REENACTORPRO

PRO TIPS:
Map Reading

Lesson 5: Terrain Analysis

References: **FM 101-5 ;** Map lesson 4 (Fort Indiantown Gap) in the Maps section.

Study assignment: read FM 101-5 Appendix II (Terrain Appreciation), then go through this lesson and take the self-assessment quiz at the end.

> *When all is said and done, it really is the commander's coup d'œil, his ability to see things simply, to identify the whole business of war completely with himself, that is the essence of good generalship. Only if the mind works in this comprehensive fashion can it achieve the freedom it needs to dominate events and not be dominated by them.*
>
> —Carl von Clausewitz
>
> *Vom Kriege*

The coup d'oeil militaire

The French do have a word for it: the military stroke of the eye. It has come down to us as one of the most important attributes of a commander (just below "luck"). It is the ability of a commander to capture at a glance the military potential of a piece of terrain. Terrain shapes, limits, and guides a battle; a commander can organize and army his forces in any way he wishes, but the ground remains the same.

Reenactors generally have a rather limited understanding of the ground—usually limited to something like "higher is better." In fact, the possibilities of terrain are formed of several variables that interact with each other and with the forces deployed.

The five terrain factors listed in your study assignment from the 1940 edition of **FM 101-5** had by 1944 been rearranged to a more complete set: *cover and concealment; observation and fields of fire; obstacles; key terrain*; and *avenues of approach*, usually abbreviated as COKOA or, after the war, OCOKA. Let's look at what they mean to a leader.

Cover and concealment

What is the difference between cover and concealment? If you are concealed, you can still be shot by accident. If you are covered, nothing can touch you. It's the difference between "hide" and "get behind something."

And remember: *if the enemy is in range, so are you.*

All in all, I'd rather be covered *and* concealed.

Concealment can be obtained by any number of measures. Excellent cover and concealment comes from a reverse slope defense, which denies the enemy a view of you until the last minute (Wellington used reverse slope defense adroitly at Waterloo, for example), but if you are behind the hill it's hard to enjoy observation and fields of fire. Excel-

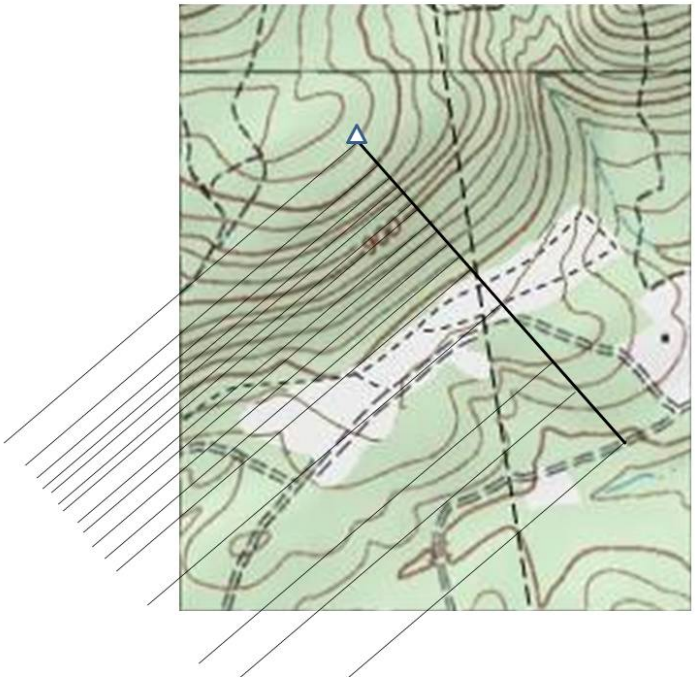
lent observation and fields of fire can be had by occupying positions on the front slope, but it's harder to provide cover and concealment, and if you have to withdraw from front slope positions you will likely be exposed to enemy fire.

Observation and fields of fire

In plain terms, "can you see the sons of bitches, and can you shoot them?" Observation is gained by terrain elevation and lack of clutter in the line of sight—"clutter" being trees, buildings, and other things in the way. Fields of fire are important because there has to be a clear path for you to shoot. In setting up a defensive position, for example, a unit might have to clear vegetation to the front enough to engage the enemy. Of course, you don't want to clear everything away—cleared areas are easy to spot and, as we like to remind ourselves, "if you can see the enemy, he can see you."

Here's a factor often forgotten: just because you're on high ground doesn't mean you have a big advantage. Let's say we have occupied a ridge line with a good view of low ground to the front. But the slope of the downhill part can create *dead space*: an area to your front shielded from your observation and fire by the contours of the ground. Union brigades pinned by Confederate fire in the assault on Marye's Heights above Fredericksburg took advantage, if you can call it that, of a foot or so of dead space.

Here's an example from the map of Fort Indiantown Gap:



In this case, an observation post (OP) is to be established near the crest of high ground to the north (blue triangle)a soldier at that OP should be able to see the road to the south along the line of sight shown by the bold black line.

