

PART 4
EXPERT
LAND NAVIGATION



USING THE MILITARY LENSATIC COMPASS



WARNING

This presentation is intended as a quick summary, and not a comprehensive resource. If you want to learn Land Navigation in detail, either buy a book; or get someone, who has the knowledge and skills, to teach you in person.

NOTE

To get the ideas across presented on these slides, many figures, pictures, and calculations may not be to scale and may be exaggerated for clarity.

Note:

Prior to being issued any training *equipment, you will be required to sign a “statement of liability” agreeing to pay for anything you damage or lose.

All items will be inspected and inventoried prior to your signature and at the end of the training day too.

If you do not intend to sign this statement, then you may be denied training.

*** You may use your own equipment.**

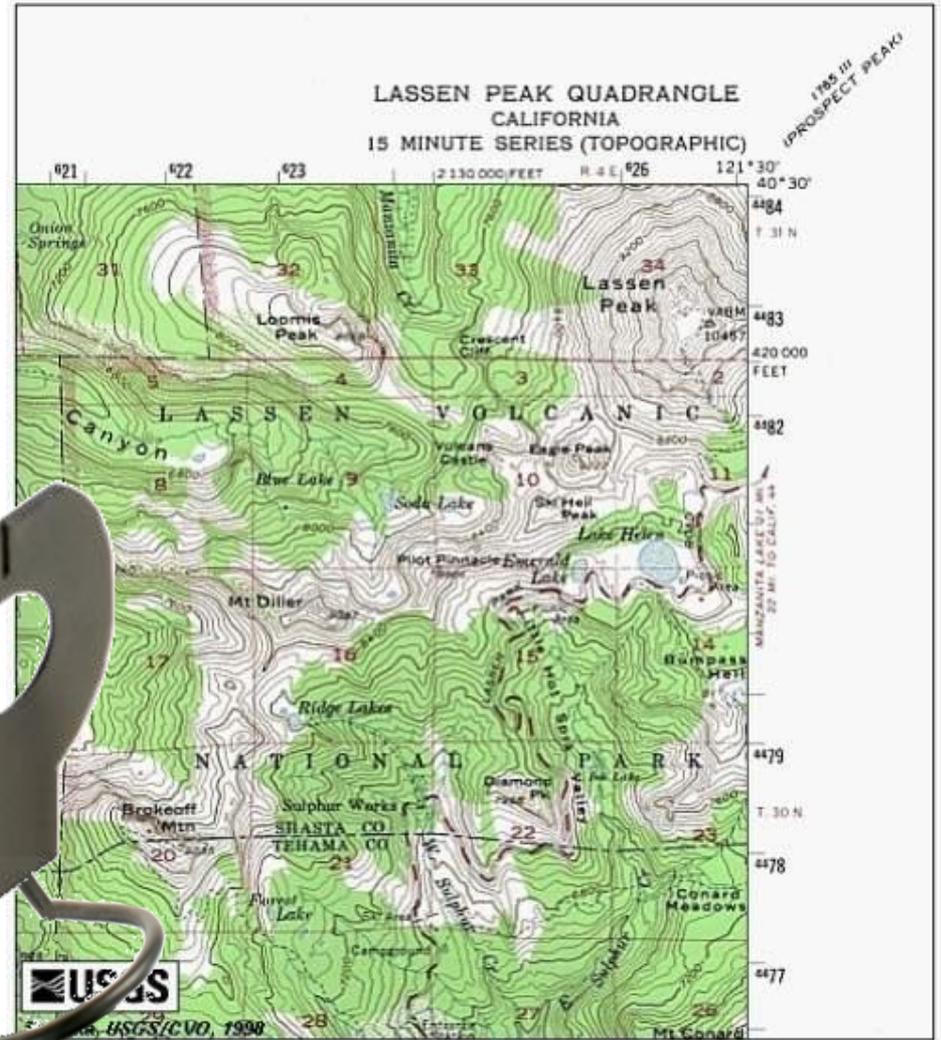
Any Questions?

BREAK TIME

... and now on with the ...



LAND NAVIGATION WITH MAP AND LENSATIC COMPASS



LAND NAVIGATION

Why Learn Land Navigation? *Training and practicing land navigation on foot provides the following everyday navigation (how not to get lost) benefits;*

- *Tracking present location (Where am I ?)*
- *Determining Distance (How far is it and am I there yet ?)*
- *Sense of direction (Where do I want to go and where am I actually going ?)*
- *How to read a topographic map (Do I understand the map ?)*
- *Terrain and map association (What hill or river am I looking at ?)*
- *Spatial skills (Can I mentally visualize the landscape in 3D ?)*
- *Planning safe, practical routes (Take a long safe route or a short risky route ?)*
- *And more Navigational skills*

The best way to learn LAND NAVIGATION is to get "dirt time", that is, get out there with a map and compass!

Navigation is not about finding yourself after you are lost (although that's what happens sometimes); it's about keeping track of your position as you move away from a known point. As you move you have to remain cognizant of the terrain you are leaving, of the terrain you are passing, and of the terrain that is ahead.

Navigation in the wilderness means knowing your starting point, your destination, and your route to get there.

These skills will allow you to venture farther off the beaten path than you ever thought before.

THIS PRESENTATION IS DIVIDED INTO FOUR PARTS

PART 1 Basic Land Navigation

- The Lensatic Compass
- The Topographic Map
- The Land and Map Association

PART 2 Intermediate Land Navigation

- Making Sense of Direction
- Tracking Present Location
- Determining Travel Distance

PART 3 Advance Land Navigation

- Planning to Navigate
- Navigation Methods to Stay On Course
- Additional Skills of Land Navigation

PART 4 Expert Land Navigation

- Navigation in different types of Terrain
- Night Navigation
- Sustainment

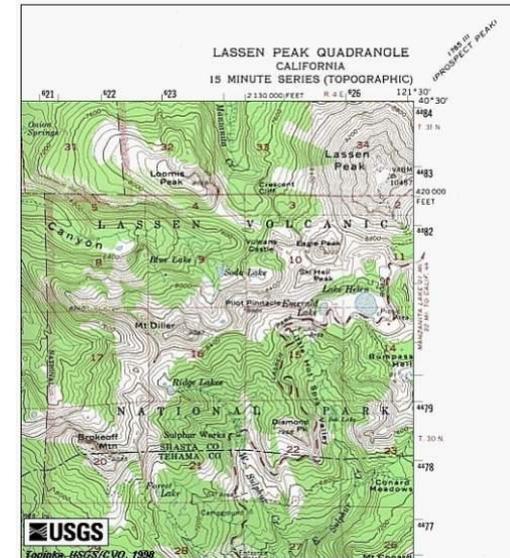
Any Questions?

