crisis was the C-130B variant of the Hercules transport. The SIGINT-equipped aircraft was known as the Queen Bee and was manned by AFSS personnel ☐ The aircraft had the capability for ten radiotelephone and morse intercept and search positions, though the mix varied among individual airframes. ☐
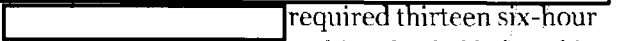
(S//SI) The C-130 was a far more effective platform for intercept. ☐ required thirteen six-hour missions for each of two orbits, the Gulf of Tonkin and northwest Thailand, that totalled 156 hours of coverage. By early 1965, there were four planes in Southeast Asia, ☐

(S//SI) However, administrative problems plagued the effectiveness of the early ACRP mission. The old bugaboo of a proper staging base hampered early Queen Bee operations. ☐ However, after the crisis in August, the focal point for the initial processing

of intercept of North Vietnamese [____] air defense-related communications shifted to the AFSS site at Danang. When the communist jet fighters arrived at Phuc Yen in August, an operational requirement to process their communications was added to Danang's tasking.

(S//SI) Clearly, staging the C-130 Queen Bee missions [____] was not efficient in terms of SIGINT processing. The best solution was to relocate the Queen Bee missions to Danang. This proved impossible at the moment. CINCPAC ruled out any relocation because of the already crowded conditions at the airfield: there was lack of sufficient maintenance, hardstand space, pilot and crew billeting facilities, etc. An interim transfer procedure was put in place in which the C-130 would land at Danang, [____]
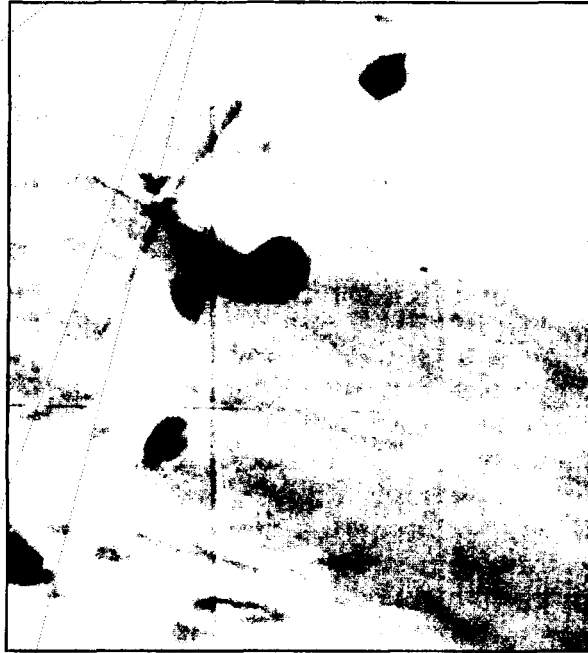
(S//SI) The effectiveness of SIGINT support to air missions remained limited through mid-1965. It would be the exigencies of the air defense threat and the need to provide rapid and clear threat and target information which would force American SIGINT to provide the type of support that U.S. airmen needed in their campaign over North Vietnam.

(U) MiG-17 in U.S. gun sight

(S//SI) SIGINT and the Air War, 1965-1968

(U) There are several misconceptions about the air war fought in the skies over North Vietnam. First of all, this was not a campaign of air-to-air combat involving anything like the numbers of aircraft such as the blitz over England during World War II. Aerial combat in the Indochina war was on a much smaller scale. Most engagements were fought by handfuls of fighters. Rarely did air combat directly involve more than a dozen planes. On those occasions when it did, it was a specifically designed operation such as Operation Bolo.

(U) Another misconception is that of relative effectiveness of the U.S. forces against those of North Vietnam. While it is true that American aircraft downed 193 Vietnamese aircraft while losing 92, this ratio is misleading. The fortunes of the air war in Southeast Asia can be best described as "streaky." As both sides sought to gain (and regain) an advantage, their relative effectiveness against one another fluctuated. Both sides

showed an ability to adapt tactics and command structures to changes introduced by the other.[31]

(U) However, when viewed in terms of clashes between different aircraft, the results of the air combat come into better focus. For most of the Rolling Thunder campaign, from June 1965 when the first aircraft tangled, until December 1967, the U.S. Air Force and Navy downed 109 Vietnamese aircraft. However, of those shot down, only twenty-five were MiG-21s. During the same period, the MiG-21s shot down twenty-six American jets. From August to December 1967, Hanoi's air force turned the tables on the Americans: the U.S. lost thirteen jets to Hanoi's twelve; more importantly, MiG-21s shot down twelve to the loss of only one. Into the next year and right up to the cessation of Rolling Thunder in March 1968, the U.S. lost aircraft to the MiG-21 at a rate in excess of 3:1.[32]

(U) Despite Hanoi's best efforts, though, overall American aerial superiority was never in doubt. The best the Vietnamese could hope for was to contest the skies over a bombing target. The presence of MiGs could cause fighter-bombers to drop their ordnance in order to meet the immediate threat. Though this seldom happened to an entire strike force, it diverted many strike aircraft away from their primary missions in order to counter the MiG threat.

(U) In March 1965, when Rolling Thunder began, the opposing forces were hardly ready for the tasks confronting them. The U.S., on paper, seemed to have an overwhelming advantage in aircraft and technical capabilities. At the height of Rolling Thunder, the U.S. could count on upwards of 400 advanced combat aircraft, backed by a sophisticated command and control system, aerial refuelling, expert maintenance, and a large Search and Rescue (SAR) effort. But the effort was plagued by a number of organizational and doctrinal problems.

(S//SI) The U.S. forces were divided into a number of commands, each of which exercised

control over its aircraft and tactics. The largest was the 7th Air Force (known originally as the 2nd Air Division) whose tactical fighter wings staged from various bases throughout Thailand. The 7th Air Force's headquarters was at Tan Son Nhut Air Base near Saigon, but it had a tactical Control and Reporting Post (CRP) on Monkey Mountain at Danang next to the detachment from the 6924th Security Squadron. Almost from the beginning, the AFSS group on the mountain would share SIGINT with the CRP.[33]

(S//SI) Early in the air war, the 7th Air Force discovered that SIGINT revealing North Vietnamese countermeasures to its SAM suppression missions was not getting to its operations planners in a timely basis. The result was that certain Wild Weasel and Iron Hand missions were ineffective in destroying SAM batteries and their associated Fan Song and Fire Can radars. The information was readily available, but it just was not getting to the 7th AF planners. There were several layers of intervening SIGINT elements and organizations that handled the information first, as well as sanitization procedures which slowed down the delivery of the intelligence.

(S//SI) By the end of 1965, 7th AF intelligence analysts listed their concerns which boiled down to the fact that SIGINT was unavailable for the daily tactical briefs on the status of the North Vietnamese air force and air defense systems. NSA agreed that there was a problem and suggested it could be solved by augmenting the staff at the NRV with about a dozen personnel.

(S//SI) However, the 7th AF was not buying this solution. The 7th Air Force's director of intelligence, Brigadier General Rocky Triantafellu, wanted an Air-Force-only manned intelligence center that would fuse all intelligence sources. General Triantafellu insisted that the center be

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colocated with the 7th Air Force's operations and intelligence staffs. He wanted the SIGINT staff to be part of the overall activities of the 7th AF. He was afraid that if NSA or the NRV controlled it, the center would be diverted from its primary support mission. Backing up Triantafellu was the USAF assistant chief of staff for intelligence and the NSA Pacific representative, Brigadier General John Morrison.[35]

(S//SI) NSA fought Triantafellu's plan, claiming that the problem was not the idea, but the realities of manning the center. Filling the proposed thirteen billets, especially in an operational mode, would require a large number of highly trained SIGINT analysts, a commodity in short supply throughout the Indochina theater. NSA won out and in March 1966, the 7th AF's SIGINT Support Group (SSG) was formed at Tan Son Nhut Air Base. Even though the SSG was within the operational compound of the 7th AF, and that unit was its primary customer, the SIGINT group remained under the operational control of the NRV. It did not take long for SSG operations to become diverted from its principal mission of support. By the middle of 1966, the SSG began publishing SIGINT product which had nothing to do with 7th AF daily operations, and the direct support effort fell to a secondary role. By 1967, the 7th AF had to bring its complaints about the SSG to NSA. By the end of the year, the SSG had dropped almost all of its reporting mission and resumed its main role of direct support.[36]

(U) In addition to the Air Force, flying from the Gulf of Tonkin were the aircraft of the U.S. Navy's

Task Force 77. The navy maintained two or three attack carriers at a location known popularly as Yankee Station, a point at sea near the DMZ between the two Vietnams. The navy controlled its strikes through a series of radar picket ships and shipborne controllers known collectively under the callword of Red Crown. The carrier strikes were centered on the coastal regions of the DRV and the narrow panhandle south of the nineteenth parallel. The First Marine Wing of the Third Marine Amphibious Force flew from bases in the north of the RVN. Occasionally, they would strike targets in the southern region of the DRV.

(U) Finally, there was the Strategic Air Command (SAC), which conducted the famous B-52 Arc Light strikes over both North and South Vietnam. These bombers flew from Andersen Air Force Base, Guam, Utapao, Thailand, and Kadena, Okinawa. SAC's bombers attacked various "chokepoints" along the Ho Chi Minh Trail in the DRV and Laos. The Arc Light missions also included tactical strikes against suspected communist troop concentrations during ground campaigns such as Khe Sanh.
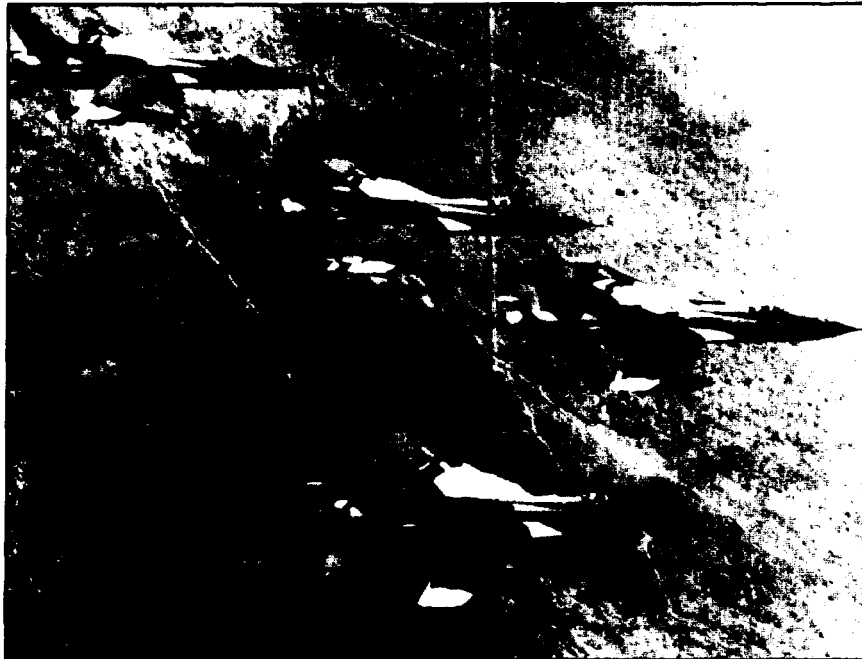
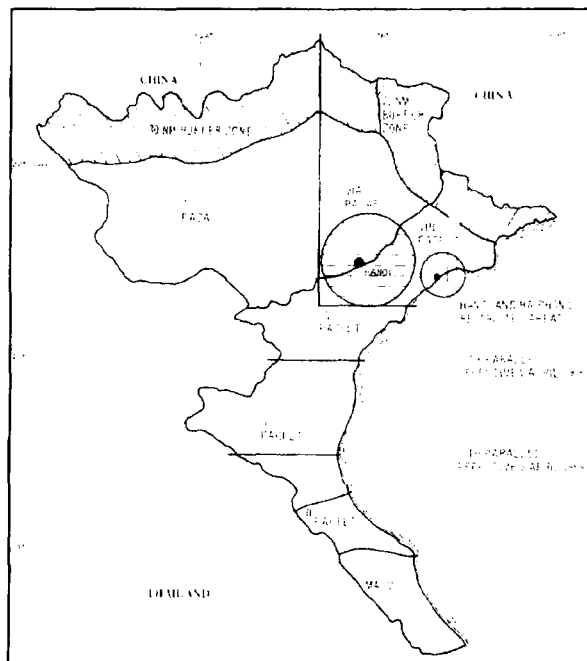(U) F-105 Thunderchiefs in formation over Vietnam

(U) Although the United States used a number of combat aircraft during Rolling Thunder, the two main workhorses were the Republic F-105 (Thunderchief, nicknamed "Thud") fighter bomber and the multirole McDonnell Douglas F-4 (Phantom). The F-105 was a heavy-duty tactical fighter-bomber that could carry tactical nuclear weapons. Designed for low-level tactical strikes, it was a durable airframe. In a fighter role, it was a match for the DRV's MiG-17, shooting down twenty-two of them during the war. On the other hand, the more advanced MiG-21s shot down fifteen F-105s without a loss to themselves.

(U) By the end of the 1960s, the F-105 was replaced almost totally by the F-4, except in the SAM suppression role known as Wild Weasel. The F-4 became the most recognized fixed-wing aircraft of the war. Capable of low-level ground strikes and high-level intercept work, this aircraft made up much of the inventories of the air force, navy, and marine attack squadrons. It filled all roles, including reconnaissance. It carried an advanced air-to-air weapons suite and was highly maneuverable under 25,000 feet. Despite its telltale smoke trail, in the hands of a good pilot the Phantom matched up well with the North Vietnamese MiG-21.

(U) Despite its technical advantages, the U.S. bombing campaign was hampered by a number of administrative and organizational problems.

(U) Route package areas

The American command had divided the DRV into a number of districts known as route packages. The division also included restricted areas around Hanoi and Haiphong, and a thirty-mile buffer zone along the PRC/DRV border. The problem was that air strike operations within the route packages soon became stereotyped, and the North Vietnamese would plan their defenses to maximize their destructive effect along the known ingress and egress routes taken by the American aircraft.

(U) F-4 Phantom over Vietnam in 1965

(U) Another major problem was that there was no overall management of the strikes against various targets. The 7th AF and TF 77 used separate target lists, never shared operational intelligence, reported to separate commands, and never coordinated their strikes until December 1966. Aircraft from one service could not attack targets in the other service's route package without specific permis-
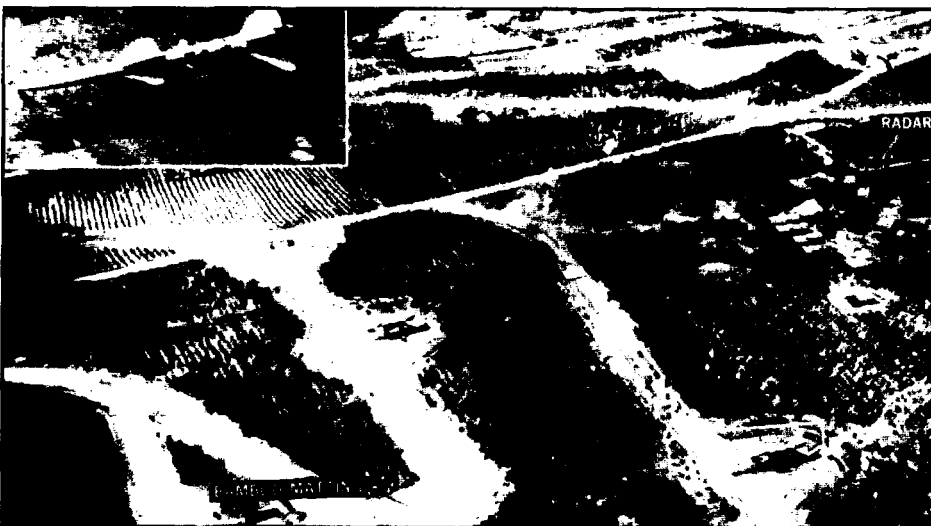
sion. In fact, there never emerged a single overall air manager for the Rolling Thunder campaign.[37]

(U) Finally, many aspects of the bombing campaign were controlled from Washington. Much of the time the White House itself selected targets and defined the tempo of the missions. The reason behind this control was that Washington intended Rolling Thunder as a means to force North Vietnam to the negotiating table. To achieve this, the bombing was directed at Hanoi's ability to support the war in the South.[38] Slowly, as bombing pauses failed to elicit the "proper" response from the North, the target list was extended. By the middle of 1966, petroleum storage sites were added to the targets for the aircraft.

(S//SI) Still, an all-out bombing campaign, not unlike that launched against Germany during World War II, never materialized. Against the backdrop of contradictory estimates that the bombing would effect Hanoi's ability to prosecute the war[39] was the specter of intervention by the People's Republic of China. It should be noted that over 300,000 Chinese troops and technical experts rotated through North Vietnam during the war and that large Chinese air and ground combat formations lurked across the border. The possibility of a massive aggressive Chinese intervention exerted considerable influence on the strategic planning of the air campaign. The example of Korea was still very vivid in the minds of many people in the administration, especially the president. As the war progressed, however, this fear began to recede.[40]

(S) Opposing the Americans was a Vietnamese air defense system which, in 1964, was little more than a collection of AAA and radar sites. However, by the end of Rolling Thunder, it had evolved into a system capable of actively engaging American air strikes anywhere in the country with a multitude of weapons systems. The ground component consisted of hundreds, later thousands, of AAA sites with guns ranging in caliber from 12.7mm and above. Some of the larger guns were radar controlled, using such systems as the Whiff and Fire Can. At about the time Rolling Thunder began, the North Vietnamese were emplacing their first SA-2 batteries. In July 1965, the first U.S. aircraft was downed by an SA-2 SAM. This missile, designed for high-altitude threats such as the B-52, soon became a mainstay of North Vietnam's air defense. Coupled with nearby AAA sites, the Vietnamese could threaten high-level and low-level strike aircraft.

(U) As for aircraft, the North Vietnamese could send up two jet fighters, the MiG-17 (Fresco) and MiG-21 (Fishbed). In August 1964, there were only about three dozen MiGs in North Vietnam's air force. By 1970, the force had grown to 265, including almost 100 MiG-21s.

(U) SA-2 batteries in North Vietnam

(U) The MiG-17 was a slow, poorly armed aircraft, especially when compared to its American counterparts. It lacked an ability to carry air-to-air missiles and relied solely on its cannon. This meant that it had to close in on its targets to be effective. Its one advantage, an ability to turn inside the less maneuverable U.S. aircraft was often frittered away due a lack of aggressiveness by the Vietnamese pilots. The MiG-17 was generally ineffective in general air combat and was used mostly for low-level point defense and intercept.
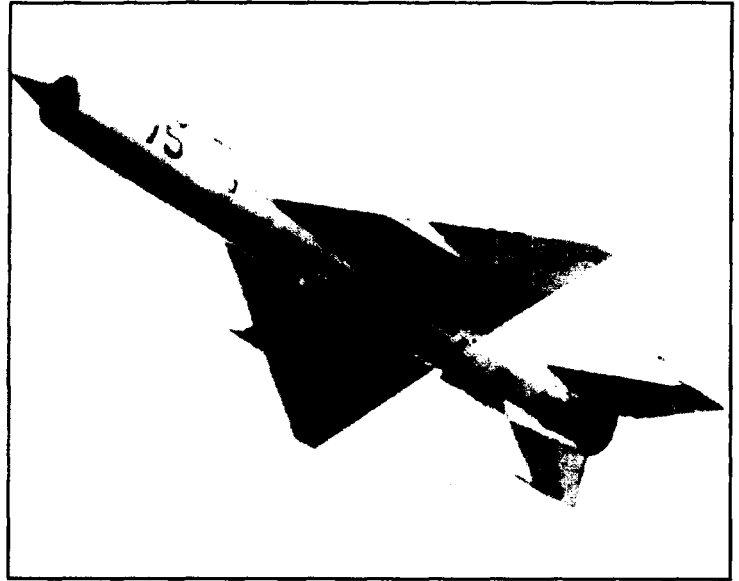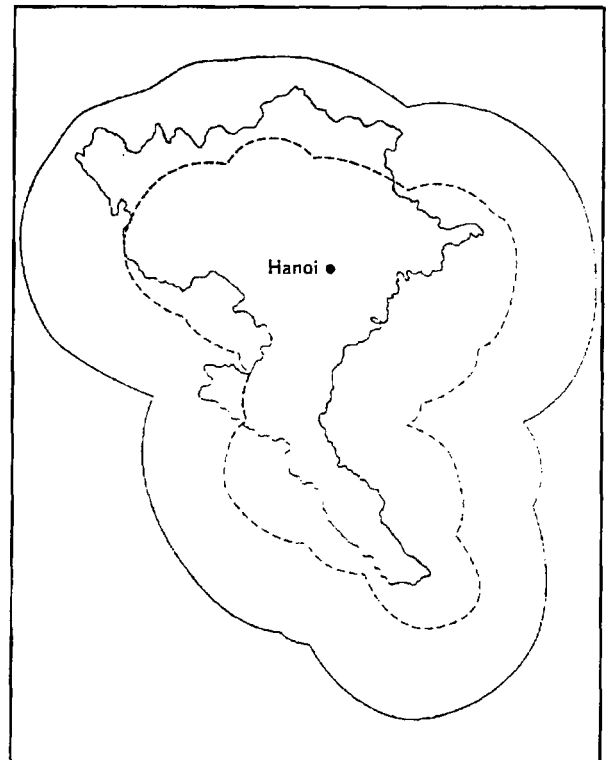
(U) On the other hand, the Soviet-designed MiG-21, even its stripped-down export version, was comparable to the American front-line fighters of the time, the F-4 and the navy's F-8 (Crusader). It was superior in maneuverability and acceleration, especially at high altitudes, to American jets. Flown by an experienced pilot, the Fishbed could hold its own. Armed with both guns and infrared air-to-air missiles, the MiG-21 proved a difficult and dangerous adversary.

(U) Hanoi's main organizational advantage was that its air defense system was integrated, and that it could call on any combination of resources to meet the threat, whether it be AAA, SAMs, or fighters. Backing up this was Hanoi's main operational advantage, its GCI system. With radar coverage extending to almost 100 miles outside its borders, North Vietnamese controllers had the ability to detect Air Force and Navy strikes early and could track and control their own MiGs. They could position their pilots into tactical advantage, while warning them of approaching American interceptors.

(U) This was something the American pilots lacked. Land-based radar coverage into North Vietnam was limited. Such systems could see only a short distance; similar efforts by the Navy with

(U) MiG-21 (Fishbed)

(U) North Vietnamese early warning radar coverage. The solid line indicates the limit of detection for an F-105-size aircraft flying at 15,000 feet. The broken line indicates the limit of detection of the same type of aircraft at 5,000 feet.

