Colorado Department of Transportation
GPS Planning Worksheet

Project Information	Project Name	Classification Desired
Project Number	Project Subaccount #	
Project Location		

Session Schedule
Session Planning

How Many Receivers? _____
How Many Stations? _____

$$\frac{\#\ \text{Stations} \times \#\ \text{Occupations}}{\#\ \text{Receivers}} = \#\ \text{Sessions}$$

Begin Local Time	End Local Time	Receiver #1	Receiver #2	Receiver #3	Receiver #4	Receiver #5	# Vectors Repeated	N-S Vectors Repeated	E-W Vectors Repeated	Vectors per Session= $\frac{\#Rx \times (\#Rx-1)}{2}$	
										Percent Repeated Vectors N-S	Percent Repeated Vectors E-W
										Percent of Total Vectors Repeated	Total # Vectors On Project

List All Stations	# Times Observed
% Single	
% Double	
% Triple	
% Quadrup	
Total	

List All Pairs	# Times Observed
% Single	
% Double	
% Triple	
% Quadrup	
Total	

List Bench Marks Included And Quadrant From Center		List Fiducial/Master Stations And Quadrant from Center	
Bench Mark	Quadrant	Fiducial Sta	Quadrant

Questions (circle answer)

Are moves between sessions reasonable?	Y	N
Are dual frequency receivers used?	Y	N
Are 4 or more receivers used?	Y	N
Are sessions longer than 2 hours?	Y	N
Are satellites observed from at least three quadrants?	Y	N
Are 20% of stations triple occupied?	Y	N
Are 50% of stations double occupied?	Y	N
Are 100% of bench marks double occupied?	Y	N
Are 100% of intervisible stations double occupied?	Y	N
Are 100% of vectors under 2 km couble occupied?	Y	N
Are 50% of repeated vectors in N-S direction?	Y	N
Are 50% of repeated vectors in E-W direction?	Y	N
Are more than 5% of total vectors repeated vectors?	Y	N
Are 3 CHARN stations included in the project?	Y	N

Attachments

Attach a copy of the project map showing project station names and numbers.
Attach a printout of the NSATS and PDOP vs. TIME
Attach printout of AZIMUTH vs. TIME
Attach printout of SKYPLOT
Attach printout of ELEVATION vs. TIME
Attach copies of all obstruction diagrams

Submitted by: _____
GPS Project Manager Date

Approved: _____
NGS State Advisor Date

5/12/94 GPSPLAN

Colorado Department of Transportation
GPS Fast-Static Planning Form

Project

Subaccount	GPS Week
Julian Day	Date

Receiver Assignments

Receiver Set	Observer Initials	Radio Call Sign
Orange	_____	_____
Blue	_____	_____
Green	_____	_____
Yellow	_____	_____
Red	_____	_____

Sessions

Receiver Set	Session 1 Pnt. No.	Session 2 Pnt. No.	Session 3 Pnt. No.	Session 4 Pnt. No.	Session 5 Pnt. No.	Session 6 Pnt. No.
Orange	_____	_____	_____	_____	_____	_____
Blue	_____	_____	_____	_____	_____	_____
Green	_____	_____	_____	_____	_____	_____
Yellow	_____	_____	_____	_____	_____	_____
Red	_____	_____	_____	_____	_____	_____

Receiver Set	Session 7 Pnt. No.	Session 8 Pnt. No.	Session 9 Pnt. No.	Session 10 Pnt. No.	Session 11 Pnt. No.	Session 12 Pnt. No.
Orange	_____	_____	_____	_____	_____	_____
Blue	_____	_____	_____	_____	_____	_____
Green	_____	_____	_____	_____	_____	_____
Yellow	_____	_____	_____	_____	_____	_____
Red	_____	_____	_____	_____	_____	_____

Receiver Set	Session 13 Pnt. No.	Session 14 Pnt. No.	Session 15 Pnt. No.	Session 16 Pnt. No.	Session 17 Pnt. No.	Session 18 Pnt. No.
Orange	_____	_____	_____	_____	_____	_____
Blue	_____	_____	_____	_____	_____	_____
Green	_____	_____	_____	_____	_____	_____
Yellow	_____	_____	_____	_____	_____	_____
Red	_____	_____	_____	_____	_____	_____

