Chapter 2
Threat

The enemy uses a variety of sensors to detect and identify US soldiers, equipment, and supporting installations. These sensors use visual, ultraviolet (W), infrared (IR), radar, acoustic, and radio technologies. They may be employed by dismounted soldiers or ground- or airborne-mounted platforms. Such plafonns are often capable of supporting multiple sensors. We will rarely know the specific systems the enemy will employ. Whenever possible, protect against all known Threat surveillance systems.

2-1. Data Collection. The Threat collects information about US forces for two basic reasons:

a. *Target Acquisition.* Modem Threat weapons systems often have sensors capable of locating and identifying targets. All soldiers and units should protect themselves from target acquisition.

b. *Intelligence Production.*

(1) Predicting Future Activities. The Threat uses its sensor systems to locate and identify large US Army formations and headquarters and to predict their future activities. Threat detection of our activities in the rear area, such as at logistics centers, also reveals our intentions.

(2) Tactical Reconnaissance. The Threat uses tactical reconnaissance to provide additional information on US forces' dispositions and the terrain in which they operate. Threat tactical reconnaissance also attempts to identify targets for later attack by long-range artillery, rockets, and aircraft.

2-2. Organization. The Threat conducts reconnaissance activities at all echelons. Troop reconnaissance is usually conducted by specially trained units. The following summarizes the types of Threat units that have specific intelligence collection missions:

a. *Troops.* The Threat uses ordinary combat troops to perform reconnaissance; one company per battalion specifically trains to conduct reconnaissance operations behind enemy lines.

b. *Motorized Rifle and Tank Regiments.* Each of these units has a reconnaissance company and a chemical reconnaissance platoon.

c. Maneuver Divisions. Divisions have a reconnaissance battalion, an engineer reconnaissance platoon, a chemical reconnaissance platoon, and a target-acquisition battery.

2-3. Doctrine.

a. *Observation Posts.* Threat doctrine provides for each battalion to continuously maintain two observation posts when in close contact with OPFOR. An additional command and observation post is established when the battalion is in the defense or preparing an offensive.

b. *Patrols.* Patrolling is employed extensively but particularly during offensive operations. The Threat uses patrols to detect the location of opposing indirect- and direct-fire weapons, gaps in formations, and obstacles and bypasses.

c. Raids. Threat forces use raids to capture prisoners, documents, weapons, and equipment. A reconnaissance-in-force (usually by a reinforced company or battalion) is the most likely tactic when other methods of tactical reconnaissance have failed. The purpose of the reconnaissance-in-force is usually to deceive us into thinking that we are being attacked, causing us to reveal our defensive positions.

2-4. Sensor Systems. The Threat uses many different types of electronic surveillance equipment. The following is a discussion of Threat surveillance capabilities:

a. *Classification.* Sensor systems are classified according to the part of the electromagnetic (EM) spectrum in which they operate. Figure 2-1 shows the parts of the EM spectrum that are of concern to soldiers. Sensor systems are also categorized as either active or passive.

(1) Active. Active sensors emit energy that reflects from targets and is recaptured by the emitting or other nearby unit, indicating the presence of a target. Examples of active sensors are searchlights and radars.

(2) Passive. Passive sensors emit no energy. This type of sensor collects energy, which may indicate the presence of a target. Examples of passive sensors are the human eye, night vision devices, and photographs.

b. *Visual Sensors.* Visual sensors work in the parts of the EM spectrum that are visible to the human eye. Enemy soldiers' eyes are the most plentiful sensors on the battlefield. Their vision may be aided by binoculars, telescopic sights, and image intensifiers. Civilian populations, enemy agents, reconnaissance teams, and patrols are visual sensor systems from the enemy's intelligence viewpoint.

(1) Image Intensifiers. Image intensifiers are passive night observation devices that amplify low-level light present on even the darkest night. These devices are used for surveillance and as weapon sights on small arms and vehicles. Airborne platforms are also capable of supporting image intensifiers.

(2) Low-Light Television (LLTV). LLTV combines image intensification with television technology and is usually mounted on airborne platforms.
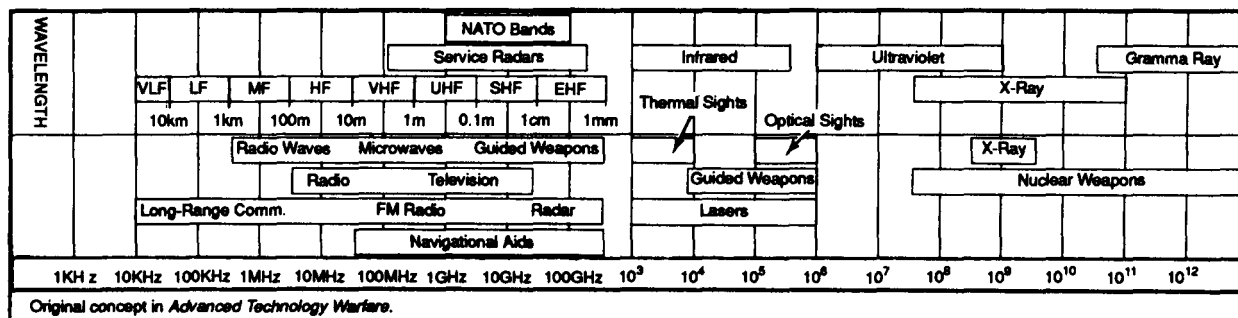
WAVELENGTH

| NATO Bands |
| Service Radars |
| Infrared | Ultraviolet | Gramma Ray |

| VLF | LF | MF | HF | VHF | UHF | SHF | EHF | | | X-Ray |
| 10km | 1km | 100m | 10m | 1m | 0.1m | 1cm | 1mm | Thermal Sights | Optical Sights |

Radio Waves	Microwaves	Guided Weapons			X-Ray
Radio	Television		Guided Weapons	Nuclear Weapons
Long-Range Comm.	FM Radio	Radar	Lasers
Navigational Aids

1KHz 10KHz 100KHz 1MHz 10MHz 100MHz 1GHz 10GHz 100GHz 10^3 10^4 10^5 10^6 10^7 10^8 10^9 10^{10} 10^{11} 10^{12}

Original concept in *Advanced Technology Warfare*.

Figure 2-1. Electromagnetic Spectrum

(3) Aerial Reconnaissance, Remote Sensing, and Imagery. Aerial photography, sattelite imagery, and video imagery allow visual information to be recorded and subsequently studied. Video systems allow transmission of visual images to the ground while the manned aircraft or drone is still in flight.

c. *Near Infrared (NIR) Sensors. The* next most common Threat sensor is NIR. They are classified as *near infrared* because they use radiation near the visible portion of the EM spectrum. NIR energy reflects well from live vegetation but not as well from dead vegetation and most man-made materials. NIR sensors, such as a camera using camouflage-detecting (false-color) film and NIR sights and periscopes, allow the human eye to detect targets based on differences in their reflection of NIR energy. NIR sensors are partially blocked by fog, mist, and smoke operations, although not as completely as visual sensors are blocked. Most Threat combat vehicles use active NIR sensors that employ searchlights, periscopes, and sights. Threat forces are slowly replacing these NIR sensors with image intensifiers.

d. *IR Sensors.* IR sensors detect the differences in heat energy radiated by objects on the battlefield and display the differences as different colors or shades. Since the waves detected by these systems are further from visible light than NIR waves on the EM spectrum, IR waves are less affected by fog, mist, or conventional smoke.

Military items are usually hotter or cooler than their surroundings. For example, operating vehicles and generators, heated buildings or tents, and soldiers are usually hotter than their backgrounds. Metallic surfaces lose heat faster than natural vegetation, so parked vehicles, cargo trailers, tankers, and unused weapons are usually cooler than their surroundings.

(1) Forwad-Looking Infrared (FLIR). Sophisticated enemy passive IR sensors are usually aircraft-mounted such as the FLIR system.   FLIR provides the aircraft crews with real-time information displayed on television-type screens.

(2) IR Films. Special IR films record temperature differences. Reconnaissance aircraft usually employ this type of sensor system.

e. *UV Sensors.* UV is the part of the EM spectrum just below visible light. UV sensors are more important in snow-covered areas because snow reflects UV waves well and most white paints and man-made objects do not reflect UV waves very well. Photographic intelligence systems with simple UV filters will highlight military objects as dark areas against snow-covered backgrounds. Camouflage in snow-covered backgrounds requires specially designed camouflage that provides a high UV reflectance.

f. *Radar.* Radar uses radio waves to penetrate fog, mist, smoke, and even canvas and wood. Radar works by transmitting a very strong burst of radio waves, then receiving and processing the reflected waves. In general, metal objects reflect radar waves well, while radar waves are absorbed by or pass through most other objects. The shape and size of a metal object will determine the strength of the reflected signal. A large metal object generally reflects more signal than a small object. Therefore, large metal objects can be detected from greater distances. The method by which the received radio wave is processed determines the type of radar. Radar systems commonly used against ground forces on the battlefield include—

(1) Moving Target Indicators (MTIs). When any EM wave hits something that is moving, it is reflected and changes frequency. The faster the object moves, the more the frequency changes. The simplest and most common battlefield radars detect this frequency change. The radar unit changes the signal into a sound for the radar operator to hear. Threat forces use this type of radar for target acquisition.

(2) Imaging Radars. An imaging radar's receiver and processor are so sensitive that an image of the detected object is displayed on a scope. Imaging radar is generally used on airborne platforms, such as side-looking airborne radar (SLAR).

(3) Countermortar and Counterbattery (CM and CB) Radars. CM and CB radars usually transmit two beams of energy that sweep above the horizon. An artillery or mortar round or a rocket passing through the beams reflects two signals that are received and plotted to determine the origin of the round.

g. *Acoustic Sensors.* There are two types of enemy acoustical systems:

(1) Human Ear. Every soldier, whether engaged in normal operations or at a listening post, is an acoustic sensor. However, the human ear is easily deceived and relatively inaccurate. Visual confirmation is usually required.

(2) Flash-Sound Ranging. Flash-sound ranging is used against artillery. Light travels at a much faster speed than sound. By accurately measuring the time between seeing a muzzle flash and the arrival of the sound, enemy sound-ranging teams can accurately measure the distance to the

gun tube. If two or more sound-ranging teams hear the sound, the sound-ranging analyst simply plots the ranges on a map as arcs. The target is located where the plotted arcs intersect.

h. *Radio Sensors.* The Threat makes a great effort to search for, detect, and locate the sources of US radio communications. Threat forces use various direction-finding techniques to locate opposing emitters.   Once an emitter is detected, the enemy can take a number of actions, ranging from simply intercepting the transmissions to jamming or targeting the emitter for destruction. See FM 34-1 for more details.