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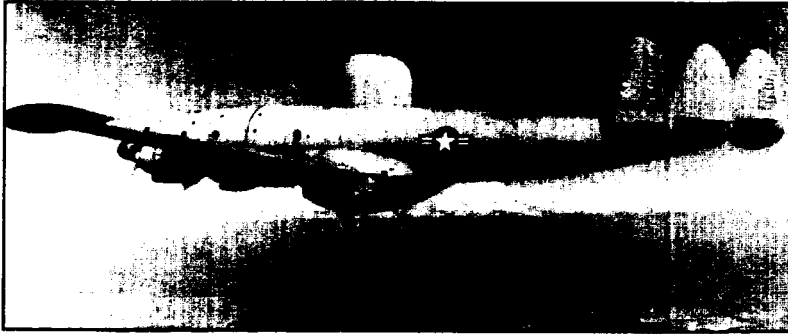
(U) EC-121D radar aircraft

its special radar ships, known as Positive Identification and Radar Advisory Zone, or PIRAZ, were also limited. Beyond their radars' horizon, U.S. controllers, either at the Monkey Mountain CRP or aboard the PIRAZ ships, could do little to help the pilots. Support, in the form of an EC-121 "Bullseye" radar surveillance aircraft, arrived in mid-1965. However, because of the technical shortcomings of its radar, the Bullseye could not provide the close tracking needed by the American pilots to intercept defending MiGs.

(S//SI) What the 7th AF and TF 77 needed was some way to extend the "legs" of its radar tracking coverage in terms of distance and precise tracking so as to nullify Hanoi's advantage. In this instance, signals intelligence was seen as a possible solution. In fact, the main effort of SIGINT support to the air war was an effort to extend the eyes of American air surveillance. To do this, a number of systems were employed in succession over the years. The first was called Hammock.

(S//SI) Project Hammock

(U) On 4 April 1965, the air war over North Vietnam became a serious affair. On that day, a flight of USAF F-105s was attacking the rail and road bridge complex at Thanh Hoa, seventy-five miles south of Hanoi, when a pair of MiG-17s was vectored by the North Vietnamese GCI past the escorting fighters and into the bombers orbiting the strike area waiting their turn to attack. Two of the heavily laden F-105s were shot down by the

Frescos, which then were done and gone before any of the American aircraft could react. The score was more than evened up later, when, in June and July of 1965, four MiG-17s were shot down by Navy and Air Force F-4s.

(S//SI) Since the North Vietnamese had contested the American attacks, the American command was compelled to take measures to warn their pilots of the MiG threat. Actually, at the time of the first dogfights, NSA had been working on a warning system making use of intercept of Hanoi's communications. Also, the 6924th Security Squadron at Danang already had positions collecting the DRV air communications. Project Hammock was the name given the dedicated collection of North Vietnamese ⬚ ⬚ air defense communications and the dissemination of intelligence gathered from those transmissions to U. S. air units. NSA felt that this system could provide all of the information needed to alert and warning support to U.S. tactical aircraft.[41]

(S//SI) Project Hammock, it was hoped, could extend the range of American radar coverage in Southeast Asia by integrating data from North Vietnamese ⬚ air defense radar tracking. The 6924th at Danang took pertinent radar tracks, converted them to the normal U.S. tracking lateral-tell format, which were then entered into the general system. This conversion provided the illusion that the tracks came from U.S. radar sources. The tracks that were included by the Air Force cryptologists also theoretically had to be within the capabilities of American radar. The maximum extended capability was for detection of an aircraft at 40,000 feet at 235 miles from Danang, or about half the distance to Hanoi.[42] Of course, there were allowances such as the inclusion of the tracks of

American[   ]aircraft flying near the Sino-Vietnamese border region.

(TS//SI) The testing of the Hammock system started in late October 1965. A single-channel printer communications link between the AFSS intercept site at Danang and the Air Force's Control and Reporting Post (CRP) at Monkey Mountain was set up and secured using a KW-26 (Romulus) encryption device. During the test, the KW-26 proved to be too slow, so a KY-8 (Nestor) secure voice link was set up. A cross-tell link was set up with the 7th Fleet carriers in the Gulf of Tonkin so that the warnings could be passed to the navy's air controller known as Red Crown. The initial test results appeared to be good and everyone was enthusiastic about the possibilities.[43]

(TS//SI) However, during the tests the NRV suggested that the 7th AF Tactical Air Control Center (TACC) at Tan Son Nhut Air Base should receive the same data from the Air Force SIGINT site at Danang. This led to a duplicative effort in which Tan Son Nhut and Monkey Mountain received separate plots from Danang. In some cases, the information was different, such as when Tan Son Nhut received MiG warnings while the Monkey Mountain CRP got border plots. During crucial activities, such as shootdowns, the Danang analysts would find themselves reporting to both stations, not certain if the information could be processed and passed along.[44]

(TS//SI) Also, the system was inherently slow. Manually converting the North Vietnamese tracks, which themselves could be minutes old, took time to complete. Passing the data to both the TACC and CRP slowed it down even more. The warnings could take anywhere from twelve to thirty minutes to reach the pilots. Added to this, the warnings were passed to the pilots over their communications guard channel, which already was close to overload. Warnings would be transmitted, but in the confusion and clutter of radio communications, they could get missed or

ignored. So it was in April 1966 that an F-105 was shot down well after a Hammock warning was passed twice over the guard channel.[45]

(TS//SI) However, it was an international incident which finally forced changes to the clumsy procedures in the Hammock warning system. On 8 May 1966, four Air Force EB-66 Electronic Warfare aircraft, escorted by four F-4C fighters, strayed into Chinese Communist air space near the town of Lao Kay. Beginning early that morning, the SIGINT mission at Danang sent seven messages to the CRP at Monkey Mountain warning of the impending border crossing. The CRP, in turn, tried to relay the messages to the designated ACRP mission, the Navy's Big Look (EC-121M), supposedly flying in the Gulf of Tonkin. But the Big Look mission had been scrubbed that day, possibly for lack of fighter support, so the warnings went nowhere. The Reporting Post also tried to pass the warnings via the Navy's Red Crown platform, but no one could confirm that the warnings had been sent.[46]

(TS//SI) In reaction to the border intrusion, the Chinese scrambled four MiG-17s to intercept the errant flight. A dogfight took place and one MiG was shot down, crashing seventeen miles inside the Chinese border. Beijing officially complained of a border violation and threatened to widen the war. They released pictures of the wreckage and of the F-4s' auxiliary fuel tanks in Chinese territory. The Air Force claimed that they had never strayed over the border.[   ] The Pentagon ordered an investigation into why the planes had not been warned.[47]

(TS//SI)[   ] The problem was not the collection or interpretation of the SIGINT. Rather, it lay in get-

ting the intelligence to the pilots where it would be effective. During this incident, the cumbersome, uncoordinated nature of the warning system, plus the last-minute absence of a critical communications relay platform, had precluded any chance of warning the Air Force flight of its navigational error.[49]

(TS//SI) Owens' team made several recommendations, most dealing with assuring that the clutter that was clogging the warning system was swept away. First of all, the ACRP flights were brought into the warning system with communications gear that could relay the MiG alerts and border encroachment warnings. Secondly, the ACRP flights, like Big Look, were brought under 7th AF's control so that there was an assurance they would be in orbit when strike missions were flown.[50]

(TS//SI) However, it was the organization of the warning nodes that got the most attention. General Owens proposed that a completely integrated warning center replace the duplicative effort currently used by 7th AF. The TACC at Tan Son Nhut was dropped, while a new one was established at Monkey Mountain – the Tactical Air Control Center-North Sector (TACC-NS) which assumed complete control of air operations over North Vietnam. The TACC-NS was staffed with technicians cleared for the SIGINT coming from the adjacent AFSS site.

(TS//SI) In December 1966, the restrictions on the use of the SIGINT were eased further. The TACC-NS had suggested to the NSA representative's office that, with all of the additional aerial radar and electronic warfare platforms active during strike and reconnaissance missions, the theoretical and real areas covered by non-SIGINT sensors had increased to the point beyond the current 235-mile radius at a certain altitude. The

NRV agreed and urged NSA to lift all of the restrictions from Hammock reporting. In February 1967, NSA agreed to lift them. With that decision any target located in the entire region,
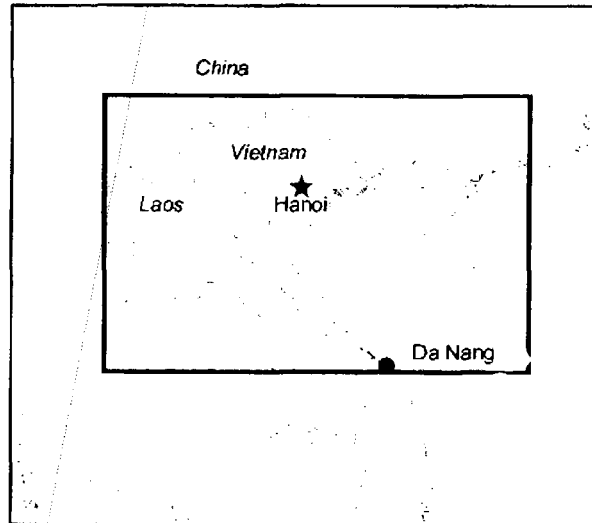
(U) Area coverage for Hammock reporting

encompassed in a box from $16°00'$ to $23°30'$ degrees north latitude and from $100°00'$ to $112°00'$ degrees east longitude (essentially all of Laos and North Vietnam), could now be reported.[51]

(TS//SI) And with the addition of the secured KY-8 circuits, it was possible for the senior controller at the TACC-NS to receive all tracks, including those from the intercept of the North Vietnamese air defense communications. The responsibility for issuing the MiG, SAM, and border warnings passed to the TACC-NS. The role of SIGINT was now reduced solely to input. More importantly, the battle commander, in the person of the senior controller at Danang, now had all source information in front of him without any more restrictions.[52]

(S//SI) Was Hammock effective, though? This is a difficult question to answer. While it is true that Hammock came on line in December 1965, it was not until late April 1966 that the system could claim its first MiG kill. This was not due

to any shortcomings in Hammock; the North Vietnamese MiGs had been in a stand-down since the summer of 1965 after a series of disastrous air engagements against the Americans. But the nature and tempo of the air war changed dramatically in the spring of 1966.

(U) In April 1966, Washington realized that the Rolling Thunder campaign, to that point, had been ineffective in halting the supply of the southern communists and had failed to convince Hanoi's leadership to end its support. The White House decided to change the emphasis of the campaign and go after the DRV's petroleum, oil, and lubricant (POL) capacity, especially its storage sites. The planners at the Pentagon projected that this assault would cause the North's supply effort to grind to halt as it ran out of fuel. The importance of the POL targets brought the MiGs out in greater numbers to defend the fuel dumps. After initial clashes in April, in which the U.S. came away the clear winner, Hanoi again pulled its MiGs out of the war. From April to December 1966, the Air Force shot down seventeen North Vietnamese MiGs, but how much of a role Hammock had in any of these engagements is unknown.

(U) In late 1966, the MiG threat returned as North Vietnamese pilots engaged Americans during their bombing runs. The American response to the MiG attacks was hampered by two considerations, both drawn from the limits imposed on operations by the Johnson administration: MiGs could fly across the border into Chinese airspace to avoid pursuit, and the five principal MiG airfields of Phuc Yen, Kep, Gia Lam, Kien An, and Cat Bi were off-limits to ground strikes by American aircraft. (This latter limit would be removed in April 1967, but the returns would be meager. The North Vietnamese minimized their MiG losses through a combination of redeployment to airfields in Communist China, dispersal among the five combat airfields in the North, and a concentration of AAA and SAM defenses at each base.) To get around these restrictions, the USAF

came up with a plan to lure out the MiGs, especially the dangerous MiG-21s, ambush them, and destroy them in detail. The plan was called Bolo, and SIGINT was very much a player in the operation.

(U) Setting the Trap: Operation Bolo, January 1967

(U) The philosophy behind Operation Bolo was as simple as the first premise in judo: utilize the enemy's strength against himself. For the Bolo planners, an understanding of the North Vietnamese air surveillance system, and the means whereby intelligence was fed into it, was the key to making the operation work. North Vietnamese signals intelligence was able to identify the type of American aircraft involved in strike operations based on the profile of its emitters, in this case, aircraft callsigns, procedural chatter, and the ECM emissions from specific aircraft jamming pods. Knowing the aircraft profile of the strike formations, the controllers then vectored MiGs against the fighter bombers, principally the F-105s, which were considered vulnerable to the high-speed MiG-21s. Vietnamese pilots had come to respect the capabilities of the Phantom and often avoided them except for quick hit-and-run strikes.

(U) The commander 7th Air Force tasked the skipper of the 8th Tactical Fighter Wing (TFW), Colonel Robin Olds, to come up with a plan to neutralize the MiG threat. Olds' main problem was how to lure the North Vietnamese MiGs up into the air in numbers enough to make a large combat effort worthwhile. MiG combat tactics and reactions to American air strikes were often unpredictable.[53] He hit upon the idea of presenting Hanoi with a juicy target – a seemingly large flight of bomb-laden F-105s. However, they were not to be the Thunderchiefs. Rather, the flights were to be made up of Phantoms mimicking the fighter-bomber electronic profile.

(S//SI) The F-4 pilots were to use F-105 communications procedures and flight routines to deceive the North Vietnamese COMINT monitors and radar operators. The Phantom pilots would use Thunderchief callsigns and communications procedures. They would refuel at usual F-105 points, fly their strike ingress routes and altitudes, and airspeeds. The extra touch of deception was that the F-4s would carry the F-105 ECM pod, the QRC-160-1, that was used for protection against the local SAM threat. Extra sets of these pods had to be specially flown in from the stateside factory while aircrews had to modify the F-4 wing pylons to hold the jammers. Ground crews also made other physical changes to the F-4s to make the disguise convincing to the enemy pilots.[54]

(S//SI) A second problem for Olds was to overcome the major advantage that the MiGs had, which was their far longer time in flight over target. The MiGs were able to stay in their patrol area for about fifty minutes, whereas the F-4s could stay for only twenty minutes, if not engaged. That time dropped to five minutes when the Phantoms fought the MiGs. Olds' solution was to stagger a number of flights to arrive in five-minute intervals. This way, fresh Phantoms would be arriving just as the previous flight had to leave because of low fuel. Olds planned for two main attacks. The first, staging from bases in Thailand,

would engage the MiGs in aerial combat. The second wave, from the 366th TFW, would stage from Danang, fly in from the east, and arrive over the Viet-namese bases in time to catch the surviving MiGs returning to their bases. It was a complicated plan, and the aircrews had to train vigorously over a number of days to get their acts down and coordinate the flights. Almost 100 aircraft, including Iron Hand SAM suppression aircraft, RB-66 ECM aircraft, and ninety combat jets, were involved.

(TS//SI) SIGINT support came from the Silver Dawn ACRP mission. The commander 7th Air Force, Lieutenant General William Momyer, specifically asked for the involvement of the RC-130s in a tactical control role. The question of how the planes would be utilized vexed the cryptologists. Afraid of compromising their sources, the decision was kicked up the Air Force Security Service chain of command. [   ] and AFSS headquarters agreed to this special use of Silver Dawn. To overcome the complaints about the confusing nature of the usual MiG warnings issued by the ACRP, a set of special
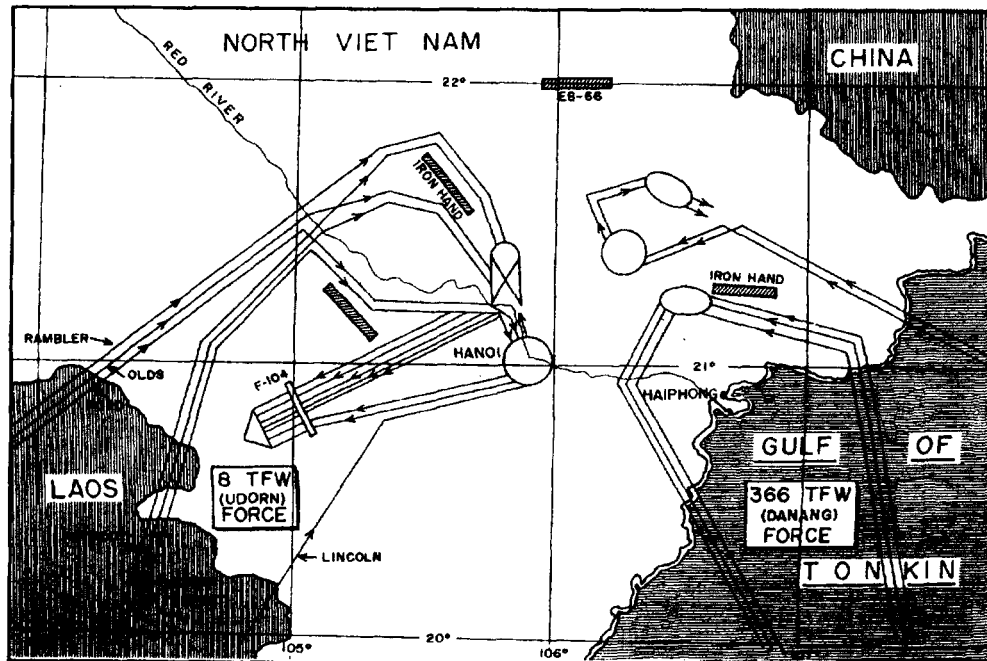
(S) Flight routes for Operation Bolo

alert codes was developed that the pilots could understand quickly. Another problem for the AFSS was the shortage of qualified linguists to sit the intercept positions in the aircraft. Because the ACRPs were to operate for three days prior to the actual Bolo operation, crew exhaustion was a real possibility.[55]

(S//SI) On 2 January 1967, Bolo kicked off. Bad weather forced a one-hour delay and grounded about half of the participating aircraft. Still, the F-4s took off from their Thai bases and streaked into North Vietnam. The Phantom pilots and jamming pods performed perfectly. To the North Vietnamese they looked and sounded like several waves of F-105s. However, the weather added its own problems. The North Vietnamese reaction was sluggish; an American air strike in the poor weather may have surprised them. As the first F-4s arrived in the target area, the Silver Dawn controller issued his first MiG warning, but no MiGs were seen. The second flight arrived just as the MiGs came in. The surprise was nearly complete: AFSS linguists overheard the MiG pilots frantically calling their GCI controller with the news that the sky "was filled with F-4s." [56]

(U) The result was an overwhelming victory. Eleven MiGs piloted by the Vietnamese, fresh from training in the Soviet Union, had flown into the melee expecting to meet the F-105s. Instead, in about twelve minutes, seven went down in flames. The F-4s held all of the advantages: tactical surprise, a superior combat position, numbers, and the initiative brought on by the deception. However, the bad weather and poor communications kept the second group of Americans from catching the MiGs as they returned to their bases. In the mix of planes in the air, the Americans needed visual identification, but the clouds prevented that.[57]

(U) Despite the circumstances of the weather, Bolo had been a rousing success. The severity of the losses caused the North Vietnamese to reduce their fighter reactions to American missions. The

SIGINT contribution had been valuable, especially as an example of timely tactical support. Surprisingly, though, this type of mission was never done again, at least on a scale approaching Bolo. On 6 January, two F-4s imitated the flight plan of a reconnaissance aircraft and bagged two more MiGs. But that would be the end of the deception operations. The JCS seemed interested in the idea, but Rolling Thunder planners, and even the 7th Air Force command, always claimed that MiG-killing operations were not a primary objective, only a "bonus."[58] Also, there was the belief that the Vietnamese would be wary of a similar deception operation. The cost in men, time, and machines taken away from Rolling Thunder was high – about 100 planes for at least three days. When one considers that the MiG threat was still minor, accounting for only 3 percent of U.S. air losses in 1966, and 8 percent in all of 1967, the cost in aircraft and crews removed from Rolling Thunder appeared too high for the marginal return. (It would not be until 1968 that the MiGs began to cause a substantial proportion of U.S. losses – 22 percent – and this may have been caused more by the relative effectiveness of on-board ECM systems which lowered the kill rates for the SAMs.)

(U) The Battle Joined:
Air Combat to the Bombing Halt,
January 1967-March 1968

(S//SI) After the losses from the Bolo operations, the North Vietnamese MiGs again were held back and refused to engage the American aircraft. SIGINT detected distinct changes in Hanoi's tactics as it experimented with a variety of flight formations and tactical approaches against the American attack formations. The MiG-21s tried out four-flight formations with approaches from ahead and behind the Americans. A few attack runs succeeded in causing the Americans to prematurely drop their ordnance. However, the kill ratio continued to be heavily in the Americans' favor. For the first six months of 1967, the U.S. downed fifty-four MiGs

with the loss of only eleven. Another nine MiGs had been destroyed on the ground as some of the restrictions against hitting the jet-capable airfields were lifted.

(U) In April and May, improved Air Force tactics, equipment, and numbers of escort aircraft increased the kill ratio to almost eight-to-one over the North Vietnamese. Among the changes was the introduction of the QRC-248 enemy IFF transponder interrogator. The QRC-248 was developed to read the SRO-2 transponder carried on all versions of Soviet fighter aircraft. Originally, it had been developed to target Cuban and Soviet aircraft. In late December 1966, an experimental EC-121 was dispatched to Southeast Asia to see if the QRC-248 would work against North Vietnamese aircraft. The test was successful. The EC-121s could register the North Vietnamese MiGs at a range of 175 miles and now could determine which radar returns in the area


(U) EC-121 College Eye

were MiGs. Since the SRO-2 transponder was used by Hanoi's GCI to identify and control the MiGs, it was expected that this technical feat would be a breakthrough. QRC-248 sets were sent to the EC-121D College Eye aircraft.

