responding nightly to activations Scattered instances such as the find of three or four enemy bodies in graves adjacent to sensor fields throughout our sector did provide us evidence that our efforts were beginning to get some results But we still were not completely convinced that our sensings were adequate to justify great expenditures of ammunition. We needed a foolproof way to verify the results of our artillery and mortar fire on sensor activations.

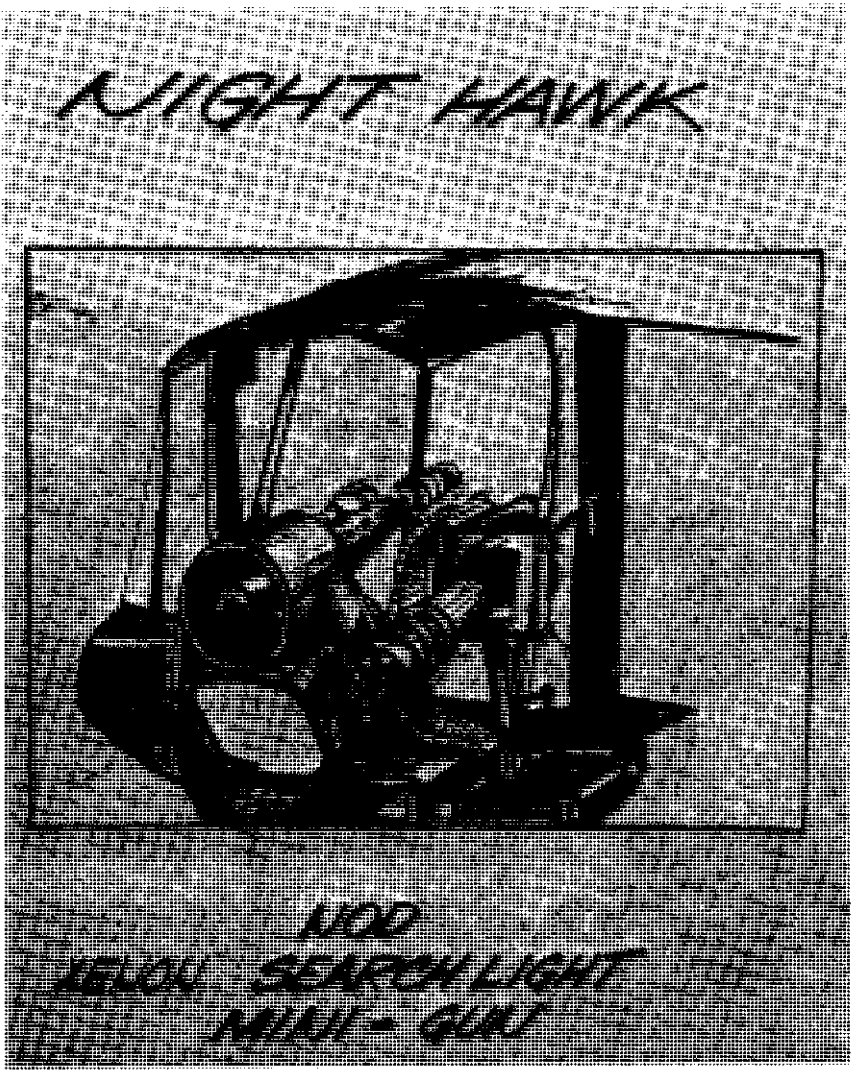
CLOSING THE LOOP

In April we started using a system that we called "closing the loop." Each morning we sent air and ground observers into the activation areas of the previous evening. We soon found that we were doing the enemy more damage than we had previously thought. I would recognize claims of success only if our teams could produce a man, a weapon, or enough other equipment to give a clear indication that we had in fact gotten the job done.

NIGHT HAWK HELICOPTERS

I will divert from the sensors briefly to describe the Night Hawk helicopters. I do this to emphasize that the sensors were not working in isolation. This helicopter proved to be a valuable night surveillance tool as well as a deadly weapon.

The Night Hawk kit was built in the 25th Infantry Division. It consists of a searchlight having an infrared and white searchlight capability, mounted coaxially with a crew-served night observation device. Alongside the light and observation device is a pedestal-mounted minigun—the rapid firing machinegun. As soon as an unmanned sensor registered, a Night Hawk helicopter was dispatched to the scene. We



killed 103 North Vietnamese soldiers during a 1-month period, using this technique, at no personnel cost to us, not even an injury.

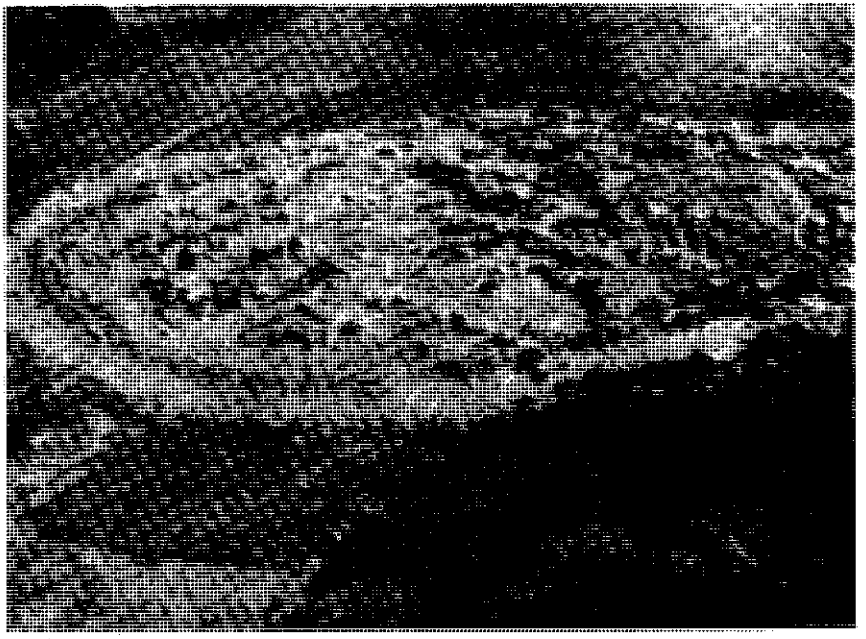
You probably have heard the saying that "The half of a new idea is all too short." The enemy became wise to the Night Hawk pretty quickly. However, he was forced to combat our new technique by reducing his free movement at night. He actually played into our hands by moving more in daylight hours when we were better able to see him and shoot him.

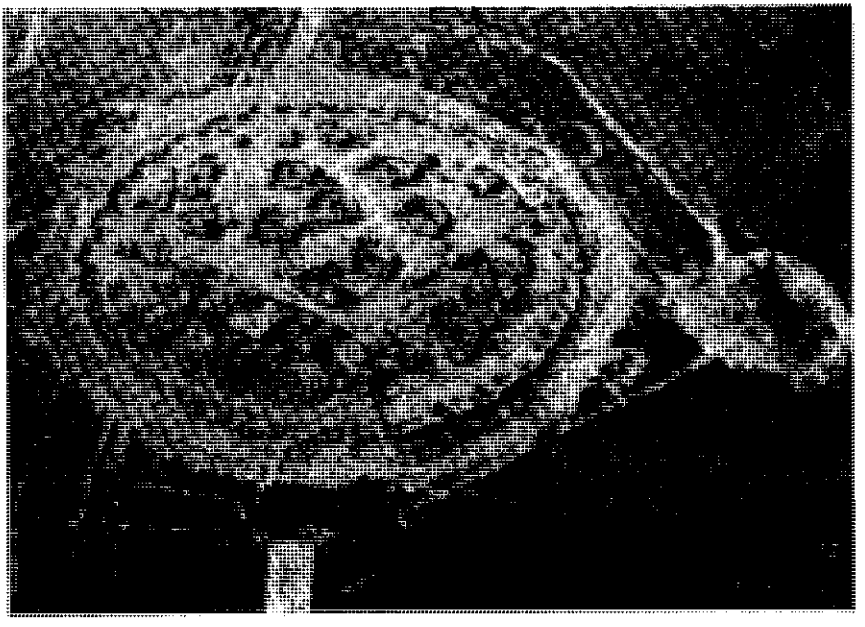
Following a series of actions near Tay Ninh in the fall of 1968, we recognized that our fire support bases and patrol bases could be utilized in a more profitable manner—they could be the firepower jumping-off place as opposed to just a defensive position. With proper prior information of the enemy, we could often fight a major battle without actually

committing the physical bodies of our men into the danger area. That meant that we could spread out. We could use less men in a given area. We could occupy more areas that were widely dispersed.

FIRE BASES

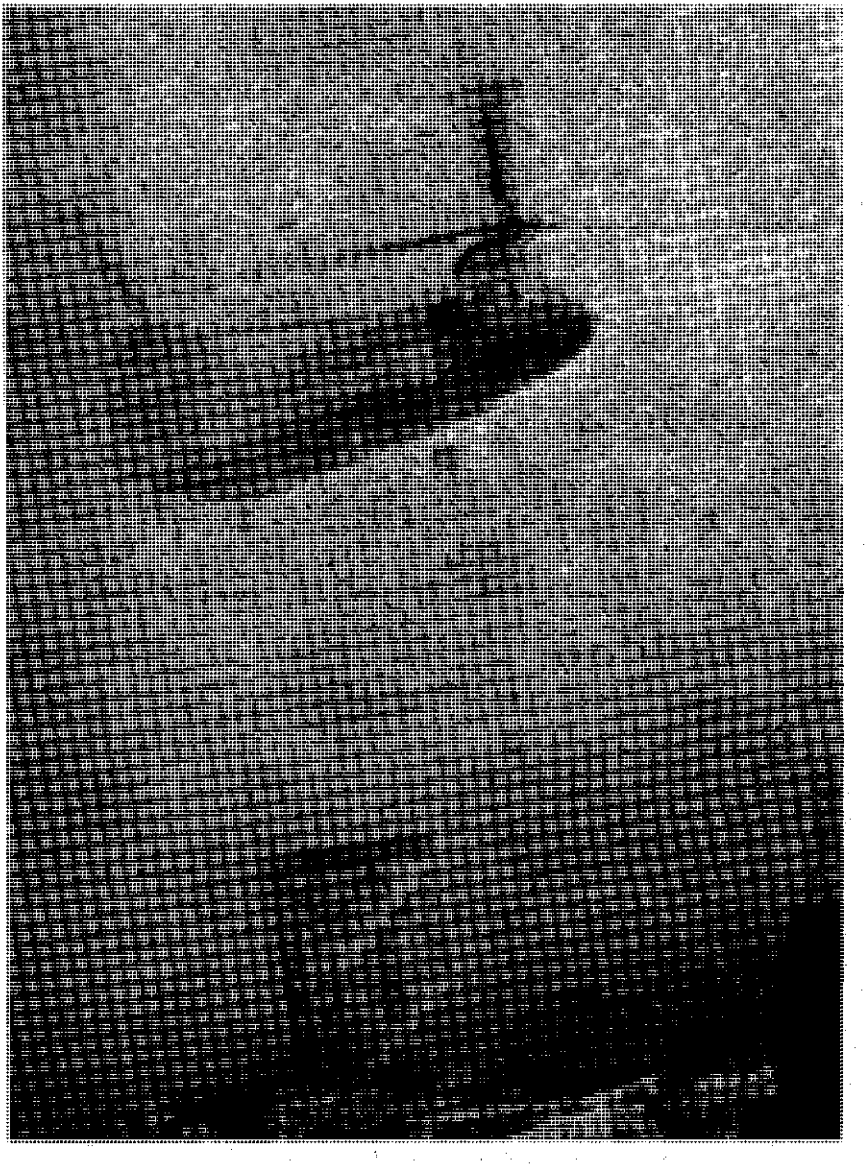
Our fire bases initially were quite large and required two, three or





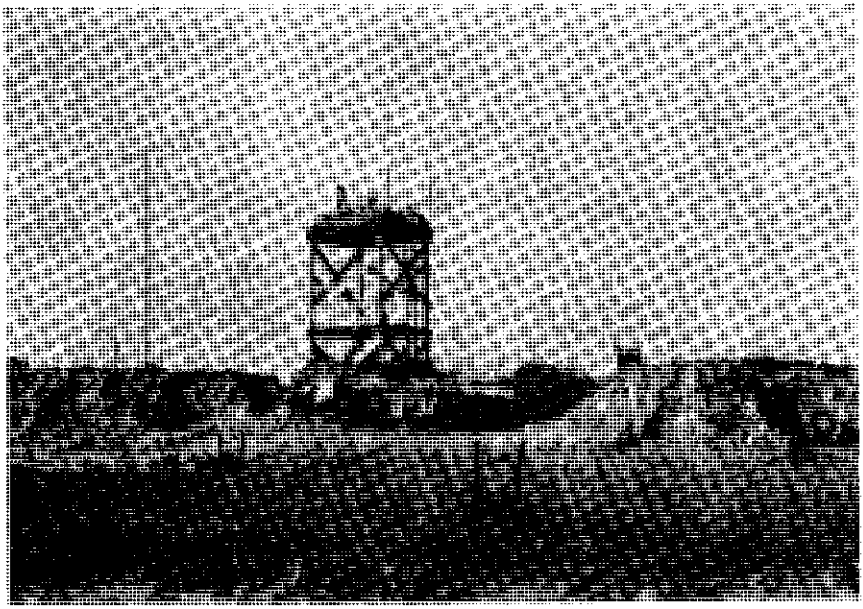
more rifle companies for their defense. The elliptical shape was rejected in favor of a circle and the size of the bases was eventually reduced so that the bases could each be defended by one rifle company or less.

