OPERATING INSTRUCTIONS MAGNAVOX MX1502 SATELLITE SURVEYOR

1. Standby - Warm Up

The oscillator requires a 24 hour warm up period. Warm up is achieved by applying an external battery to the machine and turning the power switch to ON and the other switch to STANDBY.

1.1 The instrument has an internal battery which when fully charged will maintain the oscillator for a nominal period of 22 hours. On STANDBY the instrument will not track satellites but uses the internal battery to keep the oscillator "warmed up". It also retains all memory functions.

1.2 To transport the instrument in the field in a "warmed up" condition, the power switch must be ON and the other switch on STANDBY. The instrument must be reconnected to external power before the internal battery goes flat or another 24 hour warm up will be required.

2. Field Procedures

On arrival at the site apply the external 12V source, ensuring correct polarity, and book voltage from the voltmeter (EXT and INT).

2.1 Assemble the antenna and accurately position it over the mark. Where the top section is telescopic, ensure that it is fully extended. Ensure that the aerial is vertical. The electrical centre of the antenna (E.C.) is the bottom of the red band. Protect the antenna and receiver from man and beast. Guy the antenna to prevent it from being blown over. Connect the antenna and receiver cables at the antenna end only. Ensure that there are no kinks or breaks in the antenna cable. Roll the cable out if possible.

2.2 Set the STANDBY switch to OPERATE. The display will show either (a) INIT 19 or (b) INIT 20.

(a) The instrument has not retained all memory functions. It will require ALERT DATA and time may not be correct. Proceed to Section 3.

(b) The internal battery has maintained the memory while on STANDBY and the operator can proceed to Section 4.

3. Initialise 19

The machine can obtain alert data by searching for a satellite every two minutes until all five satellites have been tracked. It then goes into its normal mode of operation and "sleeps" between satellite passes. Searching every two minutes rapidly drains battery power and should be avoided if possible.

If it is necessary to obtain alerts in this way, select CODE 19 E - this requests the number of satellites required (usually 5).

ENTER 5 PRESS E

Then proceed to section 4.

3.1 The preferred method to obtain alert data is from a tape recorded at any site within the last 30 days. If such a tape is available place it in the machine with side A uppermost.

CODE 41 E - this rewinds the tape

CODE 19 E - this requests the number of satellites required (usually 5)

5 E -

CODE 24 E - enter the GMT in the format hours space minutes space seconds. (See NOTE 1).

HRS-MINS-SEC E

CODE 25 E - enter the GMT date in the format day space month space year. (See NOTE 2).

DAY-MONTH-19( )E

CODE 43 E - the machine reads the alert data from the tape until 5 different satellites have been found, then rewinds the cassette.

CODE 18 E - displays the number of satellites which the machine has alert data for. It should be the same as CODE 19 and is usually 5.

Remove the alerts tape from the machine.

NOTE 1. The time entered at CODE 24 must be GMT and in error by no more than 10 minutes.

GMT = Eastern Standard Time - 10 hours

= Eastern Summer Time - 11 hours

= Central Standard Time - 9 hours 30 minutes

= Central Summer Time - 10 hours 30 minutes

= Western Standard Time - 8 hours

NOTE 2. The date entered at CODE 25 must be the correct GMT date e.g. at 0930 EST on 09-09-1983 GMT time is 23-30-00 and GMT date is 08-09-1983.

4. Initialise 20

Place a new (unrecorded) tape in the machine side A uppermost.

CODE 41 E – this makes the tape go to the start of tape. (See NOTE 3).

CODE 20 E – the machine calls for a series of information as follows –

SITE – enter the numeric part of the site number up to 5 digits – Press E

MODE STANDARD – select STANDARD by pressing E.

LT – enter the approximate latitude in the format Degrees→Mins→Sec. Change the latitude to south by pressing the $\pm$ key. Press E.

LN – enter the approximate longitude in the format Degrees→Mins→Sec. Longitude East is automatically selected. Press E.

HGT HT – select the HT mode by pressing E.

HT – enter the best available height of the E.C. Press E.

GMT – the machine should display the correct time, if not enter GMT time in format HRS→MINS→SEC. Press E.