(U) At first, the effects of the QRC-248 were limited. This was due largely to the requirements of NSA in keeping the fact of its effectiveness from the North Vietnamese. So, the operators on board the College Eye aircraft were prohibited

from actively interrogating each radar return for fear that this would tip off the GCI controllers. Instead, the Air Force operators only passively read the IFF interrogations initiated by the North Vietnamese controllers. This lowered the number of identities registered and the continuity on each enemy track. In late July, the restrictions on the use of the QRC-248 were lifted by NSA and the JCS. The overall result of the wide-open use of the system was that, for the first time, it gave intelligence analysts and commanders an accurate picture of MiG operations; it showed where their standard orbits were and gave a more accurate count of enemy aircraft. So complete was the picture, that some observers found it almost frightening when they realized how poor their previous idea of the MiG threat had been.[59]

(S//SI) In August 1967 another element was brought into the support of air operations when the EC-121K, the SAC Rivet Top aircraft, was introduced into Southeast Asia. Rivet Top was intended to function as an airborne extension of the TACC-NS on Monkey Mountain. What made Rivet Top exceptional was that it carried COMINT positions, an enemy IFF display (based on the QRC-248), and an ELINT display panel for Vietnamese SA-2 radar, the Fan Song, all to provide threat warning to American aircraft. However, some of the functions were done poorly: the electronic display of Fan Song returns showed only a small percentage of the active plots. The COMINT positions were controlled by the Security Service and NSA; the rest of the crew often was not cleared for SIGINT. Still, the general success of Rivet Top was obvious to PACAF and 7th Air Force commanders. Of the twenty MiG kills registered by the Air Force from August 1967 until the end of Rolling Thunder, thirteen were attributed to Rivet Top. American pilots felt that finally they had a decent GCI control.[60] Originally, the aircraft had been dispatched for only a 120-day test, but the Air Force chief of staff ordered it to remain in the area until another suitable replacement platform could be found. Rivet
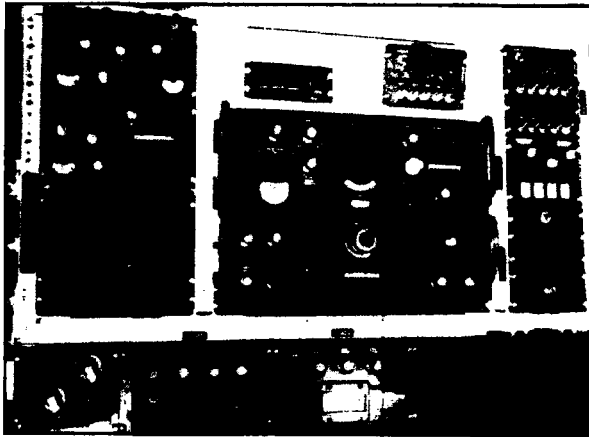
(U) Rivet Top mission supervisor's position

Top stayed until the end of the Rolling Thunder campaign.[61]

(U) When combined with improvements to armaments and defensive systems to the American air capability, such as the installation of gun pods on the F-4s, and the distribution of ECM pods to all aircraft, which considerably reduced the SAM threat, the Americans seemed to have gained the final upper hand in the air war. The Air Force, especially, could fly in larger formations and saturate a target. During April and May, fewer strikes were forced to jettison their ordnance. The kill ratio against the MiGs continued to improve with occasional spectacular air victories. For example, on 13 May 1967 seven MiG-17s were shot down by American pilots. In June and July, the MiG threat seemed to disappear; there were hardly any engagements. Most of the Vietnamese MiGs had dispersed to Chinese airfields in the face of the American onslaught against their bases. All of this seemed to augur final victory in the war against the MiGs; or, if not complete victory, the MiGs were now a negligible threat. In August 1967, the former commander of the 7th Air Force, General William Momyer, would tell a Senate Subcommittee on Defense Preparedness that "We had driven the MiGs out of the sky for practical purposes. If he comes up, he will probably suffer the same fate." [62]

(U) However, as others did in the war, General Momyer had spoken too soon.

(U) On 23 August, a flight of 7th Air Force Phantoms was on a bombing mission near Hanoi. Suddenly two F-4s exploded into fireballs. The only thing the other American pilots saw was two MiG-21s streak by with afterburners on, already too far away to pursue. What had happened? How had the MiGs attacked without warning? As it turns out, the MiG-21s had been vectored by their GCI controller into an attack plane from the rear and above the American formation. The MiGs had been directed there in a route that had taken them out of the radar range of the U.S. jets, and at low-level which hid them in the ground clutter from the College Eye airborne controller. Apparently, they had flown silently, as well, neither having communicated, nor had their IFF transponder been active. The MiGs had achieved complete surprise and had made their quick "hit and run" attack.

(U) This incident marked a change in North Vietnamese tactics. Gone were the aggressive attacks in which their jets mixed it up with American fighters. Instead, Hanoi's tactics were

(U) A deadly sight: a MiG-21 passing below

optimized to make use of the tactical and technical advantages it had: a faster jet in the MiG-21, complete GCI surveillance and control, and the isolated nature of the large formations the Americans employed.

(S//SI) What was even more disconcerting to the Americans was that the North Vietnamese were able to carry out the attacks despite the presence of the QRC-248 and the Rivet Top systems; somehow they were able to devise techniques that negated the technical warning systems which had just been installed by the Air Force that summer. Furthermore, the attacks suggested that the Vietnamese understood the technical limits of the American radar and SIGINT systems. Later, it would be revealed that U.S. intelligence, mainly SIGINT, had observed the new Vietnamese tactics for some time before the attack, perhaps as early as April 1967.[63] It should be mentioned, though, the SIGINT elements had monitored a number of new tactics being tested by the North Vietnamese and probably did not know which one(s) Hanoi was going to settle on. Still, 7th Air Force commanders were angry at this news.[64]

(U) To counter the enhanced MiG threat, the Air Force tried a number of things. It moved the EC-121 orbit in closer to the Vietnamese border, thus extending radar coverage to Route Packages V and VI. The College Eye flights were given control of the U.S. fighters flying the MiG combat air patrol (MiGCAP). The platform could now direct the MiGCAP based solely on the returns from the QRC-248. Finally, the White House allowed air strikes on the jet airfield

at Phuc Yen. (Gia Lam, because it also was an international airport, was still off limits.) All of these tactics restored some advantage to the American position. In October, twenty MiGs were de-stroyed, twelve on the ground, but only two were MiG-21s. Many of the remaining MiGs dispersed to China.

(U) Still, de-spite all of these more aggressive tactics, the hit-and-run tactics by the MiG-21s continued to hurt the Americans. Before August 1967, the U.S. Air Force was downing MiG-21s at a rate of 6 to 1. From August 1967 to the end of February 1968, the MiG-21 was shooting down Air Force jets at a rate of better than 3 to 1. The U.S. Navy had broken even on the MiG-21s, shooting down two while losing two F-4s, but the Navy had expended forty-two air-to-air missiles to rack up the two kills![65]

(U) In early 1968, events on the ground diverted the Air Force and Navy air missions away from Rolling Thunder. The siege of the marines at Khe Sanh caused the services to shift to ground support of that garrison. The Tet offensive at the end of January diverted further air resources. A last effort at attacking targets in the north was stymied due to the usual bad weather at that time of the year. Most importantly, on 1 April 1968 President Johnson ordered a halt to all

(U) President Johnson, on 31 March 1968, appeared on nationwide TV to announce termination of attacks north of the 19th parallel.

bombing north of the nineteenth parallel. (All commando operations against the North also ceased.) After that date, only a few MiGs ever ventured below the parallel to attack American bombing missions. By November 1968, Rolling Thunder ended completely.

(S//SI) However, if Rolling Thunder had ended, American SIGINT continued to seek out ways to improve its support to the air war. Automation was coming, and it led to a new way to handle Hanoi's air defense communications.

(S//SI) Iron Horse: Automating the SIGINT Support to the Air War

(S//SI) At the end of the Rolling Thunder campaign, the tempo of the air war had peaked, flooding Hammock's ability to pass data. As Hanoi's air surveillance system improved and became faster, larger, and more sophisticated, it was obvious to the controllers at the TACC and the cryptologists at NSA and the AFSS that there was a need to improve the manual system of plotting the North Vietnamese air surveillance tracks. A system to handle this increased data flow was already in the works in late 1967 at the height of the new MiG threat – it was called Ironhorse.

(S//SI) Surprisingly, the concept for Iron Horse actually began before the first Rolling Thunder mission took off. In June 1964, Project Furnace was started up and proved the feasibility of automating the plotting of air tracks, but the system was hung up on the time gap in transfer of the data. So, in November 1964 R8, the NSA office responsible for the development of processing and telecommunications portions of SIGINT systems was handed Ironhorse. R8's main responsibility was for the technical development and provisioning of equipment that provided a "visual display of SIGINT derived tracking of aircraft reflected ⬚ DRV Air Defense communications."[66]

EO 1.4.(c)

(S//SI) The designers at NSA viewed the problem essentially in terms of command and control. Data from intercept positions had to be reduced and fused into a commonly accessible format and then transmitted to the air commander working out of the TACC-NS at Monkey Mountain. R8's solution was the development of an automated version of the manual plotting that would encompass the processing, display, and forwarding of the information via a cathode ray tube (CRT) display. Selected data from Ironhorse would then be forwarded into the tactical data displays that served the air commanders of the various services in Southeast Asia.

(S//SI) At the heart of Ironhorse was technology. A special version of two AN/GYK-9 Flexscop computers, a digital system used for processing non-morse intercept, and known as the CP818, was selected, partly because it was compatible with the U.S. Navy's standard computer. Input came from as many as twenty-five AN/GGC-15 (AG-22) intercept positions which collected manual morse. The AG-22 system allowed for the flagging of critical elements of the intercept such as the start and stop positions of DRV air surveillance tracking messages, callsigns, and frequencies of the Vietnamese stations. Eventually, voice intercept positions were added to the configuration, and they used MOD-35 teletype input keyboards for their input.

(S//SI) The computer would decrypt the track and amplification codes, convert the DRV station callsign and frequency into a geographic location for an azimuth/range report. The intercept was then put on a magnetic tape for future reference. The second computer would format the plot and then display it for an analyst on a CRT. The plots appeared on the screen superimposed over a map showing the significant geographical and political features of Southeast Asia. A grid system overlay the display.

(S//SI) Ironhorse was supposed to reflect the location of all North Vietnamese ⬚

Communist, unidentified, and U.S. strike aircraft over North Vietnam. [   ] As for American aircraft, Ironhorse was to provide their location when over Laos, near the Chinese border or Hainan Island, when an air engagement was imminent, and for search and rescue operations.[67]

(S//SI) The analyst sitting in front of the CRT was trained to recognize tactically important North Vietnamese tracking information and forward it to the TACC. Since all the tracking data were displayed, the analyst had to decide what was tactically important and to which air command element he had to forward the information. The system could display up to 120 tracks, though, realistically, this number cluttered the screen beyond recognition, so considerably fewer were displayed. The analyst could select a track by typing in its number or else select it directly from the screen with a light pen.[68]

(S//SI) The tracks he selected then went into the TACC Backup Interceptor Control System (BUIC), the computer which controlled the automated distribution of air tactical information. Ironhorse was the latest addition to the overall automation of the Air Force's tactical air control system known as Combat Lightning. The information was then fed into a communications interface which relayed it to the Marine Tactical Data System (MTDS), the Navy Tactical Data System (NTDS) with Task Force 77, and the 7th Air Force command centers. The operators at these sites would see the displays in a sanitized geographic plot. The local air commander combined this information with what he had received from other sources, such as the MTDS and College Eye, through the Seek Dawn interface.[69] To further help in understanding the SIGINT information, the USAFSS sent a Support Coordination Advisory Team (SCAT) to the TACC at Danang.

(S//SI) Ironhorse-configured morse intercept position in an H-1 van, Danang, RVN, April 1968

(S//SI) Initially, Ironhorse testing and training were conducted at NSA headquarters. Sample intercept tapes from the Hammock system were sent to Fort Meade to test against the Ironhorse equipment. Morse intercept operators arrived in the summer for training on the system. By September, people and equipment began to arrive at Danang. Arriving there, the airmen found a major problem. In July 1967, a communist rocket attack on the air base had seriously damaged the building designated for the Ironhorse complex. So, personnel from the 6924th Security Squadron had to utilize H-1 vans configured for Ironhorse. Eventually, four vans were modified to house twenty intercept positions. Three more vans were customized to house the computers and communications equipment. They were airlifted to Danang by November 1967.[70] An engineering team made up of technicians from the USAFSS and NSA arrived to complete the connections and to start up operations.

(S//SI) In mid-December, Ironhorse sent its first data to the TACC-NS on an unofficial basis. Modifications continued to be made to the system as it was being put through its routines. An enhanced voice intercept position was installed to accommodate the growing use of voice communications by the North Vietnamese air surveillance system. Software modifications to the interface cleaned up the garbled tracks sent to the TACC. By the middle of May 1968, Ironhorse was considered ready for operations. Even in its test phase, the goal of faster data transfer had been met and exceeded. Compared to Hammock, Ironhorse reduced the time it took to send the information to the TACC. The time dropped from a range of a low of thirty seconds and a high of two minutes to a low of eight seconds and a high of one minute. Tracking data sent through the navy's data distribution system were now available anywhere from eight seconds to three minutes instead of the previous twelve to thirty minutes![71]

(U) It is difficult to assess the effect of Ironhorse on the air war. This is because about the time the system became operational, the United States was dramatically reducing the scope of the bombing campaign. On 31 March 1968, President Johnson announced the cessation of bombing north of the nineteenth parallel. On 1 April 1968, the air war over North Vietnam came to a practical end. Although some bombing missions continued in the southern portion of the DRV, there was little reaction to them by Hanoi's fighters, since this was on the edge of their effective GCI range. The American bombing effort swung its emphasis to Laos. By 1

November, LBJ ordered a complete halt to bombing over North Vietnam.

(S//SI) In April 1969, the Ironhorse complex at Danang was seriously damaged by an explosion of an adjacent Marine Corps ammunition dump. Most of the equipment and software was destroyed in the ensuing blasts and fire. Intercept coverage was transferred to Air Force positions at field sites in the Philippines and Thailand. The Hammock system was resuscitated to handle the input from these sites. Ironhorse operations at Danang were not restored until July of 1969, but problems with its communications and software continued to plague the system until April 1970.[72]

(S//SI) With the nexus of the air war now located in the complex of U.S. air bases in Thailand, Ironhorse eventually was shifted to the 7th RRFS at Ramasun, Thailand, and was renamed Ironhorse II. In April 1971, the Danang mission closed down, and its vans were shipped to Fort Meade. The personnel from the 6924th Security Squadron deployed to Thailand. From then on, Ironhorse became just another input into Combat Lightning, the USAF's C3I system for the air war. Ironhorse continued to function as part of the tactical air control system until the


(S//SI) Damage to the Ironhorse operations area caused by the 27 April 1969 ammunition dump explosion at Danang

last bombing operation of Linebacker II in December 1972.

(S//SI) Flying for Uncle Ho: Foreign Communist Pilots during the Vietnam War, 1964-1972

(S//SI) During the air war, there were reports of pilots from other countries flying missions against American aircraft. To SIGINT personnel, these reports reflected a well-known fact. From the very beginning of the air war in North Vietnam, there was foreign communist support to the Hanoi's air force.
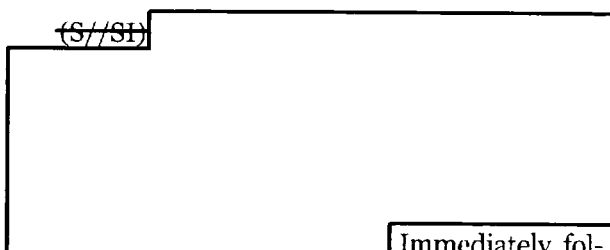
(S//SI) [___] Immediately following the Gulf of Tonkin incidents, thirty-six of the MiGs from the training unit redeployed from Mengtzu to the newly extended and upgraded airfield at Phuc Yen in the DRV. Chinese pilots stayed on at Phuc Yen as instructors from late 1964 into early 1965. During this time, North Vietnamese pilots practiced a variety of maneuvers to develop proficiency in take-off and landings, climb exercises, cloud piercing, and some occasional aerial intercept. Vietnamese trainee pilots were taught using Chinese flight terminology. By December 1964, another set of MiGs arrived from China to bring the total to fifty-three.

(S//SI) Still, the Chinese pilots performed solely as instructors as their Vietnamese charges extended their proficiency into nighttime intercept and gunnery exercises.[74] At no time did the Chinese pilots ever engage in combat missions. In fact, their role faded by mid-1965 when newer aircraft, notably the Soviet-supplied MiG-21, were added to Hanoi's inventory by the Soviets. The Chinese maintained a sizable contingent in North

Vietnam, which was estimated at about 180,000 personnel at its height. Chinese troops mostly provided logistical and engineering support and manned AAA units around air bases and key transportation sites such as bridges and railroads. The Chinese forces stationed in North Vietnam never included any ground combat or air force units.[75]

(U) Between 1965 and 1973, about 320,000 Chinese technicians and soldiers would serve in the DRV. Over 5,000 Chinese would be killed or wounded, almost all casualties from U.S. air attacks. Interestingly, the Chinese took few security precautions and operated openly, aware that U.S. photographic and signals intelligence sources were observing them. Some scholars have suggested that by this rather open presence, the Chinese were sending Washington a warning of their intention to support the Vietnamese.[76]

(U) Later, after 1968, the Chinese would supply the DRV air force with nearly three dozen of a Chinese variant of the Soviet MiG-19, known as the F-6, a highly potent air-to-air fighter. This fighter would supplement the DRV's inventory of jet fighters, but the Soviets eventually would supply almost ten times more aircraft.[77]

(S//SI) As mentioned above, in early 1965 the Chinese instructors were supplanted by their Soviet counterparts. Soviet pilots were known to have been in the DRV as early as January 1961.[78] By May 1965, they were heard for the first time in Vietnamese Air Force communications. Some Vietnamese pilots were also heard using Russian terms, while others appeared to be bilingual.

(S//SI) Actually, Vietnamese pilots had been going to the USSR [___] at a rate of about forty per annum. They had been sent to Krasnodar to participate in a five-year training program in either the MiG-17, single-engine fighter or the IL-28 (BEAGLE) light bomber aircraft. The Soviet fighter training program emphasized basic flight and engineering up to complex

GCI (ground-controlled intercept) and combat flight training.[79]

(S//SI) The first Soviet pilot flew in North Vietnam in July 1965. After that date, the Soviets continued to conduct intensive GCI training of their Vietnamese counterparts. This heavy training may have been in response to the MiG losses incurred in the previous weeks in dogfights with American pilots. As part of the training regimen, the Soviet pilots usually manned the target aircraft and coached the Vietnamese through standard stern intercept, the use of airborne intercept (AI) radars, night flying, air-to-air gunnery, and the use of afterburners. At the same time, the Vietnamese trained with their ground controllers, who themselves were being coached by Soviet advisors. However, there was no direct combat application of this training until February 1966.[80]
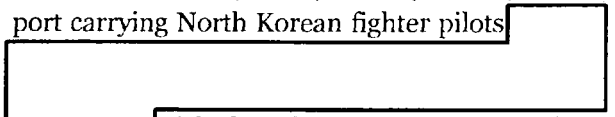
(S//SI) For the most part, the relative handful of Soviet pilots, controllers, and advisors, perhaps totalling no more than thirty personnel at any one time, restricted their activities to training and testing out the newly delivered, high-performance MiG-21 fighter aircraft that the Soviet Union shipped to the DRV in late 1965. In fact, the Soviet pilots were responsible for test flying each MiG as it was reassembled at the Vietnamese base at Phuc Yen.[81] Once the MiG-21s were ready, the Vietnamese pilots began their familiarization flights and tactical training in them. Usually, the aircraft would operate in the Phuc Yen area under close supervision of a Soviet controller. Initial flights were solely familiarization flights; later, GCI-supervised flights would range as far as eighty kilometers from Phuc Yen. By early 1966, the Vietnamese pilots were practicing special tactics for attacking U.S. reconnaissance and ECM aircraft, trying out "zoom" climbs and high-speed attack runs.[82]

(S//SI) For all this flight activity, the Soviet pilots avoided actual combat operations. There is a suggestion that Soviet pilots may have flown air cover missions over Phuc Yen Airfield. In January

1966, for example, a Soviet pilot, along with his controller, was engaged in a closely controlled GCI activity against an unidentified target near Phuc Yen. The identity of the target was unknown.[83]

(S//SI) However, if the Chinese and Soviet airmen remained in the background as instructors, the third contingent of foreign pilots, the North Koreans, did not. The North Korean pilots who served in the DRV were a different breed – they had come to fight.

(S//SI) On 20 September 1966, a North Korean Air Force (NKAF) IL-18 (CRATE) transport carrying North Korean fighter pilots picked up the Korean pilots and flew them to Hanoi. Eventually, this first contingent would grow to thirty-four MiG-17-qualified pilots. Most of the Korean pilots were from the NKAF's 1st Fighter Division, though at least fifteen were recent graduates from Pyongyang's flight schools.[84]

(S//SI) For the first five months, the North Koreans restricted their flight operations to the area around Phuc Yen Airfield, essentially performing a sector defensive patrol limited to the areas north and east of their base.[85] In late April of 1967, the North Koreans redeployed to Kep Airfield, replacing the North Vietnamese MiG-17 unit there. The Koreans took over defensive responsibility for the base, which had been attacked repeatedly by American aircraft during the month. In two engagements with the Americans over the last week of April into May, the Koreans lost at least three MiG-17s.

(S//SI) In June, the Koreans returned to Phuc Yen for rotation, and a new contingent of Korean pilots arrived in Vietnam. The new pilots refrained from any combat, performing mostly familiarization flights and restricted defensive patrols around Phuc Yen. Finally, in late July

1967 the Korean MiGs mixed with the Americans. Again, the results were not good. On 19 and 21 July, four Korean MiGs were shot down without any American losses. This led to a stand-down of the Korean contingent.

(S//SI) After the stand-down, the Korean pilots flew, but with their most experienced pilots doubling as ground controllers.[86] By August, they returned to Kep, where on 23 August they scored their first air victory when four MiG-17s attacked a USAF combat air patrol and shot down an F-4C. At about the same time, the North Koreans began flying MiG-21s from Phuc Yen. These pilots would remain at Phuc Yen and be integrated into North Vietnamese MiG-21 operations;[87] on occasion, however, the Korean MiG-21s would fly joint operations with their MiG-17 counterparts, usually under the control of a single Korean controller.[88]

(S//SI) From September 1967 to March 1968, the Koreans continued to fly patrols out of Kep. In the first months of 1968, the Korean pilots had sporadic engagements with American aircraft. In three separate encounters, the Koreans downed a USAF F-105 and an F-4D, while losing a MiG-21.

(S//SI) After the bombing pause, the Koreans consolidated their aircraft at Kep airfield. There was little left for them to do. The Koreans busied themselves with reconnaissance patrols and tactical training. One activity they engaged in frequently was reaction to American pilotless reconnaissance drones. On 16 May 1968, during one of these reactions, a flight of two MiG-21s was pursuing a drone when the flight leader, lacking a clear shot, launched a missile and downed his wingman.[89]

(S//SI) By early 1969, flight activity fell to virtually nothing as the Koreans prepared to leave North Vietnam, which they did finally on 9 February.

(U) "Take nothing on faith": SIGINT and the Son Tay Raid, 21 November 1970

(U) On the evening of 21 November 1970, American prisoners of war (POW) held at the prison at Dan Hoi, just ten miles west of downtown Hanoi, were awakened by the sounds of gunfire and explosions some ten miles further to the west of them in the neighborhood of the town of Son Tay. Flares burned in the sky, creating an eerie light show, while the faint staccato beat of automatic weapons fire mixed with the shriek and roar of U.S. combat aircraft flying overhead. It would be some months later when the prisoners would learn that this had been the unsuccessful raid on the prison complex at Son Tay by U.S. Special Forces. U.S. Navy Lieutenant Everett Alvarez, the longest-held POW, would ruefully note the irony of the U.S. captives at Dan Hoi watching a raid under way that had been meant to free them.[90]

(U) Over the years, the raid on Son Tay has accrued enough controversy of its own to fill several books. The raid has become a symbol for many positions concerning the Indochina War. Some critics see it as an example of the congenitally flawed U.S. planning, while others view the raid as a brilliantly conducted special military operation, or "SPECOP." Others look at it as a gesture to the captive U.S. prisoners that the United States had not forgotten them. It is not difficult to be impressed with the planning and precision of the conduct of the raid. Yet, one has to wonder why, during the seven months of planning and training by the rescue group prior to the raid, nobody involved in the planning tried to verify whether or not the POWs were still in the prison.