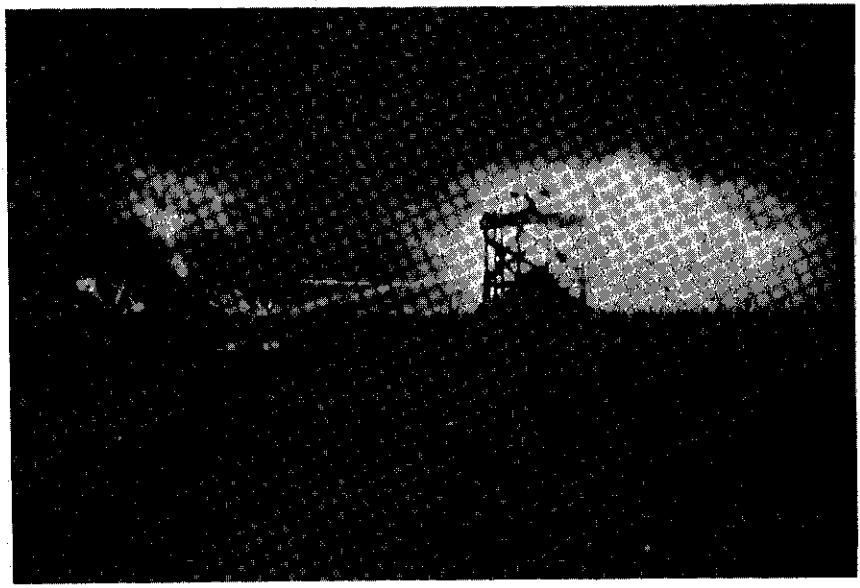
In addition to freeing additional troops to provide the division with a more flexible maneuver force, these smaller bases were designed so that emplacement, complete with heavy bunkers, protective wire and observation towers, could be completed within a 10-hour period,



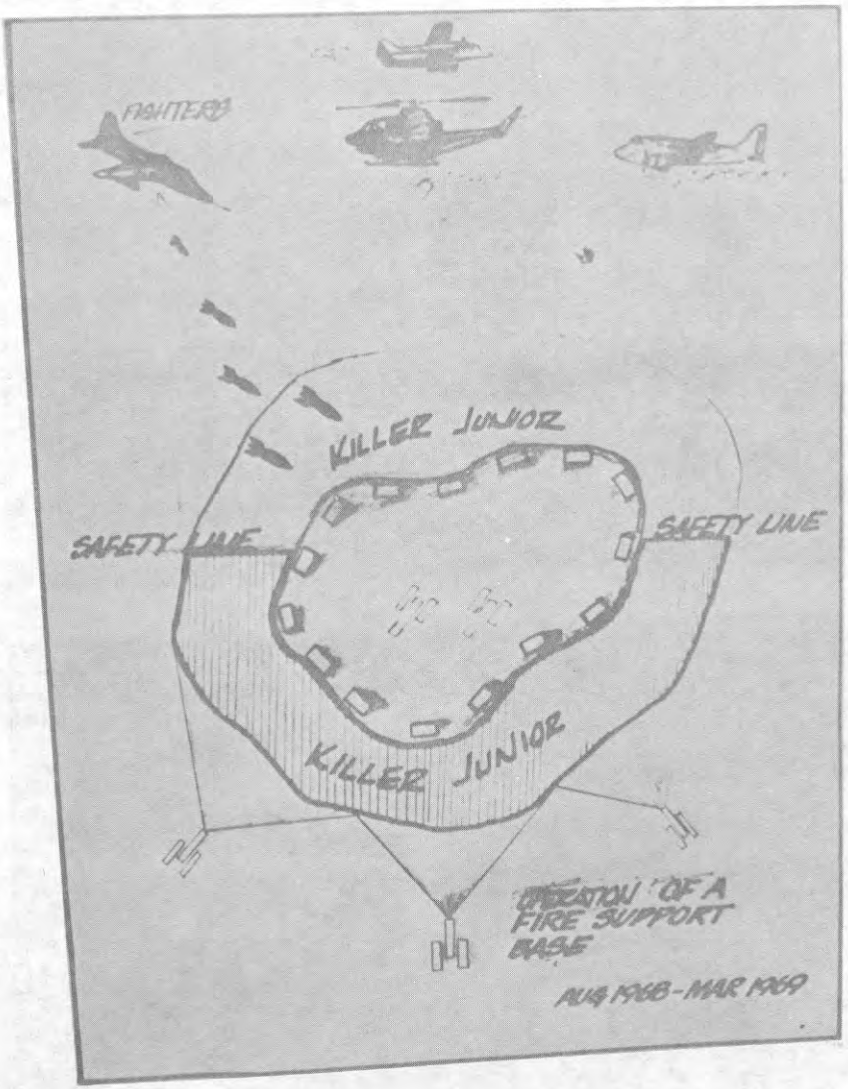
thereby giving our men good protection the first night. With the smaller defensive force rapid emplacement took on paramount importance.

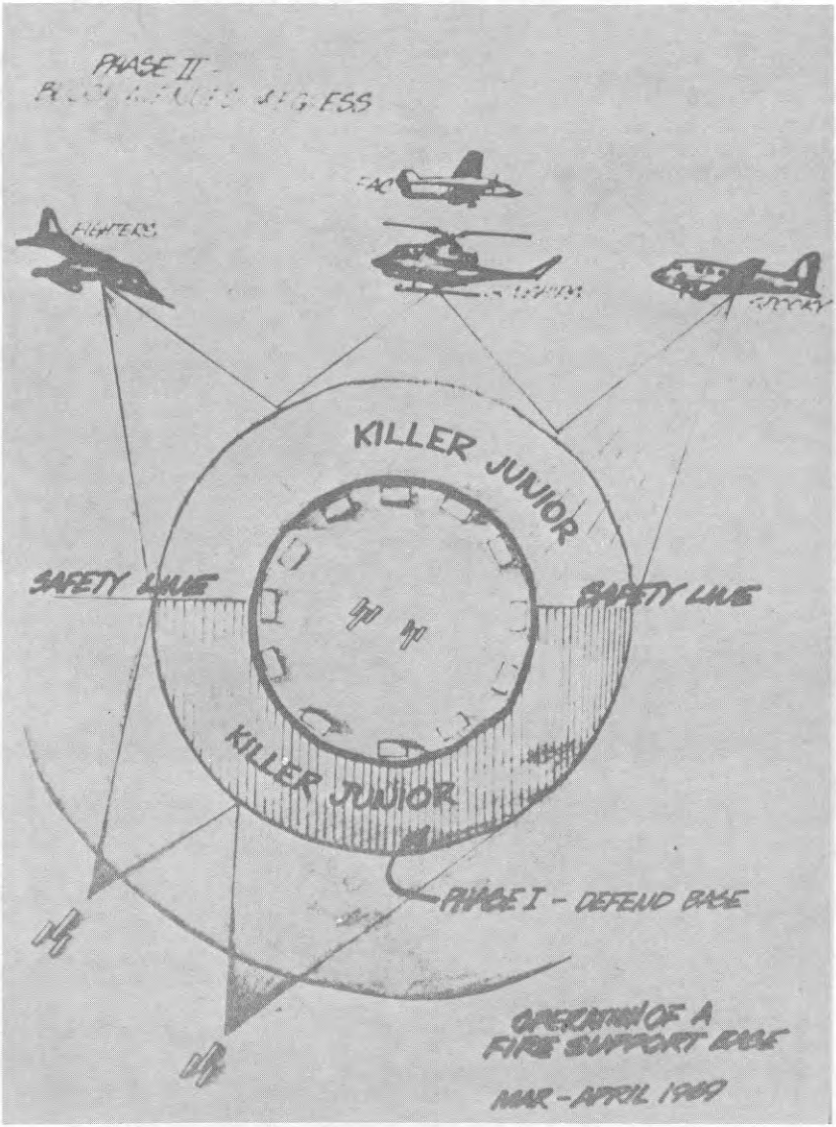
Here is a sequence of an observation tower going into position, the helicopter lift-in, the quick set-up, and here it is during an actual night operation.





We were now ready for the more offensive roll of the fire bases. Instead of just defending in close to a fire base as shown here, and later moving our fires out to follow the enemy retreat as shown here, we learned to find the enemy early and, as I have mentioned several times, we started fighting with firepower great distances from our troop location areas as shown here. This caused us to give even greater priority to and to place greater reliance on our surveillance devices.




PHASE II -
FIGHTERS
FAC
KILLER JUNIOR
SAFETY LINE
SAFETY LINE
KILLER JUNIOR
PHASE I - DEFEND BASE
OPERATION OF A
FIRE SUPPORT BASE
MAR - APRIL 1969


KILLER JUNIOR
SAFETY LINE
SAFETY LINE
KILLER JUNIOR

HIT AND RUN ATTACKS

In early 1969, the enemy commenced a series of hit-and-run attacks from his Cambodian sanctuary. You probably read of some of our battles around Diamond I, II, and III and Frontier City, the names given our bases by company and battalion commanders. With these very small fire bases, placed in exposed positions, some poorly informed people back here in the United States accused us of baiting the enemy.

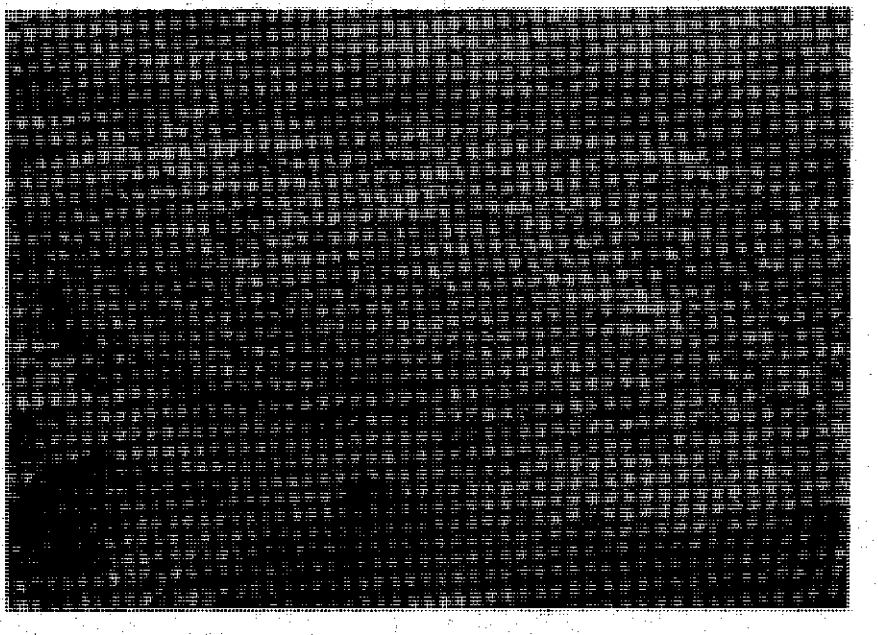
I remind you that Diamond I, the first in the series, was put in position because the enemy, operating out of Cambodia, had raided the South Vietnamese Government-supporting, prosperous little town of Phuc Lu three different times. The enemy had killed the village chief and 10 other local officials during these three raids. Diamond I was placed in a flat dried-up rice paddy in the wide open between Phuc Lu and the Cambodian border in order to stop these enemy raids. Our radars, sensors, and Night Hawk aircraft were in place ready to work.

On five separate occasions, North Vietnamese battalions and regiments attacked these bases and on every occasion our early warning gave us the advantage of our being able to deliver large volumes of firepower which broke up the momentum of his attack and sent him reeling back into Cambodia. Of his five attacks, not one single enemy soldier got inside the wire enclosures.

FIRE BASE CROOK

Now, I guess probably the best real war story that I have is one called Fire Base Crook. This is the story of where some 412 enemy soldiers were eliminated with the loss of one U.S. soldier.

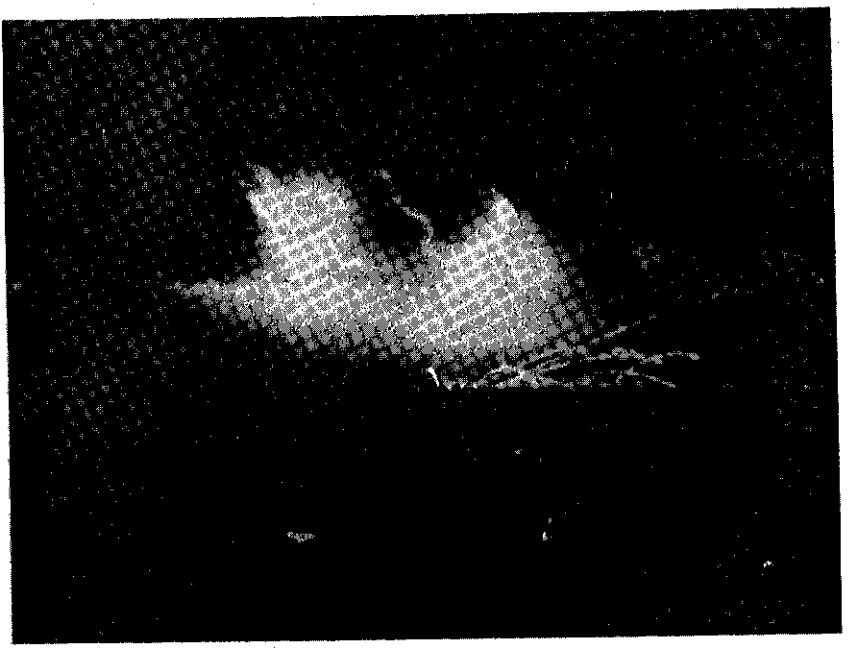
Fire Support Base Crook was established in April 1969 northwest of Tay Ninh City. The base was an irritation to the enemy because



from it we could block movements of the enemy 9th Division and could support continuous reconnaissance operations into the enemy's base areas near the Cambodian border. Unlike many of our bases farther south along the Cambodian border, Fire Support Base Crook was in place almost 2 months before the enemy decided that he had to attack. When he did, he really meant business.

As I turn to these charts, I have a few drawings. These drawings were made from an aerial photograph that was made facing to the west so to the map readers here, I remind you that north is to your right, west is to the top and east is to the bottom.

On June 5, 1969, the first indication of enemy activity near Crook was given by sensor activations 950 meters east and 550 meters northwest of the base at 2000 hours. Reconstruction of enemy plans later proved this movement was preparation for a secondary attack and the establishment of firing positions for his indirect fire weapons.



Artillery took the movements under fire. Simultaneously our radar atop the tower began to detect groups of three to four persons moving in the woodline which ranged from 220 meters to 1,000 meters from the base perimeter. Some 18 sightings were made between 8 o'clock at night and 0100 the next morning. All of these were engaged with artillery fire from within the base.