Receiver Set	Session 19 Pnt. No.	Session 20 Pnt. No.	Session 21 Pnt. No.	Session 22 Pnt. No.	Session 23 Pnt. No.	Session 24 Pnt. No.
Orange	_____	_____	_____	_____	_____	_____
Blue	_____	_____	_____	_____	_____	_____
Green	_____	_____	_____	_____	_____	_____
Yellow	_____	_____	_____	_____	_____	_____
Red	_____	_____	_____	_____	_____	_____

Receiver Set	Session 25 Pnt. No.	Session 26 Pnt. No.	Session 27 Pnt. No.	Session 28 Pnt. No.	Session 29 Pnt. No.	Session 30 Pnt. No.
Orange	_____	_____	_____	_____	_____	_____
Blue	_____	_____	_____	_____	_____	_____
Green	_____	_____	_____	_____	_____	_____
Yellow	_____	_____	_____	_____	_____	_____
Red	_____	_____	_____	_____	_____	_____

Colorado Department of Transportation
GPS Kinematic Planning Form

Project

Subaccount	GPS Week
Julian Day	Date

Receiver Assignments

	Receiver Set	Observer Initials	Radio Call Sign
Base1			
Base2			
Rover1			
Rover2			
Rover3			

Occupations

	Point Name	Antenna Height	Start Time	Stop Time
Base1				
Base2				

Rover1		Rover2		Rover3	
Point Name	Antenna Height	Point Name	Antenna Height	Point Name	Antenna Height

Colorado Department of Transportation
GPS Zero Baseline Calibration Test

Survey Crew_____ Date_____
Weather_____Dry Temp._____Wet Temp._____RH%_____Pressure_____
Calibration Location_____5-Digit Weather Code_____

Instrument Set #1 Manufacturer_____Color_____
Receiver #1 Model_____Serial Number_____
Antenna #1 Model_____Serial Number_____
Cable #1 Length_____Serial Number_____

Instrument Set #2 Manufacturer_____Color_____
Receiver #2 Model_____Serial Number_____
Antenna #2 Model_____Serial Number_____
Cable #2 Length_____Serial Number_____

Instrument Set #3 Manufacturer_____Color_____
Receiver #3 Model_____Serial Number_____
Antenna #3 Model_____Serial Number_____
Cable #3 Length_____Serial Number_____

Instrument Set #4 Manufacturer_____Color_____
Receiver #4 Model_____Serial Number_____
Antenna #4 Model_____Serial Number_____
Cable #4 Length_____Serial Number_____

Instrument Set #5 Manufacturer_____Color_____
Receiver #5 Model_____Serial Number_____
Antenna #5 Model_____Serial Number_____
Cable #5 Length_____Serial Number_____

Instrument Set #6 Manufacturer_____Color_____
Receiver #6 Model_____Serial Number_____
Antenna #6 Model_____Serial Number_____
Cable #6 Length_____Serial Number_____

Instrument Set #7 Manufacturer_____Color_____
Receiver #7 Model_____Serial Number_____
Antenna #7 Model_____Serial Number_____
Cable #7 Length_____Serial Number_____

Instrument Set #8 Manufacturer_____Color_____
Receiver #8 Model_____Serial Number_____
Antenna #8 Model_____Serial Number_____
Cable #8 Length_____Serial Number_____

Attach a copy of the reduction report and diskette with raw data to this form.

