

# CHAPTER 14

## Situation Awareness

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**Abstract:** Operational training requirements for future Infantry teams must be derived from mission essential task lists that encompass the entire range of military situations from mid-intensity combat in urban environments to peace keeping and peace enforcement. The first requirement for situational awareness is team cohesion under fire. The second is mission orientation, the ability to act consistent with the commander's intent, and to adjust rapidly to new circumstance.

**sit-u-a-tion** *n.* 1. Manner in which a thing is placed in relation to its surroundings; location; position 2. a place; locality 3. position or condition with regard to circumstances 4. a) the combination of circumstances at any given time b) a difficult or critical state of affairs c) any significant combination of circumstances developing in the course of a novel, play, etc. d) *Psychol.* The objective conditions, environment, stimuli, etc. immediately affecting an individual 5. A position of employment

**sit-u-a-tion-al** *adj.* 1. of or resulting from a situation 2. altered to fit a specific situation

**a-ware** *adj.* 1. Orig., on one's guard, vigilant 2. Knowing or realizing; conscious; informed - **a-ware'ness** *n.*

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### Situation: Awareness for What Purpose?

Operational training requirements for future Infantry teams ought to proceed from a thorough understanding of environments in which these must be prepared to operate. Mission essential

task lists (METL) for training can then be derived from that understanding.

Two pitfalls obtrude: the first is propensity to relate future situations solely to Infantry's canonical combat mission - "to close with and to destroy the enemy by means of fire and maneuver, or to repel his attack by fire, close combat and counterattack." The second, a corollary of the first, is presumption that training for Operations Other Than War (OOTW) is a less demanding undertaking, often entailing operational training requirements inconsistent with maintaining Infantry's warrior ethic.

Concerning the first fallacy, Infantry requirements for situation awareness have for decades transcended its functions in close combat. In November 1971, William E. DePuy, then a Lieutenant General and Assistant Vice Chief of Staff of the Army, lectured at the Infantry School on "The Future of Infantry." DePuy cited statistics that showed that enemy casualties caused by the basic Infantry weapon had been declining for centuries, and that the percentage of Infantry effort devoted to finding the enemy, as opposed to fighting him, had been rising over the same period. He averred that technology was changing the Infantry mission as dramatically as that of other arms. Then he shocked students and members of the faculty by pointing out that, while the Infantry's own statement of its mission had remained unchanged since 1941 ["to close with and destroy..."], in practice its mission in Europe during World War II had been "to move the Artillery Forward Observer to the next hill." It should be noted that General George Patton, who headed the board of officers convened for an after action review in 1945, concluded that U.S. artillery had "won the war," and almost certainly would have agreed with DePuy's characterization of the Infantry's role.

Infantry is demonstrably the most versatile arm of our Army. The main advantage of Infantry over other elements of our armed forces is discrimination. Human eyes, and human minds examining any situation on the ground can best judge when that situation requires lethal force, and most surely determine how to apply that force with minimum unintended side effects.

Would that all young Infantrymen could be mentored as was I by General Harold K. Johnson. When he was the Deputy

Chief of Staff for Operations, he taught me a most memorable lesson about operational training requirements. One day in the spring of 1963 I entered his office with a dozen other majors of the Army Staff to brief him on certain matters pertaining to the war in Southeast Asia. I had been sitting on a board considering the adoption of the 5.56mm rifle, and was surprised to find that the General had that weapon on his desk. He handed it to me, and told me to explain to the others the purpose of such a weapon. I started with the mission of the Infantry "to close with and destroy..." He cut me short, and handed the rifle to another officer. The latter reworded my statement, only to lose the weapon to his neighbor. One by one, we tried all sorts of variants on the rifle as an instrument for killing, capturing, or disabling an enemy, but the General kept expressing displeasure, and moving the weapon to the next man. Finally he made this point:

Gentlemen, modern wars are not internecine wars, in which the killing of the enemy is the object. The destruction of the enemy in modern war, and indeed, modern war itself, are means to obtain that object of the belligerent which lies beyond the war. The soldier shoots his rifle so that his comrade can advance, and by so moving, rifleman by rifleman, our army asserts control over enemy territory and enemy people. This rifle, and any one of our other weapons, is a means to the end of control.