DATE – if date is not correct enter GMT date in the format Day→Month→Year. Press E.

SRNO – enter the serial number from the side of the MX1502. Press E.

SP1 – enter the height of the EC above the ground mark or eccentric mark in centimetres. If an eccentric mark is used a station diagram must be drawn showing all details. Press E

SP2 – enter the cassette number. Press E.

SP3 – Press E.

SP4 – Press E.

TEMP – enter the recorded temp in degrees centigrade. Press E.

PRESS – enter the recorded pressure in millibars. Press E.

HUM – enter the recorded percentage humidity – PRESS E.

VAR 1 – PRESS E

VAR 2 – PRESS E

VAR 3 – PRESS E

VAR 4 – PRESS E

CODE 91E – enter the limit of the standard deviation of the 2D residuals. 0.35E.

NOTE 3. If the cassette being used already has recorded data which it is wished to retain use CODE 42 instead of CODE 41. CODE 42 takes the tape to the end of recorded data.

NOTE 4. It is vital to ensure that latitude is entered as south. A northern latitude will cause the machine to "wake" at the wrong time and no satellite passes will be recorded.

5. Transformation Parameters

Now is a suitable time to enter or check the transformation parameters. Select CODE 100 E – the instrument calls for a series of information in the following format –

A	6378.160	E
1/F	298.250	E
△X	112.29	E
△Y	50.56	E
△Z	-142.73	E
RX	– .16	E
RY	– .37	E
RZ	+ .40	E
BS	– 1.43	E

ZONE – AMG Zone Number – E

CM – Longitude of Central Meridian – E

FN 10 000.E

FE 500.E

SF 999.6 E

The MX1502 always observes and computes in Satellite Datum. If the above parameters are entered in the machine an option exists to transform results to AGD (CODE 110) or AMG (CODE 130) coordinates. The transformation is not rigorous and the answer is therefore approximate.

6. Satellite Predictions

Select CODE 51 E - the display shows NSAT then displays the information for the next satellite in the following format -

[Pass number][GMT of Satellite rise][Geometry and Maximum elevation] [Satellite Number].

PRESS E - the display shows NSAT then displays the information for the next pass.

6.1 Each successive prediction should be booked until the operator is satisfied that he has recorded all the passes which will be required at this site. (See NOTE 5). It is not necessary to book all predictions at this stage. If a satellite is due proceed to Section 7 and return to the predictions whenever there is an interval of time between satellites.

NOTE 5. Twenty acceptable passes are required at each site. The parameters for acceptability of a pass are set out in the manual under CODE 63. Of the twenty passes at least four must have geometry in the NW (i.e. the satellite is travelling North and passes to the West of the site), four in the NE, four in SW and four in the SE. A satellite which rises less than 20 minutes after the rise of another satellite might be rejected.

7. Self Test

Connect the antenna cable at the set now.

Select CODE 16 E - the display shows TEST and the machine takes about 5 minutes to complete its self test.

7.1 If, when CODE 16 is selected, the machine shows CODE ? then the instrument is tracking a satellite. Let it finish before proceeding.

7.2 When the display shows STAT...../..... the machine has successfully completed a self test. Proceed to Section 8.

7.3 If there is a problem at this test then an alarm sounds and the display will show the error in the following format -

STAT...../ERROR CODE

Error codes are explained in the manual under both CODE 16 and CODE 50.

7.4 After remedial action has been taken to correct an error the error code remains displayed until cleared by a successful self test.

7.5 After any error has been cleared by a successful self test, initialisation data must be checked. Select CODE 20 E and press E until all data has been checked.

8. First Satellite Pass

After initialising and before leaving the machine unattended a satellite pass must be observed and booked.

8.1 At the time of closest approach (TCA) of the satellite pass select
CODE 94 E - the display shows the frequency of the 150 MHz channel receiver oscillator and the signal to noise ratio in the following format. (See NOTE 6).

F/S1 [Frequency] [Ratio]

Select
CODE 54 E - the display shows the frequency of the 400 MHz channel receiver oscillator and signal to noise ratio as above. (See NOTE 6).

8.2 At the end of the satellite pass, observe that data is recorded on the cassette. This is done by watching the cassette move.

