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JTF-2 REPORT

SC-M-68-696
October 1968

JOINT TASK FORCE TWO
TEST 4.1
RF-101 Aircraft
Data Book (U)
Part i of 2

Department 9210

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SANDIA SYSTEMATIC DECLASSIFICATION REVIEW	
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JOINT TASK FORCE TWO
TEST 4.1
RF-101 AIRCRAFT
DATA BOOK (U)
PART 1 OF 2

DEPARTMENT 9210

OCTOBER 1968

Sandia Laboratory, Albuquerque, New Mexico

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FOREWORD

1. Joint Task Force Two (JTF-2) was organized by the Joint Chiefs of Staff to conduct a series of coordinated and integrated tests to determine the capabilities and vulnerabilities of offensive and defensive weapons systems in the low altitude flight regime.

2. Joint Task Force Two Test 4.1 Visual Target Acquisition, the second test in the series, investigated the relationships among aircraft, altitude, speed, environment, and the air-to-ground target acquisition task for representative operational aircraft and aircrew combinations. Additionally, through the incorporation of a low altitude navigation course, corollary objectives of Test 2.1, Penetration-Operational Systems, were investigated.

3. In the conduct of Test 4.1 extensive instrumentation data were collected for the ten participating aircraft types (five tactical strike, A-1E, A-4B, A-6A, F-4C and F-105D; three tactical reconnaissance, RA-5C, RF-4C and RF-101; and two strategic aircraft, B-52 and B-58). Some of these data were not related to the visual target acquisition objectives. A series of books, by aircraft type, have been prepared which present those data which are reliable over a majority of the test sorties and of possible interest to agencies other than those concerned with the target acquisition problem.

4. This book contains the following data for the RF-101 type aircraft: plots of the aircraft position track in the target area and of the aircraft elevations above mean sea level, along with the terrain elevation under the aircraft track; plots of the aircraft altitude above the terrain, normal accelerations, roll angle, pitch angle and slant range from the navigation check points and the targets to the aircraft.

5. A supplemental volume of data summaries lists statistics on aircraft altitude above terrain and on speed; measurements from the six visibility instruments located at each target site; and pilot acquire qualifier, time and ground range for all the sorties flown in Test 4.1 and is titled, Low Altitude Test 4.1, Visual Target Acquisition, All Aircraft, Data Summary Book.

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SECTION I

INTRODUCTION

1.(U) BACKGROUND.

a. Joint Task Force Two Test 4.1, Visual Target Acquisition-Operational Systems, was the second in a series of tests designed to obtain data on low altitude weapons systems operations. Test 1.0 investigated minimum terrain clearance capabilities of tactical and strategic aircraft, and was reported on in JTF-2 Report 001.

b. Test 4.1 was a test of visual target acquisition capabilities of aircraft weapons systems at low altitude over rolling terrain. It investigated the relationships among aircraft, altitude, speed, environment, and the air-to-ground target acquisition task for representative operational aircraft and aircrew combinations. Similarities in tactics between tactical strike and tactical reconnaissance aircraft allowed the investigation of certain corollary objectives of Test 4.4, Target Acquisition-Tactical Reconnaissance. Additionally, through the incorporation of low altitude navigation courses, corollary objectives of Test 2.1, Penetration-Operational Systems, were investigated.

c. The Test 4.1 reporting consists of a series of bound volumes, each addressing a particular facet of the visual target acquisition test. All volumes bear the basic title: Low Altitude Test 4.1, Visual Target Acquisition, Volume ___: (Identifying Subtitle). Table 1-1 is a tabulation of the documentation.

2.(U) PURPOSE.

a. Test 4.1.

(1) Measure and analyze the visual ground target acquisition capabilities of representative aircraft and aircrews under visual flight conditions over rolling terrain.

(2) Investigate the relationship between such variables as aircraft, terrain clearance altitude, aircraft speed, target characteristics and environment, and the target acquisition task.

VOLUME	IDENTIFYING SUBTITLE
1	Controlled Flight Observations
2	Field Test Description
3	Navigation over Flat Terrain (Test 2.1 Penetration-Operational Systems)
4	Tactical Aircraft Performance
5	Strategic Aircraft Performance
6	Human Factors Studies
7	Flight Simulator Studies
	Basic Validation
	Briefing Effectiveness
	Target/Background Parameters and Avionics Aids
	Pilot Orientation
8	Mathematical Model Calibration
	Data Books - By Aircraft Type (A-1E, A-4B, A-6A, F-4C, F-105D, RA-5C, RF-4C, RF-101, B-52 and B-58)
	Data Summaries (All Aircraft Types in One Book)

Table 1-1 (U) Component Documentation for Test 4.1

b. Data Book.

(1) Provide those data collected during Test 4.1 which are considered pertinent in evaluating the participating weapons systems performance in visual target acquisitions and other areas.

(2) Assemble these data, by weapon system type, into volumes which will facilitate data retrieval and application.

3.(U) TEST DESCRIPTION.

a. General.

(1) Ten types of tactical and strategic aircraft were flown. These consisted of tactical strike, tactical reconnaissance and strategic aircraft. The ability of the aircrews to visually acquire tactical targets was measured. With the exception of 32 tactical reconnaissance night flights, all aircraft were flown under daylight visual flight conditions. There were 474 sorties flown by the 232 participating aircrews. Flight operations were conducted from 27 June to 19 September 1966.

(2) The test was designed with two bands of assigned terrain clearance altitude (0-400 feet, 500-900 feet) and five assigned apeeds (175, 270, 360 (350 for B-52), 420 (450 for B-58) and 550 knots). The F-105D and the SAC aircraft were assigned only the higher altitude band. Table 1-2 is a tabulation of the test design assignments in the target area, by aircraft.

(3) The target area consisted of two courses each with four targets. These targets consisted of two surface-to-air missile (SAM) sites, two aircraft control and warning (AC&W) sites, two bridges (one with superstructure) a petroleum oil and lubricants (POL) dump and a tactical airfield. Each course contained a SAM site, an AC&W site and a bridge. The bridges were real and the other targets were constructed to appear realistic. Each of the eight targets was preceded by a final reference point (FRP), a prebriefed, man-made, ground cue intended to assist the aircrew in locating the target. Aircrews of the tactical aircraft used the FRP's but the Strategic Air Command (SAC) selected radar offset aiming points (OAP) (prominent terrain features) as navigation aids for aircrews of the strategic aircraft. The B-52 aircrews were prebriefed on two OAP's per target and the B-58 crews on one OAP per target.

(4) The aircraft and crews for Test 4.1 were provided from operational units of the Air Force, Navy, Navy Reserve, and Marine Corps. Routinely, the aircrews spent at least four days on Test 4.1. This included time for a thorough filmed briefing of their participation in the test, completion of questionnaires and forms for human factors studies, time to fly two sorties, and participation in vision tests for a portion of the aircrews. The

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ALTITUDE		0-400 FEET (DAY)					500-900 FEET (DAY)					500-900 FEET (NIGHT)					TOTAL SORTIES	TOTAL CREWS
SPEED		175K	270K	360K	420K	550K	175K	270K	360K	420K	550K	175K	270K	360K	420K	550K		
AIRCRAFT TYPE	F-4C			12	12	12				12	12						120	60
	A-4B		12	12				12	12								96	48
	A-6A			8					8								32	16
	A-1E	8					8										32	16
	F-105D									8							16	8
	B-52								12**								24	12
	B-58									12**							24	12
	RF-4C				8					8*					8		48	16
	RF-101			8	8					8							48	24
	RA-5C				8										8		32	16
																	472	228

*SAME CREWS FLEW AT NIGHT.

**B-52 AND B-58 AIRCRAFT FLEW 350 AND 450 KNOTS, RESPECTIVELY.

THE ENTRIES IN THE TABLE INDICATE THE NUMBERS OF CREWS UTILIZED FOR EACH ALTITUDE AND SPEED COMBINATION BY TYPE AIRCRAFT. EACH CREW FLEW TWO SORTIES, ONE OVER EACH COURSE.

Table 1-2 (U) Target Acquisition, Sorties and Aircrews

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aircrewmen were briefed to activate an event button on acquisition of navigation control check points (CCP), final control check points (FCCP), final reference points (FRP) and targets, and again at their estimated closest points of approach to check points, reference points, and targets. The SAC radar navigator was instructed to activate an event button when he had acquired the radar offset aiming points (OAP) for a target and at the point that the bomb-navigation sytem (BNS) indicated weapon release at the target.

(5) Each aircraft carried an instrumentation pod and each target had a ground based instrumentation system. The two systems provided data for computation of aircraft position in space, recording of event button activation, monitoring aircraft maneuvering, recording visibility conditions, and monitoring instrumentation system performance.

(6) A detailed description of the test, test area, targets, and procedures may be found in items 2, 4, and 10, Appendix A.

b. Test Area.

(1) The test was conducted on a special range located in west central Arkansas and eastern Oklahoma. The ancillary navigation test (Test 2.1) was conducted on two adjacent low altitude navigation courses originating near England AFB, Alexandria, Louisiana, and extending north northwest 190 miles to the southern edge of the target area.

(2) The target area included two courses, each containing four tactical targets. The first two targets on each course were approached from south to north, the second two from north to south. An FCCP terminated each navigation course about 10 to 20 nautical miles prior to the FRP for the first target. Diagrams of the target area and the navigation courses are shown in Figure 1-1. Figure 1-2 is a diagram of the target area showing nominal tactical and strategic aircraft course lines. A detailed description of the targets, final reference points, offset aiming points, and target approaches is contained in items 2, 4, and 10, Appendix A.

(3) Targets selected for the test were typical fixed or semi-fixed types that would normally be scheduled for attack by pre-planned air-strikes as a result of pre-strike intelligence. The targets are listed in Tables 1-3 and 1-4. All target component vehicles, missile launchers, and missiles located at the sites were mock ups. A detailed description of the targets, final reference points, and target approaches is contained in items 2 and 4, Appendix A.

c. Pilot (Aircrew) Test Participation.

(1) Tactical (strike and reconnaissance) and strategic aircraft

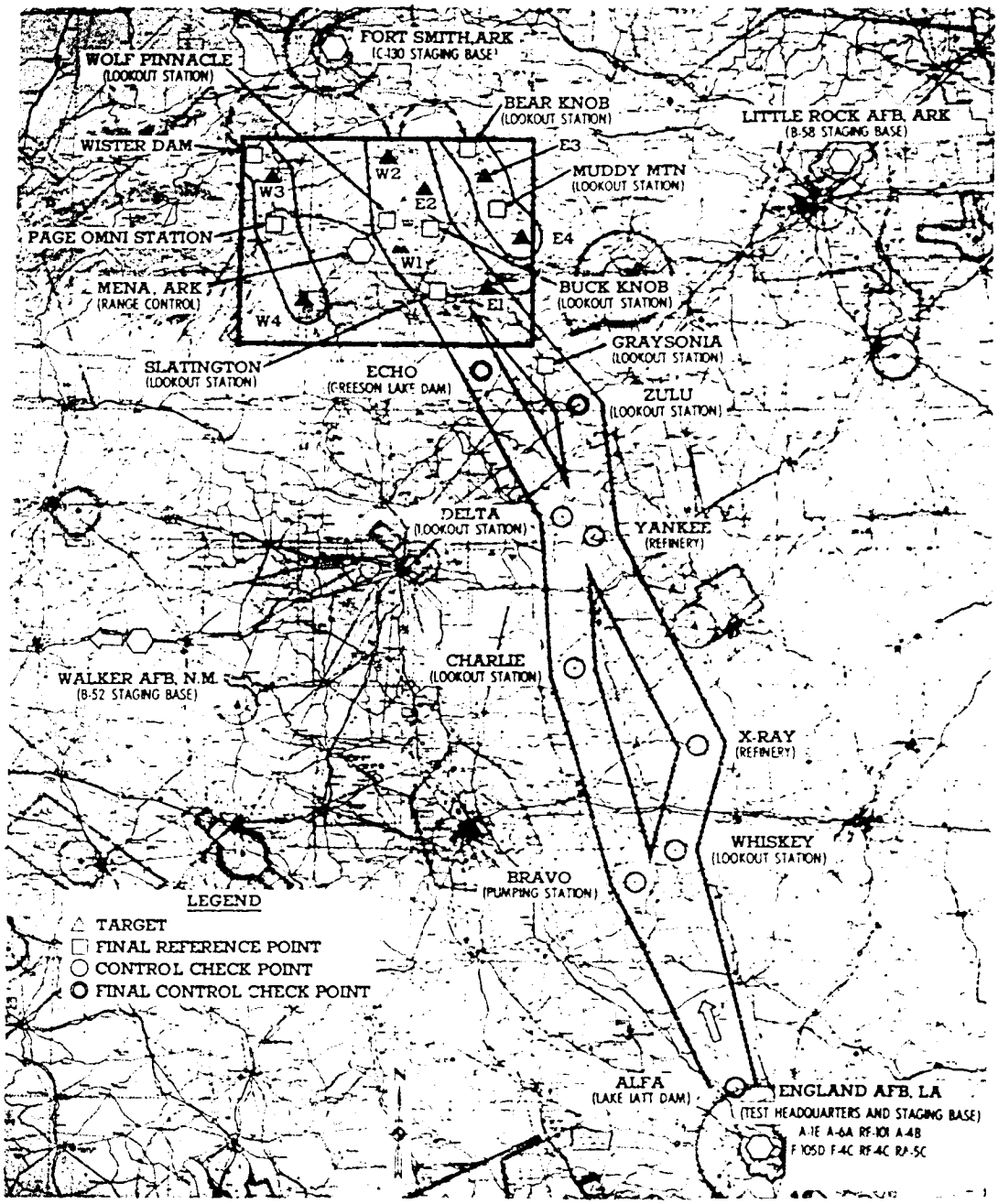

Figure 1-1 (U) 4.1 Test Range, Navigation Courses and Target Area

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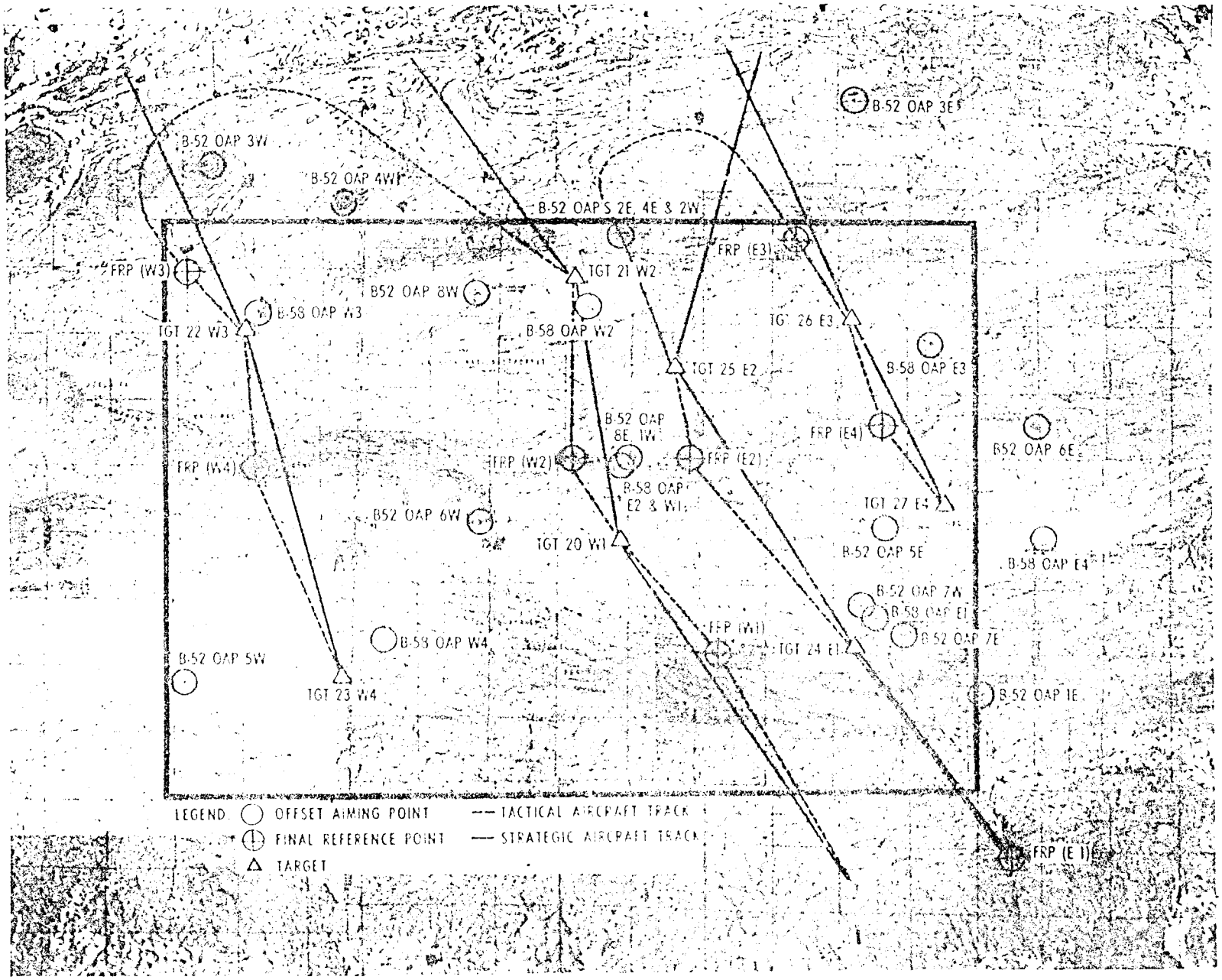

Figure 1-2 (U) 5.1 Target Area

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SITE NUMBER	TARGET DESIGNATOR	TARGET NAME	MAP COORDINATES	REFERENCE GRAPHIC
20	W1	Aircraft Control and Warning (AC&W) Radar Site	343501N/0940306W	USGS Topo. 15 Min. Series Mena, Ark. 1958
21	W2	Petroleum, Oil and Lubricant (POL) Dump	345636N/0940700W	USGS Topo. 15 Min. Series Waldron, Ark. 1939
22	W3	Highway Bridge over Poteau River (with Super-structure)	345129N/0943743W	USGS Topo. 15 Min. Series Heavener, Okla. 1959
23	W4	Surface-to-Air Missile (SAM) Site	342416N/0942854W	USGS Topo. 15 Min. Series Cove, Ark. 1959

Table 1-3 (U) West Course Target Positions

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SITE NUMBER	TARGET DESIGNATOR	TARGET NAME	MAP COORDINATES	REFERENCE GRAPHIC
24	E1	Aircraft Control and Warning (AC&W) Radar Site	342624N/0934114W	USGS Topo. 15 Min. Series Glenwood, Ark. 1942
25	E2	Surface-to-Air Missile (SAM) Site	344829N/0935748W	USGS Topo. 15 Min. Series Parks, Ark. 1960
26	E3	Tactical Airfield	345221N/0934115W	USGS Topo. 15 Min. Series Gravelly, Ark. 1960
27	E4	Highway Bridge Over Ouachita River (Flat Bridge)	343734N/0933249W	USGS Topo. 15 Min. Series Mount Ida, Ark. 1959

Table 1-4 (U) East Course Target Positions

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were flown from the vicinity of England AFB to point Alfa, then along one of the two navigation courses ending at either point Echo or Zulu. They then continued on the corresponding east or west target course. The aircrews attempted to visually acquire each prebriefed target and, as necessary, maneuver the aircraft to fly directly over the target. No attempt was made to simulate delivery techniques for ordnance. Course reversals and second attempts were not permitted. Aircrews were instructed not to alter heading more than 90 degrees for attempted target flyovers. Pilots were provided vectors to succeeding reference points or check points, on request.

(2) The events corresponding to visual acquisition of, and closest point of approach to, each target were recorded by the aircrews by activating an event button which recorded the time of the event. (For this test visual acquisition was defined as the event response by the aircrews following detection and identification of the prebriefed target.) Each aircrew flew two test sorties, one over each of the two test courses. Approximately one-half of the aircrews flew in the order east course-west course; the remainder flew the west course first. Performance was recorded by a special range instrumentation system which involved both surface and airborne components and telemetry. Each test aircraft carried an instrumentation pod which collected test data such as radar altimeter measurements, event button activation, and slant range measurements, and relayed these data to three instrumented aircraft orbiting overhead. Aircraft position during the sortie was calculated from the recorded data.

(3) For the purpose of standardization and consistency, aircrew members were given sound film briefings on general objectives of and procedures for the test and for the specific test course to be flown. Following each permission briefing, each aircrewman completed a written questionnaire to verify understanding of essential phases of the sortie including speed, altitude, course, targets assigned, data transmission procedures, and emergency procedures. All necessary test area maps and charts (annotated to indicate exact location of check points and targets and pinpoint oblique and vertical area photographs of each target) were provided the aircrews. Sufficient time was made available for adequate mission planning. After each sortie was completed, each aircrewman completed a postflight questionnaire. After both sorties were completed each aircrew member was given a confidential debriefing interview. Vision tests were given to a limited number of aircrews.

d. Test Aircraft. Ten aircraft types participated in the test. Five tactical strike aircraft (A-1E, A-4B, A-6A, F-4C, and F-105D) and three tactical reconnaissance aircraft (RA-5C, RF-101, and RF-4C) operated from England AFB, Louisiana. Two strategic aircraft, the B-52 and B-58, staged from

their home bases, Walker AFB, New Mexico and Little Rock AFB, Arkansas, respectively. These aircraft with MA-9 instrumentation pod attached are shown in Figures 1-3 through 1-12. Detailed information on the physical characteristics of these aircraft and their performance may be found in item 7, Appendix A.

4.(U) DATA PRESENTATION.

a. Data Plots.

(1) Aircraft position data.

(a) The aircraft position data plot shows the aircraft x-y location with respect to the Mena plane coordinate system. The Mena plane is a plane passing through a monument in Mena, Arkansas, and perpendicular to a line passing through the monument and the center of the earth. The Mena, Arkansas, monument is the origin of the coordinate system with east being +x and north being +y. The aircraft position data sheets contain a continuous plot of the aircraft track (except between the second and third target on each course) with one data point per second. The data are presented by one overall plot and four expanded plots. The overall plot shows the aircraft track over the whole target area, and each expanded plot shows one target and its associated final reference point (FRP). The target is denoted by an X with the center of the X being the target coordinate. The FRP coordinates are the dot at the bottom of the F. The aircraft track is annotated with time ticks in central standard time, once every minute on the expanded plots and once every five minutes on the overall plot. The point on the expanded plots at which target acquisition occurred is annotated with an A. When the time of acquisition is not known or no acquisition occurred, there will be no annotation. The minimum ground range from the aircraft to the target and associated qualifier is also shown on the expanded plots. Map overlays are provided for the overall plots and each expanded plot. The overlays are in three colors; brown for contours, red for cultural features, and blue for lakes and water-ways. The overlays are also annotated with target numbers on the overall maps. The overlays are numbered one through ten, Table 1-5 lists the overlay numbers and the corresponding position data plot.

Figure 1-3 (U) A-1E Aircraft with MA-9 Pod

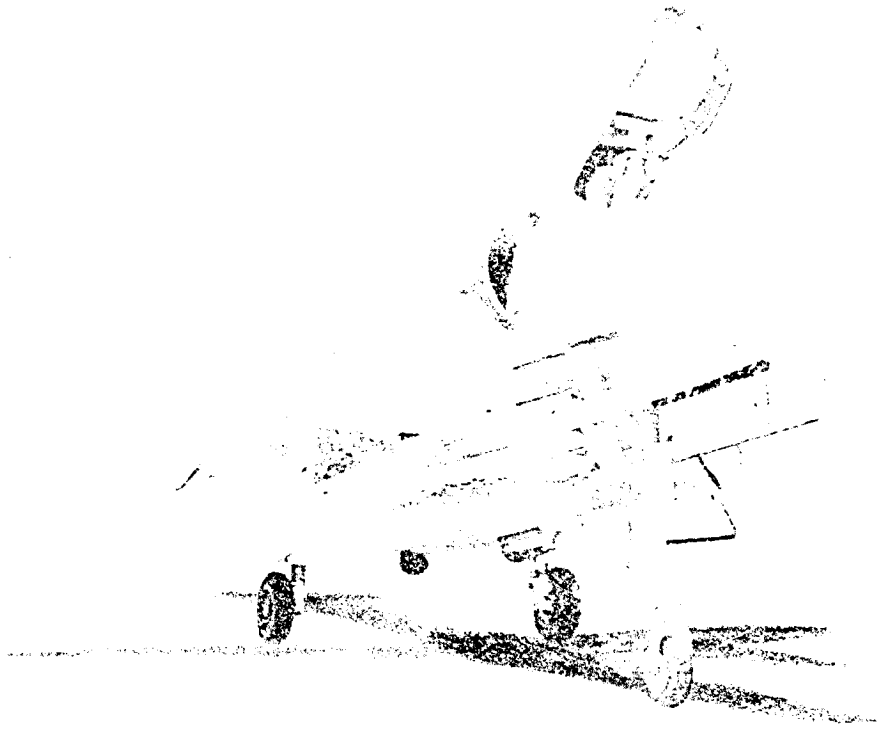

Figure 1-4 (U) A-4B Aircraft with MA-9 Pod

Figure 1-5 (U) A-6A Aircraft with MA-9 Pod

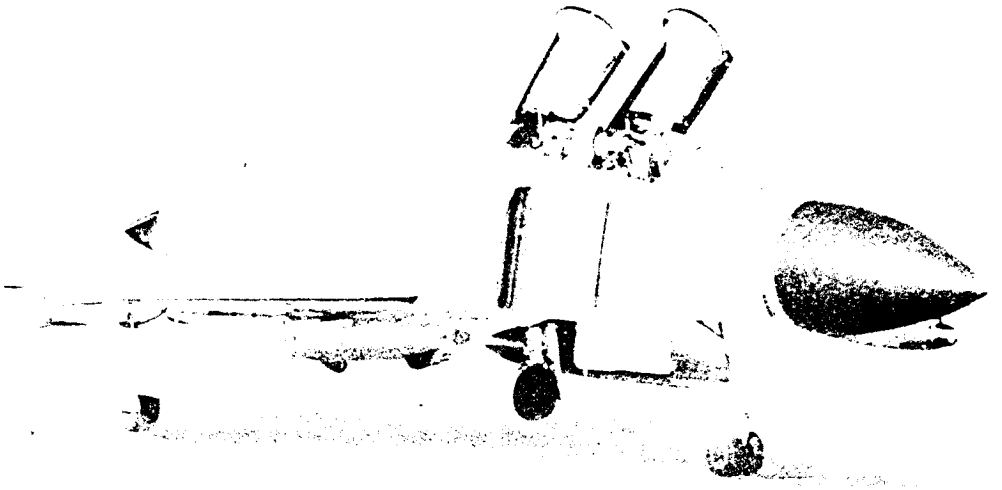

Figure 1-6 (U) F-4C Aircraft with MA-9 Pod

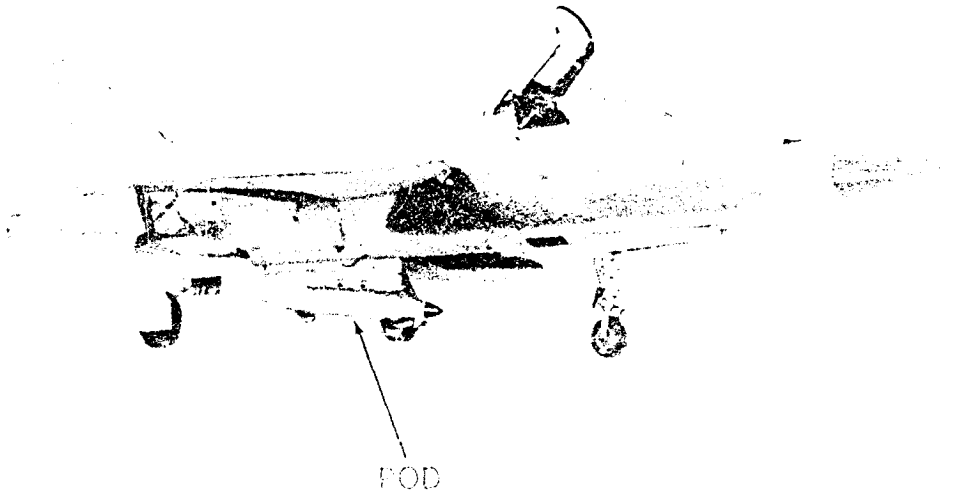

Figure 1-7 (U) F-105D Aircraft with MA-9 Pod

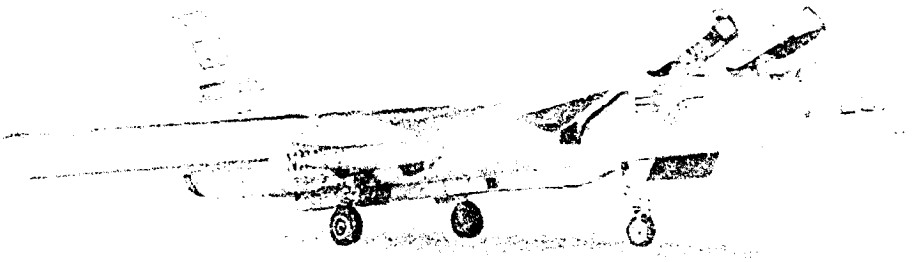

Figure 1-8 (U) RA-5C Aircraft with MA-9 Pod

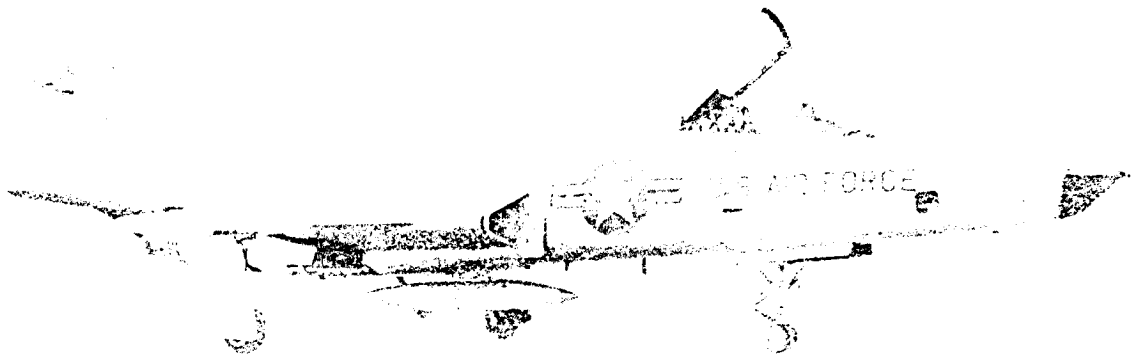

Figure 1-9 (U) RF-101 Aircraft with MA-9 Pod

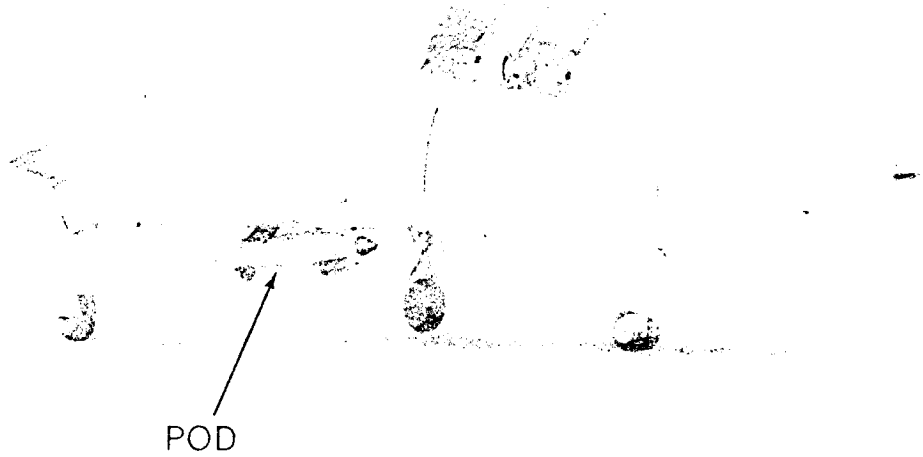

Figure 1-10 (U) RF-4C Aircraft with MA-9 Pod

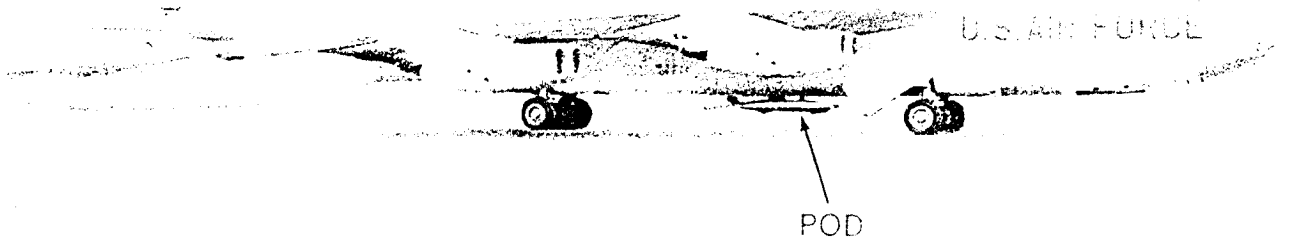

Figure 1-11 (U) B-52 Aircraft with MA-9 Pod

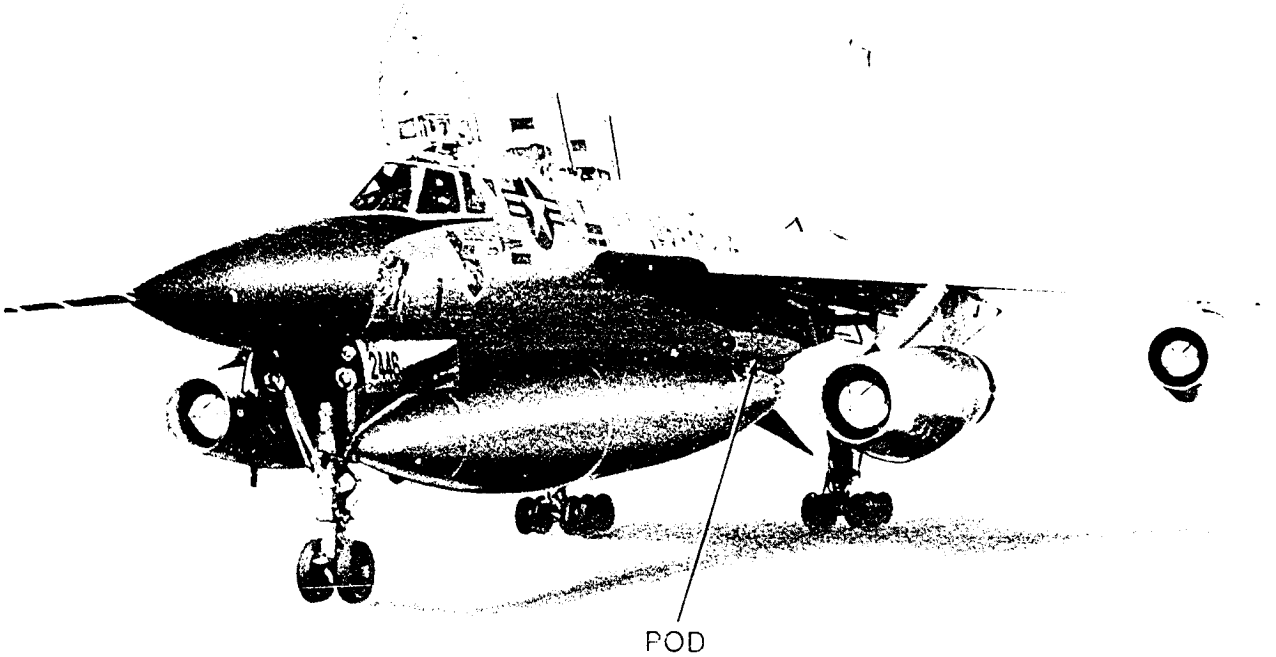

Figure 1-12 (U) B-58 Aircraft with MA-9 Pod

OVERLAY NUMBER	POSITION PLOT
1	WEST COURSE OVERALL
2	TARGET W1
3	TARGET W2
4	TARGET W3
5	TARGET W4
6	EAST COURSE OVERALL
7	TARGET E1
8	TARGET E2
9	TARGET E3
10	TARGET E4

Table 1-5 (U) Overlay Numbers with Corresponding Position Plots

(b) Minimum ground distance. The minimum ground distance, in feet, from the aircraft track to the target and a qualifier which indicates its source are printed underneath each expanded plot. The following qualifiers are used.

Qualifier	Definition
DME	Minimum ground distance was calculated from the x-y position data.
C-band	Minimum ground distance was calculated using C-band slant range and aircraft altitude above the target plane.
Estimated	Minimum ground distance was estimated by extrapolating the x-y position data.

(c) Accuracy.

1 The x-y position plots were obtained from the Test 4.1 distance measuring equipment (DME) system which included an instrumented pod on the aircraft, three C-130 aircraft orbiting the test area and seven DME ground transponder stations. The raw DME data was processed by an electronic computer with considerable quality control by a man in the loop at various stages during the processing to obtain the final smoothed x-y plots presented. A detailed description of the DME instrumentation and data processing system may be found in item 2, Appendix A.

2 The accuracy of the aircraft position plots was determined by comparing the x-y plots to C-band radar slant range (discussed in paragraph 4a(2)(d), page 1-20 of this report) and reconnaissance imagery data collected during Test 4.1 (item 4, Appendix A). A sample of the raw DME data

was also processed through a significantly different data reduction system than used in Test 4.1, and compared to the 4.1 data output to determine the effect of data processing on accuracy. The results of these comparisons indicated that better than 75 per cent of the aircraft position data was within ± 200 feet of the actual position.

(2) Telemetry data (Figure 1-13). There are five telemetry data plots on each page, aircraft terrain clearance, normal acceleration, roll angle, pitch angle, and slant range to the navigation course check points and the targets. The data is plotted generally continuously from the time the aircraft passes point Alfa, the beginning of both navigation courses, to the time the aircraft passes the final target on the appropriate course. Time annotation appears at the top of each page and each vertical grid is equivalent to one minute. The arithmetic mean and standard deviation (sigma) of the data for the terrain clearance, normal acceleration, roll angle and pitch angle is listed on each page over the interval covered by that page. The statistics were calculated using all the data available for that time interval, including portions that were off scale or abnormal. Abnormal data are identified as such on the plots, where appropriate. The series of numbers in the lower right corner of each page refers to the data tape used and has no significance to the data plotted. A detailed description of the Test 4.1 instrumentation system may be found in item 2, Appendix A.

(a) Terrain clearance. The terrain clearance data shown on the telemetry data plots are the aircraft altitude above the terrain versus central standard time. The data were obtained from a radar altimeter located in the aircraft instrumentation pod. The resolution is five feet and nominal accuracy is ± 20 feet. A vertical gyro directed the radar altimeter antenna directly downward. The antenna gimbals had a range of ± 45 degrees so that when the aircraft roll angle exceeded this limit the antenna would range off terrain not directly under the aircraft. Therefore, aircraft roll angle data should be considered when using radar altimeter data.

(b) Normal acceleration. The normal acceleration data shown for the aircraft is the acceleration on the axis perpendicular to the plane of the lateral and longitudinal axis of the aircraft. Positive values indicate increasing velocity upwards. The data were obtained from a standard accelerometer located in the aircraft instrumentation pod. Its resolution is 0.012g and advertised accuracy is ± 0.15g. The measuring instrument was located on a main structure of the pod, which was connected to the aircraft by two mounting lugs generally at the standard bomb attachment station. The effect

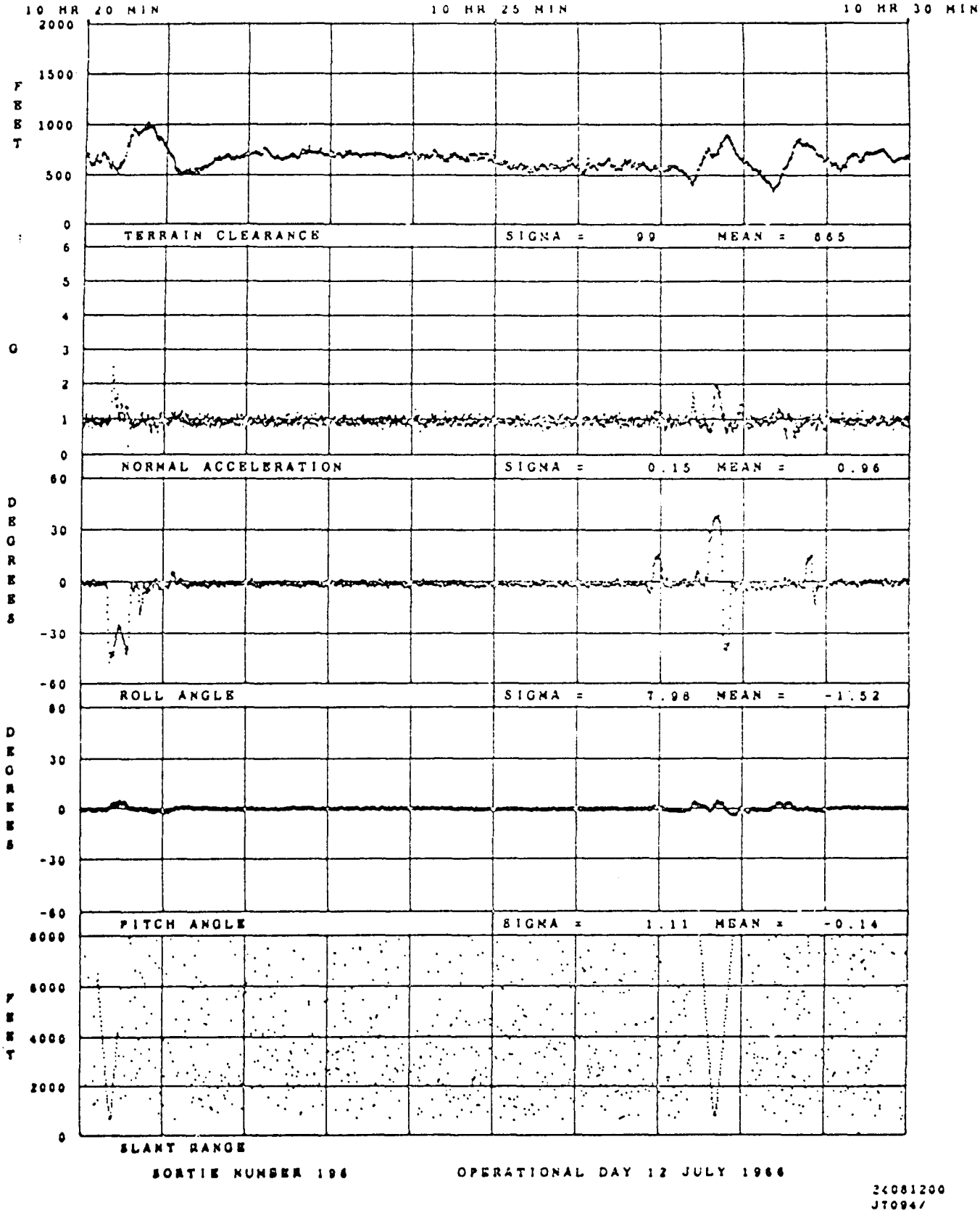

Figure 1-13 (U) Typical Telemetered Data Plots

of the mechanical coupling between the aircraft and pod is unknown.

(c) Roll and pitch angle. The roll and pitch angle data shown is the aircraft's angle change about its longitudinal and lateral axis, respectively, versus central standard time. Positive values indicate clockwise roll angle looking forward and nose rising pitch angle. These angles are measured by the appropriate gimbal outputs on a vertical gyro mounted in the instrumentation pod. The roll angle has a resolution of 0.36 degrees and an accuracy of ± 2 degrees. The pitch angle has a resolution of 0.17 degrees and an accuracy of ± 2 degrees. If the aircraft made a pitching maneuver over ± 85 degrees about its lateral axis, the gyro would hit its gimbal stops and tumble. This would cause the gyro to lose its reference, after which the readings could be invalid for the remainder of the flight.

(d) Slant range. The slant range data shown was the slant range from the aircraft to each navigation course CCP and FCCP and each target, versus central standard time. The slant range data was obtained from a C-band radar system. Each target, FCCP, and CCP had a ground based C-band radar transceiver which excited a transponder located in the aircraft instrumentation pod. The random points on the plots (Figure 1-13) are generated when the aircraft is out of range of the C-band transceiver. A series of points in a straight line generally forming a V is the slant range data from the aircraft to the transceiver. The vertex of the V is the minimum slant range. The data collection system had a maximum range capability of 50,000 feet. However, the range of the radar system was limited to approximately 18,000 feet. The accuracy of the system was 50 feet + 0.2 per cent of the actual range.

(3) Aircraft altitude and terrain profile.

(a) Terrain altitude profile. The terrain profile shown is the altitude of the terrain above mean sea level (MSL), under the aircraft track. The profile was plotted versus central standard time over the same time interval as the expanded aircraft position plots. There are time ticks on the terrain plot once every five seconds. The plots are annotated with a CPA which indicates the time of the aircraft's closest point of approach to the target. The terrain profile data were obtained from elevation listings from photogrammetric terrain maps of the target area. The terrain elevations were digitized in 150-foot grids from which a profile under the aircraft track was plotted. Linear interpolation between grids was used for points located between grid lines. The accuracy of the terrain listings is considered to be from ± 10 feet to ± 20 feet, depending upon the map quadrangle used. The error in the interpolation between grids is dependent upon the terrain being interpolated and cannot be defined quantitatively, but is considered to approach the accuracy of

the elevation listings:

(b) Aircraft altitude profile. The aircraft altitude profile shown is the altitude of the aircraft above mean sea level versus central standard time.

1 Data process. The aircraft altitude profile was obtained by combining the radar altimeter data, discussed in paragraph 4a(2)(a), with the terrain altitude profile data. The computer, which was used for the computation, calculated a value of aircraft altitude at every time point along the track, and then fitted a curve to these points producing a smooth continuous plot. During the smoothing process data that varied more than 500 feet from the smoothed plot were eliminated and the remaining data were resmoothed.

2 Accuracy. There were three main sources of error in the aircraft altitude:

a The error in the aircraft position (±200 feet) placed the aircraft over the wrong terrain and thus the wrong terrain elevations. This was critical, depending upon how rapidly the terrain changed in the area of the calculation.

b The radar altimeter ranged off dense foliage, which was prevalent in the test area. The terrain elevations neglect foliage; therefore, the error in aircraft altitude is a direct function of the foliage height from which the radar altimeter may have ranged.

c The error in the radar altimeter as previously quoted, was ± 20 feet.

3 Considering these three factors and the computer programming used to minimize them, the accuracy of the aircraft altitude is considered to be ± 50 feet for over 75 per cent of the data.

b. Data Summaries. The data summaries which are contained in the supplemental volume (item 9, Appendix A) presents statistics on the aircraft speed and its altitude above terrain over the search interval for each target encounter. The search interval is defined as the track interval, for each aircrew/target encounter which commenced when the test aircraft crossed an imaginary line perpendicular to the course line (line between the FRP and target) at the target FRP, or at a predetermined point between the FRP and target and which terminated at the point of pilot acquisition, or when the aircraft crossed a line passing through the target and perpendicular to the course line when pilot acquisition did not occur. The time the speed and altitude statistics calculations started and stopped is provided for each encounter listed. Since missing or poor quality data are excluded from these statistics, different

start and stop times for speed and altitude may result for a particular encounter. The visibility data collected during the test and the pilot acquisition qualifier, time, and ground range are also presented in the summary. The data are listed by sortie and the sorties are ordered by aircraft type, operational day, course, assigned speed, and assigned altitude.

(1) Speed.

(a) The aircraft speed values provided in the data summary are the mean, median, and standard deviation calculated generally over the search interval.

(b) Accuracy. Aircraft instantaneous speed was obtained by taking the derivative with respect to time of the smoothed x-y track of the aircraft. The accuracy of the instantaneous speed is considered to be $\pm$ 10 knots for over 75 per cent of the data. Errors greater than this may occur in places where the aircraft position data is larger than the quoted 200 feet.

(2) Aircraft altitude above terrain.

(a) The aircraft altitude values provided in the data summary are the mean, median, and standard deviation of the radar altimeter data generally over the search interval.

(b) Accuracy. The accuracy of the data is dependent upon the radar altimeter accuracy and the ability of the quality control system to eliminate bad data caused by instrument malfunctions.

(3) Visibility.

(a) There were four photometers located at each target site. Their readings were sampled once every tenth of a second throughout the operational day. In the data reduction process the data was thinned such that only those readings for an interval of interest during each target encounter was used. The area of interest was established from the time of minimum approach of the aircraft to the target back to a time when the target could not possibly have been visible. The photometer readings in each level of interest were exponentially smoothed over the interval and then averaged to obtain a single value for each encounter. This process minimized the errors due to noisy data. The following photometer readings are listed in the data summaries for each encounter.

1 A telephotometer (TP) which looked into a black box and measured the brightness of field between instrument and black box. It was oriented in the direction of target to FRP. The black box was located at different ranges from the telephotometer for each target. The various ranges are listed in Table 1-6.

TARGET	RANGE FROM TELEPHOTOMETER TO BLACK BOX (FEET)
AC&W SITE (W1)	35,469
POL DUMP (W2)	31,901
BRIDGE (W3)	4,225
SAM SITE (W4)	4,507
AC&W SITE (E1)	22,786
SAM SITE (E2)	25,729
TACTICAL AIRFIELD (E3)	23,760
BRIDGE (E4)	25,062

Table 1-6 (U) Range of Telephotometer From its Associated Black Box for Each Target

The telephotometer was calibrated in foot-lamberts and, combined with the data collection system, had a resolution of 47 foot-lamberts and an accuracy of ± 23 foot-lamberts.

2 An approach photometer (AP) looked at the sky, just over the black box and measured the brightness of the sky in the direction of the target to FRP. The approach photometer was calibrated in foot-lamberts and, combined with the data collection system, had a resolution of 159 foot-lamberts and an accuracy of ± 79 foot-lamberts.

3 A sky photometer (SP) looked at the sky, just above the horizon, 180 degrees in azimuth from the approach photometer and measured the brightness of the sky in the nominal direction of outgoing sortie aircraft. The sky photometer was calibrated in foot-lamberts and, combined with the data collection system, had a resolution of 159 foot-lamberts and an accuracy of ± 79 foot-lamberts.

4 A background photometer (BP) looked at the average target background and measured its brightness in the same direction as the sky photometer. The background photometer was calibrated in foot-lamberts and, combined with the data collection system, had a resolution of 32 foot-lamberts and an accuracy of ± 16 foot-lamberts.

(b) The above photometer readings were used in Test 4.1 to calculate the following visibility parameters.

1 Meteorological visibility (Vm) was calculated from the following relation:

$$Vm = R \left[\frac{\ln K}{\ln (-P)} \right]$$

where R was the range from the telephotometer to the black box; K was a constant which was used to relate the threshold contrast to the "standard" weather observer, and was generally considered to be 0.032; and P was a ratio calculated from the telephotometer (TP) and approach photometer (AP) readings using the relation:

$$P = \frac{TP-AP}{AP}$$

2 The sky/ground ratio was calculated from the relation:

$$\text{sky/ground} = \frac{\text{sky photometer}}{\text{background photometer}}$$

(c) In addition to the photometers there was an illuminometer located at each target site. It consisted of a light sensing device, looking straight up, with a shade passing over its lens once every 15 seconds. The illuminometer measured the total illumination from sky and sun (B1), and when the direct rays from the sun were masked by the shade the total illumination from the sky only (B2) was measured.

1 Once every 15 seconds there was a maximum and minimum reading from the illuminometer throughout the operational day. These data were thinned in a manner similar to the photometer data and an average maximum and minimum value was obtained over each interval of interest. A detailed description of the processing of the visibility data is available in item 5, Appendix A.

2 Accuracy. The illuminometer was calibrated in foot-lamberts and, combined with the data collection system, had a resolution of 159 foot-lamberts and an accuracy of $\pm$ 79 foot-lamberts.

3 The illuminometer readings were used to establish the sun illumination (B1-B2) and the sky illumination (B2) for each encounter in Test 4.1. They were also used in calculating the shadow contrast using the relation:

$$\text{shadow contrast} = \frac{B2}{B1} - 1$$

(d) The accuracies stated for the visibility readings are ideal and are based only on the limitations of the instrumentation system. Malfunctions in the instrumentation system which would cause erratic readings and noisy data, and in some cases a complete loss of data, are not taken into account. However, the data processing system and man in the loop quality control of the data minimized the bad data such that over 75 per cent is considered to be within the accuracies stated. When using the visibility data it

should be realized that all the instruments are integrating devices such that the readings from sources of different light intensities, such as sky and cloud, within the field of view of the instrument are integrated together.

(4) Pilot acquisition. The data summaries list the pilots' target acquisition qualifier for each encounter. The pilot acquisition time and ground range are also provided, when available.

5. HUMAN FACTORS DATA. During the conduct of Test 4.1, human factors data were collected from the aircrews by means of questionnaires and personal interviews. The aircrewmen completed an experience questionnaire, a preflight questionnaire, a postflight debriefing questionnaire, and a safety questionnaire. They also had a confidential oral debriefing after completing both of their assigned sorties. Those aircrewmen given vision tests completed a special personal questionnaire.

a. Purpose of Human Factors Studies.

(1) Human factors studies were intended to complement the analysis of objective flight performance data collected by the inflight and ground instrumentation systems. The interview and questionnaire data were intended to provide explanations for the more objective data and to suggest hypotheses for further study.

(2) A second purpose of these studies was to secure opinion data not otherwise obtainable. For example, aircrew opinion of present low altitude training programs or of the aircraft performance during low altitude flight can point to design deficiencies and possible means for correction.

(3) Another purpose of the human factors studies was to derive a mathematical statement to explain relative aircrew proficiency in low altitude flight as a function of such factors as age, experience, and scores on the visual tests.

b. Sources of Human Factors Data. Test 4.1 human factors areas of interest and data sources are outlined below. JTF-2 4.1, Volume 2, Field Test Description, (item 2, Appendix A) describes in detail the forms and procedures utilized in obtaining the human factors information.