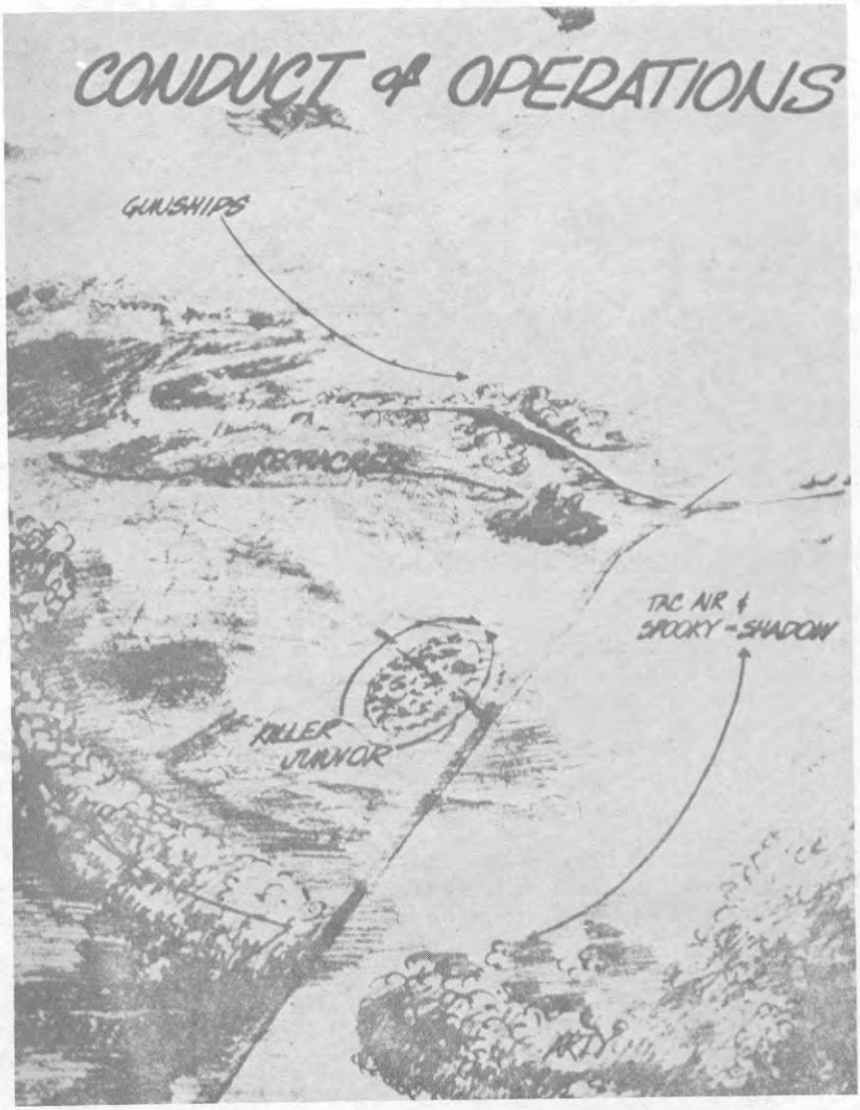
All personnel within the perimeter were alerted and the higher headquarters got all outside supporting elements ready to operate. Cloud cover cleared shortly after midnight, and the soldier manning the night observation device on the tower began confirming radar sightings.

From 0130 until 0255, enemy movement appeared to cease. The quiet was broken at 0255 with a heavy attack by indirect fire as the enemy attempted assaults from the south and east. One U.S. soldier was killed by a mortar round as his listening post withdrew into the base. This was our only man to die in this great battle.

The enemy attack continued until 0530 hours. Meanwhile, all available artillery and air support had been dispatched to the Crook

area as the initial actions around the base quickly proved to be our firepower offensive. As soon as the enemy was detected, we went into an attack by fire against him.

A search of the battlefield after the first night showed that the enemy had lost 76 of his troops. Although the bodies were relatively free of documents, we did pick up enough to identify the attacking unit as a battalion of one of the other regiments of the 9th Division, the 272d Regiment. Search of the battlefield was not completed on June 6, because elements flown in to assist in sweeping the area became engaged with small enemy forces. Contact in the deep jungle continued until late afternoon—B company (just one rifle company) the 3d Battalion of the 22d Infantry and its artillery battery remained in the small circle and secured for the night.



This second night, June 6, proved to be even more active than the first. Strangely the times of the incidents were almost identical. Sensor fields activated at about 8 o'clock, radar sightings of small groups were made from 2000 to 0100 hours, starlight scope operators spotted movement around midnight, movement had substantially ceased at 0100, and the attack commenced at 0255 hours. Several notable sightings were made—the radar detected two groups of about 40 persons each moving about 1,500 meters north of the base at about 2030 hours. The Night Hawk helicopter detected another group of about 40 persons actually in formation moving toward Crook along the road from the east.

The Night Hawk immediately dived on its target. All other targets were engaged with direct and indirect artillery fire, mortar fire, and all available Army helicopters and Air Force attack planes.

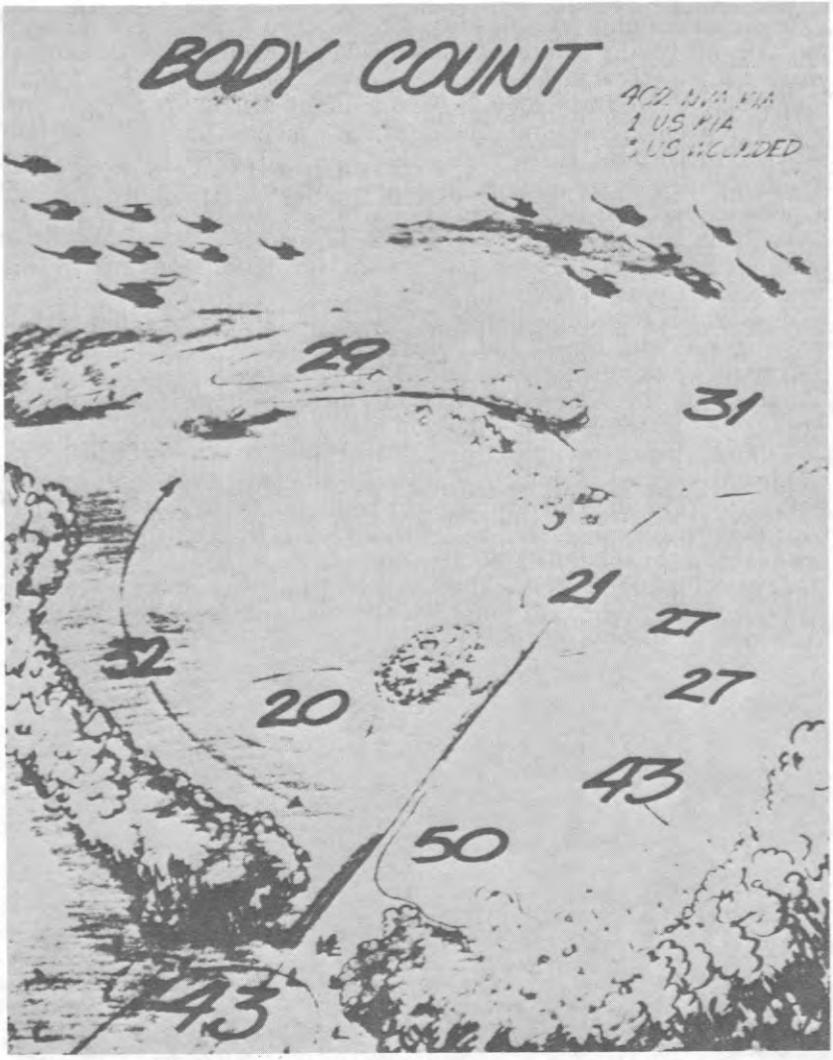
Analysis of the action proved that these relatively large groups were sighted in the general direction of the enemy's main attacks.

As on the previous night, the attack ceased at about 0530 hours. Our defensive was, as I have stated, an offensive that went exactly as planned. The aircraft approached from the west to remain clear of artillery trajectories. Indirect fire and fire from within the base were placed into the indicated areas.

Our search of the battlefield proved just how punishing our efforts had been. At daylight additional infantry elements were flown into the battle area to assist in the sweep.

Before helicopters could land on the helipad at Crook, 38 enemy bodies had to be removed.

This diagram indicates where the bodies were found, and gives us an idea as to which weapons eliminated the enemy. The 60—29 plus



31—west of the river were killed almost exclusively by helicopters, the 32 along the woodline were killed by indirect artillery, and the 20 close in were killed by direct fire—rifle and machine gun—from the base, the 43 along the road were killed by the Night Hawk helicopters and the remainder of over 150 were killed by a combination of U.S Air Force planes and fire from within the base.

In all, on the second night, 323 additional enemy were killed and 10 live prisoners taken. I had to move two bulldozers up to the area, just to bury the dead.

On the third night the fire base commander again held his test firing in the early evening to check all weapons. Much to our surprise the enemy responded with return fire on the support base.

This action apparently preempted another planned enemy attack and cost him three more of his soldiers. I don't know what happened to our early warning that last night. It is possible that the enemy moved in during the daylight while we were depending on visual observation and were not reading our sensors adequately.

402 ENEMY KILLED

This completed the action around Fire Base Crook, resulting in 402 enemy killed and 10 captured, a large amount of equipment picked up. One U.S. soldier was killed during the battles and three were slightly wounded.

COUNTERING BOOBYTRAPS

While the enemy's main forces were suffering major defeats in their attacks on our fire bases, he instructed the Vietcong local forces to increase the use of antitank mines and boobytraps throughout our sector.

They used plastic antitank mines which are nearly impossible to detect with our current mine-sweeping equipment. They also employed literally thousands of booby trapped hand grenades and homemade devices which were producing an unacceptable rate of U.S. and Vietnamese casualties. We felt that something had to be done about this as a matter of priority.

We had a hunch that there was a pattern to the enemy's use of mines and boobytraps. In the division we had a UNIVAC 1005 computer (actually it is more of a high speed card processor). This is used primarily for mechanizing personnel records and computing our pay.

Somebody had the bright idea of punching a card for every mine and booby trap we had encountered since January 1 of 1969.

After running various sorting procedures on the computer, we found that there were definite patterns in the manner in which the enemy used mines and booby traps. We found that NVA regular units seldom used antipersonnel mines or booby traps. They used, to a great extent, just the metallic antitank mines almost exclusively on roads and trails.

On the other side of the coin, most nonmetallic mines and booby traps were laid by the small local Vietcong forces.

We found seven areas in our division zone where mines and booby traps were sown in high density. I am sure you will recognize that the computer did not give us the answer to our problem. It merely took a great deal of information that had been collected over a long period of time, that we had on hand, and allowed us to collate this data and put it in manageable format for effective study and decision-making.

Some of our bright young men continued the study of the mine-booby trap problem and recommended that we emplace sensors in the vicinity of the heavily mined areas. The theory here was to detect the enemy soldier whose mission was to steal out at night and sow the mines. This was the core of the problem. If the miner could be stopped, the mines would be stopped.

USE OF SENSORS TO REDUCE VEHICLE LOSSES

We diverted 56 unmanned sensors to the mine problem. Our initial results against antitank mines were somewhat dramatic. In one month we reduced the number of damaged or destroyed vehicles by 50 percent. At that time we were losing about 70 vehicles per month.

I am sure you appreciate the fact that most of these vehicles were the expensive, full-track, armored types as we used them more as we were opening roads. It was relatively easy to fight the antitank miner because he, in general, was working on a road or trail away from populated areas, where we could use our firepower more freely.

Each morning we sent confirmation teams, helicopter and ground patrols, into places where we had fired during the night. I recall three separate occasions when we confirmed that we, responding to a sensor pickup, had blown up a mine before it was planted.

We found groups of three to four dead mine planters lying beside their shovels. I am convinced that we complicated the life of the mine planter no end.

The employment of sensors in the heavily booby trapped areas was not quite as effective but we did reduce our casualties by about 30 percent.

This is less than the antitank mine side of the coin because booby traps are more often used among people. Very often our reaction to sensor alerts could not be firepower. The best we could do was to send our patrols to try to capture the enemy or run him off. This often found us arriving too late.

Small, moveable sensors that General Deane referred to, became available to the field in July of 1969. They were used most successfully by the armored cavalry squadron at many night locations. These small, movable devices are of significant value to maneuver units in any situation where they stop for only a few hours at a time.

SENSORS REQUIRE ADDED PERSONNEL

So far, I have described those good points about the sensors. Of course, with the good, there usually exist some drawbacks. Each commander must equate the cost of employment of each asset in his command against the results that that asset is producing. We found the sensors rather expensive with respect to personnel requirements.

During sensor emplacement operations, I often sent an infantry company to protect the emplacement team. This was expensive in many instances since the entire company might have been used somewhere else.

We countered this limitation to some extent by learning to accurately drop the sensors from helicopters, as General Deane also referred to.

Another drawback is that watching a Portatale monitor can be expensive in time and it can be boring.

We found that a soldier's optimum time watching a monitor is no longer than 3 hours, particularly during the rainy season. At this stage we did not have extra people in our organizations to monitor the Portatales.

Every military commander is always looking for a foolproof early warning system that will allow him to execute his plans early enough to thwart his enemy before that enemy can become truly dangerous.

I found at the Diamonds, Frontier City, and Fire Support Base Crook, that sensors represent only a part of a team. Where the unmanned sensor is ineffective, the small radar may compensate—and vice versa.

I would like to emphasize this one point. We again confirmed, however, that often we have to have a man with his eyes, his brain and his morality to tell us where and when to shoot.

Like anything new, this sensor must completely prove itself on the battlefield. We tried our best to make it work during those early stages of development and we consider that we did a reasonably good job, under the circumstances.

I was one of the first major Army commanders to use sensors in Vietnam. I employed early versions and models which were not as effective as the sensors that are currently in use. General Wright who will follow me will discuss some of the newer or later sensors.

I have taken you away from the subject of sensors and back again several times to help us understand the philosophy of operations in order to more clearly see what we were doing with surveillance devices.

We of the Army are continuing tests at Fort Hood, Tex., and elsewhere. We are making unusual efforts to avoid having the American young man stand toe-to-toe, eyeball-to-eyeball, or even rifle-to-rifle against an enemy that may outnumber him on the battlefield.

FIREPOWER NOT MANPOWER

We are trying to fight the enemy with our bullets instead of the bodies of our young men—"firepower not manpower."

IMPORTANCE OF EARLY WARNING

No one can say that the unmanned sensors, the radars, or the night observation devices were the total difference between victory and defeat; between high or low friendly casualty figures. I am sure, however, that every soldier who has engaged an enemy in battle will tell you in plain terms how important early warning is, how essential it is to know where and when the enemy is moving, and how less painful it is to use firepower to fight him at a distance rather than expend your manpower as the enemy makes his close-in assault.

SAVED AMERICAN LIVES

In my judgment, as a combat commander, I certainly believe that the availability and use of unattended ground sensors and other surveillance devices significantly lowered our casualties.

Thank you, gentlemen, may I have your questions.

METHOD OF LOCATING ENEMY PRIOR TO SENSORS

Senator CANNON. Thank you, General, for a very fine statement.

Prior to receiving sensors, what was the main method of detecting and locating the enemy? Did you simply have to wait, particularly at night for him to come at you?