8.3 Select CODE 53 E - the machine displays a series of information about the last satellite pass in the following format.

2D [ ] [Maximum elevation] [Number of interations]
[Number of Doppler Counts] [Sat. No.] Press E

[Satellite Geometry] [Standard deviation of Residuals] Press E

LT [Latitude in satellite datum] Press E

LN [Longitude in satellite datum] Press E

GMT [GMT of centre of pass] Press E

DATE [GMT date of centre of pass] Press E

SD [Standard deviation of Latitude] [Standard deviation of Longitude] Press E

- the machine now displays a series of information about the accumulated 3D fix calculated from all acceptable satellite passes (Point Position) in the following format.

PT [See NOTE 7] [Number of passes used in Point Position] [Distance from the previously computed Point Position] Press E

LT [Latitude in Satellite Datum] Press E

LN [Longitude in Satellite Datum] Press E

HT [Height in Satellite Datum] Press E

SD [Standard Deviation of the Latitude] [Standard Deviation of the Longitude] Press E

SDH [Standard Deviation of the Height] Press E

N-WE [Number of Passes with geometry in NW] [Number of Passes with geometry in NE] Press E

S-WE [Number of Passes with geometry in SW] [Number of Passes with geometry in SE] Press E

DLT [Latitude distance of Point Position from Reference Position] Press E

DLN [Longitude distance of Point Position from Reference Position] Press E

DHT [Height distance of Point Position from Reference Position] Press E

DREF [Radial distance of Point Position from Reference Position] Press E

RT [Latitude of Reference Position] Press E

RN [Longitude of Reference Position] Press E

RHT [Height of Reference Position] Press E

A machine with a translocation board will now show

TR [ ] [ ] other machines will display CODE .

8.4 Select CODE 48 E - the display shows the amount of tape which has been used.

8.5 Select CODE 56 E – the display shows the offset frequency of the reference oscillator from 400 MHz. The offset should not exceed 40 Hz. The offset must not vary more than 0.5 Hz in any 24 hour period.

8.6 Select CODE 66 E – the display shows (a) the number of satellite passes tracked (b) the number of satellite passes recorded successfully on tape (c) the number of satellite passes used in the Point Position calculation.

NOTE 6. The ratio of signal to noise should be in the high 80 to 90 range otherwise some external interference is indicated, e.g. high tension power lines, large metal objects, TV antenna, Radar receivers, large bodies of water. Such stations are to be avoided.

NOTE 7. If this space is blank the last satellite pass was used in the Point Position calculation. A one letter code in this space indicates why the last pass was not used. Codes are listed in the manual at CODE 63.

9. At each subsequent visit to the machine

Select CODE 50 E – the display shows the status of the machine in the following format.

STAT [ ]/[Error Codes]

If an error is indicated the alarm should be sounding.

The error codes are listed in the manual at CODE 50. Remedial action should be taken immediately e.g. change battery.

The error code will remain displayed until cleared by a successful self test. Letters or numbers to the left of the slash indicate a satellite is being tracked, wait until it is completed before proceeding.

9.1 Check the internal and external batteries. The external battery should be changed before voltage drops below 11.2 volts. (See NOTE 8).

9.2 Select CODE 53 E and book as for section 8.3

9.3 Select CODE 48 E as for section 8.4.

9.4 Select CODE 56 E as for section 8.5 Check that the offset frequency has not varied more than 0.5 Hz since the last booking.

9.5 Select CODE 66 E as for section 8.6.

9.6 Select CODE 80 E - the machine displays the previously entered temperature which may be updated. Press E.
The Pressure may be updated. Press E.
The relative humidity may be updated. Press E.

NOTE 8. To change a battery, let the machine go to sleep. Switch to STANDBY. Connect new battery and switch back to OPERATE. If the battery is being changed because of a power failure (i.e. alarm sounding, error code P displayed) check the initialisation data. A successful self test will be required to clear the error code.

10. End of observations

When twenty acceptable passes have been recorded (CODE 66) select CODE 53 E and book as in previous sections. When N-WE is displayed it must show a minimum of four passes in each quadrant. Similarly S-WE must show a minimum of four passes in each quadrant. If more passes are needed the predictions will show when the next pass in the desired quadrant is due. Otherwise proceed to 10.1.