(1) Aircrew age and rank. Source: Aircrew experience forms filled out by participating aircrews either prior to or during the test.

(2) Aircrew flying experience (including low altitude experience). Source: Aircrew experience forms, except for a question on the number of prior flights together as an aircrew. This was asked during some of the confidential (i.e., private) interviews conducted by civilian scientists after each aircrew's final sortie.

(3) Aircrew motivational factors. Source: confidential interviews.

(4) Other factors influencing performance levels. Source: Confidential interviews, postflight questionnaires filled out by aircrews after each sortie, and observations made by civilian scientists during the conduct of the test.

(5) Aircrew predictions and evaluations of performance. Source: preflight questionnaires filled out by aircrews prior to each sortie, postflight questionnaires, confidential interviews, and inflight performance data derived from the test instrumentation.

c. Reports of Human Factors Observations. Test 4.1, Volume 6, Human Factors Studies (item 8, Appendix A), reports the results of the detailed human factors studies conducted in connection with Test 4.1 field test. Items 4 and 10, Appendix A, contain summaries of human factors studies related to the tactical and strategic aircrews respectively. The data collected through questionnaires and personal interviews is catalogued by sortie and filed in the JTF-2 low altitude data bank.

6.(U) ADDITIONAL TEST 4.1 DATA. All of the data that were collected during Test 4.1 are described in detail in Appendix F, of item 4, Appendix A. The data described in the appendix are stored in the JTF-2 low altitude data bank.

a. FORMAN. Those data which were specifically related to target acquisition are summarized on microfilm in a listing called FORMAN. The listings are catalogued by sortie with a title page for each sortie, which contains the sortie nomenclature, and a separate data page for each target encounter. Figure 1-14 is a sample of a title page and Figures 1-15 through 1-18 are samples of target pages.

b. FORMAN Format. The FORMAN list contains one record per sortie. Each record consists of an identification array (title page), followed by four target arrays (each on a separate page). The identification array is 50 words long and each target array is 200 words long. The target pages are listed by target site number. Targets 20 through 23 refer to targets W1 through W4; targets 24 through 27 refer to targets E1 through E4. The Binary Coded Decimal (BCD) literal FILLWORD indicates that no previous program ever attempted to supply the value of an output variable. The BCD literal MISSINGD indicates that a program other than SKELETON attempted to fill the variable, but the required input information was not present. All BCD words are assumed to be left-justified unless otherwise specified. All distances are in feet, and all times are in hundredths of a second.

(1) ID array.

Word	Description
1	"ID BLOCK." A BCD literal identifier.
2	Operational date. A BCD word giving the date the sortie was flown and of the form DDMMYY.
3	Program name. A BCD identifier giving the name of the program which last modified the sortie. Legal forms are: SKELETON HEADING UPDATE NEWPD
4	Sortie number. A BCD identifier.
5	Aircraft type. A BCD identifier.
6	Altitude code. A BCD identifier of the assigned altitude. Legal forms are: 1, for 0 to 400 feet 2, for 500 to 900 feet
7	Speed code. A BCD identifier of the assigned speed code. Legal forms are: 1, for 175 knots 2, for 270 knots 3, for 360 knots 4, for 420 knots 5, for 550 knots
8	Course/navigation leg, completed targets. A BCD word. Character 1: Course identifier; 1 is east course, 2 is west course. Character 2: Navigation leg completion index; 1 is completed, 0 is not completed. Characters 3-6: Identification of each target and whether or not it was attempted.

Character	West Course Tgt	East Course Tgt
3	W1	E1
4	W2	E2
5	W3	E3
6	W4	E4

Each character is filled with a 1 or 0, as follows:
1 is satisfactorily attempted,
0 is not satisfactorily attempted.

9	Pilot code. A BCD word, uniquely identifying each pilot.
10	Pod identification and channel number. A BCD word identifying each pod and indicating telemetry channel number. Characters 1 through 3 identify the pod; character 3 also identifies the channel. Channel numbers range from 1 through 6.
11	Aircraft number. A BCD word giving the number on the aircraft tail.

Word	Description
12	Number of sortie flights. A BCD character giving the number of flights composing the sortie being described.
13	Course sequence. A single BCD character indicating whether course being described was encountered by pilot on first or second sortie. 1. The present course was flown by the pilot on his first sortie. 2. The present course was flown by the pilot on his second sortie; the other course was flown first.
14	Sortie start time. Time of day.
15	Blank.
16	Day/night indicator. A BCD word. If time is less than 6840000, this word will contain DAY; if time is greater than 6840000, it will contain NIGHT.
17	Actual altitude code for all targets. A numbered code for each target indicating the actual altitude group. An "N" replaces the numbered code if no statistics were calculated; a "P" replaces the code if the calculated value was considered poor. The actual altitude codes were:

Code	Altitude Band (feet)
ALT 1	0 - 500
ALT 2	501 - 1000
ALT 3	1001 - 1500
ALT 4	Sbove 1500

Word	Description
18	Actual speed code for all targets. A numbered code for each target indicating the actual speed group. An "N" replaces the numbered code if no statistics were calculated; a "P" replaces the code if the calculated value was considered poor. The actual speed codes were:

Code	Speed Band (knots)
SPD 1	160 - 230
SPD 2	231 - 325
SPD 3	326 - 400
SPD 4	401 - 500
SPD 5	501 - 610

Word	Description
19	Time of acquisition of first navigation check point, ALFA.
20	Time of ALFA minimum. Measured closest approach to initial control check point ALFA.
21	ACQCCP29 or ACQCCP33. Acquisition time of second control check point, BRAVO (east course) or WHISKEY (west course).
22	MINCCP29 or MINCCP33. Measured time of closest approach to check point BRAVO or WHISKEY.
23	ACQCCP30 or ACQCCP34. Acquisition time of third control check point, CHARLIE (east course) or XRAY (west course).

Word	Description
24	MINCCP30 or MINCCP34. Measured time of closest approach to check point CHARLIE or XRAY.
25	ACQCCP 31 or ACQCCP35. Acquisition time of fourth control check point, DELTA (east course) or YANKEE (west course).
26	MINCCP31 or MINCCP35. Measured time of closest approach to check points DELTA or YANKEE.
27	ACQFCP32 or ACQFCP36. Acquisition time of final control check point (FCCP) ECHO or ZULU.
28	MINFCP32 or MINFCP36. Measured time of closest approach to check point ECHO or ZULU.
29	Vector time. Time of day if vectoring assistance on navigation leg was required; otherwise, the literal MISSINGD. Source is Word 21 of identification block.
30	Target code total. Number of times flown over target or final control check point. 0 indicates that the final control check point or target was aborted.

Character	Word if on West Course	Word if on East Course
1	FCP32	FCP36
2	TGT20	TGT24
3	TGT21	TGT25
4	TGT22	TGT26
5	TGT23	TGT27

31	Pilot acquisition qualifier (paragraph 3d(3)(a)).*
32	Pilot weapon qualifier (paragraph 3d(3)(a)).
33	Copilot acquisition qualifier (paragraph 3d(3)(a)).
34	Copilot weapon qualifier (paragraph 3d(3)(a)).
35	Radar Navigator (R/N) acquisition qualifier for SAC aircraft (paragraph 3d(3)(a)).
36	Radar Navigator qualifier for SAC aircraft (paragraph 3d(3)(a)).

Words 37 through 40 are target status identifiers. Data in the target arrays can be changed by program HEADING only if these words contain the BCD identifier "TARGETXX." If the target was not completed, the word will contain the BCD identifier "ABORTEDY." Once a sortie has been certified, these words will contain the certification date in the form MM/DD/YY.

	West Course	East Course
37	Target W1	Target E1
38	Target W2	Target E2
39	Target W3	Target E3
40	Target W40	Target E4

*All paragraphs referenced on pages 1-29 through 1-37 are contained in Appendix F of item 4, Appendix A.

Word	Description
41	East or west course (EAST or WEST).
42	Reference number.
43	Random operational day number and group number. The first two characters are the random operational day identification used during data processing. The last four characters (right justified) are the Roman numeral group indicator used during data processing.
44	Masking program tape number.
45	Masking program run rate.
46	J Number. A BCD word identifying the PODPOS02 tape which was last used by program HEADING to modify this sortie.
47	J Number. A BCD word identifying the PODPOS02 tape which was last used by program NEWPD to modify this sortie.
48	HEADING date. The date the HEADING program was last run on this sortie (MM/DD/YY).
49	NEWPD date. The date the NEWPD program was last run on this sortie (MM/DD/YY).
50	UPDATE date. The date the update program was last run on this sortie (MM/DD/YY).

(2) Target array. In the following descriptions, X, Y, Z refer to Mena rectangular coordinates and x, y, z refer to target plane coordinates wherein: the origin is at the target, +x is toward the final reference point (FRP), +y is to the right of the FRP-to-target line when looking toward the target, and z is positive above the target. If X, Y, Z are all present, the transformation to x, y, z is rigorous. If Z is missing, the last good Z is used for transforming from the Mena to the target plane coordinate system and the value for z will be missing. All slant ranges are $(x^2 + y^2 + z^2)^{\frac{1}{2}}$ at the time of the event. If any X, Y, Z or the time of the event are missing, the slant range will be missing. All ground ranges are $(x^2 + y^2)^{\frac{1}{2}}$ at the time of the event. If any X, Y, or the time of the event are missing, the ground range will be missing.

Word	Description
1	Target number identifier (i.e., targets 20 through 27).
2	Visibility index.
3	Meteorological visibility, feet.
4	Sky/ground ratio.
5	Sky illuminance.
6	Sun illuminance.
7	Shadow contrast.
8	Target code (indicates number of times pilot has flown over target being described).

Word	Description
9	Pilot acquisition qualifier (paragraph 3d(3)(a)).
10	Pilot acquire time. Time of day of pilot's acquisition.
11	Pilot acquire slant range.
12	Pilot acquire ground range.
13	Start time of acquire line.
14	Stop time of acquire line.
15	Slope of acquire line.
16	y-intercept of acquire line.
17	Acquire line qualifier (paragraph 3d(3)(b)).
18	Acquire angle, degrees. Angle between x-axis and acquire line.
19	Acquire offset distance.
20	Range on course (x-coordinate at acquire).
21	Lateral displacement (y-coordinate at acquire).
22	Local z at acquire (z-coordinate at acquire).
23	Depression angle, degrees. Angle between horizontal target plane and line of sight to target at acquisition. Positive angle implies that pilot must look down to see target.
24	Offset angle, degrees. Angle between acquire line and line of sight to target at acquire. A positive angle indicates aircraft must turn right to overfly the target.
25	g-turn speed, feet per second. The speed used for g-turn calculations. It is the mean x, y velocity over the acquire line interval and is always positive.
26	g-turn acceleration, g's. Horizontal acceleration required to pass over a point in the target complex.
27	Total g's. This word is $(1 + (\text{Word } 26)^2)^{\frac{1}{2}}$. It is intended that this word be comparable to the pod vertical accelerometer reading.
28	g-turn category. This BCD word indicates the type of g-turn calculation that was performed. PARTIAL indicates an offset angle between 0 degrees and 45 degrees and a positive range on course. QUARTER indicates an offset angle between 45 degrees and 90 degrees and a positive range on course. NONE indicates an offset angle greater than 90 degrees or a negative range on course.
29	g-turn qualifier (paragraph 3d(3)(c)).
30	Actual g-turn, peak value of pod vertical-accelerometer reading between acquire and closest approach to target.
31	Pilot's weapon qualifier (paragraph 3d(3)(a)).
32	Pilot's weapon time. Time of day of weapon event switch activation by pilot.

Word	Description
33	Pilot's weapon slant range.
34	Pilot's weapon ground range.
35	Minimum range qualifier (paragraph 3d(3)(d)).
36	Time of minimum. If program HEADING calculates this word, it will be the time at which the minimum value of $(x^2 + y^2)^{\frac{1}{2}}$ occurs.
37	Minimum slant range.
38	Minimum ground range.
39	Minimum local z, feet. z-coordinate at minimum time.
40	Previous minimum ground range, feet. If the minimum ground range (Word 38) is replaced by another value such as the C-band determined minimum ground range, the value in Word 38 is placed in Word 40.
41	Search interval source qualifier (paragraph 3d(3)(e)).
42	Start time of search interval. This word is the time of day of the beginning of the search interval.
43	Stop time of search interval. This word is the time of day of the search interval completion.
44	Time of track line. This word is the time of day of the beginning of the track line.
45	Stop time of track line. This word is the time of day of the end of the track line.
46	Slope of track line.
47	y-intercept of track line.
48	Track line qualifier (paragraph 3d(3)(f)).
49	Track angle, degrees. Angle measured from x-axis to track line. A track line with positive slope will yield negative track angle.
50	Track offset distance. Minimum distance between extrapolated track line and target. This variable carries the sign of its y-coordinate.
51	Sun azimuth, degrees.
52	Sun altitude, degrees.
53	Relative sun azimuth, degrees. (Relative to track line.)
54	Included sun angle, degrees. (See Section 3, paragraph 3c(11) of item 4, Appendix A.)

The following words pertain to speed statistics. Speed is defined as $(X^2 + Y^2)^{\frac{1}{2}}$.

55	Speed statistics start time. This word specifies the beginning of the interval over which NEWPD calculates speed statistics (Words 57 through 66).
56	Speed statistics stop time. This word specifies the end of the interval over which NEWPD calculates speed statistics (Words 57 through 66).

Word	Description
57	Number of good points. This is number of data points used in the statistics. It is the total number of points for the time span, reduced by the number of missing points and reduced by the number of points above and below the limits specified in Words 67 and 68.
58	Per cent good. This is based on the number of good points and the start and stop times (Words 55 and 56). Data rate was 10 points per second. Per cent good = $\frac{\text{(number of points)} \times 100}{\text{(stop time minus start time)}/10}$
59	Standard deviation, feet per second.
60	Mean, feet per second.
61	Median, feet per second.
62	Minimum, feet per second.
63	Maximum, feet per second.
64	Time span. This word is the actual time span over which statistics are calculated. It will differ from the time span indicated in Words 57 and 58 if gaps in the data occur at the start or stop times.
65	Per cent above. This number is based on the time span and on the number of points with data values greater than the value specified in Word 67. Per cent above $= \frac{\text{(number of points greater than upper limit)} \times 100}{\text{(stop time minus start time)}/10}$
66	Per cent below. This number is based on the time span and on the number of points with data values less than the value specified in Word 68. Per cent below $= \frac{\text{(number of points less than lower limit)} \times 100}{\text{(stop time minus start time)}/10}$
67	Upper limit, feet per second. Maximum value for acceptable data.
68	Lower limit, feet per second. Minimum value for acceptable data.
69	Speed statistics qualifier. This word will be filled with a BCD qualifier by program UPDATE. It is intended to indicate the quality of the speed statistics (paragraph 3d(3)(g)).

Words 70 through 84 refer to radar altimeter statistics. All comments regarding Words 55 through 69 apply to these words.

70	Start time.
71	Stop time.
72	Number of points.
73	Per cent good.

Word	Description
74	Standard deviation, feet.
75	Mean, feet.
76	Median, feet.
77	Minimum, feet.
78	Maximum, feet.
79	Time span.
80	Per cent above.
81	Per cent below.
82	Upper limit, feet.
83	Lower limit, feet.
84	Qualifier (paragraph 3d(3)(g)).

Words 85 through 99 refer to local z (height above target plane). All comments regarding Words 55 through 69 apply to these words.

85	Start time.
86	Stop time.
87	Number of points.
88	Per cent good.
89	Standard deviation, feet.
90	Mean, feet.
91	Median, feet.
92	Minimum, feet.
93	Maximum, feet.
94	Time span.
95	Per cent above.
96	Per cent below.
97	Upper limit, feet.
98	Lower limit, feet.
99	Qualifier (paragraph 3d(3)(g)).
100	Copilot acquire qualifier. A BCD character qualifying the target acquisition by the copilot. A blank indicates either that the target was aborted or that there was no copilot (paragraph 3d(3)(a)).
101	Copilot acquire time of day. Time of day of target acquisition by the copilot.
102	Copilot acquire slant range.
103	Copilot acquire ground range.
104	Copilot weapon qualifier. A BCD character qualifying the target flyover indication by the copilot. A blank indicates that either the target was aborted or there was no copilot (paragraph 3d(3)(a)).
105	Copilot weapon time of day. Time of day of the weapon event by the copilot.

Word	Description
106	Copilot weapon slant range.
107	Copilot weapon ground range.
108	Pilot/copilot acquire qualifier. A BCD word explaining the data or lack of data in Word 109 (paragraph 3d(3)(h)).
109	Pilot/copilot time difference. Time difference between pilot and copilot event button activation. A positive value means copilot indicated the event first.
110	Radar navigator acquire qualifier. A BCD character qualifying the acquisition of the target by the radar navigator. A blank indicates that the target was aborted or no radar navigator existed (paragraph 3d(3)(a)).
111	R/N acquire t me of day. Time of day of target acquisition by the R/N.
112	R/N acquire slant range.
113	R/N acquire ground range.
114	R/N weapon qualifier. A BCD character qualifying the weapon event indication by the R/N. A blank indicates either that the target was not reached or that there was no R/N (paragraph 3d(3)(a)).
115	R/N weapon time of day. Time of day of the weapon event indication by the R/N.
116	R/N weapon slant range.
117	R/N weapon ground range.
118	Spare.
119	Last mask time. Time of day of the last positive x-coordinate.

Words 120 through 163 provide mask and unmask data. The first four words (120 through 123) indicate the qualifier, time, duration, and ground range of the unmask event nearest the target. The next four words indicate the qualifier, time, duration, and ground range of the mask event nearest the target. The data are then repeated for subsequent unmasks and masks away from the target to a maximum of five mask and six unmask situations, or for forty-four words; i.e., to Word 163.

Word	Description
120	Unmask 1 qualifier (paragraph 3d(3)(i)).
121	Unmask 1 time.
122	Unmask 1 duration.
123	Unmask 1 ground range.
124	Mask 1 qualifier (paragraph 2d(3)(i)).
125	Mask 1 time.
126	Mask 1 duration.

Word	Description
127	Mask 1 ground range.
128	Unmask 2 qualifier (paragraph 2d(3)(i)).
129	Unmask 2 time.
130	Unmask 2 duration.
131	Unmask 2 ground range.
132	Mask 2 qualifier (paragraph 2d(3)(i)).
133	Mask 2 time.
134	Mask 2 duration.
135	Mask 2 ground range.

This sequence is repeated from Word 136 through Word 163.

164	First unmask qualifier (paragraph 3d(3)(j)).
165	First unmask duration.
166	First unmask ground range.
167	Qualifier for most extensive unmask (paragraph 3d(3)(j)).
168	Duration of most extensive unmask.
169	Ground range covered during most extensive unmask.
170	Event designator. Indicates acquire or minimum.

Word 170 refers to the last unmask event before the time given in Word 10 (pilot acquire time) of this target array. If Word 10 is not present, it refers to the last unmask event before the time given in Word 36 (time of minimum range.) By indicating the acquire and minimum range event, it also determines the content of Words 171, 172, 173, and 174. Its possible designators are:

Designator	Description
ACQUIRE	The pilot acquire was selected.
MINIMUM	The minimum approach to the target was selected.
NO EVENT	Words 10 and 36 are both missing; therefore, Words 171-174 are MISSINGD.
NO UNM	There is no unmask event; therefore, Words 171-174 are MISSINGD.
NOUB4A/M	No unmask event prior to acquire or minimum.

Word	Description
171	Qualifier for last unmask before acquire (or minimum) (paragraph 3d(3)(j)).
172	Duration of last unmask before acquire (or minimum).
173	Ground range covered during last unmask before acquire (or minimum).
174	Time between last unmask and acquire (or minimum).
175	Total unmask time.

Word	Description
176	Actual altitude code. A numbered code, 1 through 4, to group aircrews by actual altitude bands as described in Word 17 of the ID array. If the altitude was qualified poor, a "P" replaces the code. If no statistics were calculated, an "N" replaces the code.
177	Actual speed code. A numbered code, 1 through 5, to group aircrews by actual speed bands as described in Word 18 of the ID array. If the speed was qualified poor, a "P" replaces the code. If no statistics were calculated, an "N" replaces the code.
178	Slant range qualifier (paragraph 3d(3)(k)).
179	Ground range qualifier (paragraph 3d(3)(k)).
180	Second g-turn (see Word 30).
181	Delta time, first g-turn peak.
182	Delta time, second g-turn peak.
183	Target certification data.
184	g-turn diameter, feet.
185	Acquire altitude.
186	Acquire line start, x position.
187	Acquire line start, y position.
188	Track line start, x position.
189	Track line start, y position.
190	Track line stop, x position.
191	Track line stop, y position.
192	Speed at acquire.
193	x position at time of weapon event.
194	y position at time of weapon event.
195	x position at time of minimum distance to target.
196	y position at time of minimum distance to target.
197	J number. A BCD word identifying the PODPOS02 tape which was last used by program HEADING to modify this sortie-target.
198	J number. A BCD word identifying the PODPOS02 tape which was last used by program HEADING to modify this sortie-target.
199	HEADING date. The date program HEADING was last run on this sortie-target (MM/DD/YY).
200	NEWPD date. The date program NEWPD was last run on this sortie target (MM/DD/YY).

SØRTIE 286120

REFER 7733

JTF-2

INPUT DATA TAPE = J0134
OUTPUT PLOT TAPE = J7166

1	IDENT	(ID BLOCK)	26	MIN D/Y	(*3354000)
2	OP DAY	(290666)	27	ACØ E/Z	(*3379753)
3	PROGNAME	(SMRG SA2)	28	MIN E/Z	(*3382032)
4	SORTIE	(286120)	29	VECT LOC	(NONE)
5	A/C TYPE	(F4)	30	TGT CODE	(11111)
6	ALT CODE	(2)	31	PILACØ Ø	(AAAAA)
7	SPD CODE	(4)	32	PILWPN Ø	(AAAAA)
8	CSNAVTGT	(211111)	33	CP ACØ Ø	(AAAAA)
9	PILOT	(1F4)	34	CP WPN Ø	(AAHDA)
10	POD ID	(102)	35	R/NACØ Ø	( )
11	AC NUM	(803)	36	R/NWPN Ø	( )
12	NUM SF	(1)	37	TGT 1	(02/27/68)
13	CSC SCØ	(2)	38	TGT 2	(02/27/68)
14	START T	(3214586)	39	TGT 3	(02/27/68)
15	SPARE	( )	40	TGT 4	(02/28/68)
16	D/N IND	(DAY)	41	COURSE	(WEST)
17	ACTALT C	(2222)	42	REFER	(77334073)
18	ACTSPD C	(4444)	43	IDENT2	(82 :)
19	ACØ ALPH	(MISSINGD)	44	MSK TAPE	(J0046)
20	MIN ALPH	(*3240000)	45	MSK DATE	(03/13/68)
21	ACØ B/W	(MISSINGD)	46	HEADTAPE	(J1011)
22	MIN B/W	(*3282000)	47	NPD TAPE	(J6547)
23	ACØ C/X	(*3321803)	48	HEADDATE	(02/26/68)
24	MIN C/X	(*3330000)	49	NPD DATE	(03/12/68)
25	ACØ D/Y	(*3349279)	50	UPD DATE	(03/25/68)

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* THE QUALITY OF THIS TIME HAS NOT BEEN ESTABLISHED. CAUTION SHOULD BE EXERCISED IN ITS USE.

[redacted] UPDATE RUN 06/26/68

Figure 1-14 (U) FORMAN Listing Title Page

[redacted]

Q=A$A
TARGET 20

REFER 7733
SORTIE 286120 88

FORMAN TARGET CHARACTERISTICS

1	TGT	(20)	51	SUN AZ	(95.22)	101	CP ACQ T	(3407904)	151	MSK04 GR	(FILLWORD)
2	VISINDEX	(MISSINGD)	52	SUN ALT	(51.15)	102	CP ACQSR	(5493)	152	UNM05 Q	(FILLWORD)
3	VM	(-30401)	53	RELSUNAZ	(132.86)	103	CP ACQGR	(5457)	153	UNM05 T	(FILLWORD)
4	SKY/GND	(MISSINGD)	54	INCSUN A	(115.26)	104	CP WPN Q	(A$)	154	UNM05 DT	(FILLWORD)
5	SKY ILL	(4.0+003)	55	SPD STRT	(3398621)	105	CP WPN T	(3408569)	155	UNM05 GR	(FILLWORD)
6	SUN ILL	(1.9+003)	56	SPD STOP	(3407961)	106	CP WPNSR	(2391)	156	MSK05 Q	(FILLWORD)
7	SHADOW	(-3.2-001)	57	SPDNGOOD	(935)	107	CP WPNGR	(2369)	157	MSK05 T	(FILLWORD)
8	TGT CODE	(1)	58	SPD PCGD	(100.0)	108	PIL-CP Q	(A)	158	MSK05 DT	(FILLWORD)
9	PILACQ Q	(A$A)	59	SPD SD	(20)	109	PIL-CP T	(55)	159	MSK05 GR	(FILLWORD)
10	PILACQ T	(3407959)	60	SPD MEAN	(722)	110	R/NACQ Q	($)	160	UNM06 Q	(FILLWORD)
11	PILACQSR	(5155)	61	SPD MED	(724)	111	R/NACQ T	(FILLWORD)	161	UNM06 T	(FILLWORD)
12	PILACQGR	(5116)	62	SPD MIN	(661)	112	R/NACQSR	(FILLWORD)	162	UNM06 DT	(FILLWORD)
13	ACQLSTRT	(3406961)	63	SPD MAX	(756)	113	R/NACQGR	(FILLWORD)	163	UNM06 GR	(FILLWORD)
14	ACQLSTOP	(3407959)	64	SPD TS	(9340)	114	R/NWPN Q	($)	164	F UNM Q	(TCPI)
15	ACQLSLOP	(3.2-002)	65	SPD PC A	(0.0)	115	R/NWPN T	(FILLWORD)	165	F UNM DT	(4140)
16	ACQL INT	(3223)	66	SPD PC B	(0.0)	116	R/NWPNSR	(FILLWORD)	166	F UNM GR	(71073)
17	ACQL Q	(CHECKED)	67	SPDHILIM	(929)	117	R/NWPNGR	(FILLWORD)	167	MAXUNM Q	(TCPI)
18	ACQ ANG	(-1.8)	68	SPDLOLIM	(608)	118	CRSENTRY	(FILLWORD)	168	MAXUNMDT	(4140)
19	ACQ OD	(3221)	69	SPD Q	(CHECK)	119	L MASK T	(3408531)	169	MAXUNMGR	(71073)
20	ACQ ROC	(3871)	70	ALT STRT	(3398621)	120	UNM01 Q	(NCP)	170	EVENT	(ACQUIRE)
21	ACQ LD	(3345)	71	ALT STOP	(3407961)	121	UNM01 T	(3405361)	171	U-A/M Q	(NCPN)
22	ACQ LOCZ	(636)	72	ALTNGOOD	(934)	122	UNM01 DT	(3170)	172	U-A/M DT	(3170)
23	ACQ DANG	(7.09)	73	ALT PCGD	(99.9)	123	UNM01 GR	(22315)	173	U-A/M GR	(22315)
24	ACQ OA	(-39.0)	74	ALT SD	(158)	124	MSK01 Q	(NCP)	174	(A/M)-UT	(2598)
25	GTRN SPD	(690.8)	75	ALT MEAN	(792)	125	MSK01 T	(3402761)	175	TOTUNM T	(7310)
26	GTRN ACC	(3.65)	76	ALT MED	(750)	126	MSK01 DT	(2600)	176	ACTALT C	(2)
27	GTRNTOTG	(3.78)	77	ALT MIN	(350)	127	MSK01 GR	(40805)	177	ACTSPD C	(4)
28	GTRN CAT	(PARTIAL)	78	ALT MAX	(1230)	128	UNM02 Q	(TCP)	178	SRSOURCE	(GGGGNN G)
29	GTRN Q1	(ACM)	79	ALT TS	(9340)	129	UNM02 T	(3398621)	179	GRSOURCE	(GGGGNN G)
30	ACT G	(FILLWORD)	80	ALT PC A	(0.0)	130	UNM02 DT	(4140)	180	ACT G 2	(FILLWORD)
31	PILWPN Q	(A$)	81	ALT PC B	(0.0)	131	UNM02 GR	(71073)	181	ACTG TS1	(FILLWORD)
32	PILWPN T	(3408359)	82	ALTHILIM	(1500)	132	MSK02 Q	(FILLWORD)	182	ACTG TS2	(FILLWORD)
33	PILWPNSR	(3038)	83	ALTLOLIM	(0)	133	MSK02 T	(FILLWORD)	183	TGT/CERT	(FILLWORD)
34	PILWPNGR	(2971)	84	ALT Q	(CHECK)	134	MSK02 DT	(FILLWORD)	184	GTRN DIA	(8124)
35	MIN Q	(DDDD)	85	L Z STRT	(3398621)	135	MSK02 GR	(FILLWORD)	185	ACQ ALT	(660)
36	MIN T	(3408641)	86	L Z STOP	(3407961)	136	UNM03 Q	(FILLWORD)	186	AQLSTRTX	(10769)
37	MIN SR	(2345)	87	L ZNGOOD	(935)	137	UNM03 T	(FILLWORD)	187	AQLSTRTY	(3562)
38	MIN GR	(2263)	88	L Z PCGD	(100.0)	138	UNM03 DT	(FILLWORD)	188	TL STRTX	(70807)
39	MIN LOCZ	(616)	89	L Z SD	(277)	139	UNM03 GR	(FILLWORD)	189	TL STRTY	(991)
40	PREV MGR	(FILLWORD)	90	L Z MEAN	(920)	140	MSK03 Q	(FILLWORD)	190	TL STOPX	(3871)
41	SCH CODE	(EA)	91	L Z MED	(865)	141	MSK03 T	(FILLWORD)	191	TL STOPY	(3953)
42	SCH STRT	(3398621)	92	L Z MIN	(602)	142	MSK03 DT	(FILLWORD)	192	ACQ SPD	(671)
43	SCH STOP	(3407961)	93	L Z MAX	(1431)	143	MSK03 GR	(FILLWORD)	193	WPN X	(1188)
44	TL STRT	(3398621)	94	L Z TS	(9340)	144	UNM04 Q	(FILLWORD)	194	WPN Y	(2723)
45	TL STOP	(3407961)	95	L Z PC A	(0.0)	145	UNM04 T	(FILLWORD)	195	MIN X	(-696)
46	TL SLOP	(-4.4-002)	96	L Z PC B	(0.0)	146	UNM04 DT	(FILLWORD)	196	MIN Y	(2153)
47	TL INT	(4124)	97	L ZHILIM	(3000)	147	UNM04 GR	(FILLWORD)	197	HEADTAPE	(J1011)
48	TL Q	(CHECKED)	98	L ZLOLIM	(-500)	148	MSK04 Q	(FILLWORD)	198	MPD TAPE	(J6547)
49	TRAK ANG	(2.5)	99	L Z Q	(CHECK)	149	MSK04 T	(FILLWORD)	199	HEADDATE	(02/26/68)
50	TRAK OD	(4120)	100	CP ACQ Q	(A$)	150	MSK04 DT	(FILLWORD)	200	MPD DATE	(03/12/68)

CERTIFICATION DATE02/27/68

Figure 1-15 (U) FORMAN Listing Target W1
(West AC&W Site)

[redacted] UPDATE RUN 06/26/68

Q=A$A
TARGET 21

REFER 7733
SORTIE 286120

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FORMAN TARGET CHARACTERISTICS

1	TGT	(21)	51	SUN AZ	(96.15)	101	CP ACQ T	(3427777)	151	MSK04 GR	(FILLWORD)
2	VISINDEX	(MISSINGD)	52	SUN ALT	(51.69)	102	CP ACQSR	(807)	152	UNM05 Q	(FILLWORD)
3	VM	(MISSINGD)	53	RELSUNAZ	(96.72)	103	CP ACQGR	(743)	153	UNM05 T	(FILLWORD)
4	SKY/GND	(5.1-001)	54	INCSUN A	(94.16)	104	CP WPN Q	(MC)	154	UNM05 DT	(FILLWORD)
5	SKY ILL	(3.6+003)	55	SPD STRT	(3419681)	105	CP WPN T	(MISSINGD)	155	UNM05 GR	(FILLWORD)
6	SUN ILL	(1.1+003)	56	SPD STOP	(3426561)	106	CP WPNSR	(MISSINGD)	156	MSK05 Q	(FILLWORD)
7	SHADOW	(-2.3-001)	57	SPDNGOOD	(689)	107	CP WPNGR	(MISSINGD)	157	MSK05 T	(FILLWORD)
8	TGT CODE	(1)	58	SPD PCGD	(100.0)	108	PIL-CP Q	(A)	158	MSK05 DT	(FILLWORD)
9	PILACQ Q	(A$A)	59	SPD SD	(13)	109	PIL-CP T	(-1220)	159	MSK05 GR	(FILLWORD)
10	PILACQ T	(3426557)	60	SPD MEAN	(705)	110	R/NACQ Q	($)	160	UNM06 Q	(FILLWORD)
11	PILACQSR	(9557)	61	SPD MED	(704)	111	R/NACQ T	(FILLWORD)	161	UNM06 T	(FILLWORD)
12	PILACQGR	(9549)	62	SPD MIN	(670)	112	R/NACQSR	(FILLWORD)	162	UNM06 DT	(FILLWORD)
13	ACQLSTRT	(3425561)	63	SPD MAX	(753)	113	R/NACQGR	(FILLWORD)	163	UNM06 GR	(FILLWORD)
14	ACQLSTOP	(3426557)	64	SPD TS	(6880)	114	R/NWPN Q	($)	164	F UNM Q	(TCPI)
15	ACQLSLOP	(-1.6-002)	65	SPD PC A	(0.0)	115	R/NWPN T	(FILLWORD)	165	F UNM DT	(8190)
16	ACQL INT	(-958)	66	SPD PC B	(0.0)	116	R/NWPNSR	(FILLWORD)	166	F UNM GR	(57956)
17	ACQL Q	(CHECKED)	67	SPDHILIM	(929)	117	R/NWPNGR	(FILLWORD)	167	MAXUNM Q	(TCPI)
18	ACQ ANG	(0.9)	68	SPDLOLIM	(608)	118	CRSENTRY	(FILLWORD)	168	MAXUNMDT	(8190)
19	ACQ OD	(-958)	69	SPD Q	(CHCK)	119	L MASK T	(3427871)	169	MAXUNMGR	(57956)
20	ACQ ROC	(9485)	70	ALT STRT	(3419681)	120	UNM01 Q	(TCP)	170	EVENT	(ACQUIRE)
21	ACQ LD	(-1107)	71	ALT STOP	(3426561)	121	UNM01 T	(3419681)	171	U-A/M Q	(TCPI)
22	ACQ LOCZ	(375)	72	ALTNGOOD	(689)	122	UNM01 DT	(8190)	172	U-A/M DT	(8190)
23	ACQ DANG	(2.25)	73	ALT PCGD	(100.0)	123	UNM01 GR	(57956)	173	U-A/M GR	(57956)
24	ACQ OA	(5.8)	74	ALT SD	(101)	124	MSK01 Q	(FILLWORD)	174	(A/M)-UT	(6876)
25	GTRH SPD	(685.9)	75	ALT MEAN	(526)	125	MSK01 T	(FILLWORD)	175	TOTUNM T	(8190)
26	GTRH ACC	(0.31)	76	ALT MED	(510)	126	MSK01 DT	(FILLWORD)	176	ACTALT C	(2)
27	GTRHTOTG	(1.05)	77	ALT MIN	(270)	127	MSK01 GR	(FILLWORD)	177	ACTSPD C	(4)
28	GTRH CAT	(PARTIAL)	78	ALT MAX	(710)	128	UNM02 Q	(FILLWORD)	178	SRSOURCE	(GGGNNN G)
29	GTRH Q1	(AC)	79	ALT TS	(6880)	129	UNM02 T	(FILLWORD)	179	GRSOURCE	(GGGNNN G)
30	ACT G	(FILLWORD)	80	ALT PC A	(0.0)	130	UNM02 DT	(FILLWORD)	180	ACT G 2	(FILLWORD)
31	PILWPN Q	(A$)	81	ALT PC B	(0.0)	131	UNM02 GR	(FILLWORD)	181	ACTG TS1	(FILLWORD)
32	PILWPN T	(3427832)	82	ALTHILIM	(1500)	132	MSK02 Q	(FILLWORD)	182	ACTG TS2	(FILLWORD)
33	PILWPNSR	(592)	83	ALTLOLIM	(0)	133	MSK02 T	(FILLWORD)	183	TGT/CERT	(FILLWORD)
34	PILWPNGR	(491)	84	ALT Q	(CHCK)	134	MSK02 DT	(FILLWORD)	184	GTRN DIA	(95232)
35	MIN Q	(DDDD)	85	L Z STRT	(3419681)	135	MSK02 GR	(FILLWORD)	185	ACQ ALT	(465)
36	MIN T	(3427871)	86	L Z STOP	(3426561)	136	UNM03 Q	(FILLWORD)	186	AQLSTRTX	(16343)
37	MIN SR	(523)	87	L ZNGOOD	(689)	137	UNM03 T	(FILLWORD)	187	AQLSTRTY	(-1215)
38	MIN GR	(395)	88	L Z PCGD	(100.0)	138	UNM03 DT	(FILLWORD)	188	TL STRTX	(57956)
39	MIN LOCZ	(342)	89	L Z SD	(175)	139	UNM03 GR	(FILLWORD)	189	TL STRTY	(-246)
40	PRECT MGR	(FILLWORD)	90	L Z MEAN	(580)	140	MSK03 Q	(FILLWORD)	190	TL STOPX	(9465)
41	SCN CODE	(EA)	91	L Z MED	(550)	141	MSK03 T	(FILLWORD)	191	TL STOPY	(-1379)
42	SCN STRT	(3419681)	92	L Z MIN	(375)	142	MSK03 DT	(FILLWORD)	192	ACQ SPD	(706)
43	SCN STOP	(3426561)	93	L Z MAX	(923)	143	MSK03 GR	(FILLWORD)	193	WPN X	(283)
44	TL STRT	(3419681)	94	L Z TS	(6880)	144	UNM04 Q	(FILLWORD)	194	WPN Y	(-400)
45	TL STOP	(3426561)	95	L Z PC A	(0.0)	145	UNM04 T	(FILLWORD)	195	MIN X	(19)
46	TL SLOP	(2.3-002)	96	L Z PC B	(0.0)	146	UNM04 DT	(FILLWORD)	196	MIN Y	(-395)
47	TL INT	(-1601)	97	L ZHILIM	(3000)	147	UNM04 GR	(FILLWORD)	197	HEADTAPE	(J1011)
48	TL Q	(CHECKED)	98	L ZLOLIM	(-500)	148	MSK04 Q	(FILLWORD)	198	MPD TAPE	(J6547)
49	TRAN ANG	(-1.3)	99	L Z Q	(CHCK)	149	MSK04 T	(FILLWORD)	199	CADDATE	(02/26/68)
50	TRAN OD	(-1601)	100	CP ACQ Q	(A$)	150	MSK04 DT	(FILLWORD)	200	MPD DATE	(03/12/68)

CERTIFICATION DATE02/27/68

Figure 1-16 (U) FORMAN Listing Target W2
(POL Dump)

[redacted]

Q=A$A REFER 7733

TARGET 22 SORTIE 286120 90

FORMAN TARGET CHARACTERISTICS

1	TGT	(22	51	SUN AZ	(97.69)	101	CP ACQ T	(3496348)	151	MSK04 GR	(FILLWORD)
2	VISINDEX	(MISSINGD)	52	SUN ALT	(53.62)	102	CP ACQSR	(481)	152	UNM05 Q	(FILLWORD)
3	VM	(-36481)	53	RELSUNAZ	(320.09)	103	CP ACQGR	(181)	153	UNM05 T	(FILLWORD)
4	SKY/GND	(MISSINGD)	54	INCSUN A	(62.94)	104	CP WPN Q	(D$)	154	UNM05 DT	(FILLWORD)
5	SKY ILL	(MISSINGD)	55	SPD STRT	(3490811)	105	CP WPN T	(MISSINGD)	155	UNM05 GR	(FILLWORD)
6	SUN ILL	(MISSINGD)	56	SPD STOP	(3495301)	106	CP WPNSR	(MISSINGD)	156	MSK05 Q	(FILLWORD)
7	SHADOW	(MISSINGD)	57	SPDNGOOD	(450)	107	CP WPNGR	(MISSINGD)	157	MSK05 T	(FILLWORD)
8	TGT CODE	(1)	58	SPD PCGD	(100.0)	108	PIL-CP Q	(A)	158	MSK05 DT	(FILLWORD)
9	PILACQ Q	(A$A)	59	SPD SD	(17)	109	PIL-CP T	(-1049)	159	MSK05 GR	(FILLWORD)
10	PILACQ T	(3495299)	60	SPD MEAN	(712)	110	R/NACQ Q	($)	160	UNM06 Q	(FILLWORD)
11	PILACQSR	(7406)	61	SPD MED	(714)	111	R/NACQ T	(FILLWORD)	161	UNM06 T	(FILLWORD)
12	PILACQGR	(7368)	62	SPD MIN	(673)	112	R/NACQSR	(FILLWORD)	162	UNM06 DT	(FILLWORD)
13	ACQLSTRT	(3494301)	63	SPD MAX	(754)	113	R/NACQGR	(FILLWORD)	163	UNM06 GR	(FILLWORD)
14	ACQLSTOP	(3495299)	64	SPD TS	(4490)	114	R/NWPN Q	($)	164	F UNM Q	(TCPN)
15	ACQLSLOP	(4.7-002)	65	SPD PC A	(0.0)	115	R/NWPN T	(FILLWORD)	165	F UNM DT	(3230)
16	ACQL INT	(372)	66	SPD PC B	(0.0)	116	R/NWPNSR	(FILLWORD)	166	F UNM GR	(23112)
17	ACQL Q	(CHECKED)	67	SPDHILIM	(923)	117	R/NWPNGR	(FILLWORD)	167	MAXUNM Q	(TCPN)
18	ACQ ANG	(-2.7)	68	SPDLOLIM	(608)	118	CRSENTRY	(FILLWORD)	168	MAXUNMDT	(3230)
19	ACQ OD	(372)	69	SPD Q	(CHEK)	119	L MASK T	(3496321)	169	MAXUNMGR	(23112)
20	ACQ ROC	(7333)	70	ALT STRT	(3490811)	120	UNM01 Q	(TCP)	170	EVENT	(ACQUIRE)
21	ACQ LD	(719)	71	ALT STOP	(3495301)	121	UNM01 T	(3493091)	171	U-A/M Q	(TCPN)
22	ACQ LOCZ	(745)	72	ALTNGOOD	(450)	122	UNM01 DT	(3230)	172	U-A/M DT	(3230)
23	ACQ DANG	(5.78)	73	ALT PCGD	(100.0)	123	UNM01 GR	(23112)	173	U-A/M GR	(23112)
24	ACQ OA	(-2.9)	74	ALT SD	(75)	124	MSK01 Q	(TCP)	174	(A/M)-UT	(2208)
25	GTRN SPD	(716.4)	75	ALT MEAN	(734)	125	MSK01 T	(3490811)	175	TOTUNM T	(3230)
26	GTRN ACC	(0.22)	76	ALT MED	(750)	126	MSK01 DT	(2280)	176	ACTALT C	(2)
27	GTRNTOTG	(1.02)	77	ALT MIN	(530)	127	MSK01 GR	(39290)	177	ACTSPD C	(4)
28	GTRN CAT	(PARTIAL)	78	ALT MAX	(850)	128	UNM02 Q	(FILLWORD)	178	SRSOURCE	(GGGNNN G)
29	GTRN Q1	(AC)	79	ALT TS	(4490)	129	UNM02 T	(FILLWORD)	179	GRSOURCE	(GGGNNN G)
30	ACT G	(FILLWORD)	80	ALT PC A	(0.0)	130	UNM02 DT	(FILLWORD)	180	ACT G 2	(FILLWORD)
31	PILWPN Q	(A$)	81	ALT PC B	(0.0)	131	UNM02 GR	(FILLWORD)	181	ACTG TS1	(FILLWORD)
32	PILWPN T	(3496258)	82	ALTHILIM	(1500)	132	MSK02 Q	(FILLWORD)	182	ACTG TS2	(FILLWORD)
33	PILWPNSR	(667)	83	ALTLOLIM	(0)	133	MSK02 T	(FILLWORD)	183	TGT/CERT	(FILLWORD)
34	PILWPNGR	(487)	84	ALT Q	(CHEK)	134	MSK02 DT	(FILLWORD)	184	GTRN DIA	(146063)
35	MIN Q	(DDDD)	85	L Z STRT	(3490811)	135	MSK02 GR	(FILLWORD)	185	ACQ ALT	(555)
36	MIN T	(3496331)	86	L Z STOP	(3495301)	136	UNM03 Q	(FILLWORD)	186	AQLSTRTX	(14491)
37	MIN SR	(455)	87	L ZNGOOD	(450)	137	UNM03 T	(FILLWORD)	187	AQLSTRTY	(1057)
38	MIN GR	(87)	88	L Z PCGD	(100.0)	138	UNM03 DT	(FILLWORD)	188	TL STRTX	(39282)
39	MIN LOCZ	(447)	89	L Z SD	(35)	139	UNM03 GR	(FILLWORD)	189	TL STRTY	(606)
40	PREV MGR	(FILLWORD)	90	L Z MEAN	(750)	140	MSK03 Q	(FILLWORD)	190	TL STOPX	(7333)
41	SCH CODE	(CA)	91	L Z MED	(760)	141	MSK03 T	(FILLWORD)	191	TL STOPY	(1046)
42	SCH STRT	(3490811)	92	L Z MIN	(687)	142	MSK03 DT	(FILLWORD)	192	ACQ SPD	(706)
43	SCH STOP	(3495301)	93	L Z MAX	(815)	143	MSK03 GR	(FILLWORD)	193	WPN X	(476)
44	TL STRT	(3490811)	94	L Z TS	(4490)	144	UNM04 Q	(FILLWORD)	194	WPN Y	(104)
45	TL STOP	(3495301)	95	L Z PC A	(0.0)	145	UNM04 T	(FILLWORD)	195	MIN X	(-20)
46	TL SLOP	(-1.4-002)	96	L Z PC B	(0.0)	146	UNM04 DT	(FILLWORD)	196	MIN Y	(84)
47	TL INT	(1147)	97	L ZHILIM	(3000)	147	UNM04 GR	(FILLWORD)	197	HEADTAPE	(J1011)
48	TL Q	(CHECKED)	98	L ZLOLIM	(-500)	148	MSK04 Q	(FILLWORD)	198	MPD TAPE	(J6547)
49	TRAK ANG	(0.8)	99	L Z Q	(CHEK)	149	MSK04 T	(FILLWORD)	199	HEADDATE	(02/26/68)
50	TRAK OD	(1147)	100	CP ACQ Q	(A$)	150	MSK04 DT	(FILLWORD)	200	MPD DATE	(03/12/68)

CERTIFICATION DATE02/27/68

Figure 1-17 (U) FORMAN Listing Target W3
(West Highway Bridge)

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C[redacted] UPDATE RUN 08/26/68

Q=A$A REFER 7733

TARGET 23 SØRTIE 286120 91

FORMAN TARGET CHARACTERISTICS

1	TGT	(23)	51	SUN AZ	(97.90)	101	CP ACØ T	(3519610)	151	MSKO4 GR	(FILLWORD)
2	VISINDEX	(6148)	52	SUN ALT	(54.62)	102	CP ACØSR	(9303)	152	UNMO5 Ø	(FILLWORD)
3	VM	(28353)	53	RELSUNAZ	(298.56)	103	CP ACØGR	(9284)	153	UNMO5 T	(FILLWORD)
4	SKY/GND	(5.8+000)	54	INCSUN A	(73.93)	104	CP WPN Ø	(A$)	154	UNMO5 DT	(FILLWORD)
5	SKY ILL	(3.8+003)	55	SPD STRT	(3510661)	105	CP WPN T	(3520990)	155	UNMO5 GR	(FILLWORD)
6	SUN ILL	(1.9+003)	56	SPD STOP	(3519351)	106	CP WPNSR	(626)	156	MSKO5 Ø	(FILLWORD)
7	SHADOW	(-3.3-001)	57	SPDNGOOD	(870)	107	CP WPNGR	(294)	157	MSKO5 T	(FILLWORD)
8	TGT CODE	(1)	58	SPD PCGD	(100.0)	108	PIL-CP Ø	(A)	158	MSKO5 DT	(FILLWORD)
9	PILACØ Ø	(A$A)	59	SPD SD	([illegible])	109	PIL-CP T	([illegible])	159	MSKO5 GR	(FILLWORD)
10	PILACØ T	(3519355)	60	SPD MEAN	(715)	110	R/NACØ Ø	($)	160	UNMO6 Ø	(FILLWORD)
11	PILACØSR	(11101)	61	SPD MED	(711)	111	R/NACØ T	(FILLWORD)	161	UNMO6 T	(FILLWORD)
12	PILACØGR	(11085)	62	SPD MIN	(686)	112	R/NACØSR	(FILLWORD)	162	UNMO6 DT	(FILLWORD)
13	ACØLSTRT	(3519351)	63	SPD MAX	(757)	113	R/NACØGR	(FILLWORD)	163	UNMO6 GR	(FILLWORD)
14	ACØLSTOP	(3519355)	64	SPD TS	(8690)	114	R/NWPN Ø	($)	164	F UNM Ø	(TCPI)
15	ACØLSLOP	(3.2-002)	65	SPD PC A	(0.0)	115	R/NWPN T	(FILLWORD)	165	F UNM DT	(10300)
16	ACØL INT	(1557)	66	SPD PC B	(0.0)	116	R/NWPNSR	(FILLWORD)	166	F UNM GR	(73009)
17	ACØL Ø	(CHECKED)	67	SPDHILIM	(929)	117	R/NWPNGR	(FILLWORD)	167	MAXUNM Ø	(TCPI)
18	ACØ ANG	(-1.8)	68	SPDLOLIM	(608)	118	CRSENTRY	(FILLWORD)	168	MAXUNMDT	(10300)
19	ACØ OD	(1556)	69	SPD Ø	(CHEK)	119	L MASK T	(3520961)	169	MAXUNMGR	(73009)
20	ACØ ROC	(10921)	70	ALT STRT	(3510661)	120	UNMO1 Ø	(TCP)	170	EVENT	(ACØUIRE)
21	ACØ LD	(1301)	71	ALT STOP	(3519351)	121	UNMO1 T	(3510661)	171	U-A/M Ø	(TCPI)
22	ACØ LOCZ	(594)	72	ALTNGOOD	(870)	122	UNMO1 DT	(10300)	172	U-A/M DT	(10300)
23	ACØ DANG	(3.07)	73	ALT PCGD	(100.0)	123	UNMO1 GR	(73009)	173	U-A/M GR	(73009)
24	ACØ OA	(-8.1)	74	ALT SD	(148)	124	MSKO1 Ø	(FILLWORD)	174	(A/M)-UT	(8694)
25	GTRN SPD	(703.2)	75	ALT MEAN	(784)	125	MSKO1 T	(FILLWORD)	175	TOTUNM T	(10300)
26	GTRN ACC	(0.39)	76	ALT MED	(735)	126	MSKO1 DT	(FILLWORD)	176	ACTALT C	(2)
27	GTRNTOTG	(1.07)	77	ALT MIN	(560)	127	MSKO1 GR	(FILLWORD)	177	ACTSPD C	(4)
28	GTRN CAT	(PARTIAL)	78	ALT MAX	(1270)	128	UNMO2 Ø	(FILLWORD)	178	SRSOURCE	(GGGGNN G)
29	GTRN Ø1	(AC)	79	ALT TS	(8690)	129	UNMO2 T	(FILLWORD)	179	GRSOURCE	(GGGGNN G)
30	ACT G	(FILLWORD)	80	ALT PC A	(0.0)	130	UNMO2 DT	(FILLWORD)	180	ACT G 2	(FILLWORD)
31	PILWPN Ø	(A$)	81	ALT PC B	(0.0)	131	UNMO2 GR	(FILLWORD)	181	ACTG TS1	(FILLWORD)
32	PILWPN T	(3520760)	82	ALTHILIM	(1500)	132	MSKO2 Ø	(FILLWORD)	182	ACTG TS2	(FILLWORD)
33	PILWPNSR	(1438)	83	ALTLOLIM	(0)	133	MSKO2 T	(FILLWORD)	183	TGT/CERT	(FILLWORD)
34	PILWPNGR	(1329)	84	ALT Ø	(CHEK)	134	MSKO2 DT	(FILLWORD)	184	GTRN DIA	(78988)
35	MIN Ø	(DDDD)	85	L Z STRT	(3510661)	135	MSKO2 GR	(FILLWORD)	185	ACØ ALT	(625)
36	MIN T	(3520961)	86	L Z STOP	(3519351)	136	UNMO3 Ø	(FILLWORD)	186	AØLSTRTX	(17951)
37	MIN SR	(588)	87	L ZNGOOD	(870)	137	UNMO3 T	(FILLWORD)	187	AØLSTRTY	(2122)
38	MIN GR	(213)	88	L Z PCGD	(100.0)	138	UNMO3 DT	(FILLWORD)	188	TL STRTX	(72997)
39	MIN LOCZ	(548)	89	L Z SD	(402)	139	UNMO3 GR	(FILLWORD)	189	TL STRTY	(1661)
40	PREV MGR	(FILLWORD)	90	L Z MEAN	(793)	140	MSKO3 Ø	(FILLWORD)	190	TL STOPX	(10921)
41	SCH CODE	(CA)	91	L Z MED	(585)	141	MSKO3 T	(FILLWORD)	191	TL STOPY	(2341)
42	SCH STRT	(3510661)	92	L Z MIN	(446)	142	MSKO3 DT	(FILLWORD)	192	ACØ SPD	(698)
43	SCH STOP	(3519351)	93	L Z MAX	(1775)	143	MSKO3 GR	(FILLWORD)	193	WPN X	(1325)
44	TL STRT	(3510661)	94	L Z TS	(8690)	144	UNMO4 Ø	(FILLWORD)	194	WPN Y	(104)
45	TL STOP	(3519351)	95	L Z PC A	(0.0)	145	UNMO4 T	(FILLWORD)	195	MIN X	(43)
46	TL SLOP	(-1.1-002)	96	L Z PC B	(0.0)	146	UNMO4 DT	(FILLWORD)	196	MIN Y	(-206)
47	TL INT	(2460)	97	L ZHILIM	(3000)	147	UNMO4 GR	(FILLWORD)	197	HEADTAPE	(J1011)
48	TL Ø	(CHECKED)	98	L ZLOLIM	(-500)	148	MSKO4 Ø	(FILLWORD)	198	NPD TAPE	(J6547)
49	TRAK ANG	(0.6)	99	L Z Ø	(CHEK)	149	MSKO4 T	(FILLWORD)	199	HEADDATE	(02/26/68)
50	TRAK OD	(2460)	100	CP ACØ Ø	(A$)	150	MSKO4 DT	(FILLWORD)	200	NPD DATE	(03/12/68)

CERTIFICATION DATE02/28/68

Figure 1-18 (U) FORMAN Listing Target W4 (SAM Site)

SECTION 2

DATA PLOTS

1. (U) INTRODUCTION. The data plots present the following data:

a. The aircraft position plots are by sortie within the appropriate target area and are plotted in the Mena plane coordinate system. There is an overall plot showing the entire target area and four expanded plots, one for each target and its final reference point (FRP). The plots are annotated with time ticks in central standard time, an X for each target location, and an FRP. The expanded plots are also annotated with an A at the point of the pilot's target acquisition. The minimum ground distance in feet from the aircraft track to the target and a qualifier which indicates its source are printed underneath each expanded plot.

b. The telemetry plots are: aircraft terrain clearance, normal acceleration, roll angle, pitch angle, and slant range from the navigation control check points (CCP and FCCP) and the target. These plots are versus central standard time and are generally continuous from near the beginning of the navigation course to the end of the target course.

c. The aircraft and terrain altitude profile plots are of the terrain altitude above mean sea level under the aircraft track and the aircraft altitude above mean sea level which is plotted above the terrain. The plots are versus central standard time over the same time interval as the expanded position plots. The terrain profile is annotated with time ticks every five seconds, and CPA indicating the time of aircraft closest point of approach to the target.

d. Night flights are catalogued by the operational day in which the sortie was launched. In instances where the sortie duration extended beyond midnight, the times are continued sequentially and the numerical values indicated are greater than 24 hours.

e. The plots are by sortie and the sorties are ordered by operational day, by course, by speed, and by altitude.