General WILLIAMSON. You either expended an inordinate amount of your men's time and effort and endangered them thrashing through the jungles searching, we did that quite a bit in 1965, 1966, often did not find him. You either keep your men busy and wear them out continuously searching for the enemy, or you take the chance of having

the enemy slip up on you and you suffer the penalty of giving him the advantage. We used the men principally before this time.

Senator CANNON. And the terrain there was certainly, as you pointed out in your statement, to his advantage because he could choose the time and place of contact.

General WILLIAMSON. Often that is true, particularly in the jungle where observation is so restricted.

HARASSING AND INTERDICTION FIRE

Senator CANNON. Explain the role of harassing and interdiction artillery fire?

General WILLIAMSON. The words H. & I. are sort of a holdover from World War II when we had plenty of ammunition. Harassing and interdiction fires in Vietnam were used to some extent. But it was often that we had to use our available ammunition and weapons, particularly during the early stages, just against those targets that we knew were there. So very often an enemy moved without our firing on him. We did not have the facility, the capability of just shooting everywhere all the time.

Senator CANNON. There was a lot of H. & I. fire, as I recall, used in the early stages of the war when I was there particularly at night to keep him off balance, so to speak. It is a pretty expensive operation.

General WILLIAMSON. Yes, and I am certainly agreeing with you it is a very ineffective and inefficient operation.

Senator CANNON. Have you had the chance to keep up to date on the sensor activities in Vietnam since you left there?

General WILLIAMSON. Sir, as I mentioned, I had one tour from 1965 until 1966. I spent the intervening time from 1966 to 1968 training troops to go over there, so I had a personal continuing interest and I stayed over again some 15 months. Since coming back I have been in the position where I could follow it. I have watched it with a great deal of interest; however, not an official interest in the last year. That is the reason we have asked General Wright to come in and offer more recent experiences.

Senator CANNON. So he will cover from the point of your departure, up until the present time.

General WILLIAMSON. Yes, sir, that is correct.

USE BY VIETNAMESE

Senator CANNON. Do you believe the South Vietnamese have the capability to operate effectively with this type of equipment?

General WILLIAMSON. To a great extent this equipment has the technical skills separated from the using unit.

The real complicated portion of this type equipment is accomplished before it gets into the hands of the users. In fact, in the first stages we were told just how to emplace them and then we had to keep our hands off of them. We were not permitted to make any adjustments or any movements at all. So this is the type equipment that you can give to a relatively unsophisticated force and still get a lot of good out of it.

Senator CANNON. In your judgment, will this type of equipment be effective in protecting our logistic and supply installations that will

remain after we have substantially completed our Vietnamization program?

General WILLIAMSON. I am confident it will.

This, in effect, gives you to some extent an observer in an area where you do not have a man.

Senator CANNON. You made reference to other detection equipment, such as radars and so on.

Did you use other types of equipment that you could describe for us without going into executive session?

General WILLIAMSON. Yes, sir; I can. We had some radars, some that were left over from the Korean war, a few that had been developed since the Korean war, radars that were made to detect movement.

Within the limited number that we had and the relatively unsophisticated capabilities of the radars, we used those to great advantage.

We had what we called a 25 and a 33 and later a PPS–4, and that was replaced or being now replaced by a PPS–5. So the development of the radar has been in progression similar to these unattended ground sensors.

The radar within its limitations can pick up movement quite well and in those areas where we were around rice paddies and could lift the radar above the level of the ground we could, in fact, look out at some great distances and pick up the enemy. With the radar we must have direct line of site with no hills, trees, et cetera in the way.

FALSE ALARMS

Senator CANNON. Did you have many false alarms other than the ones you referred to in your statement, like during heavy rains? Did that give you a problem?

General WILLIAMSON. Heavy rains caused false alarms to some extent, together with the untrained man trying to learn a new piece of equipment. In time experienced operators can tell the difference between rain and footsteps of a man, they can tell you the difference between a motorcycle and a small jeep, between a small truck and a large truck or tracked vehicle. There is a different signal, and a trained operator can read it accurately.

WILL SAVE MANPOWER

Senator CANNON. In order to have a man trained to that extent, won't that require greater manpower needs than you might otherwise require?

General WILLIAMSON. Frankly, I believe this will save us manpower.

Senator CANNON. You will be able to reduce your requirements in other areas.

General WILLIAMSON. By all means, it will reduce to some extent.

And let me emphasize that this machine cannot completely replace the requirement for men. I would like to repeat the requirement for the morality of the man out there making an evaluation. We hope we never completely get away from that. To a great extent the machine can alert us early. It can separate the many, many bits of information we get, and allow us to concentrate on the important matters.

SENSORS DID BETTER THAN PREDICTED

Senator CANNON. I realize you cannot really define very definitively the failure rate on the equipment because a lot of it you did not recover, but can you give us any general idea of the early failure rates as compared to the latter part of your experiences?

General WILLIAMSON. I can generalize just to a degree, that I believe in my 30 years of experience it is the first piece of equipment I have received in the field that did better than we were told in advance.

The sensor came in and they told us it would last a given number of days, and often they lasted twice that long. When it first came in, we were told that it had to be destroyed at the end of its life cycle. Part of that was entirely on an intelligence protection basis because we wanted to be sure that they did not fall into the hands of the enemy, and they were set up so that once you put them in, if you went out and moved them more than a certain number of degrees, they would destroy themselves, as General Deane mentioned.

So we did not know a failure rate. We were not in position to know. Either the thing did not work or it did work, we could tell that. Most all of them worked, and most all of them worked longer than we expected them to.

Later on we learned that they could be recovered. We could go back and recover the hand emplacements when we knew exactly where they were. In those areas that were relatively secure, we bypassed the self-destruction device, brought them back, sent them to the rear. We did not know how to change the batteries initially. We were not permitted to even open the case. So we sent them back and they were reused.

In general, the sensor held up better than we were told to expect.

SHIPPED TO VIETNAM PRIOR TO COMPLETION OF TESTING

Senator CANNON. The sensors were sent to Southeast Asia before an adequate testing program had been accomplished. This was one time, I guess, from what you say, that it proved to be certainly advantageous.

General WILLIAMSON. There were some little gadgets in pieces that were brought out there, and I am sorry I do not know the names of them, some of them were brought out by the individual who had developed them and some of them did not work at all. Do not let me oversell the case. It was a long way from perfect. We were learning how to use them out there at about the same time we learned how to make them back here.

Senator CANNON. At the time of your departure, did you have adequate sensors in the field for the use of your troops?

General WILLIAMSON. A field commander never has enough as long as the enemy is still able to operate at all.

We did have in my division area about 300 sensors and we could reasonably well cover our area with them, the important parts of our area. We had many jungle areas that it would have been most impractical to even attempt to spread the sensors throughout the entire war zone C or the portion of war zone D that I had. You could not approach that. But in the important areas we were doing acceptably well.

Senator CANNON. Did you get any kind of intelligence feedback from captured prisoners as to whether they knew you were able to pick them up?

General WILLIAMSON. We had a good many reports of their being shot at and not having the slightest idea why or how we knew they were there. But I do not know that the enemy or at least the individual soldier even knew about the sensors.

Senator CANNON. Counsel has questions.

ABOUT 300 SENSORS PER DIVISION

Mr. GILLEAS. General, do you feel the number of sensors should be increased per Army division or do you feel the units there now have a proper level of sensors?

General WILLIAMSON. I am not sure that my answer would be valid at all on that. I know that every commander that is worth his salt is constantly looking for another asset to depress the enemy's capabilities. As long as there is an active enemy over there, I think most commanders are going to want additional assets.

Mr. GILLEAS. Yes.

At what point do you believe an Army division would be saturated with sensors where they would begin to cut down on its effective combat capability?

General WILLIAMSON. I think if I were in charge of the responsibility of balancing the entire capability, I would have stopped right close to the 300 I mentioned.

SENSORS IMPROVED RESULTS OF H. & I. FIRE

Mr. GILLEAS. You told the chairman that H. & I. (harassing and interdiction) fire was largely ineffective, that is my understanding also, but do you believe the use and employment of sensors improved the accuracy of your H. & I. fire?

General WILLIAMSON. I do not think there is any question but what they told us better where and when to fire than intuition or guess would have told it. I am confident they did increase the effectiveness of our fire.

Mr. GILLEAS. That is all, Mr. Chairman.

Senator CANNON. Thank you very much, General.

We will stand in recess until 1:30.

(Whereupon, at 12:40 p.m., the subcommittee recessed, to reconvene at 1:30 p.m., the same day.)

AFTERNOON SESSION

Senator CANNON. The committee will come to order.

We will resume with Gen. John M. Wright, Jr., before we go into the executive session part of the day.

General, you may proceed, sir.

STATEMENT OF LT. GEN. JOHN M. WRIGHT, JR., COMPTROLLER OF THE ARMY

General WRIGHT. It is my purpose to report to you on the employment of sensors by the 101st Airborne Division (Airmobile) while I commanded the division, from May 25, 1969, to May 25, 1970.

First, I should like to describe briefly the area of operations of the 101st. Our primary area coincided with the Thua Thien Province, which includes the city of Hue. It was in this area that the infantry battalions were deployed. However, we were also assigned the mission of conducting reconnaissance and maintaining surveillance over the western portion of Quang Tri Province all the way up to the demilitarized zone; this mission was conducted by the division's organic Air Cavalry Squadron. Our area of operations covered 1,500 square miles, extending from the China Sea to the Laotian border, a distance of 40 miles.

A few words about the terrain are essential to an understanding of our use of sensors. The low, flat coastal area contains all of the population, about 725,000 people. Moving farther inland, the coastal plain gives way to the Piedmont area of relatively rolling country. Beyond the Piedmont is the rugged, mountainous, jungle terrain that extends into Laos. The Ashau Valley lies in the western portion of the area of operations, paralleling the Laotian border. Elevations in this rugged area reached 5,000 feet. It is the most difficult terrain I have seen in Vietnam. The jungle is extremely dense, often limiting observation to as little as 5 to 10 meters, and generally restricting movement to a few trails cut by the enemy and our own troops.

MUST KNOW ENEMY LOCATION

The enemy in the area are units of the North Vietnamese Army. The main force and local force Vietcong units have been essentially destroyed and their remnants are rather ineffective. North Vietnamese Army units move east out of Laos, cross the Ashau Valley, and attempt to destroy our pacification efforts. In turn, our objective is to insure the security of the population and to prevent the North Vietnamese Army units from interfering with pacification. To do this requires, first, that we know where the enemy units are and where they are going. I hope my description of the terrain has given you an appreciation of how difficult it is to keep track of the enemy. Now I would like to discuss our use of sensors.

I should make the point here that I am speaking as a user. I am not a sensor technician. My job was to use the sensors that were provided to us in the most effective manner possible. My principal concern was to obtain the intelligence necessary to assess the enemy's activities and then to apply our combat power to destroy him before he destroyed us. Sensors proved to be of great value as a source of intelligence.

Sensors were new to me when I arrived in Vietnam, and I soon found that there was a general lack of understanding as to their employment. Because there were so few trained people, it was necessary to control the use of sensors at division level. We collected our experts and formed a ground surveillance section under the division G–2. By September 1969 we had 17 sensor strings and 7 monitor sites. Six months later, we had 47 sensor strings which we monitored and an additional 24 strings in our reconnaissance and surveillance zone monitored by aircraft. When I left Vietnam in May 1970, we were getting ground readout from over 50 strings and air readout from over 40 strings. I assure you that this constant increase in employment of sensors reflected the value of the intelligence they contributed.

PLACED PERSONAL EMPHASIS ON SENSORS

I placed considerable personal emphasis on our use of sensors. I received a weekly report showing each type sensor we had in the division. For each type, the report showed the number actually employed; the number on the shelf; the number programed for installation; and the number on request. Of course my interest was in getting them off the shelf and in the ground, and in requesting more as rapidly as we could effectively use them.

In addition to the weekly sensor status report, I was briefed twice daily, at 0700 and 1700 hours, on every sensor activation in our area of operations. These sensor activations together with other intelligence, served to focus attention on areas of increasing activity and provided a basis for planning our combat operations.

HIGHLY ENTHUSED OVER PSID

There was one sensor in which I was particularly interested; that was the Patrol Seismic Instrusion Detector, known as the PSID. We had enough PSID's in the division for each battalion to have about 12. I tried to remove the mystery from this one and to have each trooper feel as familiar with it as he is with his rifle or a can of C-rations. He didn't have to understand how or why it worked. All he needed to know was that he had a thing small enough to carry in his pocket and that when his platoon stopped somewhere in the jungle for even a short time, he could put this thing out on the trail 25 to 50 meters away from his position and have the benefit of an always alert scout, or forward listening post, who would give warning of an enemy approach. The PSID is simple, rugged, reliable, small, easy to emplace and recover, stays awake and alert, and I would have liked to have 12 per platoon instead of 12 per battalion. I am enthusiastic about the PSID.

Of course sensors are expensive, but its cost was another feature which I liked about the PSID. I believe this little sensor set cost about $280. The set includes 4 small seismic detectors, each connected by 8 feet of wire to its own transmitter, and one receiver which can monitor the 4 transmitters to a range of up to 500 meters. Now here is the way I figured the return on our $280 cost. The detectors have a life of about 30 days That means about $10 per day. For $10 a day, a platoon gained the benefit of four constantly alert sentries—often with a capability to detect movement at ranges greater than a soldier could see in the jungle—all of that for 10 cents per hour per sensor.

We integrated sensors into our intelligence system, rather than using them as an independent system. Frequently we were able to maintain surveillance over sensor strings with ground surveillance radars, such as the PPS–4 and 5 and the TPS–25. Also, we emphasized employment of night observation devices, particularly where sensor strings were emplaced in the coastal lowlands and in the relatively open Piedmont.

TRAINED ARVN IN USE OF SENSORS

In August 1969 we undertook to train the 1st ARVN Division in sensors. Instruction and demonstrations were conducted through

interpreters. From the division commander on down, the ARVN showed considerable interest and learned rapidly. Their sensor people teamed up with ours and emplaced strings and monitored read out stations. In a few months they were on their own and ran their own sensor operations.

I have stressed our use of sensors to obtain intelligence—to gain information on where the enemy was moving and where he was going. This sensor data was of the inputs which shaped our combat operations planning. Another use we made of sensors was to identify a likely target to be engaged immediately by artillery fires. This involved plotting the location of a sensor string with sufficient accuracy to permit placing preplanned artillery on a suspected target which activated the sensor string. Through close coordination between sensor and artillery personnel, sensor activations were rapidly and accurately brought under fire employing kill zones located within 3 to 5 minutes walking distance from the sensor string.