PART 4

EXPERT LAND NAVIGATION



- **Navigation in Different Terrain**
 - Description
 - Skills
- **Night Navigation**
 - Description
 - Skills
- **Sustainment**
 - Description
 - Maintaining Skills



NAVIGATING DIFFERENT TERRAINS

DESCRIPTION



The **LAND NAVIGATION** information, concepts, and skills already presented in the other lessons will help you to navigate anywhere in the world.

However, there are some special considerations and helpful hints that may assist you in various **SPECIAL ENVIRONMENTS**. Terrains that can be featureless, rough, dense, unpredictable footing or ground, and unpredictable weather/visibility.

- Navigating accurately in featureless terrain takes lots of... mental concentration, patience, advanced navigation skills, practice, and experience.
 - Dead Reckoning
 - Desert (Mountain, Rocky Plateau, and Sand Dune Deserts)
 - Jungle
 - Snow / Arctic
 - Fog / limited visibility

NAVIGATING DIFFERENT TERRAINS

DEAD RECKONING

DEAD RECKONING, where azimuth (or direction of travel) data is combined with pacing (or distance traveled) data. With this technique, one can establish their position in featureless terrain, foul weather, or even in complete darkness.

DEAD RECKONING is not as accurate as other forms of navigation, but it will suffice, when that is the only resource available. In theory, Dead Reckoning works. But in reality, not as well, since it is impossible to walk a straight line, and measuring distance (pace or time) is not precise.

- It is an estimated position
- It is a good way of not getting lost
- It narrows down the area of uncertainty
- You are not at your estimated position, just somewhere near it
- For short distances, such as a few miles, the cumulative errors are acceptable

The "dead" in dead reckoning is derived from "ded.," an abbreviation of "deduced." It's navigation by logical deduction. It does not necessarily mean it's a deadly form of navigation.

Dead reckoning consists of three fundamental steps.

1. You begin your journey from a positive fix, a point you are sure of and can locate on the map.
2. From there you maintain accurate data of distance and direction traveled for each leg of your route, on a sheet of paper.
3. You then use this data to update your position on the map.

The rules of dead reckoning: Plot your estimated position . . .

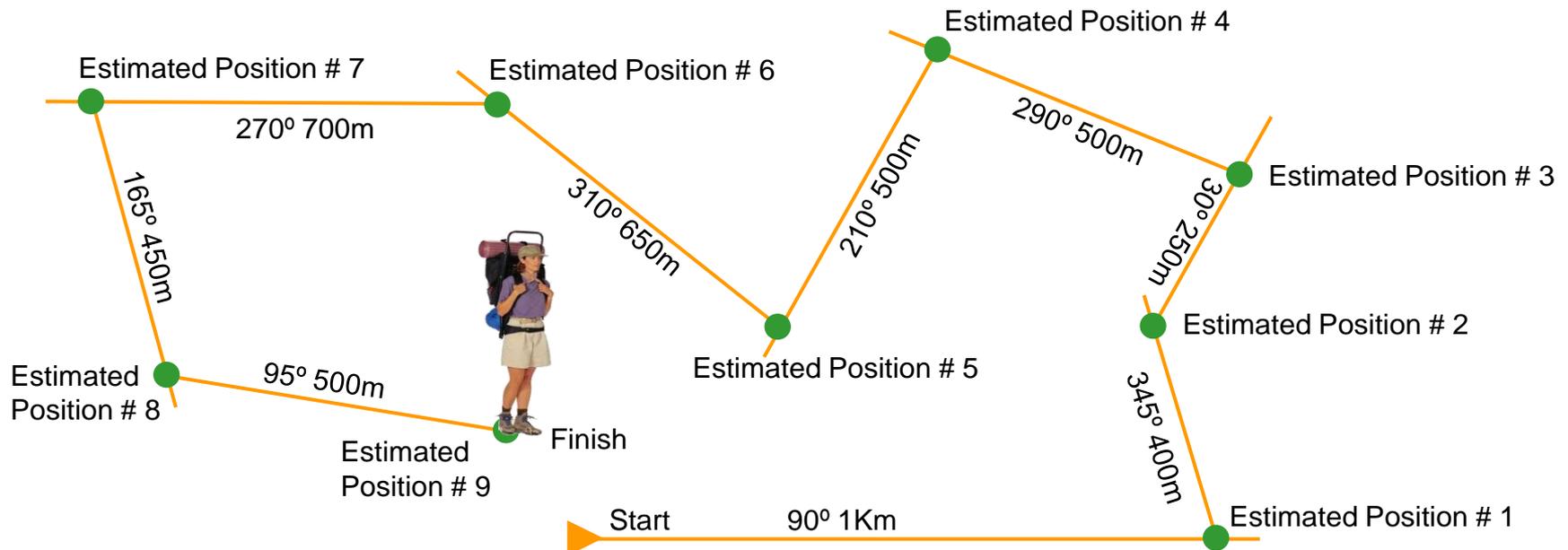
1. Every hour on the hour (*30 minutes on the half hour is more accurate*)
2. After every change of direction (azimuth)
3. After every rest stop

NAVIGATING DIFFERENT TERRAINS

DEAD RECKONING

Example – you want to explore a prairie / plain with flat terrain.

1. Set compass azimuth and follow it, use the **Center-Hold method**.
2. Measure distance traveled by pace count, time or other method.
3. When you decide to change direction
 - a. Stop and take out the map.
 - b. Draw a course line out from your start point in the direction you traveled.
 - c. Measure calculated distance on the drawn line equal to the distance traveled.
 - d. Put a “X”, circle, or tick mark - this is your new current **ESTIMATED FIXED POSITION**.
4. From your new estimated fixed position, repeats the above steps.



NAVIGATING DIFFERENT TERRAINS

DEAD RECKONING

Other featureless (non-identifiable landmarks) landscapes to use Dead Reckoning



Any Questions?