2. (U) ABNORMAL DATA. Those plotted data which were determined to be abnormal during the quality control process are identified on the plots in the appropriate location. Samples of the types of abnormal data which were found

are presented in this paragraph.

a. Terrain Clearance. Figure 2-1 shows an example of poor terrain clearance data. Generally if the terrain clearance data appear very noisy with no significant amount of continuous data, as in this example, they are considered unusable. In this case the malfunction was caused by an erratic vertical gyro, which was used to direct the radar altimeter antenna downward. Figure 2-2, is an example of poor terrain clearance data resulting from a "push to test" failure. This was caused when the "push to test" calibration circuit was activated for testing, indicating a nominal 100 foot reading, and left in the test position. The straight line output shown is an indication of this failure. When the circuit was deactivated the altimeter performed normally as shows in the example.

b. Normal Accelerometer. Figure 2-3 shows an example of biased accelerometer data. The accelerometer output was riding at approximately 0.8g during periods of no maneuvering instead of the normal 1.0g. Figure 2-4 shows an example of poor accelerometer data. The accelerometers used were the type with the output proportional to the displacement of a mass mounted on a wiper that moved across a potentiometer. The abnormal data were caused when windings on the potentiometer shorted together due to excessive vibration and wear. In cases where a small portion of the winding was shorted the data were still considered usable, but biased by a small amount (Figure 2-3). In these instances the instrument still exhibited good response to aircraft maneuvering. In cases where a significant portion of the windings was shorted so that the instrument was biased and had poor response to maneuvering, the data were considered poor (Figure 2-4).

c. Roll Angle and Pitch Angle. The roll angle and pitch angle were measured from the same vertical gyro, but the roll and pitch gimbals had separate erecting motors, therefore, abnormal data in one did not necessarily result in abnormal data in the other.

(1) The most common failures were due to erratic operation (Figure 2-1), the gyro not being up to speed (Figure 2-5), and gimbal lock (Figure 2-6). Erratic operation was characterized by random changes in the roll angle around zero and both pitch and roll angle measurements were considered poor. The gyro not being up to speed was indicated by displacement of the gyro nominal reading from zero and gradually returning to zero, as shown in the roll angle data of Figure 2-5. When the nominal value exceeded 10 degrees the data were considered poor instead of biased as shown in the example. Gyro gimbal lock is characterized by the nominal value of roll or pitch being displaced after a violent maneuver as shown in both the roll and pitch angle

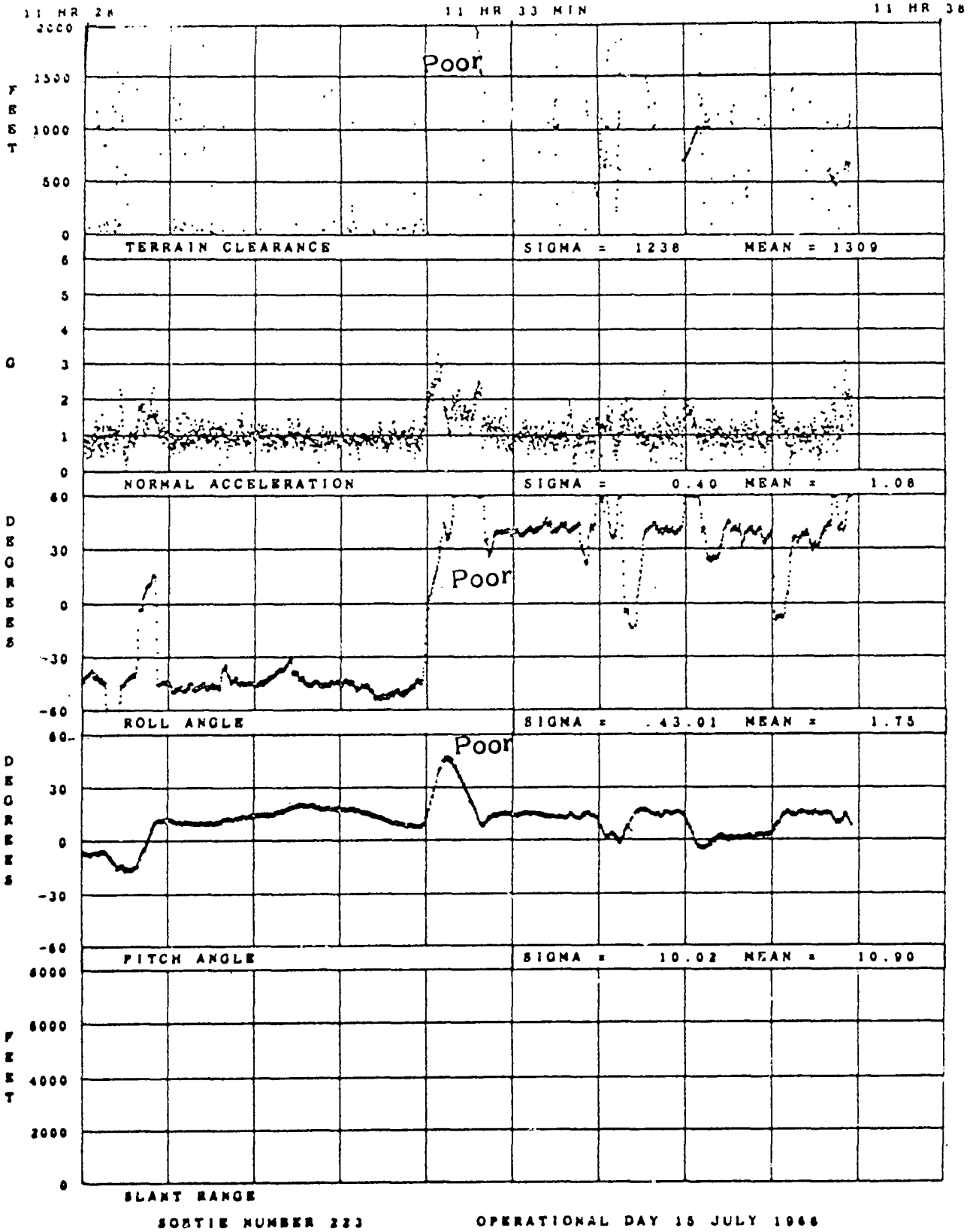
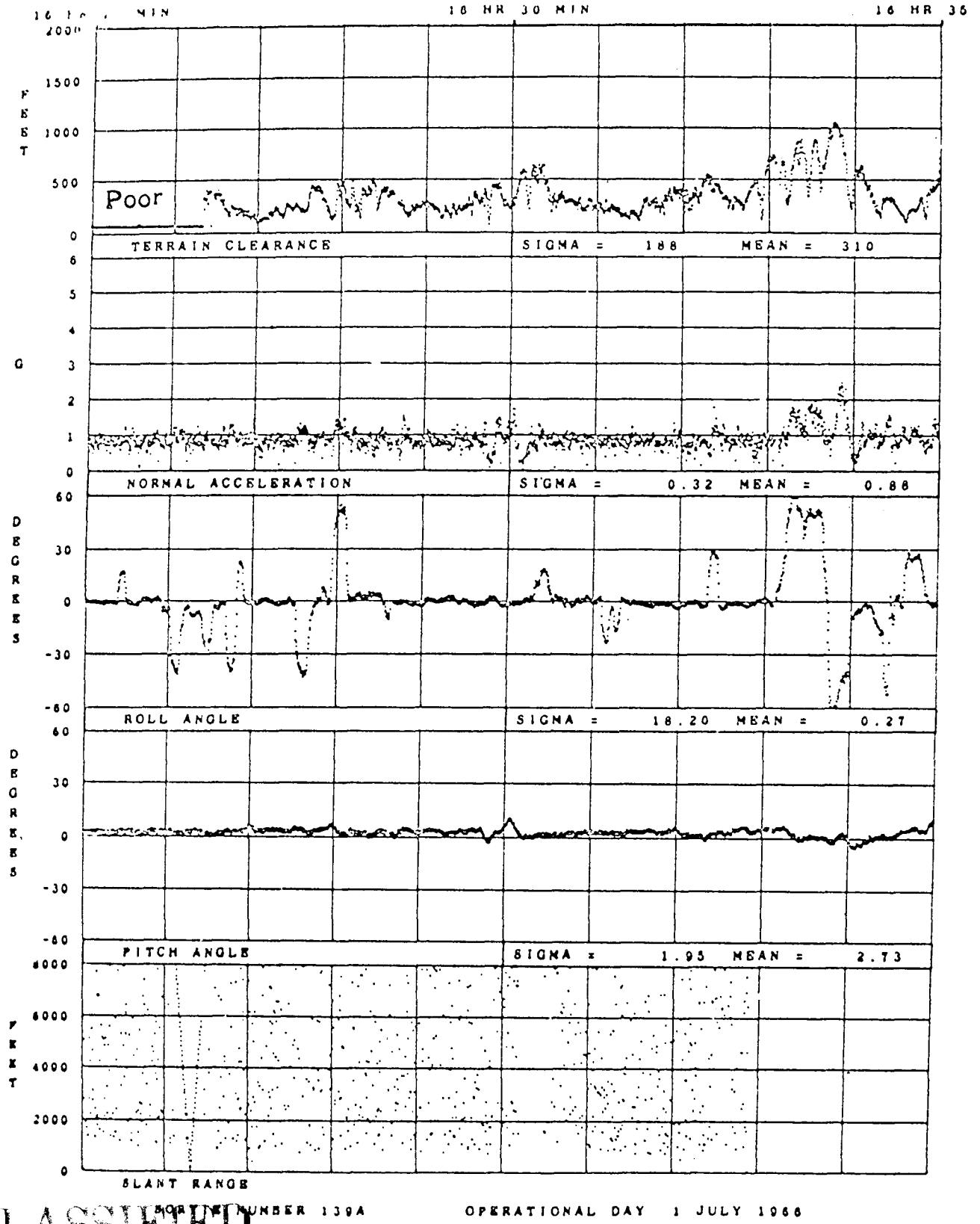


Figure 2-1 (U) Abnormal Terrain Clearance, Roll Angle and Pitch Angle Data

UNCLASSIFIED



UNCLASSIFIED

Figure 2-2 (U) Abnormal Terrain Clearance Data

UNCLASSIFIED

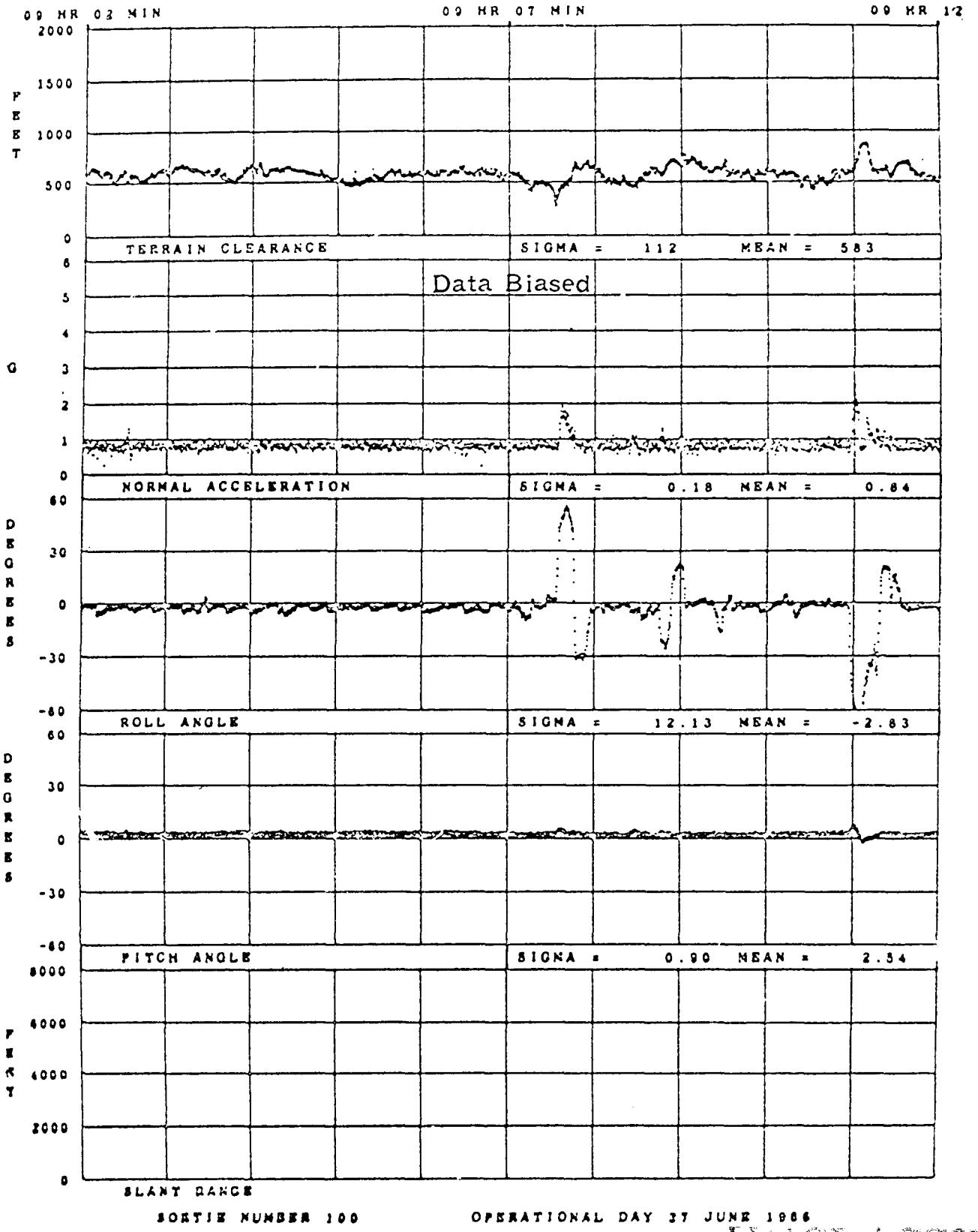


Figure 2-3 (U) Abnormal Accelerometer Data

UNCLASSIFIED

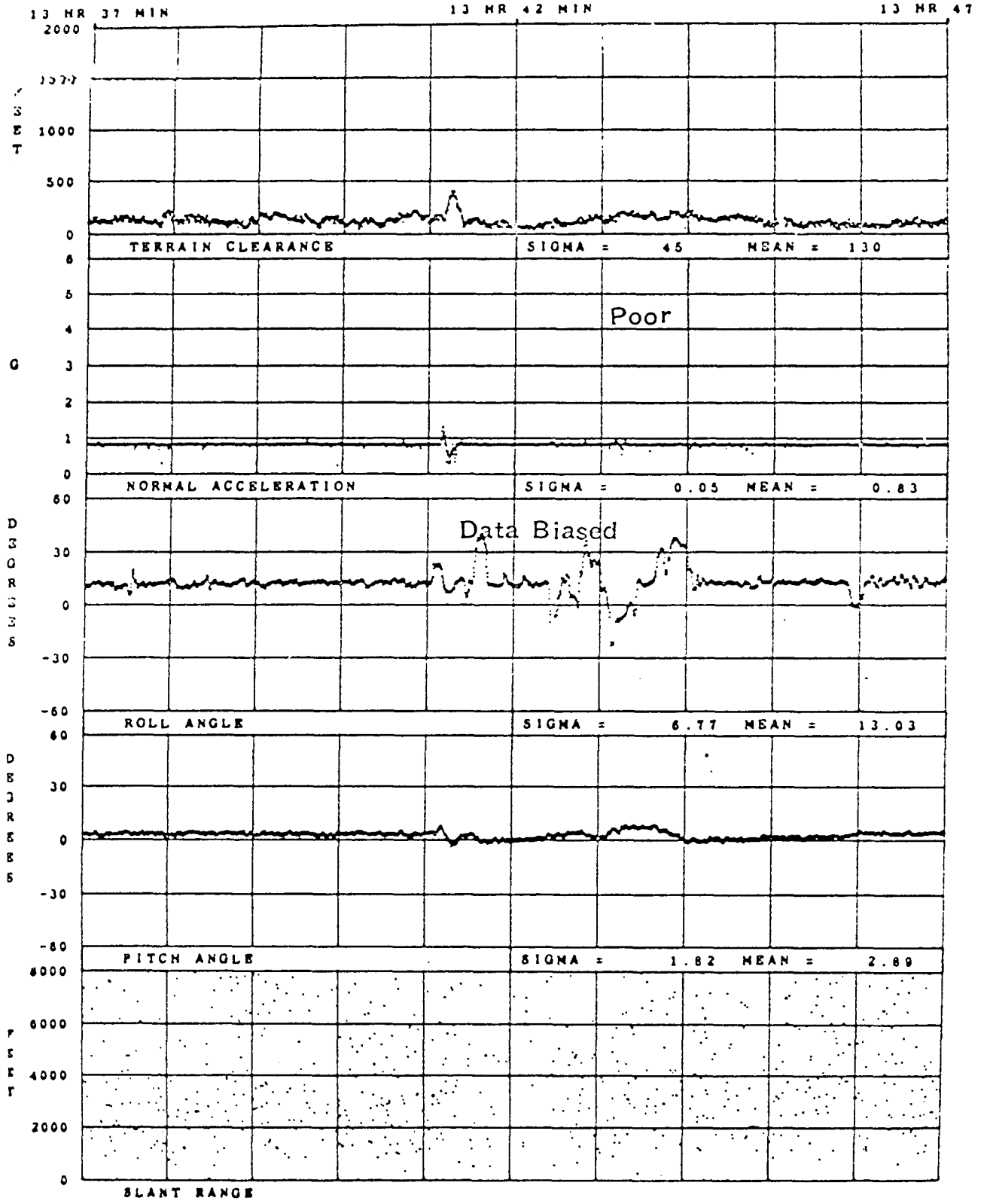


Figure 2-4 (U) Abnormal Accelerometer and Roll Angle Data

UNCLASSIFIED

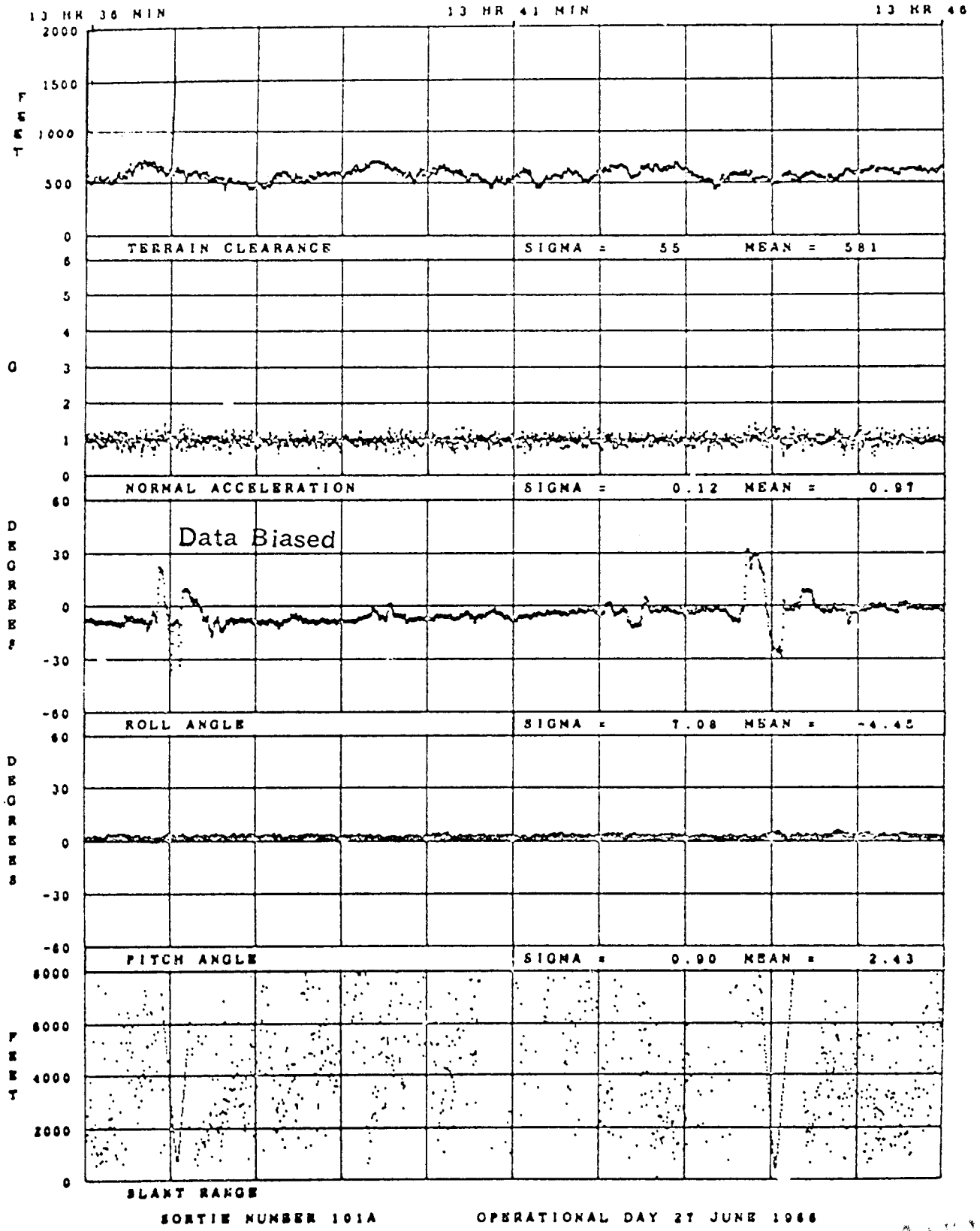
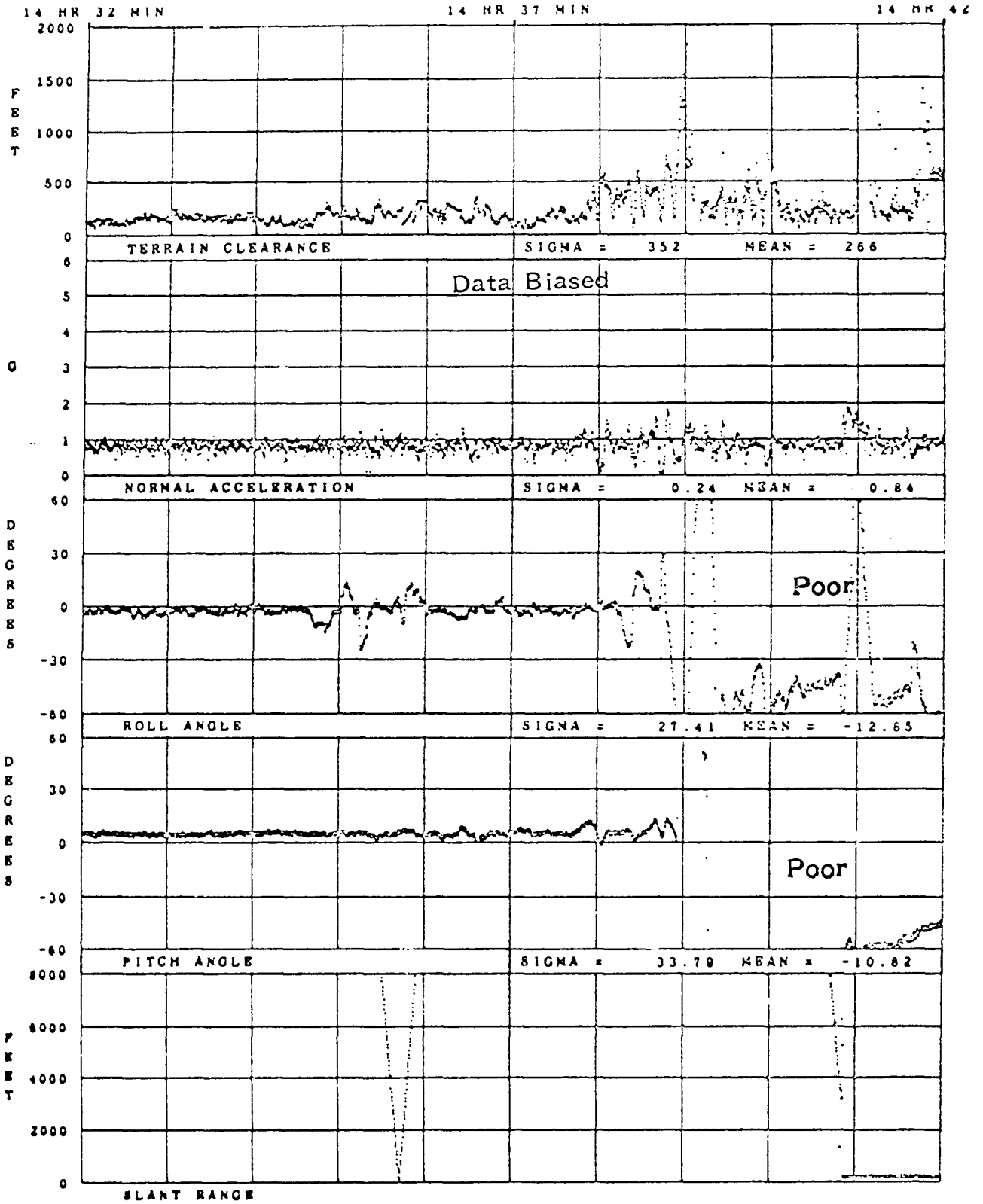


Figure 2-5 (U) Abnormal Roll Angle Data

UNCLASSIFIED

UNCLASSIFIED



UNCLASSIFIED

Figure 2-6 (U) Abnormal Accelerometer, Roll Angle and Pitch Angle Data

data of Figure 2-6. The data are considered poor until the nominal returns to its value prior to maneuvering.

(2) Biased data were caused mainly by the mechanical mounting of the instrumented pod to the aircraft and incorrect zero voltages on the gyro transducer circuits. Biased data are characterized by the nominal value for the roll angle being displaced more than 4 degrees and less than 10 degrees, as shown in Figure 2-4. Biased data were generally considered usable when the shift in the nominal value was taken into account. Biasing on the pitch angle was not generally recognizable since its nominal value was dependent upon indeterminant factors such as aircraft angle of attack under various fuel loads and speeds.

d. Slant Range. Figure 2-7 shows an example of abnormal slant range data. The double traces that appear for each of the three C-band encounters were caused by a malfunction in the digital encoder of the telemetry system. The data points in a line outside the V are the biased data and should be disregarded. Those data which form the inner V or portions of this V are considered usable. In the second encounter of the example, the data forming the right hand line are the acceptable data.

e. Off Scale Data. Data that exceeded the vertical scale of the plots and had no indications of being abnormal were identified as "off scale" (Figure 2-8).

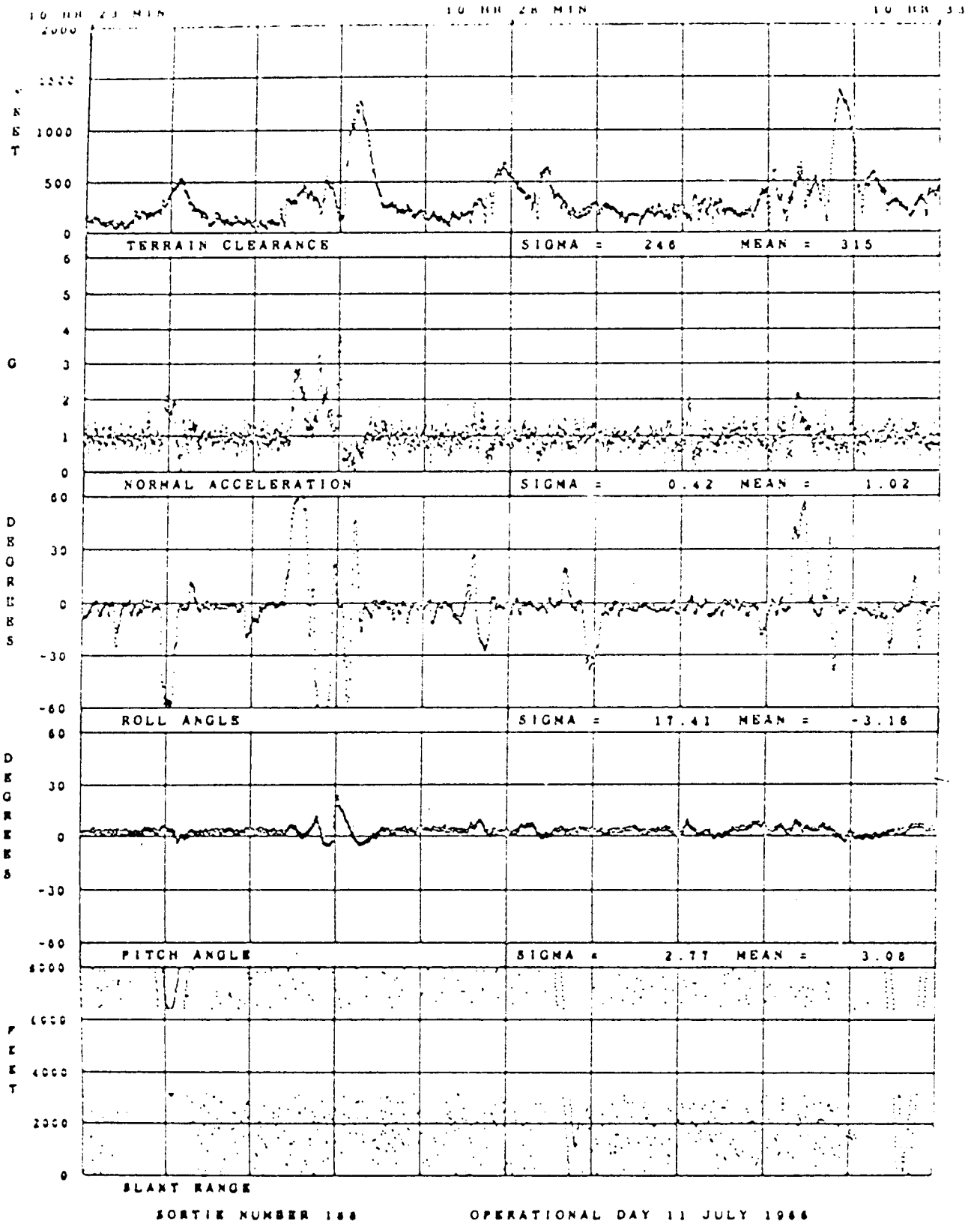


Figure 2-7 (U) Abnormal Slant Range Data

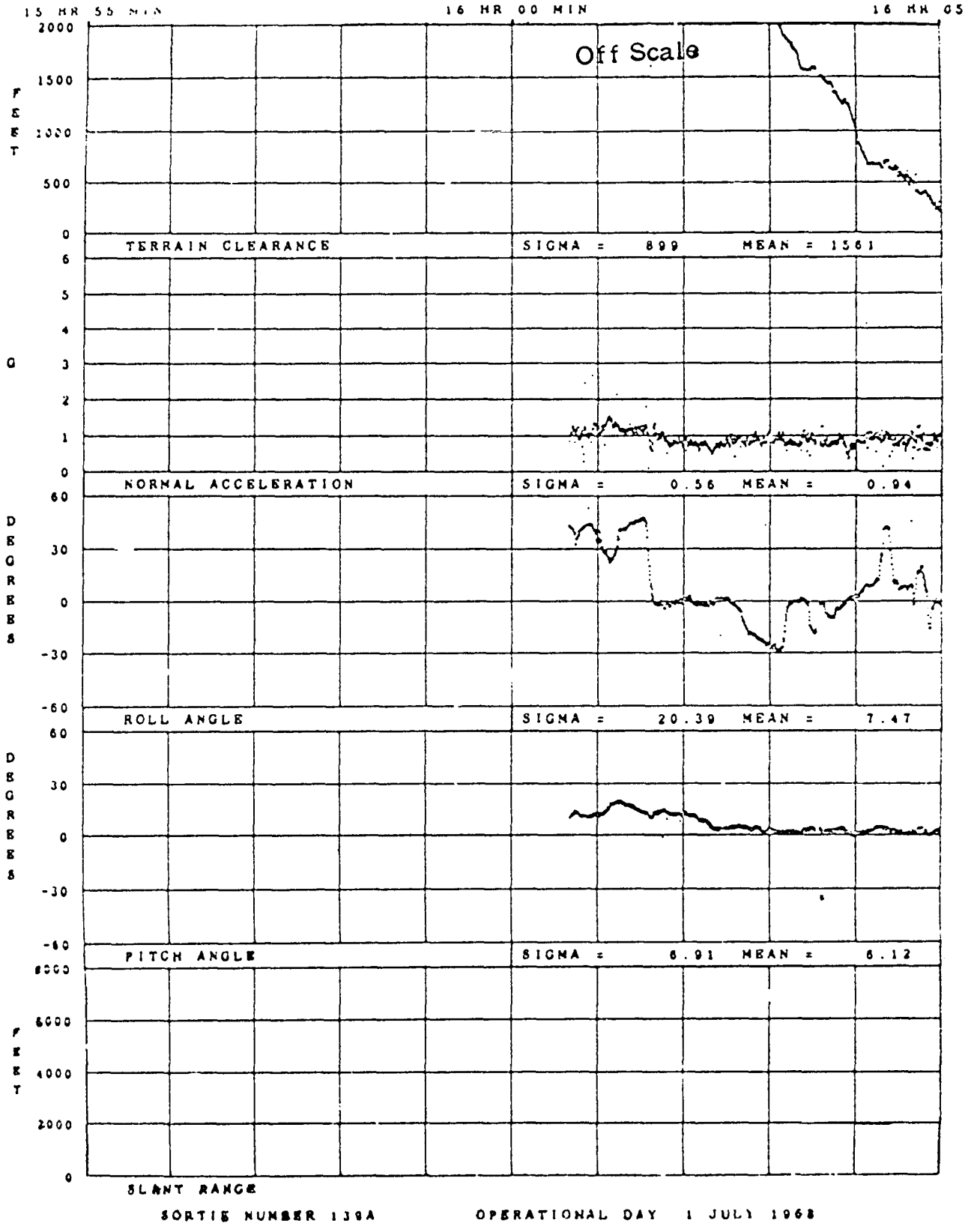


Figure 2-8 (U) Terrain Clearance Off Scale Data

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SECTION 3

DATA PLOTS FOR RF-101 AIRCRAFT BY SORTIE

1. Sortie Order. This section contains plots of aircraft position data, telemetered data and aircraft altitude and terrain profile. The plots are listed by sortie and ordered by operational day. The sorties appear in the following order.

PART 1 OF 2

SORTIE	PAGE NUMBER
286	3-5
289A	3-17
288A	3-28
298A	3-39
293	3-52
299	3-64
292A	3-75
287C	3-87
300A	3-99
305	3-108
295A	3-118
308	3-128
294A	3-137

PART 1 OF 2 SORTIE	PAGE NUMBER
309	3-149
317	3-159
318	3-171
327	3-183
323A	3-195
325	3-207
334	3-219
324B	3-230
335	3-241

PART 2 OF 2 SORTIE	PAGE NUMBER
343	3-255
341	3-268
344	3-280
363	3-292
356	3-305
342A	3-317
364	3-329
351A	3-340
374A	3-351

PART 2 OF 2 SORTIE	PAGE NUMBER
369	3-363
373	3-375
370	3-387
372	3-398
389	3-409
388	3-420
380	3-433
382	3-445
381	3-457
379A	3-469
389A	3-481
391	3-492
392	3-502
395	3-514
391A	3-525
389D	3-536
393A	3-548
377C	3-560
395A	3-572
394A	3-584

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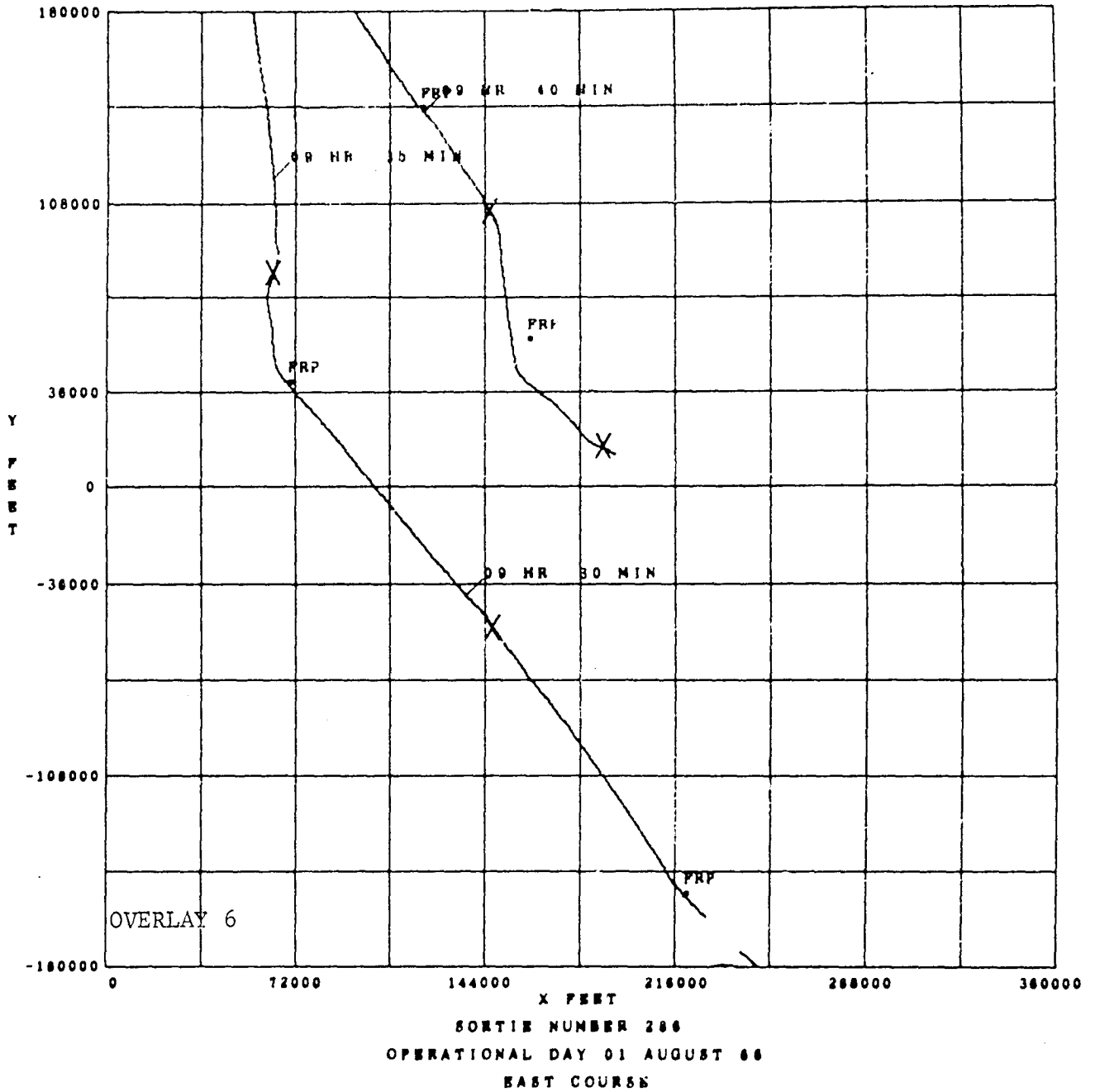


Figure 3-1 (U) Aircraft Position Data (Part 1 of 5)

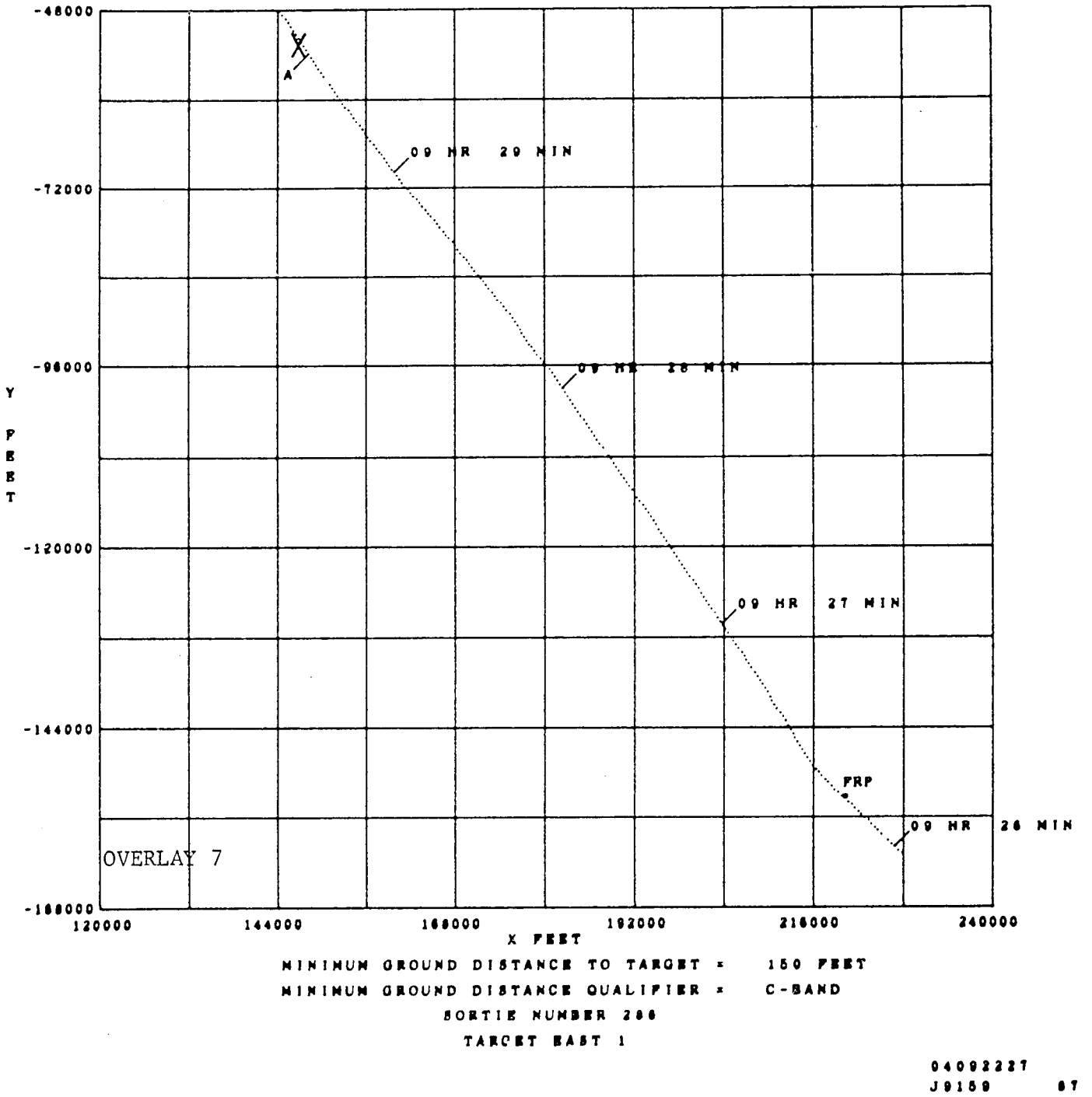
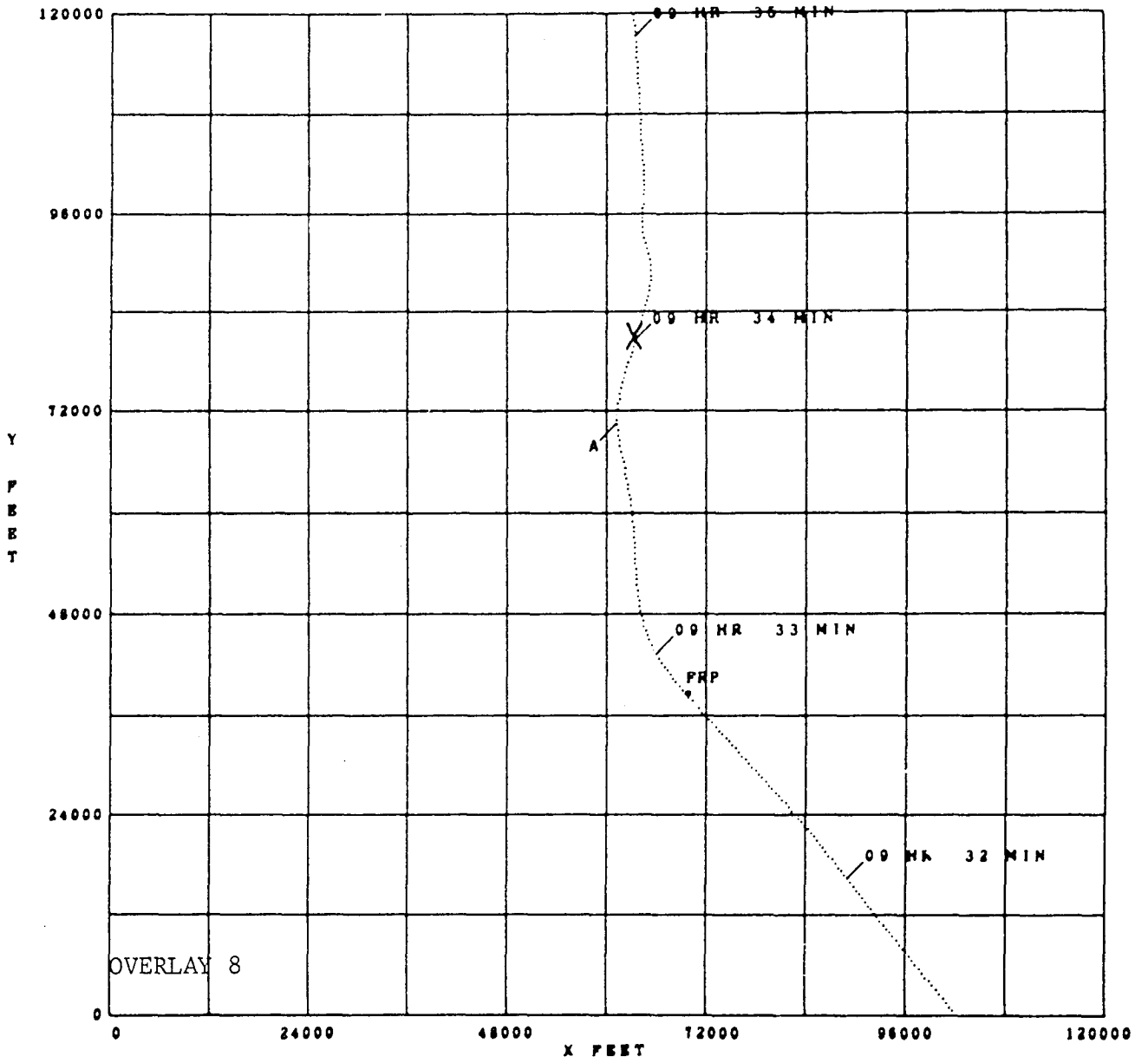


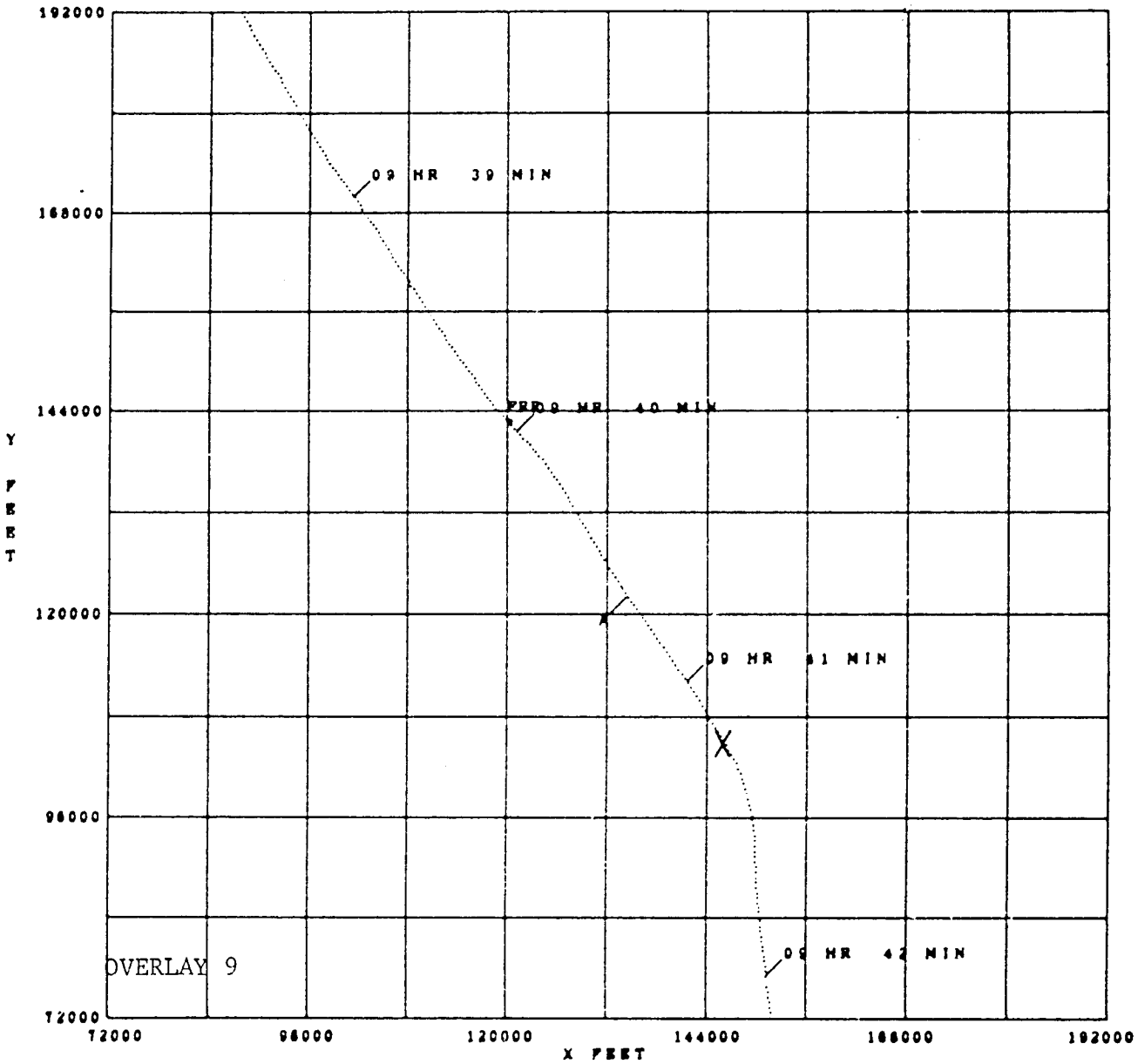
Figure 3-1 (U) Aircraft Position Data (Part 2 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 264 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 286
TARGET EAST 2

