

Change 1

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Department of the Army  
Washington, DC, 30 August 2006

## Map Reading and Land Navigation

1. Change FM 3-25.26, 18 January 2005, as follows:

<b>Remove old pages:</b>	<b>Insert new pages:</b>
Preface v through vi .....	Preface v through vi
1-1 through 1-2.....	1-1 through 1-2
4-7 through 4-8.....	4-7 through 4-8
4-19 through 4-20.....	4-19 through 4-20
Glossary 1 through 4.....	Glossary 1 through 2


2. A star (\*) marks new or changed material. A star (\*) on the revised contents page could indicate a minor (single word) or entire paragraph change.

3. File this transmittal sheet in front of the publication.

By Order of the Secretary of the Army:

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## PREFACE

The field manual provides a standardized source document for Armywide reference on *map reading* and *land navigation*. It applies to every Soldier in the Army regardless of service branch, MOS, or rank.

\* This manual also contains both doctrine and training guidance on map reading and land navigation. Part One addresses map reading and Part Two, land navigation. The appendixes include an introduction to orienteering and a discussion of several devices that can assist the Soldier in land navigation.

\* The proponent for this publication is the U.S. Army Training and Doctrine Command. The preparing agency is the U.S. Army Infantry School. You may send comments and recommendations by any means, US mail, e-mail, fax, or telephone, as long as you use or follow the format of DA Form 2028, *Recommended Changes to Publications and Blank Forms*. You may also phone for more information. Point of contact information is as follows.

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Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to men.

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PART ONE  
**MAP READING**

CHAPTER 1  
**TRAINING STRATEGY**

*This manual responds to an Armywide need for a new map reading and land navigation training strategy based on updated doctrine. This chapter describes and illustrates this approach to teaching these skills.*

**1-1. BUILDING-BLOCK APPROACH**

Institution courses are designed to prepare the Soldier for a more advanced duty position in his unit. The critical soldiering skills of move, shoot, and communicate must be trained, practiced, and sustained at every level in the schools as well as in the unit. The map reading and land navigation skills taught at each level are critical to the soldiering skills of the duty position for which he is being school-trained. Therefore, they are also a prerequisite for a critical skill at a more advanced level.

a. A Soldier completing initial-entry training must be prepared to become a team member. He must be proficient in the basic map reading and dead reckoning skills.

\* b. After completing the Warrior Leader Course (WLC), a Soldier should be ready to be a team leader. This duty position requires expertise in the skills of map reading, dead reckoning, and terrain association.

c. A Soldier completing the Basic Noncommissioned Officer's Course (BNCOC) has been trained for the squad leader position. Map reading and land navigation at skill level 3 requires development of problem-solving skills; for example, route selection and squad tactical movement.

d. At skill level 4, the Soldier completing the Advanced Noncommissioned Officer's Course (ANCOC) is prepared to assume the duty position of platoon sergeant or operations NCO. Planning tactical movements, developing unit sustainment, and making decisions are the important land navigation skills at this level.

e. Officers follow similar progression. A new second lieutenant must have mastered map reading and land navigation skills, and have an aptitude for dead reckoning and terrain association.

(1) After completing the Officer Basic Course (OBC), the officer must be prepared to assume the duties and responsibilities of a platoon leader. He is required to execute the orders and operations of his commander. Map reading and land navigation at this level require development of the problem-solving skills of route selection and tactical movement.