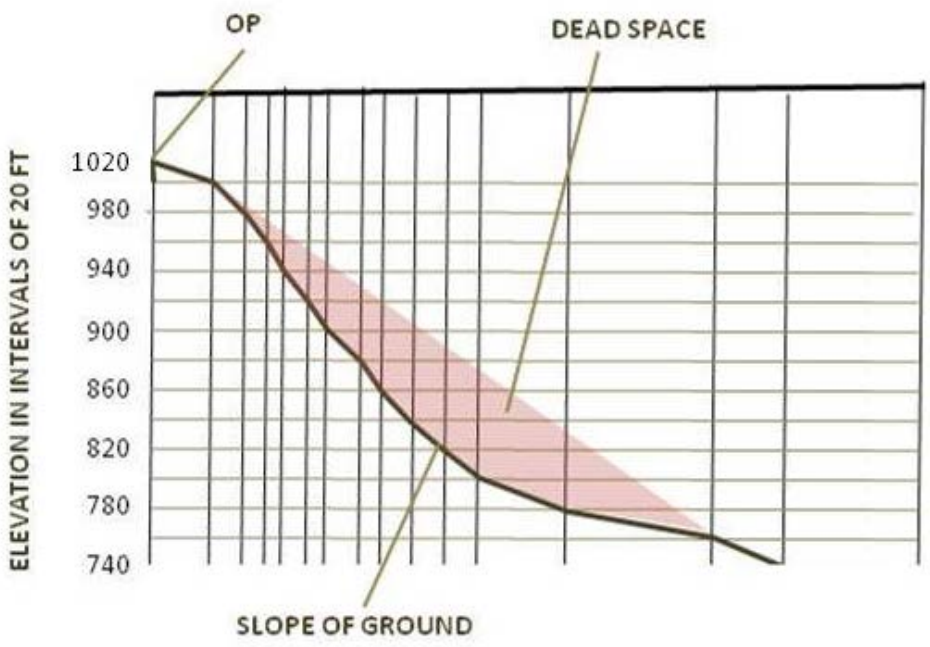
To demonstrate what can and cannot be seen, we will construct lines perpendicular to the line of sight and intersecting the line at the point it crosses each contour line.

All things being equal, it is usually better to shoot down a hill than to attack up one.

Now we focus on the thin constructed lines; they are parallel and represent intervals of 20 feet in elevation. (We know this because the marginal information on the map (not shown) tells us the contours are at intervals of 20 feet.) The dark contour lines represent even 100-foot elevations; the OP lies at an elevation of 1020 feet above sea level. We know this because the heavy line is marked 900; therefore the next heavy line up is 1000; and the OP lies on a line 20 feet higher.

In the next drawing I have moved the lines to a new sheet and rotated them so that the higher contours are on the top. By drawing a line through the points where the parallel lines cross the lines showing the slope of the ground, we can trace a profile of the slopes along the OP's line of sight.

The slope has been exaggerated here to make the point easier to visualize. The OP sits at the crest of a ridge the slopes down, first gently and then more steeply, until it levels out in the low ground to the south on the map.



If we then draw a line from the op to the level of the road, we notice that much of the slope of the ridge is not visible from the OP because of the hollow curve of the slope. The red-shaded area is the "dead space;" an enemy can swarm up the slope towards the OP without being observed. It takes more than high ground to control the battlefield.

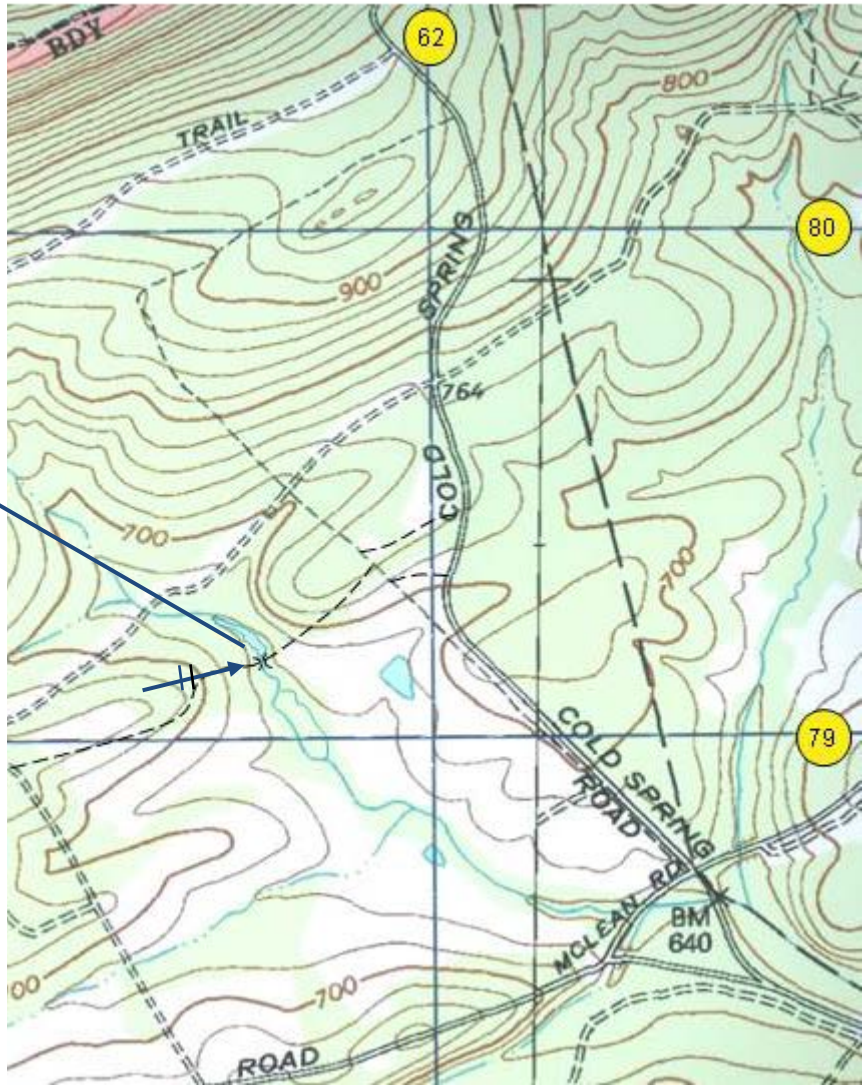
(If you don't believe this, read up on the Battle of Missionary Ridge in the American Civil War.)

