Map and Compass

Created by: Tony Gaier NMSAR

References

 SAR Field Certification Study Guide, published by NM DPS

http://www.nmsarc.org/resources/FieldCert_docs/StudyGuide.pdf

Objectives

- Identify the different types of maps and their coordinate systems
- Identify the different symbols/markings used on maps
- Describe the use of a compass and GPS in SAR
- Estimate a bearing/heading using a compass to known point

INFORMATION ONLY

Overview

- Maps
- Map Coordinate Systems
- Using a Compass
- Using GPS Receivers in SAR
- Practice Exercises

Map and Compass

Maps

 Scale

Map Scales

- What does the scale mean?
- "The large the number, the smaller the scale."
- Common Scales used in SAR:
 - 1:24,000 (most common)
 - 1:50,000 (large scale)
 - 1:100,000
 - 1:250,000 (small scale)









Maps

Map Features

 Topographic Map Symbols

INFORMATION ONLY

l.	253		,	S	54 CALE 1:24 (000	255			258
1000	- al	1000	2000	3000	4000 5000 FEET	6000	7001	8000	9000	10 000
1	1000		NATI TO CO	CONT CONT IONAL GEO	METERS OUR INTERVAL XDETIC VERTICAL IN FELT TO METURS.	10 FEET DATUM OF MULTIPLY BY	1929 0.3048		20	0

Map and Compass



igure i. moou	Figure	1:	Mesa
---------------	--------	----	------

Peak of Mesa Top

Steep Walls

Map and Compass							
• Maps — Map Feature • Map Datur	es n						
	NAD27 to WGS83	WGS83 to NAD27					
East Coordinate:	Subtract 50 meters	Add 50 meters					
North Coordinate:	Add 200 meters	Subtract 200 meters					





Trails and R	loads	5
Please note: Roads on Provisional-edition may as primary, secondary, or light duty. These roa improved roads and are symbolized the same	ps are not clas: ds are all clas: as light duty ro	sified sified as ads.
Primary highway		
Secondary highway		
Light duty road		_
Light duty road, paved*		
Light duty road, graver-	January January	
Light duty road, unspecified*		
Unimproved road		
Unimproved road*		
4WD road		
Trail		
Highway or road with median strip		_
Highway or road under construction		
Highway or road underpass; overpass	-	
Highway or road bridge; drawbridge	-	-
Highway or road tunnel	-	
Road block, berm, or barrier*		
Gate on road*		
Trailhead*		10



INFORMATION ONLY

Map and Compass

- Map Coordinate Systems
 - Latitude-Longitude
 - Universal Transverse Mercator (UTM)
 - Converting Between Coordinate Systems

UTM

Universal Transverse Mercator System (UTM)
Most common system used for ground SAR















• Please be back in 15 minutes.













INFORMATION ONLY

Map and Compass

Using a Compass

 Taking and Following Bearings

Map and Compass

Using a Compass

 Measuring and Plotting Bearings





INFORMATION ONLY

True, Grid, and Magnetic North

- True North A line from any position on the Earth's surface to the North Pole
- the North Pole.
 Grid North The north established by the vertical UTM grid lines on the map.
- Magnetic North The direction to which the compass points.
 Magnetic Declination – The
- Magnetic Declination The angular difference between magnetic north and true (geographic) north at the point of observation; it is not constant but varies with time because of the "wandering" of the magnetic north pole.

16½* 0°43' 13 MILS UTM GRID AND 1980 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

Map and Compass

Using GPS Receivers in SAR

 How They Work



INFORMATION ONLY

Map and Compass

Using GPS Receivers in SAR

 Datum

Map and Compass

Using GPS Receivers in SAR

 Position Display

13 S 0384521 UTM 4014683

Map and Compass

Using GPS Receivers in SAR

 Tracking Your Progress

INFORMATION ONLY

Map and Compass

Using GPS Receivers in SAR

 Waypoints



Map and Compass

• Practice Exercises

- Mesa
- Steep cliffs
- Intermittent stream
- Drainage going uphill to the northwest
- Ridgeline













Your team has been assigned to do a line search along the ridgeline shown by the wider dashed line on the map in Figure 15, below. A. What magnetic compass bearing would you follow on this route? The magnetic

declination is ten degrees.





Exercise Answers	
Exercise 1: A. F B. C	Exercise 3: A. K B. I
C. A and E D. B E. G	C. L D. J
Exercise 2:	Exercise 4: B (Incorrect Datum setting)
A. 449.8 E, 3960.7 N B. 449.2 E, 3966.2 N C. 450.1 E, 3966.1 N	Exercise 5: Saddle
D. 450.7 E, 3966.5 N E. 449.3 E, 3965.4 N F. 449.9 E, 3965.6 N	Exercise 6: A. 213 degrees magnetic B. Downhill
H. 450.8 E, 3965.4 N	



Summary

- Maps
- Map Coordinate Systems
- Using a Compass
- Using GPS Receivers in SAR
- Practice Exercises