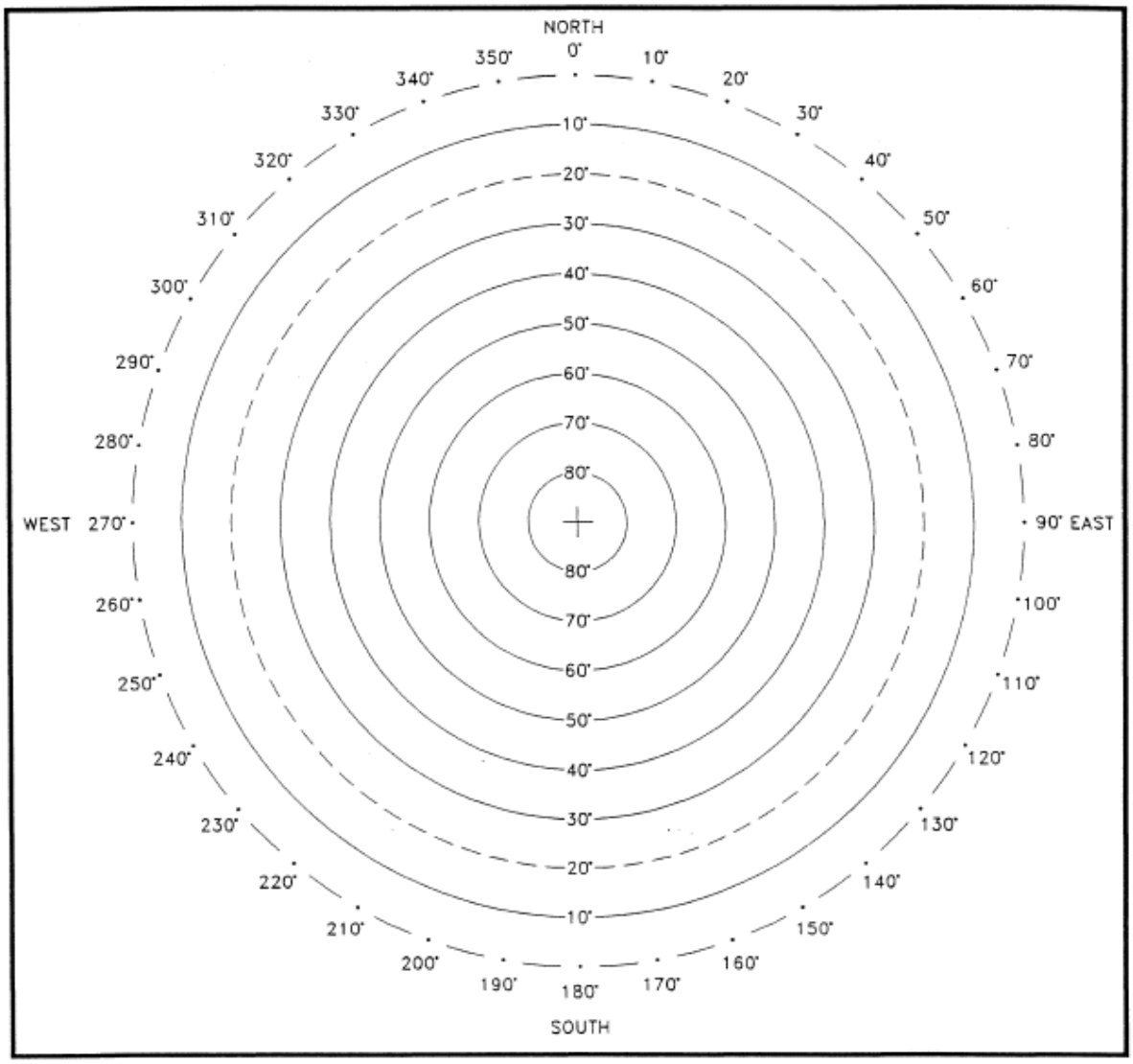
Comments_____

0 Baseline Observation Sets

Set #1		
Receiver #1	Antenna #8	Cable #1
Receiver #2		Cable #2
Set #2		
Receiver #3	Antenna #7	Cable #3
Receiver #4		Cable #4
Set #3		
Receiver #5	Antenna #4	Cable #5
Receiver #6		Cable #6
Set #4		
Receiver #7	Antenna #6	Cable #7
Receiver #8		Cable #8
Set #5		
Receiver #1	Antenna #5	Cable #1
Receiver #8		Cable #8
Set #3		
Receiver #2	Antenna #3	Cable #2
Receiver #7		Cable #7
Set #4		
Receiver #3	Antenna #2	Cable #3
Receiver #6		Cable #6
Set #5		
Receiver #4	Antenna #1	Cable #4
Receiver #5		Cable #5

Comments _____

Colorado Department of Transportation
GPS Station Visibility Diagram



STATION NAME _____ (Exact Stamping on Disk)

STATION AGENCY _____

PID # _____

LATITUDE _____

LONGITUDE _____

ELEVATION _____ M. Ft.