Obstacles

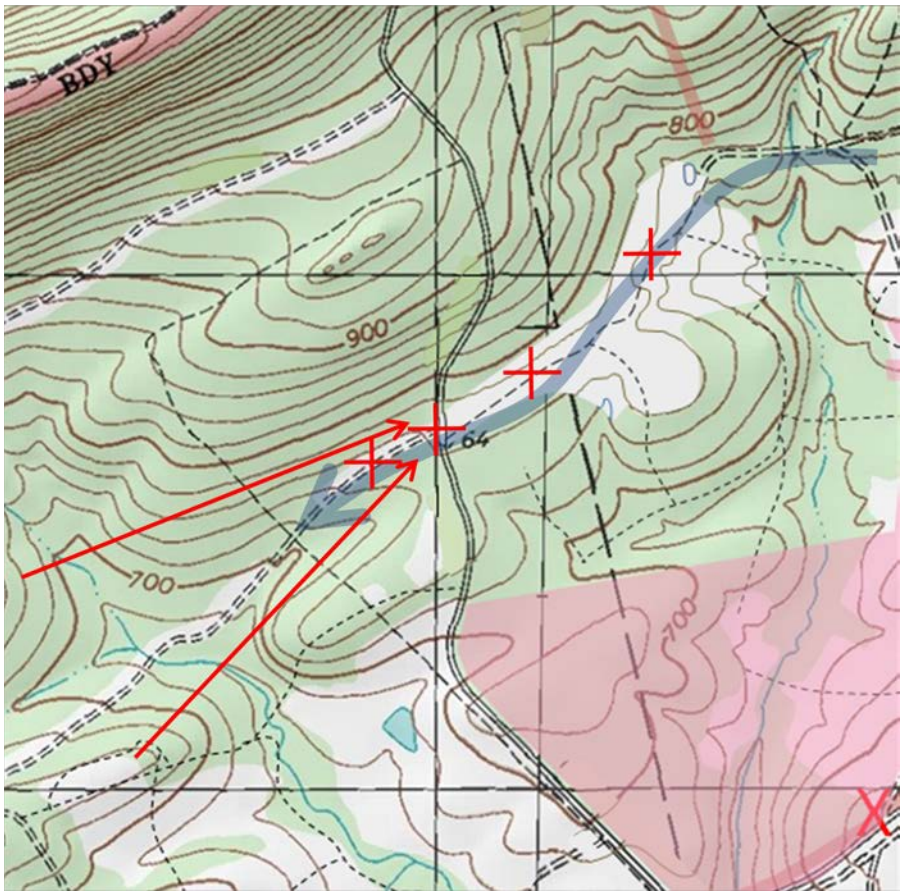
An obstacle is a terrain feature that prevents, complicates, or channels movement. Obstacles can also be manmade—mine fields, antitank ditches, deliberately flooded low fields as in Normandy—but in this lesson we will confine the discussion to terrain.

Some examples from the Indiantown Gap training area:

Here is one of my favorite obstacles at the Gap: the "culvert of death." It is a one-lane crossing point over an unnamed creek, small but strong enough to permit tanks to cross. It's narrow, but that isn't the real problem. It crosses a creek that drains to the southeast. Below the culvert the ground is too marshy to permit vehicular movement. Above the culvert the stream is dammed to form a pond. Since there is no way to avoid crossing by the culvert at that point, it is an easy point to defend by fire from the higher ground just to the west (a heavy MG is shown in defense). Such an obstacle that restricts maneuver to a single small space is called a *defile*.



We can also expect combinations of natural and manmade obstacles to complicate life on the battle field. The commonest are ditches to slow vehicle movement, road blocks (logs, tank obstacles) and mines. None of these will simply stop movement, but they force an attacker to slow down and deal with the problem, which is when the engineer casualties start to spoil your day. It takes time to clear a corridor through a minefield, and the Germans like to mix antipersonnel and antitank mines to keep the clearance teams busy and under fire.



Here's another beaut from the Gap, and it frequently shapes the field exercises. the pink overlay actually excludes movement to avoid damage to an MOUT (military operations in urban terrain) training complex; we designate it a barrier minefield.

The important part: denial of movement in the pink area squeezes maneuvers from either direction against the high, steep ridge line to the north, creating a *terrain corridor* (more about these later).

Here a US (blue) advance is vulnerable to artillery concentrations (red crosses) and direct fire across a limited front (the neck of a terrain corridor, or defile). Blue will have to put some planning into dealing with this obstacle, and will likely have to accept casualties.