04092227

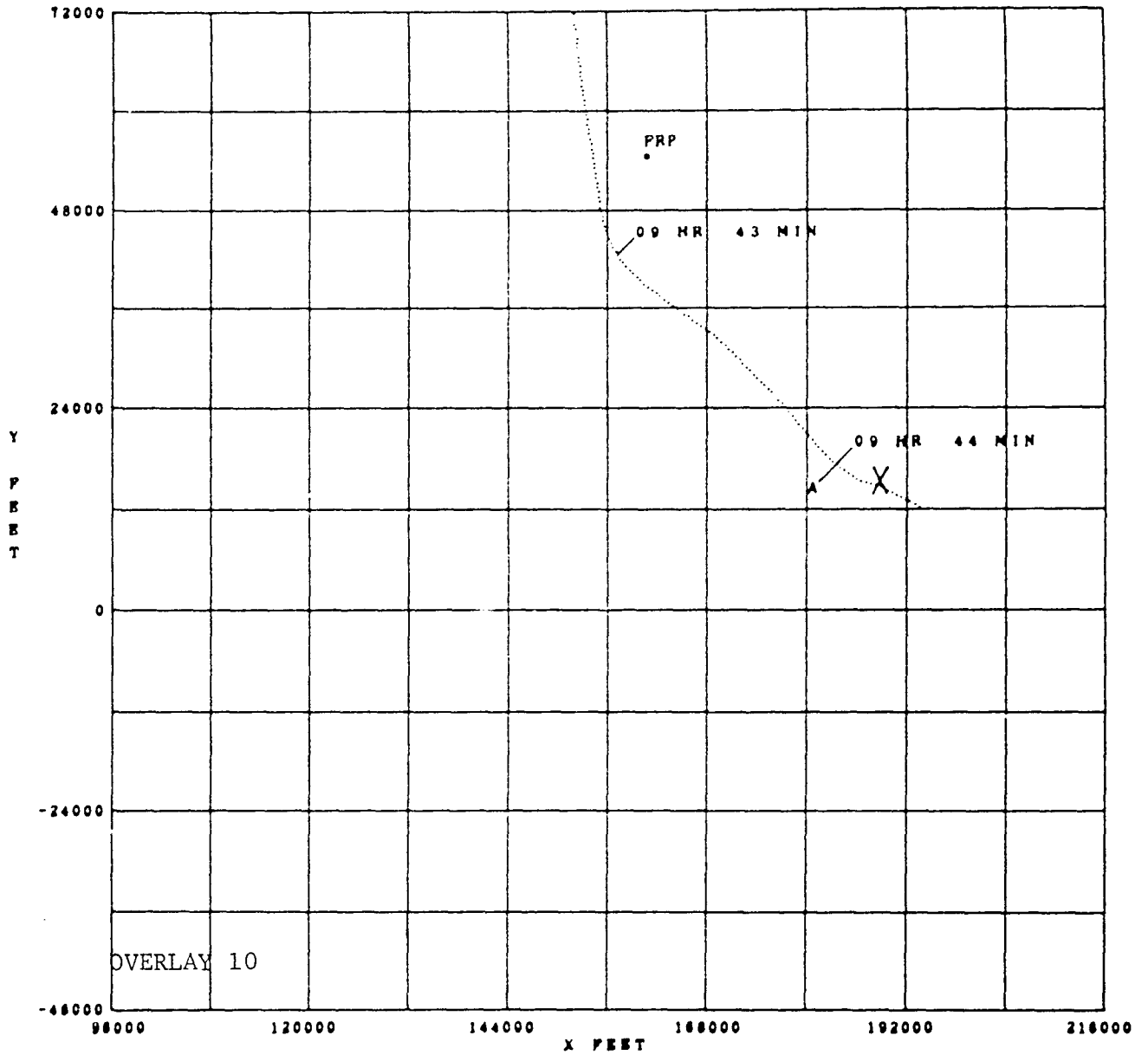
Figure 3-1 (U) Aircraft Position Data (Part 3 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 326 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 286
TARGET EAST 3

04092227
J9150 89

Figure 3-1 (U) Aircraft Position Data (Part 4 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 250 FEET
MINIMUM GROUND DISTANCE QUALIFIER = C-BAND
SORTIE NUMBER 286
TARGET EAST 4

04092228
J9159 91

Figure 3-1 (U) Aircraft Position Data (Part 5 of 5)

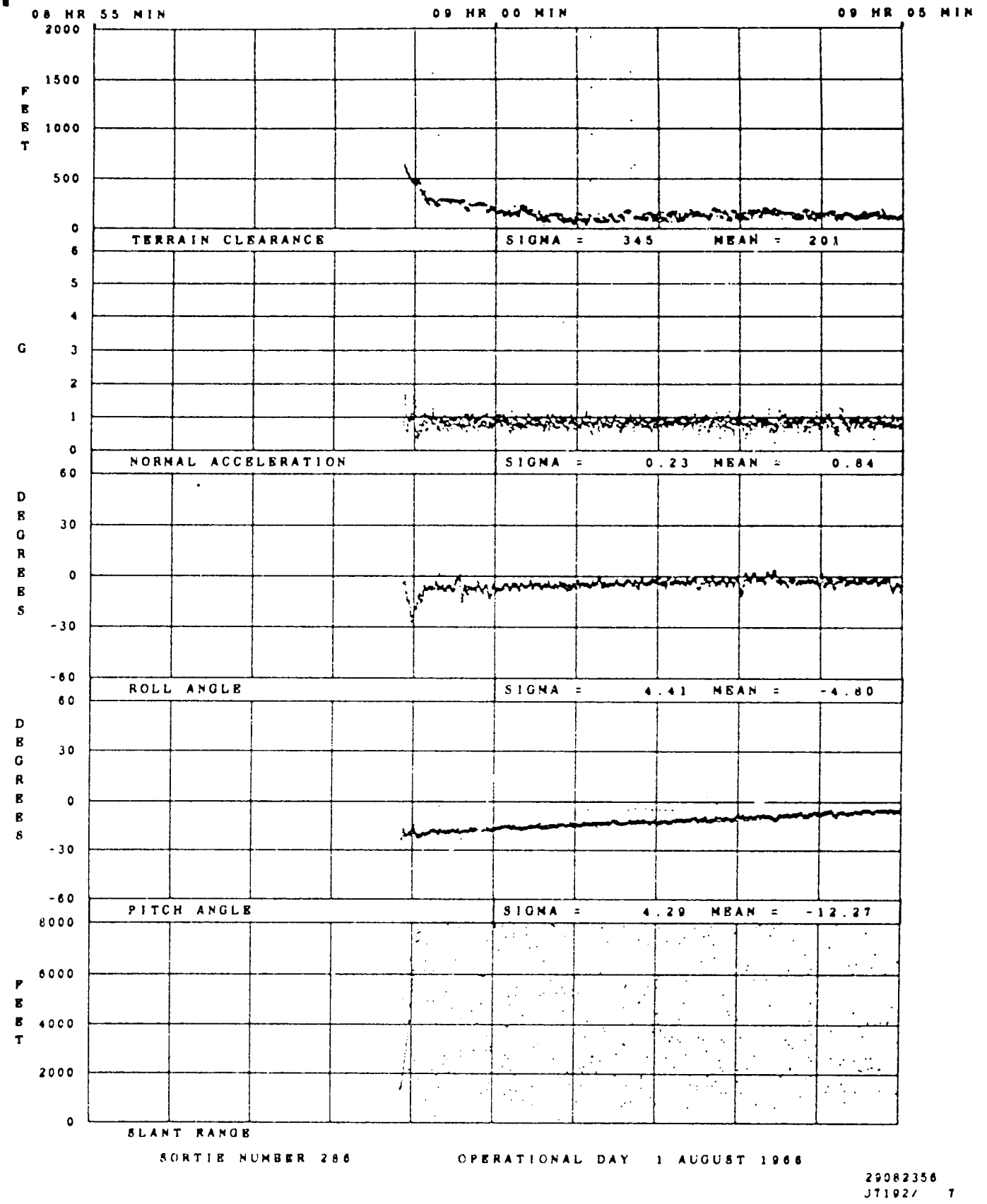


Figure 3-2 (U) Telemetered Data (Part 1 of 5)

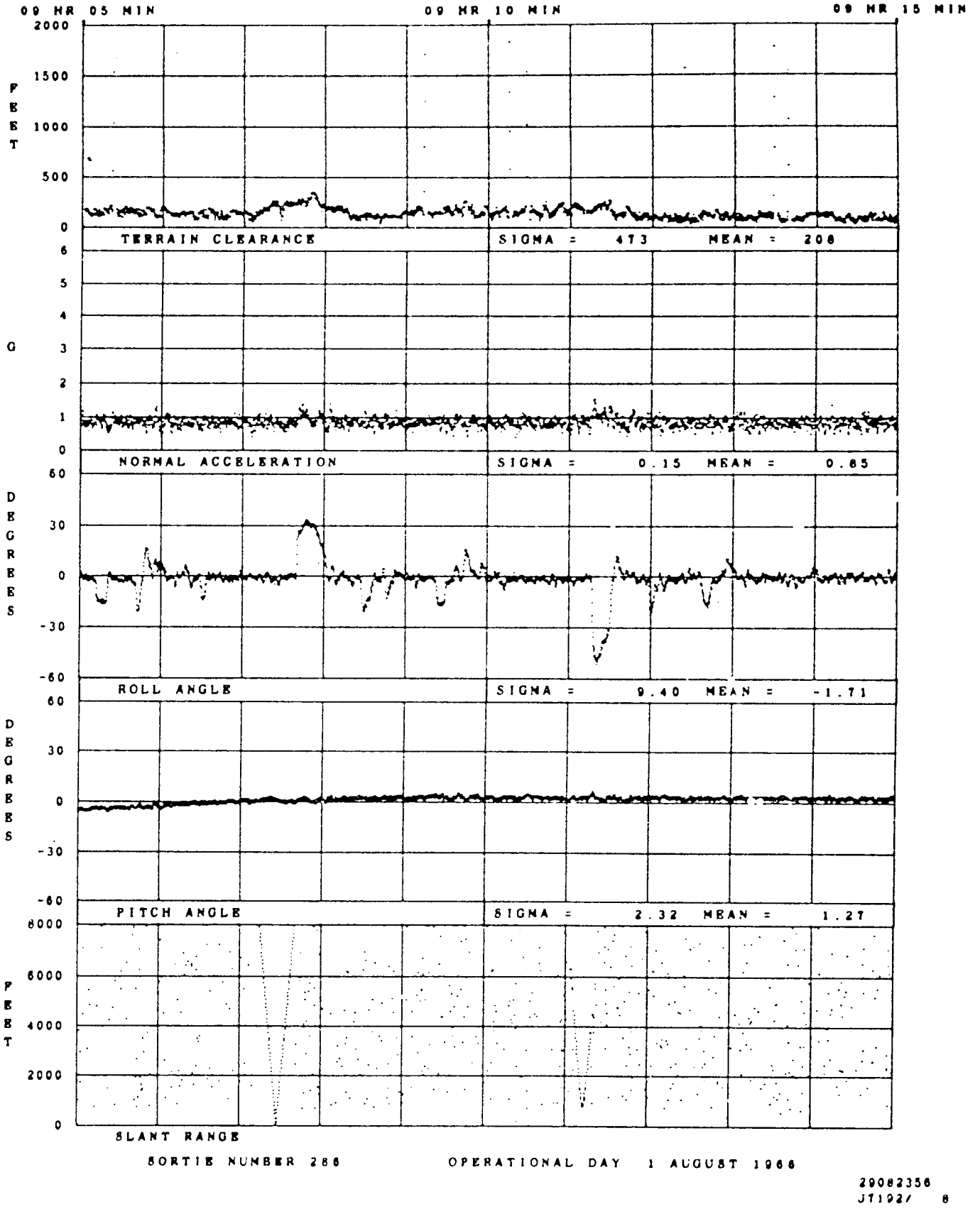


Figure 3-2 (U) Telemetered Data (Part 2 of 5)

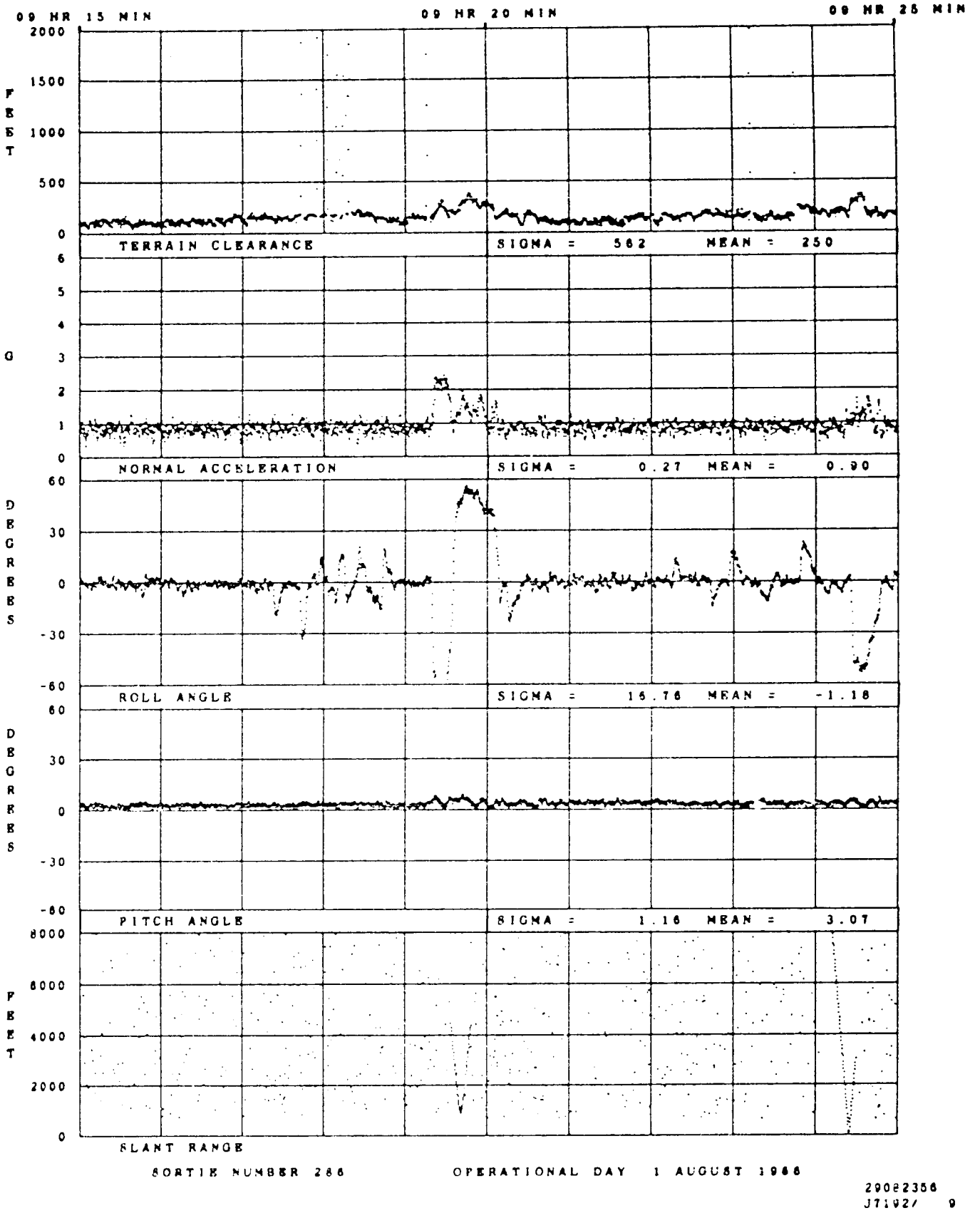


Figure 3-2 (U) Telemetered Data (Part 3 of 5)

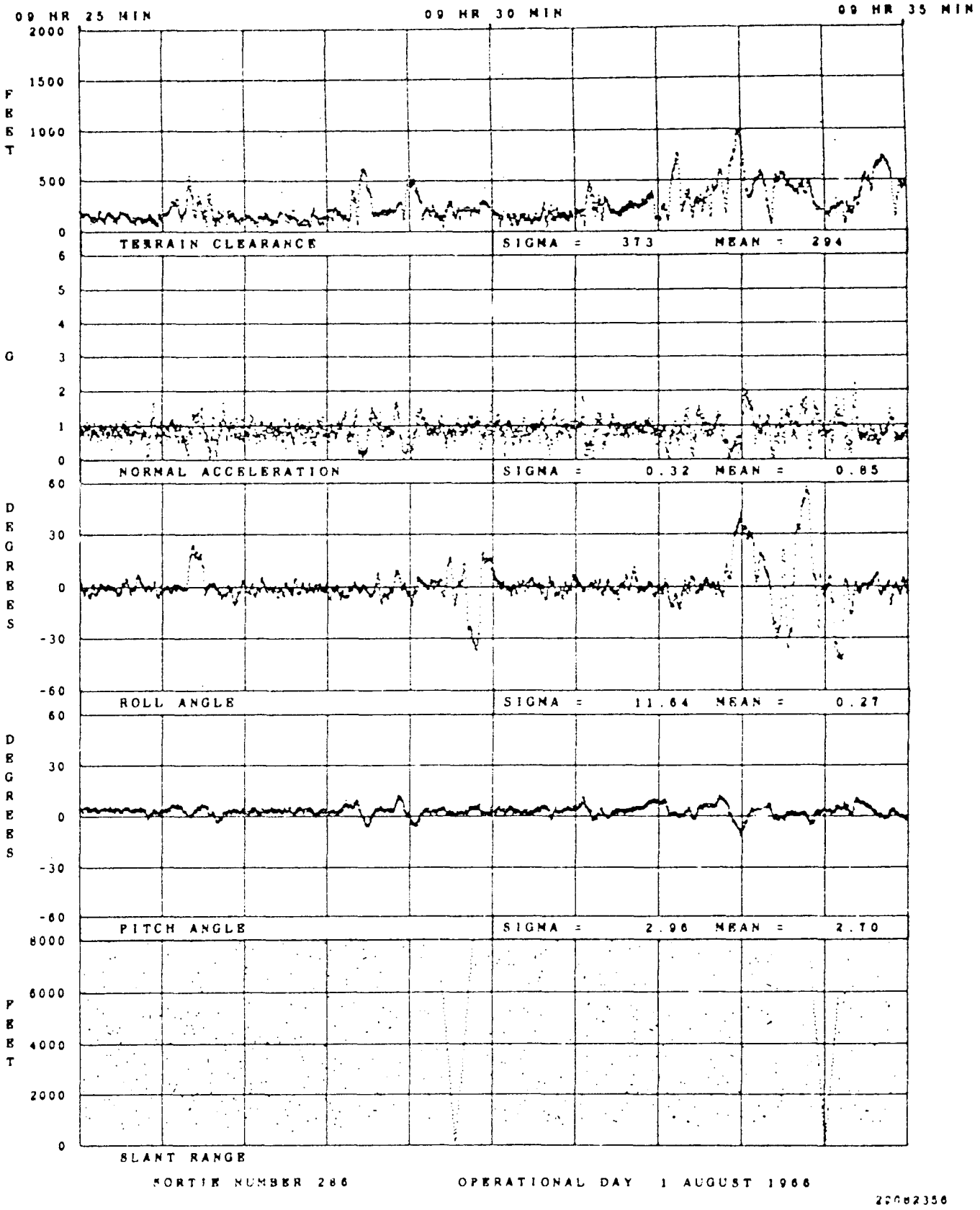


Figure 3-2 (U) Telemetered Data (Part 4 of 5)

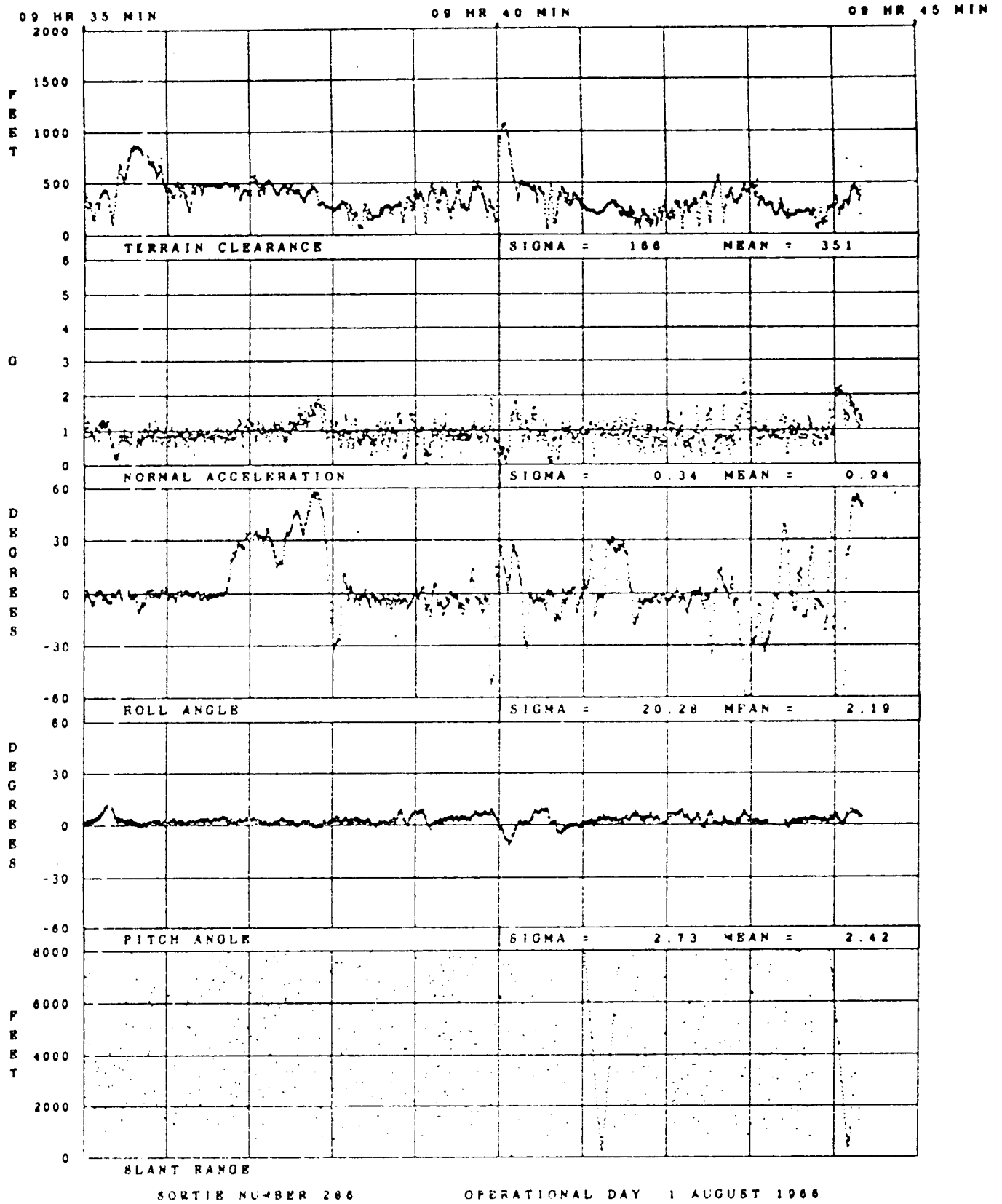
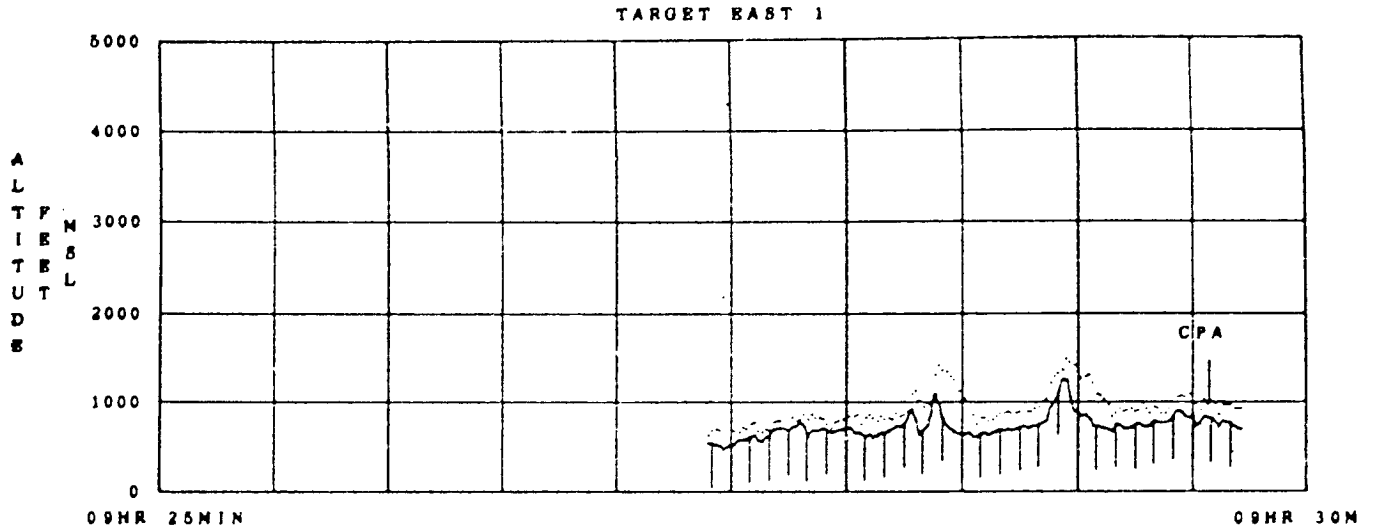
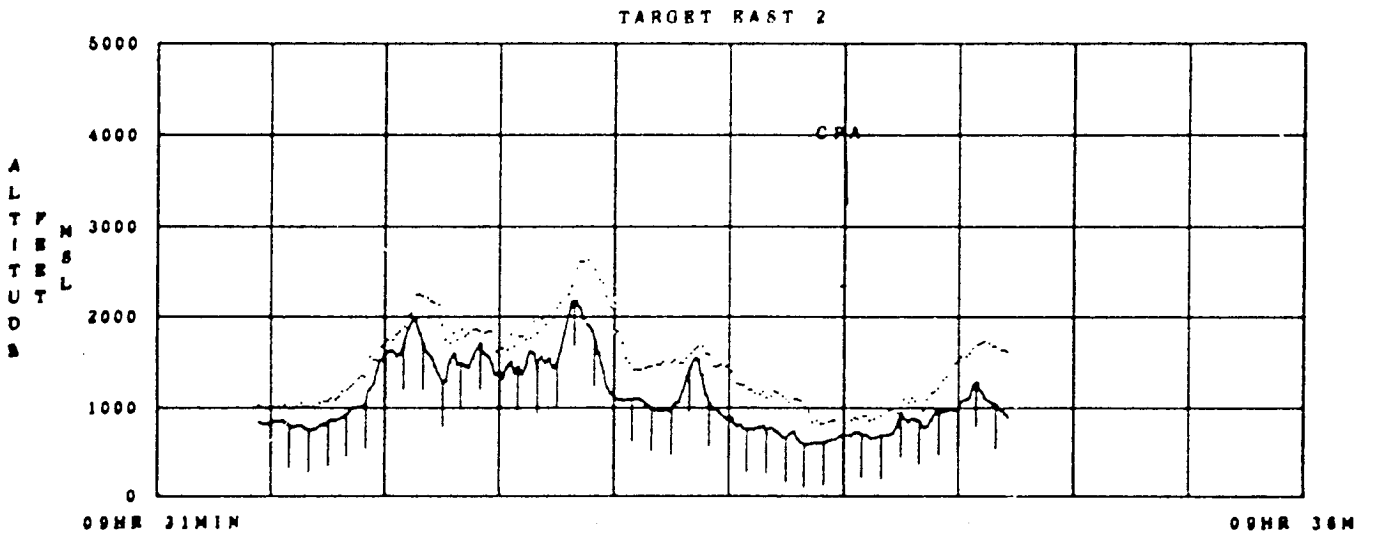


Figure 3-2 (U) Telemetered Data (Part 5 of 5)

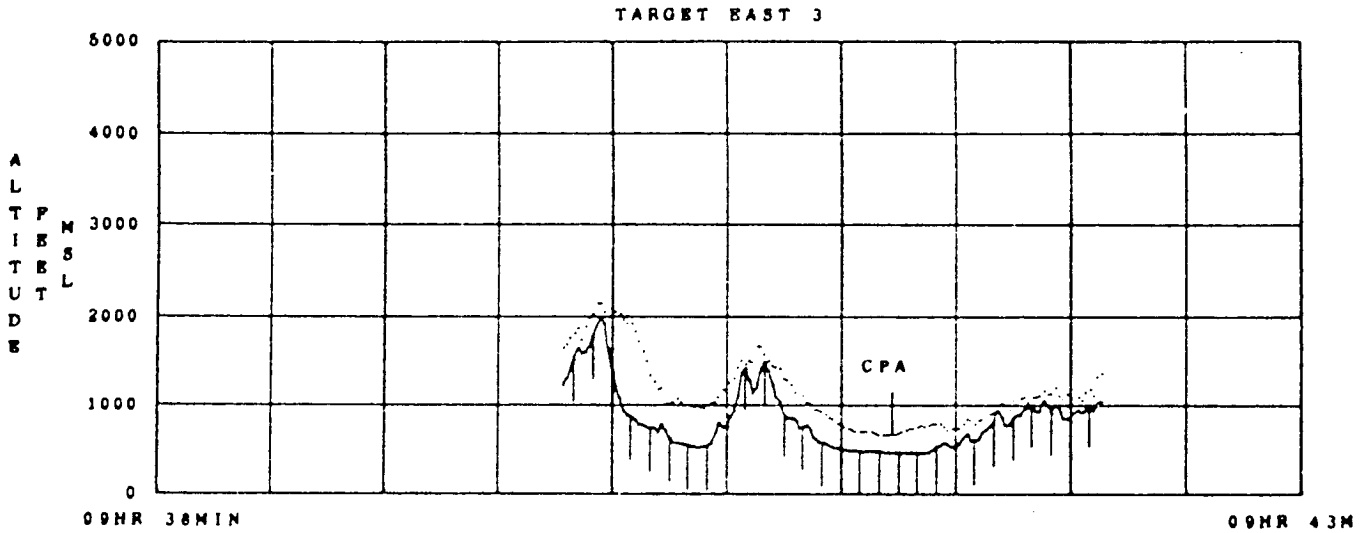


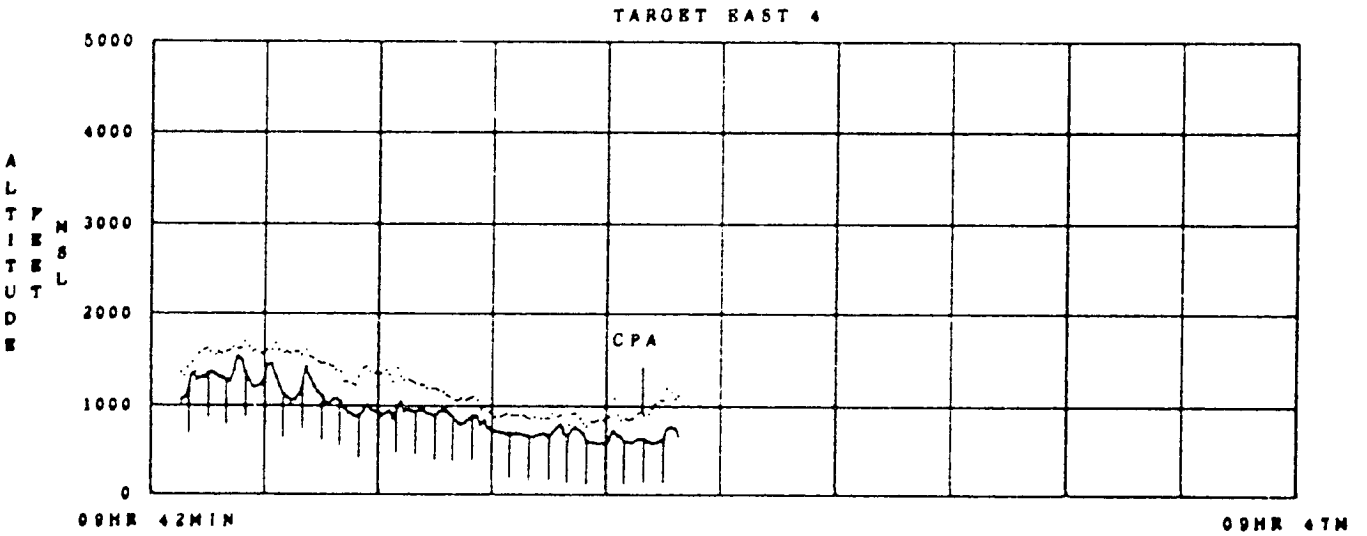


SORTIE NUMBER 286

04092228
J9159

Figure 3-3 (U) Aircraft Altitude and Terrain Profile (Part 1 of 2)

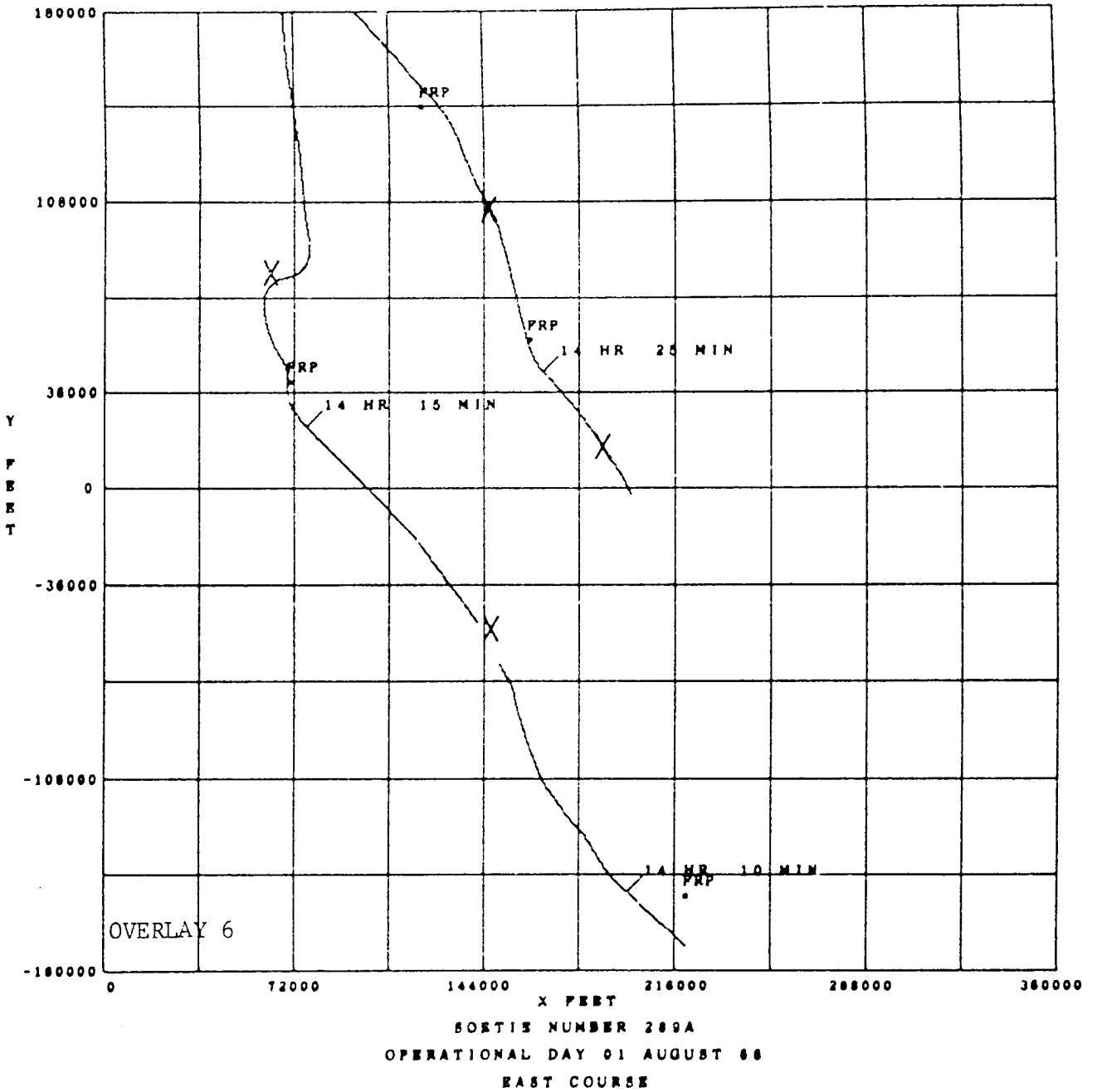




SORTIE NUMBER 286

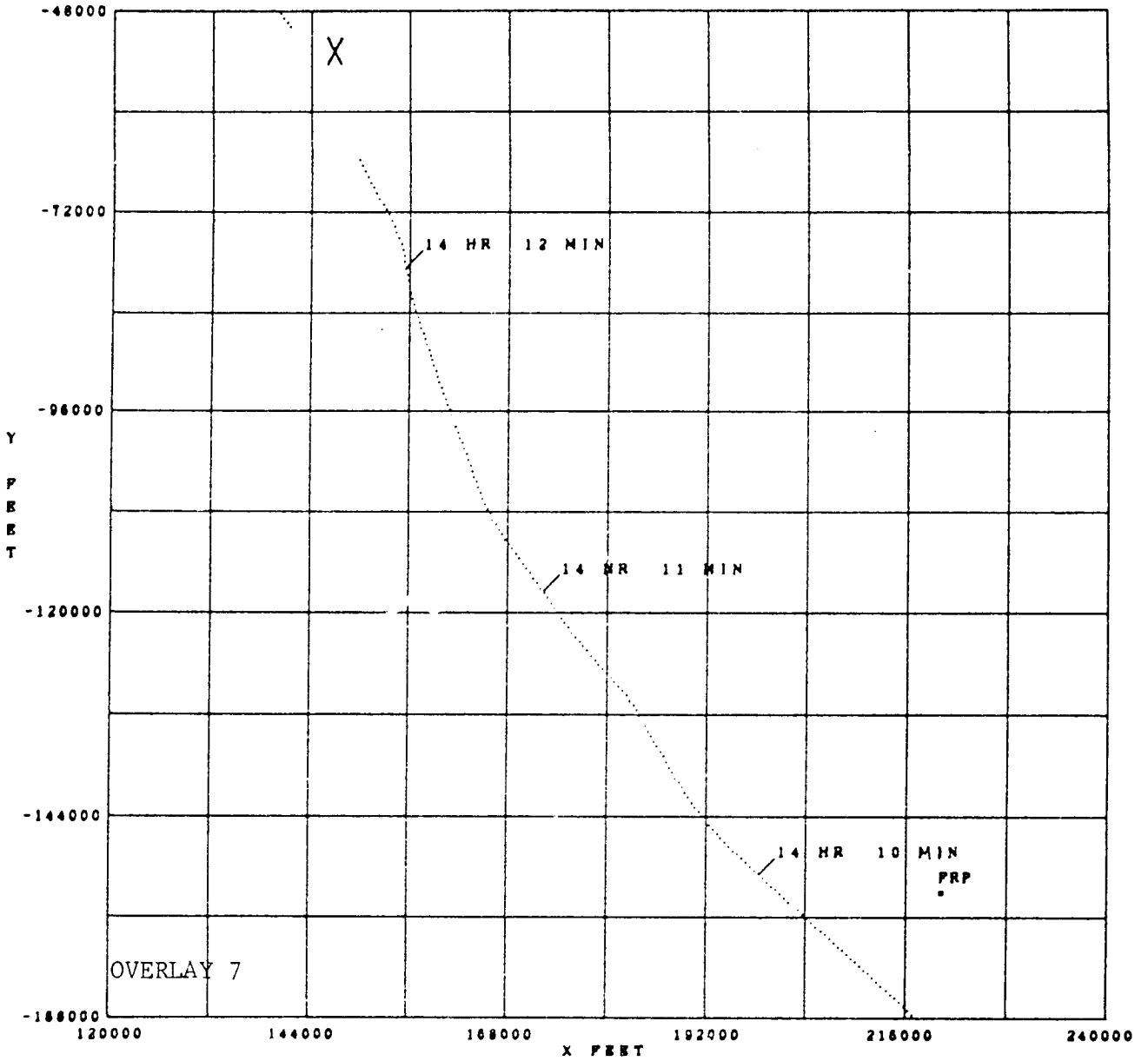
04092228
J9159

Figure 3-3 (U) Aircraft Altitude and Terrain Profile (Part 2 of 2)



04092228
J9159 10

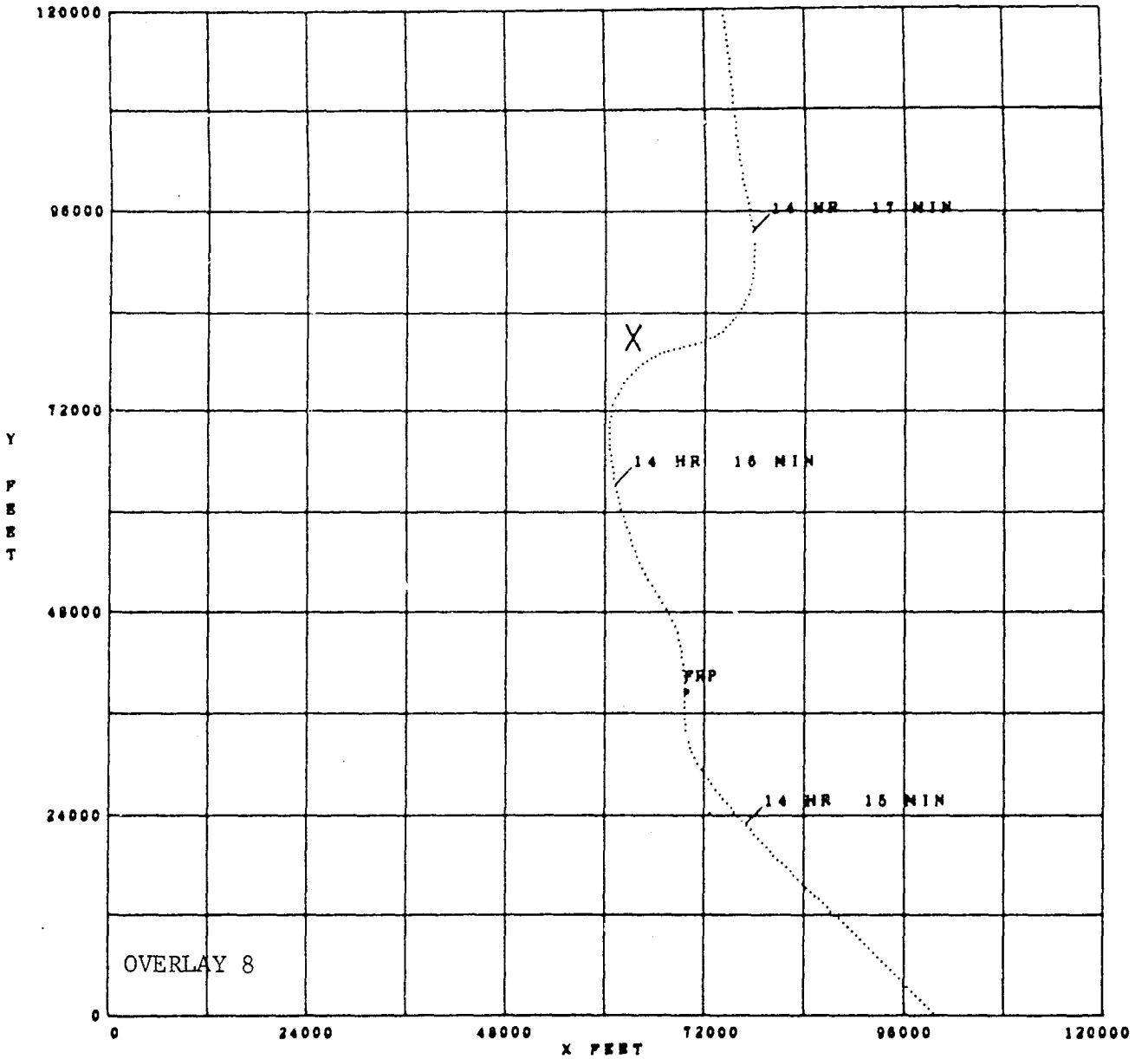
Figure 3-4 (U) Aircraft Position Data (Part 1 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 3100 FEET
MINIMUM GROUND DISTANCE QUALIFIER = ESTIMATED
SORTIE NUMBER 289A
TARGET EAST 1

04092229
J9159 103

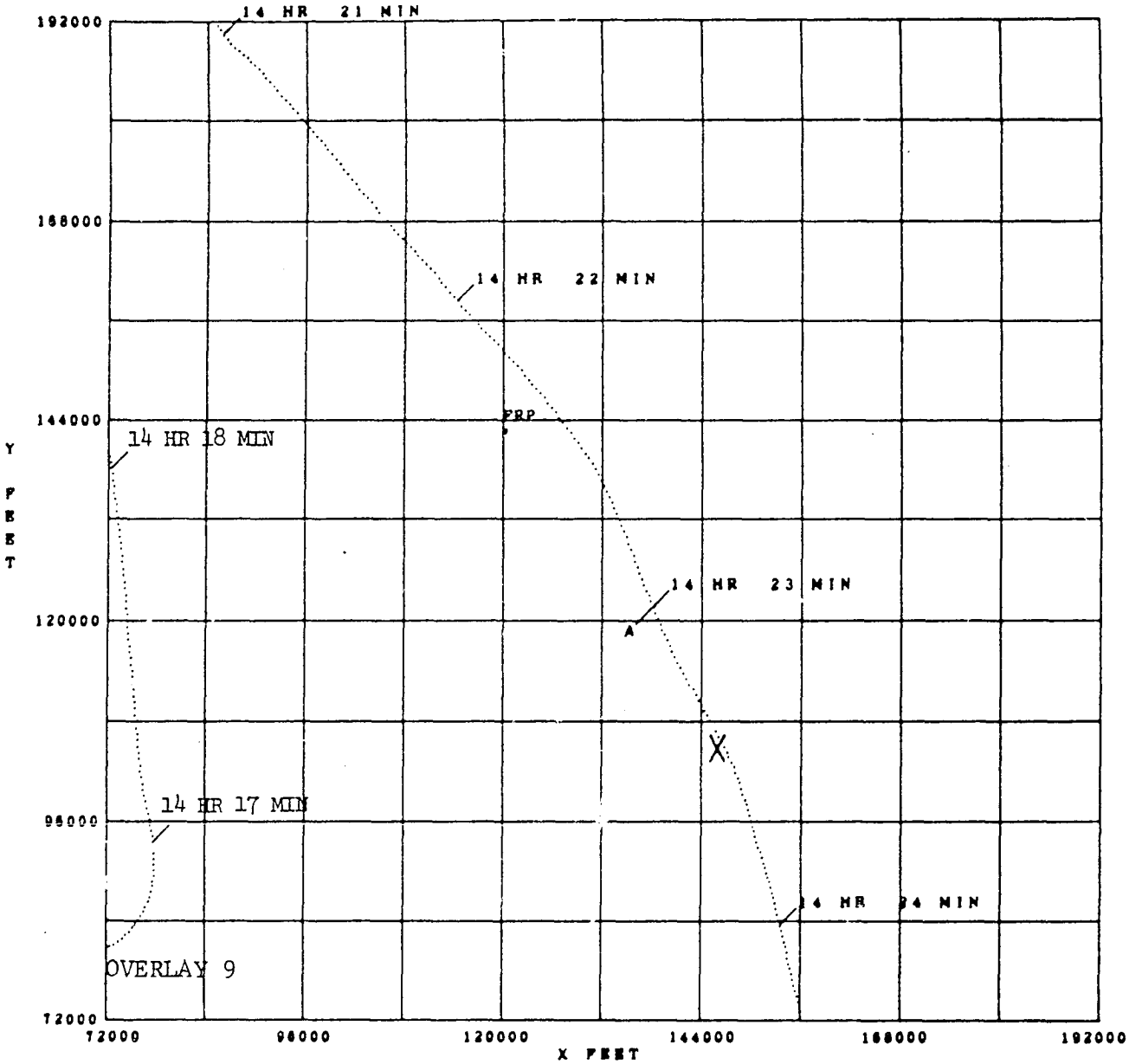
Figure 3-4 (U) Aircraft Position Data (Part 2 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 3122 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 289A
TARGET EAST 2

04092229
J9159 10

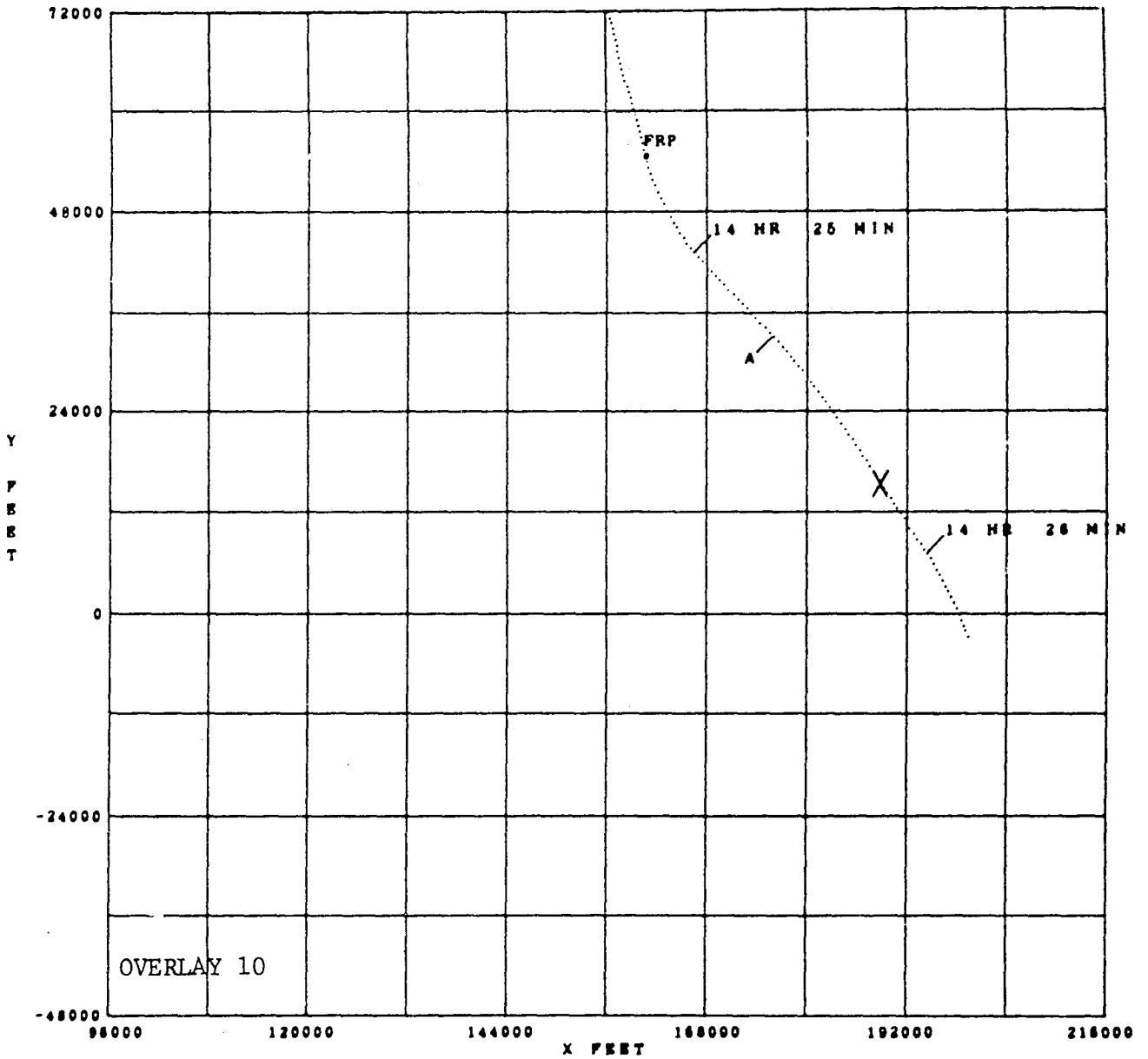
Figure 3-4 (U) Aircraft Position Data (Part 3 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 828 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 289A
TARGET EAST 3

04092229
J9159 105

Figure 3-4 (U) Aircraft Position Data (Part 4 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 406 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 289A
TARGET EAST 4

04092229
J9159 108

Figure 3-4 (U) Aircraft Position Data (Part 5 of 5)

