

Land Navigation

Table of Contents

Preparatory Notes to Instructor	1
Session Notes	5
Learning Activity: Grid Reference Four Figure	7
Learning Activity: Grid Reference Six Figure.....	8
Learning Activity: Combined Exercises	11
Learning Outcome Assessment	13

Preparatory Notes to Instructor

Background

A lack of infrastructure, traffic signs and road signs in mission areas can lead to inadequate transport and road systems. UN Police is often in situations that require the ability to navigate using available equipment such as topographical maps, compass or global positioning system (GPS). Without an adequate level of comprehension of the various equipment and methods and the ability to navigate safely in mission environment, the function of the UN Police can be limited and the safety of the police officer at risk.

Aim

To familiarize participants with:

- the necessary skill to enable them to navigate using maps, compass and GPS.

Learning Outcomes

On completion of Land Navigation Module, participants will be able to:

1. Interpret the information on a map and be able to read a map.
2. Demonstrate the use of different grid reference systems and be able to establish coordinates and grid references.
3. Explain the main principles of using a compass.
4. Explain the main principles of using GPS.

Training Sequence

It is suggested that the module is delivered during one to two training units, depending on participants' skills and additional time should be allocated for practice during a field exercise.

Duration

Minimum Session Time	Lecture/Presentation	Questions/Assessment	Session Activities
105 minutes	20 min	15 min.	70 min. activity
Additional Options	Mission Specific	Optional Film	Optional Activity
	as needed		

2 ▪ Land Navigation

Methodology

This module is highly dependent on what material the trainer has available and require adjustments accordingly.

It is recommended that this module is kept as practical as possible and will be conducted predominantly based on tasks and exercises on which basic details can be explained. The module is best delivered if at least teams of two can share a map and compass.

It is furthermore recommended to extend the module to practical exercises in the terrain and if possible during a wider peacekeeping exercise in the field.

- Introduction to Maps
 - Grid References
 - Measuring Distances
 - Identify Shapes – Map to ground and ground to map
 - Function and use of compass
 - Practical exercises
5. Basic functioning of GPS

* **Please Note:** It is up to the learning institution to decide whether the learning assessment questions are used informally in a group question and answer session, or if they are provided to the participants as a written quiz. In either case, it is recommended that the correct answers are provided at the end of the assessment in order to ensure participants are clear on the key messages.

Instructors are encouraged to add examples and mission-specific information related to the specific deployment of participants, if known.

Instructor Profile

This module is best presented by an instructor who has practical experience in land navigation and with knowledge of mission conditions in this regard should present the module.

Instructor Preparations

Required Readings

- [http://www.ema.gov.au/agd/EMA/rwpattach.nsf/VAP/\(A80860EC13A61F5BA8C1121176F6CC3C\)~ASM_Map_Reading.pdf/\\$file/ASM_Map_Reading.pdf](http://www.ema.gov.au/agd/EMA/rwpattach.nsf/VAP/(A80860EC13A61F5BA8C1121176F6CC3C)~ASM_Map_Reading.pdf/$file/ASM_Map_Reading.pdf)
- <http://www.scribd.com/doc/4020131/Map-Reading-Navigation>

General Preparations

Equipment:

1. Computer and PowerPoint slides
2. Projector and Screen
3. DVD and speakers if film is being used

Materials:

1. Maps
2. Compasses
3. White board
4. Protractor
5. GPS

4 ▪ Land Navigation

Symbols Legend

-  Note to the Instructor (Some background information for consideration)
-  Speaking Points (The main points to cover on the topic. Ideally the speaking points are presented in the instructor's own words versus being read to participants)
-  Mission Specific (A point where the session will benefit from mission specific information)
-  Example (Stories that illustrate a point or key message)
-  Sample questions (A list of potential questions to pose to participants)
-  Handout (Indicates a handout is provided to participants at this point)
-  Film (A film that is recommended as a core part of the training or an option)
-  Core Learning Activity (An activity that is strongly recommended for inclusion)
-  Optional Learning Activity (An activity that can be used if there is time and it is appropriate for the participant group. Guidelines for these activities are provided at the end of the unit, section or part – as indicated in the text)
-  Key summary points (Key messages that are worth repeating at the end of the session. Alternatively, the instructor can ask participants what are the main messages they are taking from the session. Instructors can then fill in any points that have been missed.)

Session Notes

Land Navigation	Slide 1
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 **Note to Instructor:** Give the participants a brief explanation why they should pay special attention to this module. Refer to: Background in the Preparatory Notes to the Instructor.

