

SAR Theory for FTMs

KFM – Fall, 2005

So far this year, we have taught you how to search (Field ops), how to get to your task area (land nav), and how to communicate with base and other teams (Radio Comms). Now though, it's time to learn the backbone of all of this great stuff – Search Theory.

What is search and rescue, and who is ultimately responsible for it?

Search – the function of trying to find the missing subject

Rescue – medical treatment and evacuation of the subject

In the US, all inland SAR is ultimately the responsibility of the Air Force (Coast Guard gets the maritime stuff). In Virginia, responsibility falls to a combination of the local Responsible Agency and the state department of emergency management (VDEM).

What you will be learning tonight is an introduction to search theory, as it applies to ground search and rescue in Virginia. This class assumes that you attended and stayed awake through the Field Ops class from earlier in the evening.

Central Dogma of Search Theory

Search theory is all about probabilities. On a search mission, base assigns those tasks which they think have the best chance (highest probability) of being successful. The way they do this is by calculating the Probability Of Success, or POS. Success in searching for something or someone is defined as finding that which you're looking for. This can only happen if two conditions are true – the subject has to be where you're looking (Probability Of Area – POA), and you have to be able to detect him/her/it (Probability Of Detection – POD). Basic math tells us then that

$$\text{POS} = \text{POA} * \text{POD}$$

This is the central dogma of search theory. You already know how to come up with a POD from your field ops classes. POA is generated by base in a similar manner, which you will learn if you decide to take MLSO (the first class towards becoming an IS).

The Rest of It

There's a lot that goes into figuring out where someone is so that you can send ground pounders to the rescue. The first step is establishing where the subject was last. This is the Last Known Point, or LKP. This may be the place where he or she was last seen – the Point Last Seen (PLS), or it may be something like a hunter's car in a parking lot. Whatever point is chosen becomes the Initial Planning Point (IPP). Next, you have to figure out how far the subject could theoretically have gone in the time that he or she has been missing. This defines the search area, the area in which you will be searching. There are several ways of establishing this.

- 1) Theoretical area. This is the farthest the person could possibly have gone given the amount of time in question.
- 2) Statistical area. This is the farthest that other similar subjects have gone in previous missions.
- 3) Subjective area. This is the area defined by boundaries around the IPP which the subject probably did not cross. Examples are major highways and rivers.
- 4) Deductive area. This is the area indicated by available clues and other facts.

Now that we have an area to search, meaningful, helpful tasks can be drawn up. The first of these are called "Reflex tasks," and are the ones with the highest probability of succeeding. These tasks allow base to put people out in the field quickly so that time isn't lost while they are trying to apply theory. They will usually be Hasties right around the IPP, along with containment tasks. Another good reflex task is the so called "Bastard search." This term was coined because of the searchers' comments on the subject when they found him or her at a friend's house having an impromptu sleep over. More recent texts have re-named it the "Investigative" search, but people still know what you're talking about if you tell them a mission is a "Bastard search."

As the hasty reflex tasks are being completed, the mission begins shifting into its next phase, efficient searching. These are the open grid sweep tasks. The highest POA areas are assigned first, and then farther down the line as the search progresses. Base will make use of as many different resources in an area as it possibly can (dogs, horses, ground pounders, helicopters, wombats...), but all the while being careful to not put resources in an area that will run afoul of each other. Putting a team of 10 humans into an area right near an air scent dog will not be helpful to anyone.

On any given task, one of two things will occur – either the subject will be found, or the subject will not be found. If the subject is found, then everyone can go home. If, however, the subject is not found, we have to keep searching...so what happens if despite all of our efforts, we can't find the subject? Eventually, the decision must be made to suspend the search. This is a decision reached by the Incident Commander (IC) in conjunction with the Responsible Agent (RA), and is based upon the resources available, and the cumulative probabilities of success and detection for the mission. It is a very difficult decision to make, but it is a reality of search and rescue that sometimes, the subject is not in the area where we are searching.

There is a lot more to SAR theory than what is contained in this handout. During the FTL semester, you will learn more theory, and also more about how to set up a base staff according to the Incident Command System (ICS). If you are interested in learning more about SAR theory and working in base, then you should definitely take the Managing Land Search Operations (MLSO) and Practical Search Operations (PSO) classes offered by VDEM – just taking them does not confine you permanently to twinkiedom. Understanding the search theory and the reasons why base does what they do makes you a better, more effective searcher.