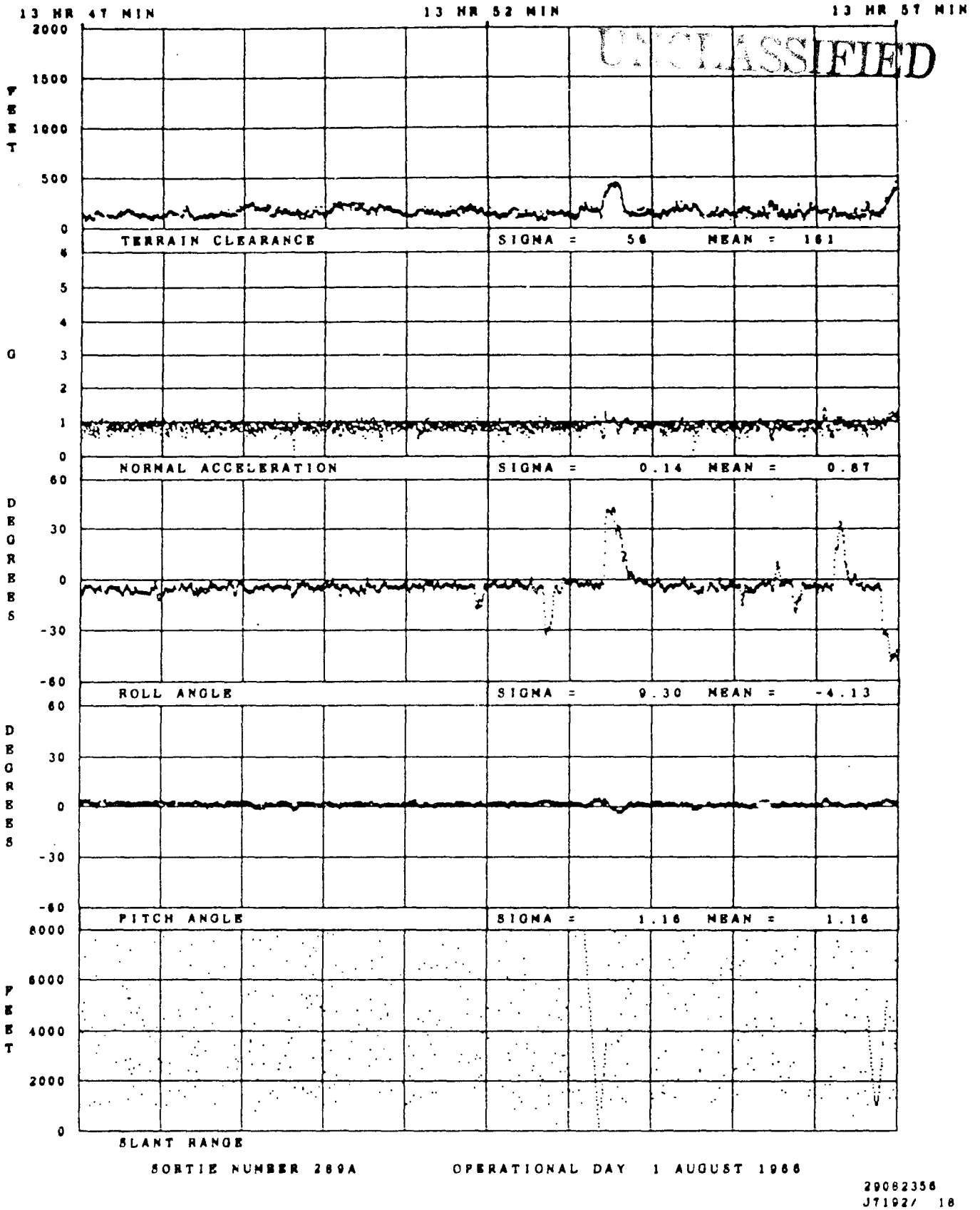
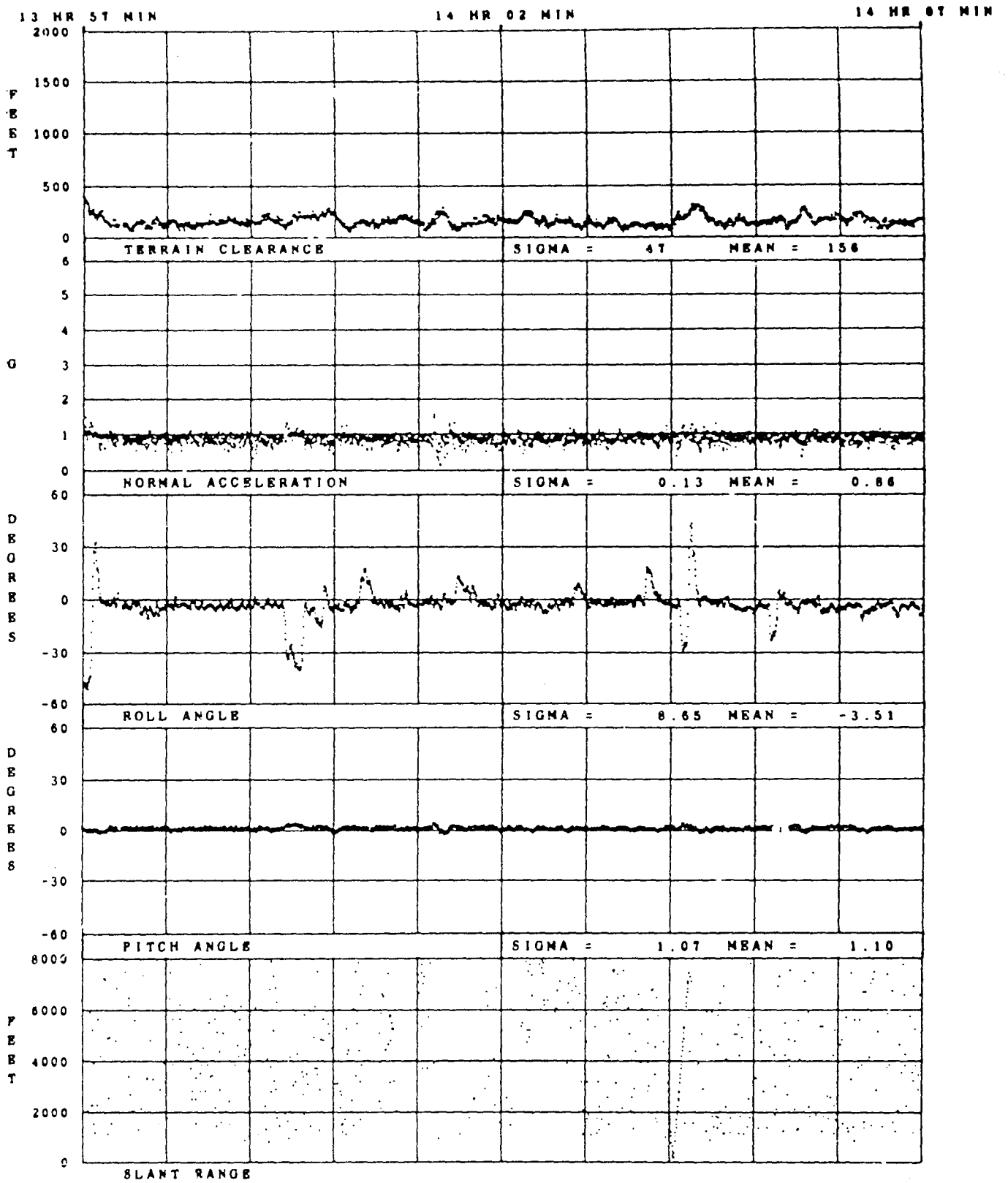


Figure 3-5 (U) Telemetered Data (Part 1 of 4)

UNCLASSIFIED



29082356
J7192/ 19

Figure 3-5 (U) Telemetered Data (Part 2 of 4)

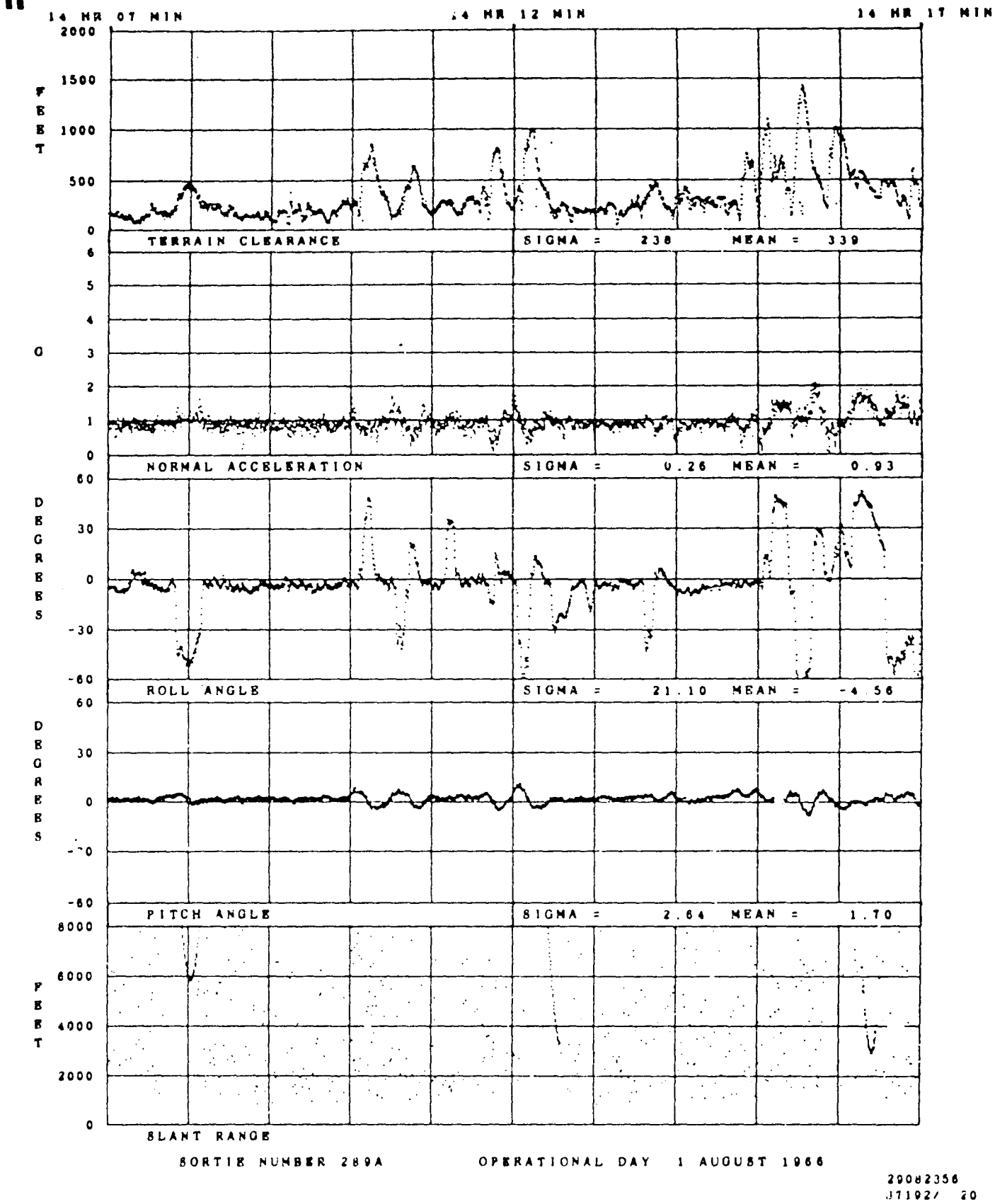


Figure 3-5 (U) Telemetered Data (Part 3 of 4)

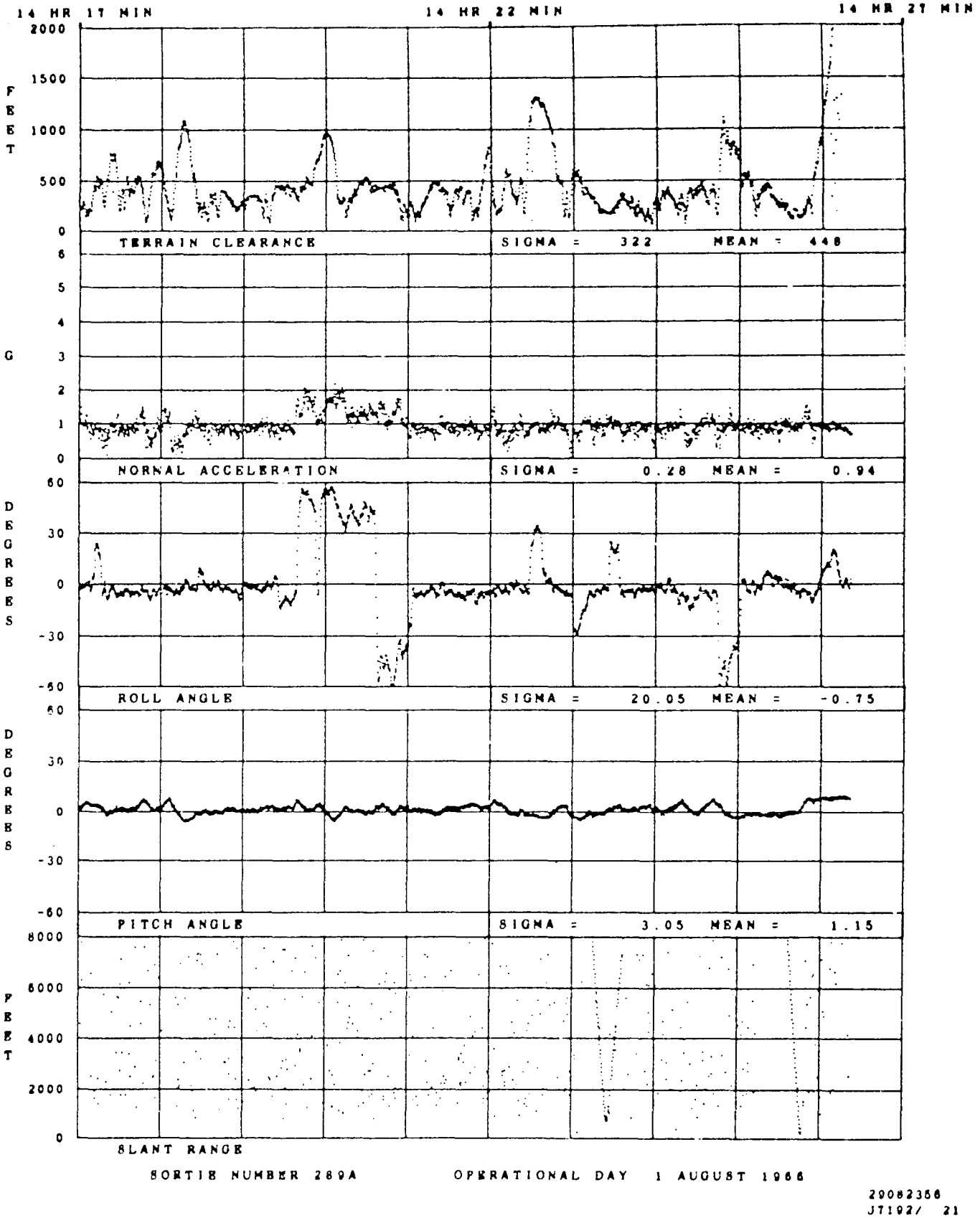
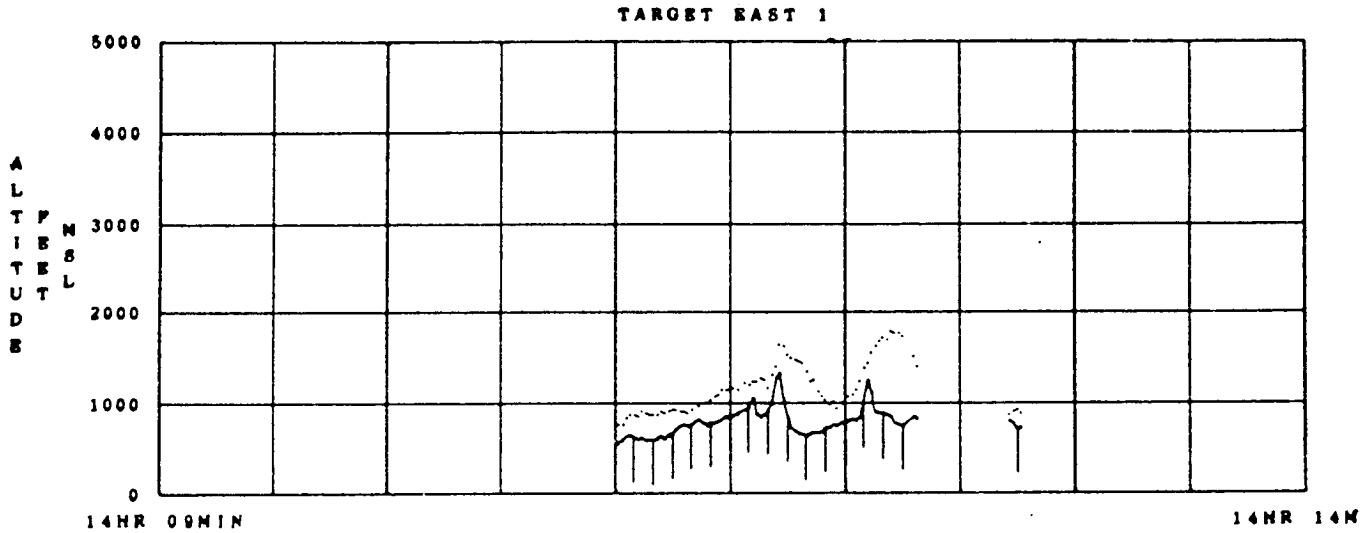
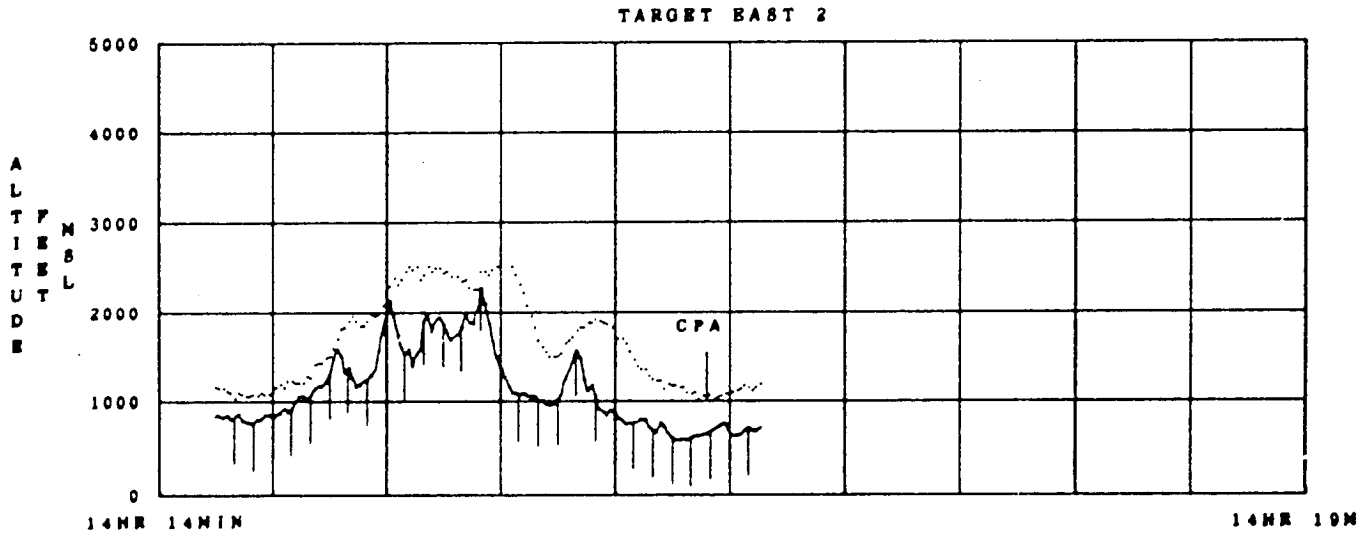


Figure 3-5 (U) Telemetered Data (Part 4 of 4)

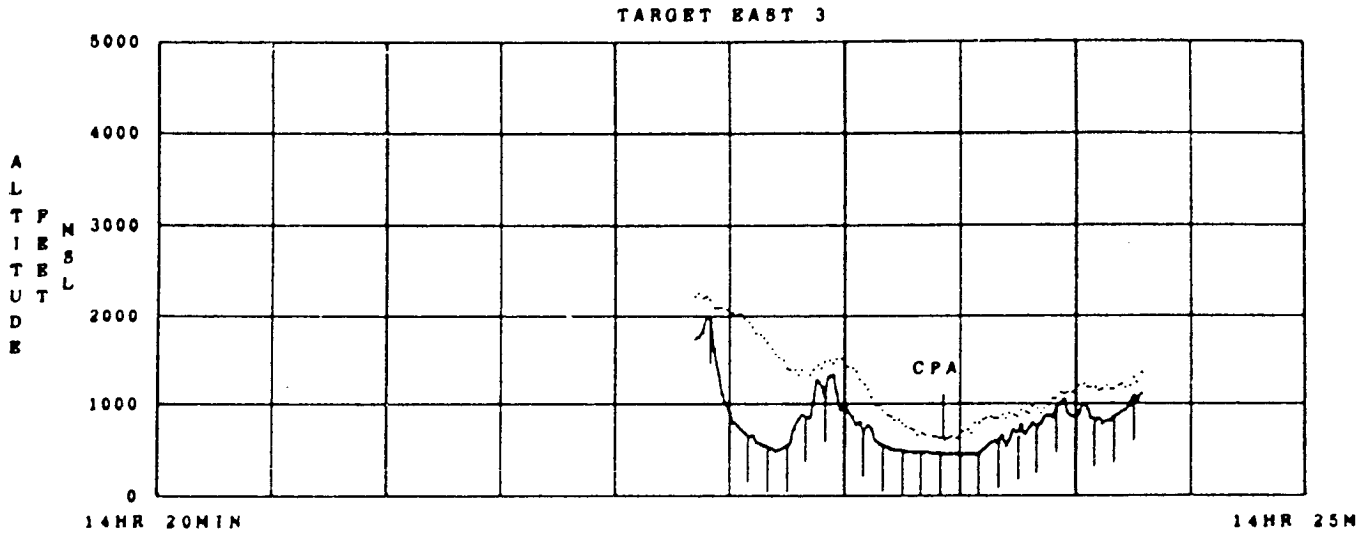


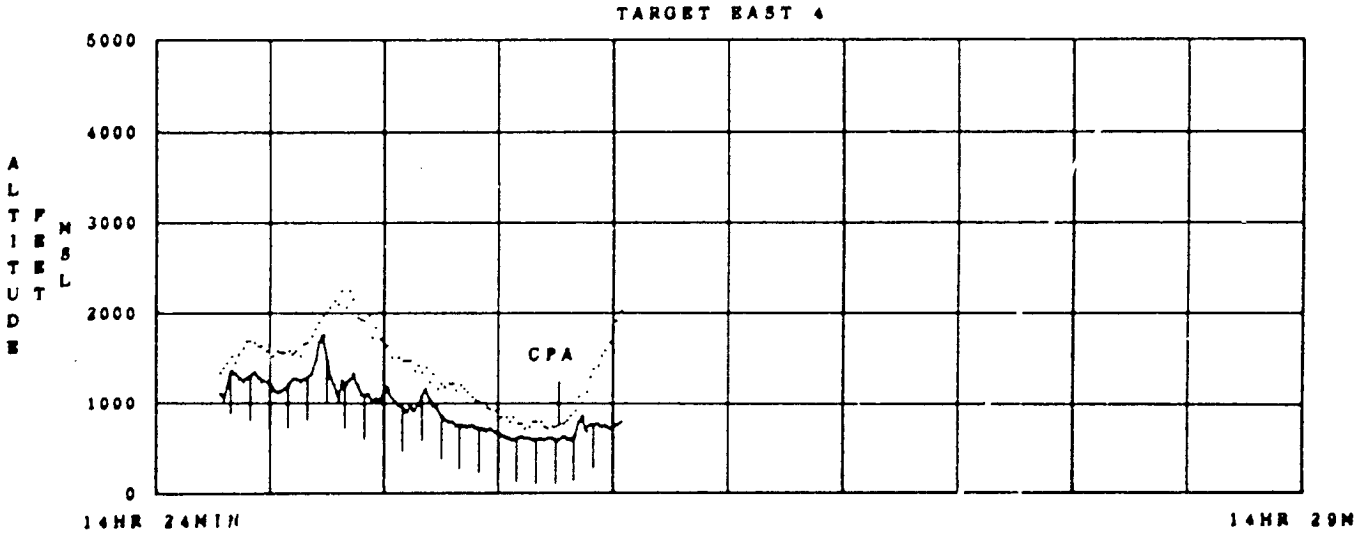


SORTIE NUMBER 289A

04092229
J9159

Figure 3-6 (U) Aircraft Altitude and Terrain Profile (Part 1 of 2)

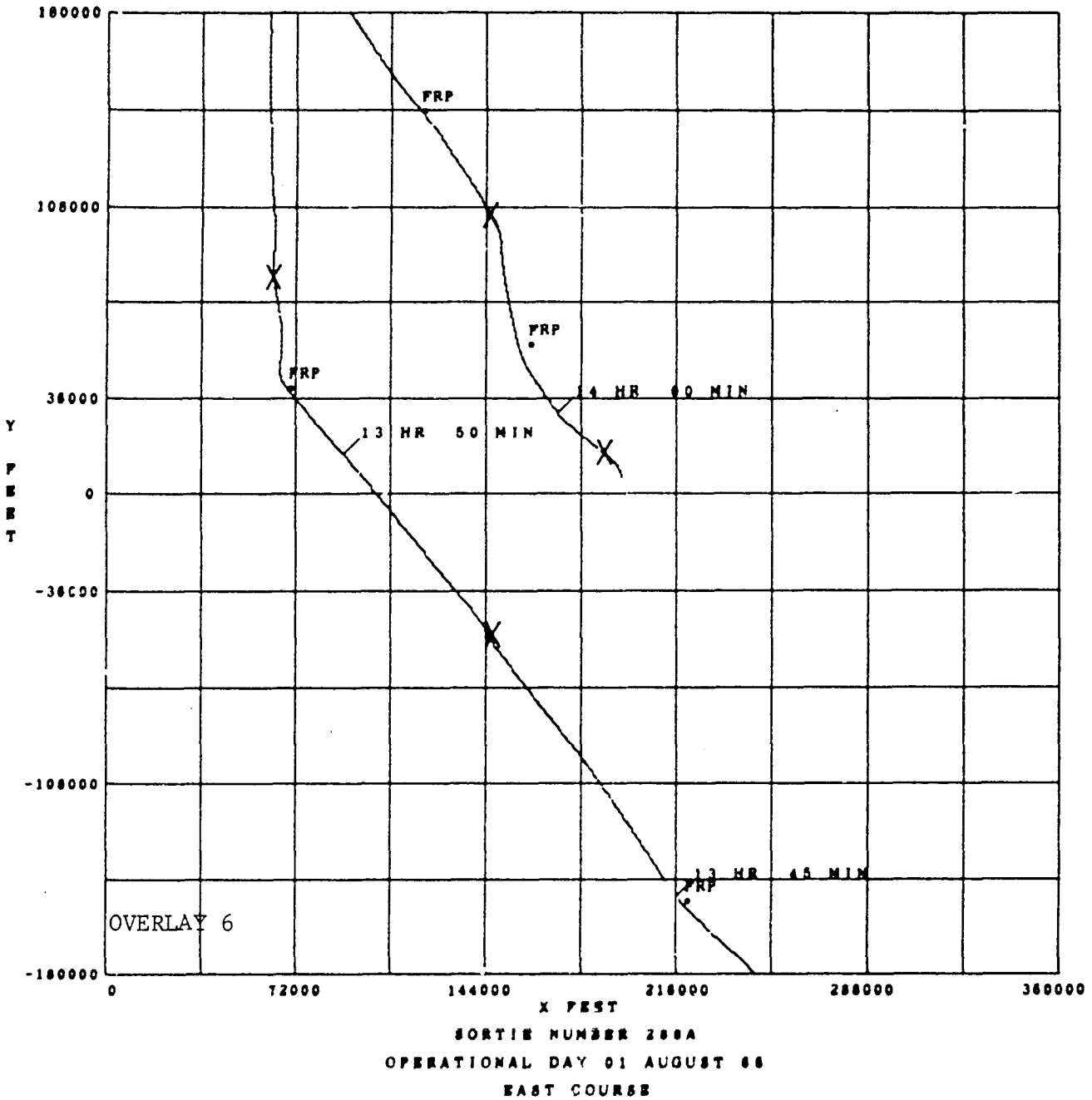




SORTIE NUMBER 289A

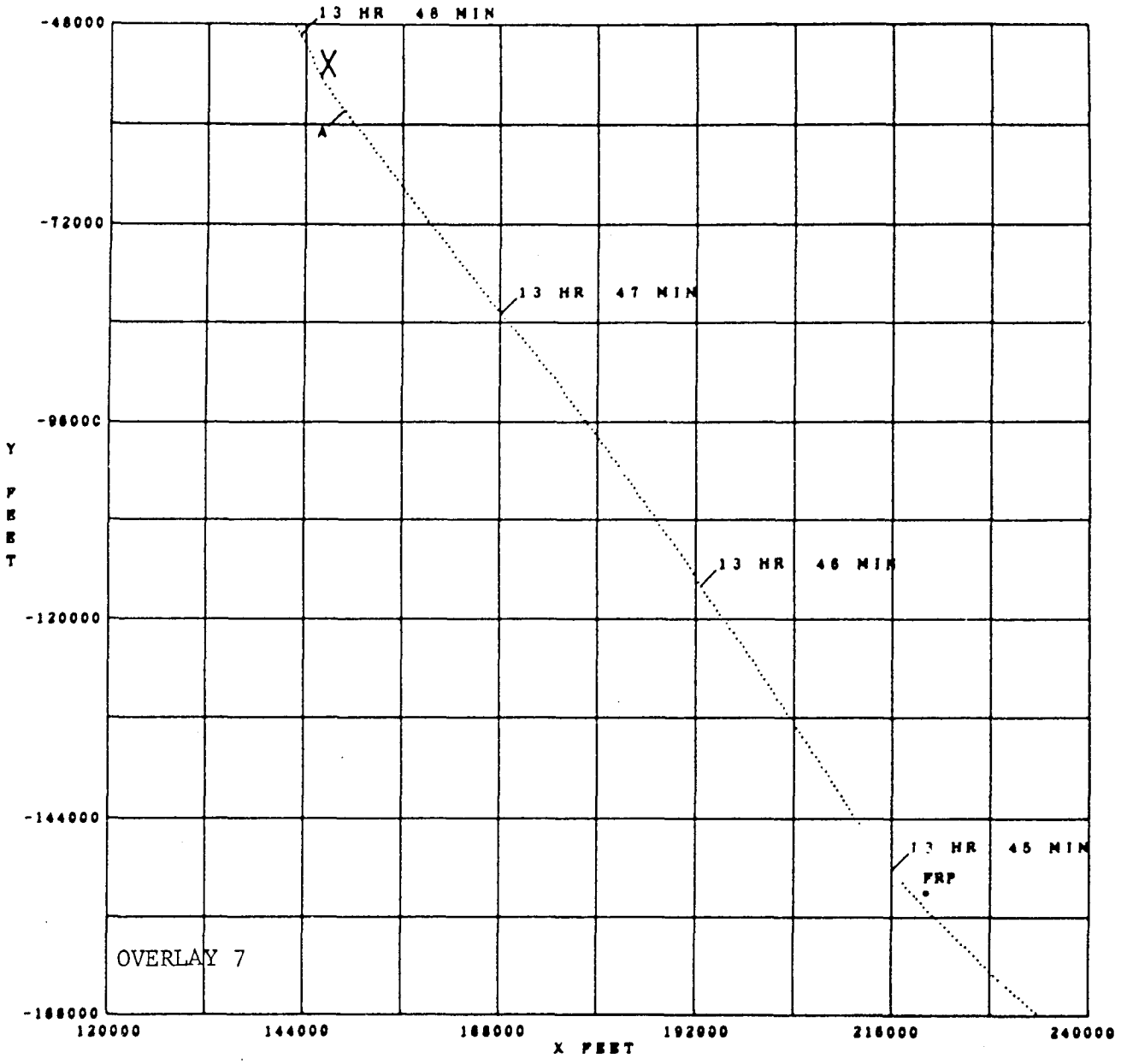
04092229
J9159

Figure 3-6 (U) Aircraft Altitude and Terrain Profile (Part 2 of 2)



04092228
J9159 94

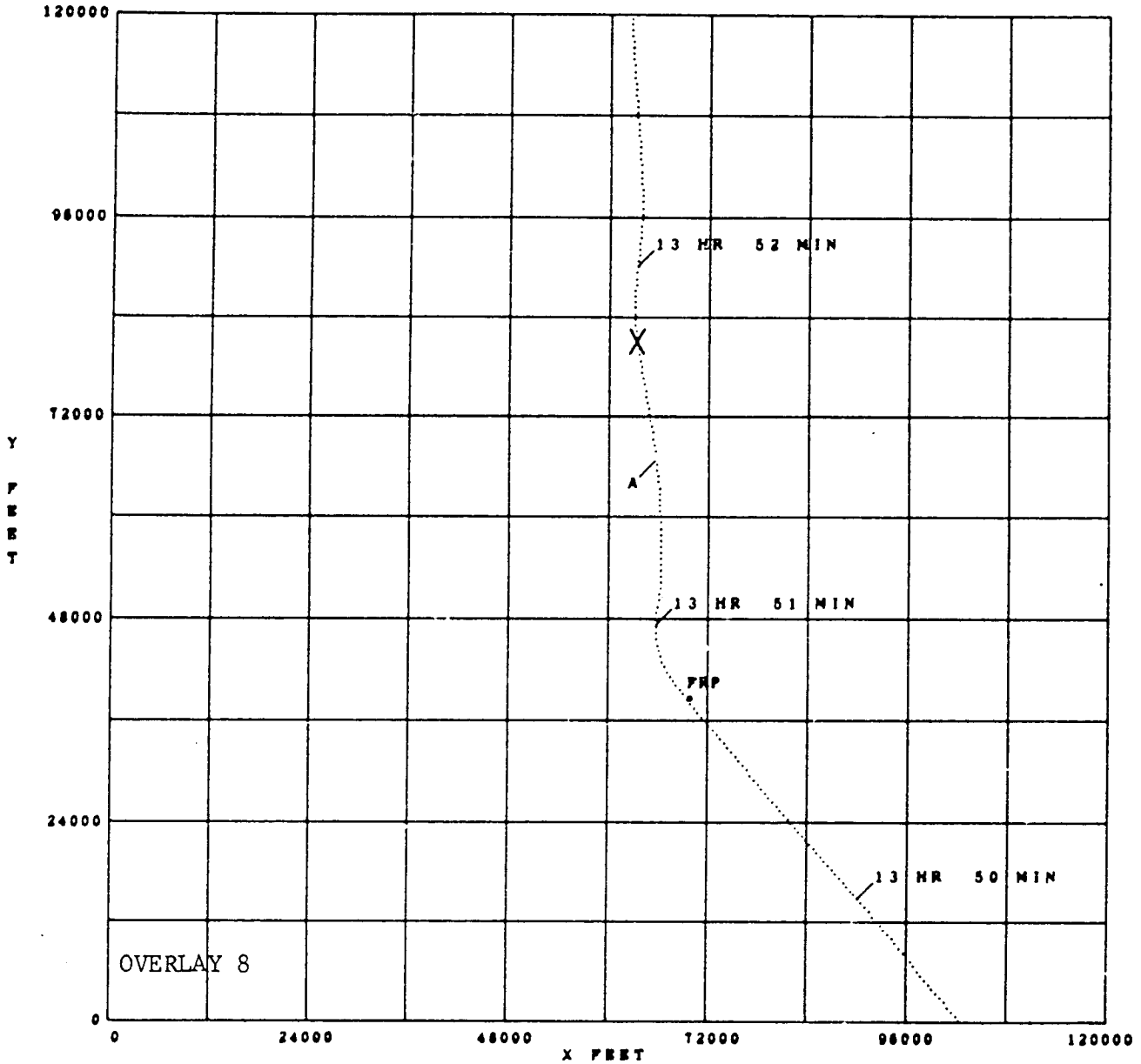
Figure 3-7 (U) Aircraft Position Data (Part 1 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 1498 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 286A
TARGET EAST 1

04092228
J9159 95

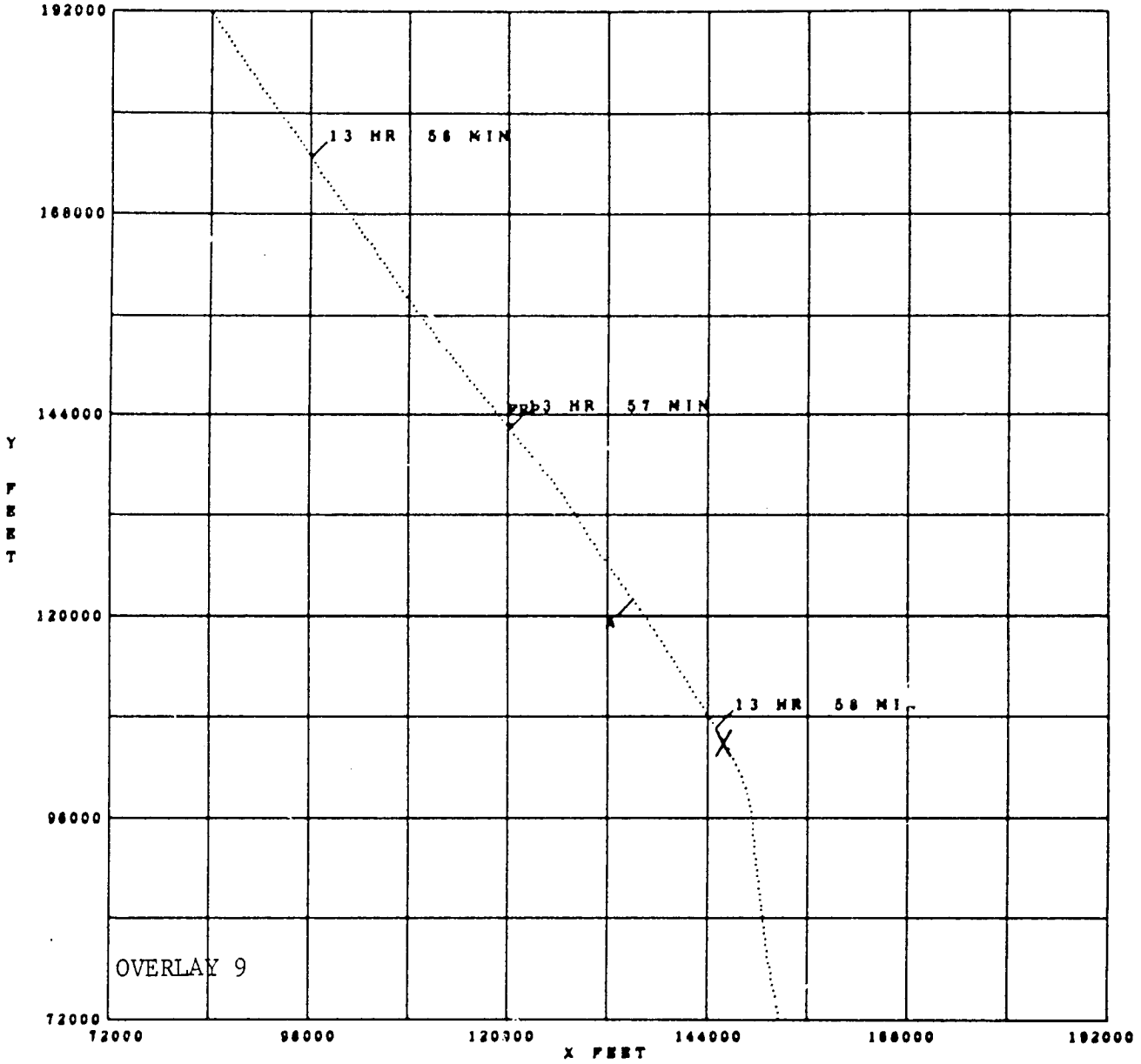
Figure 3-7 (U) Aircraft Position Data (Part 2 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 173 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 288A
TARGET EAST 2

04092228
J9159 1

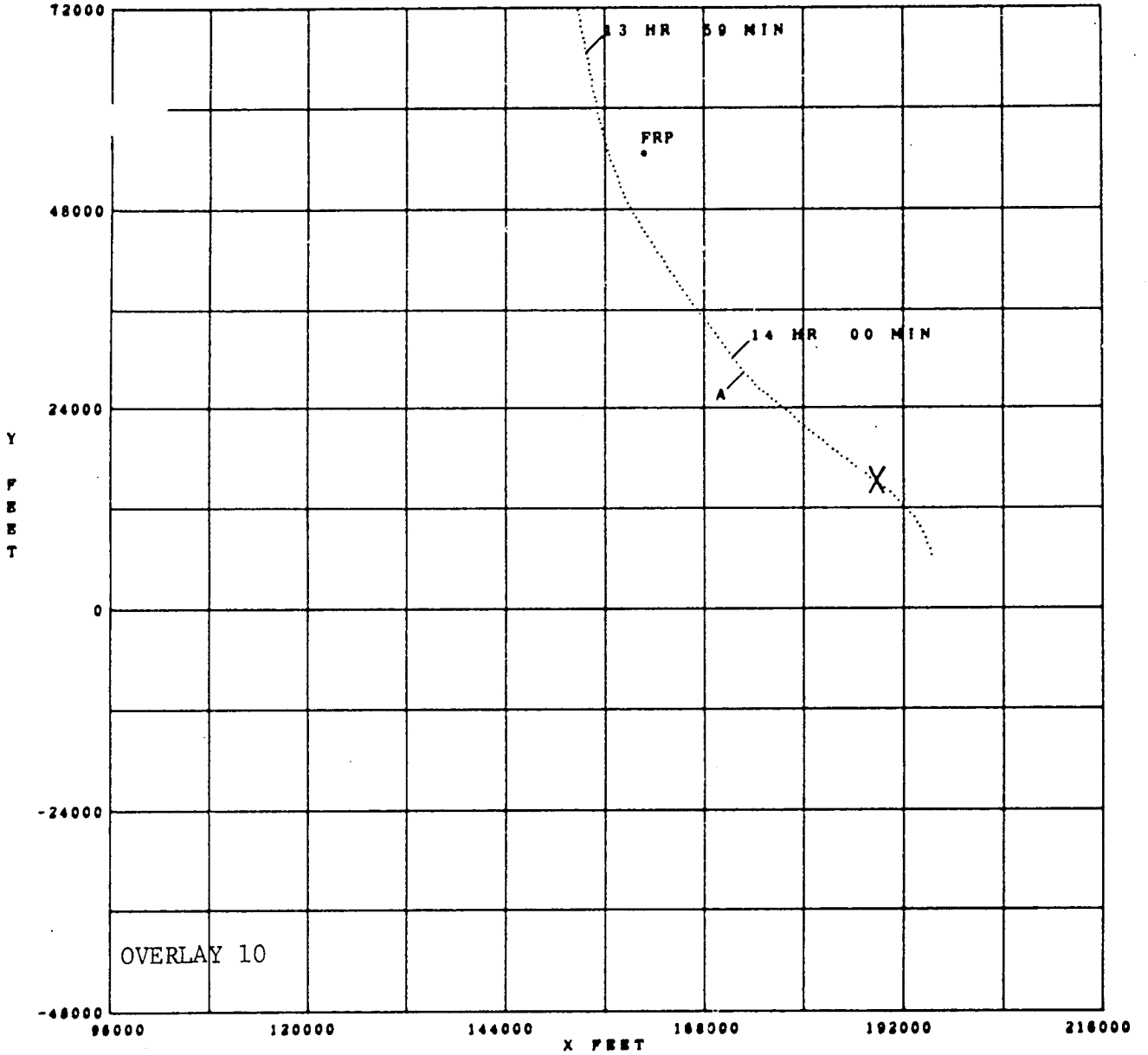
Figure 3-7 (U) Aircraft Position Data (Part 3 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 224 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 288A
TARGET EAST 3

04092228
J9159 97

Figure 3-7 (U) Aircraft Position Data (Part 4 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 18 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 286A
TARGET EAST 4

04052228
J9159 98

Figure 3-7 (U) Aircraft Position Data (Part 5 of 5)

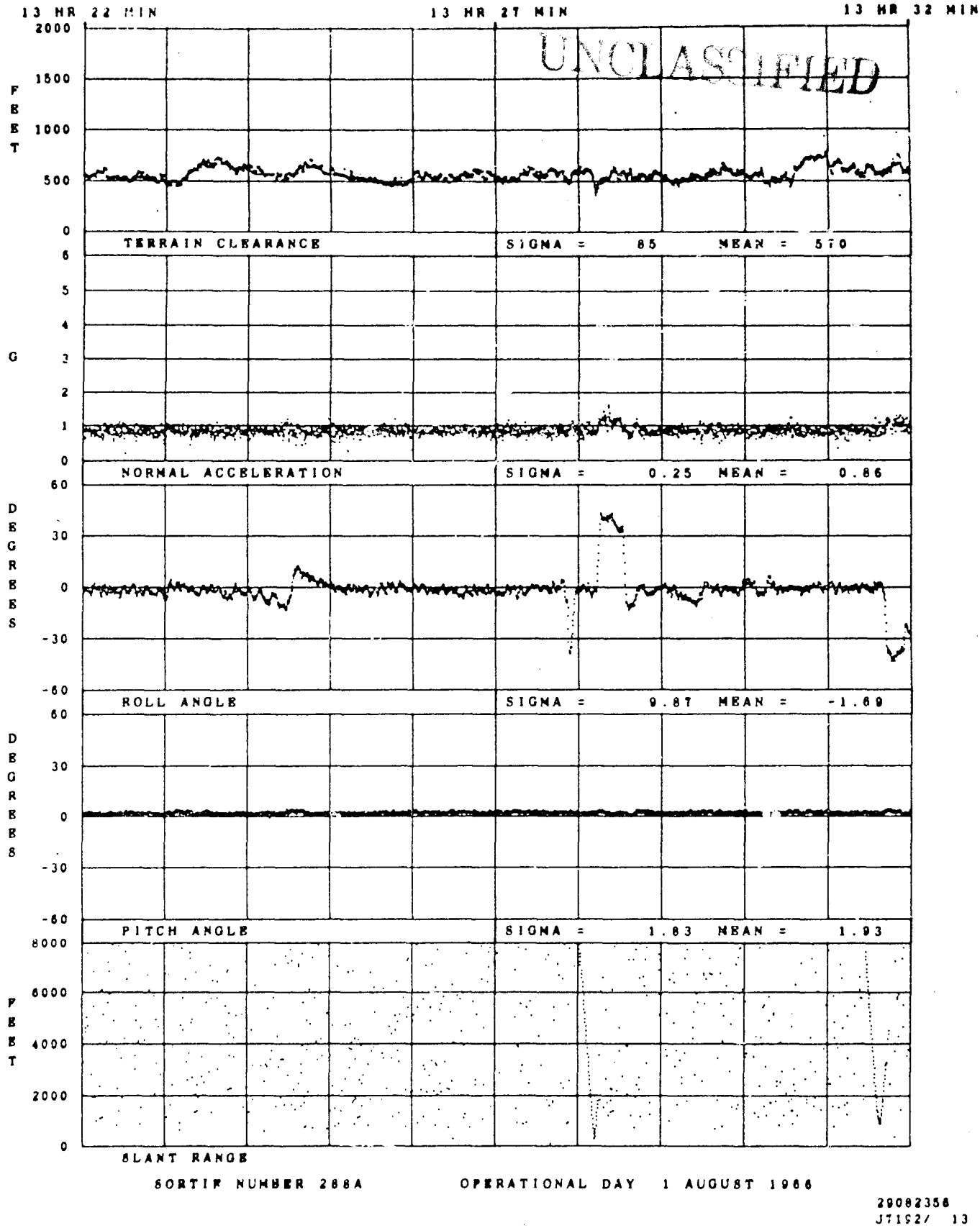


Figure 3-8 (U) Telemetered Data (Part 1 of 4)

UNCLASSIFIED

UNCLASSIFIED

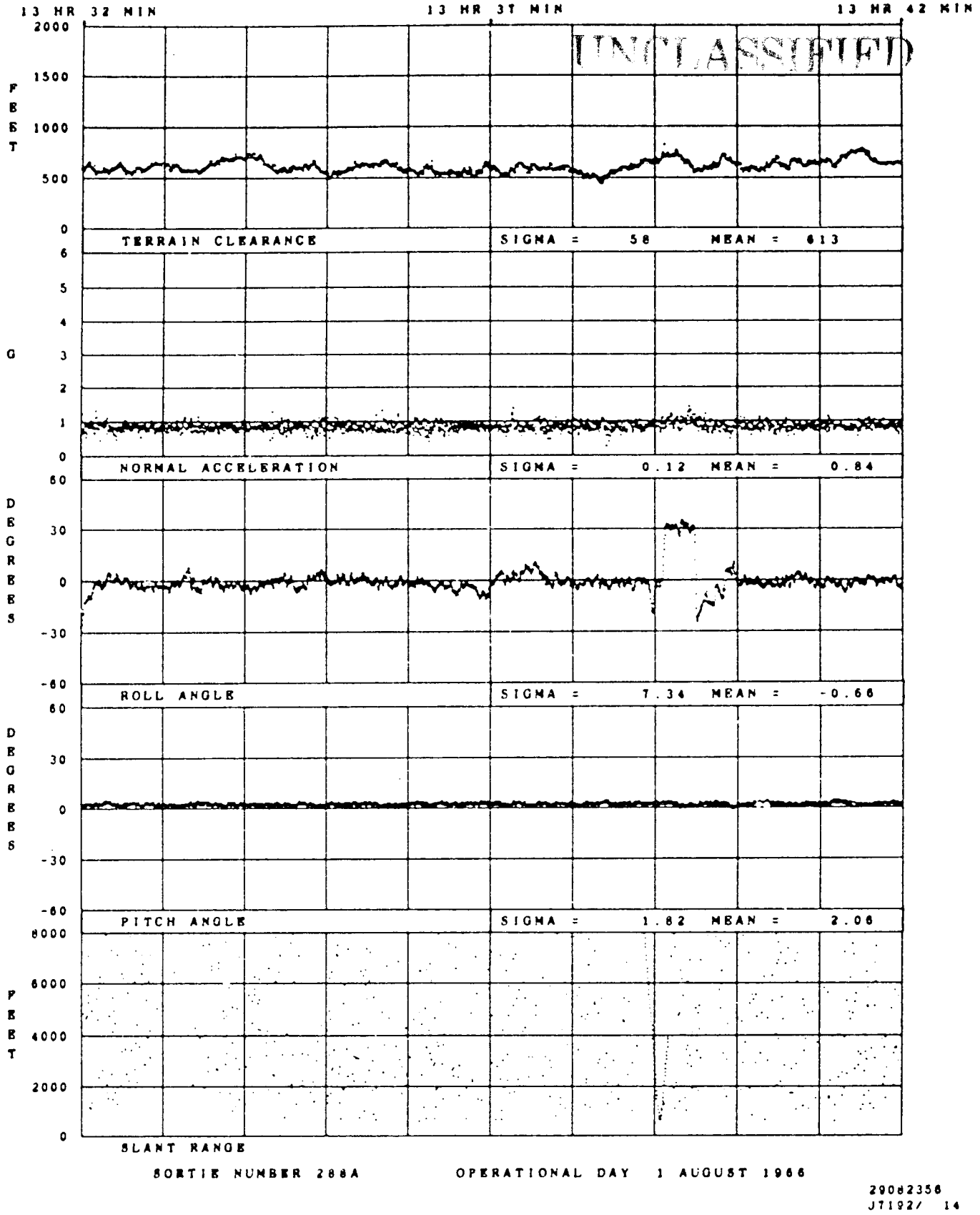


Figure 3-8 (U) Telemetered Data (Part 2 of 4)

UNCLASSIFIED

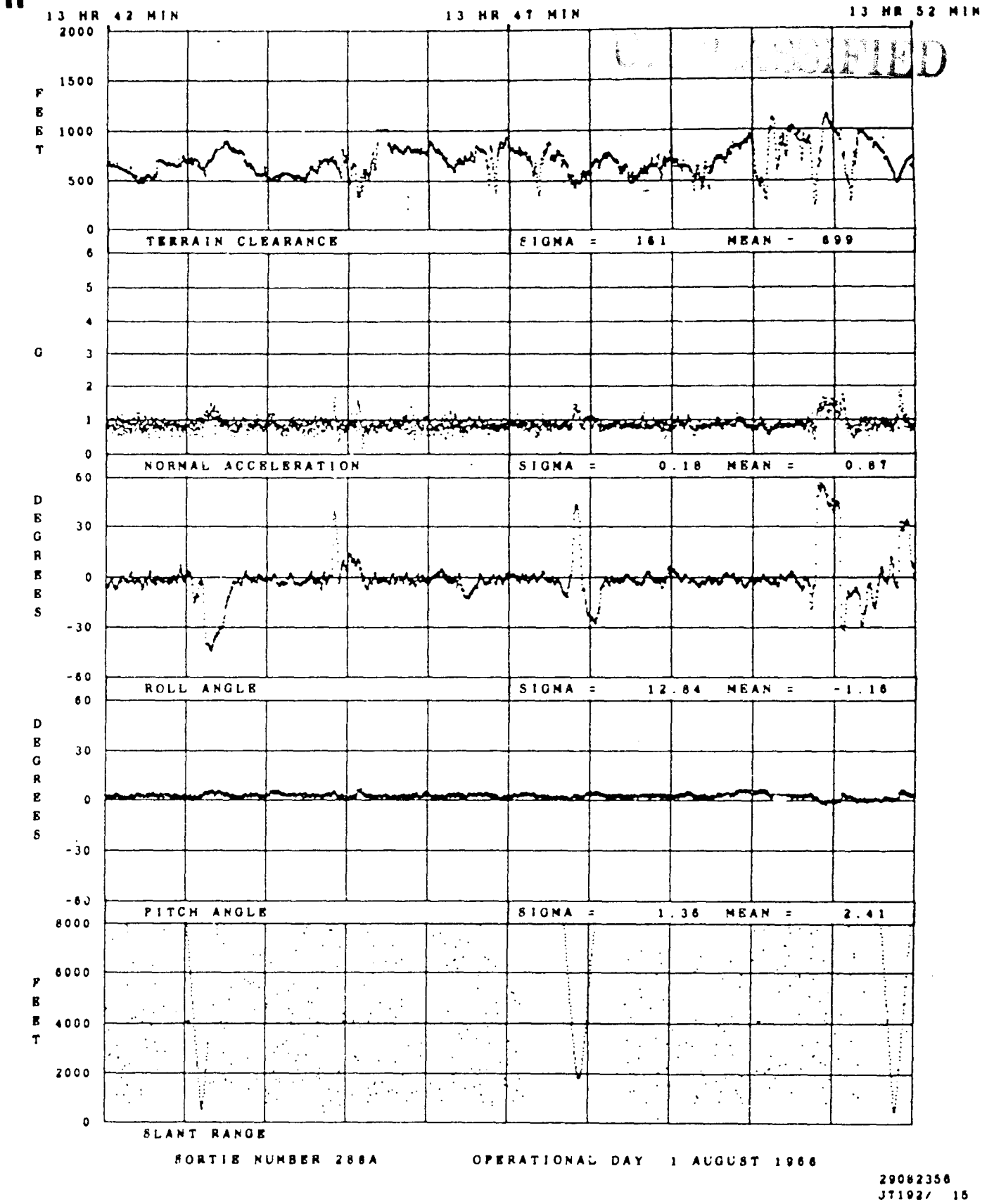


Figure 3-8 (U) Telemetered Data (Part 3 of 4)

