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Haystack Pointing System: Satellite Acquisition

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY

LINCOLN LABORATORY

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Group 62

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ABSTRACT

Haystack Pointing System consists of hardware and software which points the Haystack 120-foot X-band antenna dish with great accuracies. The Satellite Acquisition program, described in this report, generates acquisition scans and searches for target returns. Once the target has been sighted, the program tracks the target by conical scanning. After acquisition, time correction can be made in the orbit computations.

Accepted for the Air Force
Franklin C. Hudson
Chief, Lincoln Laboratory Office

HAYSTACK POINTING SYSTEM: SATELLITE ACQUISITION

INTRODUCTION

One of the objectives of the Haystack facility is to track satellites for various experiments. Monopulse autotrackers have been built for this purpose. The autotrackers require that the antenna beam be pointed at the satellite, before automatic tracking can take place. The satellite program[1,2] of the Haystack Pointing System[3] is capable of computing azimuth and elevation commands from orbit parameters; but past experience has shown that the accuracy of the available orbit parameters is too poor to place the satellite within the antenna beam. An initial search has to be conducted to locate the satellite before autotracking can take place.

An acquisition program has been written for the Univac 490 computer to facilitate a more orderly search and acquisition. The primary objective of this program is to find the target and point the antenna at it long enough for the autotracker to lock on and follow the target from the acquisition point. However, the program is capable of independently tracking the satellite by continuously sensing the discrepancy between the computed commands and the actual target position.

The program was written to be used with the first Haystack radar equipment and the sequential doppler processor built by W. F. Kelley[4]. This equipment generates a pulse, called a RP2 pulse, whenever the receiver output exceeds a given threshold. These pulses can be generated by noise and false targets as well as the target which is being tracked.

Indeed, the program only requires that a RP2 like signal be given the computer whenever the target is within the antenna beam. Hence, any equipment that generates

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1. A. A. Mathiasen and J. D. Drinan, editors, "Haystack Pointing System: Satellite," Lincoln Laboratory Technical Note 1965-36, (9 September 1965).
2. A. A. Mathiasen, editor, "Haystack Pointing System: Mathematical Development for Satellites and Belts," Lincoln Laboratory Technical Note 1965-49, (23 September 1965).
3. A. A. Mathiasen and J. D. Drinan, "Haystack Pointing System: Control Structure," Lincoln Laboratory Technical Note 1966-10, (March 9, 1966).
4. H. G. Weiss, "The Haystack Experimental Facility," Lincoln Laboratory Technical Report 365, (15 September 1964).

such a pulse can be used in conjunction with the acquisition program. R. Silva has constructed a CW monopulse autotracker which generates the RP2 pulse whenever signals exceed a threshold. The acquisition program has successfully acquired one of the Lincoln experimental satellites, LES II, using this equipment.

The Haystack computer can send pointing commands to the Westford antenna over telephone lines[5]. A. Dockrey has built circuitry at the Westford site to allow a RP2 pulse to be sent back to the Haystack U-490 computer under various modes of Westford equipment operation. The acquisition program has acquired satellites by means of Westford equipment in the radar mode as well as in the CW mode.

Since the doppler and range predictions are usually within the required accuracies, the acquisition program only searches and acquires in azimuth and elevation angles. No provision has been made for range or doppler acquisition.

The program acquires in two phases. First, a search scan is generated which grossly looks for the target. It does this by superimposing a long and narrow scan along the orbit and searching for RP2 pulses. Secondly, when a hit is received (designated by an RP2 pulse), the values of azimuth and elevation for the target are observed and a local scan is initiated around these coordinates. The local scan consists of a set of concentric circles. The radius of the consecutive circles being increased by about one beamwidth from one circle to the next. The local scan is continuously computed, even after the antenna is controlled by the analog tracker; so that if at any time the analog tracker should lose the target, the computer will have a correct pointing angle already computed in the buffer region. By simply changing the antenna mode to computer pointing, the target will again be acquired.

When the program has made three successful local scans, a message is printed to indicate that the target has been acquired. At this time the operator can ask the program to compute and affect a time correction in orbit computations which is expected to correct most of the error in predicted angles. If reacquisition is later required, the acquisition program will not have to search quite as large an area. A local scan may be sufficient for reacquisition after time correction has been made.

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5. J. E. Gillis, "Haystack-West Ford Intersite Coupling Link," Lincoln Laboratory Group Report 1964-25, (14 May 1964).

The program is under complete control of the operator. The automatic sequence of scans just described can be overriden by means of the keyboard. For instance, at any time the search scan can be made to start over, fixed biases can be added to the predicted commands, the program computed errors can be set to zero, only local scan can be requested if predictions are known to be sufficiently accurate, etc.

OPERATOR INTERVENTION

Figure 1 shows a typical on-line record of operator action. Typical acquisition scans are shown by Fig. 2 where the command elevation is plotted as a function of command azimuth. When the pointing system is requested to point at a satellite, the question "Do you want acquisition" is asked and three choices are given as shown in Fig. 1. The only other method of getting to the acquisition program is through the attention symbol as shown by Fig. 1. When the program is reached through the attention symbol, the operator is offered more choices.

1. Stop Acquisition

This choice stops the acquisition scans and causes the program to ignore the RP2 interrupts.

2. Search Scan

This choice sets up the normal acquisition mode. The program will first scan in a long and narrow area of uncertainty along the orbit. The scan shown in Fig. 3 is superimposed on the computed pointing commands. The length and width of the scan is requested through the keyboard. When RP2 pulses are observed, the program automatically switches to local scan. When RP2 pulses disappear for a sufficiently long period the program goes back to search scan.

3. Local Scan

This choice allows the program to superimpose only a local scan on the pointing commands. Figure 4 shows a local scan. The RP2 pulses are observed as usual.

```
SYSTEM DATA RECORDING...COMPLETE(0) PARTIAL(1) NONE(2) 0
    *

DO YOU WANT ACQUISITION

NO(1)  SEARCH SCAN(2)  LOCAL SCAN(3)
    2*

ENTER SCAN LENGTH IN DEGREES
     3*

ENTER SCAN WIDTH IN DEGREES
    .4*

DATA PROCESSING PROGRAM..
NONE(0) RADIOMETER(1) RADIOMETER SCAN(2) MERCURY EXP(3)
    *
Φ

SIGN OFF(1) MOD(2) NEXT RUN(3) PRINT(4)
    2*

SAT  (1) DATA PROCESSING(2) SCAN(3) RECORDING(4) TIMING(5) OTHER(6)
    6*

RA-DEC DISPLAY(1) CORRECTION(2) PARAMETERS(3) ACQUISITION(4)
CC(5) DYDMP(6) PLOT(7) AUTOT(8)
    4*

STOP (1) SEARCH(2) LOCAL(3) CL BIAS(4) SET BIAS(5) TIME (6) HS(7) WF(8)
    5*

ENTER AZIMUTH BIAS IN DEGREES
     5.328 *

ENTER ELEVATION BIAS IN DEGREES
    3.8 *
Φ

SIGN OFF(1) MOD(2) NEXT RUN(3) PRINT(4)
    1*

TITLE
```

Fig. 1. Example of on-line printout.

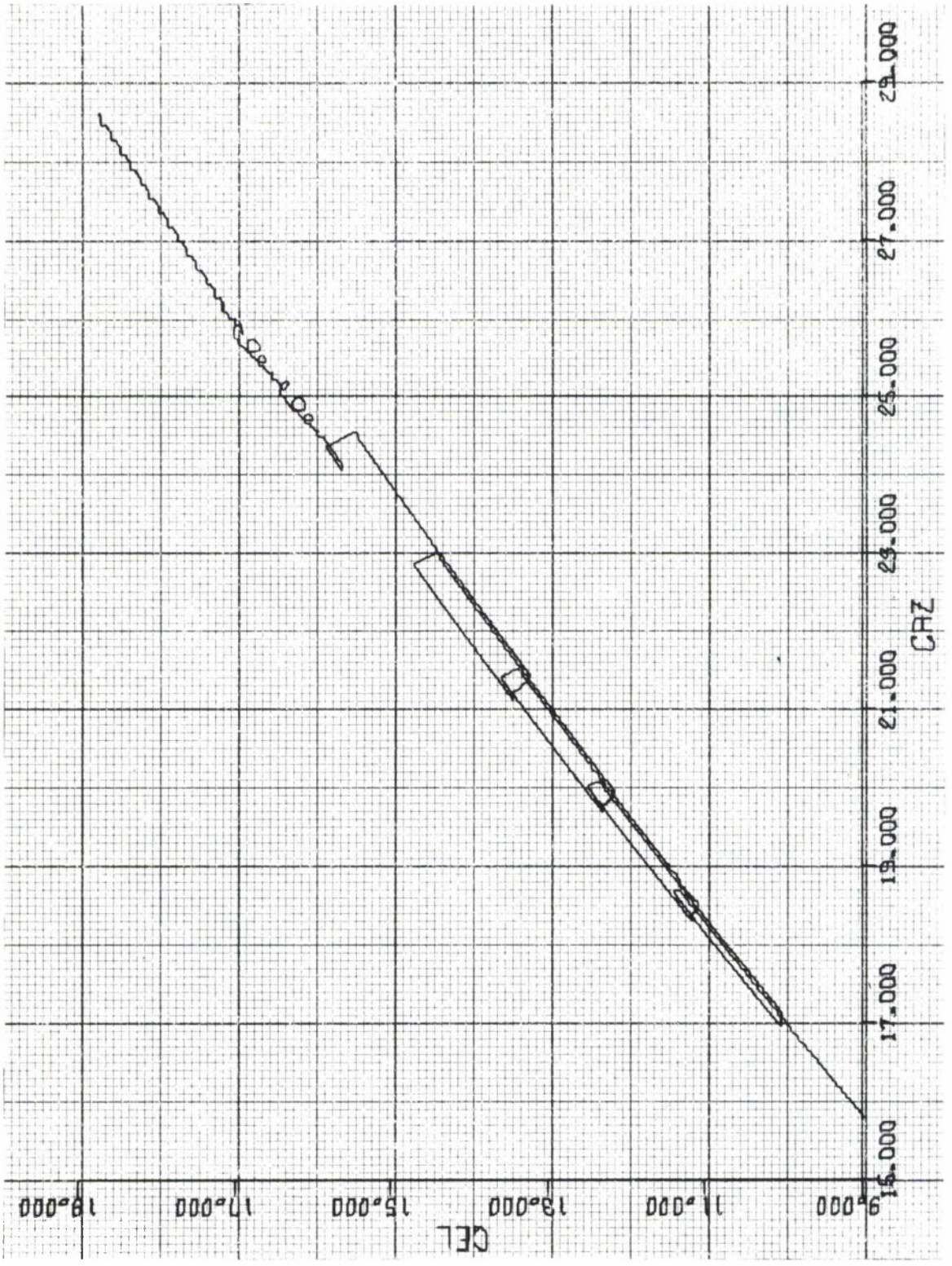

Fig. 2. Typical acquisition.

3-62-4523

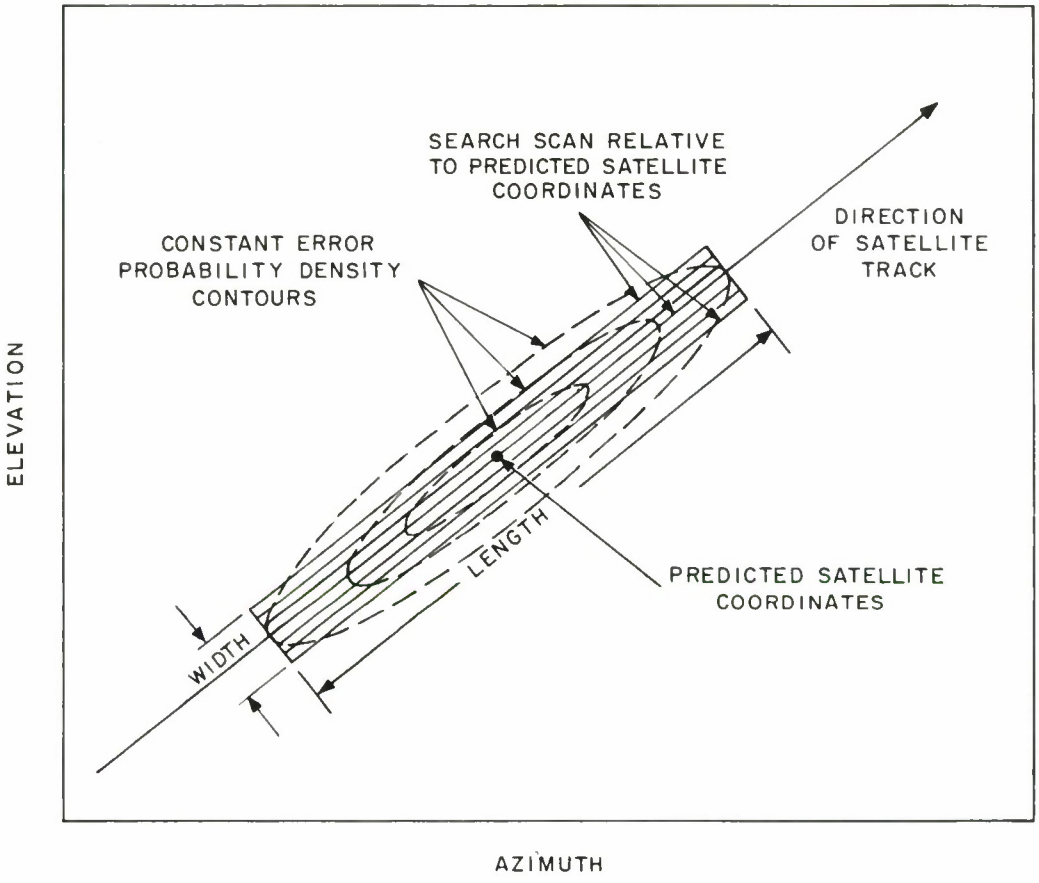

Fig. 3. Search scan.

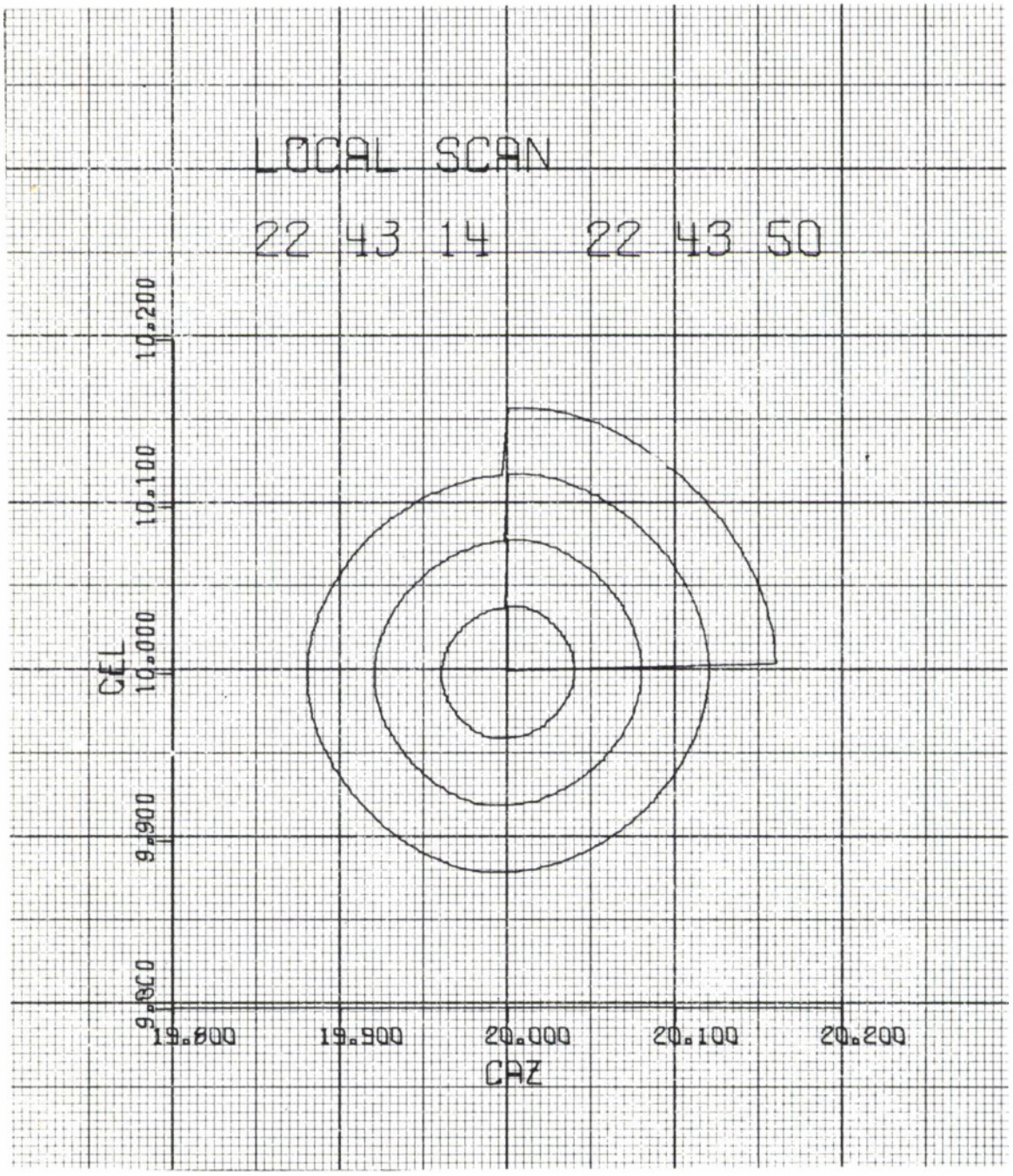

Fig. 4. Local scan.

4. Clear Biases

This choice clears the computed error biases in the local scan.

5. Set Biases

This choice sets the azimuth and elevation local scan biases to the keyboard entered values.

6. Time Correction

This choice causes a time correction to be made in the ephemeris computation, based on the errors in commands at that particular time.

7. Haystack Acquisition

This choice makes the program operate with Haystack RP2 pulses (channel 8 external interrupts). Search or local scan must be requested before the new site RP2 pulses will be used.

8. Westford Acquisition

This choice makes the program operate with Westford RP2 pulses (channel 12 external interrupts). Search or local scan must be requested before the new site RP2 pulses will be used.

PROGRAM INPUTS AND OUTPUTS

Basically the acquisition program computes four values of azimuth and elevation using predicted pointing azimuth and elevation from common storage and puts the four resulting values into common storage. However, additional inputs and outputs are used.

Core Storage Inputs

W(CAZIM):- Predicted satellite azimuth coordinate for $T_o + 4$ seconds in revolutions B27. T_o, $T_o + 2$ is the two second time interval for which the next data is to be interpolated.

W(CELEV):- Predicted satellite elevation coordinate for $T_o + 4$ seconds in revolutions B27.

W(AZIMOVER):- A code to indicate where the first azimuth point is to be placed. When AZIMOVER is positive first azimuth will be placed in the main antenna zone. When AZIMOVER is negative first azimuth will be placed in the overlap zone.

W(TIMEMODE):- A code to indicate if system is running in real time. When TIMEMODE is positive, the system is running in real time. Negative TIMEMODE indicates simulated time.

W(INAZIMADD):- INAZIMADD gives the input azimuth buffer locations. Upper half gives the first word address of presently read into buffer. Lower half gives first word address of previously read in buffer.

W(113):- Azimuth in buffer control word.

Interrupt Inputs

The program uses external interrupts on channel 8 (range channel) for Haystack gear and channel 10 (intersite coupling channel) for Westford gear.

Keyboard Inputs

The program accepts search scan length and width in degrees whenever search scan is requested. It also accepts the local scan azimuth and elevation biases when operator requests that option. Keyboard entered parameters are in degrees.

Core Storage Outputs

W(ACQAZIM), + 1, + 2, + 3:- Four values of azimuth which have acquisition commands superimposed on predicted azimuth commands. Values are in revolutions B27.

W(ACQELEV), + 1, + 2, + 3:- Four values of elevation which have acquisition commands superimposed on predicted elevation commands. Values are in revolutions B27.

W(TIMECORR): - Time correction in days B28.

W(TRACKINDIC): - A code which is set to -0 whenever RP2 pulses are observed and to $+0$ when no RP2 pulses are observed.

On-Line Printer Output

When a target has been acquired, a message "Target Acquired" is printed on the high-speed printer by means of the printer log program[6].

Keyboard Outputs

Miscellaneous typing out is performed by means of INTERCOM[7] as shown by Fig. 1.