Aim	Slide 2
<p>The aim of this module is to provide participants with the necessary skill to enable them to navigate using maps, compass and GPS.</p>	

Learning Outcome	Slide 3
<p>On completion of the module, participants will be able to:</p> <ul style="list-style-type: none"> • Interpret the information on a map and be able to read a map. • Demonstrate the use of different grid reference systems and be able to establish and 6 digit grid references. • Explain the main principles of using a compass and be able to determine bearings and distances between locations on a map. • Explain the main principles of using GPS. 	

6 ▪ Land Navigation

Structure of the Presentation	Slide 4
<ul style="list-style-type: none">• Introduction to Maps• Grid References• Measuring Distances• Identify Shapes – Map to ground and ground to map• Function and use of compass• Practical exercises• Basic functioning of GPS	

Map Information	Slide 5
<ul style="list-style-type: none">• General• Title Information• Production Information• Universal GRID reference• North Points• Scale and Contour Interval• Legend• Watercourse Information• Index to Adjoining Maps	



Note to Instructors: Based on map available, go through the various information contained on the map.

Map References	Slide 6
<p>Map References may be given by:</p> <ul style="list-style-type: none">• Geographic Coordinates• Grid References	

Grid References	Slide 7
<p>A grid is two sets of equally spaced parallel lines.</p> <ul style="list-style-type: none"> • Eastings (Vertical) • Northings (Horizontal) • 4 Figure Grid Reference (Grid Square) <p>One kilometer accuracy. Grid line interval generally 1000 meters. Read eastings first, then northings.</p>	



Note to Instructors: In this context, Geographic Coordinates are mainly used for GPS.

Grid Reference Four Figure	Slide 8



Learning Activity: Grid Reference Four Figure

The purpose of this group discussion activity is for participants to become familiar with a four digit grid reference.



Learning Activity Time Required:

	5 minutes	for activity introduction and instructions
	10 minutes	for work small groups discussions
	5 minutes	for small group reports in large group*
Total time:	20 minutes	*total time dependent number of groups



Activity Guidelines:

1. Based on the map you have available, ask participants to identify a 4 digit grid reference of a location on a map.
2. Use this example to explain the practicalities.
3. Ask participants to present their results in the plenary (the large group).
4. Complement the results with the expected outcome.

8 ▪ Land Navigation

Expected Outcome:

Defined by the actual tasks.

 **Note to Instructors:** *When the general understanding of identifying the grid reference has been obtained, continue with a number of similar tasks to consolidate the skills.*

Grid References Six Figure	Slide 9
<ul style="list-style-type: none">• 6 Figure Grid Reference• Easting and Northing each divided into ten <p>100 meter accuracy</p>	



Learning Activity: Grid Reference Six Figure

The purpose of this group discussion activity is for participants to become familiar with a six digit grid reference.



Learning Activity Time Required:

5 minutes	for activity introduction and instructions
10 minutes	for work small groups discussions
5 minutes	for small group reports in large group*
Total time:	20 minutes *total time dependent number of groups

Activity Guidelines:

1. Based on the map you have available, ask participants to identify a 6 digit grid reference of a location on a map.
2. Explain or demonstrate on i.e. white board the subdivision of the grid square in ten / 100 m sections.
3. Ask participants to present their results in the plenary (the large group).
4. Complement the results with the expected outcome.

 **Expected Outcome:**

Defined by the actual tasks.

 **Note to Instructors:** *When the general understanding of identifying the grid reference has been obtained, continue with a number of similar tasks to consolidate the skills.*

Scales and Distances	Slide 10
<ul style="list-style-type: none"> • Map Scales • Measuring Straight Distances 	

 **Note to Instructors:** *Based on the map available, exercise the identification of distance between locations (grid references).*

The Compass	Slide 11
<p>Compass Types: Compass Card, Orienting Lines and Arrow</p> <p>Taking Grid Bearings Setting a Magnetic Bearing</p>	

 **Note to Instructors:** *Based on the compass available, explain the features of the compass.*

North Points	Slide 12
<p>Three Types of North:</p> <ul style="list-style-type: none"> • True North • Grid North • Magnetic North 	

10 ▪ Land Navigation

Bearings	Slide 13
<p>A bearing is a direction from one point to another.</p> <p>Bearings are angles measured clockwise from North.</p> <p>Angles are measured in degrees.</p>	

Measuring Bearings	Slide 14
<p>Measure angle (bearing) using a protractor or SILVA compass</p> <p>Always measure the angle from Grid North going clockwise</p> <p>Two types of bearings</p> <ul style="list-style-type: none">• Grid Bearing used with Map and Compass• Magnetic bearing used with ground and compass	



Note to Instructors: Demonstrate and exercise how to orientate the map to terrain based on magnetic north.