S., T., R. _____

DATE OBSERVED _____

PROJECT # _____

SUBACCOUNT # _____

S. H. # _____

MILE POST _____

MAP SCALE _____

MAP SHEET _____

OBSERVER _____

OBSERVER'S HEIGHT _____ M. Ft.

NOTES: (Indicate distance, direction, frequency and power of known RF sources. Show distance to nearest edge of all obstructions exceeding 20° or indicate antenna height needed to clear at 20°.)

8/11/94 STANDARD

Colorado Department of Transportation
GPS Monument Photographic Log

STATION NAME _____ 4-CHAR ID _____
(Exact Stamping on Disk)
DATE _____

CLOSE-UP OF MONUMENT

VIEW LOOKING NORTH

Colorado Department of Transportation
GPS Monument Photographic Log

STATION NAME _____ 4-CHAR ID _____
(Exact Stamping on Disk)

VIEW LOOKING EAST

VIEW LOOKING SOUTH

Colorado Department of Transportation
GPS Monument Photographic Log

STATION NAME _____ 4-CHAR ID _____
(Exact Stamping on Disk)

VIEW LOOKING WEST

2/23/93 GPSPHTOG

Colorado Department of Transportation
GPS Observation Log

Project Information	Project Name	
Project Number		Project Subaccount #
Project Location		

Station Information	Station Name	4-char ID	Station #
Station Location			
Monument Description			
Monument Inscription			
Station Site Rubbings Taken before/during/after session (circle one) Comments:			

Session Information	Observer (Last Name)	Observer (Initials)	Agency	GPS Week	Julian Day (UTC)	Obs. Ses.	Date (UTC)

Arrive	Start Setup	End Setup	Sched. Start	Actual Start	Sched. End	Actual End	Depart	Other Stations Observed			
(UTC)	(UTC)	(UTC)	(UTC)	(UTC)	(UTC)	(UTC)	(UTC)				
(Local)	(Local)	(Local)	(Local)	(Local)	(Local)	(Local)	(Local)	Circle One 24 Hour Local + (6) or (7) = UTC			

Truck is _____(direction) _____(meters) from antenna. Truck is _____(meters) above/below antenna plane.

Power Source: _____Vehicle, _____ Battery, _____ 6 volt, _____ Generator, _____ Commercial A-C 110v.

Power Failure During Session Yes No (If a failure occurs, reapply power, turn on receiver, and continue session)

Write the Satellite PRN next to the Channel tracking it. Ch#1_____,Ch#2_____,Ch#3_____,Ch#4_____,Ch#5_____,Ch#6_____,Ch#7_____,Ch#8_____

Obstruction Survey Performed? Y N If No, Explain:

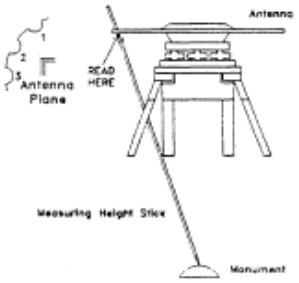
Comments:

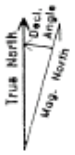
Equipment Information	Receiver	Make	Model	S/N
	Antenna	Make	Model	S/N
Cable Length (m.)		Collection Rate (secs.) 15		Horizon Mask (deg.)
Comments:				

Antenna Measurements		Measurements (circle one) Slant Height Vertical Height		Magnetic Declination
Measure.	Notch #	Before	After	Compass Reading
1		m.	m.	Compass Make
2		m.	m.	Height measured with ROD TAPE
3		m.	m.	Height entered into receiver Y N
Avg.		m.	m.	Crosshairs on target before/after Y N
Height in feet		ft.	ft.	Plumb bob check of crosshairs Y N

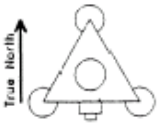
Antenna Height Measurement:

This is the most important measurement you will make. Include a sketch if the antenna height is measured differently than shown. Measure the SLANT HEIGHT from the monument to the BOTTOM INSIDE EDGE of a NOTCH on the antenna ground plane. Repeat this measurement at 3 different notches around the antenna ground plane both prior to the session and again after the session. Check the measurement by repeating one measurement in feet. Make sure the North arrow is oriented to TRUE NORTH and the eyepiece on the tribrach is oriented as shown. Check that the plumb bob agrees with the optical plummet to 1mm. If it does not, make a sketch with a brief explanation.