10.1 Select CODE 48 E as in previous sections.

10.2 Select CODE 56 E as in previous sections.

10.3 Select CODE 66 E as in previous sections.

10.4 Disconnect antenna cable.

10.5 Select CODE 110 - the display shows 2D PRESS $\pm$ until POINT POSITION is displayed. PRESS E.
The display shows the approximate AGD Latitude of the point position. PRESS E. The approximate AGD Longitude is displayed. PRESS E. The approximate Height of the EC above the AGD spheroid is displayed.

10.6 Select CODE 33 E – the display shows E/GH 2D
PRESS $\pm$ until POINT is selected.
PRESS E. The display shows EL [See NOTE 9].
PRESS E. The display shows GHT [See NOTE 9].

10.7 Select CODE 49 E – to rewind the tape.
Remove the tape and record on it the station name and time and date of removal. Store the tape carefully.

10.8 Switch to standby.

10.9 Disconnect battery. Place instrument in transit case and if necessary reconnect to external battery while in transit.

NOTE 9. When CODE 33 is selected the machine displays the height of the electrical centre above the geoid (EL). It has obtained this value from its internal map of the difference in height between the geoid and the satellite datum spheroid (GHT). At this stage EL is the best approximation to AHD height.

NOTE 10. Alarms.
The alarm will sound for a few seconds before each satellite rises unless the satellite alarm is suppressed by selecting CODE 37 E –

Display shows SATA ON. PRESS $\pm$. PRESS E.

To silence the alarm as an aid to concentration while correcting an error select CODE 36 E. To suppress the alarm completely (i.e. it will not sound even if an error is detected) select CODE 38 E –

Display shows XALM NO. PRESS $\pm$. PRESS E.

TRANSLOCATION PROCESSING

1. Select CODE 10E - display shows STANDARD. Press $\pm$ to select OFF LINE mode.

2. Place remote station tape in machine side A uppermost. Select CODE 41E - to rewind tape.

3. Select CODE 77E - the machine asks for a series of information in the following format.

INPS GEO-SAT - Press E to select satellite datum.

LT - enter the latitude of the remote station, in satellite datum, obtained from the result of the point position exercise. Press $\pm$ to change to south if required. Press E.

LN - enter the longitude of the remote station, in satellite datum, obtained from the result of the point position exercise. Press E.

HGT HT - Press E to select HT.

HT - enter the height of the electrical centre in satellite datum obtained from the point position.

INPS XYZ-SAT - This option only applies to entry of position in cartesian co-ordinates.

3.1 Select CODE 91E - enter limit of the standard deviation of the 2D residuals. Usually 0.35.

4. Select CODE 40E - display shows LOAD. Press E. Display shows RSET NO. Press $\pm$ to select RESET YES, then Press E. The machine will begin to load information from the tape into its memory.

If the machine stops at a site record i.e. display shows SITE [Site No.]. Select CODE 40E again and repeat as above except at RSET NO Press E. The machine takes 4 to 5 minutes to load each pass into memory. The display shows READ then PASS [Pass Number]. Do not touch the keyboard until FULL or END is displayed unless another site record appears. If the display shows SITE [Site No.] and the same site number as previously, select CODE 40E again. Repeat as above. Be sure to select RSET NO.

5. If END is displayed go to section 7.

6. If FULL is displayed select CODE 99E, the display shows the number of the last pass in memory. Record this number.

7. Select CODE 49E to rewind and unload the remote tape.

8. Insert the control station tape side A up. Select CODE 41E to rewind the tape.

9. Select CODE 77E - the machine calls for a series of information as in section 3. Enter the point position result for the control station.

10. Select CODE 46E - the display shows TRAN. Press E. The machine shows RSET NO. Press $\pm$ to select RSET YES. Press E. The display shows TAPE CONTROL. Select CONTROL by pressing E. The display shows READ.

11. If the tape stops at a site record select CODE 46E again as in section 10 except select RSET NO.

12. The machine takes four or five minutes to process each pass. The display shows READ then PASS [Pass Number]. Do not touch the keyboard until DONE or END is displayed unless another site record appears. If the display shows SITE [Site No.] and the same site number as in section 11, select CODE 46E again as in section 11 except at RSET NO Press E to select RSET NO.