Based on map and compass available, demonstrate and thereafter exercise the participants in identifying bearings between locations on the map.

Demonstrate and exercise the determining the bearing from your location to locations in your surrounding (best done in terrain but can also be applied through class room windows)

Magnetic Variation	Slide 15
<p>The angle between Grid North and Magnetic North is called Magnetic Variation</p> <p>Or Magnetic Declination</p> <p>Shown on the map marginal information</p> <p>Magnetic Variation is specific to each map</p>	



Note to Instructors: For information and awareness only. Be aware that the magnetism of a car can influence the compass. In some occasions minerals in the ground can influence the compass. The effect of the magnetic north pole varies depending on the location on the planet.



Learning Activity: Combined Exercises

The purpose of this group discussion activity is for participants to become familiar with all the activities involved in land navigation.



Learning Activity Time Required:

5 minutes	for activity introduction and instructions
15 minutes	for work small groups discussions
10 minutes	for small group reports in large group*
Total time: 30 minutes	*total time dependent number of groups



Activity Guidelines:

1. Based on the map you have available, ask participants to identify 4 and 6 digit grid reference of a location on a map.
2. Ask participants to orientate the map to true north.
3. Ask participants to identify bearing and distances between locations on the map.
4. Ask participants to present their results in the plenary (the large group).
5. Complement the results with the expected outcome.



Expected Outcome:

Defined by the actual tasks.

What is GPS	Slide 16
<ul style="list-style-type: none"> • A satellite based navigation system made up of a network of 24 satellites • Originally intended for military applications but available for civilian use in the 1980s. • It works in any weather conditions, anywhere, anytime with no subscription fees or charges 	



Note to Instructors: Depending on availability of GPS, this is for information only and explains shortly the main functioning of GPS. If equipped with GPS in the mission further training and familiarization is required.

12 ▪ Land Navigation

<p style="text-align: center;">How Does it Work?</p> <ul style="list-style-type: none">• GPS satellites circle the earth twice daily in very precise orbit• GPS uses triangulation to calculate exact location• They compare the time a signal was transmitted by a satellite with the time it was received• Time differences tell the GPS how far away the satellite is• With measurements from more satellites the receiver determines position, which is displayed on the unit	Slide 17
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<p style="text-align: center;">How Does it Work? (continued)</p> <ul style="list-style-type: none">• Three satellites calculate a 2 D position (latitude and longitude) and track movement• Four or more satellites calculate 3 D position (latitude, longitude and altitude)• GPS unit can then calculate other information, such as<ul style="list-style-type: none">▪ Speed▪ Bearing▪ Track▪ Trip Distance▪ Distance to Destination▪ Time of sunset and sunrise	Slide 18
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<p style="text-align: center;">Summary of Key Points</p> <p>Land navigation is a key competency that will support your personal security and will be a tool for your achievement of tasks.</p> <p>Always be aware where you are.</p> <p>Don't leave your duty location for unknown terrain without sufficient preparation and means; security briefing, sufficient maps, sufficient communication means.</p> <p>In peacekeeping you must always be prepared for the unexpected</p>	Slide 19
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Learning Outcome Assessment

It is up to the learning institution to decide whether the learning assessment questions are used informally in a group question and answer session, or if they are provided to the participants as a written quiz. In either case, it is recommended that the correct answers are provided at the end of the assessment in order to ensure participants are clear on the key messages.

At the end of the entire unit and/or the conclusion of the STMs instructors may want to choose some of the following questions for review.

Questions

1. Interpret various symbols from the map legend.
2. Identify the grid reference on locations (symbols) on the map and vice versa.
3. Explain the main principles of using a compass by orienting the map according to the magnetic north.
4. Establish compass bearing between the training location to a point visible from the location.
5. Explain the main principles of using GPS and establish the coordinates for the training location.



Expected Outcome

1. Map information (ref. slide 5)
2. Use of grid references (ref. slide 7)
3. Use of compass (ref. slide 11 and 12)
4. Use of compass (ref. slide 11 and 12)
5. Use of GPS (ref. slide 19 and 20)