The magnetic declination angle varies but magnetic north is always east of true north in Colorado. Correction is made by rotating the arrow on the antenna ground plane west the declination angle from magnetic north.



Tribrach Eyepiece Orientation

10/23/95 GBENGI

Colorado Department of Transportation
GPS Observation Log

Project Information	Project Name	
Project Number		Project Subaccount #
Project Location		

Station Information	Station Name	4-char ID	Station #
Station Location			
Monument Description			
Monument Inscription			
Station Site Rubbings Taken before/during/after session (circle one) Comments:			

Session Information	Observer (Last Name)	Observer (Initials)	Agency	GPS Week	Julian Day (UTC)	Obs. Ses.	Date (UTC)

Arrive	Start Setup	End Setup	Sched. Start	Actual Start	Sched. End	Actual End	Depart	Other Stations Observed			
(UTC)	(UTC)	(UTC)	(UTC)	(UTC)	(UTC)	(UTC)	(UTC)				
(Local)	(Local)	(Local)	(Local)	(Local)	(Local)	(Local)	(Local)	Circle One 24 Hour Local + (6) or (7) = UTC			

Truck is _____(direction) _____(meters) from antenna. Truck is _____(meters) above/below antenna plane.

Power Source: _____Vehicle, _____ Battery, _____ 6 volt, _____ Generator, _____ Commercial A-C 110v.

Power Failure During Session Yes No (If a failure occurs, reapply power, turn on receiver, and continue session)

Write the Satellite PRN next to the Channel tracking it. Ch#1_____,Ch#2_____,Ch#3_____,Ch#4_____,Ch#5_____,Ch#6_____,Ch#7_____,Ch#8_____

Obstruction Survey Performed? Y N If No, Explain:

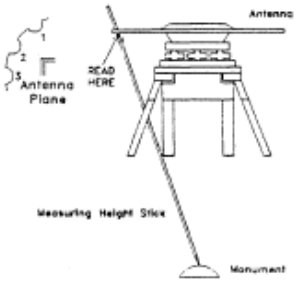
Comments:

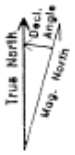
Equipment Information	Receiver	Make	Model	S/N
	Antenna	Make	Model	S/N
Cable Length (m.)		Collection Rate (secs.) 15		Horizon Mask (deg.)
Comments:				

Antenna Measurements		Measurements (circle one) Slant Height Vertical Height		Magnetic Declination
Measure.	Notch #	Before	After	Compass Reading
1		m.	m.	Compass Make
2		m.	m.	Height measured with ROD TAPE
3		m.	m.	Height entered into receiver Y N
Avg.		m.	m.	Crosshairs on target before/after Y N
Height in feet		ft.	ft.	Plumb bob check of crosshairs Y N

Antenna Height Measurement:

This is the most important measurement you will make. Include a sketch if the antenna height is measured differently than shown. Measure the SLANT HEIGHT from the monument to the BOTTOM INSIDE EDGE of a NOTCH on the antenna ground plane. Repeat this measurement at 3 different notches around the antenna ground plane both prior to the session and again after the session. Check the measurement by repeating one measurement in feet. Make sure the North arrow is oriented to TRUE NORTH and the eyepiece on the tribrach is oriented as shown. Check that the plumb bob agrees with the optical plummet to 1mm. If it does not, make a sketch with a brief explanation.