13. When DONE OR END is displayed select CODE 49E to rewind the tape. Remove the control tape.

14. If END was displayed at section 6 go to section 22.

15. If FULL was displayed at section 6 insert the remote tape again side A up. Select CODE 41E to position the tape at bottom.

16. Select CODE 44E - When [PS + 1] is displayed enter O space N, where N is the number of the pass recorded in section 6. If the tape stops at a site record select CODE 44E again and repeat as before.

17. When the correct pass record is displayed select CODE 40E. When LOAD is displayed Press E. When RSET NO. appears select NO by pressing E.

18. When FULL or END is displayed select CODE 49E to rewind the tape and remove the remote tape.

19. Install the control station tape again, side A up. Select CODE 41E to take the tape to the bottom.

20. Select CODE 46E to continue translocation from tape. When TRAN is displayed Press E. When RSET NO appears Press E.

21. When END or FULL is displayed rewind the tape by selecting CODE 49E, then remove the cassette.

22. Select CODE 73E - the machine displays the translocation solution in satellite datum in the following format.

TR [ ] [Number of passes used in translocation] [Distance in metres from the previously computed translocation position] Press E.

LT [Latitude of the remote station] Press E.

LN [Longitude of the remote station] Press E.

HT [Spheroidal Height] Press E.

SD [Standard deviation of Latitude][Standard deviation of Longitude] Press E.

SDH [Standard deviation of Height] Press E.

N-WE [No. of passes with geometry in NW][No. of passes with geometry in NE] Press E.

S-WE [No. of passes with geometry in SW][No. of passes with geometry in SE] Press E.

DLT [Latitude distance of translocation position from Reference Position] Press E.

DLN [Longitude distance of translocation position from Reference Position] Press E.

DHT [Height distance of the translocation position from the Reference Position] Press E.

DREF [Radial distance of the translocation position from the Reference Position] Press E.

RT [Latitude of Reference Position] Press E.

RN [Longitude of Reference Position] Press E.

RHT [Height of Reference Position] Press E.

- the machine now displays the relative translocation data in the format.

RANG [Range in kilometres between remote and control sites] Press E.

AZN [Geodetic azimuth between remote and control sites] Press E.

X [The difference in X co-ordinates of the remote and control sites] Press E.

Y [The difference in Y co-ordinates of the remote and control sites] Press E.

Z [The difference in Z co-ordinates of the remote and control sites] Press E.

CT [Latitude of the control site position]

CN [Longitude of the control site position]

CHT [Height of the control site position]

23. It is important to check the last three displayed values against the input data to ensure that the $\emptyset$, λ and height of the control station was input correctly.

24. The translocation result can now be converted to AGD and AHD by either a block shift (see Note 1) or by use of the post translocate command (see Section 26).

25. Select CODE 100E and check the datum conversion parameters. Press E to display each parameter in turn. (The parameters listed on the point position booking sheet are for GMA 82).

26. Select CODE 75E - the machine calls for a series of information in the following format.

INPS GEO-SAT - Press $\pm$ to select GEO-LOC. Press E.

LT - enter the published latitude of the control station in A.G.D. Press E.

LN - enter the published longitude of the control station in A.G.D. Press E.

HGT HT - Press E to select HT option.

HT - enter the published AHD height of the control station. (See NOTE).

27. Continue to Press E until a new translocation solution in satellite datum has been displayed in Latitude, Longitude and Height. There is no need to book this solution.

28. Select CODE 110E - the machine displays DATM 2D. Press $\pm$ until display shows DATM TRANSLOC. Press E. The display shows the translocation solution in AGD co-ordinates in the following format.

LT [Latitude in AGD]

LN [Longitude in AGD]

HT [Height of EC in AHD]

29. The height of the remote station should be corrected for height of EC and difference in geoidal height between the remote and control sites.

AHD Remote = HT Remote - Antenna Height - (N Remote - N Control).

The value for N between local datum and the geoid should be obtained from the best available geodial profile.