You should know that I have been quoting from General Orders Number 100, and that appraisal is as valid at this moment as when the War Department published that Order in April 1863.

I would extrapolate from General Johnson's lesson that Infantry is the arm of choice when the objective of any operation is the imposition of U.S. control - as was the case in Panama, Haiti, and Kuwait, and as it would be were our forces to be sent into a Kosovo-like situation. I believe firmly that Infantry's situational awareness must draw upon the full prowess of our intelligence community. Moreover, it constitutes one of the more daunting challenges for our technologists, for over the past century changes in warfare have dramatically raised requirements for Infantry situational awareness. Between 1860 and 1990, per

Infantry unit of about 600 men, area controlled has increased by 3 orders of magnitude, firepower by 2.5 orders of magnitude, and dispersion (lower density) by 1 order of magnitude. In the future, small Infantry teams, their situational awareness enhanced by oncoming technology, will be able to exert decisive control over even larger areas.

Situation awareness for close combat should be regarded as a subset of that for control. Let those who suppose that peace-keeping and peace enforcement detracts from the warrior ethic remember that control in any situation is better assured when hostiles, neutrals, and allies alike are convinced that U.S. Infantry can resort to deadly force in an instant, and can do so with telling effect and with minimum collateral damage.

### Awareness: Of What?

Many who have glibly addressed requirements for situational awareness have failed to appreciate that there are profound differences in those requirements among the four armed services. For instance, it is important to understand that simple awareness of the location and status of our own forces is far more problematic on the land than on the sea or in the air.

The following table compares typical forces under command of a three-star flag officer of each service. The array, left to right, compares relative ease of gaining and maintaining situational awareness. "Moveable subordinate entities" are numbers of ships, flights of aircraft, armored fighting vehicles, or dismounted elements that maneuver responsive to a single leader; these spread by orders of magnitude across the four services. The problem is most complex in an Army corps. For the reasons depicted on the chart, keeping track of where these entities are, and orchestrating what they are doing, is significantly more difficult than it is in the other services. In the current Army, situational awareness depends upon an extensive, hierarchical command and control apparatus:

# SA for Future Infantry Teams

	USN	USAF	USMC	USA
	☆☆	☆☆☆	☆☆	☆☆☆
MOVEABLE SUBORDINATE ENTITIES	10 <sup>1</sup> -10 <sup>2</sup>	10 <sup>2</sup> -10 <sup>3</sup>	10 <sup>3</sup> -10 <sup>4</sup>	10 <sup>4</sup> -10 <sup>5</sup>
RANK OF SUBORDINATE LEADERS	HIGHEST	—————→		LOWEST
COMMUNICATION WITH SUBORDINATES	BEST	—————→		WORST
INFORMATION RE SUBORDINATES	PRECISE	—————→		VAGUE
TACTICAL FLEXIBILITY	GREATEST	—————→		LEAST
COMMAND PRINCIPLE	CENTRALIZE	—————→		DECENTRALIZE

Within a force operating amid the uncertainties and clutter of the surface of the earth, the greatest contribution of improved situational awareness would be to lend purpose and cohesion to its disparate elements as they seek to act on the intent of commanders.

The challenge is greatest for those who fight on foot, where each soldier is dependent on his own physical and spiritual resources, buttressed neither by vehicles, large guns nor other impedimenta. The masterpiece on the Infantry problem remains S.L.A. Marshal, who in his classic *Men Against Fire* (1947) posited "combat isolation" as a fundamental dysfunctional phenomenon. During training, the Army's ancient forms of regimentation convey a sense of a huge, overpowering, interactive organism capable of advancing inexorably through whatever hostile resistance it may encounter. This misleads the Infantry soldier, leaving him unprepared for the day when his will and his courage may determine whether the Army will move at all. The nearer that soldier approaches battle, the stronger his misapprehension becomes. Activity of aircraft, ships, guns, and other units creates in him the expectation of overpowering strength, and renders the awesome loneliness and emptiness of the battlefield the more debilitating:

...The distant sounds of battle... are impersonal ... they produce no dispersion in the force right around him... The unit enters upon the battlefield and moves across ground within range of the enemy's small arms. The enemy fires. The transition of that moment is wholly abnormal. He had expected to see action. He sees nothing. There is nothing to be seen. The fire comes out of nowhere. He knows that

it is fire because the sounds are unmistakable. But that is all he knows for certain...The men scatter as the fire breaks around. When they go to ground, most of them are lost to the sight of each other. Those who can still be seen are for the most part strangely silent. They are shocked by the mystery of their situation. Here is surprise of a kind which no one had taught them to guard against. The design of the enemy has little to do with it; it is the nature of battle which catches them unaware. Where are the targets? How does one engage an enemy who does not seem to be present? How long will it be until the forces opposite begin to expose themselves and one's own forces will rally around the tactical ideas which training had taught them would prove useful?...There is none present to tell this rifleman and his comrades that this is normal and that only his personal reaction to it may change with time. He may go on and on through repeated engagements and never know a situation that is more tangible. In essence it is against this very situation that his unit must find the means to rally if it is to succeed in battle...The enemy fire builds up. Its aim becomes truer. The men spread further from each other, moving individually to whatever cover is nearest or affords the best protection. A few of them fire their pieces. At first they do so timidly...Others do nothing...Such response as the men make to the enemy fire tends mainly to produce greater separation in the elements of the company, thereby intensifying the feeling of isolation and insecurity in its individuals...

One must come to rest on Clausewitz's gloomy warning that: "In war the novice is only met by pitch black night. " On beyond that are to be read the words: "It is of first importance that the soldier, high or low, should not have to encounter in war things which, seen for the first time, set him in terror or perplexity."

That is the desired goal - to shed such a strong light in training that it will dispel much of the darkness of battle's night. We have the word of the nineteenth's great military thinker that it can be done. It remains a hope for those of us who weigh the military problems of the new age...

Marshall wrote before the advent of TRAINFIRE and Tactical Engagement Simulation. In a note for the 1961 edition of Men Against Fire he lauded the former, and there is every reason to believe that had he lived to see training exercises like those at the National Training Center, he would have approved heartily. But with "digitization" it now appears possible to develop in training a wholly new mental construct of battle for each Infantry team, and to provide its members with reliable counters to combat isolation. Situational awareness must, first and foremost, weld together Infantry teams with assured information as to where each soldier is relative to his leader, and to his fellows of the team.

Within that fraction of U.S. Army mounted units that is undergoing "digitization," situation awareness is embodied in a graphic depiction on a screen in each combat vehicle that presents the situation dynamically as an overlay upon a conventional, two-dimension-map. The problem of how to present comparable information to Infantry under fire remains unsolved.

The current approach of "Land Warrior" that relies on a heads-up display and in-the-ear audio seems quite inapt for the circumstance depicted by Marshall - close encounter with a deadly enemy - especially when the desired response includes sensing the location of friend and foe, firing a weapon, and purposeful movement.

I have advocated a display mounted on the weapon-support forearm simply because that area is naturally within the scan of a firing soldier. A simple plot of relative position of self, leader, and team members thereon would do much to evoke a coherent team response.

I have before me a Land Warrior Functionality Design Document approved by the TRADOC Systems Manager, *inter alia*. It describes a communications/computer system that will provide a wide range of information to each Infantryman. Indeed, Land Warrior's stated purpose is to amplify individual performance:

To improve the fightability of each dismounted soldier in the Army Infantry platoon by integrating him into the evolving digital battlefield. Improved soldier fightability includes enhancements to lethality, command & control, survivability, mobility and sustainment capabilities.