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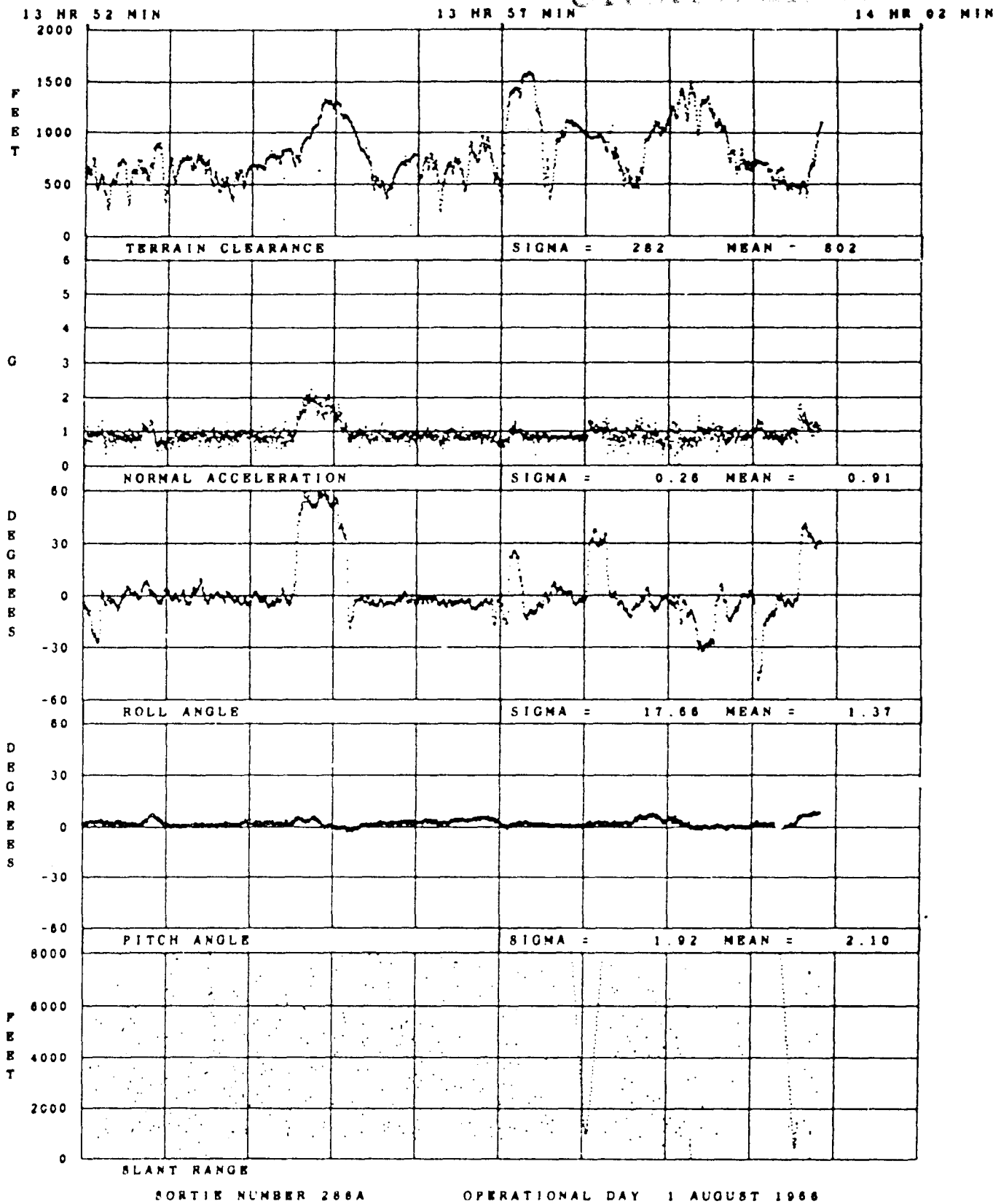

Figure 3-8 (U) Telemetered Data (Part 4 of 4)

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UNCLASSIFIED

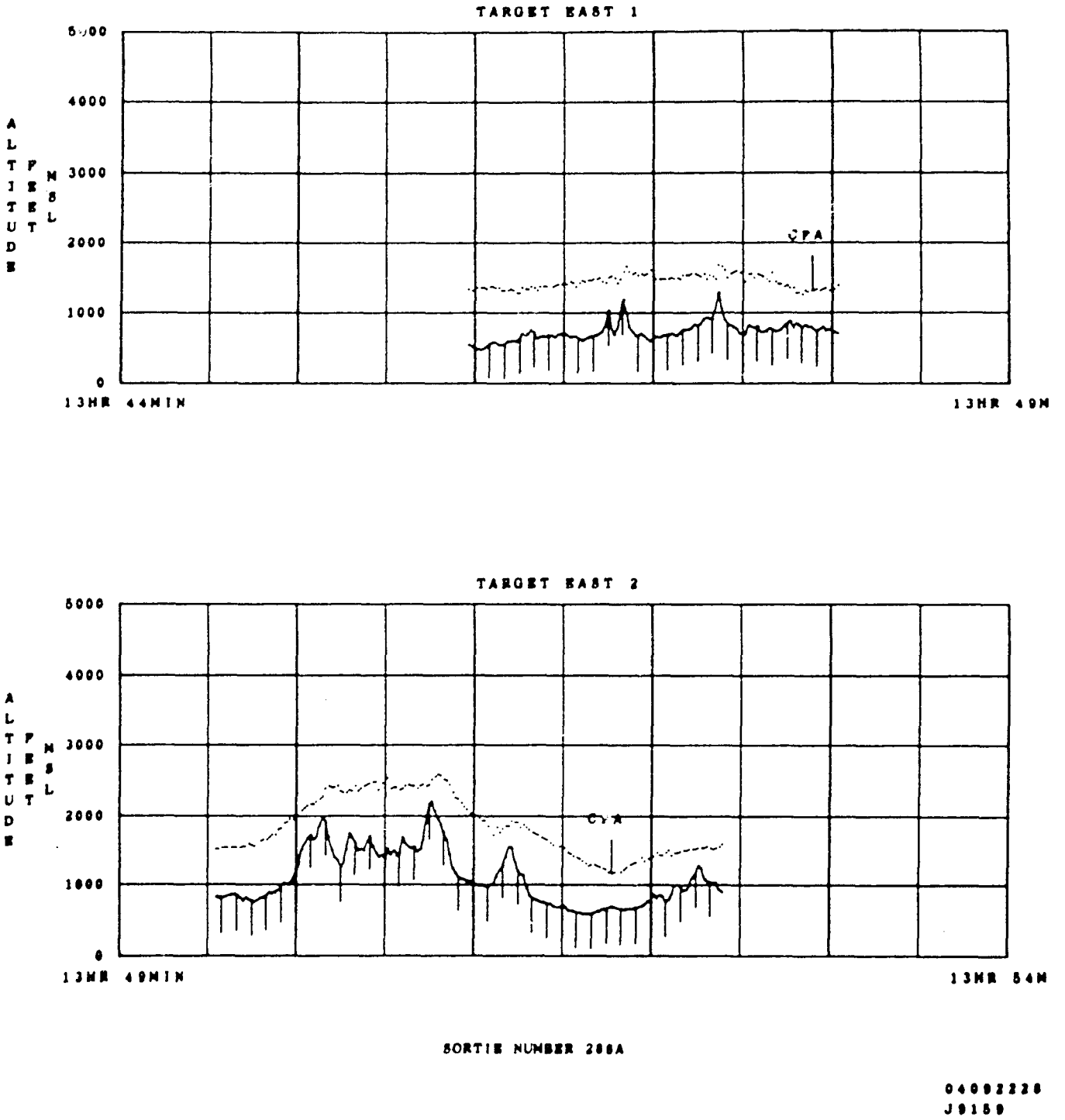
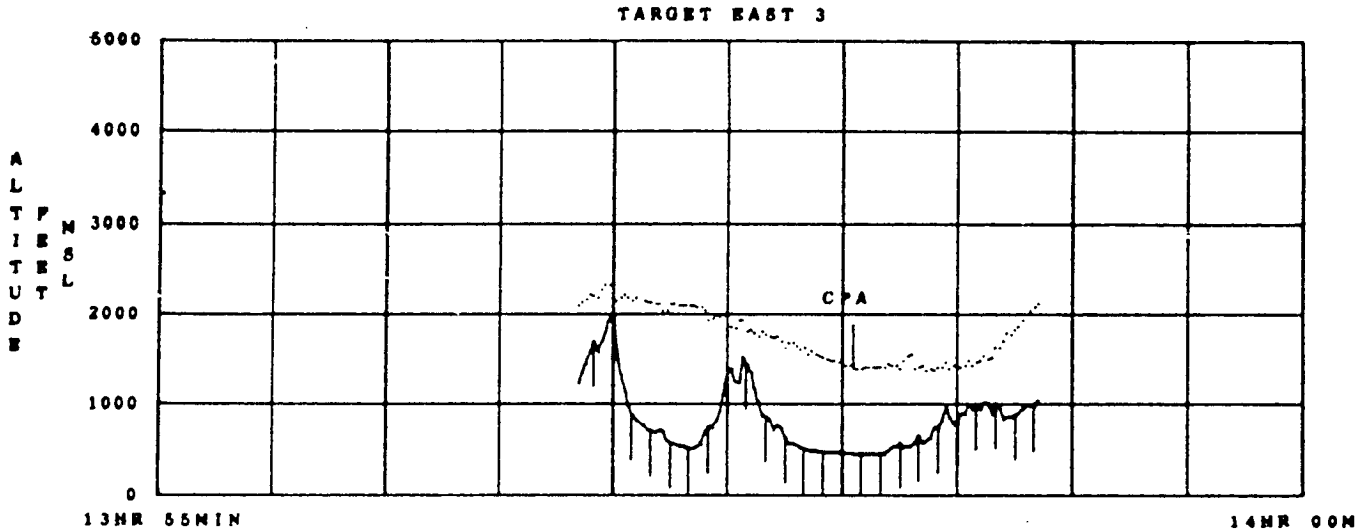
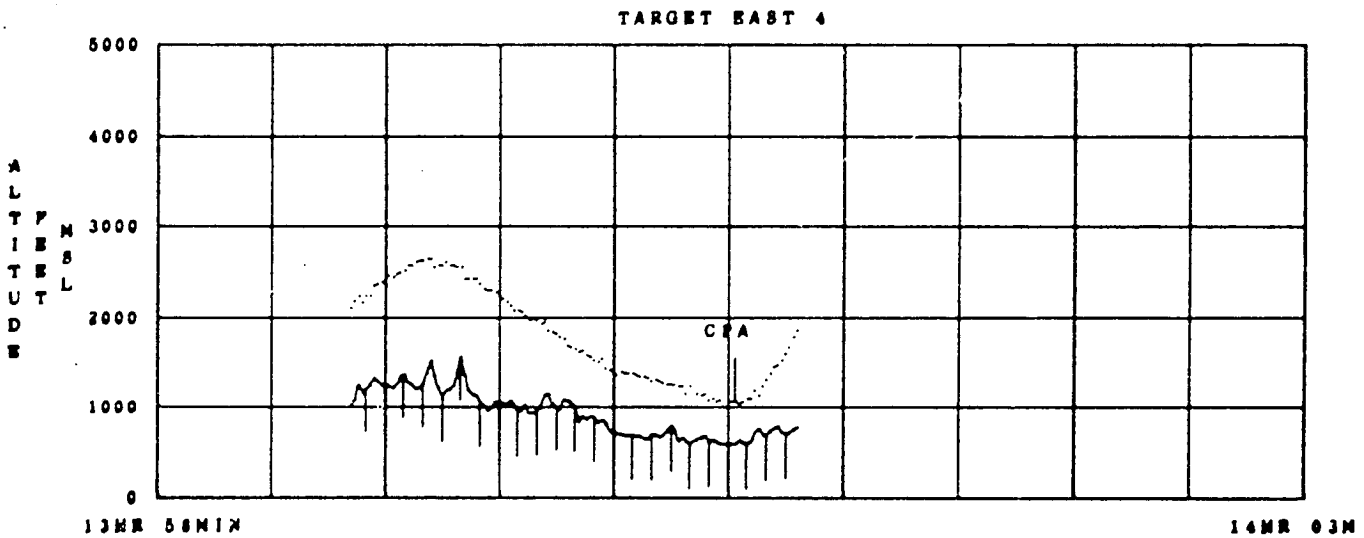


Figure 3-9 (U) Aircraft Altitude and Terrain Profile (Part 1 of 2)

UNCLASSIFIED

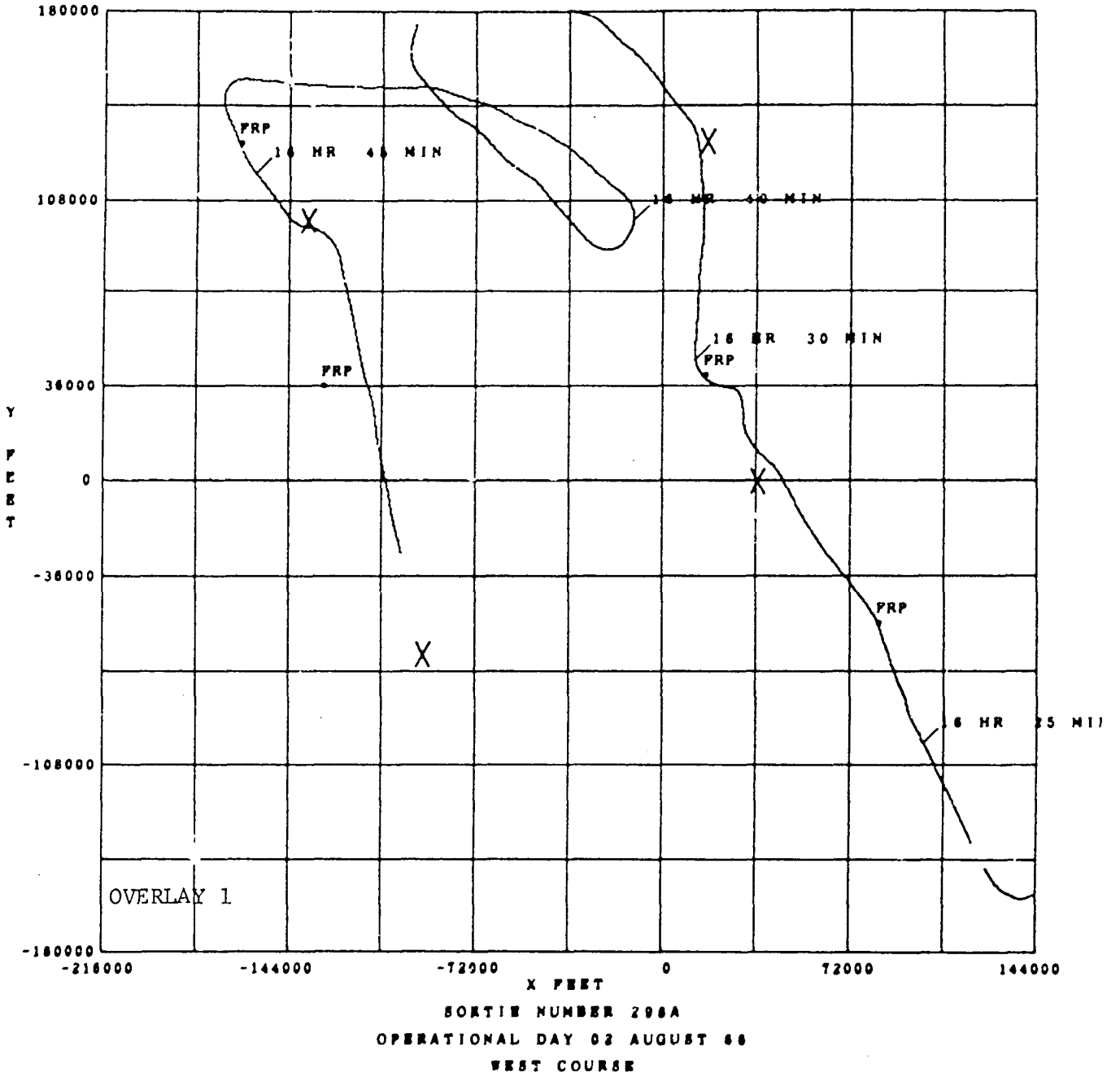




SORTIE NUMBER 288A

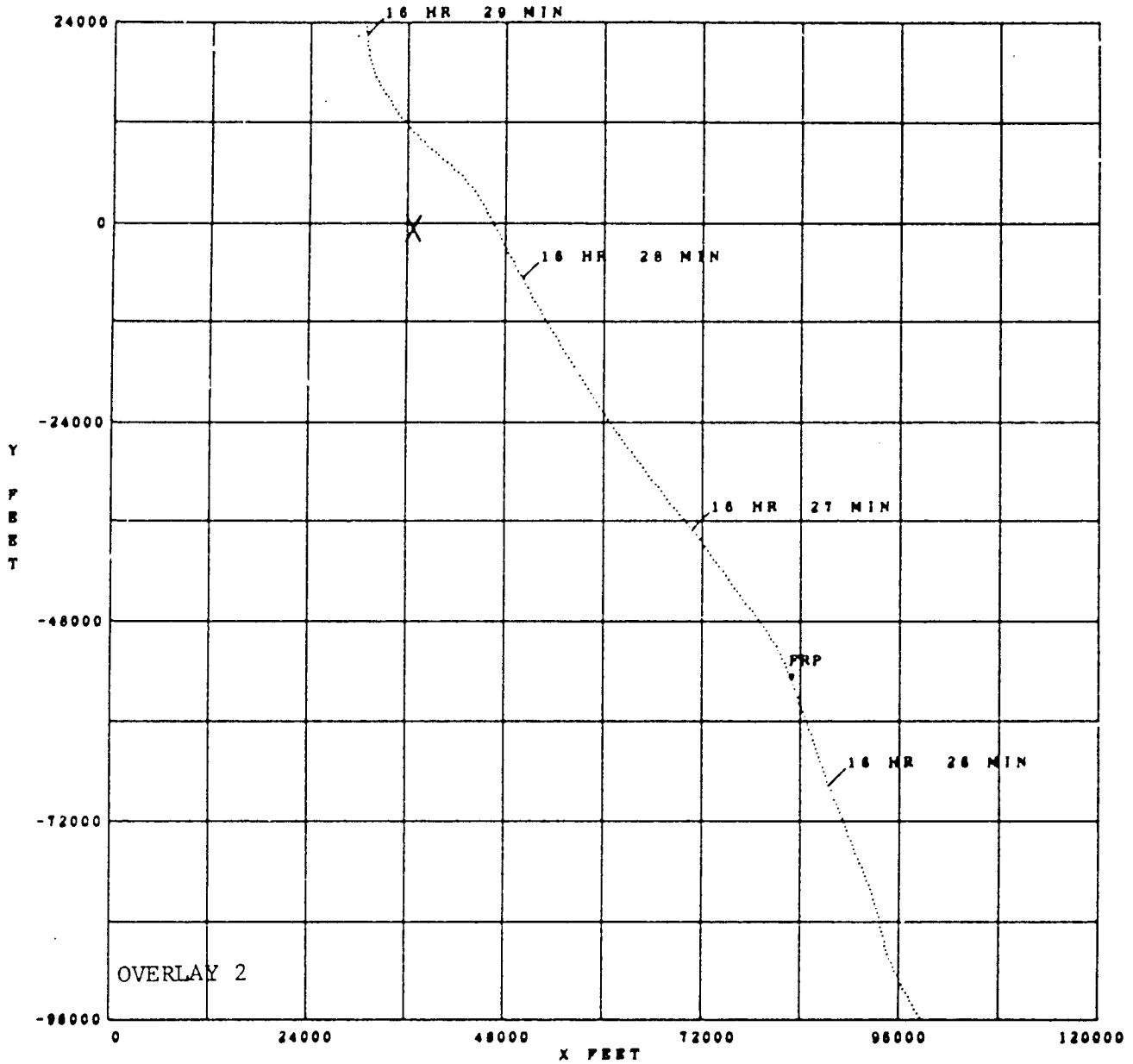
04092228
J9159

Figure 3-9 (U) Aircraft Altitude and Terrain Profile (Part 2 of 2)



04092230
J9159 1

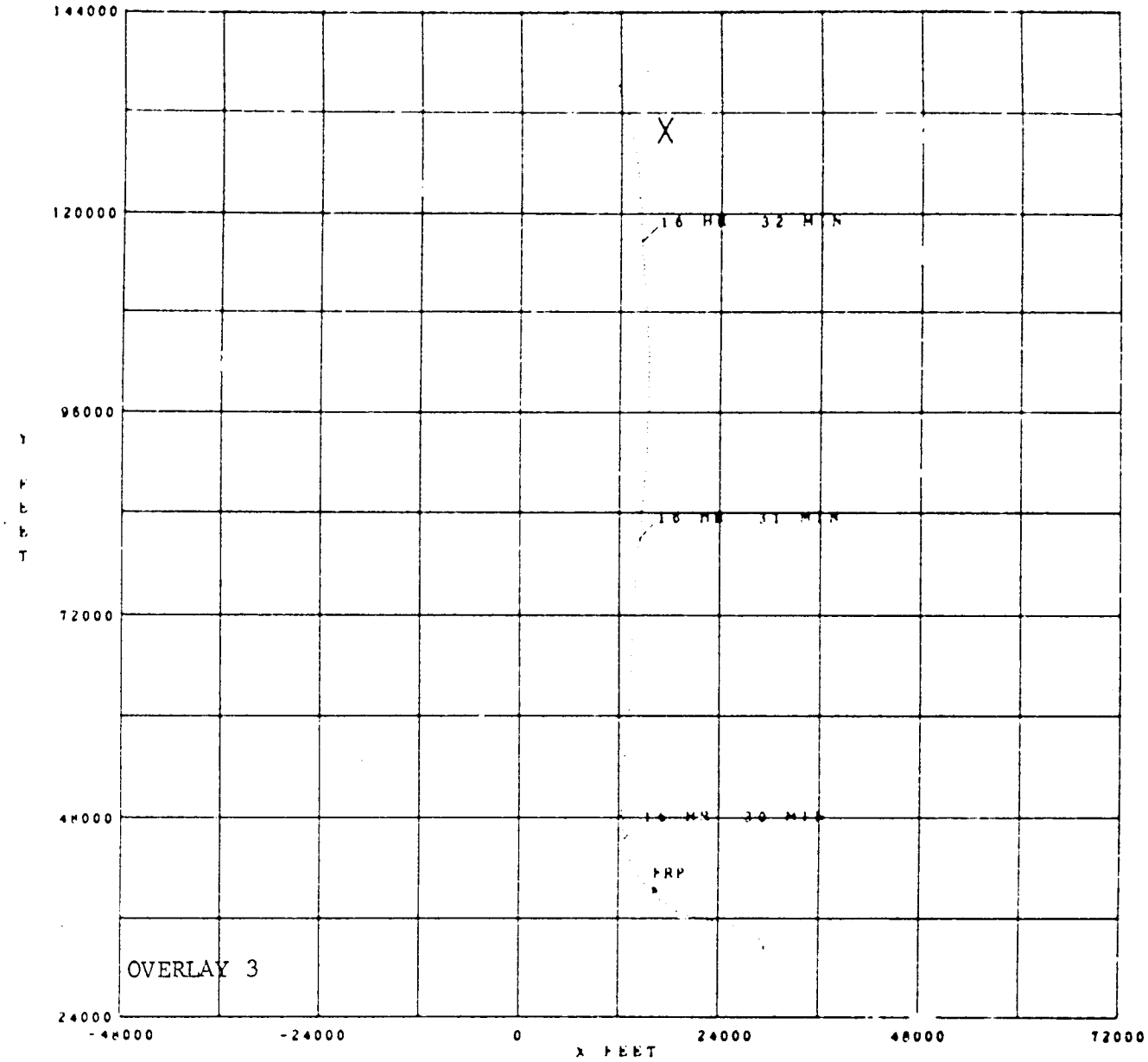
Figure 3-10 (U) Aircraft Position Data (Part 1 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 8624 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 298A
TARGET WEST 1

04092230
J9159 12

Figure 3-10 (U) Aircraft Position Data (Part 2 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 4054 FEET

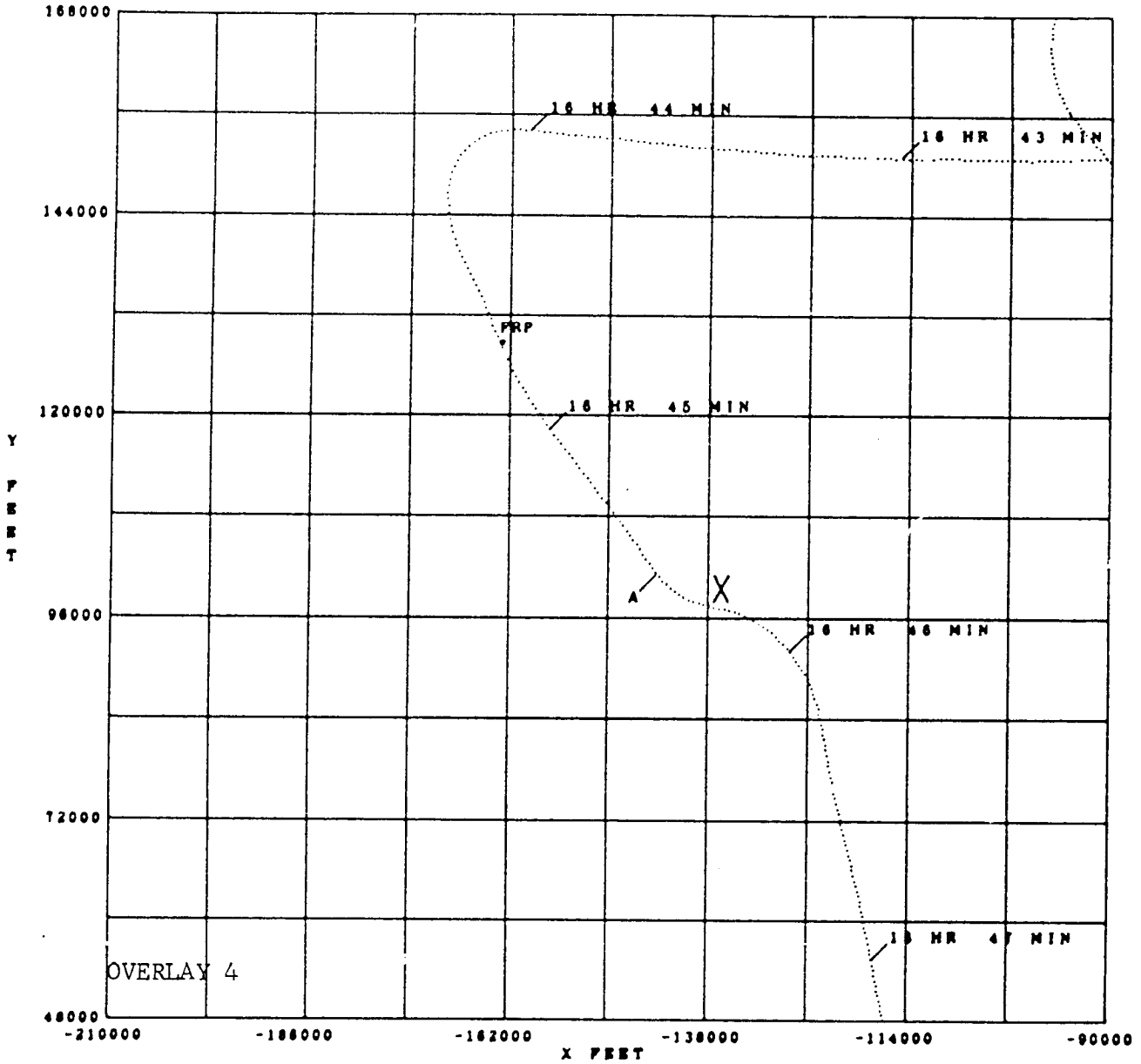
MINIMUM GROUND DISTANCE QUALIFIER = DME

SORTIE NUMBER 298A

TARGET WEST 2

24091557
J7013

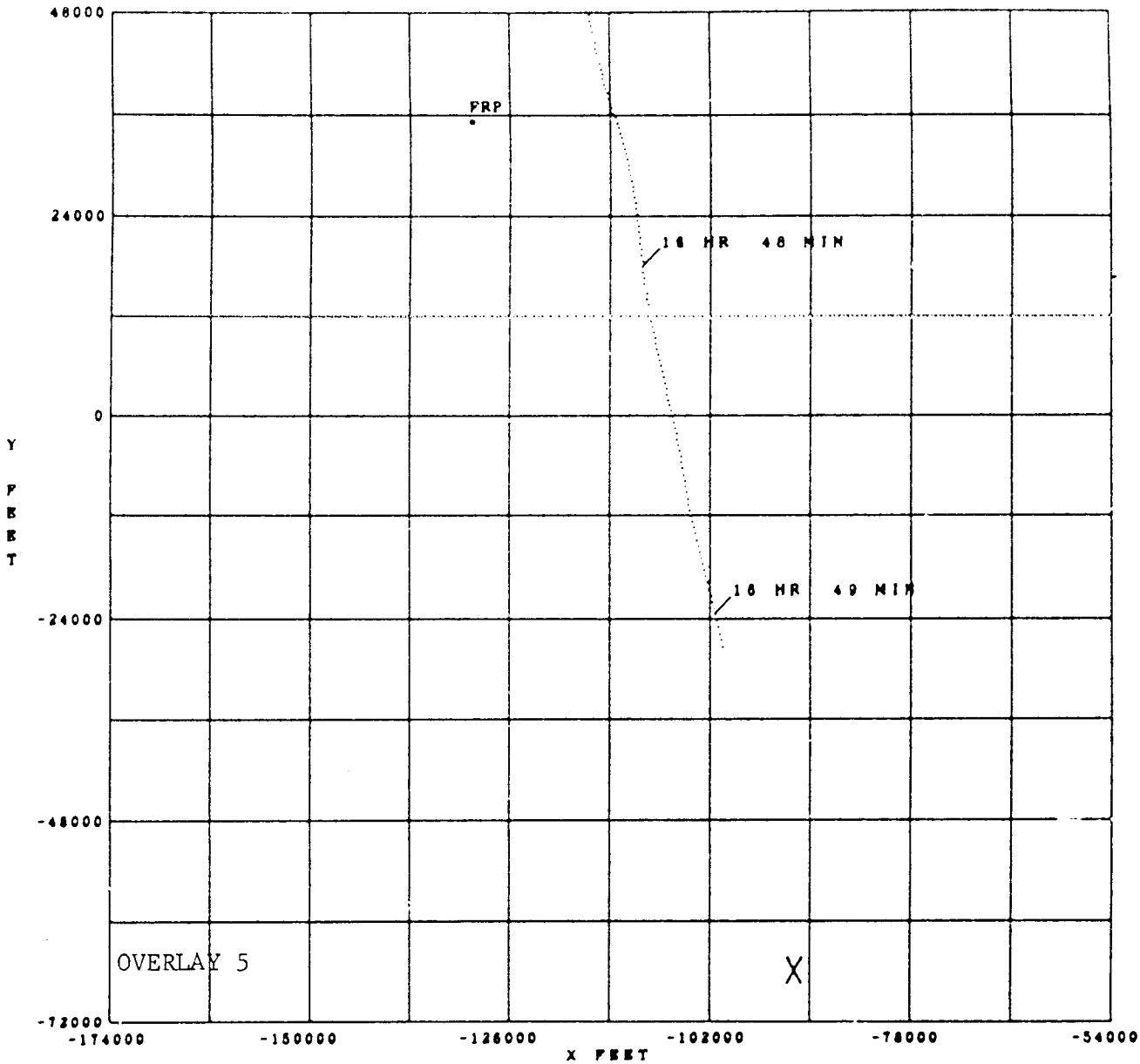
Figure 3-10 (U) Aircraft Position Data (Part 3 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 2237 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 298A
TARGET WEST 3

04092230
J9159 130

Figure 3-10 (U) Aircraft Position Data (Part 4 of 5)



MINIMUM GROUND DISTANCE TO TARGET = FEET
MINIMUM GROUND DISTANCE QUALIFIER = MISSINGD
SORTIE NUMBER 298A
TARGET WEST 4

04092230
J9159 13

Figure 3-10 (U) Aircraft Position Data (Part 5 of 5)

UNCLASSIFIED

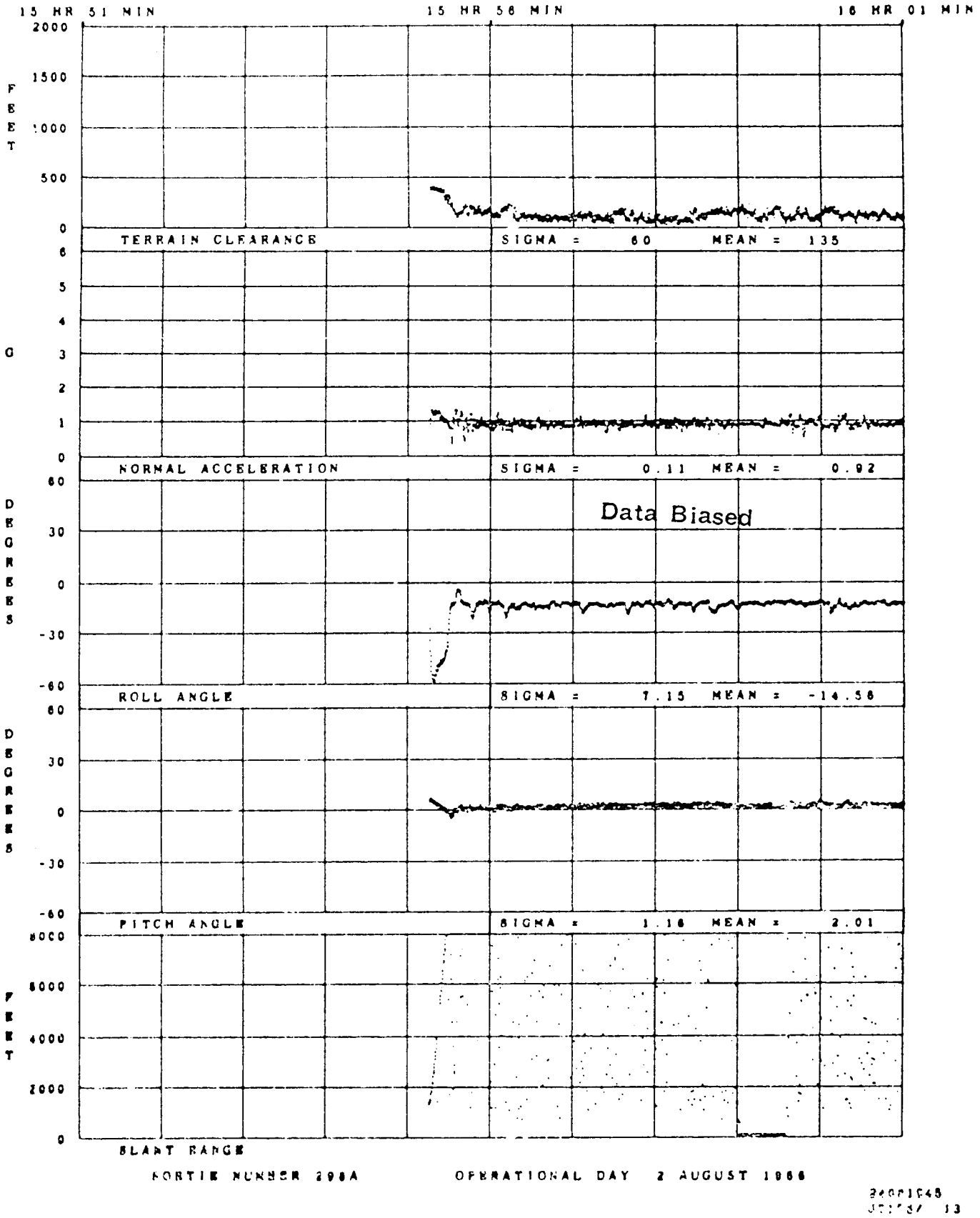


Figure 3-11 (U) Telemetered Data (Part 1 of 6)

UNCLASSIFIED

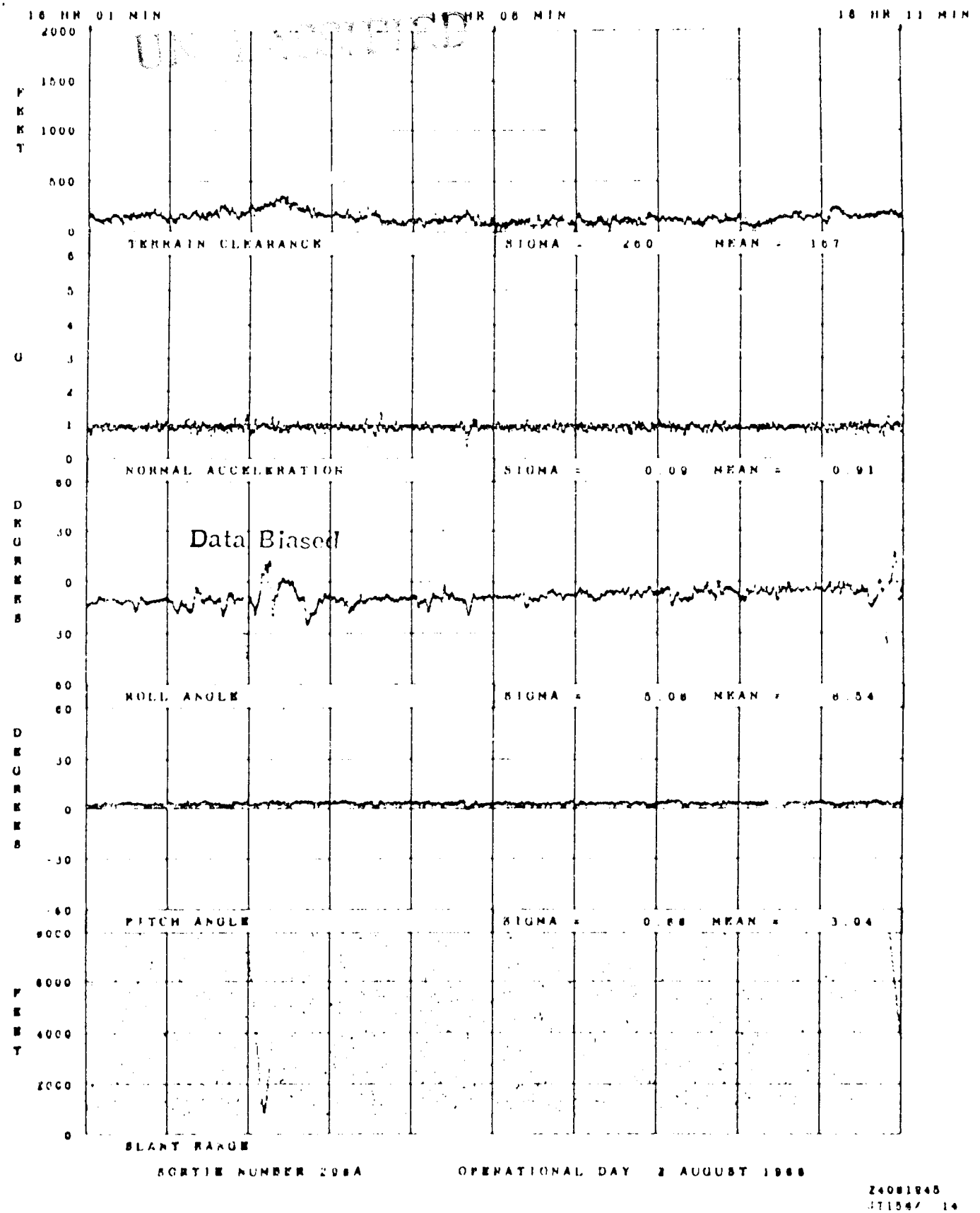


Figure 3-11 (U) Telemetered Data (Part 2 of 6)

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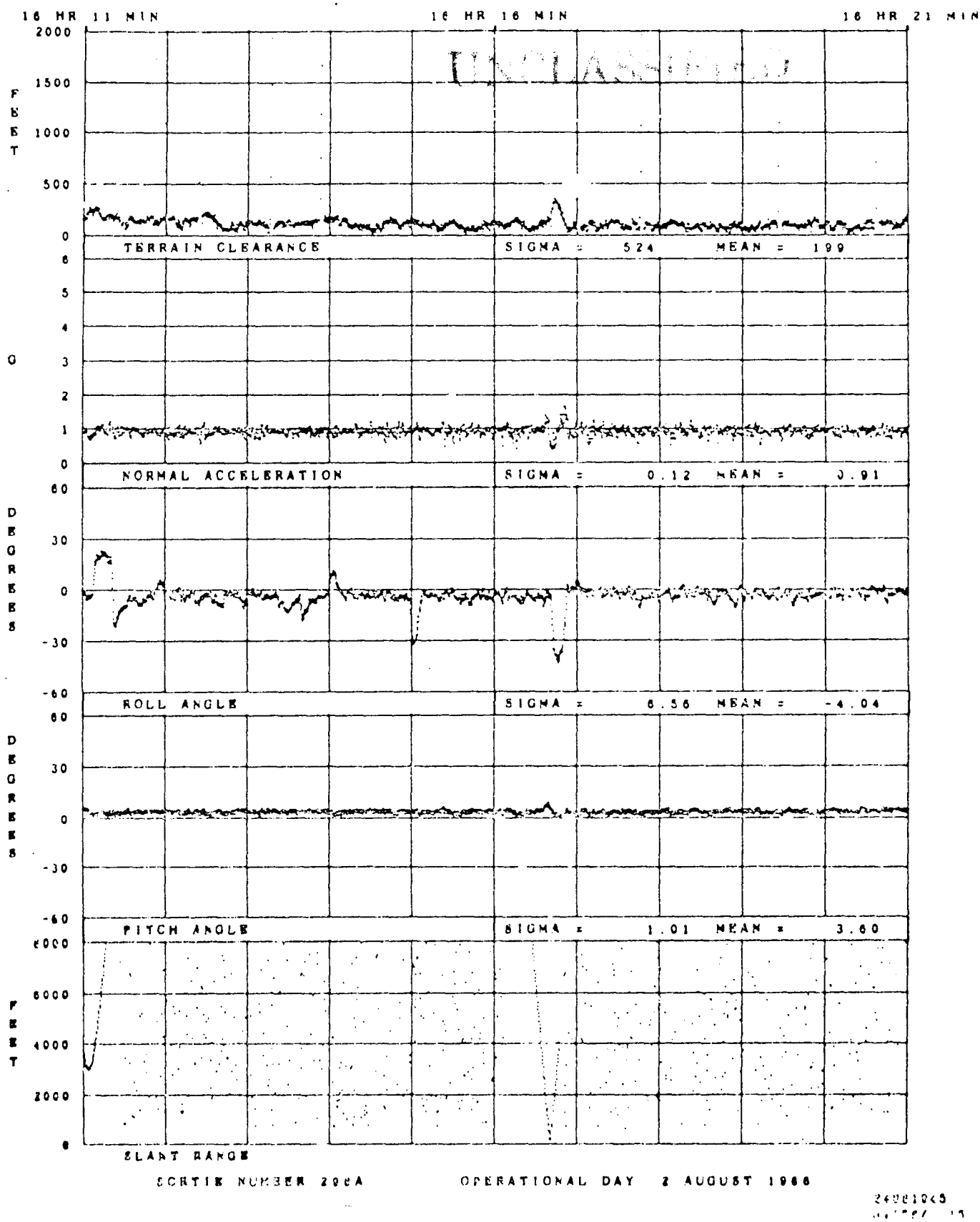

Figure 3-11 (U) Telemetered Data (Part 3 of 6)

UNCLASSIFIED

UNCLASSIFIED

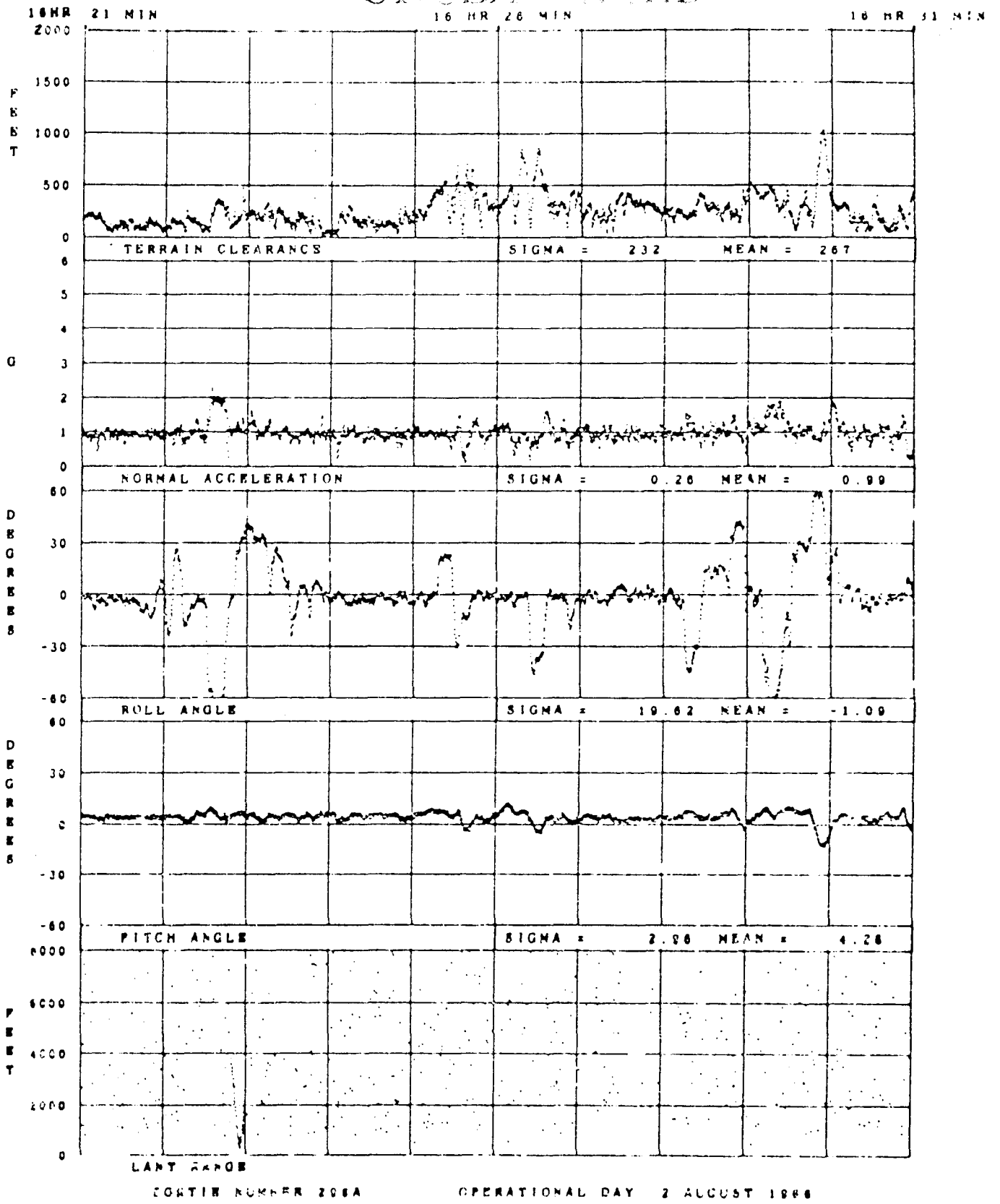

Figure 3-11 (U) Telemetered Data (Part 4 of 6)

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UNCLASSIFIED

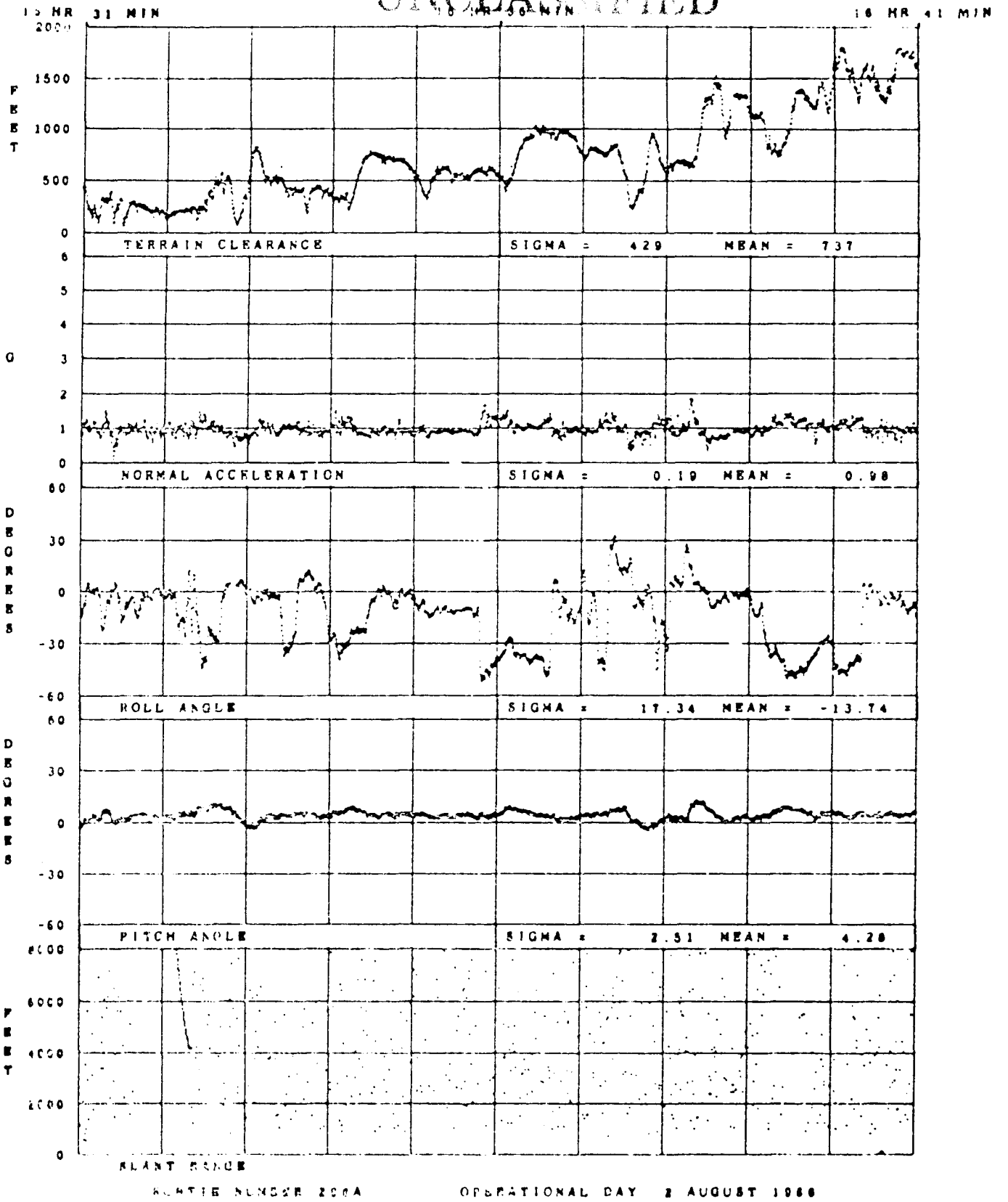

Figure 3-11 (U) Telemetered Data (Part 5 of 6)