NOTE 1. The block shift is calculated by subtracting the point position result for the control station from the published AGD co-ordinates and AHD height for the control station. The shift is then added to the satellite datum co-ords for the remote station (Section 22).

NOTE 2. Assume that AHD height (height above the geoid) is the same as spheroidal height in AGD. The height of the geoid (N) is ignored because if it was added here it would have to be subtracted from the new translocation result. The inaccuracy introduced is the difference in N values at the control and remote sites. This is allowed for in the formula at Section 29.

MX1502 FIELD RECORD SHEET STATION NAME _____

POWER SWITCH TO OPERATE
BATTERY INT _____ EXT _____ INSTRUMENT ON STANDBY SINCE _____ OBSERVER _____

INSTRUMENT DISPLAYS | INITIALISE 19 | OR | INITIALISE 20

LOAD ALERTS TAPE TAPE NUMBER _____
RECORDED _____
AT _____

CODE 41 E Rewinds tape
CODE 19 E No. of Sats. Required (5) _____ E
CODE 24 E GMT (Hrs-Mins-Secs) _____ E
CODE 25 E GMT Date (Day-Month-1983) _____ E
CODE 43 E (Reads Tape)
Displays CODE when
alerts have been read
CODE 18 E No. of Sats. Alerted _____
Should equal sats.
required.

CODE 100 E (A.N.S)

A	6378.160	E
1/F	298.250	E
ΔX	112.29	E
ΔY	50.56	E
ΔZ	-142.73	E
RX	-.16	E
RY	-.37	E
RZ	+.40	E
BS	-1.43	E
ZONE	_____	E
CM	_____	E
FN	10 000.	E
FE	500.	E
SF	999.6	E

PROCEED TO INITIALISE 20

LOAD BLANK TAPE CODE 41 TO REWIND TAPE

CODE 20 E

Site Number	_____ E
Mode	Standard E
Latitude(± for South)	_____ E
Longitude	_____ E
HGT	HT E
Height (RL of Mark + Height of EC)	_____ E
GMT (Hrs-Mins-Sec)	_____ E
Date (Day-Month-1983)	_____ E
SRNO (MX1502 Serial Number)	_____ E
SP1 (Height of EC above Mark)	_____ E
SP2 (Cassette Number)	_____ E
SP3	E
SP4	E
Temperature (°Cent)	_____ E
Pressure (Millibars)	_____ E
Humidity (%)	_____ E

RESIDUAL LIMIT (Default is 0.25 m)

CODE 91 E _____ E

PREDICTIONS

CODE 51 E NEXT SATELLITE _____ E

CONNECT ANTENNA THEN SELF TEST

CODE 16 E TEST _____ / _____
ERROR CODES SEE MANUAL

STATUS CODE 50 E STAT STATUS CODES/ERROR CODES
SEE MANUAL

SATELLITE PREDICTIONS   CODE 51 E

OCAL	GMT	SIDE/ELEVATION	SAT NO.	LOCAL	GMT	SIDE/ELEVATION	SAT NO.	LOCAL	GMT	SIDE/ELEVATION	SAT NO.

FIRST PASS

BATTERY INT _____ EXT _____

AT TCA CODE 54 E _____

CODE 94 E _____

CODE 53 E 2D	_____	CODE 63 E PT	_____	DLT	_____
GEOM/S.D.RESID.	_____	∅ S	_____	DLN	_____
∅ S	_____	λ E	_____	DHT	_____
λ E	_____	HT	_____	DREF	_____
GMT	_____	SD	_____	RT	_____
DATE	_____	SDH	_____	RN	_____
SD	_____	N-WE	_____	RHT	_____
		S-WE	_____		
CODE 48 E	_____	CODE 56 E	_____	CODE 66 E	_____

COMMENTS

CODE 53 E 2D	_____	CODE 63 E PT	_____	DLT	_____
GEOM/S.D.RESID.	_____	∅ S	_____	DLN	_____
∅ S	_____	λ E	_____	DHT	_____
λ E	_____	HT	_____	DREF	_____
GMT	_____	SD	_____	RT	_____
DATE	_____	SDH	_____	RN	_____
SD	_____	N-WE	_____	RHT	_____
		S-WE	_____		
CODE 48 E	_____	CODE 56 E	_____	CODE 66 E	_____