NAVIGATING DIFFERENT TERRAINS

DESERT

There are three types of deserts – Mountain, Rocky Plateau, and Sand Dune Deserts.

SAND DUNE DESERTS

When operating in an area with few visual cues, restricted visibility by a sandstorm, you must proceed by Dead Reckoning.

For short distances, or as long as they are visible, use your foot steps behind you as a trail back azimuth reference, to keep you on course.

Distances are deceptive! That distinct landmark that seems so near may actually be over 20 to 30 miles distant. In the dry desert air, everything will seem much closer than it actually is.

The general rule of thumb for estimating distance and time travel is to multiply your most conservative estimate by a factor of three.

NOTE - Animals like to stay near water sources, an oasis.



NAVIGATING DIFFERENT TERRAINS

DESERT

There are three types of deserts – Mountain, Rocky Plateau, and Sand Dune Deserts.

ROCKY PLATEAU DESERTS

Most challenging of all, however, are the existence of hidden canyons and deep washes (arroyos) which can impede your forward progress along a route you might have thought was easy cruising. It is not uncommon to have to hike 10 to 20 miles out of your way to work your route around a canyon that is impassable.

To avoid some of these, study your map very carefully with your current surroundings.

Use **Dead Reckoning**, very close **intermediate landmarks**, **Baselines**, **Back Azimuths**, etc.



NAVIGATING DIFFERENT TERRAINS

DESERT



There are three types of deserts – Mountain, Rocky Plateau, and Sand Dune Deserts.

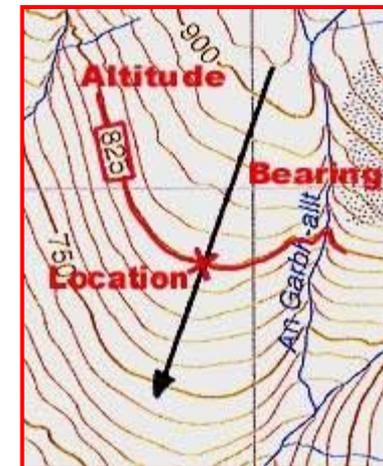
MOUNTAIN DESERTS

If you know which mountain you are on, use **ASPECT OF SLOPE** to identify which side of a hill you are on. By studying the map and knowing roughly where you are, a slope with the same approximate direction can usually be quickly identified.

Aspect of Slope. To determine the aspect of slope, take a compass reading along an imaginary line that runs straight down the slope. It should cut through each of the contour lines at about a 90° angle. By checking the map and knowing the direction of slope where you are located, you will be able to keep track of your location, and it will help guide your cross-country movement even when visibility is poor.

1. Take a compass bearing **directly down the slope** you are standing on.
2. Put the compass onto the oriented map, over the mountain you are standing on.
3. Move the compass around till you find a place where the bearing lies at right angles to the contours, just as on the ground.
4. You now know your position lies somewhere along the bearing as it is laid out on the map.
5. To find out *exactly* where, just check your **altimeter**. (If you have one)

Use **Dead Reckoning**, very close **intermediate landmarks**, short **Baselines**, **Back Azimuths**, etc. to navigate terrain.



NAVIGATING DIFFERENT TERRAINS

DESERT

OTHER MOUNTAIN DESERTS



Any Questions?

NAVIGATING DIFFERENT TERRAINS

JUNGLE



The jungle and many rainforests are so dense that you will have to make use of wildlife paths, ridge lines, streams, dry river beds, or established human trails. This is fine if your intended route of travel is going the same way, but more often than not, it isn't.



The navigator must rely heavily upon the **dead reckoning** technique when moving in the jungle.

Navigation is further complicated by the inability to make straight-line movements.

Travel during the day and get off any established paths at night; animals (predators) will use these same trails.

Be prepared to follow a meandering course that will take you twice as long to cover the same ground you would have covered had you attempted a more direct route (in a clear, easy terrain, of course). *Trying a direct route in the jungle thickets is impossible.*

A lost navigator in the jungle can eventually find his way back to civilization by following any body of water with a **downstream flow**.

Terrain analysis, constant use of the compass, and an accurate **pace count** are essential to navigation in this environment.



Any Questions?

NAVIGATING DIFFERENT TERRAINS

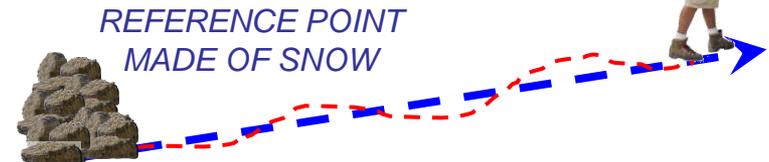
SNOW / ARCTIC



In the winter, valley floors are often the easiest places to navigate since they are somewhat sheltered from the wind that sweeps across the ridges, and the snow has likely covered any areas choked by underbrush.

Navigating over vast areas of smooth and often featureless snow can be exhausting and disorienting.

When the weather is good, **Dead Reckoning** techniques work well, even on glaciers or other open snowfields, and use **Human Reference Points**, or **Make a Reference Point** for a **Back Azimuth**.



When hiking in an area near the magnetic pole, always question your compass accuracy, it can mess with your compass.

Back up your navigational decisions and headings with celestial observation, your shadow, sundial, or watch technique.

Snow changes things, filling in the landscape...

- * Areas develop new and ever-changing contours.
- * Depressions are leveled out.
- * Drifts fill ravines, turning them into flats.
- * Trails disappear.
- * Bodies of water look like open fields.



* **An ALL WHITE environment reduces depth perception and judgment of distance.**

Any Questions?

NAVIGATING DIFFERENT TERRAINS

FOG / LOW VISIBILITY / SNOW WHITEOUT

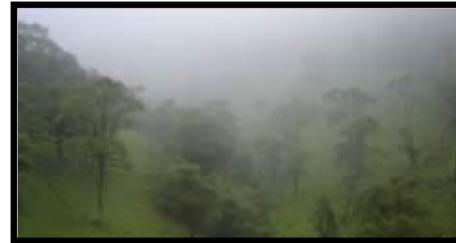
Know where you are at all times, because visibility can deteriorate quite suddenly in any environment.

If you see a fog bank approaching or fog starting to form be sure to fix your map position.

