FTM Introduction to Land Navigation

compiled by WFB 8-31-05

Why Land Navigation?

Two Aspects of Land Nav:
1. Orienteering – the science of using a map and compass
2. Terrain Association – the art of using a map with land features

We use both in search and rescue, but our primary method in most areas around here is terrain association. This class will cover the basics of both, but it is essential to practice these in the field in order to master them.

MAPS

We use 7.5 minute U.S. Geological Survey (USGS) topographical maps. In the locker, we have at least one map of almost every place in Virginia, and we have electronic versions on CD-ROM. Some features found on USGS topo maps are:

Scale
This is usually 1:24,000. A scale is also drawn out in miles, feet, and kilometers.

Symbols
Maps show the locations (from the time the map was made) of roads, trails, creeks, buildings, power lines, and many other features. It is helpful to familiarize yourself with these features to be able to recognize them in the field. Use caution, however, because these things do change over time, and the map may well be lying to you.

Contour Lines
One of the most prominent (and useful) elements found on topo maps are contour lines (the brown squiggly ones). These lines connect areas of equal elevation, usually in 20 or 40 ft. increments, and in doing so, they allow 2-dimensional maps to represent 3-dimensional terrain.

Some examples of terrain features are:

HILL RIDGE DRAINAGE SADDLE

ASRC Grids

In most of our searches, we use maps that have a grid copied onto the search area. This allows teams in the field to report locations to base more easily and accurately. The grid divides the map into areas that are 1km x 1km. When applied correctly, the grids should be aligned north-south (and east-west, funny how that works out).

There are two other pieces of information found on grid maps:
1. a letter that identifies the map
2. the declination (more about this later)

When we read locations, it is important that we do it consistently, so here is our method:

- First read the map identifier (the letter in the lower left-hand corner).
- Then read the coordinates ACROSS, THEN UP
    - To give the coordinates, add one decimal place to what is given on the grid (for example, almost halfway between 1 and 2 is 1.4)
    - Read the horizontal coordinates (x-axis for you math folks) and then the vertical ones (y-axis), but don't say "point." The decimal is implied.
- An example would be: W0922 (said "whiskey zero nine two two"), which corresponds to the point on map W that is at 0.9 along the horizontal axis and at 2.2 along the vertical one

COMPASS

Parts

- Needle – points north
- Base – the flat part on the bottom
- Bezel – the round spinning part with the degrees on it

Problems with using a compass

- Because the needle functions as a magnet, there is sometimes interference that will affect its reading. This can come from power lines, large rocks with iron in them, your radio, vehicles, etc.
- Compasses don't actually point to the true north pole. We call this phenomenon:

Declination

Compasses point to the magnetic north pole, a location that is far from the true (or geographic) north pole. The size of the discrepancy this causes us depends on our location. In Charlottesville, the declination is about 8 degrees.

To adjust for declination, you must either add or subtract declination. Here's one way to remember:

- Maps have less detail than the real world.

- When you go from the map to the real world, you add detail, so you add declination.
- When you go from the real world to your map, you are losing detail, so subtract declination.

This method works throughout the ASRC response area here in the Eastern US, but is unreliable elsewhere.

Whenever you report a bearing (degrees to something), make sure to specify whether you are giving TRUE or MAGNETIC bearings. Bearings on the map are true bearings. Bearings taken from your compass of the real world are magnetic bearings.

How do you follow bearings?
How do you take bearings?
How do you use the compass with the map?

STRATEGIES

We've now gone over the basics of orienteering and terrain association. But how does it all fit together?

It is helpful to distinguish **rough** (or **coarse**) vs. **fine** land nav. A good strategy is to use **rough** land nav (probably terrain association) to find a distinctive landmark near your target. We call this point an attack point. Once there, use **fine** land nav (such as pacing and using a compass) to find your exact target.

Plan Ahead
Before you start walking to your point, plan out the easiest way to get there. In general, this will not be a straight line. Notice the terrain, and choose a path that will be not too steep and will be easy to follow.

