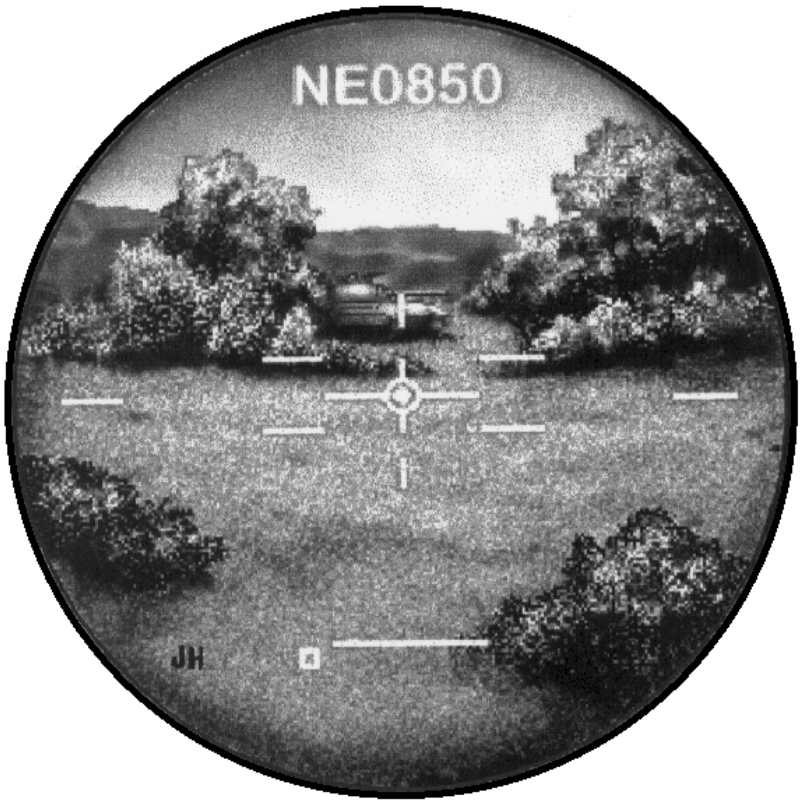
An Azimuth Indicator for Tank Gunners?

by First Lieutenant Curtis Taylor



Red 1, Red 3, I've got two stationary tanks left of TRP 2, over.

Roger 3, I can't identify them, can you send me a grid?

This is 3, working on it — I'm taking near misses! — How 'bout a little help?

3, I can't help you if I can't find the targets — send me a grid!

Red 1, this is Red 4 — 3 is down — did anyone see who shot him?

Negative, we lost 'em.

Anyone who has commanded a tank or Bradley has undoubtedly encountered a situation similar to the one described above. It is an unfortunate reality of combat that the element with the most critical information is often too focused on his own individual crisis to relay information to the rest of his element. During those critical seconds, the tank commander is trying to maneuver his tank, issue a fire command, and fumble with his map to send an accurate spot report. Naturally, his tendency toward self-preservation will take priority. For this reason, the tank or section in contact will fight for its life while the remainder of the element waits helplessly for information.

The problem is often more frustrating for the gunner — who is, in most cases, the first to identify a target. He can see the enemy clearly, but he has no idea where his tank is located or in what cardinal direction his gun tube is pointing. In the past, the tank commander would drop down to the gunner's primary sight extension (GPSE), identify the target, and try to estimate its location. However, with the new CITV, the TC's role has expanded from merely confirming targets to seeking out new ones. If, instead, the gunner had an accurate means to communicate in which direction he was looking, he or his TC could send that information over the platoon net and quickly bring the firepower of his whole platoon to bear.

History has shown, over and over again, that the success of an entire mission is often decided in these first few minutes after the initial contact. This success is contingent upon how quickly the unit as a whole can react and deploy against the threat. The key is information flow, as General S. L. A. Marshall knew when he wrote in *Men Against Fire*, "strength will multiply and decisive action will become possible at the rate at which information flows to all concerned." (p. 128)

The designers of the new IVIS system have appropriately identified this and made dramatic improvements in the situational awareness of all elements on the battlefield. As one tank identifies a target, an electronic spot report immediately flows to all others on the network and an enemy icon appears on the map display. This system will revolutionize our ability to react to contact.

However, it does not go far enough. In order to bring effective fire upon that icon on his screen, the tank commander still needs to translate what he sees into information his gunner can use. He does this in the same way TC's have since World War II — by yelling "traverse left" or "traverse right" until the gunner identifies the target — a very imprecise method, especially when dealing with long range targets that easily blend with their background.

In the fight, a tanker — and particularly a gunner — thinks in terms of polar coordinates (direction and distance) rather than Cartesian coordinates of latitude and longitude. Communication between a gunner and tank commander will always be in relation to direction and distance. For this reason, both gunner and tank commander should have the target information available to them in this format. Specifically, both gunner and TC should have a readout of the grid azimuth of the gun tube in their respective reticles. This is the information most useful to them, and the technology they operate should support that need.

The far-target designate system on the M1A2 uses a north-seeking gyroscope to compute the direction to enemy targets as it determines their location. The technology, therefore, is already on the tank — all that is needed is a simple modification to provide that information to the TC and gunner.