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UNCLASSIFIED

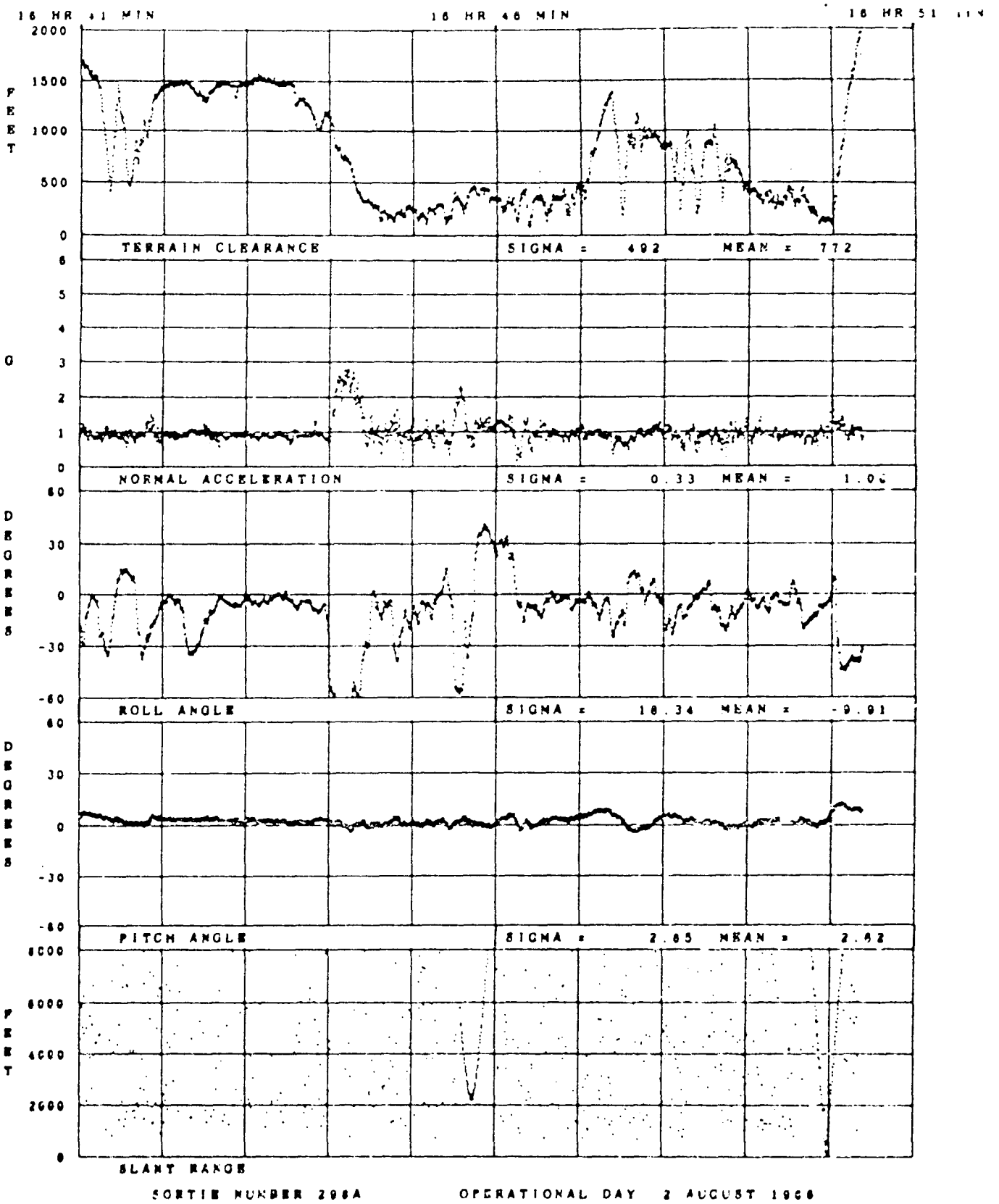
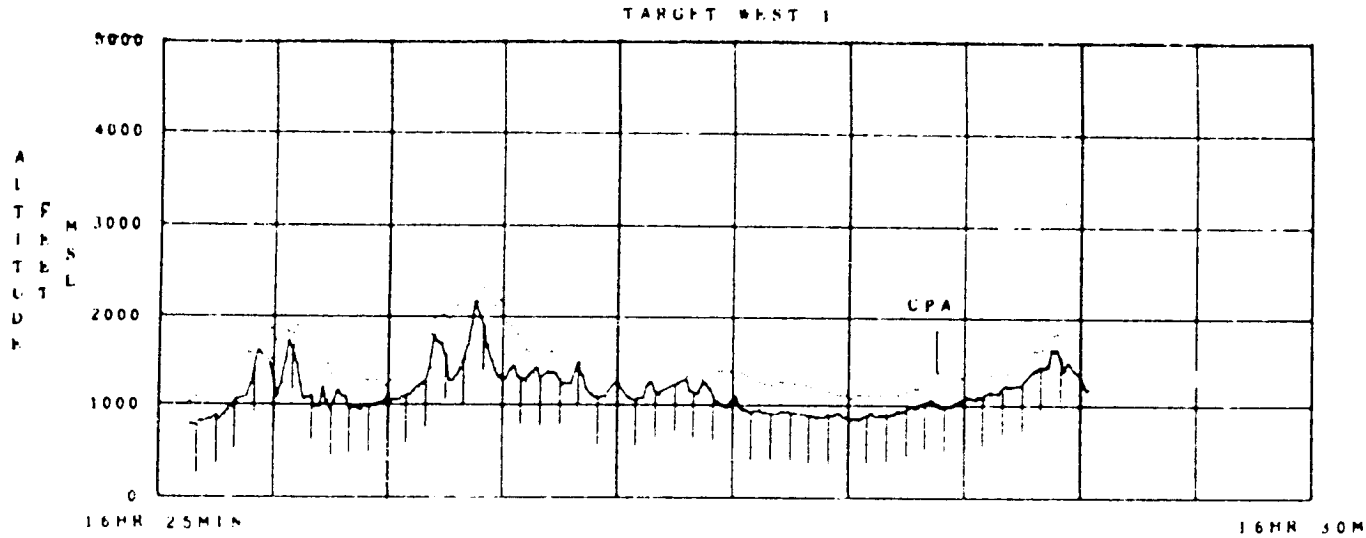
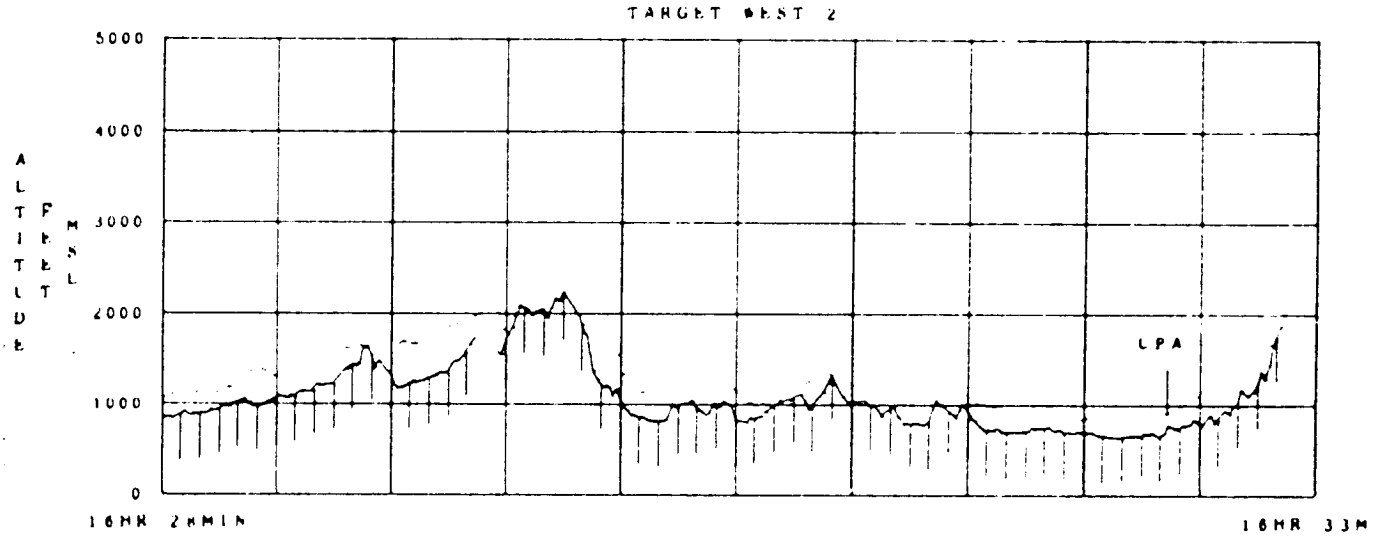


Figure 3-11 (U) Telemetered Data (Part 6 of 6)

UNCLASSIFIED

UNCLASSIFIED



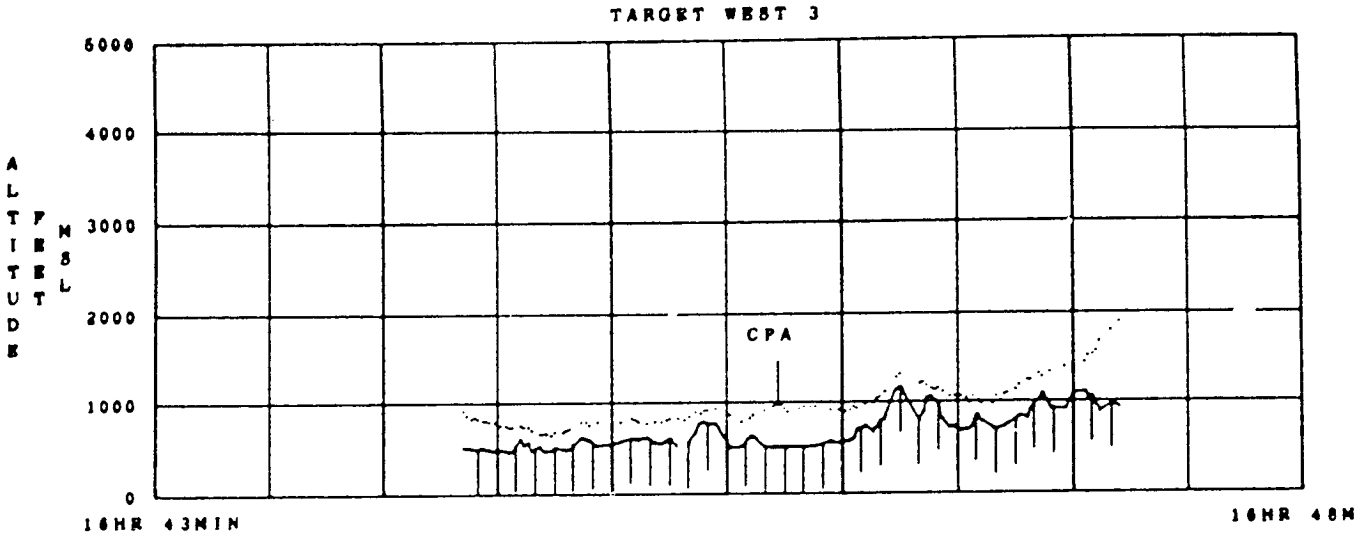


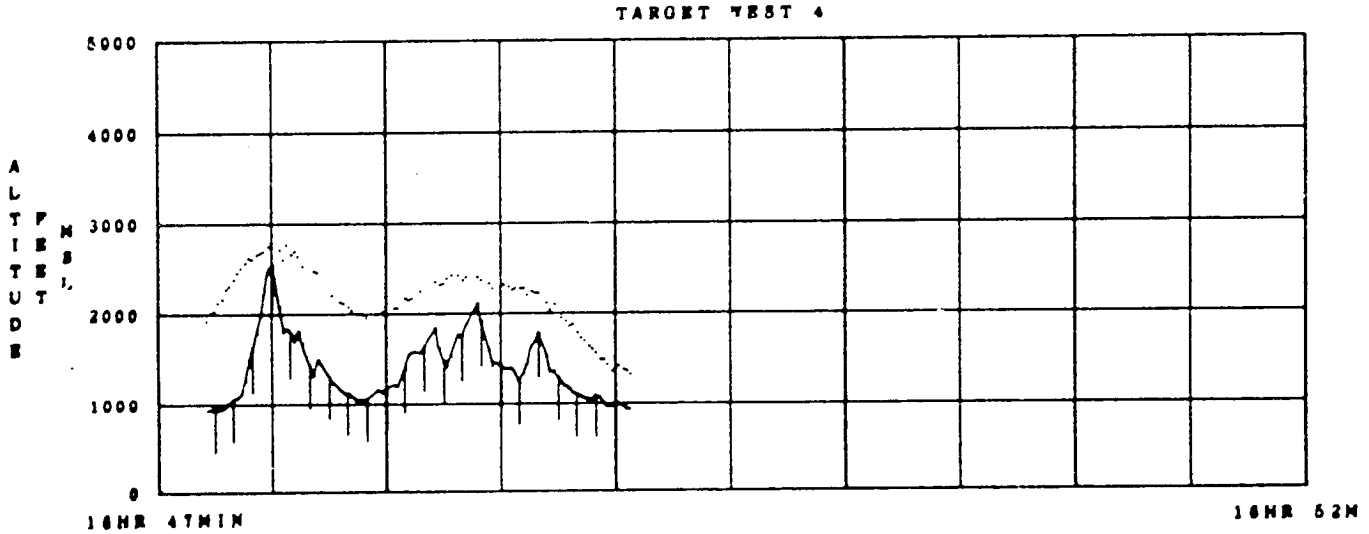
SORTIE NUMBER 29RA

24091557
J7013

Figure 3-12 (U) Aircraft Altitude and Terrain Profile (Part 1 of 2)

UNCLASSIFIED





SORTIE NUMBER 298A

04092230
J9159

Figure 3-12 (U) Aircraft Altitude and Terrain Profile (Part 2 of 2)

UNCLASSIFIED

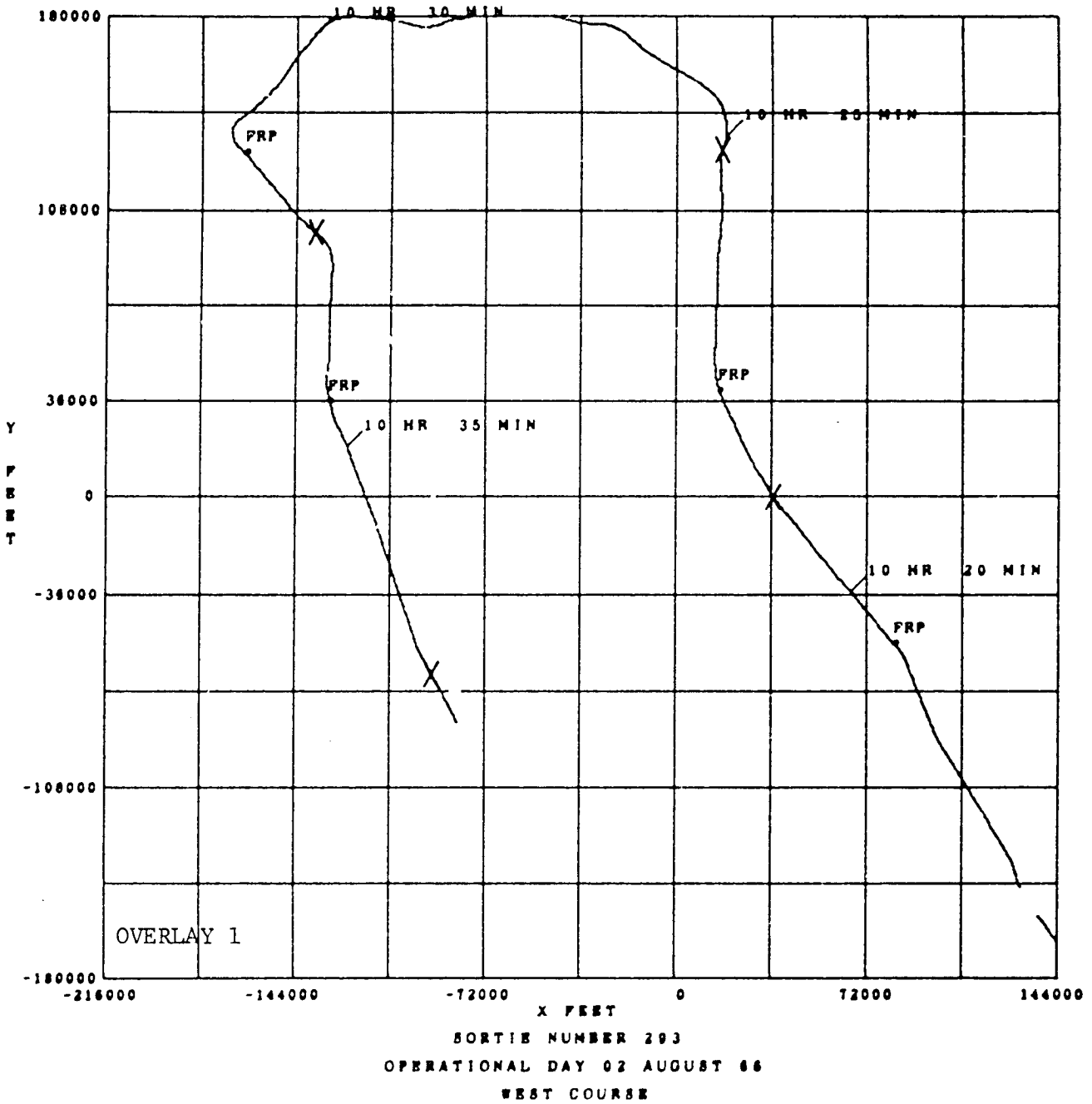
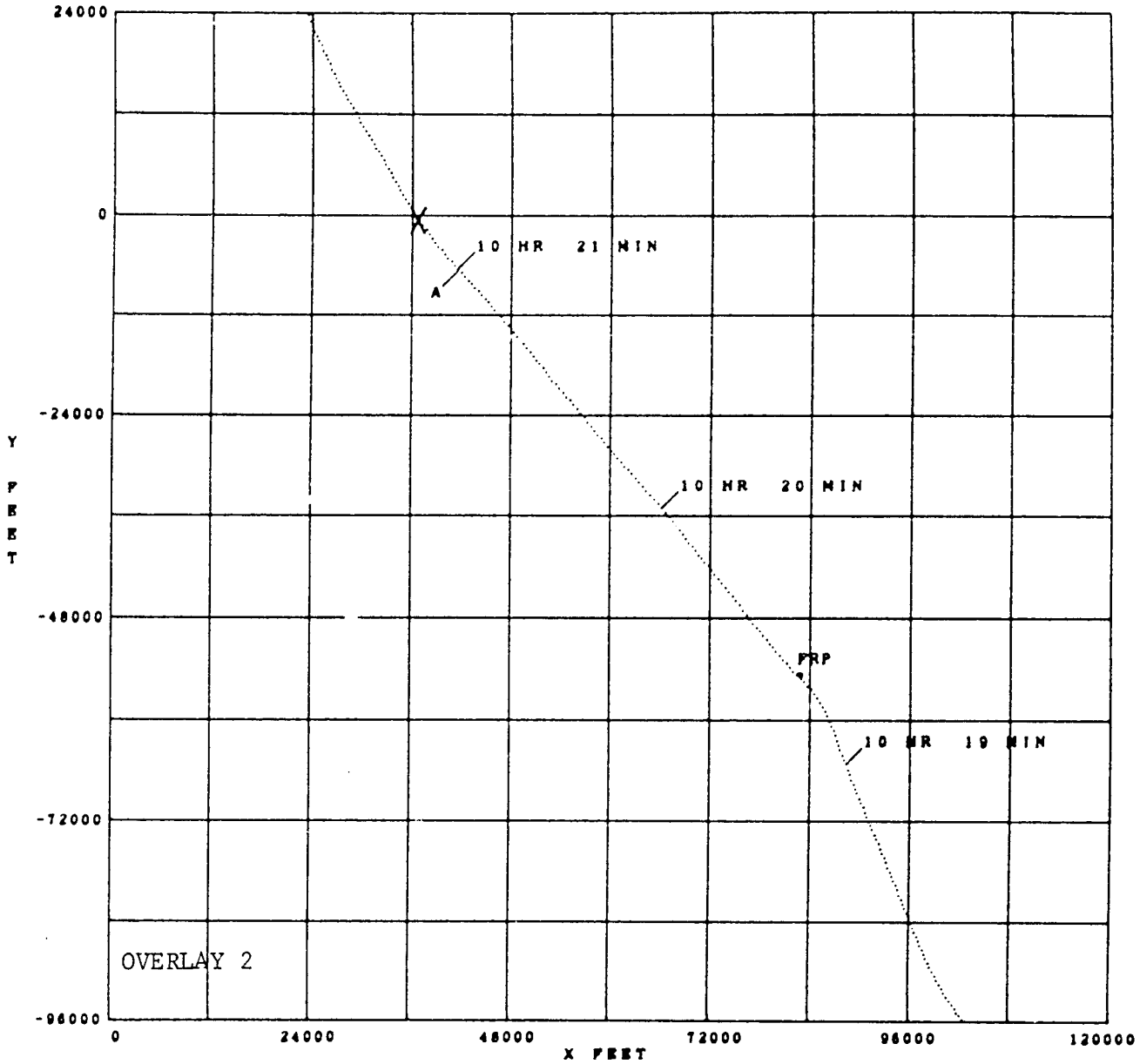


Figure 3-13 (U) Aircraft Position Data (Part 1 of 5)

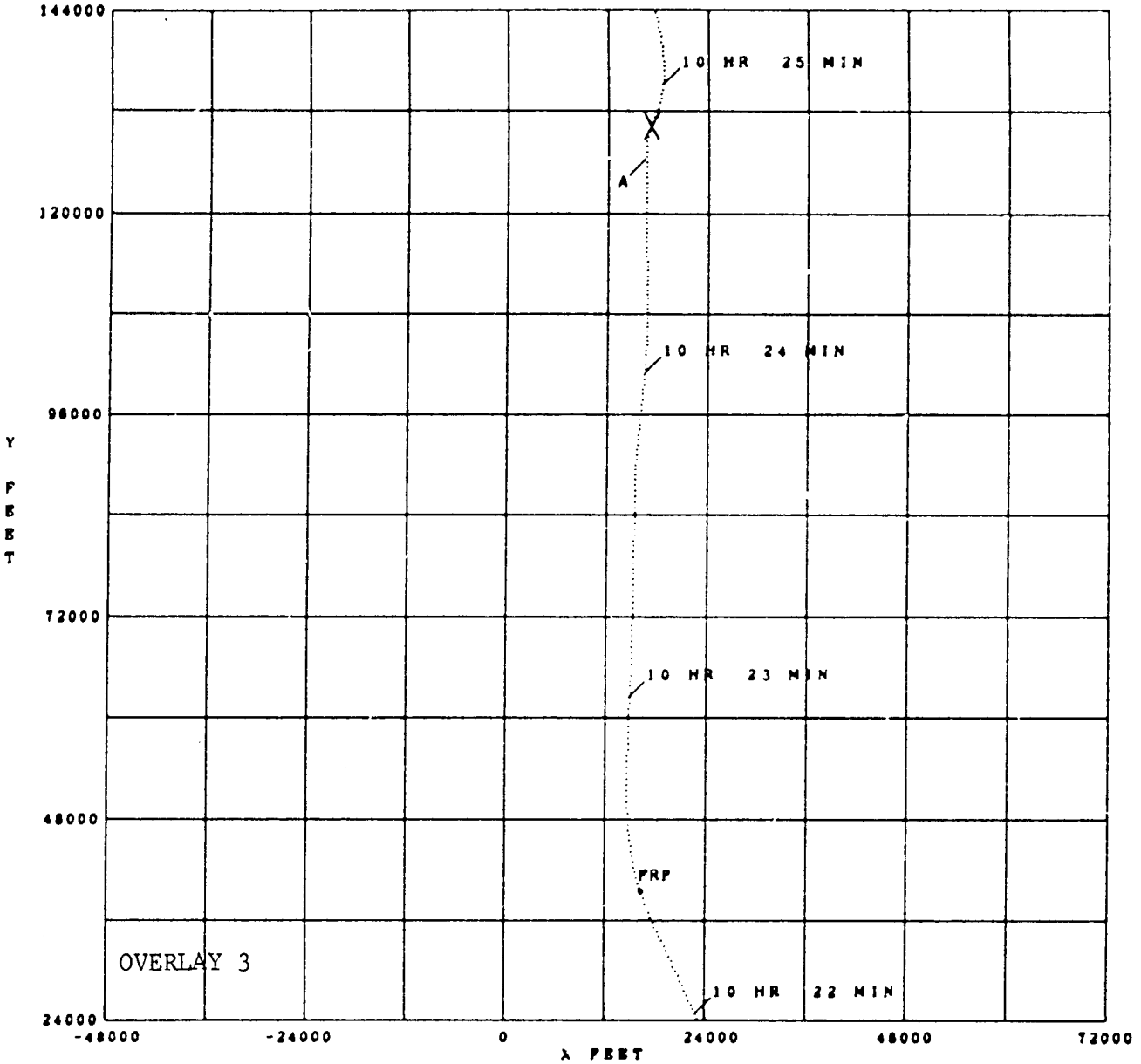
UNCLASSIFIED



MINIMUM GROUND DISTANCE TO TARGET = 113 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 293
TARGET WEST 1

04092232
J9159 15

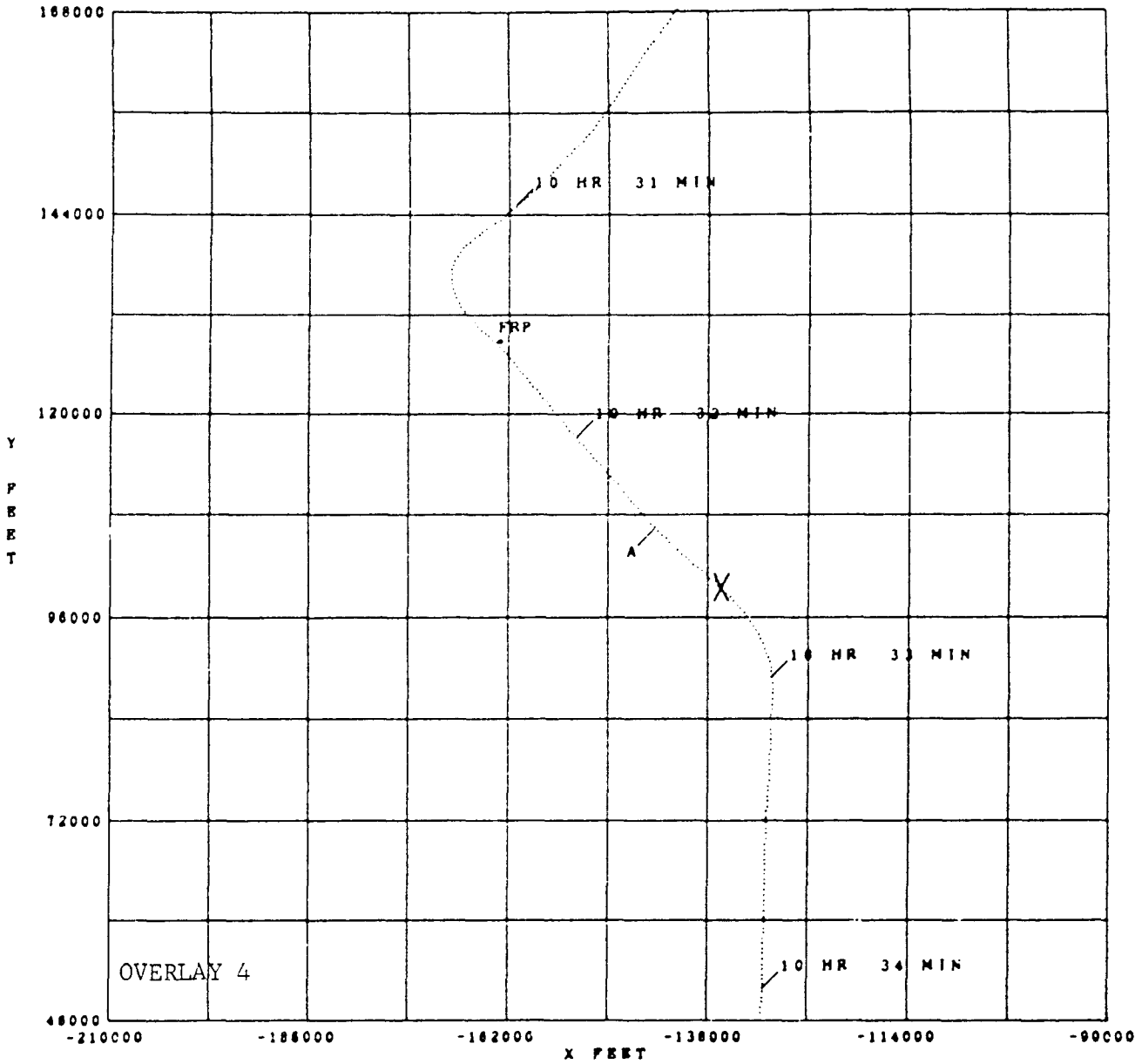
Figure 3-13 (U) Aircraft Position Data (Part 2 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 118 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 293
TARGET WEST 2

04092232
J9159 153

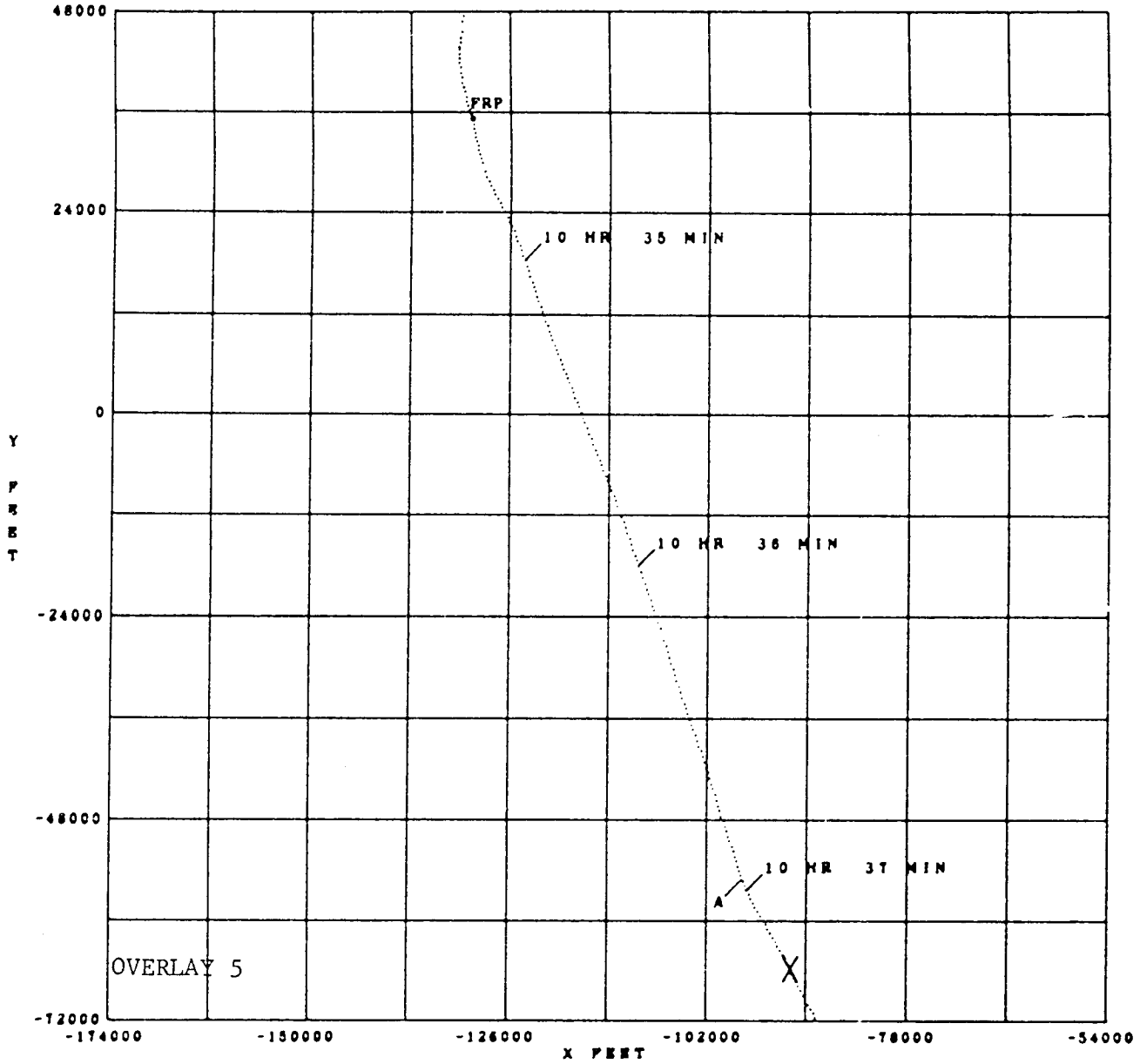
Figure 3-13 (U) Aircraft Position Data (Part 3 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 24 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 293
TARGET WEST 3

04092232
J9159 15

Figure 3-13 (U) Aircraft Position Data (Part 4 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 21 FEET
MINIMUM GROUND DISTANCE QUALIFIER = NONE
SORTIE NUMBER 293
TARGET WEST 4

04092232
J9159 158

Figure 3-13 (U) Aircraft Position Data (Part 5 of 5)

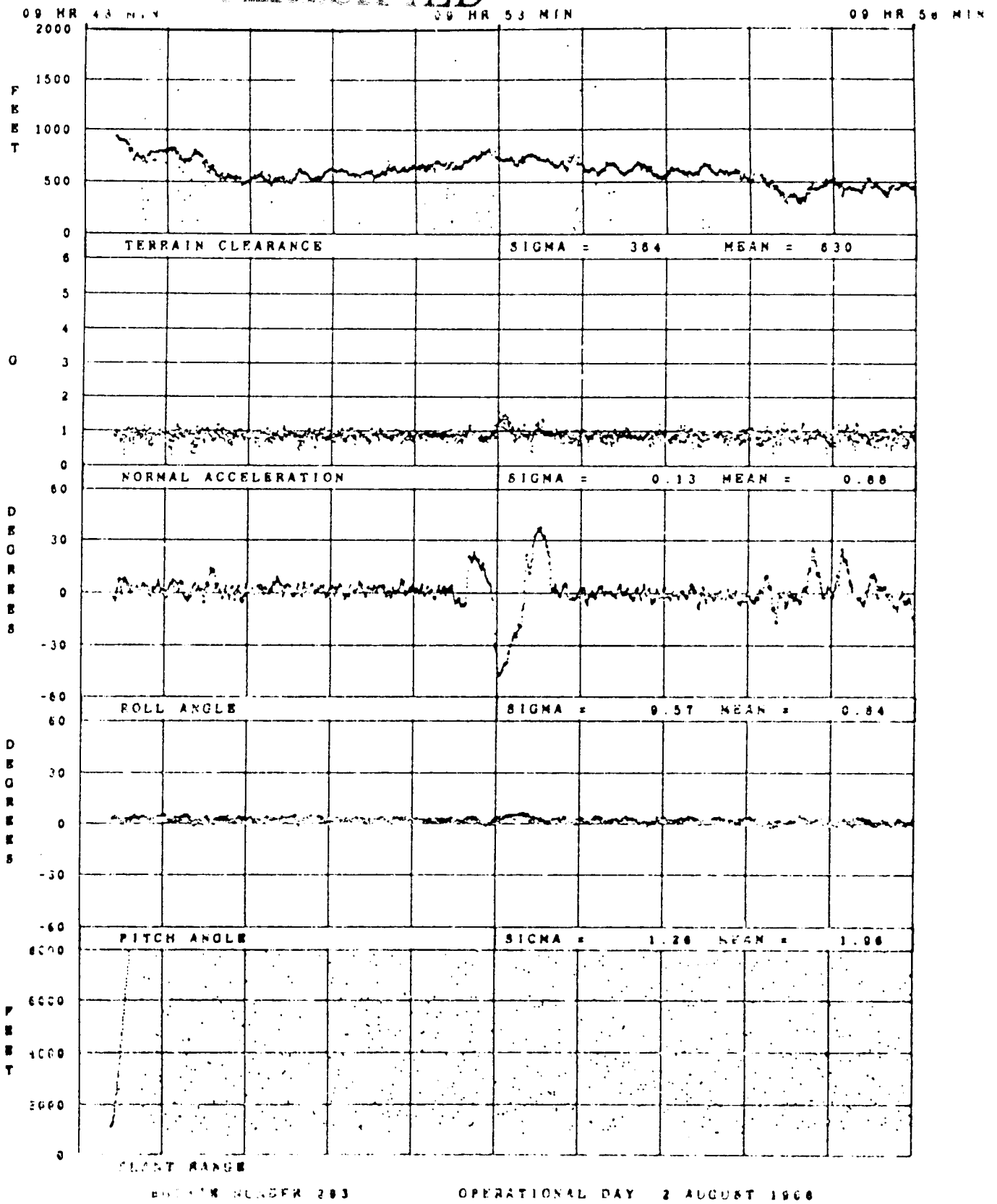


Figure 3-14 (U) Telemetered Data (Part 1 of 5)

UNCLASSIFIED

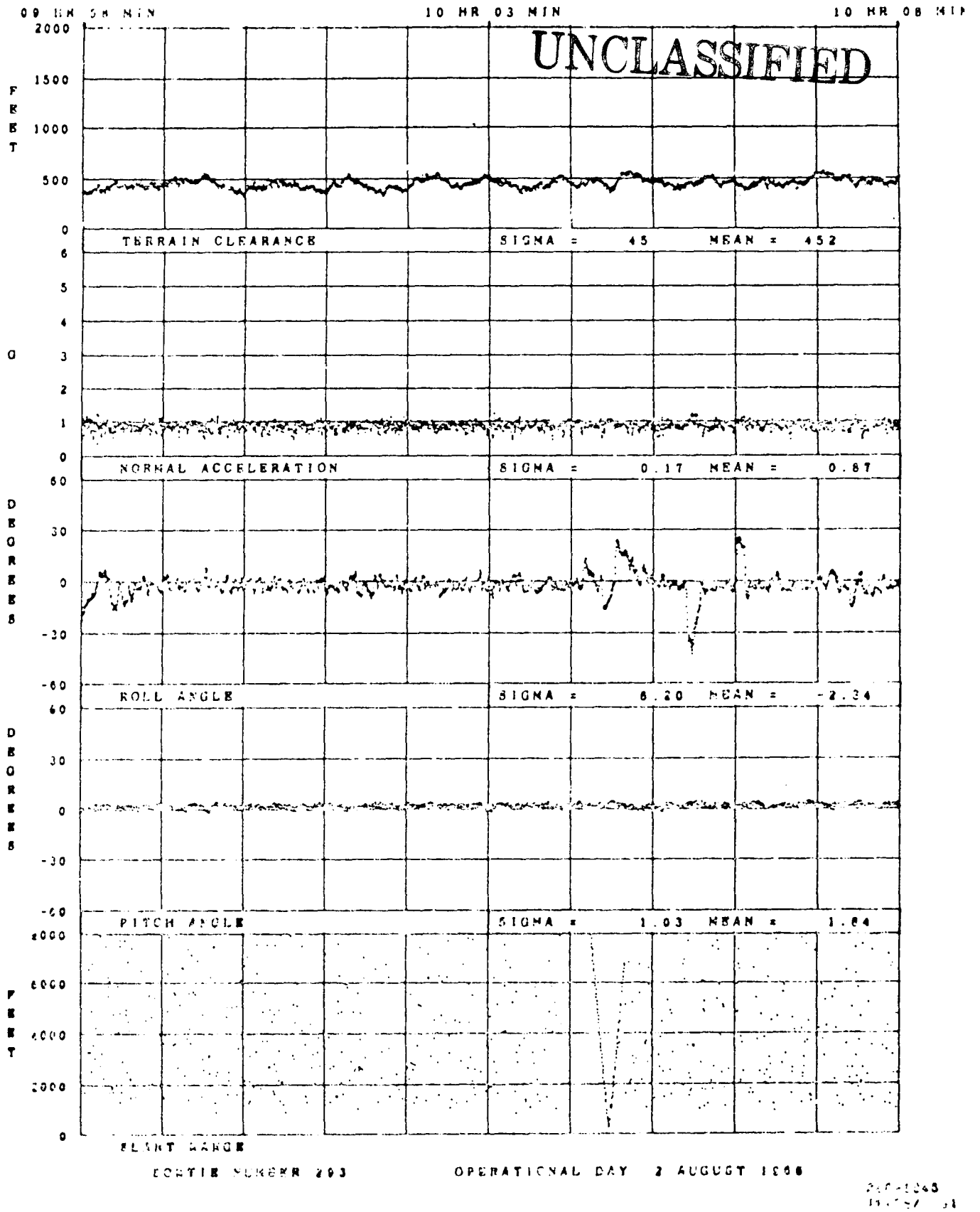


Figure 3-14 (U) Telemetered Data (Part 2 of 5)

UNCLASSIFIED

UNCLASSIFIED

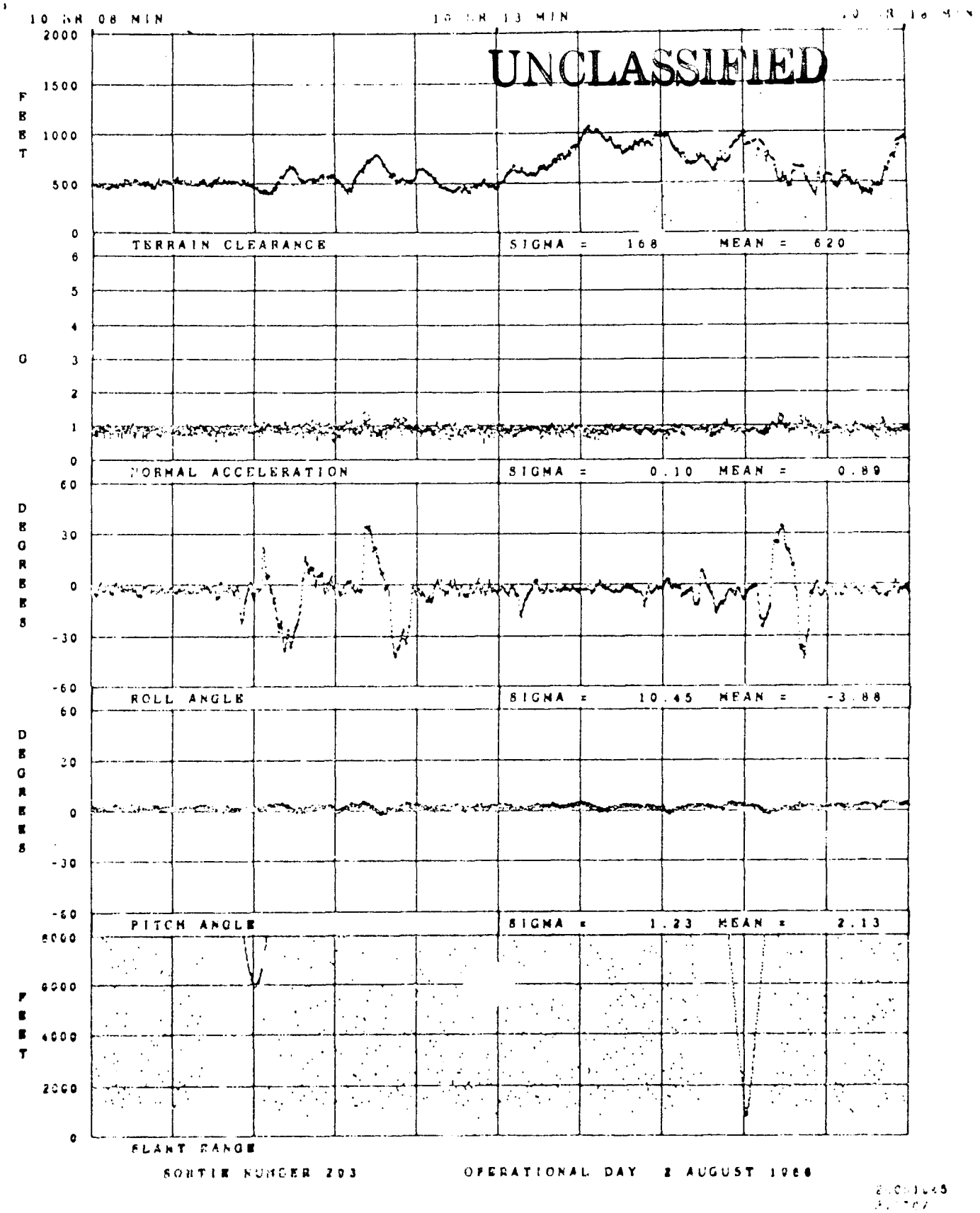


Figure 3-14 (U) Telemetered Data (Part 3 of 5)

UNCLASSIFIED

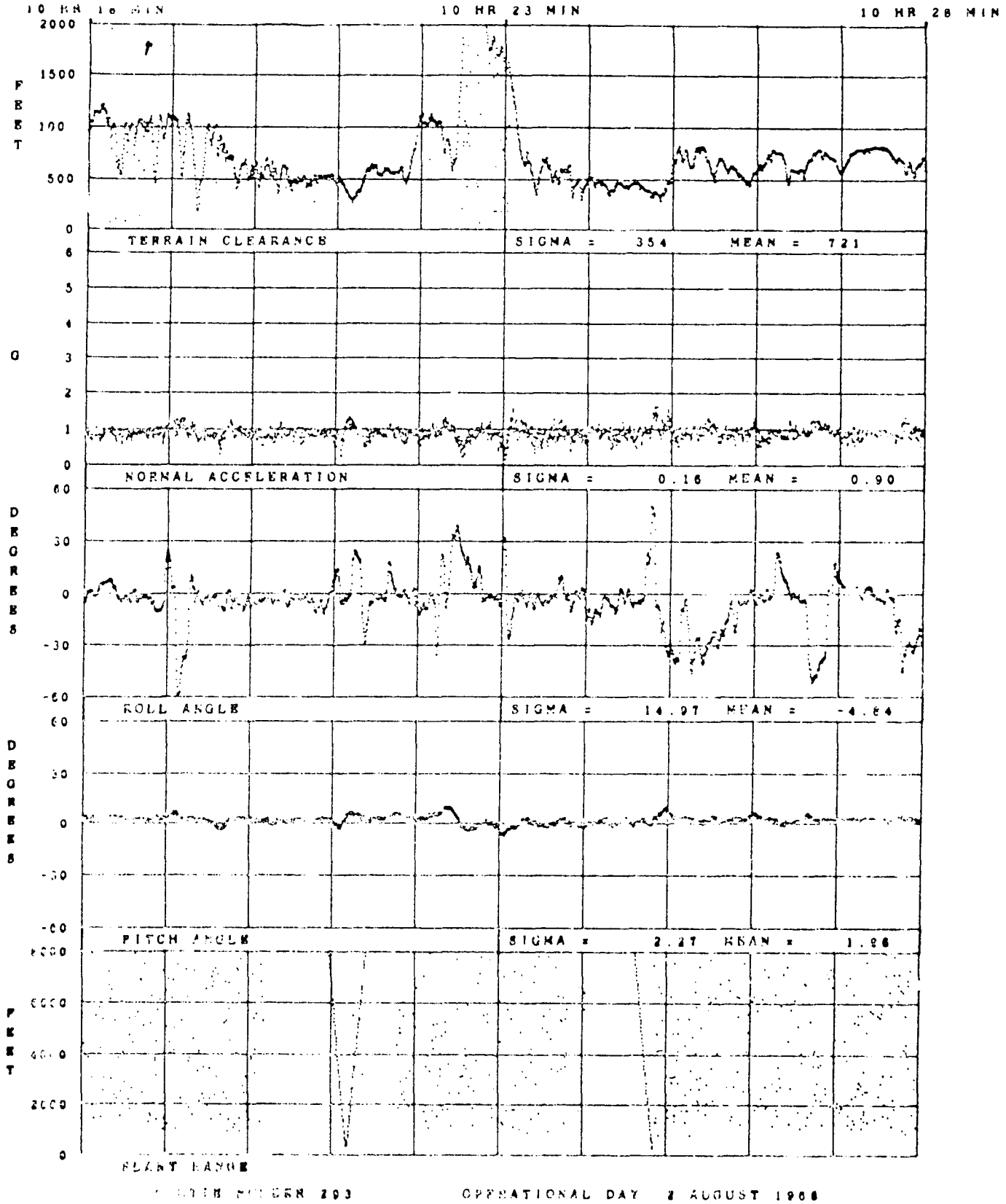


Figure 3-14 (U) Telemetered Data (Part 4 of 5)

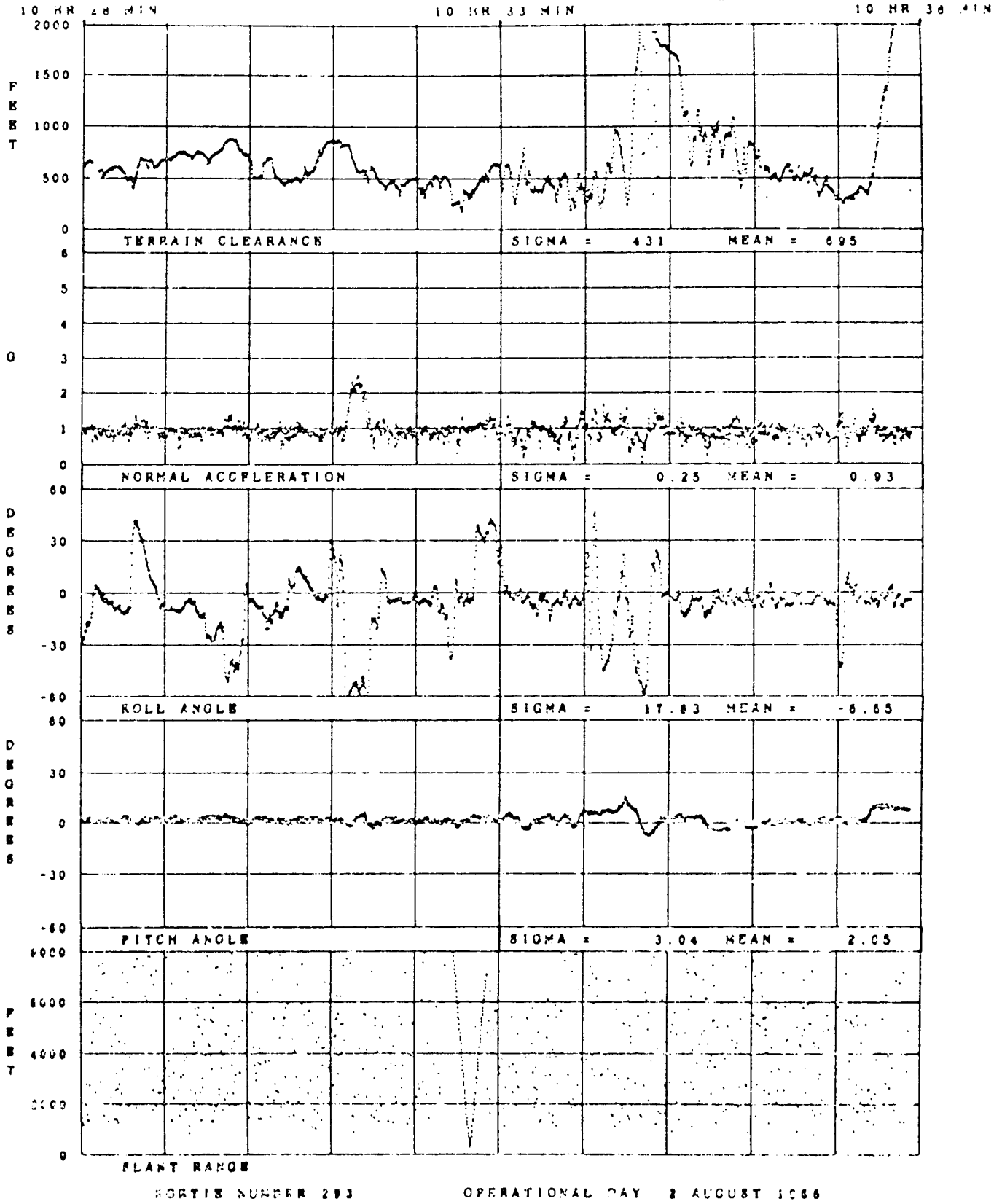
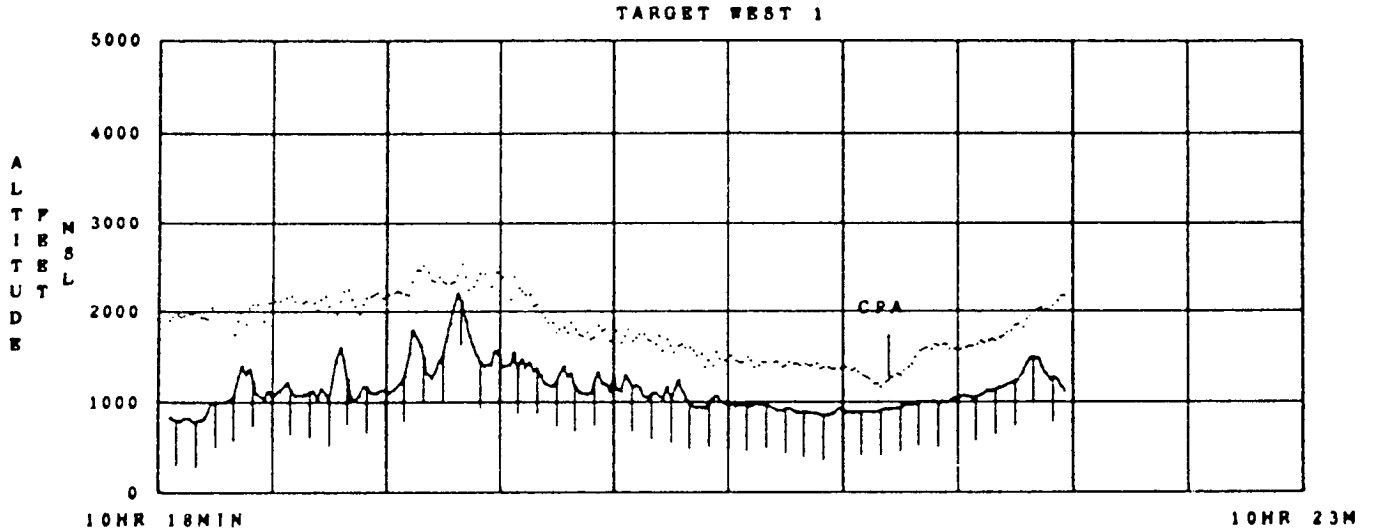
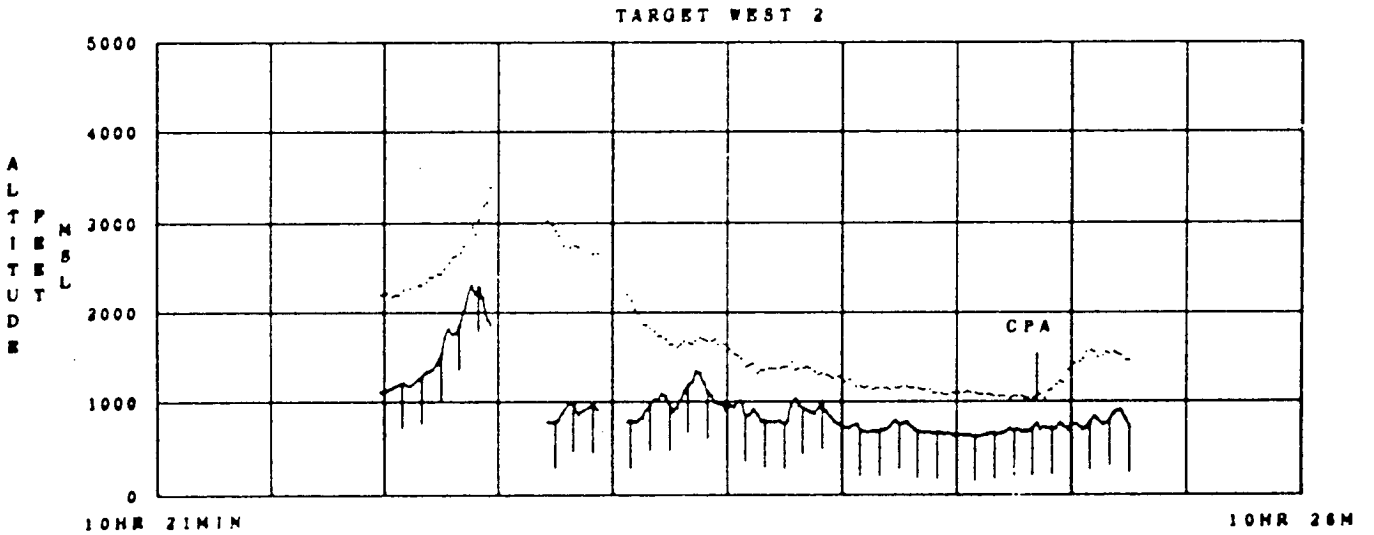