Embedded in the Land Warrior computer are the system operations manual and eight field manuals. There are elegant provisions for preparing and for transmitting formatted messages and orders (warning, operations, or fragment), for navigating (including map displays), and even for video scene capture and transmission. But the document is silent on how Land Warrior should function for situational awareness in a firefight. I believe that some of the documentation and process functionality might usefully be traded for the latter form of "fightability."

Of course leaders of Infantry units require access to the same digitized system of command, control, communications, and intelligence as their mounted counterparts. In fact, their need for powerful, speedy computers with large, facile storage is far greater. Paradoxical as it may seem, dismounted Infantry, commonly regarded as the most primitive form of modern force, demands more of "digitization" than do mounted forces. A moment's reflection will suffice to remind that a fold in the ground that would be inconsequential to an armored fighting vehicle or a helicopter might constitute cover or concealment for an Infantry unit. For example, while the Army's stated requirement for digital terrain elevation data (DTED) to support strategic and operational maneuver is one elevation posting per 30 square meters (DTED 2), its requirement for tactical maneuver is one elevation posting per 1 square meter (DTED 5)—900 times more elements of data to record the accidents of the ground. To this elevation precision there must be added even more complex data on vegetation and the works of man where these affect observation, fields of fire, cover and concealment. Moreover, while a situation can be satisfactorily portrayed for mounted troops by showing vehicles, dismounted Infantry requires plotting individual persons—again multiplying the number of entities that must be managed.

Land Warrior is supposed to facilitate situational awareness for dismounted leaders from battalion down to squad. The limitations of its display, radio, and power supply suggest that a supplemental interface with the Army Battle Command System (ABCS, the "digitized" system) will be necessary to take full advantage of ABCS. For this reason I have proposed a backpack version. In April 1999 ABCS will issue for mounted battalions a set of UNIX-based laptops; one of these computers and associated communications might well be modified for dismounted operations.

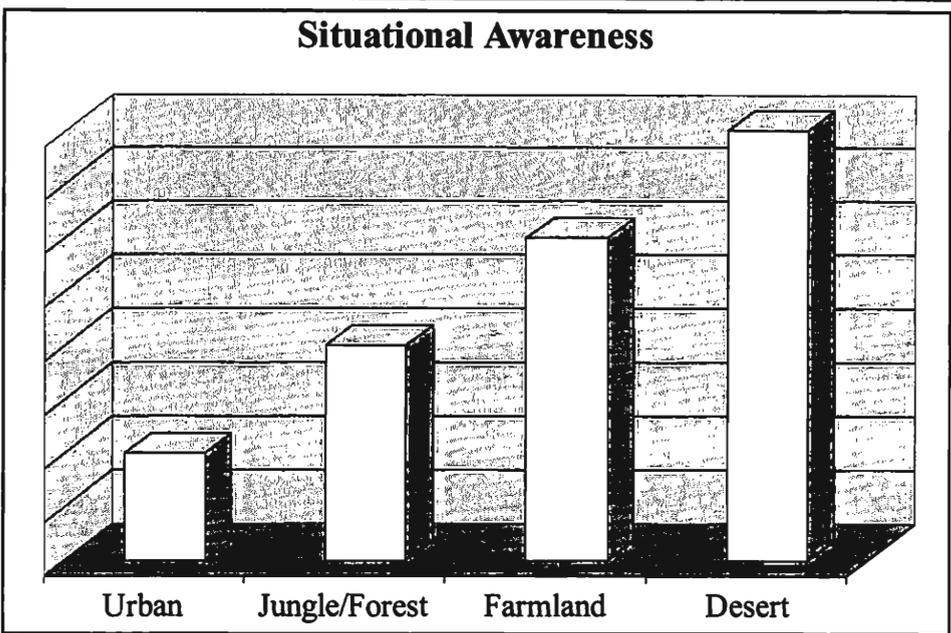


Figure 1. Situational awareness and battle environment.

