LAND NAVIGATION WITH MAP AND LENSATIC COMPASS
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.
PART 1

BASIC LAND NAVIGATION

MODULE 1

• The Lensatic Compass
  – Parts and Features
  – Sighting the Compass
THE LENSATIC COMPASS

The genuine Lensatic compass differs from the type most hikers are familiar with, the traditional "orienteering" compasses. The Lensatic, a design preferred by military forces for its precision and durability, is designed to take hyper-accurate bearings for land navigation and directing artillery fire!
LENSATIC COMPASS
DESCRIPTION

• Preferred by military for its precision and durability, and its hyper-accuracy in land navigation and combat.
• Battle tested - shock, water, sand proof, and functional from -50°F to +150°F.
• Uses a retractable lens to read the bearing while simultaneously sighting an object.
• With the Lensatic you just point and shoot one target and immediately move on to the next.
• Luminous Lights allow for navigation in low-light conditions and night navigation.
• Equipped with a magnifying lens, sight wire, and dial graduations in both degrees and mils to ensure accurate readings.
• Copper induction dampening system slows the rotation of the magnet without the use of liquids. Retractable lens locks the dial jewel bearing when stowed to lessen wear and tear.
• Employs a "Card" type compass Dial, and this makes for single handed operation. (Most magnetic "needle" type, always requires 2 hands.)
• A 'deep-well' design is used to allow the compass to be used globally with little or no effect in accuracy caused by a tilting compass dial.
• Lensatic sighting compasses are so simple and rugged and incredibly easy to use that it is no wonder they are the standard type used for navigation by the U. S. Military.
Cheap Lensatic Copies

When someone tried to buy a genuine CAMMENGA LENSATIC COMPASS from websites, he came across a whole raft of cheap imitations. Most outlets tell you they are selling ‘Military Style’ Lensatic compasses (fake, inaccurate, missing features) – but some claim to offer U.S. Government Military Lensatic compasses for just $14.95, which are also fake cheap imitations.

Cheap copies break easily, are not accurate, have false features displayed on the compass glass face and will mislead you.

The genuine lensatic compass used by the military is very durable, accurate, and easy to use. It can survive rough handling and harsh environments.

Buy the Genuine Article
Purchasing a genuine CAMMENGA LENSATIC COMPASS is easy, go to www.cammenga.com

Click on the article to the right to read about the comparison of compasses…
“orienteering compass vs. lensatic compass”.
LENSATIC COMPASS

PARTS and Features of a Lensatic compass
LENSATIC COMPASS

**Cover** - Protects the floating dial and other parts of the compass when closed.

- **Sighting Wire** - front sight used with rear sight, for sighting landmarks for azimuth headings.
- **Luminous Sighting Dots** – used in low-light condition and night navigation. Also a visual queue on aligning your body with the compass during night navigation.
- **Graduated Straight Edge** - upper half of a standard 1:50,000 scale map ruler, for measuring distances on a map.
LENSATIC COMPASS

**Base** - The main body of the compass. If, for any reason, the lensatic compass were to malfunction, the base would be the piece that you would want to still work.

- **Bezel Ring** – device clicks when turned; full 360° rotation is 120 clicks; each click equals 3°.
- **Luminous Bezel Line** – Used to mark a course direction during day or night navigation.
- **Floating Dial** – black scale (mils), red scale (degrees), set in a deep tub for global use.
- **Luminous Heading** – to read azimuth heading in low-light or night conditions.
- **Luminous Magnetic Arrow** – always points to magnetic north.
- **Thumb Loop** – to hold compass with the thumb.
- **Fixed Index Line** – azimuth heading.
- **Lanyard Ring** – for string or rope.
Mils - is used mainly in artillery, tank, and mortar gunnery. AND is also used for very accurate azimuth land navigation.

- 6400 Mils to a Circle
- Distance Between Small Marks = 20 Mils
- Distance Between Big Marks = 100 Mils
- Distance Between Numbers = 200 Mils
  
  N = 64 (6400)  
  E = 16 (1600)  
  S = 32 (3200)  
  W = 48 (4800)

8.89 Mils = ½ Degree
17.78 Mils = 1 Degree

LENSATICA

COMPASS
Degrees – common unit of measure is the degree (°).

- 360 Degrees to a Circle
- Distance Between Red Marks = 5°
- Distance Between Big Marks = 10°
- Distance Between Red Numbers = 20°
  
  N = 0°
  E = 90°
  S = 180°
  W = 270°

Mils - is used mainly in artillery, tank, and mortar gunnery. AND is also used for very accurate azimuth land navigation.

- 6400 Mils to a Circle
- Distance Between Small Marks = 20 Mils
- Distance Between Big Marks = 100 Mils
- Distance Between Numbers = 200 Mils
  
  N = 64 (6400)
  E = 16 (1600)
  S = 32 (3200)
  W = 48 (4800)

8.89 Mils = \( \frac{1}{2} \) Degree
17.78 Mils = 1 Degree
Exactly 1 cm (every 5 ticks)
Approximately 1 inch (every 13 ticks)

Used to take distance measurements from point “A” to point “B” on maps; in conjunction with the distance bar scales on the map.
LENSATIC COMPASS

**Lens Rear Site** - Sighting device.

- **Lens** - used to read the dial.
- **Rear Site** - used in conjunction with the front site wire for sighting on objects.

**NOTE:**
The Lens Rear Sight also serves as a locking device and locks the dial jewel bearing to protect from wear and tear when closed. Also the rear sight must be opened more than 45° to allow dial to float freely.

*When traveling make sure that the rear sight is totally folded down as this will lock the floating dial and prevent vibration, as well as protect the crystal and rear sight from being damaged.*
LENSATIC COMPASS
HANDLING A COMPASS

When buying a new compass check . . .