Key terrain

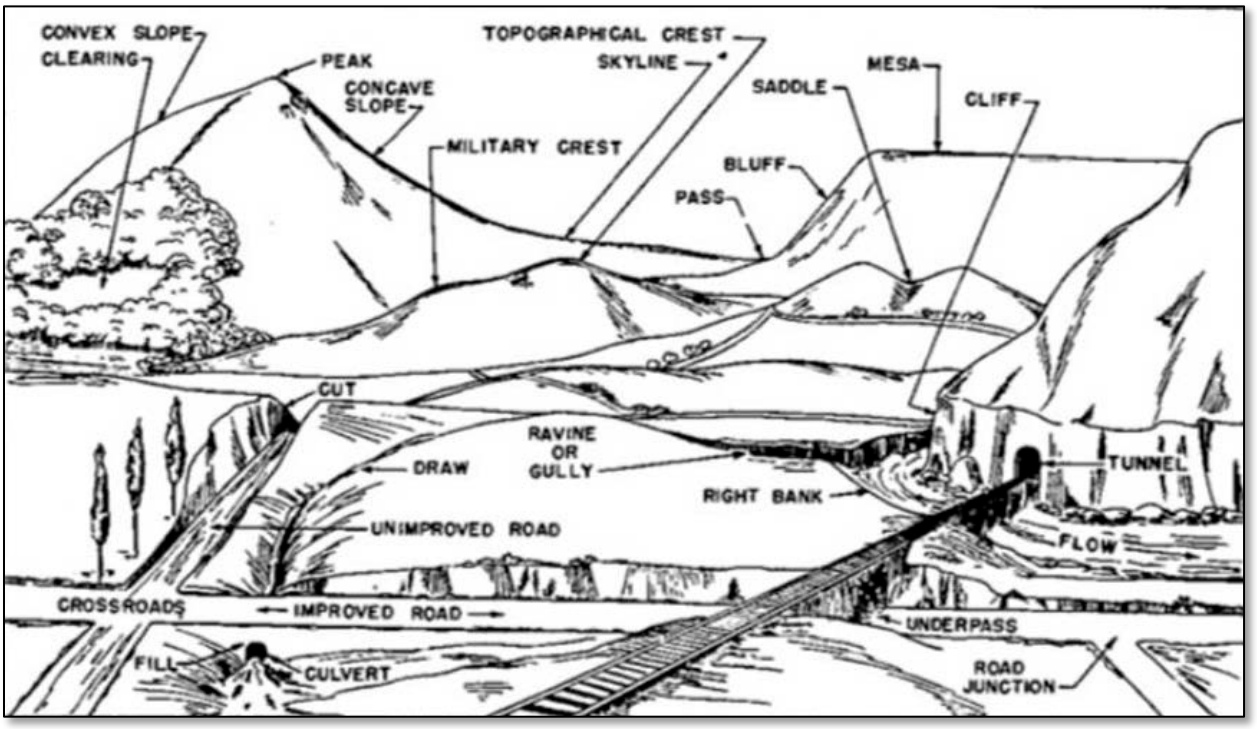
Key terrain is in the eye of the beholder. If you're attacking, it's something to capture or something the fear. If you're defending, it's a place to sit. If you're moving, it makes moving easier—or harder. And it isn't just the high ground.

The best definition of key terrain is "feature(s) that dominate the conduct of battle in a given area." An example from history is the terrain formations comprising Cemetery Ridge at Gettysburg, which was anchored by two easily defensive terrain on the flanks—Culp's Hill in the north and the Round Tops on the south.

Terrain is "key" not because of how it looks on the map; it is key because of the interaction of terrain and the tactical situation and mission. Learn to read a map, but also learn to think like a soldier.

In consulting a topographic map, the inclination is to look first to terrain contours: hills, valleys, draws, ridges, water drainage, and other obvious features. But just because one may look important because of its size or superficial importance, it doesn't become key terrain until we examine the actual effects it will have on the situation and mission we face.

The drawing below was used in WW II to illustrate terrain forms in an intuitive way. Take a moment to study this sketch so the terms and features are easily recognizable. Consult Map 5 in the maps library of this site; you should probably print it out for convenience so you won't have keep switching tabs.



Some critical points:

1. Convex slopes create dead spaces (see above) that can deny a defender the ability to observe an enemy to his front.

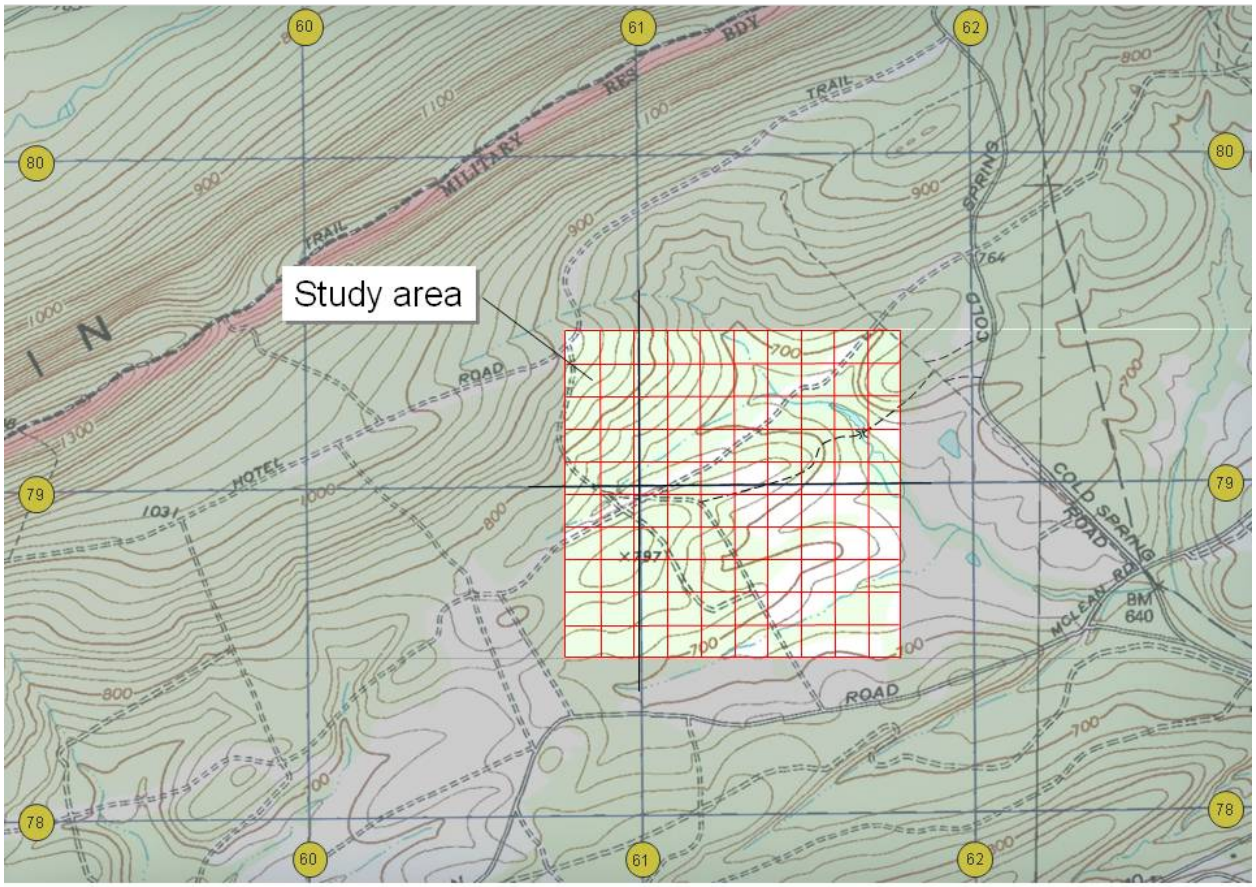
2. The topographical crest is the highest surveyed point on a piece of high ground. Avoid the topographical crest, as you will be on the skyline and easily observed. The military crest is below the topographical crest.