No. 1 rule for navigating in low visibility is “Always trust your compass.”



Use *Dead Reckoning*, visible *intermediate landmarks*, *human reference points*, *back azimuths*, *thumb the map*, *baselines*, etc.



DURING A SNOW WHITEOUT



- * There is the danger of suffering from vertigo in a world where there is no clear deference between sky and ground.
- * There are times it can be difficult to know whether you are moving up or down; one useful trick is to toss a snowball ahead of you.
 - If it appears to stick in mid-air, the ground ahead must slope upward.
 - If it lands lower than your feet you are on a downward slope and need to proceed very carefully.
 - If it disappears from view, back off quickly; you could be on the edge of a steep drop, or cliff.

Any Questions?

NIGHT NAVIGATION

DESCRIPTION



Darkness presents its own characteristics for *Land Navigation* because of limited or no visibility.

However, the techniques and principles are the same as that used for day navigation.

The success in *nighttime* Land Navigation depends on rehearsals during the planning phase before the movement, such as detailed analysis of the map to determine the type of terrain in which the navigation is going to take place and the predetermination of azimuths and distances.

Navigating at night is challenging and requires a high level of knowledge, confidence, and lots of practice performing these skills, before heading out to the wilderness at night.

- Dark Adaptation
- Protecting Night Vision
- Scanning the terrain
- Traveling at night
- Night navigation with Lensatic Compass

NIGHT NAVIGATION

Dark Adaptation

The first thing is to get your eyes ready for night vision navigation.

- Before heading into the dark, allow your eyes to adjust to the dark. Five minutes in the dark without looking at bright lights is the minimum necessary, 30 minutes is better.
- Dark adaptation is affected by exposure to bright lights such as matches, flashlights, flares, and vehicle headlights. Full recovery from this exposure may take up to 45 minutes.
- Exposure to bright sunlight during the day can impair your night vision. Wear sunglasses in bright sunlight to prevent this. For sunglasses to be effective, all visible light must be attenuated, not just portions of the visible spectrum. To protect night vision, provide the best comfort, allow for scanning close to the sun, and provide normal color vision, dark sunglasses with a neutral gray tint are recommended.
- staying either in a dark area for about 30 minutes, or in a red-lighted area for about 20 minutes followed by about 10 minutes in a dark area. The red-lighted method may save time by allowing you to check equipment, or do some other job before moving into darkness.
- If in a white lighted area, wear red goggles for 30 minutes, before heading out in the night. Wearing red goggles is effective because red light does not affect the eyes.



Any Questions?

NIGHT NAVIGATION

Protecting Night Vision

Second thing is maintain night vision during the night. Any bright light can temporarily ruin one's night vision.

- Dark adaptation is affected by exposure to bright lights such as matches, flashlights, flares, and vehicle headlights. Full recovery from this exposure may take up to 45 minutes.
- Using a flashlight with a red lens filter will not damage your night vision.
- The fashionable eye patch worn by the pirates weren't always due to the loss of an eye. In fact many pirates did it so that the one eye was good at seeing in the dark.
- If it becomes necessary to look into a lighted area or to use a flashlight, cover one eye so as to retain some night vision in the eye.
- Use a red light stick to read your map or other activity during the night.
- Night vision goggles (NVG) impede dark adaptation. However, if a soldier adapts to the dark before donning the goggles, he gains full dark adaptation in about two minutes after removing them.



NIGHT NAVIGATION

Scanning the Terrain

Night vision scanning enables you to overcome many of the physiological limitations of your eyes and reduce the **visual illusions that so often confuses** the eyes (mind).

- Practice seeing things without looking directly at them.
- The technique involves scanning from right to left or from left to right using a **very slow, scanning movement**.
- At night you must avoid looking directly at a faintly visible object when trying to confirm its presence. Use the corners of your eyes.
- **Off-Center Vision**. This technique requires looking 10 degrees above, below, or to either side of an object rather than directly at it. This allows the peripheral vision to remain in contact with an object.
- **Bleach-Out Effect**. Even when off-center viewing is practiced, the image of an object viewed longer than two to three seconds tends to bleach out and become one solid tone. As a result, the object is no longer visible. To overcome this condition, you must be aware of this phenomenon and avoid looking at an object longer than two to three seconds. By shifting your eyes from one off-center point to another, you can continue to pick up the object in your peripheral field of vision.
- Practice what you know about seeing at night until it becomes second nature for you to use your eyes to their best advantage.
- You can use Night Vision Binoculars as an additional aid in scanning the landscape at night.



NIGHT NAVIGATION

Traveling at Night

As you know there are many more hazards at night, where your visibility is limited.

- The basic technique used for night Land Navigation is **dead reckoning**.
- If you are using Night Vision Goggles (NVG) or Night Vision Binoculars, you can use other **day Land Navigation techniques**.
- When moving around in the dark, it is safer to move slowly and slide your feet, using your toes to sense obstacles in front of you.
- Travel at a steady pace and avoid running in the dark.
- You tend to travel slower and shorter steps, adjust your **pace count**.
- Check your progress and position on the map every 30 minutes.
- Lifting knees higher than normal when walking will reduce the chance of stumbling over rocks, roots, and low branches.
- Stay off paths that wild predators use for preying on other animals.
- Navigation using the stars is recommended in some areas; however, a thorough knowledge of constellations and location of stars is needed.



Any Questions?