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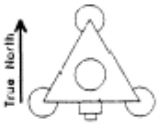


Tribrach Eyepiece Orientation

10/23/95 GBENGI

Weather Information	Barometer S/N	Barometer Type	Thermometer Type		

	Time (UTC)	Temp. Dry (F)	(C)	Temp. Wet (F)	(C)	RH (%)	Stat. Press. ( )	(mb)	5-Digit Weather Code	
Before										
Midl.										
After										

Weather taken at Antenna Height? Y N Other_____

Relative Humidity Instead of Wet and Dry Temp? Y N

Information for generating the 5-Digit Weather Code

Code	Problem	Visibility	Temperature	Cloud Cover	Wind	Example Condition=Code
0	No Problem Due to Weather	Good > 15 miles	Normal Range 32°F - 80°F	Clear < 20%	Calm < 5 mph	N,G,W,CL,C = 00000 N,F,W,CL,C = 01000 PR,P,H,CL,M = 12101 N,G,CD,O,M = 00221
1	Problem Caused by Weather	Fair 7 - 15 miles	Hot > 80°F	Partly Cloudy 20% - 70%	Moderate 5 mph - 15 mph	N=None, CL=Clear, M=Moderate PR=Problem, W=Warm, C=Calm G=Good, F=Fair, P=Poor CD=Cold, O=Overcast, H=Hot
2	Code not entered into Receiver.	Poor < 7 miles	Cold < 32°F	Overcast > 70%	Strong > 15 mph	

Time (UTC)	Comments

Receiver Solution	Source:
Latitude:	Longitude:
Height: meters	Best PDOP:

Download Information	.DAT file size .MES file size				
Disk #	Filename	.DAT	.EPH	.ION	.MES

Colorado Department of Transportation
GPS Monument Rubbing Log

STATION NAME _____
(Exact Stamping on Disk)

PROJECT # _____

4-CHAR ID _____

SUBACCOUNT # _____

S. H. # _____

OBSERVER _____

DATE _____

OBSER. SESSION _____
(Julian Day and Session #)

REVISION 03/13/17

Colorado Department of Transportation
GPS Fast Static Observation Log

Project Information	Project Name		Page ___ of ___
Project Location	Project Number	Project Subaccount #	

Equipment Information	Receiver	Make	Model	S/N
	Antenna	Make Trimble	Model	S/N
Compass Make	Thermometer Type	Barometer Type	Barometer S/N	

Session Information	Observer (Last Name)	Observer (Initials)	Agency	GPS Week	Julian Day (UTC)	Obs. Ses.	Date (UTC)

Collection Rate (secs.)	Horizon Mask (deg.)	Magnetic Declination	Circle one
5	15°		24 Hour Local + (6) (7) = UTC

Power Source: _____Vehicle, _____ Battery, _____ 6 volt, _____ Generator, _____ Commercial A-C 110v.

Power Failure During Session Yes No (If a failure occurs, reapply power, turn on receiver, and continue session)

Setup #_____	4-char ID	Station Name	Monument Description	Monument Inscription

Rubbing

Truck is _____(direction)_____(meters) from antenna.

Truck top is _____(meters) above/below antenna plane.

Actual Start (UTC)	Actual End (UTC)	File Name
(Local)	(Local)	

Antenna Measurements		Height Measured SLANT or VERTICAL		Weather Information	
Measure.	Notch #	Before	OK (✓)	Time (UTC)	
1		m.		Temp. Dry °F or °C	
2		m.		Temp. Wet °F or °C	
3		m.		RH %	
Avg.		m.		Stat. Press. inHg mb	
Height in feet		ft.		5-Digit Weather Code	

Comments:

Setup #_____	4-char ID	Station Name	Monument Description	Monument Inscription

Rubbing

Truck is _____(direction)_____(meters) from antenna.

Truck top is _____(meters) above/below antenna plane.

Actual Start (UTC)	Actual End (UTC)	File Name
(Local)	(Local)	

Antenna Measurements		Height Measured SLANT or VERTICAL		Weather Information	
Measure.	Notch #	Before	OK (✓)	Time (UTC)	
1		m.		Temp. Dry °F or °C	
2		m.		Temp. Wet °F or °C	
3		m.		RH %	
Avg.		m.		Stat. Press. inHg mb	
Height in feet		ft.		5-Digit Weather Code	

Comments:

11/15/96 FASTATIC PG 1

Setup #_____	4-char ID	Station Name	Monument Description	Monument Inscription

Truck is _____(direction)_____(meters) from antenna.