INTERNAL OPERATION OF PROGRAM

Initially, the program is made to scan either according to the search scan or the local scan. When the target is observed, the equipment external to the U-490 computer generates a RP2 pulse which appears at the computer as an external interrupt. The interrupt answering routine collects the interrupts in a table over the two second pointing system cycle. Every two seconds, the acquisition program is entered and all of the RP2 pulses are averaged to obtain an average target position. Then the predicted position is computed for that precise instant and an error is computed. This error is added to the future predicted commands and a local scan is initiated around these new coordinates. False alarms are allowed in the sense that if during the whole local scan no RP2 pulses are received, search will be continued by returning to the scan which was previously in operation. If RP2 pulses are observed during a local scan, a new local scan will be generated with the new errors as the new center point for the scan. Thus, once the target is observed, the program will track the target by continuously making one local scan after another. When three successful local scans have been made, a message is printed on the high-speed printer and only then a request for time correction will be honored.

Search Scan

The selection of search scan has received considerable attention. Typical prediction errors show that the error along the satellite track is much greater than

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6. J. D. Drinan (editor), "Haystack Pointing System: Auxiliary Real-Time Programs," Lincoln Laboratory Technical Note 1966-6, (31 January 1966).

7. A. A. Mathiasen and J. D. Drinan, editors, "Haystack Pointing System: INTERCOM," Lincoln Laboratory Technical Note 1965-39, (9 September 1965).

the deviation from the track. These errors specify a long narrow area of uncertainty with the highest probability of actual target location occurring in the center and along the satellite track. Obviously, one would like to scan the highest probability area first and then proceed to the lower probability areas. Typical constant error probability density contours are shown in Fig. 3.

The search scan also depends on the equipment limitations. The antenna control characteristics are such that large pointing errors occur when the antenna is asked to follow high rates. This suggests slow scans. Also the radar pulse repetition frequency determines minimum dwell time. One would like to have the target in the antenna beam long enough to get at least one and preferably several radar returns. These considerations dictate a quite slow search procedure. With a constant acceleration scan just slow enough for the antenna servo, an area of one degree by five degrees can be scanned in about eight minutes.

The values of L (the length along trajectory) and W (the width of scan) are given to the acquisition program via the keyboard routine. A scan is generated which goes along the trajectory $L/2$ ahead of the predicted value and $L/2$ behind the predicted value, then moves almost one beamwidth ($.04^{o}$) in cross-scan direction and repeats the scan along the trajectory, then moves almost one beamwidth to the other side of the trajectory and repeats again. The lateral distance from the trajectory is increased almost one beamwidth from one along the trajectory scan to the next, until a width of $W/2$ is scanned on each side of the trajectory. If the target has not been found then, a new scan is initiated with parameters L and W increased by 50%.

It is expected that the satellite acquisition program will be used mainly on the horizon when the satellite first comes into view. The first scan simply waits on the horizon and adjusts the azimuth so that a satellite could be acquired if it is early or late in its orbit. After this first scan, the above described pattern is used.

The scan along the satellite orbit (S) is computed by using a constant acceleration scan.

$$S = 2aI[2N - |I|] \quad , \tag{1}$$

where a is the constant acceleration, I is an index which is increased or decreased every two seconds, and N is the number of two second intervals in the half scan, and is computed by first computing a time (T).

$$T = \sqrt{\frac{L}{a_{max}}} \quad , \tag{2}$$

where L is the scan length and a_{max} is the maximum allowable acceleration of pointing commands. N is then computed such that

$$T \leq 2N - .5 \quad . \tag{3}$$

The value of the constant scan acceleration, a, is computed by

$$a = \frac{L}{(2N)^2} \quad . \tag{4}$$

The value of a obtained by this procedure is approximately equal to a_{max}.

From the azimuth and elevation differences performed on the previous values, the trackangle, θ, is determined by

$$\theta = \tan^{-1}\left[\frac{E_1 - E_{-1}}{A_1 - A_{-1}}\right] \quad , \tag{5}$$

where E_i are the elevation values and A_i azimuth values corresponding to time T_i, as shown in Fig. 5. T_o, $T_o + 2$ corresponds to the time period for which the commands are to be interpolated next.

The elevation command is then computed by adding the elevation component of the scan to the elevation predicted position.

$$E_2^* = E_2 + S \sin \theta \quad , \tag{6}$$

where E_2^* is the elevation coordinate of the command with the scan added. Now a azimuth value (A_2^*) is computed so that the resulting point is constrained to fall on the satellite trajectory which is indicated on Fig. 5 as the point labeled X_2. This is accomplished by a second order fit and extrapolation

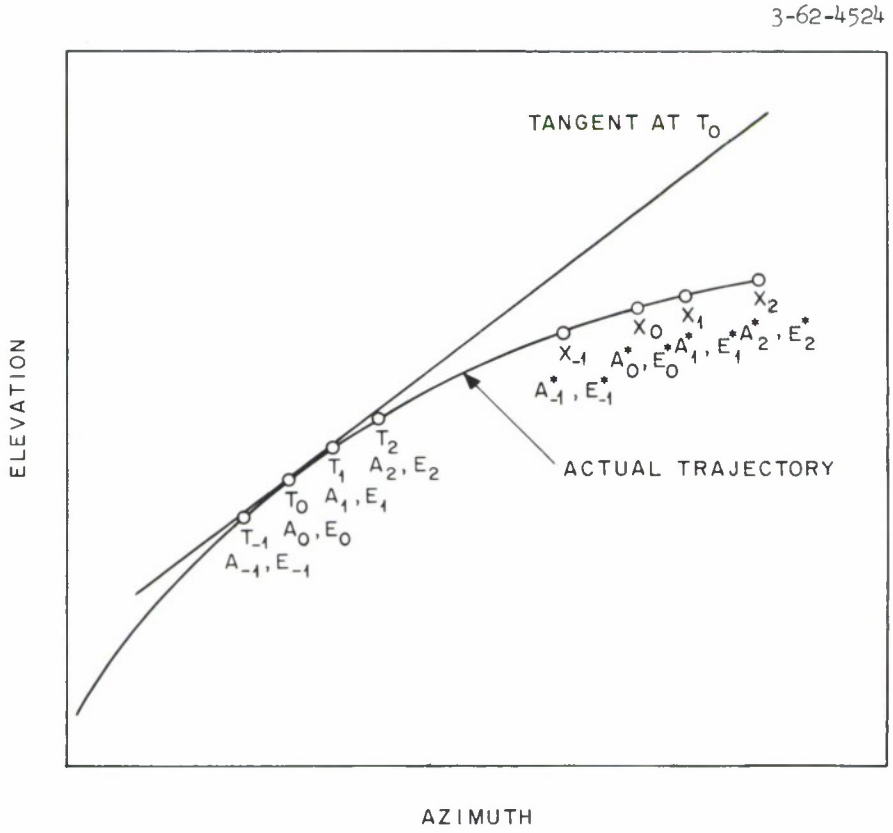

Fig. 5. Satellite trajectory.

$$A_2^* = A_2 + \frac{(A_{-1} - A_o)(E_2 - E_o)^2 - (A_2 - A_o)(E_{-1} - E_o)^2}{(E_{-1} - E_o)(E_2 - E_o)[(E_2 - E_o) - (E_{-1} - E_o)]} (E_2^* - E_o)$$

$$+ \frac{(A_2 - A_o)(E_{-1} - E_o) - (A_{-1} - A_o)(E_2 - E_o)}{(E_{-1} - E_o)(E_2 - E_o)[(E_2 - E_o) - (E_{-1} - E_o)]} (E_2^* - E_o)^2 \quad . \qquad (7)$$

In order to prevent singularities in the computations, when $\theta < 45^o$, the azimuth component of the scan is computed instead by

$$A_2^* = A_2 + S \cos \theta \qquad (8)$$

and the elevation is computed to fall on the curve by

$$E_2^* = E_2 + \frac{(E_{-1} - E_o)(A_2 - A_o)^2 - (E_2 - E_o)(A_{-1} - A_o)^2}{(A_{-1} - A_o)(A_2 - A_o)[(A_2 - A_o) - (A_{-1} - A_o)]} (A_2^* - A_o)$$

$$+ \frac{(E_2 - E_o)(A_{-1} - A_o) - (E_{-1} - E_o)(A_2 - A_o)}{(A_{-1} - A_o)(A_2 - A_o)[(A_2 - A_o) - (A_{-1} - A_o)]} (A_2^* - A_o)^2 \quad . \qquad (9)$$

When the elevation is on the horizon, the minimum elevation is used as E_2^* and A_2^* is computed by Eq. (7).

The cross-scan is added to the commands by adding the components of the cross-scan to the azimuth and elevation commands.

$$\Delta C_A = \Delta C \sin \theta \quad , \qquad (10)$$

and

$$\Delta C_E = \Delta C \cos \vartheta \quad , \qquad (11)$$

where ΔC is the incremental increase in cross-scan from one scan to the next and ΔC_A and ΔC_E are the two corresponding increments, in the azimuth and elevation directions respectively.

Local Scan

The local scan configuration is not very critical and does not have to be computed very accurately, since the scan itself has very small dimensions. The local scan which was chosen first points at the center point of the scan for six seconds. Six seconds allows the antenna to move into the local scan region and allows all transients to be decreased to negligible values. Three circular scans are then performed around the center point. Each circle is made in eight seconds, and has a radius which increases almost one beamwidth ($.04^{o}$) from one circle to the next. The velocity in the smallest circle is such that the target will be observed approximately 1.25 seconds, which allows 25 hits when the pulse rate is 20 a second. The second and third circles will allow 12 and 8 hits respectively. Since the scan is relative to the predicted target position and moves along in the expected trajectory, the errors should be so small that the larger circular scans are never used. This occurs because, whenever hits are received during a local scan, the local scan is restarted with the scan center at the coordinates where hits were received.

The circular scans are computed in a novel way. The antenna commands are interpolated from four values of azimuth and elevation by means of the interpolation program[8]. The four values given to the interpolation program are such that a smooth circle is interpolated between the points. The following values of azimuth and elevation are given at the time when new points are to be interpolated between T_o and $T_o + 2$.

	A_{-1}	E_{-1}	A_o	E_o	A_1	E_1	A_2	E_2
1st quadrant	-R	-R	0	R	R	0	-R	-R
2nd quadrant	-R	R	R	0	0	-R	-R	R
3rd quadrant	R	R	0	-R	-R	0	R	R
4th quadrant	R	-R	-R	0	0	R	R	-R

The value of azimuth and elevation at T_o are A_o and E_o respectively, and R is the radius of the scan at the time of computation.

8. R. Teoste, "Haystack Pointing System: Interpolation," MIT Lincoln Laboratory Group Report 1964-57, (28 October 1964).

Average Error Computation

When RP2 interrupts occur, an interrupt answering routine stores the pertinent information in a table, one interrupt at a time. During the two second cycle the acquisition program analyses the information in these tables. Each interrupt has four words of information as follows:

1. Azimuth input buffer control word
2. Range command
3. Doppler command
4. Azimuth input buffer control word

In addition, there is a table of weights which indicates the likelihood of the RP2 being a true target. Presently the table of weights consists of equal weights, because the hardware does not provide measured doppler and range information.

Every two seconds when the pointing system cycles through the acquisition program, the interrupt tables are examined and an average buffer control word $(BCW)_{avg}$ is computed for the previous two second interval by

$$(BCW)_{avg} = \frac{1}{N} \sum_{i=1}^{N} W_i (BCW)_i \tag{12}$$

where N RP2 pulses had been observed and W_i and $(BCW)_i$ were the weights and the buffer control words of the individual table entries. The average buffer control word is rounded to the nearest integer, and the antenna azimuth and elevation angles which correspond to this average buffer control word are read.

Predicted azimuth and elevation angles are also computed for that instant of time. Bessel's four point interpolation formula is used for this purpose which is similar to the one used in the interpolation program. The azimuth is given by

$$A(y) = \sum_{i=-1}^{2} \sum_{j=0}^{3} C_{ij}\, y^j\, A_i \tag{13}$$

and

$$E(y) = \sum_{i=-1}^{2} \sum_{j=0}^{3} C_{ij}\, y^j\, E_i \qquad (14)$$

where $A(y)$ is the value of azimuth interpolated for the time shift y (in fractions of 2 seconds) as indicated by the average buffer control word. The values of C_{ij} are a direct result of the Bessel interpolation coefficients[9]. A_i are the values of azimuth with A_o corresponding to the predicted command given at the beginning of the two second interval for which $A(y)$ is to be interpolated. $E(y)$ and E_i have the same meanings for the elevation commands.

Now the error can be computed which would have occurred, had the predicted commands been given. This is simply obtained by subtracting the interpolated predicted commands $A(y)$ and $E(y)$ from the actual values of antenna azimuth and elevation as indicated by the average buffer control word and the input angles.

In the case of the search scan, this average error over two seconds is added to the predicted commands and a local scan is generated around these coordinates. However, when RP2 pulses are observed during a local scan, the program is allowed to finish the circle and then an average error is computed for the whole circular scan. This way the antenna corrections are made in the proper direction.

Time Correction

If the operator decides that the desired target has been sighted, the program can be signaled to make a time correction in the orbit computations.

The time correction is made by computing two time increments,

$$\Delta t_1 = \frac{6}{E_2 - E_{-1}} [E_r - E_c] \quad \text{and} \qquad (15)$$

$$\Delta t_2 = \frac{6}{A_2 - A_{-1}} [A_r - A_c] \quad , \qquad (16)$$

9. D. R. Hartree, "Numerical Analysis," Oxford University Press, London, 1955, p. 68.

where E_p and A_p are the antenna pointing angles at the time of time correction and E_c and A_c are the predicted target coordinates at the same time. $A_p - A_c$ and $E_p - E_c$ are actually the averaged pointing corrections computed previously for locating the local scan.

Weighting elevation time correction by $\frac{E_2 - E_{-1}}{E_2 - E_{-1} + A_2 - A_{-1}}$ and azimuth time correction by $\frac{A_2 - A_{-1}}{E_2 - E_{-1} + A_2 - A_{-1}}$, we get

$$\Delta t = \frac{6(E_p - E_c + A_p - A_c)}{E_2 - E_{-1} + A_2 - A_{-1}} \quad , \tag{17}$$

where Δt is the desired time correction. The azimuth and elevation biases that remain will be computed by

$$\Delta A = A_p - A_c - (A_2 - A_{-1}) \frac{\Delta t}{6} \tag{18}$$

and

$$\Delta E = E_p - E_c - (E_2 - E_{-1}) \frac{\Delta t}{6} \tag{19}$$

Since the new azimuth and elevation corrections ΔA and ΔE are approximate, it may take a local scan to again precisely point the antenna at the target.

PROGRAM DETAILS

The acquisition program has three entries: working entry, initialization entry and interrupt entry. The working section is entered every two seconds in the pointing system cycle, the initialization section is entered at the beginning of a run or when requested through the attention symbol, and the interrupt answering routine is entered whenever a RP2 interrupt occurs. Figures 6, 7, and 8 show the working, initialization, and interrupt section flow diagrams respectively. The flow diagrams, in conjunction with the program listing in the APPENDIX, are self explanatory.

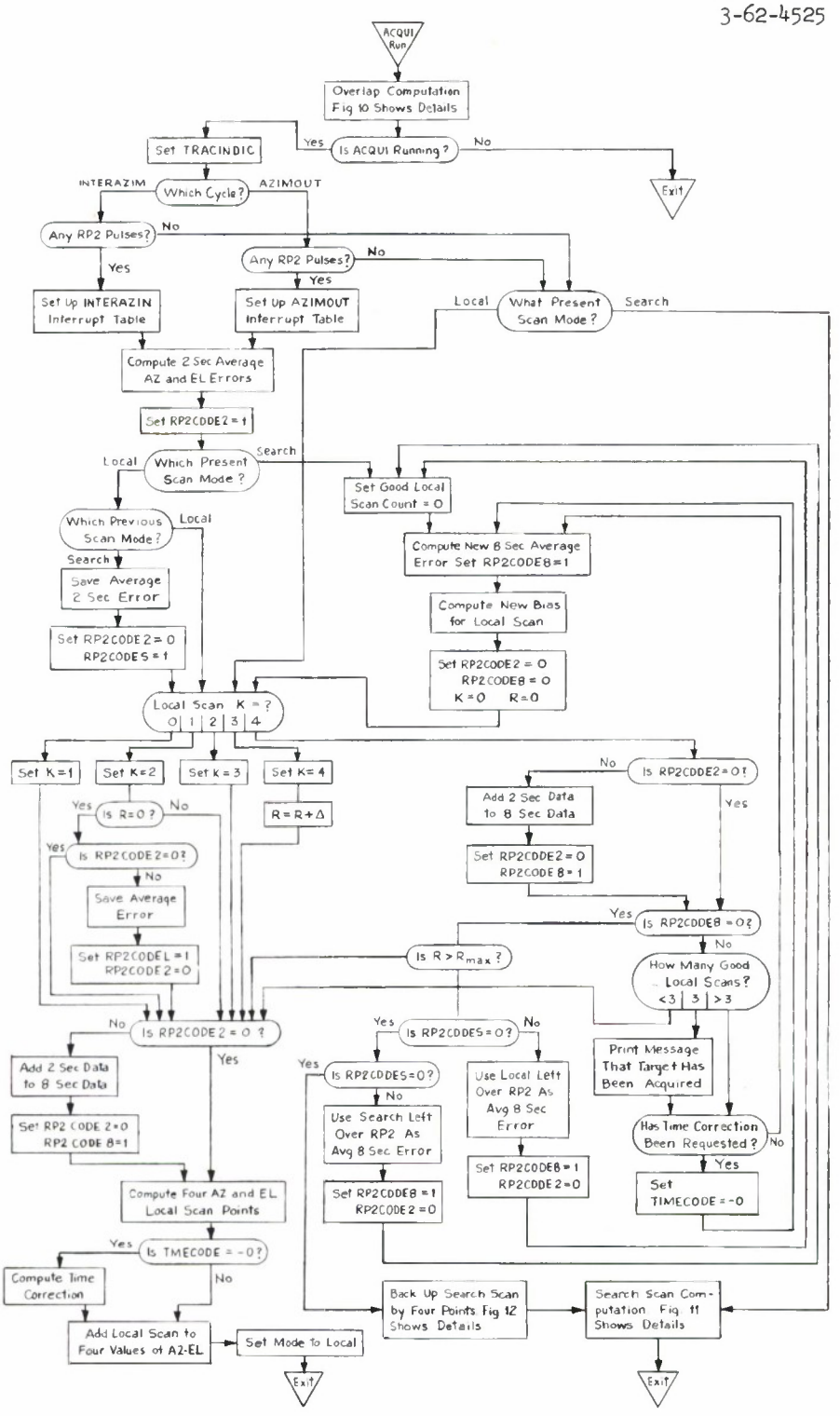

Fig. 6. Acquisition working section flow diagram.

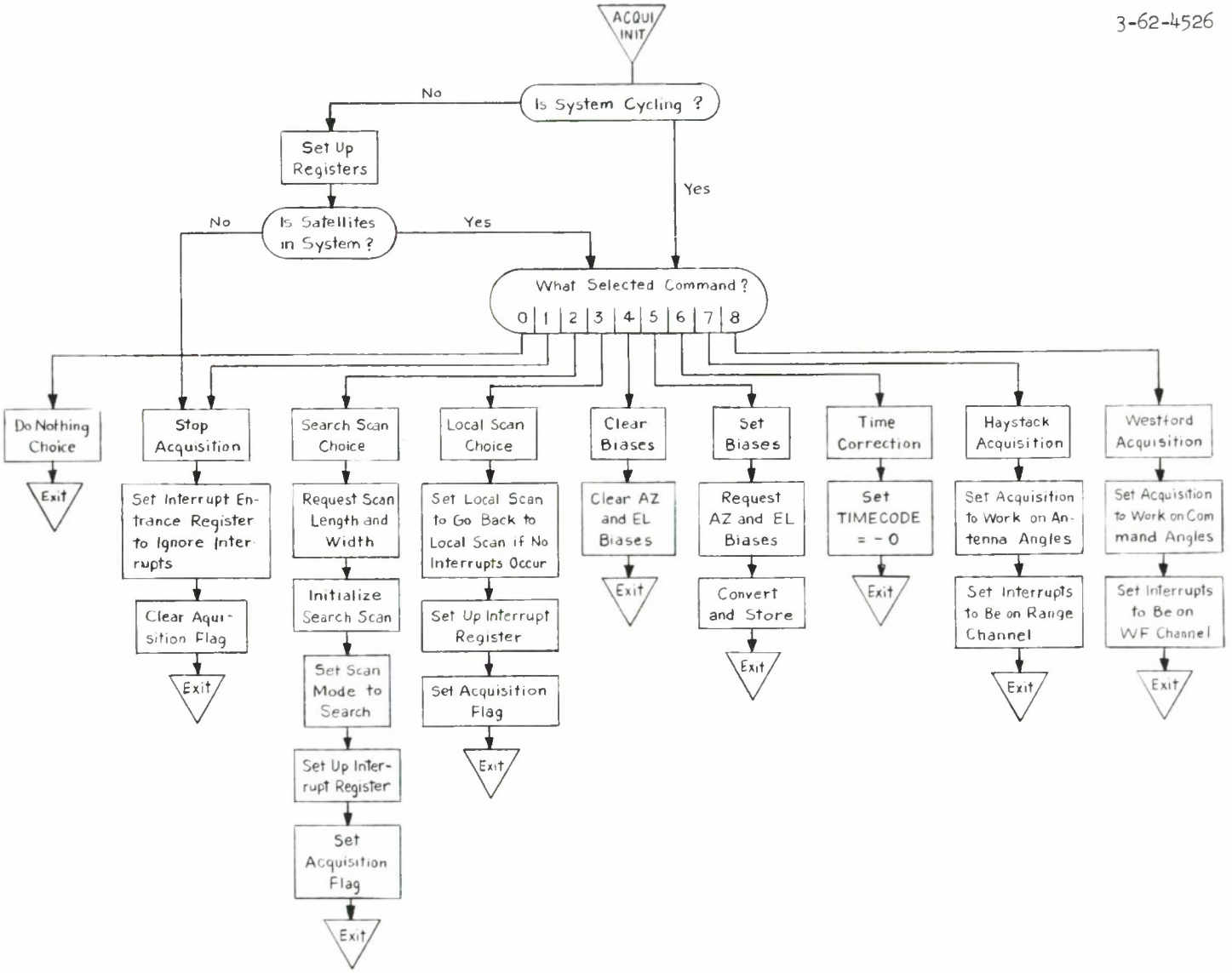

Fig. 7. Acquisition program initialization flow diagram.