3. If you are defending a hill or ridge, the *forward slope* is to the front (and we presume the enemy is also in that direction (unless your intelligence security are deficient!). Indirect fire support and combat supply are to the reverse slope, where they can deal out death, resupply you, or just hide out.

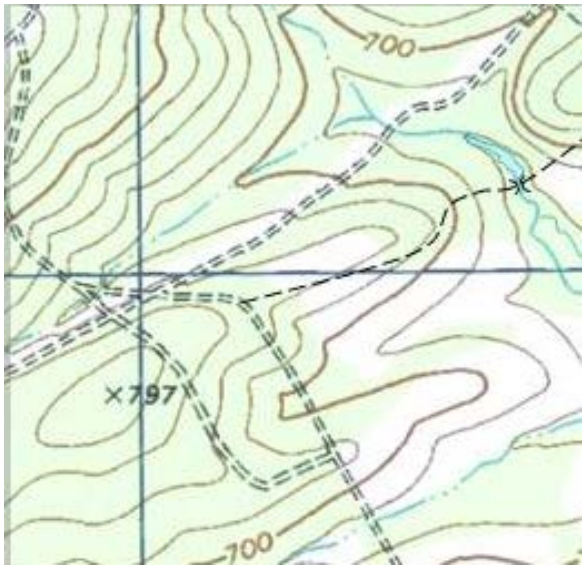
4. A draw is not just a small valley. A valley allows you to pass through a ridge or range and get to the other side. A draw is a glen; in Kentucky they are called "hollers." You can walk up a draw thinking it will take you across to the other side, but it finally just takes you farther up the hills.

To assess key terrain we need to know what the situation and mission are. A terrain feature may be key terrain in one scenario and just a lump of dirt in another. But the first step is to define and visualize the terrain over which you will have to fight. This is based on consideration of terrain forms, drainage (where the water goes—rivers, streams, ponds, marshes) which is related to the contours of the ground.

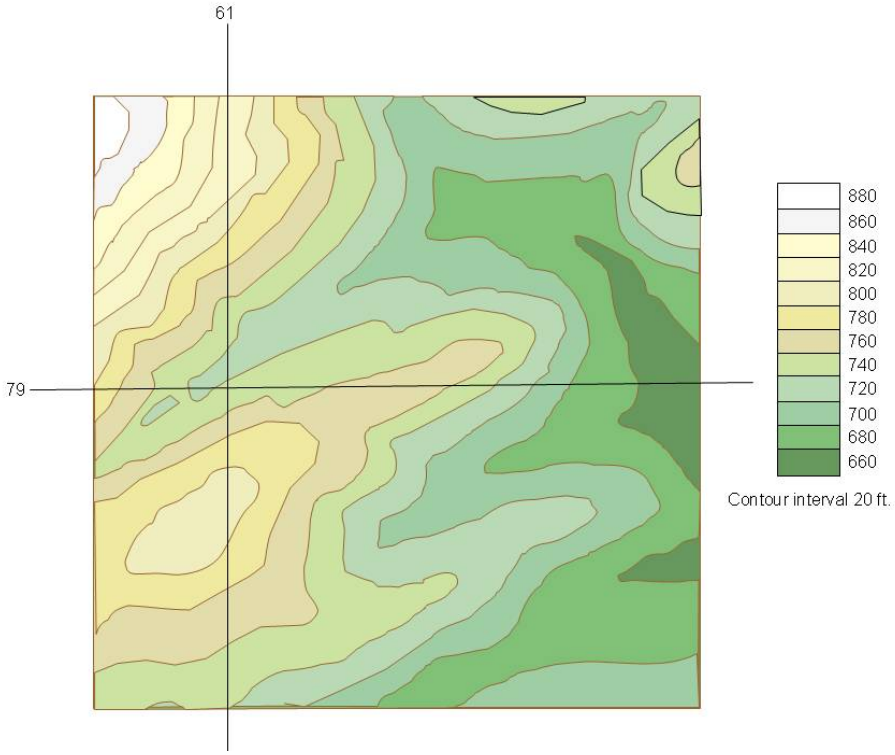
Let's select a small sample of terrain and analyze it, deciding what features might be "key." Here is another area of the Fort Indiantown Gap training area:



This is a one-kilometer square (the red lines divide it into 100 meter square sections). Here is a detail view:

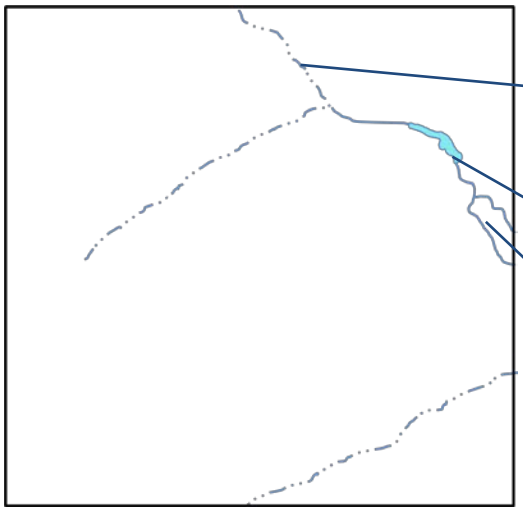


In an earlier lesson, we saw the color-pencil approach to visualizing terrain, coding elevation contours in contrasting colors to help grasp the terrain forms at a glance. Your diligent S-2 has taken the trouble to perform this obsessive work of art (or, more likely, given the job to some otherwise useless headquarters Oxygen thief).



The results are compelling, and reveal some patterns that would otherwise have been hard to extract. The rendering picks out the long upslope in the northwest quadrant, the valley and inflowing draws that form the drainage structure (where water flows), and stretching from the southwest border for nearly a kilometer, a central spur.

Now we can examine the drainage:

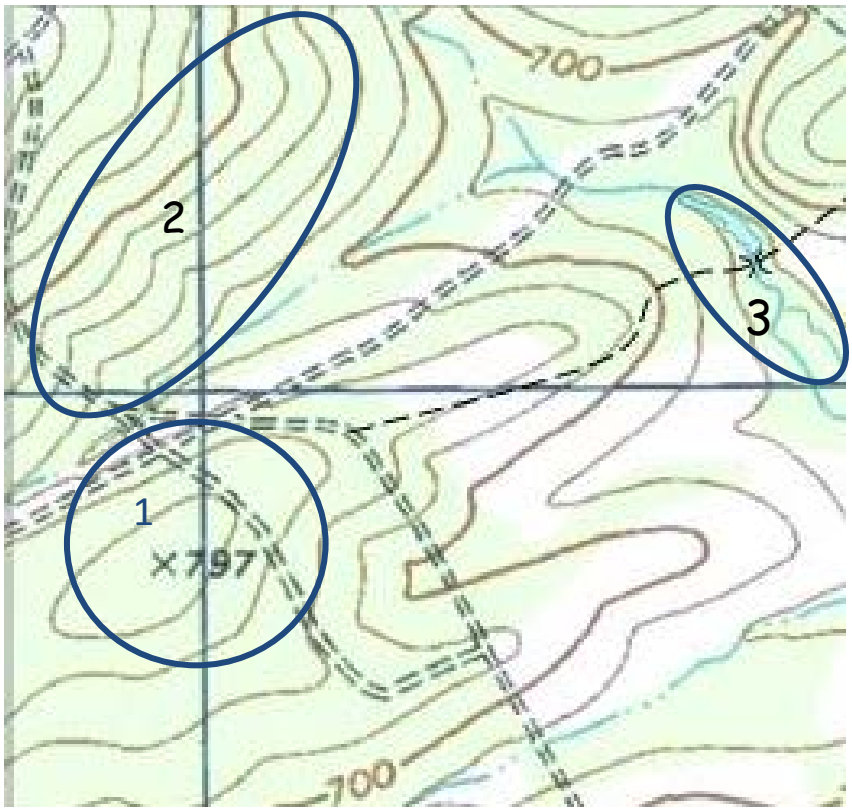


The dashed lines indicate intermittent streams, which may or may not contain flowing water depending on the season and the amount of recent rainfall or ice melt in winter on the high ground.

A pond formed by an earth dam near the "culvert of death."

Parallel stream lines (called "braided streams": see **FM 21-30**). Such stream systems usually indicate water flow across a flat area of soft ground, often creating a marshy area.

Let's specify a scenario in which your force will be defending against an enemy advance along the axis of the main east-west road. What terrain is key?



Here are some candidates:

1. High ground centered on hill 797 dominates the areas to the east by offering observation and fields of fire.
2. High ridge line in the northwest is an obstacle to vehicular movement.
3. Pond and marsh of the stream system limit enemy vehicular and foot movement to the main road and the trail at the culvert site, both of which can be covered by fire.