- That the dial does not stick
- Sighting wire is not bent
- Glass and other parts are not broken
- Numbers on the dial are legible
- Check for accuracy along a known line of direction
  - Discard any type of compass with more than a 3° +/- variation.
  - Lensatic compass is accurate to a ½° degree (better when using the mils scale).

- When traveling make sure that the rear sight is totally folded down as this will lock the floating dial and prevent vibration, as well as protect the crystal and rear sight from being damaged.

EFFECTS OF METAL AND ELECTRICITY – these sources affect the performance of a compass during use.

- 180 feet / 55 meters  High tension power lines
- 33 feet / 10 meters  Truck, car, Barbed wires
- 6 feet / 2 meter  Hunting rifle
- 1 feet / ½ meter  Knife, flashlight, binoculars, camera
- Inches / centimeters  Belt buckle, paper clip, jewelry, etc.
- Misc distances  any local geological magnetic rocks.
LENSATIC COMPASS
INSPECTING A COMPASS

Compasses are delicate instruments and should be cared for accordingly. A detailed inspection is required when first obtaining and using a compass. Important serviceability checks are outlined below:

**VISUAL INSPECTION**

- Your compass should be opened to see that the cover glass is not broken, clouded, or cracked and that the compass dial does not stick.

- The front cover should be inspected to see if the cover sighting wire is missing or bent. If it is, use the center of the opening for sighting purposes, not the wire.

- The eyepiece should be placed flat against the cover glass. The index line on the cover glass should bisect the sight slot. Then, with the compass closed, it should be noted that the sighting wire also bisects the sight slot.
  - This procedure will ensure that the eyepiece is not bent. Gently bend the eyepiece back into proper alignment, if necessary.

- 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 be taught an alternate method for night azimuth settings.

**MAINTENANCE**

- The lensatic compass is built to detailed specifications that were developed in an attempt to increase its serviceable life. Adherence to very simple maintenance procedures will significantly increase the life of the lensatic compass. Maintenance procedures are outlined below:

- Rinse in fresh water. This is extremely important, especially after exposure to salt water.

- Brush off dirt and grime. Ensure the "ridges" on the bezel ring are free of dirt. Check movement of the rear sight to ensure it is free moving.
LENSATIC COMPASS
CALIBRATION

A compass in good working condition is very accurate, but it should be checked periodically on a known line of direction. This process is called compass calibration.

CALIBRATION
• Note the calibration point azimuth. This is the known magnetic azimuth from the calibration point to a designated point.

• Shoot an azimuth from the calibration point to the designated point utilizing the compass-to-cheek technique (described in detail later in this handout).

• Ensure you check for effects on your compass from your eyeglasses, watches, rings, etc. If you wear these items in the field, ensure you wear them when calibrating your compass.

Compare azimuths:

• If your compass shot an azimuth greater than the calibration point azimuth, then you must add the difference between the two azimuths (the calibration point value) to your computed magnetic azimuth.
  ✓ Conversely, you must also ensure you subtract this value when converting from an actual compass (magnetic) azimuth to a grid azimuth.

• If your compass shot an azimuth less than the calibration point azimuth, then you must subtract the difference between the two azimuths (the calibration point value) from your computed magnetic azimuth.
  ✓ Conversely, you must also ensure you add this value when converting from an actual compass (magnetic) azimuth to a grid azimuth.
HOW TO SIGHT A LENSDATIC COMPASS
SIGHTING A LENSATIC COMPASS

Compass-to-Check method for taking a target azimuth bearing

- The compass-to-cheek technique is used almost exclusively for *sighting*, and it is the best technique for this purpose.
- It is the most efficient technique for taking an accurate azimuth bearing.
SIGHTING A LENSATIC COMPASS
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PART 1  Basic Land Navigation
SIGHTING A LENSATIC COMPASS

65° AZIMUTH

(11.5m = 1,150mils)
SIGHTING A LENSATIC COMPASS

Compass-to-Check method
for taking a target azimuth bearing

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PART 1 Basic Land Navigation

Module 1 Lensatic Compass

SIGHTING LENSATIC COMPASS
PART 1 Basic Land Navigation

Module 1 Lensatic Compass

SIGHTING LENSATIC COMPASS
Module 1 Lensatic Compass

PART 1 Basic Land Navigation

SIGHTING LENSATIC COMPASS

WRONG
SIGHTING LENSATIC COMPASS
Module 1 Lensatic Compass

SIGHTING LENSATIC COMPASS

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PART 1 Basic Land Navigation

Module 1 Lensatic Compass

SIGHTING LENSATIC COMPASS
The center-hold technique is less precise, but is faster to use and can be used under all conditions of visibility.

1. Open the cover until it forms a straight edge with the base.
2. Pull the rear sight to the rear most position, allowing the dial to float freely.
3. Next, place your thumb through the thumb loop, form a steady base with your third and fourth fingers, and extend your index finger along the side of the compass.
4. Place the thumb of the other hand between the rear sight and the bezel ring; extend the index finger along the remaining side of the compass, and the remaining fingers around the fingers of the other hand.
5. Pull your elbows firmly into your sides; this will place the compass between your chin and your belt.
LEN S A TIC C OMPA N S S

Center-Hold method for following an azimuth bearing

1. Using the Center-Hold method to hold the compass to your body.

2. Turn your body till desired azimuth is aligned with Black Index Line, hold this azimuth. Example 25º.

3. Without turning compass, rotate Bezel Ring till Luminous Bezel Line is aligned with North Arrow.

1. Once bezel is set leave it there. (Till you are ready to change heading, then start the process over again.)

2. Keeping the North Arrow aligned with the Luminous Bezel Line, proceed forward in the direction of the desired azimuth 25º on the Black Index Line.