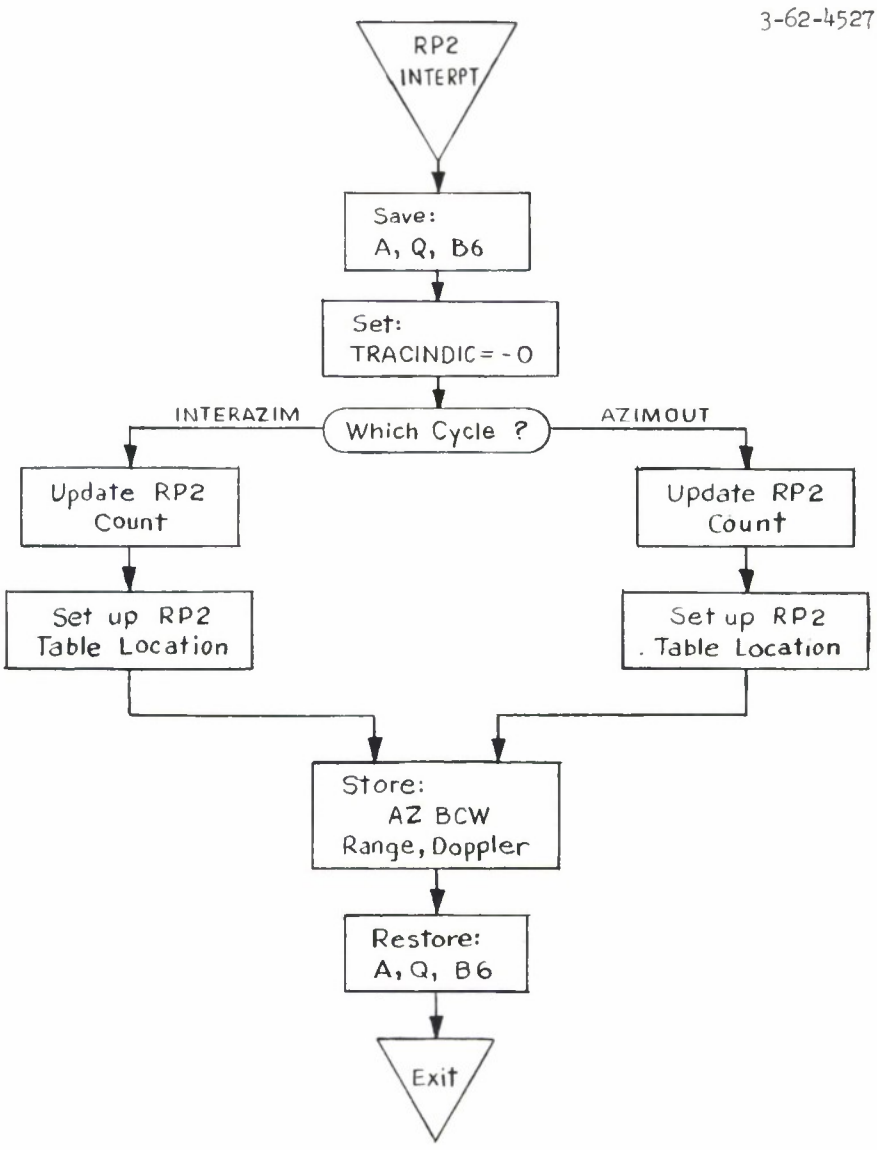

Fig. 8. Interrupt answering routine.

The initialization section performs a variety of functions. Each function is a direct result of the keyboard request, which are explained in the OPERATOR INTERVENTION section.

The interrupt answering routine serves the function of recording information when RP2 interrupts occur. This routine is entered either by the Westford RP2 interrupts or the Haystack RP2 interrupts as requested by the operator. The interrupt answering routine also sets the TRACKINDIC which is the location of a code to indicate that the target is within the antenna beam, and is used by the autotracking program.

The working section of the program contains most of acquisition program. When acquisition has not been requested, most of this program is bypassed. The values of azimuth and elevation are corrected for overlap purposes and are passed on to the interpolation program.

The Haystack antenna is capable of travelling 600 degrees in the azimuth plane. Figure 9 shows the azimuth travel limits and labels the overlap zones. The azimuth angles given the acquisition program are always between 0 and 360 degrees. The acquisition program computes the overlap information so that the antenna goes smoothly through north. The detailed computations are outlined by Fig. 10.

When the acquisition program has been asked to function, after several tests, the program computes either a local scan or a search scan. The local scan computation is broken into five alternative computations (five values of k), one for each of the four quadrants plus an additional one that is used when the local scan is reinitiated (k = 0 case). k = 4 is the first quadrant computation; during this time the previous circle is examined for RP2 pulses and appropriate computations are made when some RP2 pulses have occurred.

Figure 11 shows the search scan computations logic, while Fig. 12 shows the logic when the search scan has to be backed up four points so that continuity is preserved when after a false target the search scan is continued.

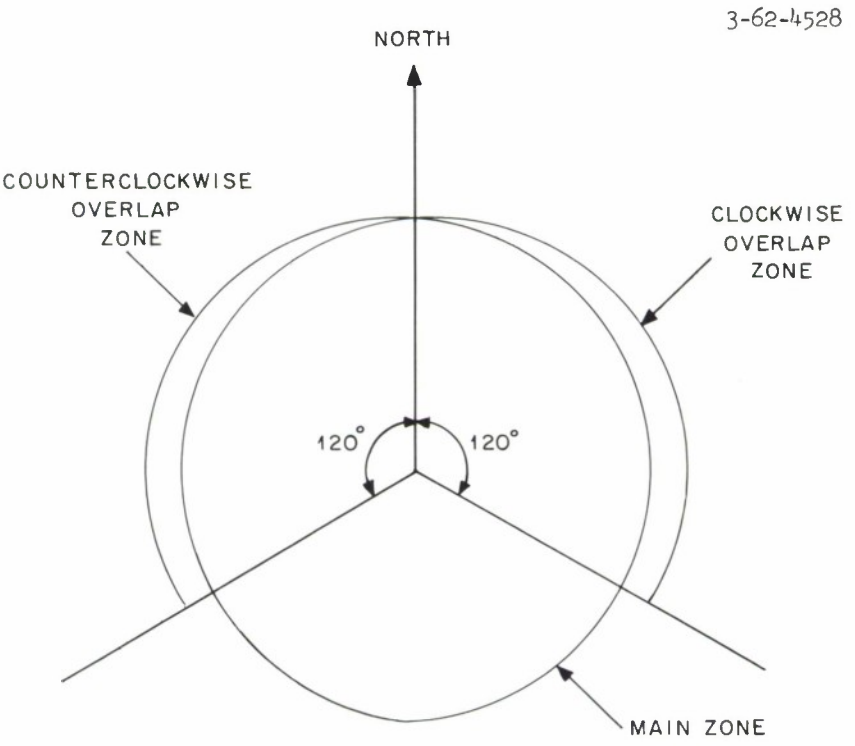

Fig. 9. Overlap zones.

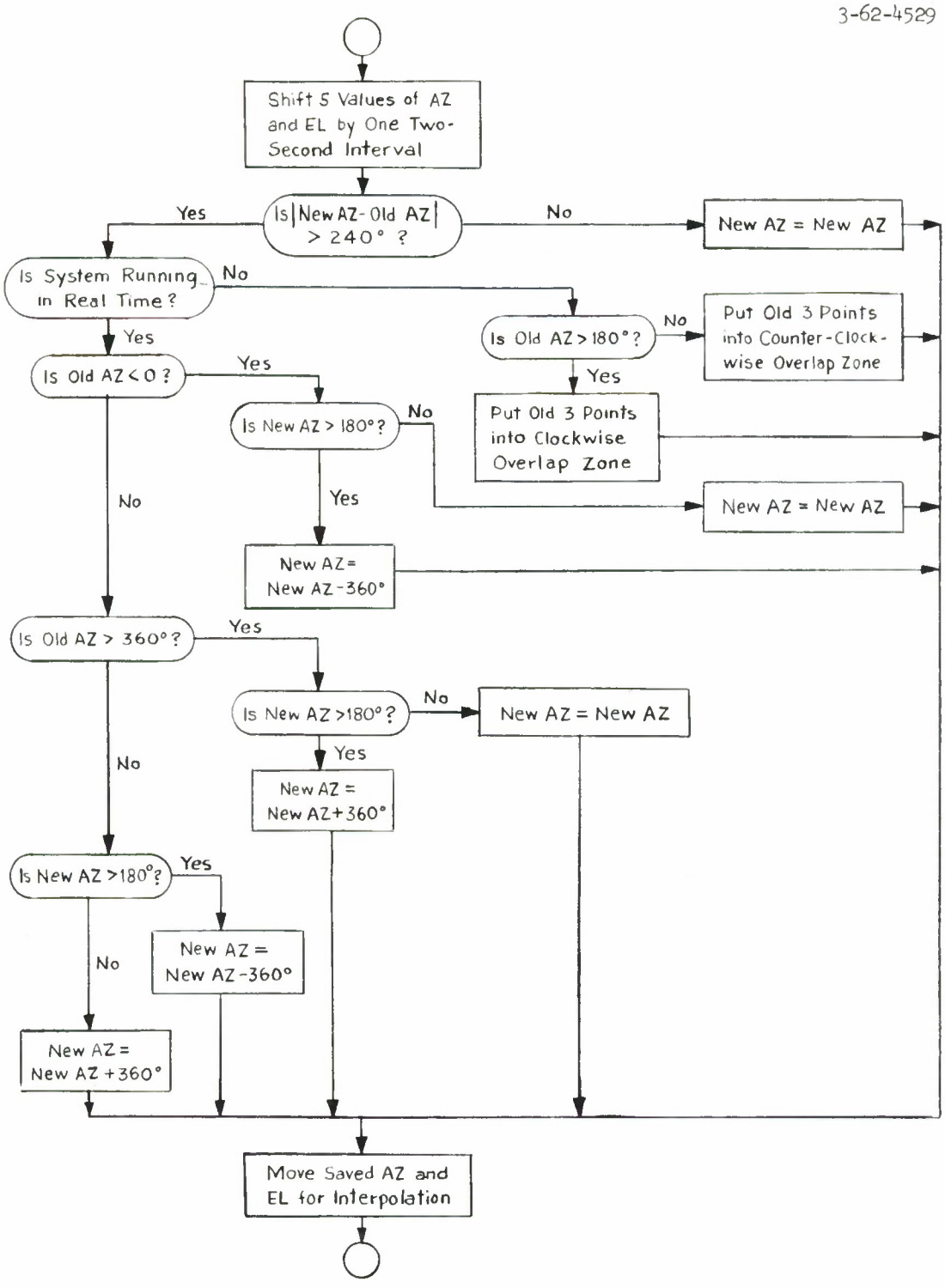

Fig. 10. Overlap computation.

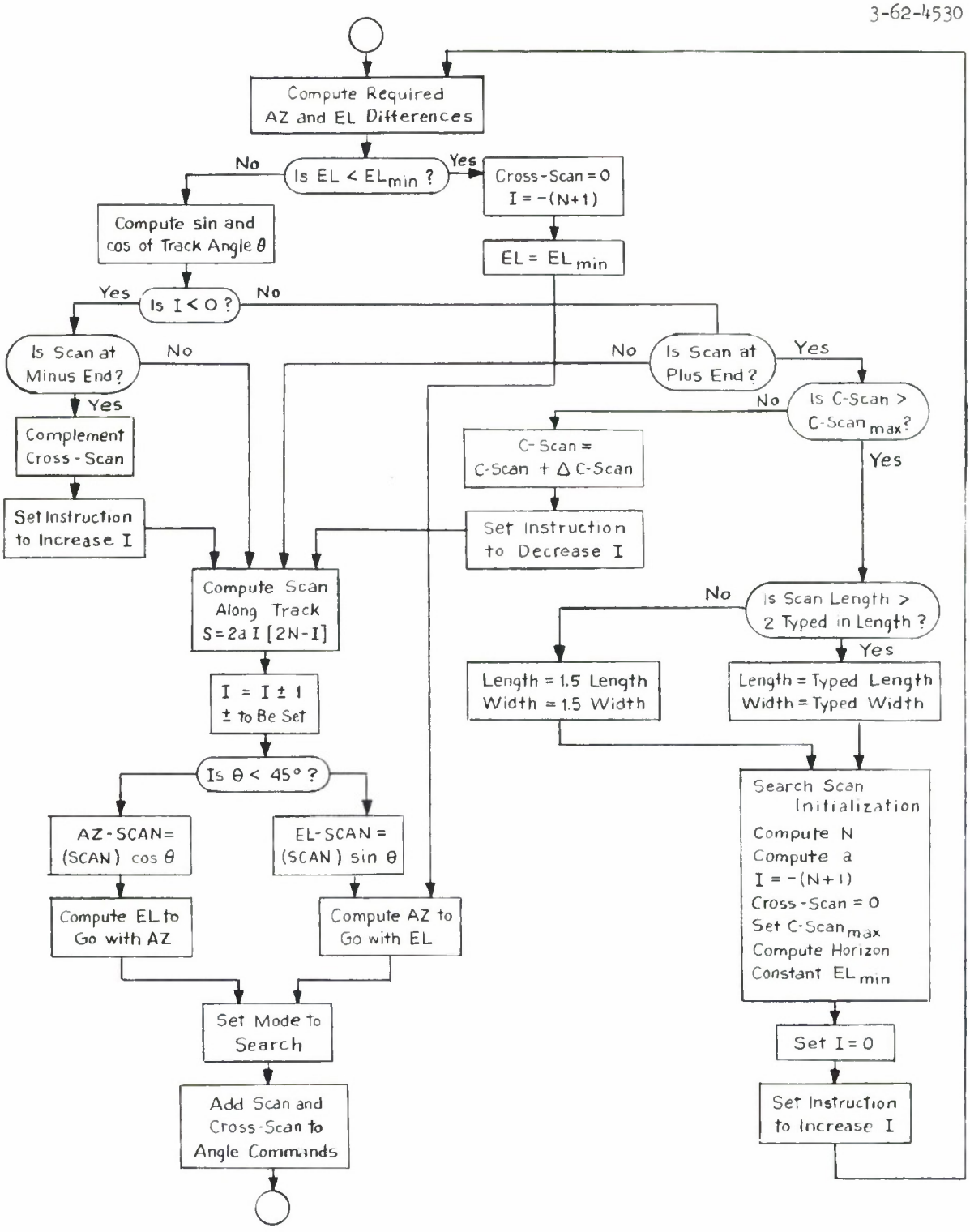

Fig. 11. Search scan computation.

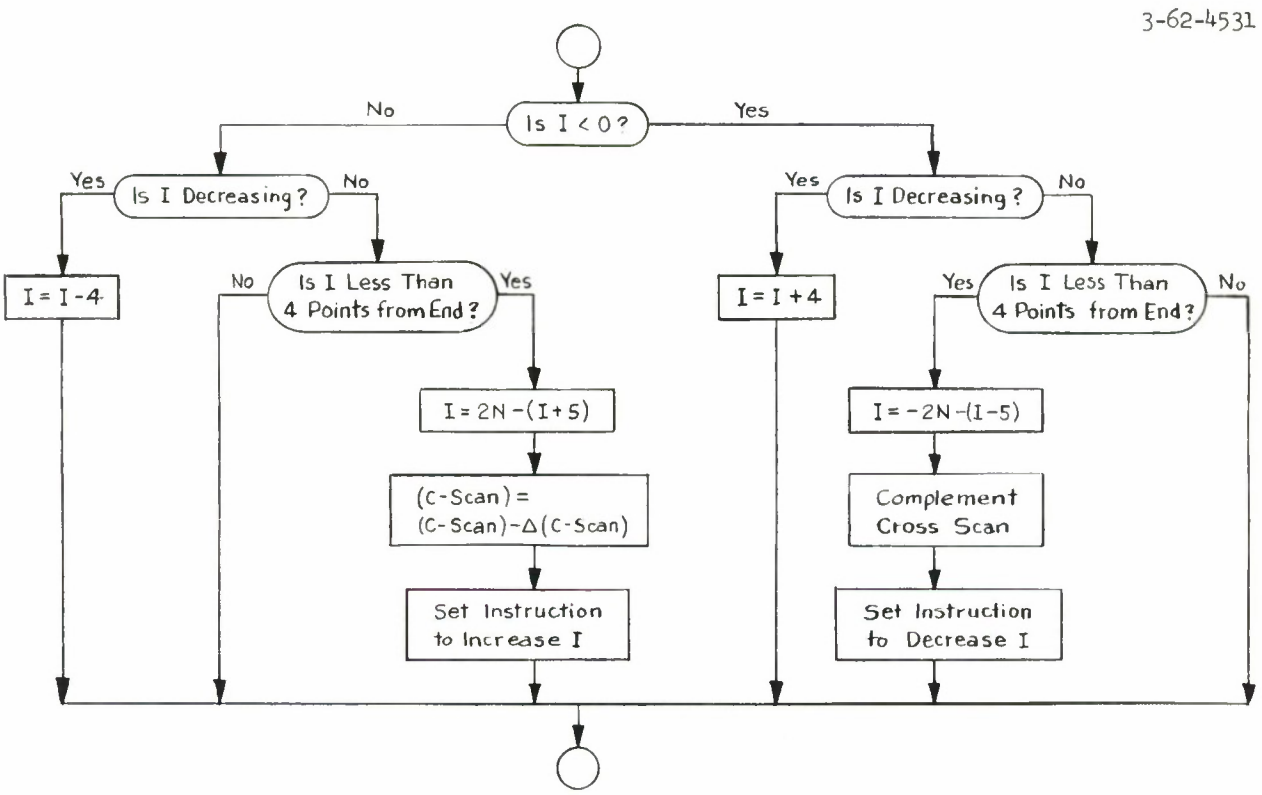

Fig. 12. Back up search scan.

SPURT OUTPUT NO. 110

ACQUI TE0STE*10FEB66

CARDS	L1 ID	LABEL	TA	STATEMENT	LOC	F	JKB	Y	NOTES
.	00000	ACQUI		PROGRAM TE0STE*10FEB66					
.	00001	ACQUIRE		U-TAG ACQUIRUN*ACQUIINIT	00000	00360	00002		
.	00002			FD 1*ACQUI	00001	06102	63216		
.	00003	ACQUIINIT		ENTRY	00002	61000	00000		
.	00004			ENT A*LX(SYSTAT1)*ANEG	00003	11750	63313		IS SYSTEM CYCLING
.	00005			JP ATTENTINIT	00004	61000	00034		
.	00006			CL W(AZENTBIAS)	00005	16030	00272		
.	00007			CL W(ELENTBIAS)	00006	16030	00273		
.	00010			CL W(TIMECODE)	00007	16030	00217		
.	00011			PUT 1*L(CHOICE)	00010	10000	00001		
					00011	14010	00040		
.	00012			ENT A*W(TEST3)	00012	11030	00344		
.	00013			STR A*W(STARTAZ)	00013	15030	00370		
.	00014			CL W(RP2CODE2)	00014	16030	01215		U(LOCAL SCAN K) L(RP2CODE2)
.	00015			CL W(RP2CODE8)	00015	16030	01216		U(END LOC SCAN) L(RP2CODE8)
.	00016			CL W(RP2CODES)	00016	16030	01217		L(RP2CODES) U(NO OF GOOD LOCAL SCANS)
.	00017			CL W(RP2COUNT)	00017	16030	02573		
.	00020			CL L(RP2CODEL)	00020	16010	01220		L(RP2CODEL)
.	00021			CL W(RP2AVG8E)	00021	16030	01231		
.	00022			CL W(RP2AVG8A)	00022	16030	01212		
.	00023			ENT A*L(SYSTAT2)	00023	11010	63314		
.	00024			SUB A*2*AZERO	00024	21400	00002		IS SATELLITES IN SYSTEM
.	00025			JP STOPACQUI	00025	61000	00042		NO
.	00026			RJP U(INTERCOM)	00026	65020	63426		YES
.	00027			U-TAG QUEST1*0	00027	00060	00000		DO YOU WANT ACQUISITION
.	00030			RJP U(INTERCOM)	00030	65020	63426		
.	00031			U-TAG QUEST3*ANSWER1	00031	00105	00070		NO(1) SEARCH SCAN(2) LOCAL SCAN(3)
.	00032			ENT B7*L(CHOICE)	00032	12710	00040		
.	00033			JP L(PROGTABLE+B7)	00033	61017	00074		JUMP TO THE REQUESTED PROGRAM
.	00034	ATTENTINIT		RJP U(INTERCOM)	00034	65020	63426		ATTENTION INITIALIZATION
.	00035			U-TAG QUEST2*ANSWER2	00035	00120	00142		
.	00036			ENT B7*L(CHOICE)	00036	12710	00040		
.	00037			JP L(PROGTABLE+B7)	00037	61017	00074		JUMP TO THE REQUESTED PROGRAM
.	00040	CHOICE		1	00040	00000	00001		
.	00041	DONOTHING		JP L(ACQUIINIT)	00041	61010	00002		
.	00042	STOPACQUI		ENT A*W($+1)*SKIP	00042	11130	00043		SKIP ALL OF ACQUI
.	00043			RJP NOINTERR	00043	65000	00052		
.	00044			STR A*W(30)	00044	15030	00030		
.	00045			STR A*W(34)	00045	15030	00034		
.	00046			CL W(ACQUIONOFF)	00046	16030	00057		
.	00047			PUT -0*W(TRACKINDIC)	00047	10040	77777		
					00050	14030	63026		
.	00050			JP L(ACQUIINIT)	00051	61010	00002		
.	00051	NOINTERR		ENTRY	00052	61000	00000		
.	00052			PUT -0*W(TRACKINDIC)	00053	10040	77777		SET TRACK INDIC. WHEN NOT ACQUIRING
					00054	14030	63026		
.	00053			STR C14*W(RP2CHANNEL)	00055	17630	02575		

```
.    00054                RILJP     L(NOINTERR)                    00056  60110 00052
.    00055 ACQUIONOFF     0                                        00057  00000 00000
.    00056 QUEST1         FD    0*A                                00060  06000 00000
.    00057                -0    $+1                                00061  77777 00062
.    00060                FD    0*DO YOU WANT ACQUISITION          00062  11240 53624
                                                                   00063  32053 40623
                                                                   00064  31050 61026
                                                                   00065  32163 01631
                                                                   00066  16242 30000
.    00061                -0                                       00067  77777 77777
.    00062 ANSWER1        FD    0*D                                00070  11000 00000
.    00063                11    CHOICE                             00071  00011 00040
.    00064                1                                        00072  00000 00001
.    00065                3                                        00073  00000 00003
.    00066 PROGTABLE      0     DONOTHING                          00074  00000 00041  DO NOTHING (0)
.    00067                0     STOPACQUI                          00075  00000 00042  STOP SCAN (1)
.    00070                0     SCHCHOICE                          00076  00000 00163  SEARCH SCAN (2)
.    00071                0     LOCCHOICE                          00077  00000 00330  LOCAL SCAN (3)
.    00072                0     CLBIASES                           00100  00000 00210  CLEAR BIASES (4)
.    00073                0     SETBIASES                          00101  00000 00252  SET BIASES (5)
.    00074                0     TIMECORREC                         00102  00000 00214  TIME CORRECTION (6)
.    00075                0     HSACQUI                            00103  00000 00146  HAYSTACK ACQUISITION (7)
.    00076                0     WFACQUI                            00104  00000 00156  WESTFORD ACQUISITION (8)
.    00077 QUEST3         FD    0*A                                00105  06000 00000
.    00100                -0    $+1                                00106  77777 00107
.    00101                FD    0*NO(1)  SEARCH SCAN(2)  LOCAL SCAN00107  23245 16140
                           (3)
                                                                   00110  05053 01206
                                                                   00111  27101 50530
                                                                   00112  10062 35162
                                                                   00113  40050 52124
                                                                   00114  10062 10530
                                                                   00115  10062 35163
                                                                   00116  40000 00000
.    00102                -0                                       00117  77777 77777
.    00103 QUEST2         FD    0*A                                00120  06000 00000
.    00104                -0    $+1                                00121  77777 00122
.    00105                FD    0*STOP (1) SEARCH(2) LOCAL(3) CL BI00122  30312 42505
                           AS(4) SET BIAS(5)
                                                                   00123  51614 00530
                                                                   00124  12062 71015
                                                                   00125  51624 00521
                                                                   00126  24100 62151
                                                                   00127  63400 51021
                                                                   00130  05071 60630
                                                                   00131  51644 00530
                                                                   00132  12310 50716
                                                                   00133  06305 16540
.    00106                FD    0* TIME (6) HS(7) WF(8)            00134  05311 62212
                                                                   00135  05516 64005
                                                                   00136  15305 16740
                                                                   00137  05341 35170
                                                                   00140  40000 00000
.    00107                -0                                       00141  77777 77777
.    00110 ANSWER2        FD    0*D                                00142  11000 00000
.    00111                11    CHOICE                             00143  00011 00040
.    00112                1                                        00144  00000 00001
.    00113                11                                       00145  00000 00011
.    00114 HSACQUI        ENT   A*INAZIMADD                        00146  11000 63446  SET UP ACQUI FOR HAYSTACK
```

```
00115                ENT  Q*30                          00147  10000 00030
00116                ENT  B6*INELEVADD                  00150  12600 63447
00117 WFHSACQUI6     STR  A*L(WFHSACQUI1)               00151  15010 01432
00120                STR  B6*L(WFHSACQUI2)              00152  16610 01445
00121                STR  Q*L(WFHSACQUI4+1)             00153  14010 00206
00122                STR  Q*L(WFHSACQUI5+1)             00154  14010 00337
00123                JP   L(ACQUIINIT)                  00155  61010 00002
00124 WFACQUI        ENT  A*AZIMADD                     00156  11000 63442
00125                ENT  Q*34                          00157  10000 00034
00126                ENT  B6*ELEVADD                    00160  12600 63443
00127                JP   WFHSACQUI6                    00161  61000 00151
00130 BACKUPWD       ENT  A*W(I)*APOS                   00162  11630 00561
00131 SCHCHOICE      RJP  U(INTERCOM)                   00163  65020 63426  ENTER SCAN LENGTH IN DEGREES
00132                U-TAG     QUEST4*ANSWER4           00164  00220 00231
00133                RJP  U(INTERCOM)                   00165  65020 63426  ENTER SCAN WIDTH IN DEGREES
00134                U-TAG     QUEST5*ANSWER5           00166  00235 00246
00135                PUT  W(LENGTHIN)*W(LENGTH)         00167  10030 00745
                                                        00170  14030 01204
00136                PUT  W(WIDTHIN)*W(WIDTH)           00171  10030 00744
                                                        00172  14030 01205
00137                CL   W(RP2COUNT)                   00173  16030 02573
00140                RJP  SSCANINIT                     00174  65000 01134
00141                ENT  Q*W(BACKUPWD)                 00175  10030 00162  MAKE SCAN BACK UP
00142                ENT  A*1                           00176  11000 00001  SET SCAN MODE TO SEARCH
00143                SIL                                00177  64000 00000
00144                STR  A*U(SCANMODE)                 00200  15020 00576
00145                STR  A*L(SCANMODE)                 00201  15010 00576
00146                STR  Q*W(BACKUPSCAN)               00202  14030 01633
00147                PUT  -0*W(ACQUIONOFF)              00203  10040 77777
                                                        00204  14030 00057
00150 WFHSACQUI4     PUT  W(RP2INTRJP)*W(30)            00205  10030 00343
                                                        00206  14030 00030
00151                RILJP     L(ACQUIINIT)             00207  60110 00002
00152 CLBIASES       SIL                                00210  64000 00000
00153                CL   W(LOCSCABIAS)                 00211  16030 01225
00154                CL   W(LOCSCEBIAS)                 00212  16030 01227
00155                RILJP     L(ACQUIINIT)             00213  60110 00002
00156 TIMECORREC     PUT  -0*U(TIMECODE)                00214  10040 77777
                                                        00215  14020 00217
00157                JP   L(ACQUIINIT)                  00216  61010 00002
00160 TIMECODE       0                                  00217  00000 00000
00161 QUEST4         FD   0*A                           00220  06000 00000
00162                -0   $+1                           00221  77777 00222
00163                FD   0*ENTER SCAN LENGTH IN DEGREES 00222  12233 11227
                                                        00223  05301 00623
                                                        00224  05211 22314
                                                        00225  31150 51623
                                                        00226  05111 21427
                                                        00227  12123 00000
00164                -0                                 00230  77777 77777
00165 ANSWER4        FD   0*X18                         00231  35617 00000
00166                11   LENGTHIN                      00232  00011 00745
00167                0    0                             00233  00000 00000
00170                0024000000                         00234  00240 00000  20B18 MAXIMUM SCAN LENGTH
00171 QUEST5         FD   0*A                           00235  06000 00000
00172                -0   $+1                           00236  77777 00237
00173                FD   0*ENTER SCAN WIDTH IN DEGREES 00237  12233 11227
                                                        00240  05301 00623
                                                        00241  05341 61131
```

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                                                    00242  15051 62305
                                                    00243  11121 42712
                                                    00244  12300 00000
.    00174                -0                        00245  77777 77777
.    00175 ANSWER5        FD   0*X18                00246  35617 00000
.    00176                11   WIDTHIN              00247  00011 00744
.    00177                0                         00250  00000 00000
.    00200                0005000000                00251  00050 00000  5B18 MAXIMUM SCAN WIDTH
.    00201 SETBIASES      RJP  U(INTERCOM)          00252  65020 63426  ENTER AZIMUTH BIAS IN DEGREES
.    00202                U-TAG     QUEST6*ANSWER6  00253  00275 00306
.    00203                RJP  U(INTERCOM)          00254  65020 63426  ENTER ELEVATION BIAS IN DEGREE
                                                                        S
.    00204                U-TAG     QUEST7*ANSWER7  00255  00312 00324
.    00205                ENT  Q*W(AZENTBIAS)        00256  10030 00272  CONVERT AZ BIAS TO REVOLUTIONS

.    00206                MUL  W(RECIPREV)          00257  22030 01202
.    00207                LSH  AQ*9D                00260  07000 00011
.    00210                STR  A*W(TEMPST)          00261  15030 00274
.    00211                ENT  Q*W(ELENTBIAS)       00262  10030 00273  CONVERT EL BIAS TO REVOLUTION

.    00212                MUL  W(RECIPREV)          00263  22030 01202
.    00213                LSH  AQ*9D                00264  07000 00011
.    00214                ENT  Q*W(TEMPST)          00265  10030 00274
.    00215                SIL                       00266  64000 00000  CHANGE BIASES
.    00216                STR  A*W(LOCSCEBIAS)      00267  15030 01227
.    00217                STR  Q*W(LOCSCABIAS)      00270  14030 01225
.    00220                RILJP     L(ACQUIINIT)    00271  60110 00002
.    00221 AZENTBIAS      0                         00272  00000 00000  B18 KEYBOARD ENTERED AZ BIAS

.    00222 ELENTBIAS      0                         00273  00000 00000  B18 KEYBOARD ENTERED EL BIAS

.    00223 TEMPST         0                         00274  00000 00000
.    00224 QUEST6         FD   0*A                  00275  06000 00000
.    00225                -0   $+1                  00276  77777 00277
.    00226                FD   0*ENTER AZIMUTH BIAS IN DEGREES  00277  12233 11227
                                                    00300  05063 71622
                                                    00301  32311 50507
                                                    00302  16063 00516
                                                    00303  23051 11214
                                                    00304  27121 23000
.    00227                -0                        00305  77777 77777
.    00230 ANSWER6        FD   0*X18                00306  35617 00000
.    00231                11   AZENTBIAS            00307  00011 00272
.    00232                7227777777                00310  72277 77777  -360B18
.    00233                0550000000                00311  05500 00000  360B18
.    00234 QUEST7         FD   0*A                  00312  06000 00000
.    00235                -0   $+1                  00313  77777 00314
.    00236                FD   0*ENTER ELEVATION BIAS IN DEGREES  00314  12233 11227
                                                    00315  05122 11233
                                                    00316  06311 62423
                                                    00317  05071 60630
                                                    00320  05162 30511
                                                    00321  12142 71212
                                                    00322  30000 00000
.    00237                -0                        00323  77777 77777
.    00240 ANSWER7        FD   0*X18                00324  35617 00000
.    00241                11   ELENTBIAS            00325  00011 00273
.    00242                7645777777                00326  76457 77777  -90B18
.    00243                0132000000                00327  01320 00000  90B18
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```
00244 LOCCHOICE     ENT  A*W(LOCSCONLY)                  00330  11030 00342  PREVENT SCAN FROM GOING TO SFA
                                                                             RCH
00245               CL   W(RP2COUNT)                    00331  16030 02573
00246               SIL                                 00332  64000 00000
00247               STR  A*W(BACKUPSCAN)                00333  15030 01633
00250               PUT  -0*W(ACQUIONOFF)               00334  10040 77777
                                                        00335  14030 00057
00251 WFHSACQUI5    PUT  W(RP2INTRJP)*W(30)             00336  10030 00343
                                                        00337  14030 00030
00252               CL   W(SCANMODE)                    00340  16030 00576  SET MODE TO LOCAL
00253               RILJP     L(ACQUIINIT)              00341  60110 00002
00254 LOCSCONLY     JP   INITLOCSC                      00342  61000 01563
00255 RP2INTRJP     RJP  RP2INTERPT                     00343  65000 02577
00256 TEST3         JP   $+1                            00344  61000 00345
00257               ENT  A*W(TEST4)                     00345  11030 00357  FIRST TIME THROUGH FIX OVERLAP
00260               STR  A*W(STARTAZ)                   00346  15030 00370
00261               ENT  A*W(AZIMOVER)*ANEG             00347  11730 63325
00262               JP   ENDAZ-1                        00350  61000 00402
00263 TEST5         ENT  Q*W(CAZIM)                     00351  10030 63060  PUT POINT IN OVERLAP REGION
00264               LSH  AQ*3                           00352  07000 00003
00265               ENT  A*W(CAZIM)*QPOS                00353  11230 63060
00266               SUB  A*W(REV)*SKIP                  00354  21130 00466
00267               ADD  A*W(REV)                       00355  20030 00466
00270               JP   ENDAZ                          00356  61000 00403
00271 TEST4         127000000                           00357  01270 00000
00272 ACQUIRUN      ENTRY                               00360  61000 00000
00273               CL   B7                             00361  12700 00000
00274               ENT  A*W(ELEVSH+1+B7)               00362  11037 00477
00275               STR  A*W(ELEVSH+B7)                 00363  15037 00476
00276               BSK  B7*4                           00364  71700 00004
00277               JP   $-3                            00365  61000 00362
00300               ENT  A*W(CELEV)                     00366  11030 63061  NEW ELEVATION
00301               STR  A*W(ELEVSH+5)                  00367  15030 00503
00302 STARTAZ       CL   B7                             00370  12700 00000
00303               ENT  A*W(AZIMSH+1+B7)               00371  11037 00471
00304               STR  A*W(AZIMSH+B7)                 00372  15037 00470
00305               BSK  B7*4                           00373  71700 00004
00306               JP   $-3                            00374  61000 00371
00307               ENT  A*W(AZIMSH+4)                  00375  11030 00474  NEW AZIMUTH OVERLAP DETERMINAT
                                                                             ION
00310               SUB  A*W(CAZIM)*APOS                00376  21630 63060
00311               STR  A*A                            00377  15040 00000
00312               SUB  A*W(MARGIN)*ANEG               00400  21730 00467
00313               JP   TEST1                          00401  61000 00444
00314               ENT  A*W(CAZIM)                     00402  11030 63060  POINT IN NONOVERLAP REGION
00315 ENDAZ         STR  A*W(AZIMSH+5)                  00403  15030 00475
00316               ENT  A*W(ELEVSH+5)                  00404  11030 00503
00317               STR  A*W(ACQELEV+3)                 00405  15030 63100
00320               ENT  A*W(AZIMSH+5)                  00406  11030 00475
00321               STR  A*W(ACQAZIM+3)                 00407  15030 63074
00322               ENT  A*W(ACQUIONOFF)*ANOT           00410  11530 00057
00323               JP   L(ACQUIRUN)                    00411  61010 00360
00324               ENT  A*W(RP2COUNT)*ANOT             00412  11530 02573
00325               CL   W(TRACKINDIC)                  00413  16030 63026
00326               ENT  A*U(INAZIMADD)                 00414  11020 63446
00327               SUB  A*AZIMIN*AZERO                 00415  21400 75000  WHUCH PREVIOUS CYCLE
00330               JP   INTERAZCY                      00416  61000 01277
00331               ENT  A*U(RP2COUNT)*AZERO            00417  11420 02573  AZIMOUT CYCLE  ANY RP2 PULSES
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00332                JP   AVGAZOCY                    00420  61000 01273
00333 NORP2PULSE     ENT  A*U(SCANMODE)*AZERO         00421  11420 00576  PRESENT SCAN MODE LOCAL
00334                JP   SEARCHSCAN+1                00422  61000 00762  GO TO SEARCH SCAN
00335                JP   LOCALSCAN                   00423  61000 01473  GO TO LOCAL SCAN
00336 SIMULATION     ENT  A*W(AZIMSH+4)               00424  11030 00474
00337                SUB  A*0400000000*APOS           00425  21630 02773
00340                JP   PUTINCW                     00426  61000 00435
00341 PUTINCCW       ENT  B5*2                        00427  12500 00002
00342                ENT  A*W(ACQAZIM+B5)             00430  11035 63071
00343                SUB  A*W(REV)                    00431  21030 00466
00344                STR  A*W(ACQAZIM+B5)             00432  15035 63071
00345                BJP  B5*PUTINCCW+1               00433  72500 00430
00346                JP   ENDAZ-1                     00434  61000 00402
00347 PUTINCW        ENT  B5*2                        00435  12500 00002
00350                ENT  A*W(ACQAZIM+B5)             00436  11035 63071
00351                ADD  A*W(REV)                    00437  20030 00466
00352                STR  A*W(ACQAZIM+B5)             00440  15035 63071
00353                BJP  B5*PUTINCW+1                00441  72500 00436
00354                JP   ENDAZ-1                     00442  61000 00402
00355                ENT  A*W(AZIMSH+4)*ANEG          00443  11730 00474
00356 TEST1          ENT  A*W(TIMEMODE)*APOS          00444  11630 63103
00357                JP   SIMULATION                  00445  61000 00424
00360                ENT  A*W(AZIMSH+4)*ANEG          00446  11730 00474
00361                JP   TEST2                       00447  61000 00456
00362                ENT  Q*W(CAZIM)                  00450  10030 63060
00363                LSH  AQ*3*QNEG                   00451  07300 00003
00364                JP   ENDAZ-1                     00452  61000 00402
00365                ENT  A*W(CAZIM)                  00453  11030 63060
00366                SUB  A*W(REV)                    00454  21030 00466
00367                JP   ENDAZ                       00455  61000 00403
00370 TEST2          SUB  A*W(REV)*APOS               00456  21630 00466
00371                JP   TEST5                       00457  61000 00351
00372                ENT  Q*W(CAZIM)                  00460  10030 63060
00373                LSH  AQ*3*QPOS                   00461  07200 00003
00374                JP   ENDAZ-1                     00462  61000 00402
00375                LSH  AQ*27D                      00463  07000 00033
00376                ADD  A*W(REV)                    00464  20030 00466
00377                JP   ENDAZ                       00465  61000 00403
00400 REV            1000000000                       00466  10000 00000  1B27
00401 MARGIN         0527024365                       00467  05270 24365  .67B27
00402 AZIMSH         0002523114                       00470  00025 23114  .0052B27 AZ(T-6) AZ=.005+EL+(E
                                                                           L)SQ
00403                0002674003                       00471  00026 74003  .0056B27 AZ(T-4)
00404                0003131225                       00472  00031 31225  .0062B27 AZ(T-2)
00405                0003453004                       00473  00034 53004  .0070B27 AZ(T)
00406                0004061115                       00474  00040 61115  .0080B27 AZ(T+2)
00407                0004553563                       00475  00045 53563  .0092B27 AZ(T+4)
00410 ELEVSH         0000406111                       00476  00004 06111  .001B27 EL(T-6)
00411                0001014223                       00477  00010 14223  .002B27 EL(T-4)
00412                0001422335                       00500  00014 22335  .003B27 EL(T-2)
00413                0002030446                       00501  00020 30446  .004B27 EL(T)
00414                0002436560                       00502  00024 36560  .005B27 EL(T+2)
00415                0003044672                       00503  00030 44672  .006B27 EL(T+4)
00416 SQRT           JP   SQRT                        00504  61000 00504  ARBITRARY
00417                CL   Q                           00505  10000 00000  CLEAR Q
00420                RPT  14D                         00506  70000 00016  NORMALIZE
00421                RSH  AQ*2*AZERO                  00507  03400 00002  SHIFT UNTIL A 0
00422                JP   L(SQRT)*ANOT                00510  60510 00504  ERROR,BIT 28 OR 29 1
00423                LSH  AQ*28D                      00511  07000 00034  NORMALIZE IN A
```

```
.  00424                STR  A*W(SQRT+34D)*ANOT          00512  15530 00546  STORE NORMALIZED RADICAND
.  00425                JP   SQRT+29D                    00513  61000 00541  RADICAND 0
.  00426                RSH  A*3                         00514  02000 00003  DIVIDE BY B FOR LINEAR APPROX

.  00427                COM  A*W(SQRT+31D)*YMORE         00515  04730 00543  SKIP IF BIT 24 0
.  00430                ADD  A*W(SQRT+33D)*SKIP          00516  20130 00545  ADD 7/B
.  00431                15140     00000                  00517  15140 00000  CP,A,SKIP
.  00432                ADD  A*W(SQRT+34D)*SKIP          00520  20130 00546  ARG/8+7/B+ARG
.  00433                ADD  A*W(SQRT+32D)*SKIP          00521  20130 00544  ADD 9/32
.  00434                RSH  A*1*SKIP                    00522  02100 00001  DIVIDE BY 2
.  00435                ADD  A*W(SQRT+34D)               00523  20030 00546  ARG/8+9/32+ARG
.  00436                STR  A*W(SQRT+35D)               00524  15030 00547  LINEAR APPROX COMPLETE
.  00437                ENT  A*W(SQRT+34D)               00525  11030 00546  ENTER RADICAND (SCALED AT 28)

.  00440                RSH  AQ*2                        00526  03000 00002  SCALE AT 26
.  00441                DIV  W(SQRT+35D)                 00527  23030 00547  DIVIDE (SCALED AT 28)
.  00442                ADD  Q*W(SQRT+35D)               00530  26030 00547
.  00443                RSH  Q*1                         00531  01000 00001
.  00444                STR  Q*W(SQRT+35D)               00532  14030 00547
.  00445                ENT  A*W(SQRT+34D)               00533  11030 00546  ENTER RADICAND
.  00446                RSH  AQ*2                        00534  03000 00002  SCALE 2(ARG) AT 26
.  00447                DIV  W(SQRT+35D)                 00535  23030 00547  DIVIDE,RESULT IN Q
.  00450                ENT  Y+Q*W(SQRT+35D)             00536  30030 00547  2(RESULT TO A
.  00451                RSH  AQ*1+B7*QPOS                00537  03207 00001
.  00452                ADD  A*1                         00540  20000 00001  ROUND
.  00453                ENT  B7*L(SQRT)                  00541  12710 00504  EXIT ADDRESS TO B7
.  00454                JP   1+B7                        00542  61007 00001  RETURN
.  00455                01000     00000                  00543  01000 00000
.  00456                04400     00000                  00544  04400 00000  9/32 AT 28
.  00457                16000     00000                  00545  16000 00000  7/B AT 2B
.  00460                0    0                           00546  00000 00000  TEMPORARY
.  00461                0    0                           00547  00000 00000  TEMPORARYATAN
.  00462 SCANLIN        0                                00550  00000 00000  2N B0
.  00463 SCANACCNEG     RESERVE   1                      00551  00000 00000  B30 NEG. COMPUTED SCAN ACCELER
                                                                             ATION
.  00464 CROSSCAN       RESERVE   1                      00552  00000 00000  B27 CROSSCAN
.  00465 ECROSSCAN      RESERVE   1                      00553  00000 00000  B27 CROSSCAN IN ELEVATION
.  00466 ACROSSCAN      RESERVE   1                      00554  00000 00000  B27 CROSSCAN IN AZIMUTH
.  00467 DELCRSC        0000034653                       00555  00000 34653  .00011B27 B27 CROSSCAN INCREME
                                                                             NT
.  00470 SCSIN          1323757473                       00556  13237 57473  .707B2B B2B ELEVATION OVER SQU
                                                                             ARE ROOT
.  00471 SCCOS          1323757473                       00557  13237 57473  .707B28 B28 AZIBUTH OVER SQUAR
                                                                             E ROOT
.  00472 CRSCW          RESERVE   1                      00560  00000 00000  B27 CROSS SCAN WIDTH OVER 2
.  00473 I              RESERVE   1                      00561  00000 00000  B0 INDEX FOR SCAN
.  00474 N              RESERVE   1                      00562  00000 00000  B0 NO OF 2-SEC INTERVALS IN FO
                                                                             URTH SCAN
.  00475 SCANPOINT      RESERVE   1                      00563  00000 00000  B27 VALUE OF SCAN IN REVOLUTIO
                                                                             NS
.  00476 HORIZTEST      0                                00564  00000 00000  L/2 + MINIMUM ELEVATION
.  00477 AZDIFM10       0                                00565  00000 00000  B27 A-1 - A0
.  00500 AZDIF20        0                                00566  00000 00000  B27 A2 - A0
.  00501 ELDIFM10       0                                00567  00000 00000  B27 E-1 - E0
.  00502 ELDIF20        0                                00570  00000 00000  B27 E2 - E0
.  00503 ELDIF20SQ      0                                00571  00000 00000  B30 (E2 - E0)SQ
.  00504 AZDIF20SQ      0                                00572  00000 00000  B30 (A2 - A0)SQ
.  00505 SQRTDEN        0                                00573  00000 00000  B29
.  00506 ELPOINT        0                                00574  00000 00000  B27 ELEVATION COMPONENT OF SCA
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00507 AZPOINT     0                                  00575  00000 00000  B27 AZIMUTH COMPONENT OF SCAN
                                                                          N
00510 SCANMODE    -1                                 00576  77777 77776
00511 JUNK        RESERVE   3                        00577  00000 00000
00512 FITDENOM    0                                  00602  00000 00000  B36 DEN OF FIT EXPRESSION
00513 FITQUAD     0                                  00603  00000 00000  B24 QUADRATIC COEFFICIENT
00514 FITLIN      0                                  00604  00000 00000  B21 LINEAR COEFFICIENT
00515 SC5         ENT   Q*W(SCANPOINT)               00605  10030 00563
00516             MUL   W(SCCOS)                     00606  22030 00557
00517             LSH   AQ*2                         00607  07000 00002
00520             STR   A*W(AZPOINT)                 00610  15030 00575  B27 AZIMUTH SCAN
00521             ENT   Q*W(AZDIF20)                 00611  10030 00566
00522             SUB   Q*W(AZDIFM10)                00612  27030 00565
00523             MUL   W(AZDIF20)                   00613  22030 00566
00524             RSH   AQ*18D                       00614  03000 00022
00525             MUL   W(AZDIFM10)                  00615  22030 00565
00526             LSH   AQ*12D*ANOT                  00616  07500 00014
00527             JP    ENDFIT+1                     00617  61000 01117
00530             STR   A*W(FITDENOM)                00620  15030 00602  B45 DEN OF QUADRATIC EXPR.
00531             ENT   Q*W(ELDIFM10)                00621  10030 00567
00532             MUL   W(AZDIF20)                   00622  22030 00566
00533             LSH   AQ*12D                       00623  07000 00014
00534             STR   A*W(JUNK)                    00624  15030 00577  B36
00535             ENT   Q*W(ELDIF20)                 00625  10030 00570
00536             MUL   W(AZDIFM10)                  00626  22030 00565
00537             LSH   AQ*12D                       00627  07000 00014
00540             STR   A*W(JUNK+1)                  00630  15030 00600  B36
00541             SUB   A*W(JUNK)                    00631  21030 00577
00542             RSH   AQ*3                         00632  03000 00003
00543             DIV   W(FITDENOM)                  00633  23030 00602
00544             STR   Q*W(FITQUAD)                 00634  14030 00603  B18 QUADRATIC COEFFICIENT
00545             ENT   Q*W(JUNK+1)                  00635  10030 00600
00546             MUL   W(AZDIFM10)                  00636  22030 00565
00547             LSH   AQ*12D                       00637  07000 00014
00550             STR   A*W(JUNK+1)                  00640  15030 00600  B45
00551             ENT   Q*W(JUNK)                    00641  10030 00577
00552             MUL   W(AZDIF20)                   00642  22030 00566
00553             LSH   AQ*12D                       00643  07000 00014
00554             SUB   A*W(JUNK+1)                  00644  21030 00600  B45
00555             RSH   AQ*15D                       00645  03000 00017
00556             DIV,  W(FITDENOM)                  00646  23030 00602
00557             STR   Q*W(FITLIN)                  00647  14030 00604  B15 LINEAR COEFFICIENT
00560             ENT   Q*W(FITQUAD)                 00650  10030 00603
00561             MUL   W(AZPOINT)                   00651  22030 00575  B15
00562             ADD   A*W(FITLIN)                  00652  20030 00604
00563             ENT   Q*A                          00653  10070 00000
00564             MUL   W(AZPOINT)                   00654  22030 00575  B12
00565             LSH   AQ*15D                       00655  07000 00017
00566             STR   A*W(ELPOINT)                 00656  15030 00574  ELEVATION TO GO WITH AZIMUTH B
                                                                          27
00567             JP    ENDFIT+1                     00657  61000 01117
00570 SC3         ENT   A*W(ECROSSCAN)               00660  11030 00553  CHANGE POLARITY OF CROSSCAN

00571             STR   A*A                          00661  15040 00000
00572             STR   A*W(ECROSSCAN)               00662  15030 00553
00573             ENT   A*W(ACROSSCAN)               00663  11030 00554
00574             STR   A*A                          00664  15040 00000
00575             STR   A*W(ACROSSCAN)               00665  15030 00554
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00576              ENT  A*36030                00666  11000 36030  CHANGE DIRECTION OF I
00577              STR  A*U(SC10)               00667  15020 01036
00600              RPL  Y+1*W(I)                00670  36030 00561
00601              JP   SC1                     00671  61000 01027
00602 SC4          SUB  A*W(N)*APOS             00672  21630 00562
00603              JP   SC1                     00673  61000 01027
00604              ENT  A*W(CROSSCAN)           00674  11030 00552
00605              SUB  A*W(CRSCW)*ANEG         00675  21730 00560
00606              JP   ENDSSC                  00676  61000 00716
00607              ENT  Q*W(CROSSCAN)           00677  10030 00552
00610              ADD  Q*W(DELCRSC)            00700  26030 00555
00611              STR  Q*W(CROSSCAN)           00701  14030 00552  NEW VALUE OF CROSSCAN
00612              MUL  W(SCSIN)                00702  22030 00556
00613              LSH  AQ*2                    00703  07000 00002
00614              STR  A*A                     00704  15040 00000
00615              STR  A*W(ACROSSCAN)          00705  15030 00554  AZIMUTH COMPONENT
00616              ENT  Q*W(CROSSCAN)           00706  10030 00552
00617              MUL  W(SCCOS)                00707  22030 00557
00620              LSH  AQ*2                    00710  07000 00002
00621              STR  A*W(ECROSSCAN)          00711  15030 00553  ELEVATION COMPONENT
00622              ENT  A*37030                 00712  11000 37030  CHANGE DIRECTION OF I
00623              STR  A*U(SC10)               00713  15020 01036
00624              RPL  Y-1*W(I)                00714  37030 00561
00625              JP   SC1                     00715  61000 01027
00626 ENDSSC       ENT  A*W(LENGTH)             00716  11030 01204  IS L FOUR TIMES THE ORIGINAL L

00627              RSH  AQ*2                    00717  03000 00002
00630              SUB  A*W(LENGTHIN)*APOS      00720  21630 00745
00631              JP   ENDSSC1                 00721  61000 00733
00632              PUT  W(LENGTHIN)*W(LENGTH)   00722  10030 00745  START SCAN OVER
                                                00723  14030 01204
00633              PUT  W(WIDTHIN)*W(WIDTH)     00724  10030 00744
                                                00725  14030 01205
00634 SEARCH101    RJP  SSCANINIT               00726  65000 01134  INITIALIZE SEARCHSCAN
00635              CL   W(I)                    00727  16030 00561
00636              ENT  B7*37030                00730  12700 37030
00637              STR  B7*U(SC10)              00731  16720 01036
00640              JP   SEARCHSCAN+1            00732  61000 00762
00641 ENDSSC1      ENT  A*W(LENGTH)             00733  11030 01204  INCREASE LENGTH BY .5
00642              RSH  A*1                     00734  02000 00001
00643              ADD  A*W(LENGTH)             00735  20030 01204
00644              STR  A*W(LENGTH)             00736  15030 01204
00645              ENT  A*W(WIDTH)              00737  11030 01205  INCREASE WIDTH BY .5
00646              RSH  A*1                     00740  02000 00001
00647              ADD  A*W(WIDTH)              00741  20030 01205
00650              STR  A*W(WIDTH)              00742  15030 01205
00651              JP   SEARCH101               00743  61000 00726
00652 WIDTHIN      0000314631                   00744  00003 14631  .4B18 KEYBOARD ENTERED WIDTH
00653 LENGTHIN     0004000000                   00745  00040 00000  4B18 KEYBOARD ENTERED LENGTH
00654              JP   SC1                     00746  61000 01027
00655 BELOWHORIZ   CL   W(CROSSCAN)             00747  16030 00552  SET CROSSCAN TO ZERO
00656              CL   W(ACROSSCAN)            00750  16030 00554
00657              CL   W(ECROSSCAN)            00751  16030 00553
00660              ENT  A*-1                    00752  11040 77776  I= -N-1
00661              SUB  A*W(N)                  00753  21030 00562
00662              STR  A*W(I)                  00754  15030 00561
00663              ENT  Q*W(SCMINEL)            00755  10030 01206
00664              SUB  Q*W(ELEVSH+3)           00756  27030 00501
00665              STR  Q*W(ELPOINT)            00757  14030 00574  EL = MINIMUM SCAN ELEVATION
```

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00666                JP   AZTOGOWEL                00760  61000 01051
00667 SEARCHSCAN     NO-OP                         00761  12000 00000
00670                ENT  Q*W(ELEVSH+5)            00762  10030 00503  SET UP DIFFERENCES
00671                SUB  Q*W(ELEVSH+3)            00763  27030 00501
00672                STR  Q*W(ELDIF20)             00764  14030 00570  B27 E2 - F0
00673                MUL  W(ELDIF20)               00765  22030 00570
00674                LSH  AQ*6                     00766  07000 00006
00675                STR  A*W(ELDIF20SQ)           00767  15030 00571  B30 (E2 - E0)SQ
00676                ENT  Q*W(ELEVSH+2)            00770  10030 00500
00677                SUB  Q*W(ELEVSH+3)            00771  27030 00501
00700                STR  Q*W(ELDIFM10)            00772  14030 00567  B27  E-1 - E0
00701                ENT  Q*W(AZIMSH+2)            00773  10030 00472
00702                SUB  Q*W(AZIMSH+3)            00774  27030 00473
00703                STR  Q*W(AZDIFM10)            00775  14030 00565  B27  A-1 - A0
00704                ENT  Q*W(AZIMSH+5)            00776  10030 00475
00705                SUB  Q*W(AZIMSH+3)            00777  27030 00473
00706                STR  Q*W(AZDIF20)             01000  14030 00566  B27  A2 - A0
00707                MUL  W(AZDIF20)               01001  22030 00566
00710                LSH  AQ*6                     01002  07000 00006
00711                STR  A*W(AZDIF20SQ)           01003  15030 00572  B30 (A2 - A0)SQ
00712                ENT  A*W(ELEVSH+5)            01004  11030 00503
00713                SUB  A*W(HORIZTEST)*APOS      01005  21630 00564  IS ELEVATIO BELOW HORIZON
00714                JP   BELOWHORIZ               01006  61000 00747
00715                ENT  A*W(AZDIF20SQ)           01007  11030 00572
00716                ADD  A*W(ELDIF20SQ)           01010  20030 00571
00717                RJP  SQRT                     01011  65000 00504
00720                JP   ENDANGLE+1               01012  61000 01023
00721                STR  A*W(SQRTDEN)*ANOT        01013  15530 00573  B29 SQUARE ROOT OF DENOM
00722                JP   ENDANGLE+1               01014  61000 01023
00723                ENT  A*W(ELDIF20)             01015  11030 00570
00724                DIV  W(SQRTDEN)               01016  23030 00573
00725                STR  Q*W(SCSIN)               01017  14030 00556  B28 SINE OF ANGLE
00726                ENT  A*W(AZDIF20)             01020  11030 00566
00727                DIV  W(SQRTDEN)               01021  23030 00573
00730 ENDANGLE       STR  Q*W(SCCOS)               01022  14030 00557  B28 COSINE OF ANGLE
00731                ENT  A*W(I)*ANEG              01023  11730 00561  IS I POSITIVE
00732                JP   SC4                      01024  61000 00672
00733                ADD  A*W(N)*APOS              01025  20630 00562  IS SCAN AT LOWER END
00734                JP   SC3                      01026  61000 00660
00735 SC1            ENT  Q*W(I)*QPOS              01027  10230 00561
00736                STR  Q*Q                      01030  14000 00000
00737                SUB  Q*W(SCANLIN)             01031  27030 00550
00740                MUL  W(I)                     01032  22030 00561
00741                MUL  W(SCANACCNEG)            01033  22030 00551
00742                RSH  AQ*2                     01034  03000 00002
00743                STR  Q*W(SCANPOINT)           01035  14030 00563
00744 SC10           RPL  Y+1*W(I)                 01036  36030 00561
00745 SC2            ENT  A*W(AZDIF20)*APOS        01037  11630 00566
00746                STR  A*A                      01040  15040 00000
00747                ENT  Q*W(ELDIF20)*QPOS        01041  10230 00570
00750                STR  Q*Q                      01042  14000 00000
00751                SUB  Q*A*QPOS                 01043  27670 00000  IS MAG(DIFEL-DIFAZ) POS
00752                JP   SC5                      01044  61000 00605
00753                ENT  Q*W(SCANPOINT)           01045  10030 00563
00754                MUL  W(SCSIN)                 01046  22030 00556
00755                LSH  AQ*2                     01047  07000 00002
00756                STR  A*W(ELPOINT)             01050  15030 00574  B27 ELEVATION SCAN
00757 AZTOGOWEL      ENT  Q*W(ELDIF20)             01051  10030 00570
00760                SUB  Q*W(ELDIFM10)            01052  27030 00567
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00761              MUL   W(ELDIF20)          01053  22030 00570
00762              RSH   AQ*18D               01054  03000 00022  B36
00763              MUL   W(ELDIFM10)          01055  22030 00567
00764              LSH   AQ*12D*ANOT          01056  07500 00014
00765              JP    ENDFIT+1             01057  61000 01117
00766              STR   A*W(FITDENOM)        01060  15030 00602  B45 DEN OF QUADRATIG
00767              ENT   Q*W(AZDIFM10)        01061  10030 00565
00770              MUL   W(ELDIF20)           01062  22030 00570
00771              LSH   AQ*12D               01063  07000 00014
00772              STR   A*W(JUNK)            01064  15030 00577  B36
00773              ENT   Q*W(AZDIF20)         01065  10030 00566
00774              MUL   W(ELDIFM10)          01066  22030 00567
00775              LSH   AQ*12D               01067  07000 00014  B36
00776              STR   A*W(JUNK+1)          01070  15030 00600
00777              SUB   A*W(JUNK)            01071  21030 00577
01000              RSH   AQ*3                 01072  03000 00003
01001              DIV   W(FITDENOM)          01073  23030 00602
01002              STR   Q*W(FITQUAD)         01074  14030 00603  B18 QUADRATIC COEFFICIENT
01003              ENT   Q*W(JUNK+1)          01075  10030 00600
01004              MUL   W(ELDIFM10)          01076  22030 00567
01005              LSH   AQ*12D               01077  07000 00014
01006              STR   A*W(JUNK+1)          01100  15030 00600  B45
01007              ENT   Q*W(JUNK)            01101  10030 00577
01010              MUL   W(ELDIF20)           01102  22030 00570
01011              LSH   AQ*12D               01103  07000 00014
01012              SUB   A*W(JUNK+1)          01104  21030 00600  B45
01013              RSH   AQ*15D               01105  03000 00017
01014              DIV   W(FITDENOM)          01106  23030 00602
01015              STR   Q*W(FITLIN)          01107  14030 00604  B15 LINEAR COEFFICIENT
01016              ENT   Q*W(FITQUAD)         01110  10030 00603
01017              MUL   W(ELPOINT)           01111  22030 00574  B15
01020              ADD   A*W(FITLIN)          01112  20030 00604
01021              ENT   Q*A                  01113  10070 00000
01022              MUL   W(ELPOINT)           01114  22030 00574  B12
01023              LSH   AQ*15D               01115  07000 00017
01024 ENDFIT       STR   A*W(AZPOINT)         01116  15030 00575  AZIMUTH TO GO WITH ELEVATION B
                                                                   27
01025              ENT   A*1                  01117  11000 00001  SET SCANMODE TO SEARCHSCAN
01026              ENT   Q*W(SCANMODE)        01120  10030 00576  1 INDICATE SEARCH SCAN
01027              RSH   AQ*15D               01121  03000 00017
01030              STR   Q*W(SCANMODE)        01122  14030 00576
01031              ENT   A*W(AZIMSH+5)        01123  11030 00475
01032              ADD   A*W(AZPOINT)         01124  20030 00575
01033              ADD   A*W(ACROSSCAN)       01125  20030 00554
01034              STR   A*W(ACQAZIM+3)       01126  15030 63074
01035              ENT   A*W(ELEVSH+5)        01127  11030 00503
01036              ADD   A*W(ELPOINT)         01130  20030 00574
01037              ADD   A*W(ECROSSCAN)       01131  20030 00553
01040              STR   A*W(ACQELEV+3)       01132  15030 63100
01041              JP    L(ACQUIRUN)          01133  61010 00360
01042 SSCANINIT    ENTRY                      01134  61000 00000
01043              ENT   Q*W(LENGTH)          01135  10030 01204
01044              CL    A                    01136  11000 00000
01045              DIV   W(MAXSCACC)          01137  23030 01203  B3
01046              LSH   AQ*31D               01140  07000 00037
01047              RJP   SQRT                 01141  65000 00504  B16
01050              ENT   A*W(NARBITRARY)      01142  11030 01207  SQRT ERROR MAKE N=NARBITRARY
01051              ADD   A*W(NROUND)          01143  20030 01210
01052              RSH   AQ*17D               01144  03000 00021
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.  01053                STR  A*W(N)                          01145  15030 00562
.  01054                LSH  A*1                             01146  06000 00001
.  01055                STR  A*W(SCANLIN)                    01147  15030 00550  B0  2N
.  01056                ENT  Q*W(N)                          01150  10030 00562
.  01057                MUL  W(N)                            01151  22030 00562
.  01060                STR  Q*W(JUNK)                       01152  14030 00577
.  01061                ENT  Q*W(LENGTH)                     01153  10030 01204
.  01062                LSH  AQ*9D                           01154  07000 00011  B27 IN Q
.  01063                DIV  W(JUNK)                         01155  23030 00577  B27 ACC IN DEGREES/SEC
.  01064                MUL  W(RECIPREV)                     01156  22030 01202
.  01065                RSH  AQ*29D                          01157  03000 00035
.  01066                STR  Q*Q                             01160  14000 00000
.  01067                STR  Q*W(SCANACCNEG)                 01161  14030 00551  B30 NEGATIVE COMPUTED SCAN ACC
                                                                                  ELERATION
.  01070                ENT  A*-1                            01162  11040 77776
.  01071                SUB  A*W(N)                          01163  21030 00562
.  01072                STR  A*W(I)                          01164  15030 00561  SET I= -N-1
.  01073                CL   W(CROSSCAN)                     01165  16030 00552
.  01074                CL   W(ECROSSCAN)                    01166  16030 00553
.  01075                CL   W(ACROSSCAN)                    01167  16030 00554
.  01076                ENT  Q*W(WIDTH)                      01170  10030 01205
.  01077                MUL  W(RECIPREV)                     01171  22030 01202
.  01100                LSH  AQ*8D                           01172  07000 00010
.  01101                STR  A*W(CRSCW)                      01173  15030 00560  B27 CROSSCAN WIDTH/2 IN REVOLU
                                                                                  TIONS
.  01102                ENT  Q*W(LENGTH)                     01174  10030 01204  SET UP HORIZON TEST CONSTANT
.  01103                MUL  W(RECIPREV)                     01175  22030 01202
.  01104                RSH  AQ*22D                          01176  03000 00026
.  01105                ADD  Q*W(SCMINEL)                    01177  26030 01206
.  01106                STR  Q*W(HORIZTEST)                  01200  14030 00564
.  01107                EXIT                                 01201  61010 01134
.  01110 RECIPREV       0013301330                           01202  00133 01330  B30 1/360
.  01111 MAXSCACC       0000000507                           01203  00000 00507  .01B15 B15 MAXIMUM ALLOWABLE A
                                                                                  CCELERATION DEG
.  01112 LENGTH         0012000000                           01204  00120 00000  10B18 B18 LENGTH OF SCAN DEGRE
                                                                                  ES
.  01113 WIDTH          0001000000                           01205  00010 00000  1B18 B18 WIDTH OF SCAN DEGREES
.  01114 SCMINEL        0001014223                           01206  00010 14223  .002B27 MINIMUM ELEVATION FOR
                                                                                  SEARCH SCAN
.  01115 NARBITRARY     100000                               01207  00001 00000  ARBITRARY N B16
.  01116 NROUND         340000                               01210  00003 40000
.  01117 RP2AVG2A       0                                    01211  00000 00000  AVERAGE OVER 2 SEC INTERVAL
.  01120 RP2AVG8A       0                                    01212  00000 00000  AVERAGE OVER 8 SEC INTERVAL
.  01121 RP2AVGSA       0                                    01213  00000 00000  AVERAGE OVER LAST SEARCH SCAN
                                                                                  INTERVAL
.  01122 RP2AVGLA       0                                    01214  00000 00000  AVERAGE OVER LAST LOCAL SCAN I
                                                                                  NTERVAL
.  01123 RP2CODE2       0                                    01215  00000 00000  RP2 CODES TO TELL IF SOMETHING
                                                                                   IS IN
.  01124 RP2CODE8       0                                    01216  00000 00000  THE ABOVE REGISTERS
.  01125 RP2CODES       0                                    01217  00000 00000  0 MEANS NO CONTENTS  (IN L)
.  01126 RP2CODEL       0                                    01220  00000 00000  NONZERO MEANS SOMETHING IN THE
                                                                                   AVG
.  01127 LOCSCK         EQUALS    RP2CODE2                                       K FOR SCAN IN U
.  01130 RAIUS          0                                    01221  00000 00000
.  01131 AVGBCW         0                                    01222  00000 00000
.  01132 DELRADIUS      0000035062                           01223  00000 35062  .000111B27
.  01133 MAXRADIUS      0000127434                           01224  00001 27434  .000334B27
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01134 LOCSCABIAS    0                                          01225  00000 00000  B27 COMPUTED LOCAL SCAN AZIMUT
                                                                                   H BIAS
01135 WEIGHTSUM     0                                          01226  00000 00000  SUM OF WEIGHTS FOR RP2 PULSES

01136 LOCSCEBIAS    0                                          01227  00000 00000  B27 COMPUTED LOCAL SCAN ELEVAT
                                                                                   ION BIAS
01137 RP2AVG2E      0                                          01230  00000 00000
01140 RP2AVG8E      0                                          01231  00000 00000
01141 RP2AVGSE      0                                          01232  00000 00000
01142 RP2AVGLE      0                                          01233  00000 00000
01143 FIVEHUND      498D 0                                     01234  00762 00000
01144 GOODLSCNT     EQUALS    RP2CODES                                              NO OF GOOD LOCAL SCANS IN U
01145 LOCSCTABLE    -1   -1                                    01235  77776 77776  1ST SCAN, 1ST POINT (OLDEST)
01146               -1   1                                     01236  77776 00001  2ND AZ IN U, EL IN L
01147               1    1                                     01237  00001 00001  3RD
01150               1    -1                                    01240  00001 77776  4TH
01151               -1   -1                                    01241  77776 77776  5TH
01152               0    1                                     01242  00000 00001  1ST SCAN, 2ND POINT
01153               1    0                                     01243  00001 00000
01154               0    -1                                    01244  00000 77776
01155               -1   0                                     01245  77776 00000
01156               0    1                                     01246  00000 00001
01157               1    0                                     01247  00001 00000  1ST SCAN, 3RD POINT
01160               0    -1                                    01250  00000 77776
01161               -1   0                                     01251  77776 00000
01162               0    1                                     01252  00000 00001
01163               1    0                                     01253  00001 00000
01164               -1   -1                                    01254  77776 77776  1ST SCAN, 4TH POINT
01165               -1   1                                     01255  77776 00001
01166               1    1                                     01256  00001 00001
01167               1    -1                                    01257  00001 77776
01170               -1   -1                                    01260  77776 77776
01171 GETAVG8       ENTRY                                      01261  61000 00000
01172               ENT  A*W(RP2AVG8A)                         01262  11030 01212  GET AZ AVERAGE
01173               ADD  A*W(RP2AVG2A)                         01263  20030 01211
01174               STR  A*W(RP2AVG8A)                         01264  15030 01212
01175               ENT  A*W(RP2AVG8E)                         01265  11030 01231  GET EL AVERAGE
01176               ADD  A*W(RP2AVG2E)                         01266  20030 01230
01177               STR  A*W(RP2AVG8E)                         01267  15030 01231
01200               RPL  Y+1*L(RP2CODE8)                       01270  36010 01216  INCREASE CODE BY ONE
01201               CL   L(RP2CODE2)                           01271  16010 01215  CLEAR 2SEC CODE
01202               EXIT                                       01272  61010 01261
01203 AVGAZOCY      ENT  B6*U(RP2TABLEID)                      01273  12620 02576
01204               ENT  Q*U(WEIGHTTID)                        01274  10020 02646
01205               CL   U(RP2COUNT)                           01275  16020 02573
01206               JP   AVGROUTINE                            01276  61000 01304
01207 INTERAZCY     ENT  A*L(RP2COUNT)*ANOT                    01277  11510 02573  ANY RP2 PULSES
01210               JP   NORP2PULSE                            01300  61000 00421
01211               ENT  B6*L(RP2TABLEID)                      01301  12610 02576
01212               ENT  Q*L(WEIGHTTID)                        01302  10010 02646
01213               CL   L(RP2COUNT)                           01303  16010 02573
01214 AVGROUTINE    STR  Q*L(AVGLOOP+2)                        01304  14010 01322
01215               STR  Q*L(AVGLOOP+6)                        01305  14010 01326
01216               CL   W(AVGBCW)                             01306  16030 01222
01217               CL   W(WEIGHTSUM)                          01307  16030 01226
01220               CL   B7                                    01310  12700 00000
01221               RSH  A*2                                   01311  02000 00002
01222               SUB  A*1                                   01312  21000 00001
01223               STR  A*L(AVGLOOP+11)                       01313  15010 01331
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.  01224              ENT  B6*3+B6                 01314  12606 00003
.  01225              STR  B6*L(AVGL00P)           01315  16610 01320
.  01226              STR  B6*L(AVGL00P+1)         01316  16610 01321
.  01227              CL   B6                      01317  12600 00000
.  01230 AVGL00P      ENT  Q*U(B6)                 01320  10026 00000  COMPUTE AVERAGE BCW
.  01231              SUB  Q*L(B6)                 01321  27016 00000
.  01232              MUL  W(B7)                   01322  22037 00000
.  01233              ADD  Q*W(AVGBCW)             01323  26030 01222
.  01234              STR  Q*W(AVGBCW)             01324  14030 01222
.  01235              ENT  A*W(WEIGHTSUM)          01325  11030 01226
.  01236              ADD  A*W(B7)                 01326  20037 00000
.  01237              STR  A*W(WEIGHTSUM)          01327  15030 01226
.  01240              ENT  B6*4+B6                 01330  12606 00004
.  01241              BSK  B7*0                    01331  71700 00000
.  01242              JP   AVGL00P                 01332  61000 01320  AVG BCW IN AVGBCW AND Q WITH B
                                                                       15
.  01243              CL   A                       01333  11000 00000
.  01244              LSH  AQ*15D                  01334  07000 00017
.  01245              DIV  W(WEIGHTSUM)            01335  23030 01226
.  01246              ADD  Q*40000                 01336  26000 40000
.  01247              SUB  Q*W(FIVEHUND)*QPOS      01337  27630 01234
.  01250              ADD  Q*W(FIVEHUND)*SKIP      01340  26130 01234
.  01251              ENT  Q*W(FIVEHUND)           01341  10030 01234
.  01252              STR  Q*W(AVGBCW)             01342  14030 01222  ROUNDED BCW IN U(AVGBCW)
.  01253              ENT  A*U(AVGBCW)             01343  11020 01222  COMPUTE INTERPOLATION COEFFICI
                                                                       ENTS
.  01254              CL   Q                       01344  10000 00000  FOR THE AVG BCW
.  01255              DIV  4000D                   01345  23000 07640
.  01256              STR  Q*W(ACQY)               01346  14030 02051  B27 Y
.  01257              MUL  W(ACQY)                 01347  22030 02051
.  01260              LSH  AQ*3                    01350  07000 00003
.  01261              STR  A*W(ACQYSQ)             01351  15030 02052  B27 YY
.  01262              ENT  Q*A                     01352  10070 00000
.  01263              MUL  W(ACQY)                 01353  22030 02051
.  01264              LSH  AQ*3                    01354  07000 00003
.  01265              STR  A*W(ACQYCUBE)           01355  15030 02053  B27 YYY
.  01266              ENT  Q*W(ACQY)               01356  10030 02051
.  01267              MUL  W(THIRD)                01357  22030 02054
.  01270              STR  A*W(JUNK)               01360  15030 00577  B27 (113)Y
.  01271              ENT  Q*W(ACQYCUBE)           01361  10030 02053
.  01272              MUL  W(THIRD)                01362  22030 02054
.  01273              STR  A*W(JUNK+1)             01363  15030 00600  B27 (1/3)YYY
.  01274              SUB  A*W(JUNK)               01364  21030 00577
.  01275              RSH  A*1                     01365  02000 00001
.  01276              STR  A*W(ACQA+3)             01366  15030 02061  A2
.  01277              ENT  A*W(ACQYSQ)             01367  11030 02052
.  01300              SUB  A*W(ACQYCUBE)           01370  21030 02053
.  01301              RSH  A*1                     01371  02000 00001
.  01302              ADD  A*W(ACQY)               01372  20030 02051
.  01303              STR  A*W(ACQA+2)             01373  15030 02060  A1
.  01304              ENT  A*W(ACQYCUBE)           01374  11030 02053
.  01305              SUB  A*W(ACQY)               01375  21030 02051
.  01306              RSH  A*1                     01376  02000 00001
.  01307              SUB  A*W(ACQYSQ)             01377  21030 02052
.  01310              ADD  A*W(ACQA1)              01400  20030 02062
.  01311              STR  A*W(ACQA+1)             01401  15030 02057  A0
.  01312              ENT  A*W(ACQYSQ)             01402  11030 02052
.  01313              SUB  A*W(JUNK+1)             01403  21030 00600
.  01314              RSH  A*1                     01404  02000 00001
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.    01315                SUB   A*W(JUNK)                      01405  21030 00577
.    01316                STR   A*W(ACQA)                      01406  15030 02056  A-1
.    01317                PUT   1*L(RP2CODE2)                  01407  10000 00001  SET RP2AVG2 CODE
                                                               01410  14010 01215
.    01320                CL    W(RP2AVG2E)                    01411  16030 01230  COMPUTE ELEVATION PREDICTED VA
                                                                                    LUE
.    01321                ENT   B6*3                           01412  12600 00003
.    01322                ENT   Q*W(ACQA+B6)                   01413  10036 02056
.    01323                MUL   W(ELEVSH+B6)                   01414  22036 00476
.    01324                LSH   AQ*3                           01415  07000 00003
.    01325                ADD   A*W(RP2AVG2E)                  01416  20030 01230
.    01326                STR   A*W(RP2AVG2E)                  01417  15030 01230
.    01327                BJP   B6*$-5                         01420  72600 01413
.    01330                CL    W(RP2AVG2A)                    01421  16030 01211  COMPUTE AZIMUTH PREDICTED VALU
                                                                                    E
.    01331                ENT   B6*3                           01422  12600 00003
.    01332                ENT   Q*W(ACQA+B6)                   01423  10036 02056
.    01333                MUL   W(AZIMSH+B6)                   01424  22036 00470
.    01334                LSH   AQ*3                           01425  07000 00003
.    01335                ADD   A*W(RP2AVG2A)                  01426  20030 01211
.    01336                STR   A*W(RP2AVG2A)                  01427  15030 01211
.    01337                BJP   B6*$-5                         01430  72600 01423
.    01340                ENT   A*U(AVGBCW)                    01431  11020 01222  COMPUTE AZIMUTH AVERAGE ERROR
.    01341 WFHSACQUI1     ADD   A*L(INAZIMADD)                 01432  20010 63446
.    01342                STR   A*L($+1)                       01433  15010 01434
.    01343                ENT   A*W(0)                         01434  11030 00000
.    01344                SEL   CL*7774000000                  01435  52030 02774
.    01345                CL    Q                              01436  10000 00000
.    01346                LSH   AQ*10D*APOS                    01437  07600 00012
.    01347                JP    INOVERLAP                      01440  61000 01475
.    01350 NONOVERLAP     RSH   AQ*2                           01441  03000 00002
.    01351                SUB   A*W(RP2AVG2A)                  01442  21030 01211
.    01352                STR   A*W(RP2AVG2A)                  01443  15030 01211
.    01353                ENT   A*U(AVGBCW)                    01444  11020 01222  COMPUTE ELEVATION AVERAGE ERRO
                                                                                    R
.    01354 WFHSACQUI2     ADD   A*L(INELEVADD)                 01445  20010 63447
.    01355                STR   A*L($+1)                       01446  15010 01447
.    01356                ENT   A*W(0)                         01447  11030 00000
.    01357                SEL   CL*7776000000                  01450  52030 02775
.    01360                CL    Q                              01451  10000 00000
.    01361                LSH   AQ*11D*APOS                    01452  07600 00013
.    01362                SUB   A*2000                         01453  21000 02000
.    01363                RSH   AQ*3                           01454  03000 00003
.    01364                SUB   A*W(RP2AVG2E)                  01455  21030 01230
.    01365                STR   A*W(RP2AVG2E)                  01456  15030 01230
.    01366                ENT   A*U(SCANMODE)*AZERO            01457  11420 00576  PRESENT SCANMODE LOCAL
.    01367                JP    FIRSTLOC                       01460  61000 01612
.    01370                ENT   A*L(SCANMODE)*ANOT             01461  11510 00576  PREVIOUS SCANMODE LOCAL
.    01371                JP    LOCALSCAN                      01462  61000 01473
.    01372                PUT   W(RP2AVG2A)*W(RP2AVGSA)        01463  10030 01211  STORE LEFT OVER SEARCH RP2
                                                               01464  14030 01213
.    01373                PUT   W(RP2AVG2E)*W(RP2AVGSE)        01465  10030 01230
                                                               01466  14030 01232
.    01374                CL    L(RP2CODE2)                    01467  16010 01215
.    01375                PUT   1*L(RP2CODES)                  01470  10000 00001
                                                               01471  14010 01217
.    01376                CL    L(RP2CODE2)                    01472  16010 01215
.    01377 LOCALSCAN      ENT   B6*U(LOCSCK)                   01473  12620 01215
.    01400                JP    L(KTABLE+B6)                   01474  61016 01502
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.    01401 INOVERLAP     LSH   AQ*1*APOS                  0147S  07600 00001
.    01402               RSH   AQ*3*SKIP                  01476  03100 00003
.    01403               LSH   AQ*S7D*SKIP                01477  07100 00071
.    01404               SUB   A*200                      01500  21000 00200
.    0140S               JP    NONOVERLAP+1               01501  61000 01442
.    01406 KTABLE        0     KIS0                       01S02  00000 01507
.    01407               0     KIS1                       01S03  00000 01511
.    01410               0     KIS2                       01S04  00000 01526
.    01411               0     KIS3                       01S0S  00000 01530
.    01412               0     KIS4                       01S06  00000 01535
.    01413 KIS0          ENT   B6*1                       01S07  12600 00001  K IS 0
.    01414               JP    LOCSCCOMP1                 01510  61000 01720
.    0141S KIS1          ENT   B6*2                       01511  12600 00002  K IS 1
.    01416               ENT   A*W(RAIUS)*AZERO           01S12  11430 01221
.    01417               JP    LOCSCCOMP1                 01513  61000 01720
.    01420               ENT   A*L(RP2CODE2)*ANOT         01S14  11S10 01215
.    01421               JP    LOCSCCOMP1                 01S1S  61000 01720  NO RP2 PULSES
.    01422               PUT   W(RP2AVG2E)*W(RP2AVGLE)    01516  10030 01230  STORE LEFT OVER RP2 PULSE
                                                          01517  14030 01233
.    01423               PUT   W(RP2AVG2A)*W(RP2AVGLA)    01520  10030 01211
                                                          01521  14030 01214
.    01424               PUT   1*L(RP2CODEL)              01S22  10000 00001
                                                          01S23  14010 01220
.    01425               CL    L(RP2CODE2)                01524  16010 01215
.    01426               JP    LOCSCCOMP1                 0152S  61000 01720
.    01427 KIS2          ENT   B6*3                       01526  12600 00003  K IS 2
.    01430               JP    LOCSCCOMP1                 01527  61000 01720
.    01431 KIS3          ENT   B6*4                       01530  12600 00004  K IS 3
.    01432               ENT   A*W(RAIUS)                 01S31  11030 01221  USE NEXT SCAN RADIUS
.    01433               ADD   A*W(DELRADIUS)             01S32  20030 01223
.    01434               STR   A*W(RAIUS)                 01S33  1S030 01221
.    01435               JP    LOCSCCOMP1                 01S34  61000 01720
.    01436 KIS4          ENT   A*L(RP2CODE2)*AZERO        01S3S  11410 01215
.    01437               RJP   GETAVG8                    01S36  6S000 01261
.    01440               ENT   A*L(RP2CODE8)*ANOT         01S37  11S10 01216  ANY RP2 PULSES IN LAST 8 SEC

.    01441               JP    LASTTEST                   01540  61000 01S72
.    01442               RPL   Y+1*U(GOODLSCNT)           01S41  36020 01217
.    01443               SUB   A*3*APOS                   01S42  21600 00003
.    01444               JP    NEWMEAN                    01S43  61000 01SS3
.    0144S               JP    ACQUIMSG*AZERO             01544  60400 02041
.    01446               RPL   Y-1*U(GOODLSCNT)           01545  37020 01217
.    01447               ENT   A*UX(TIMECODE)*ANEG        01546  11760 00217
.    01450               JP    NEWMEAN                    01547  61000 01SS3
.    01451               PUT   -0*U(TIMECORRC)            01550  10040 77777
                                                          015S1  14020 020S5
.    014S2               CL    U(TIMECODE)                01SS2  16020 00217
.    014S3 NEWMEAN       ENT   A*W(RP2AVG8A)              01SS3  11030 01212  COMPUTE LOCAL SCAN BIASES
.    014S4               RSH   AQ*30D                     01554  03000 00036  FROM THE AVERAGES ACCUMULATED
.    01455               DIV   L(RP2CODE8)                01555  23010 01216  OVER 8 SECOND INTERVAL
.    01456               STR   Q*W(LOCSCABIAS)            01S56  14030 0122S
.    01457               ENT   A*W(RP2AVG8E)              01557  11030 01231
.    01460               RSH   AQ*30D                     01560  03000 00036
.    01461               DIV   L(RP2CODE8)                01561  23010 01216
.    01462               STR   Q*W(LOCSCEBIAS)            01562  14030 01227
.    01463 INITLOCSC     CL    W(RP2AVG8A)                01S63  16030 01212
.    01464               CL    W(RP2AVG8E)                01564  16030 01231
.    01465               CL    U(LOCSCK)                  01S6S  16020 0121S  SET K TO ZERO
.    01466               CL    L(RP2CODE8)                01566  16010 01216
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.  01467              CL   W(RAIUS)                    01567  16030 01221
.  01470              CL   L(RP2CODE2)                 01570  16010 01215
.  01471              JP   LOCALSCAN                   01571  61000 01473
.  01472 LASTTEST     ENT  B6*1                        01572  12600 00001
.  01473              ENT  A*W(RAIUS)                  01573  11030 01221  ALL THROUGH WITH LOCAL SCAN
.  01474              SUB  A*W(MAXRADIUS)*APOS         01574  21630 01224  NO
.  01475              JP   LOCSCCOMP1                  01575  61000 01720
.  01476              ENT  A*W(RP2CODE2)*ANOT          01576  11530 01215
.  01477              JP   FIRSTLOC                    01577  61000 01612
.  01500              ENT  A*L(RP2CODEL)*ANOT          01600  11510 01220  ANY LEFT OVER LOCAL RP2 PULSES

.  01501              JP   LEFTSSCRP2                  01601  61000 01622  NO
.  01502              CL   L(RP2CODEL)                 01602  16010 01220  INTERROGATE THE LOCAL RP2
.  01503              PUT  W(RP2AVGLA)*W(RP2AVG8A)     01603  10030 01214
                                                       01604  14030 01212
.  01504              PUT  W(RP2AVGLE)*W(RP2AVG8E)     01605  10030 01233
                                                       01606  14030 01231
.  01505              ENT  Q*1                         01607  10000 00001
.  01506              STR  Q*L(RP2CODE8)               01610  14010 01216
.  01507              JP   CLEARCOUNT                  01611  61000 01620
.  01510 FIRSTLOC     PUT  W(RP2AVG2A)*W(RP2AVG8A)     01612  10030 01211
                                                       01613  14030 01212
.  01511              PUT  W(RP2AVG2E)*W(RP2AVG8E)     01614  10030 01230
                                                       01615  14030 01231
.  01512              PUT  1*L(RP2CODE8)               01616  10000 00001
                                                       01617  14010 01216
.  01513 CLEARCOUNT   CL   U(GOODLSCNT)                01620  16020 01217
.  01514              JP   NEWMEAN                     01621  61000 01553
.  01515 LEFTSSCRP2   CL   W(RAIUS)                    01622  16030 01221
.  01516              ENT  A*L(RP2CODES)*ANOT          01623  11510 01217
.  01517              JP   BACKUPSCAN                  01624  61000 01633
.  01520              CL   L(RP2CODES)                 01625  16010 01217  INTERROGATE THE SEARCH RP2
.  01521              PUT  W(RP2AVGSA)*W(RP2AVG8A)     01626  10030 01213
                                                       01627  14030 01212
.  01522              PUT  W(RP2AVGSE)*W(RP2AVG8E)     01630  10030 01232
                                                       01631  14030 01231
.  01523              JP   CLEARCOUNT-2                01632  61000 01616
.  01524 BACKUPSCAN   ENT  A*W(I)*APOS                 01633  11630 00561  IS I POSITIVE
.  01525              JP   NEGI                        01634  61000 01643  NO
.  01526              ENT  Q*U(SC10)                   01635  10020 01036  YES
.  01527              SUB  Q*36030*QZERO               01636  27400 36030  GOING TOWARD END
.  01530              JP   POSPOS                      01637  61000 01672  NO
.  01531              SUB  A*4                         01640  21000 00004  YES
.  01532              STR  A*W(I)                      01641  15030 00561  I IS I-4
.  01533              JP   SEARCHSCAN+1                01642  61000 00762
.  01534 NEGI         ENT  Q*U(SC10)                   01643  10020 01036
.  01535              SUB  Q*37030*QZERO               01644  27400 37030  GOING TOWARD END
.  01536              JP   $+4                         01645  61000 01651  NO
.  01537              ADD  A*4                         01646  20000 00004  YES
.  01540              STR  A*W(I)                      01647  15030 00561  I IS I+4
.  01541              JP   SEARCHSCAN+1                01650  61000 00762
.  01542              SUB  A*4                         01651  21000 00004
.  01543              STR  A*W(I)                      01652  15030 00561
.  01544              ADD  A*W(N)*ANEG                 01653  20730 00562  IS IT LES THAN 4 FROM END
.  01545              JP   SEARCHSCAN+1                01654  61000 00762  NO
.  01546              STR  A*A                         01655  15040 00000  I IS AT NEGATIVE END
.  01547              SUB  A*W(N)                      01656  21030 00562
.  01550              SUB  A*1                         01657  21000 00001
.  01551              STR  A*W(I)                      01660  15030 00561
```

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.  01552                ENT  A*W(ECROSSCAN)          01661  11030 00553  COMPLIMENT CROSSCAN
.  01553                STR  A*A                    01662  15040 00000
.  01554                STR  A*W(ECROSSCAN)         01663  15030 00553
.  01555                ENT  A*W(ACROSSCAN)         01664  11030 00554
.  01556                STR  A*A                    01665  15040 00000
.  01557                STR  A*W(ACROSSCAN)         01666  15030 00554
.  01560                ENT  A*37030                01667  11000 37030  MAKE SCAN GO THE OTHER WAY
.  01561                STR  A*U(SC10)              01670  15020 01036
.  01562                JP   SEARCHSCAN+1           01671  61000 00762
.  01563 POSPOS         ADD  A*4                    01672  20000 00004  I IS AT POSITIVE END
.  01564                STR  A*W(I)                 01673  15030 00561
.  01565                SUB  A*W(N)*APOS            01674  21630 00562
.  01566                JP   SEARCHSCAN+1           01675  61000 00762
.  01567                STR  A*A                    01676  15040 00000  I IS AT POSITIVE END
.  01570                ADD  A*W(N)                 01677  20030 00562
.  01571                SUB  A*1                    01700  21000 00001
.  01572                STR  A*W(I)                 01701  15030 00561
.  01573                ENT  Q*W(CROSSCAN)          01702  10030 00552  SUBTRACT CROSSCAN INCREMENT
.  01574                SUB  Q*W(DELCRSC)           01703  27030 00555
.  01575                STR  Q*W(CROSSCAN)          01704  14030 00552
.  01576                MUL  W(SCSIN)               01705  22030 00556
.  01577                LSH  AQ*2                   01706  07000 00002
.  01600                STR  Q*Q                    01707  14000 00000
.  01601                STR  A*W(ACROSSCAN)         01710  15030 00554
.  01602                ENT  Q*W(CROSSCAN)          01711  10030 00552
.  01603                MUL  W(SCCOS)               01712  22030 00557
.  01604                LSH  AQ*2                   01713  07000 00002
.  01605                STR  A*W(ECROSSCAN)         01714  15030 00553
.  01606                ENT  A*36030                01715  11000 36030  MAKE SCAN GO THE OTHER WAY
.  01607                STR  A*U(SC10)              01716  15020 01036
.  01610                JP   SEARCHSCAN+1           01717  61000 00762
.  01611 LOCSCCOMP1     STR  B6*U(LOCSCK)           01720  16620 01215
.  01612                ENT  A*L(RP2CODE2)*AZERO    01721  11410 01215  ANY RP2 PULSES
.  01613                RJP  GETAVG8                01722  65000 01261  ADD THEM INTO THE SUM
.  01614 LOCSCCOMP      ENT  Q*W(RAIUS)             01723  10030 01221
.  01615                MUL  UX(LOCSCTABLE+B6)      01724  22066 01235
.  01616                ADD  Q*W(LOCSCABIAS)        01725  26030 01225
.  01617                ADD  Q*W(AZIMSH+2)          01726  26030 00472
.  01620                STR  Q*W(ACQAZIM)           01727  14030 63071  OLDEST AZ POINT  AZ-1
.  01621                ENT  Q*W(RAIUS)             01730  10030 01221
.  01622                MUL  UX(LOCSCTABLE+5+B6)    01731  22066 01242
.  01623                ADD  Q*W(LOCSCABIAS)        01732  26030 01225
.  01624                ADD  Q*W(AZIMSH+3)          01733  26030 00473
.  01625                STR  Q*W(ACQAZIM+1)         01734  14030 63072  AZ0
.  01626                ENT  Q*W(RAIUS)             01735  10030 01221
.  01627                MUL  UX(LOCSCTABLE+10D+B6)  01736  22066 01247
.  01630                ADD  Q*W(LOCSCABIAS)        01737  26030 01225
.  01631                ADD  Q*W(AZIMSH+4)          01740  26030 00474
.  01632                STR  Q*W(ACQAZIM+2)         01741  14030 63073  AZ1
.  01633                ENT  Q*W(RAIUS)             01742  10030 01221
.  01634                MUL  UX(LOCSCTABLE+15D+B6)  01743  22066 01254
.  01635                ADD  Q*W(LOCSCABIAS)        01744  26030 01225
.  01636                ADD  Q*W(AZIMSH+5)          01745  26030 00475
.  01637                STR  Q*W(ACQAZIM+3)         01746  14030 63074  AZ2
.  01640                ENT  Q*W(RAIUS)             01747  10030 01221
.  01641                MUL  LX(LOCSCTABLE+B6)      01750  22056 01235
.  01642                ADD  Q*W(LOCSCEBIAS)        01751  26030 01227
.  01643                ADD  Q*W(ELEVSH+2)          01752  26030 00500
.  01644                STR  Q*W(ACQELEV)           01753  14030 63075  EL-1
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.  01645              ENT  Q*W(RAIUS)                  01754  10030 01221
.  01646              MUL  LX(LOCSCTABLE+5+B6)         01755  22056 01242
.  01647              ADD  Q*W(LOCSCEBIAS)             01756  26030 01227
.  01650              ADD  Q*W(ELEVSH+3)               01757  26030 00501
.  01651              STR  Q*W(ACQELEV+1)              01760  14030 63076  EL0
.  01652              ENT  Q*W(RAIUS)                  01761  10030 01221
.  01653              MUL  LX(LOCSCTABLE+10D+B6)       01762  22056 01247
.  01654              ADD  Q*W(LOCSCEBIAS)             01763  26030 01227
.  01655              ADD  Q*W(ELEVSH+4)               01764  26030 00502
.  01656              STR  Q*W(ACQELEV+2)              01765  14030 63077  EL1
.  01657              ENT  Q*W(RAIUS)                  01766  10030 01221
.  01660              MUL  LX(LOCSCTABLE+15D+B6)       01767  22056 01254
.  01661              ADD  Q*W(LOCSCEBIAS)             01770  26030 01227
.  01662              ADD  Q*W(ELEVSH+5)               01771  26030 00503
.  01663              STR  Q*W(ACQELEV+3)              01772  14030 63100
.  01664              ENT  Q*W(SCANMODE)               01773  10030 00576  SET MODE TO LOCAL
.  01665              CL   A                           01774  11000 00000
.  01666              RSH  AQ*15D                      01775  03000 00017
.  01667              STR  Q*W(SCANMODE)               01776  14030 00576
.  01670              ENT  A*W(TIMECORRC)*ANEG         01777  11730 02055
.  01671              JP   L(ACQUIRUN)                 02000  61010 00360
.  01672              CL   W(TIMECORRC)                02001  16030 02055
.  01673              ENT  A*W(AZIMSH+5)               02002  11030 00475  TIME CORRECTION PROGRAM
.  01674              SUB  A*W(AZIMSH+2)               02003  21030 00472
.  01675              ADD  A*W(ELEVSH+5)               02004  20030 00503
.  01676              SUB  A*W(ELEVSH+2)               02005  21030 00500  A2 - A-1 + E2 - E-1
.  01677              STR  A*W(JUNK)                   02006  15030 00577
.  01700              ENT  A*W(LOCSCEBIAS)             02007  11030 01227
.  01701              ADD  A*W(LOCSCABIAS)             02010  20030 01225
.  01702              CL   Q                           02011  10000 00000
.  01703              RSH  AQ*9D                       02012  03000 00011
.  01704              DIV  W(JUNK)                     02013  23030 00577  B21
.  01705              LSH  AQ*30D                      02014  07000 00036  TIME IN 6-SECOND INTERVALS B21

.  01706              STR  A*W(JUNK)                   02015  15030 00577
.  01707              RSH  AQ*8D                       02016  03000 00010
.  01710              DIV  W($+1)*SKIP                 02017  23130 02020
.  01711              34100000000                      02020  34100 00000  14400B15 NO OF 6 SEC IN A DAY
.  01712              STR  Q*W(TIMECORR)               02021  14030 63107  TIME CORRECTION TO MCP
.  01713              ENT  Q*W(AZIMSH+2)               02022  10030 00472
.  01714              SUB  Q*W(AZIMSH+5)               02023  27030 00475
.  01715              MUL  W(JUNK)                     02024  22030 00577
.  01716              RSH  AQ*21D                      02025  03000 00025
.  01717              RPT  6*ADV                       02026  70100 00006
.  01720              RPL  Y-Q*W(AZIMSH)               02027  35030 00470
.  01721              RPL  Y+Q*W(LOCSCABIAS)           02030  34030 01225
.  01722              ENT  Q*W(ELEVSH+2)               02031  10030 00500
.  01723              SUB  Q*W(ELEVSH+5)               02032  27030 00503
.  01724              MUL  W(JUNK)                     02033  22030 00577
.  01725              RSH  AQ*21D                      02034  03000 00025
.  01726              RPT  6*ADV                       02035  70100 00006
.  01727              RPL  Y-Q*W(ELEVSH)               02036  35030 00476
.  01730              RPL  Y+Q*W(LOCSCEBIAS)           02037  34030 01227
.  01731              JP   L(ACQUIRUN)                 02040  61010 00360
.  01732 ACQUIMSG     RJP  U(PRLOG)                    02041  65020 63423  PRINT ACQUIRED MESSAGE
.  01733              3    ACQUIMSG1                   02042  00003 02046
.  01734              1    -28D                        02043  00001 77743
.  01735              NO-OP                            02044  12000 00000
.  01736              JP   NEWMEAN                     02045  61000 01553
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.    01737 ACQUIMSG1     FD   0*TARGET ACQUIRED                02046  31062 71412
                                                              02047  31050 61026
                                                              02050  32162 71211
.    01740 ACQY          0                                    02051  00000 00000  Y B27
.    01741 ACQYSQ        0                                    02052  00000 00000  YY B27
.    01742 ACQYCUBE      0                                    02053  00000 00000  YYY B27
.    01743 THIRD         2525252461                           02054  25252 52461  .3333333B30 1/3 B30
.    01744 TIMECORRC     0                                    02055  00000 00000
.    01745 ACQA          RESERVE   4                          02056  00000 00000  INTERPOLATION COEFFICIENTS B27
.    01746 ACQA1         1000000000                           02062  10000 00000
.    01747 RP2TABLE1     RESERVE   164D                       02063  00000 00000  RP2 BUFFER TABLE NO1 GOES WITH
                                                                                    AZIMOUT
.    01750 RP2TABLE2     RESERVE   164D                       02327  00000 00000  RP2 BUFFER FABLE NO2
.    01751 RP2COUNT      0    0                               02573  00000 00000  RP2 COUNT  U FOR TABLE1  L FOR
                                                                                    TABLE2
.    01752 JUNKY         RESERVE   1                          02574  00000 00000  TEMPORARY STORAGE
.    01753 RP2CHANNEL    0    0                               02575  00000 00000
.    01754 RP2TABLEID    U-TAG     RP2TABLE1*RP2TABLE2        02576  02063 02327
.    01755 RP2INTERPT    ENTRY                                02577  61000 00000
.    01756               STR  B6*U(RP2INTERPT)                02600  16620 02577  SAVE A AND B6
.    01757               STR  Q*W(JUNKQ)                      02601  14030 02647
.    01760               STR  A*W(JUNKY)                      02602  15030 02574
.    01761               PUT  -0*W(TRACKINDIC)                02603  10040 77777
                                                              02604  14030 63026
.    01762               ENT  Q*U(113)                        02605  10020 00113
.    01763               SUB  Q*AZIMIN+499D*QZERO             02606  27400 75763
.    01764               ENT  A*L(RP2COUNT)*SKIP              02607  11110 02573
.    01765               ENT  A*U(RP2COUNT)                   02610  11020 02573
.    01766               SUB  A*164D*ANEG                     02611  21700 00244
.    01767               ENT  A*4*SKIP                        02612  11100 00004
.    01770               ADD  A*168D                          02613  20000 00250
.    01771               ADD  Q*0*QZERO                       02614  26400 00000
.    01772               STR  A*L(RP2COUNT)*SKIP              02615  15110 02573
.    01773               STR  A*U(RP2COUNT)*SKIP              02616  15120 02573
.    01774               ADD  A*L(RP2TABLEID)*SKIP            02617  20110 02576
.    01775               ADD  A*U(RP2TABLEID)                 02620  20020 02576
.    01776               SUB  A*4                             02621  21000 00004
.    01777               ENT  B6*A                            02622  12670 00000
.    02000               ENT  A*W(113)                        02623  11030 00113  STORE AZIMOUT BCW
.    02001               STR  A*W(B6)                         02624  15036 00000
.    02002               STR  A*W(3+B6)                       02625  15036 00003
.    02003               ENT  A*U(RANGEADD)                   02626  11020 63445  STORE RANGE
.    02004               STR  A*L($+1)                        02627  15010 02630
.    02005               ENT  A*W(0)                          02630  11030 00000
.    02006               STR  A*W(1+B6)                       02631  15036 00001
.    02007               ENT  A*U(B6)                         02632  11026 00000  STORE DOPPLER
.    02010               SUB  A*L(B6)                         02633  21016 00000
.    02011               ADD  A*U(DOPPADD)                    02634  20020 63444
.    02012               SUB  A*500D                          02635  21000 00764
.    02013               STR  A*L($+1)                        02636  15010 02637
.    02014               ENT  A*W(0)                          02637  11030 00000
.    02015               STR  A*W(2+B6)                       02640  15036 00002
.    02016               ENT  Q*W(JUNKQ)                      02641  10030 02647
.    02017               ENT  A*W(JUNKY)                      02642  11030 02574  RESTORE A AND B6
.    02020               ENT  B6*U(RP2INTERPT)                02643  12620 02577
.    02021               STR  C14*W(RP2CHANNEL)               02644  17630 02575
.    02022               RILJP     L(RP2INTERPT)              02645  60110 02577
.    02023 WEIGHTTID     U-TAG     WEIGHTT1*WEIGHTT2          02646  02650 02721  ARCTIFICIAL WEIGHT TABLE
.    02024 JUNKQ         0                                    02647  00000 00000
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.    02025 WEIGHTT1      1    0                    02650  00001 00000  ALL PP2 PULSES HAVE EQUAL MAX
                                                                       WEIGHT
.    02026               1    0                    02651  00001 00000  MAXIMUM VALUE COULD BE 1B15

.    02027               1    0                    02652  00001 00000
.    02030               1    0                    02653  00001 00000
.    02031               1    0                    02654  00001 00000
.    02032               1    0                    02655  00001 00000
.    02033               1    0                    02656  00001 00000
.    02034               1    0                    02657  00001 00000
.    02035               1    0                    02660  00001 00000
.    02036               1    0                    02661  00001 00000
.    02037               1    0                    02662  00001 00000
.    02040               1    0                    02663  00001 00000
.    02041               1    0                    02664  00001 00000
.    02042               1    0                    02665  00001 00000
.    02043               1    0                    02666  00001 00000
.    02044               1    0                    02667  00001 00000
.    02045               1    0                    02670  00001 00000
.    02046               1    0                    02671  00001 00000
.    02047               1    0                    02672  00001 00000
.    02050               1    0                    02673  00001 00000
.    02051               1    0                    02674  00001 00000
.    02052               1    0                    02675  00001 00000
.    02053               1    0                    02676  00001 00000
.    02054               1    0                    02677  00001 00000
.    02055               1    0                    02700  00001 00000
.    02056               1    0                    02701  00001 00000
.    02057               1    0                    02702  00001 00000
.    02060               1    0                    02703  00001 00000
.    02061               1    0                    02704  00001 00000
.    02062               1    0                    02705  00001 00000
.    02063               1    0                    02706  00001 00000
.    02064               1    0                    02707  00001 00000
.    02065               1    0                    02710  00001 00000
.    02066               1    0                    02711  00001 00000
.    02067               1    0                    02712  00001 00000
.    02070               1    0                    02713  00001 00000
.    02071               1    0                    02714  00001 00000
.    02072               1    0                    02715  00001 00000
.    02073               1    0                    02716  00001 00000
.    02074               1    0                    02717  00001 00000
.    02075               1    0                    02720  00001 00000
.    02076 WEIGHTT2      1    0                    02721  00001 00000
.    02077               1    0                    02722  00001 00000
.    02100               1    0                    02723  00001 00000
.    02101               1    0                    02724  00001 00000
.    02102               1    0                    02725  00001 00000
.    02103               1    0                    02726  00001 00000
.    02104               1    0                    02727  00001 00000
.    02105               1    0                    02730  00001 00000
.    02106               1    0                    02731  00001 00000
.    02107               1    0                    02732  00001 00000
.    02110               1    0                    02733  00001 00000
.    02111               1    0                    02734  00001 00000
.    02112               1    0                    02735  00001 00000
.    02113               1    0                    02736  00001 00000
.    02114               1    0                    02737  00001 00000
.    02115               1    0                    02740  00001 00000
```

```
.    02116          1    0
.    02117          1    0
.    02120          1    0
.    02121          1    0
.    02122          1    0
.    02123          1    0
.    02124          1    0
.    02125          1    0
.    02126          1    0
.    02127          1    0
.    02130          1    0
.    02131          1    0
.    02132          1    0
.    02133          1    0
.    02134          1    0
.    02135          1    0
.    02136          1    0
.    02137          1    0
.    02140          1    0
.    02141          1    0
.    02142          1    0
.    02143          1    0
.    02144          1    0
.    02145          1    0
.    02146          1    0
.    02147        NO-OP
```

```
02741  00001 00000
02742  00001 00000
02743  00001 00000
02744  00001 00000
02745  00001 00000
02746  00001 00000
02747  00001 00000
02750  00001 00000
02751  00001 00000
02752  00001 00000
02753  00001 00000
02754  00001 00000
02755  00001 00000
02756  00001 00000
02757  00001 00000
02760  00001 00000
02761  00001 00000
02762  00001 00000
02763  00001 00000
02764  00001 00000
02765  00001 00000
02766  00001 00000
02767  00001 00000
02770  00001 00000
02771  00001 00000
02772  12000 00000
02773  04000 00000
02774  77740 00000
02775  77760 00000
```

SPURT OUTPUT NO. 112

ACQUI TEOSTE*10FEB66

LABEL	LOC	LABEL	LOC	LABEL	LOC
ACQUIRE	00000	ACQUIINIT	00002	ATTENTINIT	00034
CHOICE	00040	DONOTHING	00041	STOPACQUI	00042
NOINTERR	00052	ACQUIONOFF	00057	QUEST1	00060
ANSWER1	00070	PROGTABLE	00074	QUEST3	00105
QUEST2	00120	ANSWER2	00142	HSACQUI	00146
WFHSACQUI6	00151	WFACQUI	00156	BACKUPWD	00162
SCHCHOICE	00163	WFHSACQUI4	00205	CLBIASES	00210
TIMECORREC	00214	TIMECODE	00217	QUEST4	00220
ANSWER4	00231	QUEST5	00235	ANSWER5	00246
SETBIASES	00252	AZENTBIAS	00272	ELENTBIAS	00273
TEMPST	00274	QUEST6	00275	ANSWER6	00306
QUEST7	00312	ANSWER7	00324	LOCCHOICE	00330
WFHSACQUI5	00336	LOCSCONLY	00342	RP2INTRJP	00343
TEST3	00344	TEST5	00351	TEST4	00357
ACQUIRUN	00360	STARTAZ	00370	ENDAZ	00403
NORP2PULSE	00421	SIMULATION	00424	PUTINCCW	00427
PUTINCW	00435	TEST1	00444	TEST2	00456
REV	00466	MARGIN	00467	AZIMSH	00470
ELEVSH	00476	SQRT	00504	SCANLIN	00550
SCANACCNEG	00551	CROSSCAN	00552	ECROSSCAN	00553
ACROSSCAN	00554	DELCRSC	00555	SCSIN	00556
SCCOS	00557	CRSCW	00560	I	00561
N	00562	SCANPOINT	00563	HORIZTEST	00564
AZDIFM10	00565	AZDIF20	00566	ELDIFM10	00567
ELDIF20	00570	ELDIF20SQ	00571	AZDIF20SQ	00572
SQRTDEN	00573	ELPOINT	00574	AZPOINT	00575
SCANMODE	00576	JUNK	00577	FITDENOM	00602
FITQUAD	00603	FITLIN	00604	SC5	00605
SC3	00660	SC4	00672	ENDSSC	00716
SEARCH101	00726	ENDSSC1	00733	WIDTHIN	00744
LENGTHIN	00745	BELOWHORIZ	00747	SEARCHSCAN	00761
ENDANGLE	01022	SC1	01027	SC10	01036
SC2	01037	AZTOGOWEL	01051	ENDFIT	01116
SSCANINIT	01134	RECIPREV	01202	MAXSCACC	01203
LENGTH	01204	WIDTH	01205	SCMINEL	01206
NARBITRARY	01207	NROUND	01210	RP2AVG2A	01211
RP2AVG8A	01212	RP2AVGSA	01213	RP2AVGLA	01214
RP2CODE2	01215	LOCSCK	01215	RP2CODE8	01216
RP2CODES	01217	GOODLSCNT	01217	RP2CODEL	01220
RAIUS	01221	AVGBCW	01222	DELRADIUS	01223
MAXRADIUS	01224	LOCSCABIAS	01225	WEIGHTSUM	01226
LOCSCEBIAS	01227	RP2AVG2E	01230	RP2AVG8E	01231
RP2AVGSE	01232	RP2AVGLE	01233	FIVEHUND	01234
LOCSCTABLE	01235	GETAVG8	01261	AVGAZOCY	01273
INTERAZCY	01277	AVGROUTINE	01304	AVGLOOP	01320
WFHSACQUI1	01432	NONOVERLAP	01441	WFHSACQUI2	01445
LOCALSCAN	01473	INOVERLAP	01475	KTABLE	01502
KIS0	01507	KIS1	01511	KIS2	01526
KIS3	01530	KIS4	01535	NEWMEAN	01553
INITLOCSC	01563	LASTTEST	01572	FIRSTLOC	01612
CLEARCOUNT	01620	LEFTSSCRP2	01622	BACKUPSCAN	01633
NEGI	01643	POSPOS	01672	LOCSCCOMP1	01720

LOCSCCOMP	01723	ACQUIMSG	02041	ACQUIMSG1	02046
ACQY	02051	ACQYSQ	02052	ACQYCUBE	02053
THIRD	02054	TIMECORRC	02055	ACQA	02056
ACQA1	02062	RP2TABLE1	02063	RP2TABLE2	02327
RP2COUNT	02573	JUNKY	02574	RP2CHANNEL	02575
RP2TABLEID	02576	RP2INTERPT	02577	WEIGHTTID	02646
JUNKQ	02647	WEIGHTT1	02650	WEIGHTT2	02721
A$$$$$1111	02773	A$$$$$1112	02774	A$$$$$1113	02775
ID1CELCOR	63000	ID2CELCOR	63001	RA	63002
DEC	63003	SRA	63004	SDEC	63005
RADIUS	63006	RADOT	63007	DECDOT	63010
RADIUSDOT	63011	SIDERTIME	63012	VIZRA1	63013
VIZDEC1	63014	VIZRA2	63015	VIZDEC2	63016
TWOSECDOP	63017	PLOTAZIM$$	63020	PLOTELEV$$	63021
AZTRACKERR	63022	ELTRACKERR	63023	MODESWITCH	63024
AUTOSWITCH	63025	TRACKINDIC	63026	AZIMERROR$	63027
ELEVERROR$	63030	ID1RADCOR	63050	ID2RADCOR	63051
RANGE	63052	AZIM	63053	ELEV	63054
SAZIM	63055	SELEV	63056	CRANGE	63057
CAZIM	63060	CELEV	63061	RANGEDOT	63062
TRUERANGE	63063	SINORIENT	63064	COSORIENT	63065
SINAZEL	63066	COSAZEL	63070	ACQAZIM	63071
ACQELEV	63075	FRAMESIZE	63101	RADIOMETER	63102
TIMEMODE	63103	FIRSTELEV	63104	ASTRORA	63105
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BLASTOFF	63146	YEARMONTH	63147	DAY	63150
HOURREG	63151	MINREG	63152	FIRSTHRU	63153
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RADINDIC	63157	PRINRECSW	63160	REFRACIND$	63161
AZELIND$	63162	ID1RECRD	63210	ID2RECRD	63211
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SYSCOMREG3	63454	SYSCOMREG4	63455	SYSCOMREG5	63456
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ELVTNSCAN	63502	RADCBXSCAN	63503	RASCTNSCAN	63504
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RDBOXLINES	63510	HOLDNOHOLD	63511	AZIMOFFSET	63512
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ARCOFAZIM	63524	PERIODDEC	63525	ARCOFDEC	63526
PERIODRA	63527	ARCOFRA	63530	RADECOTIME	63531
AZELOTIME	63532	RADIORA	63540	RADIODEC	63541
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AZIMOUT	64000	ID5RADIO	64776	ID6RADIO	64777
ELEVOUT	65000	ID7RADIO	65776	ID8RADIO	65777
DOPPOUT	66000	ID9RADIO	66776	ID10RADIO	66777
RECAZIM	67000	ID11RADIO	67776	ID12RADIO	67777
RECELEV	70000	ID13RADIO	70775	ID14RADIO	70776
RANGEOUT	70777	MCPFILLER	71000	ID15RADIO	71776
ID16RADIO	71777	INTERAZIM	72000	ID17RADIO	72776
ID18RADIO	72777	INTERELEV	73000	ID19RADIO	73776
ID20RADIO	73777	INTERDOPP	74000	ID21RADIO	74776
ID22RADIO	74777	AZIMIN	75000	ID23RADIO	75776
ID24RADIO	75777	ELEVIN	76000	ID25RADIO	76775
ID26RADIO	76776	INTERRANGE	76777	ID1SYSENT	77576
ID2SYSENT	77577	SYSENTRIES	77600	ID1SYSNAM	77676
ID2SYSNAM	77677	SYSNAMES	77700		

;;;;;;;;;;;;;;;;;;;;;;;; SPURT OUTPUT NO. 111 ;;;;;;;;;;;;;;;;;;;;;;;;

ACQUI TE0STE*10FEB66

LABEL	LOC	LABEL	LOC	LABEL	LOC
A$$$$$1111	02773	A$$$$$1112	02774	A$$$$$1113	02775
ACQA	02056	ACQA1	02062	ACQAZIM	63071
ACQELEV	63075	ACQUI	63427	ACQUIONOFF	00057
ACQUIINIT	00002	ACQUIMSG	02041	ACQUIMSG1	02046
ACQUIRE	00000	ACQUIRUN	00360	ACQY	02051
ACQYCUBE	02053	ACQYSQ	02052	ACROSSCAN	00554
ACTUALTIME	63142	ADSCN	63416	AEBOXLINES	63507
AESCN	63417	ALNGOFFSET	63517	ALNGACRSCN	63506
ANSWER1	00070	ANSWER2	00142	ANSWER4	00231
ANSWER5	00246	ANSWER6	00306	ANSWER7	00324
ARCOFAZIM	63524	ARCOFDEC	63526	ARCOFELEV	63522
ARCOFRA	63530	ASTRODEC	63106	ASTRORA	63105
ATTENTINIT	00034	AUPEREQUAT	63341	AUTOSWITCH	63025
AUTOT	63437	AVGAZOCY	01273	AVGBCW	01222
AVGLOOP	01320	AVGROUTINE	01304	AZDIF20	00566
AZDIF20SQ	00572	AZDIFM10	00565	AZDIFS	63120
AZELOTIME	63532	AZELBXSCAN	63500	AZELIND$	63162
AZENTBIAS	00272	AZIM	63053	AZIMOFFSET	63512
AZIMOUT	64000	AZIMOVER	63325	AZIMADD	63442
AZIMERROR$	63027	AZIMIN	75000	AZIMSH	00470
AZMTHSCAN	63501	AZPOINT	00575	AZTOGOWEL	01051
AZTRACKERR	63022	BODYSIZE	63462	BACKUPSCAN	01633
BACKUPWD	00162	BELOWHORIZ	00747	BLASTOFF	63146
COCON	63414	CONVERTIME	63135	CORCT	63420
COSORIENT	63065	COSAZEL	63070	CAZIM	63060
CELBODY	63113	CELCOMPGM	63424	CELEV	63061
CELTIME	63133	CHOICE	00040	CHCOR	63422
CHPAR	63431	CLBIASES	00210	CLEARCOUNT	01620
CROSSCAN	00552	CRANGE	63057	CRSCW	00560
CRSSOFFSET	63516	DONOTHING	00041	DOPPOUT	66000
DOPPADD	63444	DATANALYZE	63425	DAY	63150
DEC	63003	DECOFFSET	63515	DECDOT	63010
DECLINSCAN	63505	DELCRSC	00555	DELRADIUS	01223
DELTATEE	63316	DSECONDS	63141	DUMSECTTG	63154
DYDMP	63421	ECROSSCAN	00553	ELDIF20	00570
ELDIF20SQ	00571	ELDIFM10	00567	ELDIFS	63121
ELENTBIAS	00273	ELEV	63054	ELEVOFFSET	63513
ELEVOUT	65000	ELEVADD	63443	ELEVERROR$	63030
ELEVIN	76000	ELEVSH	00476	ELPOINT	00574
ELTRACKERR	63023	ELVTNSCAN	63502	ENDANGLE	01022
ENDAZ	00403	ENDFIT	01116	ENDSSC	00716
ENDSSC1	00733	EQUATOR	63323	ESTSHIFTED	63143
EXPNAME	63350	FIRSTELEV	63104	FIRSTHRU	63153
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FITQUAD	00603	FIVEHUND	01234	FLATTENING	63337
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ID13RADIO	70775	ID14RADIO	70776	ID15RADIO	71776

ID16RADIO	71777	ID17RADIO	72776	ID18RADIO	72777
ID19RADIO	73776	ID1CELCOR	63000	ID1ENTPNT	63410
ID1RADCOR	63050	ID1RADIO	63440	ID1RECRD	63210
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ID22RADIO	74777	ID23RADIO	75776	ID24RADIO	75777
ID25RADIO	76775	ID26RADIO	76776	ID2CELCOR	63001
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ID2RECRD	63211	ID2SYSENT	77577	ID2SYSNAM	77677
ID2SYSPAR	63311	ID2TIME	63131	ID3RADIO	63776
ID4RADIO	63777	ID5RADIO	64776	ID6RADIO	64777
ID7RADIO	65776	ID8RADIO	65777	ID9RADIO	66776
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INTERAZIM	72000	INTERCOM	63426	INTERDOPP	74000
INTERELEV	73000	INTERLCKSW	63460	INTERRANGE	76777
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KYBRDSPEC2	63345	KYBRDSPEC3	63346	KYBRDSPEC4	63347
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LOCSCEBIAS	01227	LOCSCK	01215	LOCSCTABLE	01235
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MAXRADIUS	01224	MAXSCACC	01203	MCPFILLER	71000
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NROUND	01210	POLE	63324	POSPOS	01672
PERIODAZIM	63523	PERIODDEC	63525	PERIODELEV	63521
PERIODRA	63527	PLOTAZIM$$	63020	PLOTELEV$$	63021
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RP2AVG8E	01231	RP2AVGLA	01214	RP2AVGLE	01233
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RP2CODE8	01216	RP2CODEL	01220	RP2CODES	01217
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SC10	01036	SC2	01037	SC3	00660

SC4	00672	SC5	00605	SCANACCNEG	00551
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SYSCOMREG4	63455	SYSCOMREG5	63456	SYSCOMREG6	63457
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TEST4	00357	TEST5	00351	THIRD	02054
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TIMECORREC	00214	TIMEMODE	63103	TIMEP	63435
TIMETOHOLD	63520	TRACKINDIC	63026	TRUERANGE	63063
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WEIGHTT1	02650	WEIGHTT2	02721	WEIGHTTID	02646
WFORD	63432	WFACQUI	00156	WFADD	63450
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WFHSACQUI4	00205	WFHSACQUI5	00336	WFHSACQUI6	00151
WIDTH	01205	WIDTHIN	00744	YEARMONTH	63147
YRTRAN	63327	ZRTRAN	63330		

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13. ABSTRACT

Haystack Pointing System consists of hardware and software which points the Haystack 120-foot X-band antenna dish with great accuracies. The Satellite Acquisition program, described in this report, generates acquisition scans and searches for target returns. Once the target has been sighted, the program tracks the target by conical scanning. After acquisition, time correction can be made in the orbit computations.

14. KEY WORDS

Haystack antenna
pointing system
satellite acquisitions
computer programs