NIGHT NAVIGATION

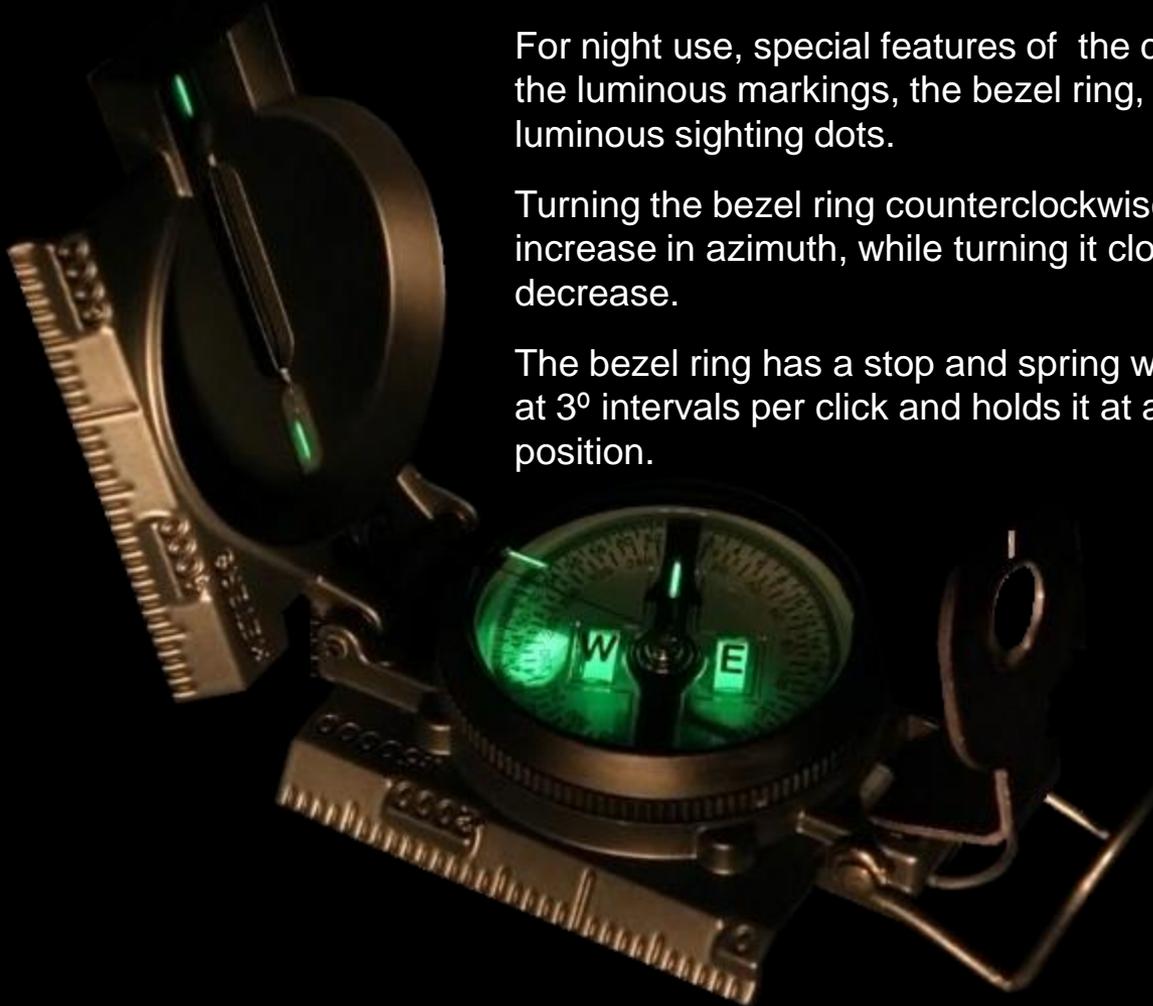
Lensatic Compass for Night Travel

Night Use of the Compass.

For night use, special features of the compass include the luminous markings, the bezel ring, and two luminous sighting dots.

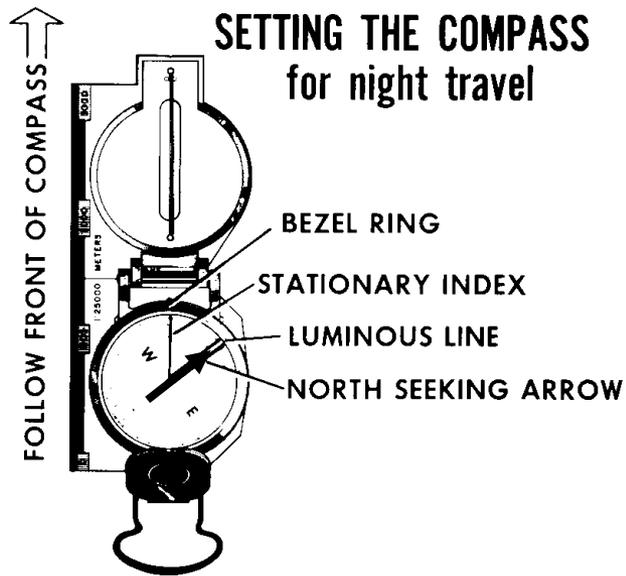
Turning the bezel ring counterclockwise causes an increase in azimuth, while turning it clockwise causes a decrease.

The bezel ring has a stop and spring which allows turns at 3° intervals per click and holds it at any desired position.



NIGHT NAVIGATION

Lensatic Compass for Night Travel



Each click of the BEZEL ring equals 3 degrees.

Heading between 0 and 180 degrees is divided by 3.
Sum is number of clicks to the left of stationary index line.
Heading between 180 and 360 degrees, subtract heading from 360 then divide sum by 3. New sum is the number of clicks to the right from stationary index line.

EXAMPLES

Heading of $027^\circ = 9$ clicks left.

Heading of $327^\circ = 11$ clicks right.



NIGHT NAVIGATION

Lensatic Compass for Night Travel

STEP 1

- Plot your course on the map. Say your travel is a **327° azimuth**.
- Align the **North Arrow** and **Luminous Bezel Line** with the **Black Index Line**.



NIGHT NAVIGATION

Lensatic Compass for Night Travel

STEP 2

- $360^{\circ} - 327^{\circ} = 33^{\circ}$ **sum**
- $33 \div 3 = 11$
- Rotate** Luminous Bezel Line 11 clicks right.

NOTE 1

If **sum** is not exactly divisible by 3, then round **up** or **down** to the **nearest** whole number.

- * **Round up** – hit right of target
- * **Round down** – hit left of target

NOTE 2

Check the bezel ring around the face of the compass; it should make a distinct click as it is rotated. If it does not click, you will have to use the alternate method for night azimuth settings.

ALTERNATE METHOD

$$360^{\circ} - 327^{\circ} = 33^{\circ} \text{ sum}$$

Set **Luminous Bezel Line** to 33°



NIGHT NAVIGATION

Lensatic Compass for Night Travel

STEP 3

NOTE

Use the **Luminous Sighting Dots** as a visual queue on aligning your body with the compass during night navigation.