Truck top is _____(meters) above/below antenna plane.

Actual Start (utc) (Local)	Actual End (utc) (Local)	File Name

Antenna Measurements		Height Measured SLANT or VERTICAL		Weather Information	
Measure.	Notch #	Before	OK (✓)	Time (UTC)	
1		m.		Temp. Dry °F or °C	
2		m.		Temp. Wet °F or °C	
3		m.		RH %	
Avg.		m.		Stat. Press. / InHg mb	
Height in feet		ft.		5-Digit Weather Code	

Rubbing

Comments:

Setup #_____	4-char ID	Station Name	Monument Description	Monument Inscription

Truck is _____(direction)_____(meters) from antenna.

Truck top is _____(meters) above/below antenna plane.

Actual Start (utc) (Local)	Actual End (utc) (Local)	File Name

Antenna Measurements		Height Measured SLANT or VERTICAL		Weather Information	
Measure.	Notch #	Before	OK (✓)	Time (UTC)	
1		m.		Temp. Dry °F or °C	
2		m.		Temp. Wet °F or °C	
3		m.		RH %	
Avg.		m.		Stat. Press. / InHg mb	
Height in feet		ft.		5-Digit Weather Code	

Rubbing

Comments:

Setup #_____	4-char ID	Station Name	Monument Description	Monument Inscription

Truck is _____(direction)_____(meters) from antenna.

Truck top is _____(meters) above/below antenna plane.

Actual Start (utc) (Local)	Actual End (utc) (Local)	File Name

Antenna Measurements		Height Measured SLANT or VERTICAL		Weather Information	
Measure.	Notch #	Before	OK (✓)	Time (UTC)	
1		m.		Temp. Dry °F or °C	
2		m.		Temp. Wet °F or °C	
3		m.		RH %	
Avg.		m.		Stat. Press. / InHg mb	
Height in feet		ft.		5-Digit Weather Code	

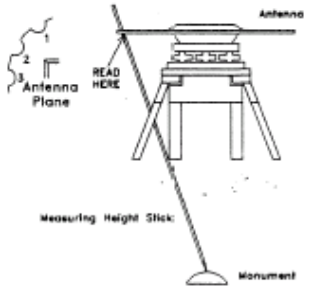
Rubbing

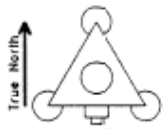
Comments:

Information for generating the 5-Digit Weather Code						
Code	Problem	Visibility	Temperature	Cloud Cover	Wind	Example Condition=Code
0	No Problem Due to Weather	Good > 15 miles	Normal Range 32°F – 80°F	Clear < 20%	Calm < 5 mph	N,G,W,CL,C = 00000 N,F,W,CL,C = 01000 PR,P,W,C,M = 12001 N,G,W,F,M = 00200 N=None, CL=Clear, M=Moderate PR=Problem, W=Warm, C=Calm G=Good, F=Fair, P=Poor
1	Problem Caused by Weather	Fair 7 – 15 miles	Hot > 80°F	Partly Cloudy 20% – 70%	Moderate 5 mph – 15 mph	
2	Code not entered into Receiver.	Poor < 7 miles	Cold < 32°F	Overcast > 70%	Strong > 15 mph	

Antenna Height Measurement:

This is the most important measurement you will make. Include a sketch if the antenna height is measured differently than shown. Measure the SLANT HEIGHT from the monument to the BOTTOM INSIDE EDGE of a NOTCH on the antenna ground plane. Repeat this measurement at 3 different notches around the antenna ground plane both prior to the session and again after the session. Check the measurement by repeating one measurement in feet. Make sure the North arrow is oriented to TRUE NORTH and the eyepiece on the tribrach is oriented as shown. Check that the plumb bob agrees with the optical plummet to 1mm. If it does not, make a sketch with a brief explanation.





Tribrach Eyepiece Orientation

The magnetic declination angle varies but magnetic north is always east of true north in Colorado. Correction is made by rotating the arrow on the antenna ground plane west the declination angle from magnetic north.