(U) The genesis of the raid was information in late 1969 concerning widespread mistreatment of U.S. prisoners by the North Vietnamese at a number of prison camps in the DRV. Actually, this intelligence was already dated. By mid-1969,

there had been a change in the Vietnamese treatment of the prisoners to the better, perceptible even to the POWs themselves. Overall conditions and treatment meted out by the North Vietnamese had ameliorated, though there still were short stretches of brutality against some prisoners. It is not clear exactly why conditions had gotten better; a host of factors seem involved: the death of Ho Chi Minh, a U.S. publicity campaign highlighting POW maltreatment, and the unexpected deaths of some POWs. Whatever the causes(s), the situation for the prisoners had gotten measurably better.[91]

(U) It should be pointed out that POW rescue raids were not new to the Indochina War. Although exact statistics are not available, it is estimated that somewhere around forty to forty-eight rescues of American and Allied prisoners were attempted between 1966 to 1970. However, while dozens of South Vietnamese were freed, only one American was ever rescued, and he died shortly afterward.[92]

(U) What was different about the proposed raid at Son Tay was the location of the camp – just twenty miles west of Hanoi – and the estimated number of POWs – maybe as many as fifty-five. The Pentagon knew that there were prisoners at Son Tay; during aerial reconnaissance flights over the camp in mid-1969, POWs had used surreptitious methods to signal their presence to the planes.[93] However, despite its proximity to Hanoi, the camp was considered vulnerable. It was isolated, and sitting on the bank of a branch of the Red River, easily cut off. But this was not to say that Son Tay was safe. The nearby town hosted a number of military installations and facilities, such as signal troop and antiaircraft training schools, as well as a

jet-capable airfield. There were thousands of North Vietnamese military personnel in the area.

(U) In April of 1970, planning for the rescue mission began. By early May, a special USAF unit picked up the effort, and in the next month produced follow-on and feasibility studies. Ultimate responsibility for the raid was given to the newly created Joint Contingency Task Group (JCTG) under the command of Brigadier General Roy Manor. The final plan called for a wave of low-flying helicopters to stage from Udorn Royal Thai Air Force Base (RTAFB), Thailand, refuel over Laos, and then dash in on the camp. The raid also was to be supported by almost sixty USAF craft in escort and support roles (including SIGINT), and another fifty-nine USN strike aircraft which carried out diversionary air strikes near the Gulf of Tonkin.

(S//SI) SIGINT was not brought into the planning until 10 August 1970, when the JCS requested CINCPAC to assign a a SIGINT representative to the JCTG. The head of SIGINT Support Group to the Pacific Air Force's (PACAF)
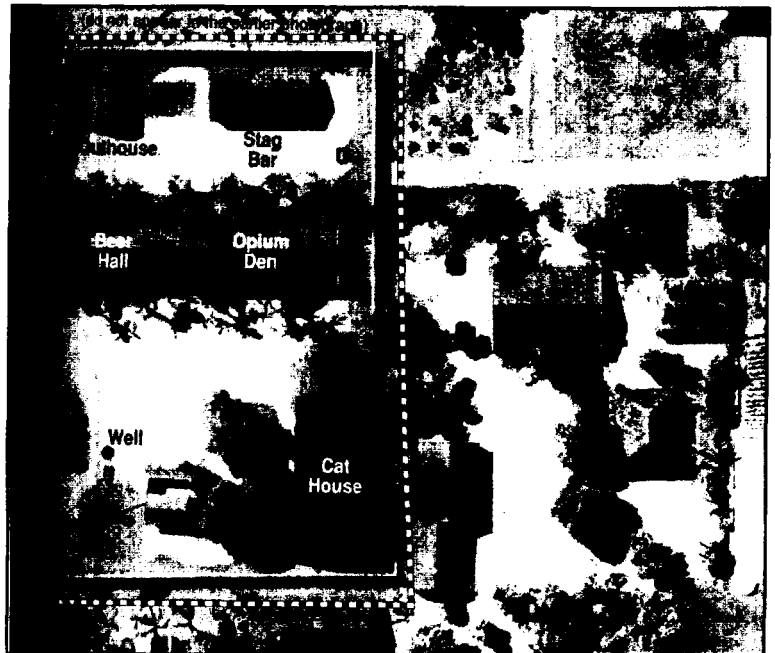
(U) Son Tay compound

Pacific Air Defense Analysis Facility (PADAF) in Hawaii, Lieutenant Colonel [REDACTED] was assigned to General Manor's staff. What the task group wanted was information on the DRV's air defense system that would define the best and least defended ingress and egress routes for the strike aircraft helicopters, and C-130 transports, as well as escort planes, notably the A-1H (Skyraider) contingent.

(S//SI) A complex profile of the possible DRV reactions and capabilities was drawn up. This included information on the PAVN air force's command and control, reaction times by SAM and AAA units, radar and spotter or observer networks' reporting times and accuracy, and the location and status of the DRV's deadly MiG force. Especially crucial was to know where North Vietnam's night-qualified MiG pilots were and what they were doing at all times. After this general picture the DRV air defenses was drawn up, then a sector-by-sector analysis had to be accomplished. Another crucial requirement was the necessity for special weather reporting of local meteorological conditions over the flight routes, and information of changes that could affect the mission. The region around Son Tay was notorious for low-level fogs, mists, and rain during November, the proposed time of the raid. It was critical to collect North Vietnamese weather broadcasts. In fact, weather was a crucial factor in the timing of the mission: it was Typhoon Patsy, moving west from the Philippine Sea, which threatened the rescue operation and forced the decision to move the initial strike date ahead by twenty-four hours.[94]

(S//SI) To prevent exposure of the mission, it was necessary to restrict access to the true nature of the mission support by various participating SIGINT units and sites. On 26 August 1970, the director of NSA, Admiral Noel Gayler, assigned the covername Adrenalin to the project with Lieutenant Colonel [REDACTED] as his direct representative. [REDACTED] assembled a complex and compartmented network of collection, analysis,

and reporting cells. Security was uppermost in many of the planners' minds. Even the SIGINT analysts charged with coming up with the DRV's air defense profile had details of the mission kept from them.[95]

(S//SI) More troublesome was the importance for the Americans not to tip their hand to the North Vietnamese by assuming any unusual patterns of activity. For example, RC-135 ACRP flight, known as Combat Apple, which was scheduled to support the task group, would have to work at night over the Gulf of Tonkin, a time when SIGINT flights simply had not ever flown. Kennedy solved this by getting SAC to establish such a flight profile in the weeks leading up to the mission so that the North Vietnamese would perceive them as normal.[96]

(S//SI) Another problem for Colonel [REDACTED] was the proposed transfer of the Air Force's cryptologic mission at Monkey Mountain near Danang to Ramasun Station, Thailand. It took the personal intervention of NSA's assistant director for production, Major General John E. Morrison, USAF, to delay the move until early December, as well as garner an assurance from the Air Force Security Service commander that no degradation to Danang's operations would occur prior to that date. Again, this had to be done without tipping the reason behind the request.[97]
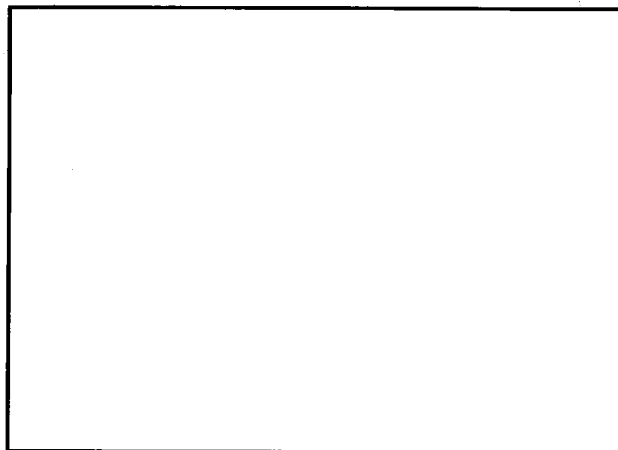
(S//SI) Five days before the raid, Colonel ▮▮▮▮▮ flew to Danang, which was his head-quarters for the operation. A special OPSCOM link was set up between ▮▮▮▮▮ and the National Military Command Center at the Pentagon. At the other end was the NSA representative to the Defense Department at the time, Milt Zaslow, who was to keep apprised a select group of defense department officials. The day before the raid, all SIGINT sites and units supporting Adrenalin were alerted to be "especially watchful for reflections/reaction to U.S. operations north of 19 [degrees] N with particular attention being paid to any NVN ▮▮▮▮▮ fore-knowledge of the activity." [99]

(S//SI) Airborne SIGINT support consisted of two missions. The first was College Eye, the EC-121T airframe which was modified to carry the Rivet Gym equipment, the special quick-disconnect SIGINT collection package. Besides the SIGINT system, College Eye served as the primary source for MiG warnings, using the APX-83 Identification Friend Foe (IFF) gear, which was capable of interrogating the North Vietnamese fighter IFF systems. [100]

(S//SI) The other platform was the USAF's Combat Apple. These aircraft had first appeared in Southeast Asia in 1967 as the replacement to the C-130 Commando Lance program. Combat Apple was flown in the RC-135, which was one of several military versions of the Boeing 707 commercial jetairliner. The payoff with the RC-135 was its capabilities as an aircraft: speed (500 knots), altitude (30,000 feet and above), and endurance (twelve hours on station) which allowed for collection and communications capabilities superior to anything else in the region. Combat Apple had two missions in support of the strike group: MiG warning and monitoring the Task Group's communications. [101]

(U) The timetable for the operation was moved up one day because of the approach of Typhoon Patsy from the west. Patsy had already struck the Philippines on 19 November and threatened the South China Sea and Gulf of Tonkin region. The typhoon's reach could affect the weather over the ingress route for the aircraft of the commando group. Clear skies were needed for the ingress refueling, and there was a need for moonlight for the assault force once they hit the POW camp. Besides, if the sea was too choppy, the navy's diversionary strike would have to be cancelled.

(TS) At about nine o'clock (2100G) in the evening of 20 November, the troops of the strike force lifted off from Takhli Royal Thai Air Force
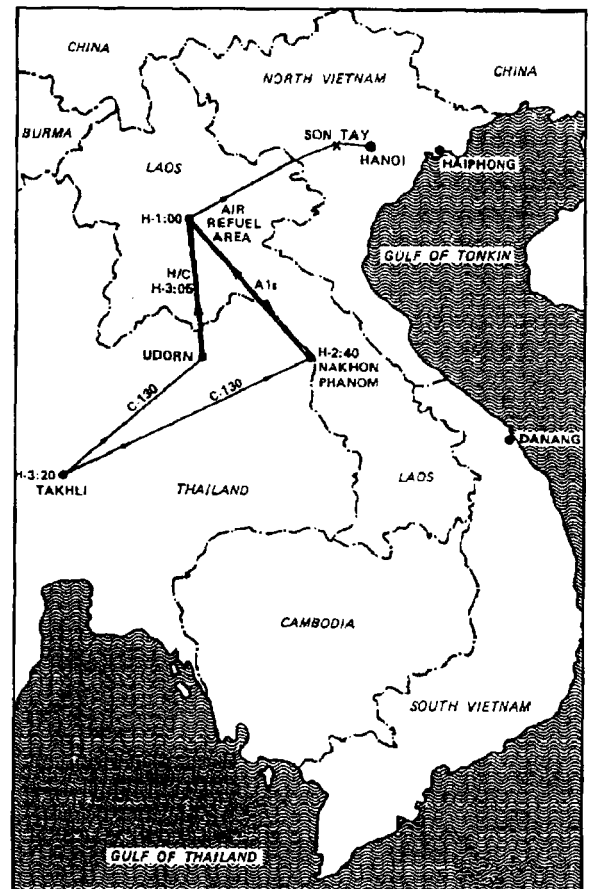
(U) Routes of the Son Tay assault force
(Source: Benjamin F. Schemmer, The Raid (New York: Harper and Row Publishers, 1976))

Base (RTAFB) in two C-130 transport aircraft. They arrived at Udorn RTAFB, where they transferred to the assault force of helicopters. Along the flight over Laos, they joined with the A-1 escort aircraft, refueled and rode into Son Tay. The commando teams hit their targets hard and fast. While local opposition was quickly suppressed by weapons teams on the ground, the rescue teams scurried through the POW holding areas, intent on freeing the captive Americans.

(U) No one was there. The cells were empty; in fact, the prison had been deserted for some time. After about thirty minutes on the ground at Son Tay, the assault teams, empty handed, reboarded their helicopters and flew back to Udorn. There were no losses to the ground assault teams.

(TS//SI) The SIGINT system had performed nearly flawlessly. The route chosen by the analysts, designed to evade the North Vietnamese warning system, was not covered by the North Vietnamese surveillance. It had been estimated that the assault force could be detected only when it was about sixteen minutes away from the prison camp. In fact, it appears that the force's helicopters and C-130s were never detected at all. However, the escort aircraft were picked up. Without the radar warning, the Vietnamese SAM and AAA reaction to the raid was sluggish; once in action, however, it managed to down two of the escorting F-105G (Wild Weasel) SAM suppression flights. One aircraft erupted into a ball of flame; the other managed to limp back to Laos, where the crew ejected safely and was recovered.[102]

(TS//SI) One incident during the mission was memorable, especially as a reflection on SIGINT's ability to monitor in detail the North Vietnamese reaction. While the raid was in progress, Milt Zaslow was briefing a select group of Defense Department officials, which included the secretary of defense, the chairman of the JCS, and a whole slew of general staff officers. Just minutes

before the assault team went in, an officer rushed in to the briefing and announced that the Task Group commander, General Manor, had issued a MiG warning.

(TS//SI) Now Zaslow and the NSA analysts had estimated that DRV would not be maintaining any jet fighters on night strip alert. This was based on the disposition of the North Vietnamese night-qualified pilots, of which none were on alert. (Hanoi had only fourteen night-qualified pilots, and of these only two were trained in low-altitude combat.) The defense group stared at Zaslow. "No MiGS," he asserted. After a certainly uncomfortable five minutes, another officer entered and canceled the warning.[103]

(TS) Actually, there had been a MiG warning, but it had been a case of mistaken identity. The crew of one of the assault group's helicopters had observed either the A-1 or the F-105 escorts and mistook them for North Vietnamese MiGs. This warning was relayed rapidly through the Task Group's communications. So fast and complete, in fact, was the warning that within a few minutes, the A-1s dropped their ordnance in reaction to the mistaken warning and assumed a defensive flight formation.[104]

*   *   *   *

(S) Still, despite efforts at painting the raid with various hues of "success," it was impossible for observers to avoid asking the main question: How had U.S. intelligence failed to note the removal of the POWs from Son Tay? There was a subsidiary question as well: Why had North Vietnamese moved the prisoners in the first place? In the mission postmortems, the second question concerned a large segment of the intelligence community. Many believed that the mission had been tipped to the North Vietnamese. Colonel [   ] believed that the visit of an unidentified "caucasian" journalist had spooked

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the North Vietnamese so much that they immediately moved the POWs.[105]

(C) Other intelligence suggested that the camp at Son Tay was not what it seemed to be. In this case, a North Vietnamese POW claimed that Son Tay had been a "model camp" and had been used rarely in the two-and-a-half years prior to the raid. The Vietnamese prisoner added that the Americans would be trucked into Son Tay for publicity sessions with foreign journalists.[106] This claim was not true, since Son Tay had been holding American POWs continuously since mid-1968.

(U) In January 1971, an article in the magazine *Human Events* claimed that "Hanoi circulated a warning to key military and civilian defense units that the U.S. was getting ready to stage a 'landing' in North Viet Nam."[107] The article went on to claim that NSA had intercepted this message, and that it had been broadcast "shortly after" Defense Secretary Melvin Laird had approved the formation of the prisoner rescue unit. The bottom line to this story was that "the North Vietnamese moves and their timing have convinced U.S. military intelligence officials there had to be a leak in U.S. plans."[108]

(S//SI) The problem with this article, like many other similar stories, was the vagueness of the claims. An expression like "shortly after," and the lack of an actual date of Hanoi's purported warning make this charge difficult to assess. What appears to have been the basis behind the charge was a SIGINT product issued by NSA that, in turn, was based on a published translation by the Army's 7th Radio Research Field Station at Ramasun, Thailand. The product detailed a 23 October message passed by an PAVN engineering unit in eastern Laos, subordinate to Binh Tram 217, to its subordinate units that stated since the dry season was upon them, they should expect more enemy commando units to be dropped into their region. The unit specified a number of points along the Ho Chi Minh trail complex in

eastern and southeastern Laos which might be targeted by these teams. The Vietnamese units were reminded to be on the lookout for "strangers" and to question anyone, even in a uniform, who looked suspicious. This warning was reported by NSA on 29 October 1970 and was
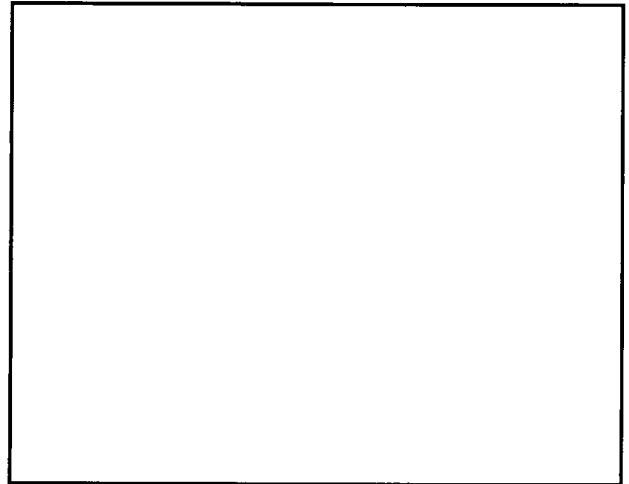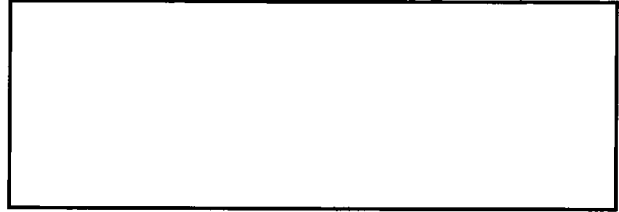
(TS//SI) The problems with this claim, especially the last statement, were many. For one thing, as we have seen, the knowledge of the exact mission of the Task Group was restricted to a few analysts; collectors and analysts at the various fixed and mobile intercept missions were not allowed to know about Adrenalin's purpose.

At the same time, such air transport activity around the town of Son Tay was not unusual since it was a jet-capable airfield and was host to a variety of DRV military units and facilities.[111] Of course, the most logical question to ask against this claim would be: Why would the North Vietnamese fly the prisoners ten miles to another camp?

EO 1.4.(c)

(U) What had really happened was this: the POWs at Son Tay were moved to another camp at Dan Hoi in the middle of July 1970. The reason for the move simply was that the North Vietnamese were unwilling to spend the resources to improve the physical conditions at Son Tay, which had always been poor, and had decided to move the prisoners to Dan Hoi camp, which was both closer to Hanoi and had better facilities.[112] The prisoners were moved by truck. Trucks and cars were the standard methods of prisoner transfer in Vietnam. For example, in May 1972, when the North Vietnamese moved over a hundred prisoners from Hanoi to a camp near Cao Bang, nine miles from the Chinese border, they were packed into a convoy of sixteen trucks for the two-day, nearly 150-mile (by road) journey to the new camp.[113]

(S) As for the first question as to how the prisoner move was missed, the answer, perhaps, lay in the mentality of the mission planners. In April 1970, the aerial imagery missions over the prison made by SR-71 aircraft and "Buffalo Hunter" reconnaissance drones had established the presence of the POWs. However, over the next seven months, subsequent imagery missions – twenty each by the SR-71 and drones – in the region, which often included Son Tay, showed no POW presence. For that matter, the imagery missions failed to reveal the presence of guards or any other activity, such as cooking fires, laundry lines, formations, or supply vehicles, associated with the operation of the prison![114] However, the absence of any activity at Son Tay seemed never to have caused the mission planners to question if the POWs were still there. That the original imagery may have gone "stale," especially when new photos showed no activity at Son Tay, seemed never to have occurred to the Task Group planners. The hard question was not asked. Instead, the planning and training continued, almost as if the mission had a momentum of its own regardless of what actually might be the situation at Son Tay.

(U) Instead, it was Henry Kissinger, President Nixon's national security advisor, who provided the final assessment of the intelligence failure at Son Tay. He remarked that "a president, and even more his security advisor, must take nothing on faith: they must question every assumption and probe every alleged fact."[115]

(U) The operation at Son Tay was a success; it was just that the patient failed to show up.

(U) The Final Air Battles: Teaball and SIGINT Support to the Linebacker Operations, May-October 1972

(U) Between the complete cessation of Rolling Thunder in November 1968 and the initiation of the Linebacker operations in early 1972, both sides made adjustments to their prevailing operations and upgraded their weapons and aircraft inventories. The paths taken by all the principal elements reveal much about the attitudes towards tactics, operations, organization, and the integration of intelligence, especially SIGINT, into air operations.

(S//SI) The North Vietnamese entered upon a gradual increase in the inventory of their air defense system. They expanded their radar net to five sectors, each with numerous subsectors, air surveillance sites, filter centers, and weapons operations centers. Over two hundred air surveillance and fire control radars operated in North Vietnam by 1972. In March and October 1968, the first intercepts in North Vietnam of the ▮▮▮▮▮▮▮▮▮▮▮▮ ▮▮▮▮▮▮▮▮▮▮▮▮ were intercepted. This system transmitted the video picture of the video radar displays to another station, usually some operating station such as a GCI facility.[116]   EO 1.4.(c)

(U) Although the number of Hanoi's jet aircraf during the period hovered around 250, the proportion of MiG-21s climbed to about 40 percent. Another jet fighter, the F-6 or Chinese version of the Soviet MiG-19 (Farmer), entered

Hanoi's inventory after 1968. A supersonic, heavily armed interceptor, it was highly maneuverable and a potent threat to the bomb-laden U.S. fighter bombers.

(S//SI) As the DRV's air defense system expanded, elements of it crept southward towards South Vietnam and Laos. A New Weapons Control Center that had been set up at Cam Xuyen (1816N 10601E) was detected by SIGINT in late 1970. Missile units were observed redeploying to the panhandle of North Vietnam. An outstation of the main air operations net near the Laotian border became active about the same time. All of these moves suggested an aggressive stance towards American air operations near the border of the DRV and southern Laos.[117] Increasingly, by late 1971 SAM and AAA units tracked and fired at American reconnaissance aircraft flying over the portion of the Ho Chi Minh trail in the panhandle of Laos. Between November 1971 and January 1972, there were almost sixty MiG intrusions into Laotian airspace. American and Vietnamese aircraft clashed several times in early 1972 with five Vietnamese and one American aircraft shot down.

(U) After Rolling Thunder, the USAF looked at the lessons of the air campaign and decided that technical solutions were needed to fix the problem of the successful MiG attacks. This track was taken despite an Air Force Weapons Systems Group study that concluded that, even with all of the detection systems like the QRC-248 and Rivet Top that effectively delivered warnings to U.S. airmen, losses to MiGs had soared at the end of Rolling Thunder. The Air Force improved its air-to-air missiles and added new airborne radar warning systems such as Combat Tree. However, in terms of training and philosophy, the air commands and weapons schools deemphasized air-to-air training in favor of ground attacks. Even the Air Force's clumsy tactical air combat formations were not changed.[118]

(U) On the other hand, the U.S. Navy, while adding new technical upgrades such as the upgraded Phantom variant, the F-4J, opted for a complete change in tactics and training. This attitude originated with a document known as the Ault Report, which asserted that U.S. naval aviators had lost their air-to-air combat skills and that, for example, problems like the poor missile-to-hit ratio in early 1968 was attributable to inadequate pilot skills. The solution that the Navy adopted was to open the Navy Fighter Weapons School – known more popularly as Top Gun – at Miramar Naval Air Station, California. There training concentrated totally on dogfighting skills – F-4 pilots trained against aircraft with MiG-like flight characteristics. Graduates from Top Gun would then return to the fleet and train other air crews. More importantly, and often overlooked, was that Navy GCI operators trained with their pilots. The crucial factor for the Navy's later high performance against the North Vietnamese was the working familiarity between the carrier pilots and their GCI operators.[119]

(S) The air war would soon restart. On 31 March 1972, under the cover of early spring drizzle and fog, three PAVN divisions, supported by tanks and heavy artillery, crossed the DMZ and hit the two ARVN divisions stationed in Military Region I with a whirlwind of steel. This was the beginning of the communist Easter offensive. The attacks had been expected by Allied intelligence; however, the move across the DMZ was a complete surprise, something that most Allied commanders believed that Hanoi would avoid so as to not give Washington an excuse to resume bombing in the North.[120]

(S//SI) As for SIGINT, NSA reporting from late January up to the date of the assault, indicated that there were major concentrations of regular North Vietnamese units near the DMZ, in the Central Highlands in Kontum Province, and in the Cambodian border region in Tay Ninh Province. Reports from late March indicated that PAVN artillery units were positioned near cities
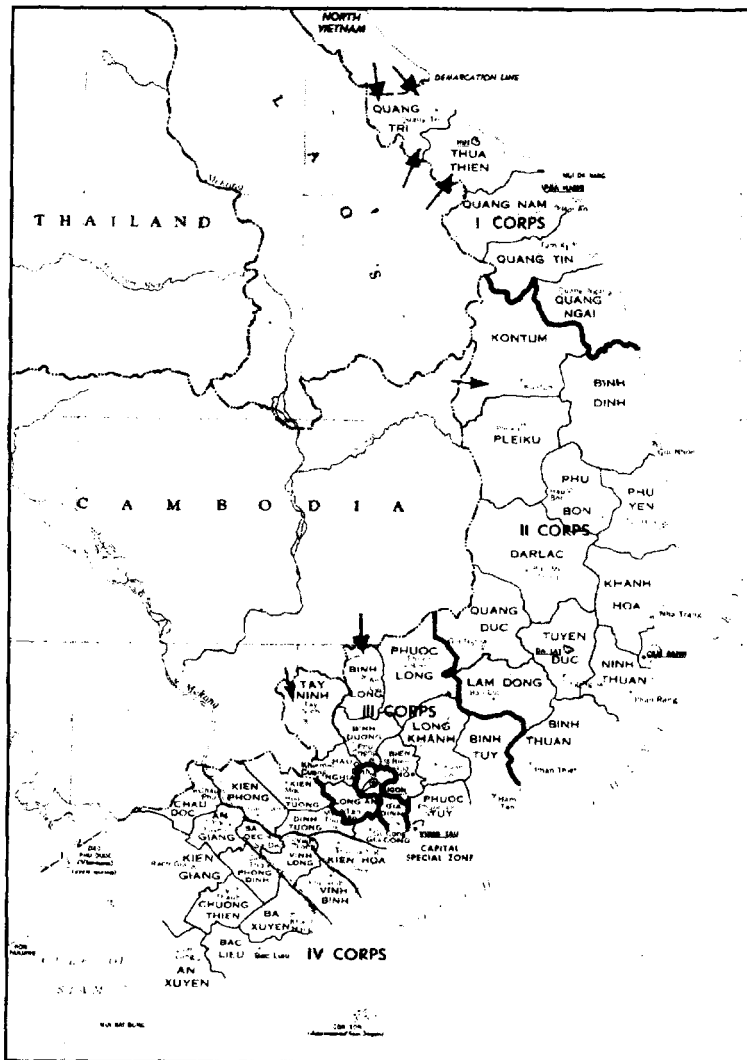
(U) Communist attacks into South Vietnam, March-April 1972

der into Tay Ninh and Binh Long Provinces. The North Vietnamese strategy was simple: win major battles and seize enough territory to force Saigon into negotiations. The ARVN resisted fiercely in some regions; in others, the government's military units melted away in the face of the PAVN attacks.

(U) The deciding factor for Saigon's eventual success was American air support. On 6 April, President Nixon ordered the resumption of bombing of North Vietnam as far north as the twentieth parallel. This aerial campaign, known as Freedom Train, was expanded on 8 May into an all-out attack on the North called Linebacker I. Linebacker was designed as a complete air assault to isolate North Vietnam from its supply sources. Unlike Rolling Thunder, there were few restraints, smaller restricted zones, and no incremental phases. All targets were on the list from the start; there were no time constraints, and targets could be hit when tactically necessary or feasible. The first phase of Linebacker, Pocket Money, was the dropping of mines in Haiphong and other ports that could receive supply shipments. The 7th Air Force was ordered to hit targets in the northern areas of Route Packages V and VI to seal off the DRV from its supply sources in the PRC. All air defense facilities, radars, SAM sites, GCI centers, and airfields were to be bombed.

in northern South Vietnamese provinces.[121] In Kontum Province, the B3 Front headquarters had ten new battalion-size units subordinate to it, while units near the DMZ were bringing up artillery.[122] Finally, SIGINT detected the North Vietnamese plan to attack the city of Hue with a combined arms force of tanks and artillery on 3 April.[123]

(U) Within a few weeks, the next stages of the North Vietnamese campaign started when more PAVN divisions moved into the Central Highlands and from across the Cambodian bor-

(U) The United States' air effort was supported by two GCI systems: the Air Force's EC-121T, known as "Disco" for its callword, and Red Crown, the Navy's shipborne controllers. Disco carried radar and the Rivet Gym SIGINT package and the Rivet Top (QRC-248) warning system.
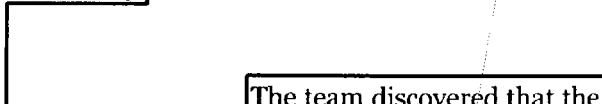
The problem with Disco was that the airframe had to fly slow, distant orbits because of its radar's technical limitations, and to stay out of DRV interceptor range. Its communications suite was limited, and MiG warnings to Linebacker mission aircraft often would be lost in the blizzard of other radio chatter. The Navy's Red Crown controller, on the other hand, while still limited in its radar coverage that was based on board Navy ships off the coast of the DRV, was augmented by Naval Security Group contingents that provided SIGINT support. However, Red Crown's best asset remained its GCI controllers. Even the Air Force pilots recognized this and often preferred working with Red Crown.[124]

(S//SI) When Linebacker started, the USAF, even with the EC-121T, barely was holding its own against the MiGs. Losses for May 1972 were barely in its favor: about 1.5 to 1. Meanwhile, the Navy pilots, with their superior Red Crown GCI and Top Gun training, were downing MiGs at a rate of over 5 to 1. However, by June and July the tables turned, and the Air Force was almost reeling from the MiG onslaught. In June, for example, MiG-21s downed eleven Air Force fighters to a loss of only three. Far worse for the Air Force, the rare and critical Pave Knife-equipped F-4s (the laser-guided ordnance precision targeting system critical for destroying the extensive bridge system in North Vietnam) were endangered.[125] A major part of the problem was that Disco and Red Crown could not see MiGs flying at low altitudes west of Hanoi, a critical staging area from which to attack missions in Route Packages V and VI.[126] Clearly, something had to be done.

(S//SI) In early July 1972, The Pacific Air Force (PACAF) appealed to the 7th Air Force for a better MiG warning system utilizing SIGINT. The PACAF also wanted the individual warning to be more useful in that it would include the callsign of the endangered USAF flight. The commander, 7th Air Force, Lieutenant General John Vogt, already was on the case. Earlier, he had requested the NRV to study the problem. The NRV office
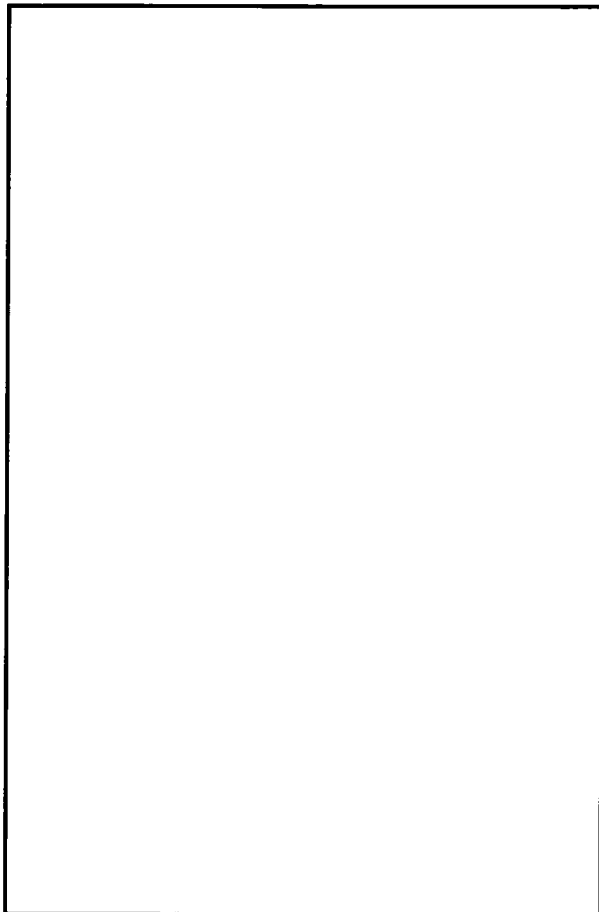
tasked the Special Support Group (SSG), 7th Air Force, at Tan Son Nhut Air Base, to see what it could find. The team discovered that the North Vietnamese radar operators originated azimuth and range reports of MiG flights, which were then passed to Hanoi's GCI controllers. These data were passed over upper HF and lower VHF voice links which could be collected only by the Olympic Torch U-2 flights. The intercepted, live communications could be relayed by radio downlink to a ground site for processing

(S//SI) For General Vogt and others, the central issue was getting this SIGINT directly to the Linebacker controllers instead of the old method

of filtering through the TACC-NS, which had always created too much of a time lag. Over the years the Air Force Security Service had tried to sell the Air Force on the concept of direct support, similar to the system that the ASA used to push ARDF results directly to the Army ground tactical commanders. However, from as early as 1966, the regular Air Force had retained control of the dissemination of such warning data from SIGINT sources.[128]

(S//SI) A second aspect of the emerging concept was General Vogt's desire to use the SIGINT for more than just air warnings. He wanted to base counter-air operations on it, that is, to use SIGINT to target North Vietnamese jets for attacks by the MiG combat air patrol (MiGCAP). He considered the idea of shooting down MiGs would offer better protection to his strike aircraft. In essence, Vogt was demanding "a whole new ballgame" for SIGINT. This new approach was agreed to by the DIRNSA, Admiral Gayler.[129] On 14 July, a team was dispatched from Fort Meade to Saigon for a planning conference. On this team were [   ] the intelligence planner for the Son Tay raid, and Delmar Lang, who had extensive experience in organizing a similar system during the Korean War.[   ] [   ] and briefed the meeting

on the plan. Teaball, as it was called (actually, Teaball was the ground callsign for the Olympic Torch mission), would be housed in a Teaball Weapons Control Center (TWCC), a portable van right next to the ones housing the downlink for Olympic Torch. The intercept operators would use a secure hotline (a KY-3 secure communications link) to pass the North Vietnamese tracking and other useful intercept directly to the controller.

EO 1.4.(c)

(S//SI) [   ] the team began to assemble the Control Center.[   ] [   ] supplied the van from [   ] resources and the Air Force Communications Service installed the radio packages. For two weeks, the team labored to bring Teaball on line. There were severe communications problems with the complicated links connecting the Teaball center with the various other control centers, airborne and ground-based. There were also reservations on the near exclusive reliance on the Olympic Torch mission. Some Air Force officers believed that the Combat Apple mission, which had a history of MiG warning support to the Disco airborne controller, should be a major collector for Teaball. However, neither Disco, even with Rivet Gym, nor Combat Apple was configured to

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(U) The U-2 SIGINT-configured Olympic Torch

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plot the tracking information.[130] Yet, this issue of primary intercept platform would be revisited.

(S//SI) More problems plagued Teaball. The main communications platform, an Air Force KC-135 radio relay aircraft, known by its callword, Luzon, had to have its operating altitude changed in order to include all of the stations on the network. The mission orbits of both Combat Apple and Olympic Torch had to be reconfigured from _____ to out in the Tonkin Gulf. Plans to put Linebacker operations on a twenty-four-hour tempo threatened to wear out the meager supply of AFSS linguists and analysts available to man the airborne missions and the TWCC.[131]

(S//SI) Teaball finally was ready for operations on 29 July when it was supposed to support a scheduled Linebacker operation. However, General Vogt held back his approval until 31 July. Even then, there was a hold-up as the many teething problems mentioned above were ironed out. In the meantime, Teaball personnel worked only when an Olympic Torch mission was in orbit during a Linebacker operation, and, then, they did work only on post-strike summaries.[132] At the same time, an evaluation of the time needed to pass the warnings to the MiGCAP aircraft through Disco showed that it still was taking too long to get the messages through the system. The downlink from Olympic Torch proved more fragile than anticipated and failed several times. When that collection mission was not up, the backup communications between Combat Apple _____ were inadequate – a single KY-8 secure voice UHF link that could not handle the information flow. That being the case, Combat Apple communicated its SIGINT take directly to Disco while the Teaball center was left out of loop.[133]

(S//SI) Teaball finally worked its first Linebacker mission on 15 August, but the results were termed "marginal" since the offensive portion of it did not operate. Two days later, MiGs were scrambled from Phuc Yen and Gia Lam, but their pilots broke off an attack as the F-4 MiGCAP

was vectored at them. Contrary to some claims, the North Vietnamese did not order a stand-down of all air operations after the first Teaball involvement in a Linebacker mission.[134] They continued to fly intercept missions.

(S//SI) The communications problems, both technical and procedural, still vexed the workings of Teaball with the rest of the air battle control system. On 22 August, 7th Air Force issued new rules of control designed to clear up the confusion:

> Seventh Air Force first made Disco responsible for controlling the three MiGCAP missions – ingress MiGCAP, mission MiGCAP, and egress MiGCAP – when there were no MiGs airborne, but when MiGs were airborne, Teaball took over, controlling the MiGCAP with Disco as a backup. (Disco and Red Crown were designated as back up control centers when Teaball communications failed.) Red Crown controlled all the strike, chaff, and escort forces, and Teaball could warn these forces on Guard [frequencies] if they were being attacked. Red Crown could also give warnings to the MiGCAP (who were not on their radio frequency) on Guard if they were being attacked.

> While Teaball controlled the MiGCAP, Disco could, with a consistent QRC-248 IFF radar contact on a MiG, take over control if Teaball chose to pass it. Additionally, if Teaball went down, Disco took over; if both were down, then Red Crown would take over.[135]

(S//SI) These new rules did nothing to fix the problem. Graphically, the entire Linebacker warning and control communications system resembled a multiheaded thing. The number of controllers and the problem of communications efficiency often left the Air Force crews confused over who was in charge. When part of the system failed, as it often did, the gap between the loss of one controller, Teaball, and the appearance of the backup could leave pilots without any support
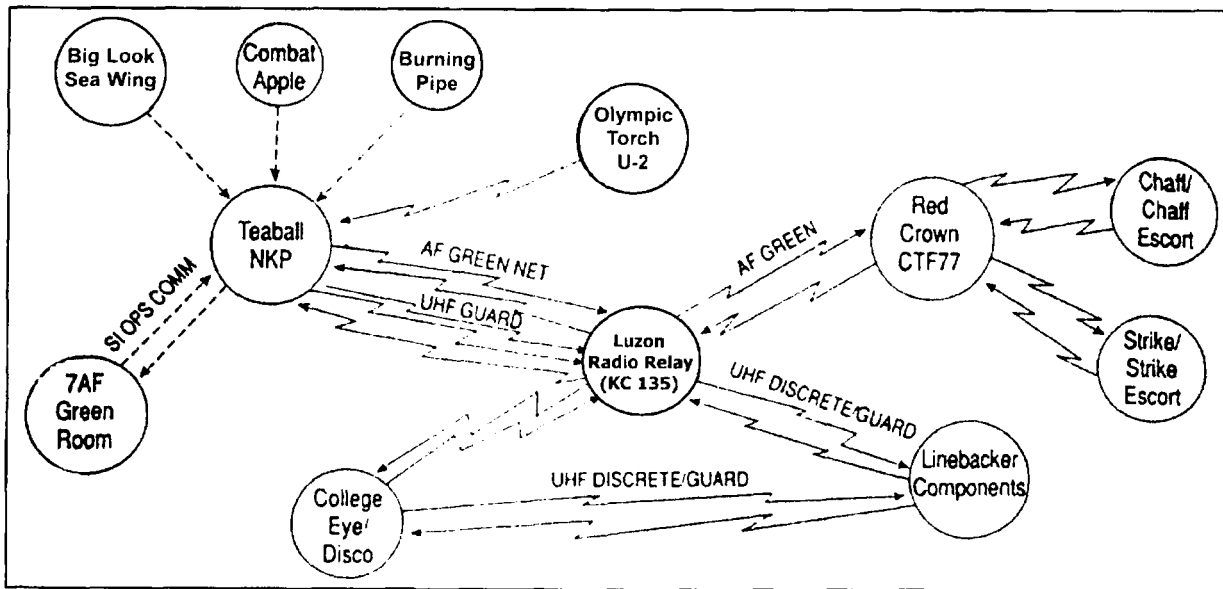
(U) The Teaball, Disco, Red Crown warning and control communications system (Source: Marshall L. Michel III, *Clashes: Air Combat over North Vietnam 1965-1972* (Annapolis, MD: Naval Institute Press, 1997))

during critical parts of a Linebacker mission. For example, this happened on 26 August when Teaball assumed control of a MiGCAP from the Red Crown controller. As the F-4s were vectored against the MiGs, the Teaball system failed. By the time Red Crown resumed control, one of the Phantoms was a fireball falling into the sea, and the MiGs got away.[136]

(S//SI) Was Teaball a success? Claims for its impact have been put forward by its originators. General Vogt stated that the shootdown ratio changed dramatically: "With the advent of Teaball, we dramatically reversed this [loss-to-victory-ratio] . . . during Linebacker we were shooting down the enemy at the rate of four to one. Same airplane, same environment, same tactics; largely [the] difference [was] Teaball."[137] [   ] who helped design the system, made much the same claims for Teaball's effectiveness.[138] So did the history [   ] which added that fourteen of the nineteen MiGs kills dating from 1 August could be traced directly to Teaball operations,

specifically the Teaball Control Center's direction of the MiGCAP.[139]

(S//SI) There was little doubt that the SIGINT portion of Teaball was collecting valuable intelligence. From the very beginning of Teaball, the Security Service personnel sitting the collection positions were getting the live intercept via a radio downlink from Olympic Torch. They were able to extract the azimuth tracking passed from the communist radar sites to the North Vietnamese GCI controllers. When Hanoi's air staff realized the Americans were listening in, they adopted changes to their procedures, attempting to disguise their operations. They tried new, special codewords to cover maneuvering, position reports, scrambles, return to base, as well as changing pilot and controller callsigns. But all of these changes and subterfuges were quickly recovered and exploited [   ] Even efforts at deception and complete radio silence during MiG scrambles were quickly seen through by the linguists and analysts at the TWCC.[141]

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(S//SI) The main problem with Teaball resided in the command and control aspects of its operations. Teaball was totally reliant on the error-free functioning of its communications systems. If the downlink from the U-2 Olympic Torch failed, or the link between the TWCC and the KC-135 relay aircraft, Luzon, went out, then a scramble began to reassign control to either Disco or Red Crown. If Teaball failed, then these two controllers had to fall back on their own SIGINT sources of warning. Even if the system worked, the number of relays slowed down the transfer of the warning data anywhere from one to five minutes.[142] In addition, the information from Teaball did not always agree with other sources; in fact, it could be wrong, as Red Crown controllers would complain.[143]

(S//SI) By mid-September, the continued faulty operations of Teaball forced another meeting of the air commanders to attempt yet another time to straighten out the rules for control of the MiGCAP. The 7th Air Force and Task Force 77 representatives met in Saigon on 11 September to iron out the jurisdictional disputes over control of the MiGCAPs. Two points emerged: (1) Disco took control of all Chaff escort, Strike Force, and Strike Escort elements of a Linebacker operation; (2) Red Crown would replace Disco as the general MiGCAP control, but when MiGs were active Teaball would take over. However, the last point was modified by giving Red Crown control when it had the complete air situation and could positively direct a MiG intercept.[144] This concession to Red Crown was hardly a ringing endorsement for Teaball! At this point, the best that could be said for Teaball comes from the USAFSS history of the project, which stated that "the operation really was not impressive; and successes were sporadic. Actually, there was no firm proof that the concept was working."[145]

(S//SI) The communications problem would never be solved during the life of Teaball. The Air Force considered a number of options to fix it. One idea, spun off the proposal to add the inter-cept positions of the 6924th Security Squadron at Ramasun Station and/or Combat Apple to direct support, led to the proposal of supporting Linebacker through the College Eye mission. This fell through when the Strategic Air Command could not supply the necessary UHF radio equipment. Alternate communications relay aircraft were experimented with, but they proved no more capable of handling the message load than Luzon.[146]

(S//SI) It could be argued that the only thing that mattered was that the loss ratio shifted heavily in favor of the Americans and that Teaball solely was responsible for this. On the surface, such an argument seems valid. However, even those numbers have to be qualified. In fact, fewer MiGs were shot down during the period Teaball was active than during the comparable pre-Teaball period – nineteen after Teaball compared to twenty-four prior to Teaball operations. What was happening in the air was that fewer American strike aircraft were being shot down; but, remember, Teaball supported only the MiGCAP. Disco controlled the strike portions of Linebacker mission.