A variation of placing artillery fire on a sensor activation was the use of Claymore mines emplaced along the line covered by a sensor string. In this case, the operator of the monitor followed the sensor activations and then used a remote control device to fire the Claymore mines when the target was in the kill zone.

ARVN PROFICIENCY IN EMPLOYMENT OF SENSORS

I have already mentioned our efforts to train the 1st ARVN Division in the employment of sensors. I would like to describe two actions which I believe illustrate ARVN proficiency. In March 1970, the 54th ARVN Regiment, with headquarters at Fire Base Anzio just south of Phu Bai, had a monitor station at that fire base. About midnight they were alerted to enemy movement by activation of sensors which they had implanted.

They had confidence in their sensor readings and decided to let the enemy continue to move toward the base rather than engaging him by artillery fire. The unit assumed a 100-percent ready posture and waited for the enemy to close on the base. The ARVN unit was completely ready when the first enemy soldiers approached the perimeter wire. Only at that time did the ARVN call down all of their preplanned fires and their close-in final protective fires. The attack was stopped without a single enemy soldier penetrating the perimeter, and at daylight approximately 75 enemy bodies were counted within about 200 meters of the perimeter. General Trong, the division commander, credited the early warning provided by sensors for this very successful operation. Only a week or so later, the enemy attempted a similar attack on the ARVN fire base Nancy, north of Hue. Again sensors provided early warning and again the ARVN chose to wait for the attack. This time the ARVN counted 45 bodies outside their perimeter without a single enemy soldier penetrating their position. I am quite confident that the 1st ARVN Division has learned to employ sensors effectively.

PREEMPTED ENEMY ATTACKS

One of our principal concerns was to prevent rocket attacks on Hue and Phu Bai. Sensors assisted greatly in our counter rocket pro-

gram, which was so successful in reducing the number of rockets that impacted in the populated areas.

It is usually difficult to prove conclusively that one action or another should be credited for breaking up an enemy attack. I did feel that artillery responses to sensor activations in the vicinity of Fire Base Bastogne and Fire Base Birmingham preempted enemy attacks on several occasions.

SENSORS OF GREAT VALUE AS SOURCE OF INTELLIGENCE

In conclusion, my experience as a user of sensors in Vietnam convinced me that sensors are of great value as a source of intelligence. In Vietnam, the commander's most difficult—and perhaps most important—task is finding the enemy and keeping track of his movements. Sensors have proven to contribute significantly to the accomplishment of this task.

I shall be happy to answer your questions.

Senator CANNON. Thank you very much, General Wright, for a fine statement.

SENSORS SAVED AMERICAN LIVES

In your judgment as combat commander did the use of sensors contribute toward reduced American casualties in your division, and, if so, can you give us any kind of an estimate?

General WRIGHT. Without any qualification at all I would say that they contributed to the reduction of casualties. As far as putting an exact figure on how many men were saved as a result of early warning, this would be impossible; but without a doubt lives were saved because we had sensors, both offensively and defensively.

Senator CANNON. What other types of sensors did you use other than the PSID that you described?

General WRIGHT. We had the MAGID, the MINISID, the ADSID, the ACOUBOUY, the PIRID, the WSD–1, and the PSR–1.

Senator CANNON. Did you have good experience with all of them? Was the PSID your most effective one?

General WRIGHT. I was referring to the fact that that one is so simple and so inexpensive that it was very practical to use, easy to get the soldiers to use it down where the soldiers are without a lot of supervision or technical assistance. The others were also effective.

Whenever we had sensor strings that were not activated for a period of time, we sent a team out to pick up those string and then put them in another area and then we got activations. So I don't know of any sensors that were ineffective.

Senator CANNON. Did the use of sensors contribute toward forcing the enemy to move more in daylight or did they continue in their same pattern of nighttime operations?

General WRIGHT. There was no change in the pattern of day and night operations that I could trace to the use of sensors.

NEVER HAD ENOUGH

Senator CANNON. You indicated you could have used more sensors than you had. At the time you left had the supply been increased to a level that you believed was acceptable or were you still short in supply?

General WRIGHT. It had increased considerably and we never had enough while I was there. But in a very large area and with the very, very large number of enemy units that were in our area, it would be almost impossible to have enough sensors to satisfy the commander on the ground. I could have effectively used many more than I was able to get.

Senator CANNON. Senator Goldwater.

Senator GOLDWATER. I have no questions.

ESTABLISHMENT OF REQUIREMENT

Senator CANNON. Thank you very much, General. We appreciate your presentation.

Counsel would now like to ask you a few questions.

Mr. GILLEAS. You said you could use more sensors. Who established the requirement as to the number of sensors you were entitled to? Did you as the division commander have a significant say in that regard or did MACV headquarters determine how many you would receive?

General WRIGHT. I don't know what the procedure was for allocating the sensors, whether it was done by USARV or MACV. I worked with my own sensor people pressing for the employment of more strings and then they put in their requisitions. Who took action on those I don't know, whether it was USARV or MACV. I was assured we were getting our fair share.

Mr. GILLEAS. You commented that your area of operations possessed a good bit of dense foliage. Did you airdrop or ground emplace the sensors you used?

General WRIGHT. We had about half as many air emplaced and air read out sensor strings as we had ground strings, but we did have a lot of strings that were emplaced by the Air Force. Also, we emplaced them by helicopter.

Mr. GILLEAS. Did you find that you generally obtained a relatively good CEP with reference to where the sensors hit, the ground and where they were located?

General WRIGHT. Good enough for intelligence collecting purposes. I would not say good enough for placing artillery fire on them, but that didn't matter because the ones that we put in specifically to identify enemy movement out along the border were out of range anyway. So this was strictly an intelligence function performed by the sensors as opposed to one that you would put fire on as a target acquisition function.

Mr. GILLEAS. General Williamson said you used some new sensors relative to the original ones he received when he was there previously. Which sensors that you discussed represented new sensors?

General WRIGHT. Well, I just looked at all of these on display and they are new to me. This business has happened very rapidly and the things I see in today's reference material are new since I used sensors.

Mr. GILLEAS. Isn't the PSID the same?

General WRIGHT. The PSID is the same. And the MAGID is the same. The other equipment I had not seen before today.

OTHER TYPES OF MAINTENANCE EQUIPMENT

Mr. GILLEAS. What other major types of intelligence-gathering equipment did you use, besides sensors.

General WRIGHT. Patrols, aerial surveillance, agents, night observation devices, radar, and combat units in contact.

Mr. GILLEAS. Did you have Mohawks, IR and SLAR equipment?

General WRIGHT. Not organic but I had them in support. I had an air cavalry squadron which was able to maintain very fine aerial surveillance over our area. In an air mobile division, of course, you have over 400 helicopters and every time people are flying they are a potential source of intelligence. So that helped us a lot. Additionally, patrols, agents, radar, night observation devices.

Mr. GILLEAS. What types of night observation devices did you, have?

General WRIGHT. Starlight scope and the large crew-served weapons scope.

Mr. GILLEAS. Did you find those very effective?

General WRIGHT. Yes, we did find them effective particularly used on a base where you had some clearing. I have to emphasize again the area I am talking about. I have crisscrossed all of Vietnam from the delta to the DMZ, and I have never seen anything as dense in the way of jungle as you have north of the Hai Van Pass, in the vicinity of Hue. You are limited in the employment of night observation devices to base areas that are relatively clear. But the sensors could get in where you couldn't get in with anything else.

SENSORS WORTH PERSONNEL REQUIRED

Mr. GILLEAS. And you found that the personnel that you had assigned to use the sensors was well worth it in your judgment?

General WRIGHT. Yes, very definitely.

Mr. GILLEAS. That is all I have, Mr. Chairman. Thank you, General.

Senator CANNON. Thank you very much, General.

We will now go into executive session and hear from General Deane.

(Whereupon, at 1:55 p.m. the committee proceeded into executive session.)

ELECTRONIC BATTLEFIELD PROGRAM

THURSDAY, NOVEMBER 19, 1970

U.S. SENATE,
ELECTRONIC BATTLEFIELD SUBCOMMITTEE
OF THE PREPAREDNESS INVESTIGATING
SUBCOMMITTEE OF THE COMMITTEE ON ARMED SERVICES,
Washington, D.C.

The subcommittee met, pursuant to recess, at 10 a.m., in room 235, Old Senate Office Building, Senator Howard A. Cannon, presiding.

Present: Senators Cannon and Goldwater.

Also present: Ben J. Gilleas, Director of Investigations, George Foster and David Littleton, Professional Staff Members.

OPENING STATEMENT

Senator CANNON. The committee will come to order.

Today is the second day of hearings by the subcommittee to inquire into the electronic battlefield program. As we did yesterday, we intend to concentrate at this time on the use of sensor surveillance types of equipment, their cost, and future potential to the Armed Forces.

I want to emphasize, as I did yesterday, that it is the responsibility of each witness to determine whether classified information is involved in his testimony. We do desire to receive as much information as possible during the open session so that we may inform the American public to the maximum extent possible.

The first witness is Maj. Gen. R. McC. Tompkins, former commander of the 3d Marine Division in South Vietnam. He is accompanied by Col. David Lownds, the commanding officer of the 26th Marine Regiment, whose valiant Marines fought the battle of Khe Sanh, and Jerry Hudson, the intelligence officer of the regiment.

Following their testimony we will hear Rear Adm. William H. House explain the use of sensor equipment by the Navy. He will be followed in an executive session by Brig. Gen. William J. Evans, who will testify concerning the Air Force's use of sensor equipment.

This afternoon testimony will be received from Maj. Gen. William Fulton and Lt. Gen. John Norton from the Department of the Army. They will explain the current program of the Army to determine what types of equipment the Army should have in the future and what types of equipment can be disposed of.

General, we are happy to have you here and you may proceed.

STATEMENT OF MAJ. GEN. R. McC. TOMPKINS, FORMER COMMANDING GENERAL, 3D MARINE DIVISION

General TOMPKINS. What I would like to do this morning is sketch the general situation that existed in Vietnam at the time of Khe Sanh. Just to be sure we're all in the picture, let me say a word about the I Corps area. It comprises the five northern provinces of Vietnam (Quang Tri, Thua Thien, Quang Nam, Quang Tin, Quang Ngai). I Corps (about 170 miles long) has an area of about 10,000 square miles, bordered on the north by the DMZ, on the west by Laos, on the east by the China Sea, and on the south by II Corps.

Now, today I am going to talk primarily about northern I Corps—the two northern provinces of Quang Tri and Thua Thien. The war here in the two northern provinces was unique at that time in all of Vietnam. It was unique for two reasons:

First. The enemy was composed almost entirely of NVA—something on the order of 90 percent.

Second. The enemy was supported not only by the usual rockets and mortars but also modern artillery up to and including 130-millimeter guns and the 152-millimeter gun howitzer. This was the only place in Vietnam where the enemy was equipped with artillery.

On December 1, 1967, in northern I Corps the enemy was disposed as follows:

First. Along the eastern DMZ he had the 324–B division (the 803D, 812th, and 90th Infantry Regiments). On the east coast he had the 270th Infantry Regiment (three infantry battalions, an artillery battalion, and an antiaircraft battalion). In the area bounded by Gio Linh, Con Thien, Cam Lo, Dong Ha—known locally as "Leatherneck Square"—he had the 27th Infantry Battalion of four companies.

Second. In the area west of the city of Quang Tri, he had about 3,250 infantry and in the area west of the city of Hue, not shown but which lies to the south of Quang Tri, about 1,385 infantry plus certain supporting troops.

Third. Between Ca Lu and Khe Sanh we knew that there was one unidentified battalion at work.

Fourth. In the eastern DMZ he was supported by about 100 to 110 artillery tubes.

Opposing him in the northern I Corps area—a distance of 85 miles from Hai Van Pass in the south to the border of the DMZ in the north and from the China Sea in the east to the Laotian border in the west—a distance of 45 miles—was my division, the 3d Marine Division (reinforced). The 3d Marine Division instead of the usual nine infantry battalions had on December 2, 1967, 13 infantry battalions and about 140 artillery tubes. Of necessity the division was widely dispersed. At Khe Sanh there was a single infantry battalion. There was one battalion between Hai Van Pass and Hue. The balance of the division was disposed between Hue in the south and the southern border of the DMZ in the north.

ENEMY MOVING TOWARD KHE SANH

During the first week in December intelligence indicated enemy units moving toward Khe Sanh. Patrols from the Khe Sanh combat

base reported increasing contacts with NVA troops who were well equipped with the latest weapons, well uniformed, well fed and thoroughly professional in the way that they handled themselves.

On December 13, 1967, the III MAF commander, Lt. Gen. Cushman, directed CG 3d Marine Division to reinforce Khe Sanh with an additional battalion plus certain supporting troops.

At the same time it became apparent that other events were taking place within the division's tactical area of responsibility that had ominous overtones. The 324–B division which had been content to remain fairly well in place in the eastern DMZ for some months, began moving. There was unsubstantiated information about a new NVA division moving down to the DMZ. The enemy units in base areas 101 and 114—in the vicinity of Quang Tri City and Hue respectively—showed increasing activity and aggressiveness.

It was against this background of enemy activity and movement that some hard decision had to be made. I asked for and received another battalion from the special landing force. Then we flew in additional forces to Khe Sanh. The combat base was reinforced with a battalion on January 15, 1968, and another battalion on January 22, 1968, along with additional artillery and supporting troops.

EVERYTHING BY AIR

I should say here that everything that went to Khe Sanh went by air. The road—Route 9 which runs from Ca Lu to Khe Sanh—had been cut by the enemy in August 1967 and remained closed until mid-April 1968.

Thus by January 27 at Khe Sanh we had the 26th Marine Regiment of four battalions—January 26, February 26, March 26, and January 9—plus a battalion (18 tubes) of 105-millimeter howitzers, a battery (6 tubes) of 155-millimeter howitzers, 5 x 90-millimeter gun tanks, 92 106-millimeter recoiless rifles, 6 4.2″ mortars plus the usual organic weapons of four infantry battalions.

We had done all that could be done at the time and under the circumstances then prevailing in northern I Corps.

Higher authority, acutely sensitive to the growing enemy threat which spread across the entire front, reacted with speed and decision.

A reinforced regiment from the 1st Marine Division was brought into the Hue-Phu Bai area. Both the 1st Air Cavalry Division and the 101st Air Cavalry Division began staging into the area between Hue and Quang Tri City.