- Using the **Center-Hold method**, rotate your body till the **North Arrow** and **Luminous Bezel Line** are aligned.
- The **327° azimuth** will be aligned under the **Black Index Line**



NIGHT NAVIGATION

Lensatic Compass for Night Travel

STEP 4

NOTE

Use the **Luminous Sighting Dots** as a visual queue on aligning your body with the compass during night navigation.

- Using the **Center-Hold method**, keep the **North Arrow** aligned with the **Luminous Bezel Line**.
- Proceed forward in the **direction** of the **Luminous sighting Dots**.



↑

DIRECTION OF TRAVEL



Any Questions?

SUSTIANMENT DESCRIPTION



Land navigation is a skill that is highly perishable. The Navigator must continually make use of the skills they have acquired to remain proficient in them.

Sustainment should use the building-block approach to training; theory of land navigation; the practice of these skills; land navigation testing, and building of navigation skills.

The purpose of setting up a **sustainment program** is to provide Navigators with training that reinforces and builds on the training they have received in the classroom and field. All Navigators should receive this training at least twice a year.

The program also provides the Navigator with a means of identifying the areas in which they need additional training.

The best way to maintain your **LAND NAVIGATION** skills is to get "dirt time", that is, get out there with a map and compass!

- SUSTAINMENT PROGRAM
- TRAIN-THE-TRAINER PROGRAM
- SET UP A LAND NAVIGATION COURSE

SUSTIANMENT

SUSTAINMENT PROGRAM

The sustainment program should address all skills from basic map reading to the Navigator planning and executing a route.

1. The program should cover the following:
 - Map reading instruction/review.
 - Land navigation skills training.
 - Dead reckoning training/practice.
 - Terrain association training/practice.
 - Land navigation written/field examination.
 - Training and testing.
2. The program should be developed into individual “Training Modules” so that it can be used as a whole group program or used separately by individuals.
3. First determine the levels of proficiency and problems that the Navigators have in land navigation.
4. Evaluate by personal observation, written test, and annual training.
5. Provide training site, resources, and time for Navigators to practice land navigation.



Any Questions?

SUSTIANMENT

TRAIN-THE-TRAINER ROGRAM

The purpose of a **Train-the-Trainer** program in a group is to develop instructors that are capable of training navigators with the confidence and skills necessary to accomplish all assigned land navigation tasks.

Development of the Program. The group should appoint a cadre of instructors to act as primary and alternate instructors for land navigation training.

Determine which instructors conduct which module of training and have them practice until they are fully prepared to give the training.

These instructors act as training cadre for the entire group. They train their peer instructors to instruct the subordinate members, and they certify each instructor's training program.

Use the training modules the group has developed and have the students go through each module of training until they can demonstrate expertise.

Conduct of Training. Conduct training at the lowest level possible.



Any Questions?

SUSTIANMENT

SET UP A LAND NAVIGATION COURSE

There are **basic guidelines** to use when setting up a course.

Determine the Standards. The group determines the standards for the course. Recommended standards are as follows:

- A course is made up of routes (lanes) - no less than 3 lanes, no more than 5 lanes.
- Total distance of a lane - no less than 2,700 meters, no more than 11,000 meters.
- Total number of position stakes (legs) for each lane - no less than 7, no more than 9.
- Distance between stakes - no less than 300 meters, no more than 1,200 meters.
- Time allowed - no less than three hours, no more than four hours.

Decide on the Terrain. The group should use terrain that is similar to terrain they will be using in actual expeditions / wilderness trips, but, terrain should be different each time training is conducted.

- The training area for a course needs to be at least 25 square kilometers (5Km x 5Km).

Perform a Map and Ground Reconnaissance. Check the terrain to determine position stake locations, to look for hazards, and to develop training briefings.

The following sequence can be used to develop any type of land navigation course. The difference in each course depends on the groups guidance.

- (1) Plot the locations of your position stakes on a map.
- (2) Fabricate position stakes. (what type of material to use – easily visible from a far distance or less visible)
- (3) Survey the locations of your position stakes.
- (4) Certify the course by having your subject matter experts (SMEs) negotiate each lane of the course.
- (5) Prepare course requirement sheets and print them.
- (6) Complete a risk assessment of the training area.
- (7) Begin teaching.

SUSTIANMENT

SET UP A LAND NAVIGATION COURSE

There are **basic guidelines** to use when setting up a course.

STANDARDS: The candidate must navigate using the compass from a **start point**, through several intermediate points (**stake points**), to a **finish point**, and record the position stake number for each point within 4 hours. the following information must be annotated for record purposes:

- Start time.
- From start point to point 1: degrees magnetic, meters, and position stake number.
- From point 1 to point 2: degrees magnetic, meters, and position stake number.
- From point 2 to point 3, etc, to finish point: degrees magnetic, meters, and position stake number.
- Stop time and elapsed time in hours and minutes.