Avenues of approach

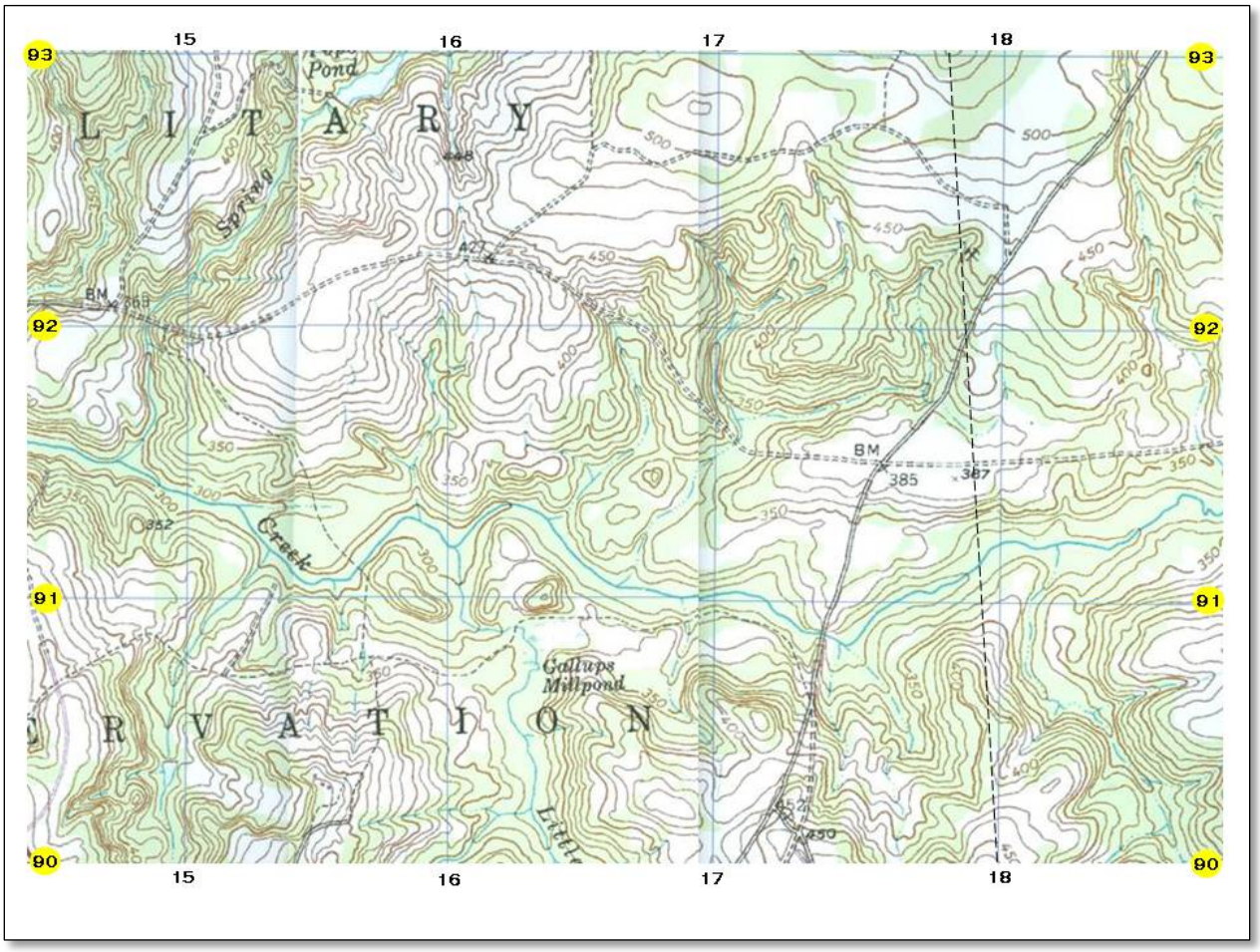
So far we've examined static features; now we turn to movement and how the terrain affects it. In 1940, these factors were called collectively "communications (that is, roads, railroads, waterways, airways, and their facilities) are important to both offense and defense for the movements of troops and supplies. In some situations, especially in the operations of large bodies of troops, the means of communication are of vital importance." (**FM 101-5** Appendix II)

With respect to terrain and movement/communication, we will be concerned primarily with *compartments* and *corridors*. We have already looked closely at terrain compartments at Fort Indiantown Gap, so let's move to a fresh location: Fort Benning Georgia, home of the Maneuver Center for Excellence and the US Army Infantry and Armor Schools or, as it has often been called, Benning's School for Wayward Boys.

The ground in the Fort Benning training area (one of the most analyzed and navigated spots in the Continental United States) is somewhat different from the terrain near Fort Indiantown Gap, and we need to understand why before planning a battle.

First, this area is part of the drainage plan for the Chattahoochee River, and lies near the junction of the Chattahoochee and Upatoi Creek (off map to the NW). The soil is somewhat less rocky than the eastern Alleghenies of Pennsylvania, and there are no high mountain ridges; the

patterns of drainage are evident because of thousands of years of soil erosion forming small valleys and draws.



The map area is divided north and south by the low ground bordering Pine Knot Creek (only the work "Creek" is shown in this map section). At about grid junction 1691 a tributary creek (imaginatively named Little Pine Knot Creek) flows into the larger stream. Drainage defines the high ground terrain forms, which are irregular hills, ridges, and draws.

Most areas are heavily wooded with mixed hardwood and softwood trees. Highest ground, however, is generally clear, providing good observation.

A hard surface road (known in the trade as a "hardball") runs north and south on the eastern half of the map, crossing a bridge at Pine Knot Creek at 173908, crossing the high ground at Hill 385 and exiting off NE corner of the map area. A gravel road follows a line north of Pine Knot Creek, roughly parallel to the stream and crossing the hardball at Hill 387.

Avenues of approach are limited. North-south movement of vehicles is largely limited to the hardball road, which is the only reliable route across the terrain compartments created by the main stream and the rather steep wooded slopes. This creates a terrain corridor that narrows the front of movement and permits an enemy to further interfere with movement by placement of mines and other obstacles, demolition of bridges and culverts, and ambushes.