In the meanwhile, at Khe Sanh, the enemy buildup continued. It now appeared that two enemy divisions—325–C and 304 were in the immediate area.

The 325–C Division consisted of the 90th, 101st, and 29th Infantry Regiments. Both the 90th and the 101st had been involved in the bitter battles for Hill 881–S and Hill 881–N at Khe Sanh in May 1967. These enemy regiments were badly cut up in those battles and had lain dormant for the ensuing months until they turned up in the same arena in January 1968. The 29th regiment was new to us although we suspected it was one of their battalions that had been operating for some months between Ca Lu and Khe Sanh to the north of route 9.

The 304 Division—consisting of the 9th, 57th, and 66th Infantry Regiments—was an unknown quantity as far as we were concerned.

We did know that 304 Division, with only one of its infantry regiments, the 57th, had fought at Dien Bien Phu together with their 345th Artillery Battalion. They attacked strongpoint "Isabelle" and overran it finally, suffering 490 killed in action.

THINGS GETTING TIGHTER

At this same time things were getting tighter at Khe Sanh. On January 18 the enemy probed our positions on Hills 881–S and 861. On January 19 one of our combat patrols early in the morning surprised an enemy force moving onto Hill 881–N. The patrol was reinforced by two rifle companies and the argument became quite vigorous.

This action continued until dark when our forces withdrew to their permanent positions. We could not afford to have them out on a limb 2,000 meters beyond our most advanced combat outpost on Hill 881–S.

THE FORTUNES OF WAR

And now, on January 20, at Khe Sanh there occurred one of these fortuitous chances that make the expression "the fortunes of war" something more than a tired cliche. At 1400 hours on that day, 1st Lt. La Thanh Tonc of the 14th AA Company, 5th Battalion, 101st Regiment, 325–C Division approached our lines waving a white flag. He revealed to our interrogators not only the dispositions of the two assault regiments of 325–C Division—that is, the 95th and 101st—but also the general plan of attack to include specific objectives.

An officer courier flew in to my CP from Khe Sanh with the interrogation report. I had assembled my principal staff officers and we studied the information that 1st Lt. La Thanh Tonc had revealed. I decided that we would accept it as valid; we had nothing to lose by so doing and stood to gain a great deal. I recalled that sometime before, at Dak To in the highlands, a similar event had occurred and the Army CG had received valuable information from a deserter. The Army staff tended to believe the information was too good to be true and should be discounted. The CG ruled otherwise and events vindicated his judgment. I wondered if history would repeat itself for us?

It may be of interest to tell you what had caused the lieutenant to desert. He was a Regular with 14 years service and had recently failed to be selected for promotion to captain. An officer with less service and fewer qualifications—at least as far as Lieutenant Tonc was concerned—had been promoted. This so incensed Lieutenant Tonc that he deserted.

I have often thought that Lieutenant Tonc's desertion may have caused the enemy to launch his attack earlier than had been planned originally. The enemy undoubtedly learned of Lieutenant Tonc's disappearance within a few hours of his surrender.

INITIAL ATTACK COMMENCED

At any rate, the initial attack on the hill positions at Khe Sanh combat base really commenced on January 21 at about 0415 hours. And I am pleased to report to you that the attack followed exactly the plan that Lieutenant Tonc had revealed to us the day before. The combat base itself came under an extremely heavy mortar, artil-

lery, and rocket barrage. One of the first incoming rounds landed in the ammunition dump, as you can see from this slide: the results were spectacular.

The enemy had placed his heavy artillery just over the border in Laos. We did not have the range to fire counter-battery on his 152-, 122-, and 130-mm. guns. Air strikes were only partially effective and then more from an inhibiting role than in a destructive role.

We were never able to silence the heavy enemy artillery and rockets that could bear on Khe Sanh combat base. Improving trenches and shelters became quite popular.

Concurrently with the attack on the combat base, the enemy attacked and finally—after 24 hours—captured the village of Khe Sanh, which lay to the west of the combat base and along Route 9. There was now not less than one enemy regiment astride route 9 west of the combat base, thus isolating the special forces at Lang Vei near the Laotian border.

The situation on the 23d of January was essentially that which we had to endure for the next 2 months: Khe Sanh combat base was completely surrounded and dependent on aerial resupply for everything.

HOLD ONTO KHE SANH

So long as we held firmly to the hill positions and could keep them resupplied by helicopter, the enemy would have a difficult job in attacking the base. It was clear, however, that we must not allow ourselves to be bled to death by engaging in meaningless adventures that did not contribute to the mission—hold on to Khe Sanh combat base; it must not fall into enemy hands.

Our four infantry battalions averaged (counting all hands) about 1,000 men each. The enemy battalions—some 18 in the two divisions—averaged about 550 men each. At least theoretically, on the basis of infantrymen, the enemy had almost 10,000 against our 4,000. Or, to put it another way, the total ration strength at Khe Sanh was some 6,000 men against two good NVA divisions totaling not less than 20,000 men.

I planned, therefore, a set-piece type of defense that would require the enemy to come to us. The daily papers, I am glad to say, made much of the fact that we were locked into our positions and did not engage in patrolling, et cetera. I hope the enemy high command believed this because such was not the case.

On January 27, the 37th Ranger Battalion (ARVN) joined us at Khe Sanh with an effective strength of about 350 total. This was the last reinforcement to come into Khe Sanh, other than individual replacements for casualties, until we were relieved in April.

MARINE TROOP DISPOSITIONS

Our dispositions were now essentially as follows:

Third Battalion, 26th Marines, occupying the hill positions on 881-S, 861, 861-A, and 950 outside the perimeter.

First Battalion, 9th Marines, occupying a position outside the perimeter and 800 meters directly west of it.

Second Battalion, 26th Marines, occupying hill 558 outside the perimeter and about 4,400 meters directly north of it.

First Battalion, 26th Marines, 37th Ranger Battalion, and all supporting forces were within the perimeter itself.

Patrolling outside our perimeter was constant, but I put a limit of 500 meters on them. This was to prevent a patrol being mousetrapped, with rescue forces, in turn, becoming entrapped. Our system worked very well and at no time did the enemy manage to surprise a position and take and hold it.

SENSORS FIRST PROVED THEIR GREAT WORTH

On the night of February 5 at 0445 hours the enemy began probing the entire Khe Sanh combat base under cover of artillery and rocket fire.

It was in this attack that the sensors first proved their great worth to Khe Sanh combat base—in their role as information-gathering devices. Let me tell you in some detail how these events were reported by one officer in the S–2 section in a personal letter to me sometime later. I will quote him verbatim as follows, the young officer writing to me:

CAPTAIN BAIG LETTER

Throughout the Dark of 3–4 February, the sensors reported large troop movements along a ridge to the Northwest of Hill 881S. This ridge approaches the hill to a point about 3000 meters away. Then, it runs south for some 4000 meters, lying to the west and southwest of the hill. Then, it turns abruptly to the east, ending about 3000 meters due south of the hill. It is a Z-shaped ridge. The northwest section of the ridge, which stretched in that direction for some 10,000 meters away from hill 881S, was the only source of sensor activity. During that phase of the seige, the S2 and FSCC personnel knew little of sensor accuracy and reliability and I knew even less.

This is Captain Baig speaking.

And so, I embraced the theory that it would be folly to become erudite in one's ignorance: Therefore, believe that which the sensors purport to say. Thus, from the evidence of that night, I concluded that at least two battalions of infantry (or an equivalent number of porters) had reached a point 3000 meters to the northwest of Hill 881S; and that they had come from the direction of the known location of the 325C Division. Dawn came without further developments—or confirmation, for that matter.

SENSORS BEGAN ACTIVATING

From the late evening of 4 February onwards, more and more puzzling things occurred. First, the sensors along the North-South portion of the ridge to the west of Hill 881S began to give tongue vociferously in the same intensity as had their neighbors on the northwest portion the night before. Second, the latter began to sound off again. Third, the hitherto silent southern portion of the ridge, running from west to east, reported movement in the same strength as had the other sensors, but only along the western section of the west to east ridge-line. The eastern section, which led to the main siege works about Khe Sanh's southern and southwestern perimeter, reported no activity. Fourth, after the western end of the west-east ridge-line—as I said earlier, lies to the southwest of Hill 881 (to the Southwest of Hill 881S) had fallen silent, the north-south portion (to the West and Southwest) began to sound off again and then lapsed into inactivity. Fifth, more activity in the same strength as event four was reported along the western end of the west-east portion of the ridge to the southwest and south of Hill 881S. By 0100 5 February all sensors fell silent.

Bearing in mind that I had had only two weeks to learn something—very little—of sensor interpretations at this stage of the siege, let me summarize the events and offer conclusions.

A. Night 3–4 February: Activity to the northwest moving towards Hill 881S; estimate two battalions.

B. Night 4–5 February:

(1) Activity to the west and southwest moving south; estimate two battalions.

(2) Activity to the southwest and south moving east, but stopping when more activity should have been reported to the southeast, had the force continued its march east; estimate same two battalions.

(3) More activity to west and southwest, moving south; estimate one battalion.

(4) More activity along western end of ridge to south moving east, but stopping at same place as before; estimate same battalion as above.

(5) Activity to the northwest moving towards Hill 881S, but stopping before the ridge turns to the south; estimate two battalions.

Questions to be determined: Have we accounted for two forces of three and two battalions respectively; do I have three battalions to the south of Hill 881S and two battalions to the northwest or four to the northwest; am I looking at a porterborne logistic train or should we rush about, shouting "Aux Armes?"

ENEMY MOVING—GRAVE DANGER

All activity had ceased by 0100, 5 February. Expecting more information, I sat back and waited. I could not prove that which I was beginning to believe. The forces—if there be forces—had either moved off the line of sensors and the ridges away from Hill 881S (therefore, no danger) or they were moving towards the hill (therefore, grave danger—especially in the thick mist). I plumped for the second explanation; for this fell neatly within the lieutenant's remarks.

The last sensor report from the south had occurred at 0100; it was now past 0200; we should fire at 0230 when the enemy should have reached this point (here) on its march north to Hill 881S. The enemy will be in regimental column, battalions on line, interval 100 meters (standard NVA regimental tactics for night attack). Therefore, we should place a target block 500x300 square meters about the anticipated enemy position, fire 350 rounds of light and medium artillery into it, and copper bottom our bet by adding a 1000 meter curtain at each end of this east-west block to the south of the hill which would stretch from the southwest to the southeast and be composed of 200 rounds of 175mm fire in the event that the enemy outsmarted us by attempting a double envelopment. It would also alert aircraft for TPC–10 runs, if necessary. Such was the solution.

At about 0230 eight batteries of artillery fired over 530 rounds into and along the curtains of the block.

NO CONFIRMATION WE HIT ANYTHING

We had no confirmation at all that we had hit anything. The enemy still had half an hour to march to reach Hill 881–S. 0300 came and went without further sign of their presence. I concluded that, even if we had not struck them fair and square, at least we had informed them clearly that we were aware of their existence; and, consequently, the enemy had aborted the attack (another NVA characteristic upon which reliance may be placed—up to a point). But, nevertheless, something continued to bother my mind. Despite my concern, the general euphoria, which by that time had permeated the FSCC, prevented me from remembering the one or two facts which hitherto had escaped my attention.

At about 0445, those facts were violently brought to mind. The enemy, attacking in two battalion strength, assaulted Hill 861–A. The missing two battalions had been signalled by the sensors and I had, to my shame, completely forgotten them. I assume now that those two battalions had left the northwest ridge near Hill 881–S, swung north of the hill, and had occupied their attack position to the northeast of Hill 861–A, whence they made their assault in battalion strength.

The rest is history. Once more, Marine NCO's and other ranks made up for the mistakes of the alleged brains of and on the staff—as they have done throughout our history. There is no proof, naturally, of any connection between those sensor impulses representing a possible two battalions on the northwest ridge and the units which attacked Hill 861–A. Only one battalion actually made a known appearance on the hill; and it, as you will remember, met a revolting fate. The second battalion, if one there was, was attended to by one hour of shelling and air strikes, which landed on all the possible assemble/reserve areas at the base of the hill. Subsequent information suggested that such a second battalion actually did exist, but that it never had an opportunity to take its place in the line of battle.

EASY TO REASON BACKWARDS

It is, as you know, very easy to reason backwards. Sensor information can be very deceptively inviting in this regard. I like to think that all I have told you

herein is precisely as it happened; but, I cannot be sure and I never will really know until the NVA actually tells us. For whatever it is worth, the major assault upon the combat base, during the night of 29 Feb–1 Mar was signalled in precisely the same way as had been the hill attacks, and we were ready for them.

That is the conclusion, sir, of the sketch of the situation that existed at Khe Sanh early in 1968 and a detailed description of the use of sensors on the night of February 4–5, 1968.

Senator CANNON. Thank you very much, General.

I think we will hear the next two witnesses and then see if we have any questions at that time.

Colonel, you may proceed.

STATEMENT OF COL. DAVID LOWNDS, FORMER COMMANDING OFFICER, 26TH MARINE REGIMENT AT KHE SANH

Colonel LOWNDS. I am Col. David E. Lownds U.S. Marine Corps (retired) who commanded the 26th Marines and conducted the defense of Khe Sanh during the Tet offensive of 1967–68.

At Khe Sanh I had the distinct honor and privilege to command some of the finest Marines in our corps' history and I was proud of the performances and contributions of our sister services—the Navy, the soldiers, Air Force personnel, and finally the ARVN Forces who added considerable strength. All of them cheerfully endured their hardships and constantly produced a team effort through most trying conditions. Through all this, their morale stayed high and their spirit never lagged.

ENEMY COMMITTED THREE DIVISIONS

A great deal was written about Khe Sanh, about the feasibility and desirability of defending it. Make no mistake about it, Khe Sanh was important at the time and the enemy wanted it—wanted it so badly that he committed approximately three divisions to try and get it. Of course, it is history that it failed.

One of the most important reasons for this failure was the man on the ground—those Marines and men of the other services and the gallant South Vietnamese Forces who fought alongside them. The enemy knew that to take Khe Sanh he had to defeat those ground forces and he found out this was impossible.

In addition to the man on the ground we had access to the finest combination of supporting arms ever to be assembled, each time the enemy mounted an attack he was soundly defeated both at the wire by the troops on the line and in his assembly areas by our supporting arms. He was never able to sustain an attack because of this combination. Two cases in point may illustrate this. On February 5, 1968, an estimated battalion tried to overrun Marine positions on the west side of Hill 881. The attack was defeated by I Co, 3rd Battalion 26th Marines who killed 109 NVA on the defensive wire. Again on February 9 at least a battalion of NVA attacked our positions about 2 miles southwest of the airstrip and they were driven off with 124 KIA's and 50 captured weapons. In both encounters our casualties were light. In addition, the enemy tried to attack different areas of Khe Sanh five times during the month of March and in each instance were driven off.