BATTERY INT _____ EXT _____

AT CENTRE OF PASS CODE 54 E _____

CODE 94 E _____

CODE 53E 2D	_____	CODE 63 E PT	_____	DLT	_____
GEOM/S.D.RESID	_____	ØS	_____	DLN	_____
ØS	_____	λE	_____	DHT	_____
λE	_____	HT	_____	DREF	_____
GMT	_____	SD	_____	RT	_____
DATE	_____	SDH	_____	RN	_____
SD	_____	N-WE	_____	RHT	_____
		S-WE	_____		
CODE 48 E	_____	CODE 56 E	_____	CODE 66 E	_____

LAST PASS BATTERY INT _____ EXT _____

CODE 53 E 2D	_____	CODE 63 E PT	_____	DLT	_____
GEOM/S.D.RESID	_____	ØS	_____	DLN	_____
ØS	_____	λ E	_____	DHT	_____
λE	_____	HT	_____	DREF	_____
GMT	_____	SD	_____	RT	_____
DATE	_____	SDH	_____	RN	_____
SD	_____	N-WE	_____	RHT	_____
		S-WE	_____		
CODE 48 E	_____	CODE 56 E	_____	CODE 66 E	_____

CODE 49 E (To Unload Tape)

CODE 110 (POINT) ØS _____ λE _____ HT _____

CODE 130 (POINT) E _____ N _____ HT _____

CODE 33 (POINT) ELEV _____

GHT+ _____

HT = _____

ACCESS DIAGRAM

N

ECCENTRIC and REFERENCE MARK SKETCHES

TO BE COMPLETED AT TIME OF OBSERVATION
SHOW POSITION OF INSTRUMENT AT TIME OF OBSERVATION

PHOTOGRAPHS	STATION DETAILS
	Station Mark
	Beacon
	Length & Material of Pole
	Eccentric Mark
	Reference Marks
	Vanes
	Vanes Attached Below Top of

TRANSLOCATION FROM TAPE MAGNAVOX MX 1502 SATELLITE SURVEYOR

REMOTE STATION _____ TAPE NUMBER _____ CONTROL STATION _____ TAPE NUMBER _____

CODE 91 E _____ E

REMOTE STATION POINT POSITION RESULT (Satellite Datum)

CODE 77 E INPS GEO-SAT E
LT (± for south) _____ E
LN _____ E
hGT HT E
HT (of E.C.) _____ E

FULL CODE 99 E NUMBER OF LAST PASS _____

CONTROL STATION POINT POSITION RESULT (Satellite Datum)

CODE 77 E INPS GEO-SAT E
LT _____ E
LN _____ E
HGT HT E
HT (of E.C.) _____ E

REMOTE STATION TRANSLOCATION RESULT (Satellite Datum)

CODE 73 E

TR		DLT		RANG	
LT		DLN		AZN	
LN		DHT		△X	
HT		DREF		△Y	
SD		RT		△Z	
SDH		RN		CT	
N-WE		RHT		CN	
S-WE				CHT	

CONTROL STATION AGD/AHD

CODE 75 E ± INPS GEO-LOC E
LT _____ E
④ LN _____ E
HGT HT E
HT (of E.C.) ⑤ _____ E

AHD GROUND MARK _____
ANTENNA HEIGHT + _____
⑤ AHD (of E.C.) _____

REMOTE STATION AGD/AHD BY BLOCK SHIFT

	∅	λ	HEIGHT
CONTROL AGD/AHD ④	_____	_____	_____
CONTROL SATELLITE ②	− _____	− _____	− _____
SHIFT			
REMOTE SATELLITE ③	+ _____	+ _____	+ _____
REMOTE AGD/AHD			

ANTENNA HEIGHT − _____
AHD GROUND MARK

REMOTE STATION AGD/AHD BY POST TRANSLOCATE COMAND

CODE 110 E ± DATM TRANSLOC E
LT _____ E
LN _____ E
HT _____ E
ANTENNA HEIGHT _____
AHD GROUND MARK _____
X _____ E
Y _____ E
Z _____ E