Figure 1 makes the point that situational awareness is relatively disadvantaged in environments that limit observation and fields of fire, and provide ample cover and concealment. Cover and concealment detract from situational awareness not only because they make it harder to locate the enemy, but also because they have the effect of "fractionalizing" - dividing friendly forces into uncoordinated parts. Men Against Fire has a chapter headed "The Multiples of Information" that describes "informational strength" and "weapon strength" as "the complementary halves of moral strength." In Marshall's view, American Infantry were stronger with weapons than they were with information, and he held that "information is the soul of morale in combat and the balancing force in successful tactics."

In combat almost nothing has the appearance of juncture and of hanging together. Viewed from above, an attack would appear not unlike the disparate movements of a colony of water bugs. The first effect of fire is to dissolve all appearance of order. This is the most shocking surprise to troops who are experiencing combat for the first time. They cannot anticipate the speed with which their own forces become fractionalized or the extent to which the fractions will become physically divorced from each other as the movement is extended and enemy resistance stiffens.

During Normandy fighting there was much emphasis on the ill effect of the bocage country in compelling a rapid breakdown of the smaller tactical units, thus compounding the difficulties of control. But this was no new problem in tactics. The main difference was that the hedgerows and their effect on a formation were fully visible to the naked eye. It was easy to see what was happening and why.

But a comparable effect is produced in almost any terrain which can serve Infantry forces, including most desert country. It is not the accident of ground which produces the effect but the simple fact that man must take advantage of the accident in order to survive. House-to-house fighting in a town or city (and regardless of what the book says, this is always a catch-as-catch-can business) will split a company apart more quickly than any other kind of action. The hedgerows notwithstanding, in Normandy it was relatively easier for forces to maintain contact among their own elements than in campaigns occurring at the same time in the Central Pacific where troops were advancing across flat, palm-covered islands.

The remedy to "fractionalization" is information: situational awareness. Marshall pointed out that the Army did relatively well with information flowing rearward, but was abjectly clumsy with passing information laterally to the flanks. Arbitrariness and inertia played a role, but few leaders understood that the passing of lateral information at platoon, company, and battalion level is frequently essential for carrying out the commander's intent. Commanders at the lower levels were too often neglectful of the principle that they were not only a channel of information, but also a distribution point.

Perhaps the greatest advantage that will accrue to Infantry teams with advanced situational awareness is the ability to adapt to unforeseen circumstance. One of the key bridgeheads over the Merderet River in Normandy was occupied by four successive small American Infantry units, who, unaware of the strategic importance of the position, moved on to other missions they deemed more important. Eventually, a major attack had to be launched to seize the bridgehead. I have personally interviewed

veterans of the 10th Armored Division, the original occupiers of Bastogne, who were entirely ignorant that they had moved onto center stage in the unfolding drama of the Battle of the Bulge, and behaved as had been their wont in routine attacks across France. Fifty years ago changes to strategic and operational circumstance were communicated by happenstance; with tomorrow's situation awareness, such communications ought to be assured for any commander.

Lower echelons will inevitably see any situation with different eyes, and with different brains from that of their higher commander, and there will be rich tactical, operational, and strategic rewards for an army able to refocus to realign its missions to meet un-provided-for situations. Warfare of widened deployments and increased dispersion, with frequent shock use of troops dropped suddenly upon decisive targets, entails combat in which initially there will be little contact among friendly units, and situation awareness will vary widely among them. Hence mission orientation will come to have many times its previous importance in operational training.

The need for a clearer concept of [the principle of the objective]... is not greater than the need for junior commanders who will take a keen interest in the larger affairs of war and for higher commanders who make it a practice to get down to their troops. More appropriate to what we will know in the future to what we have experienced in the past is that old truth: It is not always possible to lead from behind. - S.L.A. Marshall, *Men Against Fire*.