RED MUD OF KHE SANH SIMILAR TO MUD OF FLANDERS

What technological advances played a part in the defense of Khe Sanh and what did they foretell for the battlefield of the future? The actual battlefield of the future won't be that much different from the past. The red mud of Khe Sanh in 1968 was very much like the mud of Flanders in 1918 to the young man living and fighting in it and the geologists tell us that mud won't change that much. What can be predicted is a continuation of the evolutions stemming from and closely tied to the sophisticated technology used at Khe Sanh and which are in keeping with the sophisticated technological society in which we live.

SENSOR PLAYED SIGNIFICANT ROLE AT KHE SANH

One of these developments which played a significant role in the defense of Khe Sanh was the sensor which allowed for early warning and active target acquisition of targets, not only close in, but deep within enemy dominated terrain and the subsequent destruction of these targets. The sensor is not a panacea, but is a valuable tool in the effective coordination of exceptionally responsive and particularly flexible firepower. It is flexible and expendable which is something, in my estimation, your son and my son are not.

It allows a commander to quickly locate enemy assembly areas and destroy or render ineffective the main force before he can close the main battle position. In this regard, one particular situation at Khe Sanh comes to mind. It occurred in early March of 1968. The sensors, which had been emplaced along Route 9 to the Laotian border, suddenly came to life and it became obvious that a large column was moving adjacent to Route 9 toward the base. A personal previous reconnaissance prior to the start of the battle gave me the time it took to reach given points along the road and the sensors were verifying the information that the NVA were proceeding as estimated. By computing the length of the column by information produced by the sensors, it became obvious to me that an enemy regiment was trying to close the base. This information coupled with possible assembly areas, allowed us to bring down upon this unit devastating firepower (i.e. B–52 tactical air and artillery) to break up the impending attack. Approximately only one company was able to close and they were destroyed in front of the ARVN positions on the southeast corner of the perimeter.

Circumstances such as this occurred several times (although the enemy forces were not necessarily in regiment size) during the battle of Khe Sanh.

SIGNIFICANT AMERICAN LIVES SAVED

In my estimation, during the single episode described above, a significant number of American lives were saved.

The sensor and electronic battlefield as it existed at Khe Sanh were an extremely valuable adjunct to the defense. In closing, let me say the battlefield is a dirty and ugly place. All the most sophisticated instruments of destruction we can devise won't change it nor will they change the supreme demands of courage, sacrifice, professional skill and dedication which Marines of each and every generation have met

on the field of battle. However, we should have the vision with which to make our country more secure and the tasks of our young men of the future easier, their challenges less trying and their sacrifices less costly.

Thank you.

Senator CANNON. Thank you very much, Colonel.

We will hear Major Hudson before we question you.

You may proceed.

STATEMENT OF MAJ. JERRY E. HUDSON, U.S. MARINE CORPS

Major HUDSON. During the period November 1967 through April 1968, I was assigned as intelligence officer for the 26th Marines at Khe Sanh. During early January, multisource intelligence indicated a substantial buildup in enemy activity in the area and the threat of attack appeared imminent.

Approximately January 18 a team from MACV Headquarters in Saigon visited Khe Sanh and offered the use of some electronic devices which would give indications of enemy presence, later to be called sensors. Within 48 hours we began receiving reports that the devices were being implanted in likely avenues of approach to the combat base. Approximately the same time we also began receiving reports that the devices were indicating enemy activity. These reports increased in volume to over 100 per day. During the first days the reports were received with some anxiety as their meaning was not clear; however, after exchange of numerous messages with the various commands involved in implanting, readout, and interpretation of the information, definite patterns could be detected and were targeted.

SENSORS PROVIDED PRIME SOURCE OF INFORMATION

During the height of activity at Khe Sanh we received several hundred air strikes, over 500 artillery missions, as many as 80 radar directed bomb missions and as high as 16 B–52 missions all in a 24-hour period. Sensors provided a prime source in the identification of targets for these systems. One B–52 mission was followed by over 2 hours of secondary explosions.

Prior to the advent of sensors, it was command doctrine to shoot numerous harassing and interdiction (H. & I.) artillery missions each night. These missions were usually based on map inspection, suspect areas, and yesterday's intelligence. The sensor provided real time information and the words harassing and interdiction were virtually removed from the 3d Marine Division vocabulary in favor of moving target-fire.

Khe Sanh enjoyed what is probably the most heavily concentrated intelligence collection effort ever directed in support of a regimental sized operation. Sensors played an important part in this effort. Sensor activations were immediately targeted for coverage by infrared sensing aircraft and side looking airborne radar. When weather permitted, all sensor activations were reacted to by aerial observers. When sensor activations were viewed with the information available from the many other sources, valuable intelligence could be produced regarding enemy base camps, storage areas, truck parks, artillery sites and movement through the area in general.

I believe that sensors played an important role in the defense of Khe Sanh. I know that they were relied upon heavily in determining my estimates of the enemy situation to Colonel Lownds, the regimental commander of 26th Marines and commander of the Khe Sanh combat base.

Senator CANNON. Thank you. I think all three of you gentlemen should move to the table because some of our questions may apply to different people. General, if you wish to refer questions to either one of the other gentlemen, that is fine, or ask them to assist you.

General TOMPKINS. Thank you.

GATHERING INTELLIGENCE PRIOR TO SENSORS

Senator CANNON. First, would you explain prior to the introduction of sensors at Khe Sanh what your primary means of gathering intelligence was as to enemy locations and enemy movements.

General TOMPKINS. I defer that question to Colonel Lownds because he was commander on the spot.

Colonel LOWNDS. Our primary means, of course, was the insertion of small reconnaissance teams who took up positions on hills or likely avenues of approach, the strong combat patrols done by companies and, of course, we had aircraft, O.E. type aircraft, which would fly around the area to find enemy targets.

I might say, Senator, that the insertion of recon teams, I think that prompted my remark on the sensor being expendable. The insertion of recon teams, many times, becomes a very hazardous business since you are placing four or five or six or seven or 10, whatever it happens to be, young men on a hill top and, of course, if they happen to be detected, it is a devil of a job trying to get them out. This is basically how we got much of our gray hair.

We got intelligence, naturally, by the normal means from higher headquarters, from prisoners in other areas, and the information relayed to us. But this generally——

Senator CANNON. Was it possible for you to send out long-range patrols in that area?

Colonel LOWNDS. It depends, Senator, on what period of time you are talking about, sir. In the early time, August through December 1967, we would, of course, send out long-range patrols. You have to remember, sir, that Khe Sanh was located very close to the Laotian border and we were refused the right to go across the border, so my limits going to the west of Khe Sanh were somewhere in the neighborhood of, I guess, 5 to 7 miles. Of course, to my northern extremity was DMZ which we were also refused permission to go into. So that my limits were really, because I was in the northwest corner of the country, limited by geographical and political borders.

Senator CANNON. Would it have been likely if you had sent recon teams out that you might have had to commit other forces to keep them from being cut off?

Colonel LOWNDS. Well, again the time period when I first appeared on the scene of Khe Sanh, which was about July or August of 1967, we were able to move freely. That is how I made my personal reconnaissances. It was no problem to go 5 miles from the base, in fact, I could walk from my headquarters to Lang Vei and nobody would

bother me. If you are talking about the period after the divisions got around us, the answer to the question is, yes, sir. If I put recon teams out in the middle of the area after they started to move in, insertions and extractions of recon teams to gather intelligence was a highly hazardous business. I will tell you, it kept one regimental commander awake every night. You couldn't sleep because you were apprehensive as to whether you were going to get them out the next day—or in 2 days. So, at the time when it became highly concentrated, the chances of a recon team existing within a 4-mile radius of the base were, to me, practically impossible. I think this is why General Tompkins placed the 500-meter limit on me and it was a wise and good decision as far as I am concerned, sir.

WEATHER BAD

Senator CANNON. What type of weather were you normally operating in? Was visibility restricted much of the time?

Colonel LOWNDS. The visibility at Khe Sanh got to practically nothing for periods as high as 20 days. I can remember in one instance on Hill 950, I had a problem up there. I can remember it well, because it was the day before the Marine Corps birthday and weather came in and I think I finally got to the hill on about the 26th or 27th of November. So there were periods when nothing really was flying visibly around Khe Sanh. There were times, of course, when there was no visibility. However, the helicopter pilots, who did an outstanding job as far as I am concerned, did get in there.

General TOMPKINS. I would like to comment on the weather. I can state from personal experience February of 1968 made an old man out of me, sir. Zero, zero, day after day almost, insofar as Khe Sanh was concerned.

ELEPHANT GRASS 20 FEET HIGH

Colonel LOWNDS. If you are going along this line, I might add one more thing about detection of enemy and so forth.

I don't know, probably there are not many people in the room familiar with the vegetation and so forth around Khe Sanh. But there was elephant grass there that was as high as 20 feet. I can remember people going out and being on a hilltop when people passed within 50 meters of them. They knew something was there but were not able to see it. If I can just add a kind of personal note, one time the general came up and asked me why my patrols weren't making more progress than they were, I asked the general if he would mind going with me and I took him outside of the lines and put him in some vegetation and said, "General, now if you don't mind, sir, please go through there." The general started and about 15 or 20 minutes later, he had gone about 5 yards, and he said, "You win." That is how bad it was and that is why it was tough to get information in that type of terrain and vegetation, sir.

WHEN SENSORS FIRST AVAILABLE

Senator CANNON. Pin down for us once more when was it you first had the sensors available at Khe Sanh?

General TOMPKINS. I would say the first sensors went in very close to January 20.

Would you confirm that?

Major HUDSON. They were up about the 18th and within 48 hours they began emplanting and we started getting information in another 48 hours. We didn't know what it was at first but we were getting it.

Senator CANNON. At this time then you were pretty well surrounded in the Khe Sanh area. When you first received your sensors did you have the opportunity to get the sensors in before the enemy started moving?

General TOMPKINS. I would say that there were at least two divisions in the immediate area of Khe Sanh before the sensors went in.

Senator CANNON. What types of sensors were you using and how were they emplaced?

General TOMPKINS. They were all emplaced by airdrop, sir, at that time. The first generation sensors that had been destined for the extension of the McNamara line, so-called, and I think they were spike buoys and acoubuoys, Navy type and Air Force type development.

Senator CANNON. Were your people trained in read-out capability at the time and how was that handled and coordinated?

General TOMKINS. I think we had one officer, Harry Baig, whose letter quoted at the end of my testimony, sir, had had some experience; had he not?

READ-OUT CAPABILITY

Major HUDSON. No, sir; we had no read-out capability at this time. It was all handled for us by the Air Force, by the experts, and they provided us only the product at that time. About March 15 we received the ground read-out capability and immediately put it into effect.

Senator CANNON. So you were actually just given information?

Major HUDSON. Yes, sir.

Senator CANNON. You were given the raw data?

Major HUDSON. We were given it in raw data, there is something at a certain place at a certain time and we put it with what else we had and it pretty soon painted a pretty picture.

Senator CANNON. The captain you quoted, was he actually acting from information that was fed to him from a read-out facility?

General TOMPKINS. This is correct. I should have made that point clear. This information, the read-out from the Air Force, was coming in to him and the fire support personnel.

Major HUDSON. Up to March 15. After March 15 we went both ways. We also had a ground read-out capability.

Senator CANNON. So from mid-January until mid-March, you were relying on someone else, but from mid-March on you had your own capability?

Major HUDSON. That is right.

Senator CANNON. Were you also doing your own locating of sensors after mid-March, or was this all done for you?

Major HUDSON. It was all done for us.

Senator CANNON. You didn't have anything to do with the planning of sensor locations?

Major HUDSON. Yes, we recommended.

Senator CANNON. What I meant was you had nothing to do with actually emplacing them except to make the recommendations as to where they ought to be planted?

Major HUDSON. That is right.

Senator CANNON. And after mid-March you had your own read-out capability?

Major HUDSON. That is correct.

HARASSING AND INTERDICTION FIRE

Senator CANNON. Major Hudson, what type of H. & I. type of a firing program did you normally undertake prior to the use of sensors?

Major HUDSON. As I mentioned, we would take information we had from agents or whatever. The source might be a target and it was usually yesterday's information. We were just firing out there to keep him unhappy and uncomfortable and where we thought he was. Once the sensors came we had good reason to believe he was there.

General TOMPKINS. Most H. & I. fire is utterly worthless. What you are doing is map-type fire at likely assembly areas, crossroads and trail, and you hope you will bong somebody. It is a great waste of ammunition.

Senator CANNON. Is there any way you could provide us with the cost effectiveness of H. & I. fire, or is that impossible?

General TOMPKINS. Unless you are blessed with the luck of the devil I would say it is zero return on H. & I.

Senator CANNON. When you started to fire as a result of sensor activations did you have any way of confirming results, later on or were you in the dark as to what the results actually were?

General TOMPKINS. Well, I will just speak and then the others can speak.

Wherever possible, sir, we utilized aerial reconnaisance to confirm sensor read-outs or the result of strikes. And in this connection Major Hudson probably has the figure at his fingertips. But the number of secondary explosions that we had after artillery fire, or B–52 bombing, secondary explosions were very great indeed, which meant that we had hit numerous targets.

Colonel LOWNDS. Well, I say this with all due respect to everybody. I really don't believe that you can classify the information that we were getting from sensors in the normal sense of H. & I. fires. H. & I. fires are a commander's and a S–2's guess of what might be there or, trying to disrupt a plan without really knowing that the enemy is there. To me personally, the information received from the sensors, and I would like to make clear that I have said that they are not a panacea, but the information is more sound intelligence. Well, it isn't intelligence, more sound information than normally would be used in the conduct of saying the enemy probably will come through this crossroad.

I wouldn't want to leave the impression with you, sir, that H. & I. fires don't have logic to them. They do. They have the logic of disrupting the enemy and they are not just shooting blindly—just cranking out some artillery piece and cranking off the round. They do have a purpose, and have been used since they were innovated. But the information received from the sensor, along with other information, makes for more sound intelligence. And also, you know, or you can

feel in my estimation fairly certain that something is there at the time and your actual chances of hitting it are good. It is a target acquisition type of thing.

Senator CANNON. In other words, when you fire H. & I. fire you are firing at a location where you think he ought to be; and where you fire based on sensor information, you are firing at a location where you know something is?