SUSTIANMENT

SET UP A LAND NAVIGATION COURSE

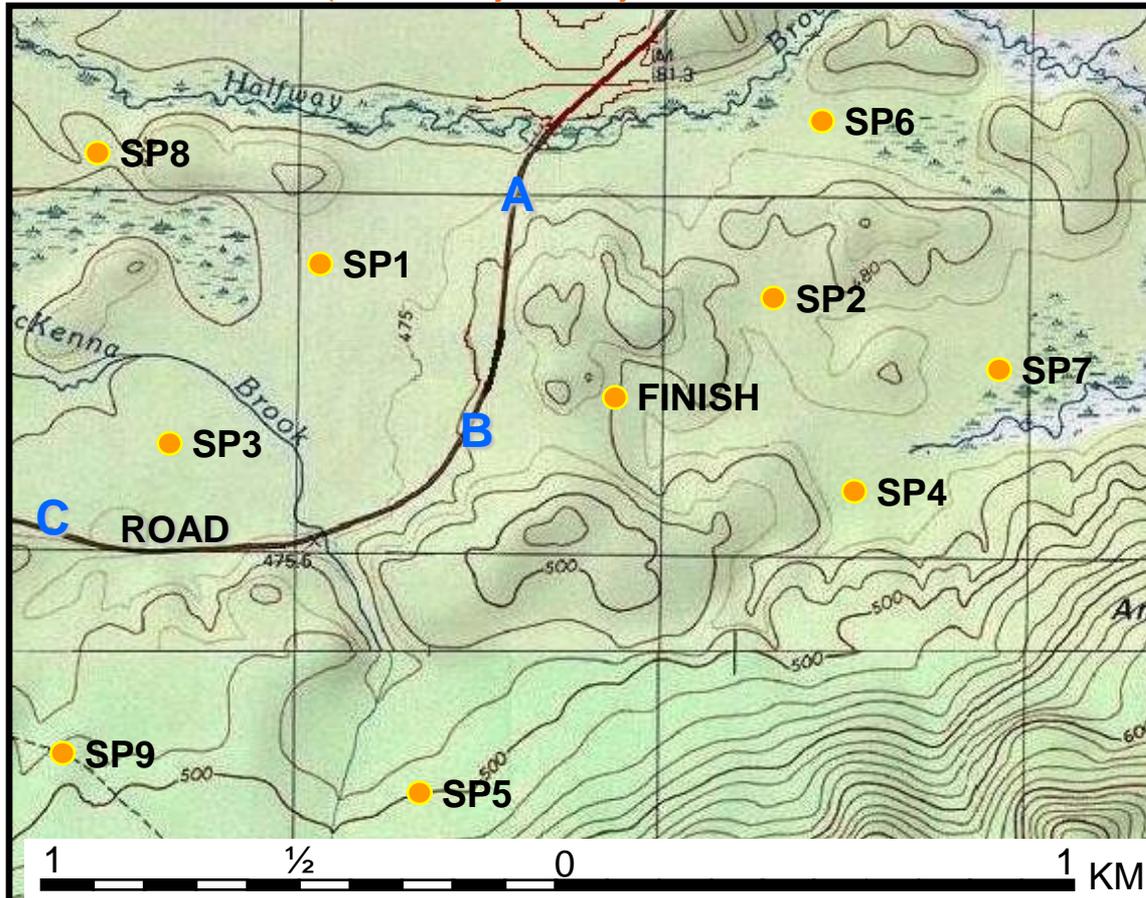
EXAMPLE #1 SETTING UP A COURSE.

Navigator A training lane #1 – Proceed to SP1, SP5, SP4, SP2, SP7, SP6, SP8, FINISH Point

Navigator B training lane #2 – Proceed to SP3, SP8, SP6, SP1, SP2, SP4, SP5, FINISH Point

Navigator C training lane #3 – Proceed to SP9, SP3, SP5, SP1, SP2, SP4, SP1, FINISH Point

● = Stake Points (which may or may not be shown on the student's map depending on skill level)



THIS IS HOW EACH NAVIGATOR SHOULD FINISH ON THEIR ANSWER SHEET

Navigator A

SP1 (250° / 400m / 15min)
 SP5 (169° / 1050m / 47min)
 SP4 (055° / 1000m / 30min)
 SP2 (337° / 400m / 15min)
 SP7 (107° / 450m / 23min)
 SP6 (325° / 600m / 35min)
 SP8 (267° / 1400m / 1hr 28min)
 FINISH (115° / 1100m / 1hr 5min)

Navigator B

Same process above.

Navigator C

Same process above.

SUSTIANMENT

SET UP A LAND NAVIGATION COURSE

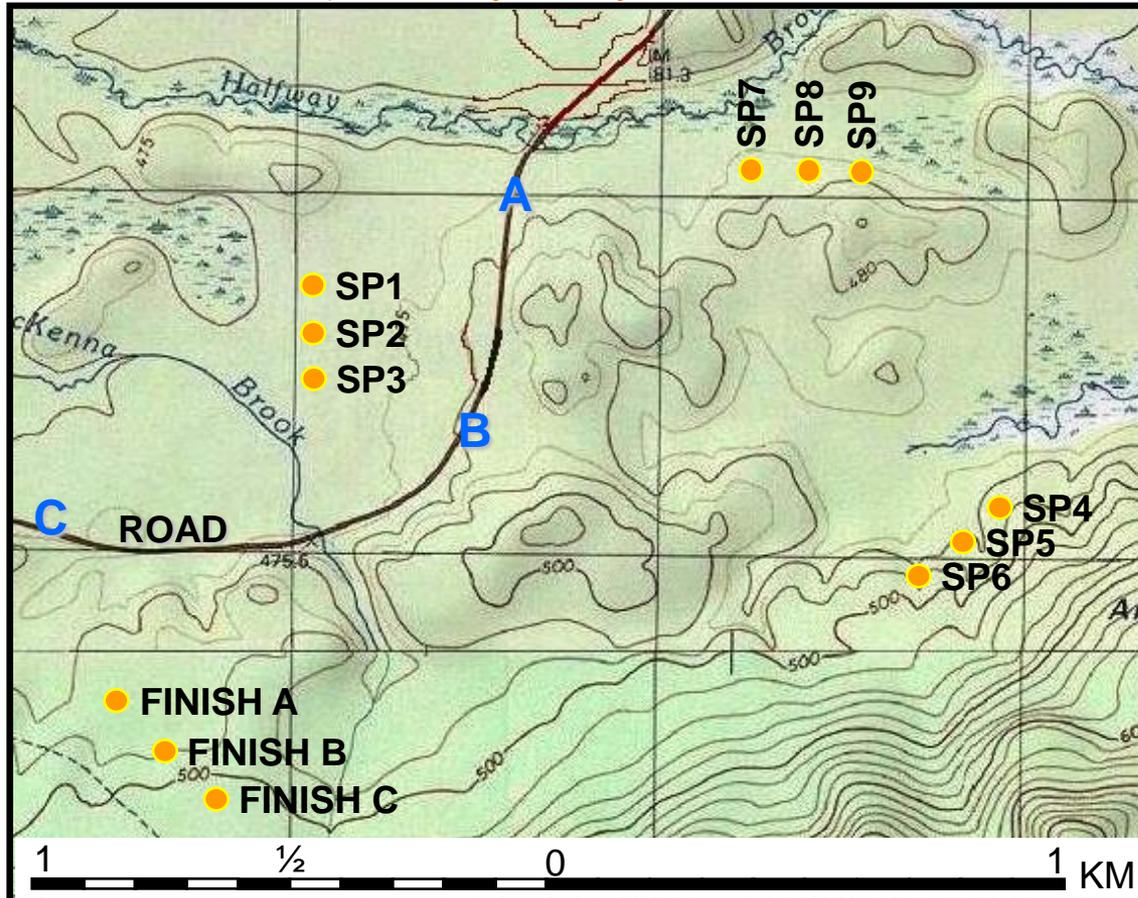
EXAMPLE #2 SETTING UP A COURSE.