Instead of slowly talking the gunner onto the target while constantly referring back to his IVIS terminal, the tank com-

mander could immediately relay the direction to the gunner with great precision. He can then return to scanning the terrain from the hatch, or from his CITV, without concern that the gunner is looking in the wrong direction. Future gunnery training could incorporate this practice into the standard fire command for IVIS-initiated engagements. *"Gunner sabot tank 2100 mils."* This will, obviously, not replace the need for constant scanning of the terrain or good target acquisition training. However, the emergence of sophisticated surveillance equipment, from satellites to UAVs, has increased the likelihood that an approaching enemy will appear on a tank commander's computer terminal long before it comes within visual range. A gunner could then point his reticle in the direction of his designated target and wait for the target to appear.

Not only would the azimuth display greatly enhance the precision of spot reports, but it would also create an entirely new method for a platoon leader to control and distribute the fires of his platoon. The platoon leader could quickly divide approaching IVIS targets by issuing approximate mil directions for each of his tanks (provided to him by his terminal). Each gunner then reports when he can identify his target and the precise mil direction. At the appropriate time, the platoon leader issues a fire command destroying four distinct targets. Immediately after the engagement, each tank returns to its designated sector of fire (marked by two mil directions). There is only minimal risk of "double-pumping" a single target because the platoon leader should be able to identify when two tanks are aiming at the same target.

Observer controllers at the NTC frequently criticize tank platoons for failing to establish and adhere to individual sectors of fire — particularly in the offense. Furthermore, these sectors are rarely properly adjusted as the tactical situation develops. The result is wide gaps in observation and an immediate focus on the first target that presents itself.

With an azimuth display, a platoon leader can establish sectors of fire based on azimuths rather than terrain features, which are often difficult to describe over the radio and tough to identify at night. If a gunner knows his sector is from 2400 to 3000 and he hears a report of tanks at 2150, he knows to remain in his sector unless given instructions otherwise.

In the defense, a tank platoon leader with a map and a protractor can also plot his platoon sector sketch with unprecedented accuracy to ensure he has no gaps in his security plan. He can identify likely avenues of approach by their numeric azimuth, making them much easier for gunners to identify at night. He can also identify areas where friendly forces are operating and require confirmation to fire into these areas. For example, *"Second Platoon is on our right flank — all fires to the right of 50 mils must be confirmed by Black 6."*

This system will also affect the communication between tanks in a platoon. A gunner could instantly react to a report on the platoon net of enemy tanks at 1400 mils without the need for translation from his TC. The same scenario described earlier might sound something like this:

Red 1, Red 3, I've got two stationary tanks at 850, over.

Roger 3 — I've got 'em. Red 4, you monitor?

This is 4 — Roger — I'm on 'em.

Okay, Bravo section, 2 rounds sabot, at my command, stand-by.

Alpha section continue to scan 1200 to 1800.

An azimuth indicator will also have a tremendous impact on the M1A2's effectiveness against aircraft. The new rapid pulse range finder on the M1A2 has, for the first time in history, made the main gun of a tank a legitimate threat to low flying aircraft. The sophisticated fire control system, however, does not eliminate the human aspect of the problem. The gunner, with an extremely limited field of view, has only a split second to acquire his target before it has passed him by. Anyone who has tried to acquire low flying OPFOR A-10s at the NTC can relate to this problem. A spot report of *"Incoming Bandits, East"* still doesn't provide the precision the gunner needs to ensure he is pointed in the right direction when an aircraft emerges over the horizon. Imagine if a tank commander, viewing his IVIS display, receives a report of an incoming aircraft at 1500 mils and 5 kilometers. He immediately passes the azimuth to his gunner who focuses on the horizon in that direction. Once the aircraft comes into visual range, the gunner can immediately begin tracking him, and, once within range, open fire. If this scenario were repeated in every tank in a platoon, an enemy aircraft would encounter a deadly and somewhat accurate hail of main gun rounds before he had the chance to make even a single pass.

In May of 1940, the German Army effectively annihilated the most powerful armored force the world had ever known in the span of four weeks. Although numerous causes are attributed to this success, one of the most significant was the presence of a radio in every tank. Few anticipated the incredible synergistic effects that were realized when a armored force could communicate effectively and quickly relay critical information to every combat element. As a result, the Germans, despite their inferior firepower, could develop the battle quicker and retain the initiative.

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Half a century later, that principle holds true. Battles are ultimately won or lost at the point of initial contact. An army that can react faster at that moment and deploy its forces will gain the initiative despite inferior numbers or equipment. The timely flow of information is fundamental to this process. But that information is only valuable if it has meaning to the actual combatant — the man who pulls the trigger. In armored warfare, that man is the gunner. The battle then hinges on passing information to this one man that he can readily translate into steel on target. Since gunners see the world in terms of direction and distance, information flowing to them should be in this format. Therefore, we need a simple way for the gunner to receive and send information about what is in his reticle. An azimuth indicator in the gunner's sight picture will accomplish this feat. It is a fairly simple mechanism, utilizing existing technology on the M1A2, that will revolutionize the way tankers communicate within a crew and within a platoon. Most importantly, it will allow a tank platoon to apply its full firepower instantly and accurately upon an enemy threat.

1LT Curtis Taylor is a graduate of USMA and the Armored Officer Basic Course. He has served as a tank platoon leader and support platoon leader and is currently the battalion maintenance officer of 1-12 Cavalry at Fort Hood, Texas.