Colonel LOWNDS. Yes, that is basically it.

SOME VERIFICATION

Senator CANNON. Have you had any chance since Khe Sanh to verify through enemy intelligence information any results on the actions you were talking about?

General TOMPKINS. The answer to that would have to be classified, I understand, sir, but there has been some verification.

Colonel LOWNDS. I think in regard to this, Senator, and, of course, you never can be sure when you get to a location sometime after the incident happened, but I do know, and I do remember, that on the particular instance that I gave relative to the regimental size attack forming along Route 9 that when we got to one of the areas which Jerry and I had figured was an assembly area, in that area, and at a point where they would go into their attack formation, some 200 bodies were found when the first forces left the base. Now, I can't say that they came from that actual incident, but at least, there is evidence that forces were there.

ATTEMPTS TO LOCATE ENEMY MORTAR AND ARTILLERY

Senator CANNON. Could sensors assist you in locating some of the enemy mortars that were used against you or some of the artillery pieces whose locations were not precisely known?

Major HUDSON. We were plagued with big tube artillery from the northwest. Everyday I was told find that stuff and get it off my back but all we had at the time was back Azimuth, a guy puts a stick in the hole and shoots a compass and says it is going from that way, and it covered 4 by 4 kilometers, 16,000 square meters, which you just can't target. So by coincidence I guess we kept each of these different types of information on different overlays, back azimuth, sensor activation, electronic intelligence reports, et cetera. One day they picked them up and there is a gob of information there. We were able then to say that there were people there, we are getting artillery from there and sensors are talking and there must be something there and we were able to target that.

Colonel LOWNDS. If the question you are asking is, will the sensors detect mortar or artillery rounds, the answer is no, it will not. However, it will provide you with information that will help to locate the tube or piece. I can remember, for example, one particular instance up in that area right there (pointed to north of Hill 558). Jerry kept telling me that the sensors are active up in that area. They go active for about 15 or 20 minutes and they go passive for awhile and go active for another 15 or 20 minutes. And as I remember it, we finally came to the conclusion that this might well be some kind of mortar dump or ammunition dump of some kind. And so, as I remember, we fired in

there and we got a large secondary. So in this regard, it provides information which can help you. It certainly isn't going to detect the tubes or pieces, to the best of my knowledge.

Major HUDSON. The first night we got ground read-out devices, we were awe inspired and we were trying to verify the fact the sensors, (1) were what the Air Force told us, and, (2) when we shoot at the target something is happening. We had one string of sensors that talked all night long. Sixteen artillery missions were fired during the period of the evening into the area. At first light when the A.O. came on station we sent him there without telling him what he was looking for, maybe the ground or the bamboo is shaking. Are we getting rounds on the target where we want it. He went down and said it is all shot up and we knew then the sensors were well located and artillery was getting on the target and we asked him, "Any signs of enemy activity?" and he said, "There are two big craters I don't recall seeing before," and the next night the same situation happened completely again and we sent him down the next morning and in the big craters were two antiaircraft guns. One night we heard them digging a hole and the next night we heard them putting them in at the time we had no idea what we were shooting at except sensor activations.

SENSORS PREVENTED MORE MARINE CORPS CASUALTIES

Senator CANNON. Counsel has a few questions, General.

Mr. GILLEAS. You gentlemen have made a very impressive case relative to the use of sensors.

I wonder if it would be possible to have you place on the record the strongest possible statement, in keeping with the facts, as to whether or not the use of sensors contributed substantially or materially in reduced Marine Corps casualties at Khe Sanh. I would like to have each of you gentlemen comment. I emphasize that we are only looking for the most factual statement that you feel can be made.

General TOMPKINS. Well, as is customary in court-martials, we will let the junior speak first.

Mr. GILLEAS. Yes.

Major HUDSON. I will have to think about that. We know there were two divisions there, possibly elements of three. That would give them a capability of about 20,000 people. With 20,000 people he could have made our life very, very much more miserable than he did and we were able to keep him off our back by using the sensors, disrupt his plans and inflict casualties on him to the extent he did not ever launch his attack. So in that regard alone we must have prevented many, many casualties, but now to put a figure on it, I don't know.

Senator CANNON. When you say, "He never did launch his attack," it seemed to me from reading the story of Khe Sanh, that he did launch his attack several times.

Major HUDSON. That is probably right. He never did complete his attack.

Senator CANNON. He never did overrun Khe Sanh, or achieve his objective.

Major HUDSON. That is correct.

Colonel LOWNDS. Well, I said in my statement, in my estimation during the single episode described above, a significant number of American lives were saved. I meant it and I mean it today and I

would like before making a more specific comment to revert back to something else that I said. I said that the sensor is not a panacea. It is not. If you ask me would I have liked to have been at Khe Sanh without the sensor, I would have to say no, I wouldn't; it was a valuable information gathering instrument for me. When you try to equate it in lives saved, the only thing that I can say is that it is a tool whch provides information that, coupled with other information is extremely valuable. If you say to a carpenter how many fingers would you have lost if you had to put in a nail with a chisel instead of a hammer he would have a hard time telling you how many fingers he was going to lose.

Let me say this: That if that enemy regiment had closed the base and I hadn't been able to locate him as finitely as I did, the casualties at Khe Sanh, in my estimation, would have been considerable—that is not a good word. I know that isn't what you are looking for, Senator.

MARINE CASUALTIES MAY HAVE DOUBLED

If an infantry regiment closed on a battalion and you lose about 10 men in a company size attack—it is hard to say, but I will go out on a limb and say, I think the casualties would have almost doubled at Khe Sanh. And this is not WIA's but KIA's that would have doubled the figure, whatever the figure. I think that it was 199.

General TOMPKINS. 205.

Colonel LOWNDS. If we hadn't had the sensor information and had not been able to finitely locate the enemy, I think our casualties would have been significantly more.

Senator CANNON. General, that brings us to you.

General TOMPKINS. I think there are several salient points. One, Colonel Lownds has just mentioned the KIA, 205. I regret even one KIA. On the other hand, a total of 205 from November to the end of March under the conditions then prevailing in northern I Corps is a low figure.

I would like also to make the point that the Khe Sanh area was infested by two first-class NVA divisions. I am convinced to this day that those two enemy divisions were destroyed.

I believe myself that sensors played an important part in the defense of Khe Sanh. Had we not had sensors we undoubtedly in my opinion would have suffered greater casualties than we did. You asked me how many. I don't know. But it is significant to remember, sir, that Hill 881 South, which was our most extended post, occupied by two Marine Corps companies reinforced, under Capt. William E. Dabney, was some 7,000 meters from the center of the perimeter. Hill 861–A, and 861 guarding the approaches of Khe Sanh, and Hill 558, were all outside the perimeter.

The enemy tried desperately to take those hills because without those hills in his possession he couldn't get into the perimeter so long as we held the hills. And as I pointed out in the letter quoted from Captain Baig, we broke up attacks. And I have mentioned only the night of February 4–5 but there were numerous other instances. Based on sensor read out we were able to preempt the enemy.

I have got to say that in my professional opinion it did save American lives, and how many, of course, I don't know.

SENSORS USED IN OTHER AREAS

Mr. GILLEAS. General, did you use sensors in any other areas of the 3d Marine Division beside Khe Sanh, or did Khe Sanh utilize all of the available sensors at that time?

General TOMPKINS. They used all of the available sensors at that time, but after Operation Pegasus, which opened Route 9 and the 1st Air Cavalry Division and 1st Marine Division, opened Route 9 to Khe Sanh, of course the enemy had withdrawn. Then I asked for sensors to be sent in the eastern DMZ to cover the Ben Hai River. You see, we knew that there were crossing sites and we knew where the crossing sites were. We knew they were using them. Our great problem was when. And we would fire H. & I. fires on these crossing sites. But it was great expenditure of ammunition and it was my view that if we would have the second generation sensors, which is a direct read out he was talking about, we would have precise information. I also wanted them in the vicinity of a place called Mutters Ridge, which in the area of Camp Carroll, was invested by the 320th Division. At that time the assets in country were not great enough to permit all of the great schemes I had. We did put some in the DMZ but I don't know how many.

Mr. GILLEAS. Did your artillery fire knock out the sensors or were they effective after you fired?

General TOMPKINS. Originally we fired at the sensors in our ignorance.

Major HUDSON. I think there were tests run where they put 400 rounds, put a sensor in and they fire 400 rounds on point concentration and the sensor still continued to talk. That was a controlled test during the testing phase. We, to our knowledge, never lost one to fire but we seldom used a sensor as an individual entity. It was a string of sensors and the information continued from the string. If it was one individual sensor we didn't know it at our level. People in the Air Force could probably tell you what sensors died. We were using the product and it continued to flow. Whether one sensor died we don't know.

Mr. GILLEAS. Did you have much trouble with false alarms?

Major HUDSON. We did later on. The interpretation people did, yes, sir. That word has been stricken from the vocabulary. That is now a nontargetable activation.

Senator CANNON. General, thank you very much. Your testimony has been very helpful to us.

General TOMPKINS. Thank you.

Senator CANNON. The next witness is Rear Adm. William House.

Admiral, you may proceed, sir.

STATEMENT OF REAR ADM. WILLIAM H. HOUSE, OFFICE OF THE CHIEF OF NAVAL OPERATIONS, DEPARTMENT OF THE NAVY

Admiral HOUSE. I am Rear Admiral House, in the Office of the Chief of Naval Operations and am responsible for the coordination of the Navy's remote sensor effort. During the period November 1967 to February 1969, I was Deputy for Commander, Naval Forces,

Vietnam (COMNAVFORV); then Vice Admiral Zumwalt, and had some firsthand experience with the early usage of these remote sensor devices in combat.

Today I will provide you with a brief history of the Navy's use of remote unattended sensors in Vietnam, give you some specifics as to the effectiveness of these devices in Navy operations, review the financial aspects of the Navy's remote sensor programs and discuss the Navy's plans for future use of remote sensors.

This briefing is unclassified. Therefore, you can appreciate that I will not be able to divulge information that if known by the enemy could endanger our fighting men. I previously submitted a list of classified areas that I cannot discuss in this open session. The list should aid you in directing your questions to those areas that can be discussed.

History will be discussed chronologically. In the chronology there are also two phases of Navy experience with sensors in Vietnam. The first—air; and the second—riverine. These will become evident in the discussion.

NAVY—LONG HISTORY WITH SENSORS

The Navy has been involved in the development, production, and operational use of expendable sensors (sonobuoys, bathythermograph, and others) for many years. It was only natural, then, that Navy should be called upon to lend its expertise to the early development of the land application to the technology. Key recommendations to the study which led to the establishment of Defense Communications Planning Group (DCPG) in September 1966 were that 68 appropriately equipped P–2V (Neptune) patrol aircraft be provided and that acoustic sensors were needed. The P–2V aircraft was probably selected because it is one of the land-based aircraft used by Navy to monitor its antisubmarine warfare (ASW) sonobuoys and was thought to be easily adaptable for delivery and monitoring land-emplanted versions of the sonobuoys. Regarding the acoustic sensors, we realized that our expertise would be required to develop the land application for these devices. In addition, we had examined the possible use of a modified sonobuoy for land application in early 1966, in connection with the developmental Trail/Road Interdiction Mission (TRIM) program. This was called ALARS (Air Launched Acoustical Reconnaissance System). Although DCPG had not yet been established, Navy realized that it would be heavily committed should the recommendations of the study be implemented.

Accordingly, preparatory actions were commenced to determine required resources, locations of these resources, and actions necessary to implement.

NEPTUNE AIRCRAFT MODIFIED

In October 1966, DCPG tasked the Navy to develop an initial capability surveillance system and to provide the 68 P–2 (Neptune) aircraft to deliver munitions and sensors and to monitor sensors. Navy diverted aircraft from Reserve units. (the P–2 was no longer a first-line aircraft) and began modifying them. The requirement for P–2 aircraft (designated OP–2E in the remote sensor role) was later reduced to 15. Twelve of these aircraft were used to outfit a newly commissioned squadron (VO–67). Three were used to test and evaluate

sensors. This is the OP–2 aircraft. The reduction was based primarily upon the determination in January 1967 that Navy would develop equipment for, and provide the Air Force with 30 other aircraft that could be used for monitoring purposes.

The initial capability surveillance system was developed in response to DCPG tasking of the services. A major contribution to the first devices for this system was the ACOUBUOY (acoustic buoy), which was developed from sonobuoy technology.

Navy deployed the 12 OP–2E aircraft to Southeast Asia in November 1967. Aircraft vulnerability was an assumed risk, and the assumption was soon proved. We lost our first with all hands on January 11, 1968, when the aircraft flew into a mountain; on February 17, and 27, 1968, we lost two more to flak. In addition, four more were hit by flak but returned to base safely. Navy then raised the altitude restriction for delivery to 5,000 feet. In May 1968 the Air Force bagan flying most of the high risk missions in high performance aircraft. The Navy flew its final delivery missions on June 25, 1968. The cost of this program amounted to $27.3 million. Of this total, cost of outfitting the 30 aircraft transferred to the Air Force was $6.9 million. (This does does not include operating costs.)

After the experience at Khe Sanh in January 1968, Navy began thinking of sensors as devices that might be used in water or land to help carry out its riverine mission.

SEA LORDS

COMNAVFORV has the mission to prevent enemy infiltration into South Vietnam via coastal and inland waterways, to maintain control of the main rivers and canals and to combine forces with other United States and Allied Forces and Vietnam forces in searching out and destroying the enemy within Republic of Vietnam. An acronym was adopted, called Sea Lords, to describe this mission. Sea Lords stands for "Southeast Asia Lake Ocean River Delta Strategy." You will be hearing the term later.

Navy had particular difficulty in carrying out this mission in the delta area.

Although this is a drawing, it does display some of the topographical changes between the north and the delta region of South Vietnam.

This action photo gives you some feel for the type of terrain under which our riverine operations are conducted.

Please note the heavy foliage along the river bank.

The delta region is laced with canals and rivers. Much of the area depicted as land on maps is under water a good portion of the year. In addition, the enemy uses waterborne lines of communication whenever they are available, especially under cover of darkness and bad weather. In short, we had a problem in the delta area and the eventful usages of sensors in riverine operations was pretty much confined to this area.

Commander, U.S. Military Assistance Command, Vietnam (COMUSMACV) directed that sensors be provided for Navy operations during August to December 1968.

COMNAVFORV then planned a three step phasein program including orientation, training, preliminary operations and expanded operations to refine tactics. As shown on this slide.