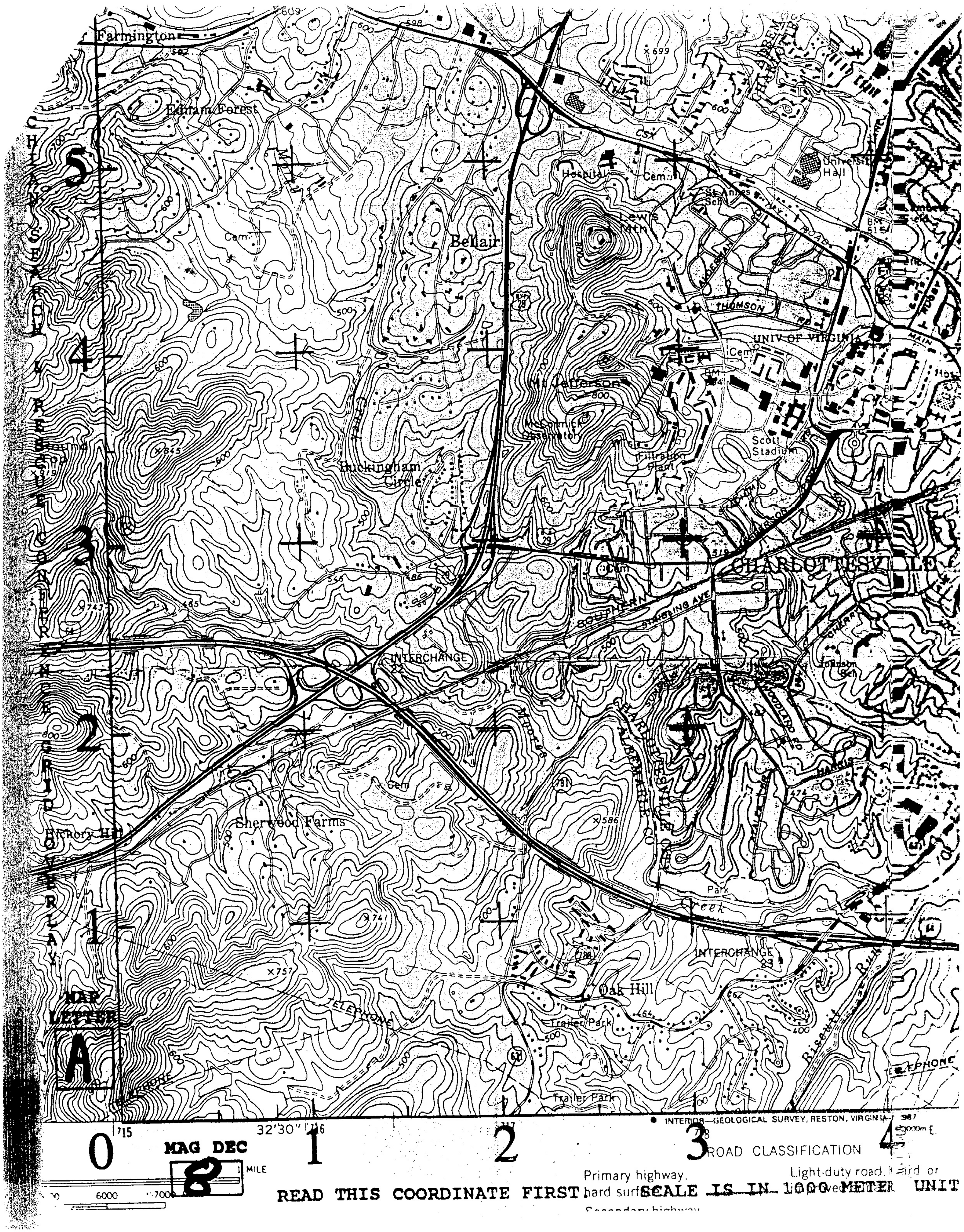
Pay Attention As You Go
- **Collecting Features** – Notice things that you pass along the way (for instance, maybe you should pass a big drainage on the left, then the trail crosses a creek, then it opens into a field, etc.). Make sure that what you pass in real life matches what the map says you should pass.
- **Catching Features** – These are obvious features that are just past your target and will "catch" you if you go too far.
- Check your compass every once in a while to make sure you are going in the right general direction
- Trust your instincts. If something feels wrong and doesn't match what you originally expected from the map, stop and check it out.

Bail-Out Plan
Always have a worst case scenario back-up in case you get lost. Know before you get out there what you should do if you lose your map and compass and have no idea where you are.

Final Tips

If you ever do get lost, STOP and DON'T PANIC. Take time to look at the features around you and visualize what they should look like on the map. Use your compass to orient your map with the real world. If nothing works and you are unable to make any sense of where you are, remember your bail-out plan.

Above all, remember that Land Navigation is an art, and it requires an open mind. Your map may lie to you, and so might your compass. Your job is to integrate all the information you get from the map, compass, and the land around you in order to figure out where you are, where you want to be, and how best to get there. The only way to truly learn how to do this is to practice it in the field.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Buckingham Circle
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SOUTHERN
STADIUM AVE
INTERCHANGE 22
Sherwood Farms
Hickory Hill
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INTERCHANGE 23
Oak Hill
Trailer Park
TELEPHONE
Johnson Sch
MAP LETTER
A
MAG DEC
8
0
1
2
3
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5
READ THIS COORDINATE FIRST
SCALE IS IN 1000 METER UNIT
ROAD CLASSIFICATION
Primary highway, hard surface
Light-duty road, hard or improved surface
INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA