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Helicopter Maneuvering: MLS Shuttle Holding Pattern Data Report

Christopher J. Wolf
Raquel Y. Santana

August 1987

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16. Abstract

This report documents the Federal Aviation Administration (FAA) Technical Center's flight test on Microwave Landing System (MLS) shuttle holding patterns. This flight test was undertaken in response to the Aviation Standards National Field Office (AVN) to provide data on the shuttle holding pattern for inclusion in chapter 11 of the Terminal Instrument Procedures (TERPS) manual.

Data were collected for MLS shuttle holding patterns using two different course width sensitivities. Data collection was performed using an Army UH-1 helicopter.

After the data were collected it was reduced and formatted and forwarded to AVN for analysis and development of TERPS criteria.

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EXECUTIVE SUMMARY

The Guidance and Airborne Systems Branch (ACT-140), FAA Technical Center, received a request from the Standards Development Branch, Aviation National Field Office (AVN-210) through APM-400, to provide flight test data on Microwave Landing System (MLS) helicopter shuttle holding patterns. This shuttle holding pattern was to be considered for inclusion in chapter 11 of the Terminal Instruments Procedures (TERPS) manual. Chapter 11 deals with helicopter only operations.

In response to this request, ACT-140 designed a flight test to collect the required data. Between December 1985 and March 1986, eight flights (for a total of 45 individual runs and taking approximately 8.29 flight hours) were flown using a course width sensitivity of 3.6°. Between January 1986 and April 1986, five flights (for a total of 32 runs and taking approximately 5.75 flight hours) were flown using a course width sensitivity of 2.0°.

After all the data were collected, it was reduced, formatted, and forwarded to AVN-210 for analysis and use in the development of helicopter TERPS criteria. The initial data reduction was accomplished by plotting each shuttle holding pattern individually, and then plotting the similar patterns together. After standard statistics were calculated at 100-foot intervals along the path, the resulting statistical data were formatted into listings and plotted as isoprobability contours.

1. OBJECTIVE.

The objective of this project was to provide the Standards Development Branch, Aviation Standards National Field Office (AVN-210), with flight test data on a helicopter shuttle holding pattern. The shuttle holding pattern, designed by AVN-210, had Microwave Landing System (MLS) course guidance on both the inbound and outbound straight segments. The assumption behind the testing was that a reduction in potential airspace required for holding was possible with no increase in pilot workload.

2. BACKGROUND.

One of the milestones laid out in the Resume schedule for Terminal Area Maneuvering in the Rotorcraft Master Plan called for the analysis of pilot performance when holding in an MLS helicopter shuttle holding pattern. The Guidance and Airborne Systems Branch, ACT-140, was requested by the Standards Development Branch, Aviation Standards National Field Office (AVN-210), through APM-400, to collect flight test data on an MLS shuttle holding pattern. AVN-210 also requested a statistical analysis of the flight test data for development of Terminal Instrument Procedures (TERPS) criteria and to provide information on pilot performance during the execution of the shuttle holding pattern. These data are needed to determine the size of support reduction of protected airspace for the shuttle pattern.

3. DISCUSSION.

3.1 TEST EQUIPMENT.

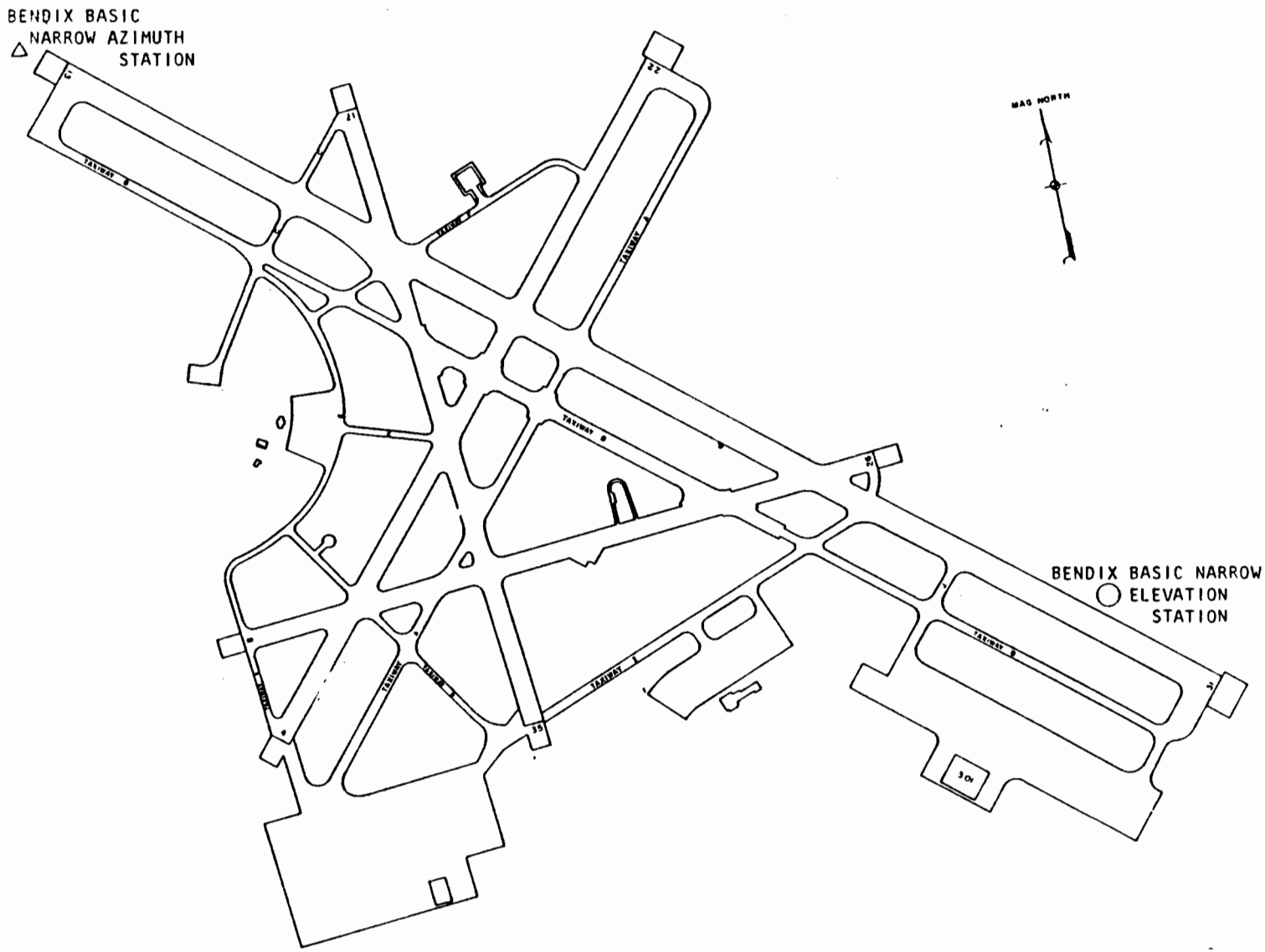
3.1.1 MLS.

The MLS used for this project was developed for the Department of Transportation (DOT)/Federal Aviation Administration (FAA) by the Bendix Communication Division under contract DOT-FA72WA-2801. This MLS is a preproduction system consisting of two basic functional elements: azimuth (AZ) and elevation (EL), along with interim precision distance measuring equipment (DME/P). This system's elements were established in a split-site configuration on runway 13/31. Figure 1 shows the system configuration at the Technical Center. This system radiates the compatible time reference scanning beam (TRSB) format, which consists of a preamble and a TO-FRO scanning beam. Proportional course guidance is provided through approximately $\pm 40°$ of AZ, and between 0° +15° of EL.

3.1.2 Test Aircraft.

The aircraft used in this project was a Bell UH-1H helicopter. This helicopter is assigned to, and operated by, the Department of the Army, U.S. Army Avionics Research and Development Activity (AVRADA), Ft. Monmouth, NJ. The UH-1 has been provided to support a joint FAA/AVRADA interagency effort to collect data for the development and updating of criteria, standards, and procedures for the safe and efficient operation of helicopters in the National Airspace System (NAS).

The UH-1 is a single engine helicopter with both instrument landing system (ILS) and MLS instrumentation and displays representative of civil Instrument Flight Rules (IFR) certified helicopters currently in use. This helicopter is standard except for its electrical system, which was upgraded to support the additional



MLS TEST SITE LOCATIONS, AT NAFEC/ATLANTIC CITY AIRPORT, ATLANTIC CITY, N.J.

FIGURE 1. RUNWAY 13/31 MLS SYSTEM CONFIGURATION

loads from the data collection system. A DME/P interrogator and an MLS receiver were installed to support the test.

3.1.3 Airborne Data Collection System.

The data collection system for this test is based on an off-the-shelf Adaptive Science Corporation, Modulas 1010/4. The Modulas 1010/4 is a Motorola 6809-based microprocessor system. Interface boards were developed in-house to process analog, synchro, discrete, and digital aircraft sensor data, and digital data from a time code generator. A Kennedy 9-track tape drive is used to record aircraft data. A block diagram of the data collection system and a complete list of recorded parameters are presented in appendix A.

3.1.4 Digital Prescale Processor (DIGPRE).

The desired course width for both AZ and EL were selectable through a DIGPRE designed and developed at the Technical Center. A thumbwheel switch provided the operator with the means to select the desired course width sensitivity. This permitted pilot performance to be measured for course width of 3.6° and 2.0° representing a heliport collocated MLS siting and a normal runway siting. Appendix B contains a block diagram of the DIGPRE along with a more detailed discussion on this unit.

3.1.5 Aircraft Tracking.

Two different ground based aircraft tracking systems were used simultaneously during this test. The systems used were an automatic system optical laser tracker and a radar system called Extended Area Instrumentation Radar (EAIR). Using both systems provided redundancy and permitted a higher degree of continuous tracking coverage. The laser system provided the preferred tracking data; however, when the laser data were invalid, the EAIR data were used.

3.1.5.1 Laser.

The Technical Center's laser is a precision automated tracking system that uses a laser beam to illuminate and automatically track aircraft that are fitted with a laser retroreflector. The laser tracking system is composed of two subsystems, target tracking and data processing. The target tracking subsystem maintains the automatic target track, while the data processing subsystem processes, displays, and records tracking data. The laser has a maximum tracking distance of 25 nautical miles (nmi), depending on visibility conditions. The data recorded by the laser system is sent to the Technical Center's Computer Facility for post-flight processing. This processing is used to both smooth the data and to translate and rotate it to the proper reference point on the airfield.

3.1.5.2 EAIR.

The Technical Center's EAIR is a model 661, precision C-band instrumentation radar system that was designed to measure, record, and display an aircraft's position in slant range and AZ and EL angles. When the EAIR is in it's primary mode, it has a maximum tracking distance of 100 nmi. In the secondary mode, it has a range of 190 nmi. In either mode it has a minimum tracking distance of 1 nmi. The data, recorded on the magnetic tape, was then sent to the Technical Center's Computer Facility for post-flight processing. This processing was done

TABLE 1. DESCRIPTION OF RUNS

Run No.	Altitude (ft)	Entry	Run Start Point	Run Stop Point
1	2500	Right 7° AZ Outbound	1st 5.5 DME Inbound	2nd 4.0 DME Inbound
2	2500	Left 7° AZ Outbound	1st 5.5 DME Inbound	2nd 4.0 DME Inbound
3	2500	Right 7° AZ Outbound	1st 5.5 DME Inbound	2nd 4.0 DME Inbound
4	2500	Left 7° AZ Outbound	1st 5.5 DME Inbound	2nd 4.0 DME Inbound
5	2500	Right 7° AZ Outbound	1st 5.5 DME Inbound	2nd 4.0 DME Inbound
6	2500	Left 7° AZ Outbound	1st 5.5 DME Inbound	2nd 4.0 DME Inbound
7	2500	Right 7° AZ Outbound	1st 5.5 DME Inbound	2nd 4.0 DME Inbound
8	2500	Left 7° AZ Outbound	1st 5.5 DME Inbound	2nd 4.0 DME Inbound
9	2500	Right 7° AZ Outbound	1st 5.5 DME Inbound	2nd 4.0 DME Inbound
10	2500	Left 7° AZ Outbound	1st 5.5 DME Inbound	2nd 4.0 DME Inbound

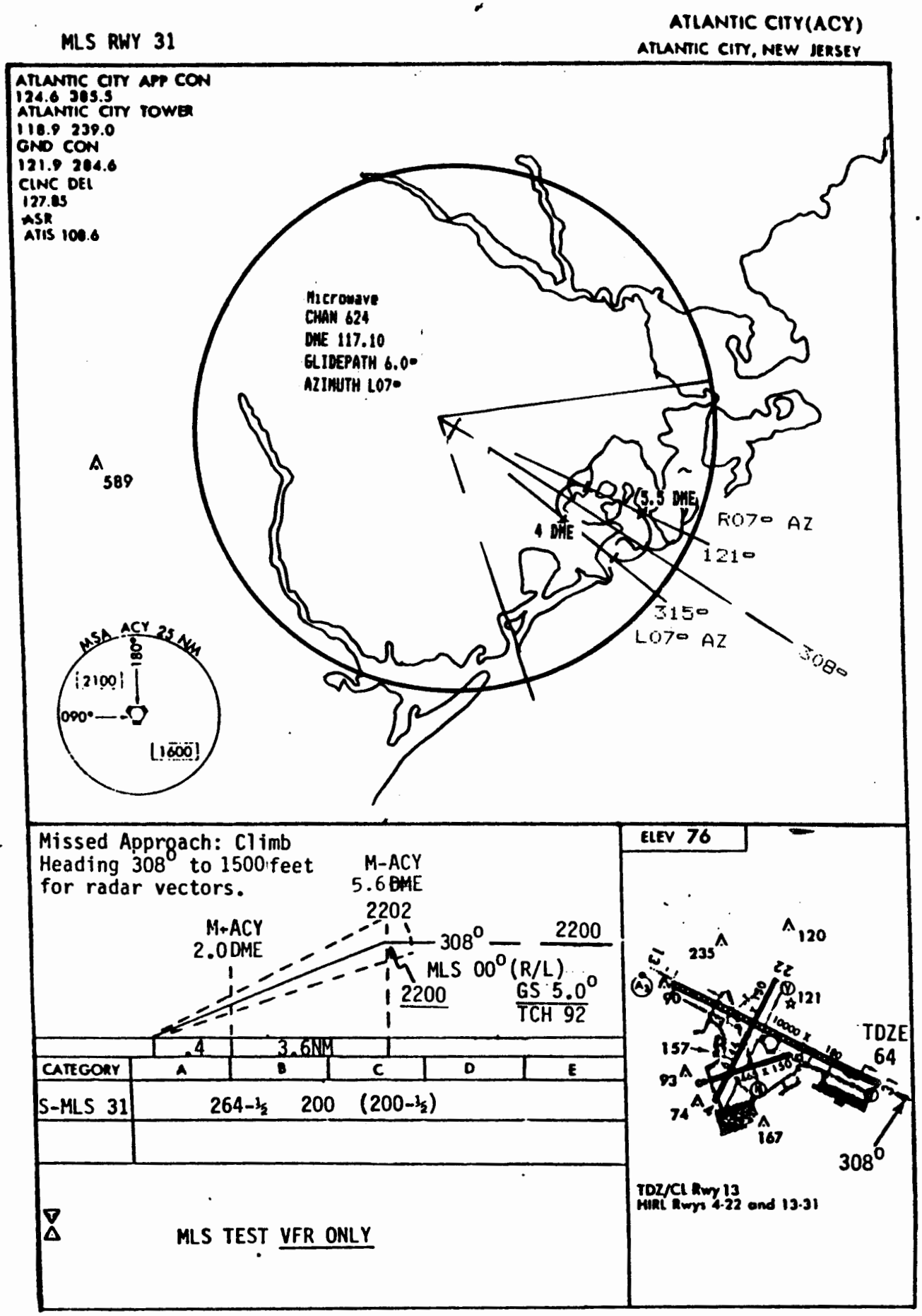


FIGURE 3. APPROACH PLATE FOR MLS SHUTTLE HOLDING PATTERNS

3.3 DATA PROCESSING.

3.3.1 Flight Data.

Flight data were provided from four separate sources: an airborne data tape, a laser tracking tape, an EAIR tracking tape, and observer flight logs. The airborne data tape contains the information recorded by the aircraft's data collection system. Both the laser tracking tape and the EAIR tracking tape contain information recorded at the tracking sites. Each of these tapes was processed to convert them from Honeywell 66/60 format to Digital Equipment Corporation (DEC) VAX 11/750 format. The observer logs contained times for specific events that occured during the shuttle holding pattern, along with other miscellaneous information and comments.

3.3.2 Merge.

For the purpose of data reduction and analysis, the three data tapes had to be merged into one file. Since all three tapes contained time tags, and each system was synchronized to the same time, they were time merged. Airborne time was considered the master, so that tracking data would be used where it's time tags equalled the airborne tag. A mode flag was created for each record to indicate which tracking data set was valid. Tracking data were considered invalid only if there were no data with the proper time tag.

3.3.3 Error Value Calculations.

Although most of the parameters to be analyzed for this test were collected by the airborne data collection system, several others had to be calculated during post-flight data processing. The following sections describe these parameters and the equations used to calculate them.

3.3.3.1 Crosstrack Error.

Crosstrack error is the distance from the aircraft's position, as reported by the tracking systems, and the path that the aircraft was theoretically flying. Crosstrack error is calculated in both feet and degrees. These parameters are used only on the course guided segments. To find the crosstrack error in feet, the tracking data were rotated to an axis system where the x axis overlayed the MLS radial that was to be flown. The standard equation for the rotation of axes used were

$$X = (X' * \mathrm{COS}\ (A)) - (Y' * \mathrm{SIN}\ (A))$$

and

$$Y = (X' * \mathrm{SIN}\ (A)) + (Y' * \mathrm{COS}\ (A))$$

where

X and Y are the coordinate values in the new system

X' and Y' are the coordinate values in the original system

A is the angle of rotation.

After finding the crosstrack error in feet, the same parameter was calculated in degrees. Since the origin of both axes systems was the phase center of the azimuth antenna, this value was calculated relative to this point by using standard trigonometric equations. Crosstrack error in degrees was found using:

$$A = \text{ARCTAN}\ (OPP\ /\ ADJ)$$

where

OPP is that leg of the right triangle opposite the angle in question (the crosstrack error in feet)

ADJ is that leg of the right triangle adjacent to the angle (alongtrack distance in feet)

A is the crosstrack error in degrees.

3.3.3.2 Azimuth Flight Technical Error (FTE).

AZ FTE is the parameter that depicts pilot lateral tracking performance, and is calculated from both analog and digital information collected from the MLS receiver. FTE is the difference between the aircraft's position, as indicated by the MLS receiver, and the intended flightpath.

AZ FTE in degrees is calculated directly from the digital azimuth data as follows:

$$AZFTE = AZ - R$$

where

AZFTE is the AZ FTE in degrees

AZ is the digital azimuth angle in degrees

and R is the intended radial in degrees.

AZ FTE in feet is indirectly calculated from the digital information by using the results of the previous equation in the following:

$$AZFTE = ADJ * TAN\ (A)$$

where

AZFTE is the AZ FTE in feet

ADJ is the length of the leg adjacent to the AZ FTE angle (along track distance)

A is the AZFTE in degrees.

AZ FTE in percent of full scale deflection is directly calculated from the analog MLS information. Full scale deflection for the horizontal situation

indicator (HSI) is ±150 microamps. Knowing this, the AZ FTE in percent full scale is:

AZFTE = (ANA / 150) *100

where

AZFTE is the AZ FTE in percent full scale

ANA is the analog azimuth data in microamps.

3.3.3.3 Azimuth Navigation System Error (NSE).

NSE is the difference between the aircraft's position according to the tracking systems, and the position according to the MLS system. NSE was calculated in both feet and degrees. NSE was found using:

AZNSE = CTRKE - AZFTE

where for feet

AZNSE is the azimuth NSE in feet

CTRKE is the crosstrack error in feet

AZFTE is the azimuth FTE in feet,

and for degrees

AZNSE is the azimuth NSE in degrees

CTRKE is the crosstrack error in degrees

AZFTE is the azimuth FTE in degrees.

3.3.3.4 Radial Error.

The radial error is the difference between the aircraft's actual distance from the center of the theoretical arc segment and the radius of that arc segment in feet. First the actual distance is calculated using:

ACT = SQRT ((X - XC)**2 + (Y - YC)**2)

where

ACT is the actual distance from the center of the arc in feet

XC,YC are the coordinates of the center of the arc in feet

X,Y are the aircraft's position from the tracking system in feet

The radial error is then found by:

Rerr = ACT - RAD

where

Rerr is the radial error in feet

ACT is as defined above

RAD is the theoretical radius of the arc in feet.

Two additional parameters that are derived from the radial error are error in the x direction and error in the y direction, and are also in feet. The error in x is found using:

Xerr = Rerr * SIN (T)

where

Xerr is the error in x in feet

Rerr is as defined above

T is defined as (X-XC)/(Y-YC) using previous definitions, and is the angular location, relative to the arc, of the aircraft.

Similarly, the error in y is found by:

Yerr = Rerr * COS (T)

where

Yerr is the error in y in feet

Rerr,T are defined as above.

3.3.4 Data Partitioning.

3.3.4.1 Course Guided Segments.

To compute the required statistical parameters, it was necessary to partition, or bin, the data along the inbound and outbound MLS radial segments. The first bin point for the inbound segment is that point along the inbound segment which is tangent to the circle containing the large arc segment. The first bin point for the outbound segment is that point along the outbound segment which is tangent to the circle containing the small arc segment. Bin ranges for the other bins were calculated as follows:

For the inbound segment:

BRn = BR0 - 100 * BNn

and for the outbound segment:

BRn = BR0 + 100 * BNn

where

BRn is the nth bin range,

BR0 is the bin range for bin zero,

100 is the partition interval (in ft),

BNn is the nth bin number.

To find the data to be stored under a specific bin tag, the position data was rotated to an axis system where the MLS radial in question was the X axis. The first bin range was also translated to this axis system so that the above formulas could be applied to the new data. These new data were then searched to find a point with the exact bin range. If an exact point wasn't found, the points closest to the bin range, on either side of the bin point, within the limits

BR < X1 <= BR + 100 and BR > X2 >= BR - 100,

were to be found, for linear interpolation. If an exact bin range was found, the corresponding data were used. If no exact bin range was found, then the data, associated with the points on either side of the bin, were run through a linear interpolation routine to calculate the necessary data.

3.3.4.2 Curved Path Segments.

The curved path, or arc segment data, were binned in an entirely different way. First, it was necessary to find the bin angle size that would correspond to a bin arc length of 100 feet. To calculate this angle the following was used:

THETA = (s / R) * 180 / PI

where

s is the arc length of 100 feet

R is the radius of the arc

180 is the number of degrees in PI radians

PI is approximately equal to 3.141592654.

Once the bin angle was determined for both the large and small arc segments, both arcs were then divided into bins by defining the start and stop angles for each bin. Bin 0 was the first bin in each arc and was defined as:

for the large arc

START0 = +83.0 degrees

STOP0 = +83.0 + THETA1 degrees

and for the small arc

STARTO = -83.0 degrees

STOPO = -83.0 + THETAs degrees

where

STARTO is the starting angle of bin 0

STOPO is the stopping angle of bin 0

THETAl is the bin angle for the large arc

THETAs is the bin angle for the small arc

all successive bins were defined by:

STARTn = STOPn-1

STOPn = STARTn + THETA

where THETA is either THETAl or THETAs depending on the arc application. STOPn cannot exceed -83.0° for the large arc, or +83.0° for the small arc.

To find the data to be associated with an arc bin, the aircraft's angular position on the arc was calculated from tracking data and then compared against a particular bin's start and stop angles. If the data in question lay between these angles (inclusive), then the data were tagged as belonging to that bin. Linear interpolation was not used for arc segment binning, as it was for course guided segments, because all data that lay between the start and stop angles for a particular bin were used in calculating statistics for that bin.

3.3.5 Statistics.

Statistical calculations were performed on the binned data. For each bin, the parameters of interest were the number of data points (N), the arithmetic mean, the unbiased estimate of standard deviation, the unbiased estimate of variance, the biased estimate of variance, the biased estimate of standard deviation, skewness, and kurtosis. The first four moments about zero were calculated to aid in calculations for skewness and kurtosis. Three additional parameters that were required were the maximum value, the minimum value, and the median value. Parameters for both course guided and arc segments on which statistical calculations were performed are shown in table 2.

3.3.5.1 Arithmetic Mean.

$$\bar{X} = \frac{\sum_{i=1}^{n} X_i}{N}$$

TABLE 2. PARAMETERS FOR STATISTICAL CALCULATIONS

Parameters for Statistics	Curved Path Segments	Course Guided Segments
Tracker Crosstrack Position (ft)	Yes	No
Tracker Along Track Position (ft)	Yes	No
Tracker Altitude (ft, AGL*)	Yes	Yes
Crosstrack Error (ft)	No	Yes
Along Path Position (ft)	No	No
Crosstrack Error (deg)	No	Yes
AZ Flight Technical Error (FTE) (ft)	No	Yes
AZ FTE (DEG)	No	Yes
AZ FTE (%)	No	Yes
AZ Navigation System Error (NSE) (ft)	No	Yes
AZ NSE (deg)	No	Yes
Radial Error (ft)	Yes	No
Cross Track Component of Radial Error (ft)	Yes	No
Along Track Component of Radial Error (ft)	Yes	No
Error in Altitude (ft)	Yes	Yes
Angular ARC Position (deg)	Yes	No
Indicated Air Speed (knots)	Yes	Yes
Velocity in X (ft/min)	Yes	Yes
Velocity In Y (ft/min)	Yes	Yes

*AGL = above ground level

3.3.5.2 Unbiased Estimate of Standard Deviation.

$$S = \left(\frac{\sum_{i=1}^{n} X_i^2}{(N-1)} - \left(\frac{N}{N-1}\right)\left(\overline{X}\right)^2 \right)^{1/2}$$

3.3.5.3 Unbiased Estimate of Variance.

$$Var_u = S^2$$

3.3.5.4 Biased Estimate of Variance.

$$Var_b = \left(\frac{N-1}{N}\right) Var_u$$

3.3.5.5 Biased Estimate of Standard Deviation.

$$s_b = \left(Var_u\right)^{1/2}$$

3.3.5.6 Moments About Zero.

3.3.5.6.1 First Moment.

$$M_1 = \overline{X}$$

3.3.5.6.2 Second Moment.

$$M_2 = \left(\left(\sum_{i=1}^{N} X_i^2 \right) / N \right) - M_1^2$$

3.3.5.6.3 Third Moment.

$$M_3 = \left(\left(\sum_{i=1}^{N} X_i^3 \right) / N \right) - 3M_1 \left(\left(\sum_{i=1}^{N} X_i^2 \right) / N \right) + 2M_1^3$$

3.3.5.6.4 Fourth Moment.

$$M_4 = \left(\left(\sum_{i=1}^{N} X_i^4 \right) / N \right) - 4M_1 \left(\left(\sum_{i=1}^{N} X_i^3 \right) / N \right) + 6M_1 \left(\left(\sum_{i=1}^{N} X_i^2 \right) / N \right) - 3M_1^4$$

3.3.5.7 Skewness.

$$b_1 = M_3 / M_2^{1.5}$$

3.3.5.8 Kurtosis.

$$b_2 = M_4 / M_2^2$$

3.3.6 Plotting.

All plotting done for the shuttle pattern holding project was accomplished with a California Computers Calcomp 1051 drum plotter using Calcomp 907 software for the VAX 11/750 computer. The plots that were generated were divided into two categories, flight data and statistical plots.

3.3.6.1 Flight Data Plots.

Flight data plots were prepared in two ways, individual and composite plots. The individual plots were prepared on a per run basis, in which each individual run of a particular flight was plotted separately. Composite plots were plots of all runs for a particular course width sensitivity drawn on the same axis. Both individual and composite plots were generated for plan views of the shuttle holding pattern.

Individual plots of the MLS analog and digital azimuth data were generated for all course guidance segments. The individual plots were used primarily to

determine if, during a particular shuttle holding pattern, there were any problems in the ground tracking or in the onboard data collection system. These plots also showed how well an individual pilot performed. The composite plots showed how the pilots as a whole performed on a particular shuttle holding pattern. These plots also can be used to show, graphically, how much airspace the group of subject pilots needed for each course width sensitivity.

3.3.6.2 Statistical Plots.

A graphical presentation of the results of the statistical analysis was performed using 95 and 99.999999 percent isoprobability contours. These plots were of the mean value surrounded by the envelope created by plotting, for the first, the mean +2 standard deviation and the mean -2 standard deviation values, and for the second, the mean +6 standard deviation and the mean -6 standard deviation values All points were plotted against their associated bin ranges. A plot of the 95 and 99.9999999 percent isoprobability for the statistics of the aircraft plan position for the entire shuttle holding pattern were also generated.

4. RESULTS.

4.1 DATA PLOTS.

4.1.1 Individual.

Figure 4 shows the individual plot format for the plan view of the shuttle holding pattern. Figures 5 and 6 show the plot format for the MLS digital and analog data for the course guided segments. Because of the large number of these plots only a sample is shown in this report.

4.1.2 Composite.

Figure 7 shows the composite plot of the plan view for all 3.6° course width shuttle holding patterns. Figure 8 shows the composite plot of the plan view for all 2.0° course width shuttle holding patterns.

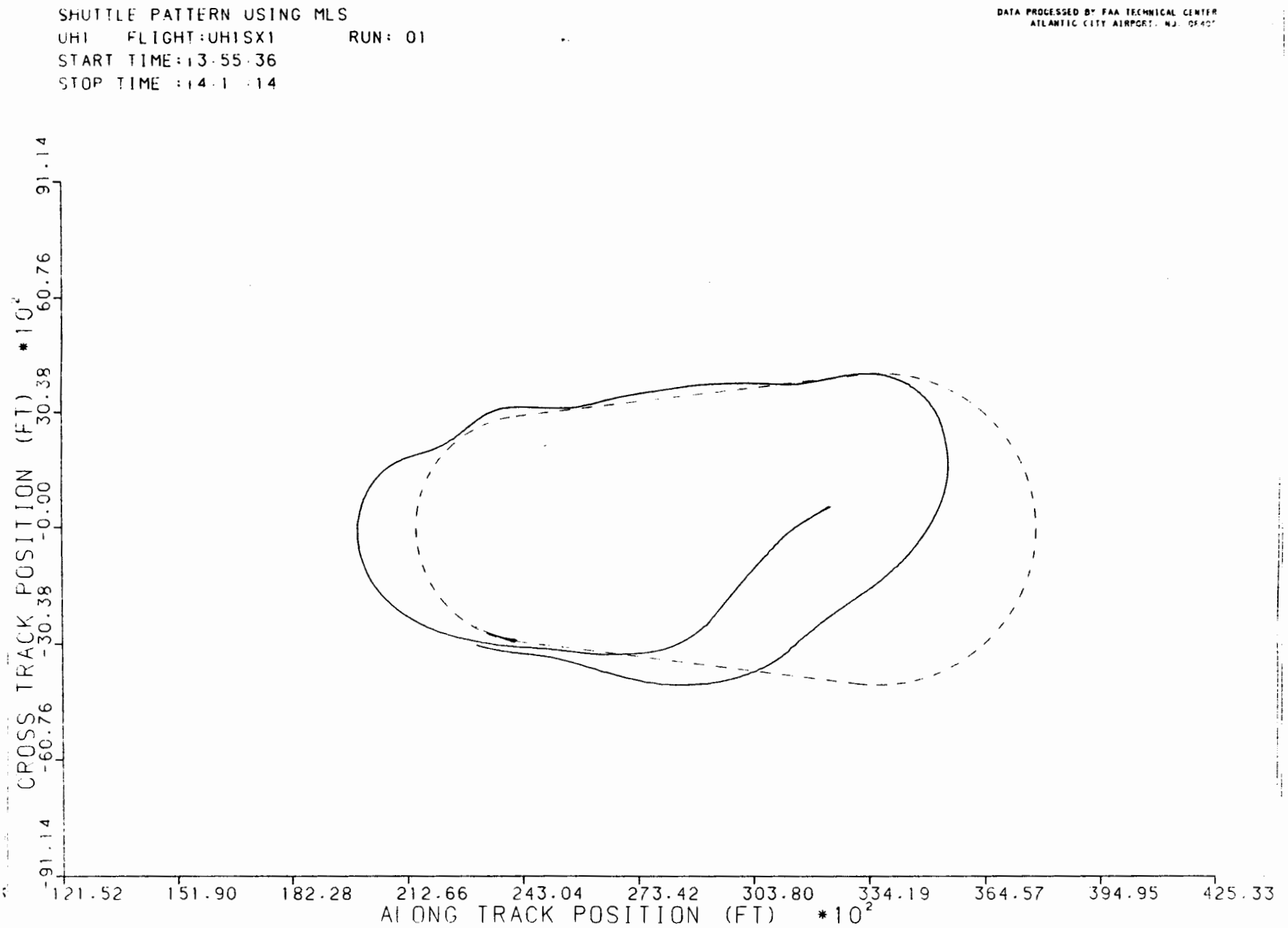


FIGURE 4. INDIVIDUAL PLAN VIEW PLOT FORMAT

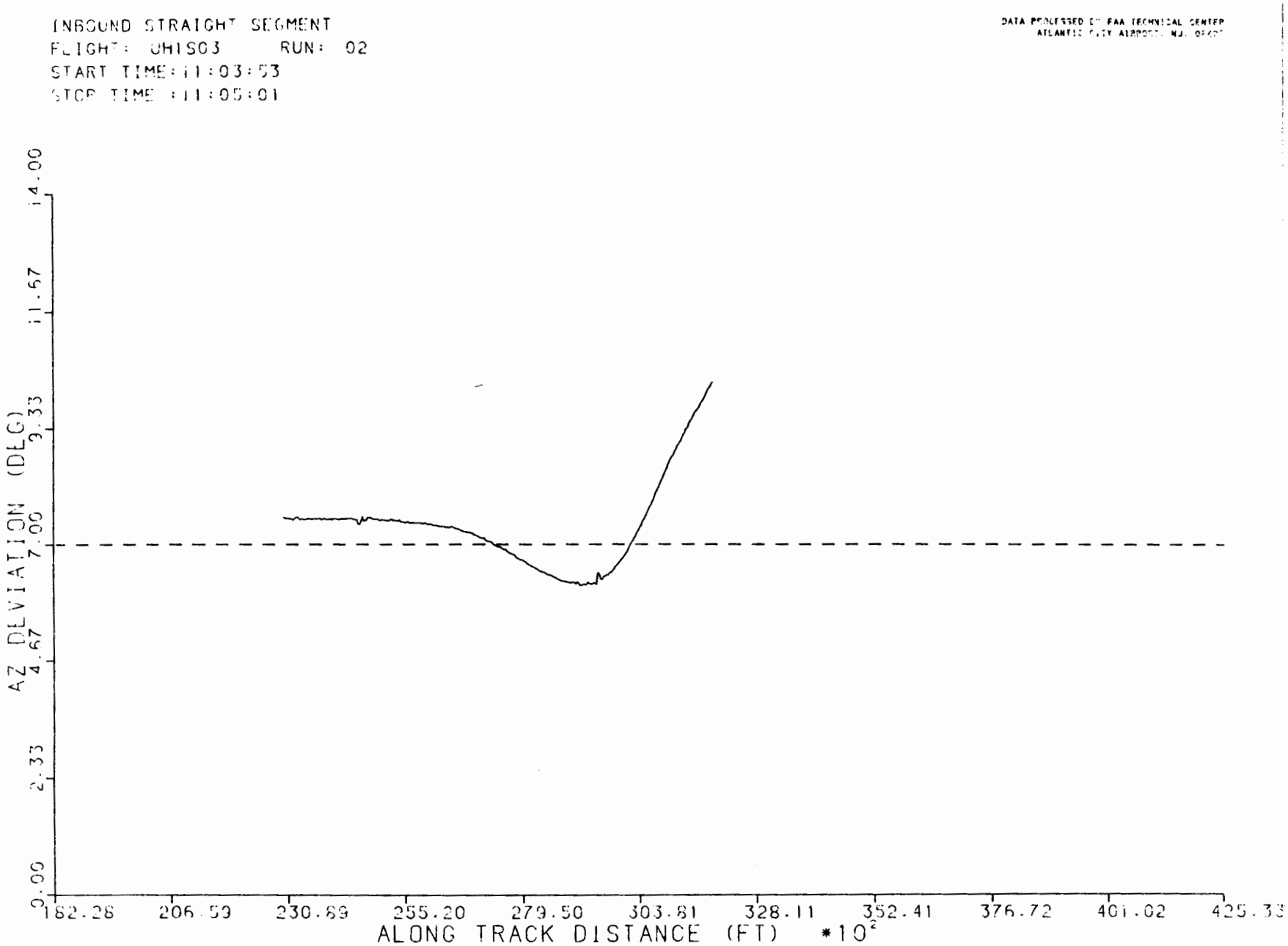


FIGURE 5. MLS DIGITAL DATA PLOT FORMAT

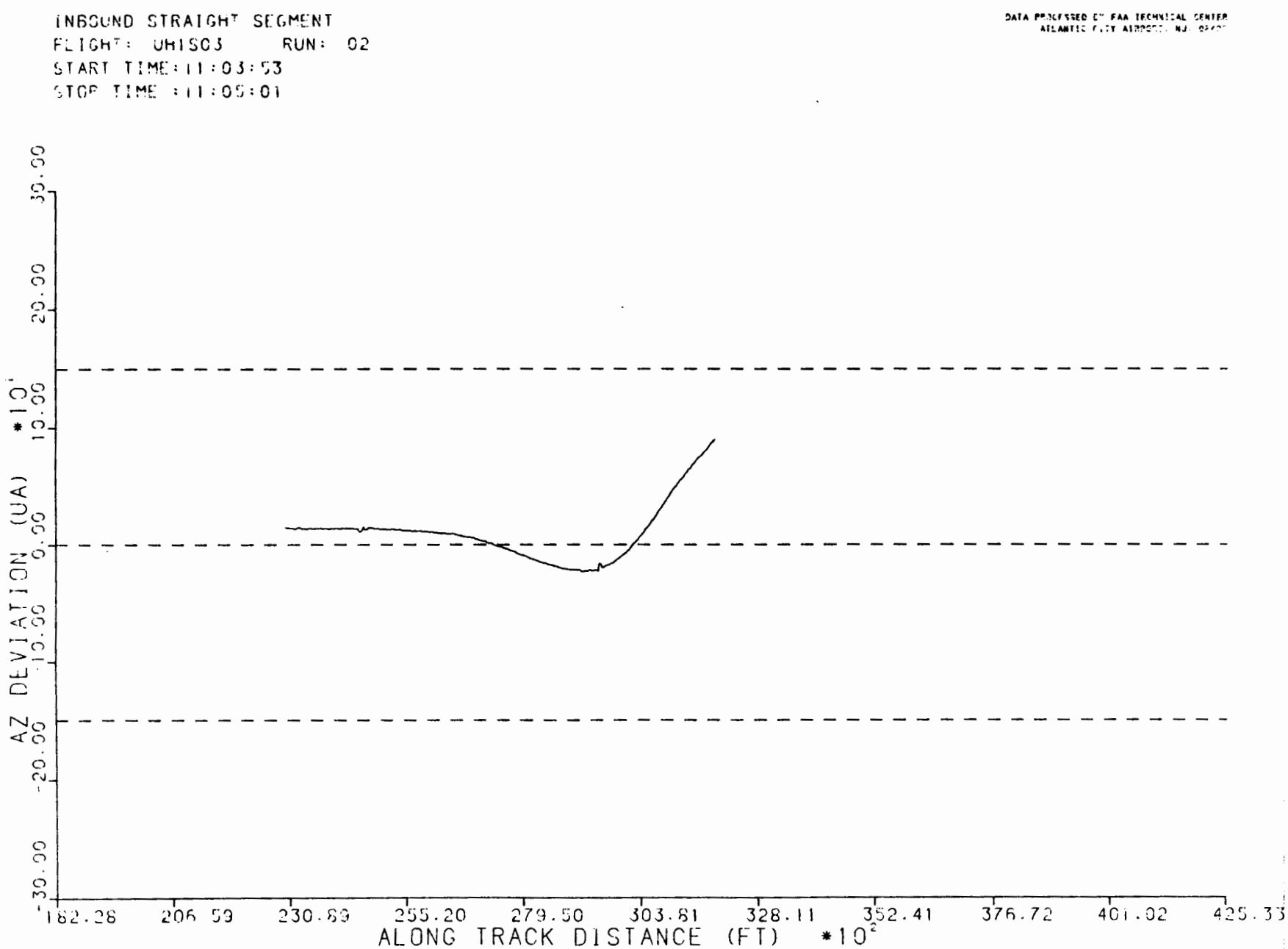


FIGURE 6. MLS ANALOG DATA PLOT FORMAT

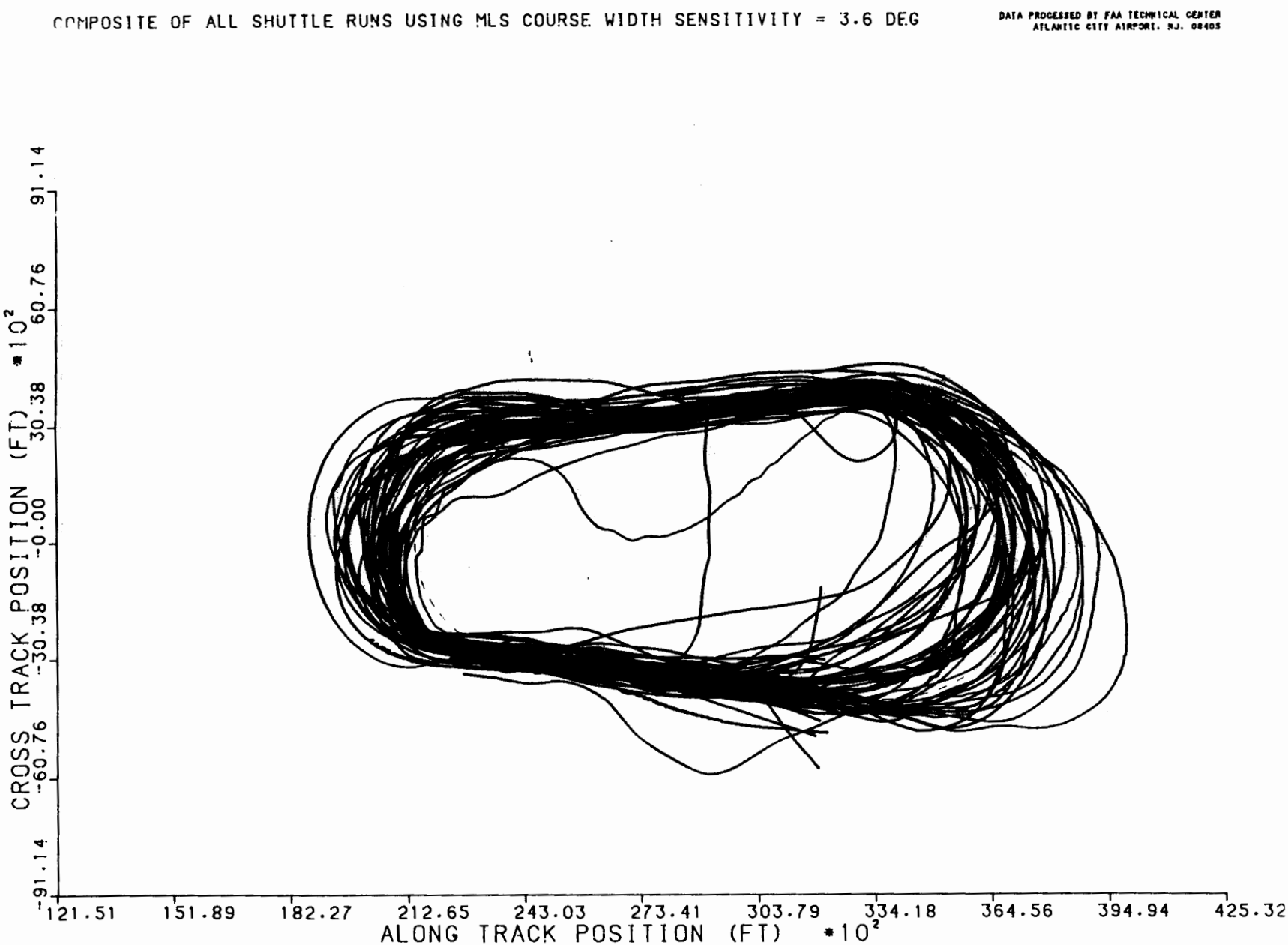


FIGURE 7. COMPOSITE PLOT PLAN VIEW OF ALL 3.6° SHUTTLE HOLDING PATTERNS

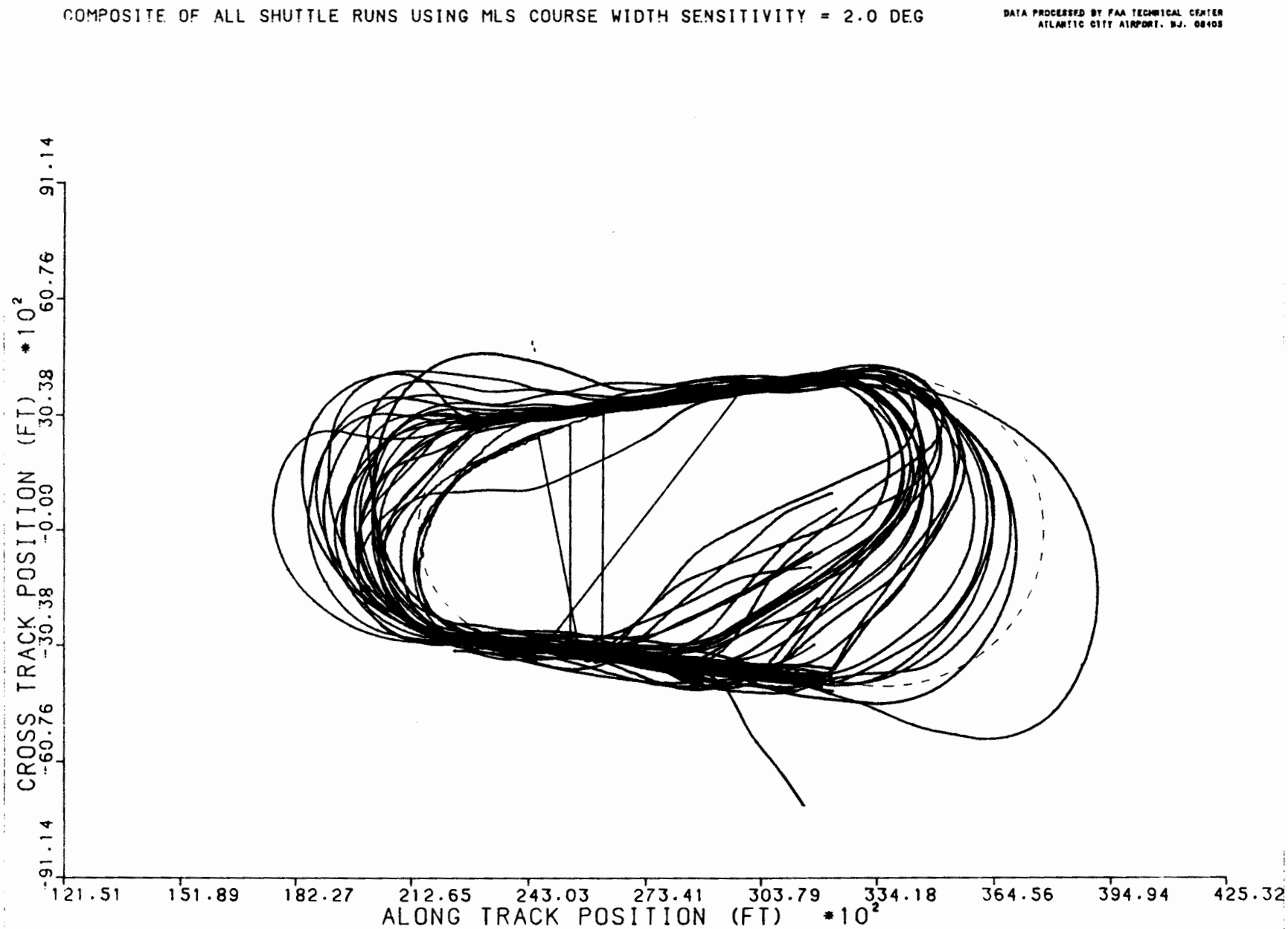


FIGURE 8. COMPOSITE PLOT PLAN VIEW OF ALL 2.0° SHUTTLE HOLDING PATTERNS

4.2 STATISTICS.

4.2.1 Listings.

A sample listing for one bin of the course guided segments is shown in table 3, while a sample for the curved path segments is shown in table 4. Table 5 shows a sample of the summary statistics for course guided segments, while table 6 shows the sample for curved path segments. Because of the excessive amount of these listings only a sample is shown in this report.

4.2.2 Plots.

Figure 9 shows a sample 95 percent isoprobability plot. All the 95 percent isoprobability plots for all runs of inbound course guided segments are presented in appendix C, those for outbound course guided segments are in appendix D, those for the small arc curved path segment are in appendix E, and those for the large arc curved path segment are in appendix F. All the 99.999999 percent isoprobability plots for all runs of inbound course guided segments are presented in appendix G, those for outbound course guided segments are in appendix H, those for small arc curved path segment are in appendix I, and those for large arc curved path segment are in appendix J.

Figure 10 is the 95 percent isoprobability plot of the aircraft plan position for the 3.6° course width shuttle holding patterns. Figure 11 is the 95 percent isoprobability plot of the aircraft plan position for the 2.0° course width shuttle holding patterns. Figure 12 is the 99.999999 percent isoprobability plot of the aircraft plan position for the 3.6° course width shuttle holding patterns.

Figure 13 is the 99.999999 percent isoprobability plot of the aircraft plan position for the 2.0° course width shuttle holding patterns.

TABLE 3. BIN LISTING FOR COURSE GUIDED SEGMENT

Data processed by FAA Technical Center,
Atlantic City Airport, NJ 08405

MLS - Helicopter Shuttle Patterns Over Runway 13

Outbound Straight Segment - Right 7° Radial
Standard Statistics - Crosstrack Error (ft)

Range to fix point: 24258.1 feet

Number of Data Points	31.
Arithmetic Mean	-489.262
Maximum Value	5911.042
Minimum Value	-13972.229
Unbiased Estimate of Variance	9389250.981
Biased Estimate of Variance	9086371.917
Unbiased Estimate of Standard Deviation	3064.188
Biased Estimate of Standard Deviation	3014.361
Median Value	-158.110
Skewness	-2.559
Kurtosis	13.812

Sorted Input Values

5911.042	3606.085	1504.626	1202.850	1116.058
530.879	527.227	485.473	445.788	442.259
314.399	187.458	122.643	84.720	42.394
-158.110	-178.270	-209.493	-304.864	-403.395
-425.364	-559.382	-891.616	-911.674	-1461.396
-1463.444	-1999.010	-2125.431	-2266.858	-4356.493
-13972.229				

TABLE 4. BIN LISTING FOR CURVED PATH SEGMENT

Data processed by FAA Technical Center,
Atlantic City Airport, NJ 08405

MLS - Helicopter Shuttle Patterns Over Runway 13

Large ARC Segment (All Runs)
Standard Statistics - Crosstrack Error (ft)

Start angle (deg) 84.40 Stop angle (deg) 85.80

Number of Data Points	139.
Arithmetic Mean	3838.112
Maximum Value	4529.970
Minimum Value	-4049.167
Unbiased Estimate of Variance	516939.055
Biased Estimate of Variance	513220.069
Unbiased Estimate of Standard Deviation	718.985
Biased Estimate of Standard Deviation	716.394
Median Value	3849.985
Skewness	-9.561
Kurtosis	105.757

Sorted Input Values

4529.970	4524.563	4517.299	4513.284	4458.439
4457.873	4456.340	4247.752	4242.395	4236.933
4181.131	4179.297	4178.471	4177.426	4173.917
4173.435	4171.413	4171.188	4170.244	4169.000
4123.878	4123.672	4125.308	4102.840	-4099.152
4095.699	4095.614	4093.874	4095.758	4090.952
4086.459	4084.318	4080.493	4080.113	4079.857
4074.781	4073.428	4072.907	4071.413	4068.304
4048.500	4043.214	4043.109	4042.114	4033.986
4032.302	4031.142	4004.107	4001.978	3999.006
3990.792	3974.294	3966.040	3961.091	3952.760
3950.075	3943.471	3937.147	3934.639	3932.663
3930.491	3916.869	3906.869	3900.469	3880.763
3875.792	3870.772	3867.574	3865.832	3849.985
3845.090	3843.284	3841.755	3840.541	3840.107
3839.005	3821.751	3819.970	3818.402	3811.571
3809.645	3807.044	3802.928	3801.178	3797.823
3795.126	3790.340	3787.452	3785.665	3784.284
3783.983	3778.556	3776.897	3775.896	3775.321
3773.790	3767.797	3764.191	3759.619	3752.842
3750.410	3750.055	3747.310	3746.978	3746.624
3745.721	3745.554	3745.263	3740.302	3737.570
3690.046	3685.229	3685.149	3675.766	3674.443
3674.042	3666.656	3660.893	3659.597	3657.978
3624.002	3619.333	3614.053	3612.632	3612.468
3577.329	3577.276	3473.589	3472.104	3464.393
3426.811	3424.939	3421.663	3415.355	3410.955
3403.931	3393.171	3381.569	-4049.167	

TABLE 5. SUMMARY STATISTICS LISTING FOR COURSE GUIDED SEGMENT

Data processed by FAA Technical Center,
Atlantic City Airport, NJ 08405

MLS - Helicopter Shuttle Patterns Over Runway 13

Outbound Straight Segment - Right 7° Radial
Standard Statistics - Crosstrack Error (ft)

Bin Range	N	Mean	Standard Deviation	Skewness	Kurtosis
24253.13	31.	-439.262	3064.188	-2.559	13.812
24358.13	31.	-50.120	625.628	-0.169	5.774
24458.13	31.	-48.962	617.032	-0.207	6.036
24558.13	31.	-51.330	606.958	-0.248	6.318
24658.13	31.	-49.506	599.462	-0.289	6.628
24758.13	31.	-48.894	590.984	-0.369	6.861
24853.13	31.	-48.800	579.429	-0.439	7.179
24958.13	31.	-48.413	572.932	-0.497	7.320
25058.13	31.	-48.482	561.077	-0.559	7.650
25158.13	31.	-50.660	552.916	-0.613	7.765
25258.13	31.	-49.232	538.501	-0.687	8.133
25358.13	31.	-48.904	528.410	-0.755	8.340
25458.13	31.	-50.530	518.226	-0.773	8.544
25558.13	30.	-32.739	502.749	-0.957	9.285
25658.13	30.	-36.092	492.971	-0.992	9.368
25758.13	30.	-39.009	482.559	-1.029	9.477
25858.13	30.	-41.642	471.150	-1.075	9.596
25958.13	30.	-44.364	457.890	-1.111	9.776
26058.13	30.	-47.211	445.712	-1.169	9.871
26158.13	30.	-50.482	432.381	-1.231	10.090
26258.13	30.	-55.154	421.265	-1.251	10.213
26358.13	29.	-43.769	410.612	-1.437	10.719
26458.13	29.	-48.537	398.155	-1.523	10.919
26558.13	29.	-48.960	387.037	-1.607	11.033
26658.13	29.	-50.622	376.279	-1.650	11.047
26758.13	29.	-48.556	365.286	-1.775	11.295
26858.13	29.	-46.417	355.793	-1.831	11.526
26958.13	29.	-45.937	345.912	-1.911	11.573
27058.13	29.	-44.319	336.720	-1.953	11.609
27158.13	29.	-42.131	327.278	-2.067	11.860
27258.13	28.	-33.258	322.376	-2.181	12.060
27358.13	28.	-30.722	313.050	-2.229	12.180
27458.13	28.	-31.811	304.806	-2.222	12.703
27558.13	28.	-29.199	296.066	-2.248	12.093
27653.13	28.	-27.566	287.645	-2.240	11.979
27758.13	28.	-26.052	279.105	-2.224	11.875
27858.13	28.	-25.632	270.761	-2.200	11.680
27958.13	28.	-24.651	262.810	-2.142	11.378
28053.13	28.	-22.252	255.812	-2.112	11.077
28158.13	28.	-21.054	247.345	-2.069	10.885
28258.13	28.	-18.712	239.900	-2.013	10.501

TABLE 6. SUMMARY STATISTICS LISTING FOR CURVED PATH SEGMENT

Data processed by FAA Technical Center,
Atlantic City Airport, NJ 08405

MLS - Helicopter shuttle Patterns Over Runway 13

Large Arc Segment (All Runs)
Standard Statistics - Crosstrack Position (ft)

Start Angle	Stop Angle	N	Mean	Standard Deviation	Skewness	Kurtosis
84.40	85.80	139.	3838.112	718.985	-9.561	105.757
85.80	87.20	129.	3827.940	739.661	-9.437	101.318
87.20	88.60	138.	3838.764	723.708	-9.439	103.821
88.60	90.00	140.	3838.276	714.242	-9.682	107.812
90.00	91.40	139.	3850.050	721.326	-9.506	105.027
91.40	92.80	142.	3834.471	711.350	-9.639	107.812
92.80	94.20	130.	3834.283	740.762	-9.334	100.264
94.20	95.60	143.	3840.447	712.736	-9.530	106.551
95.60	97.00	134.	3808.526	735.349	-9.149	98.838
97.00	98.40	146.	3805.087	704.402	-9.533	107.417
98.40	99.80	142.	3805.748	721.464	-9.118	100.450
99.80	101.20	141.	3767.991	718.115	-9.178	101.103
101.20	102.60	143.	3769.163	721.295	-8.922	97.998
102.60	104.00	145.	3741.101	712.739	-9.033	99.901
104.00	105.40	142.	3704.502	724.083	-8.661	94.029
105.40	106.80	152.	3691.475	711.759	-8.454	93.412
106.80	108.20	149.	3641.193	714.548	-8.377	91.417
108.20	109.60	153.	3616.127	716.821	-7.993	86.776
109.60	111.00	149.	3556.881	733.210	-7.514	78.978
111.00	112.40	171.	3464.393	738.169	-6.225	63.893
112.40	113.80	151.	3511.226	734.142	-7.296	75.776
113.80	115.20	142.	3479.232	761.878	-6.892	68.413
115.20	116.60	152.	3427.408	758.171	-6.461	63.494
116.60	118.00	144.	3379.890	766.512	-6.492	62.613
118.00	119.40	147.	3335.409	782.306	-5.949	55.376
119.40	120.80	149.	3311.288	776.073	-6.008	55.791
120.80	122.20	151.	3250.820	779.716	-5.750	52.432
122.20	123.60	150.	3195.604	793.096	-5.439	48.032
123.60	125.00	149.	3167.226	784.501	-5.634	49.814
125.00	126.40	152.	3117.723	758.686	-5.900	54.125
126.40	127.80	147.	3062.277	781.440	-5.555	48.504

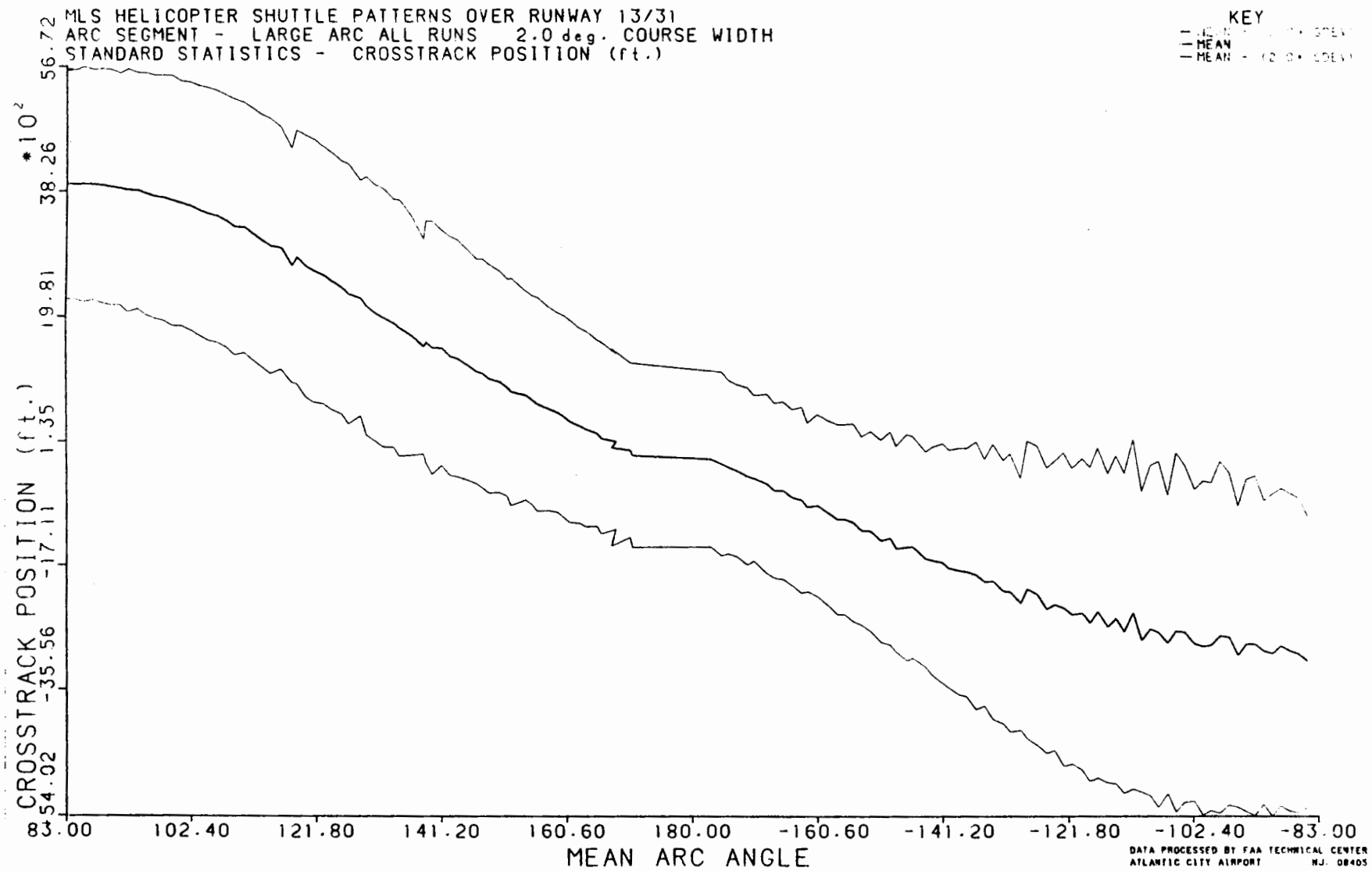


FIGURE 9. SAMPLE 95 PERCENT ISOPROBABILITY PLOT

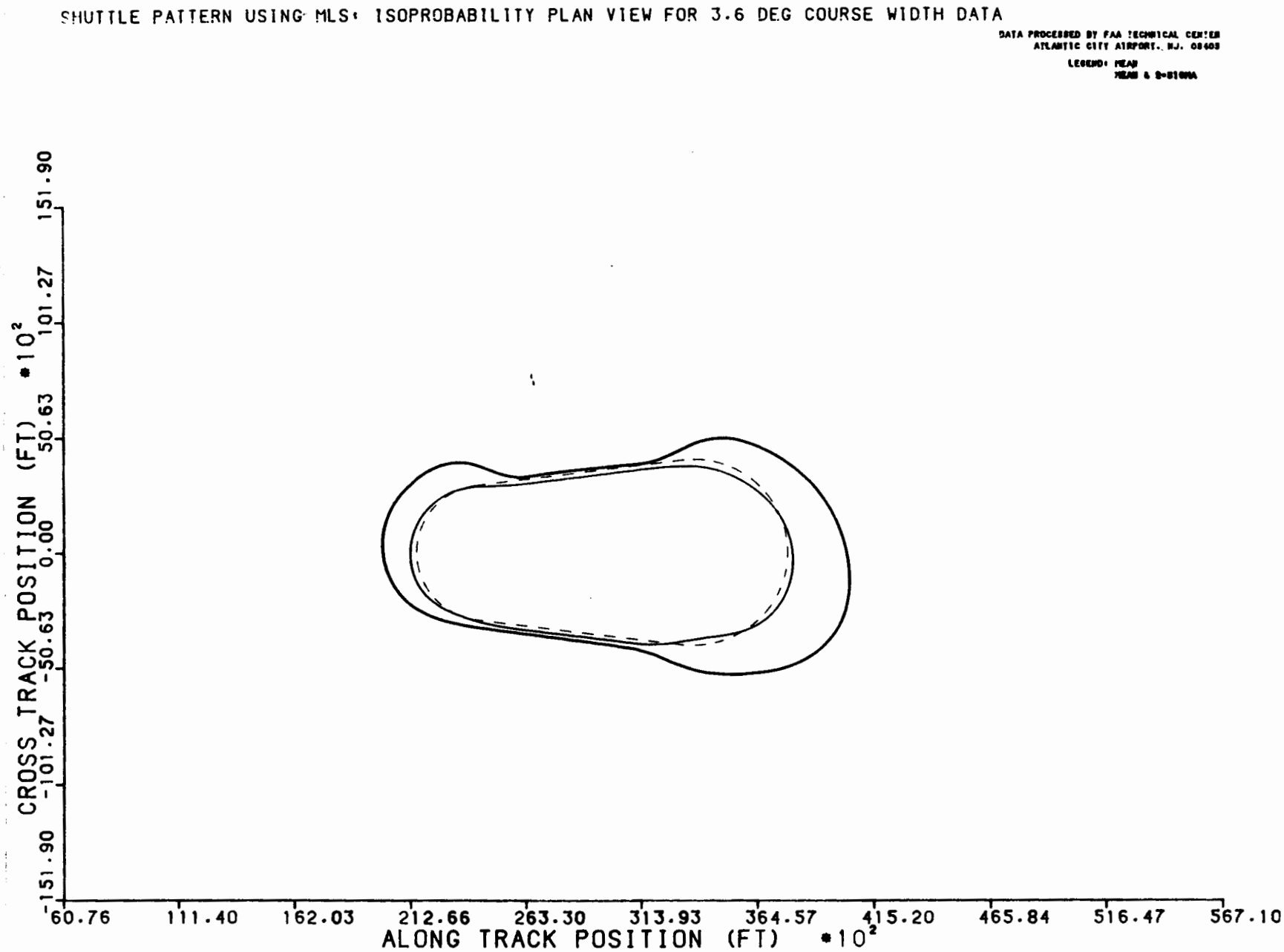


FIGURE 10. 95 PERCENT ISOPROBABILITY PLOT OF PLAN VIEW OF 3.6° SHUTTLE PATTERN

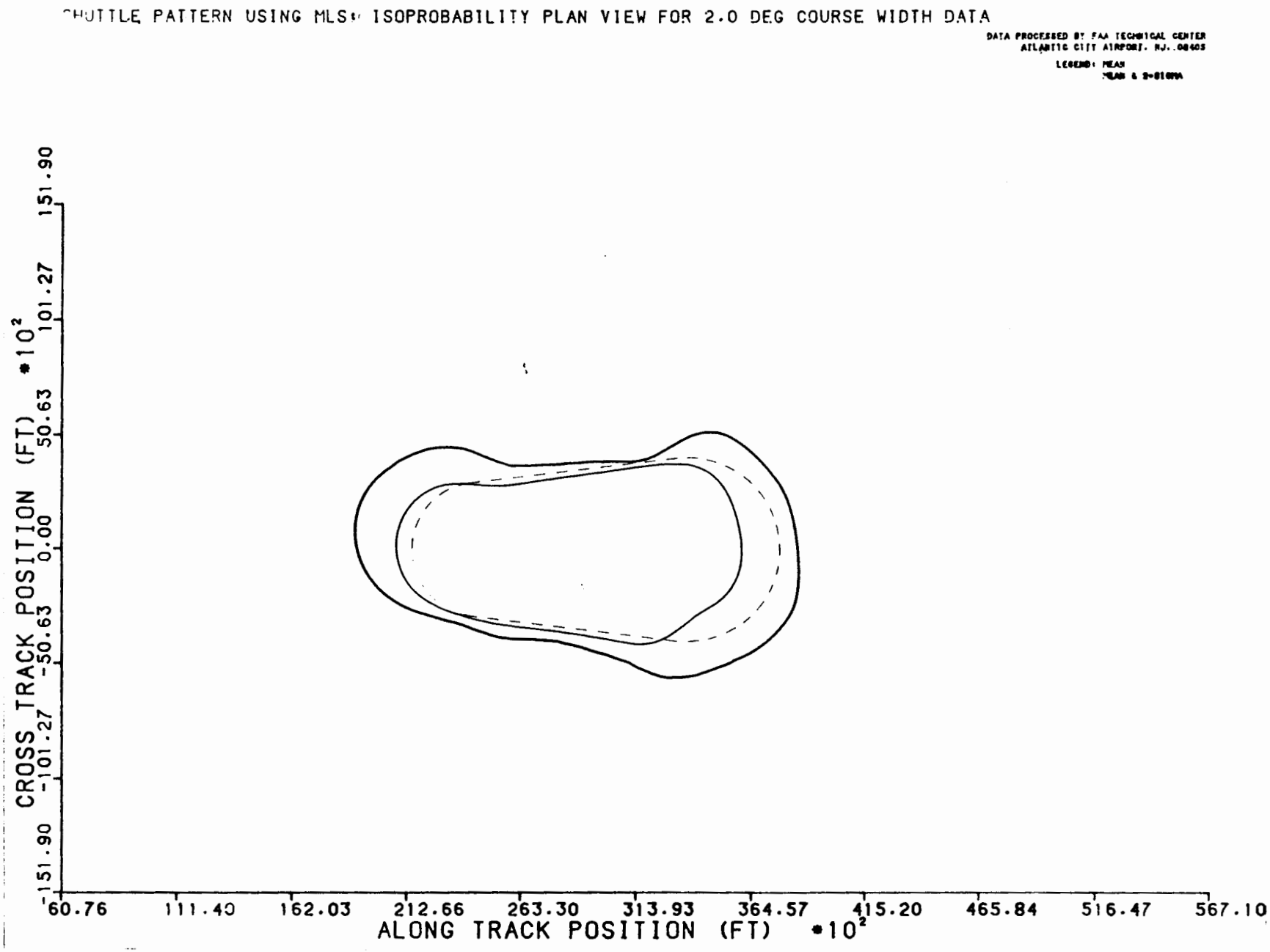


FIGURE 11. 95 PERCENT ISOPROBABILITY PLOT OF PLAN VIEW OF 2.0° SHUTTLE PATTERN

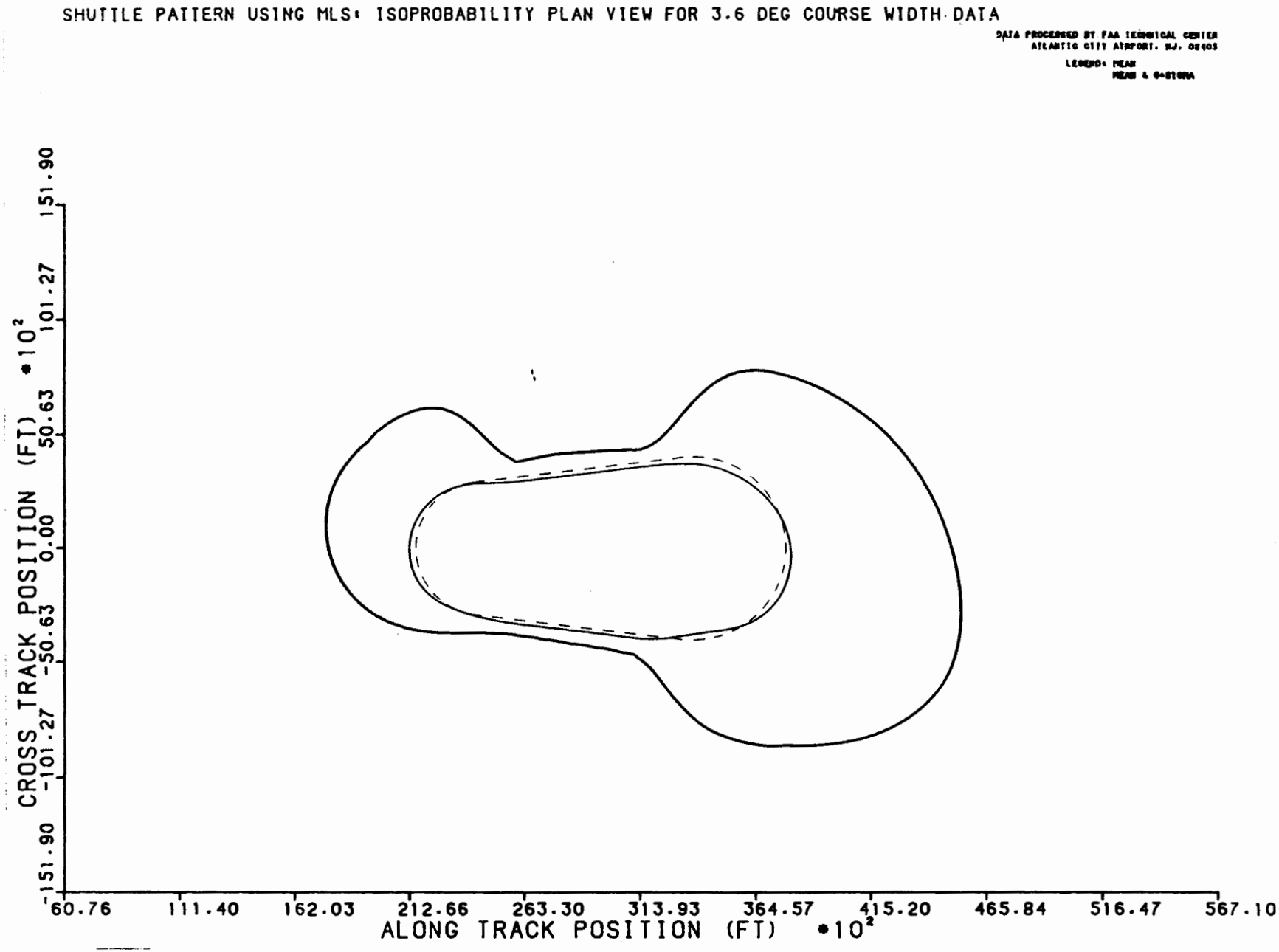


FIGURE 12. 99.999999 PERCENT ISOPROBABILITY PLOT OF PLAN VIEW OF 3.6° SHUTTLE PATTERN

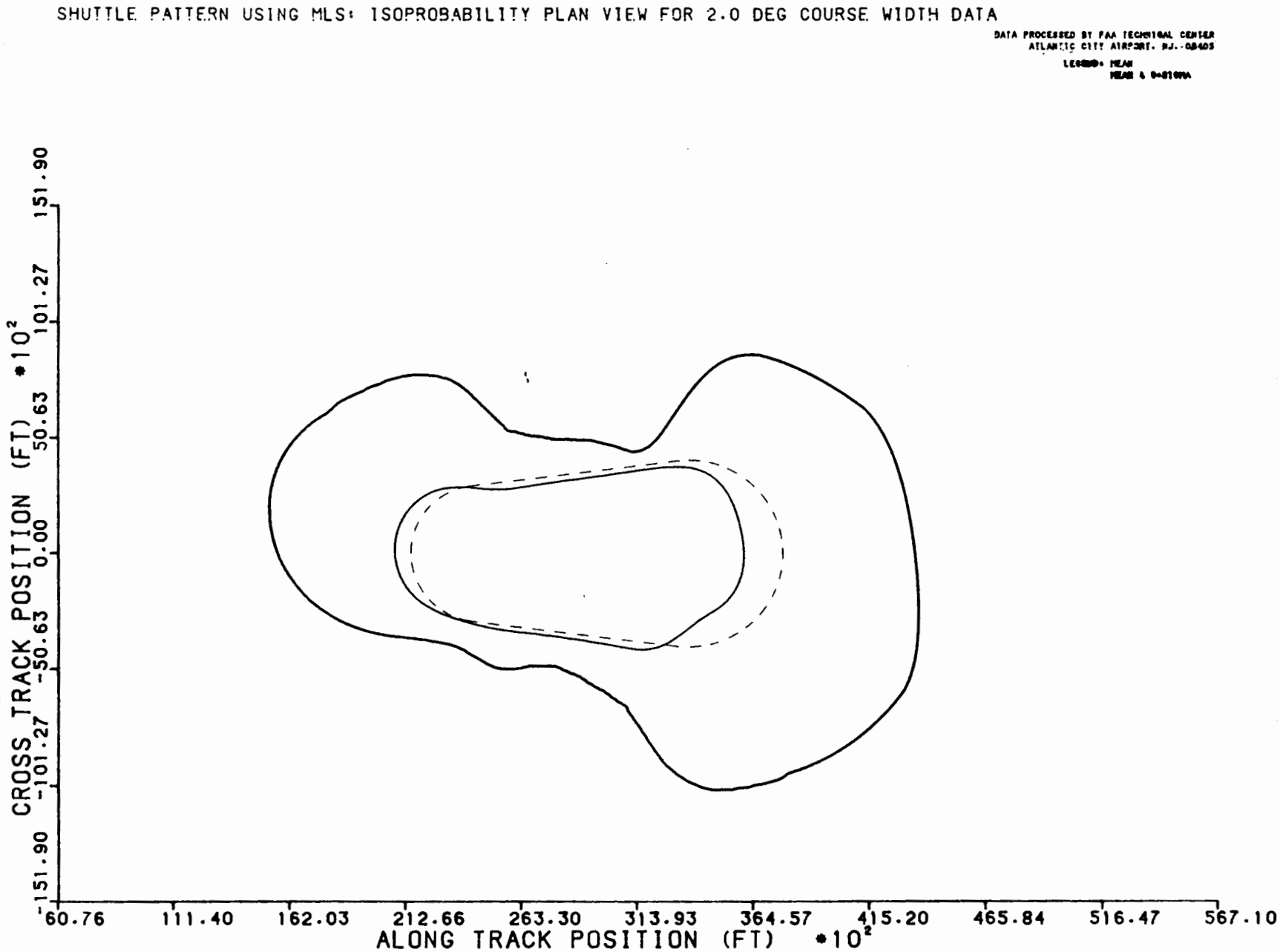


FIGURE 13. 99.999999 PERCENT ISOPROBABILITY PLOT OF PLAN 2.0° SHUTTLE PATTERN

APPENDIX A

DIGITAL PRESCALE PROCESSOR

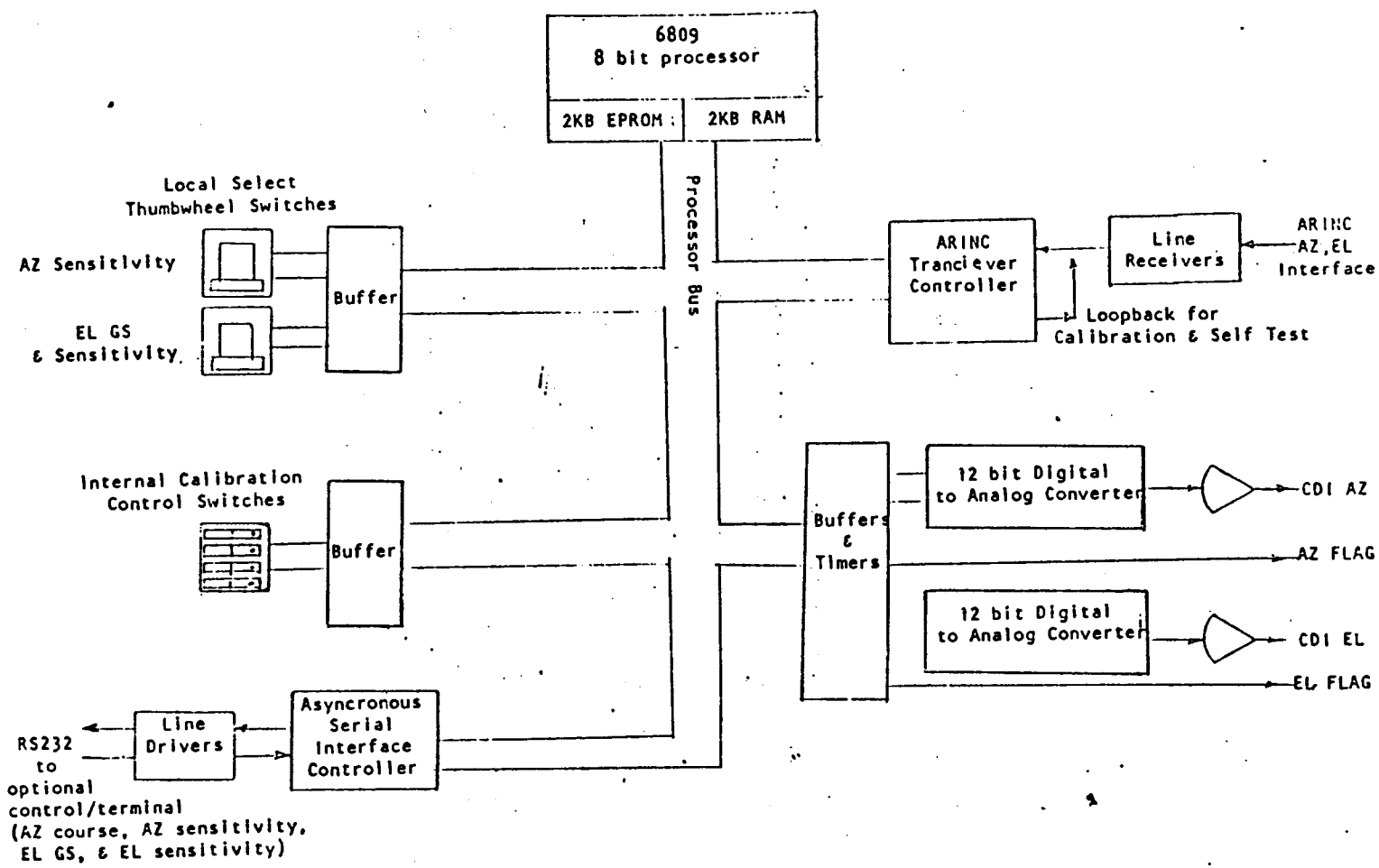


FIGURE A-1. DIGITAL PRESCALE PROCESSOR AND CDI DRIVER BLOCK DIAGRAM

1. OVERVIEW.

The Digital Prescale Processor (DIGPRE) unit is a self-contained device to supply course deviation data from microwave landing system (MLS), providing the facility for variation of such parameters as azimuth (AZ) course offset, elevation (EL) glideslope, and AZ EL course sensitivity.

The unit is contained within a 17 3/16 x 10 x 2 9/16 inch case requiring a single 28 volts direct current (Vdc) power source. The unit is supplied with an 18 5/8 x 11 1/2 inch bottom cover plate, providing flanges for mounting.

Local control of parameters is accomplished by means of two panel-mounted BCD switches. Remote control of parameters is accomplished by means of an RS-232C asyncronous serial interface to a terminal-type device, such as a TRS-80 model 100.

Power is controlled by the 1 ampere aircuit breaker. A processor reset switch is supplied, and the processor is equipped with power-on restart.

2. OPERATING PROCEDURES.

The DIGPRE unit is operated initially after master reset or power-up under control of the local BCD thumbwheel switches. Two of these switches are provided: the leftmost switch for AZ control and the rightmost switch for EL control. During operation under local control, the unit operates with an AZ course offset of zero. Two ranges of AZ course width sensitivity are provided and the range in operation is selected with one of the internal DIP switches (see installation and calibration). The single EL switch selects both glideslope and course width sensitivity for the EL signal output. The switch positions with their asociated operating conditions are listed below. The course width is the off-course angle which will produce the "full-scale" deflection output of 150 millivolts direct current (mVdc).

AZ Switch Position	Selected Course Width (in degrees)		EL Switch Position	Glideslope (in degrees)	Course (in degrees)
	Range "A"	Range "B"		Angle	Width
0	2.25	3.25	0	3.0	0.75
1	2.75	3.50	1	3.0	1.00
2	3.25	3.75	2	4.5	1.125
3	3.75	4.00	3	4.5	1.50
4	4.25	4.25	4	6.0	1.50
5	4.75	4.50	5	6.0	2.00
6	5.25	4.75	6	7.5	1.875
7	5.75	5.00	7	7.5	2.50
8	6.25	5.25	8	9.0	2.25
9	6.75	5.50	9	9.0	3.00

The DIGPRE unit may also be operated remotely through an RS232C asyncronous serial interface to an ASCII terminal such as a TRS-80 model 100 portable computer in terminal mode. The terminal should be set for seven bit characters, even parity, two stop bits, with XOFF characters enabled. The DIGPRE communications interpreter will ignore embedded spaces and tabs and will accept

an end-of-line indication consisting of carriage return, line feed, EOT character, or any combination thereof. A list of acceptable command formats and their functions are listed below:

Command Format	Effect
CS	Show current settings in effect.
AAsnn.nnn	Change AZ offset angle to snn.nnn degrees.
AC nn.nnn	Change AZ course width to +/- nn.nnn degrees.
EA nn.nnn	Change EL glideslope angle to nn.nnn degrees.
EC nn.nnn	Change EL course width to +/- nn.nnn degrees.
UL	Use local (BCD switch) data.
DH	Disable input character echoing.
DF	Enable input character echoing.

where

s is the relative sign, +(right) or -(left)
nn.nnn is the desired angle in degrees (also n.nnn, .nn,n.,etc)

The acceptance of a valid "AA", "AC", "EA", or "EC" command will switch the DIGPRE unit from "local" to "remote" control. Under remote control, the DIGPRE unit will disregard the thumbwheel switch positions and will operate under the selected parameter setting. After the transition from local to remote control, all unassigned parameters will remain at their last settings (i.e., from the BCD switches) as of the time that the command which caused the transition was accepted. All settings will remain constant regardless of the front panel switches until they are expressly assigned from the remote terminal. The DIGPRE unit will revert to local control upon either the acceptance of a "UL" command, or upon hardware reset from the panel push-button.

Note that the "CS" command when used with the DIGPRE unit under local control will display the last values actually used in conjunction with input data of the appropriate type (AZ or EL). A change of the thumbwheel switch position will not be reflected by the "CS" response unless the appropriate data are being received from the MLS unit. With the DIGPRE unit under remote control, the "CS" response will accurately reflect the current parameter settings whether the unit is processing MLS data or not.

3. INSTALLATION CALIBRATION.

The main interface signals between the DIGPRE unit and external systems are routed through two Cannon connectors: J1 (inputs) and J2 (outputs). A third connector (J3) is provided for RS232C interface to a remote control terminal. The output connector pins are assigned in pairs, providing a reference level for each output. The pin assignments are as follows:

Inputs (J1 MS3120E 12-10P)

A	+28 Vdc Power source
B	28 V power return
C	Arinc "A" input
D	Arinc Common input
E	Arinc "B" input
F	Flag logic "False" source
G	Flag logic "True" source
H	Spare
J	Spare
K	Spare

RS232 (J3 DBC-25S)

2	Rx Data (input)
3	Tx Data (output)
7	Signal Common

Outputs (J2 MS3120E 14-19S)

A	Analog AZ output (variable scale)
B	Reference for A
C	AZ flag output (main)
P	Reference for C
N	TTL-level AZ flag
L	Reference for N
D	Future analog AZ (constant scale)
E	Reference for D
R	Analog EL output (variable scale)
S	Reference for R
V	EL flag output (main)
T	Reference for V
U	TTL-level EL flag
K	Reference for U
F	Future analog EL (constant scale)
G	Reference for F
J	+28 Vdc power output (switched)
H	28 V return
M	Spare

Four DIP switches mounted on the circuit card inside the DIGPRE unit allow for the selection of the following parameters:

Switch	Function when 0 (ON)	Function when 1 (OFF)
4	Normal EL output	Invert EL analog output signal
3	Normal AZ output	Invert AZ analog output signal
2	Normal Operation	Execute Calibration Routine
1	Select AZ Range "A"	Select AZ Range "B"

It is recommended that a sticker be placed on the exterior of the unit, near the AZ thumbwheel switch, reflecting the position of the AZ range select switch.

When the DIGPRE unit is placed in Calibration Mode (DIP switch 3 off and reset), the unit will not respond to either the RS232C or to the ARINC inputs. The unit will execute the following states:

State	Function	Duration	Drive	Flag
0	0 to +2047 by +1	+1 sec	Direct	True
1	+2047 to 0 by -1	+1 sec	Direct	True
2	0 to -2047 by -1	+1 sec	Direct	True
3	-2047 to 0 by +1	+1 sec	Direct	True
4	0 out	4.8 ms	Loopback	False
5	+CW out	4.8 ms	Loopback	False
6	Right clrnc out	4.8 ms	Loopback	False
7	0 out	4.8 ms	Loopback	False
8	-CW out	4.8 ms	Loopback	False
9	Left Clrnc out	4.8 ms	Loopback	False
10	Flag	4.8 ms	Loopback	True

States 4 through 10 execute repetitively over a 33.6 ms cycle, producing a stable scope output for adjustment of output gain and zero offset at the analog output

buffer amplifier. These states drive the loopback capability of the WD1993 ARINC tranceiver at the highest possible frame rate of the ARINC interface, resulting in the verification of the operational reception firmware and hardware under conditions far more demanding than those expected during normal MLS operation.

Since the calbration outputs are designed for laboratory testing, the signals vary too rapidly for aircraft instrumentation.

Therefore, use of the calibration mode is not recommended once the unit is delivered and installed.

Alternatively, the unit may be calibrated in operational mode by means of an external controlled MLS signal generator.

A red LED is provided on the MUPAK circuit card to warn of an erroneously connected "harmonica" connector on the card interface connector.

4. THEORY OF OPERATION.

4.1 HARDWARE.

The unit hardware is based on a MC6809 advanced 8-bit microprocessor. The unit is provided with 2 Kbyte of RAM and 4 Kbyte of UV-erasable PROM. The read ($\overline{?RE}$) and write ($\overline{?WQ}$) strobes required to interface to the intel 8085-type RAM and periperals are derrived with 74'-series (not 74LS') logic in order to stretch the strobe pulses to the requisite duration. Therefore, these functions should not be replaced with the faster low level Schottky logic.

The unit is powered by a CU18-5D10-12D3 multivoltage supply, providing main TTL (+5 Vdc) supply to 1 ampere, +12 Vdc and -12 Vdc analog circuit supply, each to 300 milliamperes, and a -5 Vdc supply which is not used by the DIGPRE unit. All power is derrived from the external 28 Vdc source which typically also acts as the logic voltage levels for the flag signals to the CDI instrumentation.

The flag logic signals are isolated from the main circuitry and are selected through a dual DPDT DIP relay; thus, permitting any desired signals to be used as the flag logic level signals. The delivered configuration derives flag logic "False" (flag hidden) and flag logic.

"True" (flag showing) signals from two input pins on J1. Any desired signals (to 120 V/1 A) may be applied to these inputs. A typical installation would select +28 Vdc as flag logic "False" and 28 V return as flag logic "True." The main DIGPRE circuitry floats with respect to aircraft ground and to the supply return line. The output reference for analog AZ and EL (crosspointer) signals and for the TTL-level flags is the common circuitry ground level (Vss).

The output reference for the main AZ and EL flags is the supplied flag logic "True" signal (typically 28 V return).

The circuitry is built on a single, double-width MUPAK wire-wrap card and is interfaced through one of the two 3 x 36 pin edge mounted connectors. An edge connector orientation error indicator LED is provided in the circuit to detect erroneous modes of connection of the "harmonica" plugs which connect to the off-card mating connectors.

The primary interface to the MLS unit is a Western Digital WD1993 ARINC tranceiver. This device, wired for reception and loopback testing only (no transmit), is wired to interrupt the processor through the IRQ interrupt line and is provided with hardware interrupt.

The hardware provided for ARINC interface reception from the MLS unit is complicated by requirements for a variable configuration. In order to conform to good engineering practices, the ARINC input circuit is designed to use a dual differential input line receiver, maintaining at least 15 k between the input lines and the unit's ground reference, eliminating the possibility of "ground loops." The 75140 receiver selected enable operation over a wide range of positive and negative potential differences between the ARINC common and the DIGPRE unit ground.

However, since the selected receivers were not immediately available, and in order to assure the earliest possible availability of the DIGPRE unit, an alternate configuration was included. The alternate configuration uses available 8T37 single-ended line receivers with the ARINC common lead strapped directly to unit ground. This type of configuration has worked in the past with adequately short lead lengths to the MLS receiver unit, so this should suffice until the 75140 receivers become available. The configuration to be used is selected by the simple exchange of a single header.

The primary analog outputs are the course deviation voltage levels to the course distance indicator (CDI) AZ and EL needles. These voltage levels are derrived by means of two DAC80Z-CBI-V 12-bit digital-to-analog (D/A) converters. The D/As output a voltage level in the range of +2.5 to -2.5 Vdc. This output level is reduced to an output range of +300 to -300 mVdc through the gain control of the LM747 output buffering op-amps. The processor interface configuration is designed to assure simultaneous update of all 12 bits, despite the 8-bit processor data bus. The most significant byte, containing the four most significant bits of the digital data, is written to one of the two addresses which select the MSB buffer latch. Since this latch is common to both AZ and EL data transfer, only one of these parameters may be updated at any given time. When the least significant byte is written to the latch appropriate to the data (AZ or EL), the contents of the MSB buffer latch are simultaneously transferred to the most significant byte of the data latch. At the same time, a signetics 9602, dual retriggerable resettable monostable multivibrator, "one-shot" is retriggered to provide a valid data signal with an automatic time-out. This valid data signal is used to derrive the 28 Vdc and the TTL level voltages to remove the flag for the appropriate data from the CDI. Either of the levels of flag provided at the output jack of the unit may be selected as appropriate to the instrumentation of the aricraft. The automatic time-out feature is provided to assure a flag indication in event of MLS interface failure, insufficient data update rate, or DIGPRE processor malfunction. The flag indication can also be forced by the processor firmware by the write of any data to the appropriate address. The address decoding for the MSB buffer latch and for the AZ and EL data latches is arranged such that the 6809 processor's 16-bit register storage write cycles will properly enact the data update sequence for both AZ and EL updates.

Control of the DIGPRE unit is accomplished locally by means of the two panel-mounted BCD thumbwheel switches and a quad "DIP" switch mounted on the circuit card. These units are interfaced to the 6809 processor through 74LS373

devices which prevent data change during a processor read of the associated addresses. The BCD switches are presented to the processor in positive logic, with the leftmost switch (AZ) in the most significant four bits of the read data word and the rightmost switch (EL) in the least significant four bits. The DIP switches are presented to the processor in the least significant four bits of the data byte read from a different address and are interpreted such that a switch that is turned on will supply a logic 0 (false) indication to the processor.

Remote control of the DIGPRE unit is available by means of a serial RS232C data port operating through an MC6850 asyncronous serial interface adapter (ACIA). The link operating rate is header-selected from an MC14411 crystal controlled baud rate generator. The ACIA interrupts the processor through the 6809 FIRQ interrupt and must obtain its reset through firmware control.

APPENDIX B

UH-1 DATA COLLECTION SYSTEM

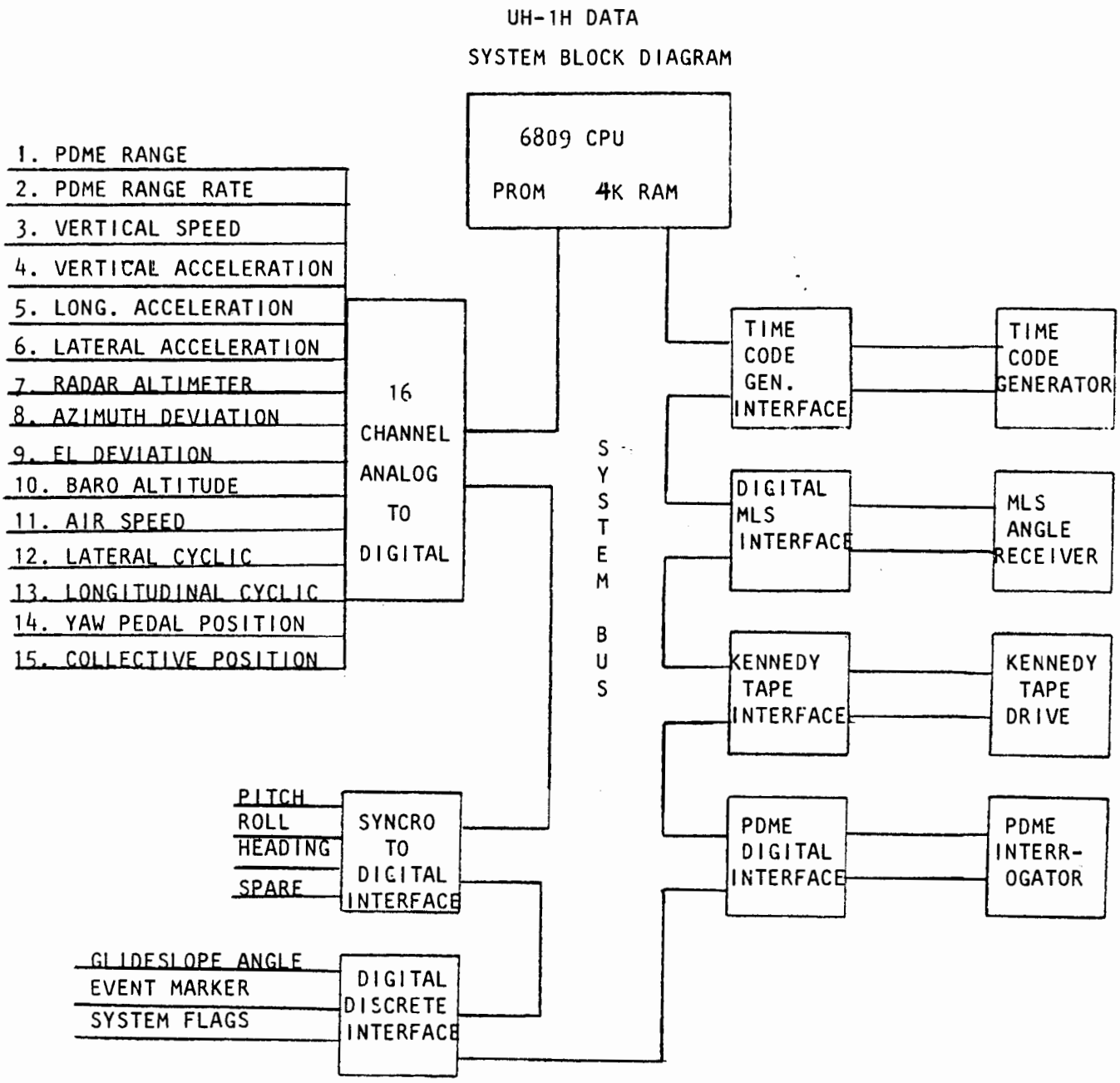
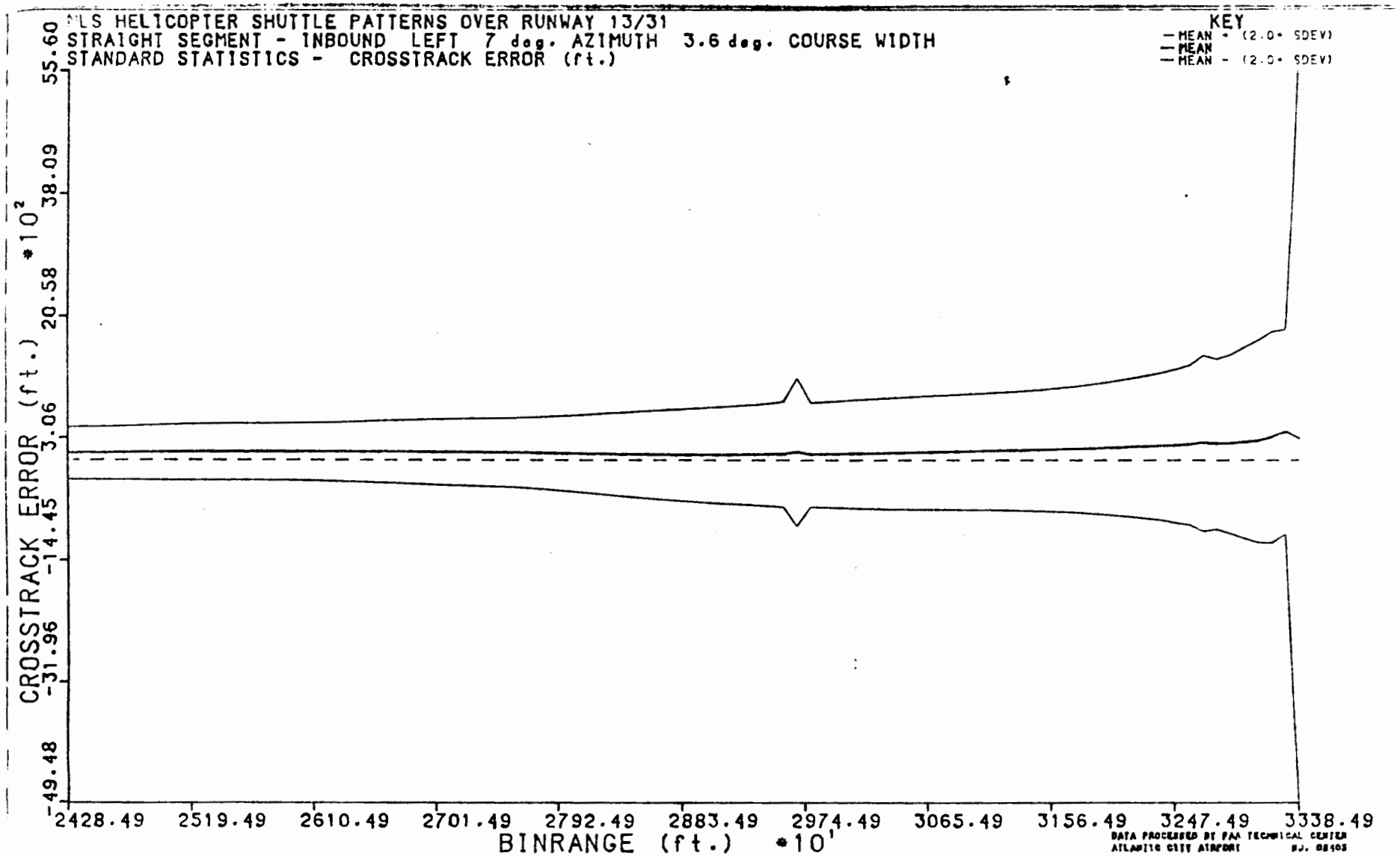
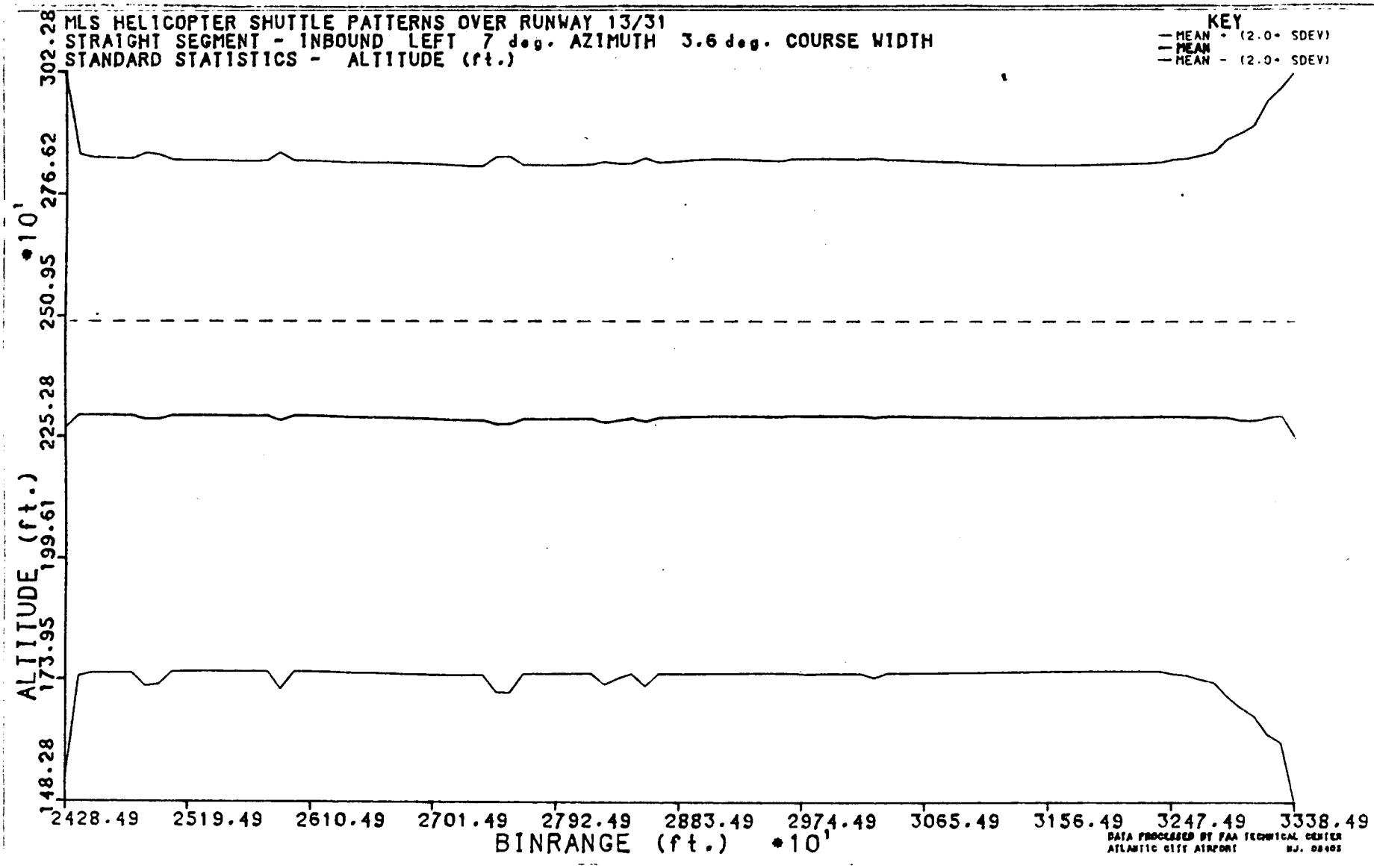


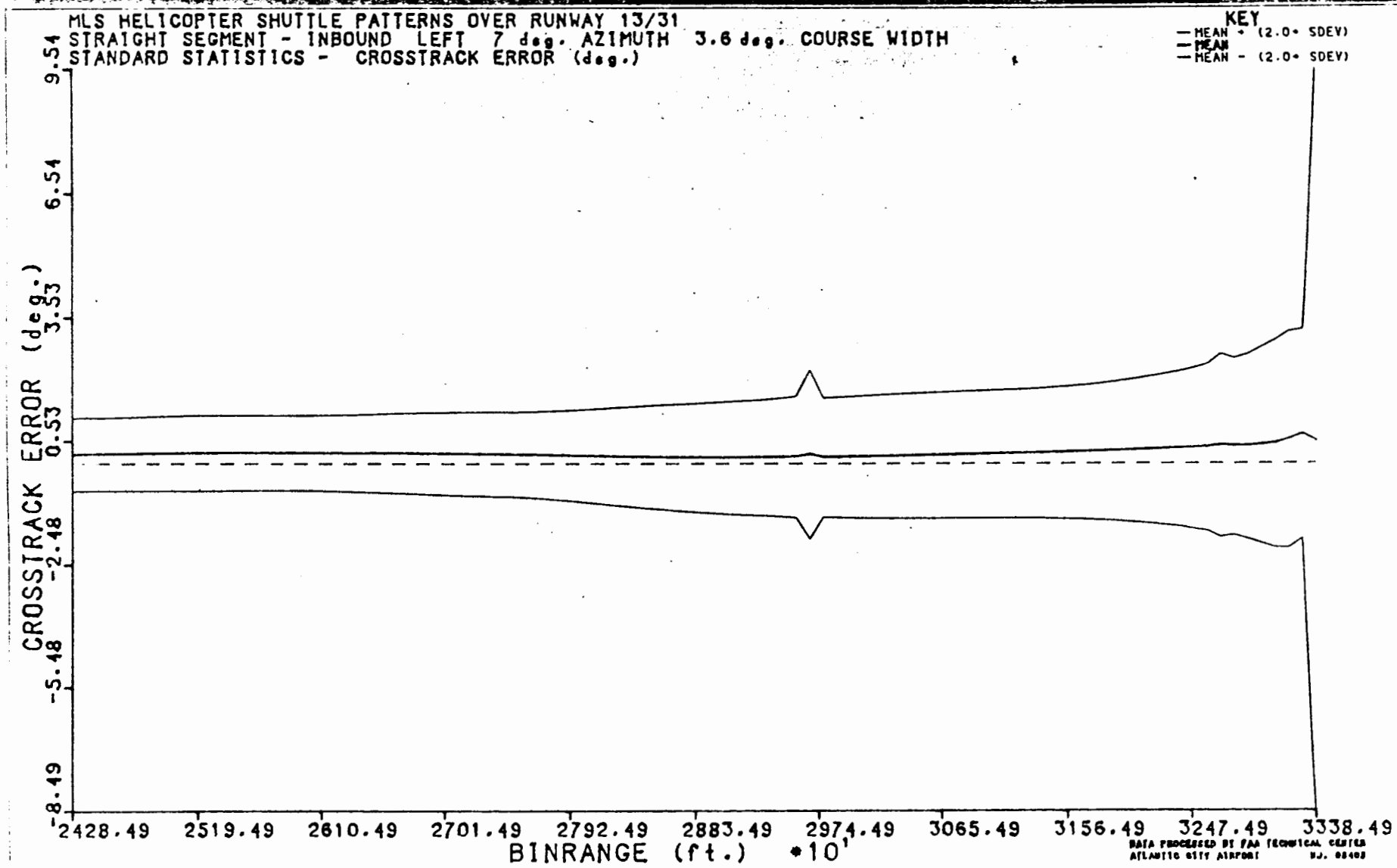
Figure B-1. UH-1H Data System Block Diagram

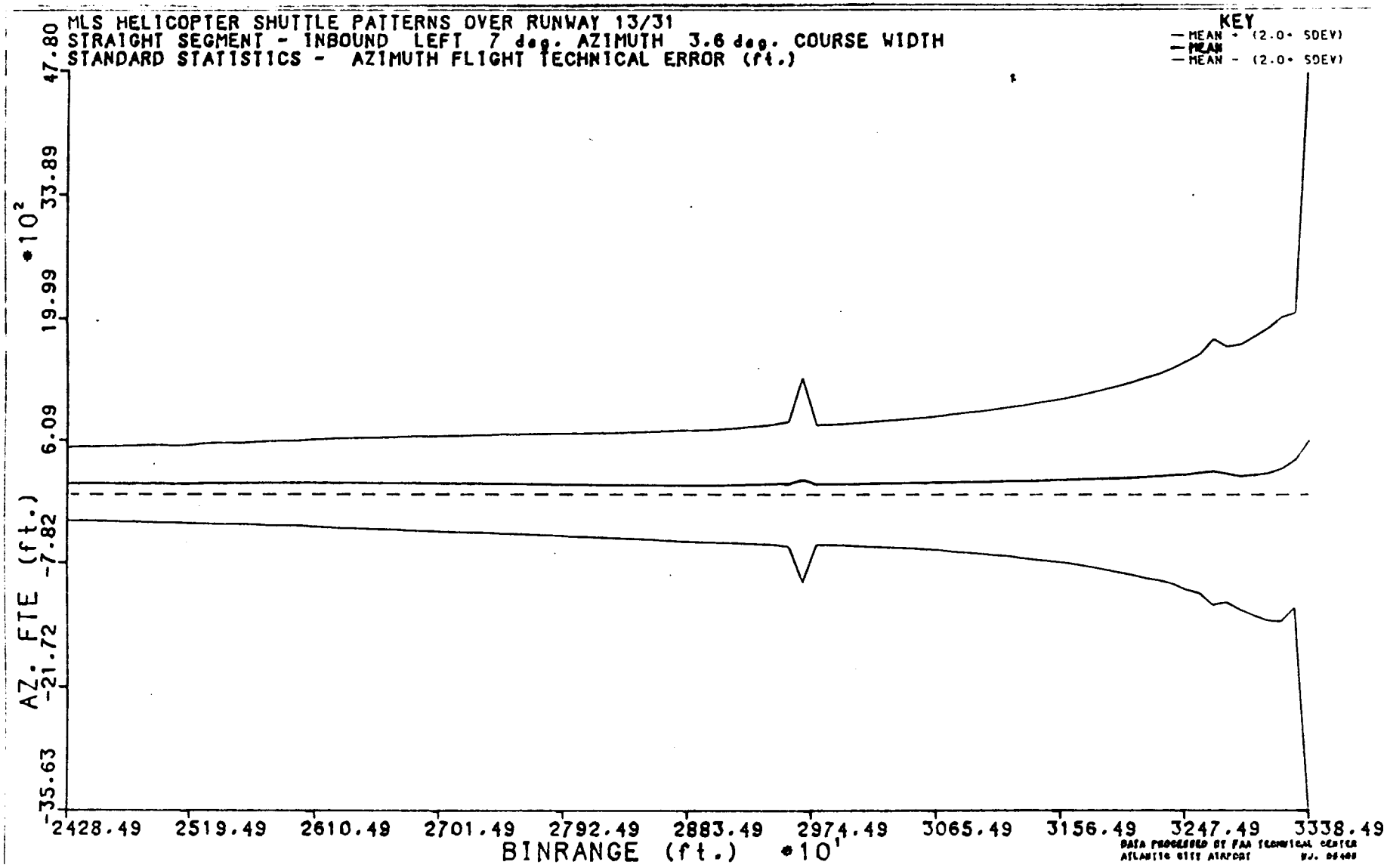
APPENDIX C

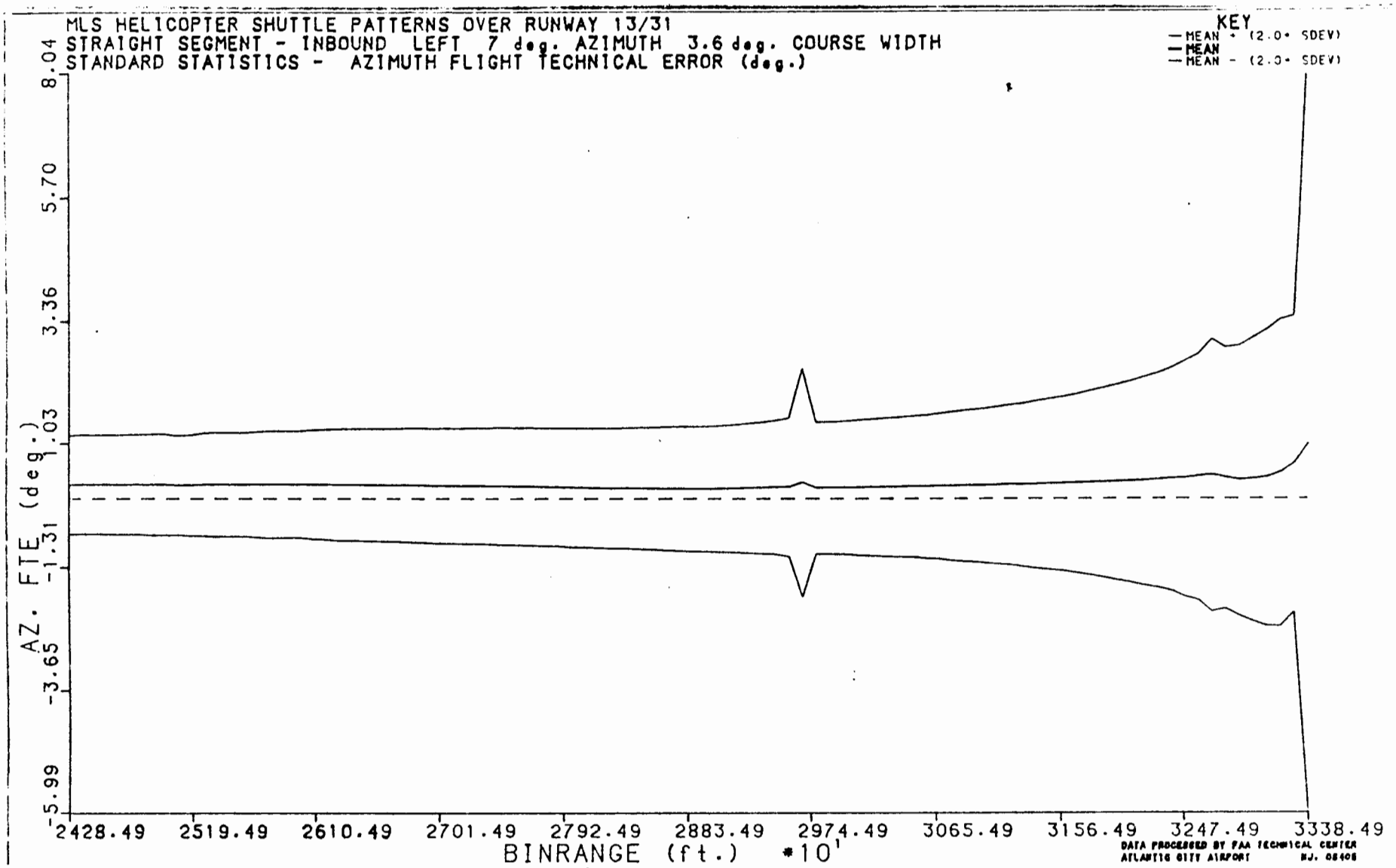
95 PERCENT ISOPROBABILITY PLOTS FOR 3.6° AND 2.0° INBOUND STRAIGHT SEGMENTS

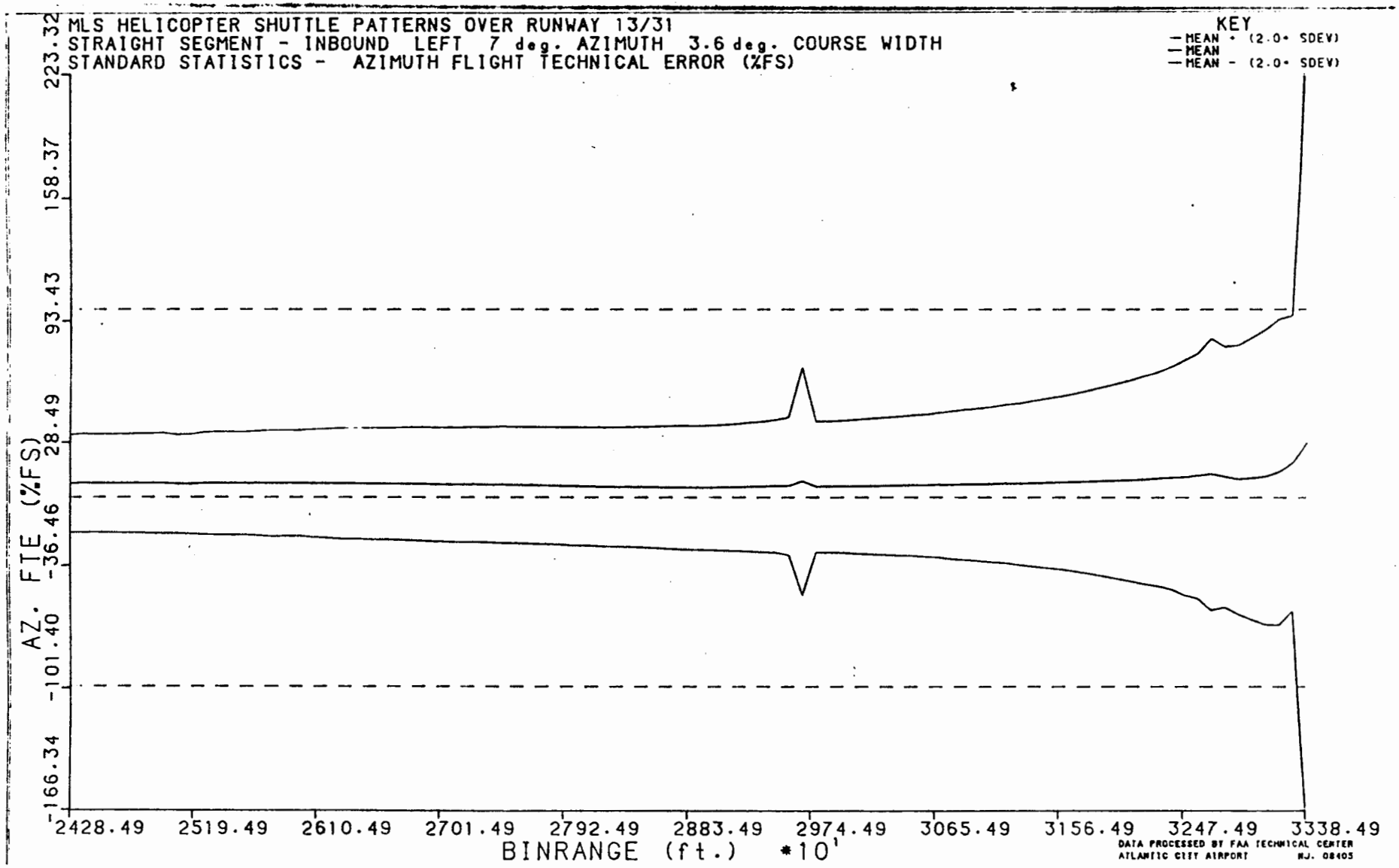

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK ERROR (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
CROSSTRACK ERROR (ft.) *10²
55.60
38.09
20.58
3.06
-14.45
-31.96
-49.48
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

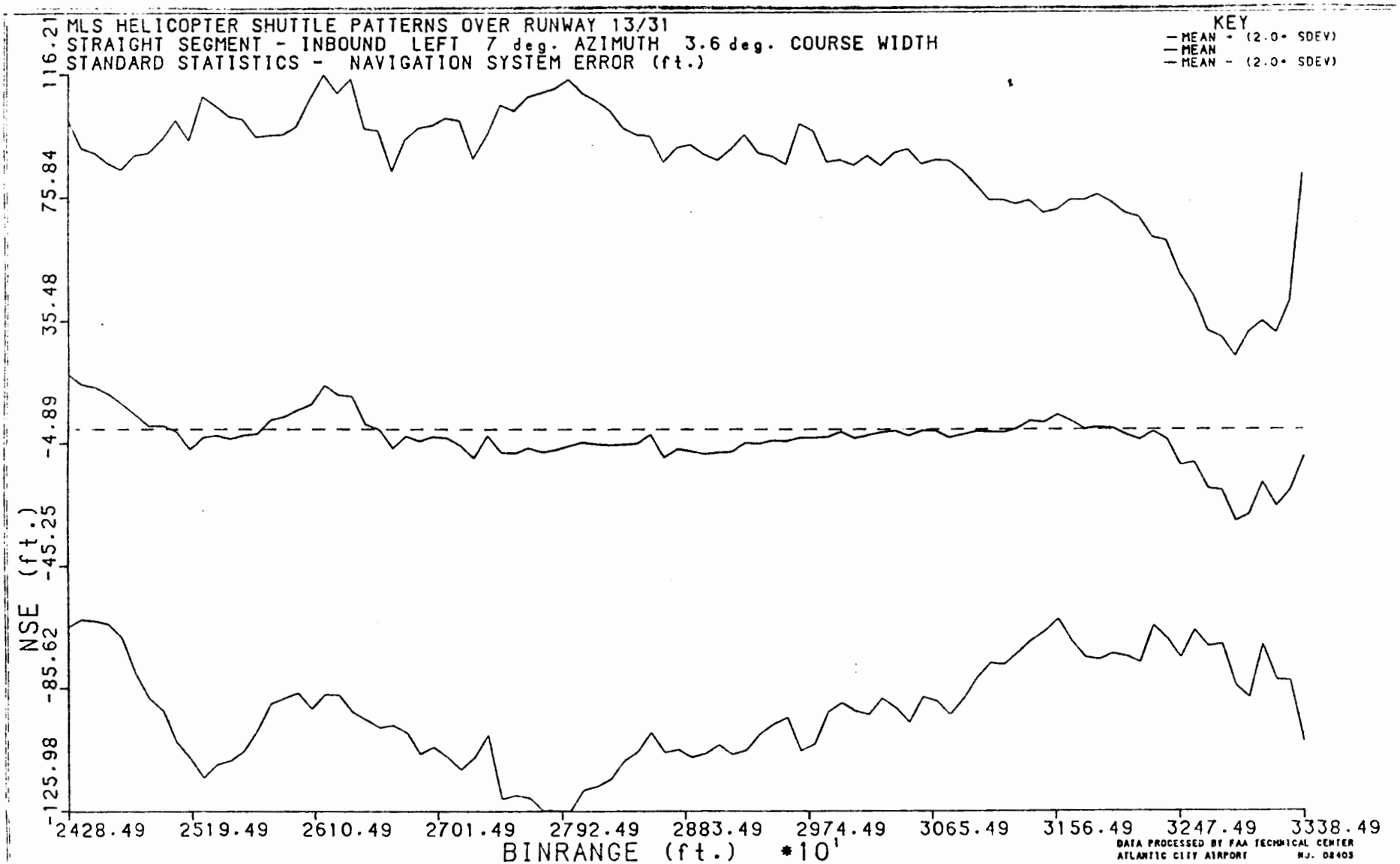

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALTITUDE (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
ALTITUDE (ft.) *10¹
302.28
276.62
250.95
225.28
199.61
173.95
148.28
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

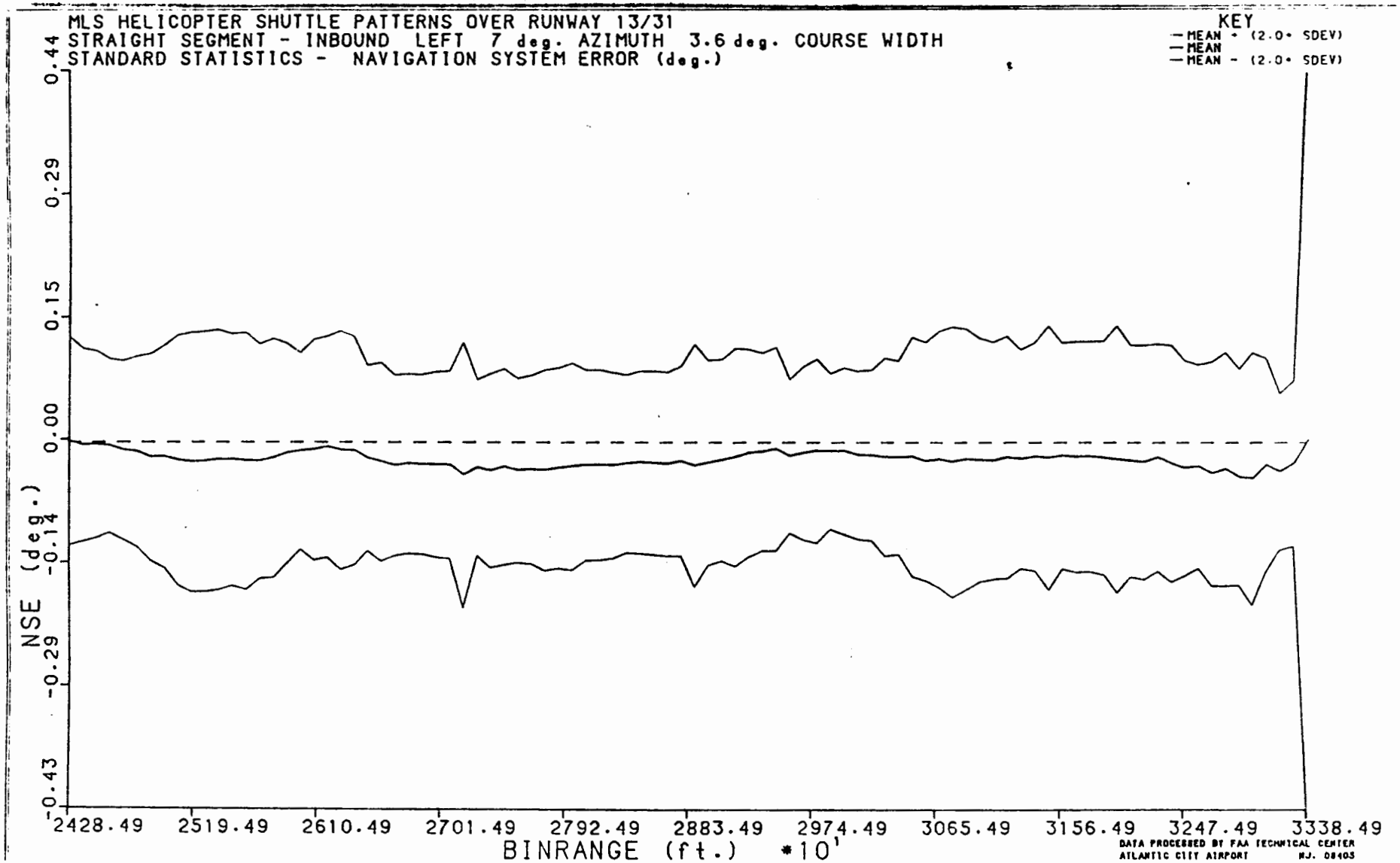

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK ERROR (deg.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
CROSSTRACK ERROR (deg.)
9.54
6.54
3.53
0.53
-2.48
-5.48
-8.49
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10'
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

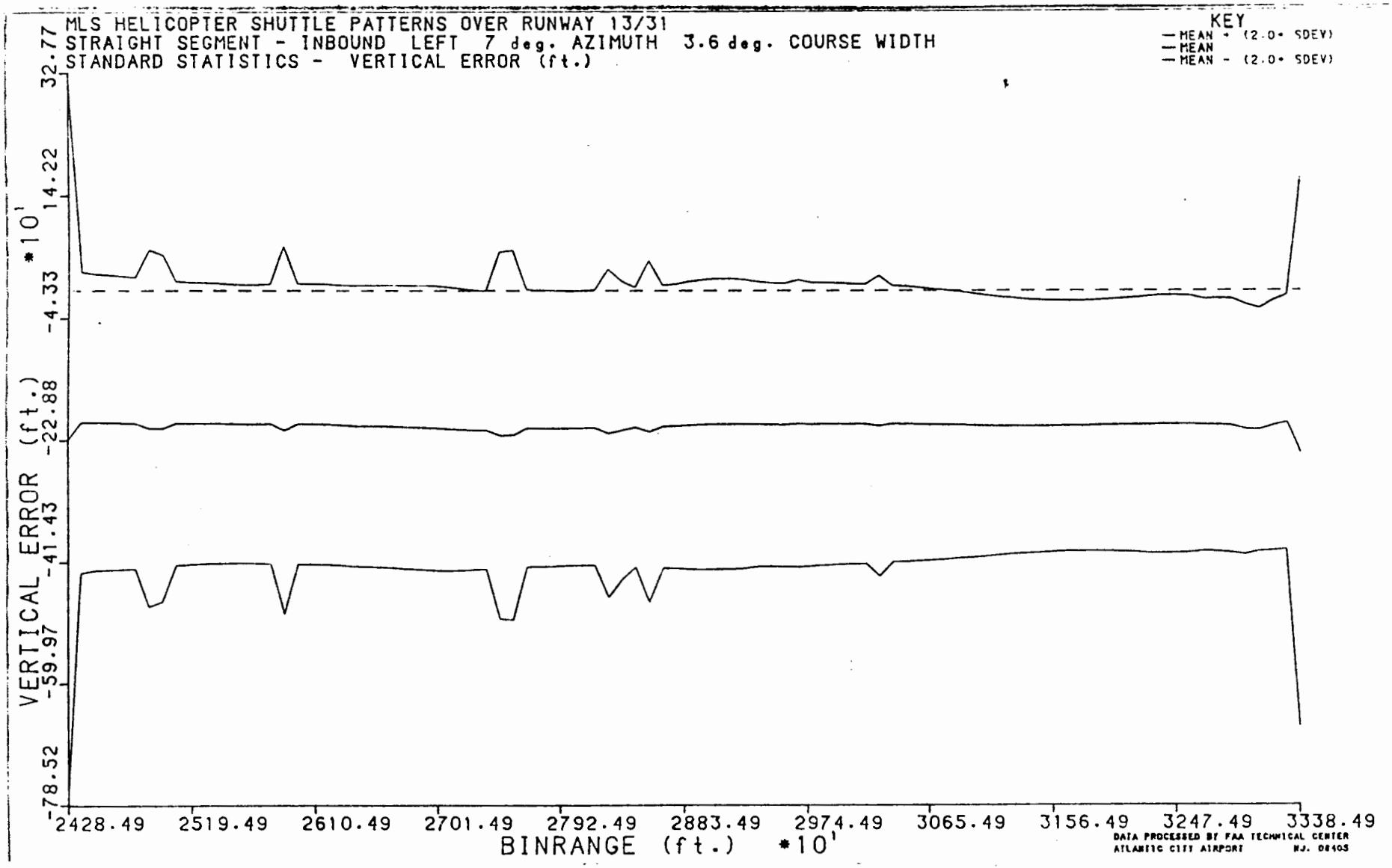

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
AZ. FTE (ft.)
*10²
47.80
33.89
19.99
6.09
-7.82
-21.72
-35.63
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

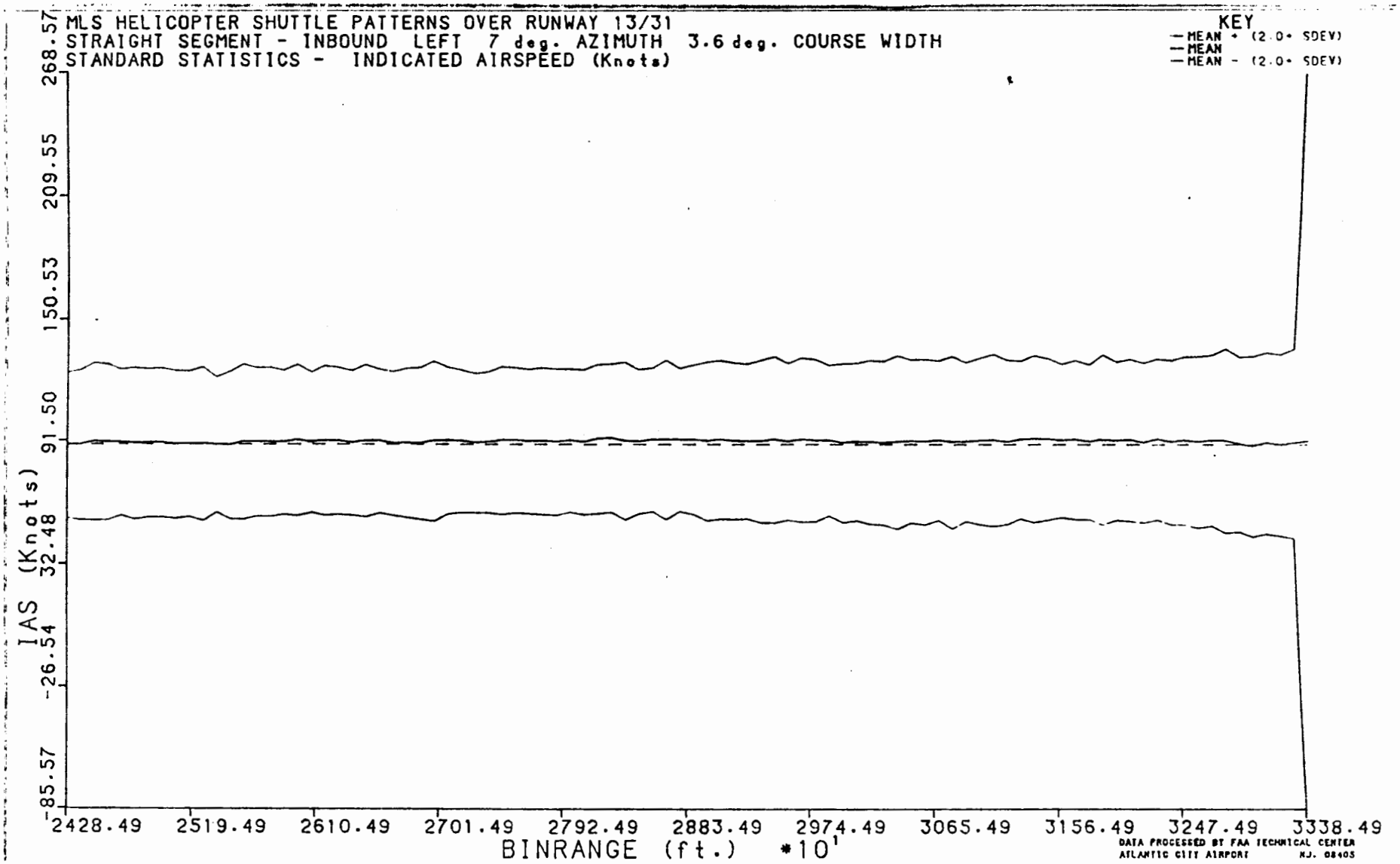

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (deg.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
AZ. FTE (deg.)
8.04
5.70
3.36
1.03
-1.31
-3.65
-5.99
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

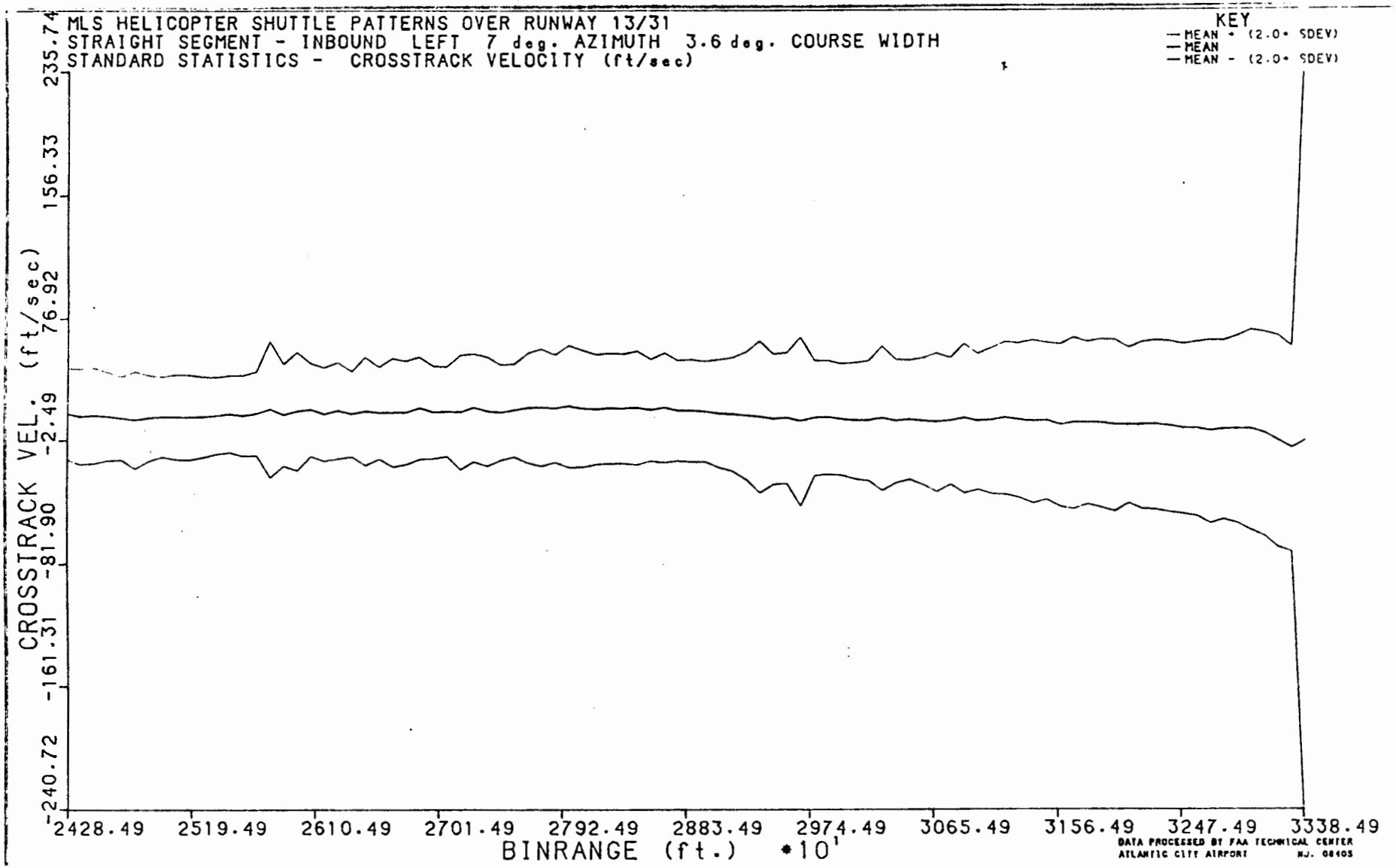

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (%FS)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
AZ. FTE (%FS)
223.32
158.37
93.43
28.49
-36.46
-101.40
-166.34
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10'
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

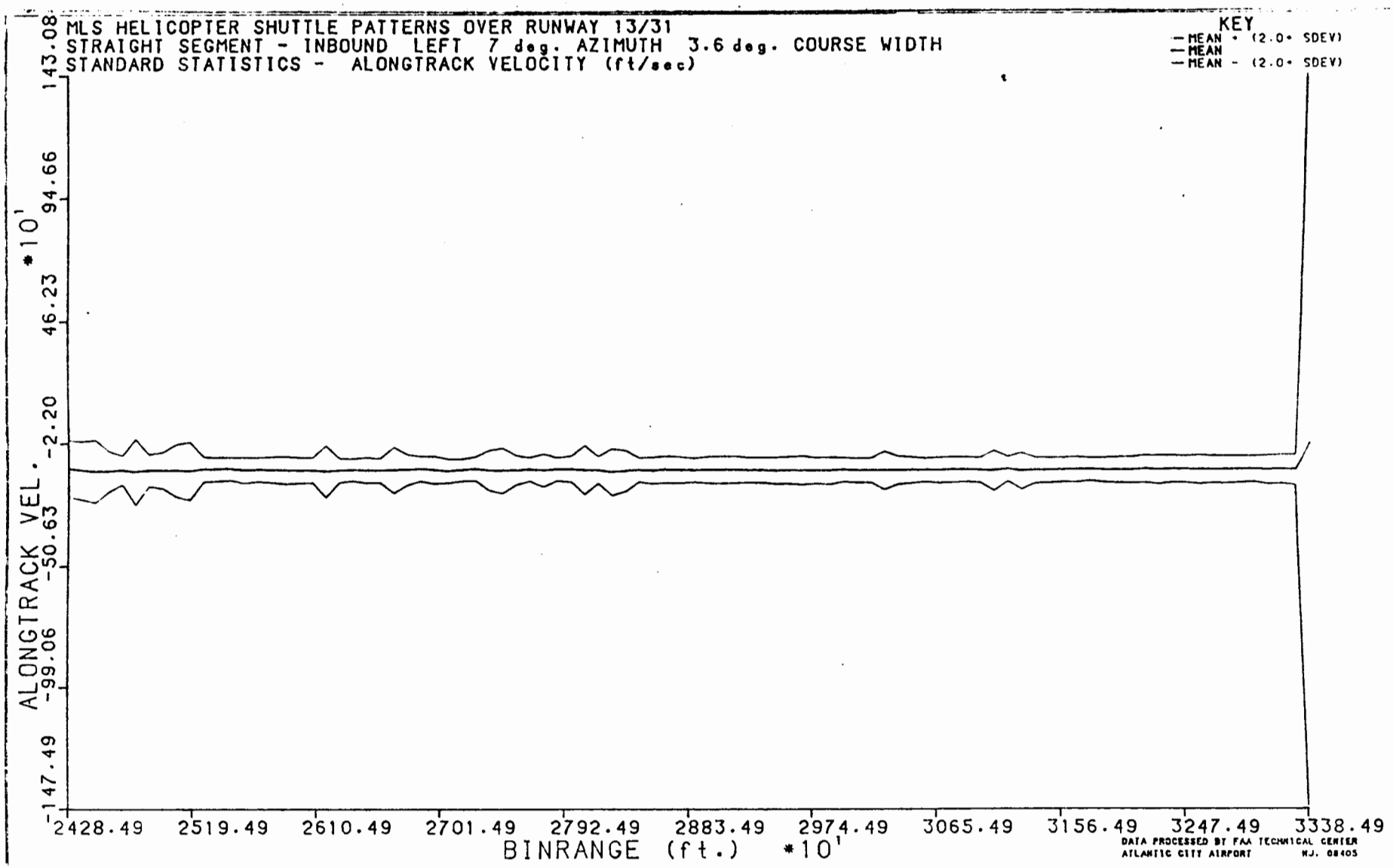

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - NAVIGATION SYSTEM ERROR (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
NSE (ft.)
116.21
75.84
35.48
-4.89
-45.25
-85.62
-125.98
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

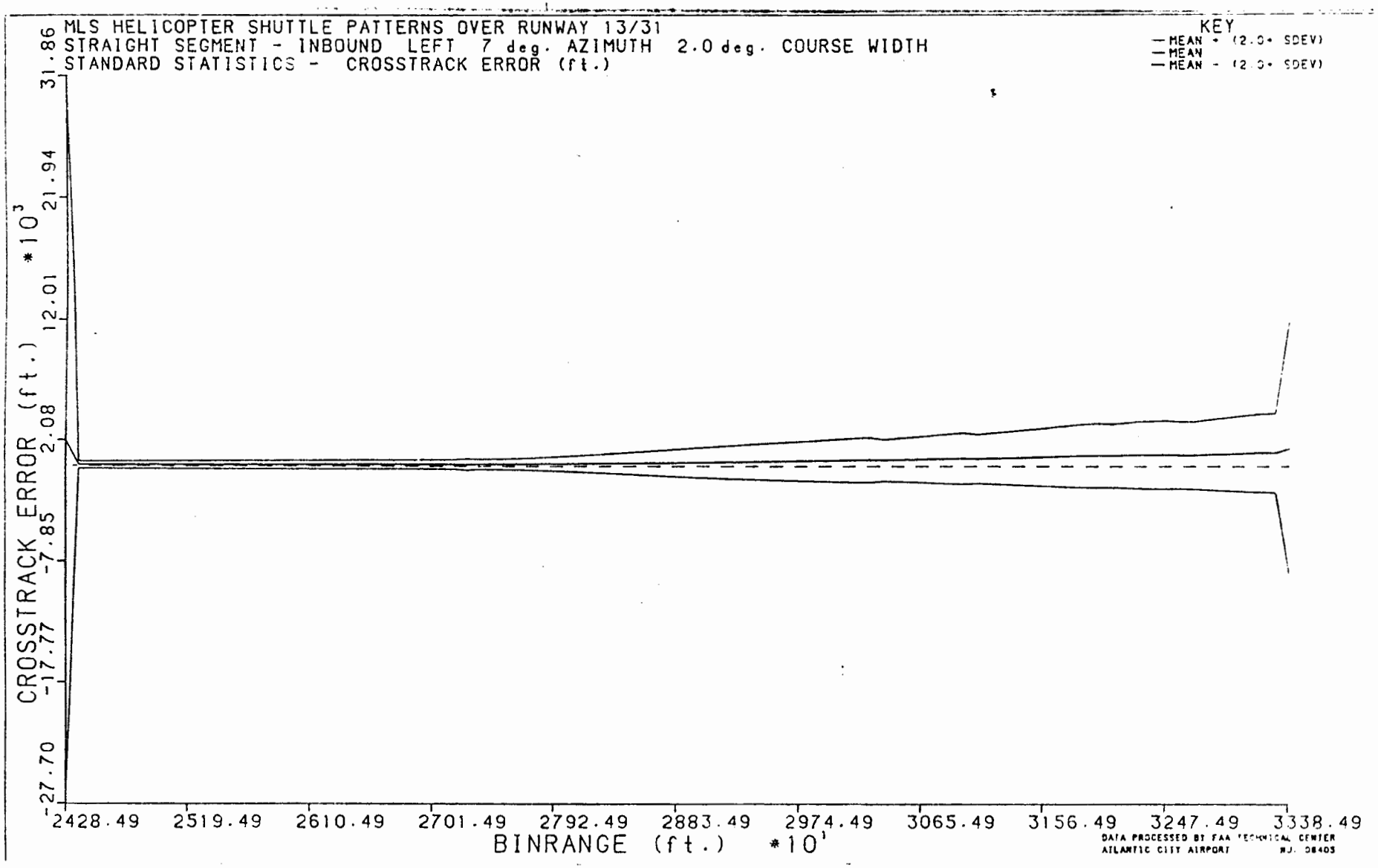

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - NAVIGATION SYSTEM ERROR (deg.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
NSE (deg.)
0.44
0.29
0.15
0.00
-0.14
-0.29
-0.43
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

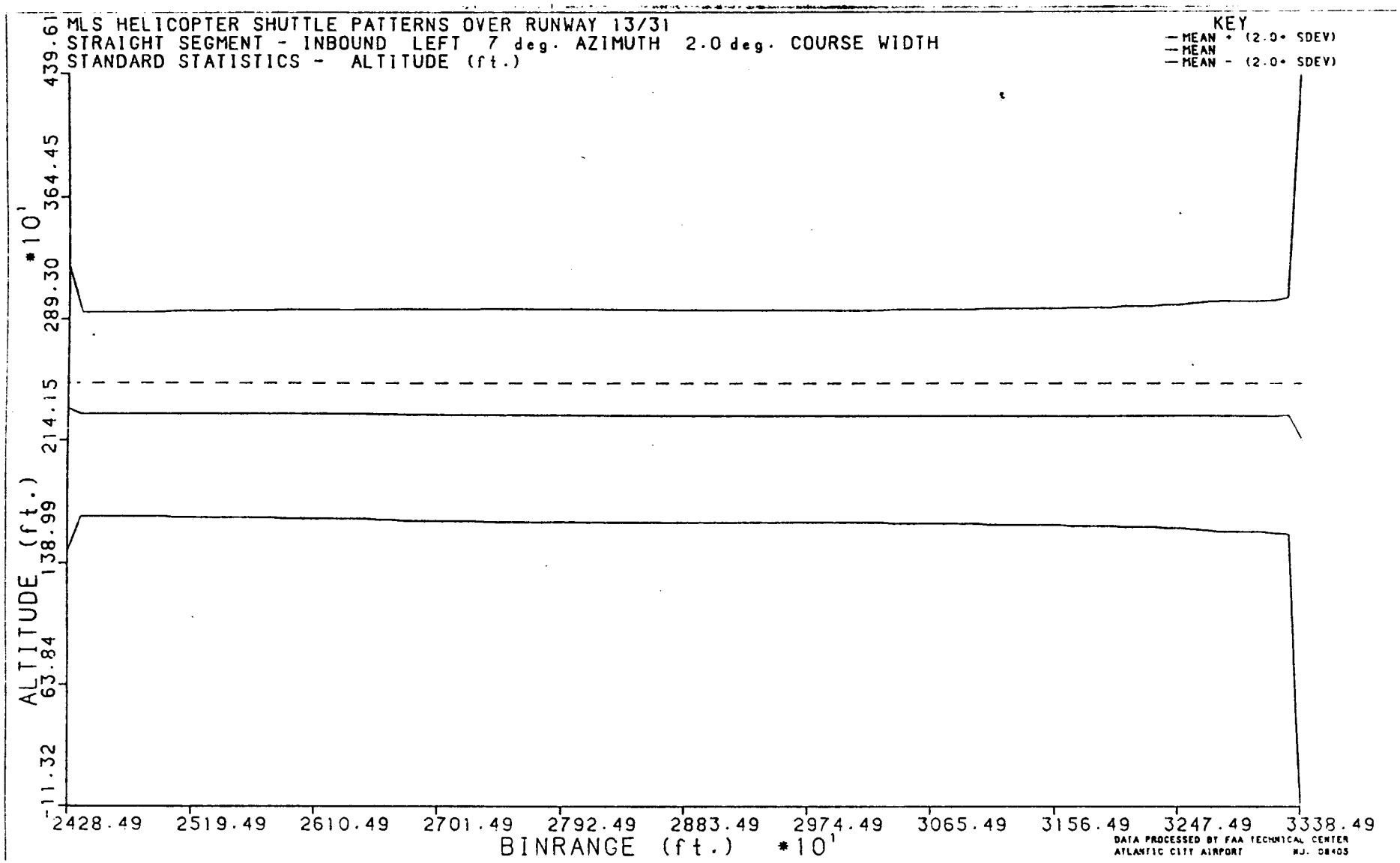

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - VERTICAL ERROR (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
VERTICAL ERROR (ft.) *10¹
32.77
14.22
-4.33
-22.88
-41.43
-59.97
-78.52
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

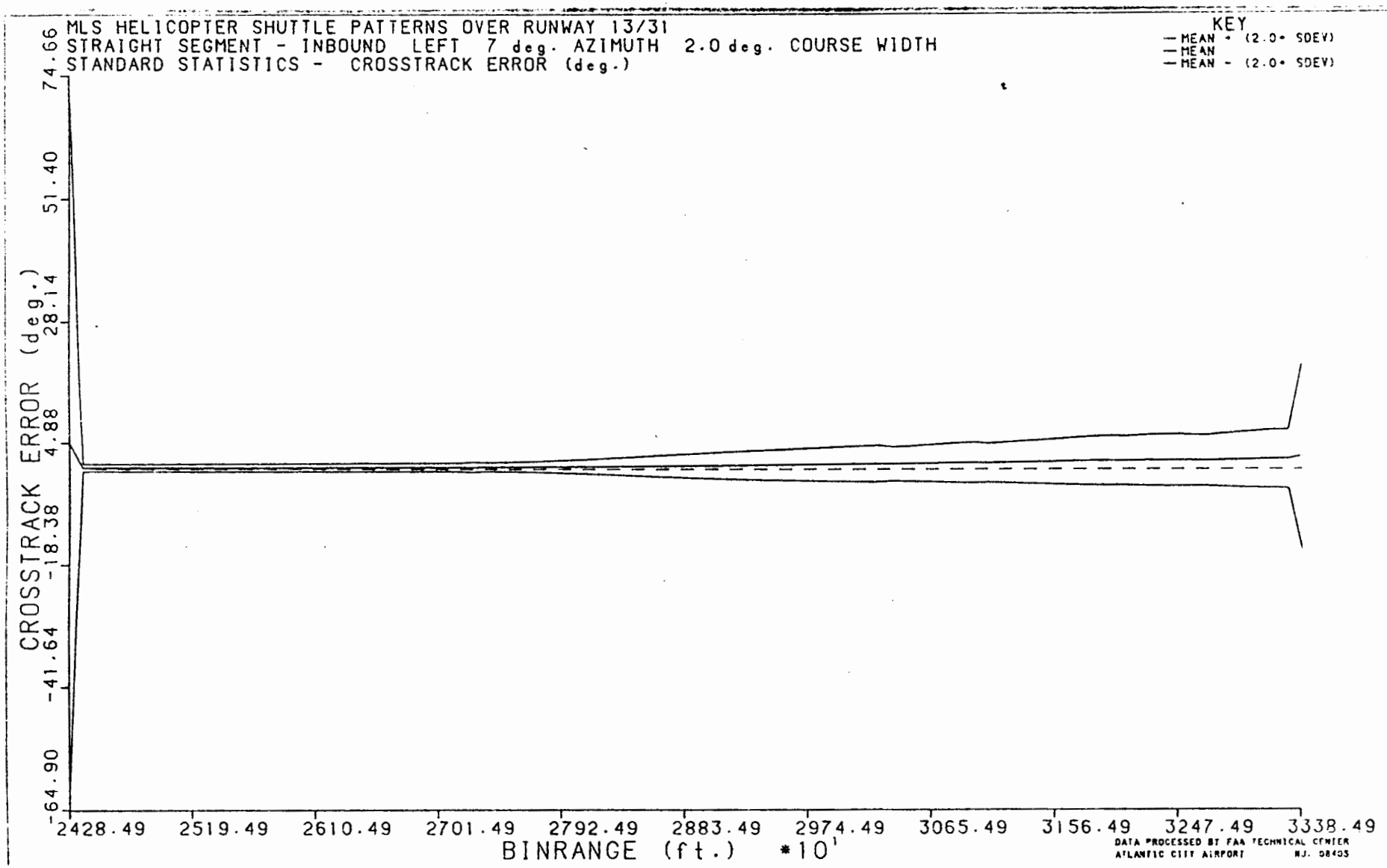

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - INDICATED AIRSPEED (Knots)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
IAS (Knots)
268.57
209.55
150.53
91.50
32.48
-26.54
-85.57
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

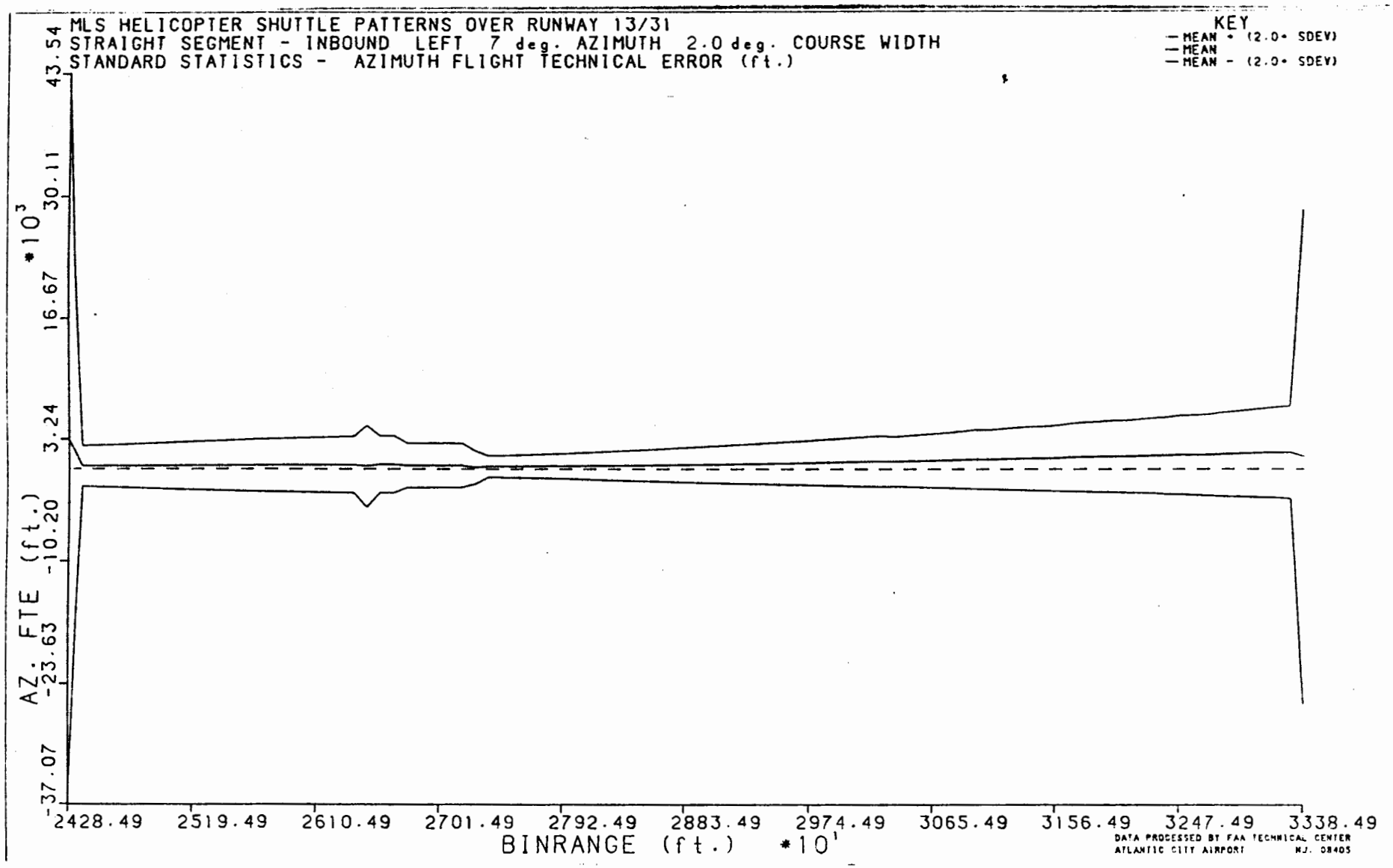

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK VELOCITY (ft/sec)
KEY
— MEAN + (2.0* SDEV)
— MEAN
— MEAN - (2.0* SDEV)
CROSSTRACK VEL. (ft/sec)
235.74
156.33
76.92
-2.49
-81.90
-161.31
-240.72
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

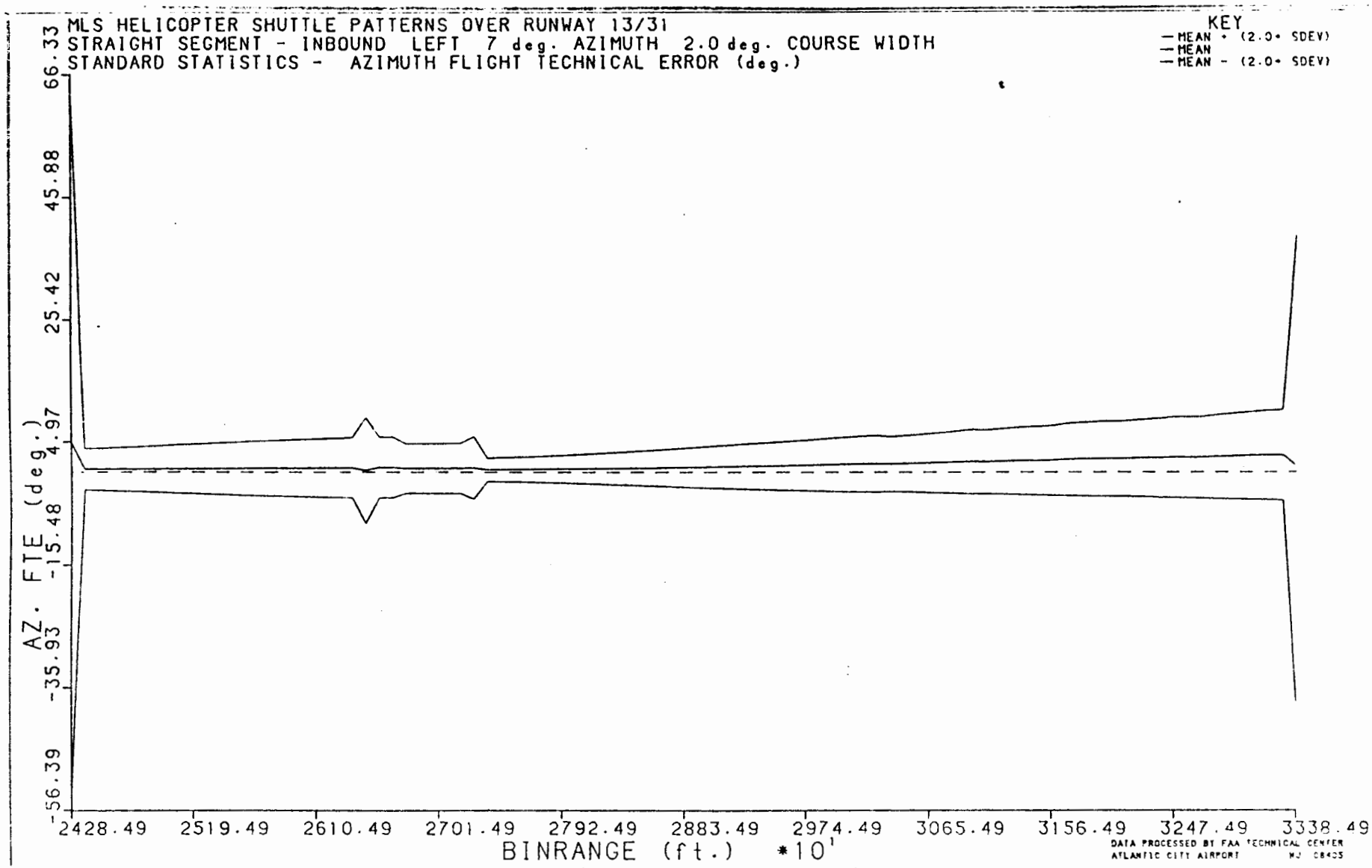

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK VELOCITY (ft/sec)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
ALONGTRACK VEL. *10¹
143.08
94.66
46.23
-2.20
-50.63
-99.06
-147.49
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

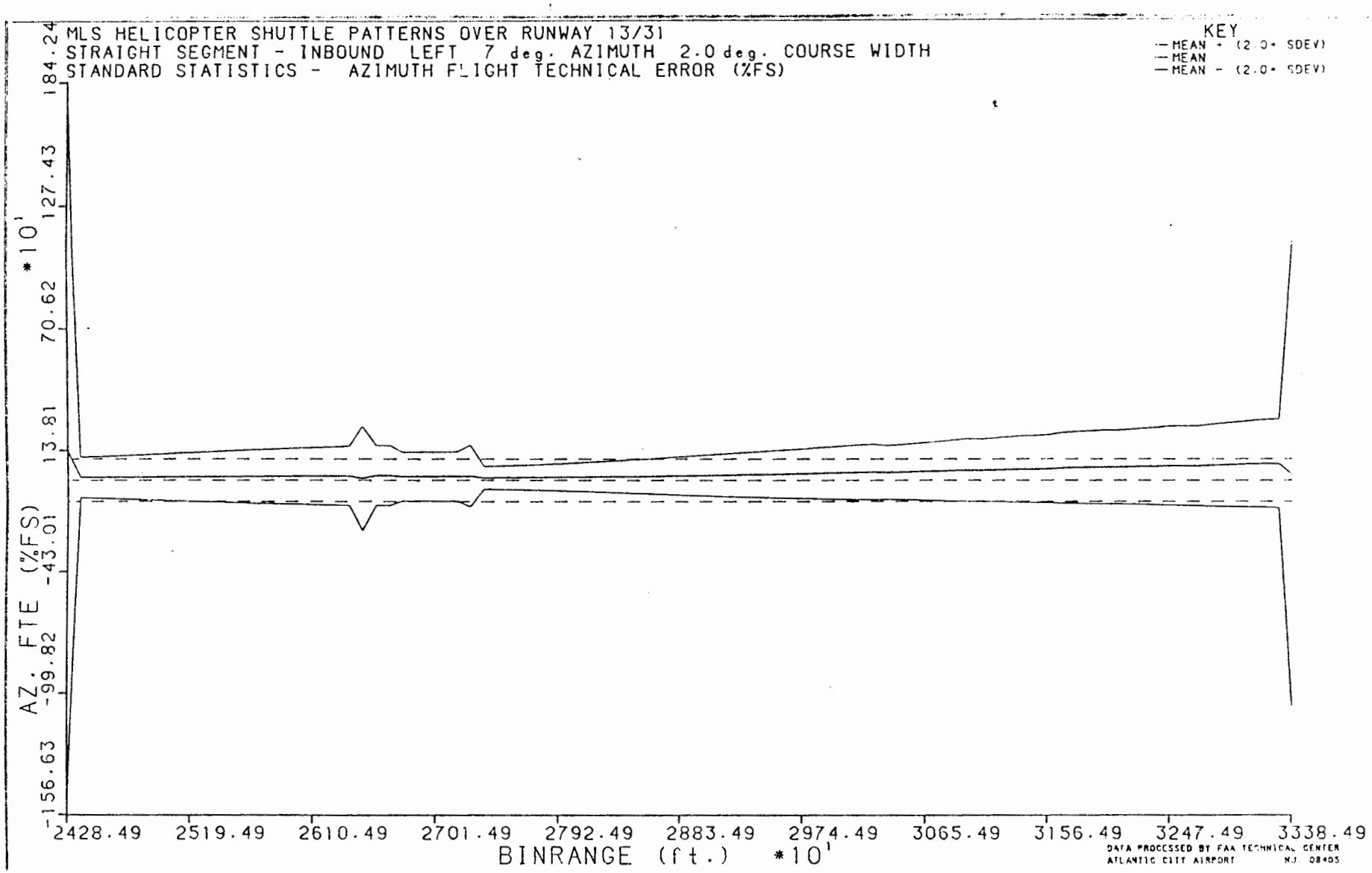

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK ERROR (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
CROSSTRACK ERROR (ft.) *10³
31.86
21.94
12.01
2.08
-7.85
-17.77
-27.70
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

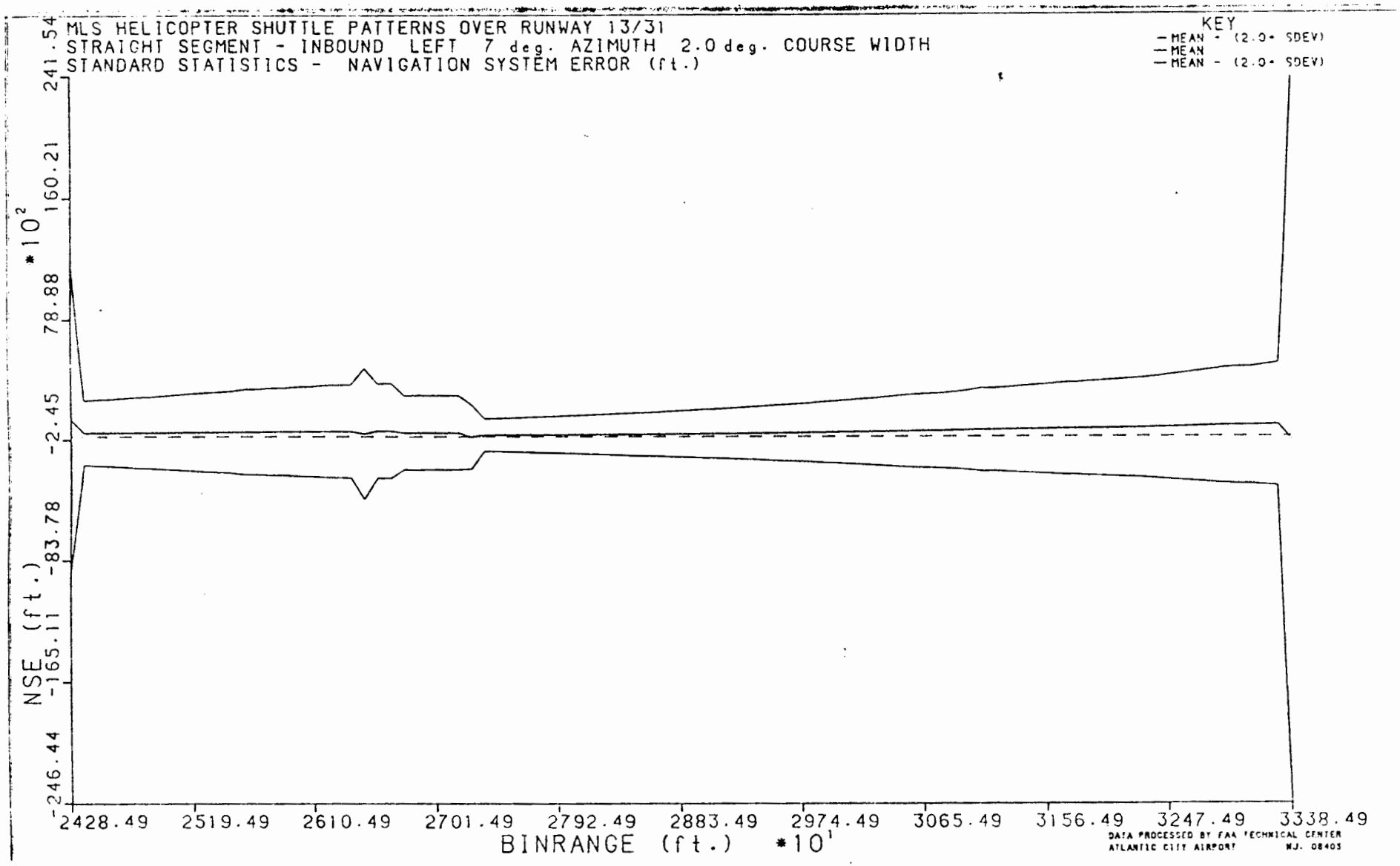

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALTITUDE (ft.)
KEY
— MEAN + (2.0* SDEV)
— MEAN
— MEAN - (2.0* SDEV)
ALTITUDE (ft.) *10¹
439.61
364.45
289.30
214.15
138.99
63.84
-11.32
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

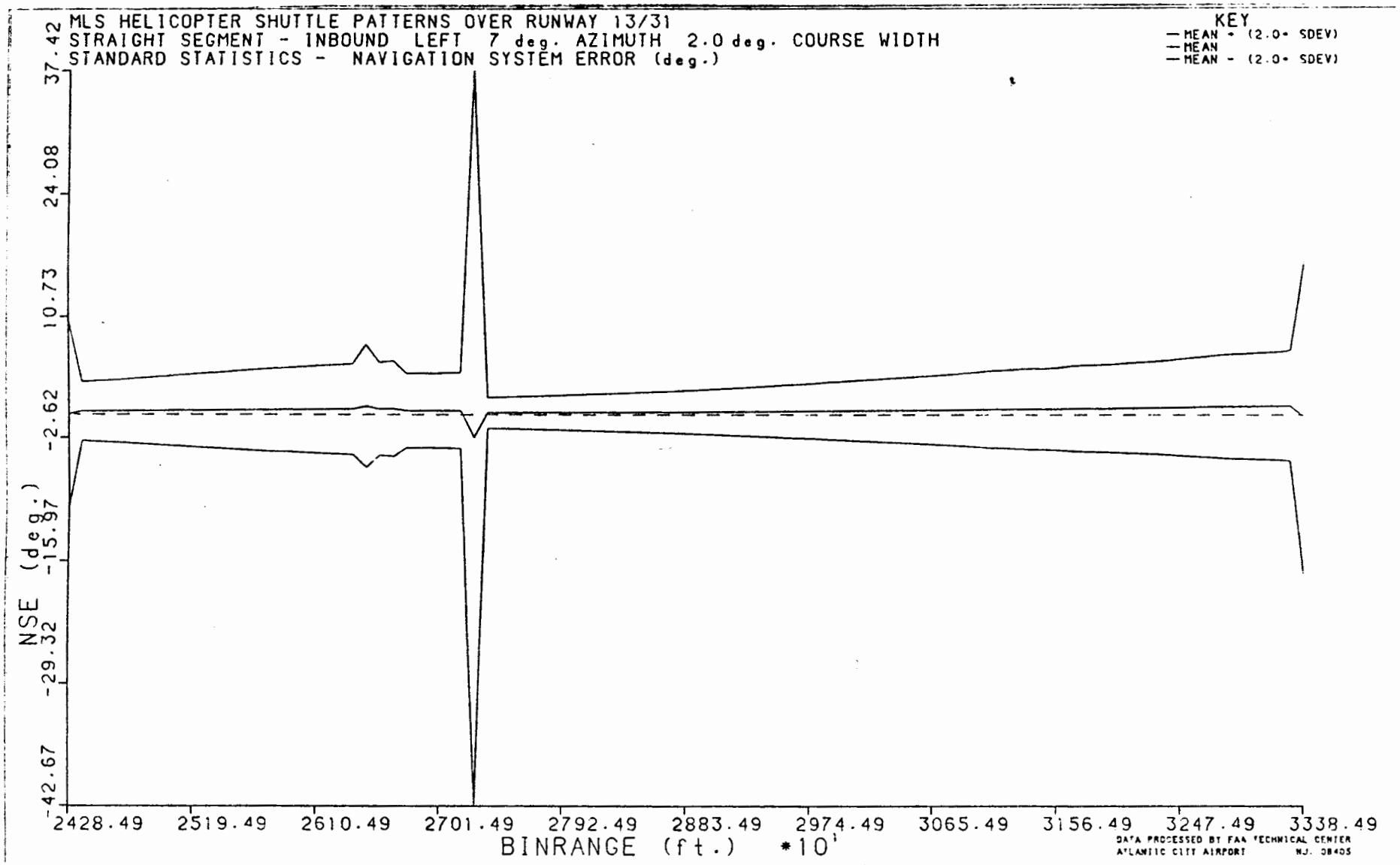

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK ERROR (deg.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
CROSSTRACK ERROR (deg.)
74.66
51.40
28.14
4.88
-18.38
-41.64
-64.90
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

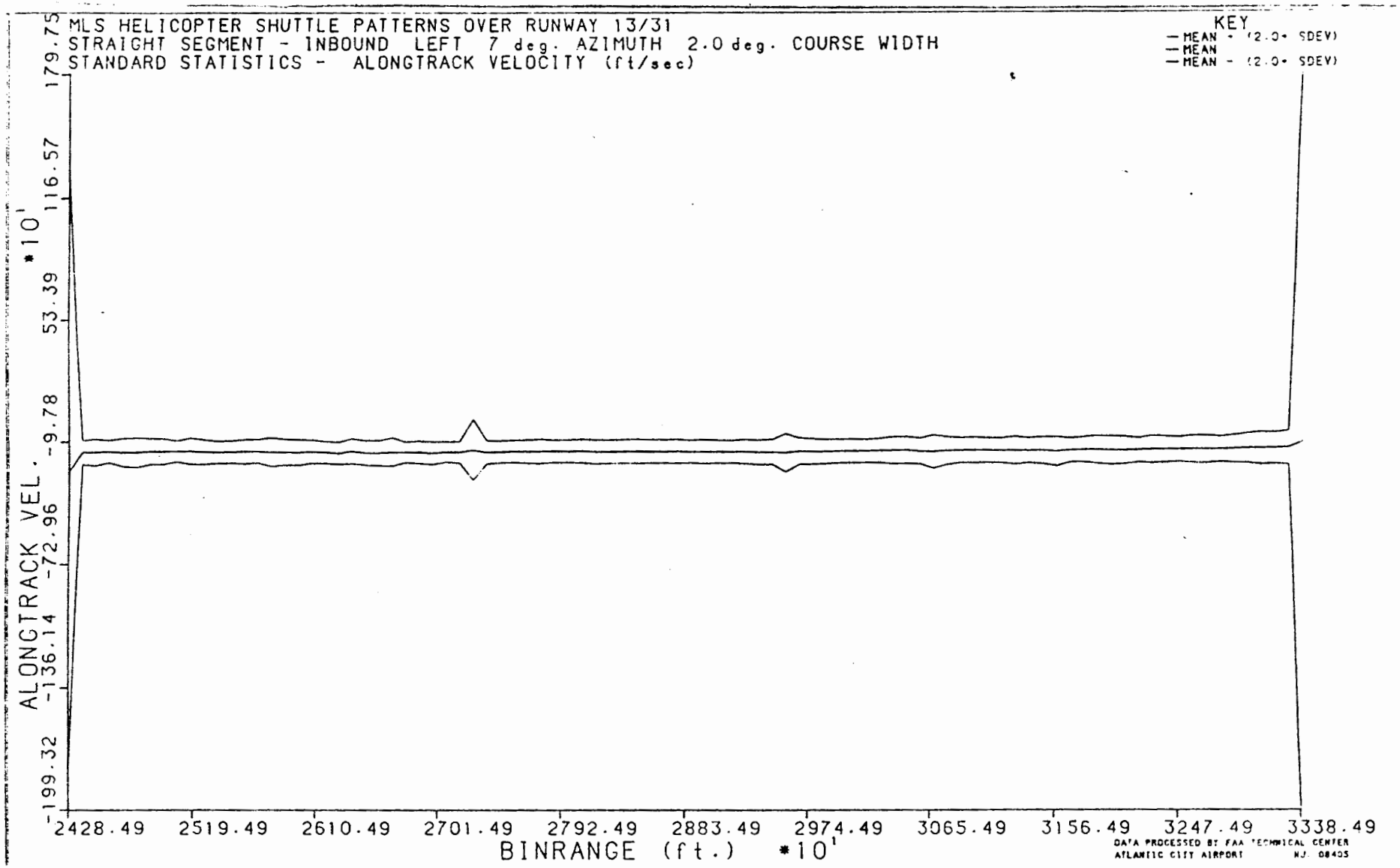

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
AZ. FTE (ft.) *10^3
43.54
30.11
16.67
3.24
-10.20
-23.63
-37.07
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10^1
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

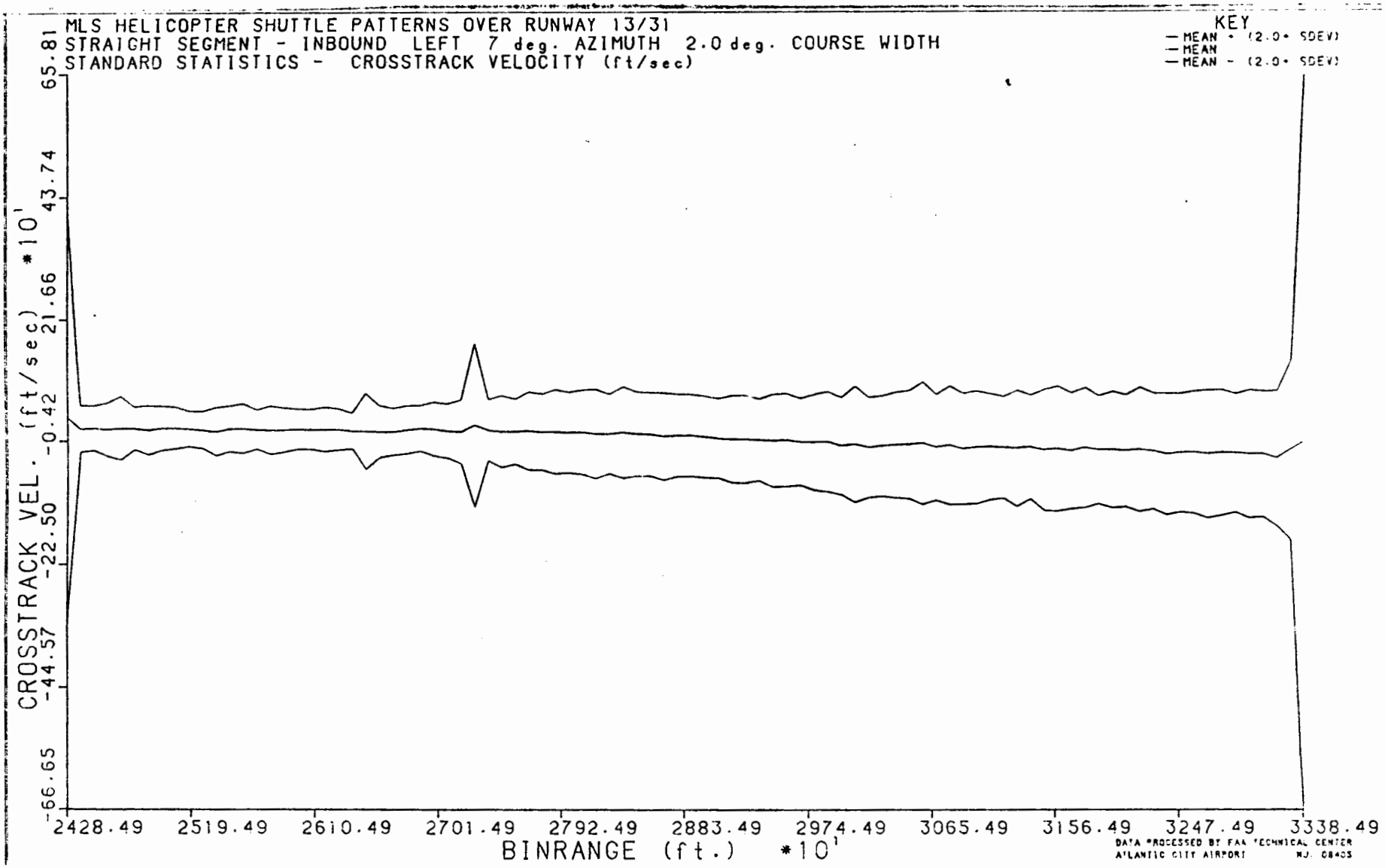

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (deg.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
AZ. FTE (deg.)
66.33
45.88
25.42
4.97
-15.48
-35.93
-56.39
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ 08405

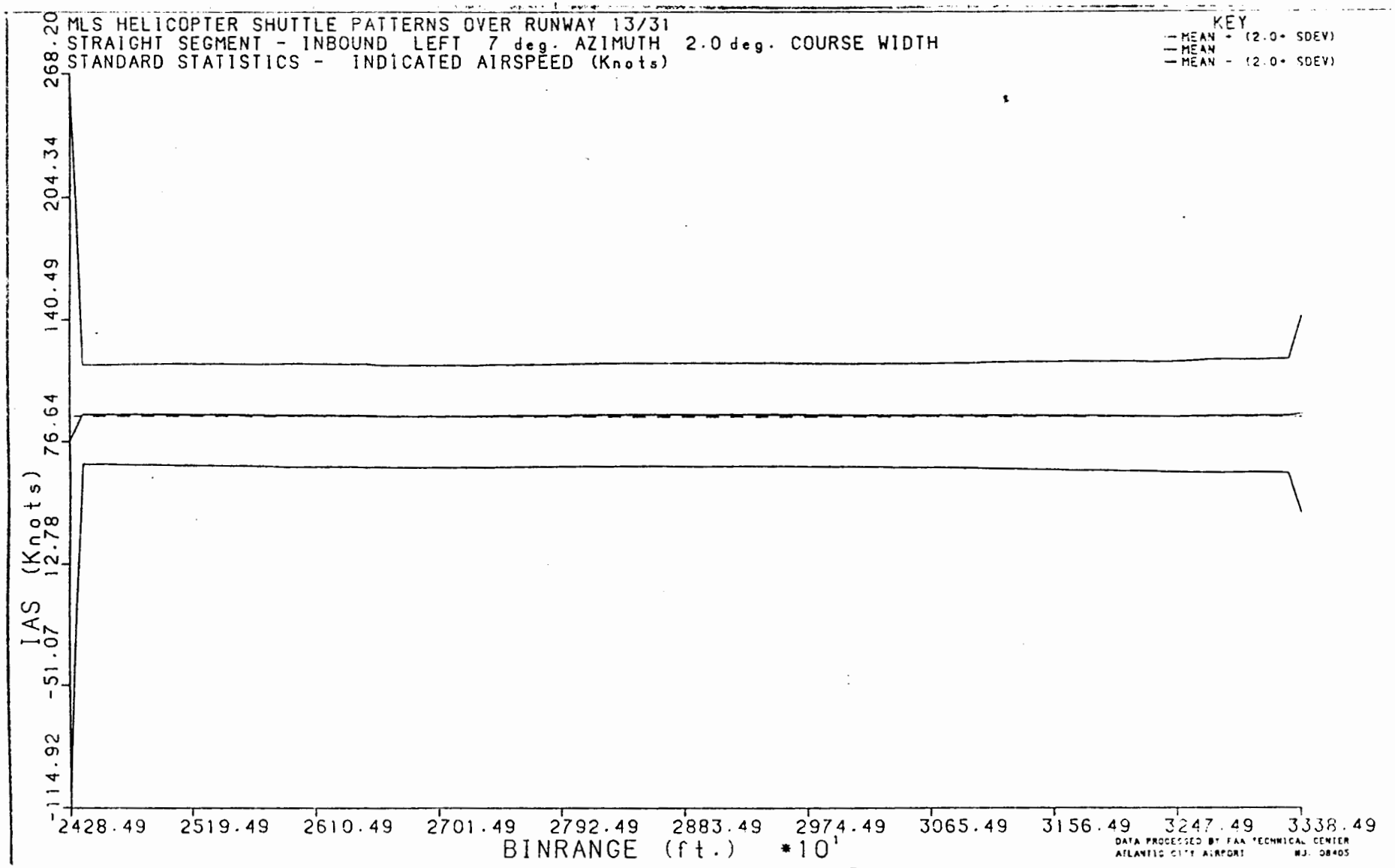

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (%FS)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
AZ. FTE (%FS)
*10¹
184.24
127.43
70.62
13.81
-43.01
-99.82
-156.63
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT N.J. 08405

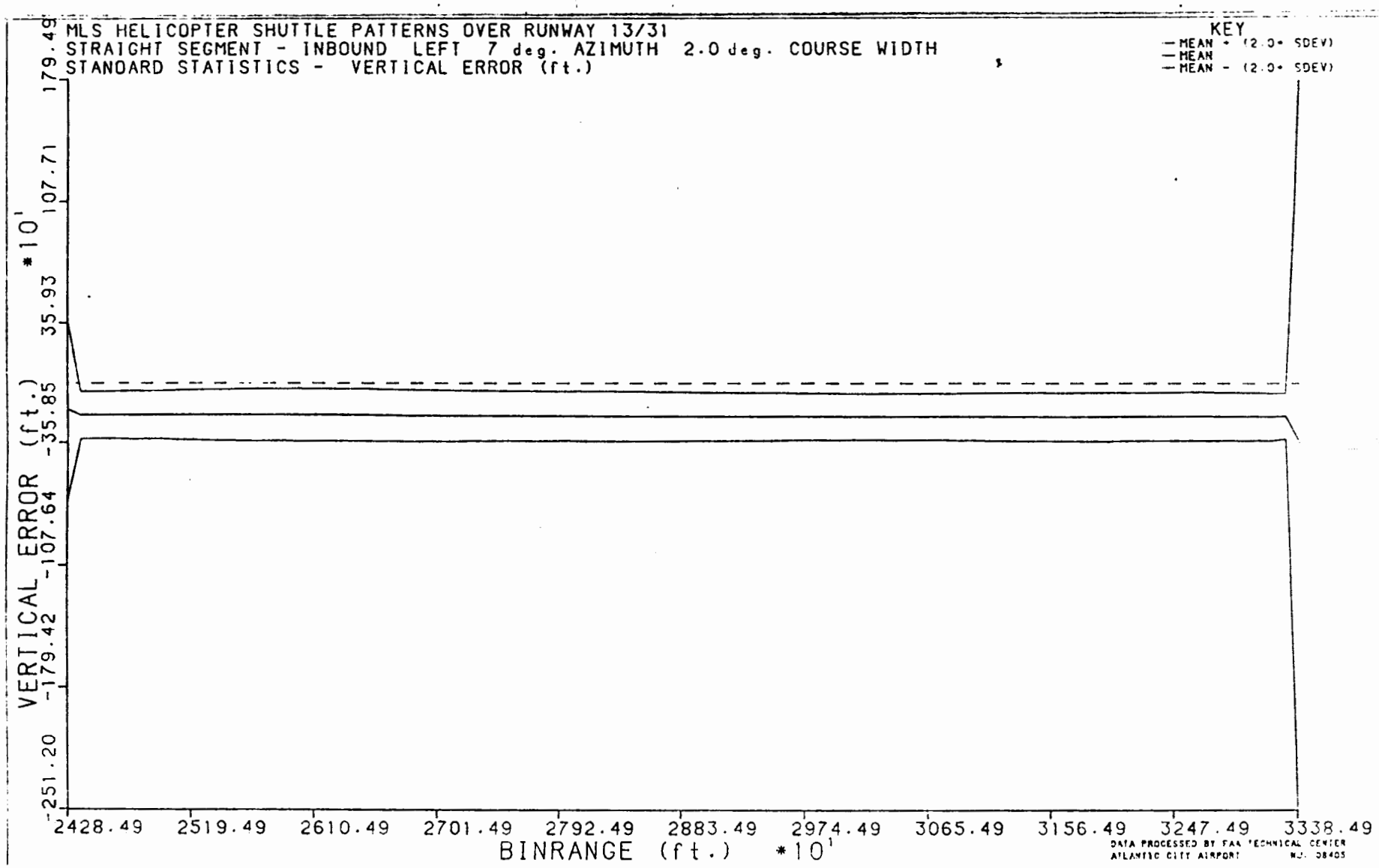

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - NAVIGATION SYSTEM ERROR (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
NSE (ft.) *10²
241.54
160.21
78.88
-2.45
-83.78
-165.11
-246.44
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - NAVIGATION SYSTEM ERROR (deg.)
KEY
— MEAN + (2.0* SDEV)
— MEAN
— MEAN - (2.0* SDEV)
37.42
24.08
10.73
-2.62
-15.97
-29.32
-42.67
NSE (deg.)
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK VELOCITY (ft/sec)
KEY
— MEAN + (2.0* SDEV)
— MEAN
— MEAN - (2.0* SDEV)
ALONGTRACK VEL.
*10¹
179.75
116.57
53.39
-9.78
-72.96
-136.14
-199.32
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

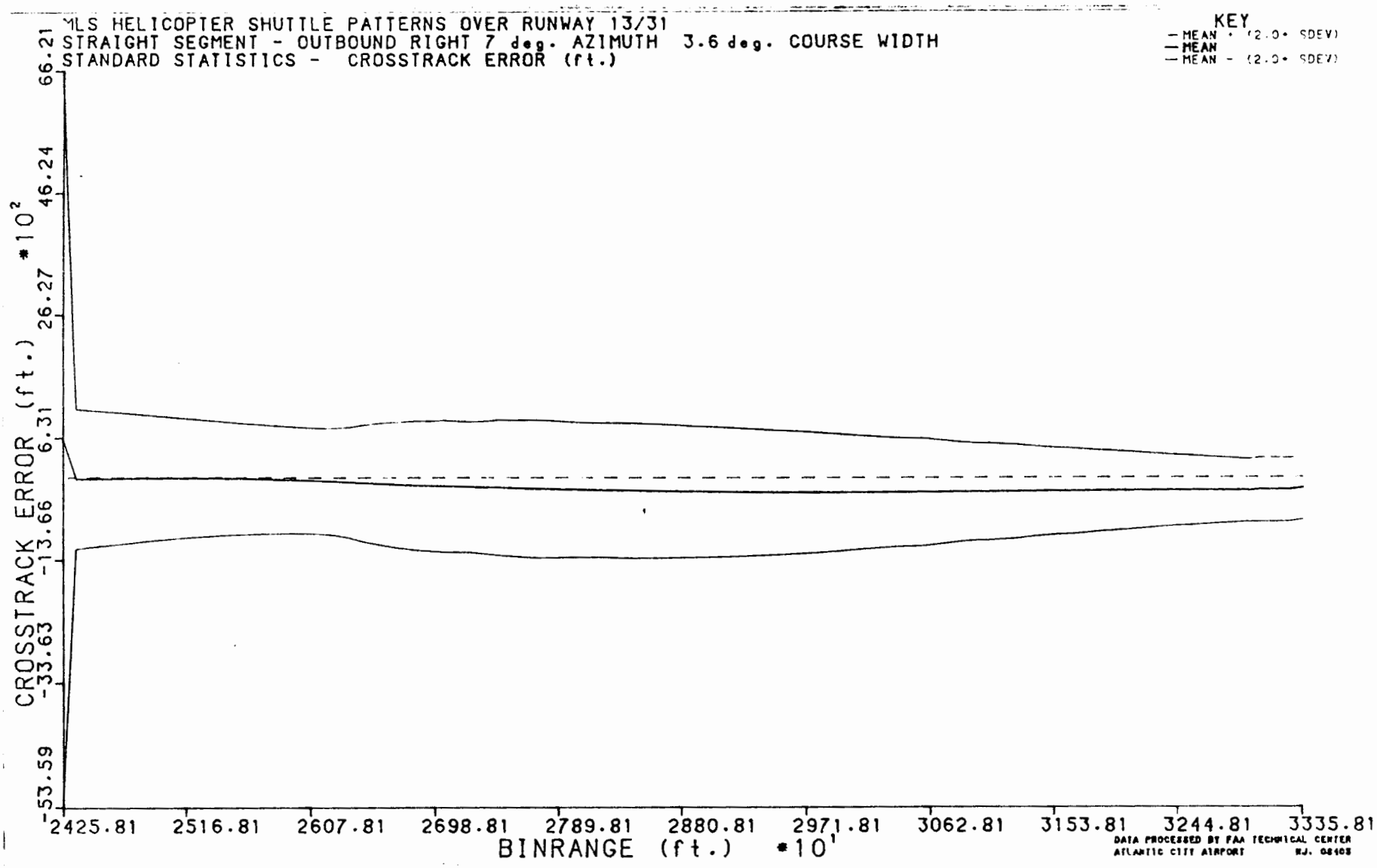

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK VELOCITY (ft/sec)
KEY
— MEAN + (2.0* SDEV)
— MEAN
— MEAN - (2.0* SDEV)
CROSSTRACK VEL. (ft/sec) *10¹
65.81
43.74
21.66
-0.42
-22.50
-44.57
-66.65
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

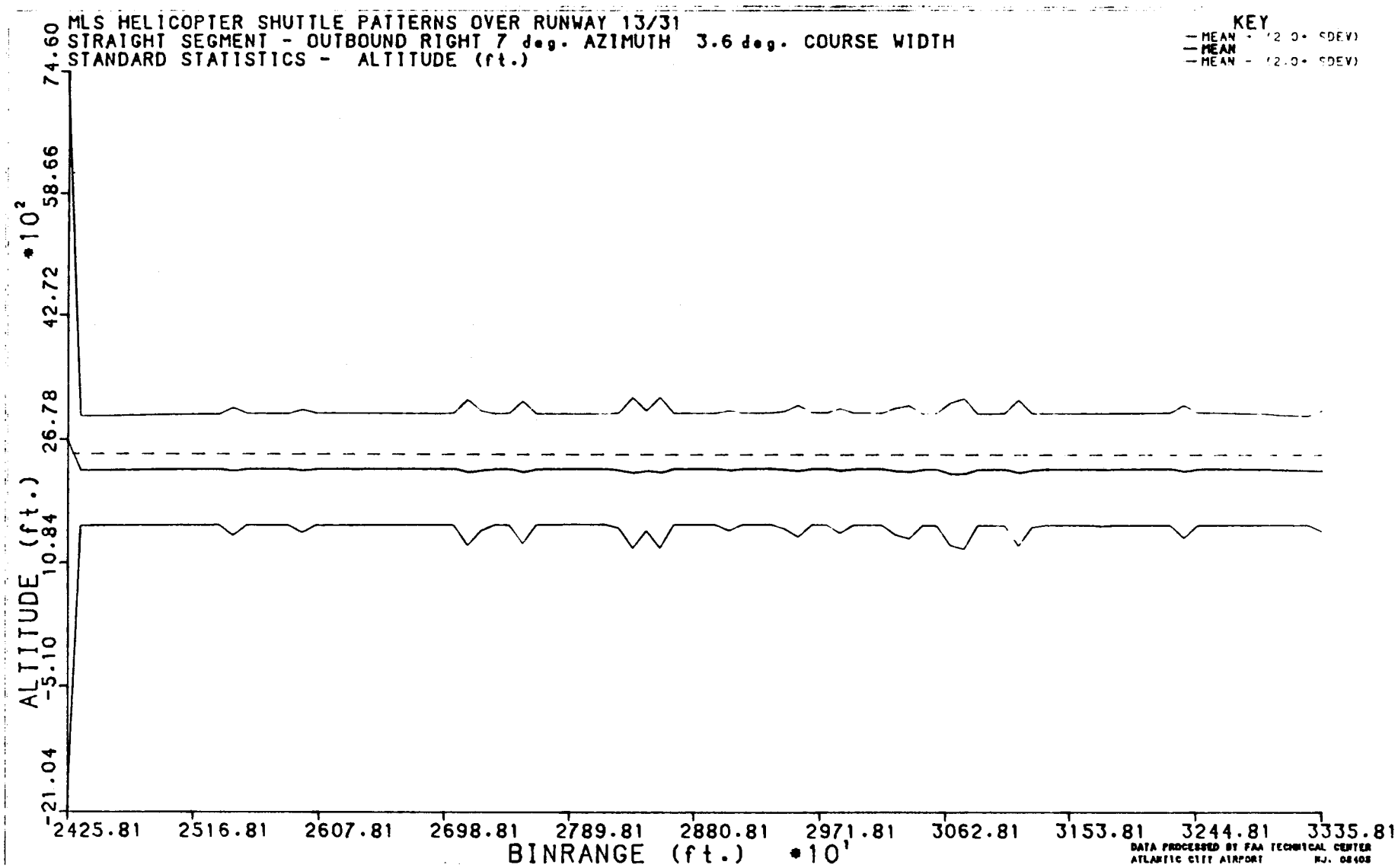

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - INDICATED AIRSPEED (Knots)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
IAS (Knots)
268.20
204.34
140.49
76.64
12.78
-51.07
-114.92
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

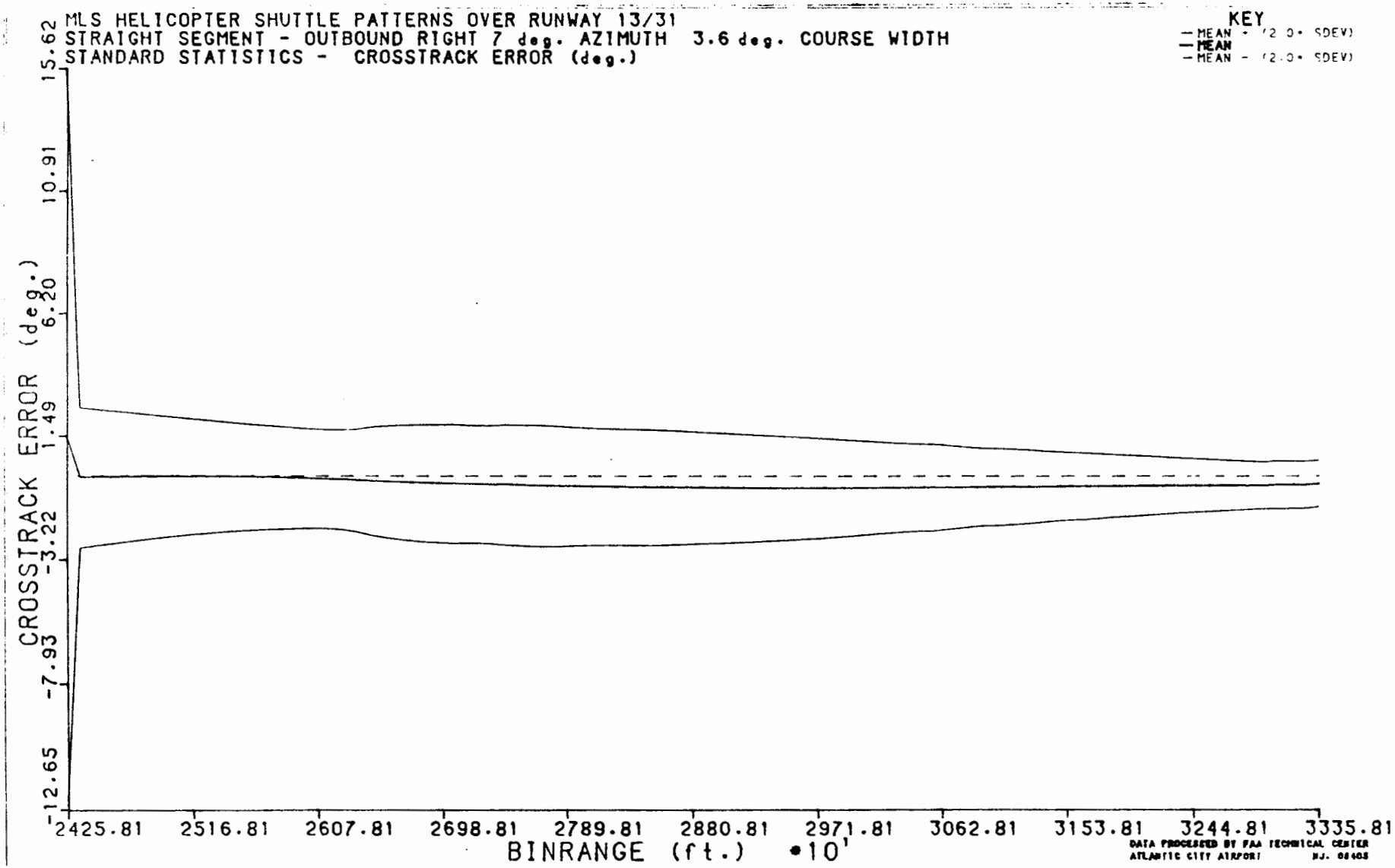

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - VERTICAL ERROR (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
VERTICAL ERROR (ft.) *10¹
179.49
107.71
35.93
-35.85
-107.64
-179.42
-251.20
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT N.J. 08405

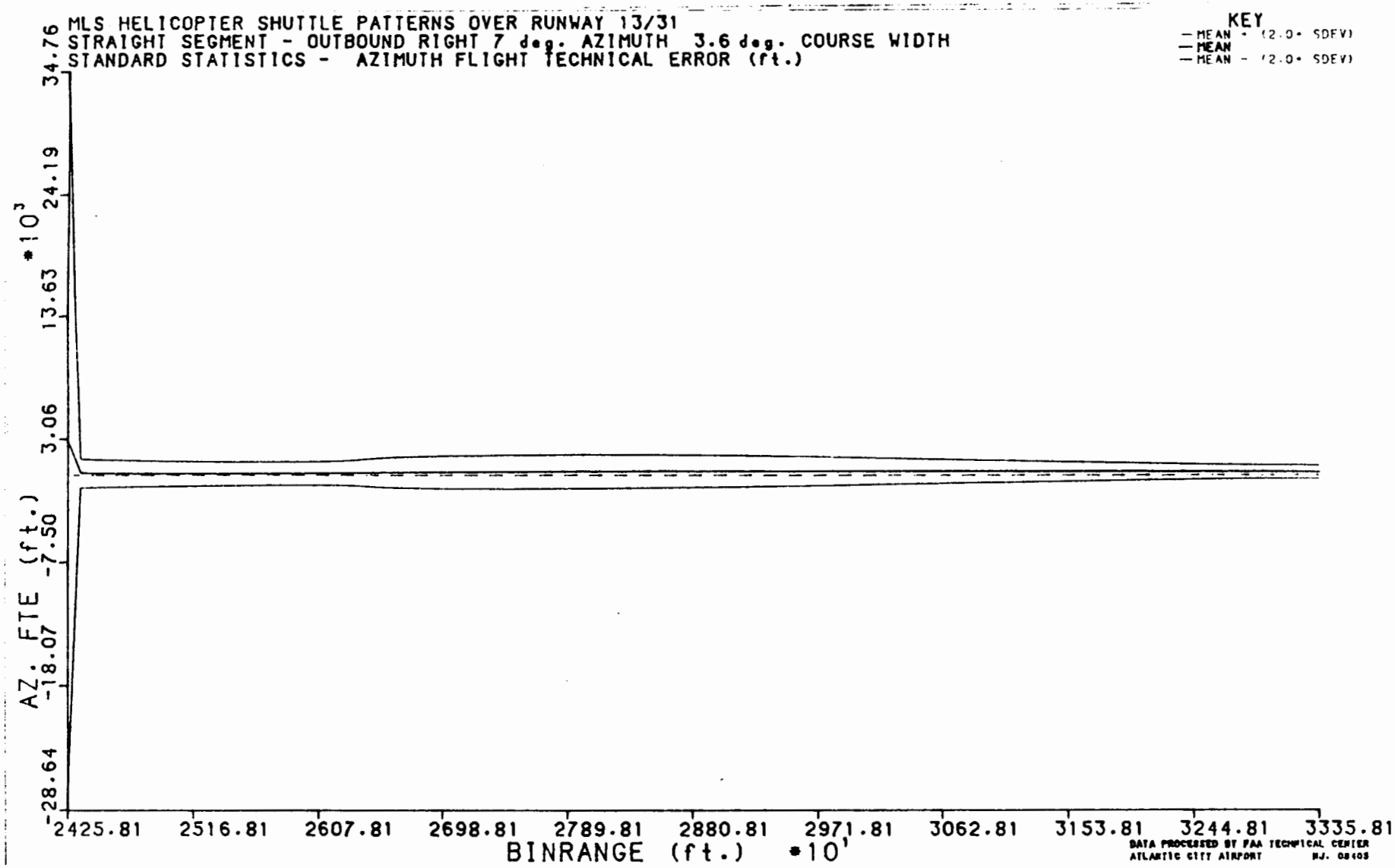
APPENDIX D

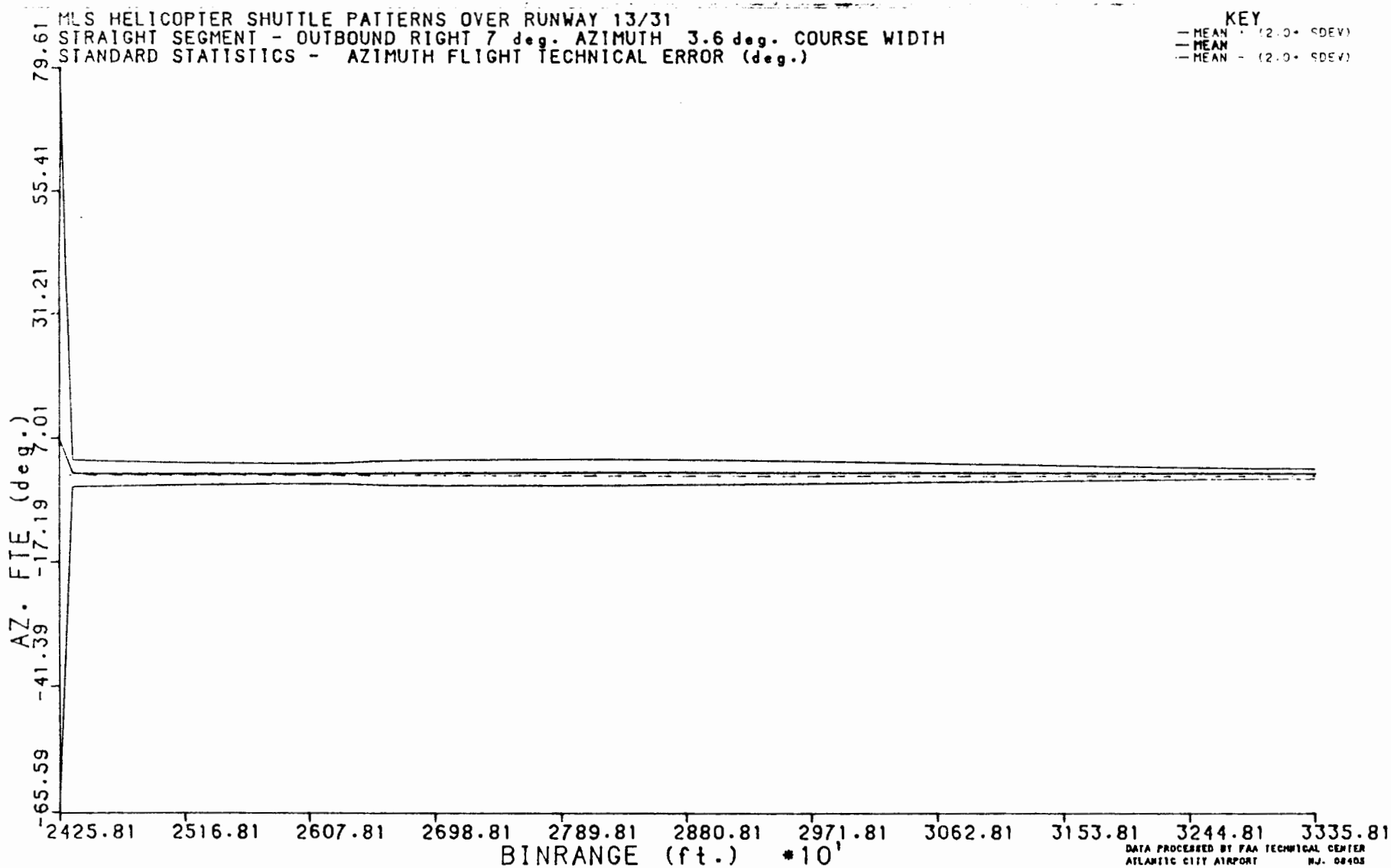
95 PERCENT ISOPROBABILITY PLOTS FOR 3.6° AND 2.0° OUTBOUND STRAIGHT SEGMENTS

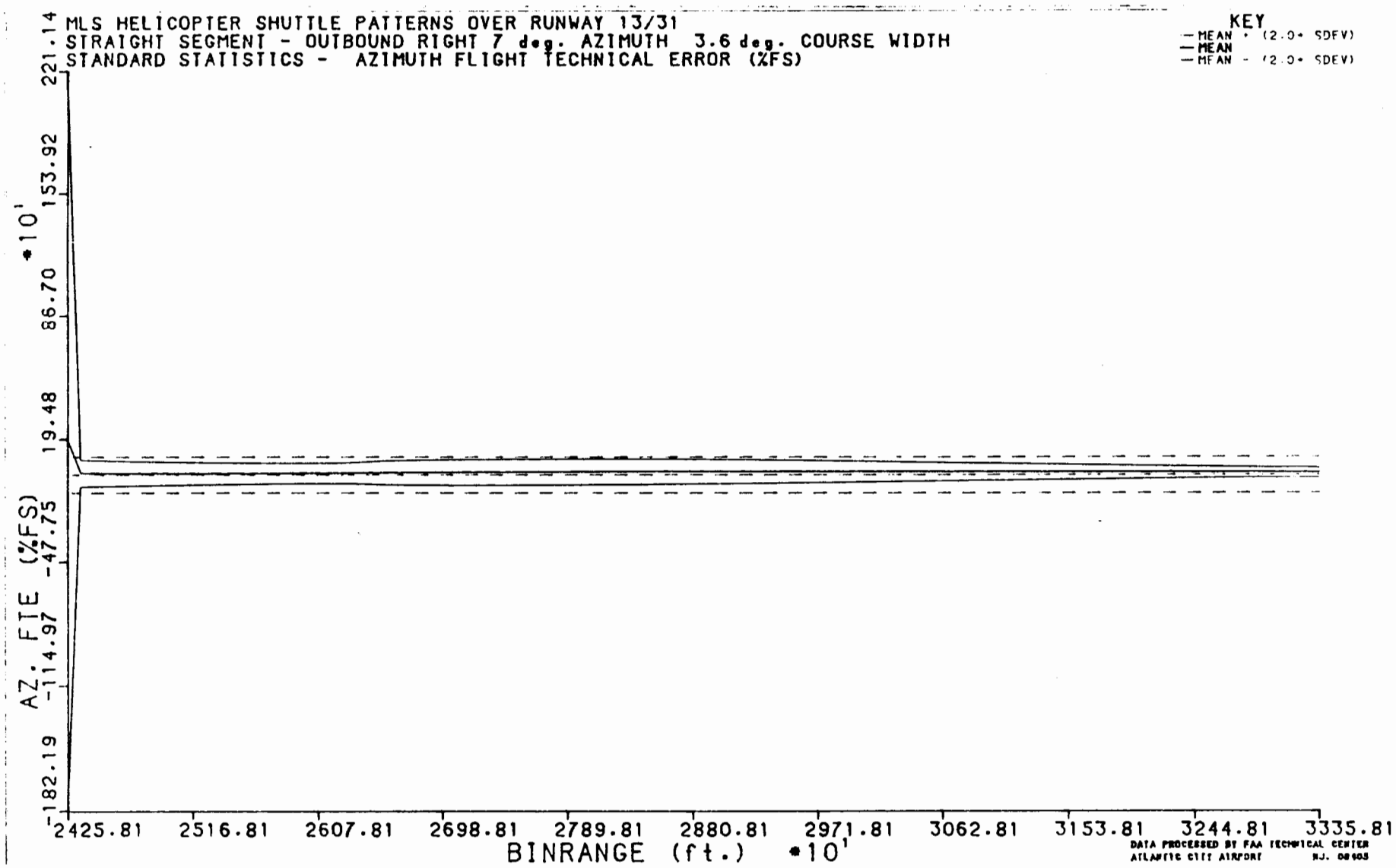

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK ERROR (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
CROSSTRACK ERROR (ft.) *10²
66.21
46.24
26.27
6.31
-13.66
-33.63
-53.59
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

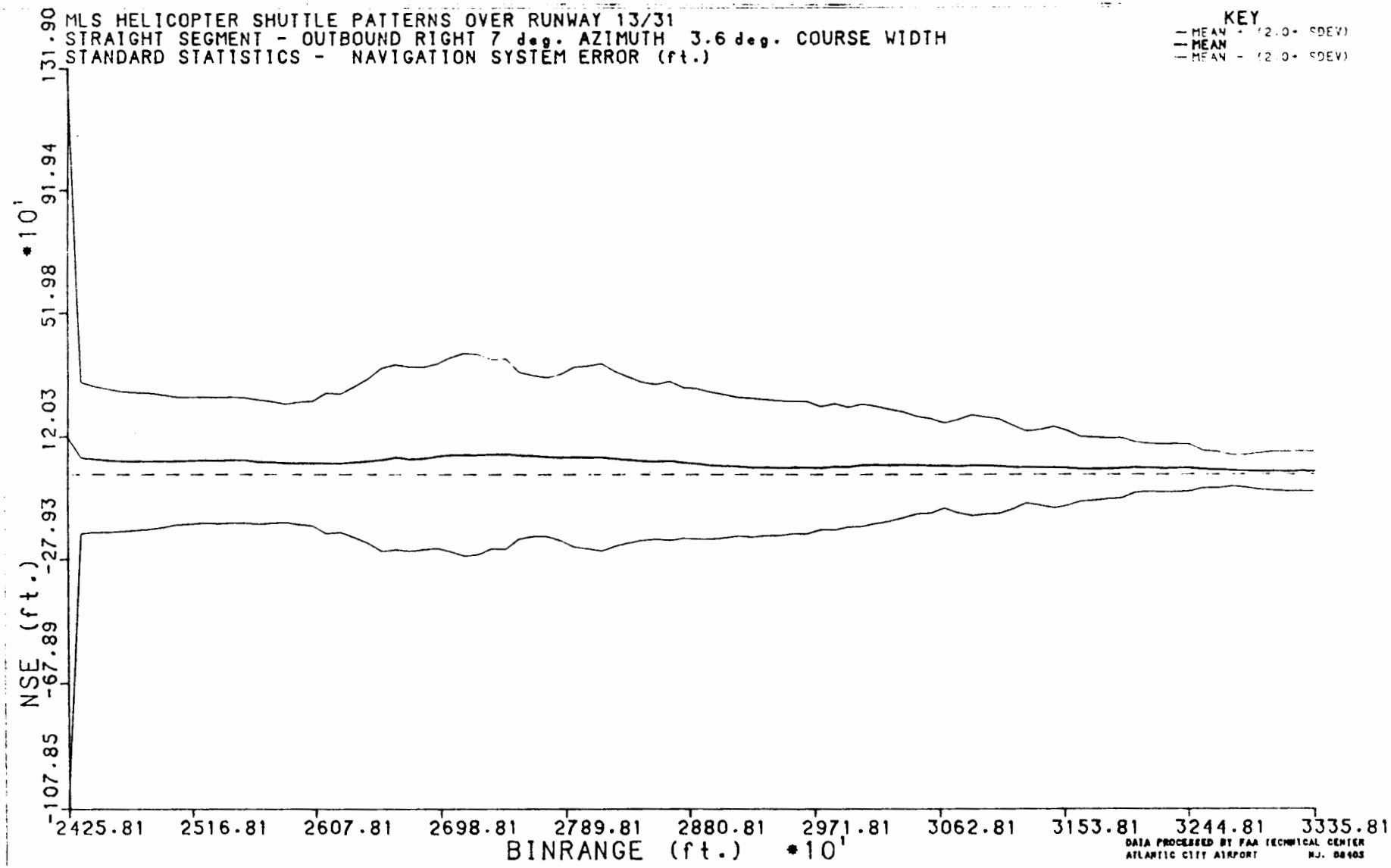

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALTITUDE (ft.)
KEY
MEAN - (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
ALTITUDE (ft.)
*10²
74.60
58.66
42.72
26.78
10.84
-5.10
-21.04
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

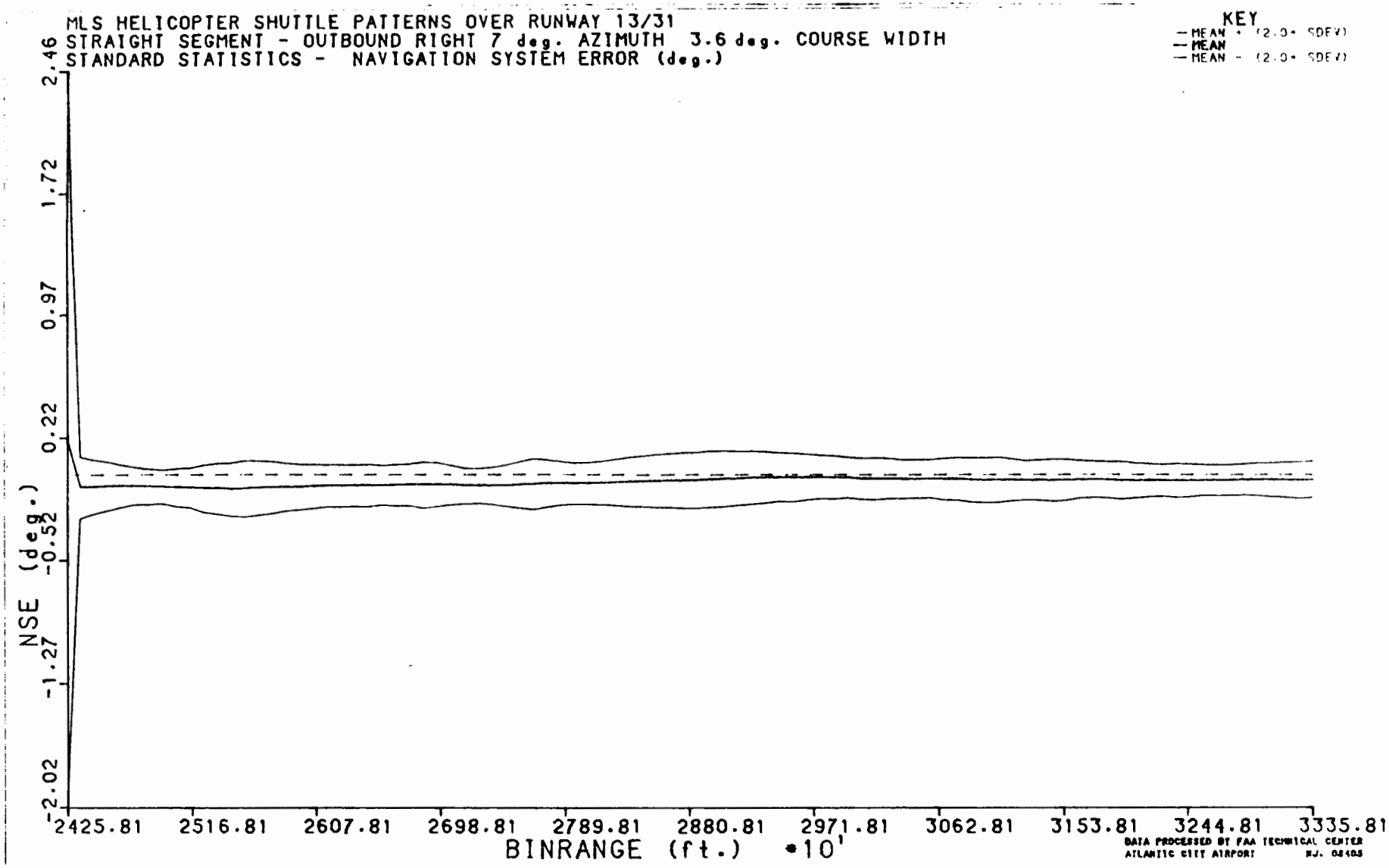

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK ERROR (deg.)
KEY
MEAN - (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
CROSSTRACK ERROR (deg.)
15.62
10.91
6.20
1.49
-3.22
-7.93
-12.65
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

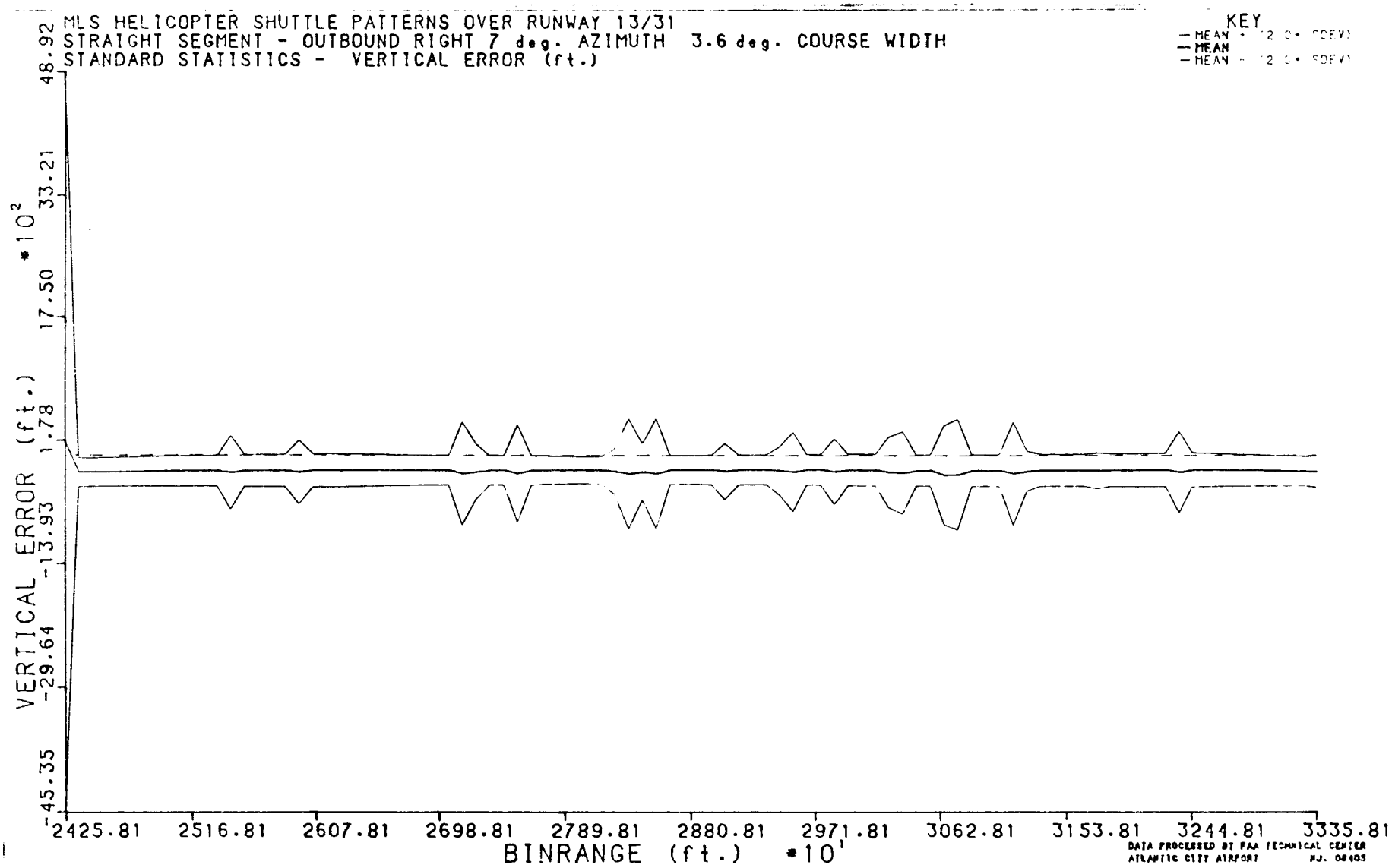

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
AZ. FTE (ft.) *10³
34.76
24.19
13.63
3.06
-7.50
-18.07
-28.64
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

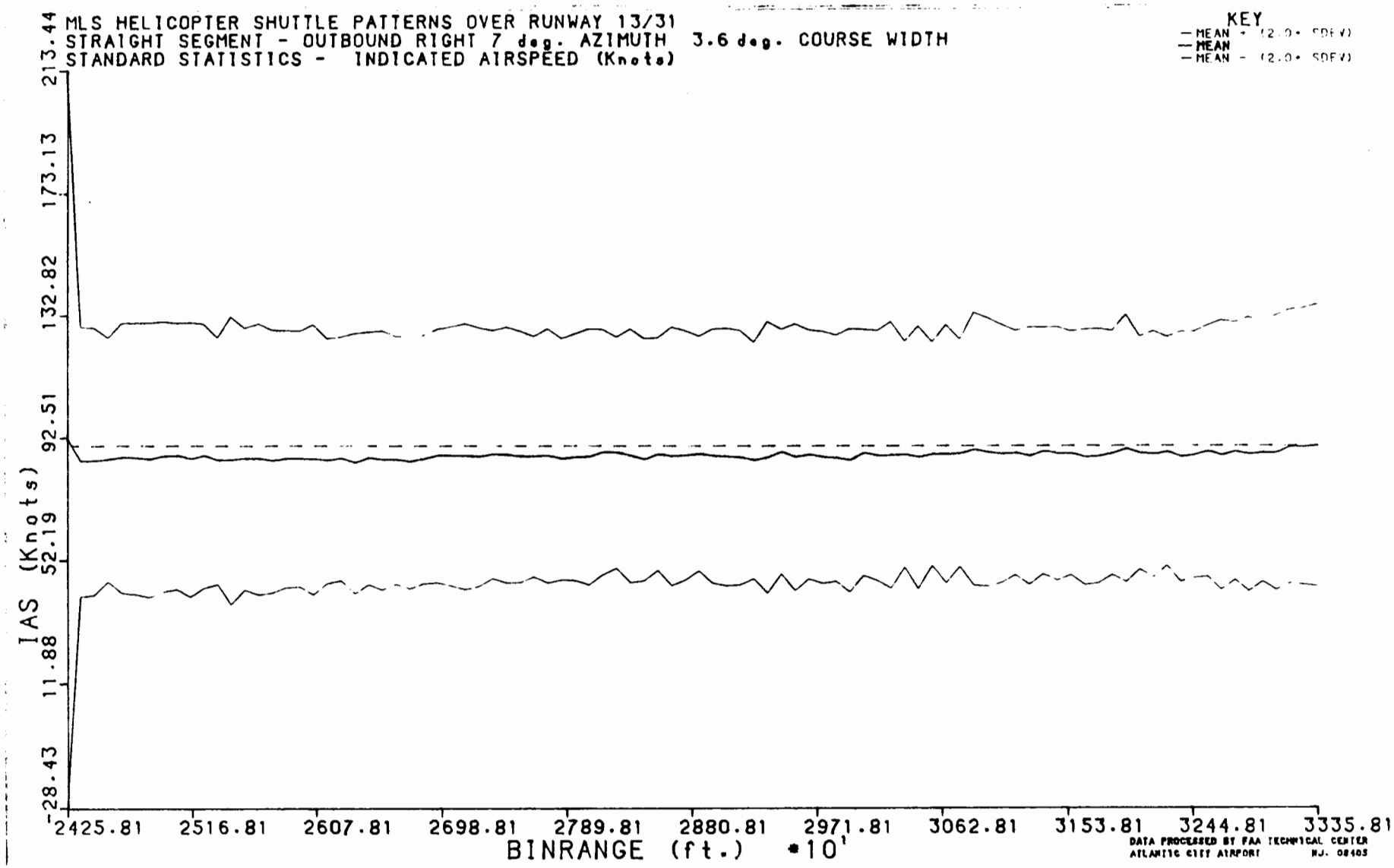

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (deg.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
AZ. FTE (deg.)
79.61
55.41
31.21
7.01
-17.19
-41.39
-65.59
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10'
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (%FS)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
AZ. FTE (%FS)
*10¹
221.14
153.92
86.70
19.48
-47.75
-114.97
-182.19
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

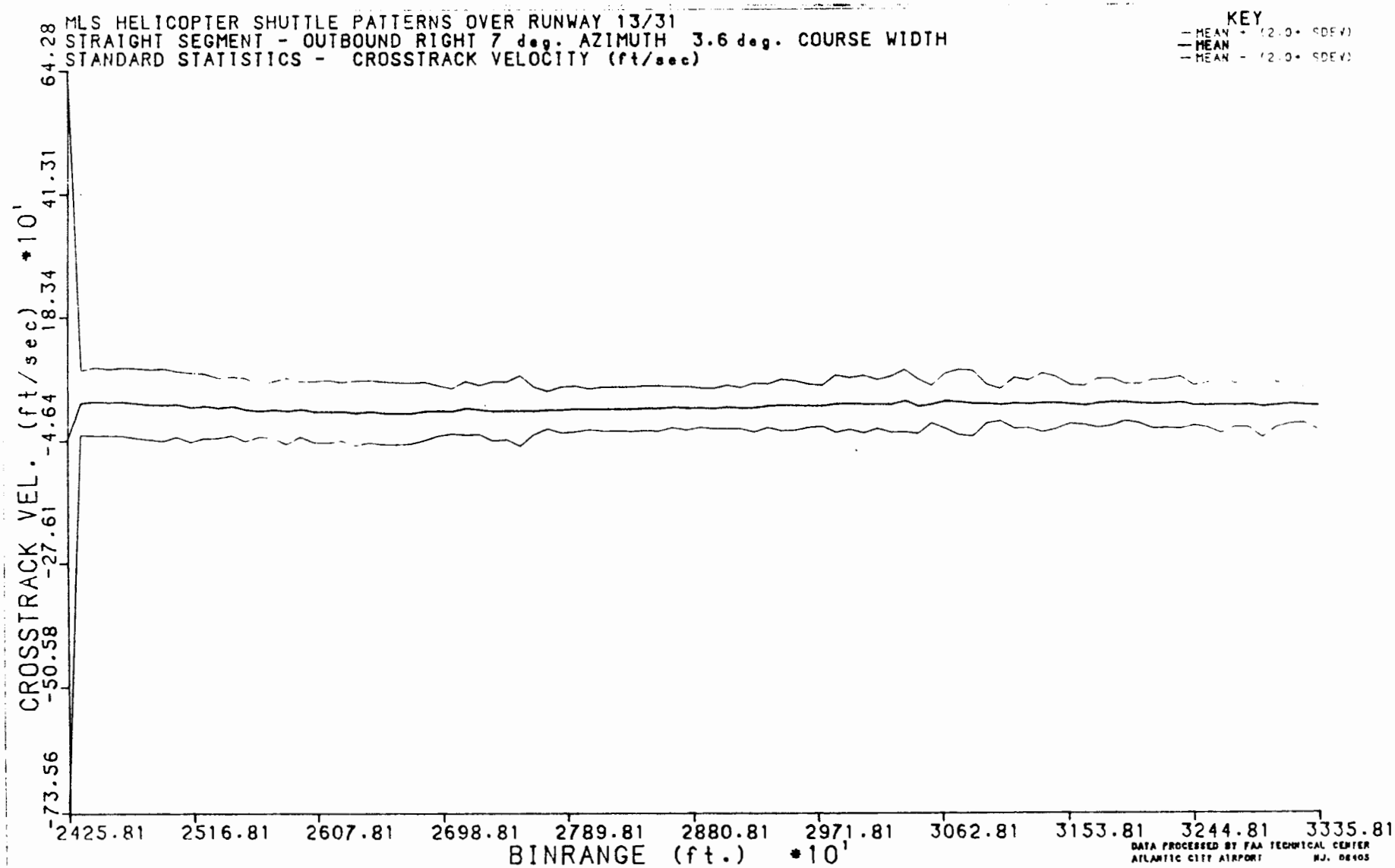

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - NAVIGATION SYSTEM ERROR (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
NSE (ft.) *10¹
131.90
91.94
51.98
12.03
-27.93
-67.89
-107.85
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - NAVIGATION SYSTEM ERROR (deg.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
NSE (deg.)
2.46
1.72
0.97
0.22
-0.52
-1.27
-2.02
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10'
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

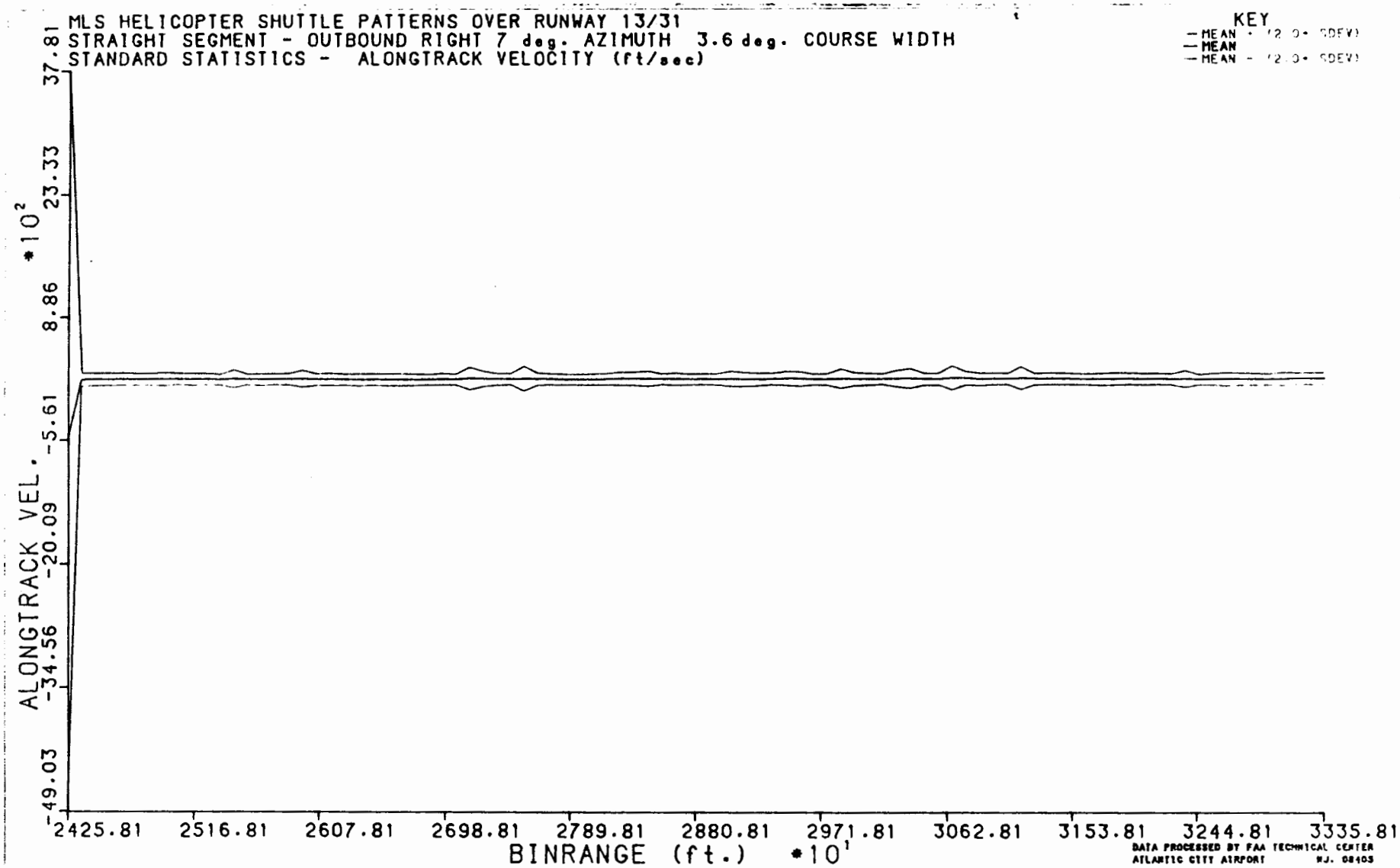

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - VERTICAL ERROR (ft.)
KEY
MEAN
VERTICAL ERROR (ft.) *10²
48.92
33.21
17.50
1.78
-13.93
-29.64
-45.35
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

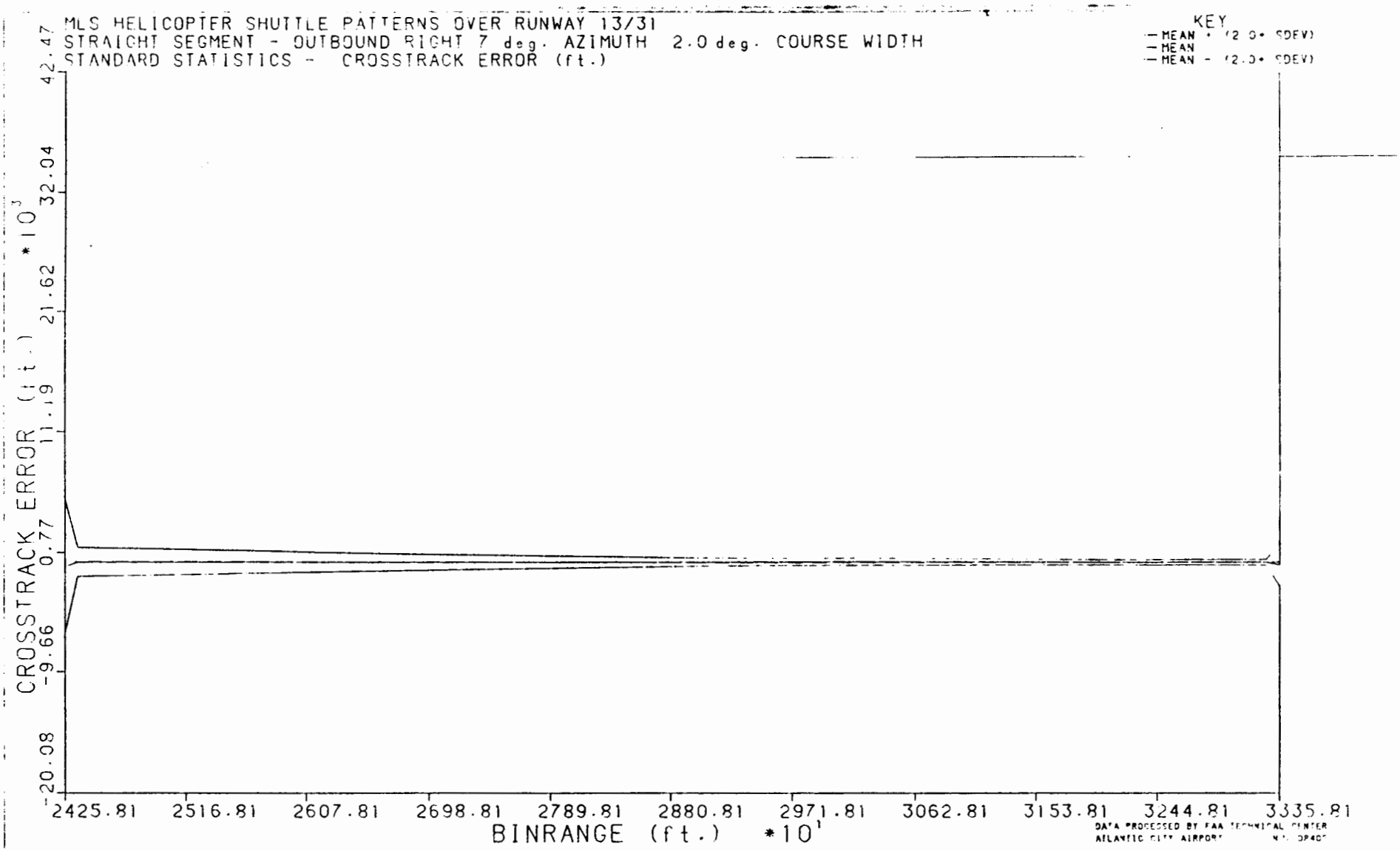

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - INDICATED AIRSPEED (Knots)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
IAS (Knots)
213.44
173.13
132.82
92.51
52.19
11.88
-28.43
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

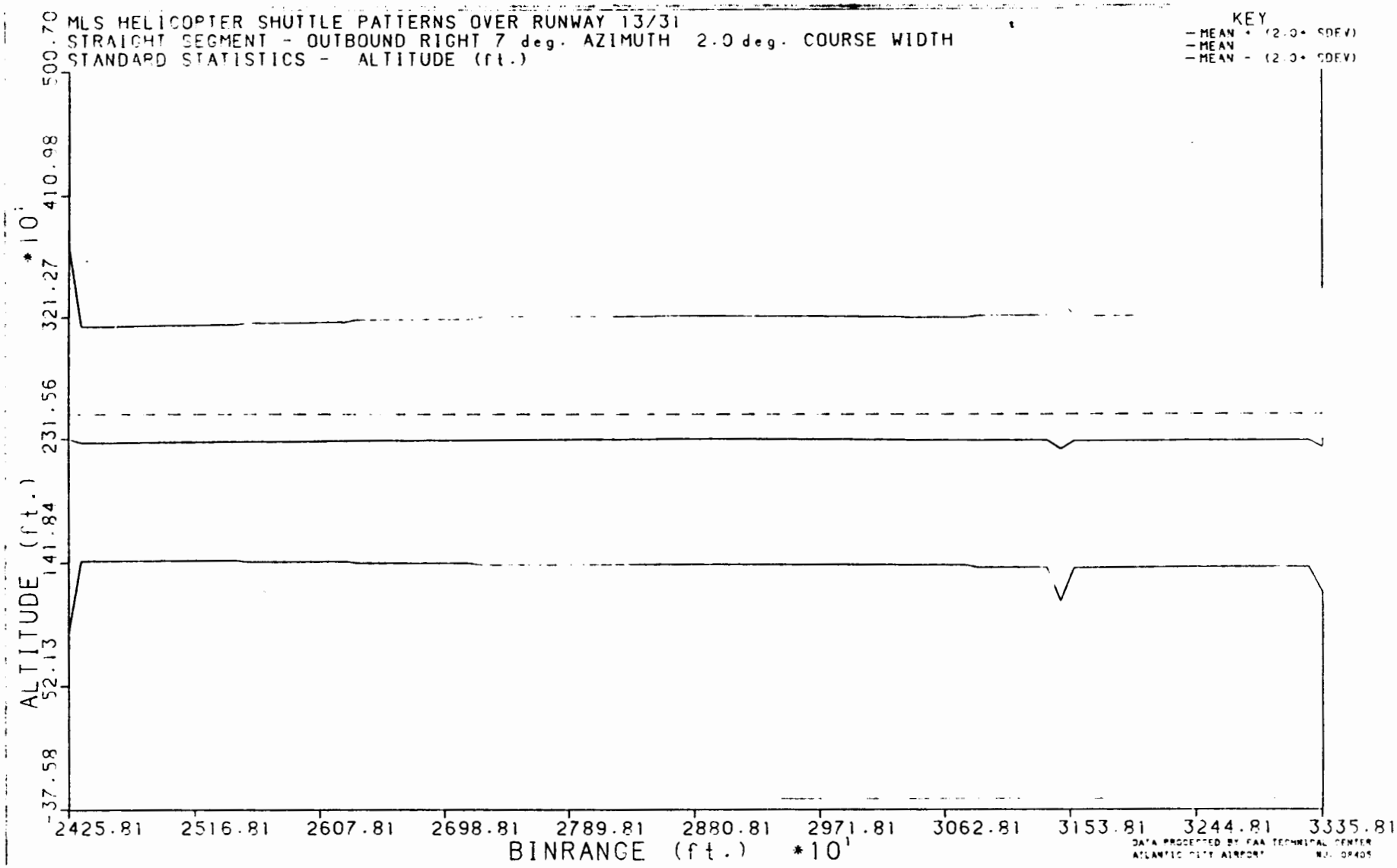
MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK VELOCITY (ft/sec)

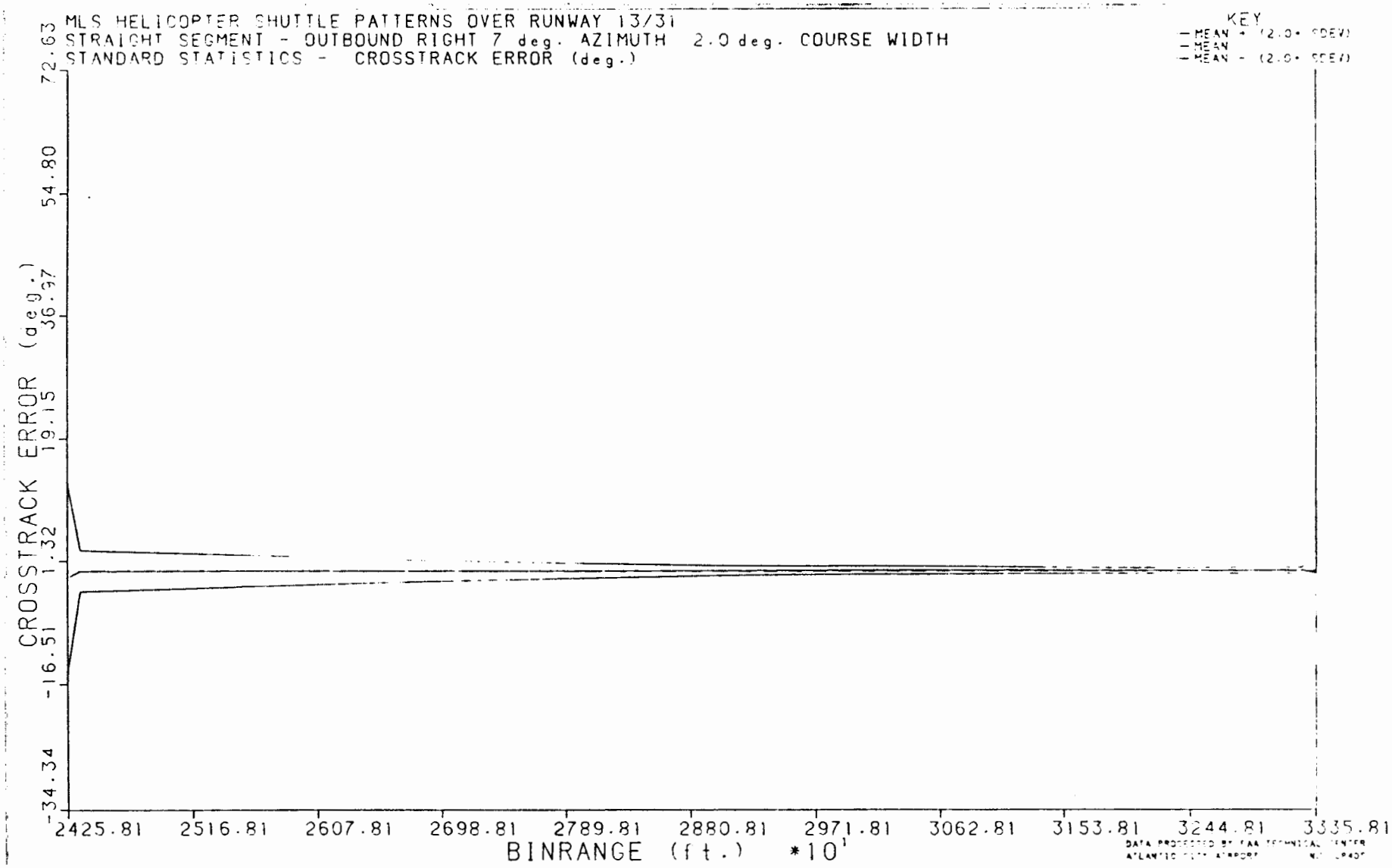


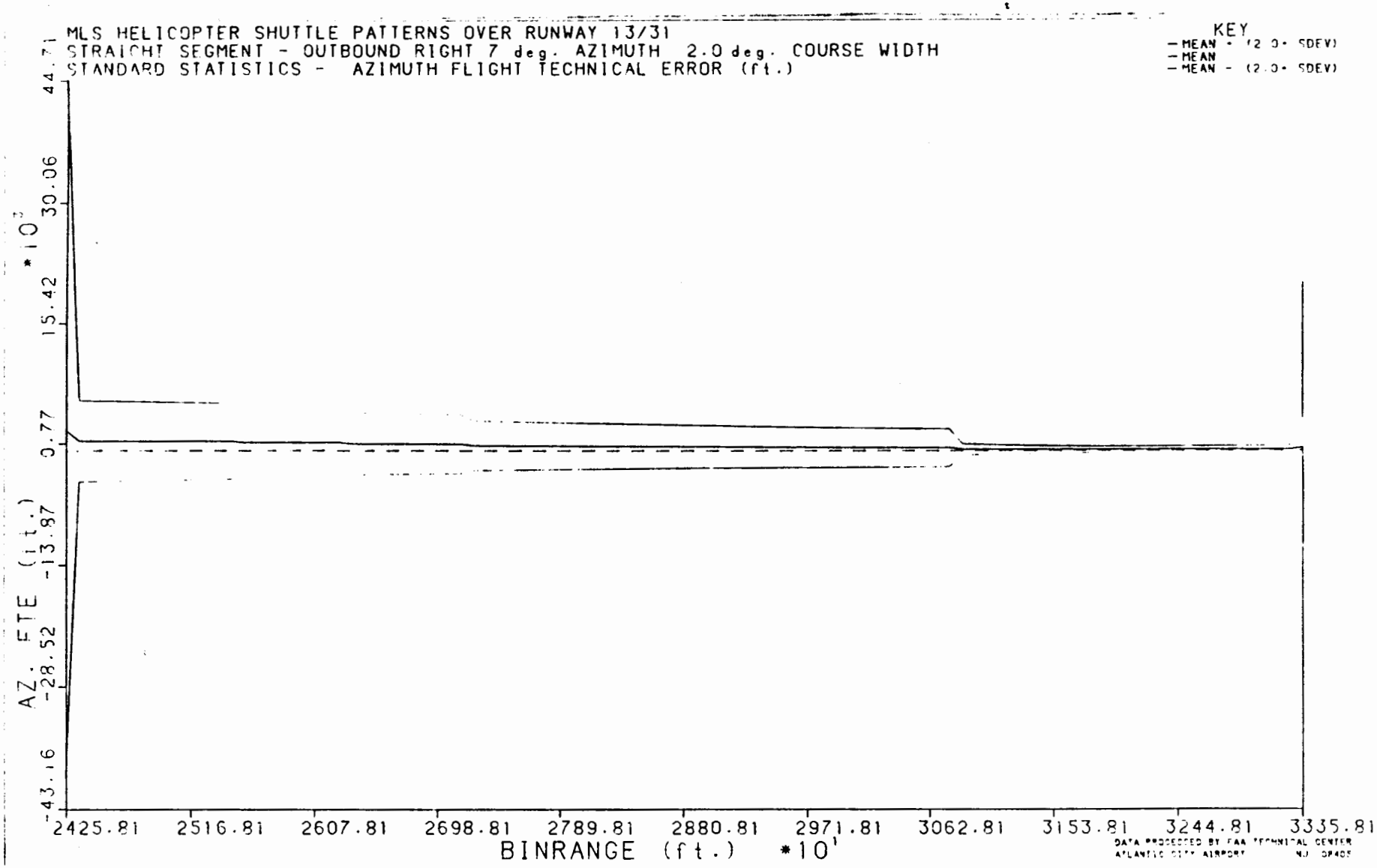
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

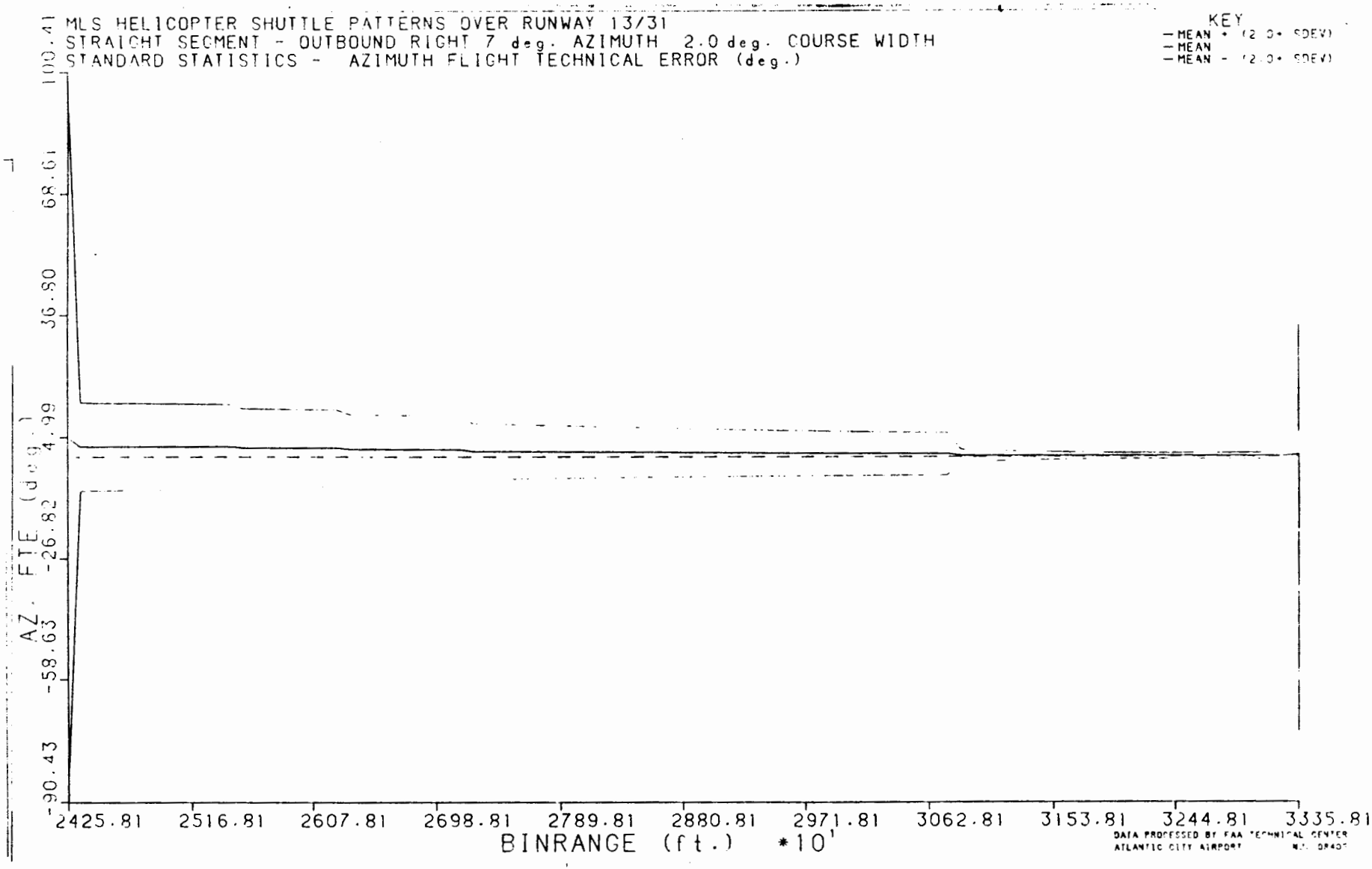

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK VELOCITY (ft/sec)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
ALONGTRACK VEL. *10²
37.81
23.33
8.86
-5.61
-20.09
-34.56
-49.03
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK ERROR (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
CROSSTRACK ERROR (ft.) *10^3
42.47
32.04
21.62
11.19
0.77
-9.66
-20.08
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10^1
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT

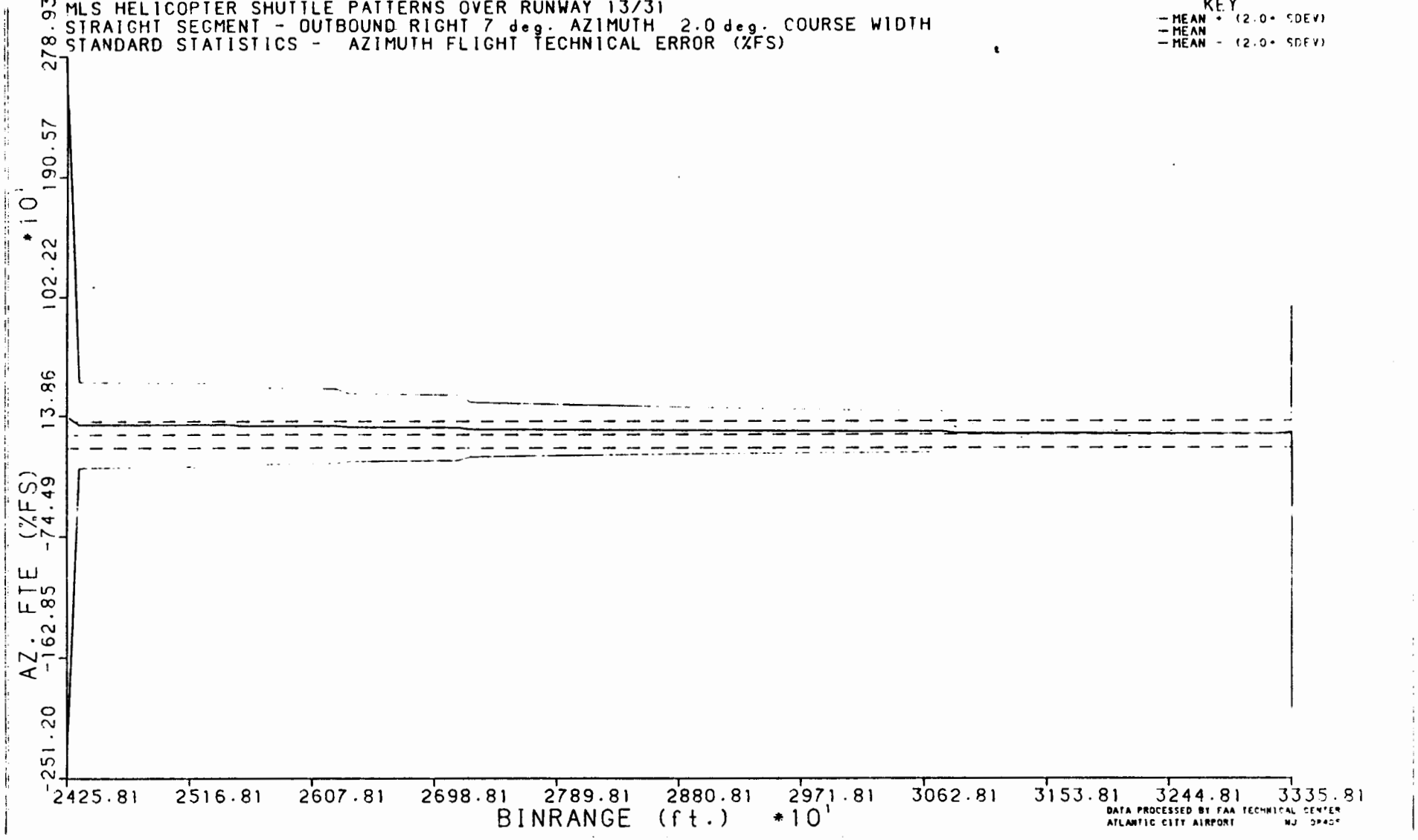

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALTITUDE (ft.)
KEY
- MEAN + (2.0* SDEV)
- MEAN
- MEAN - (2.0* SDEV)
ALTITUDE (ft.) *10¹
500.70
410.98
321.27
231.56
141.84
52.13
-37.58
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

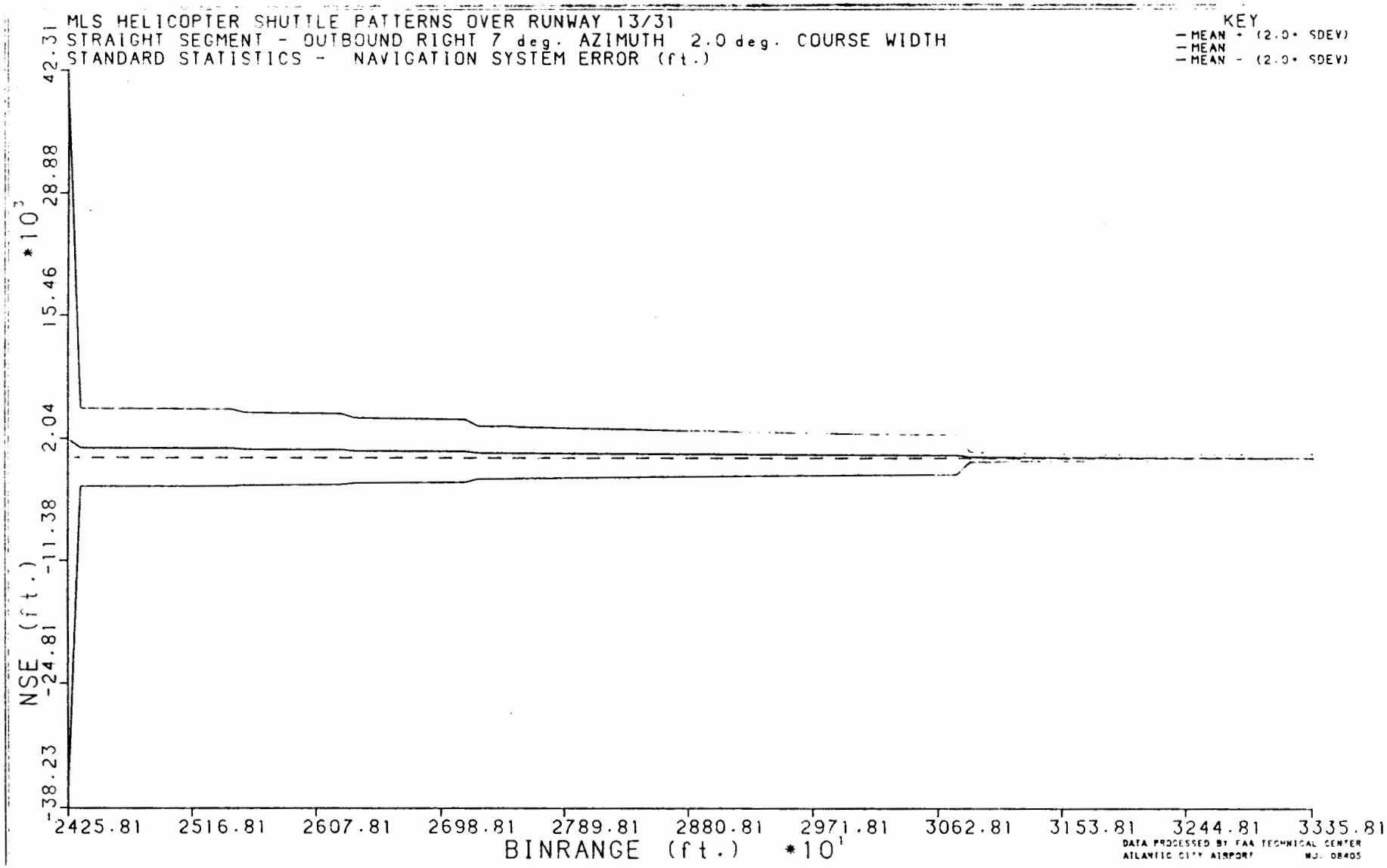

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK ERROR (deg.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
CROSSTRACK ERROR (deg.)
72.63
54.80
36.97
19.15
1.32
-16.51
-34.34
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ 08405

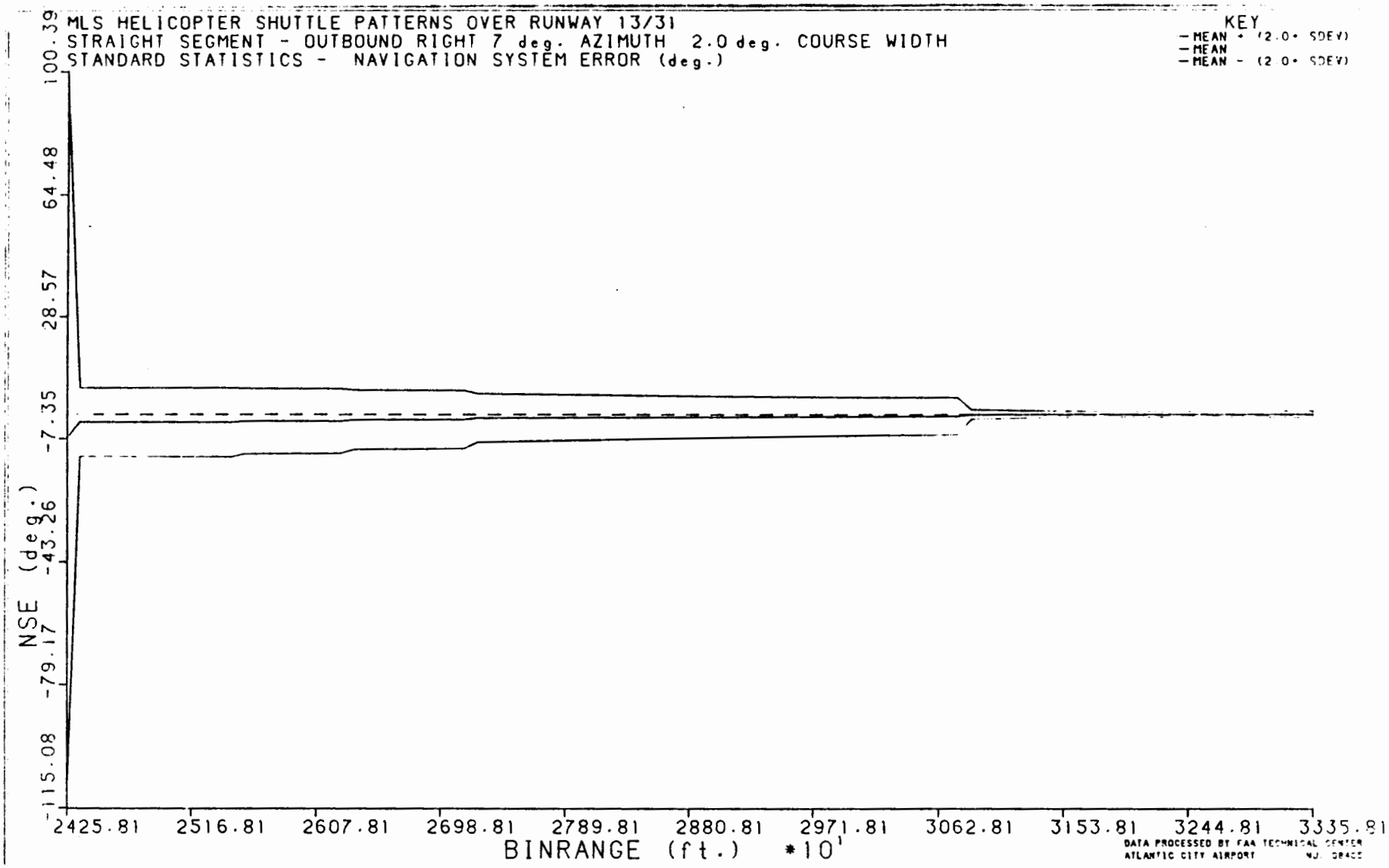

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (ft.)
KEY
- MEAN + (2.0* SDEV)
- MEAN
- MEAN - (2.0* SDEV)
AZ. FTE (ft.) *10²
44.71
30.06
15.42
0.77
-13.87
-28.52
-43.16
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ 08405

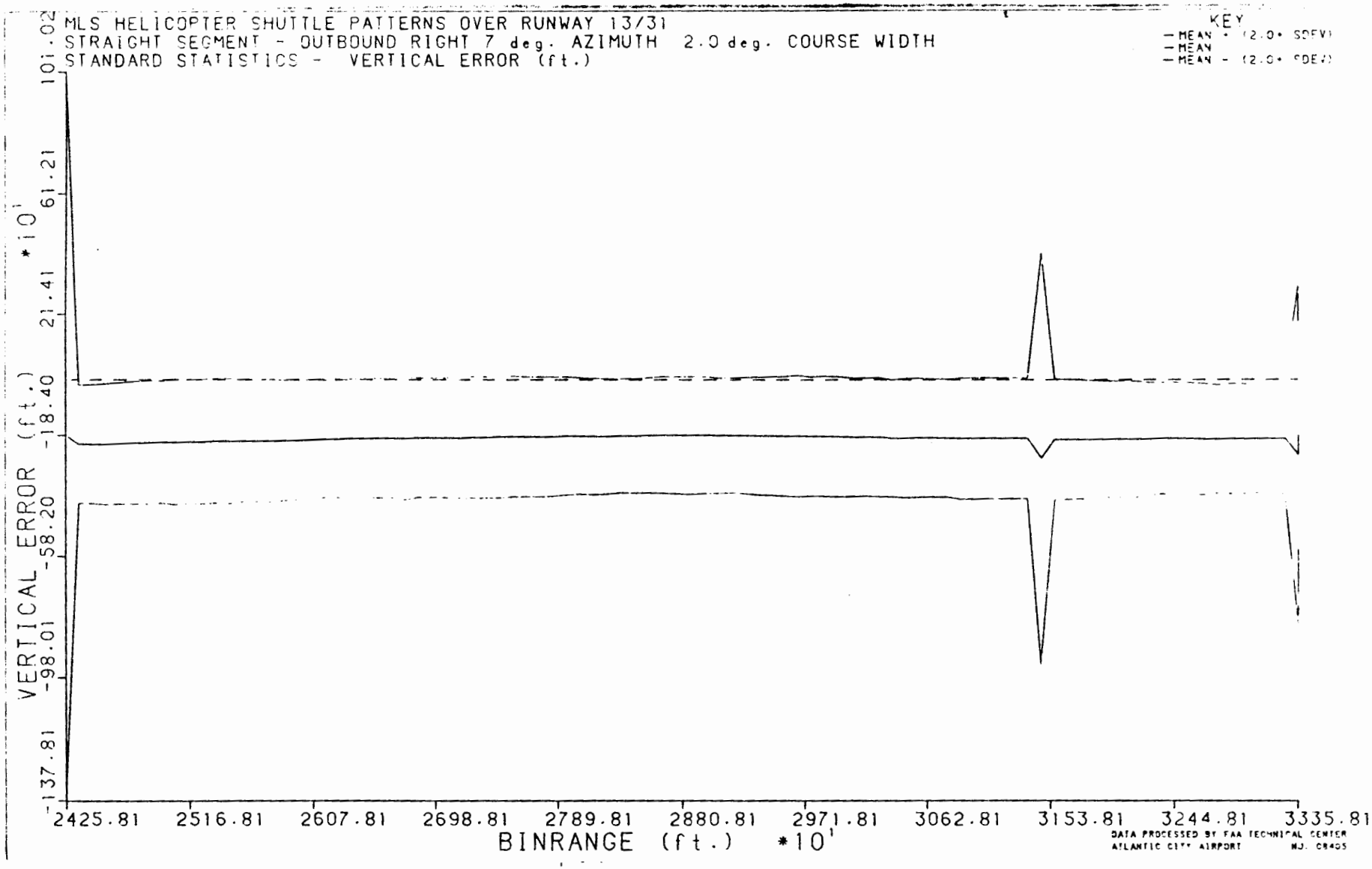

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (deg.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
AZ. FTE (deg.)
100.41
68.61
36.80
4.99
-26.82
-58.63
-90.43
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10'
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT

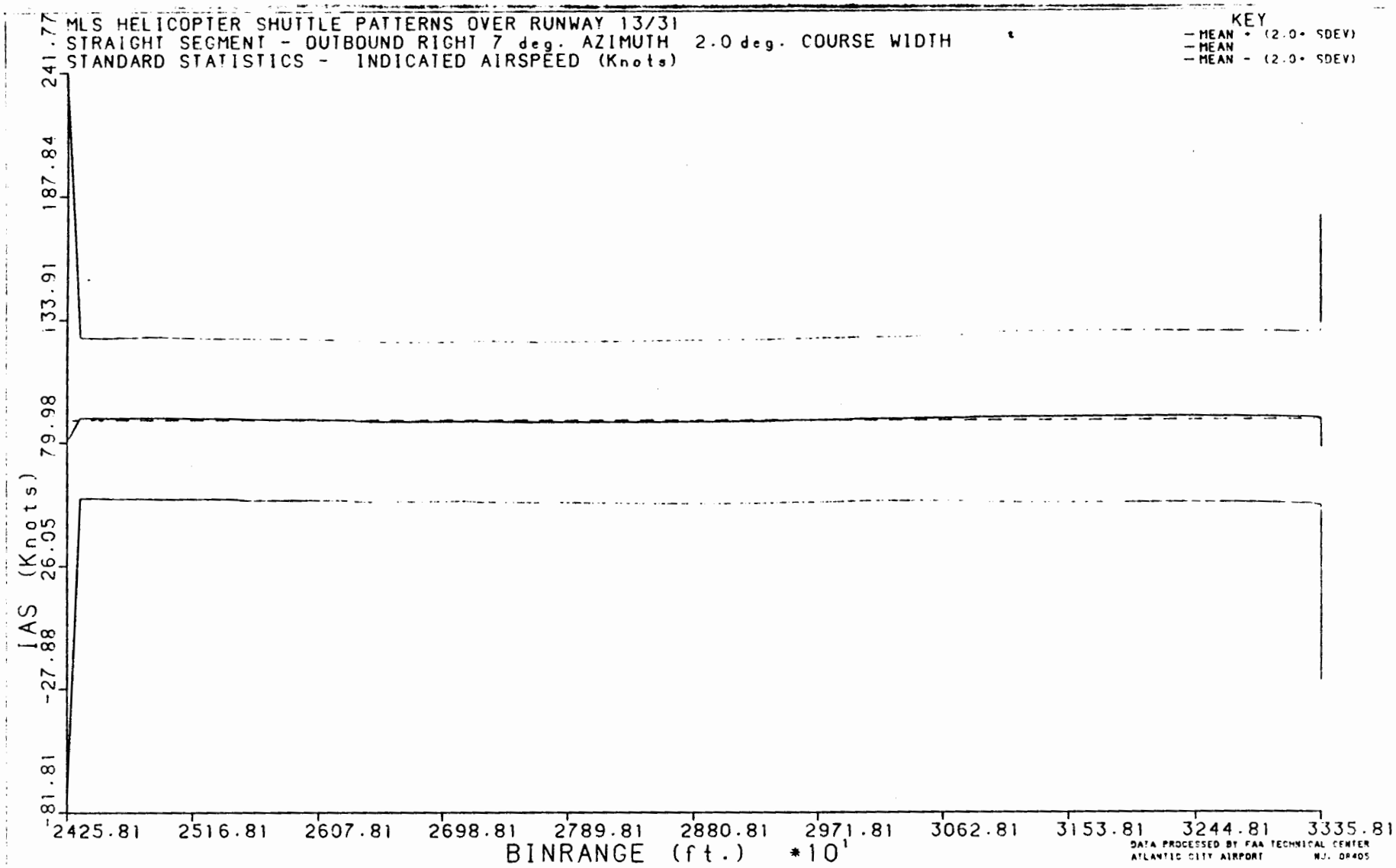
MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (%FS)

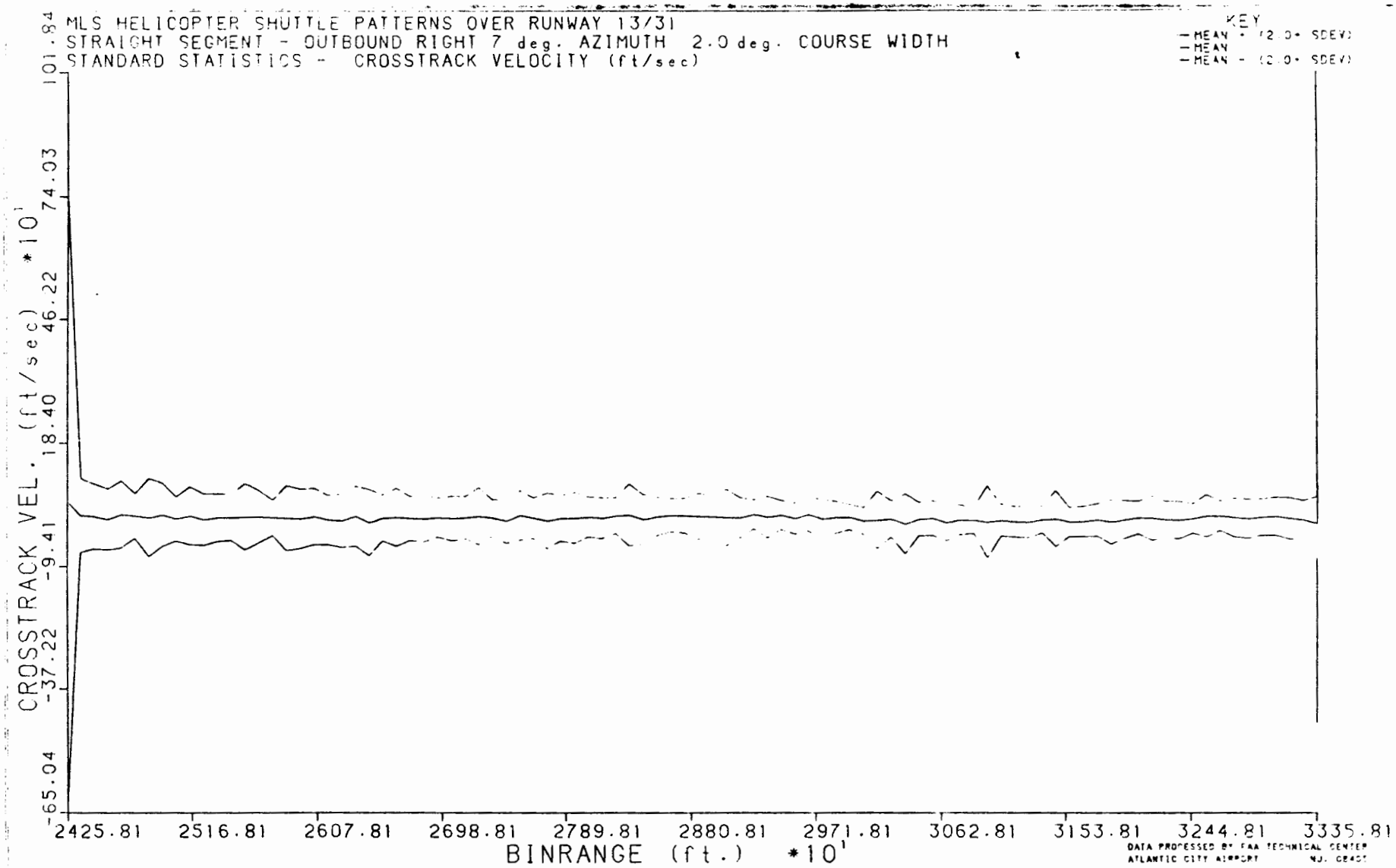



MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - NAVIGATION SYSTEM ERROR (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
NSE (ft.) *10^3
42.31
28.88
15.46
2.04
-11.38
-24.81
-38.23
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10^1
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - NAVIGATION SYSTEM ERROR (deg.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
NSE (deg.)
100.39
64.48
28.57
-7.35
-43.26
-79.17
-115.08
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - VERTICAL ERROR (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
VERTICAL ERROR (ft.) *10¹
101.02
61.21
21.41
-18.40
-58.20
-98.01
-137.81
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - INDICATED AIRSPEED (Knots)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
IAS (Knots)
241.77
187.84
133.91
79.98
26.05
-27.88
-81.81
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK VELOCITY (ft/sec)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
CROSSTRACK VEL. (ft/sec) *10¹
101.84
74.03
46.22
18.40
-9.41
-37.22
-65.04
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
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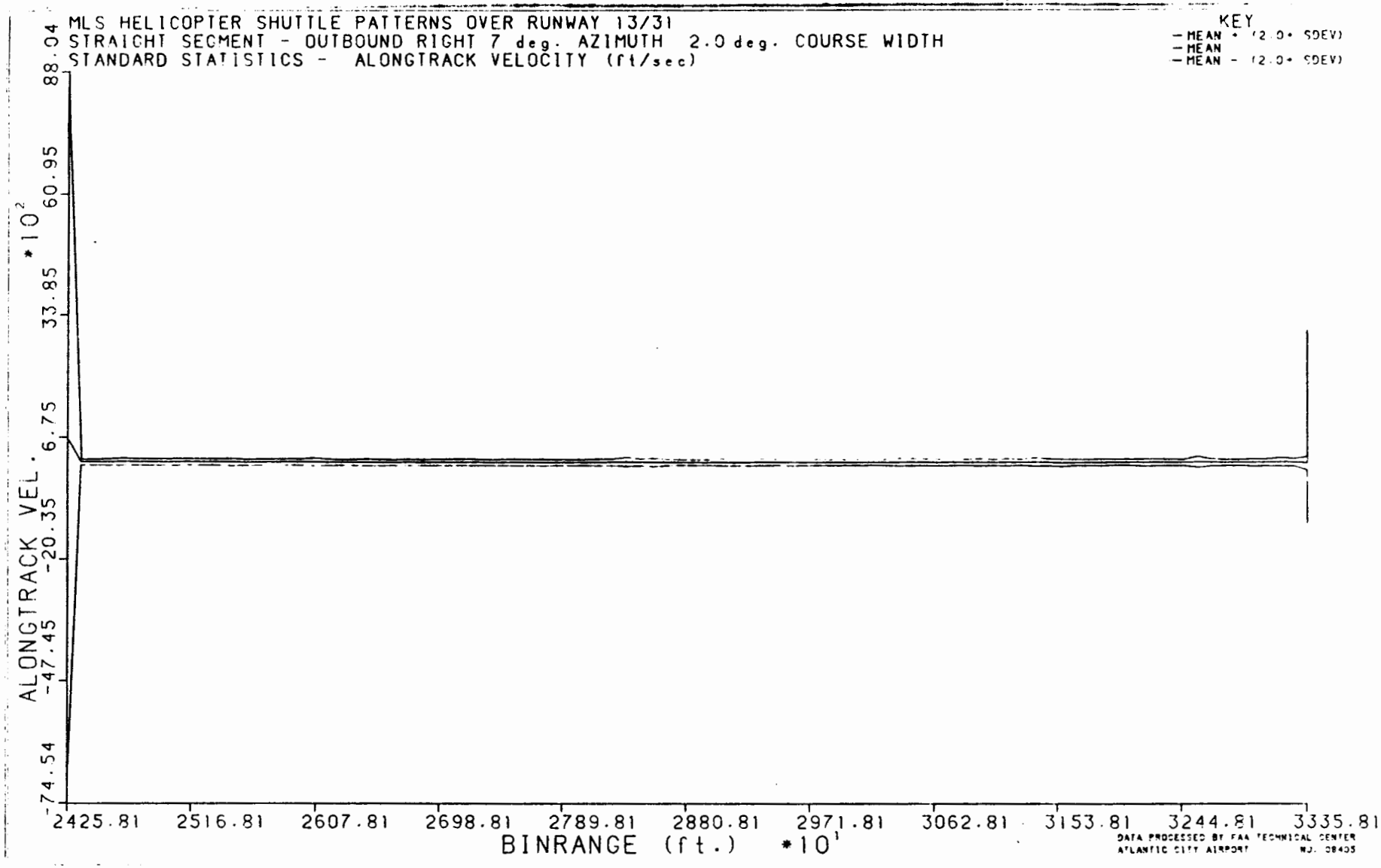
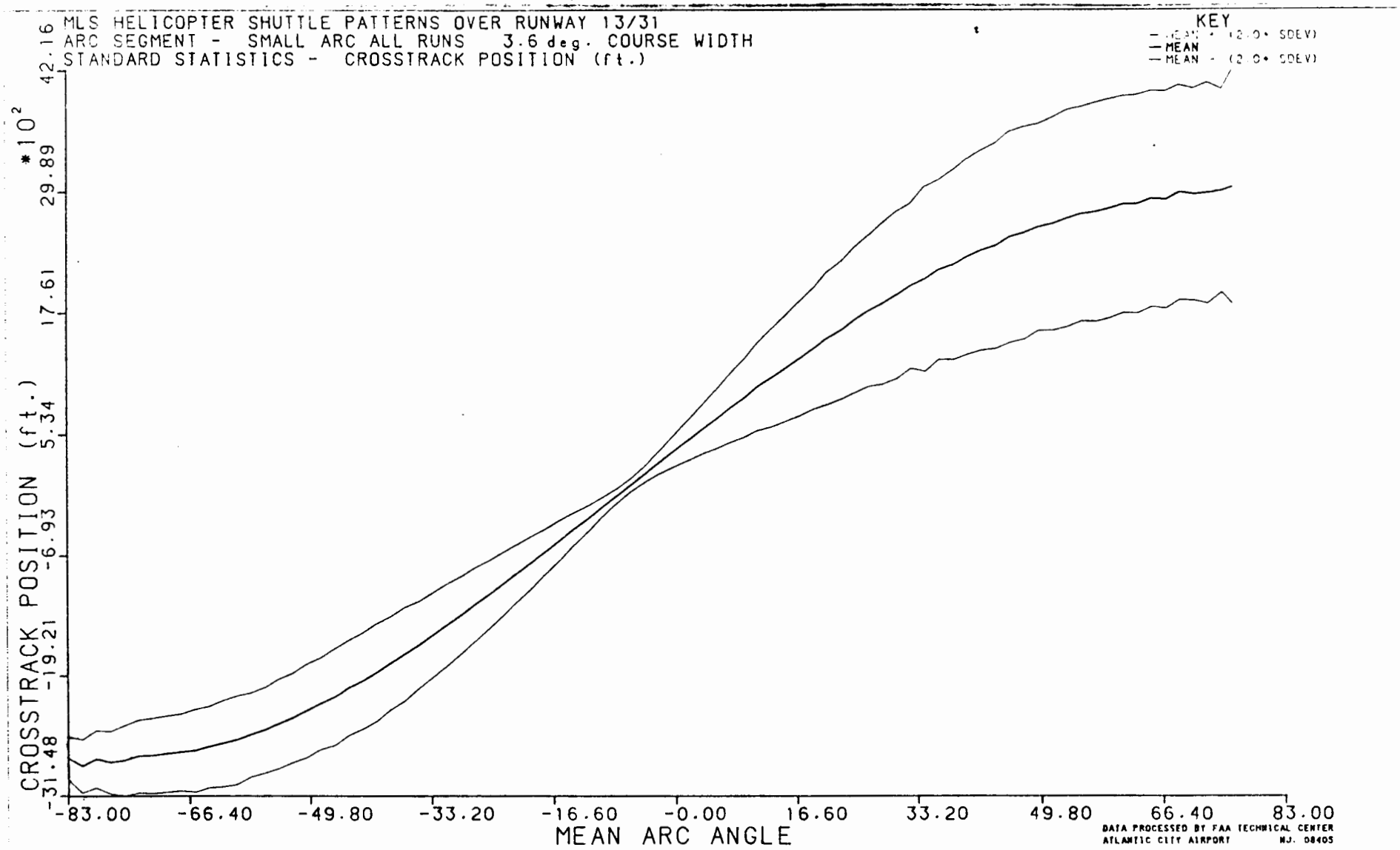
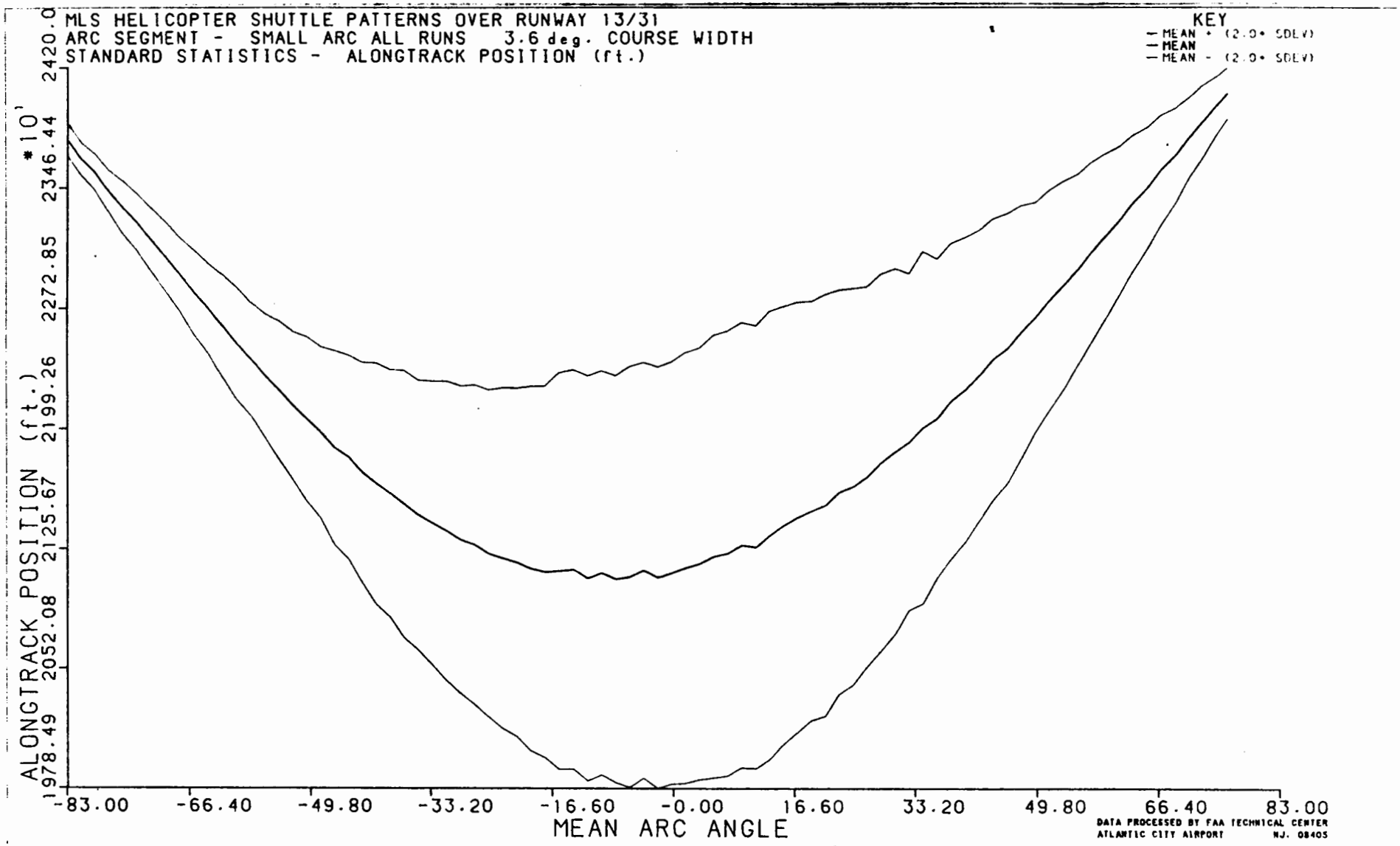
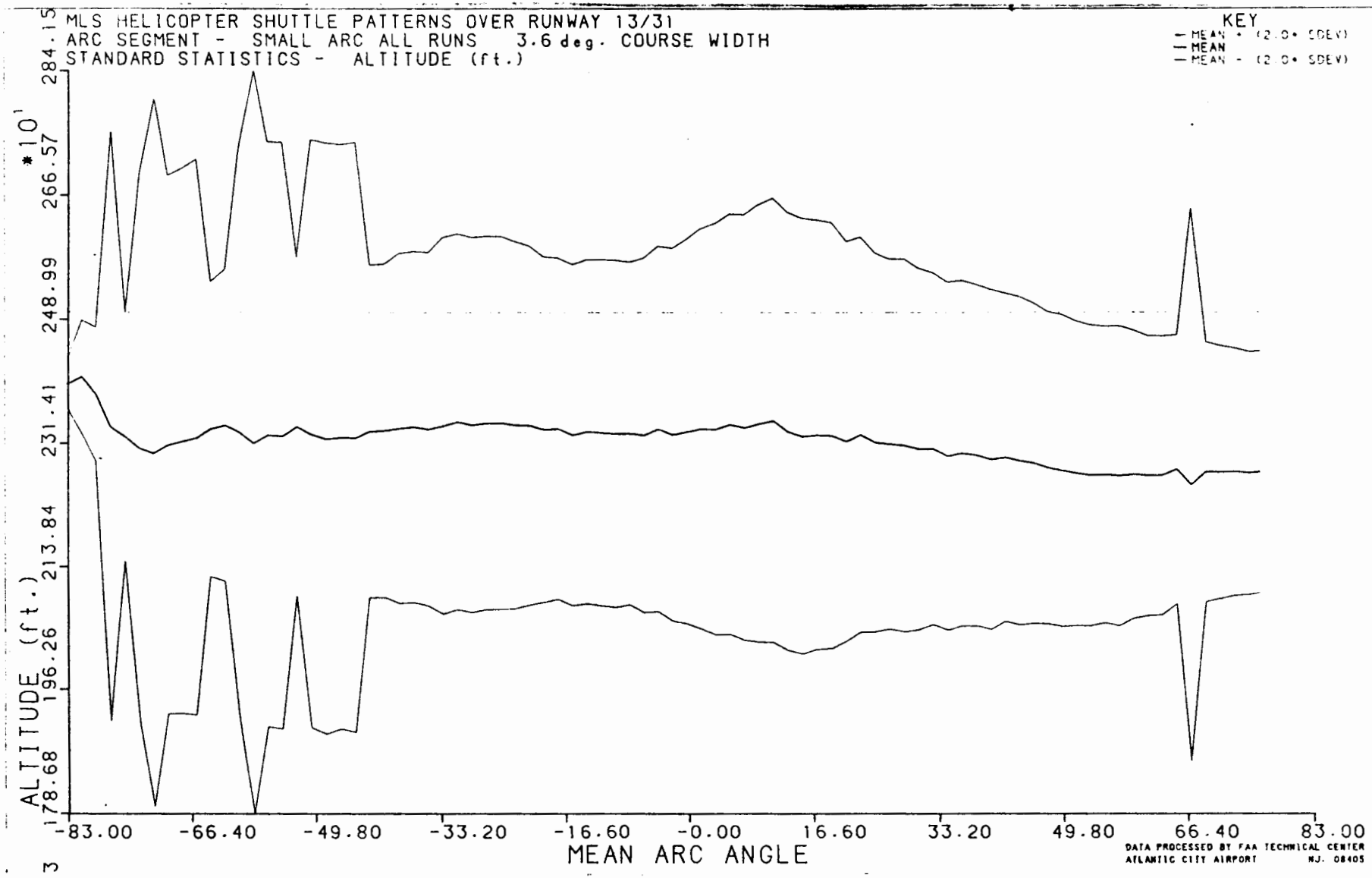

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK VELOCITY (ft/sec)
KEY
— MEAN + (2.0* SDEV)
— MEAN
— MEAN - (2.0* SDEV)
ALONGTRACK VEL. *10²
88.04
60.95
33.85
6.75
-20.35
-47.45
-74.54
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

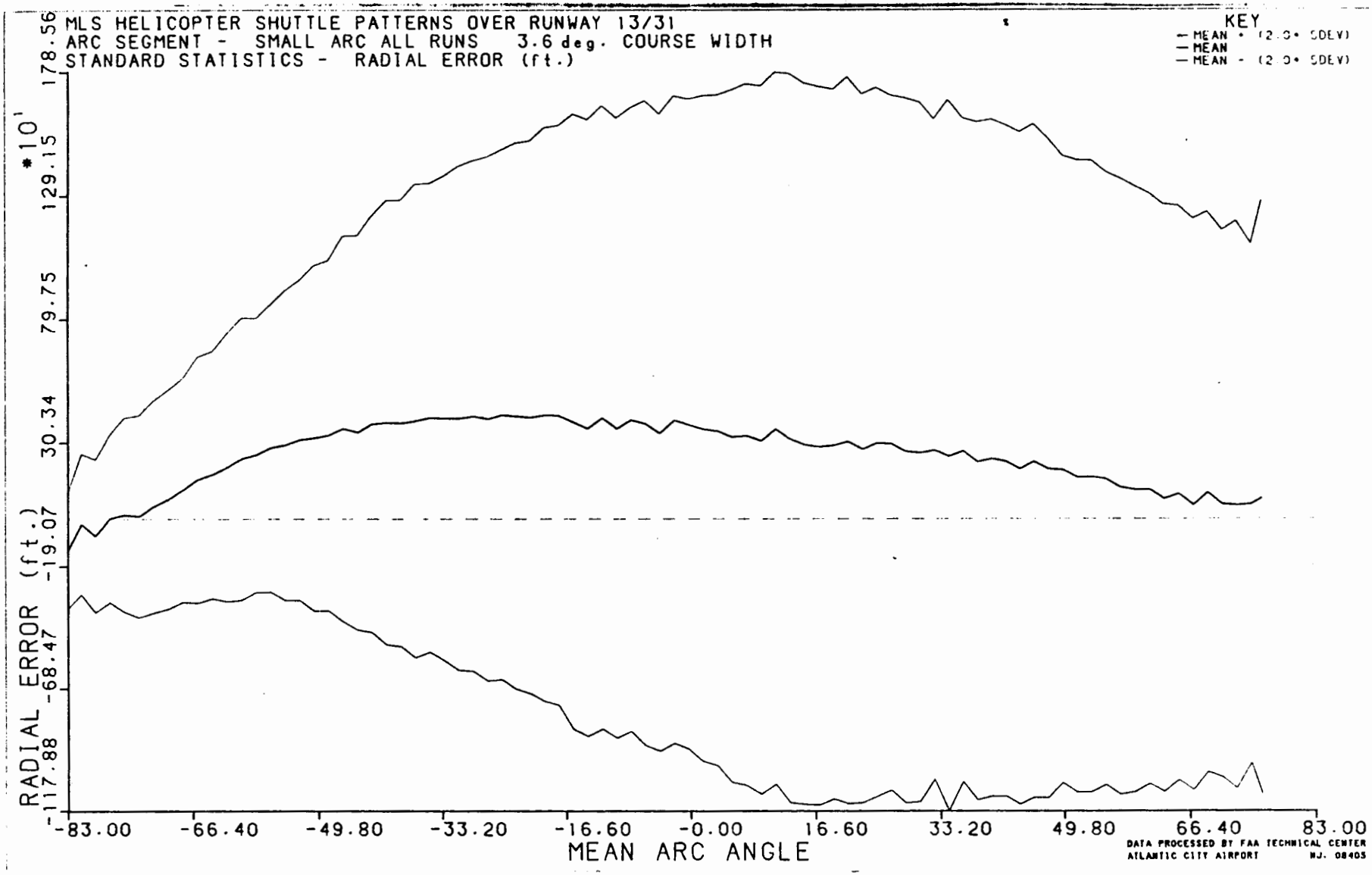
APPENDIX E

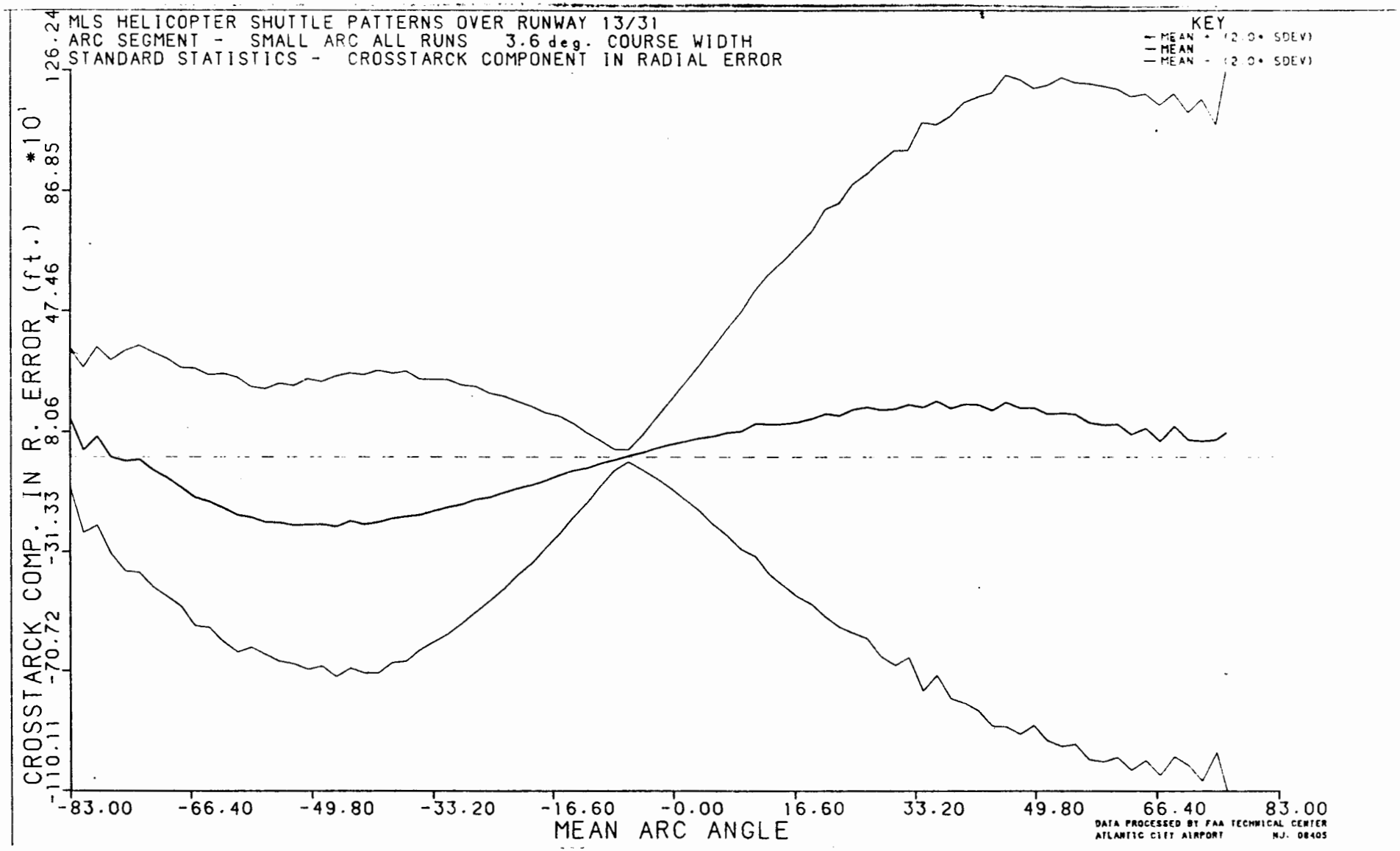
95 PERCENT ISOPROBABILITY PLOTS FOR 3.6° AND 2.0° SMALL ARC SEGMENTS

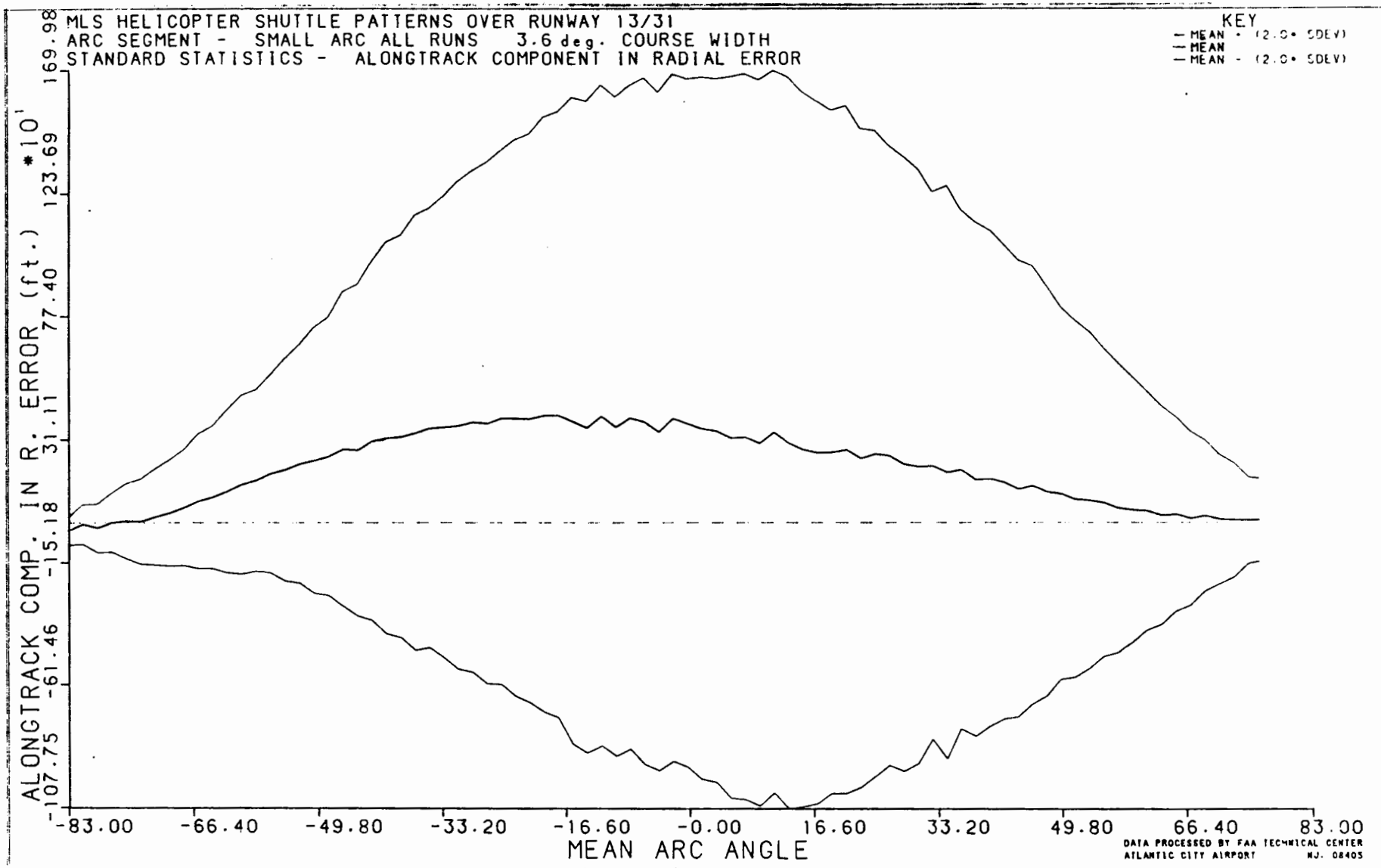

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK POSITION (ft.)
KEY
MEAN
CROSSTRACK POSITION (ft.) *10^2
42.16
29.89
17.61
5.34
-6.93
-19.21
-31.48
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

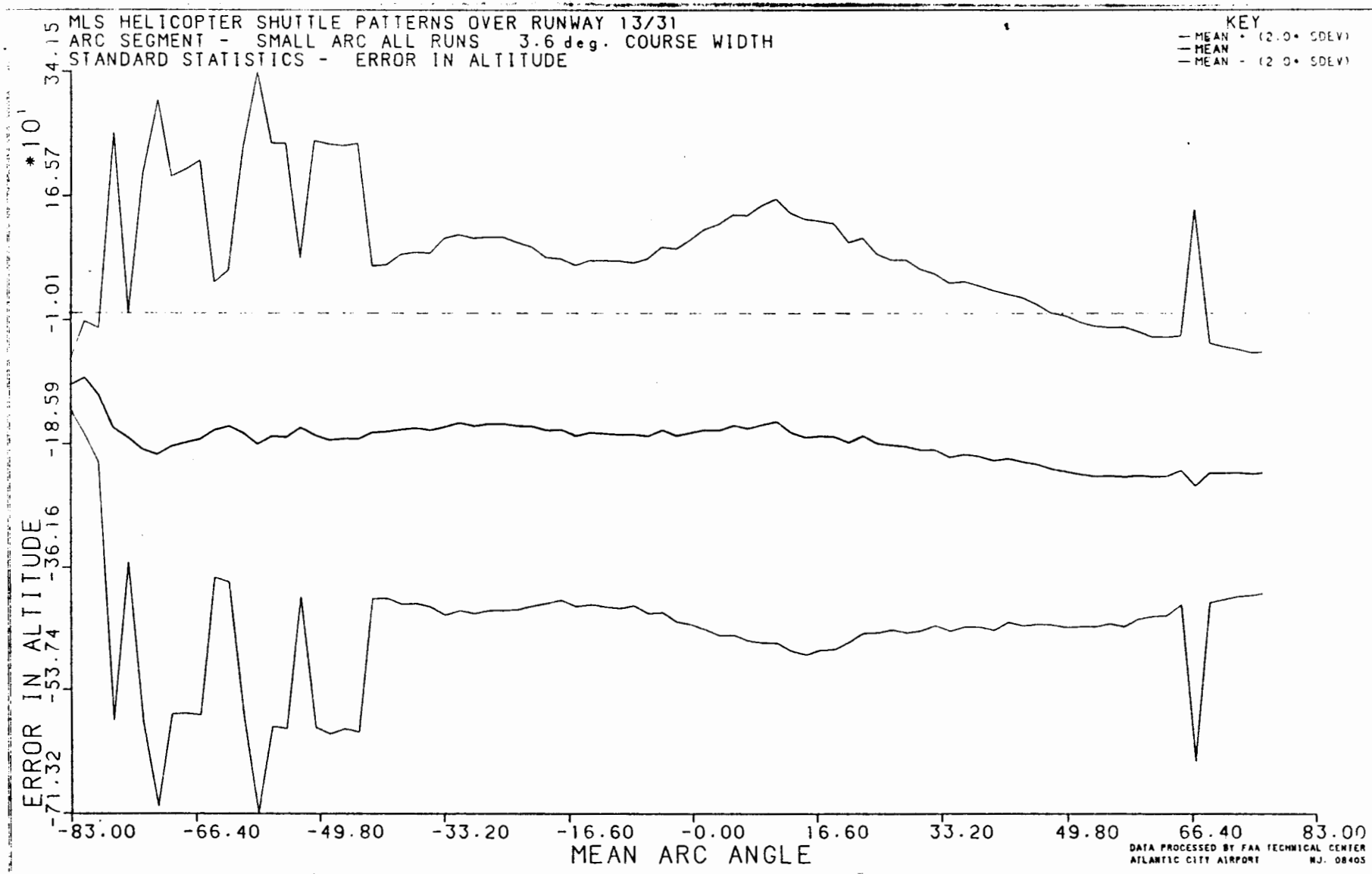

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK POSITION (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
ALONGTRACK POSITION (ft.)
*10'
2420.0
2346.44
2272.85
2199.26
2125.67
2052.08
1978.49
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

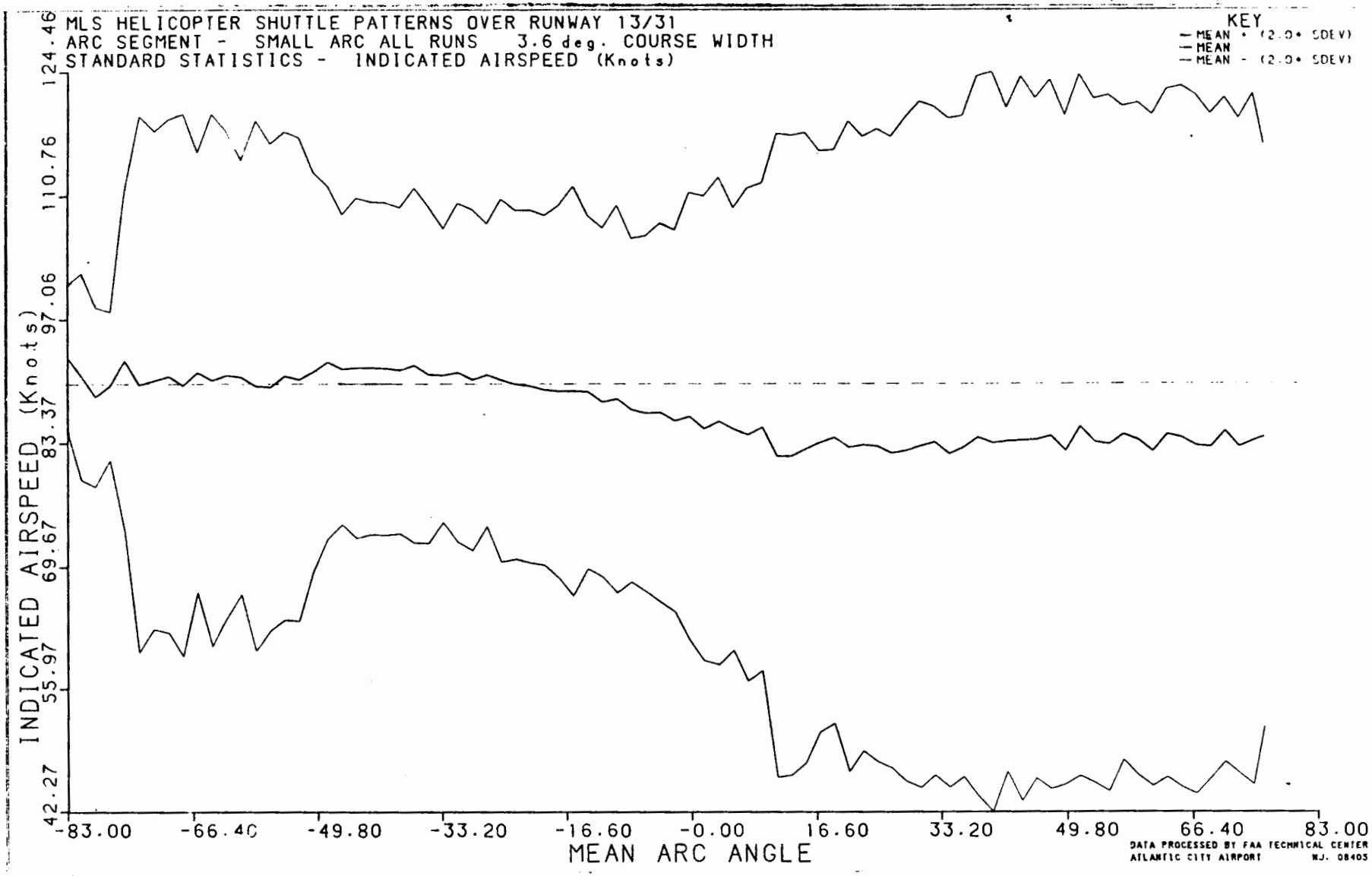

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALTITUDE (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
*10¹
284.15
266.57
248.99
231.41
213.84
196.26
178.68
ALTITUDE (ft.)
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

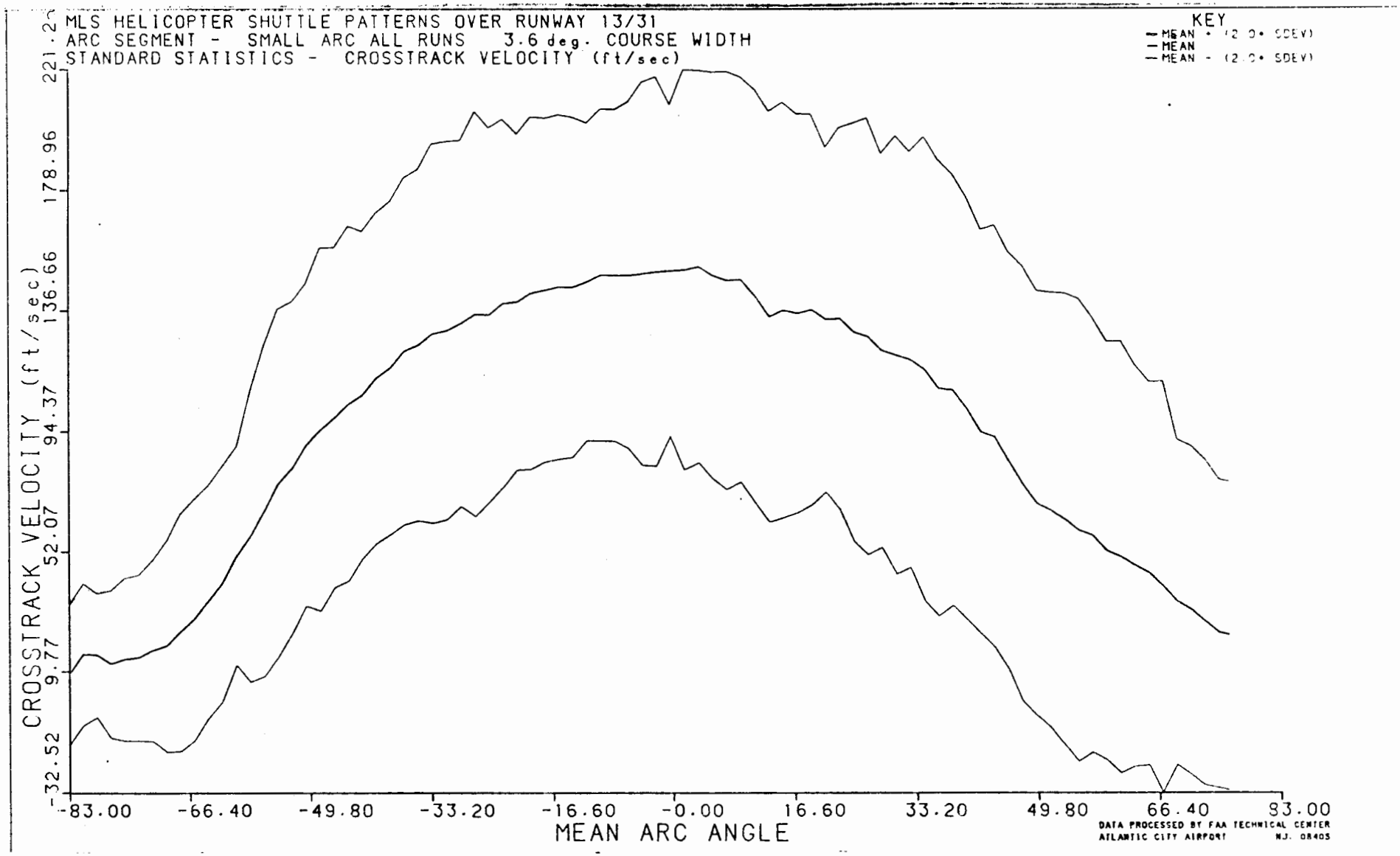

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - RADIAL ERROR (ft.)
KEY
— MEAN + (2.0* SDEV)
— MEAN
— MEAN - (2.0* SDEV)
RADIAL ERROR (ft.) *10¹
178.56
129.15
79.75
30.34
-19.07
-68.47
-117.88
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

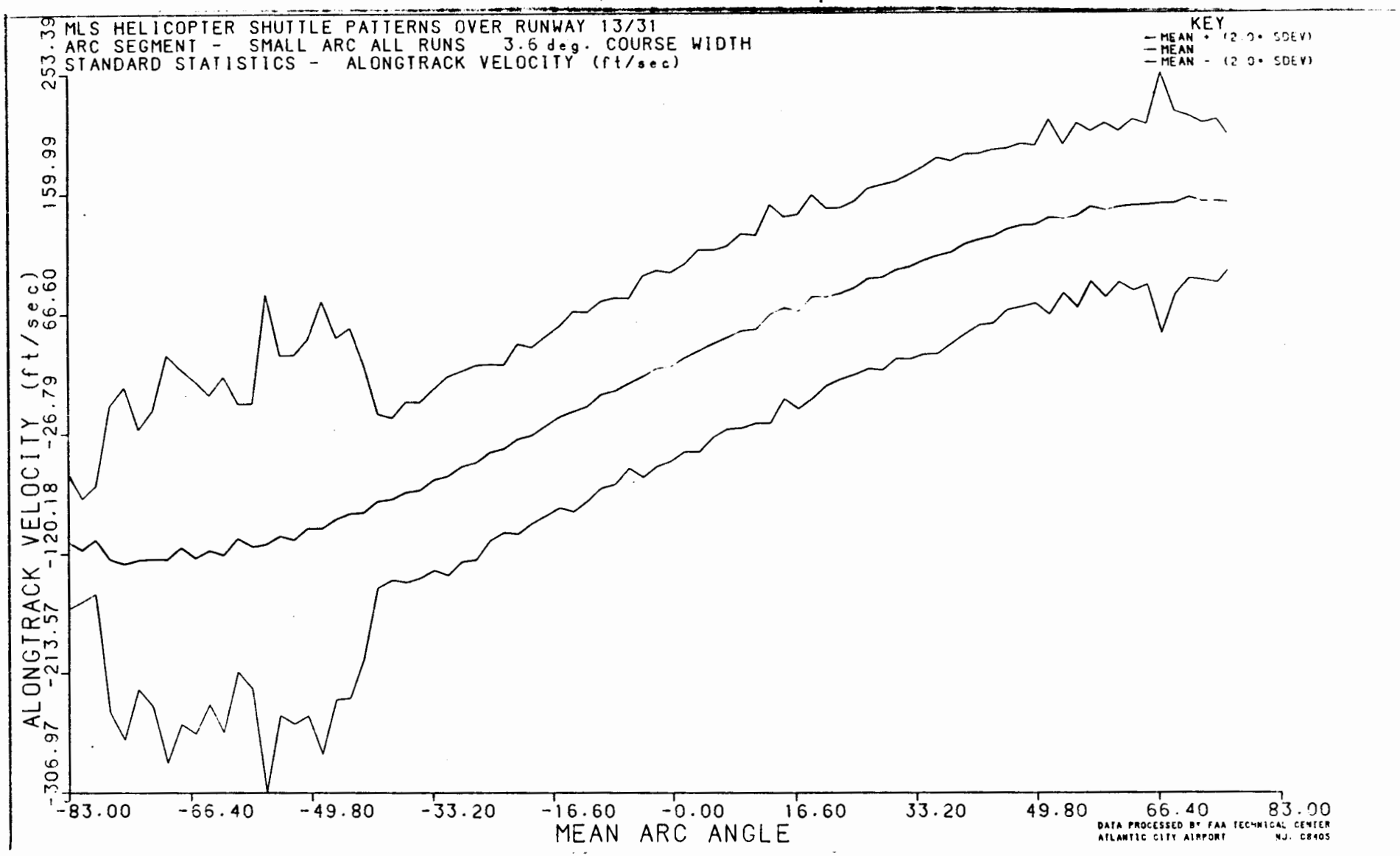

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTARCK COMPONENT IN RADIAL ERROR
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
CROSSTARCK COMP. IN R. ERROR (ft.) *10¹
126.24
86.85
47.46
8.06
-31.33
-70.72
-110.11
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

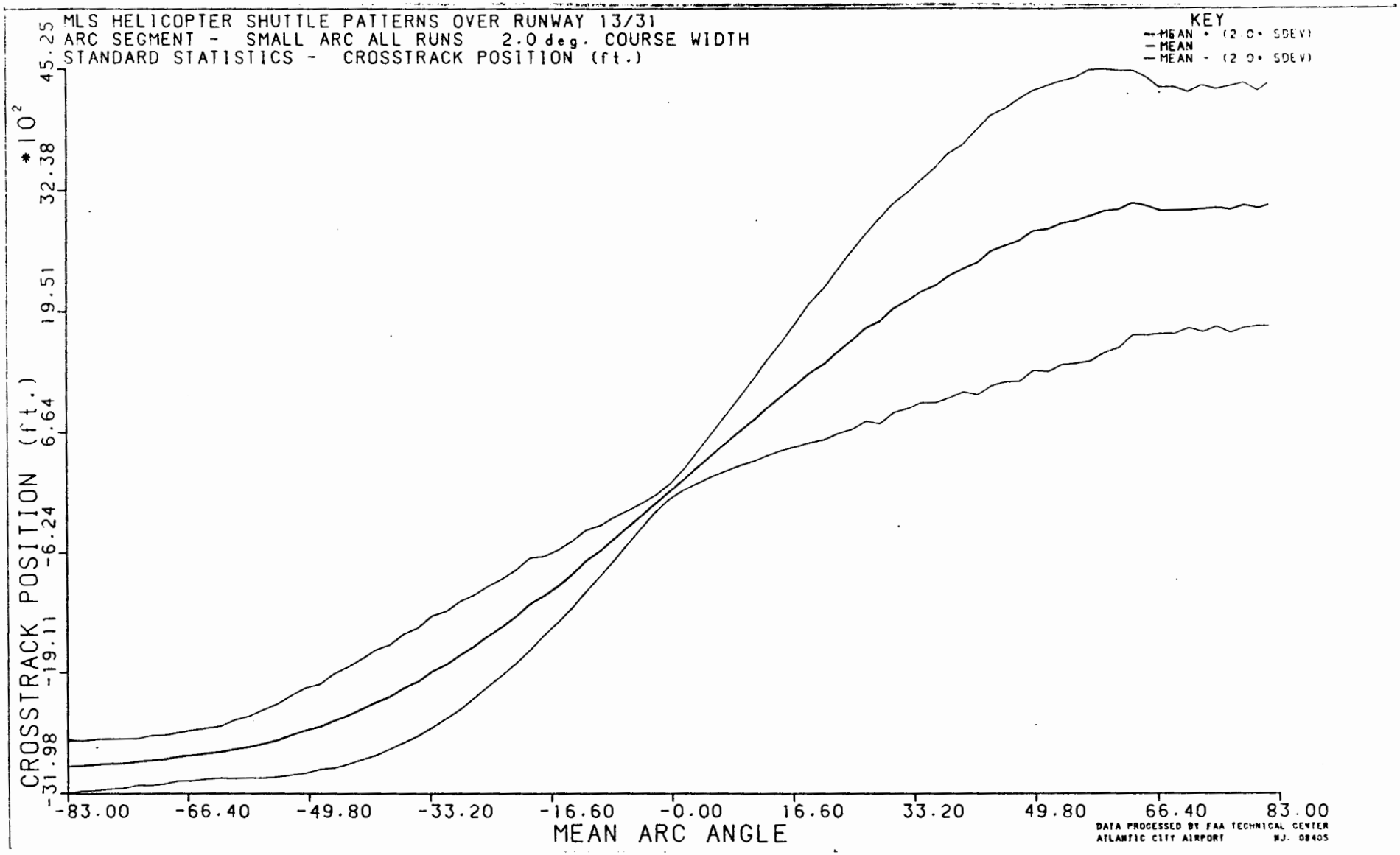

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK COMPONENT IN RADIAL ERROR
KEY
— MEAN + (2.0* SDEV)
— MEAN
— MEAN - (2.0* SDEV)
ALONGTRACK COMP. IN R. ERROR (ft.) *10¹
169.98
123.69
77.40
31.11
-15.18
-61.46
-107.75
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

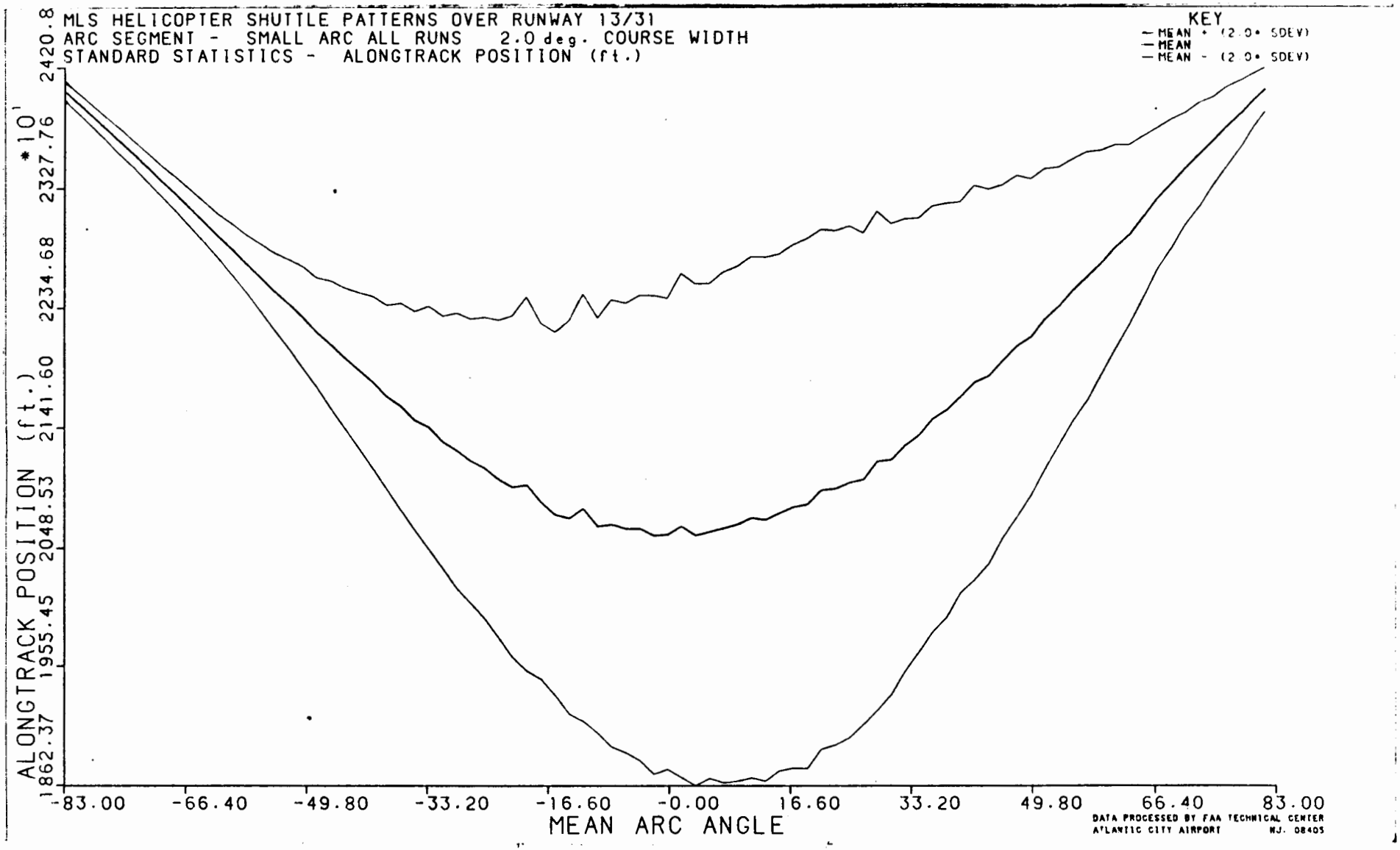

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ERROR IN ALTITUDE
KEY
— MEAN + (2.0* SDEV)
— MEAN
— MEAN - (2.0* SDEV)
ERROR IN ALTITUDE *10¹
34.15
16.57
-1.01
-18.59
-36.16
-53.74
-71.32
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

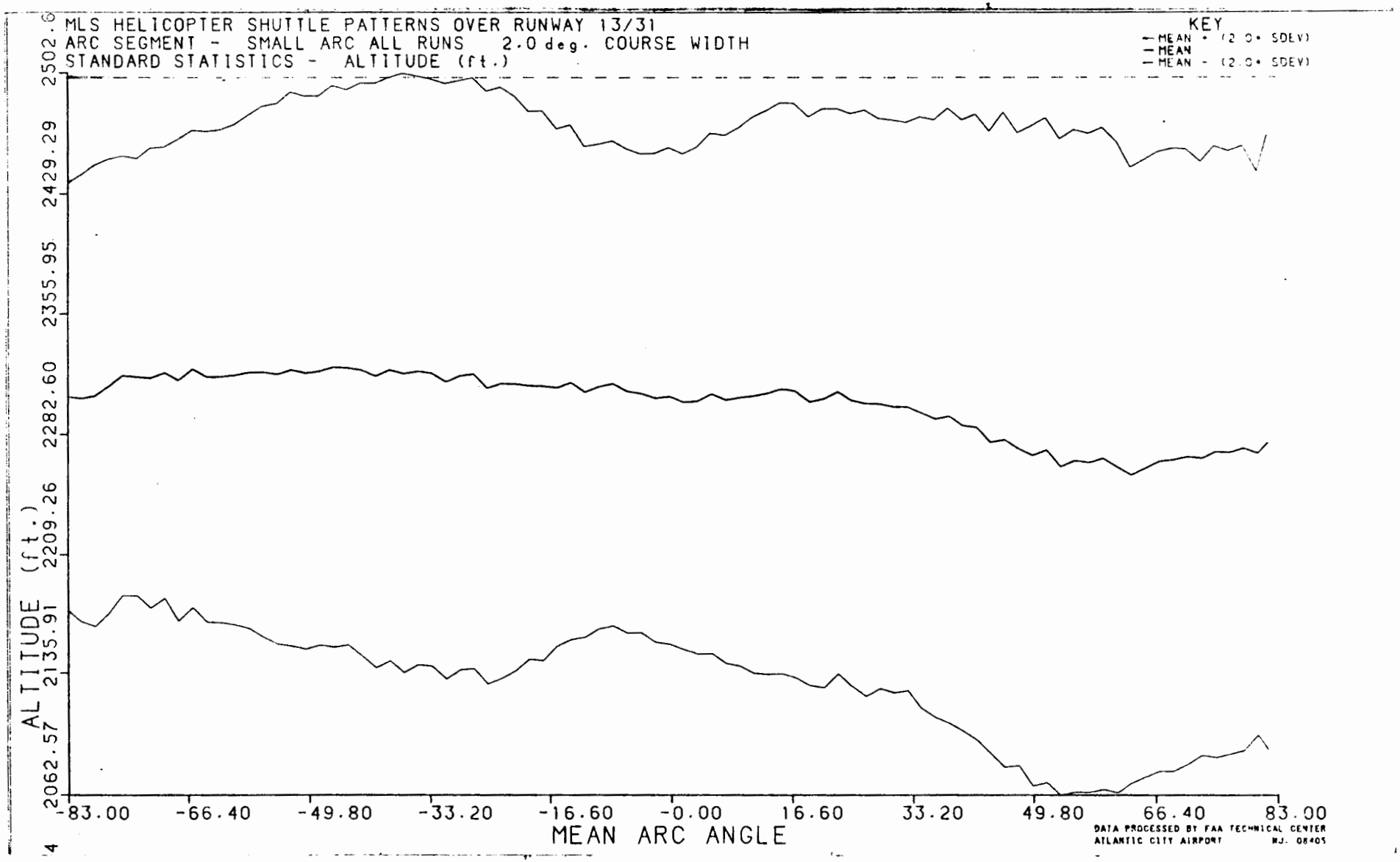

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - INDICATED AIRSPEED (Knots)
KEY
— MEAN + (2.0* SDEV)
— MEAN
— MEAN - (2.0* SDEV)
INDICATED AIRSPEED (Knots)
124.46
110.76
97.06
83.37
69.67
55.97
42.27
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

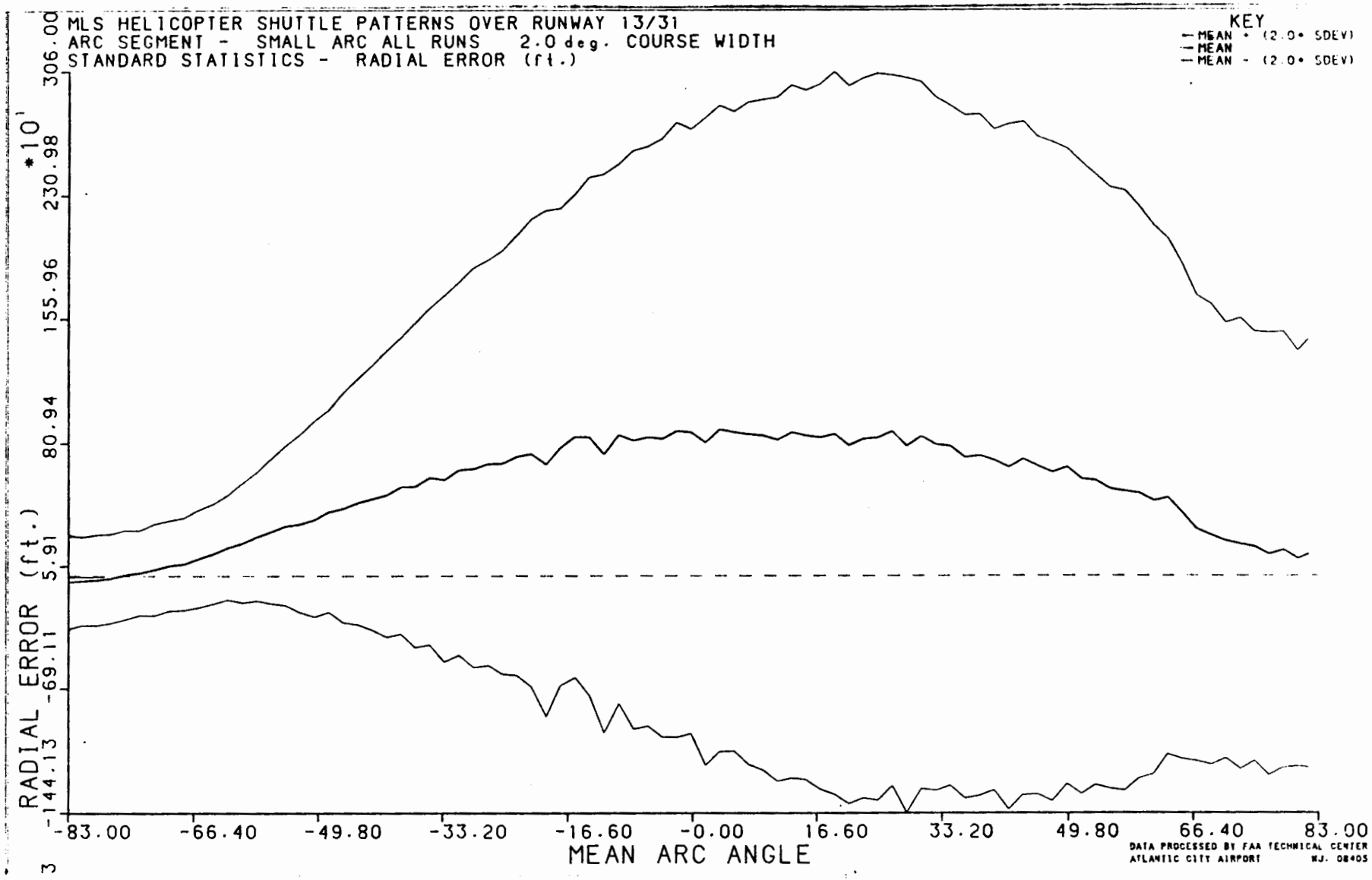

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK VELOCITY (ft/sec)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
CROSSTRACK VELOCITY (ft/sec)
221.20
178.96
136.66
94.37
52.07
9.77
-32.52
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

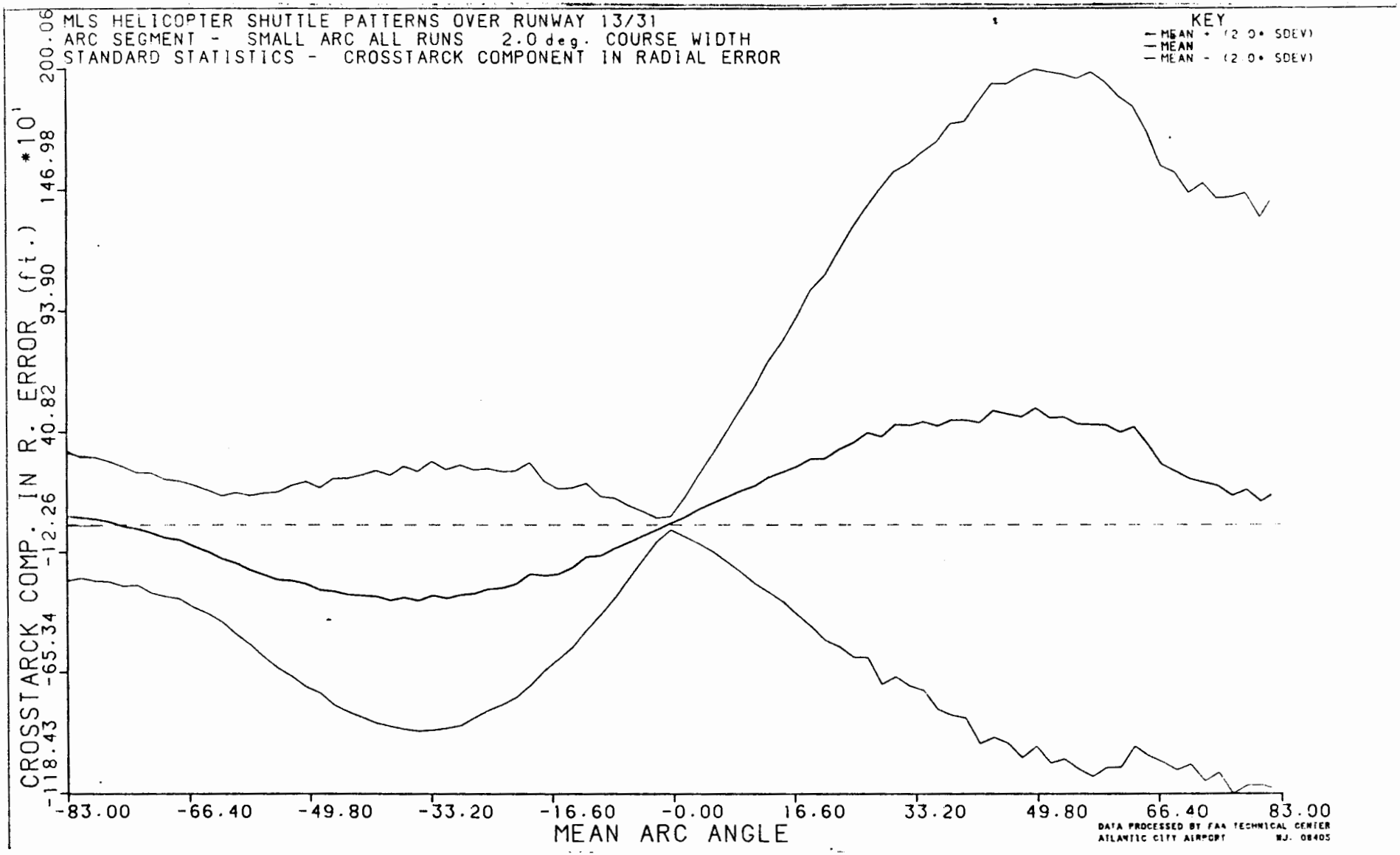

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK VELOCITY (ft/sec)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
ALONGTRACK VELOCITY (ft/sec)
253.39
159.99
66.60
-26.79
-120.18
-213.57
-306.97
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

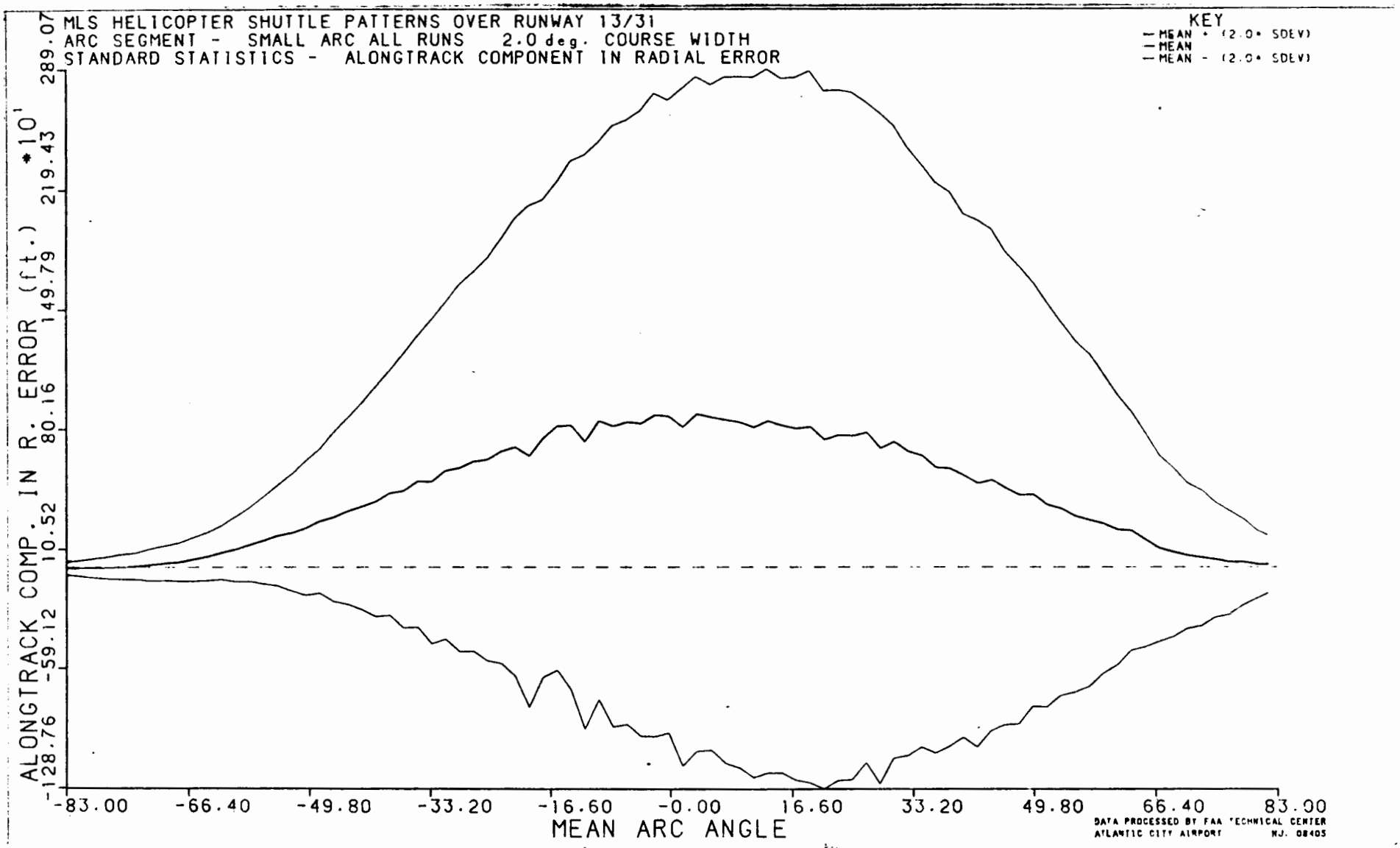

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK POSITION (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
CROSSTRACK POSITION (ft.) *10^2
45.25
32.38
19.51
6.64
-6.24
-19.11
-31.98
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

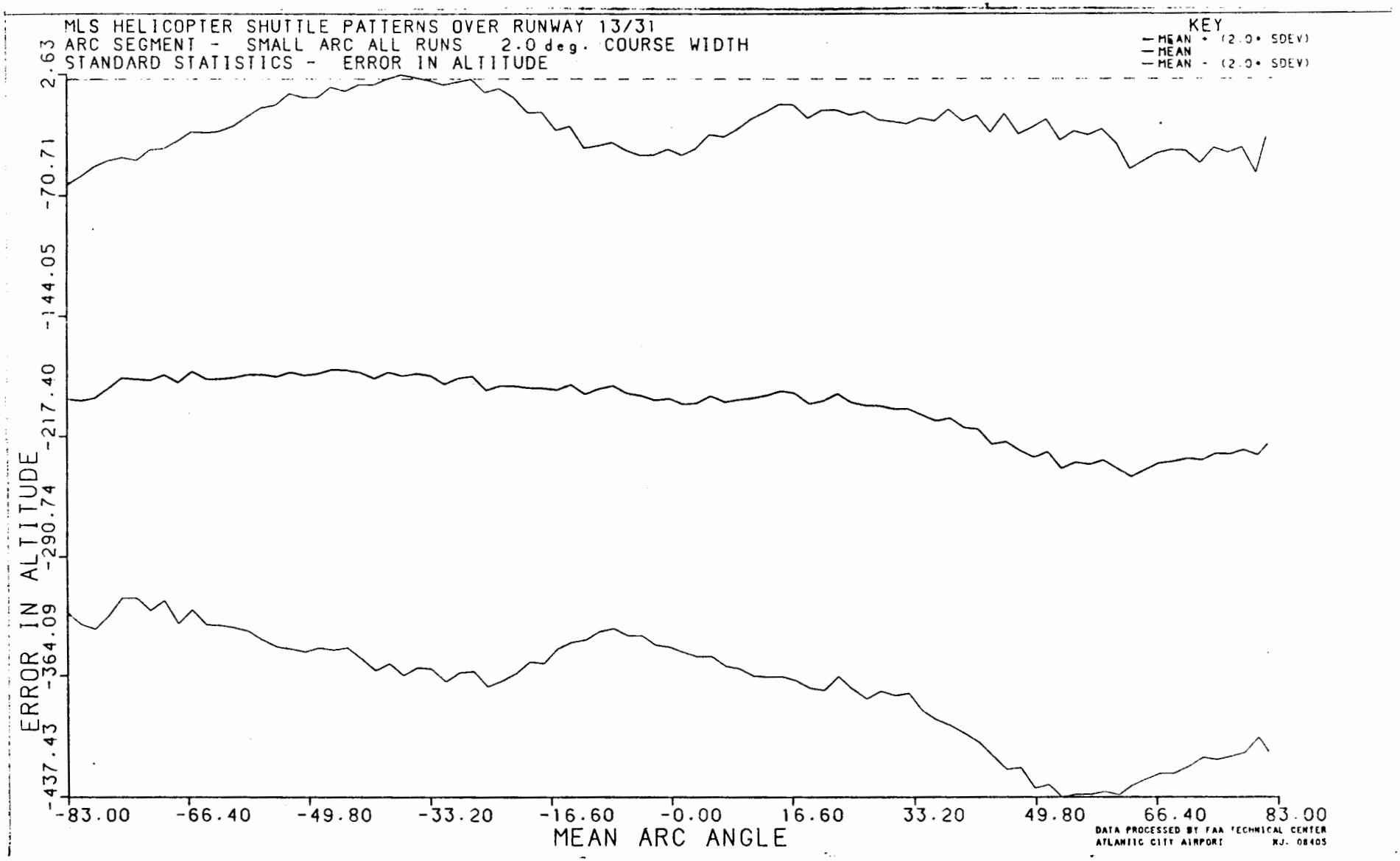

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK POSITION (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
ALONGTRACK POSITION (ft.)
*10¹
2420.8
2327.76
2234.68
2141.60
2048.53
1955.45
1862.37
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

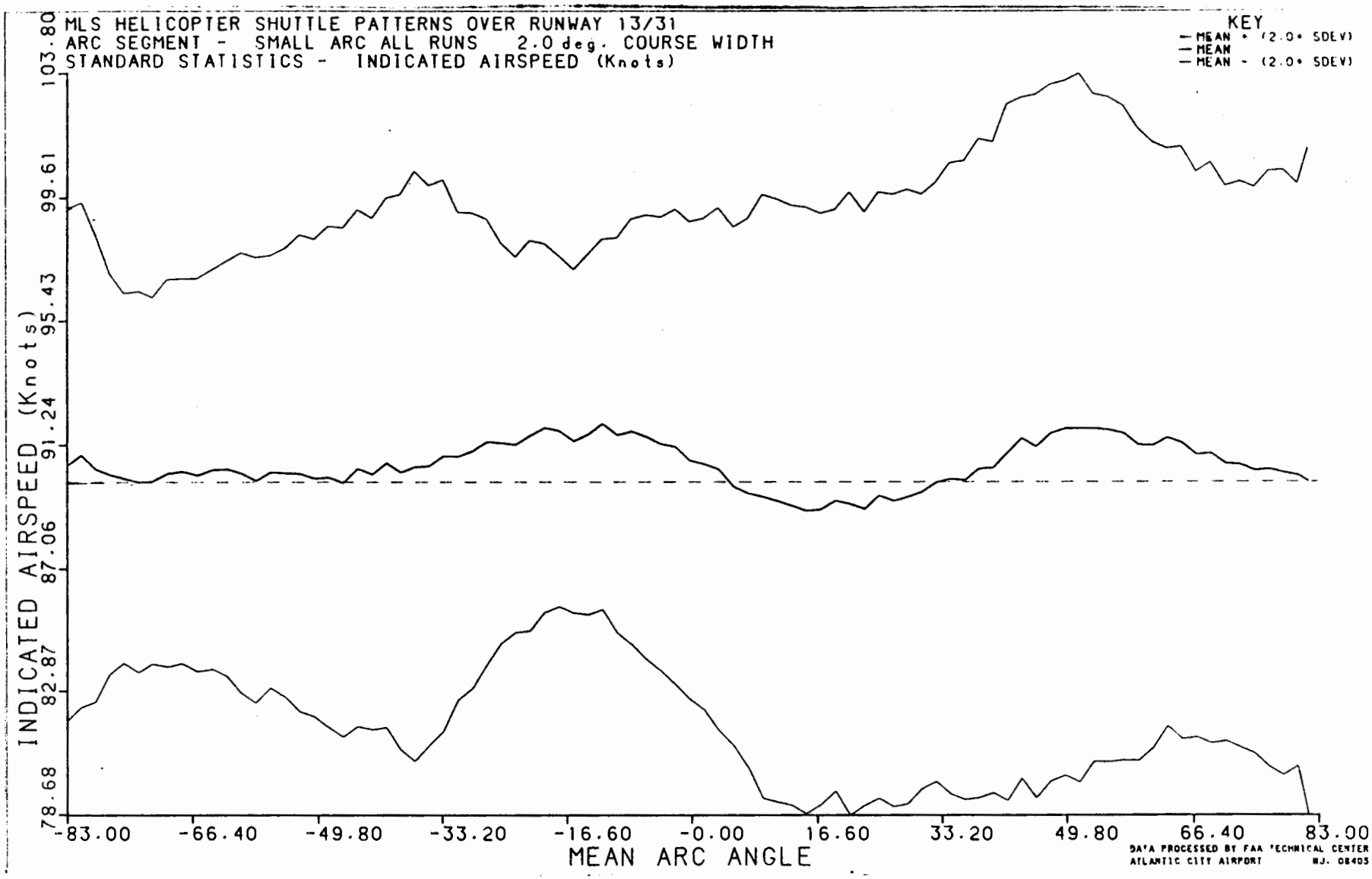

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALTITUDE (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
ALTITUDE (ft.)
2502.6
2429.29
2355.95
2282.60
2209.26
2135.91
2062.57
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

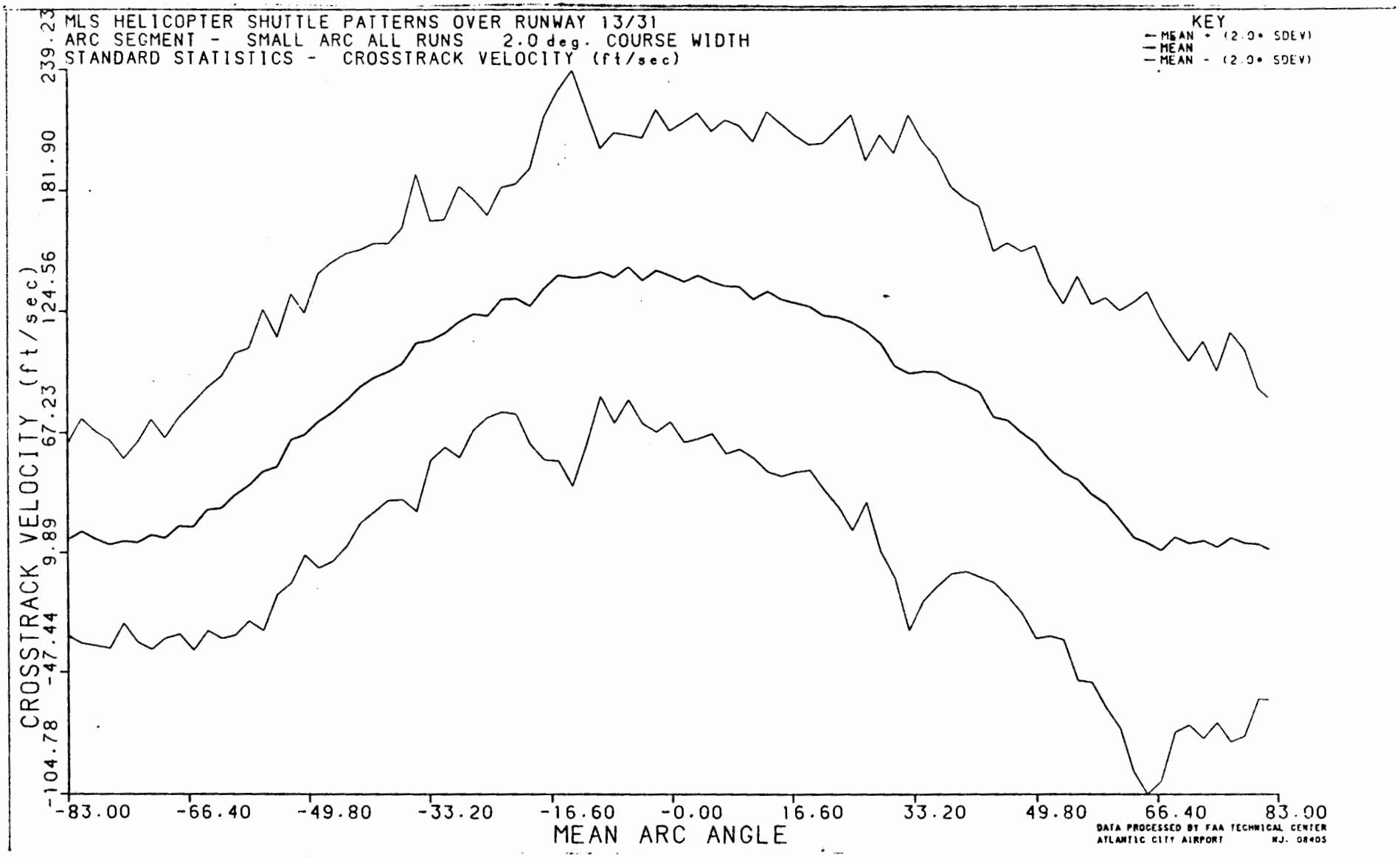

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - RADIAL ERROR (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
RADIAL ERROR (ft.)
*10¹
306.00
230.98
155.96
80.94
5.91
-69.11
-144.13
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

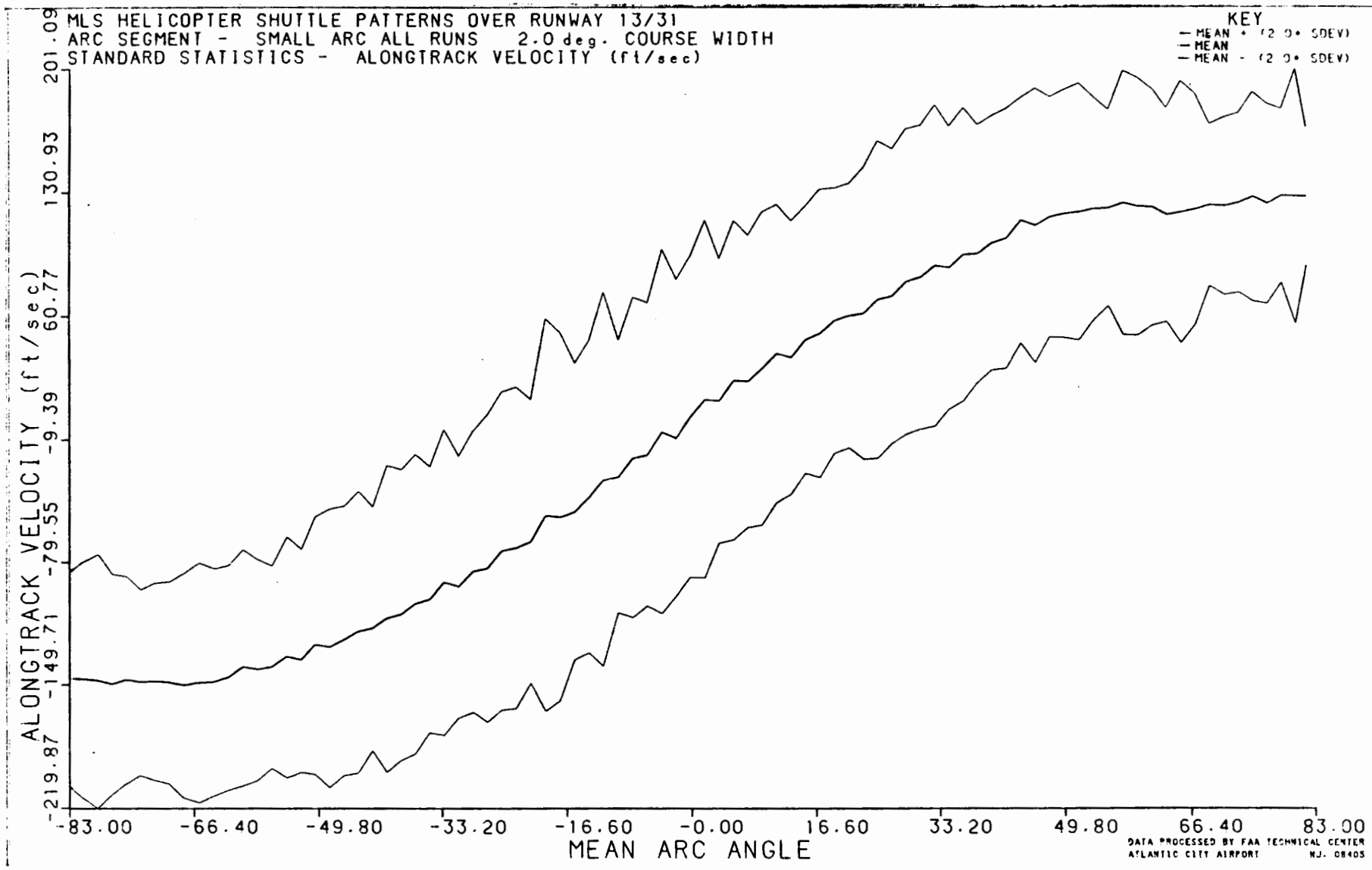

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTARCK COMPONENT IN RADIAL ERROR
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
CROSSTARCK COMP. IN R. ERROR (ft.) *10¹
200.06
146.98
93.90
40.82
-12.26
-65.34
-118.43
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK COMPONENT IN RADIAL ERROR
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
ALONGTRACK COMP. IN R. ERROR (ft.) *10¹
289.07
219.43
149.79
80.16
10.52
-59.12
-128.76
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ERROR IN ALTITUDE
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
ERROR IN ALTITUDE
2.63
-70.71
-144.05
-217.40
-290.74
-364.09
-437.43
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - INDICATED AIRSPEED (Knots)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
INDICATED AIRSPEED (Knots)
103.80
99.61
95.43
91.24
87.06
82.87
78.68
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK VELOCITY (ft/sec)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
CROSSTRACK VELOCITY (ft/sec)
239.23
181.90
124.56
67.23
9.89
-47.44
-104.78
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK VELOCITY (ft/sec)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
ALONGTRACK VELOCITY (ft/sec)
201.09
130.93
60.77
-9.39
-79.55
-149.71
-219.87
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
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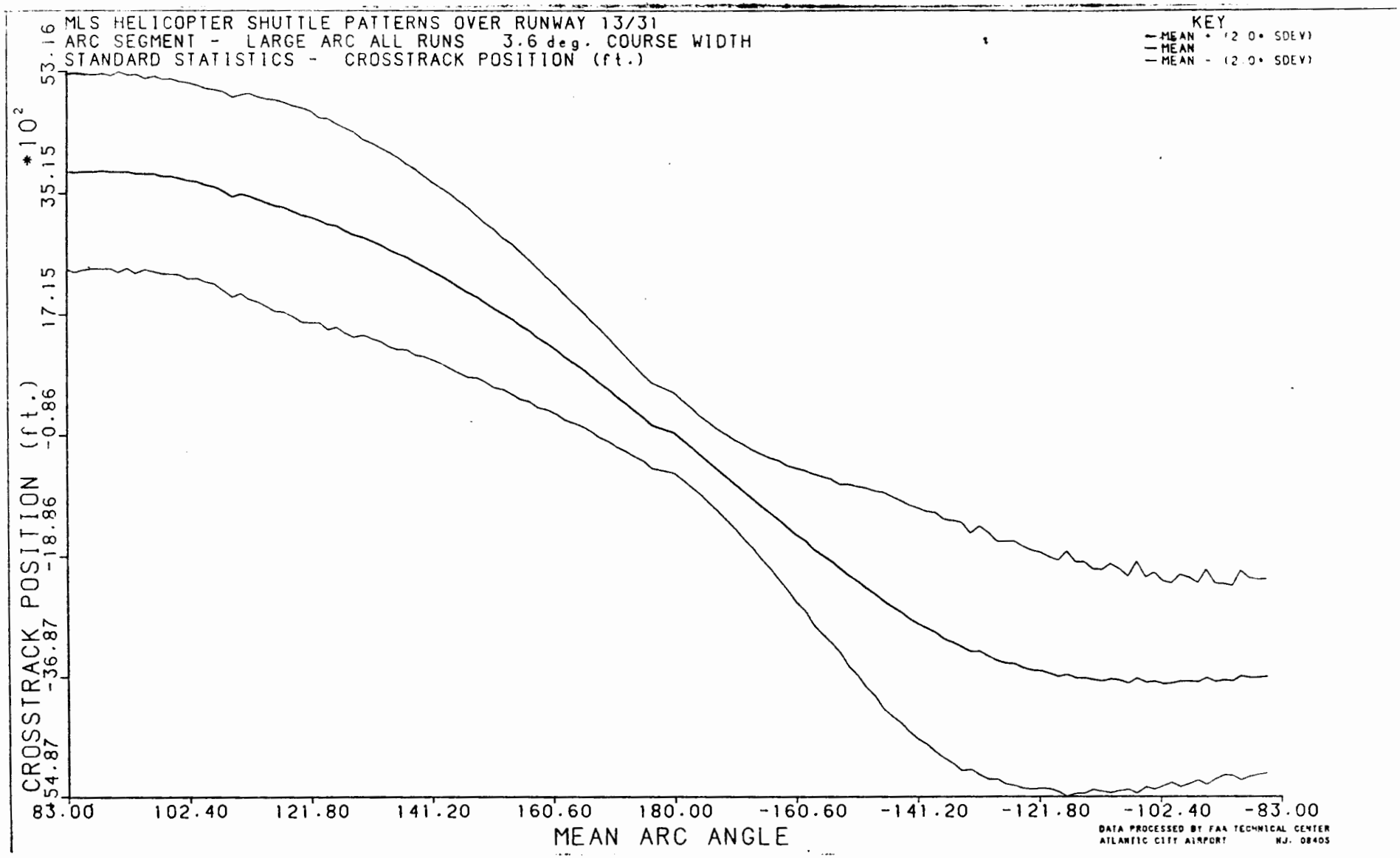
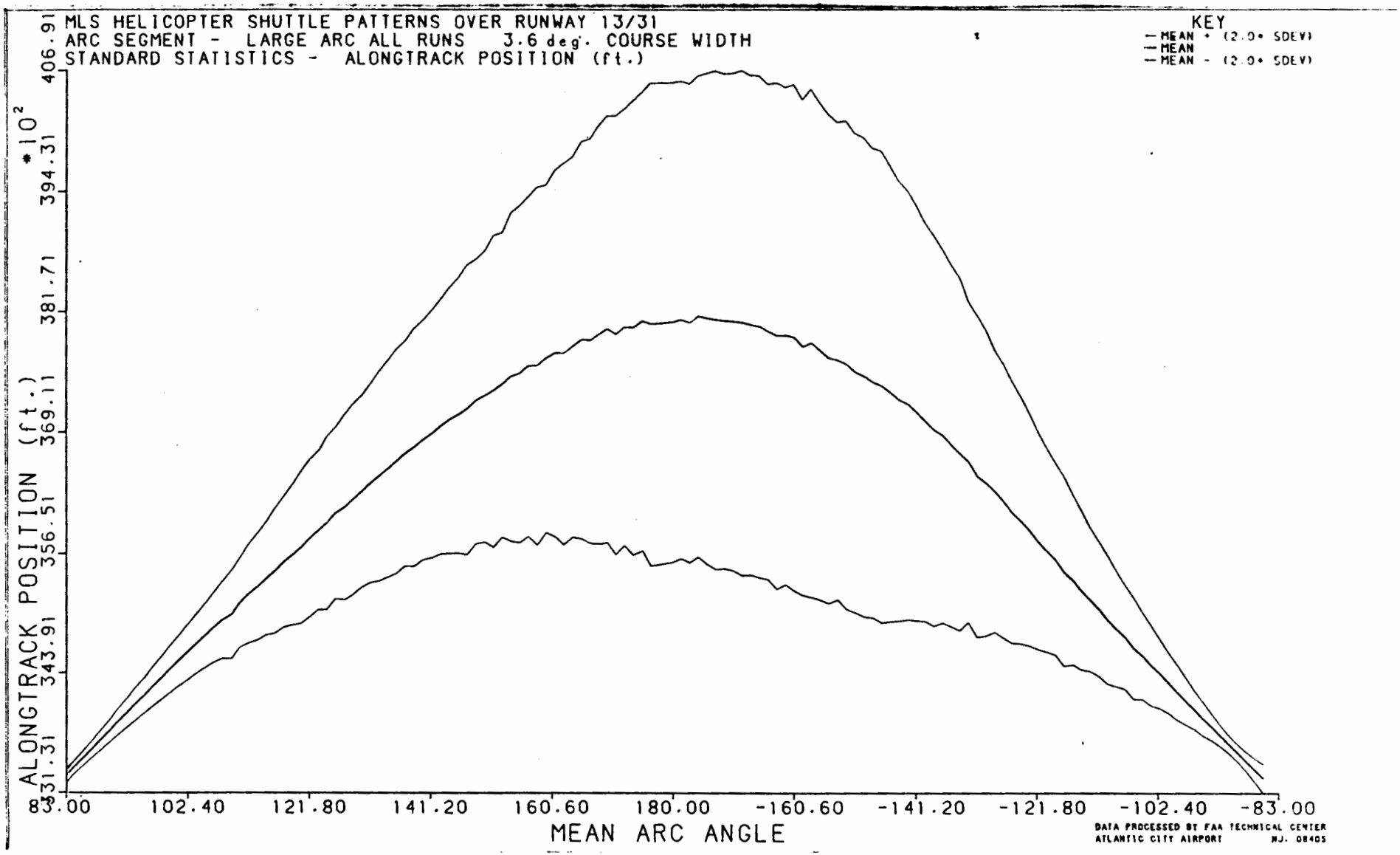
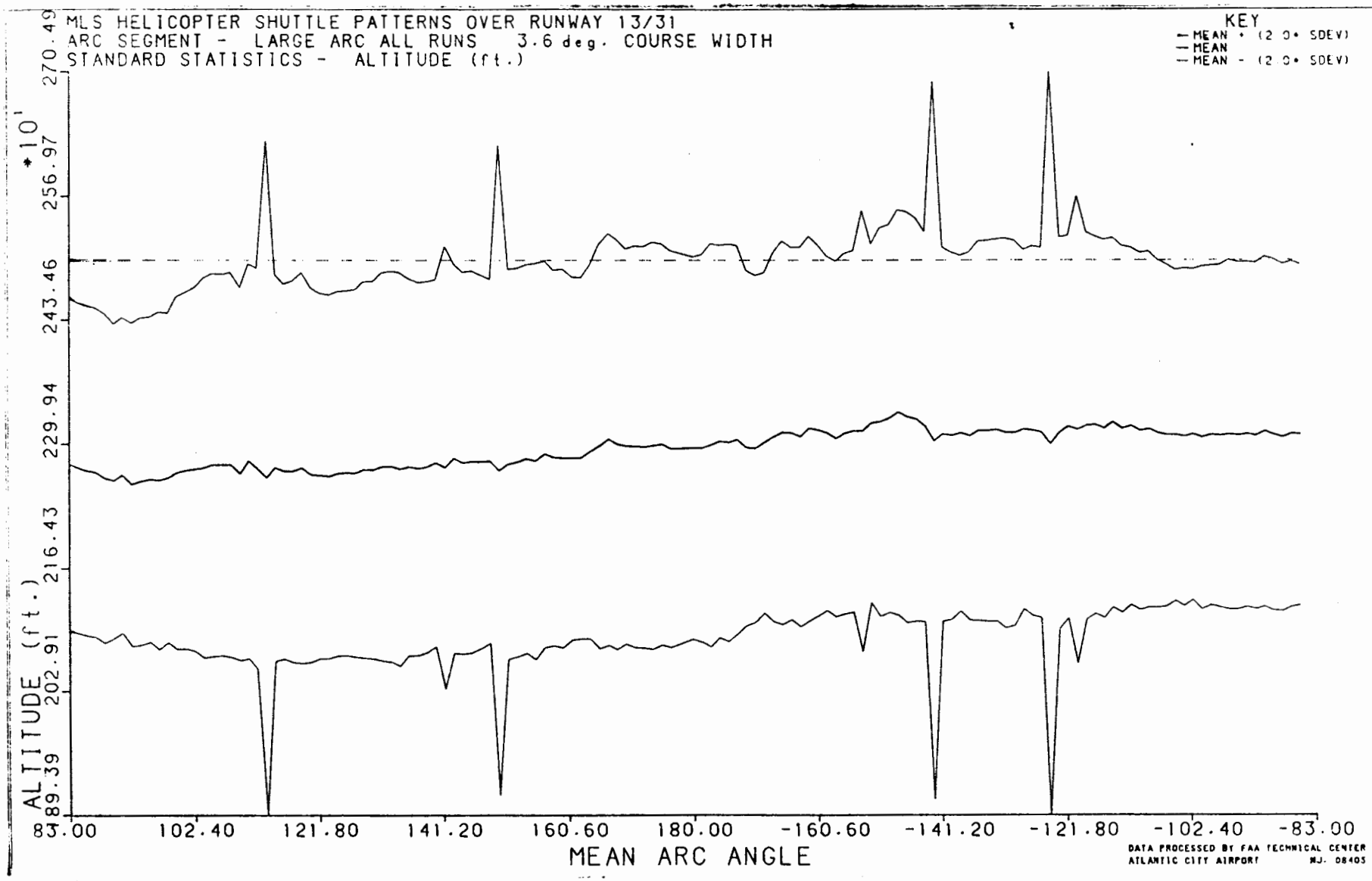
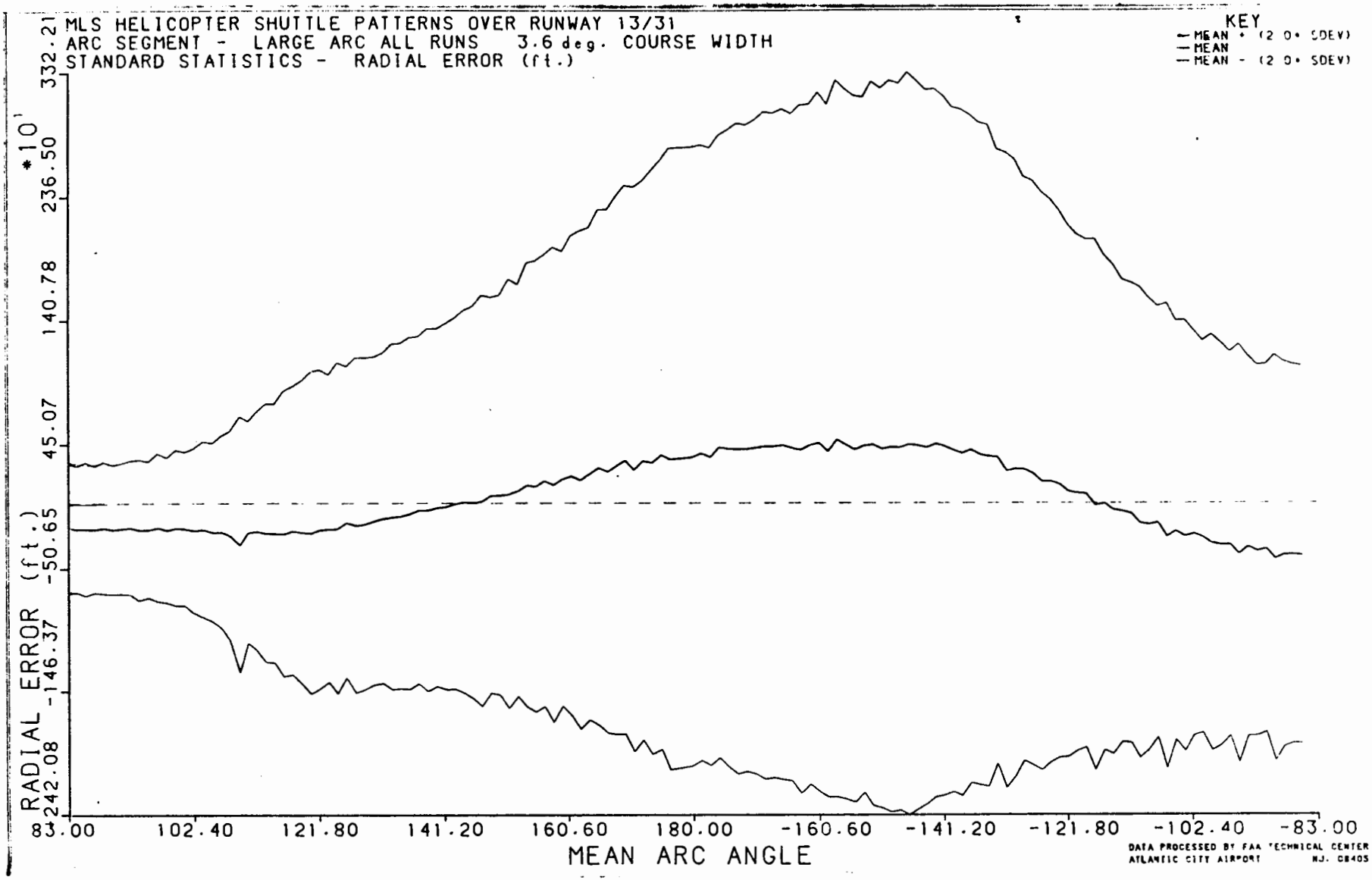
APPENDIX F

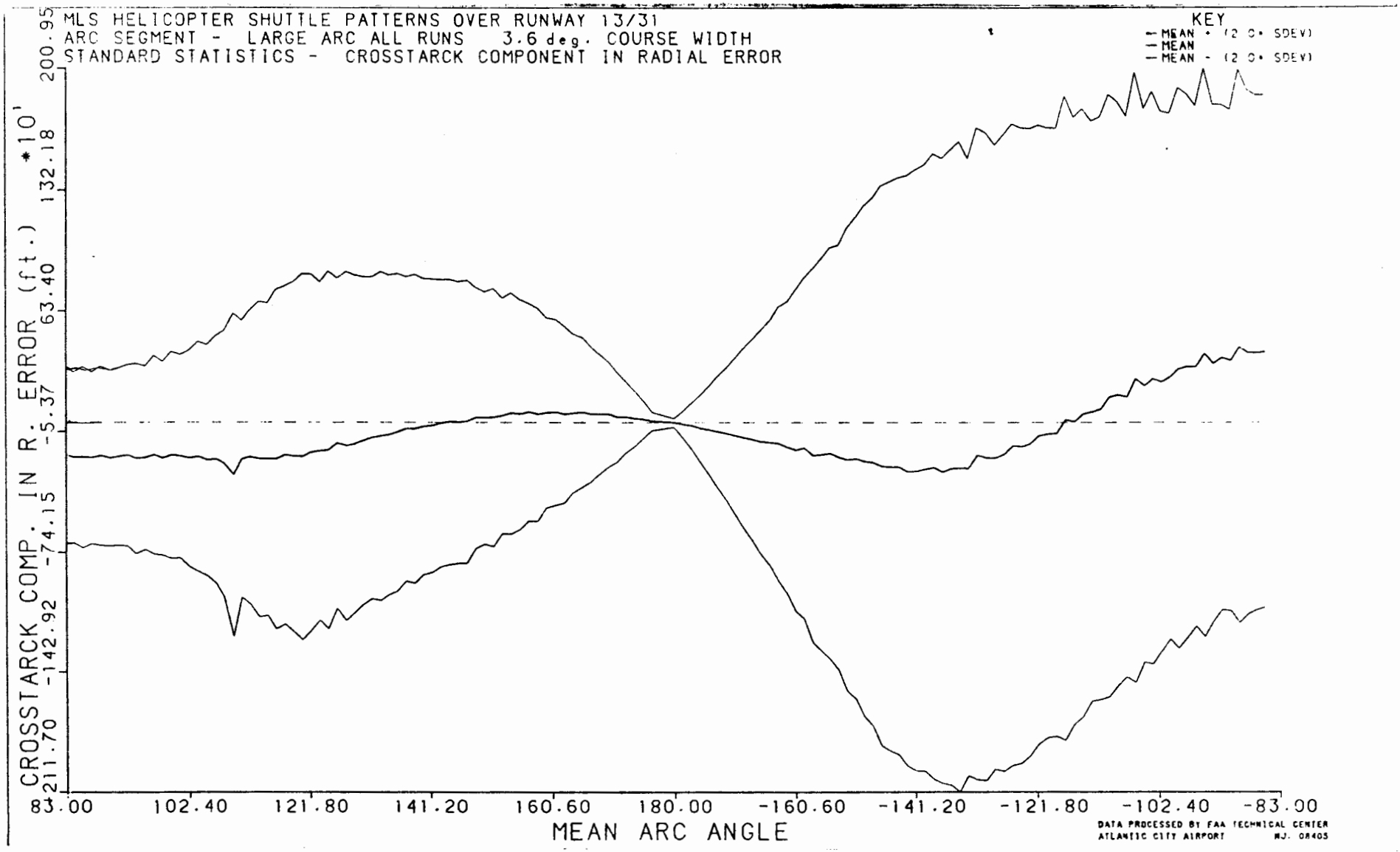
95 PERCENT ISOPROBABILITY PLOTS FOR 3.6° AND 2.0° LARGE ARC SEGMENTS

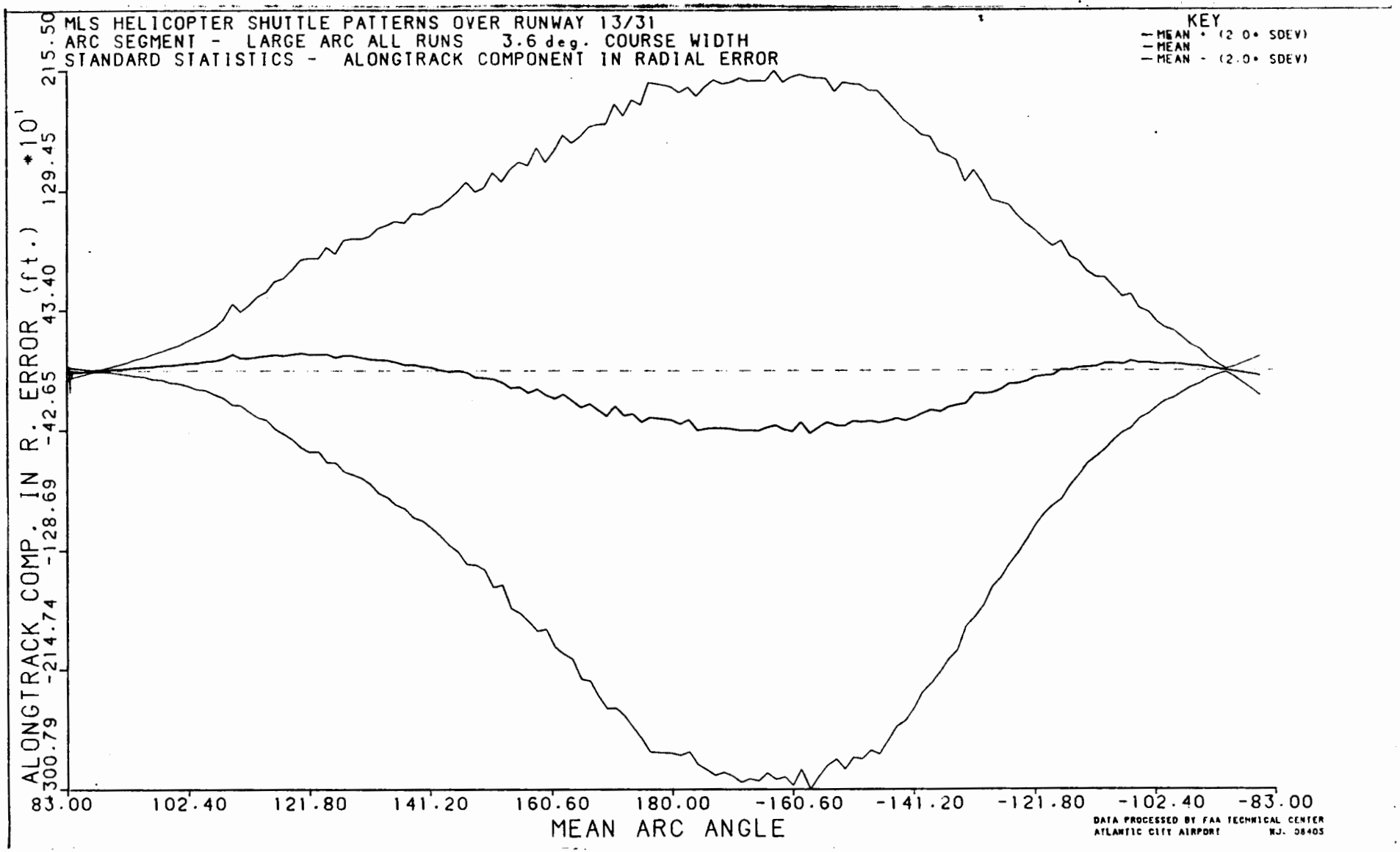

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK POSITION (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
CROSSTRACK POSITION (ft.) *10^2
53.16
35.15
17.15
-0.86
-18.86
-36.87
-54.87
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

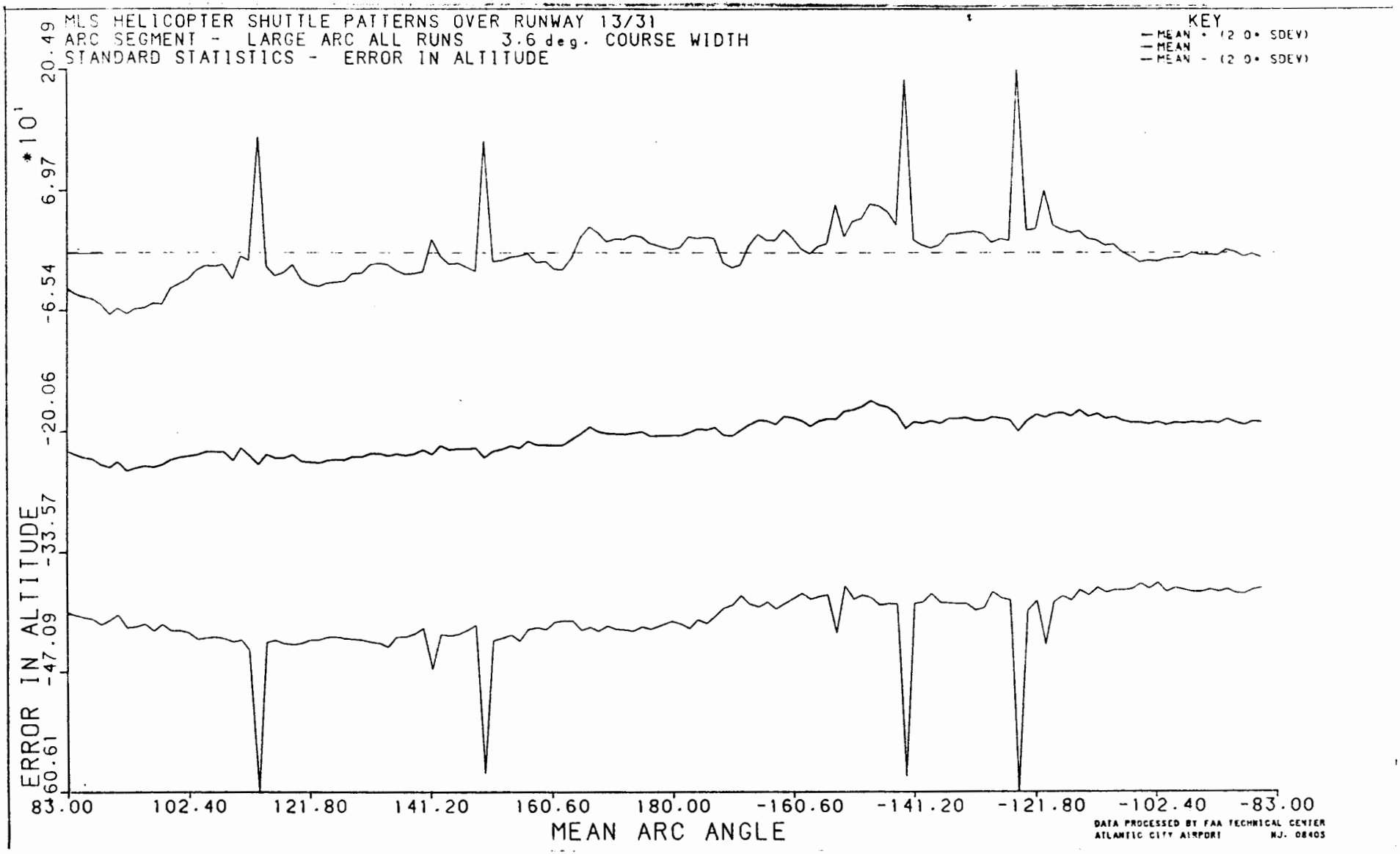

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK POSITION (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
ALONGTRACK POSITION (ft.) *10^2
406.91
394.31
381.71
369.11
356.51
343.91
331.31
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

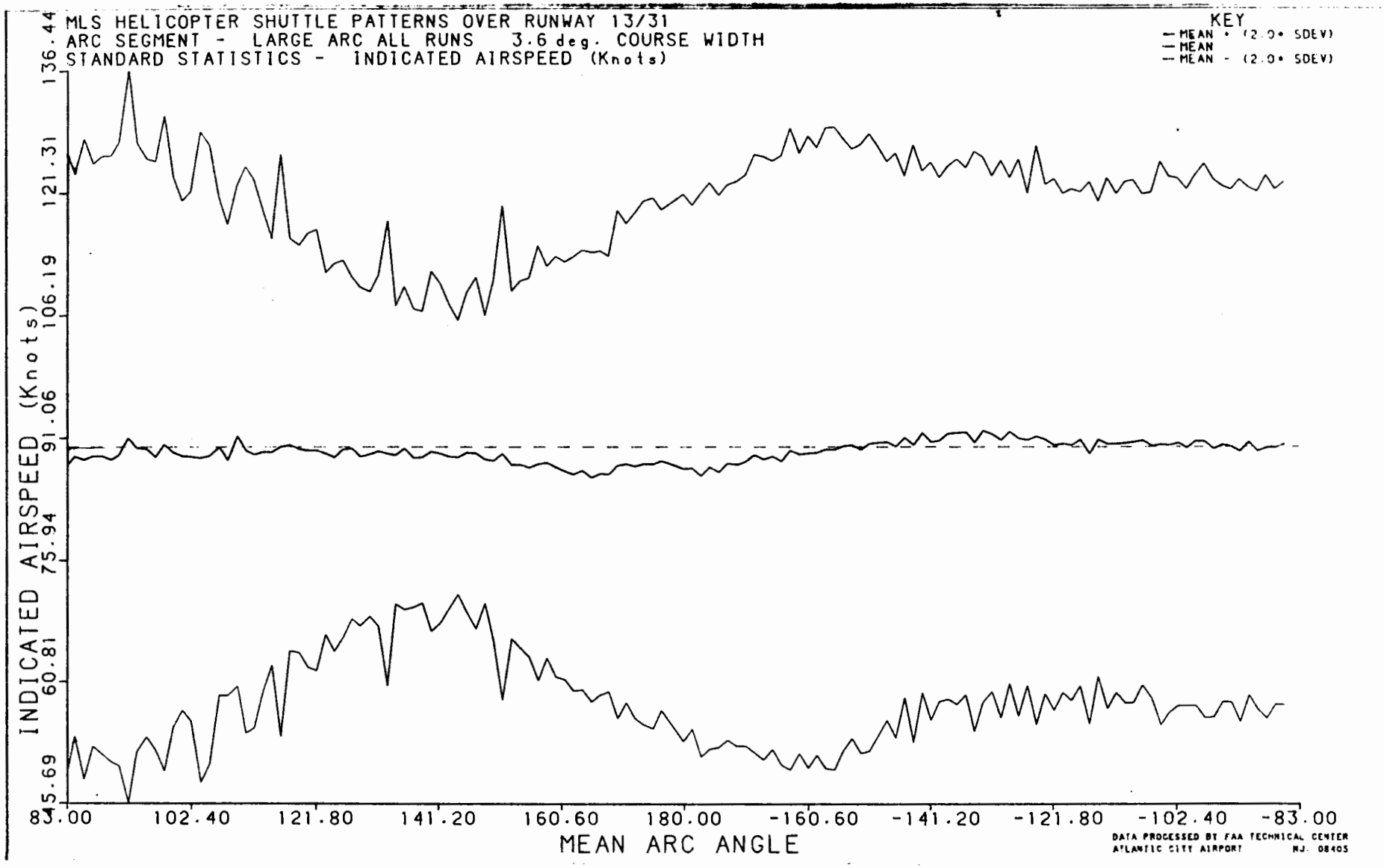

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALTITUDE (ft.)
KEY
— MEAN + (2.0* SDEV)
— MEAN
— MEAN - (2.0* SDEV)
ALTITUDE (ft.)
*10¹
270.49
256.97
243.46
229.94
216.43
202.91
189.39
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

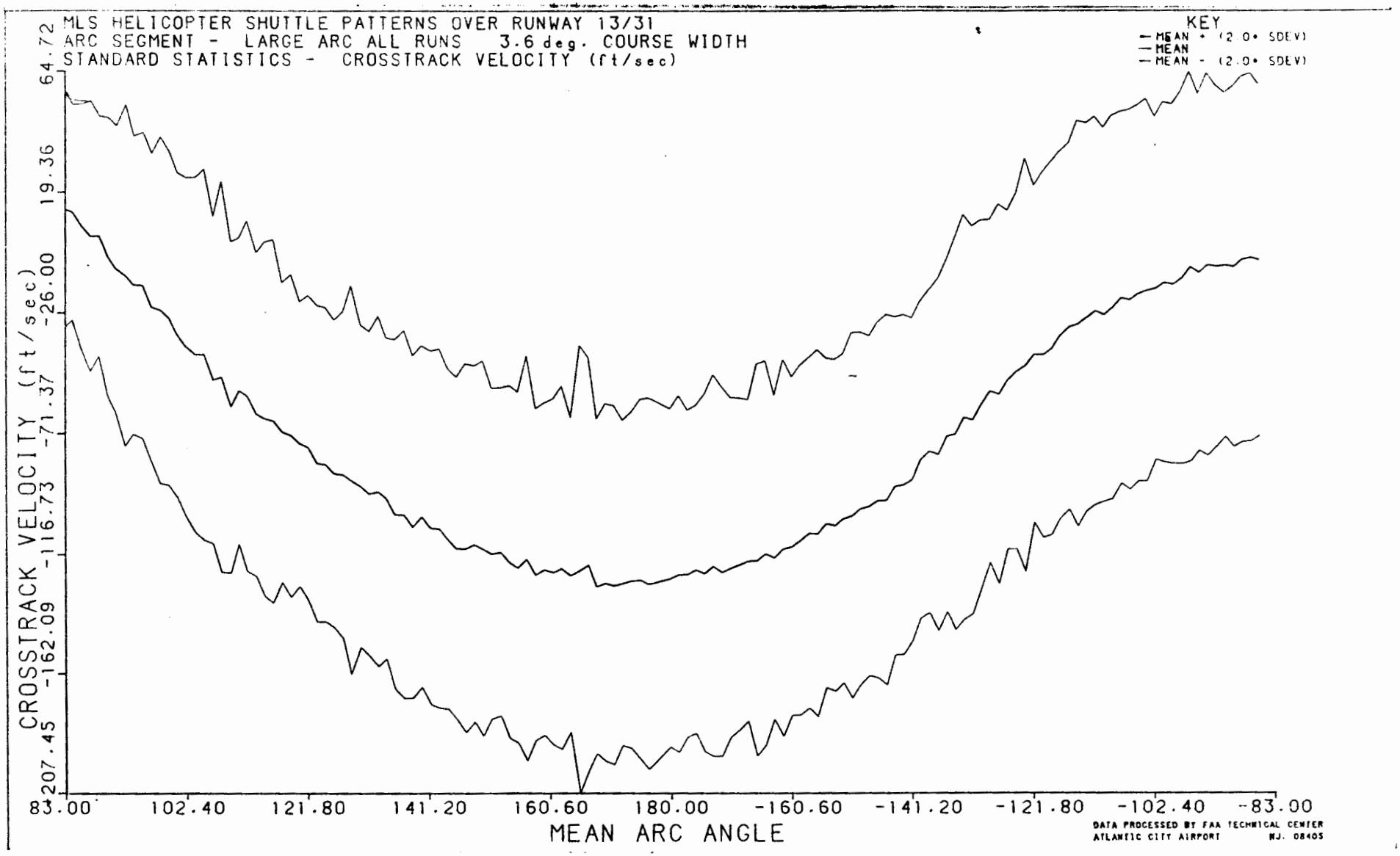

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - RADIAL ERROR (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
RADIAL ERROR (ft.)
*10¹
332.21
236.50
140.78
45.07
-50.65
-146.37
-242.08
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

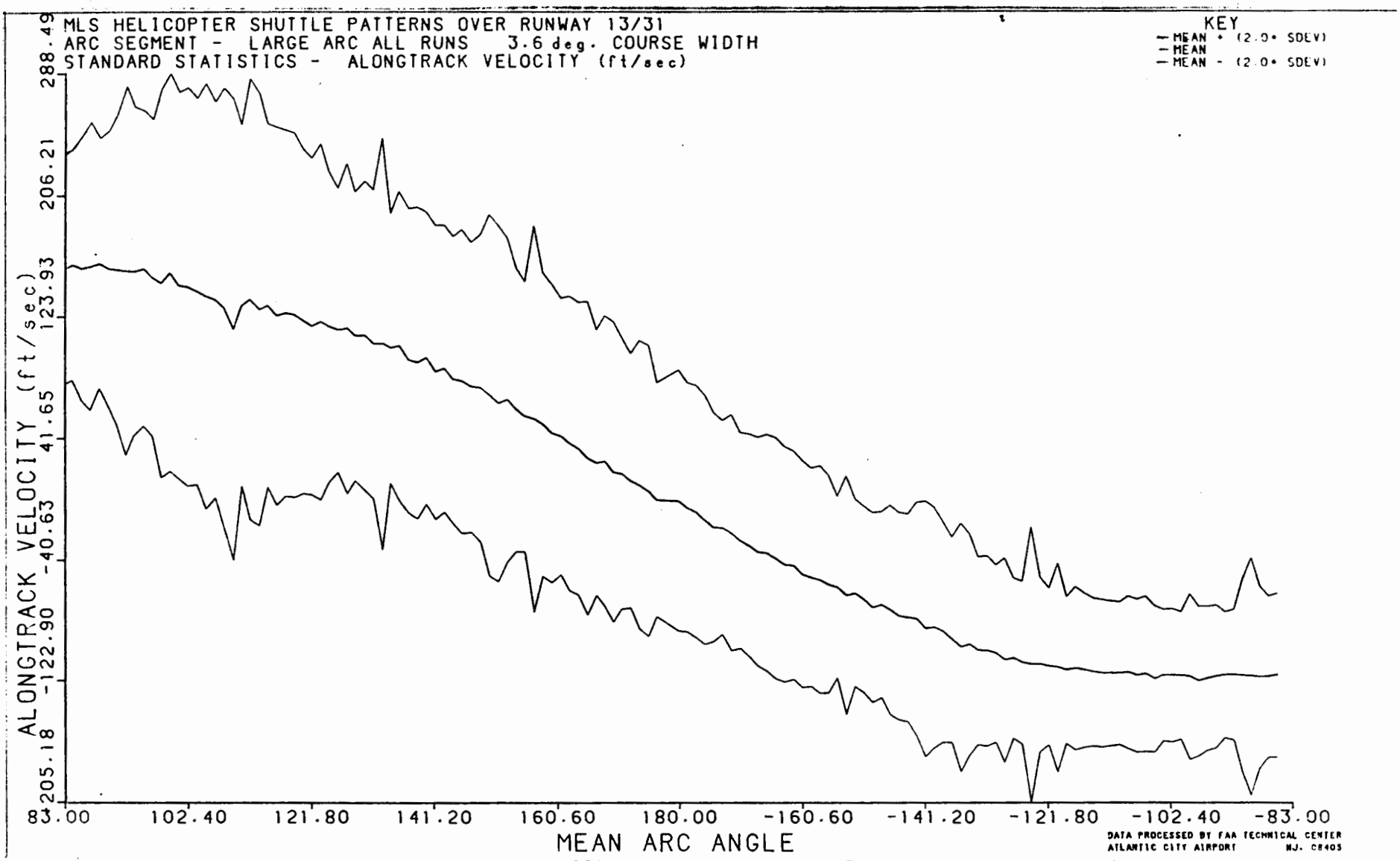

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTARCK COMPONENT IN RADIAL ERROR
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
CROSSTARCK COMP. IN R. ERROR (ft.) *10¹
200.95
132.18
63.40
-5.37
-74.15
-142.92
-211.70
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

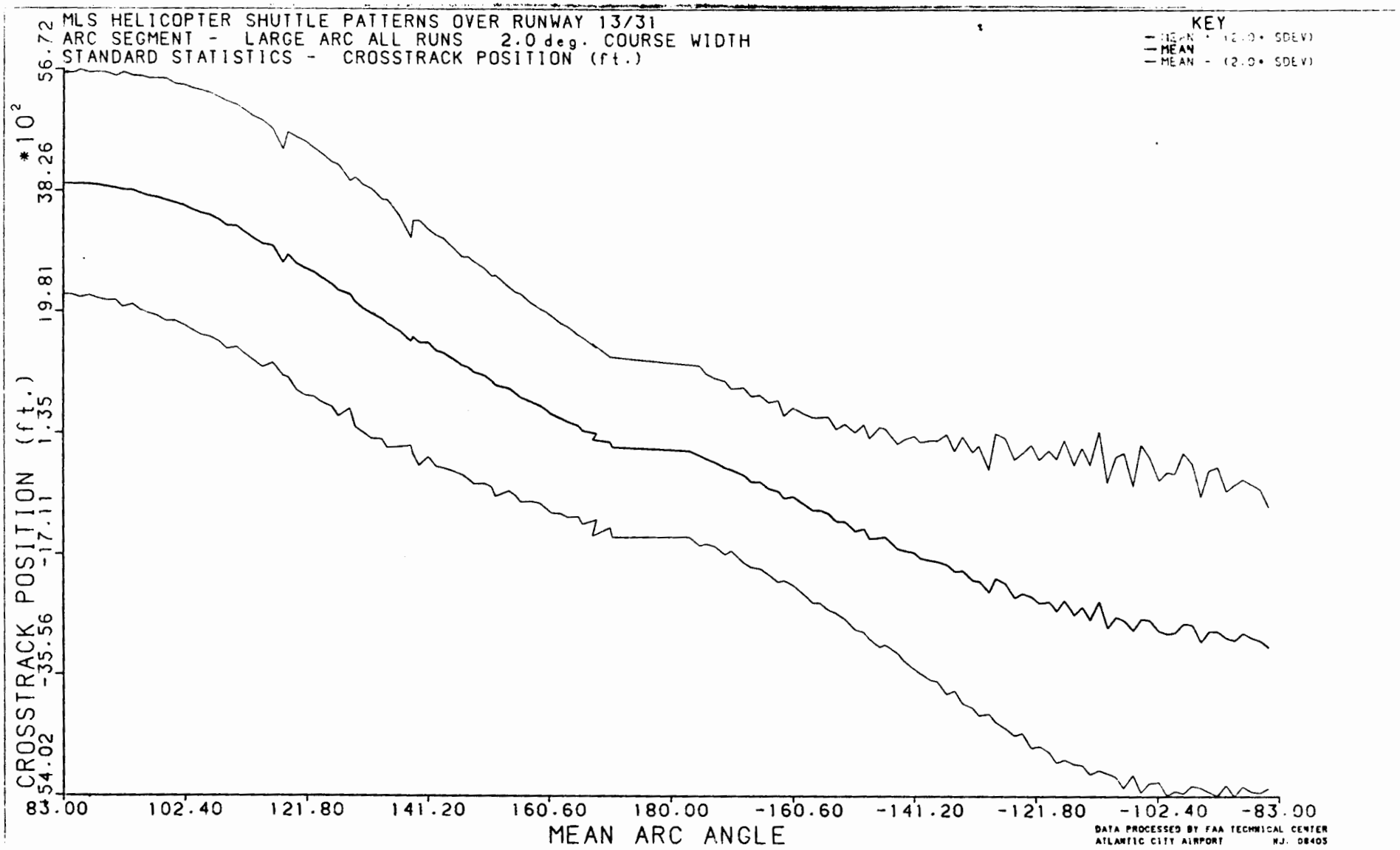

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK COMPONENT IN RADIAL ERROR
KEY
— MEAN + (2.0* SDEV)
— MEAN
— MEAN - (2.0* SDEV)
ALONGTRACK COMP. IN R. ERROR (ft.) *10¹
215.50
129.45
43.40
-42.65
-128.69
-214.74
-300.79
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

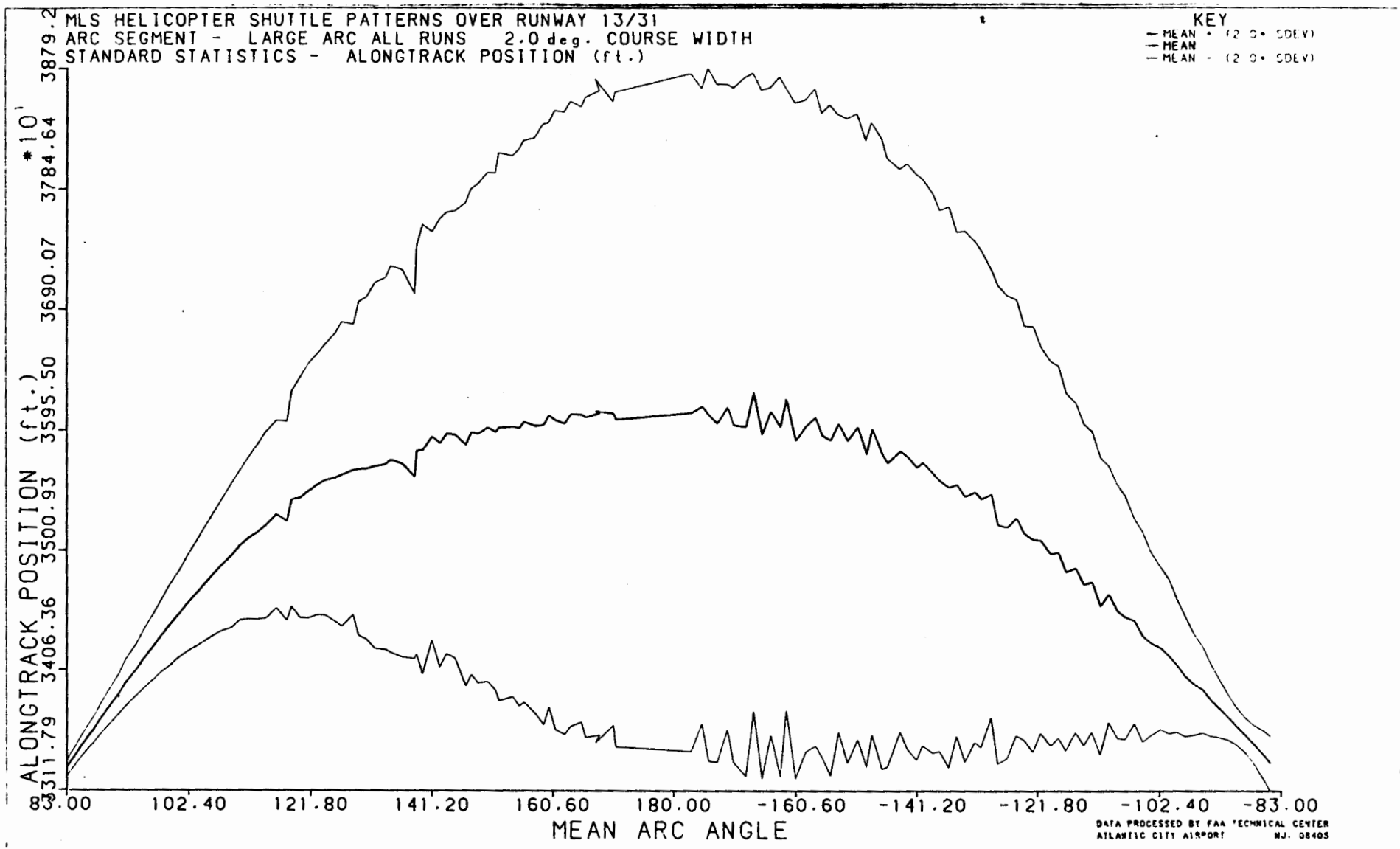

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ERROR IN ALTITUDE
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
ERROR IN ALTITUDE
*10¹
20.49
6.97
-6.54
-20.06
-33.57
-47.09
-60.61
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

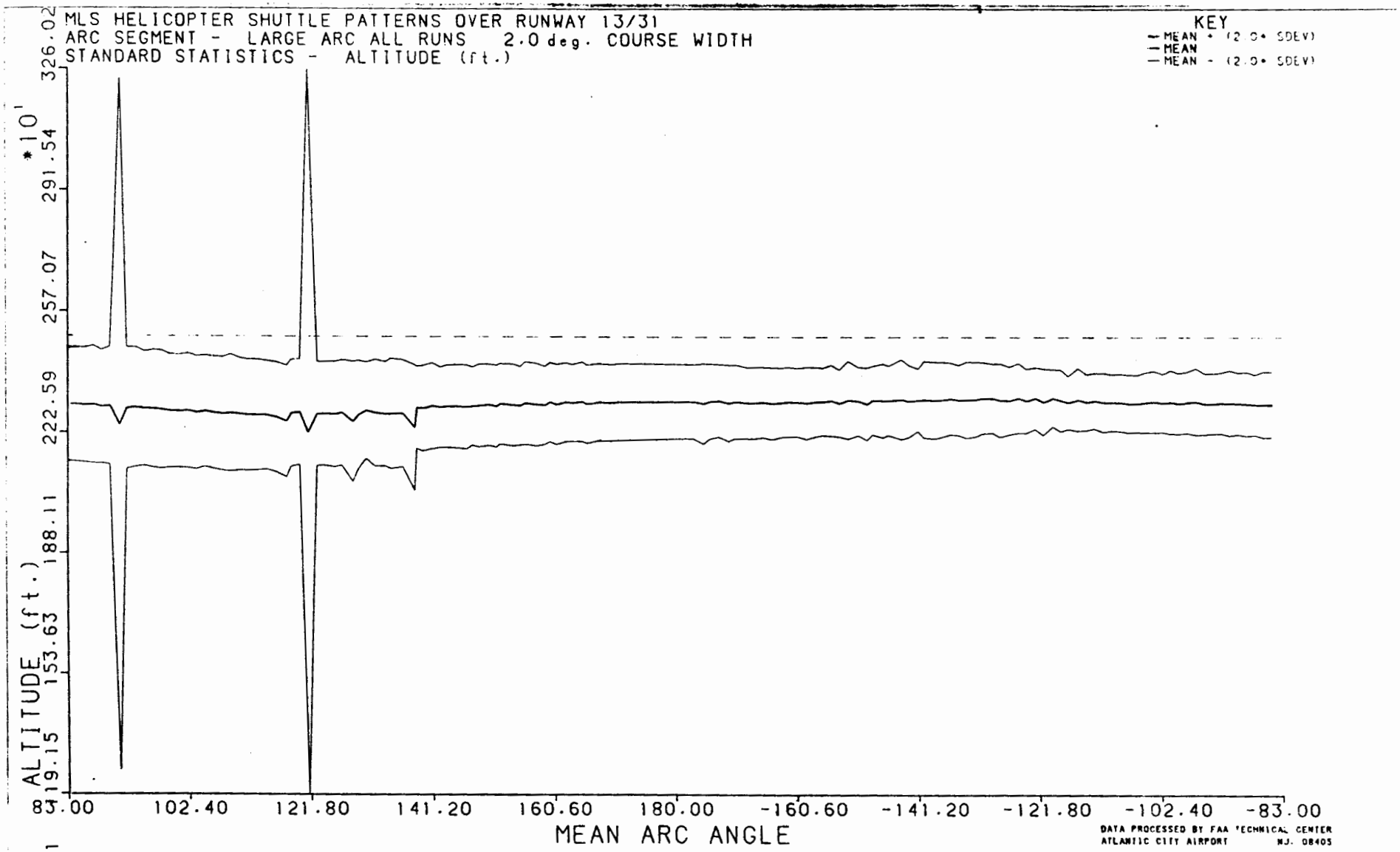

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - INDICATED AIRSPEED (Knots)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
INDICATED AIRSPEED (Knots)
136.44
121.31
106.19
91.06
75.94
60.81
45.69
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

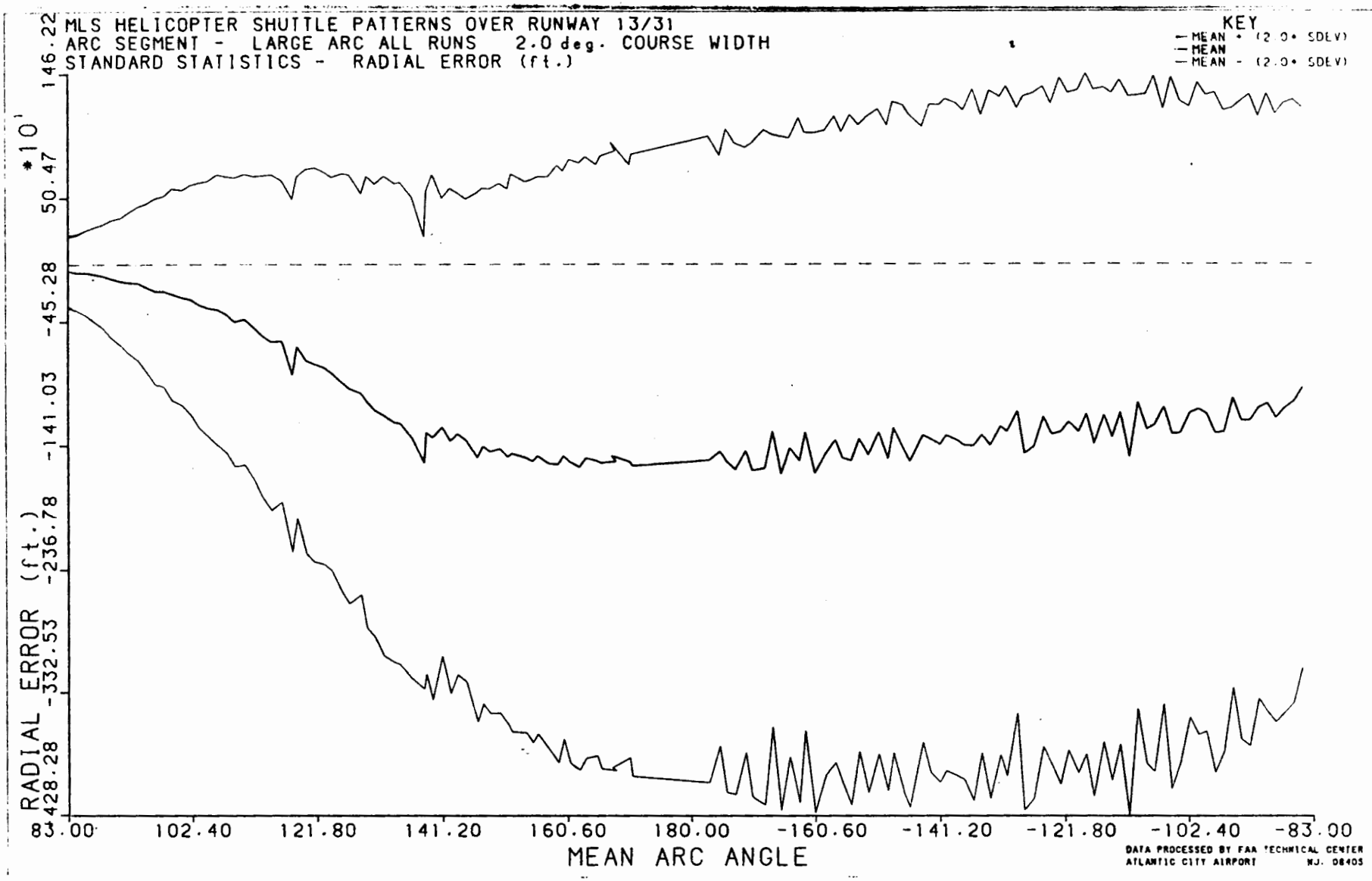

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK VELOCITY (ft/sec)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
CROSSTRACK VELOCITY (ft/sec)
64.72
19.36
-26.00
-71.37
-116.73
-162.09
-207.45
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

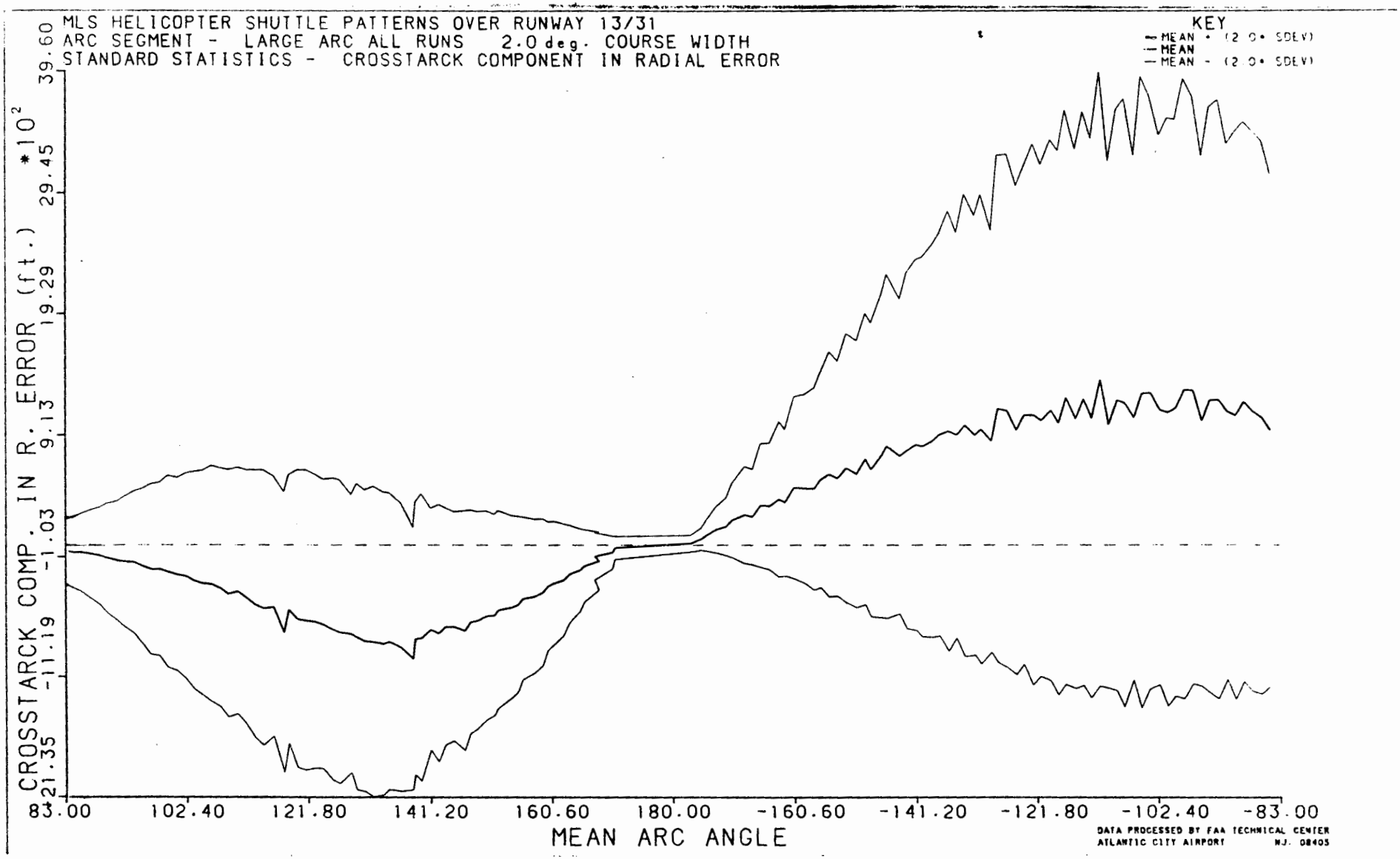

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK VELOCITY (ft/sec)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
ALONGTRACK VELOCITY (ft/sec)
288.49
206.21
123.93
41.65
-40.63
-122.90
-205.18
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

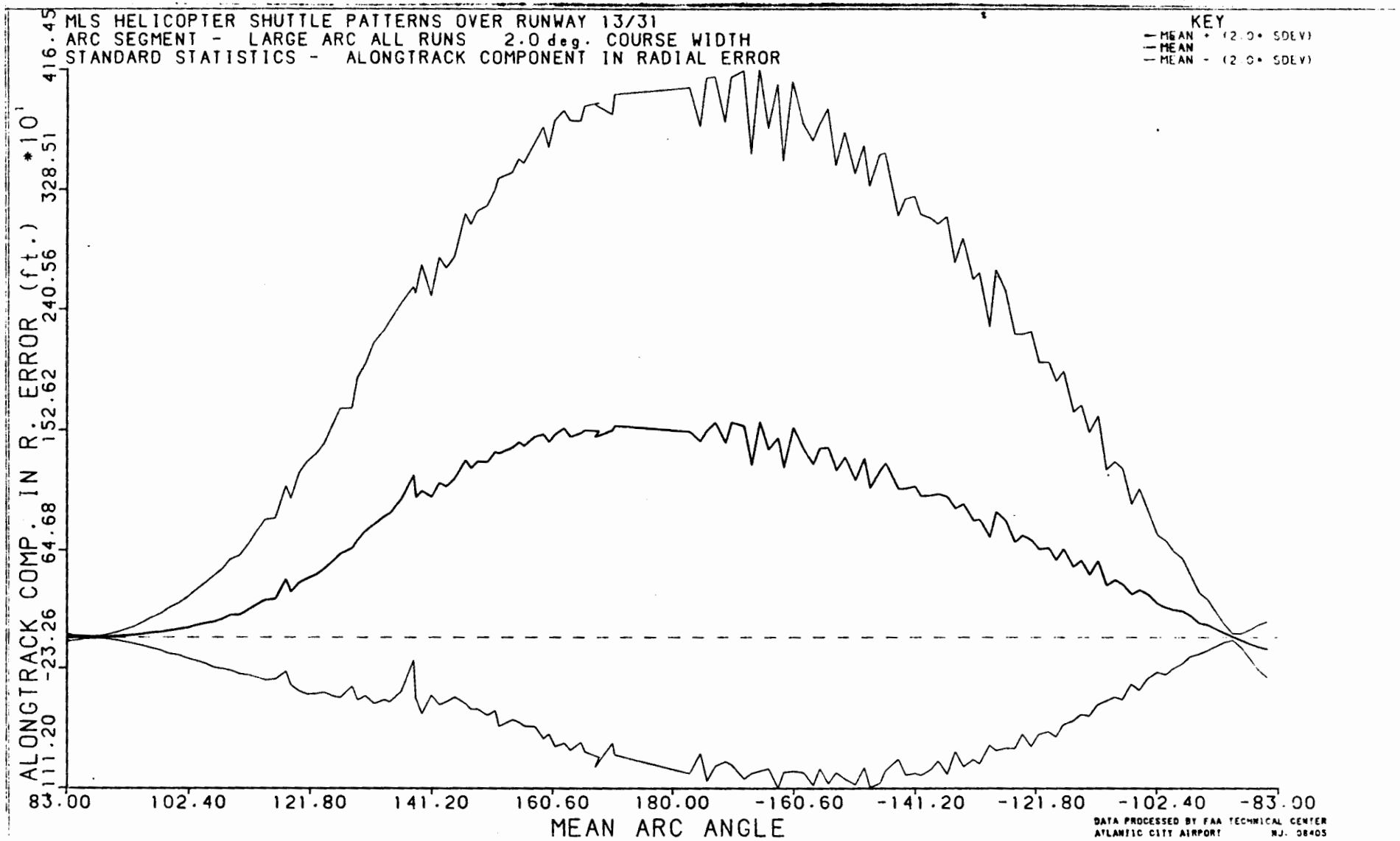

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK POSITION (ft.)
KEY
MEAN
MEAN - (2.0* SDEV)
CROSSTRACK POSITION (ft.)
*10^2
56.72
38.26
19.81
1.35
-17.11
-35.56
-54.02
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

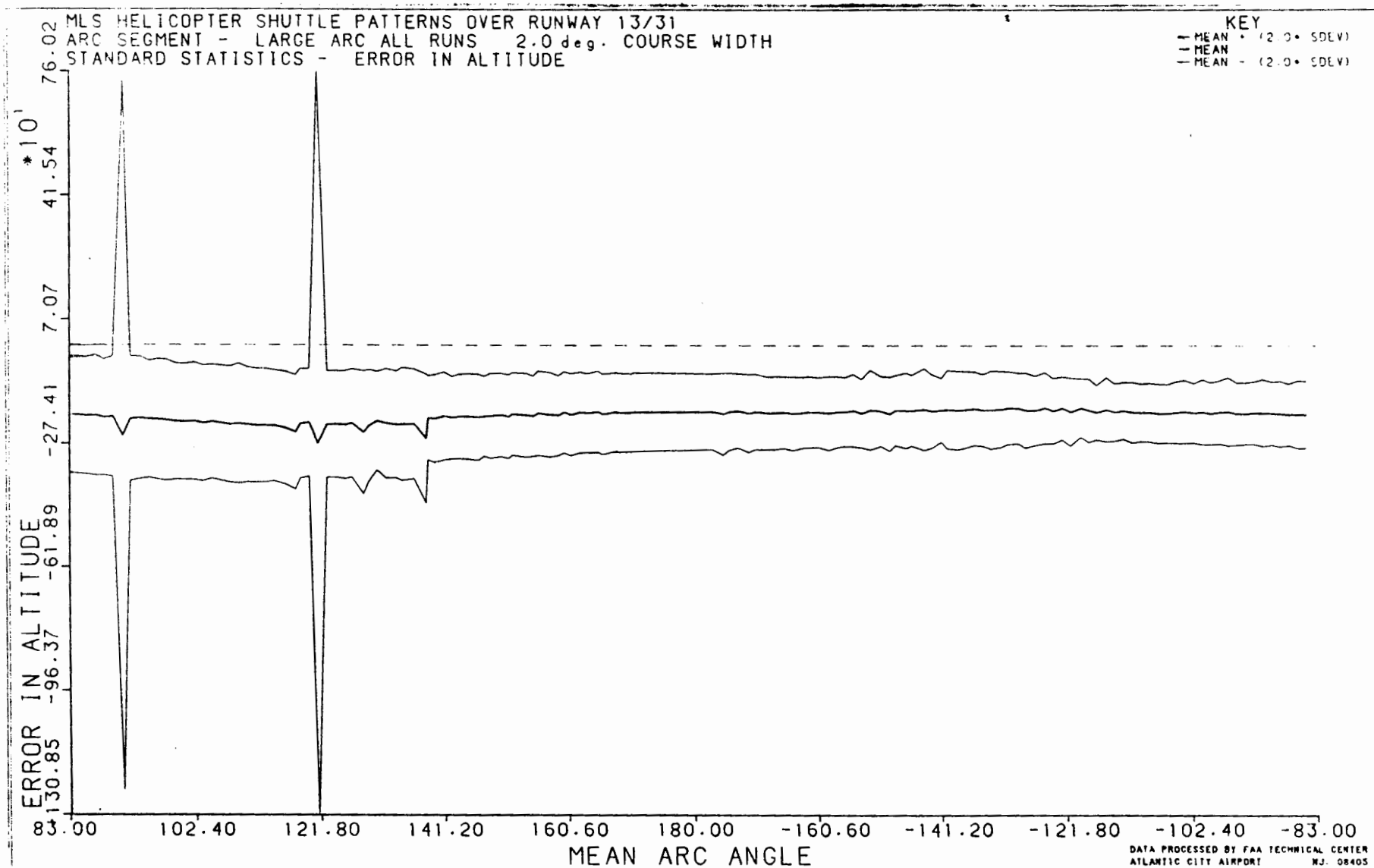

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK POSITION (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
ALONGTRACK POSITION (ft.)
*10¹
3879.2
3784.64
3690.07
3595.50
3500.93
3406.36
3311.79
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

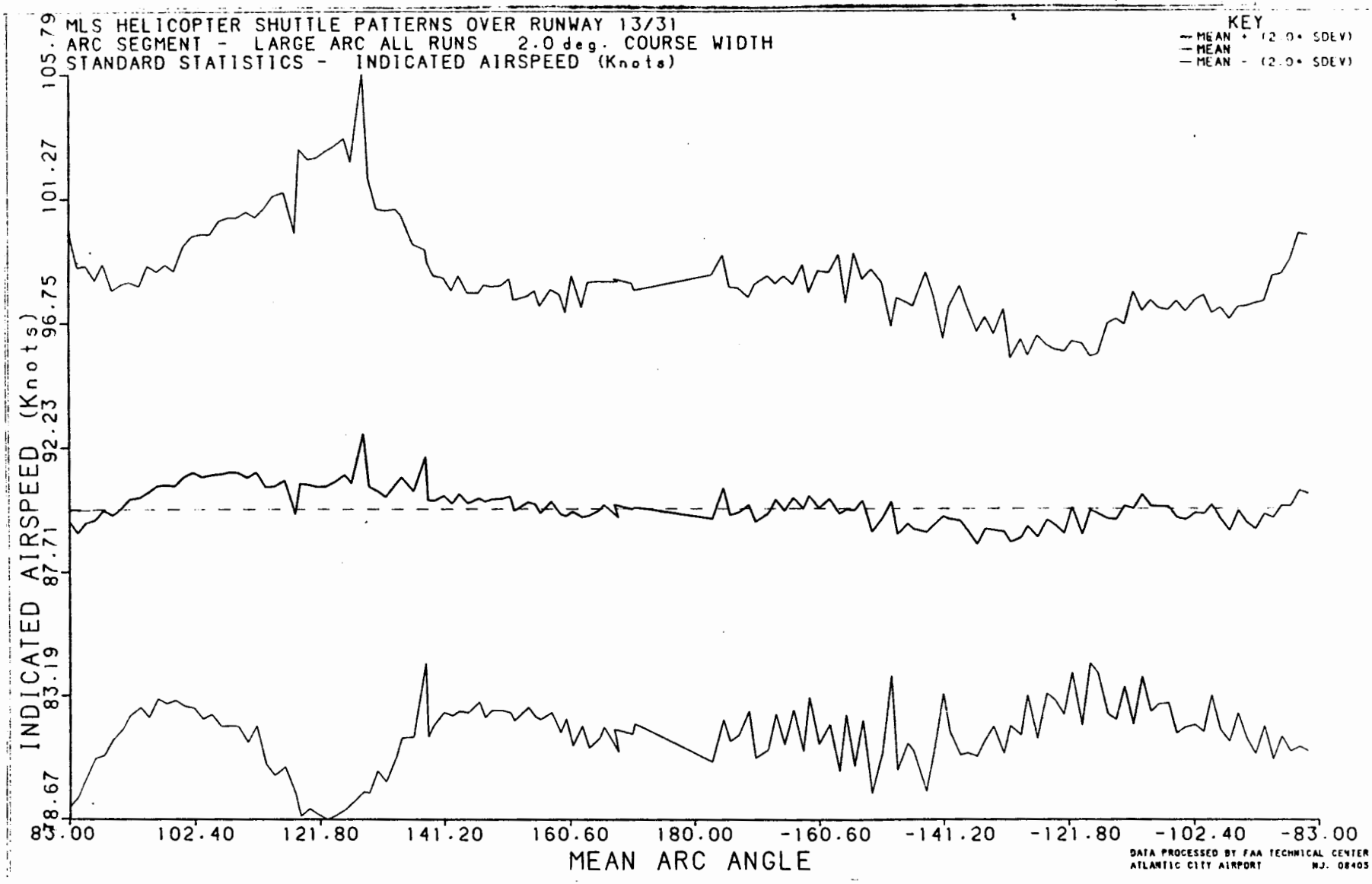

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALTITUDE (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
ALTITUDE (ft.)
*10¹
326.02
291.54
257.07
222.59
188.11
153.63
119.15
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

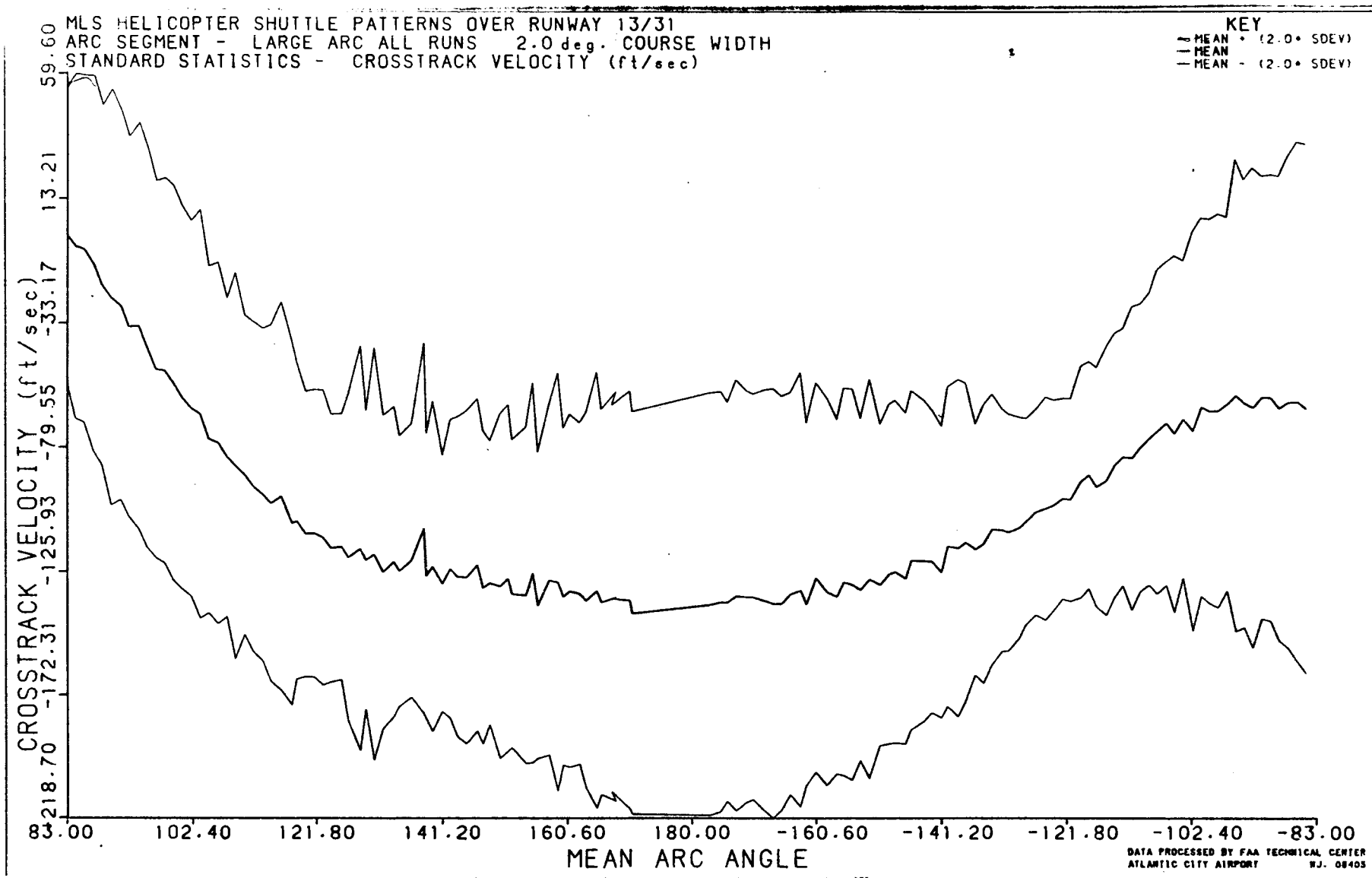

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - RADIAL ERROR (ft.)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
RADIAL ERROR (ft.)
*10¹
146.22
50.47
-45.28
-141.03
-236.78
-332.53
-428.28
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

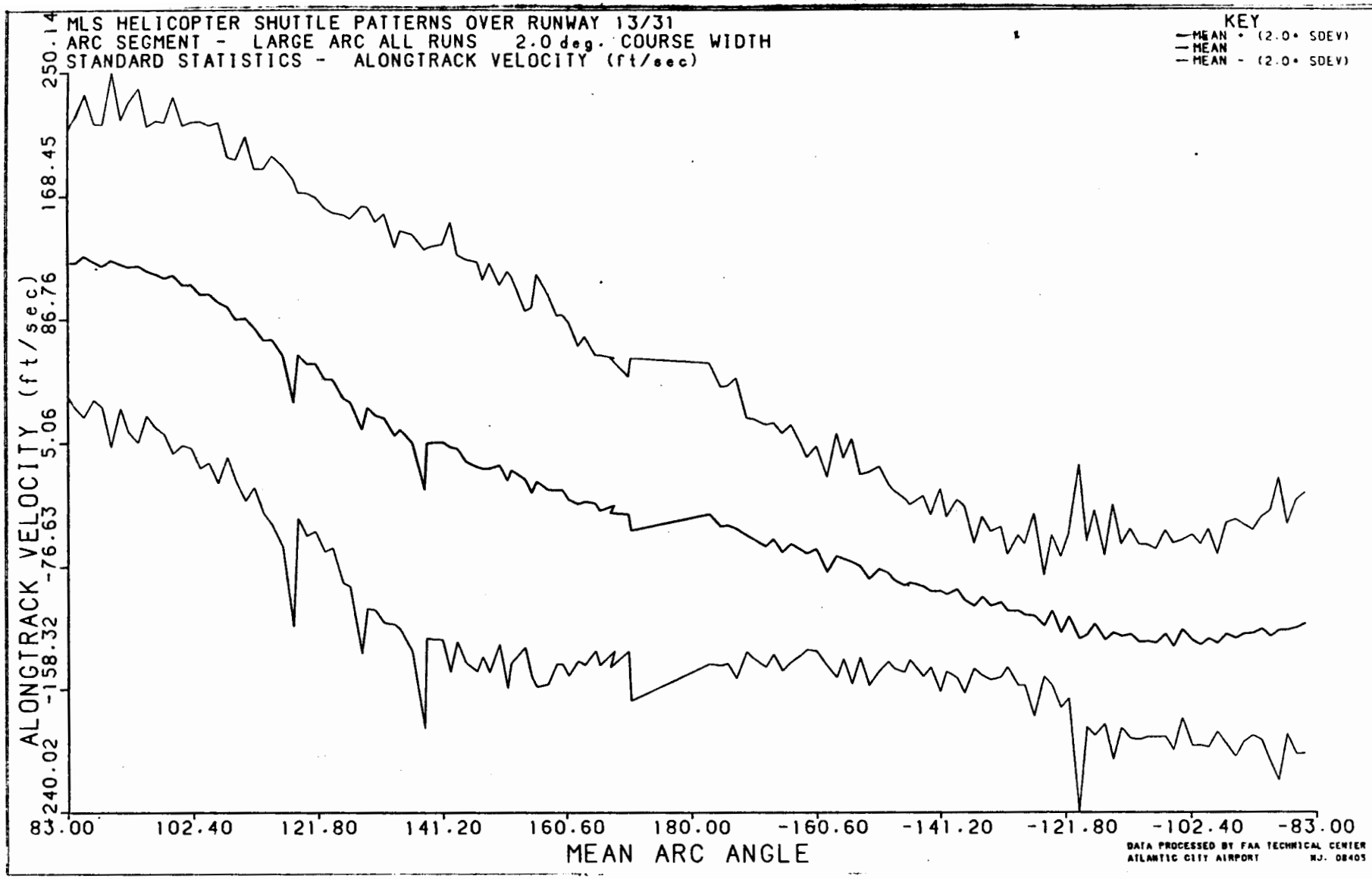

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTARCK COMPONENT IN RADIAL ERROR
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
CROSSTARCK COMP. IN R. ERROR (ft.) *10^2
39.60
29.45
19.29
9.13
-1.03
-11.19
-21.35
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK COMPONENT IN RADIAL ERROR
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
ALONGTRACK COMP. IN R. ERROR (ft.) *10¹
416.45
328.51
240.56
152.62
64.68
-23.26
-111.20
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ERROR IN ALTITUDE
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
ERROR IN ALTITUDE *10¹
76.02
41.54
7.07
-27.41
-61.89
-96.37
-130.85
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

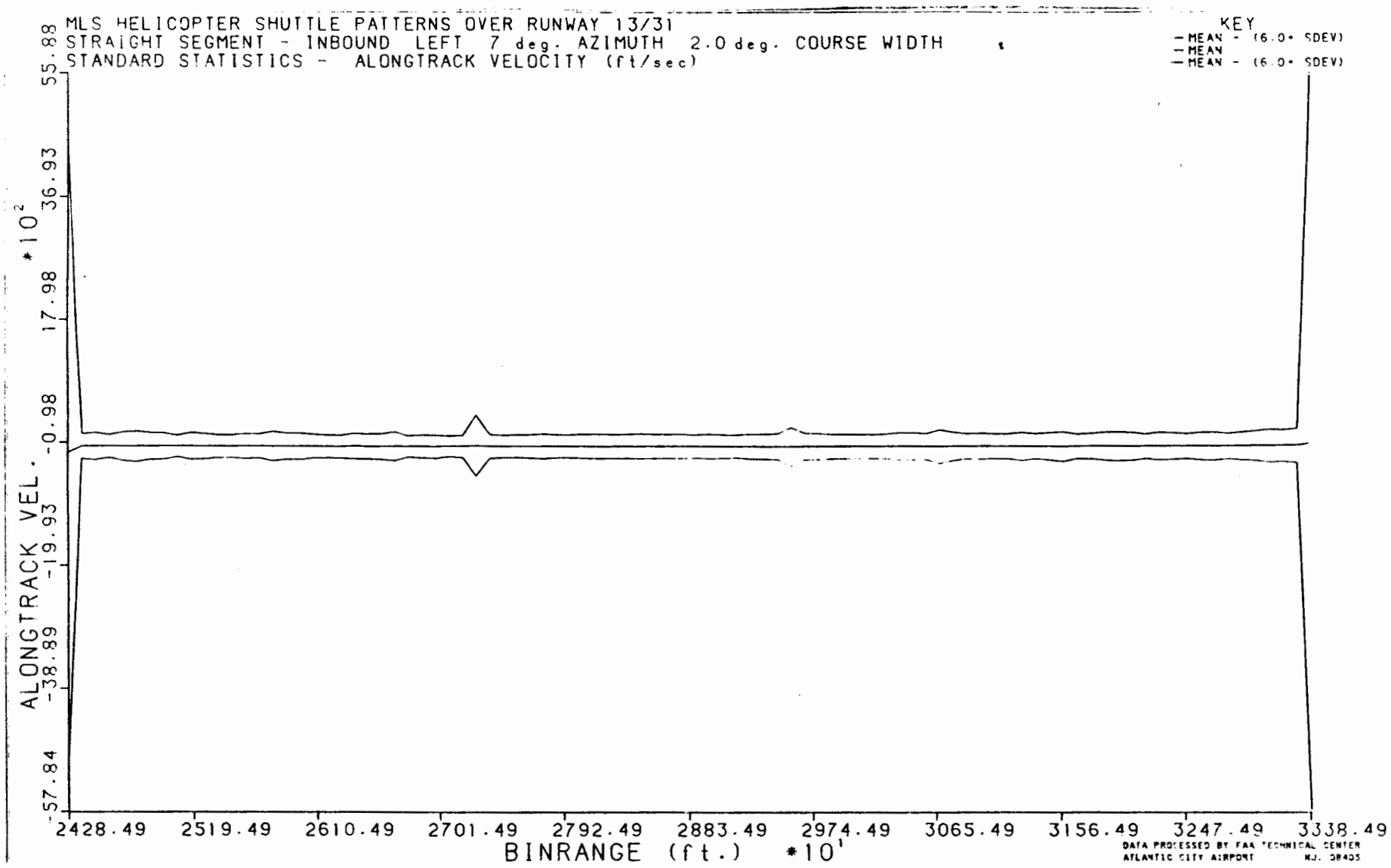

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - INDICATED AIRSPEED (Knots)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
INDICATED AIRSPEED (Knots)
105.79
101.27
96.75
92.23
87.71
83.19
78.67
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

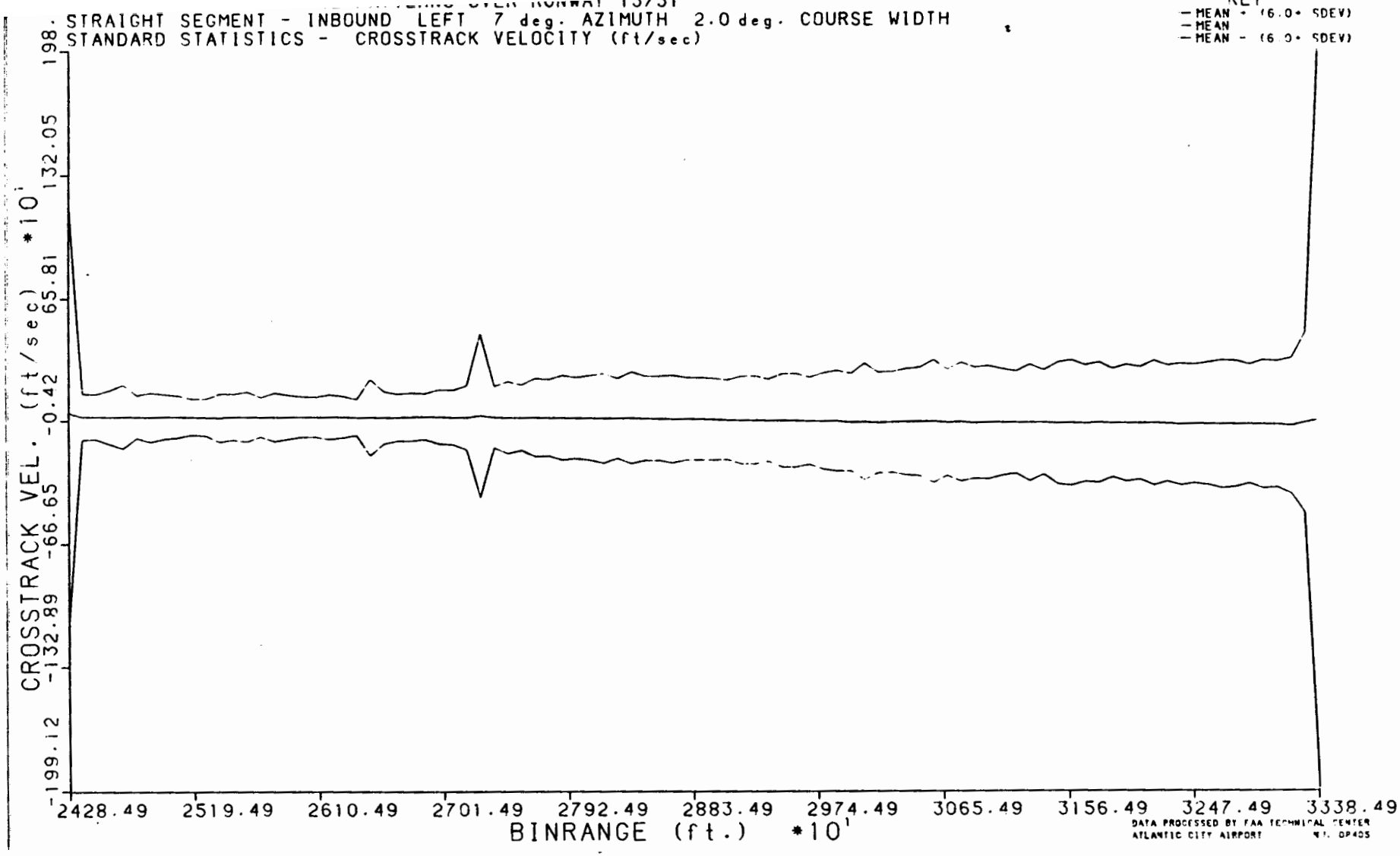

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK VELOCITY (ft/sec)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
CROSSTRACK VELOCITY (ft/sec)
59.60
13.21
-33.17
-79.55
-125.93
-172.31
-218.70
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

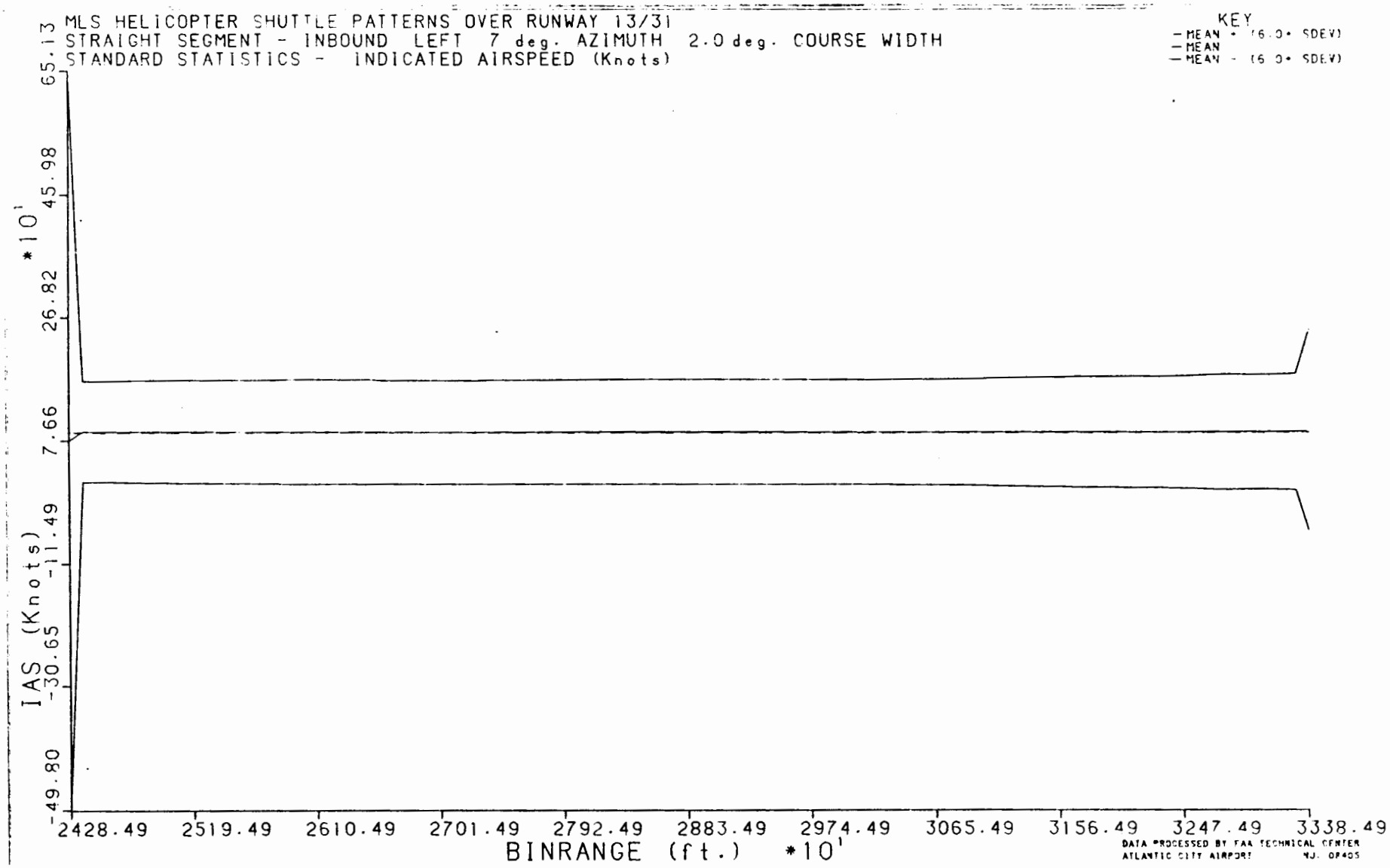

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK VELOCITY (ft/sec)
KEY
MEAN + (2.0* SDEV)
MEAN
MEAN - (2.0* SDEV)
ALONGTRACK VELOCITY (ft/sec)
250.14
168.45
86.76
5.06
-76.63
-158.32
-240.02
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

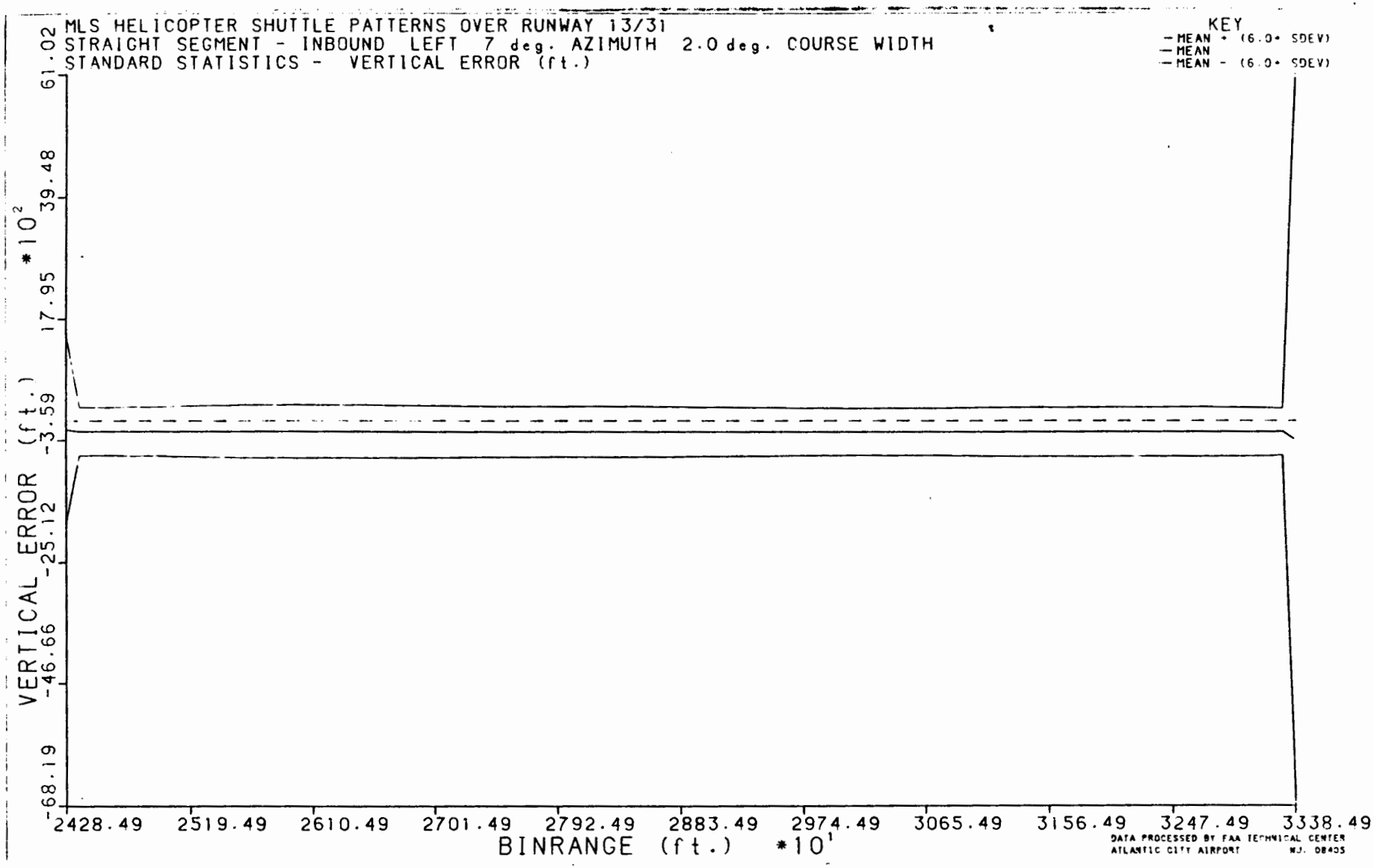
APPENDIX G

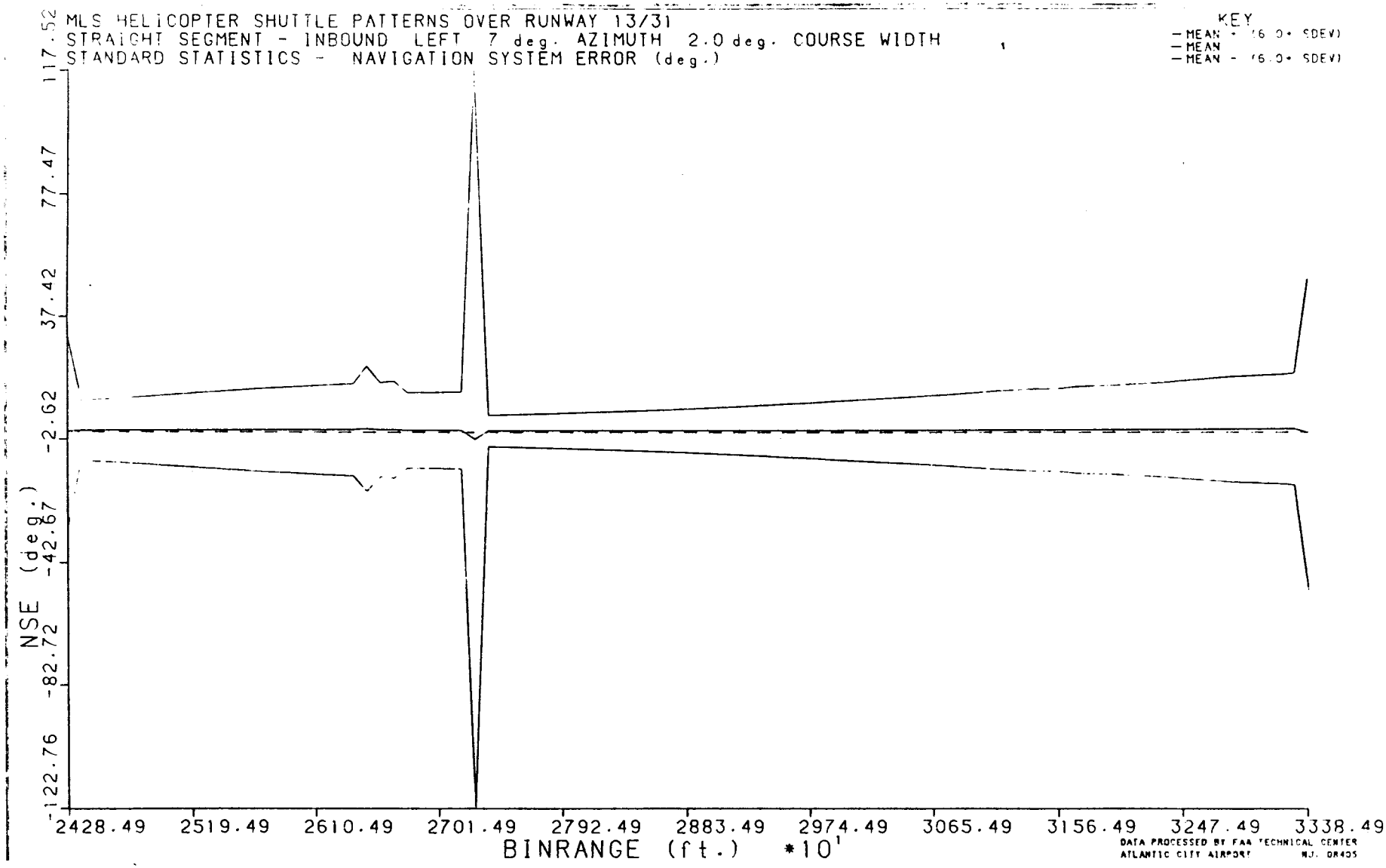
99.999999 PERCENT ISOPROBABILITY PLOTS FOR 3.6° AND 2.0° INBOUND STRAIGHT SEGMENTS

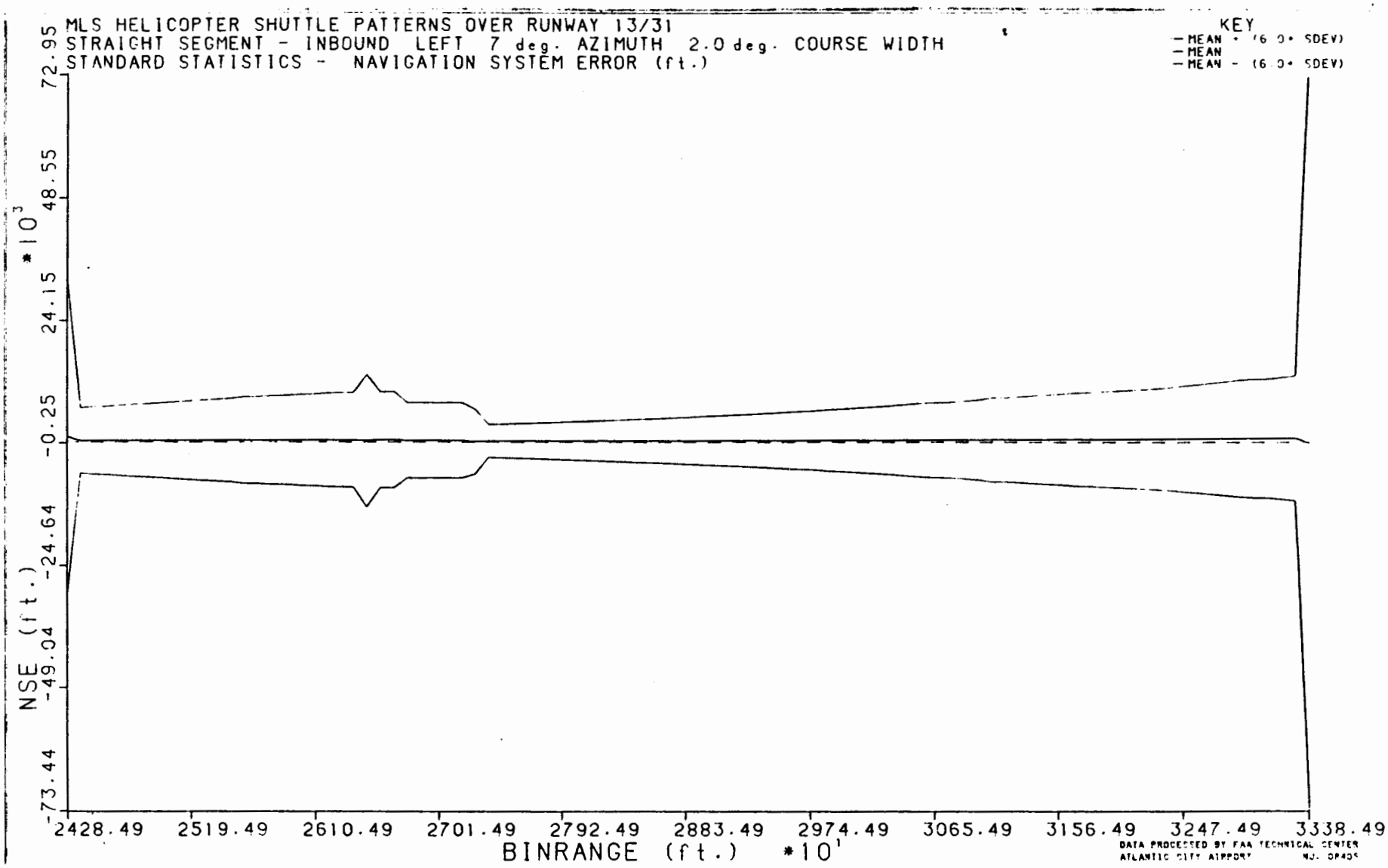

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK VELOCITY (ft/sec)
KEY
— MEAN - (6.0* SDEV)
— MEAN
— MEAN - (6.0* SDEV)
ALONGTRACK VEL. *10²
55.88
36.93
17.98
-0.98
-19.93
-38.89
-57.84
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

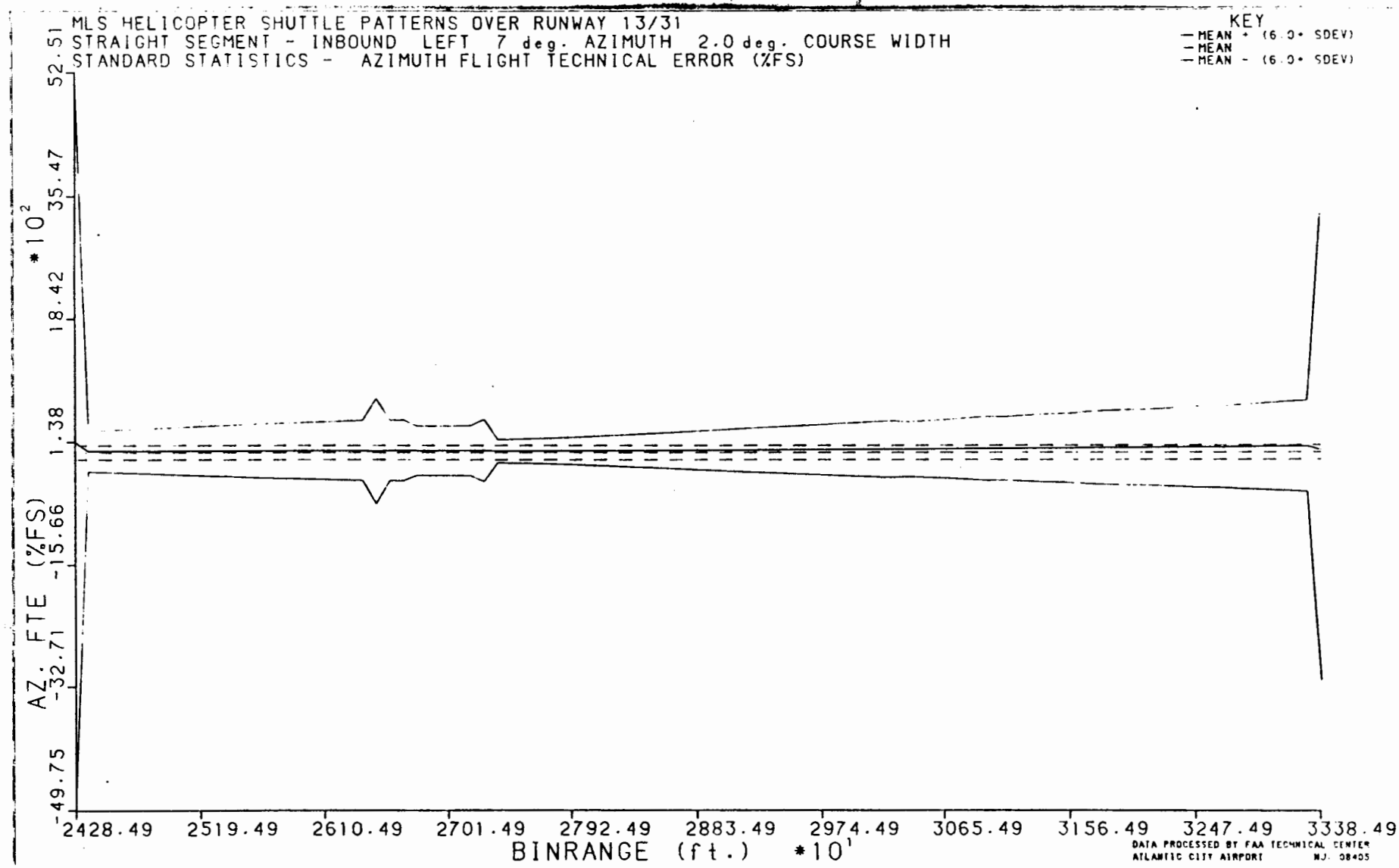

STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK VELOCITY (ft/sec)
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
CROSSTRACK VEL. (ft/sec) *10¹
198.
132.05
65.81
-0.42
-66.65
-132.89
-199.12
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT

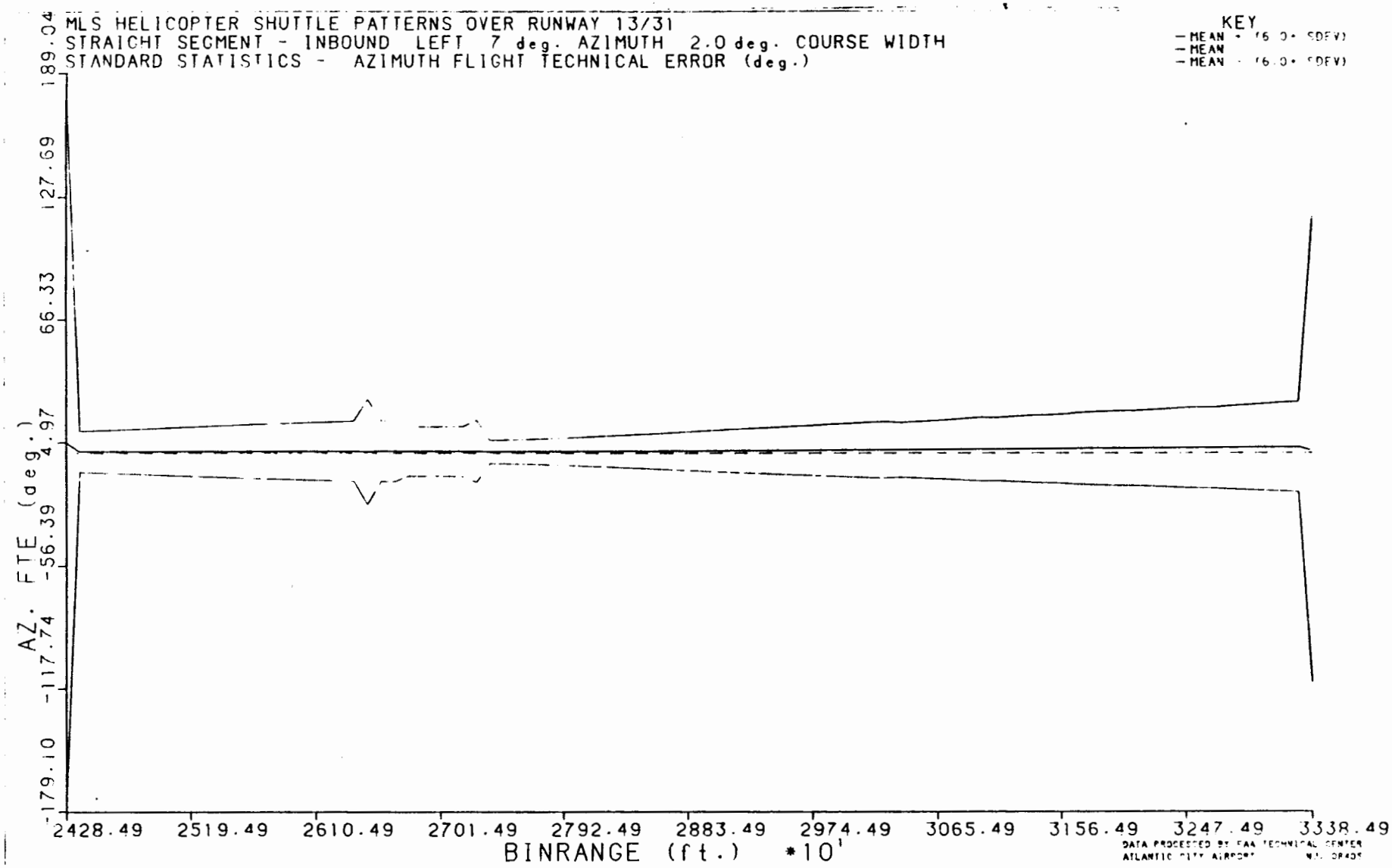

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - INDICATED AIRSPEED (Knots)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
IAS (Knots)
*10¹
65.13
45.98
26.82
7.66
-11.49
-30.65
-49.80
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. OP405

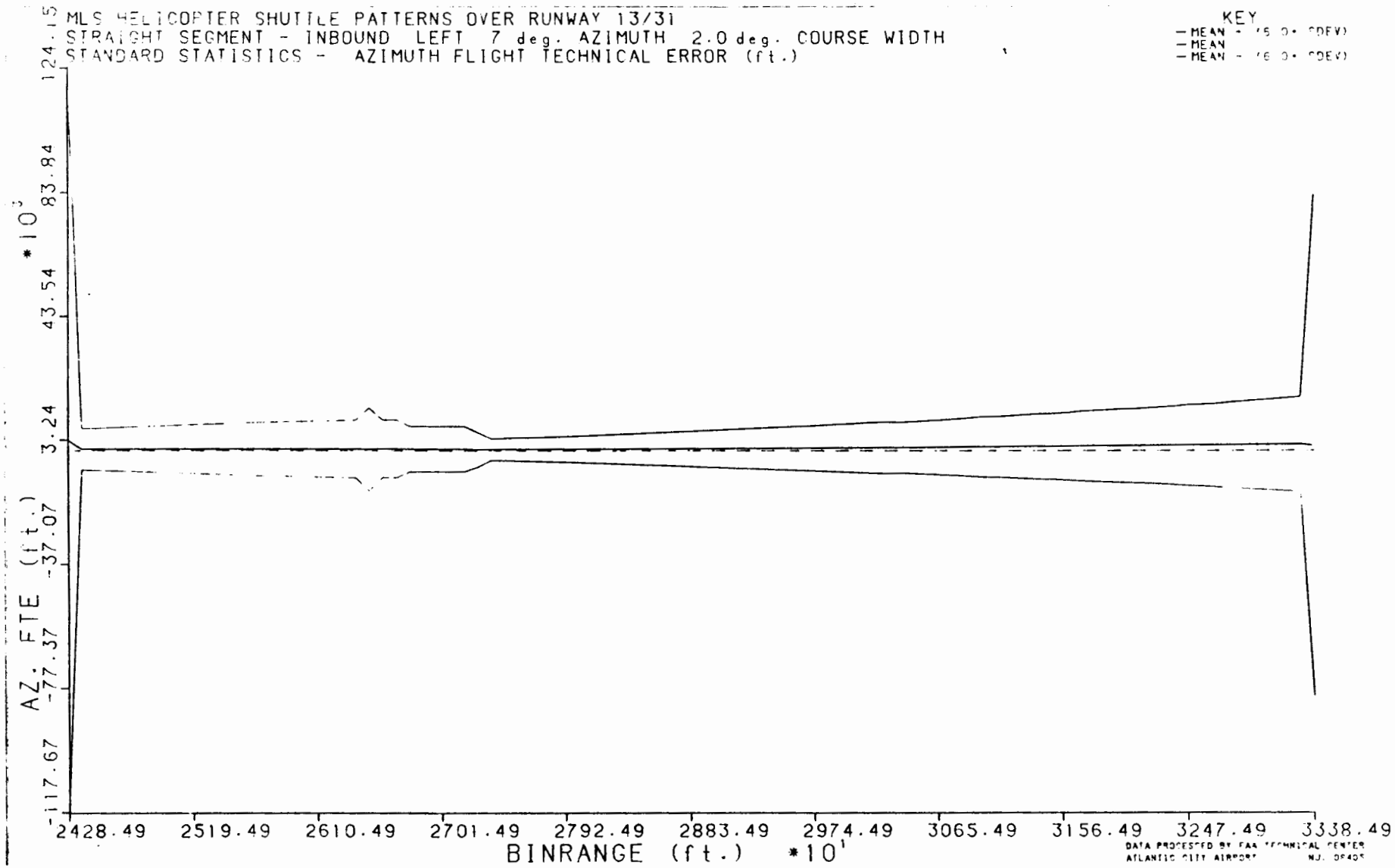

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - VERTICAL ERROR (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
VERTICAL ERROR (ft.) *10^2
61.02
39.48
17.95
-3.59
-25.12
-46.66
-68.19
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10^1
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

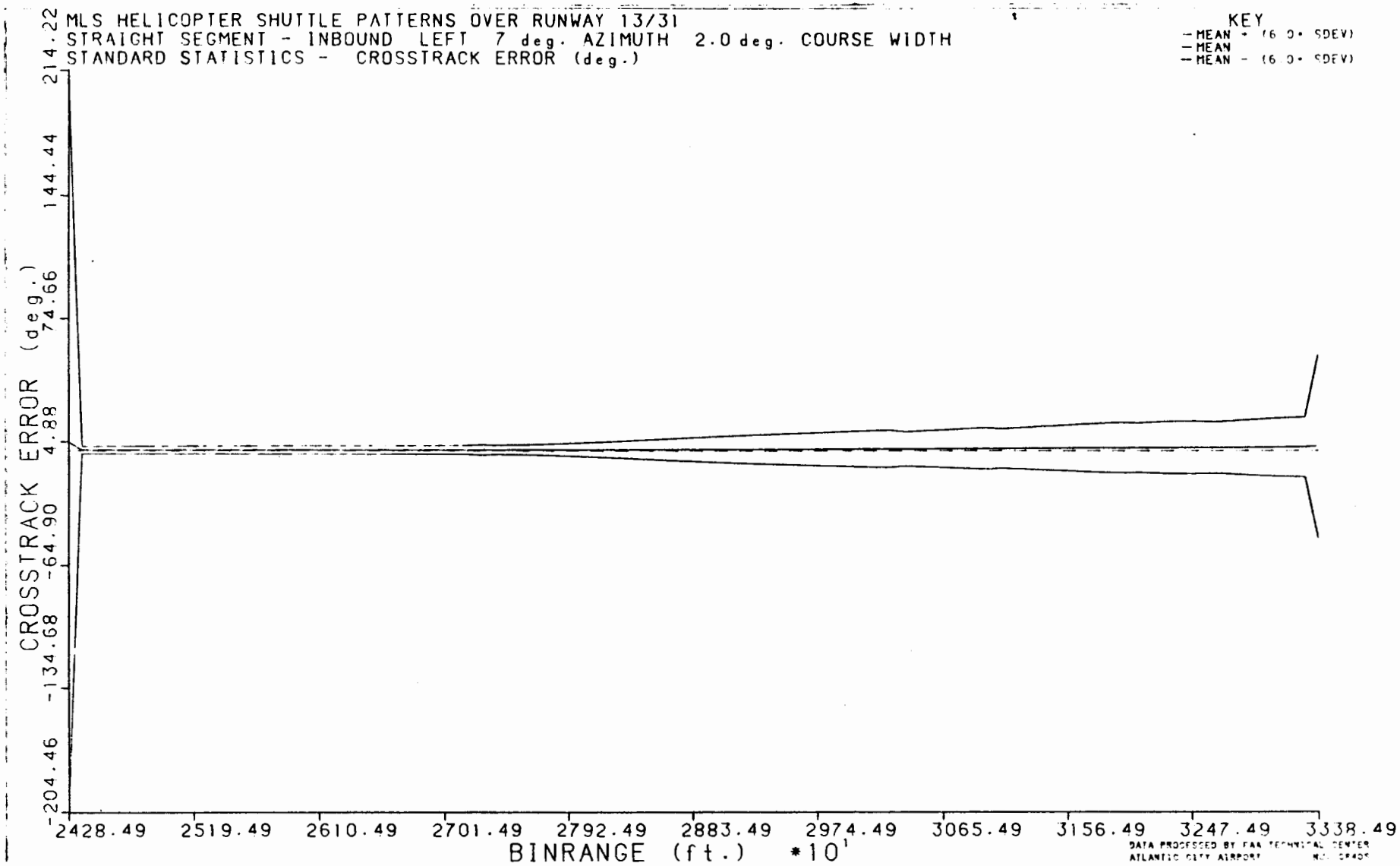

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - NAVIGATION SYSTEM ERROR (deg.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
117.52
77.47
37.42
-2.62
-42.67
-82.72
-122.76
NSE (deg.)
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. DR405

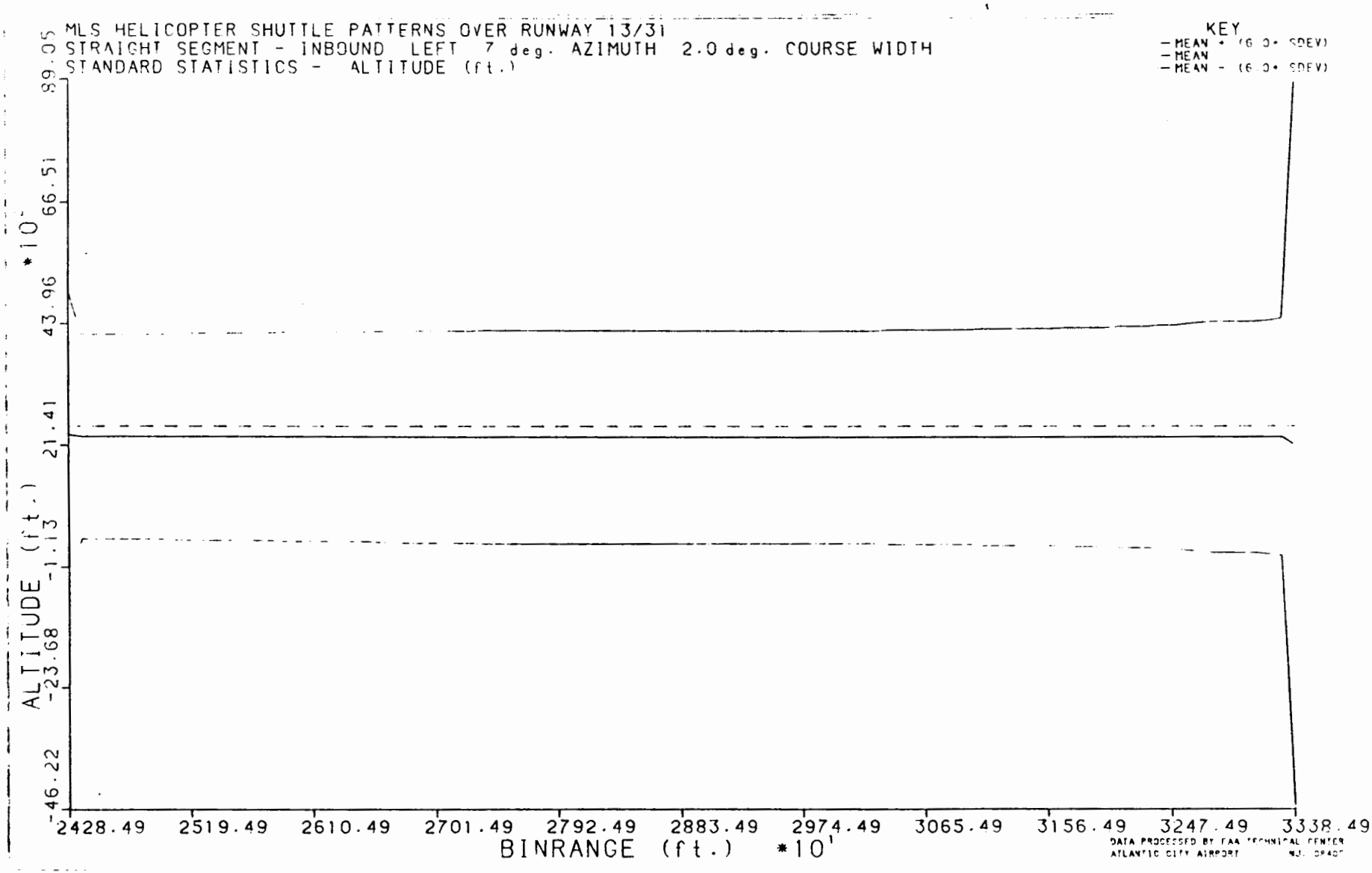

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - NAVIGATION SYSTEM ERROR (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
NSE (ft.) *10^3
72.95
48.55
24.15
-0.25
-24.64
-49.04
-73.44
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10^1
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

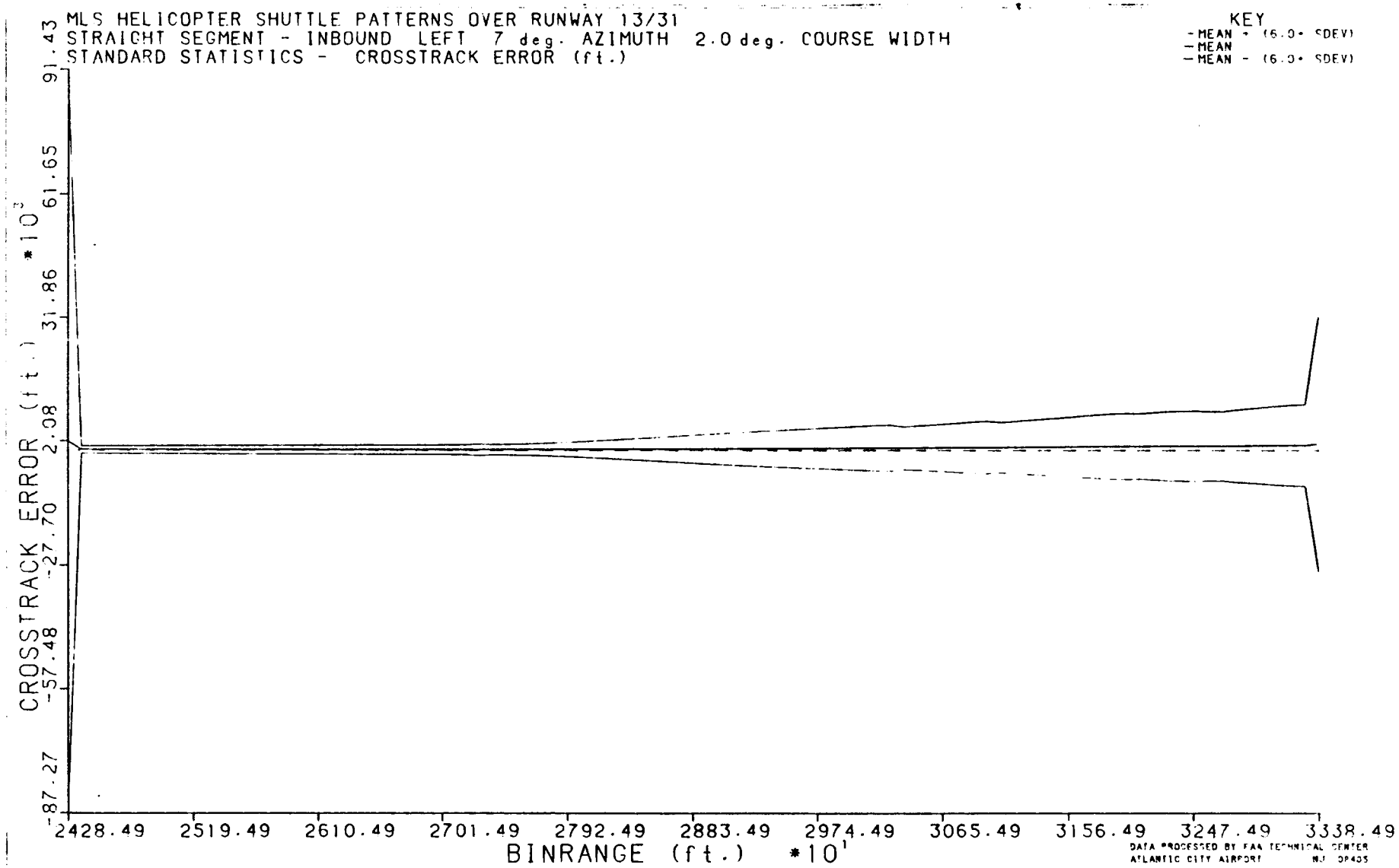

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (%FS)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
AZ. FTE (%FS) *10^2
52.51
35.47
18.42
1.38
-15.66
-32.71
-49.75
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10^1
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

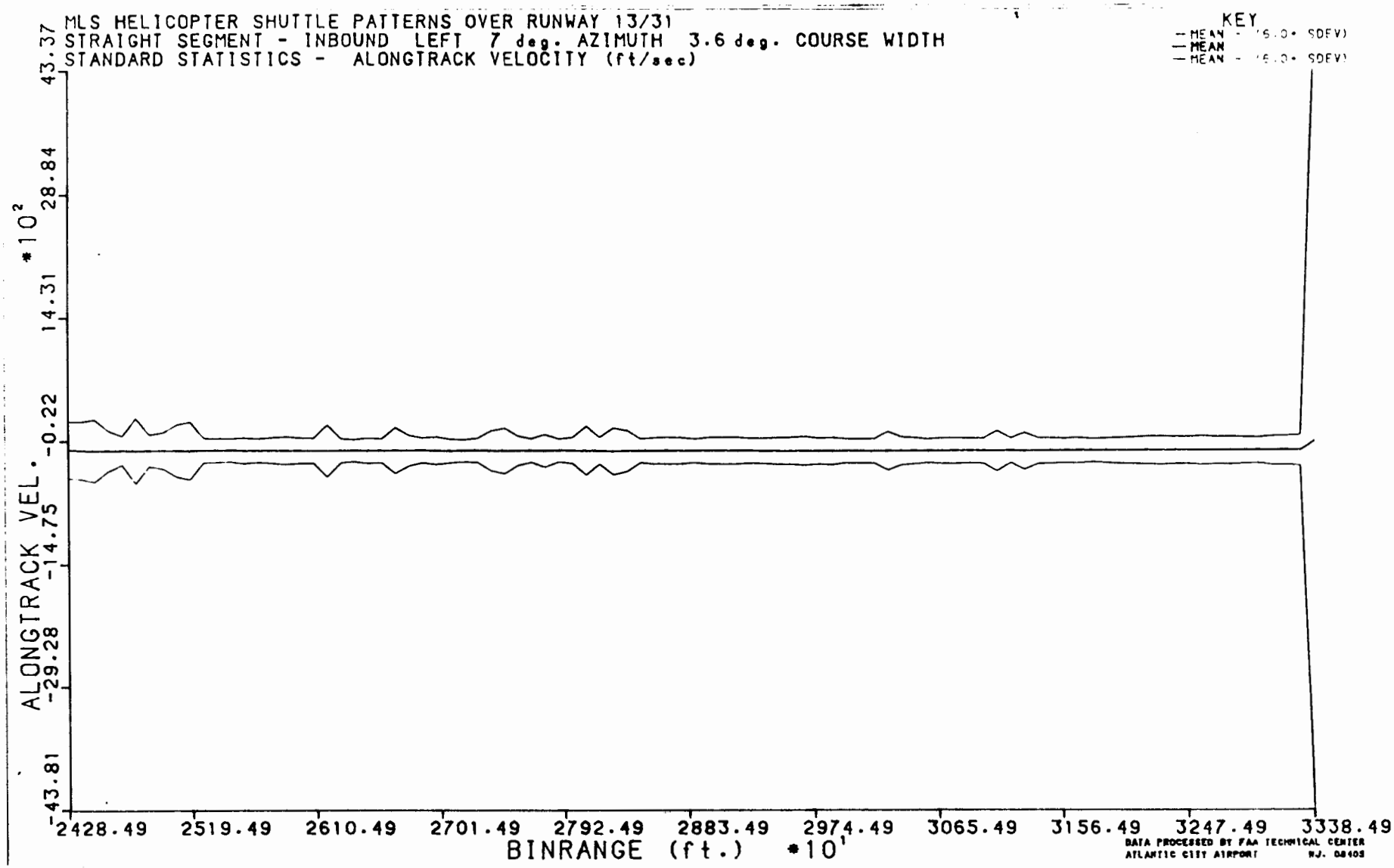

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAICHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (deg.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
AZ. FTE (deg.)
189.04
127.69
66.33
4.97
-56.39
-117.74
-179.10
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT

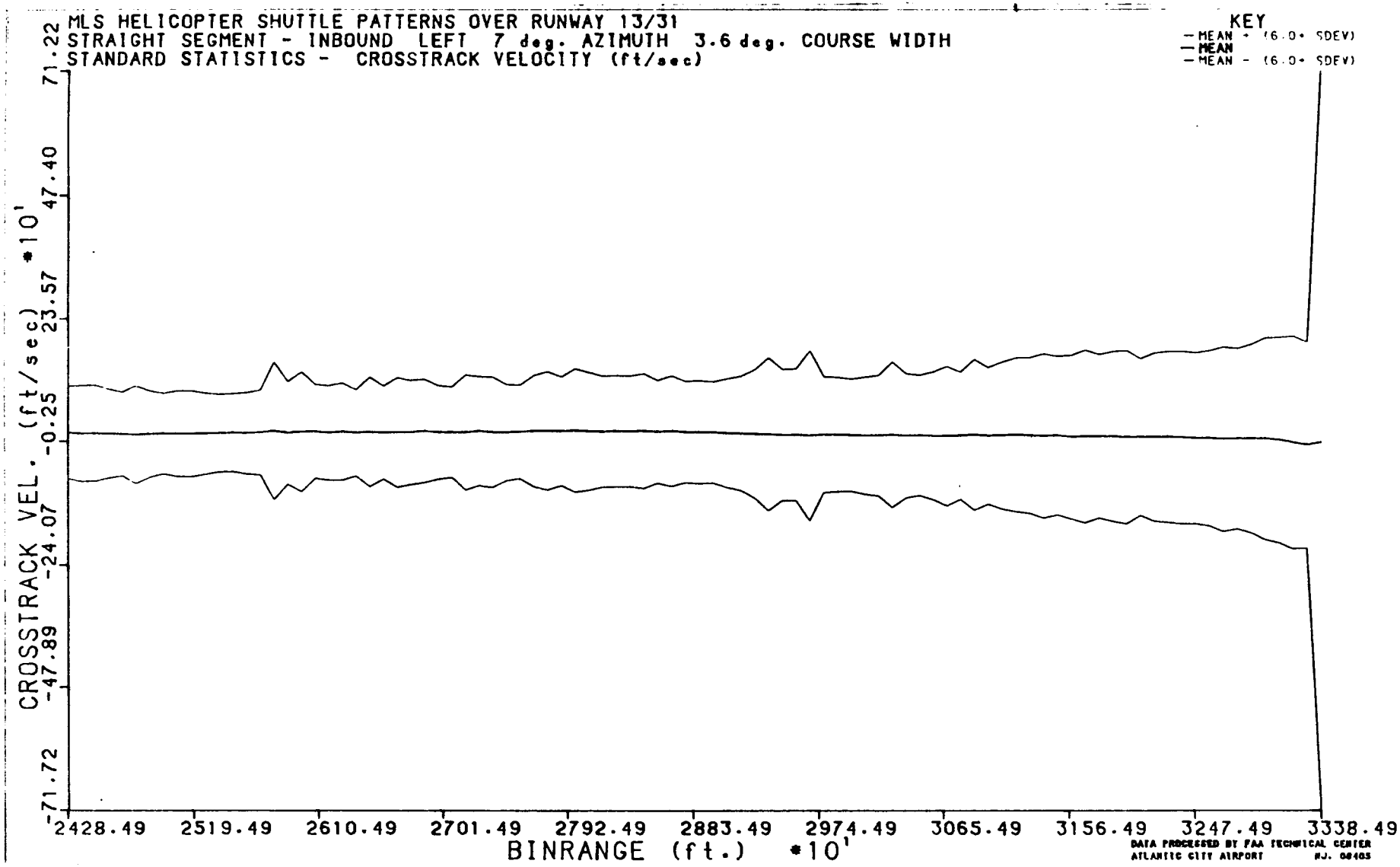

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (ft.)
KEY
MEAN
MEAN
MEAN
124.15
83.84
43.54
3.24
-37.07
-77.37
-117.67
*10³
AZ. FTE (ft.)
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

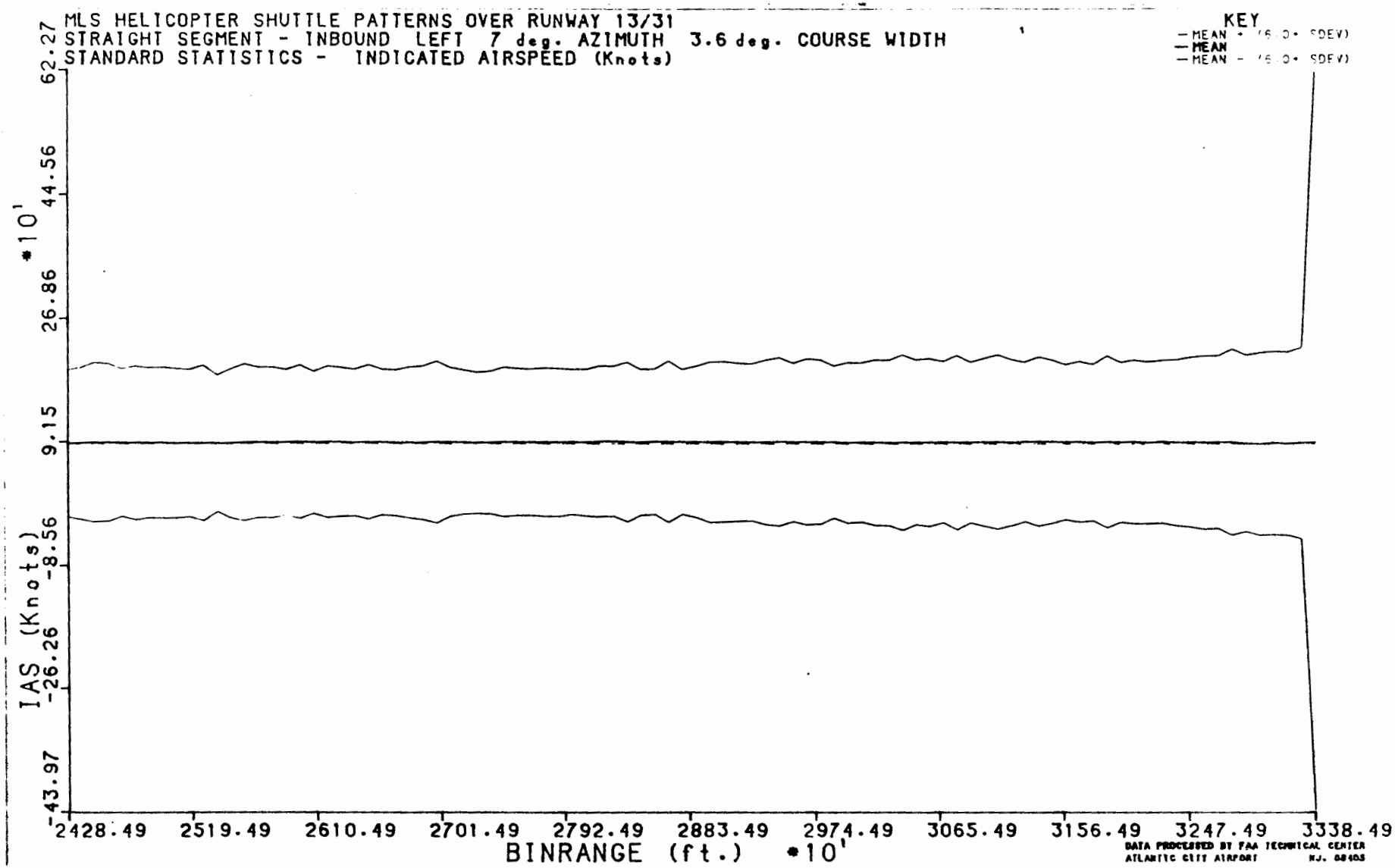

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK ERROR (deg.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
CROSSTRACK ERROR (deg.)
214.22
144.44
74.66
4.88
-64.90
-134.68
-204.46
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALTITUDE (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
ALTITUDE (ft.) *10
89.05
66.51
43.96
21.41
-1.13
-23.68
-46.22
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

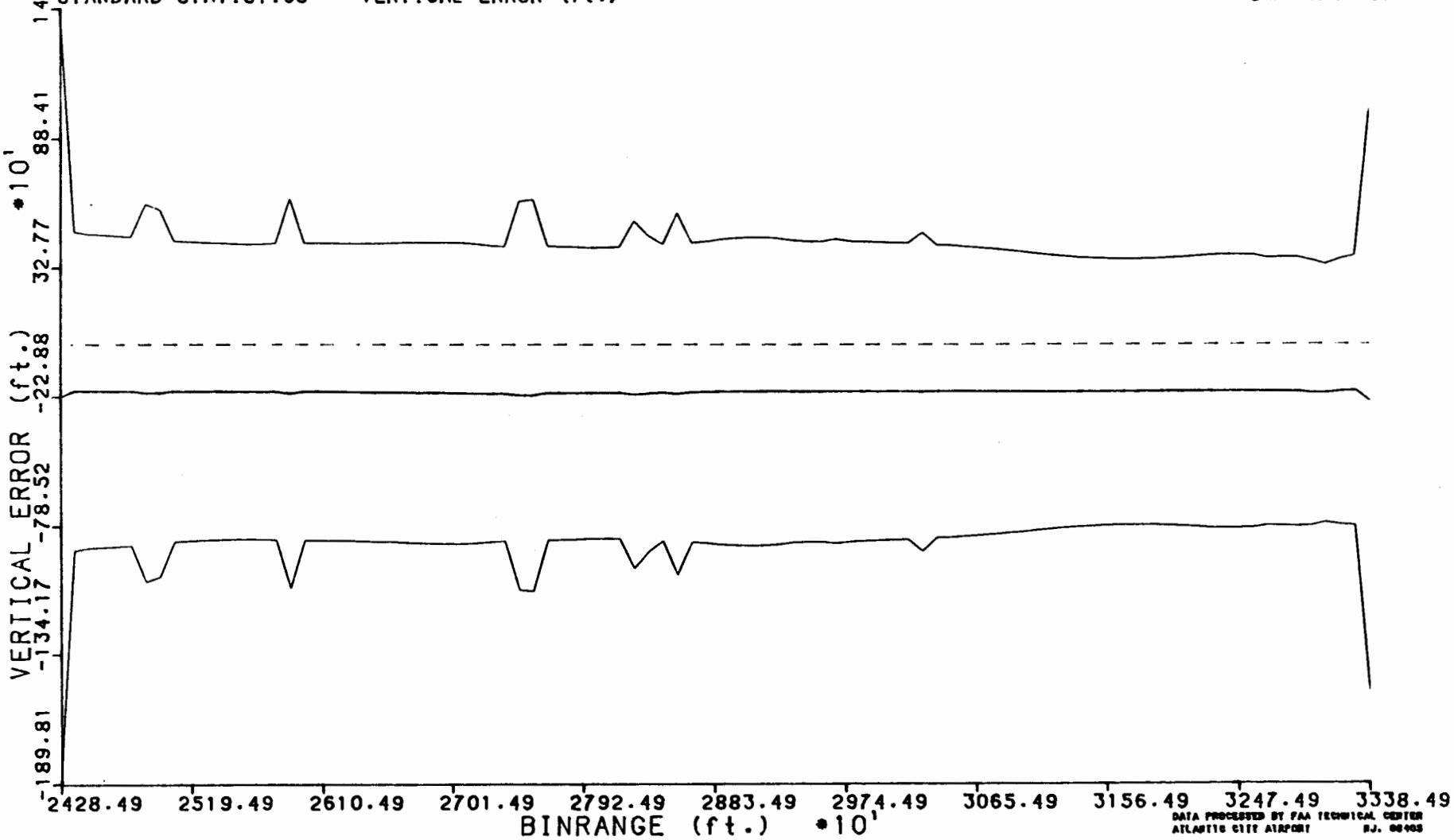

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK ERROR (ft.)
KEY
-MEAN + (6.0* SDEV)
-MEAN
-MEAN - (6.0* SDEV)
CROSSTRACK ERROR (ft.) *10^3
91.43
61.65
31.86
2.08
-27.70
-57.48
-87.27
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10^1
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ DP405

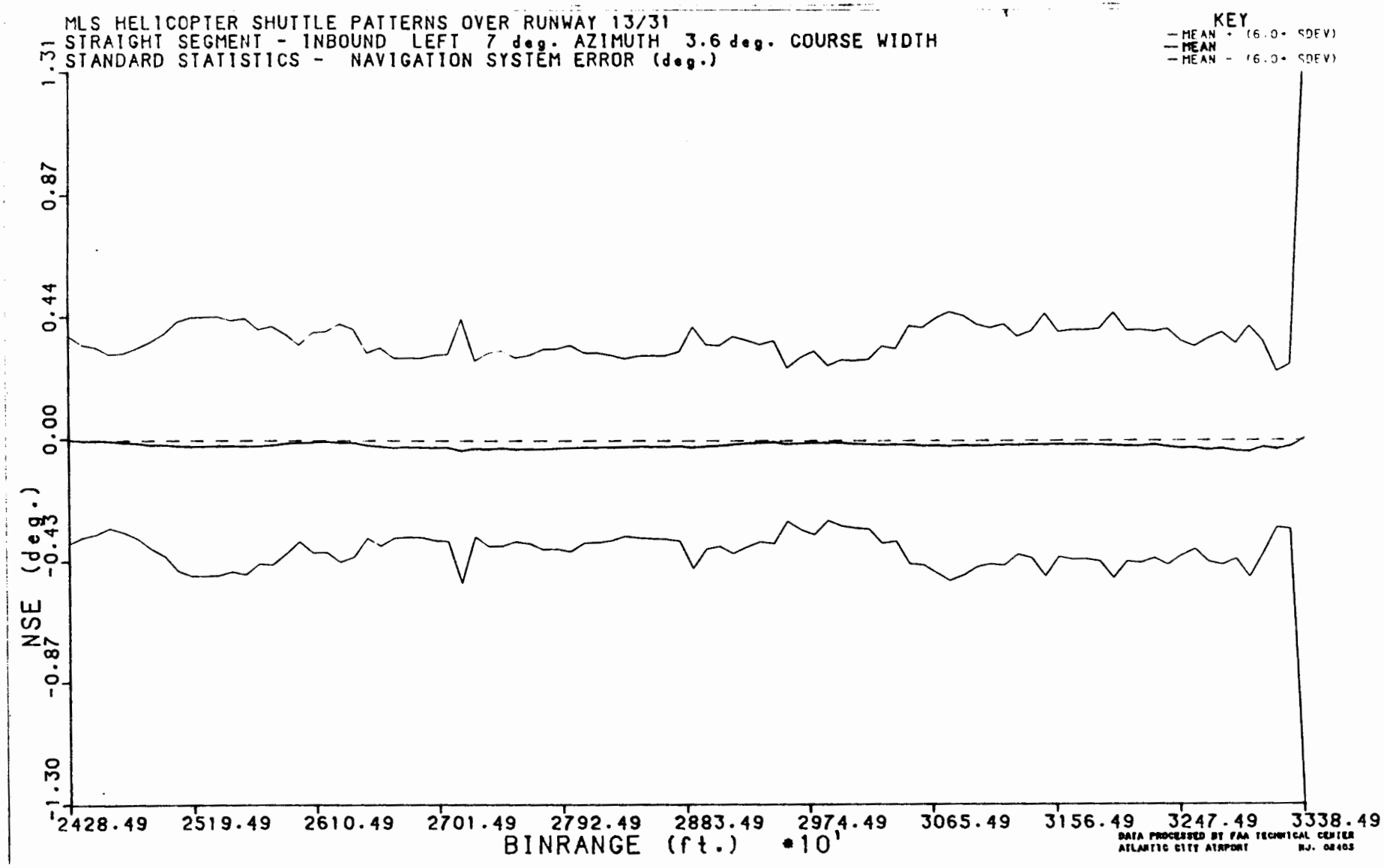

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK VELOCITY (ft/sec)
KEY
MEAN
MEAN
ALONGTRACK VEL. *10²
43.37
28.84
14.31
-0.22
-14.75
-29.28
-43.81
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

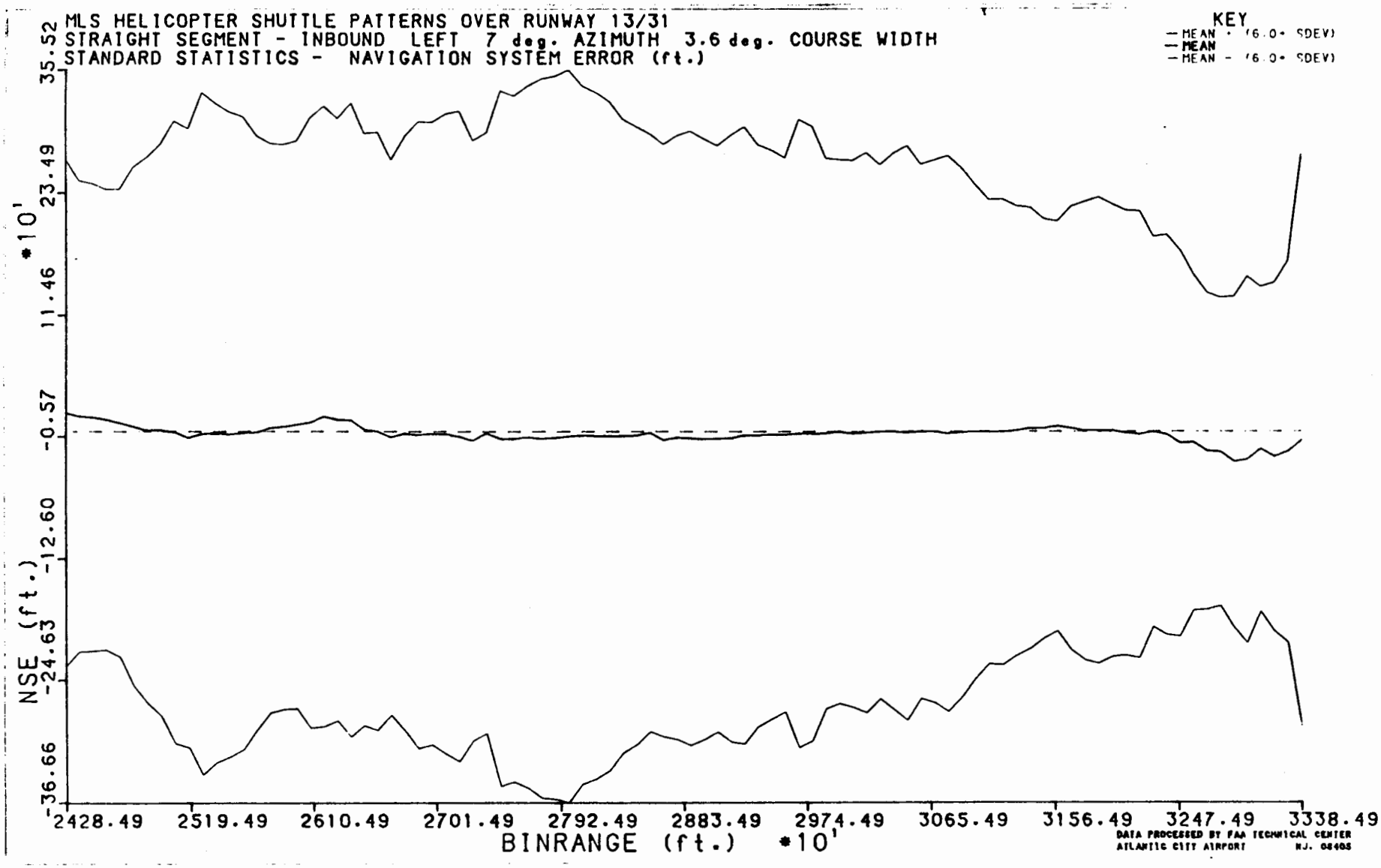

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK VELOCITY (ft/sec)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
CROSSTRACK VEL. (ft/sec) *10¹
71.22
47.40
23.57
-0.25
-24.07
-47.89
-71.72
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

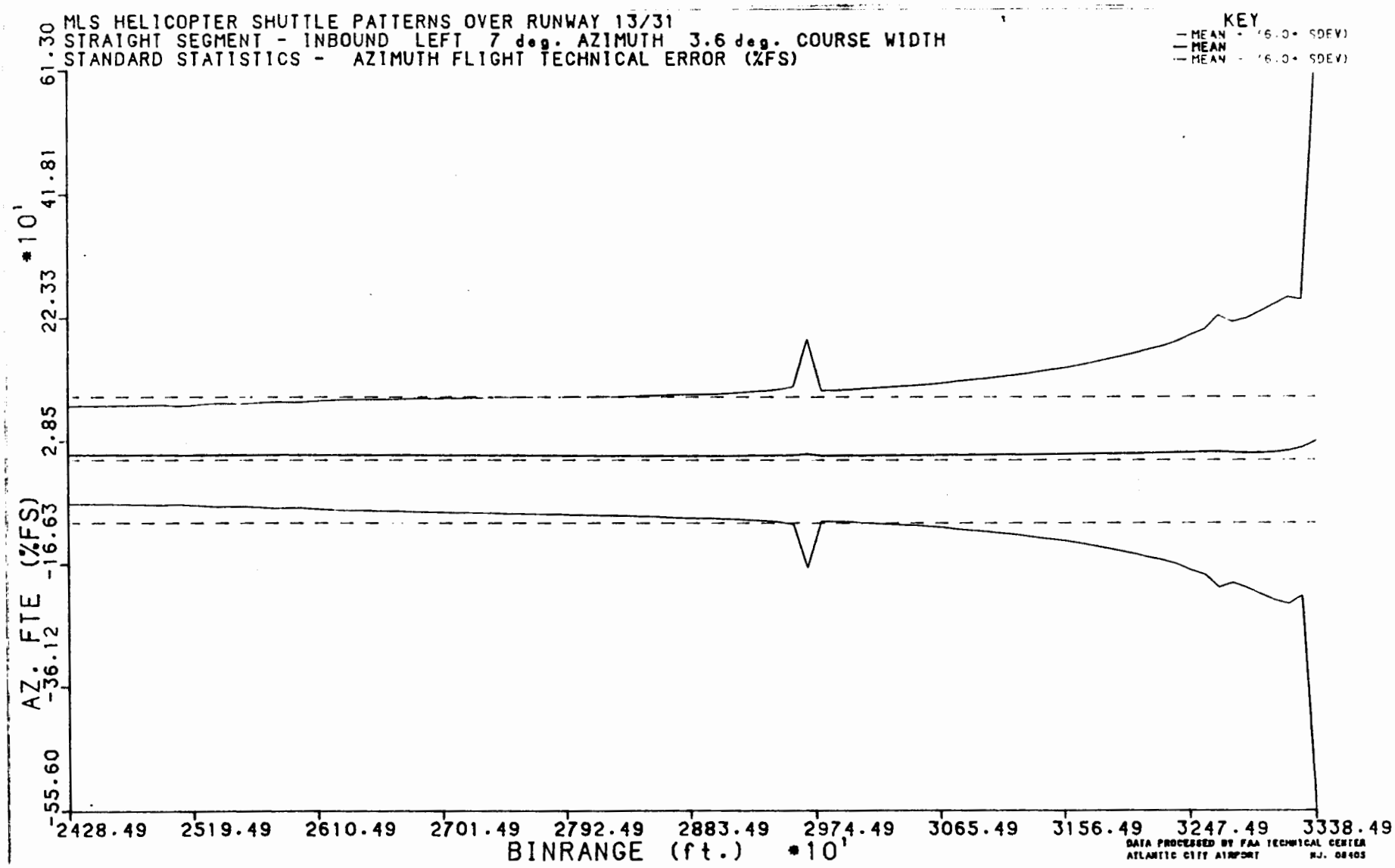

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - INDICATED AIRSPEED (Knots)
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
IAS (Knots) *10¹
62.27
44.56
26.86
9.15
-8.56
-26.26
-43.97
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

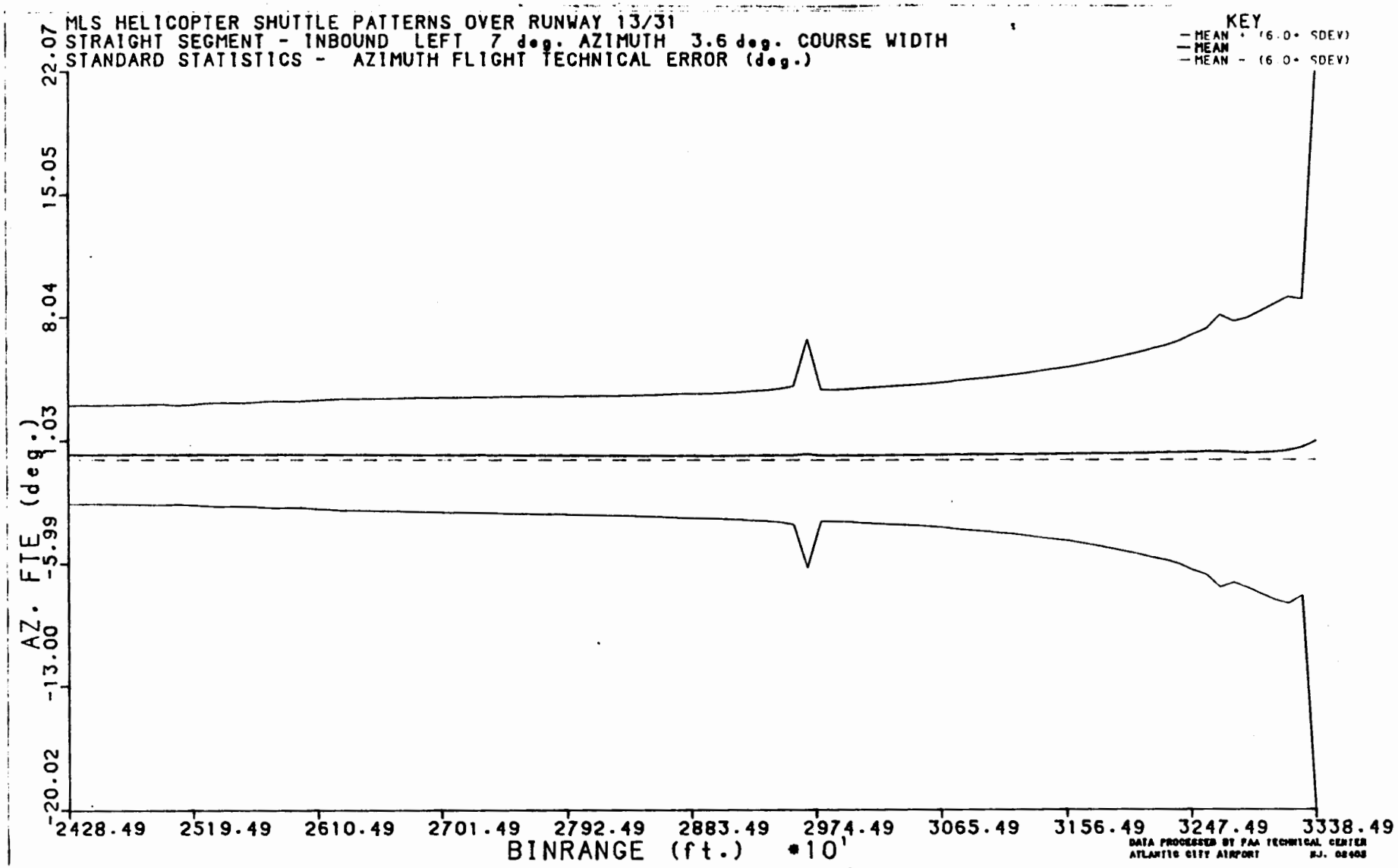
MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - VERTICAL ERROR (ft.)

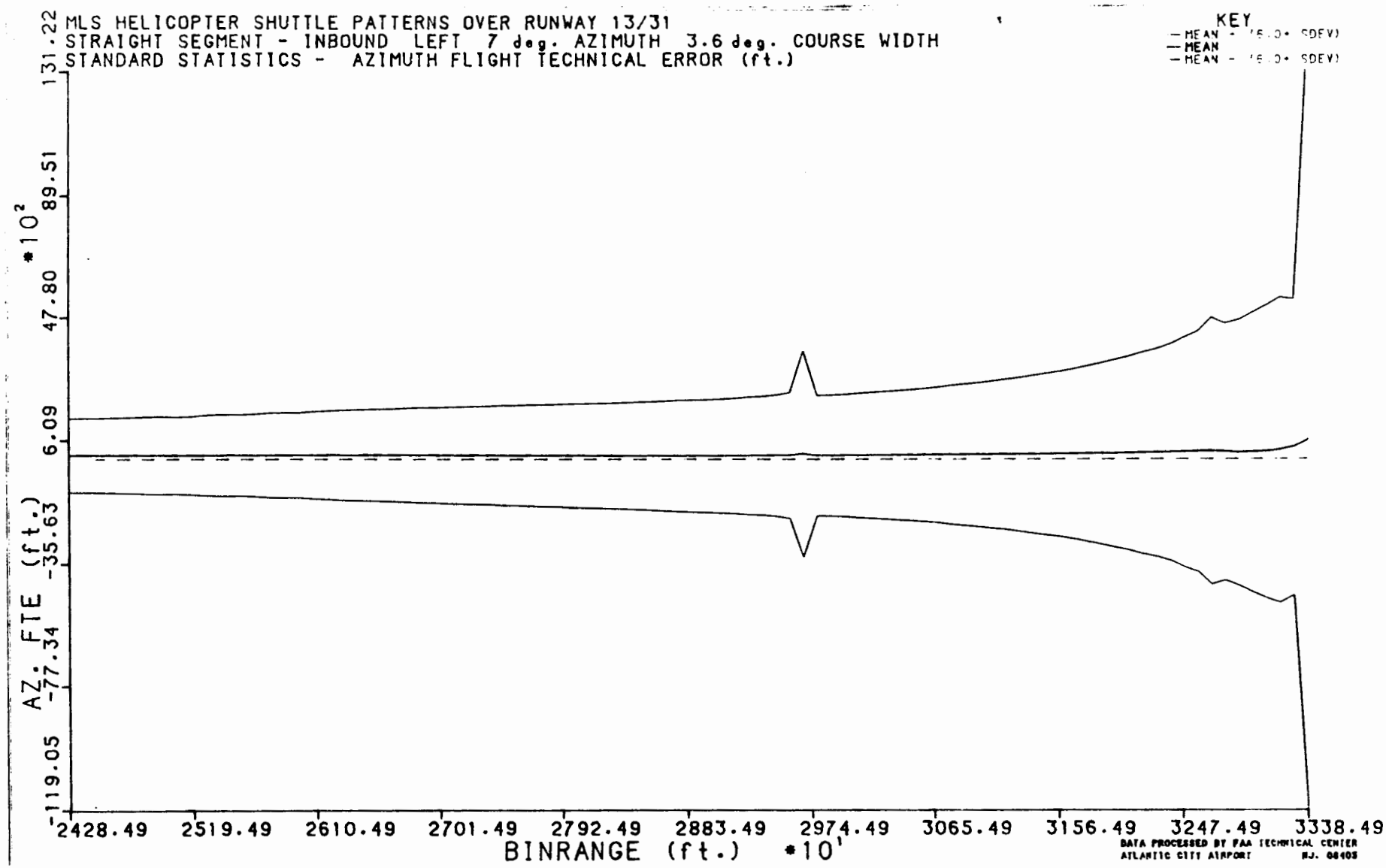


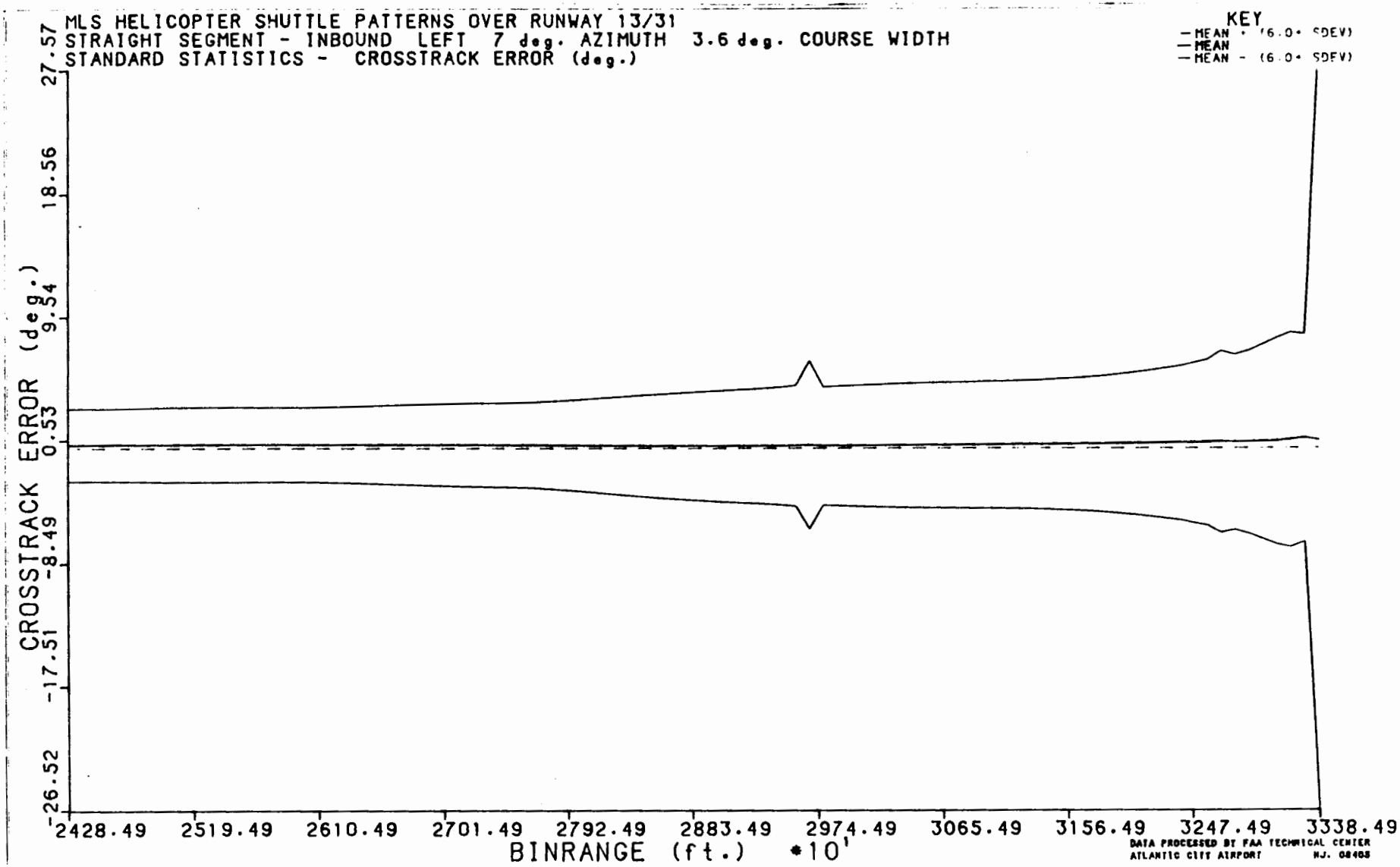

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - NAVIGATION SYSTEM ERROR (deg.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
1.31
0.87
0.44
0.00
-0.43
-0.87
-1.30
NSE (deg.)
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

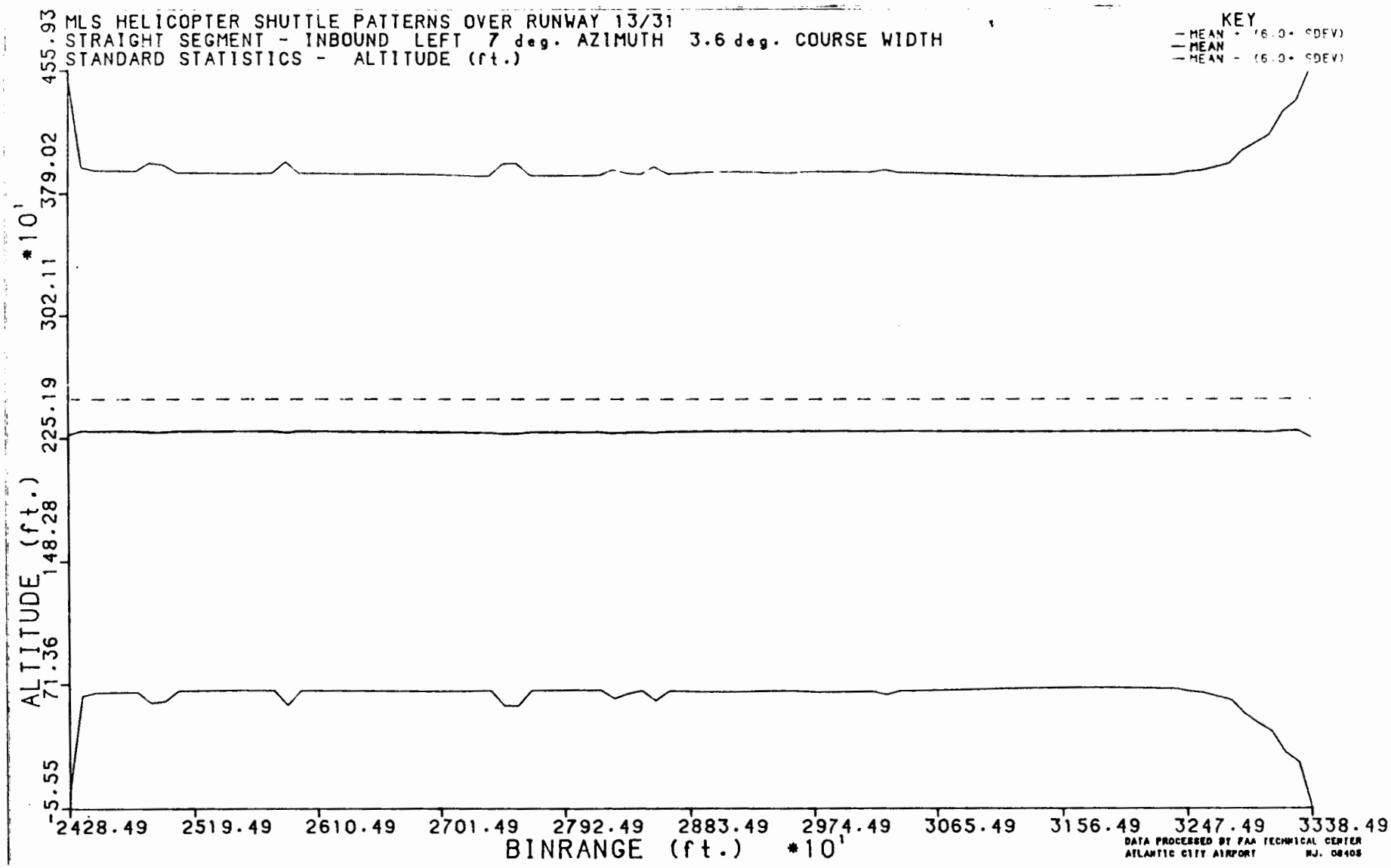

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - NAVIGATION SYSTEM ERROR (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
NSE (ft.) *10¹
35.52
23.49
11.46
-0.57
-12.60
-24.63
-36.66
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

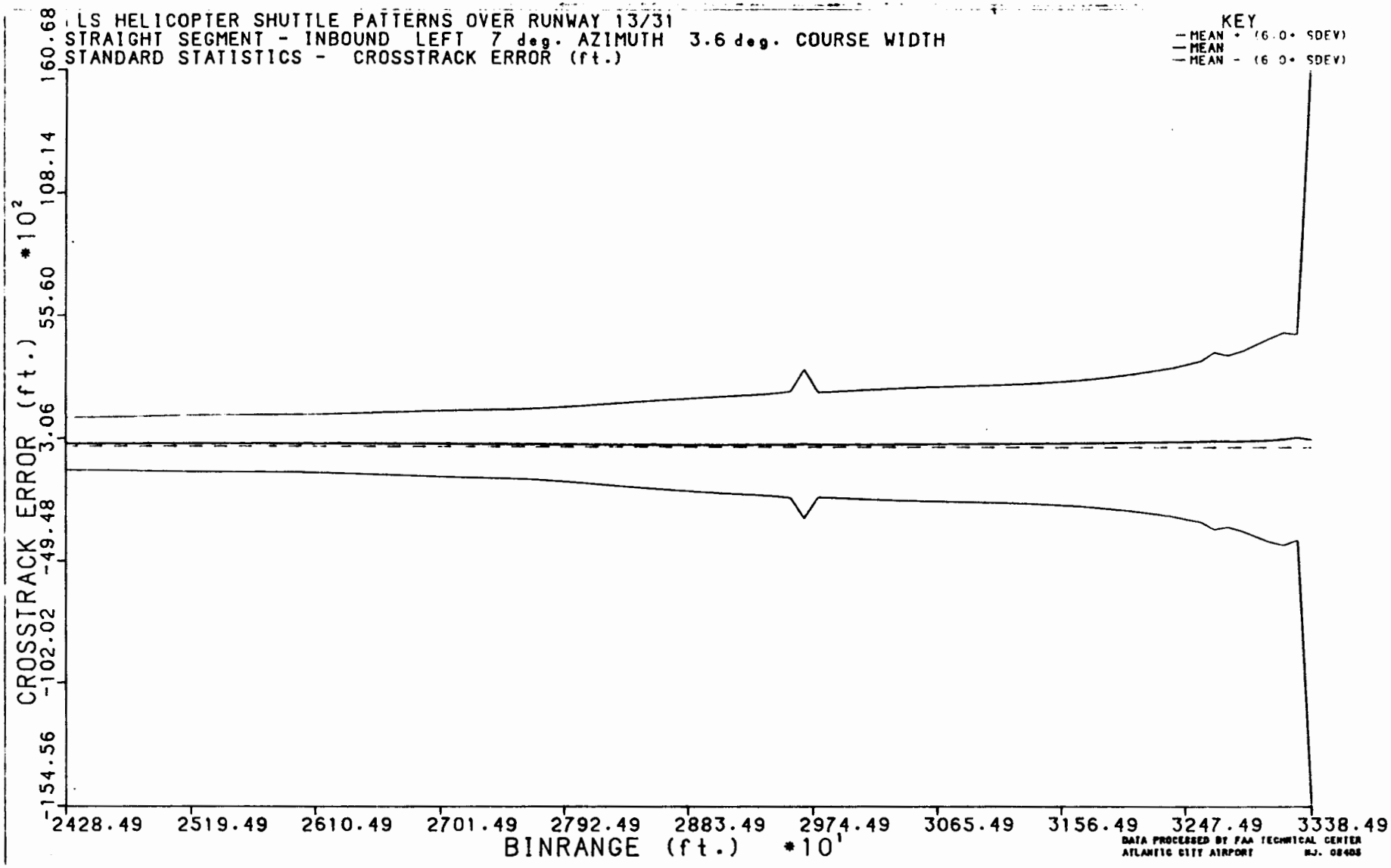

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (%FS)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
AZ. FTE (%FS)
*10¹
61.30
41.81
22.33
2.85
-16.63
-36.12
-55.60
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (deg.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
AZ. FTE (deg.)
22.07
15.05
8.04
1.03
-5.99
-13.00
-20.02
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (ft.)
KEY
MEAN
MEAN
131.22
89.51
47.80
6.09
-35.63
-77.34
-119.05
*10²
AZ. FTE (ft.)
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

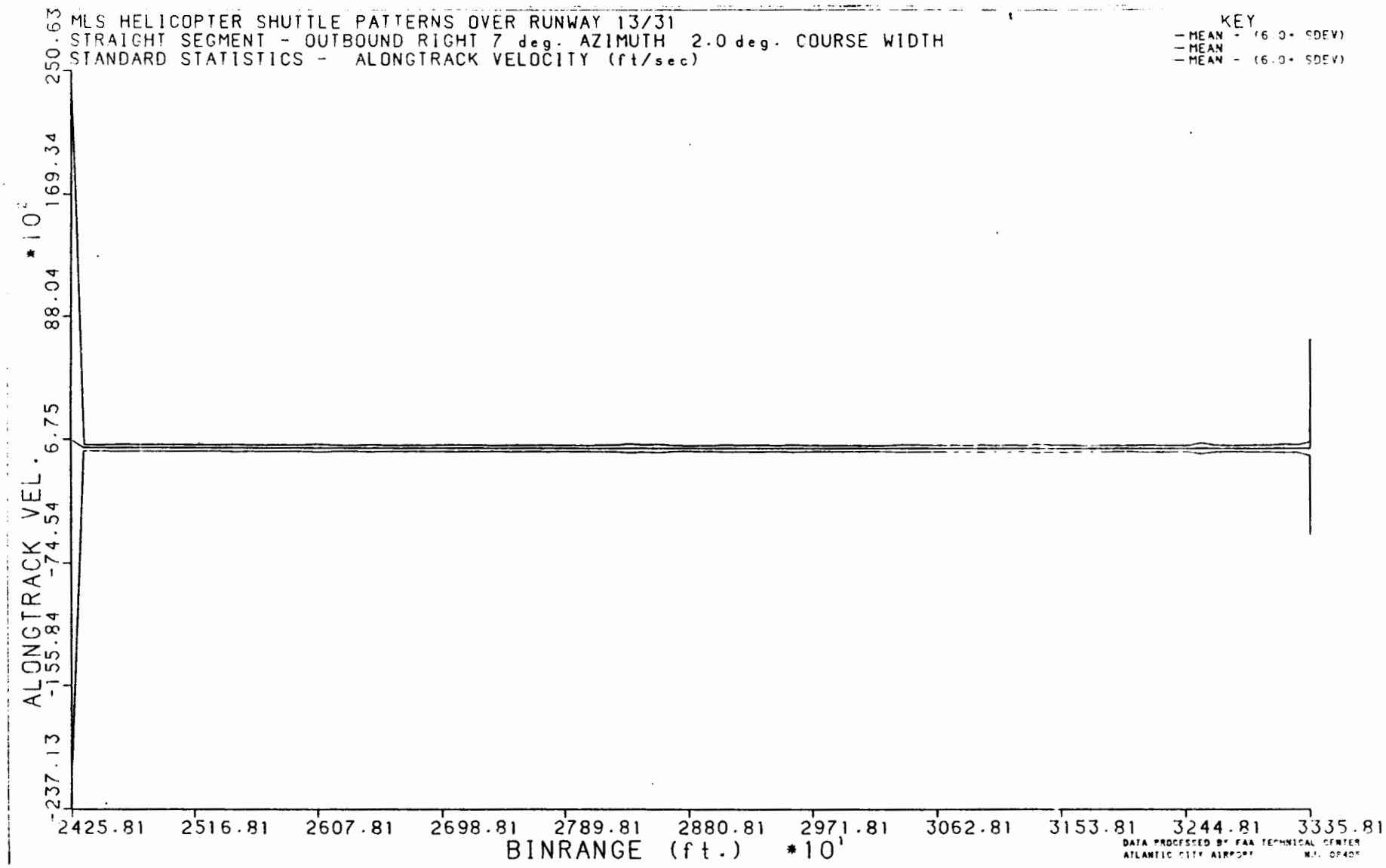

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK ERROR (deg.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
CROSSTRACK ERROR (deg.)
27.57
18.56
9.54
0.53
-8.49
-17.51
-26.52
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

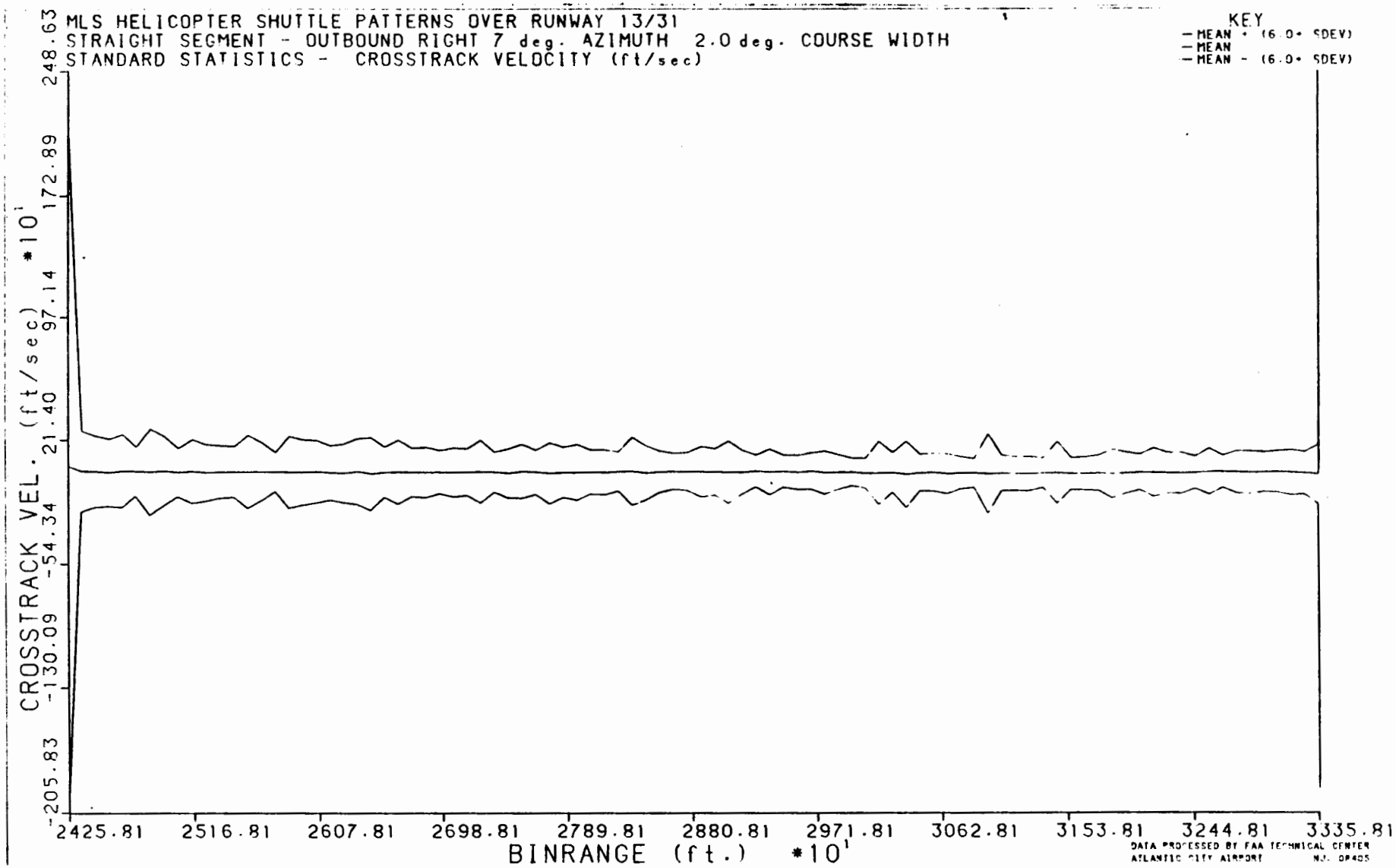

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALTITUDE (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
ALTITUDE (ft.) *10¹
455.93
379.02
302.11
225.19
148.28
71.36
-5.55
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

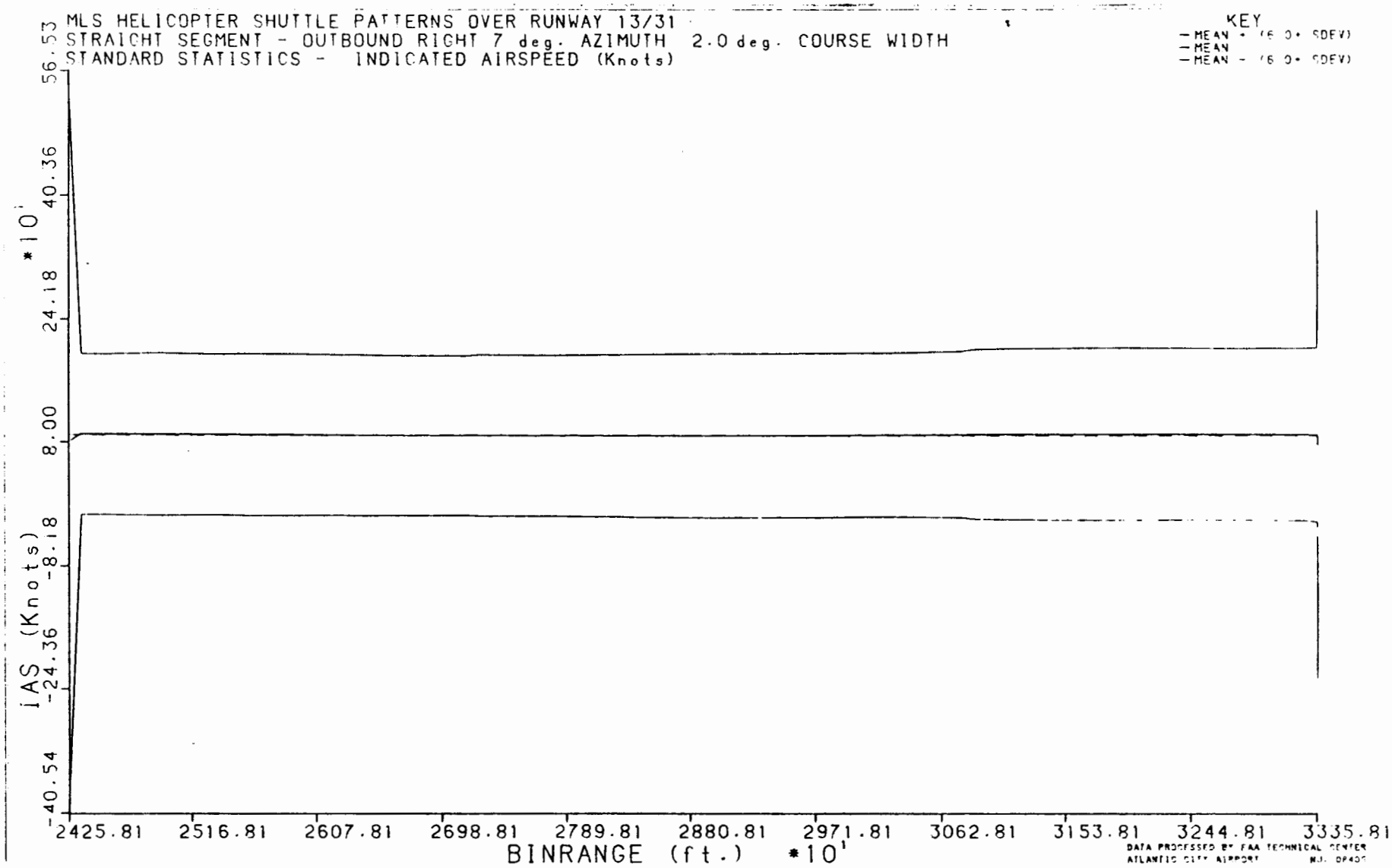

LS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - INBOUND LEFT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK ERROR (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
CROSSTRACK ERROR (ft.) *10²
160.68
108.14
55.60
3.06
-49.48
-102.02
-154.56
2428.49
2519.49
2610.49
2701.49
2792.49
2883.49
2974.49
3065.49
3156.49
3247.49
3338.49
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT N.J. 08405

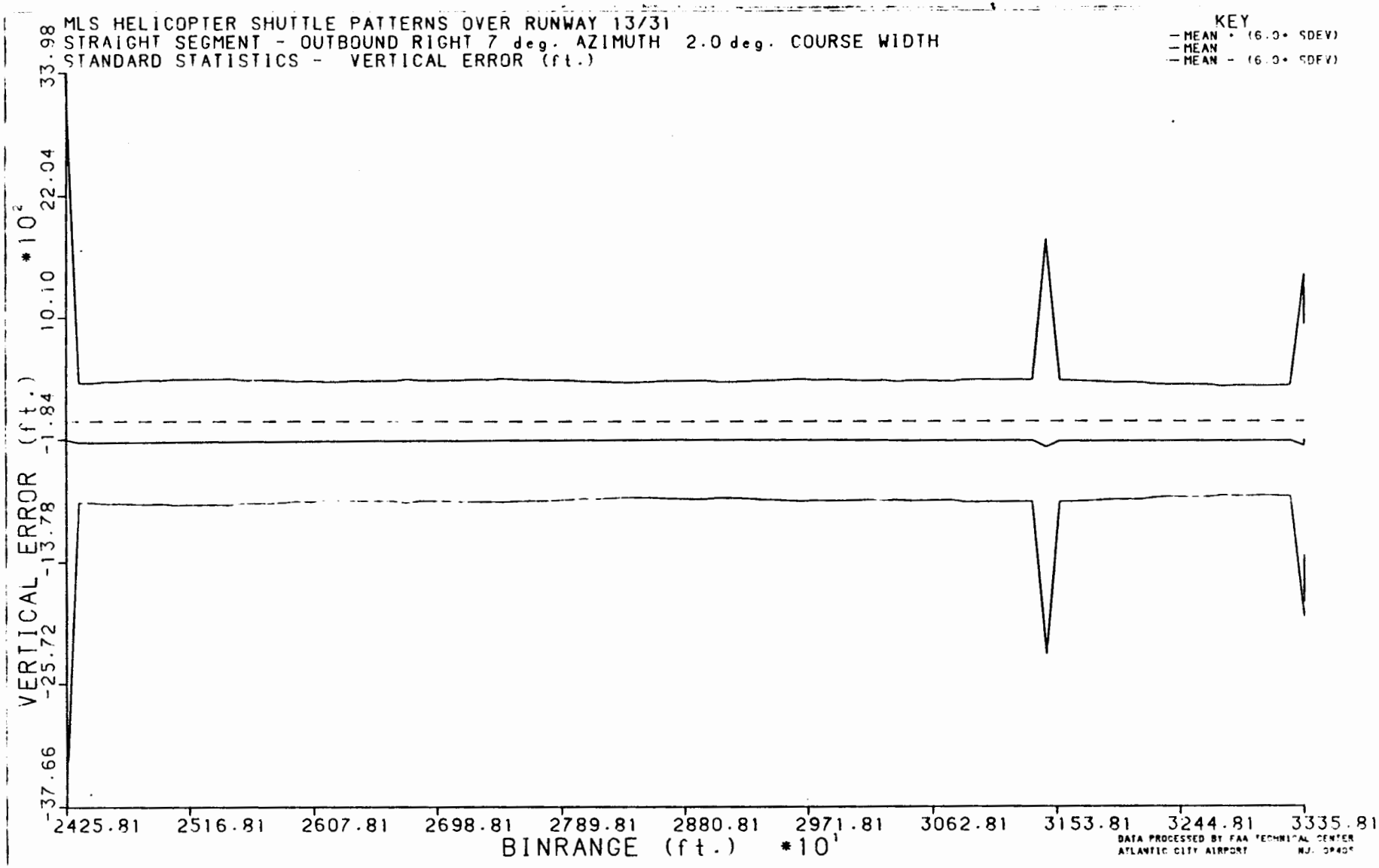
APPENDIX H

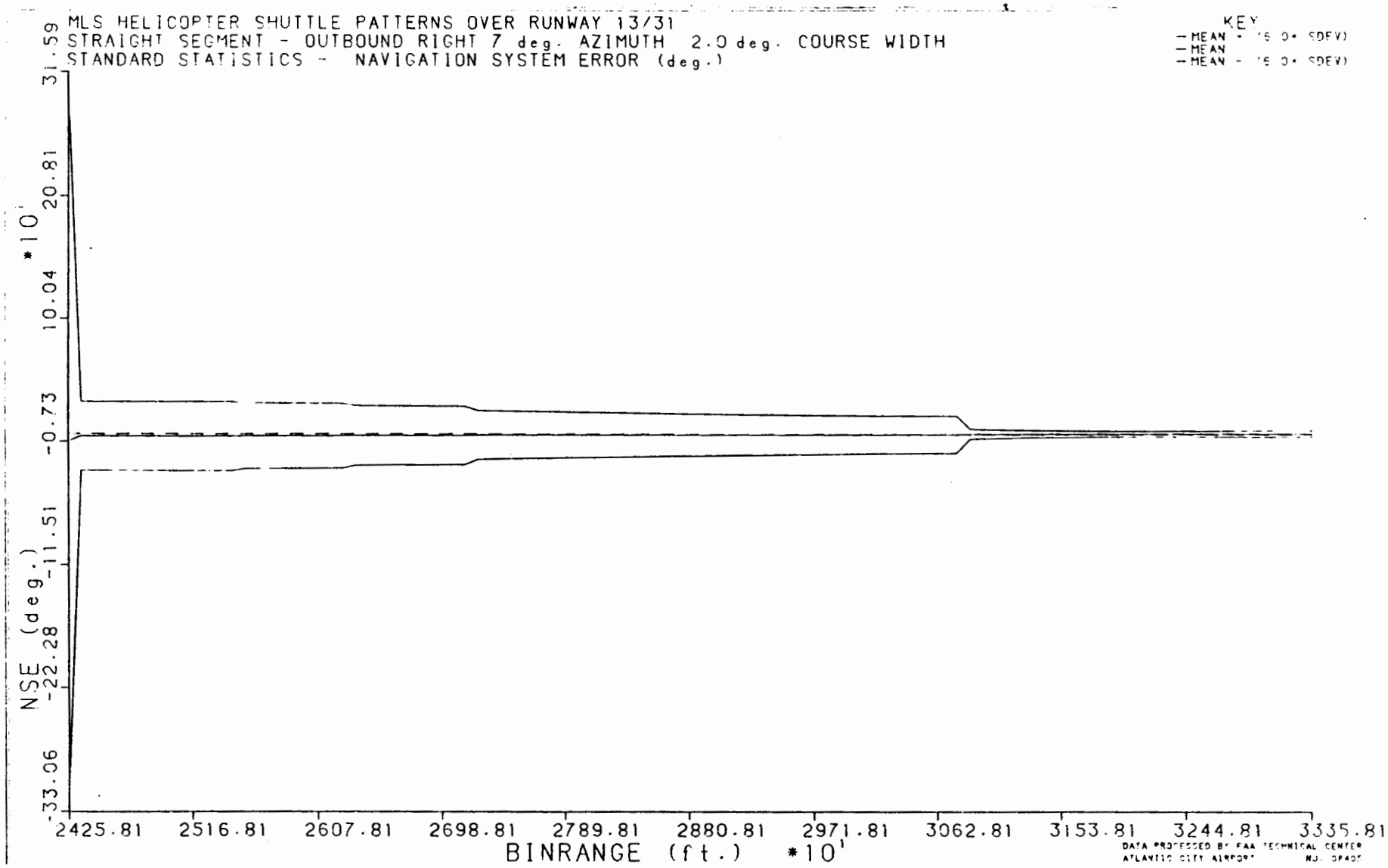
99.999999 PERCENT ISOPROBABILITY PLOTS FOR 3.6° AND 2.0° OUTBOUND STRAIGHT SEGMENTS

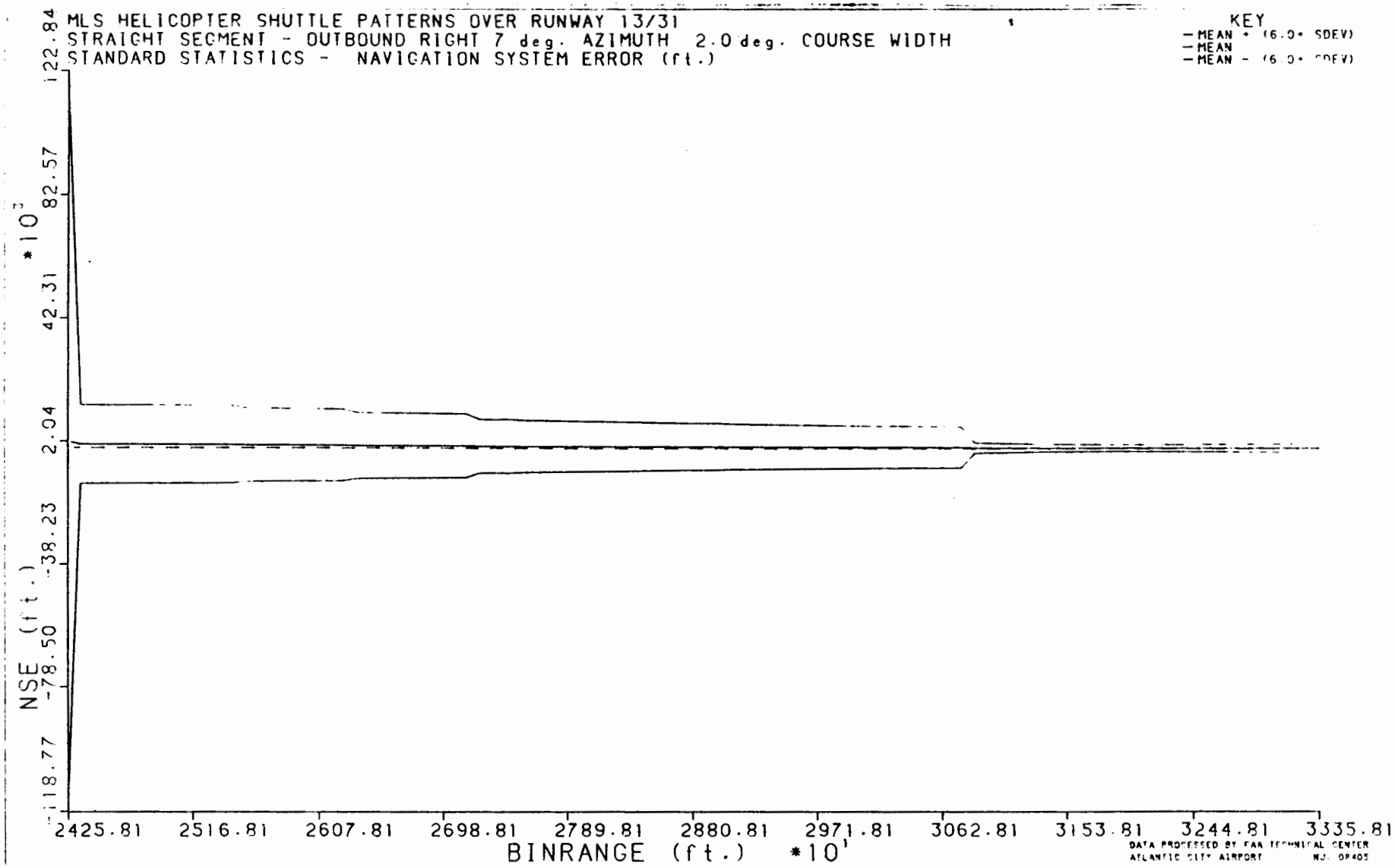

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK VELOCITY (ft/sec)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
ALONGTRACK VEL. *10²
250.63
169.34
88.04
6.75
-74.54
-155.84
-237.13
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT

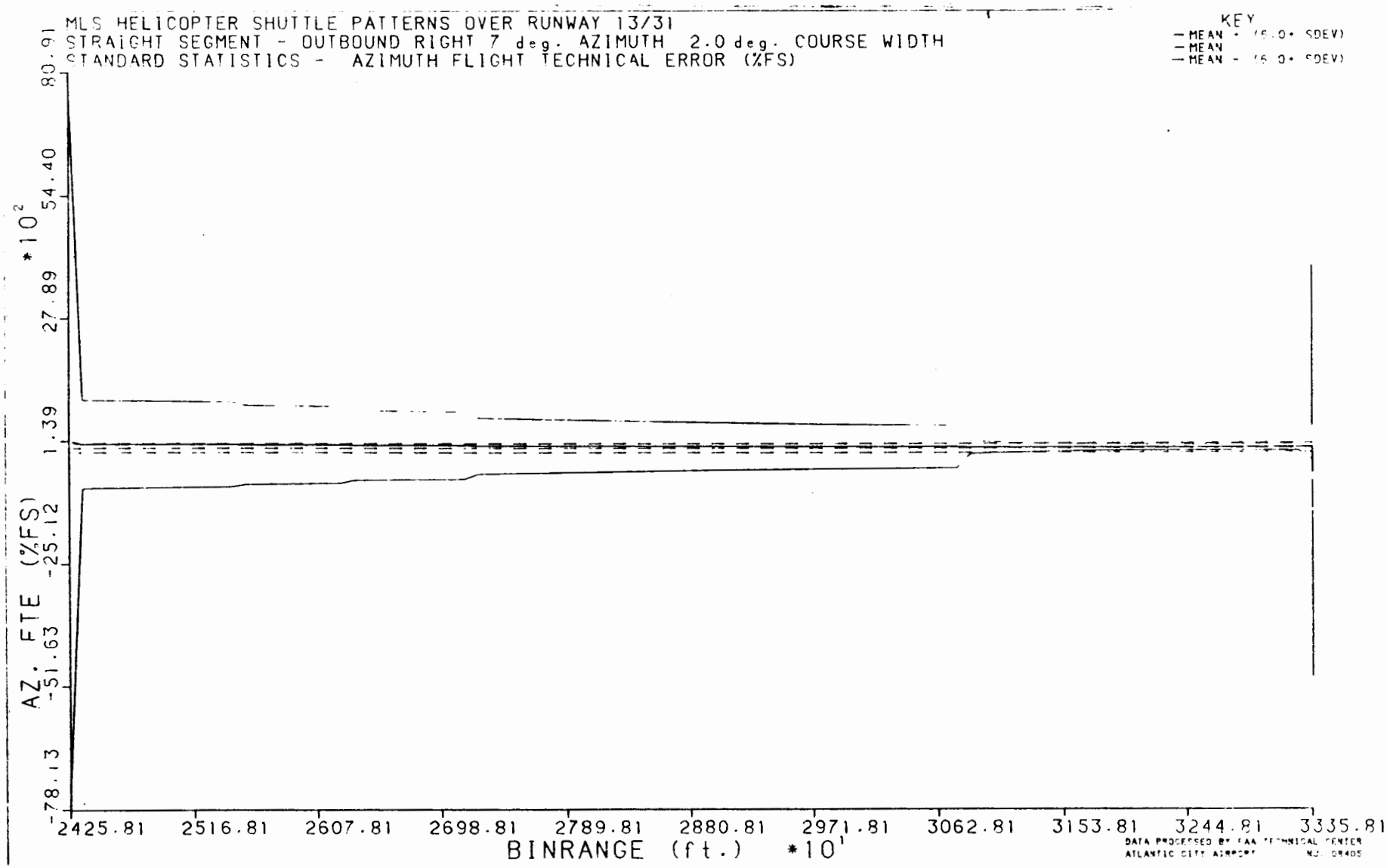

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK VELOCITY (ft/sec)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
CROSSTRACK VEL. (ft/sec) *10¹
248.63
172.89
97.14
21.40
-54.34
-130.09
-205.83
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

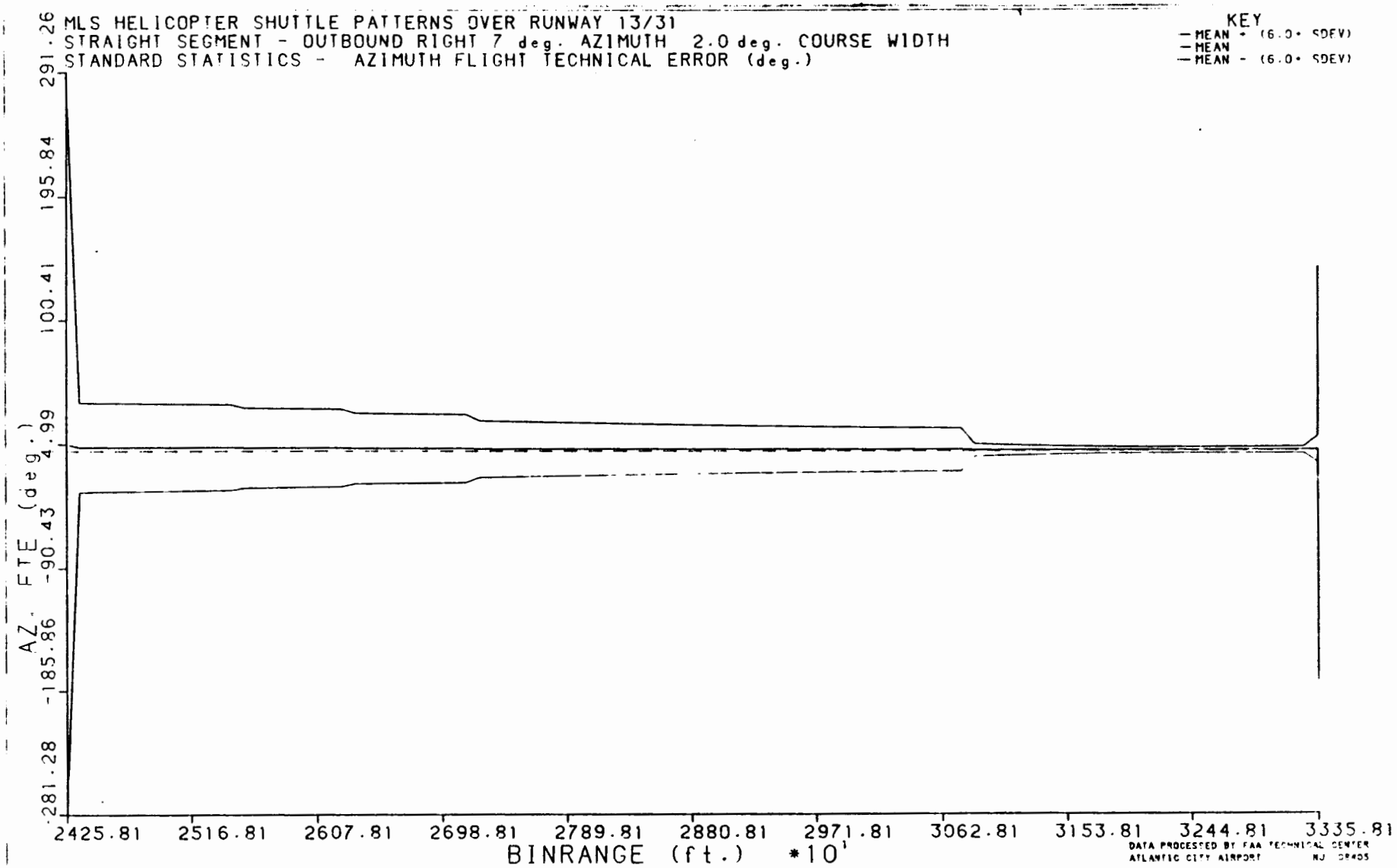

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAICHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - INDICATED AIRSPEED (Knots)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
56.53
40.36
24.18
8.00
-8.18
-24.36
-40.54
*10¹
IAS (Knots)
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT N.J. 08405

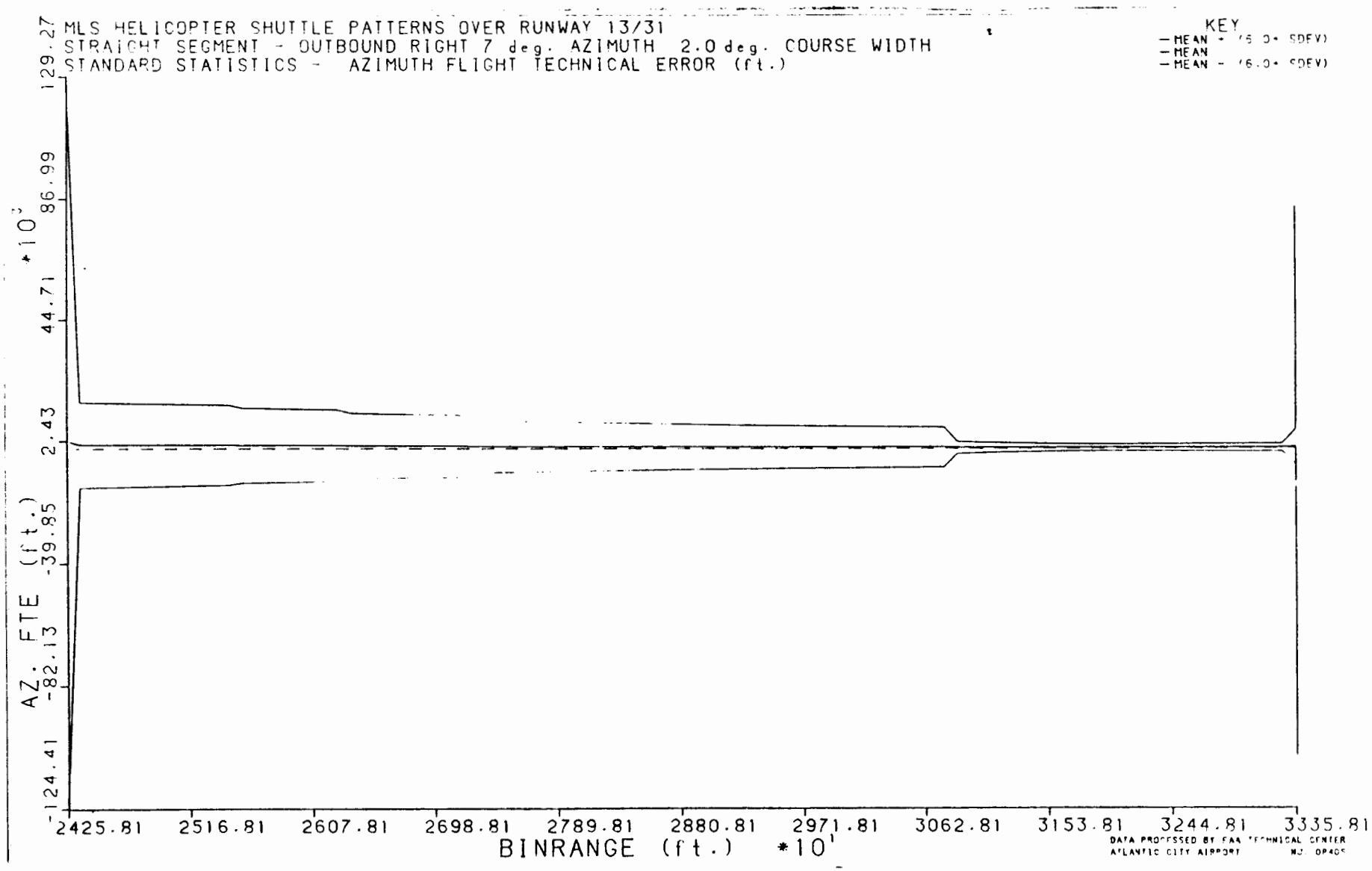

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - VERTICAL ERROR (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
VERTICAL ERROR (ft.) *10²
33.98
22.04
10.10
-1.84
-13.78
-25.72
-37.66
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

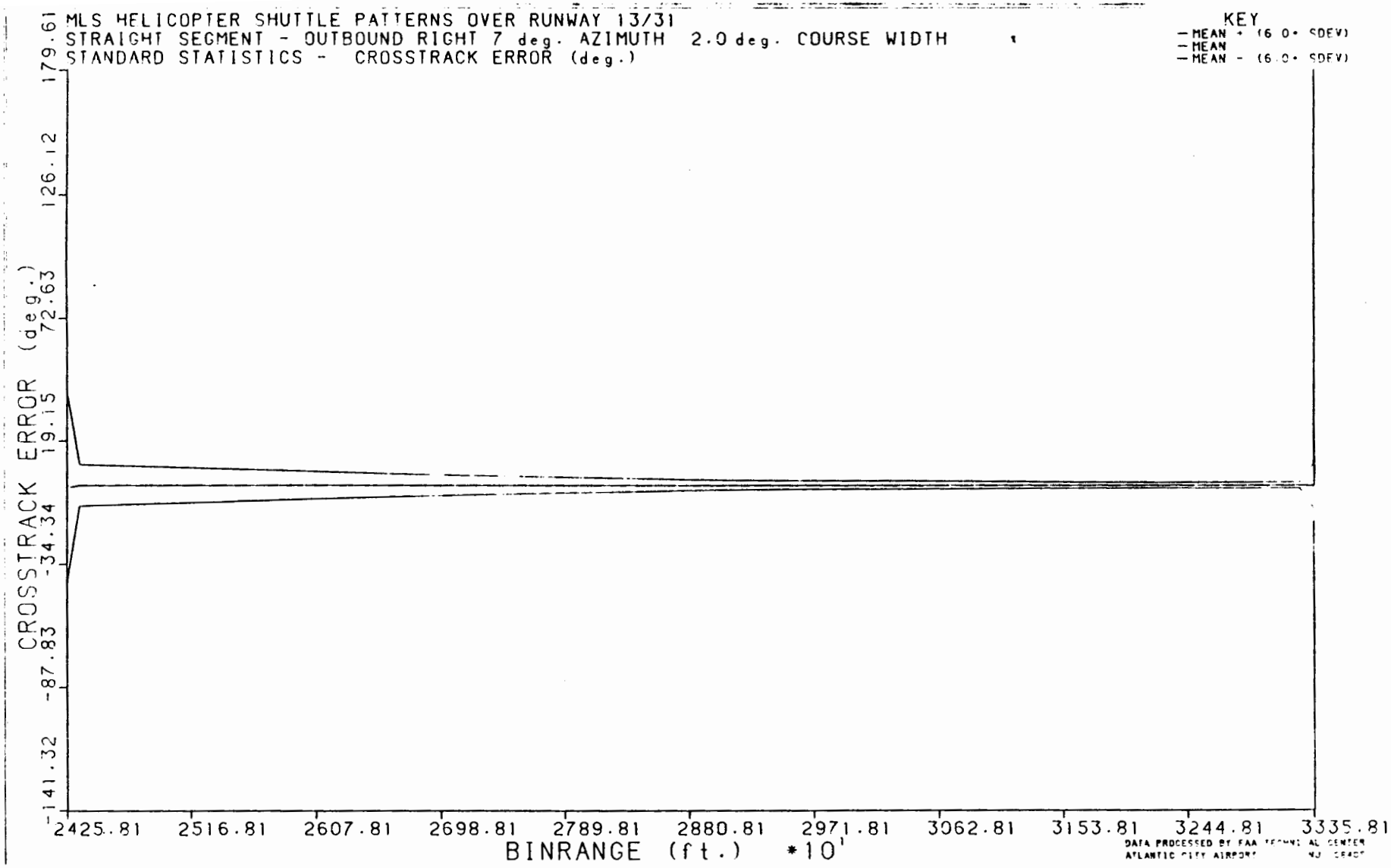

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - NAVIGATION SYSTEM ERROR (deg.)
KEY
MEAN + (S.D.* SDEV)
MEAN
MEAN - (S.D.* SDEV)
NSE (deg.)
*10¹
31.59
20.81
10.04
-0.73
-11.51
-22.28
-33.06
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

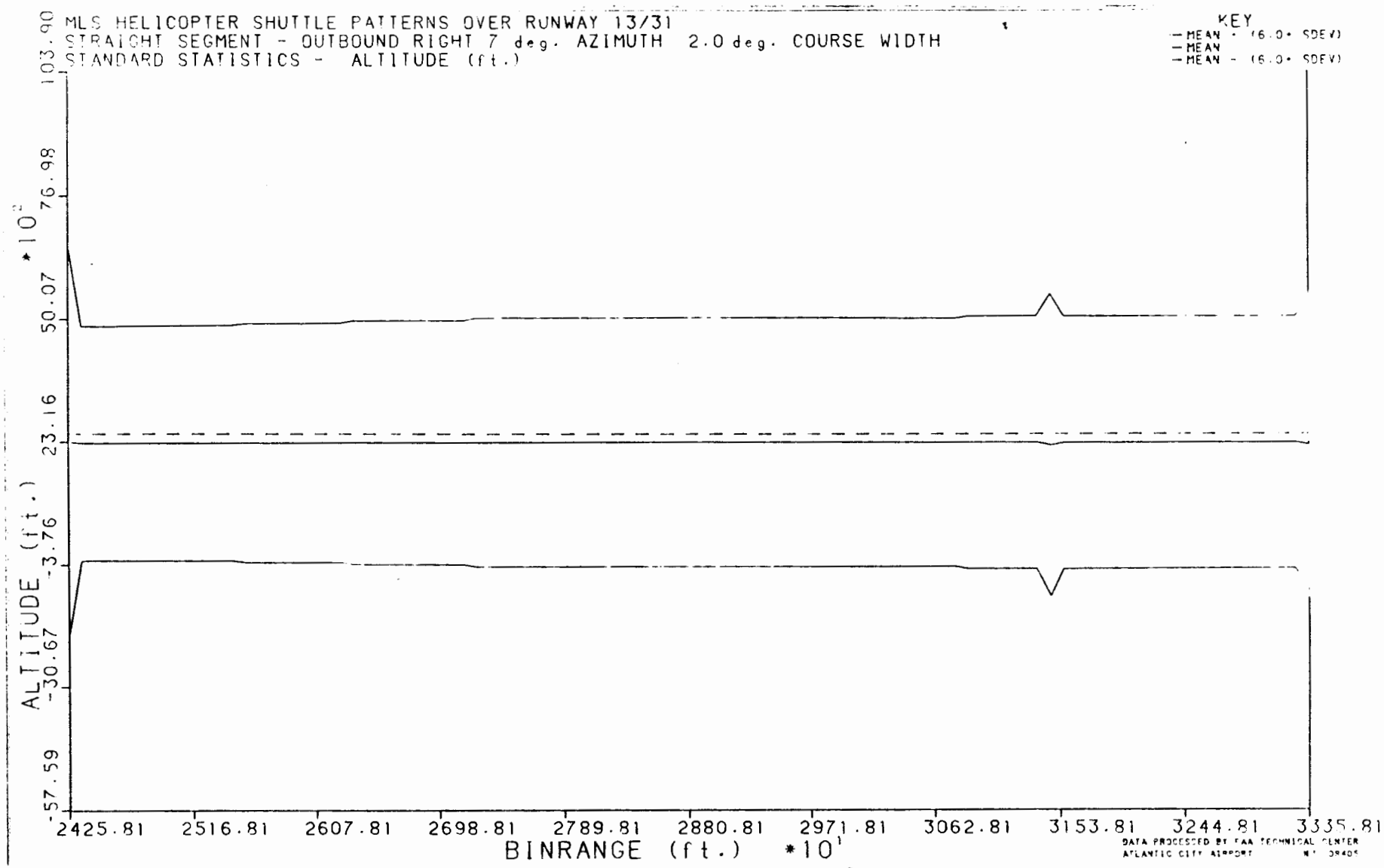

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - NAVIGATION SYSTEM ERROR (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
122.84
82.57
42.31
2.04
-38.23
-78.50
-118.77
NSE (ft.) *10³
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

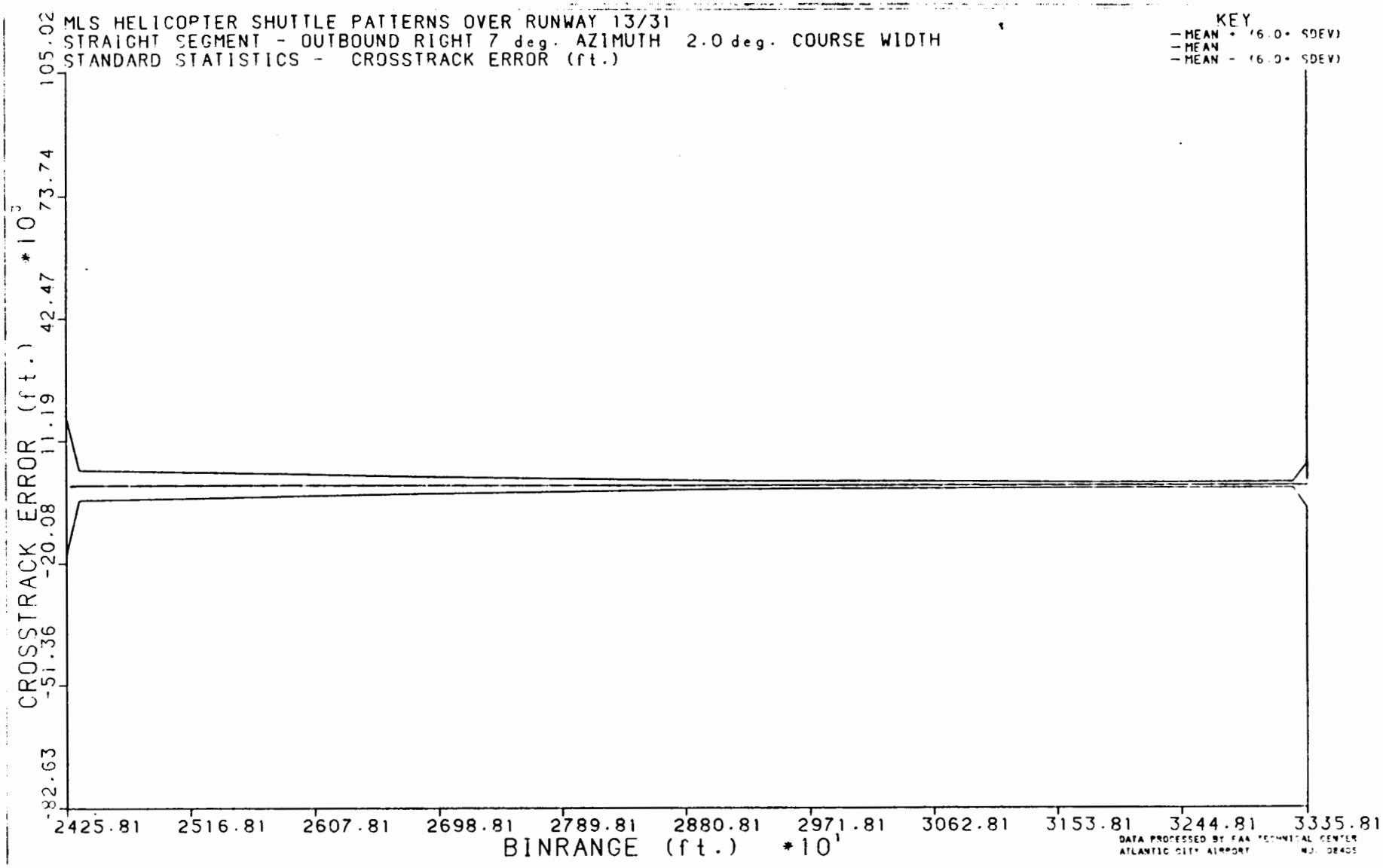

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (%FS)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
AZ. FTE (%FS) *10²
80.91
54.40
27.89
1.39
-25.12
-51.63
-78.13
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ 08405

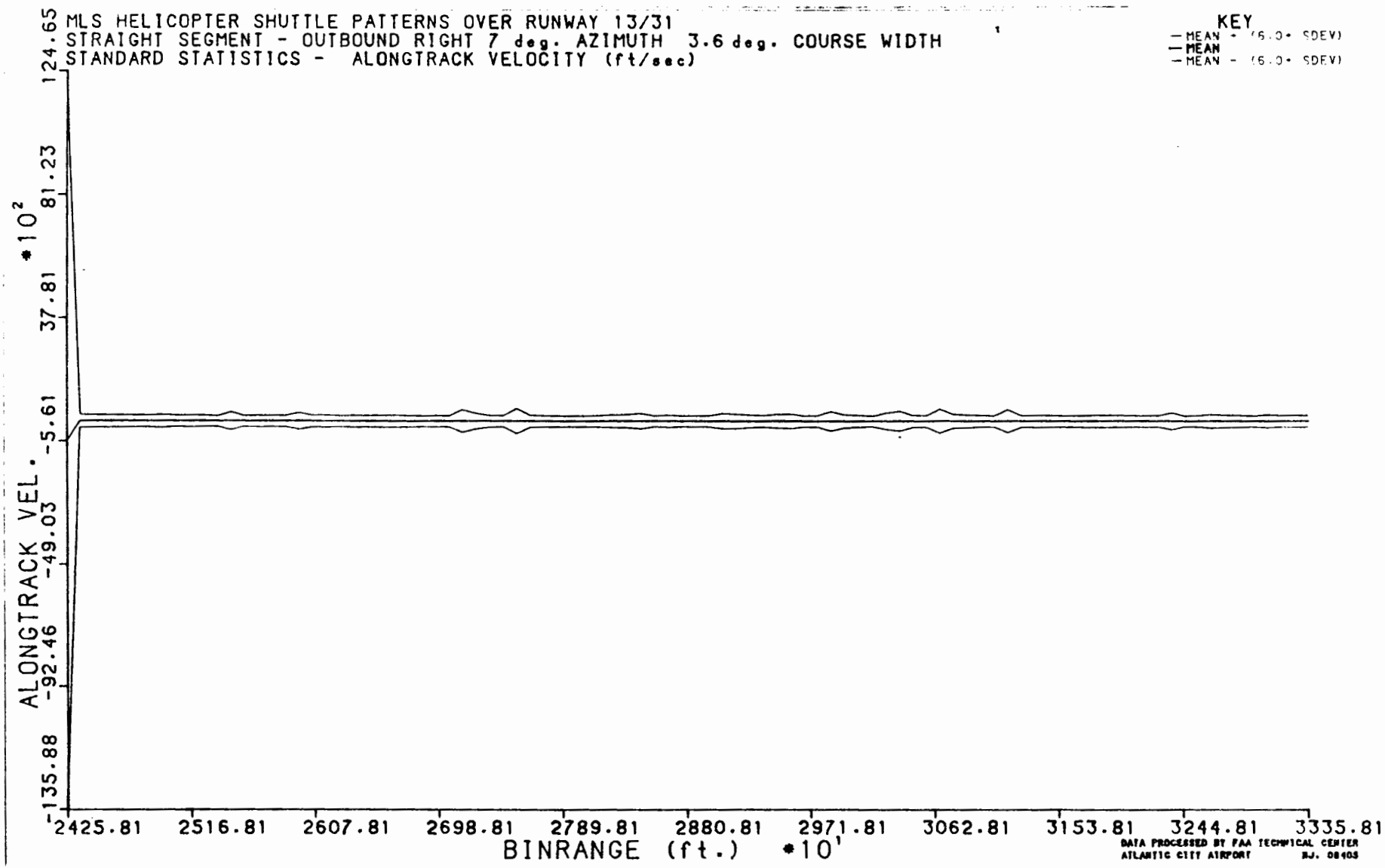

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (deg.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
AZ. FTE (deg.)
291.26
195.84
100.41
4.99
-90.43
-185.86
-281.28
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ

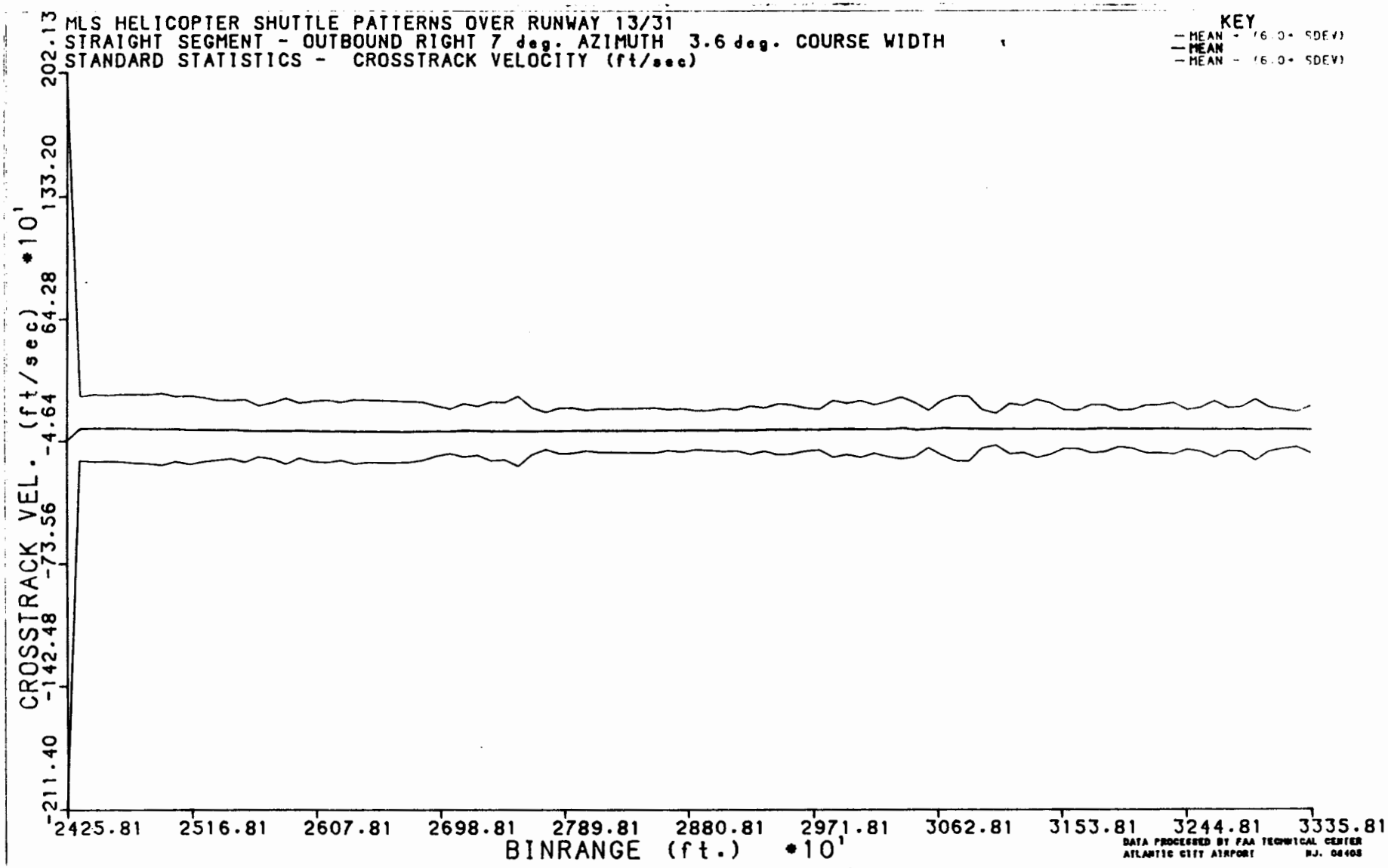

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
AZ. FTE (ft.)
*10
129.27
86.99
44.71
2.43
-39.85
-82.13
-124.41
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. OP405

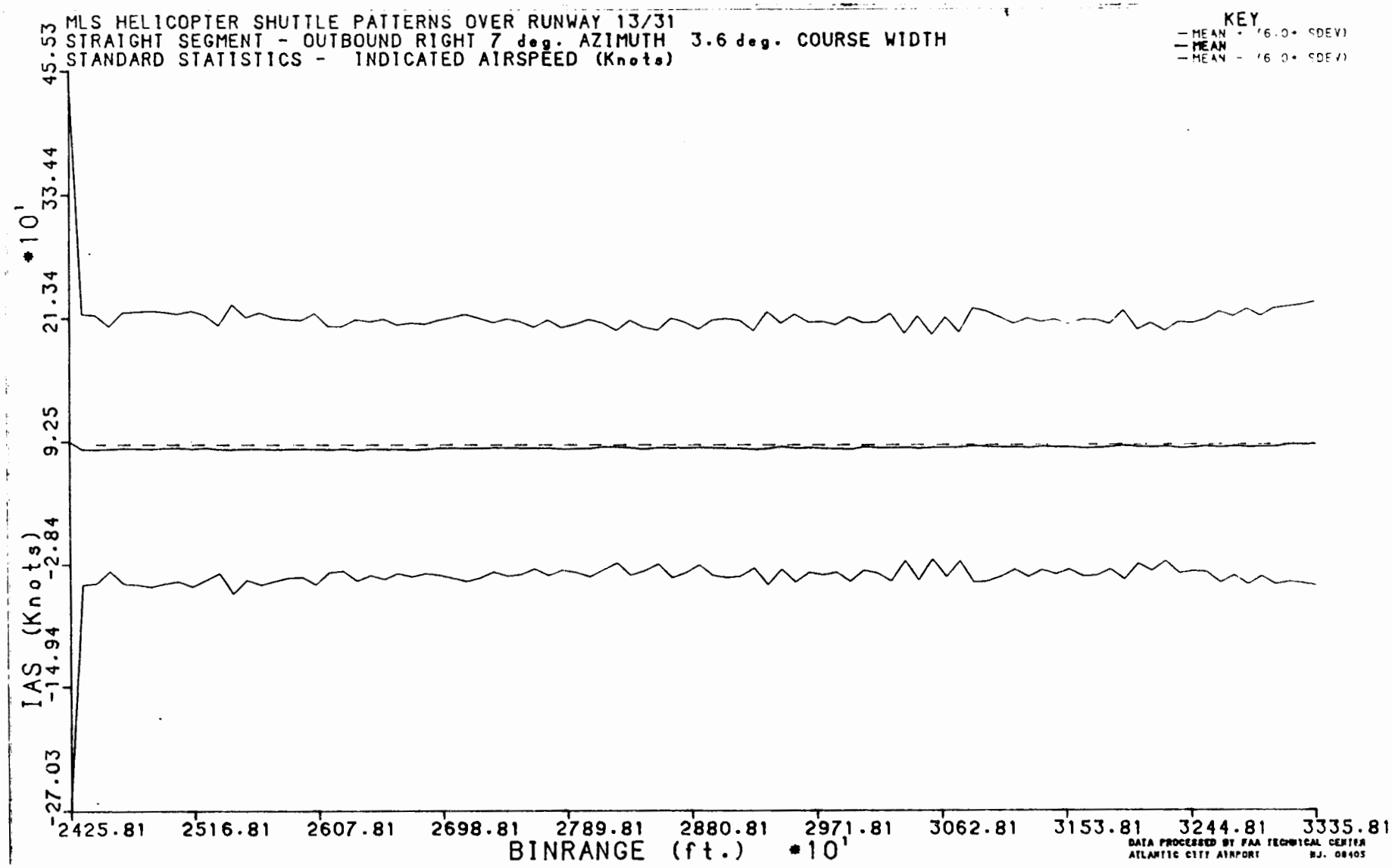

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK ERROR (deg.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
CROSSTRACK ERROR (deg.)
179.61
126.12
72.63
19.15
-34.34
-87.83
-141.32
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10'
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ 08405

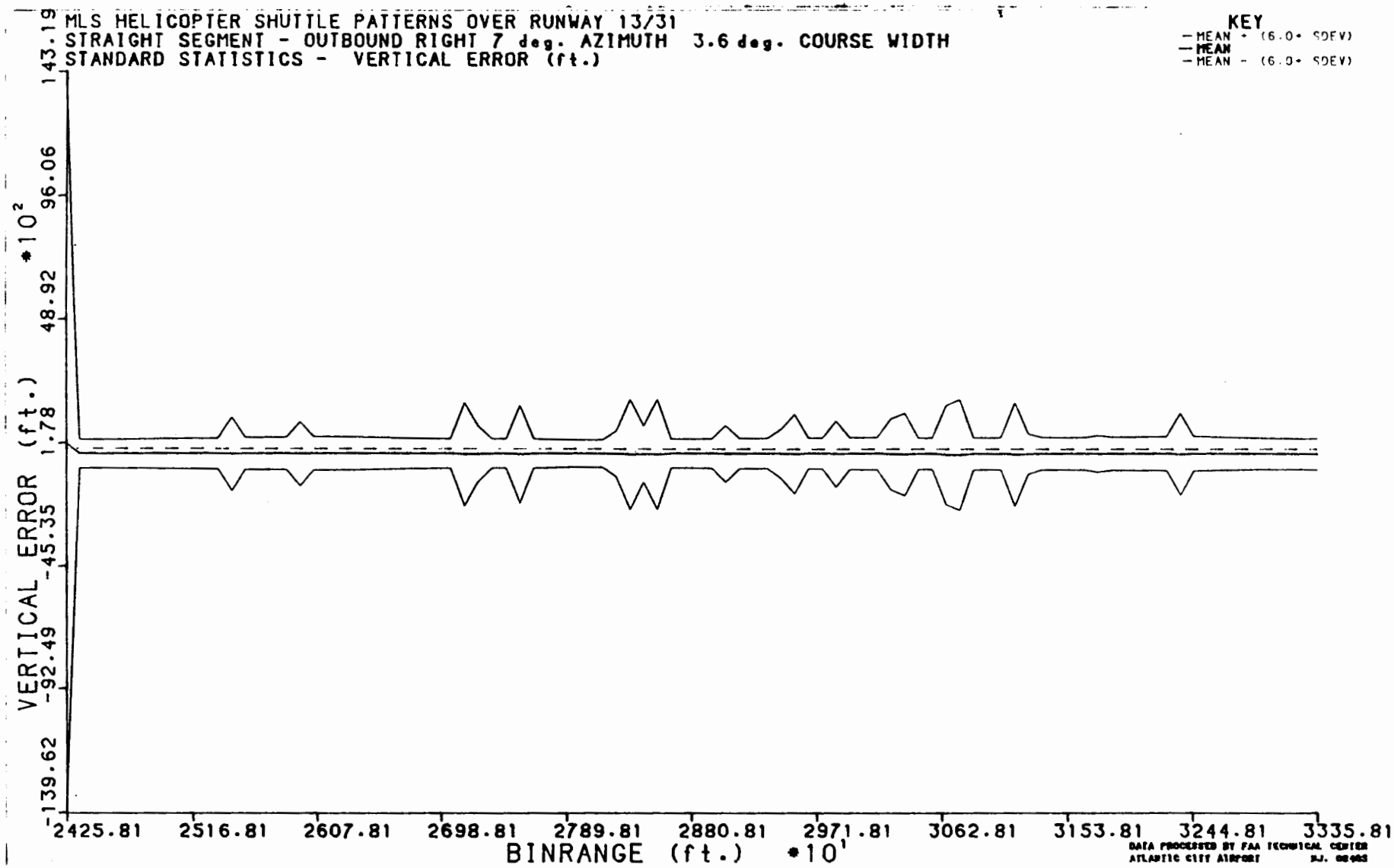

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALTITUDE (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
ALTITUDE (ft.) *10²
103.90
76.98
50.07
23.16
-3.76
-30.67
-57.59
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT

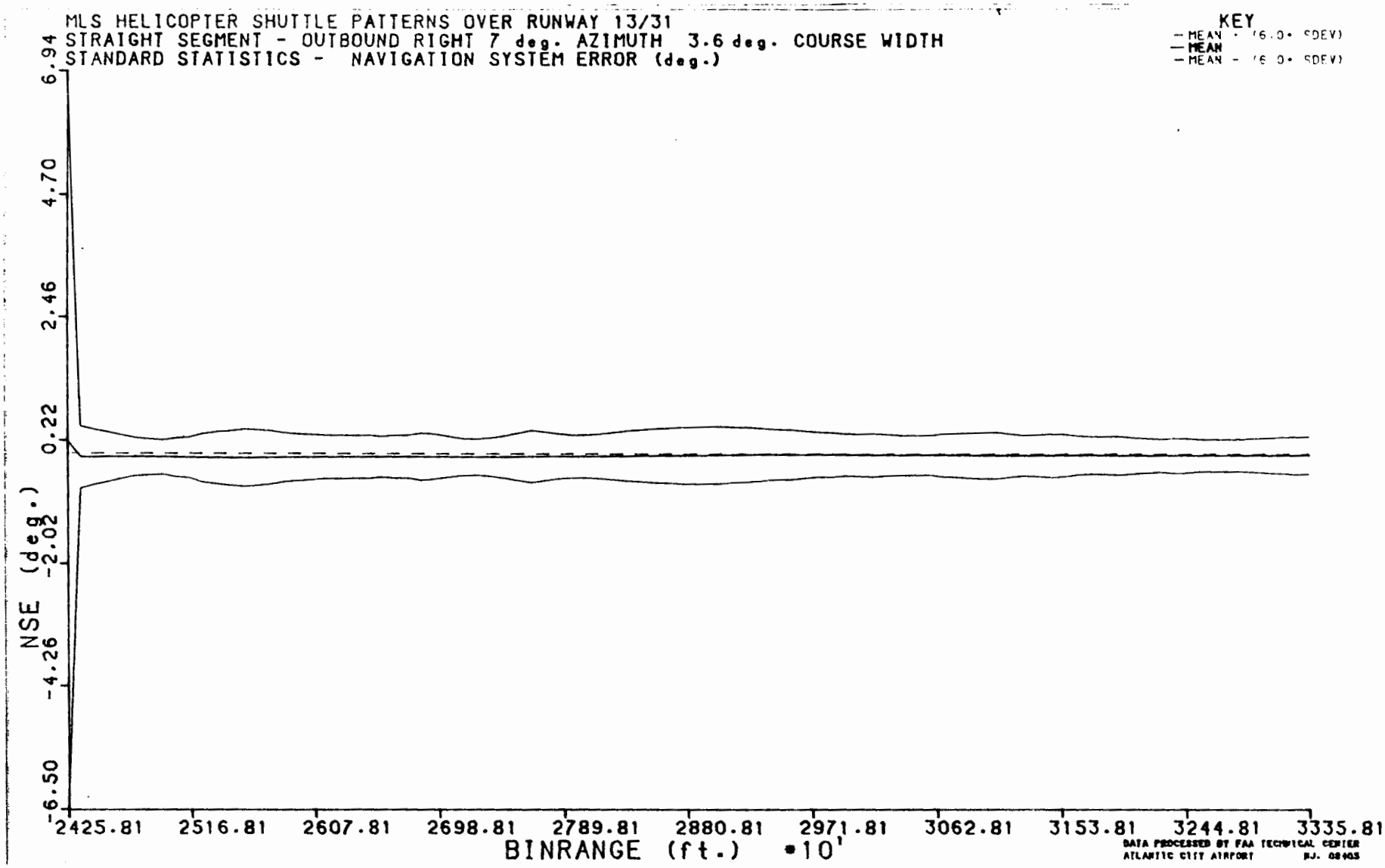

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK ERROR (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
CROSSTRACK ERROR (ft.) *10
105.02
73.74
42.47
11.19
-20.08
-51.36
-82.63
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

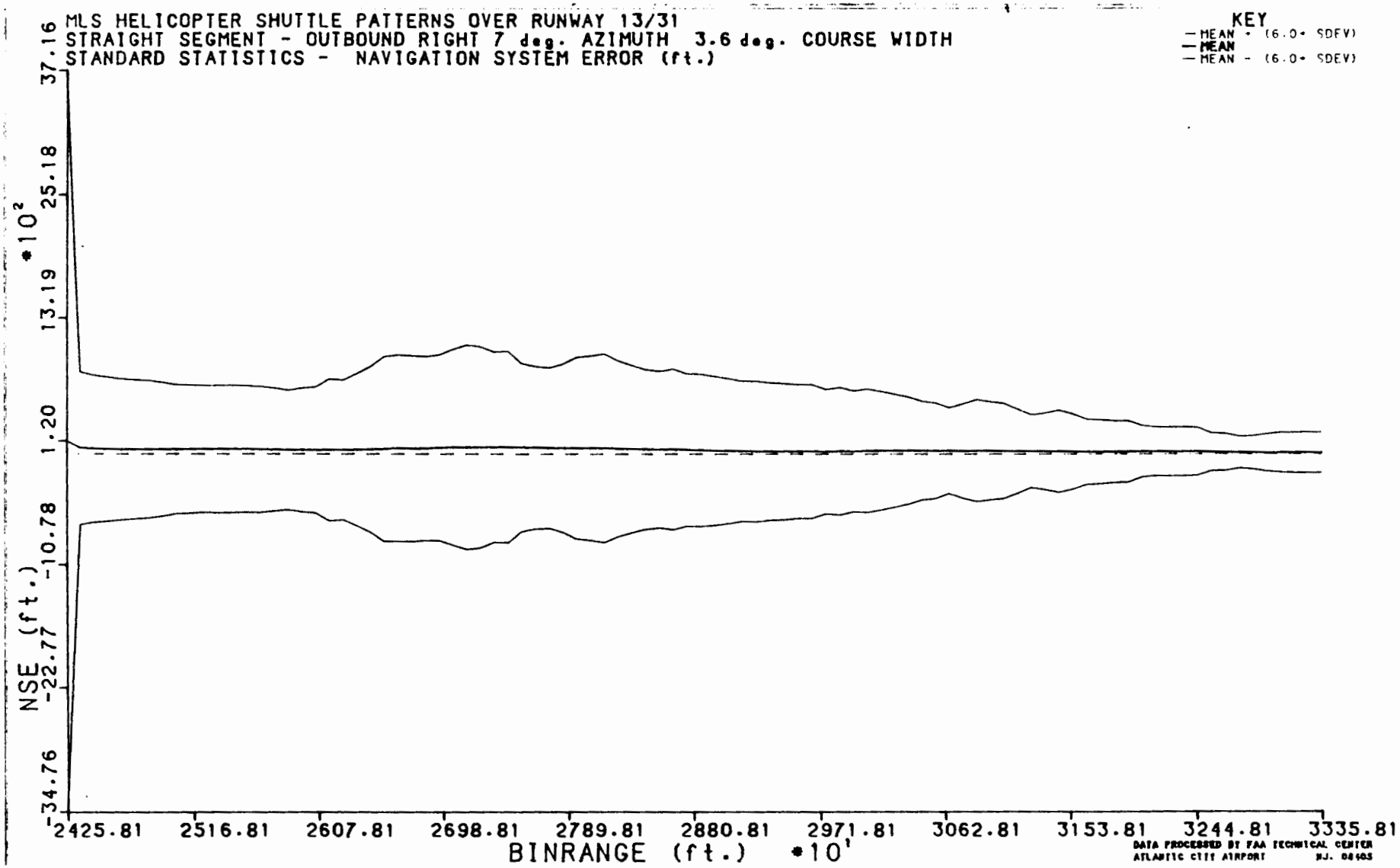

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK VELOCITY (ft/sec)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
ALONGTRACK VEL. *10²
124.65
81.23
37.81
-5.61
-49.03
-92.46
-135.88
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

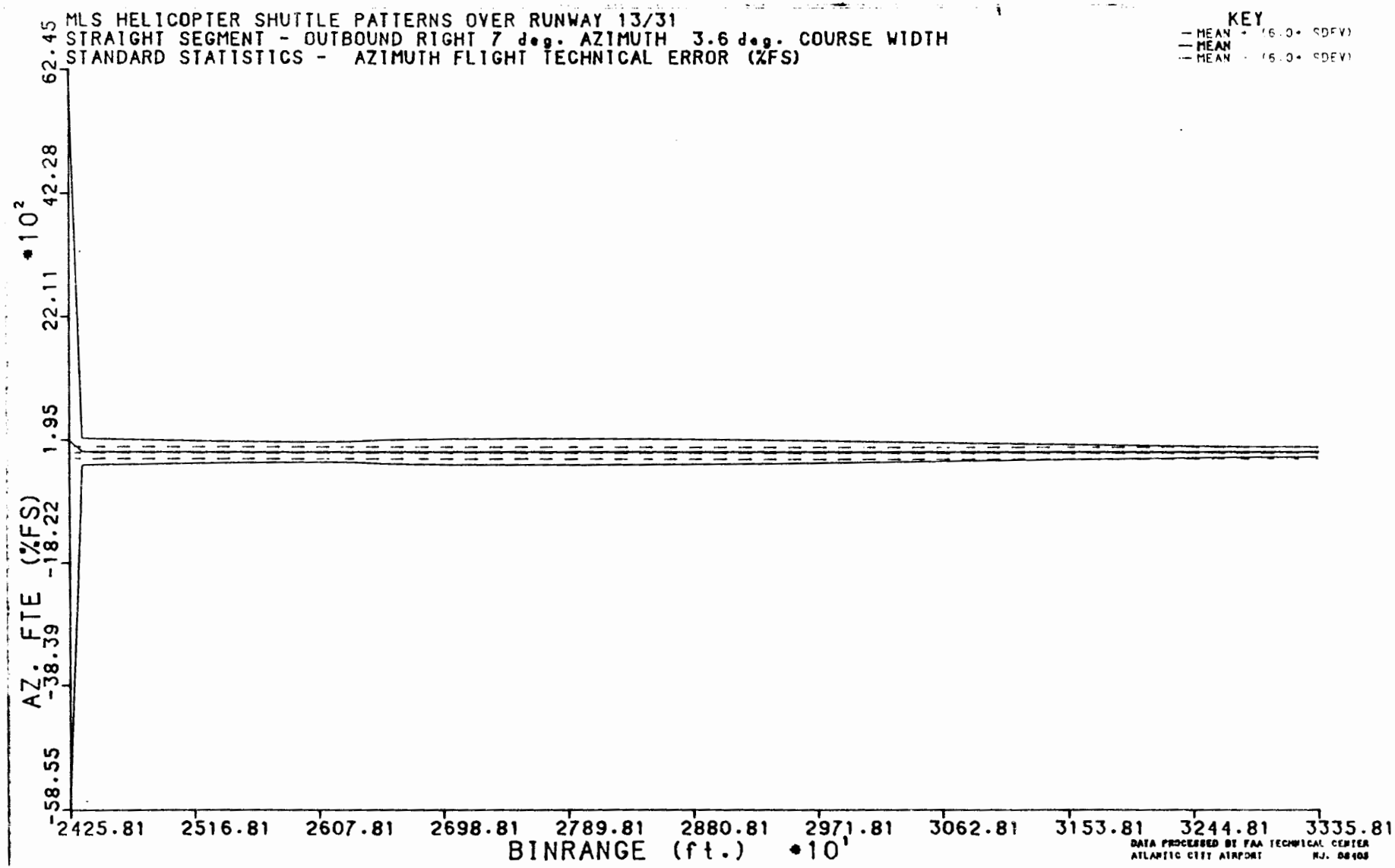

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK VELOCITY (ft/sec)
KEY
MEAN - (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
CROSSTRACK VEL. (ft/sec) *10¹
202.13
133.20
64.28
-4.64
-73.56
-142.48
-211.40
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - INDICATED AIRSPEED (Knots)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
IAS (Knots) *10¹
45.53
33.44
21.34
9.25
-2.84
-14.94
-27.03
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

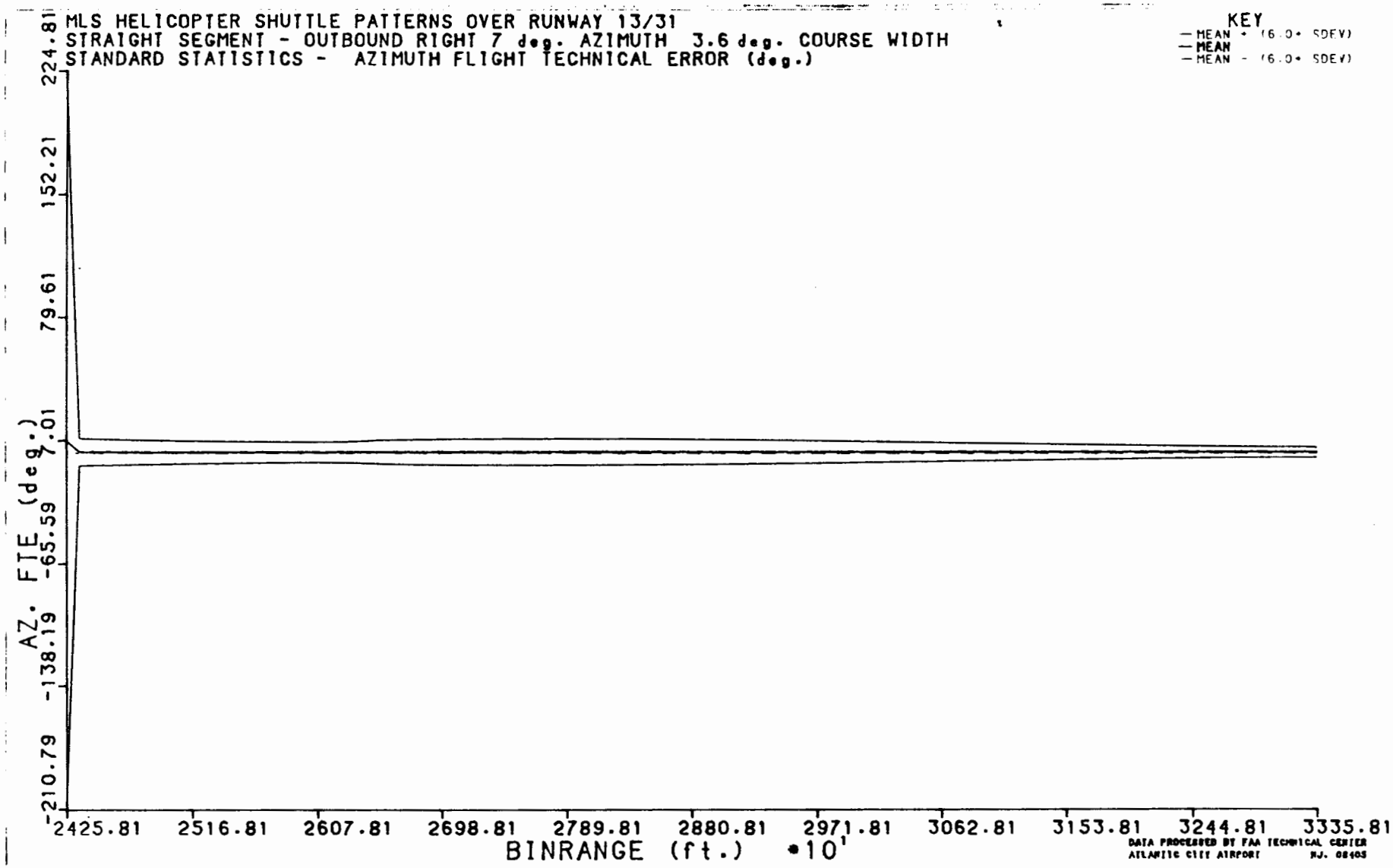

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - VERTICAL ERROR (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
VERTICAL ERROR (ft.) *10²
143.19
96.06
48.92
1.78
-45.35
-92.49
-139.62
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT N.J. 08405

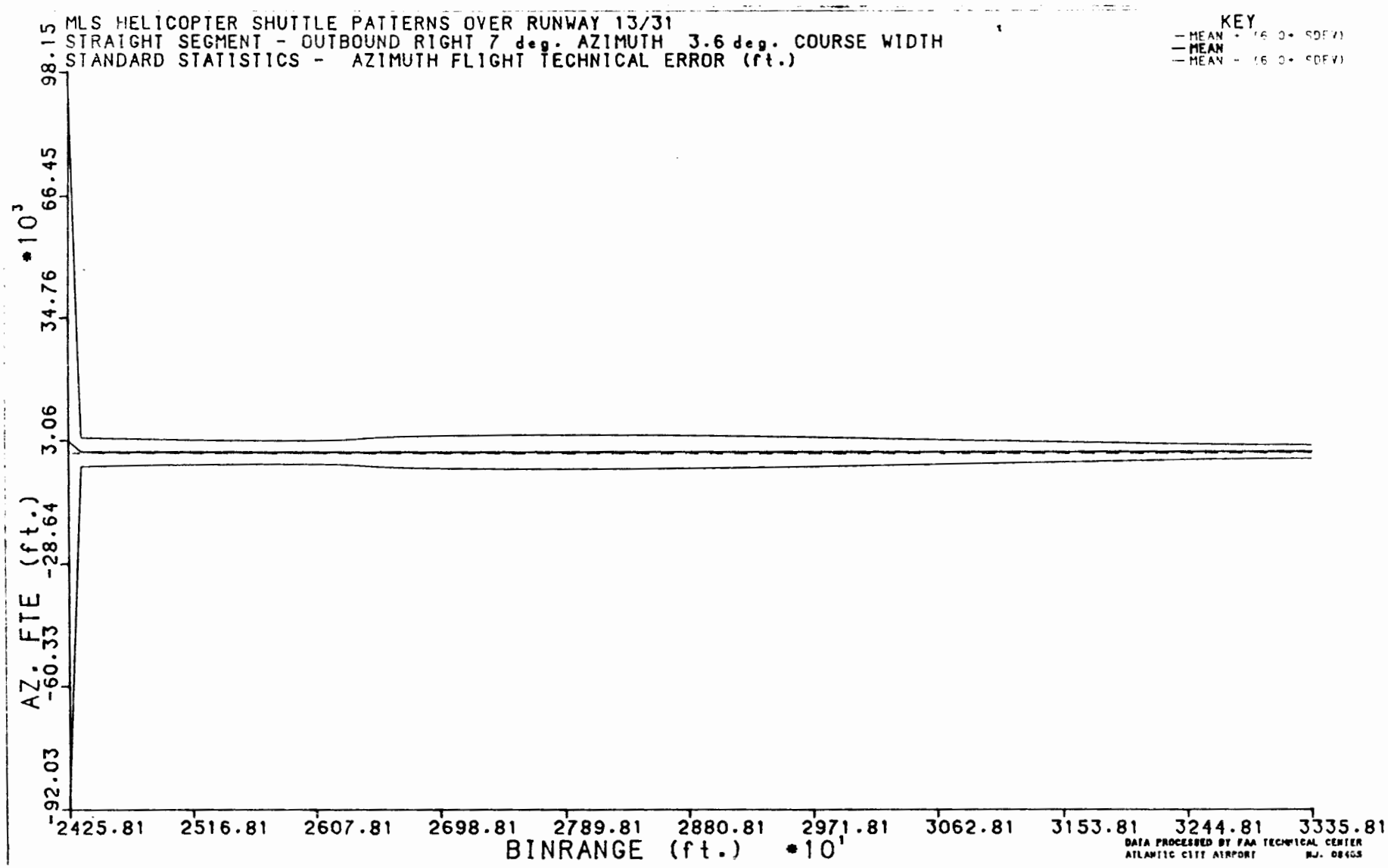

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - NAVIGATION SYSTEM ERROR (deg.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
NSE (deg.)
6.94
4.70
2.46
0.22
-2.02
-4.26
-6.50
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - NAVIGATION SYSTEM ERROR (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
NSE (ft.) *10²
37.16
25.18
13.19
1.20
-10.78
-22.77
-34.76
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

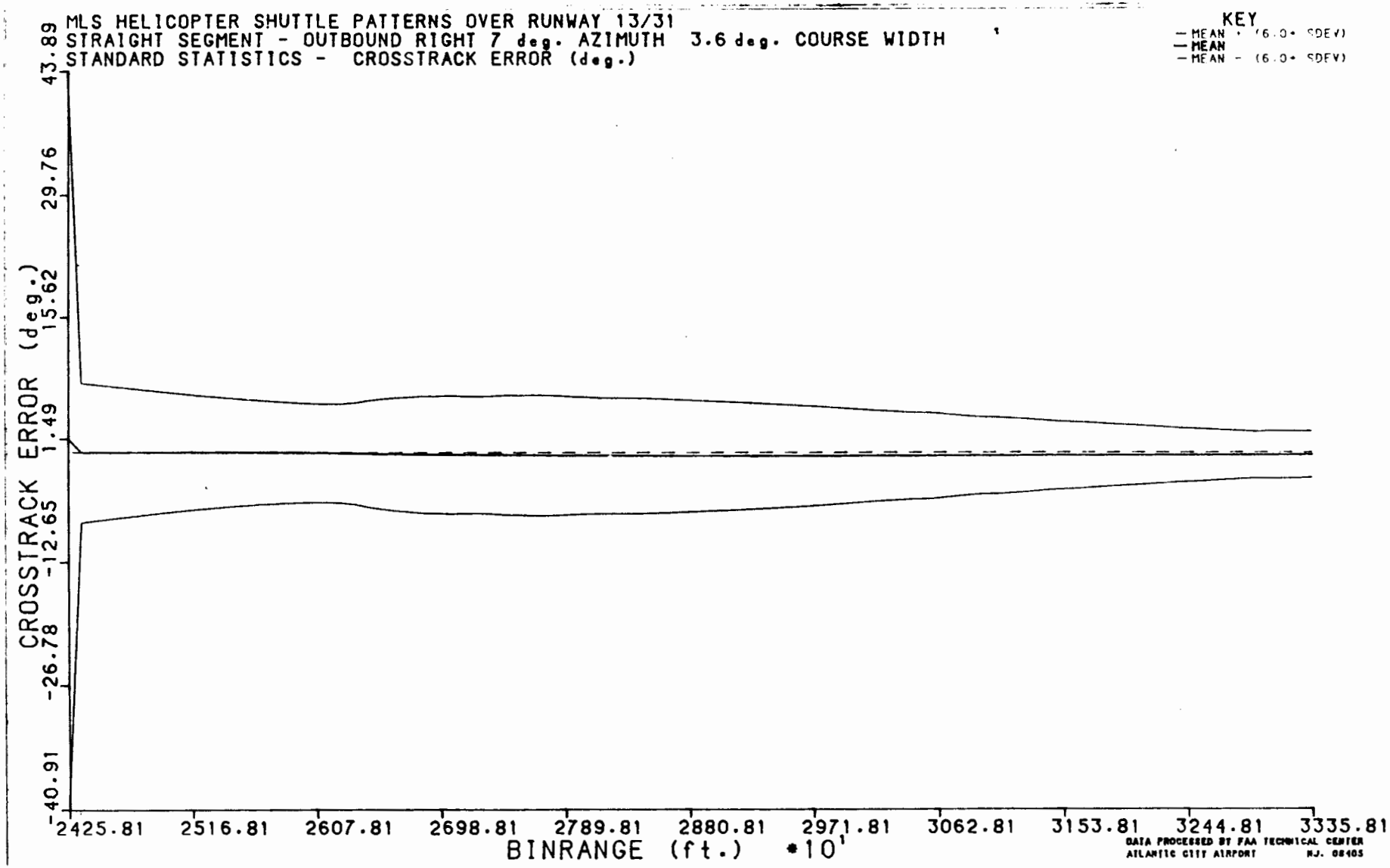

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (%FS)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
AZ. FTE (%FS)
*10²
62.45
42.28
22.11
1.95
-18.22
-38.39
-58.55
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

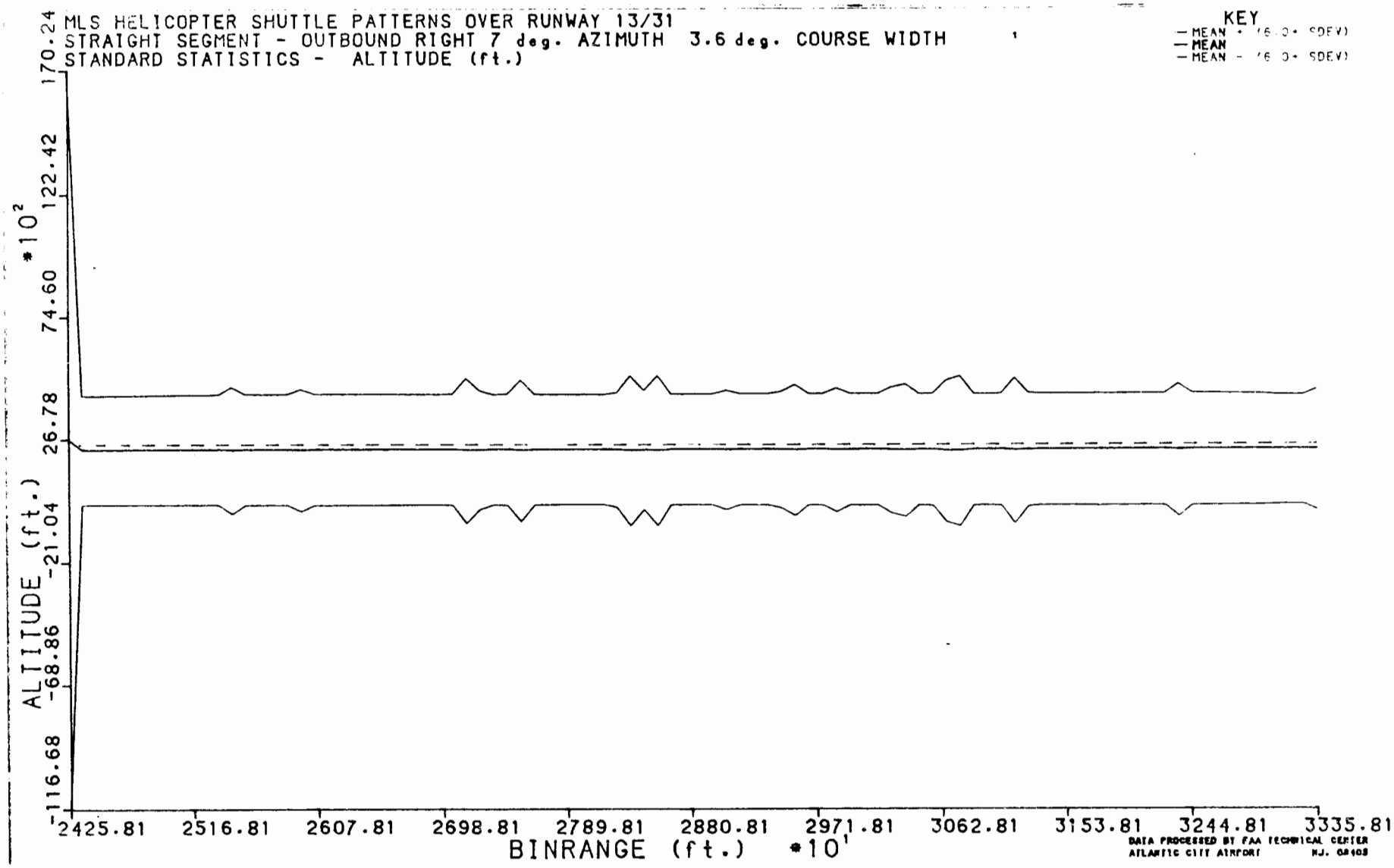
MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (deg.)




MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - AZIMUTH FLIGHT TECHNICAL ERROR (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
AZ. FTE (ft.) *10³
98.15
66.45
34.76
3.06
-28.64
-60.33
-92.03
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK ERROR (deg.)




MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALTITUDE (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
ALTITUDE (ft.) *10²
170.24
122.42
74.60
26.78
-21.04
-68.86
-116.68
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
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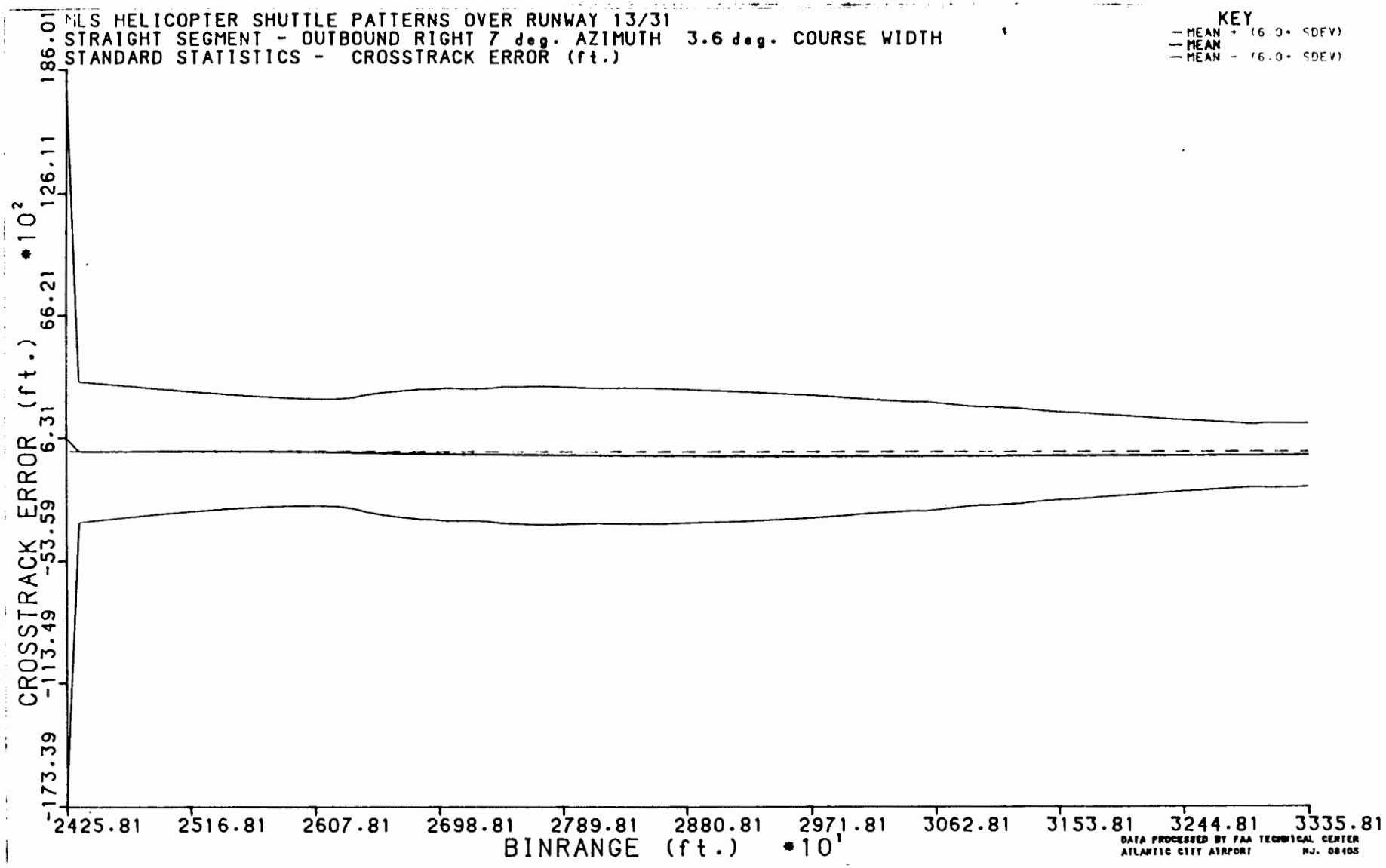
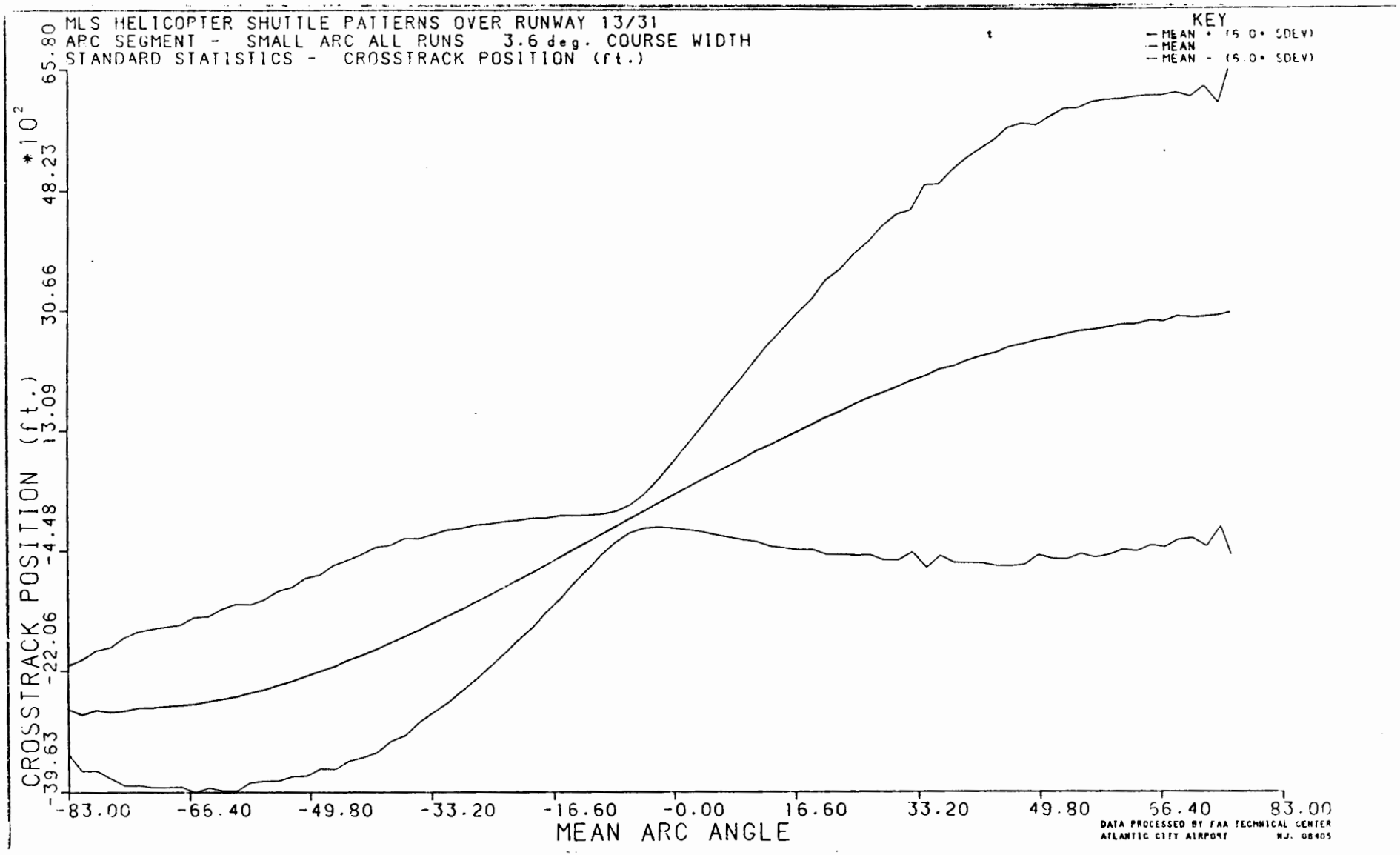
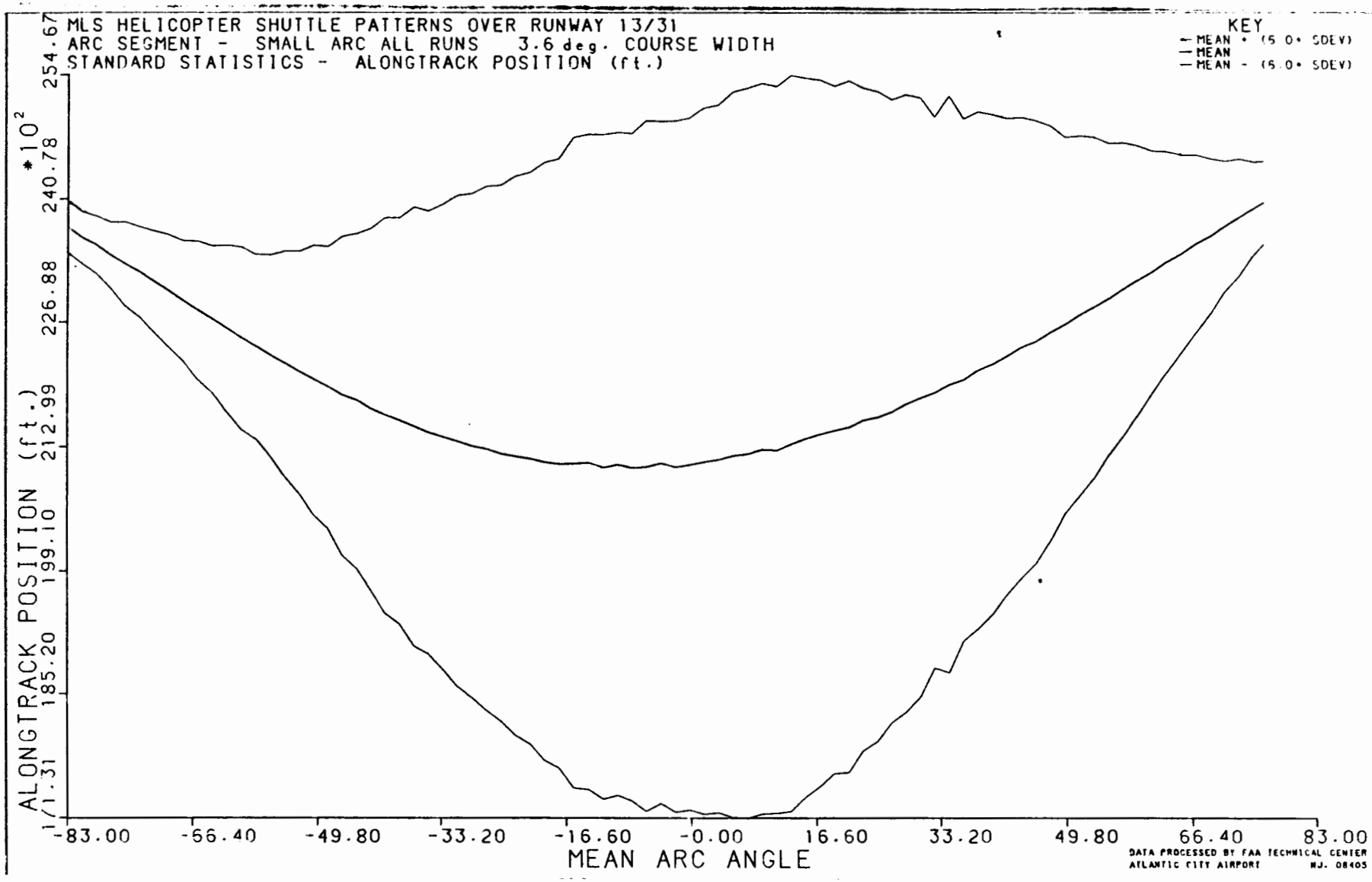
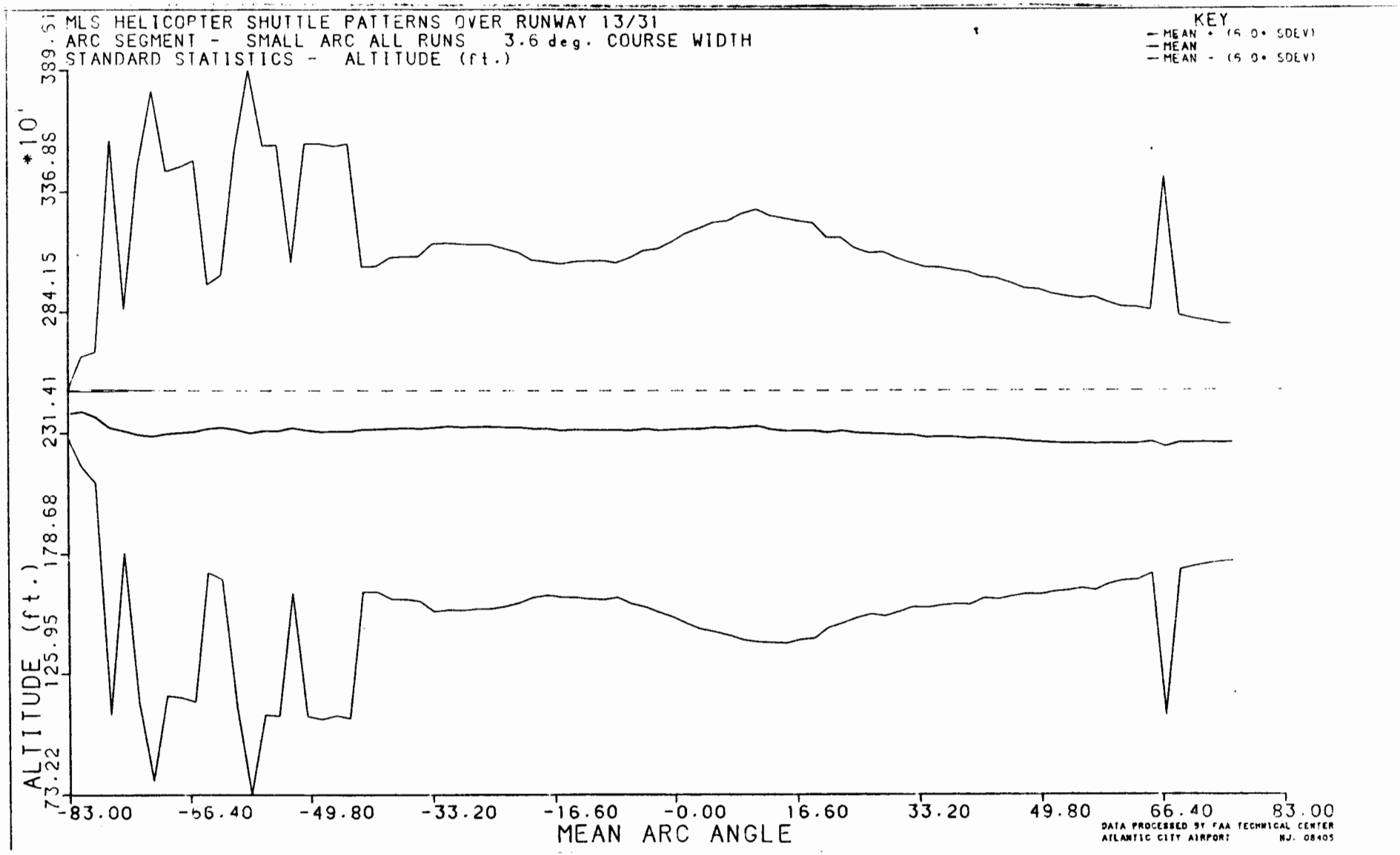

NLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
STRAIGHT SEGMENT - OUTBOUND RIGHT 7 deg. AZIMUTH 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK ERROR (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
CROSSTRACK ERROR (ft.) *10²
186.01
126.11
66.21
6.31
-53.59
-113.49
-173.39
2425.81
2516.81
2607.81
2698.81
2789.81
2880.81
2971.81
3062.81
3153.81
3244.81
3335.81
BINRANGE (ft.) *10¹
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

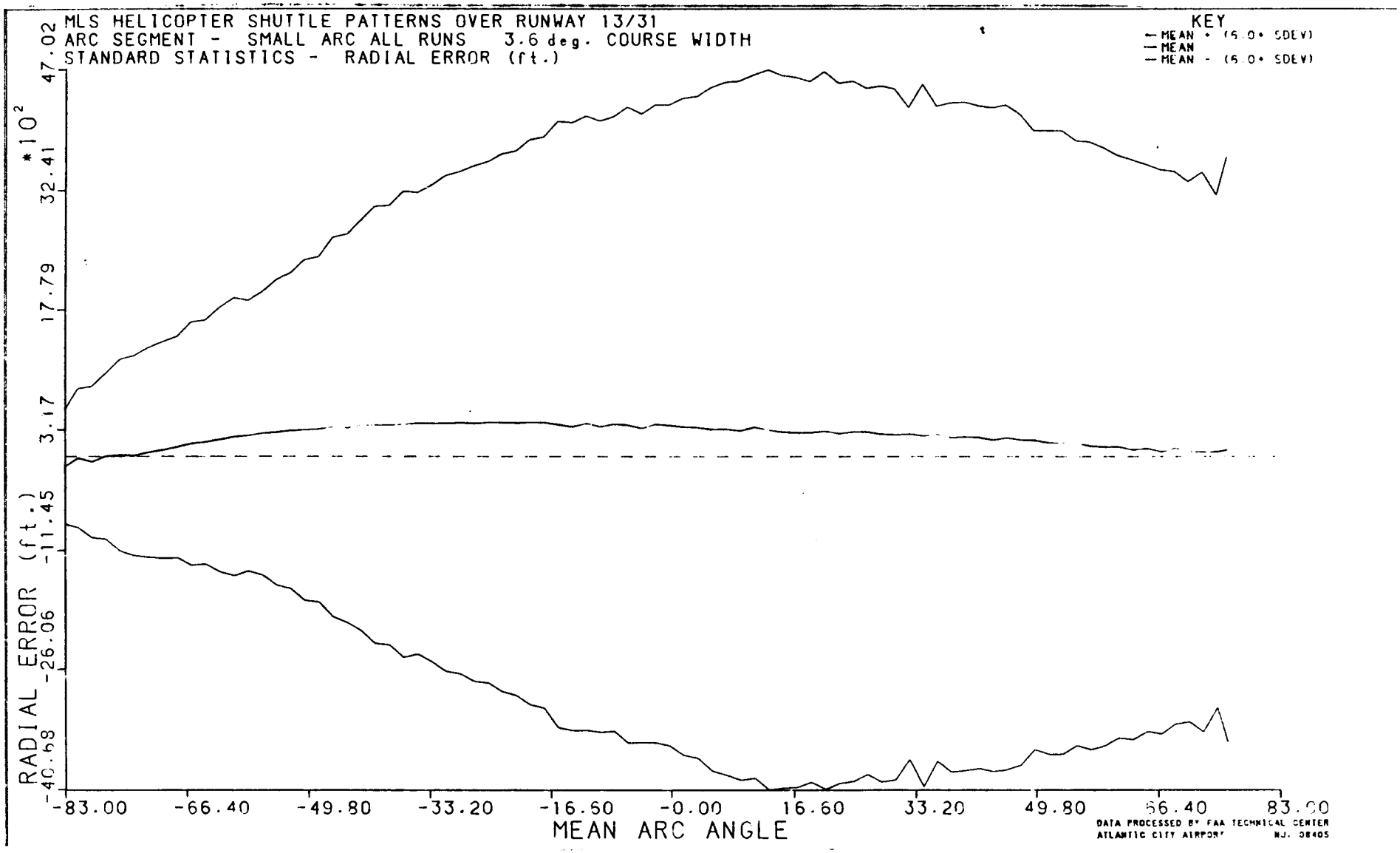
APPENDIX I

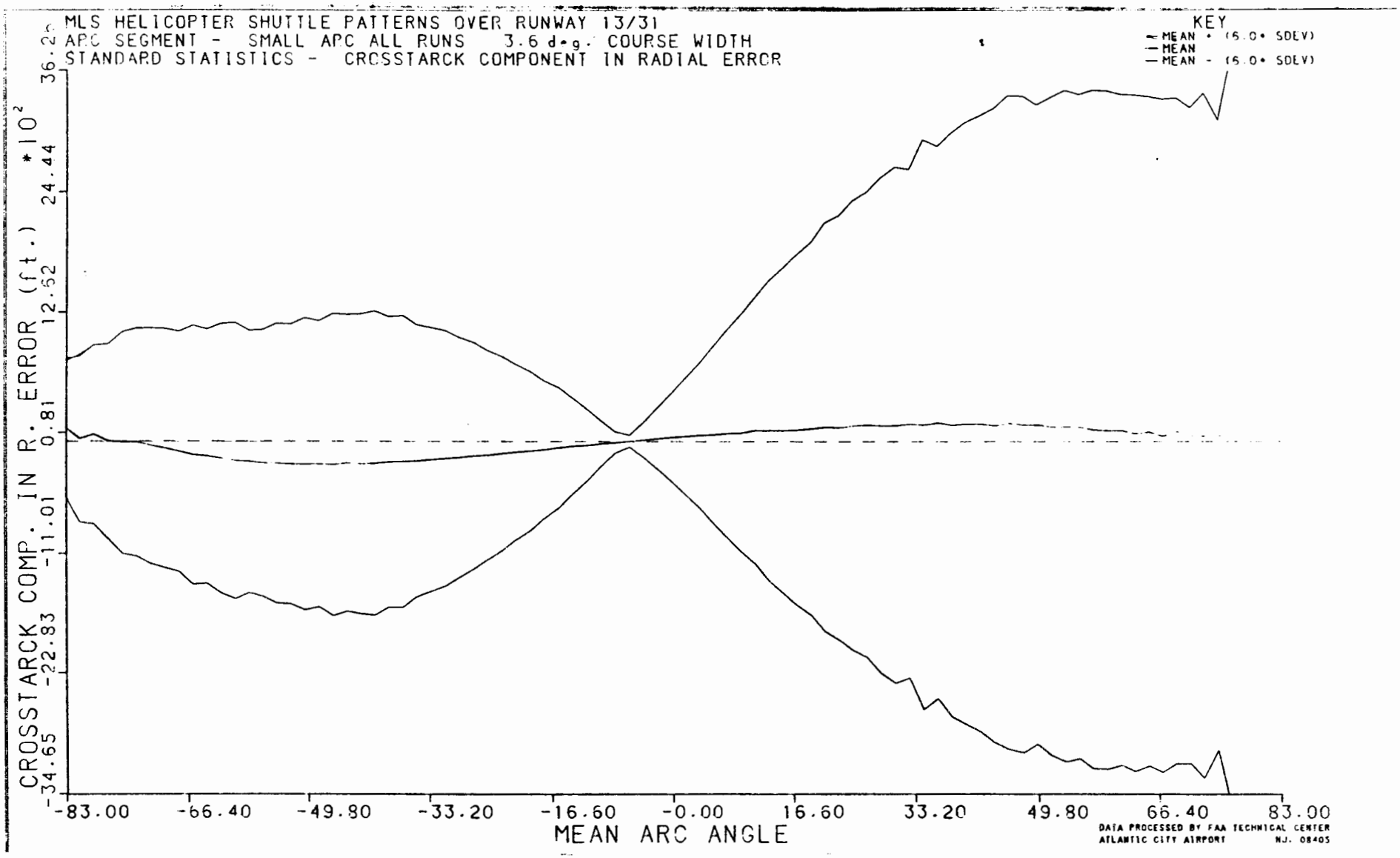
99.999999 PERCENT ISOPROBABILITY PLOTS FOR 3.6° AND 2.0° SMALL ARC SEGMENTS

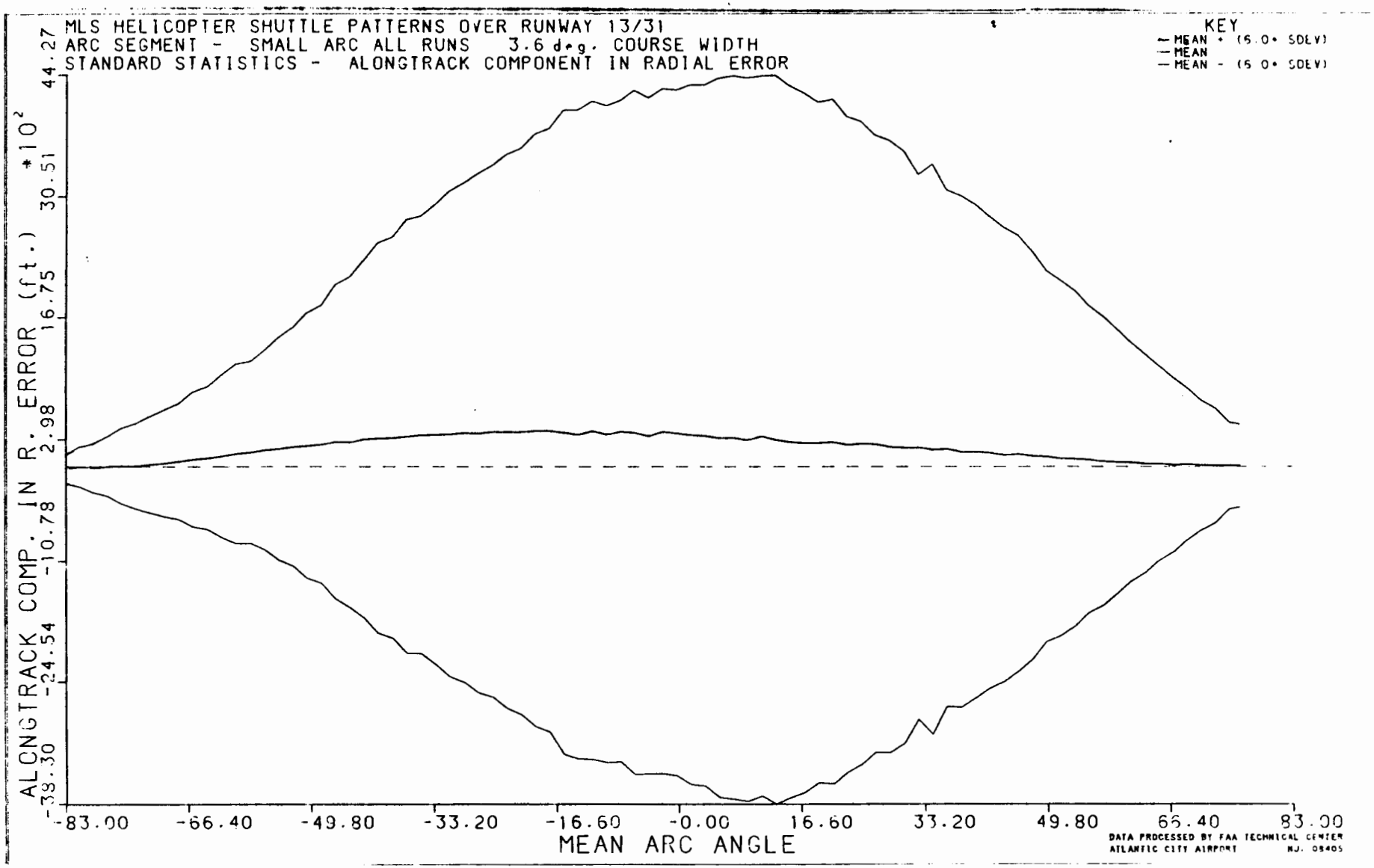

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK POSITION (ft.)
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
CROSSTRACK POSITION (ft.) *10^2
65.80
48.23
30.66
13.09
-4.48
-22.06
-39.63
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

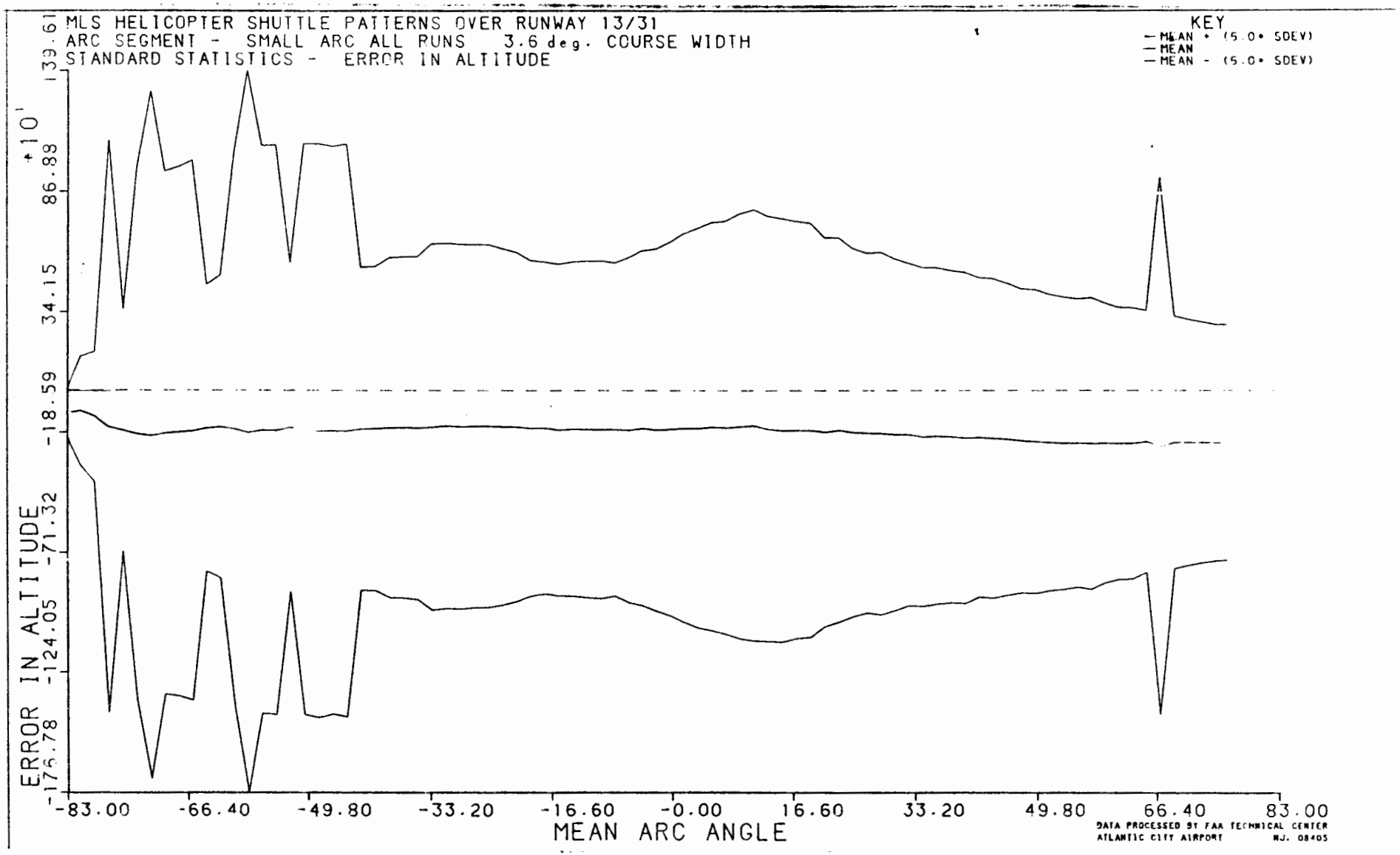

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK POSITION (ft.)
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
ALONGTRACK POSITION (ft.)
*10^2
254.67
240.78
226.88
212.99
199.10
185.20
171.31
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

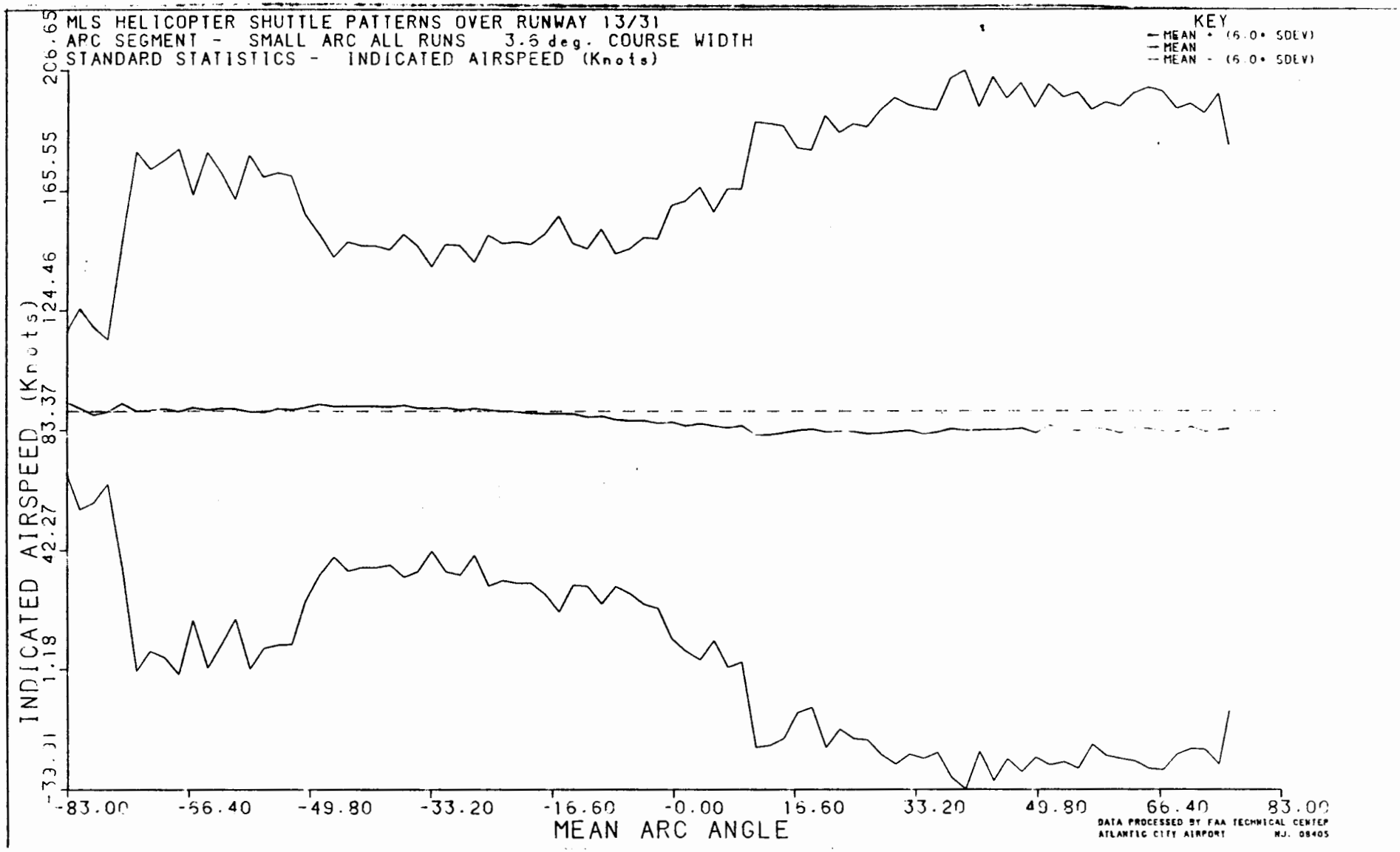

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALTITUDE (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
ALTITUDE (ft.)
*10'
389.51
336.85
284.15
231.41
178.68
125.95
73.22
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

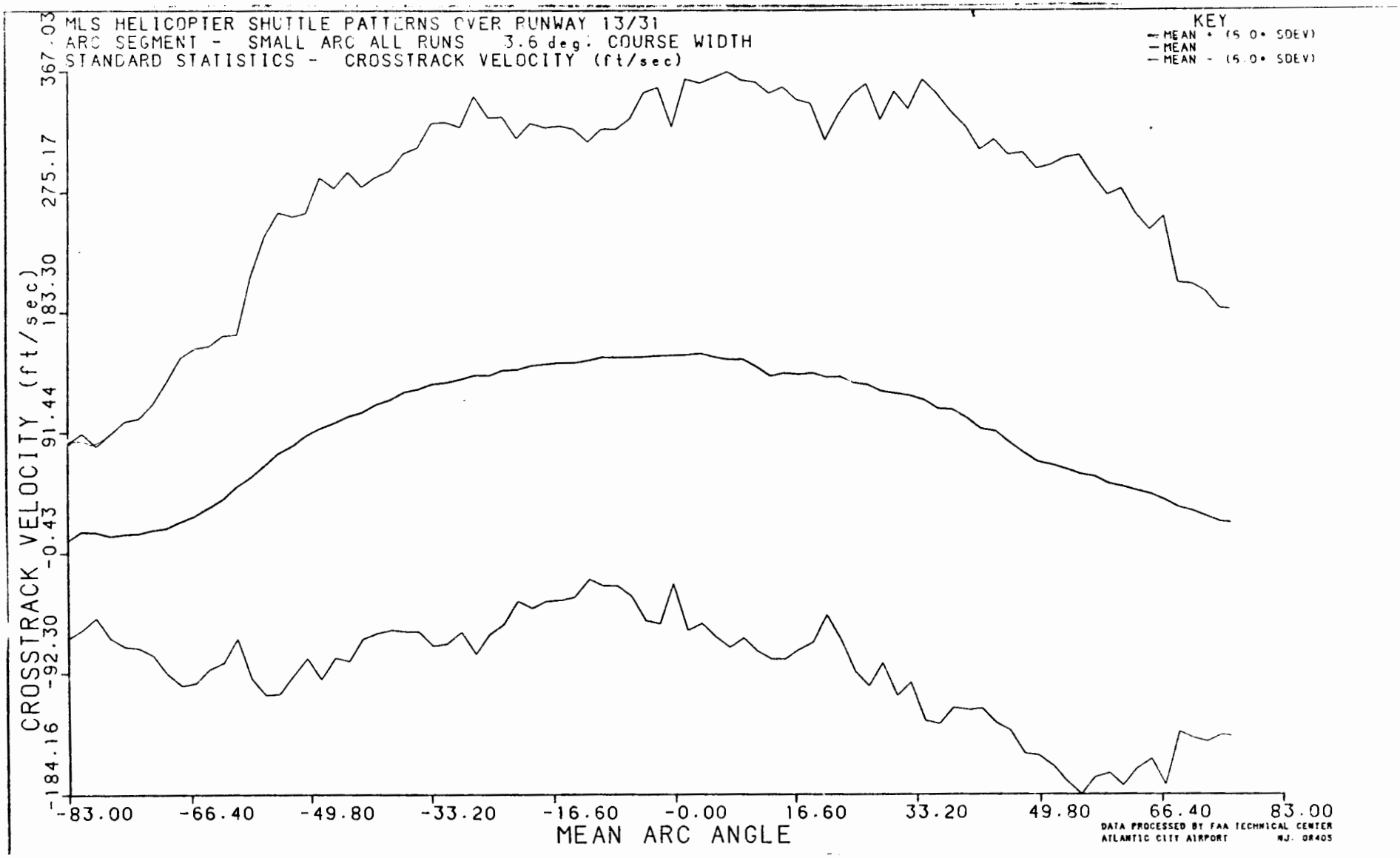

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - RADIAL ERROR (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
RADIAL ERROR (ft.) *10^2
47.02
32.41
17.79
3.17
-11.45
-26.06
-40.68
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

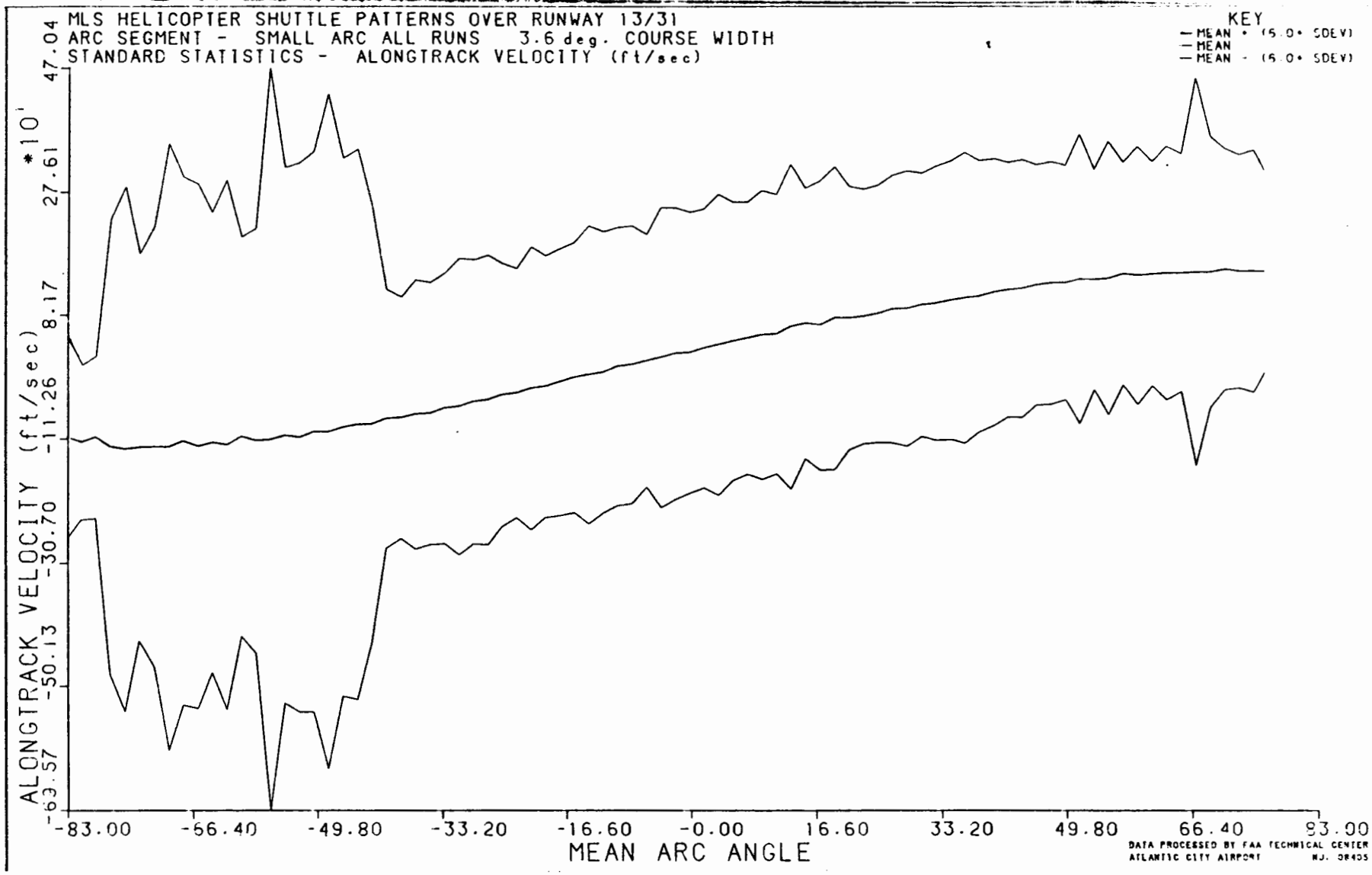

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTARCK COMPONENT IN RADIAL ERROR
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
CROSSTARCK COMP. IN R. ERROR (ft.) *10²
36.26
24.44
12.62
0.81
-11.01
-22.83
-34.65
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

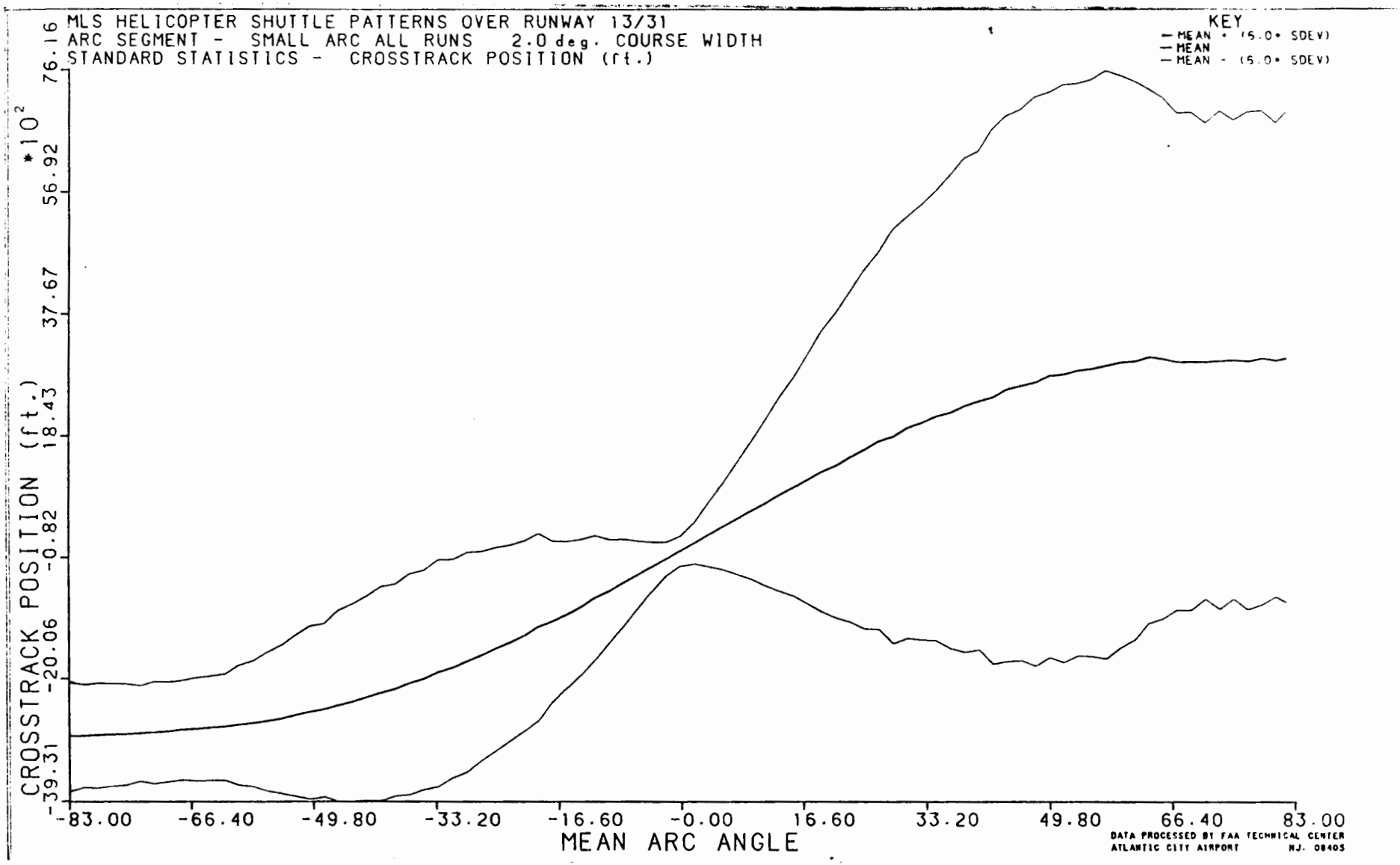

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK COMPONENT IN RADIAL ERROR
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
ALONGTRACK COMP. IN R. ERROR (ft.) *10²
44.27
30.51
16.75
2.98
-10.78
-24.54
-38.30
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

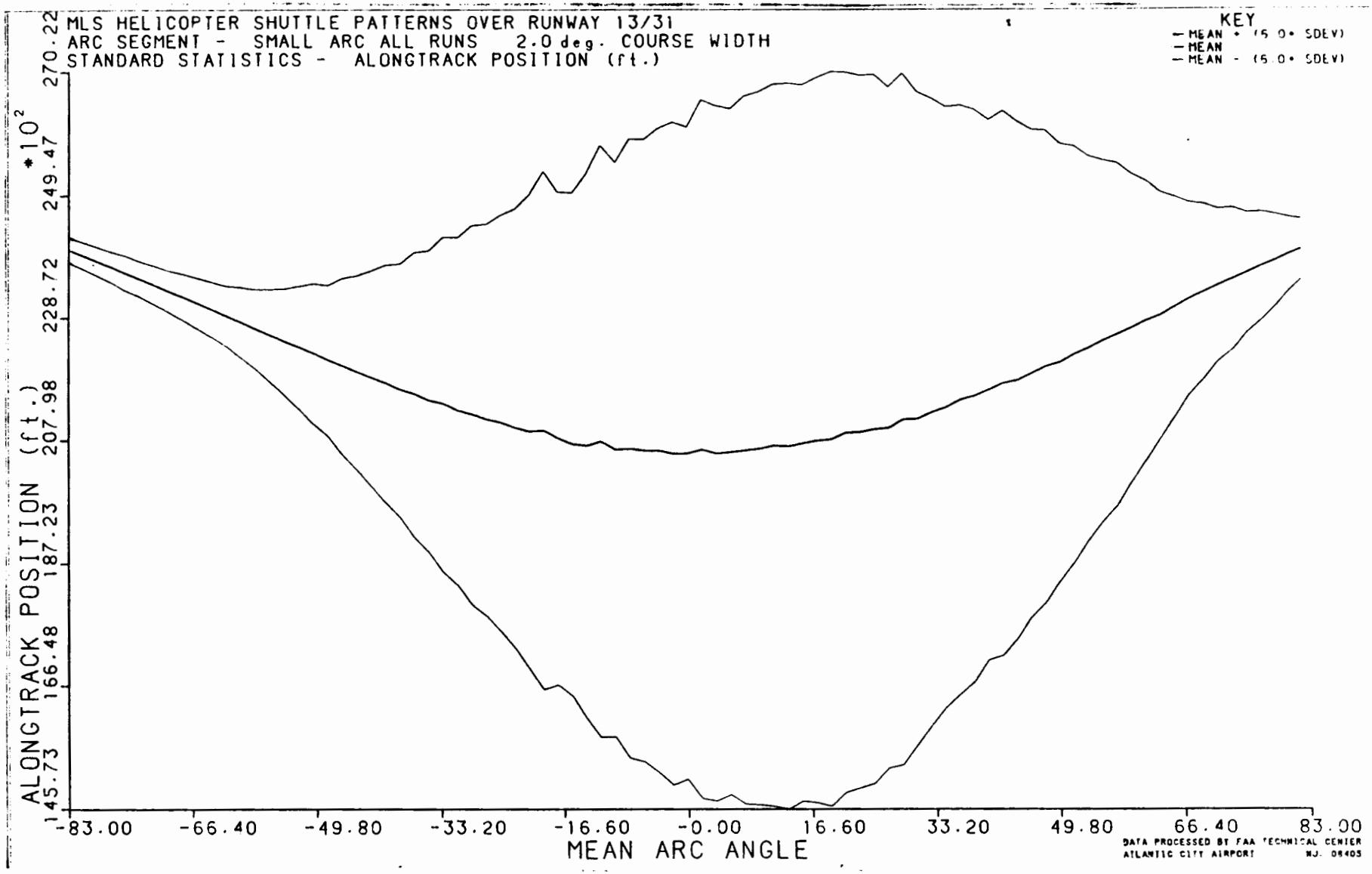

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ERROR IN ALTITUDE
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
*10¹
139.61
86.88
34.15
-18.59
-71.32
-124.05
-176.78
ERROR IN ALTITUDE
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - INDICATED AIRSPEED (Knots)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
INDICATED AIRSPEED (Knots)
206.65
165.55
124.46
83.37
42.27
1.18
-33.91
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK VELOCITY (ft/sec)
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
CROSSTRACK VELOCITY (ft/sec)
367.03
275.17
183.30
91.44
-0.43
-92.30
-184.16
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK VELOCITY (ft/sec)
KEY
— MEAN + (5.0* SDEV)
— MEAN
— MEAN - (5.0* SDEV)
ALONGTRACK VELOCITY (ft/sec) *10¹
47.04
27.61
8.17
-11.26
-30.70
-50.13
-69.57
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK POSITION (ft.)
KEY
— MEAN + (5.0* SDEV)
— MEAN
— MEAN - (5.0* SDEV)
CROSSTRACK POSITION (ft.) *10²
76.16
56.92
37.67
18.43
-0.82
-20.06
-39.31
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK POSITION (ft.)
KEY
— MEAN + (5.0* SDEV)
— MEAN
— MEAN - (5.0* SDEV)
ALONGTRACK POSITION (ft.)
*10^2
270.22
249.47
228.72
207.98
187.23
166.48
145.73
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
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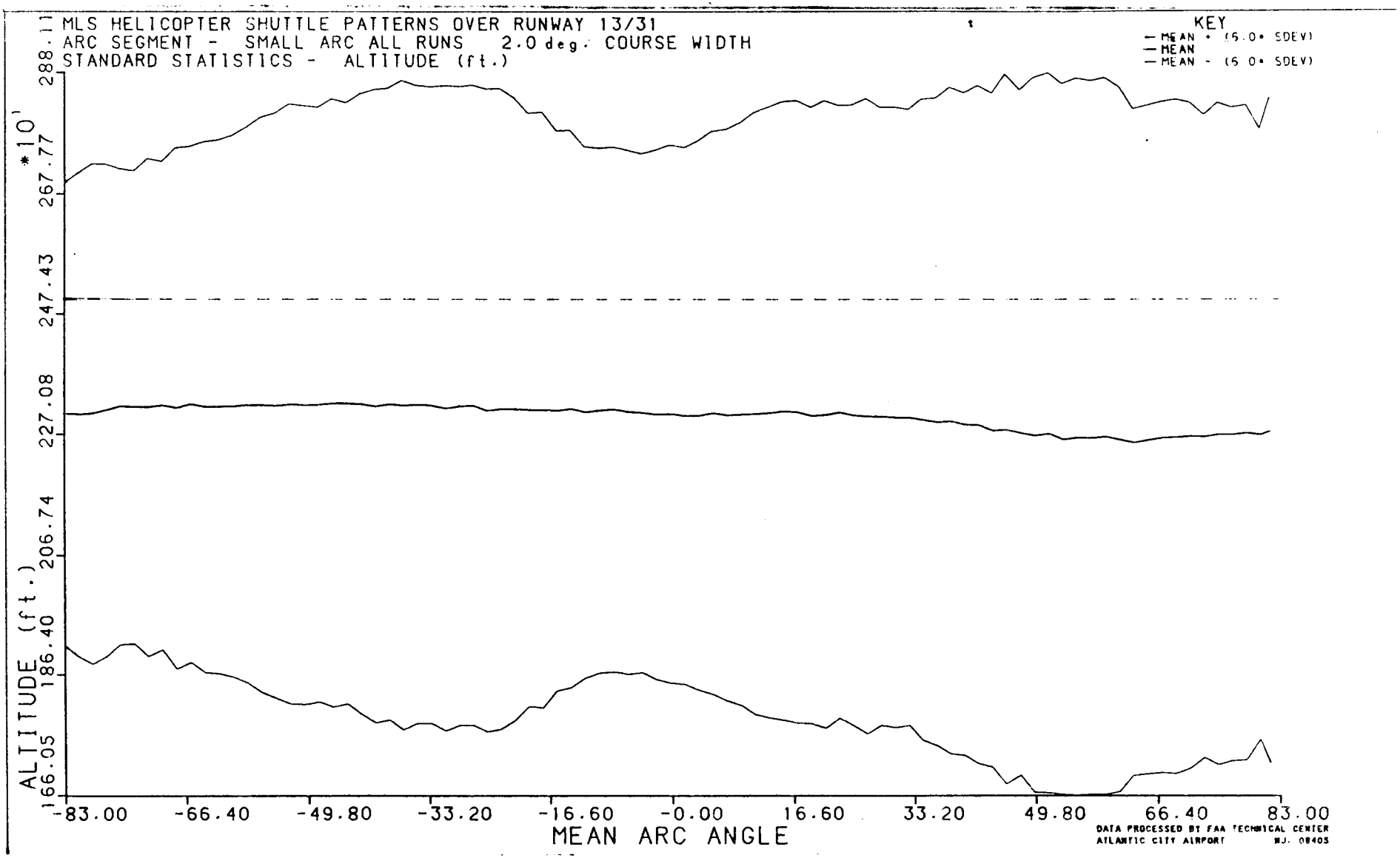
MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALTITUDE (ft.)
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
ALTITUDE (ft.)
*10¹
288.11
267.77
247.43
227.08
206.74
186.40
166.05
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
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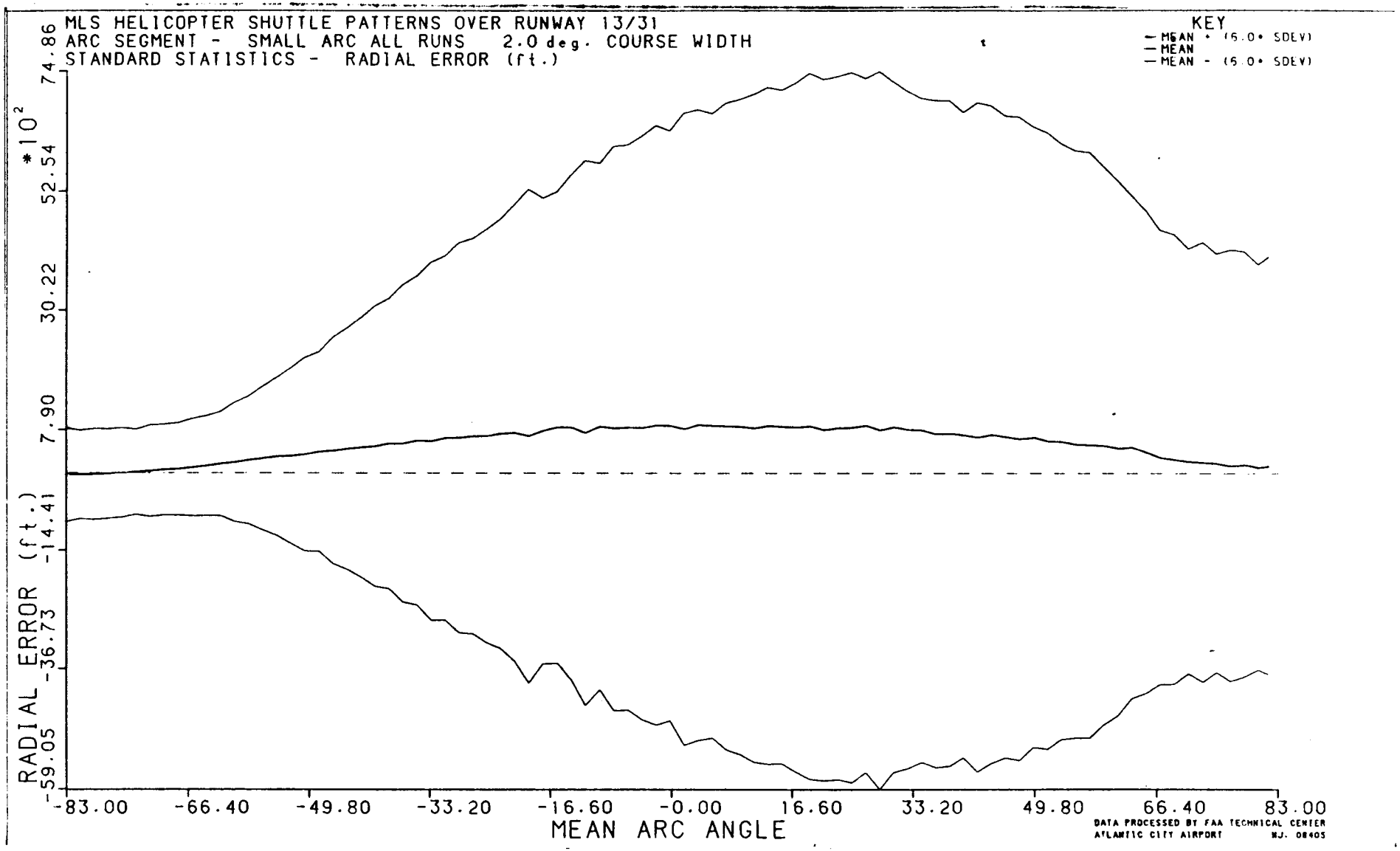
MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - RADIAL ERROR (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
*10²
74.86
52.54
30.22
7.90
-14.41
-36.73
-59.05
RADIAL ERROR (ft.)
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
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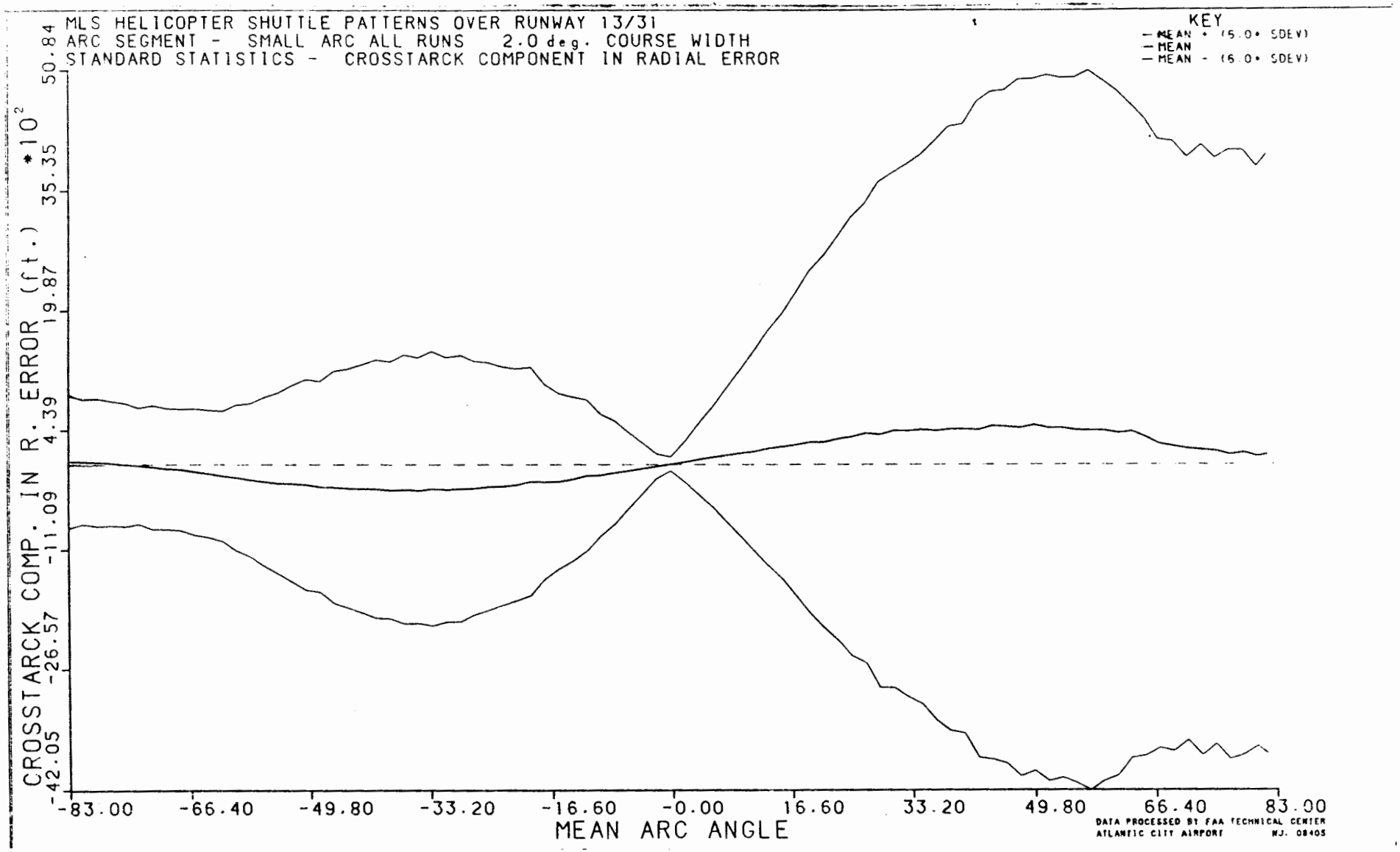
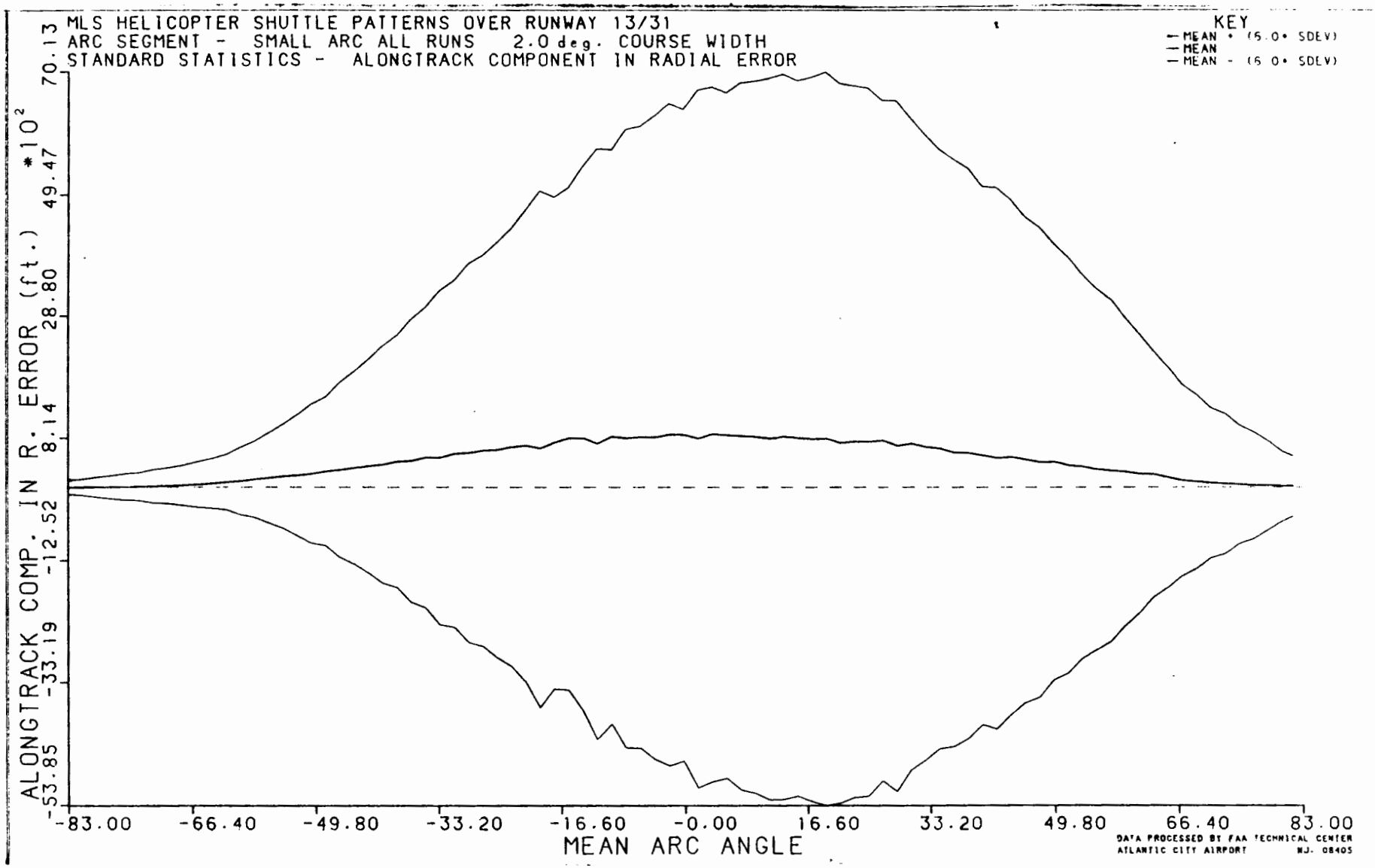
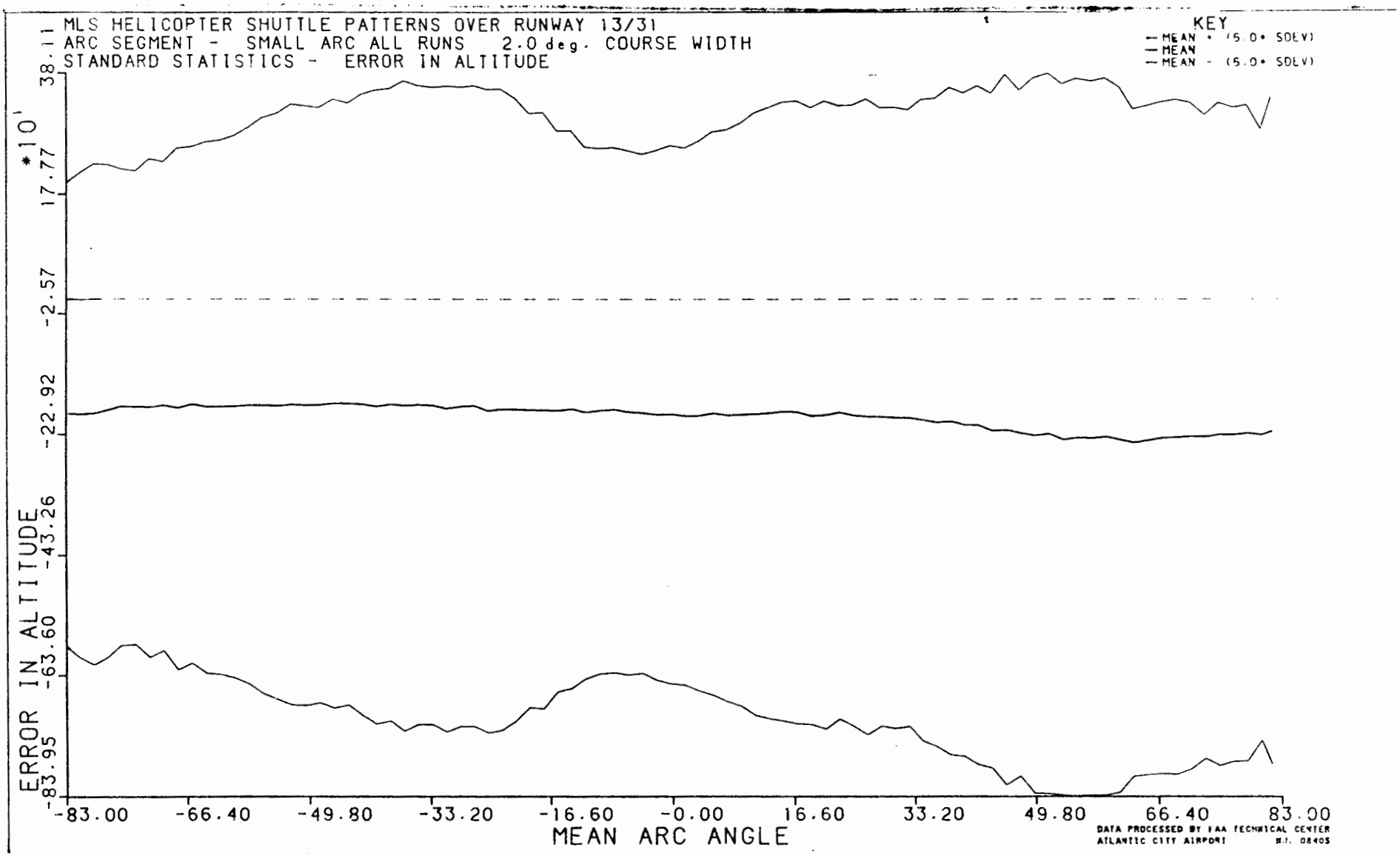
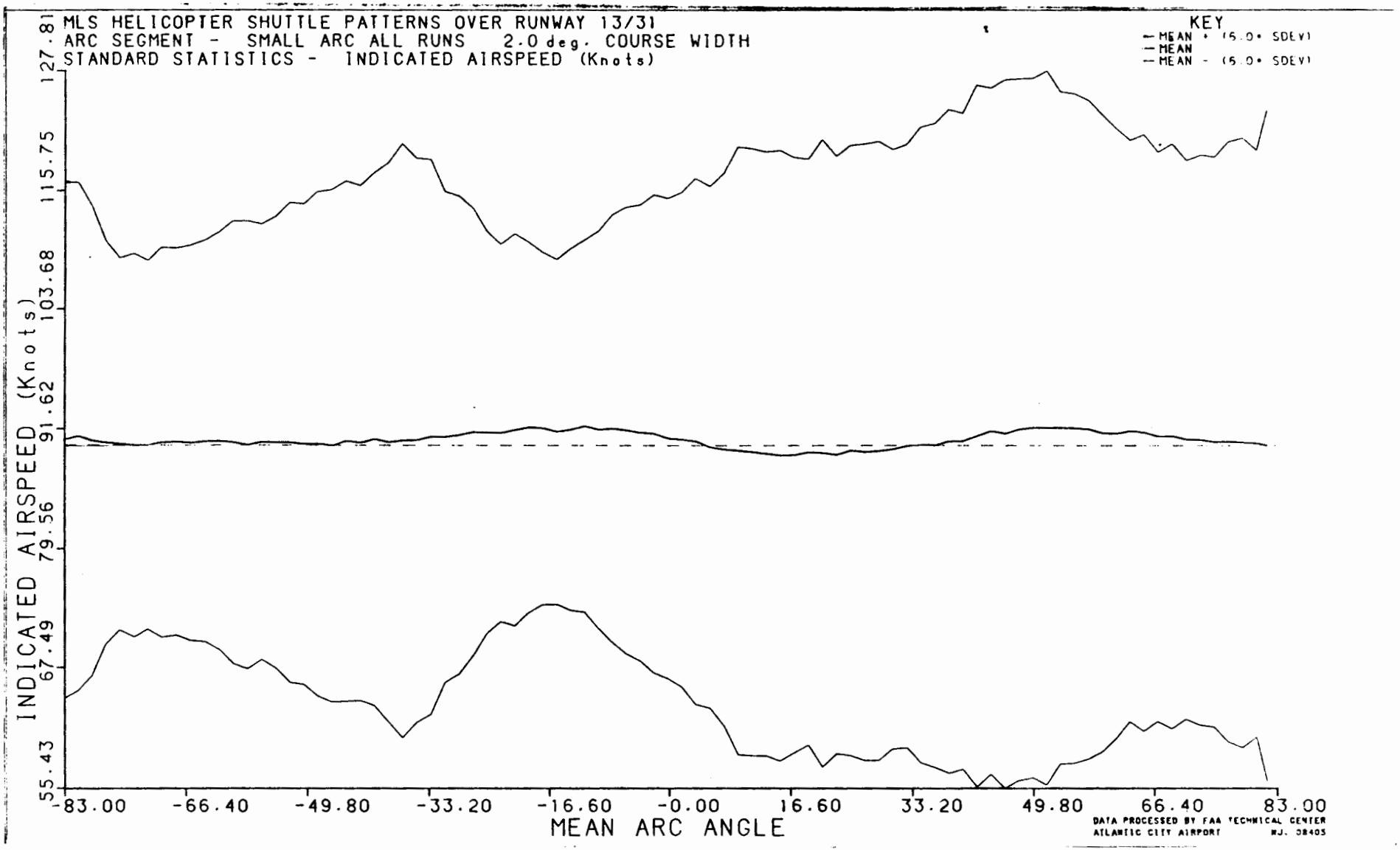
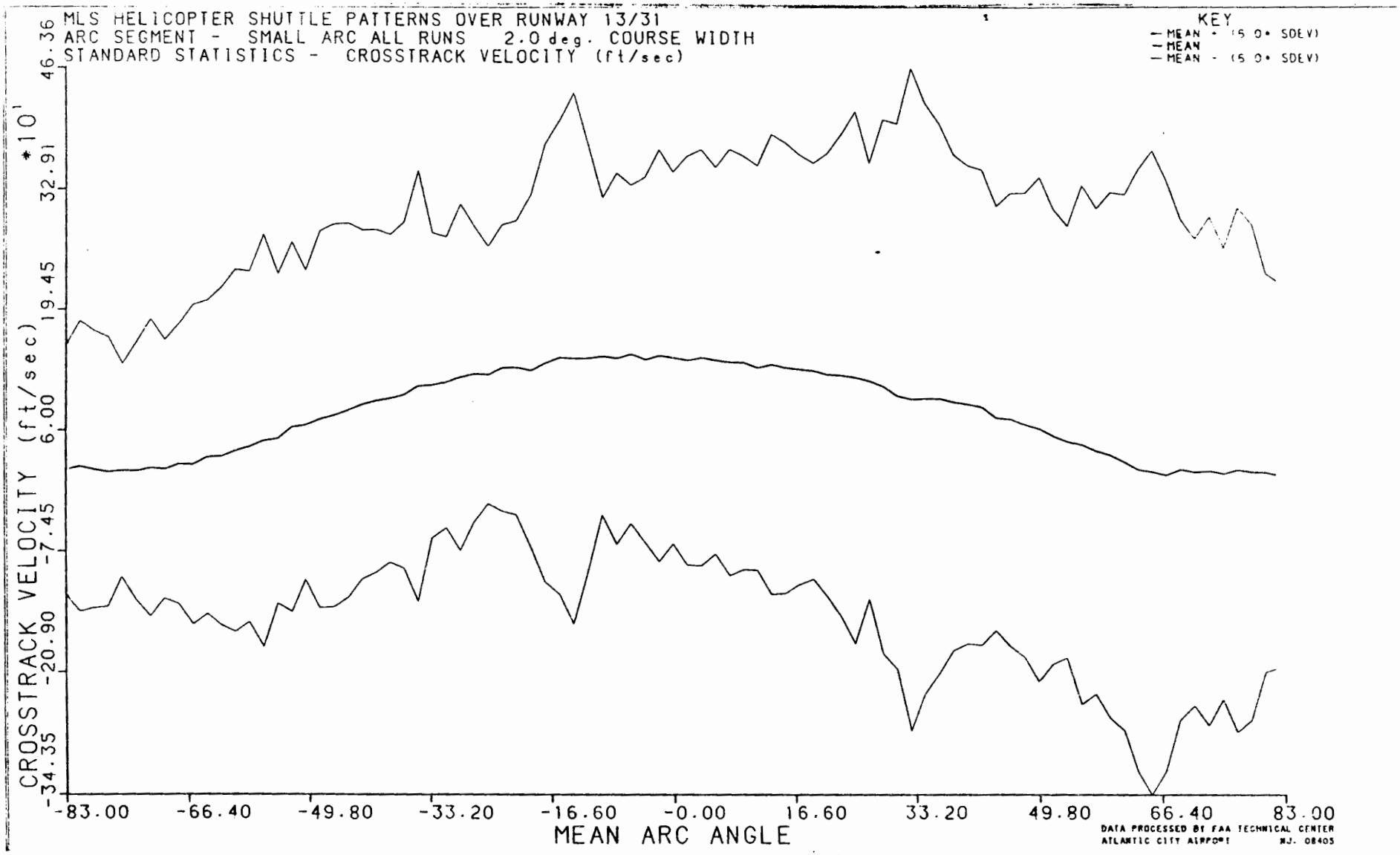
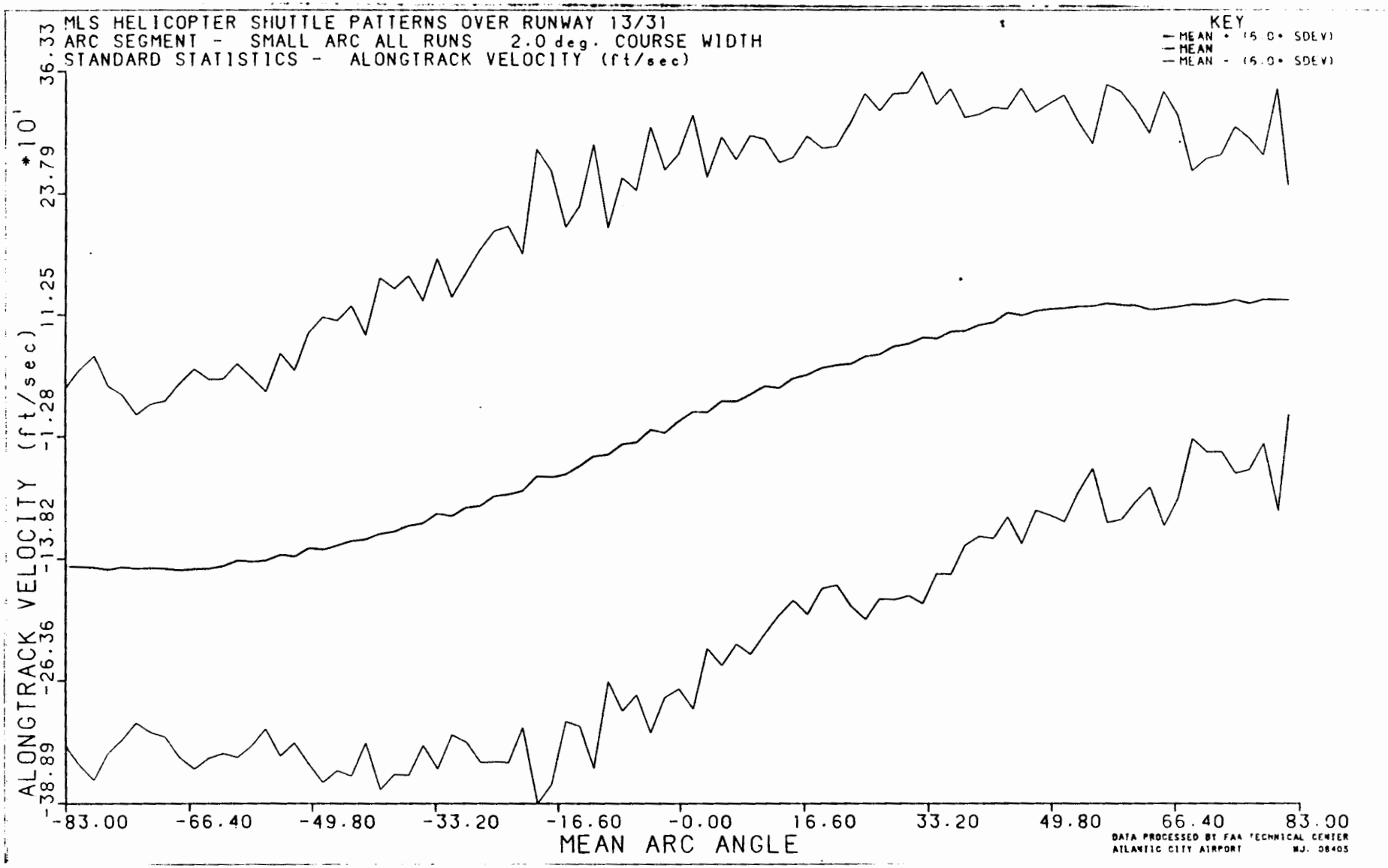

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTARCK COMPONENT IN RADIAL ERROR
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
CROSSTARCK COMP. IN R. ERROR (ft.) *10^2
50.84
35.35
19.87
4.39
-11.09
-26.57
-42.05
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK COMPONENT IN RADIAL ERROR
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
ALONGTRACK COMP. IN R. ERROR (ft.) *10^2
70.13
49.47
28.80
8.14
-12.52
-33.19
-53.85
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ERROR IN ALTITUDE
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
ERROR IN ALTITUDE *10'
38.11
17.77
-2.57
-22.92
-43.26
-63.60
-83.95
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT N.J. 08405

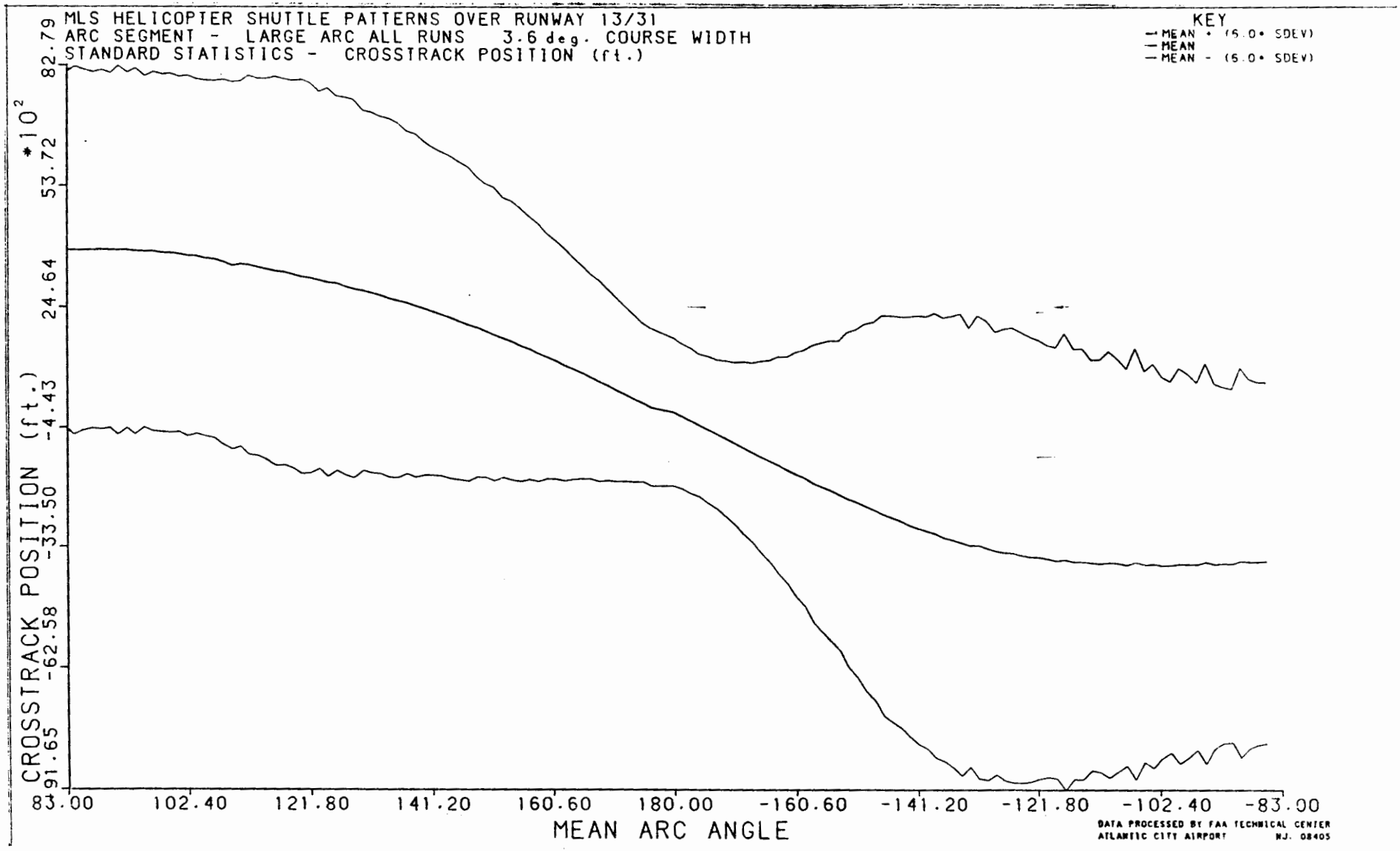

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - INDICATED AIRSPEED (Knots)
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
INDICATED AIRSPEED (Knots)
127.81
115.75
103.68
91.62
79.56
67.49
55.43
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

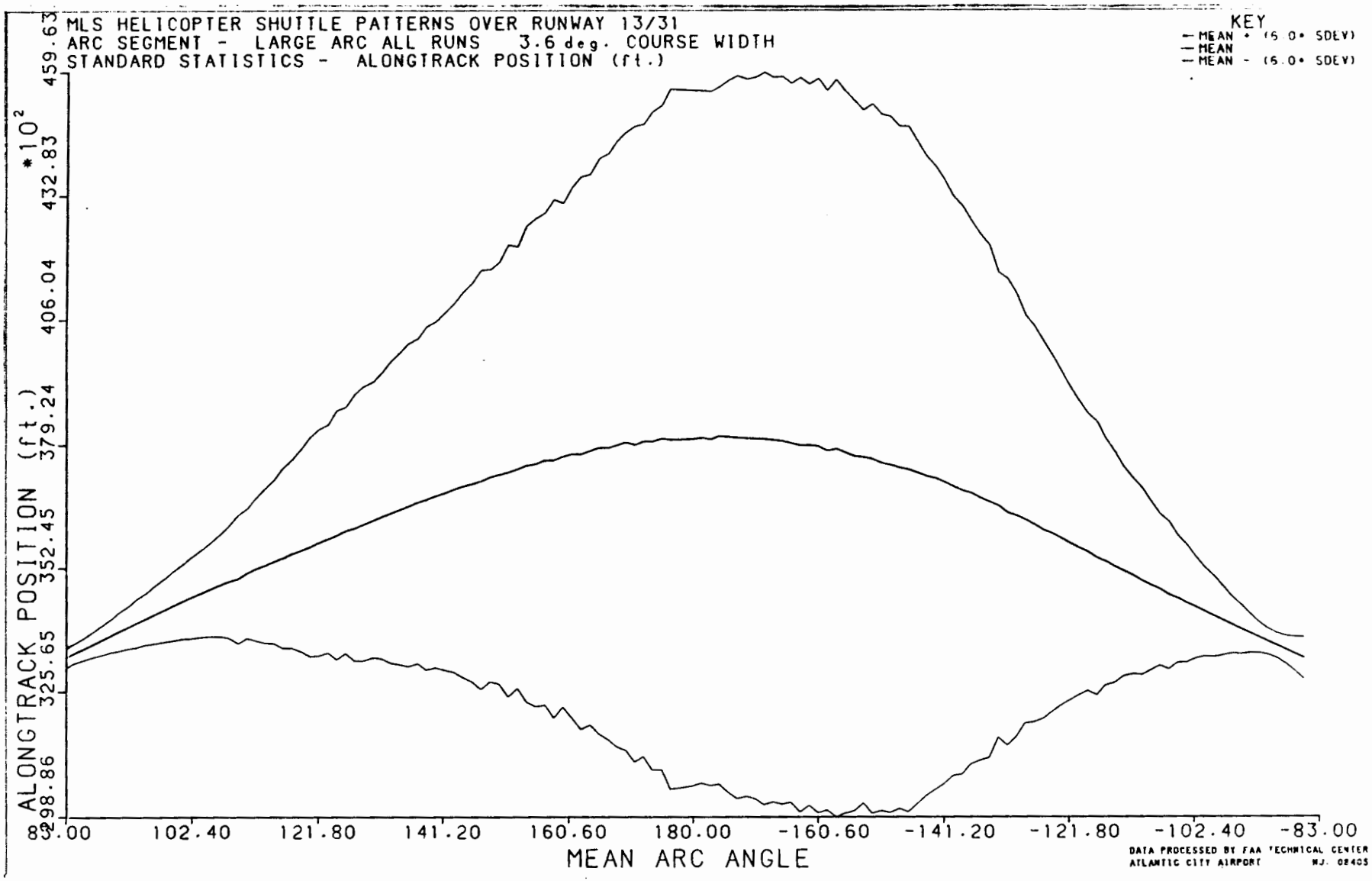

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK VELOCITY (ft/sec)
KEY
— MEAN + (5.0* SDEV)
— MEAN
— MEAN - (5.0* SDEV)
CROSSTRACK VELOCITY (ft/sec) *10¹
46.36
32.91
19.45
6.00
-7.45
-20.90
-34.35
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

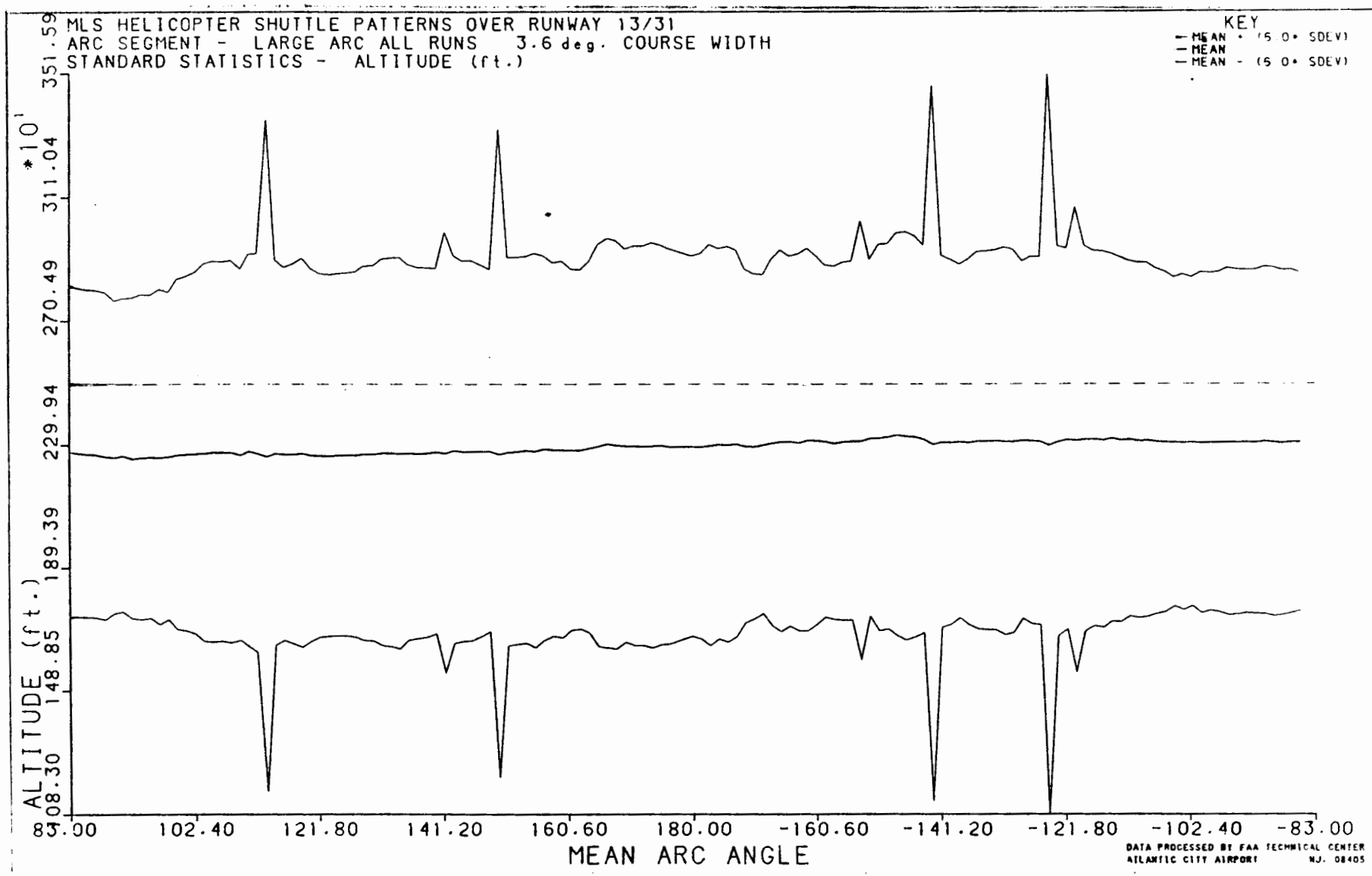

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - SMALL ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK VELOCITY (ft/sec)
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
ALONGTRACK VELOCITY (ft/sec) *10¹
36.33
23.79
11.25
-1.28
-13.82
-26.36
-38.89
-83.00
-66.40
-49.80
-33.20
-16.60
-0.00
16.60
33.20
49.80
66.40
83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

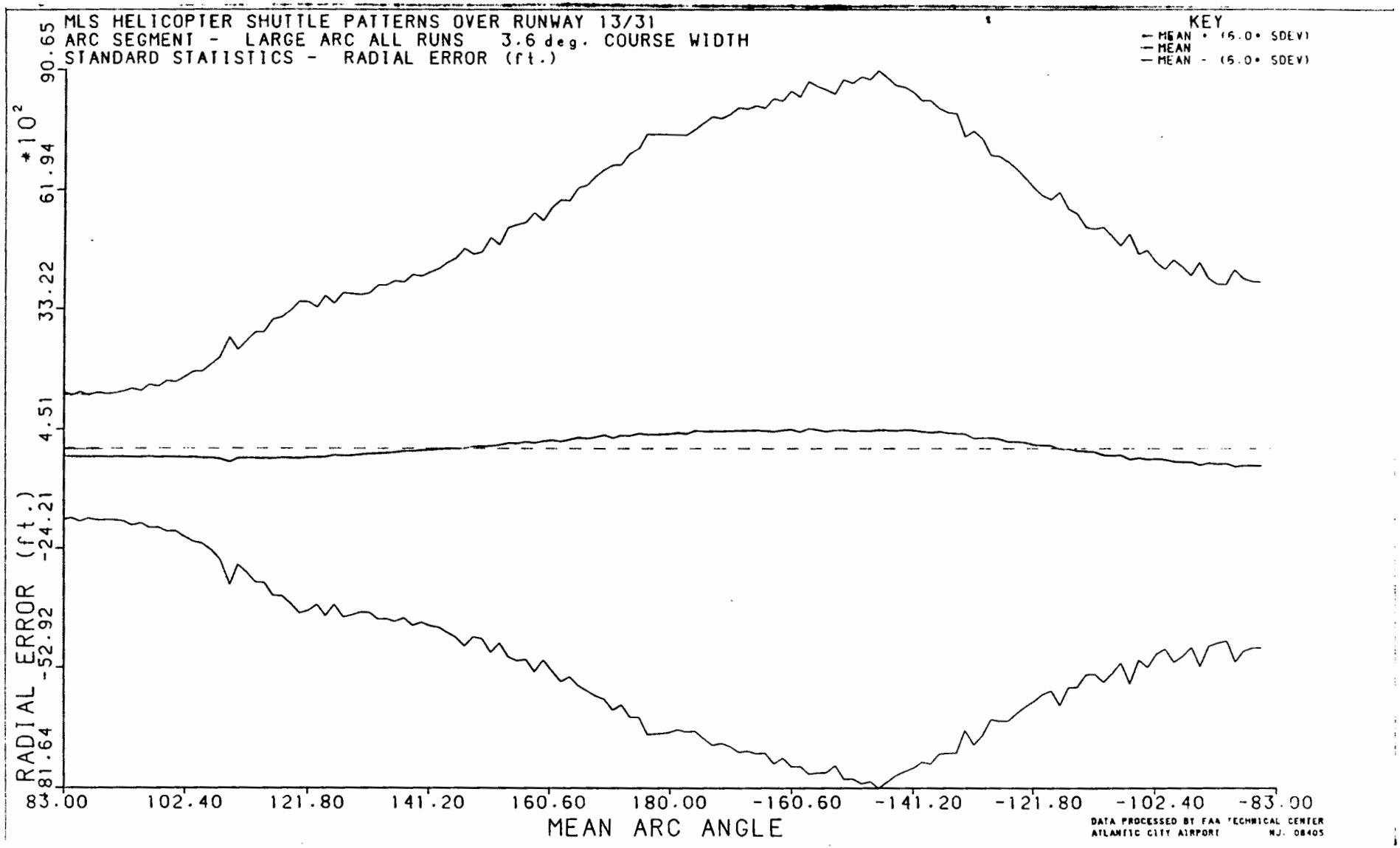
APPENDIX J

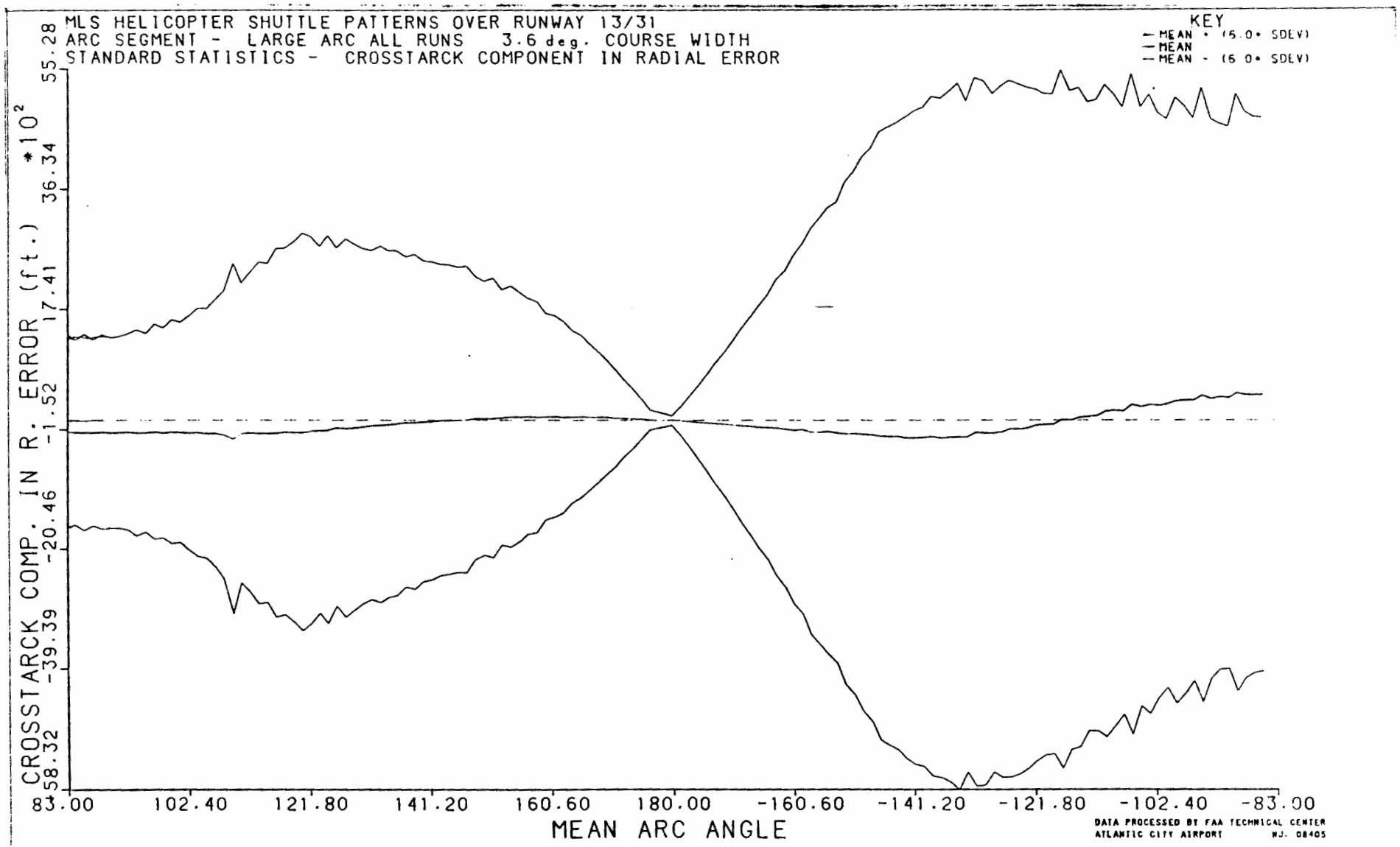
99.999999 PERCENT ISOPROBABILITY PLOTS FOR 3.6° AND 2.0° LARGE ARC SEGMENTS

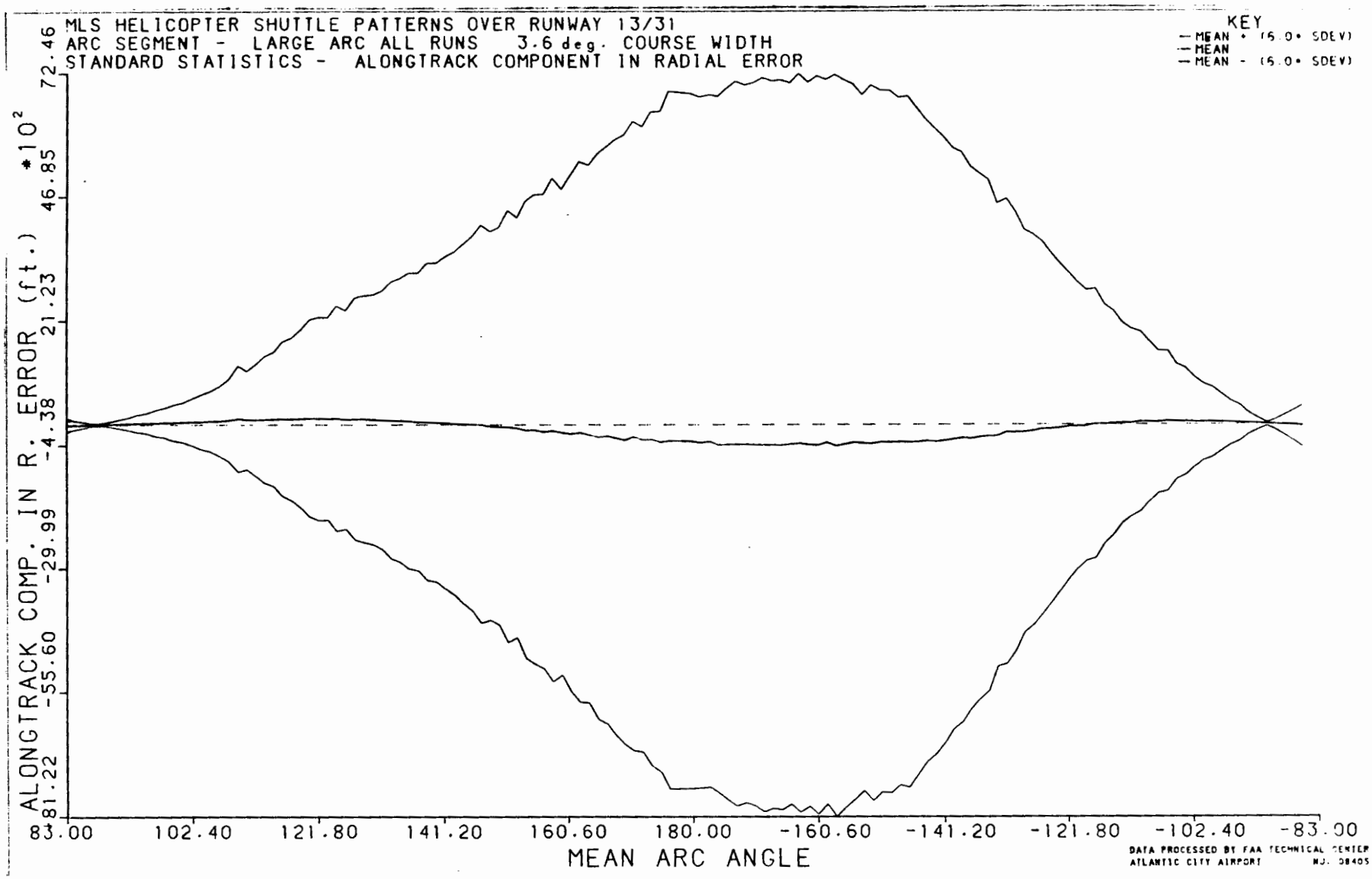

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK POSITION (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
CROSSTRACK POSITION (ft.) *10^2
82.79
53.72
24.64
-4.43
-33.50
-62.58
-91.65
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

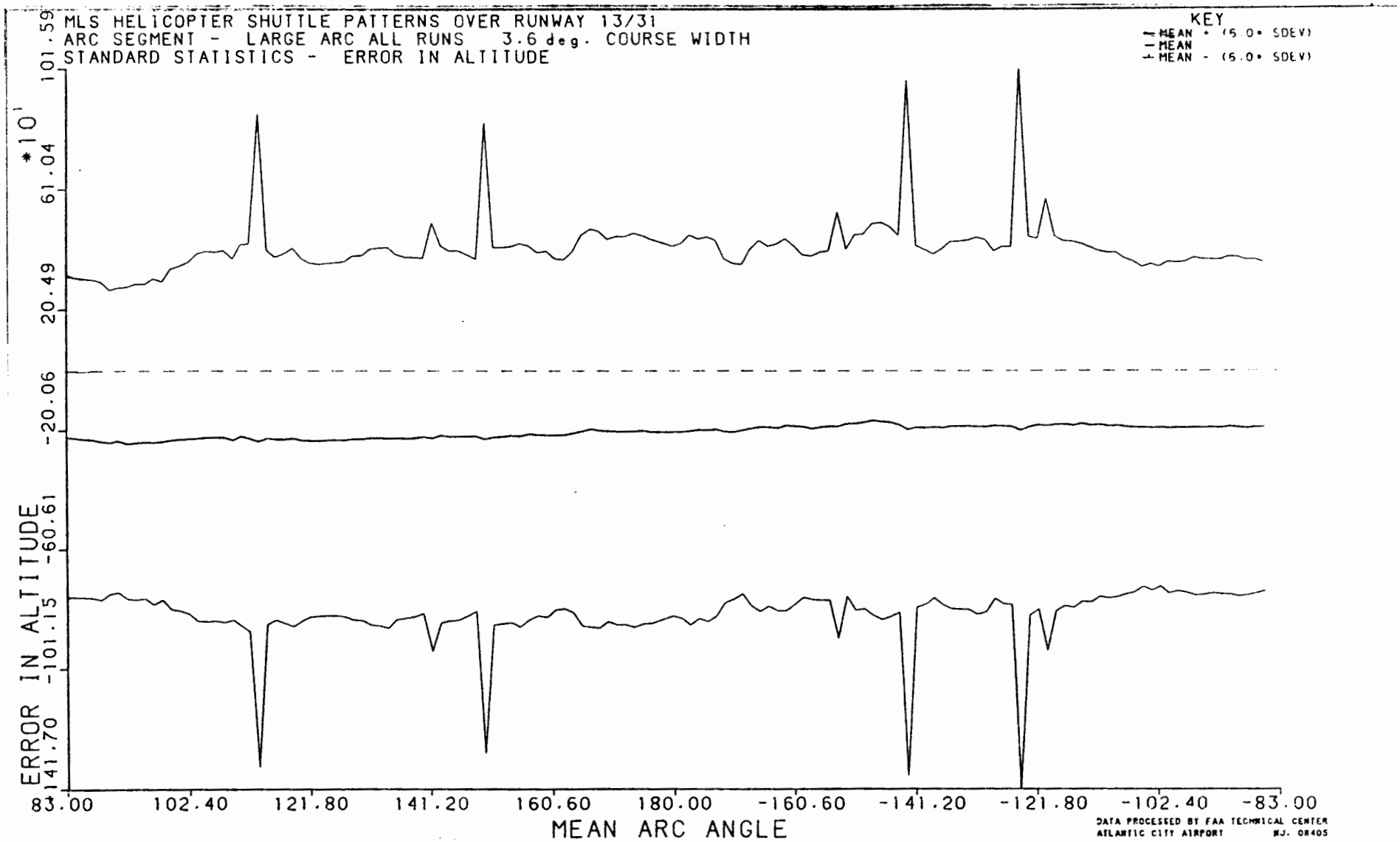

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK POSITION (ft.)
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
ALONGTRACK POSITION (ft.) *10^2
459.63
432.83
406.04
379.24
352.45
325.65
298.86
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

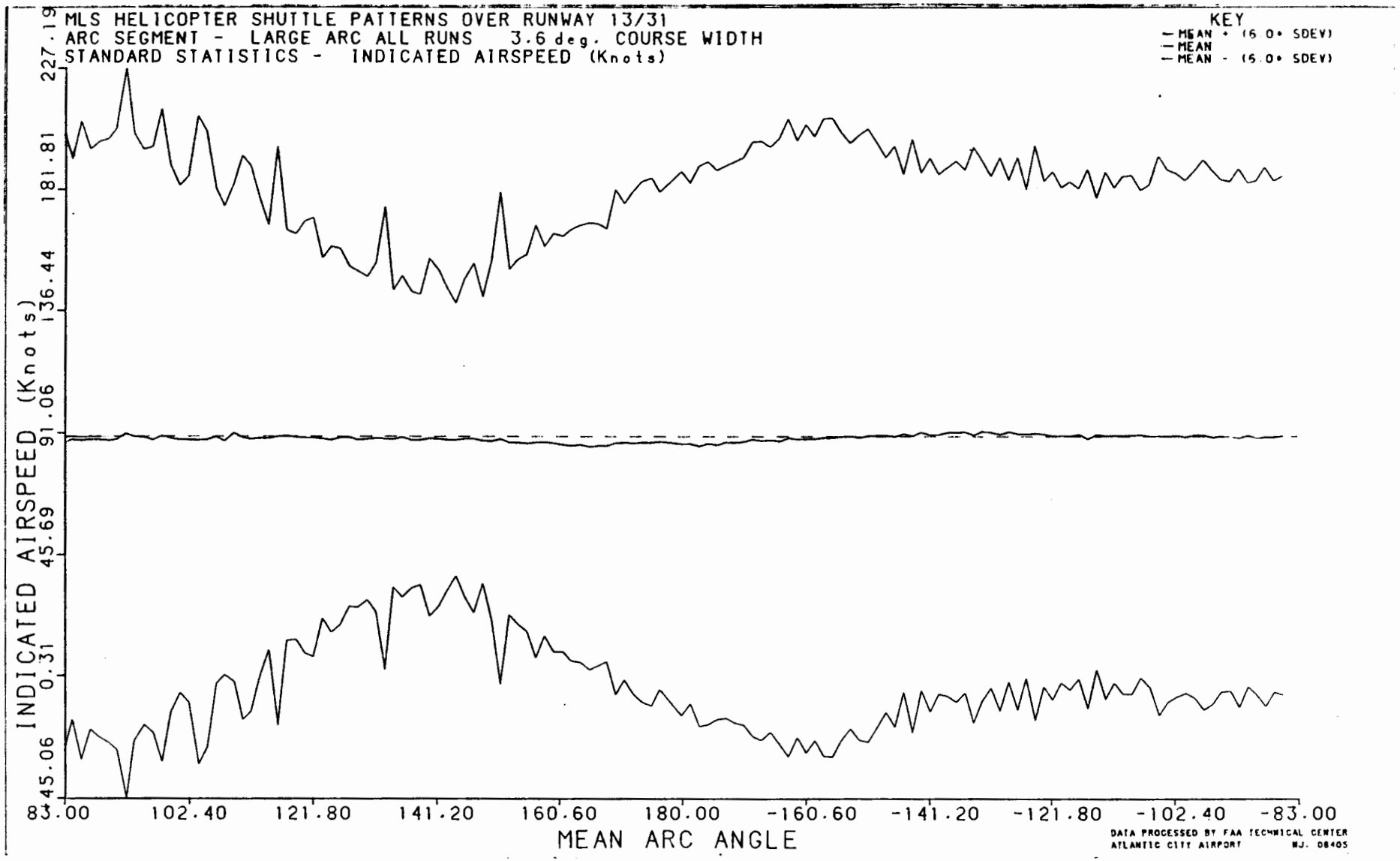

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALTITUDE (ft.)
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
ALTITUDE (ft.)
*10¹
351.59
311.04
270.49
229.94
189.39
148.85
108.30
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

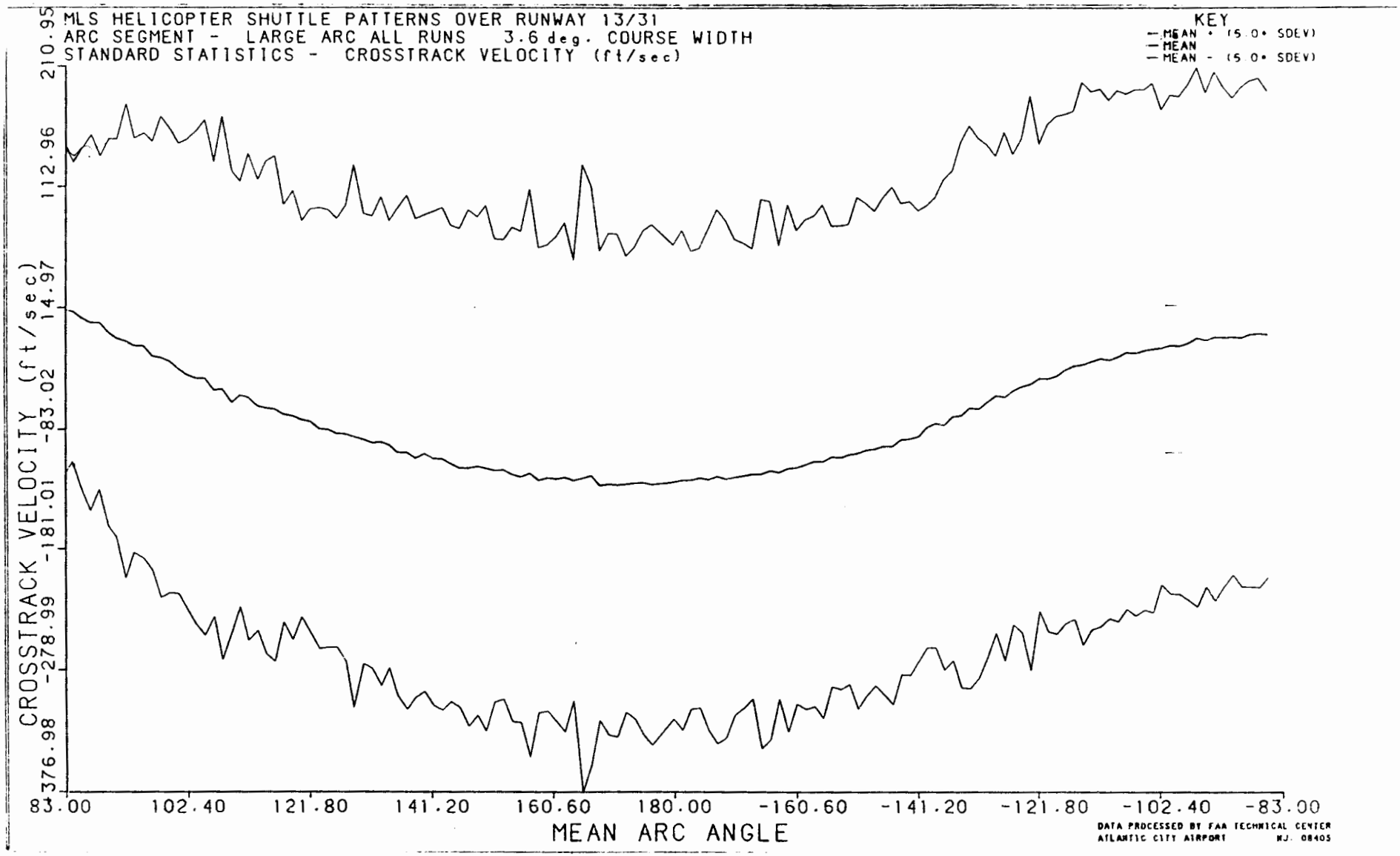

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - RADIAL ERROR (ft.)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
RADIAL ERROR (ft.) *10^2
90.65
61.94
33.22
4.51
-24.21
-52.92
-81.64
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

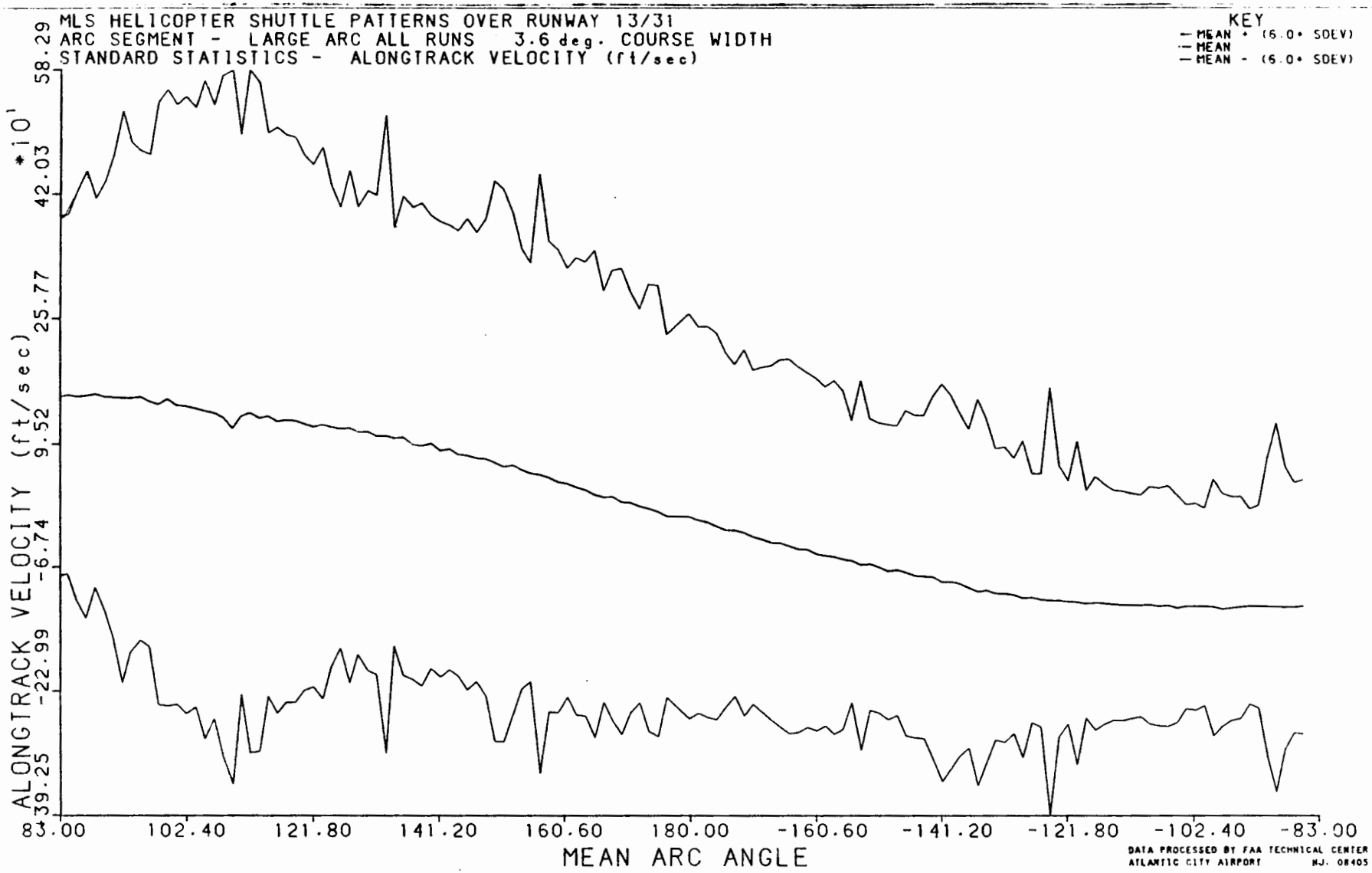

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTARCK COMPONENT IN RADIAL ERROR
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
CROSSTARCK COMP. IN R. ERROR (ft.) *10²
55.28
36.34
17.41
-1.52
-20.46
-39.39
-58.32
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

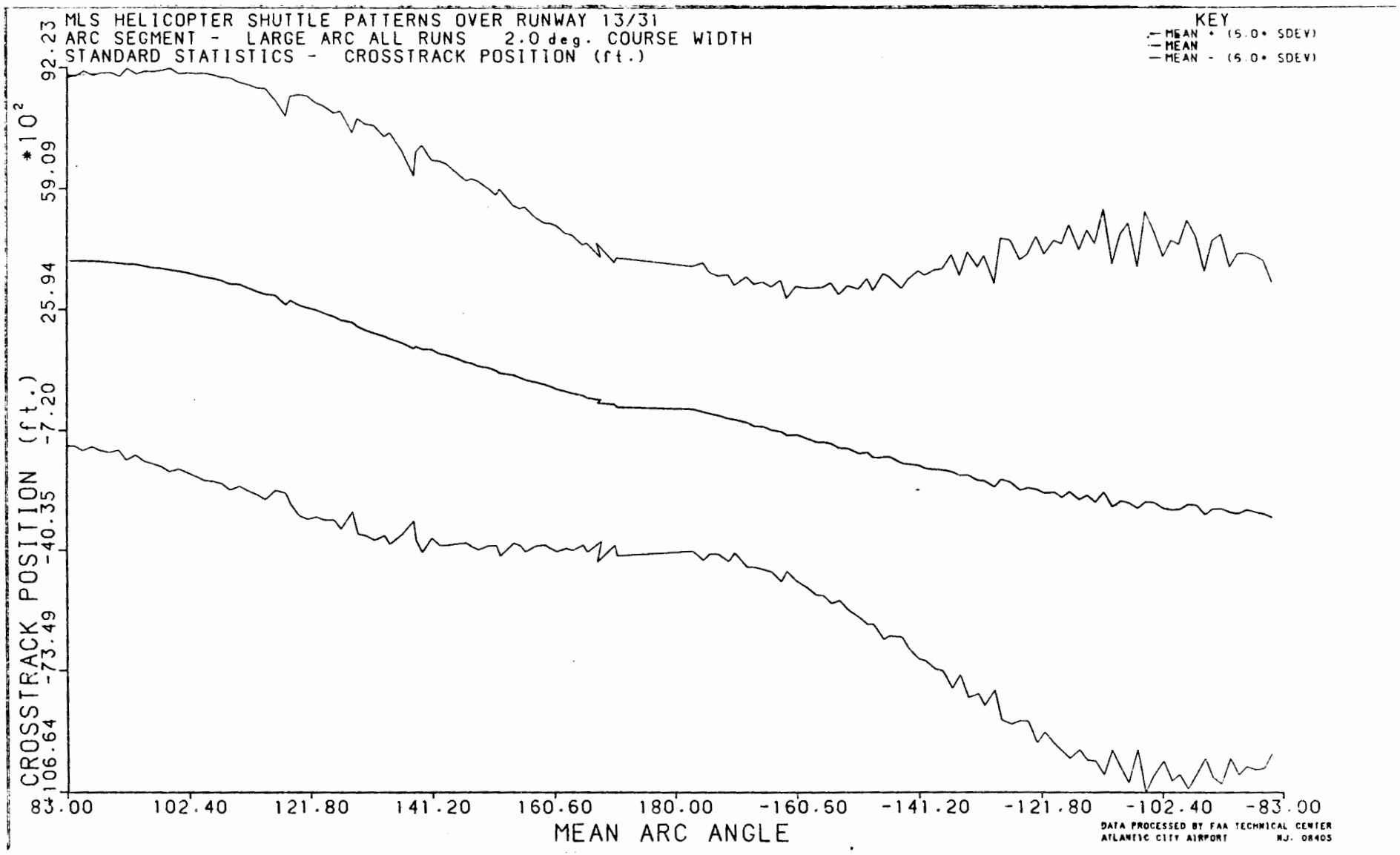

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK COMPONENT IN RADIAL ERROR
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
ALONGTRACK COMP. IN R. ERROR (ft.) *10^2
72.46
46.85
21.23
-4.38
-29.99
-55.60
-81.22
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

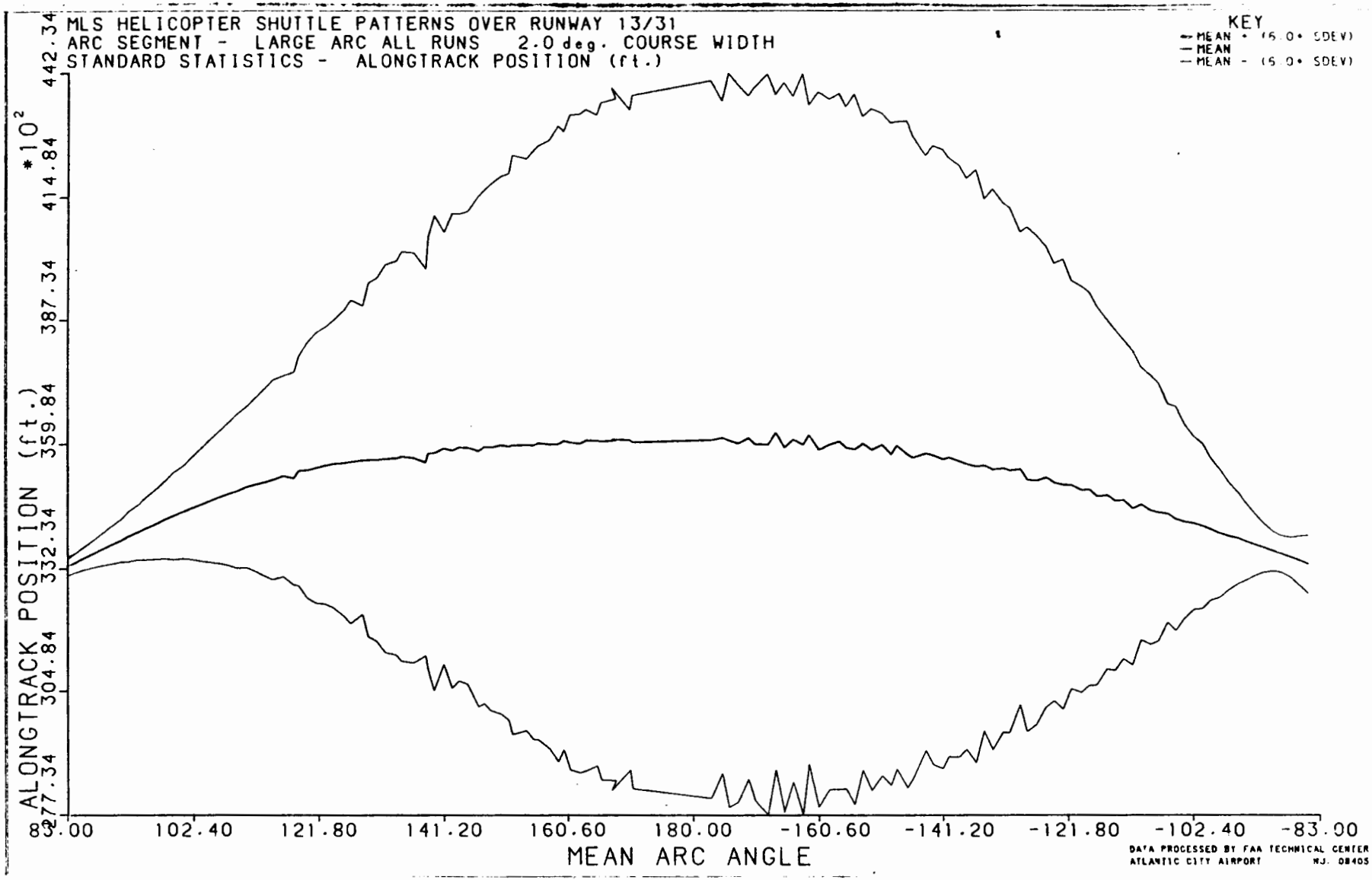

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ERROR IN ALTITUDE
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
*10¹
101.59
61.04
20.49
-20.06
-60.61
-101.15
-141.70
ERROR IN ALTITUDE
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

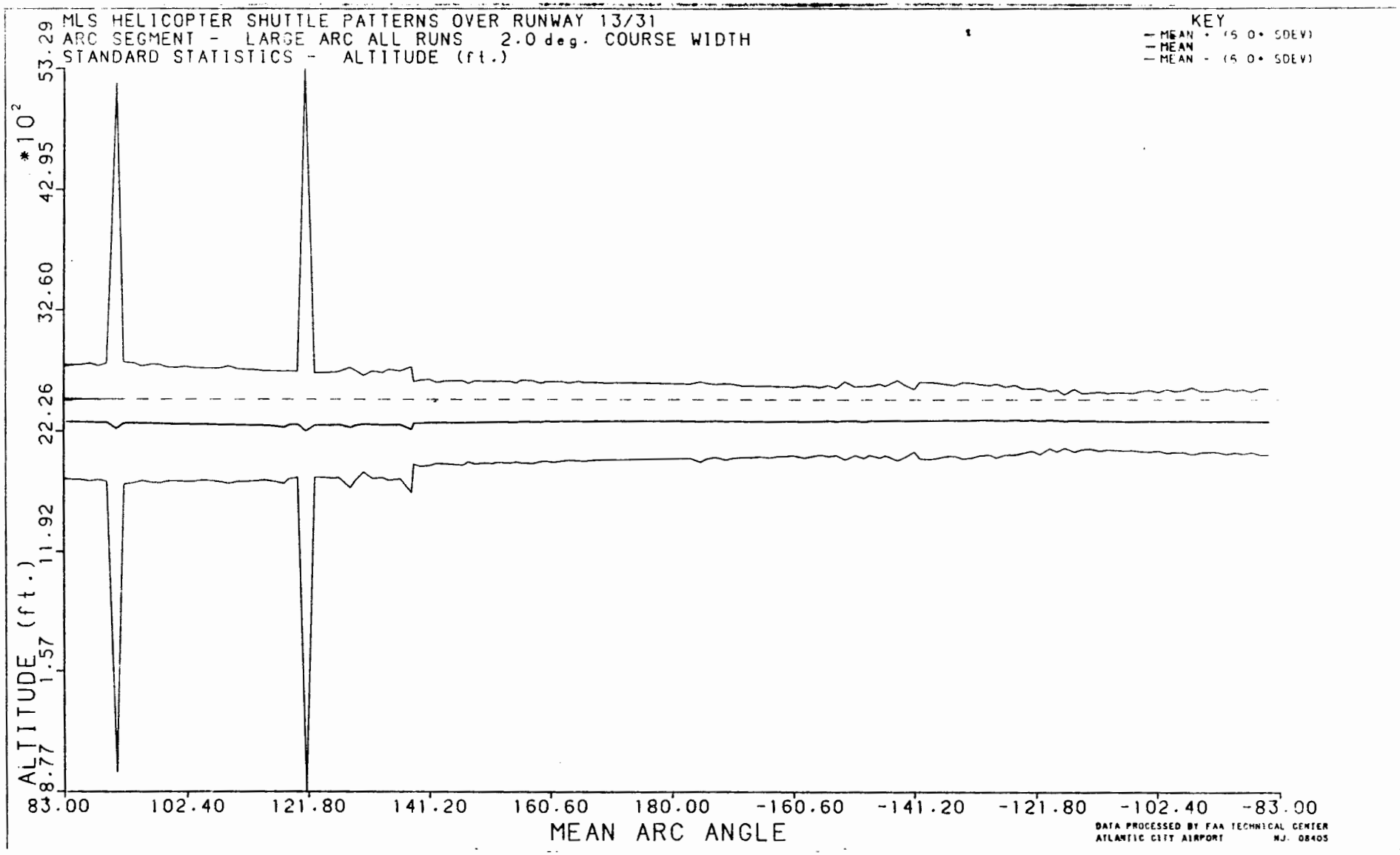

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - INDICATED AIRSPEED (Knots)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
INDICATED AIRSPEED (Knots)
227.19
181.81
136.44
91.06
45.69
0.31
-45.06
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

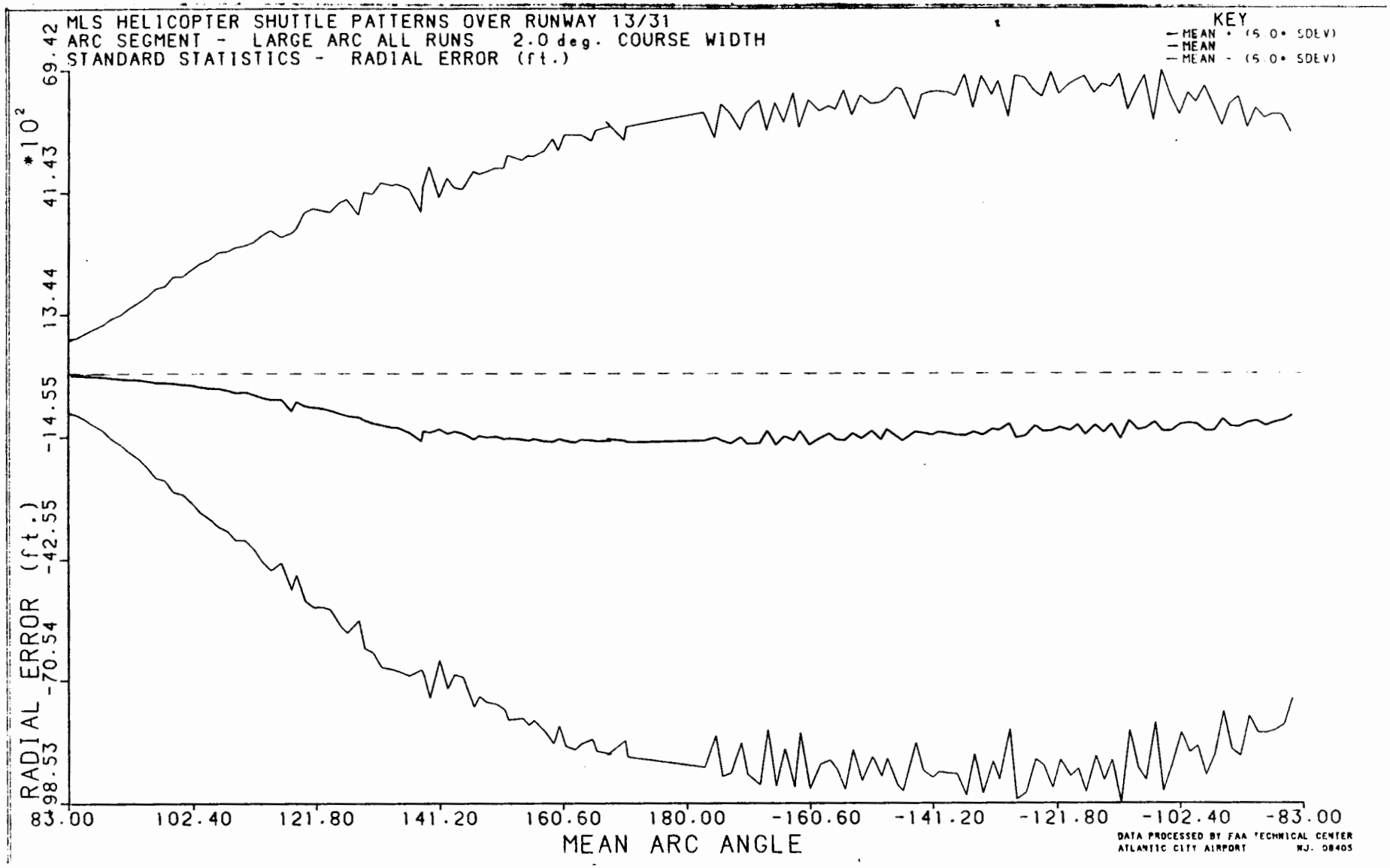

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK VELOCITY (ft/sec)
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
CROSSTRACK VELOCITY (ft/sec)
210.95
112.96
14.97
-83.02
-181.01
-278.99
-376.98
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405

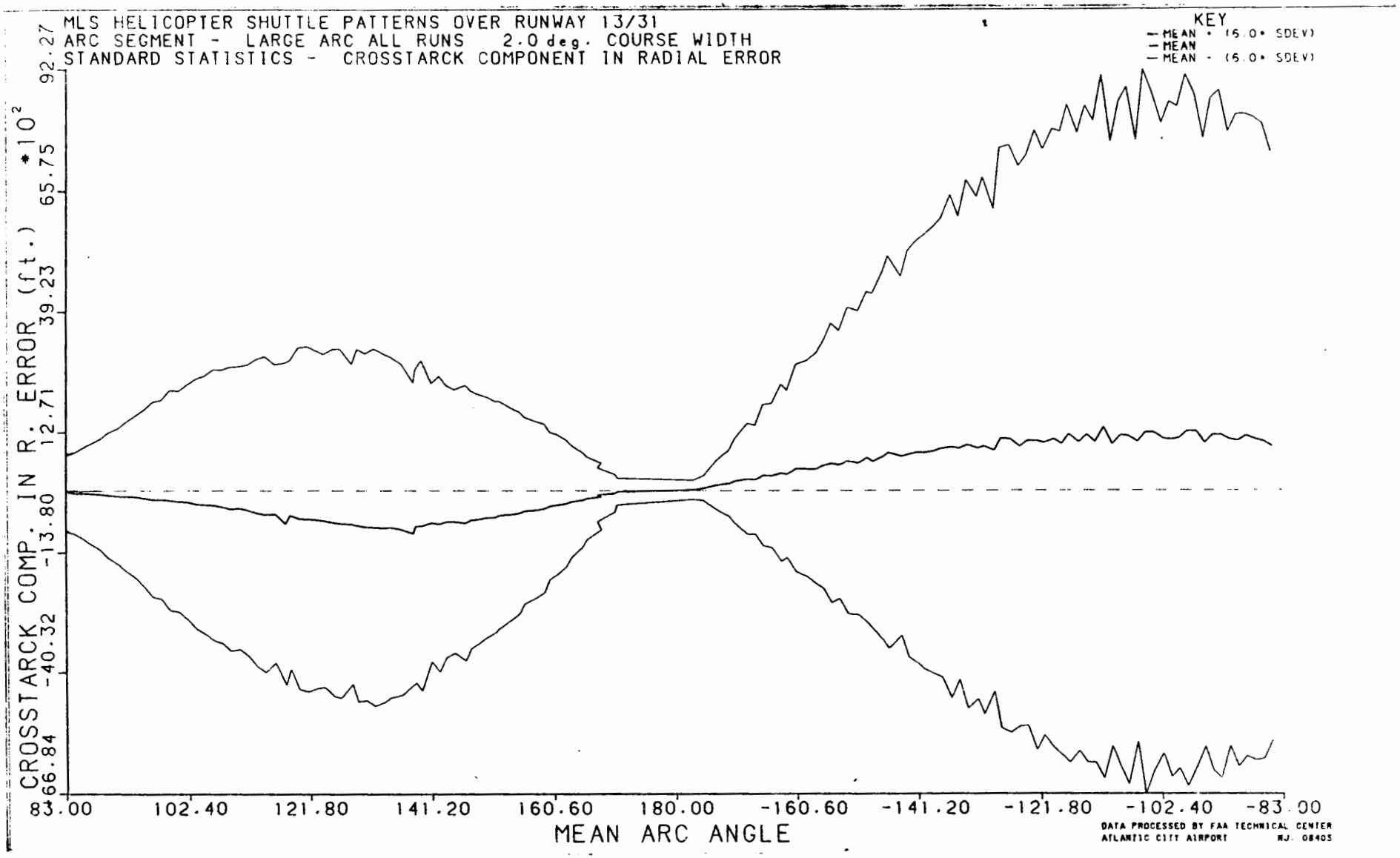

MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 3.6 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK VELOCITY (ft/sec)
KEY
— MEAN + (6.0* SDEV)
— MEAN
— MEAN - (6.0* SDEV)
ALONGTRACK VELOCITY (ft/sec) *10¹
58.29
42.03
25.77
9.52
-6.74
-22.99
-39.25
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK POSITION (ft.)
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
CROSSTRACK POSITION (ft.) *10^2
92.23
59.09
25.94
-7.20
-40.35
-73.49
-106.64
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK POSITION (ft.)
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
ALONGTRACK POSITION (ft.) *10^2
442.34
414.84
387.34
359.84
332.34
304.84
277.34
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALTITUDE (ft.)
KEY
— MEAN + (5.0* SDEV)
— MEAN
— MEAN - (5.0* SDEV)
ALTITUDE (ft.) *10^2
53.29
42.95
32.60
22.26
11.92
1.57
-8.77
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - RADIAL ERROR (ft.)
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
RADIAL ERROR (ft.)
*10²
69.42
41.43
13.44
-14.55
-42.55
-70.54
-98.53
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT NJ. 08405


MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTARCK COMPONENT IN RADIAL ERROR
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
CROSSTARCK COMP. IN R. ERROR (ft.) *10²
92.27
65.75
39.23
12.71
-13.80
-40.32
-66.84
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
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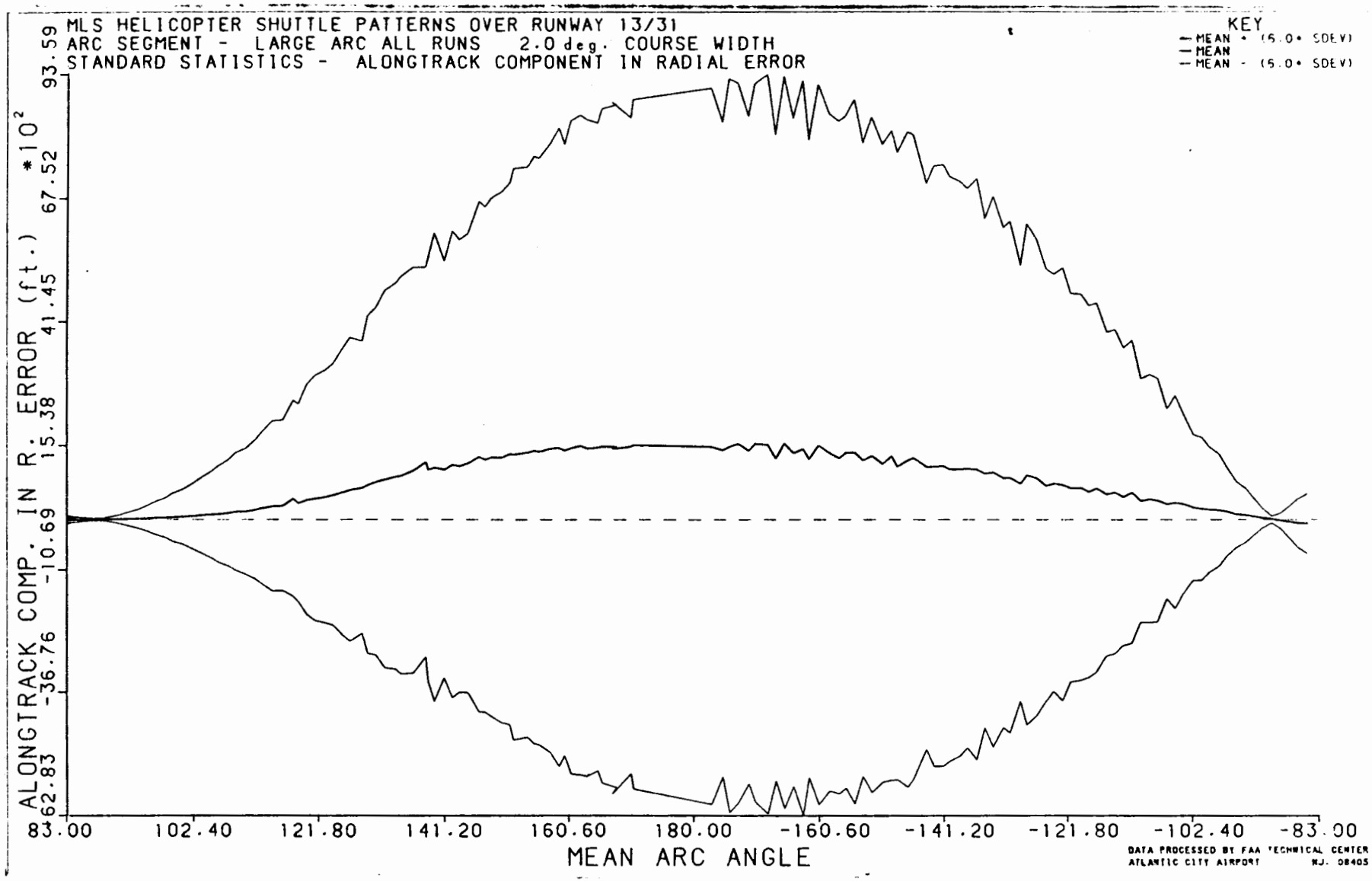
MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK COMPONENT IN RADIAL ERROR
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
ALONGTRACK COMP. IN R. ERROR (ft.) *10²
93.59
67.52
41.45
15.38
-10.69
-36.76
-62.83
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
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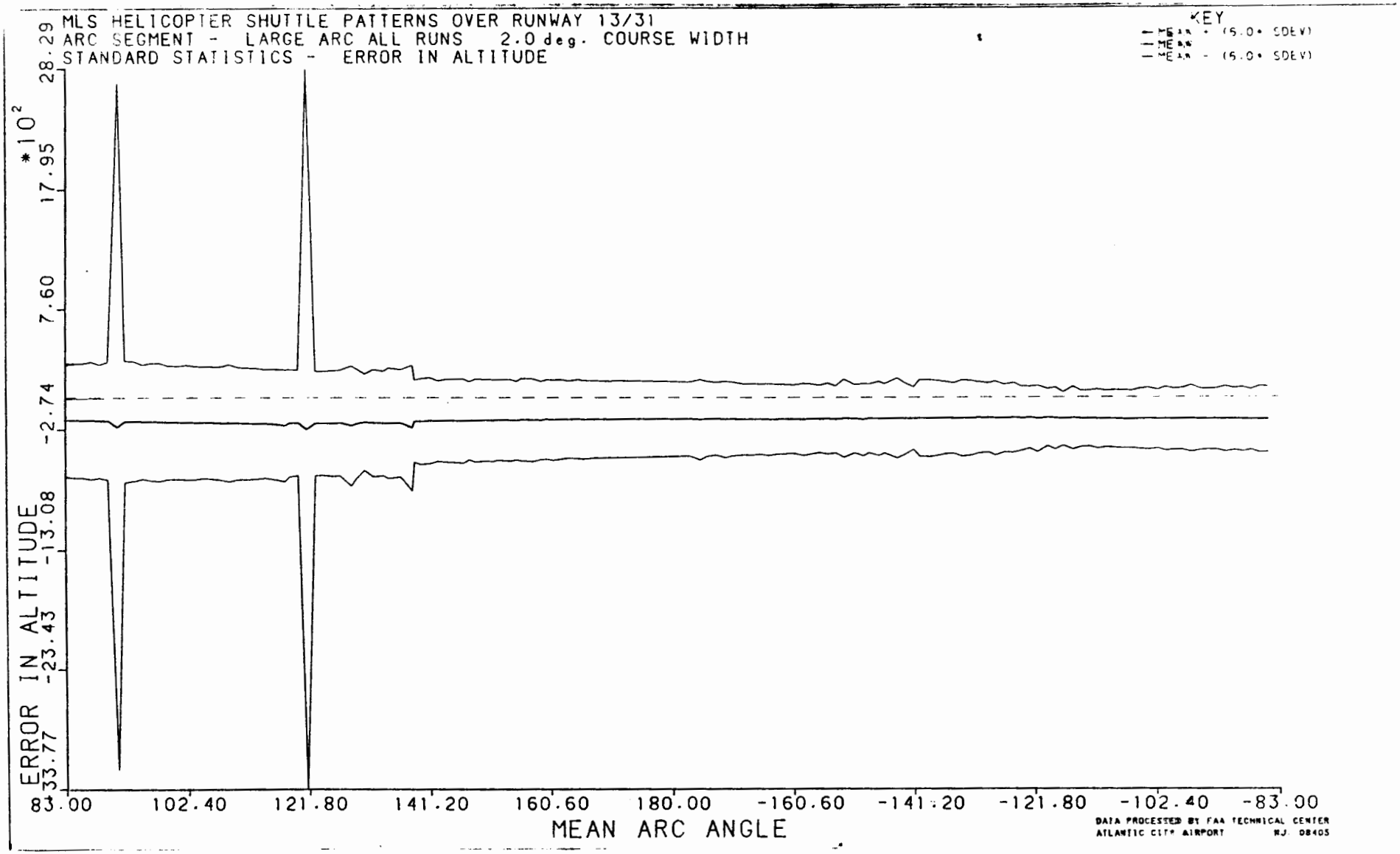
MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ERROR IN ALTITUDE
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
ERROR IN ALTITUDE *10^2
28.29
17.95
7.60
-2.74
-13.08
-23.43
-33.77
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
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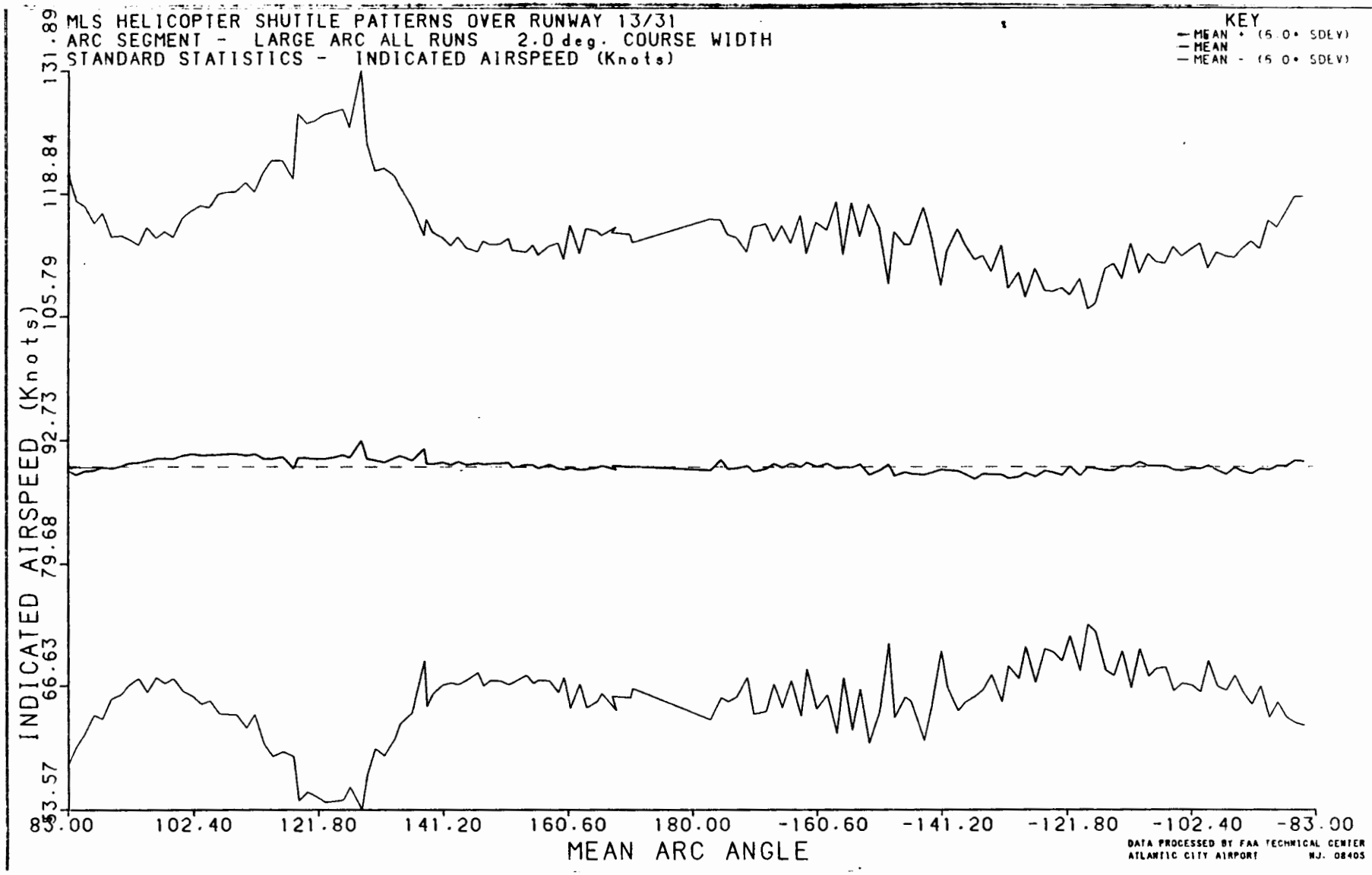
MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - INDICATED AIRSPEED (Knots)
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
INDICATED AIRSPEED (Knots)
131.89
118.84
105.79
92.73
79.68
66.63
53.57
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
DATA PROCESSED BY FAA TECHNICAL CENTER
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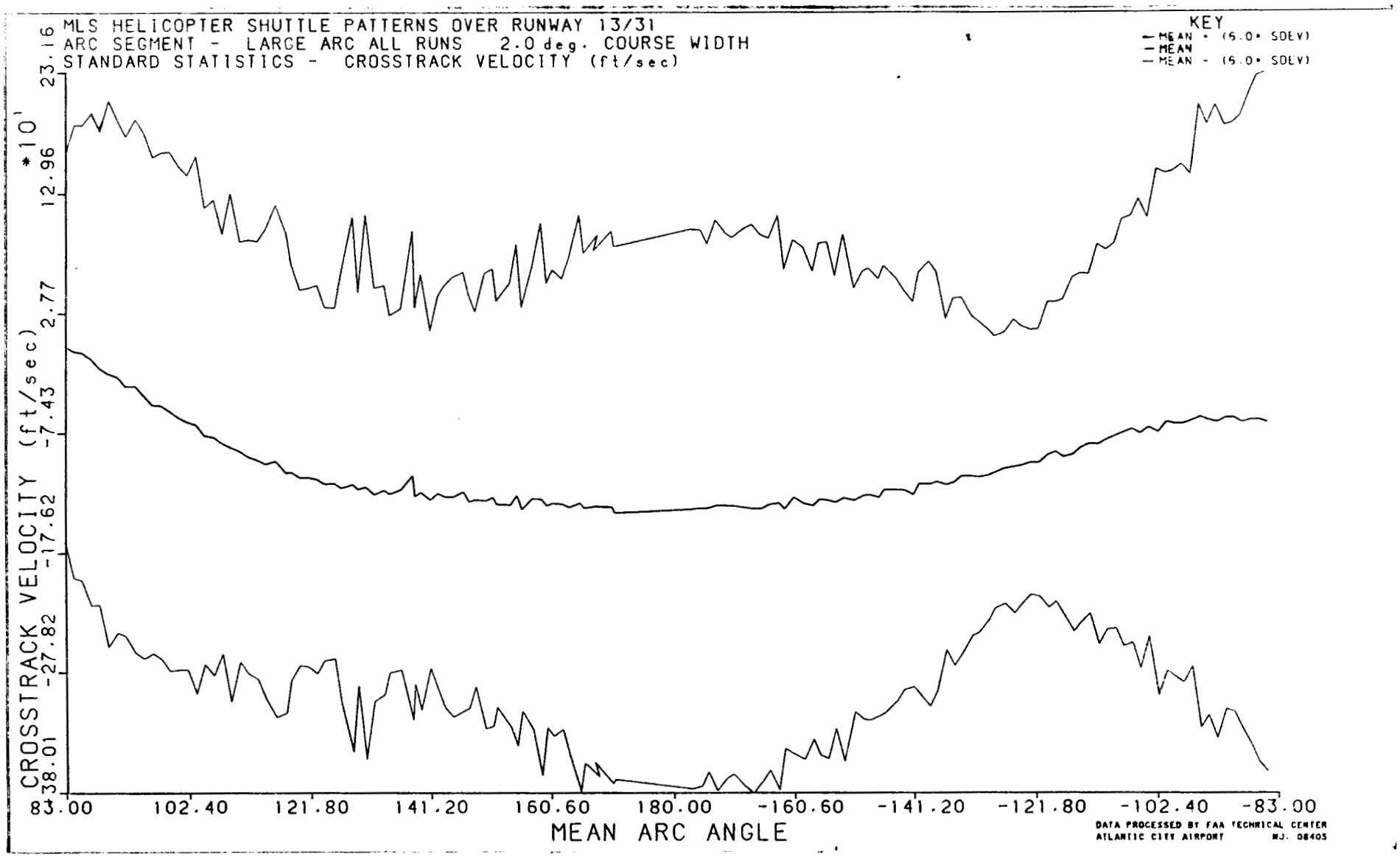
MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - CROSSTRACK VELOCITY (ft/sec)
KEY
MEAN + (6.0* SDEV)
MEAN
MEAN - (6.0* SDEV)
CROSSTRACK VELOCITY (ft/sec) *10¹
23.16
12.96
2.77
-7.43
-17.62
-27.82
-38.01
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
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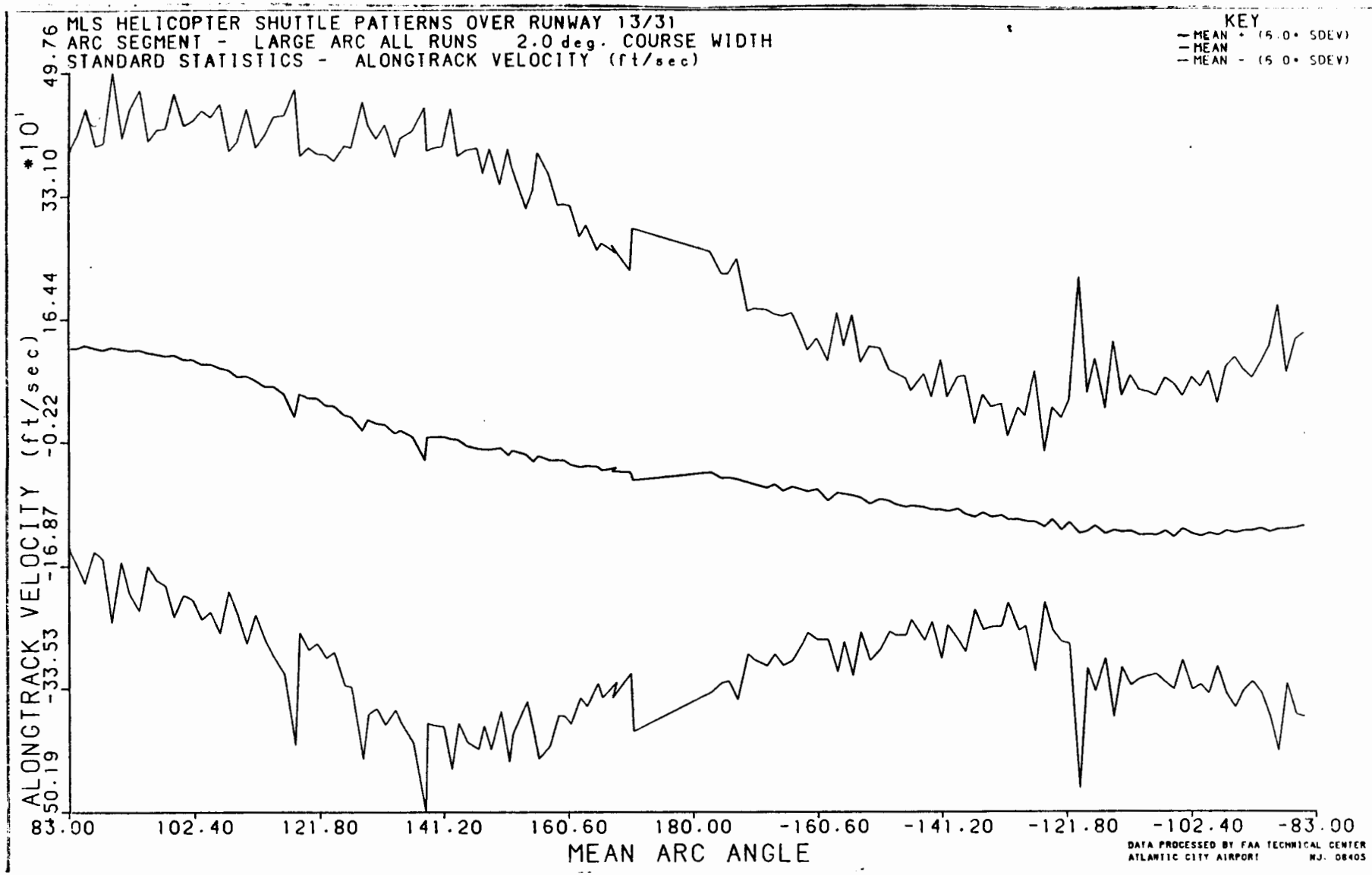
MLS HELICOPTER SHUTTLE PATTERNS OVER RUNWAY 13/31
ARC SEGMENT - LARGE ARC ALL RUNS 2.0 deg. COURSE WIDTH
STANDARD STATISTICS - ALONGTRACK VELOCITY (ft/sec)
KEY
MEAN + (5.0* SDEV)
MEAN
MEAN - (5.0* SDEV)
ALONGTRACK VELOCITY (ft/sec) *10¹
49.76
33.10
16.44
-0.22
-16.87
-33.53
-50.19
83.00
102.40
121.80
141.20
160.60
180.00
-160.60
-141.20
-121.80
-102.40
-83.00
MEAN ARC ANGLE
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