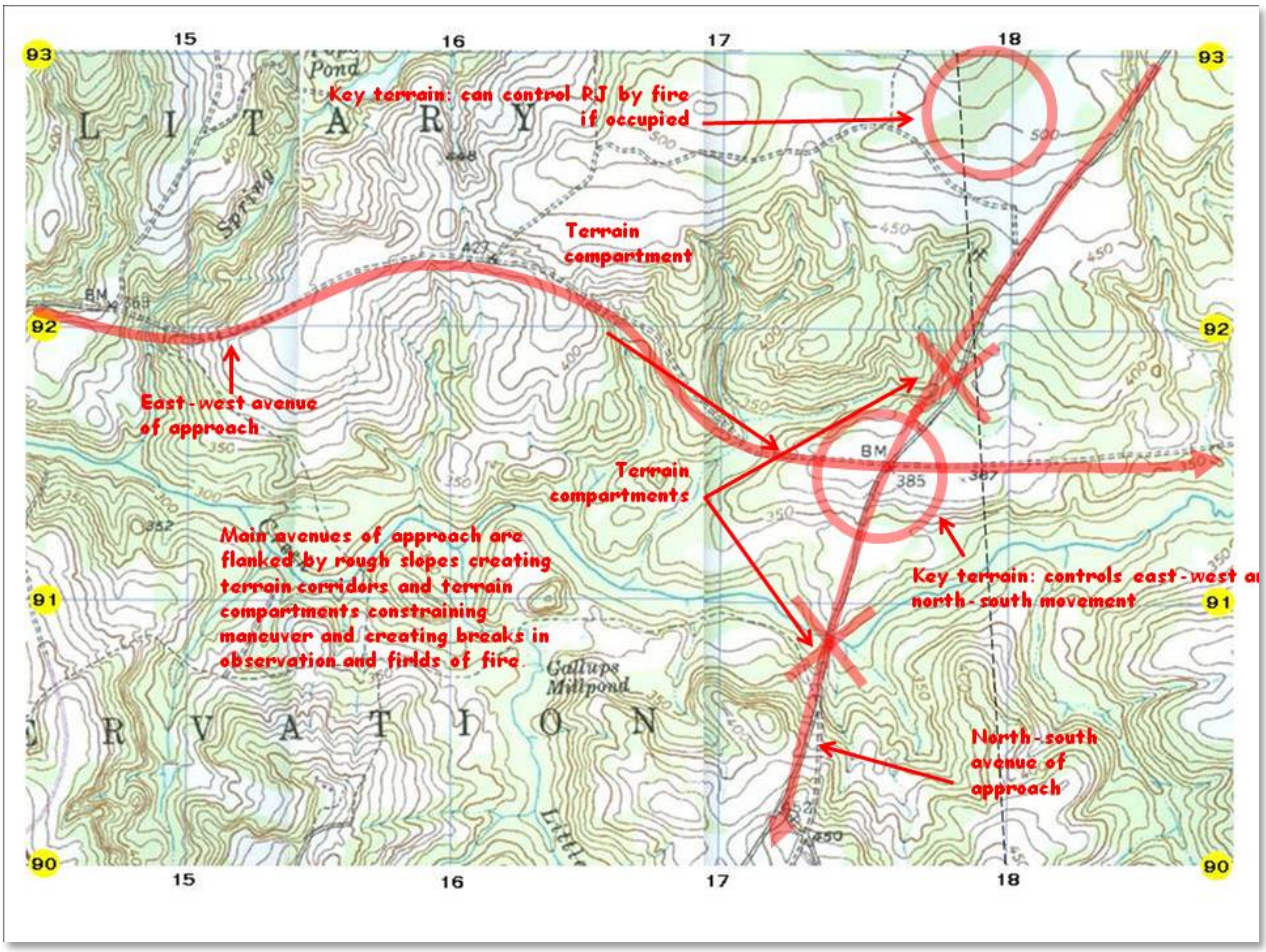
Other effects of terrain

Observation and fields of fire, cover and concealment. While observation is generally good from the rather flat cleared high ground, ravines and draws create dead space allowing enemy infantry to move without being observed or brought under direct fire. Moving along the reverse slope of a ravine closest to observers creates excellent cover and concealment.

Key terrain. The high ground at Hill 387 allows an occupying force to control movement in all directions from the critical road junction at BM 385. However, that is an open area dominated by higher ground to the north; occupation of those areas permits observed fire, both direct and indirect, to be brought on the road junction whether it is physically occupied or not.

Obstacles: A unit moving along the low areas defined by the drainage patterns (e.g., Pine Knot Creek) is limited to a terrain corridor that makes movement and communication with adjacent units difficult. Note, however, that the main avenues of approach (the hardball and the east-west secondary road) are also terrain corridors when low areas border the high ground.

Units moving perpendicular to the stream line depressions face cross corridors that require difficult movement up and down slopes and with limited observation, conditions that favor only movement of dismounted troops.



LESSON SUMMARY

1. The ability to assess terrain on a map or on the ground is a basic skill required for a combat leader—the "military stroke of the eye."

2. Terrain analysis is a critical first step in planning ground combat.

3. There are five basic terrain effects to consider: observation and fields of fire, cover and concealment, obstacles, key terrain, and avenues of approach or movement. (OCOKA)

4. Analyzing terrain on a map requires strong map reading skills, including the ability to judge slopes and terrain forms from topographic contour lines.

5. All these effects are judged, not from terrain alone, but by consideration of the way terrain and combat interact in a specific situation. You must be able to read a map, but that of itself is not enough: you need to think like a warrior.

Take the self-test for this lesson.

This completes your introduction to map reading and terrain analysis. Now practice it.