\*(2) After completing the Captain's Career Course (CCC), the officer is prepared to assume the duties and responsibilities of a company commander or primary staff officer. The commander must plan and execute operations with full consideration to all aspects of navigation. The staff officer must recommend battlefield placement of all administrative, logistical, and personnel resources. These recommendations cannot be tactically sound unless the estimate process includes a detailed analysis of the area of operations. This ability requires expertise in all map reading and navigation skills to include the use of nonmilitary maps, aerial photographs, and terrain analysis with respect to both friendly and enemy forces. The commander/staff officer must plan and execute a program to develop the unit's train-the-trainer program for land navigation.

f. A program of demonstrated proficiency of all the preceding skill levels to the specified conditions and standards is a prerequisite to the successful implementation of a building-block training approach. This approach reflects duty position responsibilities in map reading and land navigation. An understanding of the fundamental techniques of dead reckoning or field-expedient methods is a basic survival skill that each Soldier must develop at the initial-entry level. This skill provides a support foundation for more interpretive analysis at intermediate skill levels 2 and 3, with final progression to level 4. Mastery of all map reading and land navigation tasks required in previous duty positions is essential for the sequential development of increasingly difficult abilities. Scope statements support the building-block approach. It is part of the training doctrine at each level in the institutional training environment of each course.

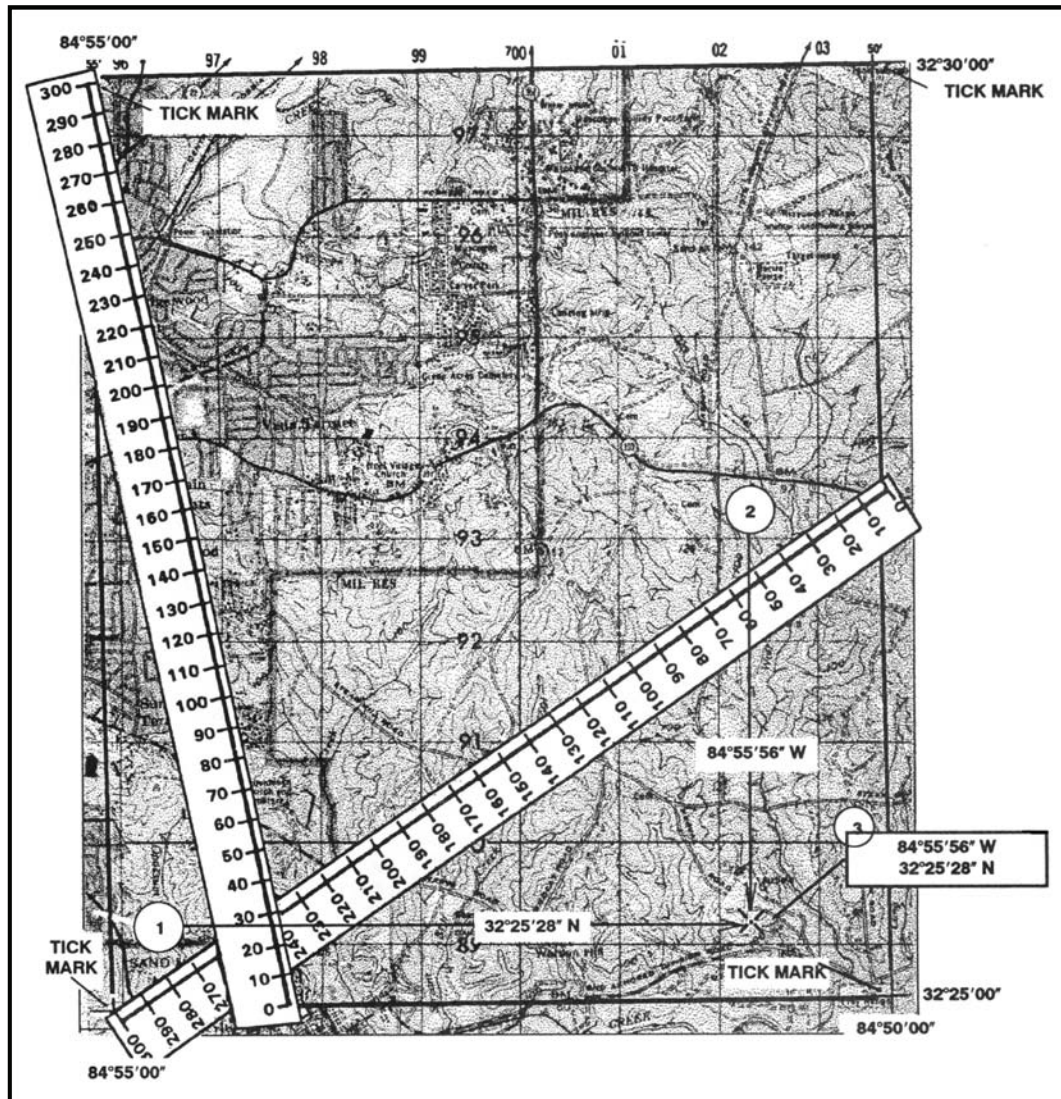
\*

### **1-2. ARMYWIDE IMPLEMENTATION**

A mandatory core of critical map reading and land navigation tasks and a list of electives will be provided to each TRADOC service school and FORSCOM professional development school. Standardization is achieved through the mandatory core.

### **1-3. SAFETY**

Unit leaders plan to brief and enforce all safety regulations established by local range control. They coordinate the mode of evacuation of casualties through the appropriate channels. They review all installation safety regulations. Unit leaders must complete a thorough terrain reconnaissance before using an area for land navigation training. They should look for dangerous terrain, heavily trafficked roads, water obstacles, wildlife, and training debris.



**Figure 4-6. Determining geographic coordinates.**

h. If you do not have a scale or ruler with 300 equal divisions or a map whose interval is other than 5'00", use the proportional parts method. Following the steps determines the geographic coordinates of horizontal control station 141.

(1) Locate horizontal control station 141 in grid square (GL0784) (Figure 4-7, page 4-8).

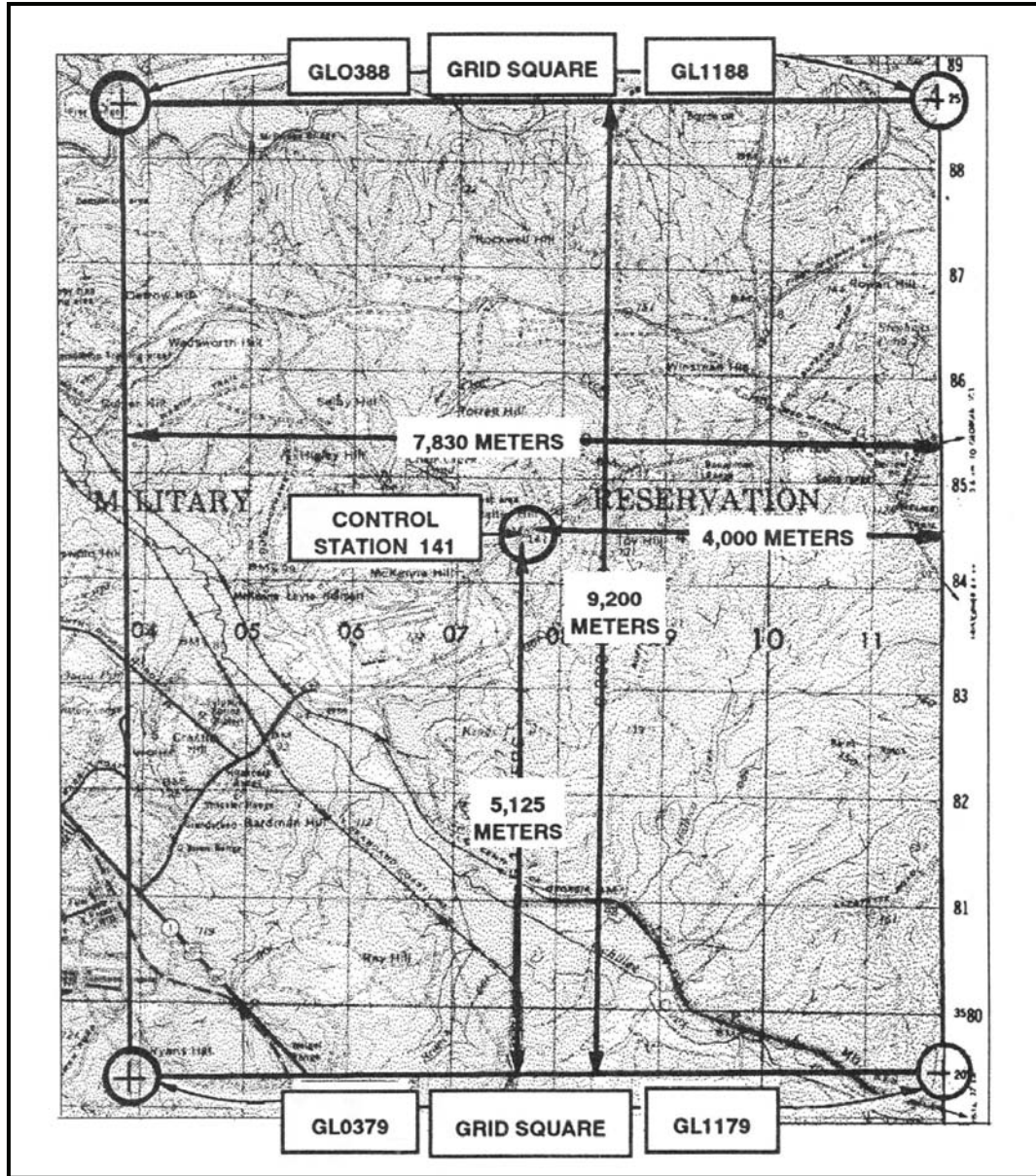
(2) Find a cross in grid square GL0388 and a tick mark in grid square GL1188 with 25'.

(3) Find another cross in grid square GL0379 and a tick mark in grid square GL1179 with 20'.

(4) Enclose the control station by connecting the crosses and tick marks. The control station is between 20' and 25'.

(5) With a boxwood scale, measure the distance from the bottom line to the top line that encloses the area around the control station on the map (total distance).





**Figure 4-7. Using the proportional parts method.**

(6) Measure the partial distance from the bottom line to the center of the control station. These straight-line distances are in direct proportion to the minutes and seconds of latitude and are used to set up a ratio.

(7) The total distance is 9,200 meters, and the partial distance is 5,125 meters.

(8) With the two distances and the five-minute interval converted to seconds (300"), determine the minutes and seconds of latitude using the following formula:

1.  $5,125 \times 300 = 1,537,500$
2.  $1,537,500 \div 9,200 = 167$
3.  $167 \div 60 = 2'47''$
- \*4. Add  $2'47''$  to  $32^{\circ}20'00'' = 32^{\circ}22'47''$



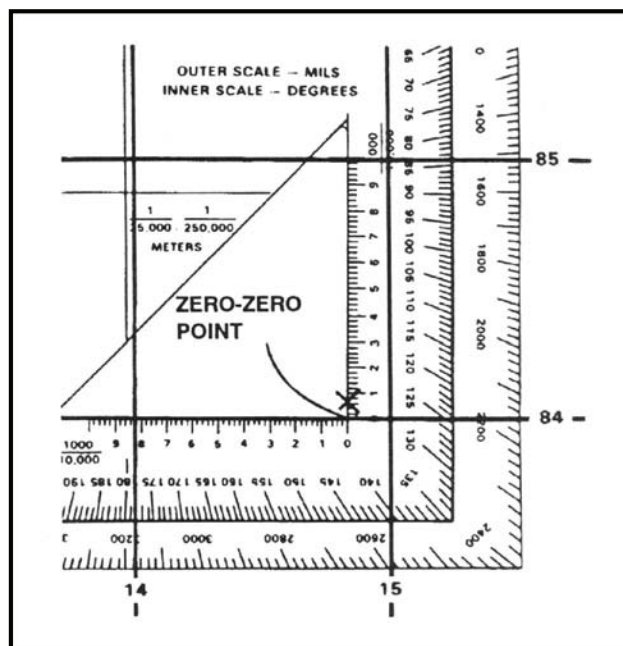


Figure 4-17. Zero-zero point.

**NOTE:** Special care should be exercised when recording and reporting coordinates. Transposing numbers or making errors could be detrimental to military operations.

#### 4-6. LOCATING A POINT USING THE U.S. ARMY MILITARY GRID REFERENCE SYSTEM

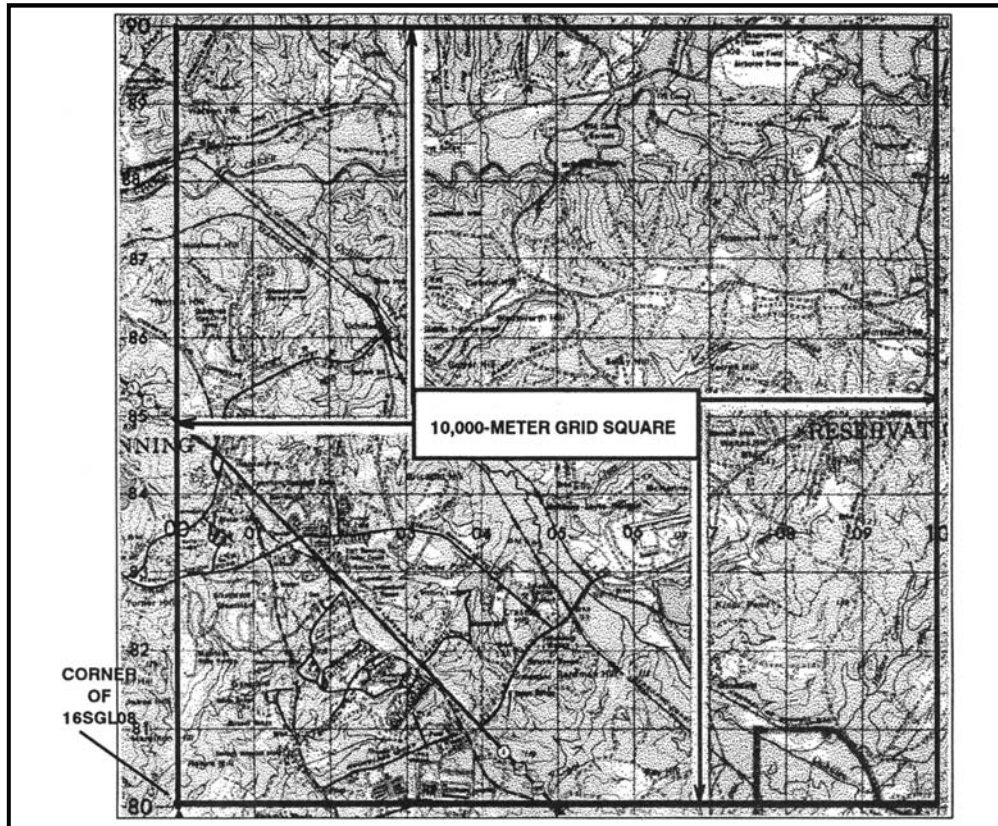
There is only one rule to remember when reading or reporting grid coordinates—always read to the RIGHT and then UP. The first half of the reported set of coordinate digits represents the left-to-right (easting) grid label, and the second half represents the label as read from the bottom to top (northing). The grid coordinates may represent the location to the nearest 10-, 100-, or 1,000-meter increment.

\* a. **Grid Zone.** The number 16 locates a point within zone 16, which is an area  $6^\circ$  wide and extends between  $80^\circ\text{S}$  latitude and  $84^\circ\text{N}$  latitude (Figure 4-8, page 4-10).

\* b. **Grid Zone Designation.** The number and letter combination, 16S, further locates a point within the grid zone designation 16S, which is a quadrangle  $6^\circ$  wide by  $8^\circ$  high. There are 19 of these quads in zone 16. Quad X, which is located between  $72^\circ\text{N}$  and  $84^\circ\text{N}$  latitude, is  $12^\circ$  high (Figure 4-8, page 4-10).

\* c. **100,000-Meter Square Identification.** The addition of two more letters locates a point within the 100,000-meter grid square. Thus 16SGL (Figure 4-11, page 4-13) locates the point within the 100,000-meter square GL in the grid zone designation 16S. (For information on the lettering system of 100,000-meter squares, see TM 5-241-1.)

d. **10,000-Meter Square.** The breakdown of the U.S. Army military grid reference system continues as each side of the 100,000-meter square is divided into 10 equal parts. This division produces lines that are 10,000 meters apart. Thus the coordinates 16SGL08 would locate a point as shown in Figure 4-18. The 10,000-meter grid lines appear as index (heavier) grid lines on maps at 1:100,000 and larger.



**Figure 4-18. The 10,000-meter grid square.**

e. **1,000-Meter Square.** To obtain 1,000-meter squares, each side of the 10,000-meter square is divided into 10 equal parts. This division appears on large-scale maps as the actual grid lines; they are 1,000 meters apart. On the Columbus map, using coordinates 16SGL0182, the easting 01 and the northing 82 gives the location of the southwest corner of grid square 0182 or to the nearest 1,000 meters of a point on the map (Figure 4-19).

## GLOSSARY

AA	avenue of approach
ANCOC	Advanced Noncommissioned Officer Course
AR	Army regulation
BM	bench marks
BNCOC	Basic Noncommissioned Officer Course
BT	basic training
*CCC	Captain's Career Course
cm	centimeter
CONUS	continental United States
CS	combat support
CSS	combat service support
CUCV	commercial utility cargo vehicle
DD Form	Department of Defense form
E	east
EPLRS	Enhanced Position Location Reporting System
FIST	fire support team
FM	field manual
FORSCOM	United States Army Forces Command
GD	ground distance
GEOREF	geographic reference
G-M	grid-magnetic
GPS	Global Positioning System
GSR	ground surveillance radar
GTA	graphic training aid
G/VLLD	ground/vehicular laser locator designator
HD	horizontal distance
HHC	headquarters and headquarters company
HMMWV	high-mobility multipurpose wheeled vehicle
JOG	joint operations graphics
JTIDS	Joint Tactical Information Distribution System
km	kilometer
LAT	latitude

MD	map distance
METT-TC	mission, enemy, terrain and weather, troops and support available, time available, civil considerations
MITAC	Map Interpretation and Terrain Association Course
N	north
NCO	noncommissioned officer
NGA	National Geospatial-Intelligence Agency
OAC	Officer Advanced Course
OBC	Officer Basic Course
OCS	Officer Candidate School
OSUT	one station unit training
PADS	Position and Azimuth Determining System
PD	photo distance
PJH	hybrid (PLRS and JTIDS)
PLGR	precision lightweight Global Positioning System receiver
POI	program of instruction
PRE	precommission
QRMP	quick response multicolor printer
RF	representative fraction
ROTC	Reserve Officers' Training Corps
S	south
SF	standard form
SME	subject matter expert
SOSES	shape, orientation, size, elevation, and slope
SUSV	small-unit support vehicle
tan	tangent
TM	technical manual
TOW	tube-launched, optically tracked, wire-guided missile
TRADOC	United States Army Training and Doctrine Command
topo	topographic
UPS	universal polar stereographic
U.S.	United States
USGS	United States Geological Survey
UTM	universal transverse mercator
VD	vertical distance
VNAS	Vehicular Navigation Aids System
W	west
*WLC	Warrior Leader Course

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