(U) If one counts the U.S. Navy's score, then another consideration must be made. The Navy pilots shot down MiGs at a 5.5:1 ratio before Teaball became operational, compared to the Air Force's ratio of 1.3:1. What made the Navy so effective during Linebacker was the integration of all naval air intelligence and command and control functions with the Red Crown controller. In August, Red Crown could claim to have downed twelve MiGs while USAF pilots under Teaball control could claim only one. So effective was Red Crown, that Air Force pilots preferred to use it instead of Disco or Teaball.[147]

(S//SI) If Teaball was not a clear-cut success, was it really so ineffective? Looking at the Teaball After Action Reports [   ] can give an idea of the level of effectiveness and the combat

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environment in which it operated. First of all, usually more than one Linebacker mission a day was staged. But the missions followed one another, so that the Teaball system was active from the beginning to the end of them all, often operational for as long as eight hours. Of the thirty-six days of Linebacker missions, Teaball could claim totally error-free operations for only 53 percent of the time (nineteen days). In the other 47 percent, Teaball suffered partial to total degradation of the system: Olympic Torch was inoperable or ineffective (out of position or poor weather) on six days, while radio relay problems plagued Teaball on twelve days. On two days, both Olympic Torch and communications relay difficulties occurred.[148]

(S//SI) The Teaball system seldom operated in a heavy combat environment. Despite the image of "wall-to-wall" MiGs that some pilots have claimed (which may have been caused by the continuous repeat and relay of initial MiG warnings), on only one day during this period were there more than four MiGs active (8 September). In fact, of forty-four Linebacker missions listed in the reports, 43 percent saw only two MiGs react, while 36 percent had no MiG reaction. In only 18 percent of the missions were there four MiGs opposing the Americans. On three days when there were no MiGs, the Vietnamese attempted to "spoof" the Americans with communications simulating MiG activity.[149]

(U) In the end, Teaball proved to be a most modest success. Its claims for superiority have to be balanced against Vogt's stated second major objective to help "shoot down MiGs." An Air Force study of the Linebacker operation, called Red Baron III found a multitude of deficiencies in Teaball: shortage of personnel with experience and the necessary security clearances, a dependency on radio relay aircraft, lack of automated display equipment, vulnerability to UHF jamming, a dependency on outside agencies for information, changes in procedures which confused aircrews, and security requirements which pre-

vented them from grasping the significance and validity of the information passed to them.[150]

*   *   *   *

(U) While the MiG and Phantom pilots flung themselves at each other over the skies of North Vietnam, negotiations continued in Paris between Henry Kissinger and Le Duc Tho for the possible peace settlement. By early October, rumors out of Paris indicated that Washington and Hanoi were close to a breakthrough: that the countries would arrange for a cease-fire and leave the political settlement to the two Vietnams through the agency of a "National Council of Reconciliation." By the middle of the month, Kissinger claimed that peace "may be at hand." The bombing of North Vietnam shifted to below the twentieth parallel. Attention focused on the travels of Henry Kissinger from Washington to Paris to Saigon as he tried to herd both Vietnams into the corrals of peace. However, there would be one more gasp of the air war in December 1972 before "peace" was finally achieved.

(S//SI) For SIGINT, its ability to support the air war over those seven years was something of a disappointment. The expressed ambition of "extending" the reach of radar was seldom met. Hammock, Ironhorse, and Teaball, all, to a degree, managed to provide coverage of Hanoi's air defense system that could supplement the radar coverage of controllers in the EC-121s, on Monkey Mountain, and on board the PIRAZ ships. Yet, the studies of Hammock, Ironhorse, and ancillary SIGINT systems such as the QRC-248 and Rivet Gym, indicated that the North Vietnamese could find a way(s) to counter American SIGINT through the application of various operational security measures or deception practices. The losses incurred by U.S. aircraft during the months before Rolling Thunder's termination aptly illustrated this situation.

(S//SI) Teaball, on the other hand, was able to overcome North Vietnamese countermeasures,

such as deception and changes in communications procedures. This was due, in large measure, to the ability of individual intercept operators and analysts in detecting them. Furthermore, the impressive exactitude in targeting those critical North Vietnamese communications that tipped off MiG activity was equally important. There was little that the DRV air defense personnel could do to overcome the vulnerabilities in their MiG command and control system: the flights of the MiGs had to be tipped off to the SAM batteries, and the MiGs could not operate without the direction from tactical air communications. The true strength and value of Teaball was the SIGINT coverage it provided. However, Teaball remained vulnerable to the two problems that plagued SIGINT support throughout the air war: administrative strictures and technical difficulties with the command, control, and communications system.

(S//SI) Both problems affected how the SIGINT could get to the pilots. Administrative restrictions, employed by both the regular Air Force and the cryptologists, kept ephemeral tactical SIGINT information from arriving in a timely manner, if at all. By the time Teaball had arrived, the shortcoming of these limitations had been realized by both the Air Force and NSA, though their influence did not completely fade.

(S//SI) The larger, and ultimately intractable, problem for SIGINT was that of the faulty C3. In 1965 Hammock, even without the need for sanitization of the SIGINT, could supply information only in a matter of several minutes. By the time of Teaball in 1972, even though the times had improved dramatically, the C3 shortcomings were still paramount. The kluge of systems that constituted Teaball left too many points of failure – it was completely down or degraded 47 percent of the time. The only saving grace for American pilots was that the individual control systems, such as Disco and Red Crown, could operate individually and effectively even when Teaball was out of commission.

(U) As long as the delivery of SIGINT information to the pilots was limited, either through administrative or technical barriers, the best it could be was as an adjunct to the air war. The larger problem of an effective C3I system for air combat would be solved in a few years with the arrival of the E-3A (Sentry) Airborne Warning and Control System (AWACS) aircraft. What this single platform did was to remove all intermediate steps in the control of air combat. Its presence could nearly guarantee complete air supremacy, as the examples over Lebanon and the Persian Gulf illustrated. No longer would several systems compete for control of a campaign. The ridiculous example of Teaball and Red Crown controllers bumping each other off of the command frequency as the air situation changed would become a thing of memory.

(U) Notes

1. (U) Schulzinger, 155-159.
2. (U) Karnow, 405.
3. (TS//SI) DIRNSA 021540Z August 1964, 08006/02 SIGINT Readiness Bravo Lantern; DIRNSA, 3/O[____]R18-64, SIGINT Readiness Bravo Lantern Declared 042058Z August 1964; 3/O[____]R03-64 7 August 1964, inter alia.
4. (U) Van Staaveren, 40.
5. (U) VandeMark, 35.
6. (U) Ibid.
7. (U) Karnow, 411.
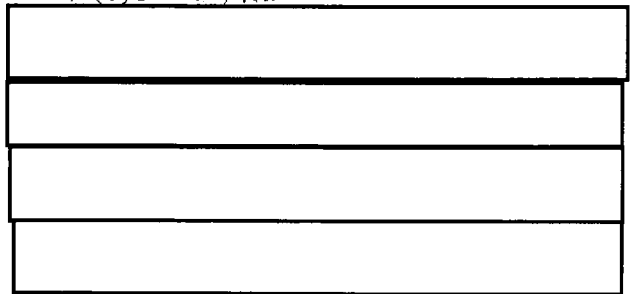
12. (S//SI) 2/O/VHK/R2-64, 25 September 1964, 45539Z.
13. (S//SI) 2/O/VCK-E/R97-70, December 1970.
14. (S//SI) Thompson, [____] and Gerhard, 27.
15. (TS//SI) Ibid., 28.
16. (TS//SI) Ibid., 29.
17. (U) Gaddy, 122-123.

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18. (S//SI) 2/O/VHK-E/R1-65, 082312Z January 1965.

19. (U) Figures vary with the determination of the range of Hanoi's air surveillance system beyond its borders. Some estimates put it as far as 230 miles. The detection range estimates depend on a number of factors, which, if individually varied, could affect the range. These factors included the aircraft's altitude, size, and radar cross section; the location and height (to sea level) of the early warning radar, the weather, time of day, and whether or not ECM were employed. The 150-mile detection range is based on the radar return of an F-105 flying at 15,000, the normal ingress altitude by American strike aircraft.

20. (S//SI) Thompson [ ] and Gerhard, 50.

21. (S//SI) Pike, 116; For example, also see "North Vietnam Monthly Air Summary," 2/H8/VHA/R01-62, 31 October 1962, and 2/H8/VHT/R02-62, 050745Z October 1962.

22. (TS//SI) Thomas Thompson, *Special Historical Study: Development of USAFSS Capability in Southeast Asia. Vol II: The Buildup, a Period of Experimentation, 1962* (San Antonio, TX: HQ USAFSS, 1963), 4-5.

23. (TS//SI) Thomas Thompson, *Special Historical Study: Development of USAFSS Capability in Southeast Asia. Vol III: 1963 – A Year of Difficulty* (San Antonio, TX: HQ USAFSS, 1963), xviii.

24. (S//SI) 2/O/VCK-E/R1-70, 022140Z January 1970.

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26. (TS//SI) Thomas N. Thompson, *A Special Historical Study of SIGINT Support to Air Operations in SEA 1965-1972* (San Antonio, TX: HQ, United States Air Force Security Service. No. 10, 1972), 9.

27. (TS//SI) Thompson [ ] and Gerhart, 56.

28. (TS//SI) Ibid., 68.

29. (TS//SI) Ibid., 77.

30. (TS//SI) Ibid., 85.

31. (U) Robert Frank Futrell, *Aces and Aerial Victories: The United States Air Force in Southeast Asia 1965-1973* (Washington, D.C.: Office of Air Force History, Headquarters, USAF, 1976), 12-16.

32. (U) Marshall L. Michel III, *Clashes: Air Combat over North Vietnam, 1965-1972* (Annapolis, MD: Naval Institute Press, 1997), 139-140; Futrell, 16.

33. (TS//SI) Thompson, *SIGINT Support to Air Operations in Southeast Asia, 1965-1972*, 21.

34. (TS//SI) Ibid., 32-33.

35. (TS//SI) Ibid., 35.

36. (TS//SI) Ibid., 36.

37. (TS//SI) Thompson, 29; Gibson 358-360. TF77 reported to CINCPAC while 7th AF reported to MACV for instructions.

38. Schulzinger, 203.

39. (U) Ibid., 207, 210; The most important assessment may have been the 1966 study by the Institute of Defense Analysis, known as the Jason P.L. 86-36 Study. See Gibson, pps 346-349; also Harold Ford for a post-Tet CIA estimate of the results of continuing the bombing, pps 127-8.

40. (S//SI) "SIGINT Information on CHICOM Forces in North Vietnam, 1969," NCA# 45222; Schulzinger 210; Van De Mark, 108.

41. (S//SI) NRV to PACSCYTRGN, F4/1435, 21 July 1965.

42. (TS//SI) James E. Pierson, *A Historical Study of the Iron Horse System* (San Antonio, TX: United State Air Force Security Service 15 December 1974), 10.

43. (TS//SI) Ibid., 11.

44. (TS//SI) Ibid., 15-16.

45. (TS//SI) Ibid., 17.

46. (TS//SI) Ibid., 17-18.

47. (TS//SI) Johnson, *American Cryptology during the Cold War, Vol. II,* 548.

48. (TS//SI) Ibid.; Pierson, 22. EO 1.4.(c)

49. (TS//SI) Pierson, 18.

50. (TS//SI) Ibid., 22.

51. (TS//SI) Ibid., 25.

52. (TS//SI) Ibid.

53. (TS//SI) Thompson, *SIGINT Support to Air Operations in Southeast Asia, 1965-1972*, 42.

54. (TS//SI) Thompson, 42; Futrell, 37.

55. (TS//SI) Thompson, 46-47.

56. (TS//SI) Ibid., 52.

57. (U) Futrell, 11; Micel, 74.

58. (U) Futrell, 11.

59. (U) Michel, 101.

60. (U) Ibid., 144.

61. (TS//SI) Thompson [ ] and Gerhard, 103; Michel, 114.

62. (U) Michel, 118.

63. (TS//SI) Thompson, SIGINT Support to Air Operations in Southeast Asia, 1965-1972, 57.

64. (U) Michel, 128.

65. (U) Ibid., 170; Futrell, 12, 75.

66. (S//SI) John Clegg, "Ironhorse: A Tactical SIGINT System," *Cryptolog Special Issue – Vietnam*, October 1975, 24.

67. (TS//SI) Pierson, 30.

68. (S//SI) DIRNSA to PACAF, "Ironhorse," R8/43/67, 150119Z April 1967, CCH Series XII.NN.VI.

69. (S//SI) Clegg, 26.

70. (TS//SI) Pierson, 31.

71. (TS//SI) Ibid., 40.

72. (TS//SI) Ibid., 80.

73. (TS//SI) Thompson, *SIGINT Support to Air Operations in SEA, 1965-1972*, 8.

74. (S//SI) 2/O/VCA/R54-68, 212156Z 1968.

75. (TS//SI) SIGINT Information on CHICOM Forces in North Vietnam, 1969; NCA# 45222. The report did not give a forces figure. For a full accounting of Chinese forces, see "The Vietnam War, 1964-1968; A Chinese Perspective," Xiaoming Zhang, *The Journal of Military History*, Vol. 60, No. 4, (Oct 1996): 731-62.

76. (U) Qiang Zhai, "Beijing and the Vietnam Conflict 1964-1965: New Chinese Evidence" (Washington, D.C.: Woodrow Wilson Center), 237.

77. (U) Michel, 189.

78. (S//SI) 2/O/VCK-E/R1-70, 022140Z January 1970.

79. (S//SI) Ibid.

80. (S//SI) 2/O/VCA/R1-67.

81. (TS//SI) 2/O/VCK-E/R1-70.

82. (S//SI) 2/O/ [ ] R1-66, 071600Z February 1966.

83. (S//SI) 2/H3/VCA/R06-66, 061600Z January 1966.

84. (S//SI) 2/K/ [ ] R1-69, 19 April 1969.

85. (S//SI) Ibid.

86. (S//SI) Ibid.

87. (S//SI) Ibid; 2/O/VCK-E/R41-67, 062003Z August 1967.

88. (S//SI) 2/O/VCK-E/R4-68, 121455Z March 1968.

89. (S//SI) 2/O/ [ ] R1-69.

90. (U) Stuart I. Rochester, and Frederick Kiley, *Honor Bound: The History of American Prisoners of War in Southeast Asia, 1961-73* (Washington, D.C.: Historical Office, Office of the Secretary of Defense, 1998), 506; This history is probably the most comprehensive record available of the POW experience, at least from the perspective of the POWs themselves.

91. (U) Ibid., 490-491.

92. (U) Ibid., 240, 638; See also Susan Katz Keating, *Prisoners of Hope: Exploiting the POW/MIA Myth in America* (New York: Random House, 1994), 125.

93. (U) Rochester and Kiley, 502.

94. (S//SI) Lawrence J. Polkalba, "Son Tay Raid: Intelligence Capabilities/Utilization Analysis," Master of Science in Strategic Intelligence Thesis, August 1970, 9, CCH Series XII.NN.

95. (S//SI) Lt. Col. [ ] "Project Adrenalin. A Journal of Cryptologic Support to the U.S. Effort to Extract American prisoners of War from North Vietnam," 7 December 1970; DIRNSA MSG, 262245Z August 1970, 08232/26; CCH Series VIII, Box 21, "Son Tay Prison Raid."

96. (TS//SI) Johnson, 578.

97. (S//SI) [ ] M/R: "Hold Action on Drawdown of USA-32 Resources," 29 October 1970.

98. (S//SI) [ ] 2/G3/VCJ/T363-70, 232348Z October 1970.

99. (S//SI) DIRNSA 190923Z November 1970, 11015/19; DIRNSA MSG, "Special Collection and Reporting Emphasis," 191757Z November 1970, 07042/19, CCH Series VII, Box 21.

100. (S//SI) Commander JCS Joint Contingency Task Group "Report on The Son Tay Prisoner of War Rescue Operation," Part 1, 1971, 45, 69, CCH Series VIII, Box 21.

101. (S//SI) Ibid., 69.

102. (TS//SI) Ibid., 68.

103. (TS//SI) Zaslow interview; Lt. Col [ ] USAF, "Project Adrenalin. A Journal of Cryptologic Support to the U.S. Effort to Extract

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American Prisoners of War from North Vietnam," 21 December 1970, Version #3, CCH Series VIII, Box 21.

104. (TS//SI) JCS Joint Contingency Task Group, 71.

105. (TS//SI) Message, _____ to _____ 030650Z March 1971, CCH Series VIII, Box 21.

106. (C) CINCPAC MSG 110230Z December 1971, FIR 0576-01-A 111/71, CCH Series VIII, Box 21.

107. (U) Paul Scott, "Were the North Vietnamese Informed About U.S. Raid on POW Camp?" *Human Events*, 9 January 1971.

108. (U) Ibid.

109. (S//SI) 2/G3/VCJ/T363-70, 232348Z October 1970; 2/O/VCJ/R474-70, 292124Z October 1970, CCH Series VIII, Box 21.

110. (U) Jack Anderson, "Report on Raid on POW Camp Ruffles Admiral," *Washington Post*, 12 February 1982.

111. (S//SI) See 2/O/VCK-E/R99-70, 27 September 1970; 2/O/VCJ/R390-70, 25 September 1970.

112. (U) Rochester and Kiley, 502.

113. (U) Ibid., 555.

114. (S//SI) Polkalba, 28.

115. (U) Henry Kissinger, *The White House Years* (Boston: Little Brown and Company, 1979), 982.

116. (S//SI) 2/O/TEL/R150-68, 16 October 1968.

117. (S//SI) For more details of changes to the North Vietnamese air defense structure and C3 during this period, see 2/O/VCA/R38-70, 092210Z November 1970; 2/O/VCK-E/R6-69, 16 April 1969; and SSG PADAF to NSA 13/0030Z November 1970.

118. (U) Michel, 184.

119. (U) Ibid., 186.

120. (S) Palmer, 93.

121. (S//SI) 2/OO/VCM/R95-72, 302105Z March 1972.

122. (S//SI) See 2/OO/VCM/R45-72, 082203Z February 1972, and 2/OO/VCM/R36-72, 022112Z February 1972, inter alia.

123. (S//SI) 2/OO/VCM/R105-72, 131415Z March 1972.

124. (U) Michel, 226.

125. (U) Ibid., 239-240.

126. (U) Thompson, Teaball, 12; Michel, 251.

127. (TS//SI) Thomas N. Thompson, *A Historical Study of USAFSS SIGINT Support to the Teaball Weapons Control Center* (San Antonio, TX: USAFSS, 1974) 9, NCA #26389; _____ "Teaball: Some Personal Observations of SIGINT at War," *Cryptologic Quarterly*, Vol. 9, No. 4, Winter 1991, 92-93.

128. (TS//SI) Thompson, *Teaball Weapons Control Center*, 10; Johnson, Vol. 2, 580; Major General Doyle Larson, USAF, "Direct Intelligence Combat Support in Vietnam, Project Teaball," *American Intelligence Journal*, Spring/Summer 1994, 56.

129. (TS//SI) Thompson, 11.

130. (TS//SI) Ibid., 19.

131. (TS//SI) Ibid., 36-39.

132. (TS//SI) Ibid., 24.

133. (TS//SI) Ibid., 40.

134. (TS//SI) _____ 94.

135. (U) Michel, 253.

136. (TS//SI) Thompson, *Teaball Weapons Control Center*, 42; (U) Michel, 265.

137. (U) Michel, 283.

138. (TS//SI) _____ 95.

139. (TS//SI) Thompson, *Teaball Weapons Control Center*, 43n.

140. (S//SI) Det 5 621 TCS/WCC to AFSSO PACAF, Documentation of Teaball, RD Rpt NR. 28-72, 110800Z December 1972, CCH Series VI.HH.15.37.

141. (S//SI) _____ AFSSO 7AF, Teaball Weapons Control Center Wrap-up, 240300Z September 1972.

142. (TS//SI) Thompson, *Teaball Weapons Control Center*, 43; Michel, 256.

143. (TS//SI) Thompson, 43.

144. (TS//SI) Ibid., 44.

145. (TS//SI) Ibid., 43.

146. (TS//SI) Ibid., 49-50.

147. (U) Michel, 284.

148. (S//SI) _____ AFSSO 7th AF, Teaball Wrap-ups, 251220Z August 1972 to 220300Z October 1972.

149. (S//SI) Ibid.

150. (U) Michel, 283.

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(U) Third Interlude: "Who'll Stop the Rain?"
## America Enters the Ground War, 1965-1967

(U) Soldiers of a forward direction finding site at an unidentified fire base, 1968

(U) The beginning of Rolling Thunder in March 1965 forced a new demand on the American command in Vietnam: air base security. The mortar and sapper attack against Pleiku in early February 1965 illustrated only too well the communist capability to harass operations at the vulnerable airfields, especially the big ones at Danang and Cam Ranh Bay. To provide the necessary security required a larger ground force element. ARVN forces were considered inadequate to meet both this task and to counter the communist military onslaught. The solution was for American troops to guard the air bases and other installations. This would free up the ARVN to battle the Viet Cong units in the field.

(U) Sending in American ground troops was an option not sought eagerly by Washington. However, the political and military situations in South Vietnam appeared to be on the verge of a collapse. The successive Saigon regimes under General Khanh and Marshall Nguyen Cao Ky seemed incapable of handling the military struggle with the Viet Cong, and, only barely, had defeated the large-scale, countrywide opposition from the Buddhists. Rolling Thunder was not having the desired result of stiffening Saigon's spine. Neither did the bombing seem to lessen Hanoi's will to continue the struggle in the South. In March 1965, General Westmoreland had anticipated the problem and had cabled President

Johnson that the time had come "to put our own finger in the dike." [1]
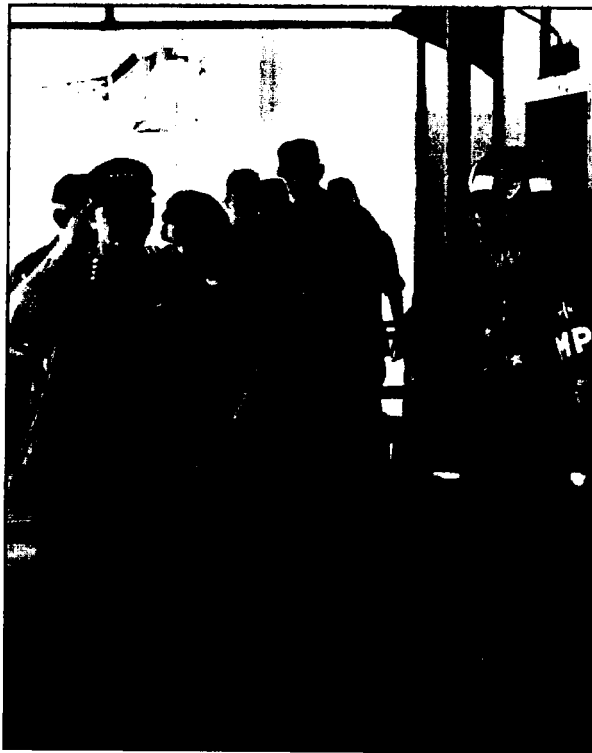
(U) General William Westmoreland visits the 8th RRFS at Phu Bai.