Navigator A training lane #1 – Proceed 235° 500m, 112° 1300m, 352° 800m, 230° 1800m

Navigator B training lane #2 – Proceed 287° 350m, 104° 1300m, 330° 850m, 220° 1650m

Navigator C training lane #3 – Proceed 046° 700m, 108° 1400m, 331° 850m, 232° 1850m

● = Stake Points (which may or may not be shown on the student's map depending on skill level)



THIS IS HOW EACH NAVIGATOR SHOULD FINISH ON THEIR ANSWER SHEET

Navigator A SP2, SP6, SP9, FB

Navigator B SP3, SP5, SP7, FC

Navigator C SP1, SP4, SP8, FA

IF THE NAVIGATOR HAS A DIFFERENT ANSWER, THIS IS WHERE THEY MADE ERRORS IN CALCULATING THEIR "POSITION" AND LAND NAVIGATION "STAYING ON COURSE".

EXAMPLE **Navigator A** reached SP1 vice of SP2. From there, SP4, SP9, FA (Navigator drifts to the right).

SUSTIANMENT

SET UP A LAND NAVIGATION COURSE

EXAMPLE #3 SETTING UP A COURSE.

Navigator A training lane #1 – UTM Coordinates 55906 428261, 56073 428194, 56059 428307, 55866 428171

Navigator B training lane #2 – UTM Coordinates 55906 428248, 56084 428205, 56025 428307, 55880 428158

Navigator C training lane #3 – UTM Coordinates 55906 428274, 56095 428213, 56040 428307, 55852 428186

● = Stake Points (which may or may not be shown on the student's map depending on skill level)

THIS IS HOW EACH NAVIGATOR SHOULD FINISH ON THEIR ANSWER SHEET

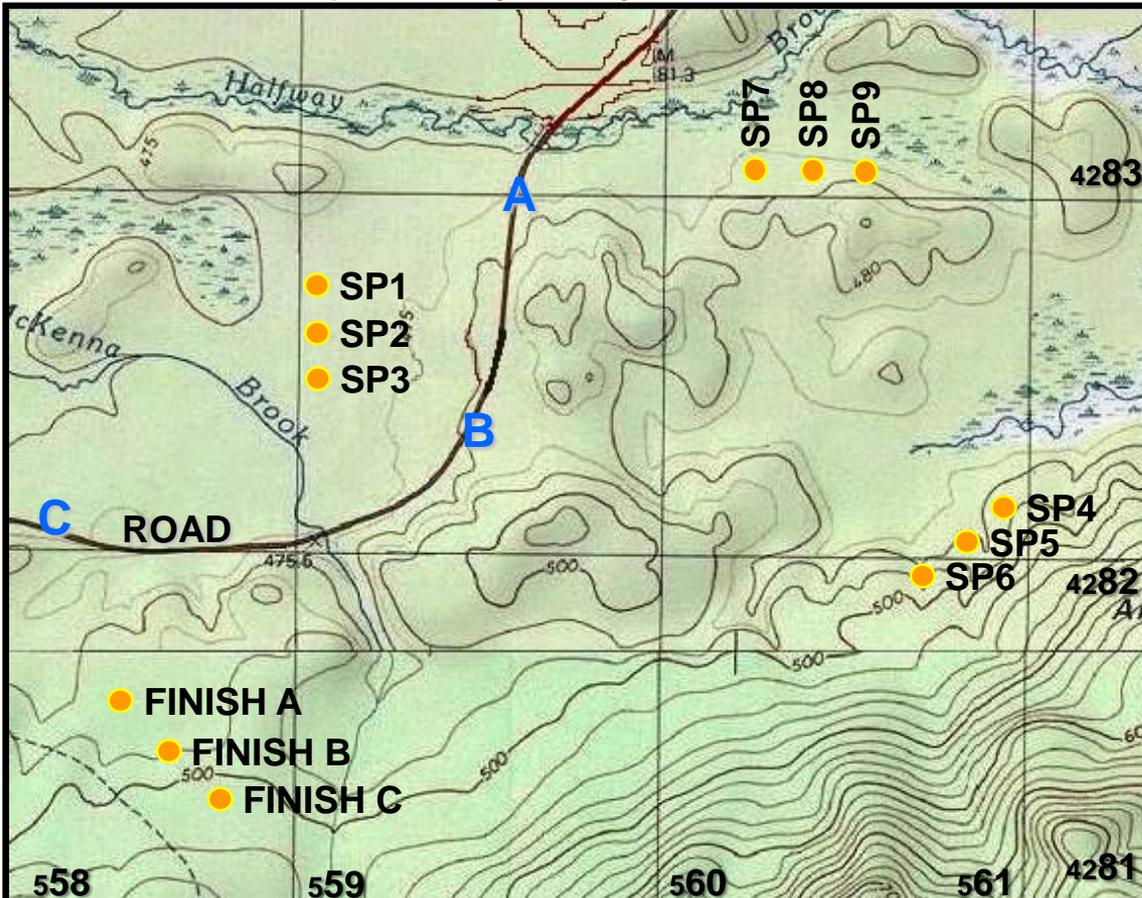
Navigator A SP2, SP6, SP9, FB

Navigator B SP3, SP5, SP7, FC

Navigator C SP1, SP4, SP8, FA

IF THE NAVIGATOR HAS A DIFFERENT ANSWER, THIS IS WHERE THEY MADE ERRORS IN CALCULATING THEIR "POSITION" AND LAND NAVIGATION "STAYING ON COURSE".

EXAMPLE **Navigator A** reached SP1 vice SP2. From there, SP4, SP9, FA (Navigator drifts to the right).



Any Questions?

Note:

Prior to being issued any training *equipment, you will be required to sign a “statement of liability” agreeing to pay for anything you damage or lose.

All items will be inspected and inventoried prior to your signature and at the end of the training day too.

If you do not intend to sign this statement, then you may be denied training.

*** You may use your own equipment.**

TESTING

Now it is time for the following . . .

- Written exam
- Hands-on / Outdoors exam

THE END OF
LAND NAVIGATION
PRESENTATION
PART 4