(U) On 8 March, the first of 3,500 marines landed to protect the air base at Danang and the ASA field site at Phu Bai. It had been hoped that this would suffice, but within a week Westmoreland demanded more troops. The marines themselves chafed at perimeter patrols and extended their patrols into the surrounding countryside. The inevitable clashes with communist forces ensued. Westmoreland and the Joint Chiefs of Staff recommended that two ground divisions be sent to South Vietnam. [2] In late July, Secretary of Defense McNamara returned from South Vietnam with the recommendation that the U.S. expand its military pressure on the ground and in the air so that Saigon could survive. He recommended sending in 175,000 troops. [3] Johnson now had to decide to which side of the flooding stream of the Vietnam problem he would jump.

(U) On 28 July, LBJ made his decision to commit U.S. combat formations to the war. The choice to intervene was a complex one and involved political concerns about continued support for the president's Great Society programs. There were also the background pressures

(U) Marines landing on Danang's beaches

brought on by Cold War imperatives and concurrent fears about the possible global expansion of communism. However, it must be remembered that virtually all of the administration in Washington, military and civilian, supported the military buildup. Public opinion supported the overall conduct of the war by a wide margin. However, the polls were divided about sending in troops. Before the July decision, less than half of those polled favored sending in more troops. The rest were divided between uncertainty and opposition.[4] At this juncture, Americans were unsure where this next escalation would take the country.

(U) Even before the first American soldiers had set foot on Danang's beaches, General Westmoreland had conceived a long-term strategy to win the war. First, he would deploy the American troops to protect the constellation of American air bases and supply centers sprinkled along the coast and around Saigon. At the same time, he would commit U.S. troops to stop the communist troops from taking the Central Highlands and sweeping to the sea, thus cutting the country in half. Finally, once he had accumulated enough mobile forces and the bases were secure, he would initiate a series of large-scale search-and-destroy operations in which the vastly superior mobility and firepower of American forces could be brought down on the Viet Cong and North Vietnamese forces that might stand and fight.

(U) At the same time, the air war continued in the North and along the Ho Chi Minh Trail. It was believed that Rolling Thunder would ruin Hanoi's system of supply and reinforcement, and thereby help American forces in the South. Meanwhile, a joint military and civilian pacification program was started, mostly in the regions to the north of the country controlled by the marines who had favored the approach, which was supposed to eradicate the communist presence. Under American tutelage and supervision, Saigon could regain control of the rural population and countryside from the communists.

(U) All of these programs would take time to show results. By the end of 1965, there were 184,000 American troops in South Vietnam. By 1966, the buildup reached 385,000 soldiers, sailors, marines, and airmen. By the end of 1967, about a half million Americans were in South Vietnam. A million tons of supplies a month rolled into South Vietnam to supply the gigantic military machine that was running in high gear. The war was on in earnest. The number of combat formations of the United States and other countries would fill the map of South Vietnam.

(U) Propping Up the Domino: American Cryptology Enters a Wider War

(U) As the American forces began to pour in, so did the SIGINT elements needed to support them. The various Service Cryptologic Agencies committed units and personnel to man the field stations and support the combat units there. What had begun in 1961 as a small-scale advisory and SIGINT support mission would, like the overall intervention, grow into a large multiservice and multination effort.

(U) The Army Security Agency

(U) The Army Security Agency had, by far, the largest number of personnel committed to the struggle, perhaps as much as a fifth of its entire worldwide strength would be stationed in Indochina. A number of ASA direct support units would arrive with their host Army formations. The Army field stations in Vietnam would multiply and expand. This would be especially true for the site at Phu Bai.

(S//SI) On 1 November 1964, the field station at Phu Bai was redesignated the 8th Radio Research Unit (later, Phu Bai was designated the 8th RRFS). The need to expand Phu Bai's opera-
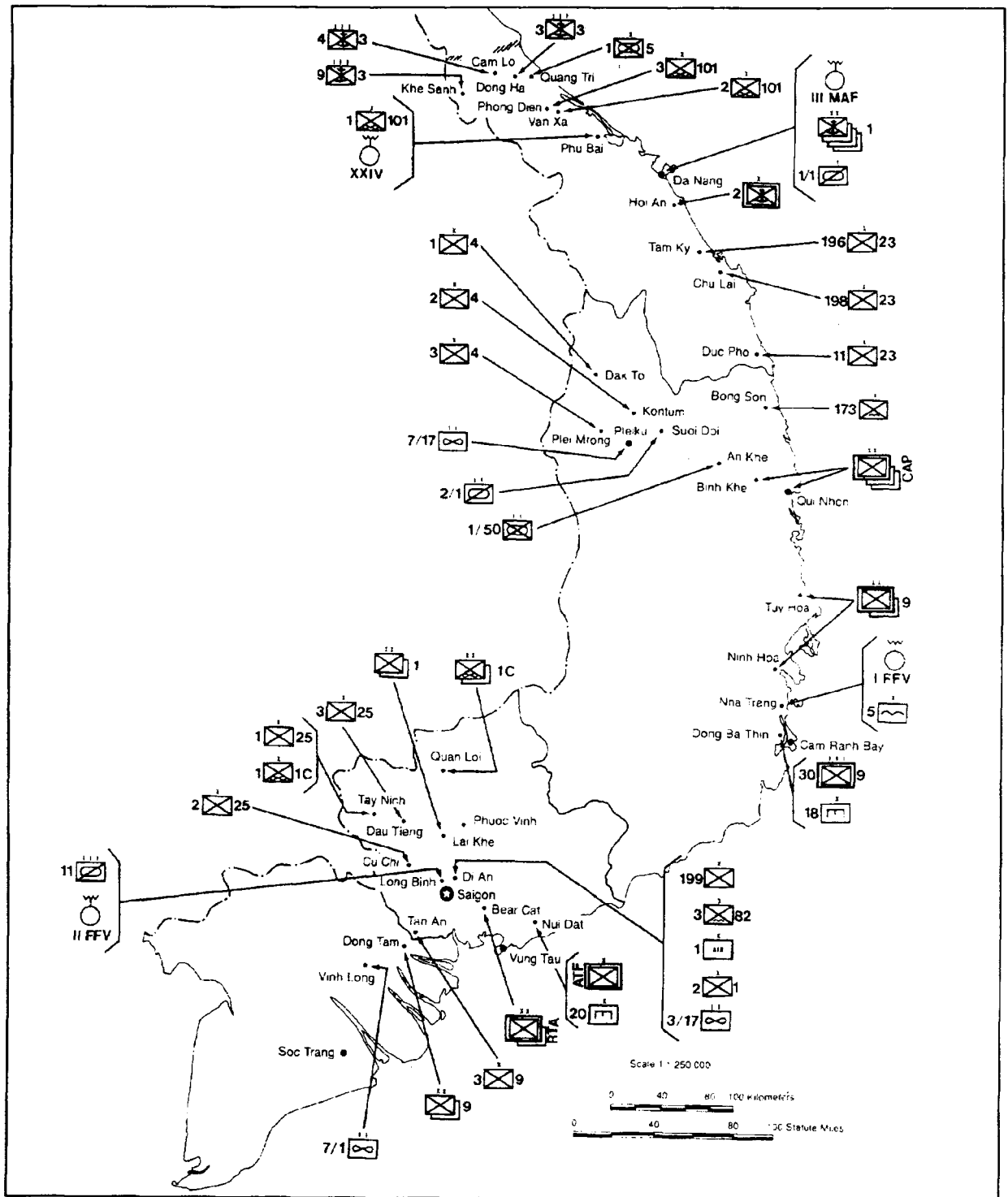
(U) Locations of major U.S. and Allied combat units in Vietnam (except RVN) December 1968. (Key: MAF: Marine Amphibious Force; CAP: ROK Capital Division; ATF: Australian Task Force; RTA: Royal Thai Army; FFV: Field Force Vietnam. Allied units are in double boxes. (Courtesy: Stanton, Shelby L., *Vietnam Order of Battle* (Washington, D.C.: U.S. News Books, 1981))

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tions was obvious as the scope of communist communications far exceeded the station's current ability to collect and exploit them. The intercept target list assigned to Phu Bai grew almost exponentially during the year. And it was not just the intercept problem which was getting to be too much; the networks and cryptographic systems of the North Vietnamese and the Viet Cong had grown more complex. There was a greater national interest in⎿_____⏌the Chinese military presence in the DRV and Laos. Washington and Saigon were asking questions like, Would the Chinese increase their presence, and would it affect the course of the war?

(S//SI) In the same month, the commanding general, ASA (CGUSASA), ordered ASA field sites and missions from around the world to transfer equipment and personnel to Phu Bai to augment its mission. Over fifty manual morse and radiotelephone intercept positions were shipped to Phu Bai from ASA sites and facilities around

the world,⎿_____⏌ This augmentation was needed if Phu Bai was to achieve its targeted complement of 100 positions. By the end of 1965, the 8th RRFS was the largest U.S. SIGINT station in the world in terms of intercept positions.[6] Its mission included a far-ranging list of targets and modes of transmission ⎿_____⏌ dedicated to collection against North Vietnamese communications. Over 800 ASA personnel were needed to man the site in 1967. This number would grow to almost 1,100 by late 1968, the high point of the American presence. With such a rapid growth, standard construction routines would not have the base ready for operations. While the permanent structures went up, ASA flew in a number of prefabricated units, including a number of pre-engineered vans to stand in place.[7]

(S//SI) Phu Bai's resources came under a jurisdictional squabble between the NSAPAC representative, Vietnam (NRV) and the ASA. In late 1965, the NRV in Saigon used its pre-emptive authority to take over some of Phu Bai's intercept
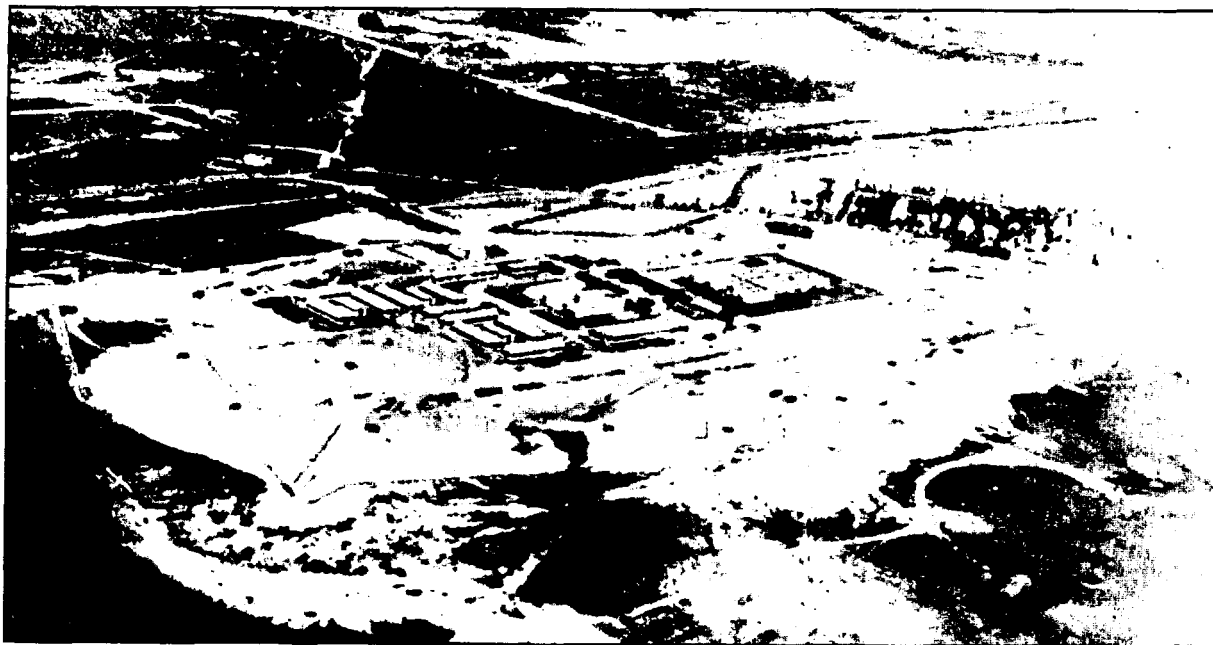
(U) Aerial view of the 8th RRFS, March 1965. The ARVN security force compound is to the right; the airstrip is in the background.

positions in support of monitoring the effects of the B-52 Arc Light raids in South Vietnam and the strikes against targets along the Ho Chi Minh Trail. Apparently, the NRV had the authority to do this, but the disruption to Phu Bai's operations was so great that Headquarters ASA Pacific requested the CGUSASA to settle the problem with DIRNSA. ASA believed that the NSA Representative, Vietnam, could preempt only those positions under his collection mandate, whereas the NRV had been taking control of any position at the field site regardless of its tasking authority or priority mission. Eventually, a compromise was reached in that the NRV had to provide sufficient advance notice of the time and area of the Arc Light missions so that Phu Bai could reconfigure collection so as to avoid losing valuable intercept from previously assigned, priority missions.[8]

(S//SI) A new intercept site or, to be more precise, an old site, at Pleiku in the Central Highlands, was reopened under ASA auspices. Earlier, Pleiku had been the location of the initial marine COMINT site in Vietnam for a year before it redeployed to Phu Bai. In the meantime, an outstation of the Whitebirch D/F network had been located there. By 1966, the ASA had fully reestablished the site with a potential for thirty intercept positions to cover manual morse, voice, and teleprinter communications. The 330th Radio Research Company (RRC), subordinate to the 313th ASA Battalion, was assigned to Pleiku (USM-604). Pleiku's responsibility was COMINT support to allied forces in the II Corps operating area, which encompassed the Central Highlands of South Vietnam from Kontum Province south to Binh Tuy Province. Pleiku was also the collection management authority (CMA) for all American DSUs assigned to the region.

(S//SI) The third member of the ASA field station constellation was the venerable site in Saigon. By 1963, this outfit, then the 82nd Special Operations Unit, had gone a long way from the primitive days when analysts used empty crates

(U) Traffic analysis in the early days at Pleiku

for chairs and operated out of old run-down hangars at Tan Son Nhut. Soon, it moved into the Whitebirch operations area and was renamed the 3rd RRU. There it shared its mission with the D/F project. The 3rd RRU often was assigned the lead in new endeavors by ASA in Vietnam. This involved some of its personnel redeploying to monitoring sites in the northern part of South Vietnam and in aircraft.[9]

(S//SI) By 1966, the 3rd RRU was targeting primarily Viet Cong communications in the southern regions of South Vietnam. It assumed oversight of intercept performed by the aerial platforms of the ASA's 156th Aviation Company (USM-624D) assigned to Can Tho. The 3rd also absorbed the resources of the 335th RRC, the DSU belonging to the U.S. 9th Infantry Division, which operated in the Mekong Delta.

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(S//SI) By the end of 1966, the 3rd RRU was redesignated the 175th RRC and placed under the direct control of the ASA command in Vietnam, the 509th ASA Group. The field station had the major coverage of the Viet Cong communications networks in the Saigon and Mekong Delta regions. By early 1967, the 175th was slated to move out of the Whitebirch operations area to Bien Hoa Air Base just outside of Saigon. The move was accomplished in two steps. Mobile vans from the AFSS were flown into Bien Hoa and set up. When they were ready, the personnel packed up their personal belongings and technical material into trucks and drove the short distance to the air base. Within a few hours, the new site was up and running.

(S//SI) With three field sites, the ASA headquarters in Vietnam had to redefine the areas of responsibility in the areas of collection management and mission if the stations were to avoid inefficient collection and duplicative intercept and analytic work. In the early 1960s, the station at Tan Son Nhut in Saigon was responsible for collection management and reporting for all of the South Vietnam. However, by late 1966, with the arrival of numerous DSUs, the situation had gotten more complex. The support units proved to be extremely effective at their jobs, but the overall effort suffered from coverage duplication and an uncoordinated response to the increasingly complex VC communications system.[10]

(S//SI) ASA headquarters assigned the control of the DSUs to Saigon, but the remote units in the Central Highlands and near the DMZ were passed over to the 8th RRFS for supervision. This proved to be an interim measure. Eventually, the ASA chose to divide, along geographic regions, the responsibility for control of tasking and processing by the DSUs to the 8th RRFS and two ASA battalions, the 303rd ASA Battalion at Long Binh, and the 313th ASA Battalion at Nha Trang. All collection, processing, and reporting efforts at all of the DSUs and stations were now coordinated through the three management authorities. By

1967, the system was further refined when the two ASA battalions ceded SIGINT operations to their subordinate companies while retaining the administrative functions.

(S//SI) Phu Bai was responsible for communist communications near the DMZ, the two provinces south of it (Thua Thien and Quang Tri), and all of Hanoi's military communications with its major commands in the South. The 303rd ASA Battalion handled all communist communications in the provinces around Saigon south into the Mekong Delta – equivalent to the VC military regions VI through IX. The 313th at Nha Trang was responsible for all communist activity in the Central Highlands from Quang Nam province south to Dar Lac.

(S//SI) The major reason for all of these reorganizations was the arrival of the numerous ASA DSUs from 1965 through 1967. These support units were configured to optimize the collection of tactical voice communications. The basic unit was a company which supported an army division. Detachments would be formed from the company to support the brigades or regiments of a division. Independent army brigades carried their own ASA detachments, such as the 404th RR Detachment which was attached to the 173rd Airborne Brigade.

(S//SI) Each company carried a complement of five vehicle-mounted mobile intercept positions, known as a MRPV, and five man-pack voice intercept equipments, known as a RTPV. Each MRPV consisted of two HF/VHF intercept positions, with a R-392 (HF) and R-744 (VHF) receivers, and a PRD-1 SRDF equipment. These companies could break down further to form detachments which consisted of three MRPVs and three RTPVs. Because of the predominance of communist HF manual morse communications, and the concurrent scarcity of voice communications, the companies removed two HF positions from the mobile elements and created a

semifixed intercept site in the host unit base camp.

(U) A soldier from the 407th RRD mans an AN/PRD-1 short range direction finding position in a field of elephant grass.

(S//SI) When the host unit, either a division or independent brigade, deployed to the field, it usually did so in brigade or battalion-sized formations, more often the latter. This deployed unit moved out from its base camp and could stay in the field for several weeks. To support the deployed unit, the DSU would create a mobile element, which would be transported by helicopter to the host unit's command post. This DSU detachment would provide air-to-ground communications for any ARDF aircraft supporting the operation, a ground-based SRDF capability (with the PRD-1), and limited manual morse (and later voice) intercept. Sometimes, the PRD-1 would be loaded on board a helicopter in a kind of quick-fix D/F capability. Generally, company-sized DSUs operated four "stabilized," that is, semifixed, positions from its base camp, while one position was in a mobile configuration. Detachments, as a practice, kept two positions in a base camp and one free for mobile operations.

(S//SI) The first ASA DSU arrived in South Vietnam in June 1965. This was the 404th Radio Research Detachment in support of the 173rd Airborne Brigade. The table on the next page is a list, though not necessarily complete, of ASA direct support units which arrived in South Vietnam between June 1965 and July 1968.
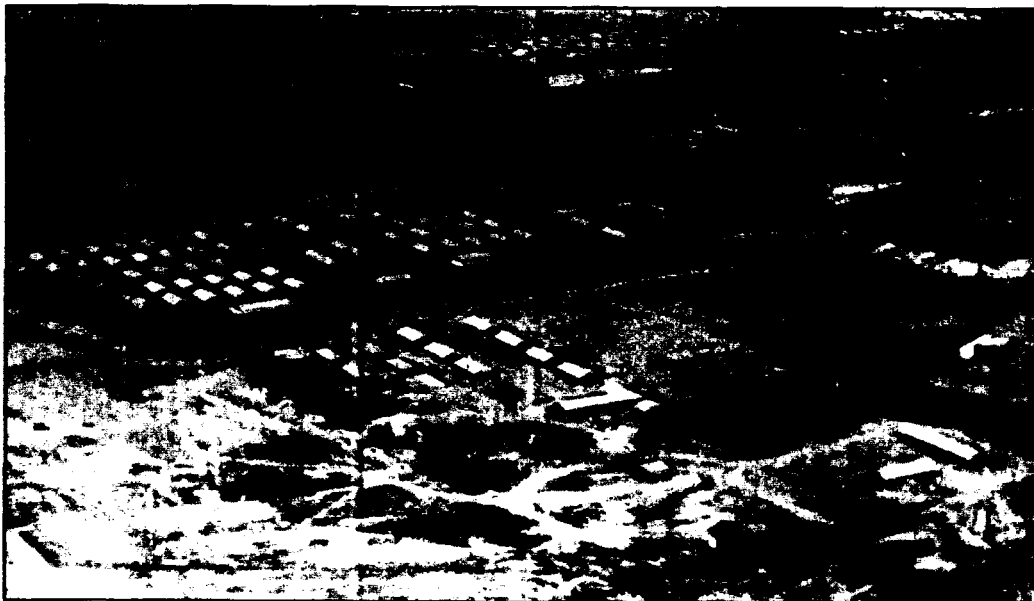
(U) Aerial view of base for 337th RRC, Di An, the DSU for the U.S. 1st Infantry Division
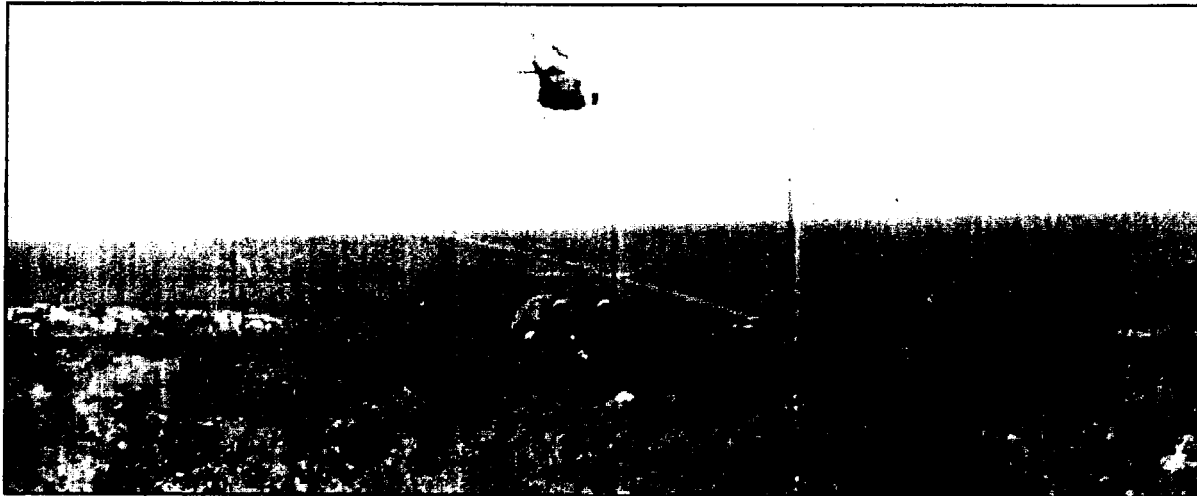
(U) Heliborne SRDF with PRD-1 unit attached to starboard side of the craft

(S//SI) Table of ASA direct support units, 1965-1968. (Key: HHC: Headquarters and Headquarters Company; RRC: Radio Research Company; RRB: Radio Research Battalion; RRD: Radio Research Detachment; Avn: Aviation; SOD: Special Operations Detachment)

Arrival Date, RVN	Unit Designator	USM No.	Supported Command
12/06/65	404th RRD	628	173d Abn Bde
24/07/65	406th RRD	630	1st Bde, 101st Abn Div
03/08/65	337th RRC	629	1st Inf Div
16/09/65	371st RRC	631	1st Cav Div
24/01/66	372nd RRC	633	25th Inf Div
09/04/66	313th RRB (HHC)	**613**	I FFV
09/04/66	303rd RRB (HHC)	614	II FFV
01/06/66	244th RRB (Avn)	624	MACV
01/06/66	138th RRC (Avn)	624A	I CTZ
01/06/66	144th RRC (Avn)	624B	II CTZ
01/06/66	146th RRC (Avn)	624C	III CTZ
01/06/66	156th RRC (Avn)	624D	IV CTZ
03/08/66	408th RRD	617	196th Lt Inf Bde
10/08/66	330th RRC	604	I FFV
26/08/66	374th RRC	634	4th Inf Div
08/09/66	409th RRD	636	11th ACR
18/10/66	403RD RR (SOD)	653	5th SF Gp
18/12/66	856th RRD	616	199th Lt Inf Bde
12/01/67	335th RRC	615	9th Inf Div
25/09/67	328th RRC	649	23rd Inf Div
18/11/67	265th RRC	604	101 Abn Div (Airmobile)
25/07/68	407th RRD	645	5th Mech Div

(U) The Naval Security Group

(S//SI) Personnel from the Naval Security Group arrived in force in Southeast Asia after the Gulf of Tonkin crisis. The Naval Security Group presence in South Vietnam was never as large as the Army and Air Force cryptologic agencies. Since NSG's primary theater mission was tactical support to naval and marine elements, only a few units were needed. The Security Group's major field station was not even on the Indochina landmass. It was located at the Naval Communications Station (NAVCOMMSTA) at San Miguel, Luzon Island, in the Philippines. Up to 1964, San Miguel was the only major ground site for the navy's cryptologists. It collected the communications from a wide range of countries, but emphasized those of North Vietnam[_____]
[_____] San Miguel was also the source of naval cryptologic DSUs which were assigned to carrier task groups, and later to the Desoto patrols.

(S//SI) In response to the crisis and buildup in Vietnam in later 1964, the Security Group established a small field site at Phu Bai, South Vietnam (USN-27J), to optimize coverage of the naval activity in the Gulf of Tonkin. At first, Phu Bai supplemented San Miguel's coverage of the region, but by April 1965 it had assumed responsibility for the DRV[_____]naval targets. The Philippines station continued to cover[_____]
[_____]the Gulf of Tonkin. It also enlarged its support to ongoing naval and naval air operations in Southeast Asia. San Miguel provided as many as seventy-five navy personnel for DSU duty with the carriers, search and rescue units, air defense, and support to naval air strikes that were part of the Rolling Thunder campaign against North Vietnam.

(S//SI) Finally, San Miguel provided the "back seat" air crews aboard the navy's aerial SIGINT collection missions. This included the navy's large support platform, Big Look (EC-121M), and the smaller Wee Look (EA-3B) mission.[_____]
[_____]
By October 1965 they had redeployed to Danang. Their main mission was not unlike that of their Air Force opposites: SAM and MiG threat warning support to Task Force 77 strikes from the Gulf of Tonkin. The Big Look aircraft featured the Brigand ELINT system, which had the capability of locating SAM radar sites[_____]
[____]The intercept was processed after the mission landed at Danang."
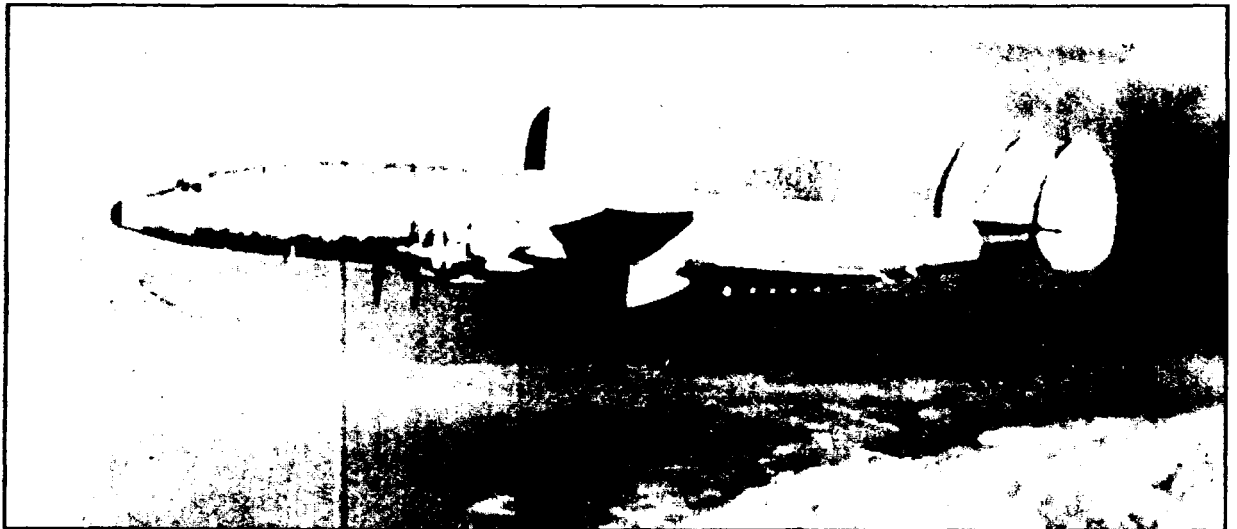
(U) EC-121M Big Look aircraft

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(S//SI) Even with the rapid increase of SIG-INT personnel throughout the region, there were still currents of concern at commands, such as CINCPAC, over the "risky" locations of some field sites in Vietnam, especially Phu Bai with its concentration of SIGINT facilities and personnel, as well as a lack of flexibility in meeting communist communications changes. One solution to both concerns was put forward by CINCPACFLT in February 1965 when it suggested that two technical research ships (TRS) be transferred to the waters near Indochina.

(TS//SI) The recommendation was taken to the United States Intelligence Board in April 1965. Both DIA and NSA favored the dispatch of at least one TRS to the region, stating that the ship could provide "a useful adjunct in the event we were forced to evacuate one or more ground sites." [12] Since the vessel would require regular port calls for maintenance and personnel replacement, it was decided that two technical research ships would be sent to the region in order to maintain a continuous at-sea presence. This decision did not go without argument from other elements at NSA.

[13]

(S//SI) The USS *Oxford* (AGTR-1) was the first technical research ship deployed to the area. It arrived at Subic Bay, Philippines, in May and then sailed for the coast of South Vietnam in June.

(S//SI) A second TRS, the USS *Jamestown* (AGTR-2) arrived at Subic Bay and joined the *Oxford*. The problem for both ships was how to develop a mission that was not duplicative of those performed by the shore-based missions. As it turned out, the *Oxford* and *Jamestown* acquired two principal missions: the intercept of communist communications south of the Mekong Delta and a number of hearability tests for unique targets in the region. For the latter, both ships were used to develop Cambodian military, internal security, and naval communications,

(S//SI) The two ships also were valuable as SIGINT "firemen," moving to cover particular missions that the fixed sites were unable to cover.

The two ships also participated in a special test in support of ARDF flights against air and sea targets.

(S//SI)

(U) The two ships remained in the region until December of 1969 for decommissioning as part of the phasing out of the entire TRS program. The two ships had brought a certain flexibility to coverage of communications of interest that the fixed sites were unable to collect. They also represented an insurance policy in case of evacuation of the land-based sites.

(S//SI) From the very beginning of the conflict, NSG direct support units had been present aboard navy ships in the Gulf of Tonkin and the South China Sea. These units were assigned to the three attack carriers of the Seventh Fleet. Later, when the Desoto operations were extended to

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cover Southeast Asia, DSUs were stationed on them, as in the case of the USS *Maddox*. Operationally, these units were controlled by the Navy's command structure, beginning with the Chief of Naval Operations. This control was delegated down the chain of command, usually finally residing with the on-site commander to which the DSU was assigned. The National Security Agency and the Naval Security Group provided technical support. In most cases, these units maintained a separate communications link, or a channel on the Fleet Broadcast for the transmittal and reception of messages on the Criticomm and Opscomm circuits.

(S//SI) The primary mission of the naval DSUs was SIGINT support to the local commander. This meant that all DSU resources, COMINT and ELINT intercept, tactical reporting support, and communications were steered in that direction. As the war widened and the tempo of naval operations increased, the DSUs were placed on other ships performing specialized missions. One unique type was the Search and Rescue/Anti-Air Warfare Destroyers (SAR/AAW). These vessels were tasked with rescue of downed American pilots and also fleet air defense. This latter mission was expanded to include placement of SIGINT teams on board the PIRAZ vessels that housed the controllers for intercept of North Vietnamese MiGs during Rolling Thunder. Later, some national tasking, especially on the Desoto missions, was laid on by NSA.

(S//SI) As the number of personnel available for DSU duty increased, more and more navy ships added them to their complements. These teams would be placed on board with their equipment in specially configured spaces known as supplementary radio facilities (SUPRADS) which supported SIGINT operations. These facilities included from three to five intercept spaces and a special communication position. SUPRADS were complements to the Desoto huts.
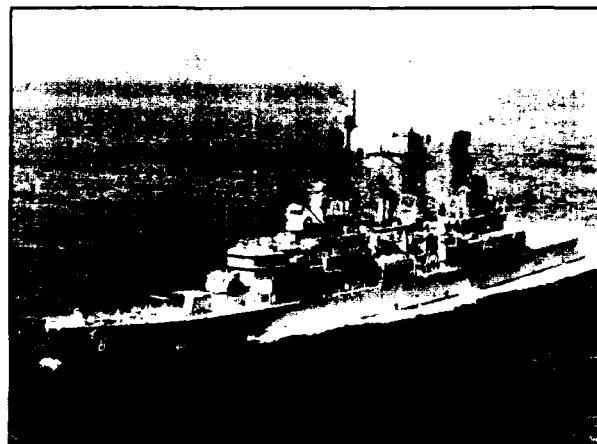

(U) Exterior of SUPRAD spaces on the USS *Providence* CLG-6)

(U) The Air Force Security Service

(S//SI) This period also saw the final arrival and organization of the AFSS in Southeast Asia. Within the region, the Security Service presence was not very large. In fact, the majority of Security Service personnel who served in Indochina were actually stationed outside the region, but served as collectors and analysts on ACRP flights   Depending on the capabilities of the airframe, these flights would redeploy from their home bases to those in Vietnam   and rotate back on a regular basis.

(S//SI) On the ground the AFSS manned two sites: Danang, RVN, belonging to Detachment 2 of the 6925th Security Group (USA-32), and
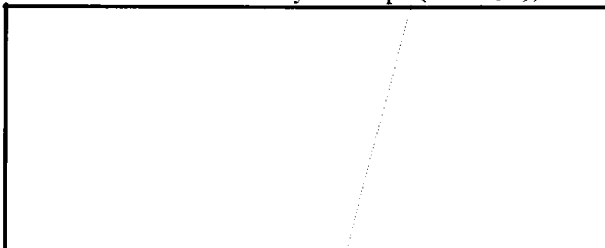
By the beginning of 1967,   intercept responsibilities were transferred to Udorn. The Air Force mission there (renotated USA-29 in November

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1967) took on collecting

Vietnamese air and air navigation communications.[15]

(S//SI) The AFSS site at Danang remained the hub of ground-based SIGINT support to Rolling Thunder. But its location within that vital American complex also made it a target by proxy for communist attacks. For the first six months of 1968, Danang intercept operations lost about 350 hours of coverage due to shutdowns and curtailments brought by communist rocket, artillery, and sapper attacks.[16] By late 1970, due to cutbacks, the consolidation of the Air Force tactical operations in Thailand, and the base security issue, the decision was made to shut down the Danang operations which were transferred to Udorn.

(S//SI) The 6925th Security Group at Clark Air Base in the Philippines was the overall operational control for its detachments at Danang and in Thailand. Its main responsibility was the processing of the intercept of the North Vietnamese air-related communications.

In January 1965, it was conceded by the AFSS to NSA that a consolidation of efforts would be more effective. In June 1965, the 6922th Security Wing arrived in the Philippines and superseded its subordinate element.[17]

(S//SI) The aerial intercept missions were flown primarily by two Security Squadrons, and each one utilized a separate collection platform. The airmen flew on the modified C-130 transports, which went through a variety of mission cover designators. First, they were known as Queen Bee flights. In the fall of 1965, one of the Queen Bee

fighter escort aircraft was shot down

As a result, the mission was renamed Silver Dawn. In February 1967, the flight again was redesignated, this time called Commando Lance.

(S//SI) The second aerial collection flight was known as Combat Apple. These were missions flown in the RC-135M aircraft, which was a modification of the military version of the Boeing 707 commercial jet airliner.

Unlike the Commando Lance C-130s, which were being phased out by 1968, the Combat Apple missions, thanks to the higher speed and far greater endurance of the RC-135 airframe, could stage rather than vie for precious space at the overcrowded air bases in Thailand and South Vietnam. Combat Apple missions were flown in the Gulf of Tonkin and carried a complement of linguists to intercept Vietnamese, voice communications, manual morse intercept, and ELINT.
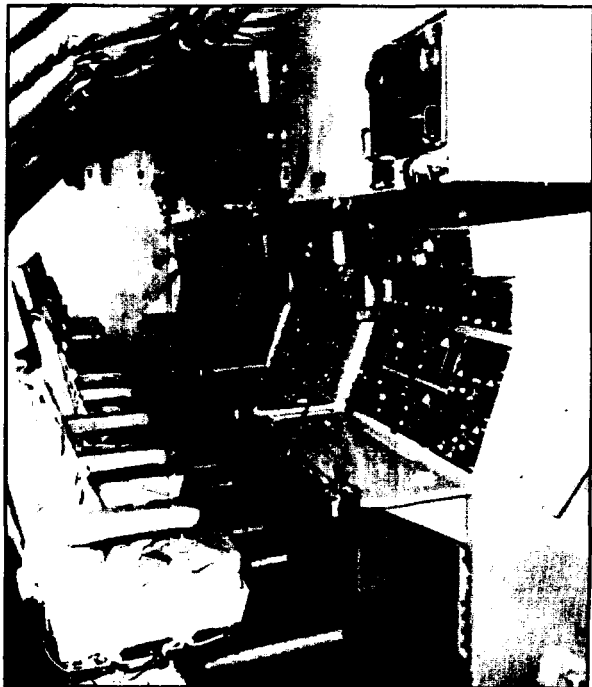
(S) Operations station on a RC-135M

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(S//SI)

(U) The operations building at Nui Dat

(U) Centralization of SIGINT: The Missing Ingredient

(S//SI) The arrival of all of these units and the development of the field station complexes begged the question: Who was in charge of all of this? Concurrent with the apparent need for centralization and coordination of collection was the similar requirement for centralized processing and reporting.

(TS//SI) The obvious choice, at least from NSA's view, was the office of the NRV, or something equivalent. Yet, this was not so simple an idea to implement. In 1962, the DIRNSA had tried to sell MACV on the idea of a Joint SIGINT Authority, which would receive requirements from MACV's J-2 and control local collection and reporting. But this suggestion was rebuffed

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by General Harkins, who saw no need at that time for it, and by the Army which feared that all SIGINT resources would be pulled away from the control of the local commanders. (See Chapter 4, pages 144-145.) At this time, considering that the American involvement was construed as short term and advisory, the proposal for the JSA may have appeared unnecessary and unwarranted.

(S//SI) There also had been an effort to consolidate reporting from Vietnam back in November 1962, when the Southeast Asia Processing and Intelligence Center (SEAPIC) was established at the ASA site at Clark Air Base, Philippines. The center was manned almost entirely by ASA personnel and was meant to be a second echelon-type reporting center. That is, the center was to fill the gap between the available, timely, but uncoordinated reporting by the individual field sites in Indochina, and the more centralized, complete, but tardy reporting from NSA. The SEAPIC was supposed to take the reporting from the sites in the region and produce more complete and timely SIGINT for the main commands like MACV.

(S//SI) However, manning remained the biggest obstacle to an effective SEAPIC. The center was supposed to have over 200 soldiers, but, in reality, it could barely muster 60 percent of its required manning. The problem, of course, was a general shortage of qualified analysts in the region. To fully man the SEAPIC meant stripping the field sites of their already sparse experienced personnel.[18] Although early computers, such as the IBM 1401, were introduced at the SEAPIC, the manpower problem could not be overcome. In late 1964, the DIRNSA ordered the center to be phased out and its personnel dispersed to units in Southeast Asia. The commander, ASA, Major General William Craig, USA, objected to the phaseout, and even offered an alternate suggestion for building a consolidated, joint service reporting center in the Philippines to support the mainland effort.[19] But the SEAPIC was shut down and nothing was erected in its place.

(TS//SI) A kind of operations center was established in late 1965 in Hawaii – the NSA Pacific Operations Group, known as the NOG. The idea had come to the NSAPAC representative, Colonel John E. Morrison, shortly after the Gulf of Tonkin incident. He envisioned an operations center that would coordinate the use of SIGINT in the Pacific Command (PACOM) region,

The work to get the Pacific NOG going took about a year.

(S//SI) However, the NOG never became the answer to centralized reporting for Vietnam. The NOG served the intelligence needs of the CINCPAC staff, and that command's interests ranged all over the Pacific.

impossible for the NOG to concentrate on the needs of MACV. And, in truth, it could not do so. For the operations group, the war in Vietnam was just another issue to watch.

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Yet, timely intelligence support was beyond its ability. The NOG proved incapable of supporting Rolling

Thunder in a "real time" fashion.[21] Eventually, the Pacific Air Force (PACAF) commander would have to resort to establishing another center to meet its needs for the air war in Southeast Asia, known as the Pacific Air Defense Analysis Facility (PADAF).

(TS//SI) It seemed that MACV's fears were never settled. Two years later, in August 1967, MACV requested that NSA do a survey of SIGINT activities supporting its command. A seven-man NSA survey team traveled throughout South Vietnam interviewing personnel and assessing the effort. At one meeting, the MACV J-2 personnel asked for the setup of a Central Processing Center in-country. The J-2 people told the survey team that there was no single in-country SIGINT element which was capable of putting all the disparate field reporting into a single, coherent pic-

ture for MACV.[24] As far as the MACV people were concerned, the NSA reporting, although detailed, was not timely for tactical applications. At the same time, the reporting from the field sites and the direct support units was uncoordinated and seldom reflected similar activities from other parts of the country.[25]

(S//SI) The team considered the MACV request and then decided that it could not support it. The members, aware of the concerns from the ASA 509th Group over additional manpower constraints if the CPC was formed, found that there were elements already in place that conceivably could handle MACV's requirements. The survey team recommended that the current reporting setup, with the single collection management authority overseeing the processing and reporting of Hanoi's communications, adequately covered the problem. Besides, the team also pointed out, there was the SSG for MACV, which could be the means for "pulling together" all related activities reflected in communist communications.[26] However, implicit in MACV's complaints was the criticism that the SSG was not performing its function.

(S//SI) These recommendations, though, remained just that. They would not be implemented, and there never would be a central processing or reporting authority established in Vietnam. MACV continued to rely on NSA for consolidated reporting of the war. The SSG remained beyond Saigon's control. Although Washington was capable of nearly instant communications with Saigon, this technical connection did not mean that their perspectives on the war were the same. The gulf between the two was more than just the several thousand miles separating the two capitals. Each held altogether different outlooks on what was happening in Vietnam. And, in a few months, it would be this difference that would would make a telling change in the outcome of the war.

(U) Notes:

1. (U) Schulzinger, 173.

2. (U) Vandermark, 105.

3. (U) Ibid., 183.

4. (U) Schulzinger, 180.

5. (TS//SI) *United States Army Security Agency Southeast Asia Cryptologic History*, Section II (Part 4), SIGINT: 1964 through 1967 (Draft) 383, CCH Series 12.7.

6. (TS//SI) Ibid., 390.

7. (TS//SI) Gerhard, 125.

8. (TS//SI) *United States Army Security Agency Southeast Asia Cryptologic History*, 389.

9. (TS//SI) Ibid., 373.

10. (TS//SI) Ibid., 394.

11. (TS//SI) Thompson,   and Gerhard, 108.

12. (TS//SI) George F. Howe, *Technical Research Ships, 1956-1969* (Fort George G. Meade: United States Cryptologic History, Special Series Number 2), 22.

13. (TS//SI) Ibid.

14. (TS//SI) Ibid., 24.

15. (TS//SI) Thompson,   and Gerhard, 72.

16. (TS//SI) Ibid., 67.

17. (TS//SI) Ibid., 55.

18. (TS//SI) Gerhard, 83.

19. (TS//SI) Craig, Major General Willam. Memorandum, "Summary of Trip to Southeast Asia, 21 July to 7 August 1964," NCA ACC# 39428.

20. (TS//SI) Thompson, *SIGINT Support to Air Operations*, 12.

21. (TS//SI) Ibid., 15; DIRNSA Memorandum, "NSA Operations Groups Supporting Major Military Commands," Serial N0003, 5 January 1965, NSA ACC# 35248, Folder 8.

22. (TS//SI) HQ NSAPAC to DIRNSA, 2020055Z April 1965, NSA ACC# 35248, Folder 8.

23. (TS//SI) COMUSMACV to DIRNSA, 200815Z May 1965, NSA ACC# 35248, Folder 8.

24. (S//SI) "Report of MACV SIGINT Survey," 22 September 1967, CCH Series VI.HH.12.1, 9.

25. (S//SI) Ibid., 33.

26. (S//SI) Ibid.

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