Figure 3-14 (U) Telemetered Data (Part 5 of 5)

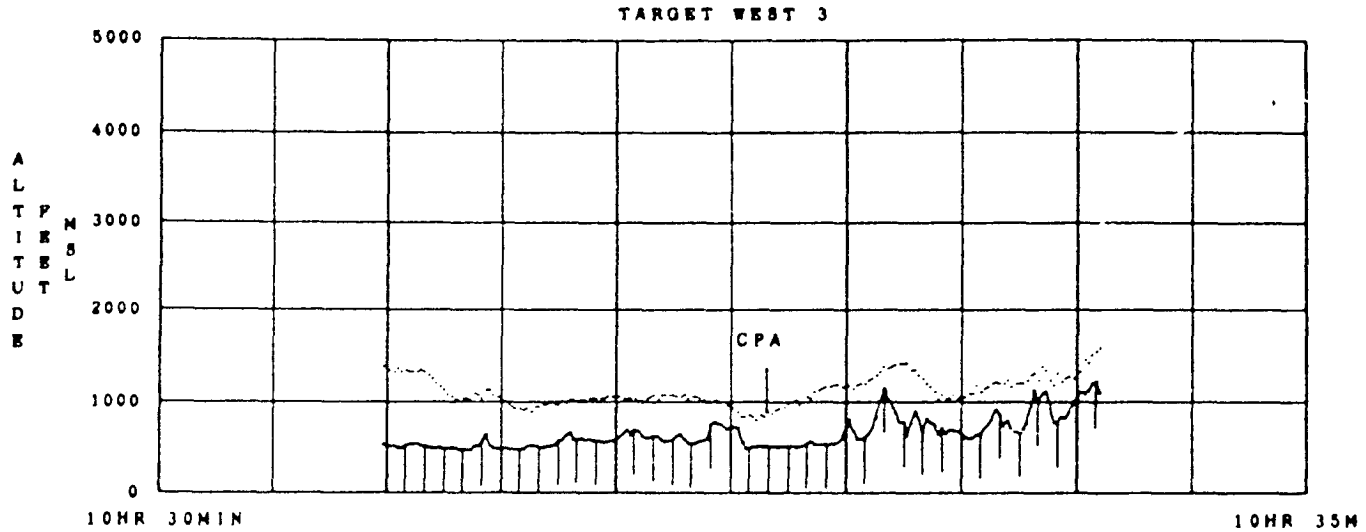


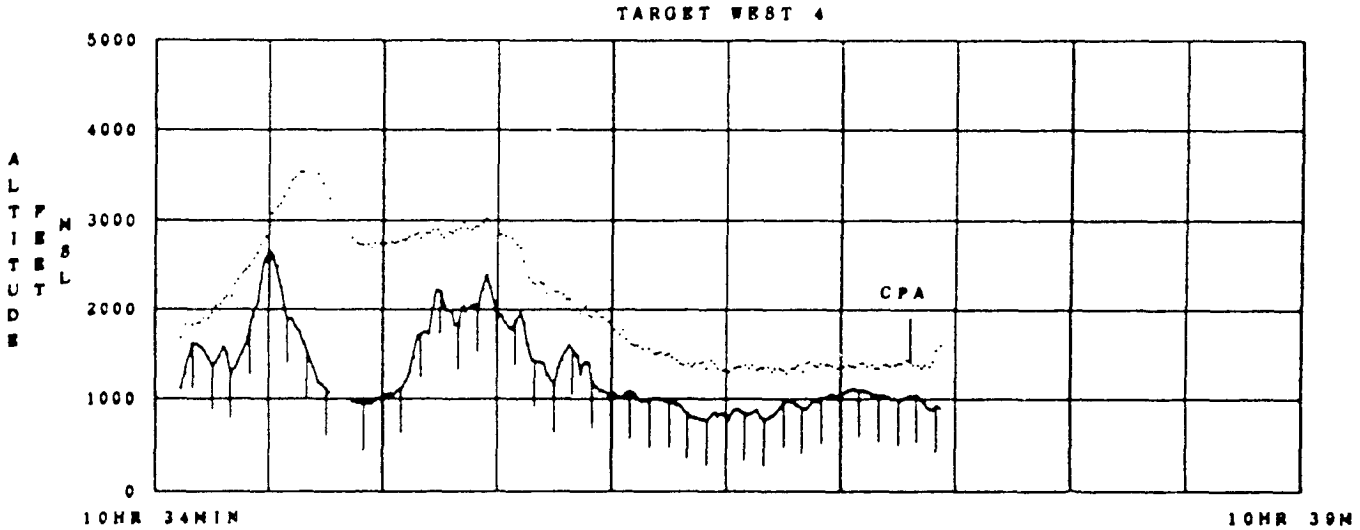


SORTIE NUMBER 293

04092232
J9159

Figure 3-15 (U) Aircraft Altitude and Terrain Profile (Part 1 of 2)

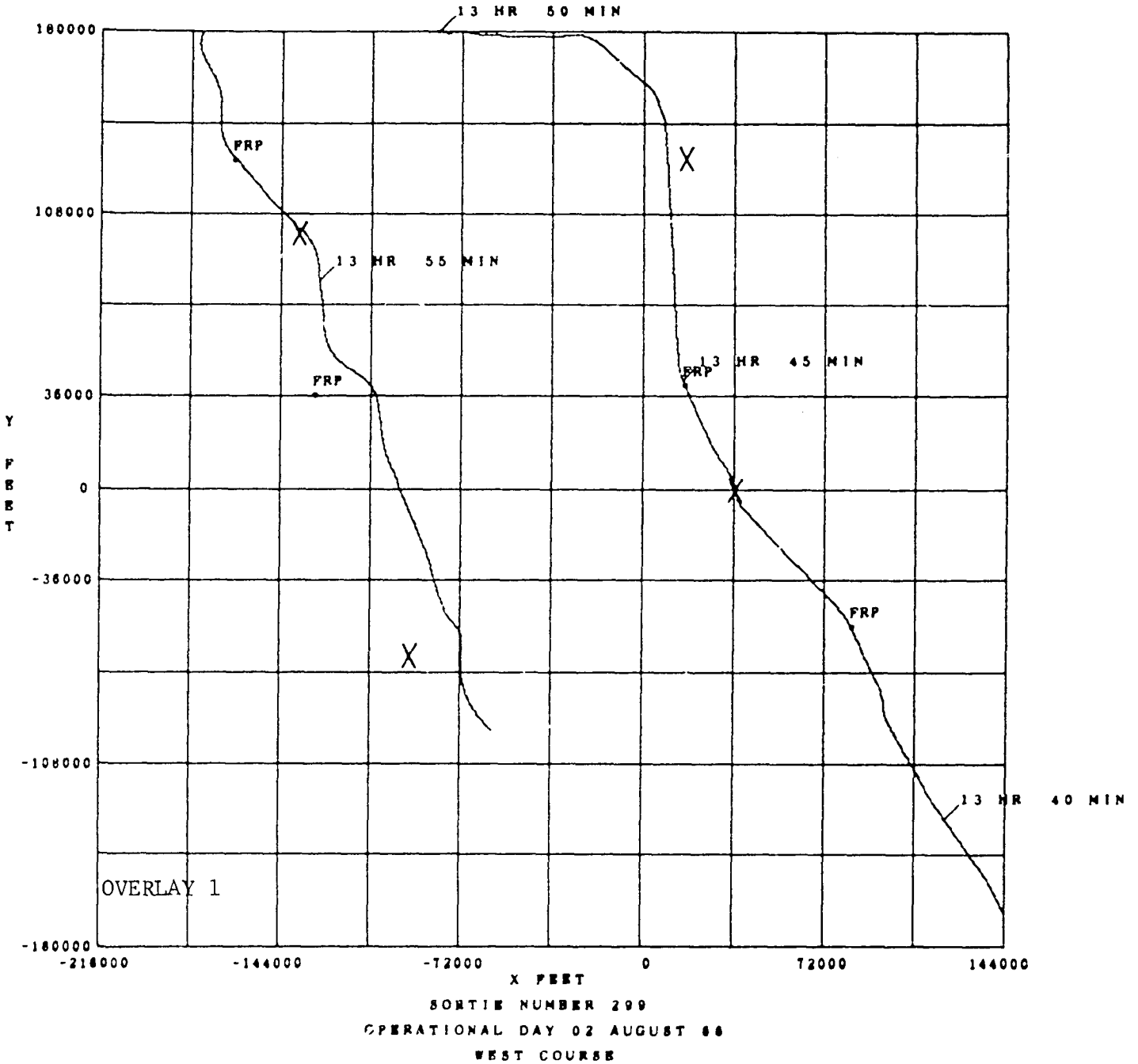




SORTIE NUMBER 293

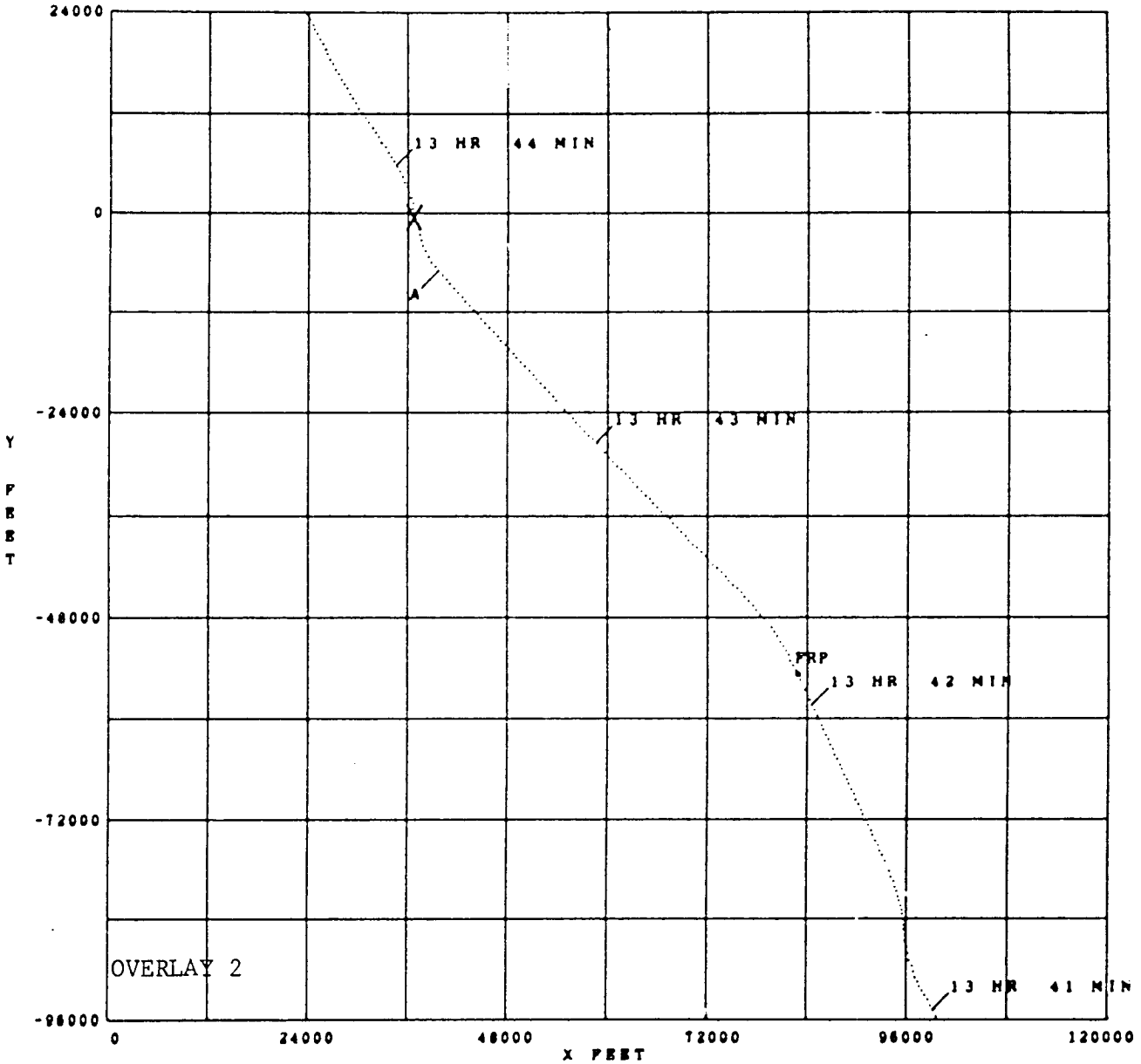
04092232
J9159

Figure 3-15 (U) Aircraft Altitude and Terrain Profile (Part 2 of 2)



04092233
J9159 159

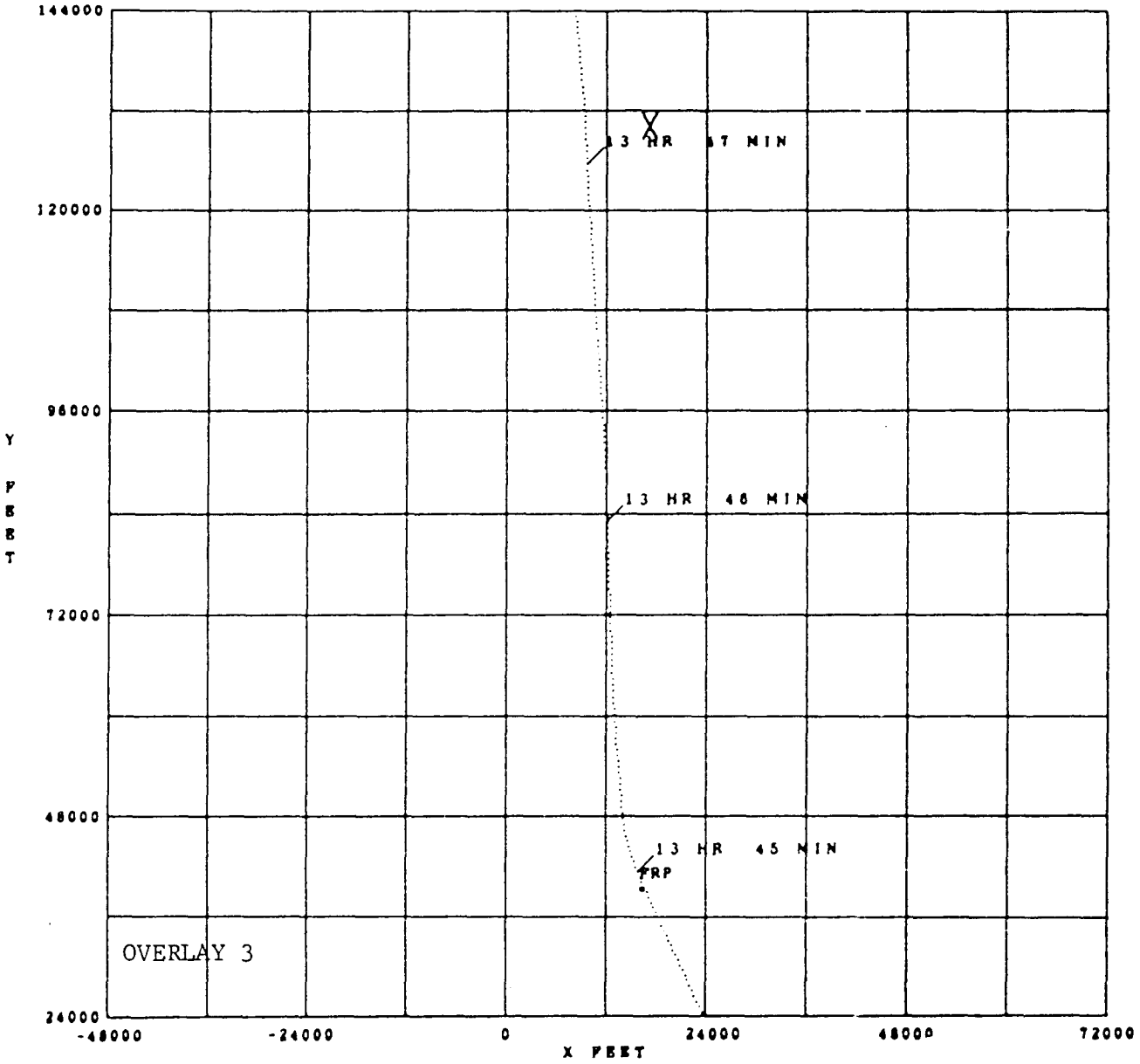
Figure 3-16 (U) Aircraft Position Data (Part 1 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 25 FEET
MINIMUM GROUND DISTANCE QUALIFIER = ONE
SORTIE NUMBER 299
TARGET WEST 1

04092233
J9159 160

Figure 3-16 (U) Aircraft Position Data (Part 2 of 5)

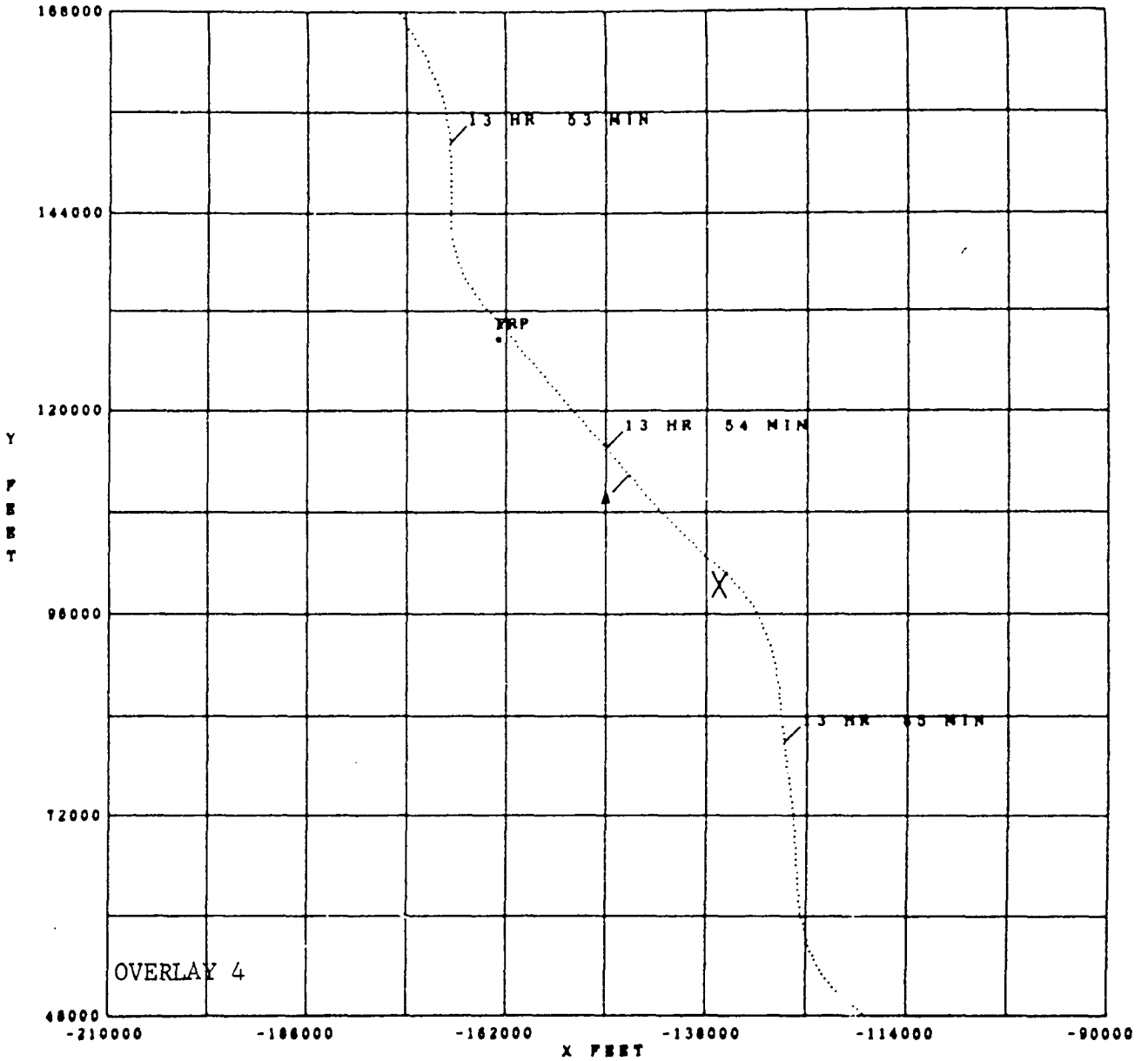


MINIMUM GROUND DISTANCE TO TARGET = 7854 FEET
MINIMUM GROUND DISTANCE QUALIFIER = ONE
SORTIE NUMBER 299
TARGET WEST 2

04092233
J9159 161

Figure 3-16 (U) Aircraft Position Data (Part 3 of 5)

UNCLASSIFIED

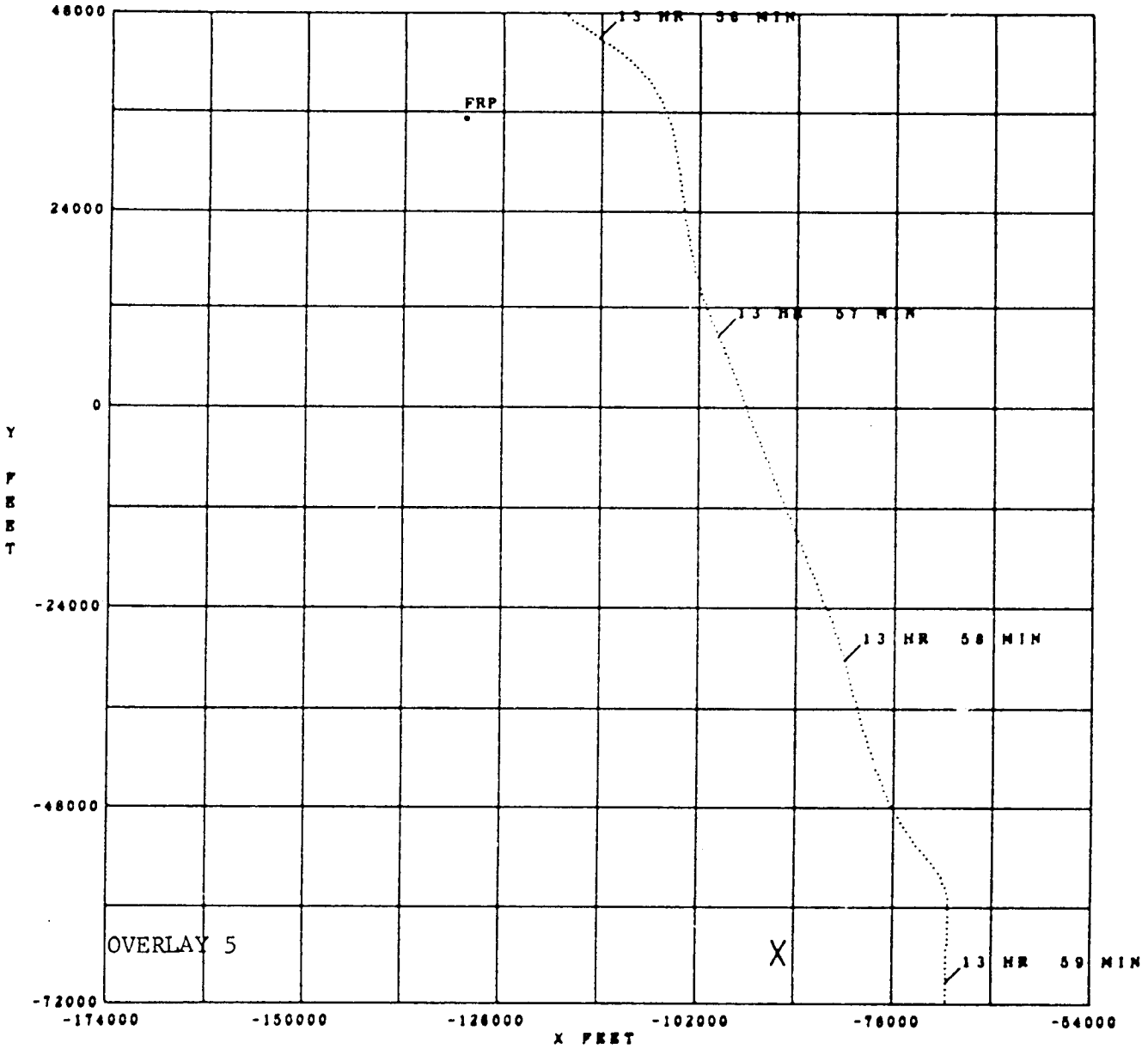


MINIMUM GROUND DISTANCE TO TARGET = 500 FEET
MINIMUM GROUND DISTANCE QUALIFIER = C-BAND
SORTIE NUMBER 299
TARGET WEST 3

04092233
J9159 18

Figure 3-16 (U) Aircraft Position Data (Part 4 of 5)

UNCLASSIFIED



MINIMUM GROUND DISTANCE TO TARGET = 20137 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 299
TARGET WEST 4

04092233
J9159 163

Figure 3-16 (U) Aircraft Position Data (Part 5 of 5)

UNCLASSIFIED

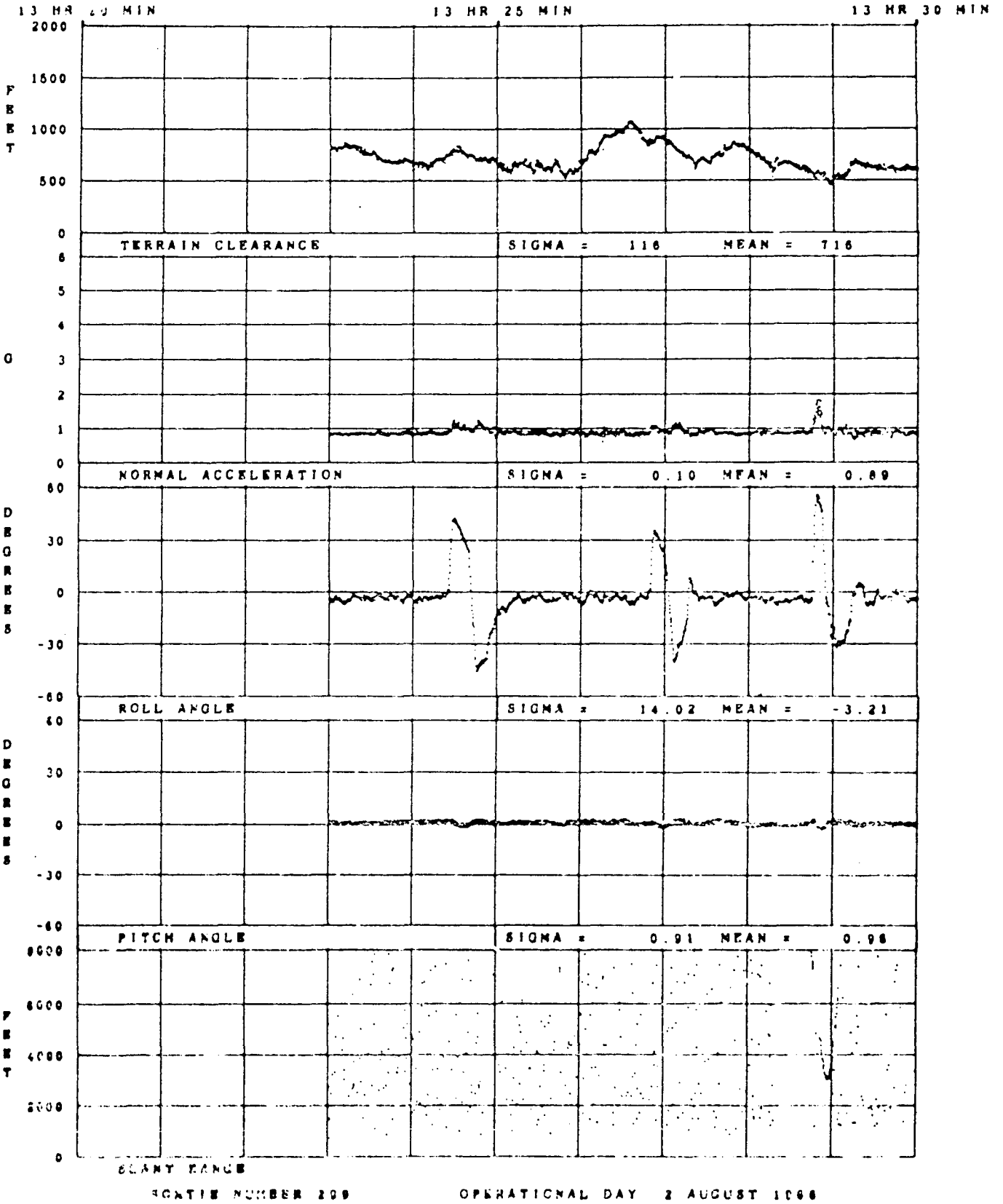


Figure 3-17 (U) Telemetered Data (Part 1 of 4)

UNCLASSIFIED

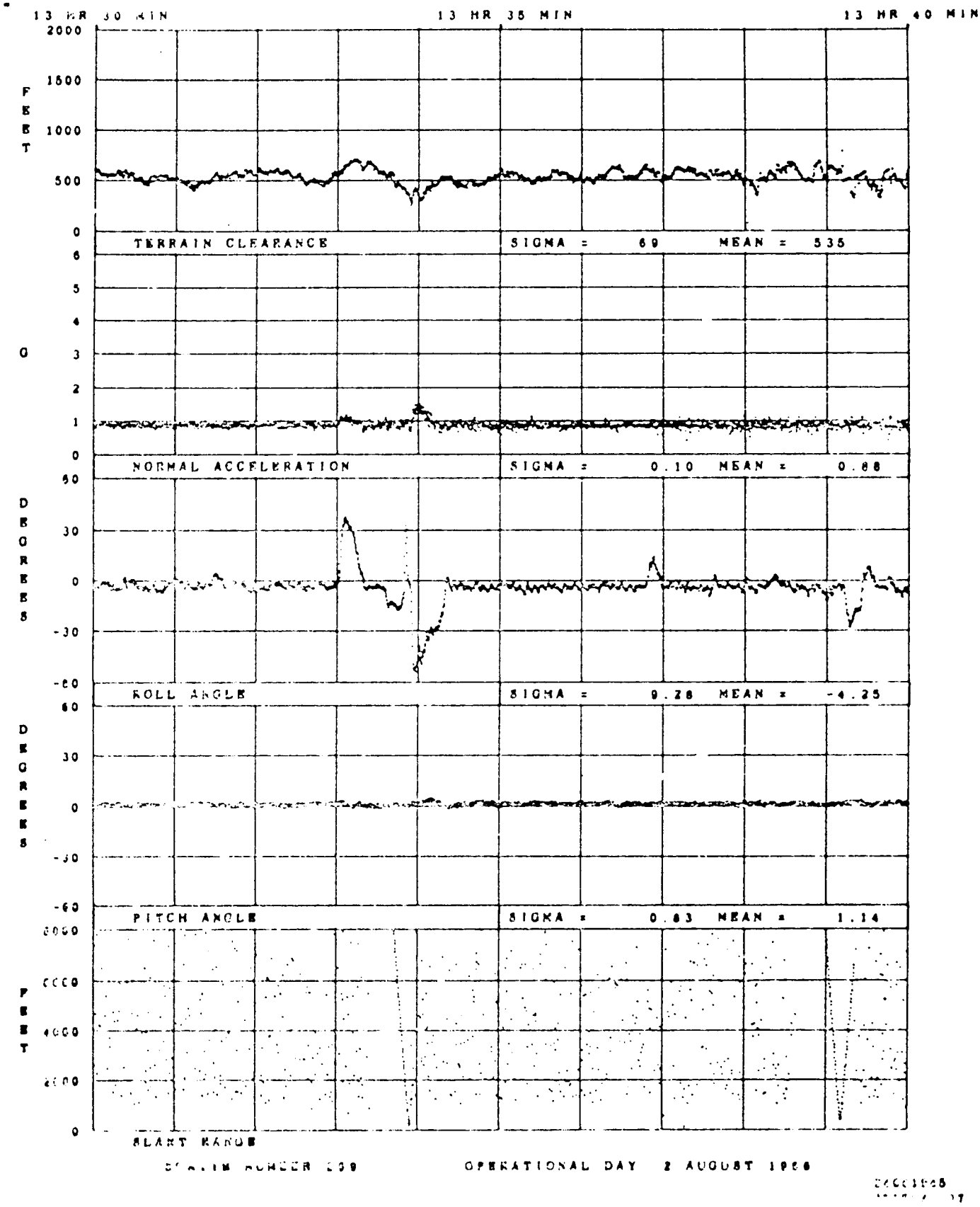


Figure 3-17 (U) Telemetered Data (Part 2 of 4)

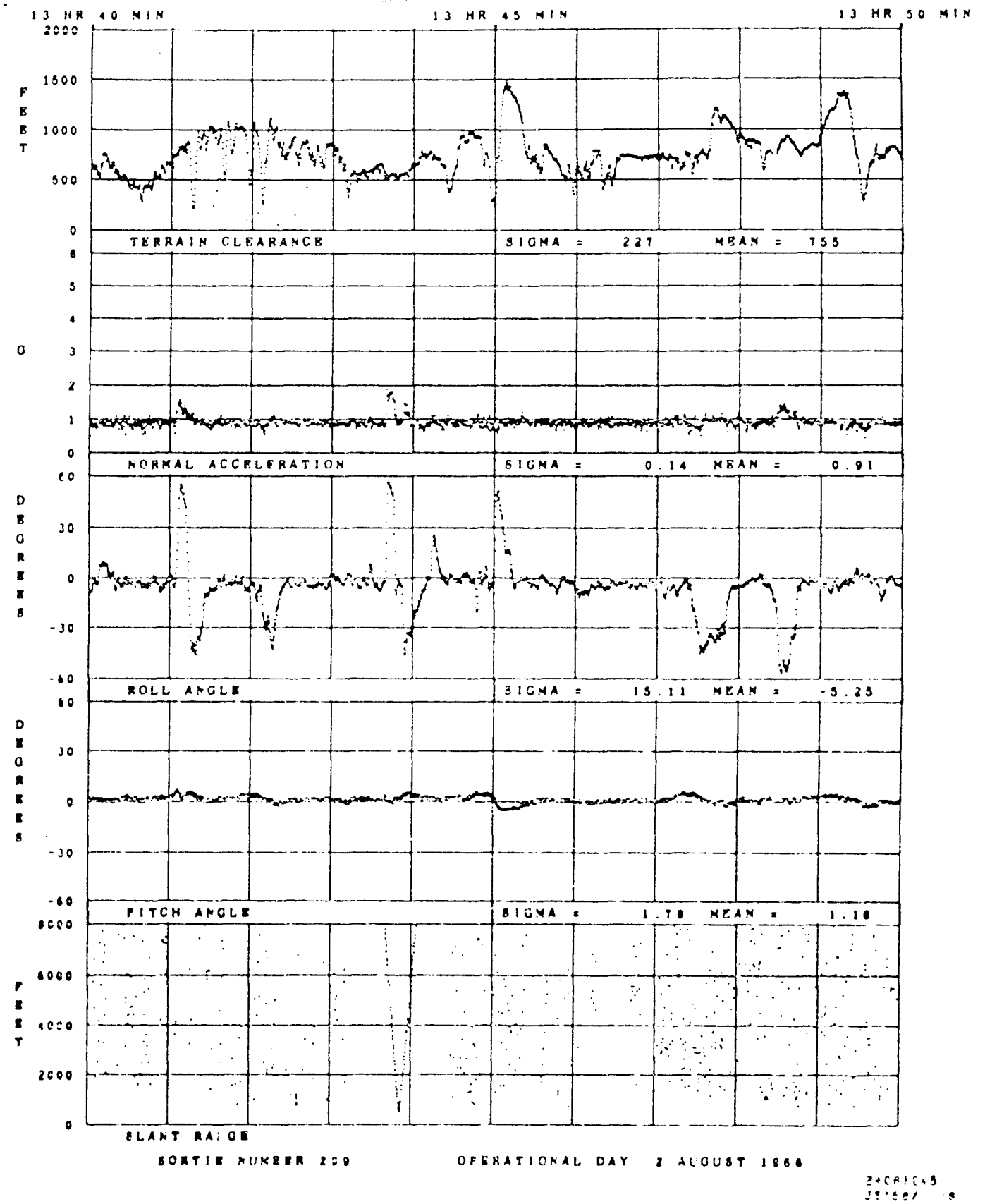


Figure 3-17 (U) Telemetered Data (Part 3 of 4)

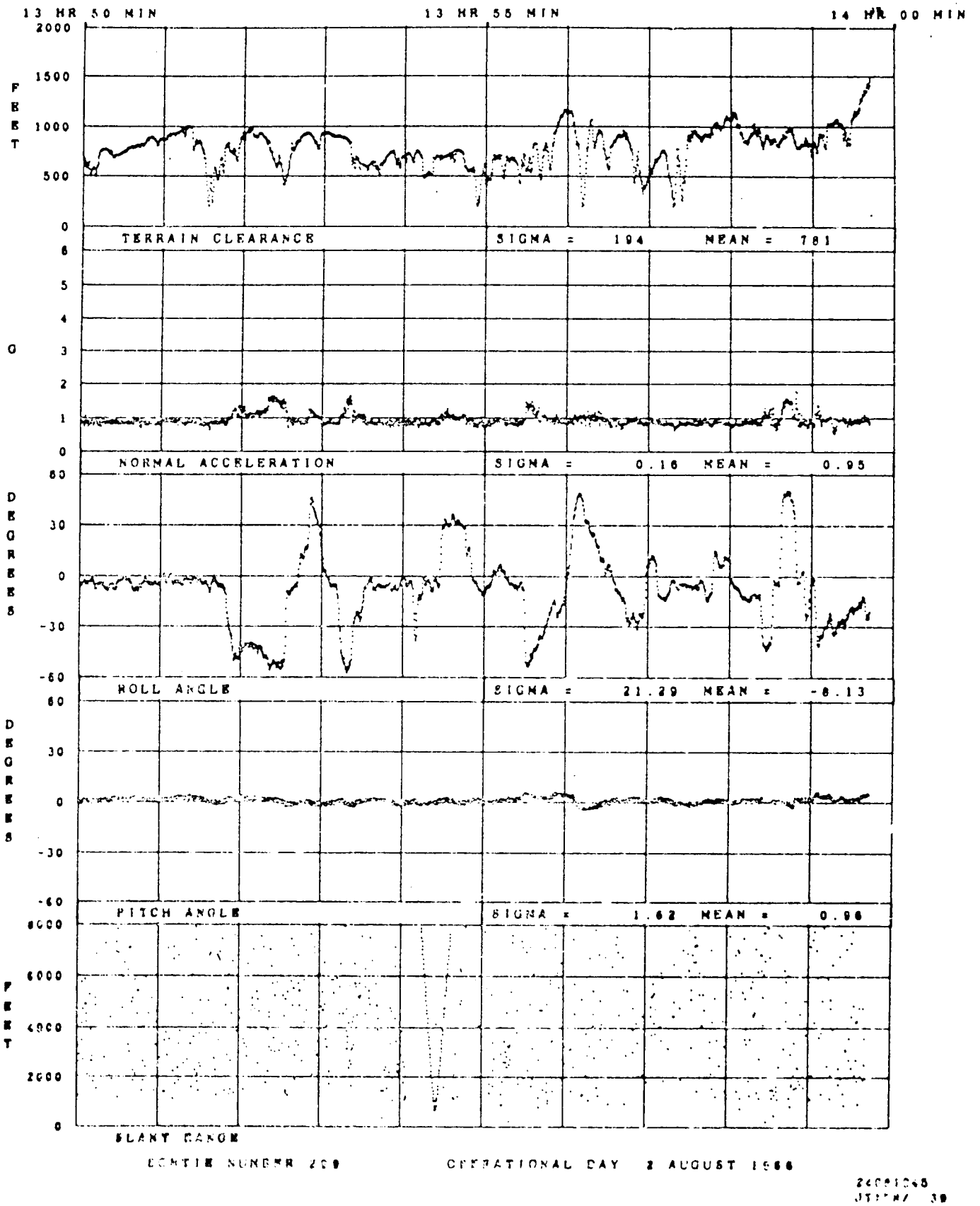
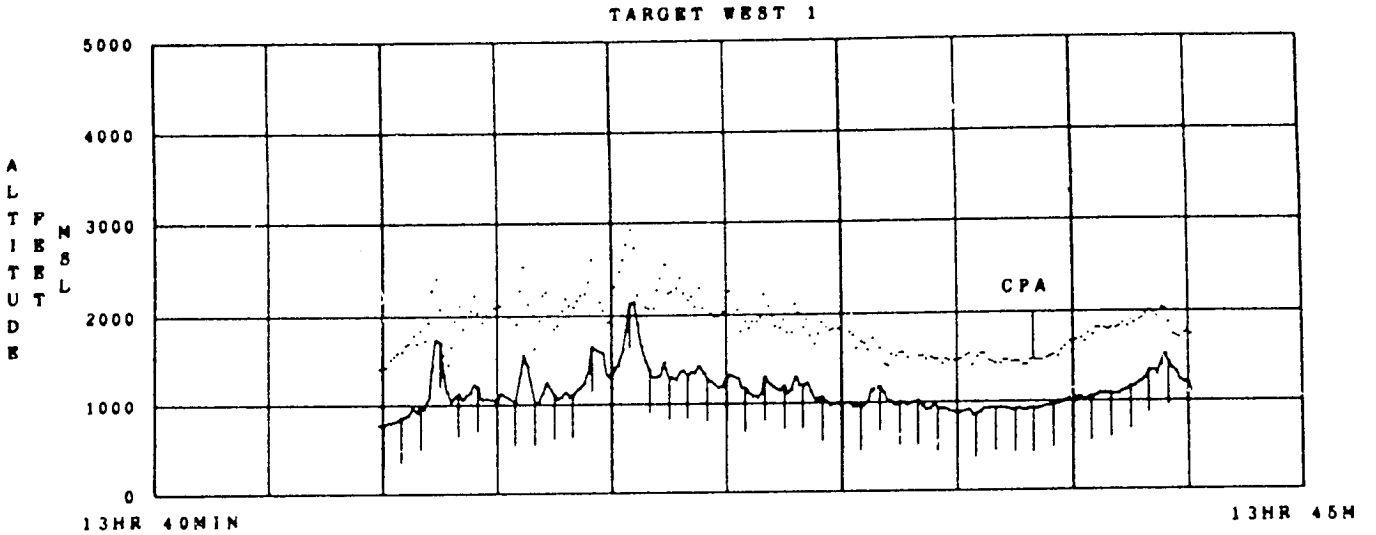
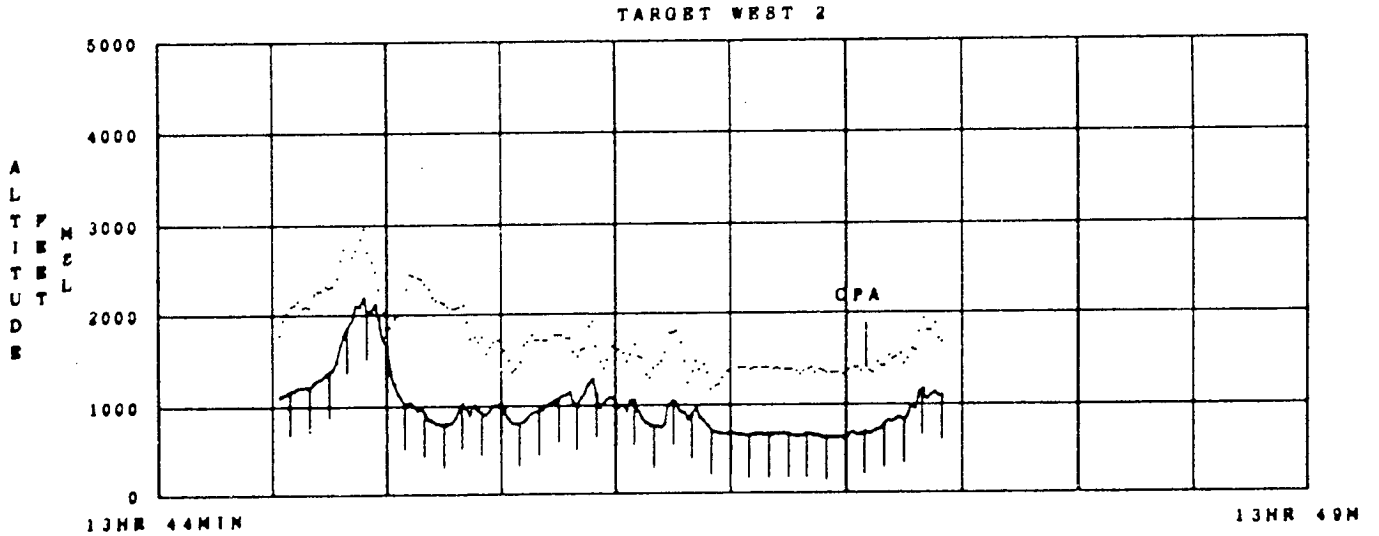


Figure 3-17 (U) Telemetered Data (Part 4 of 4)

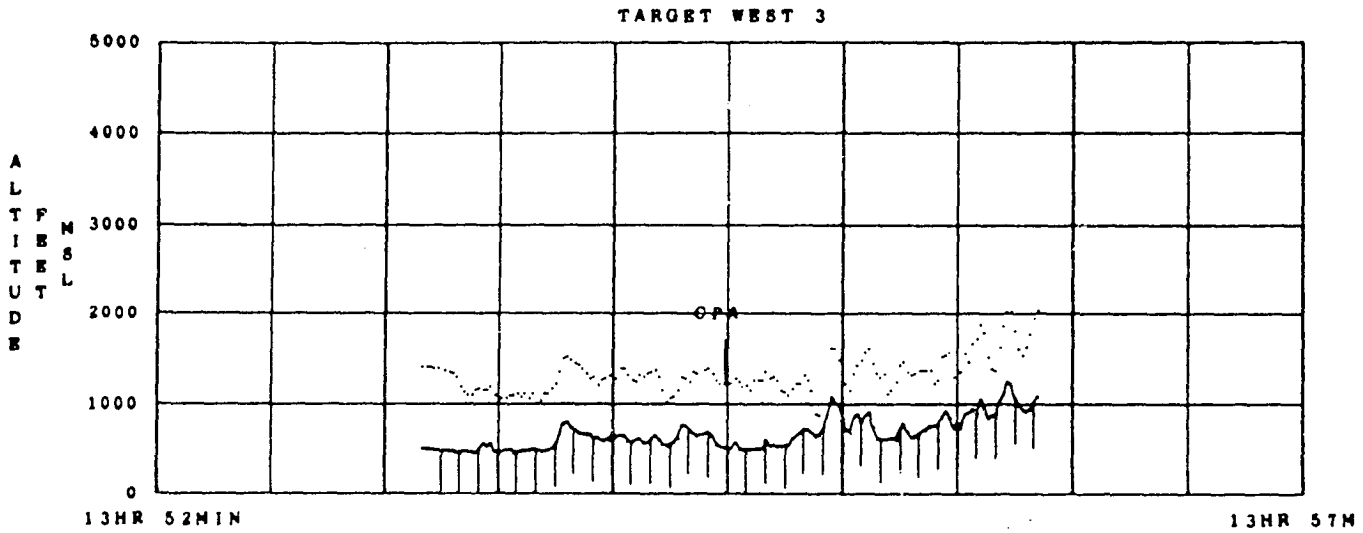


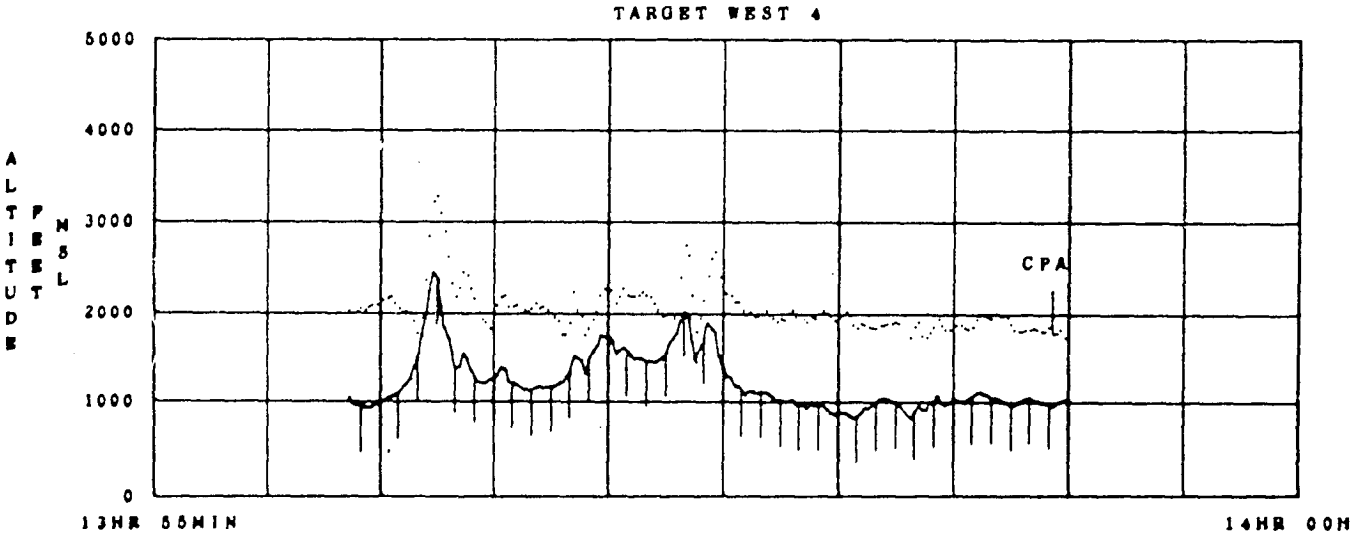


SORTIE NUMBER 299

04022233
J9159

Figure 3-18 (U) Aircraft Altitude and Terrain Profile (Part 1 of 2)

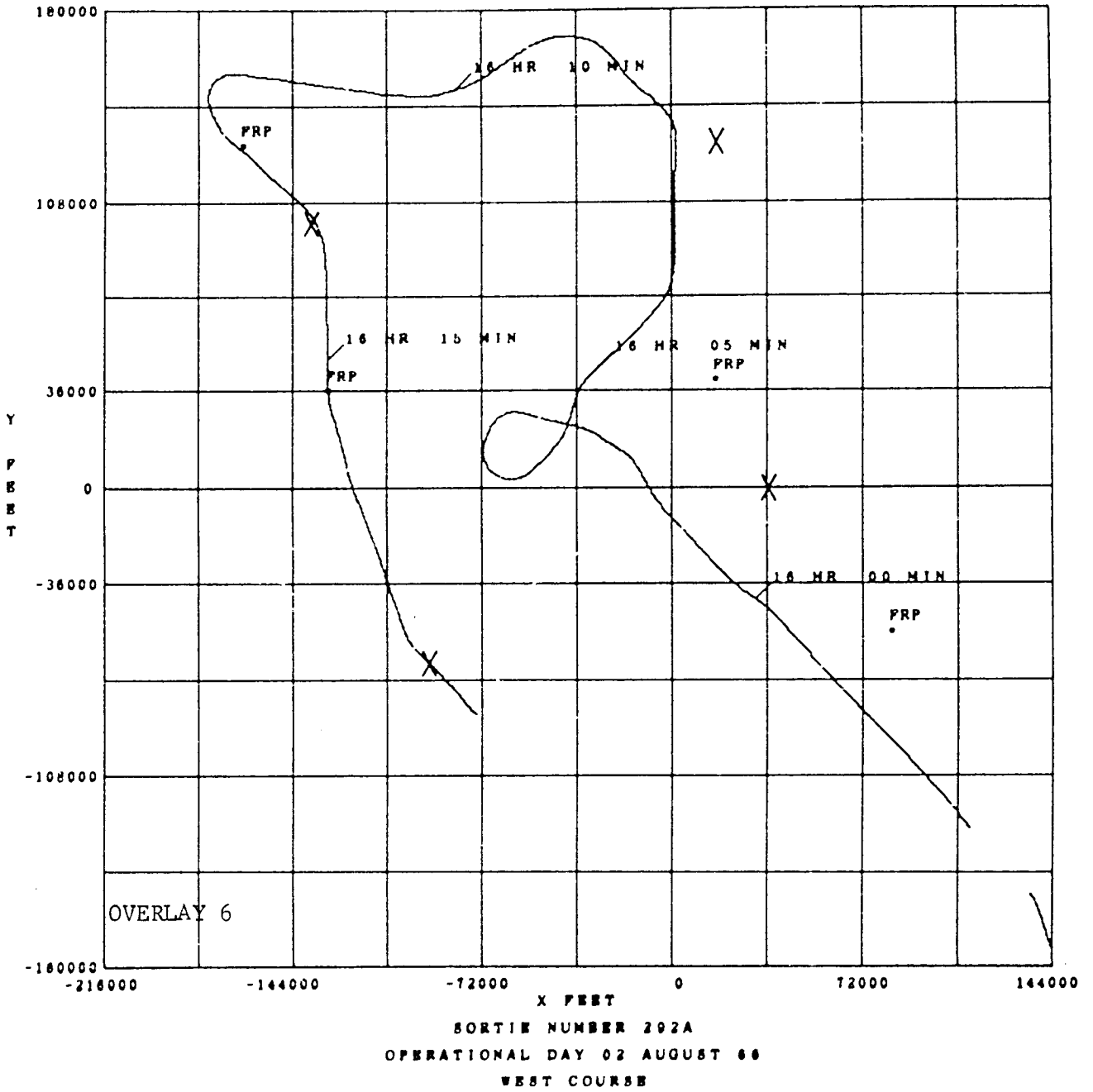




SORTIE NUMBER 299

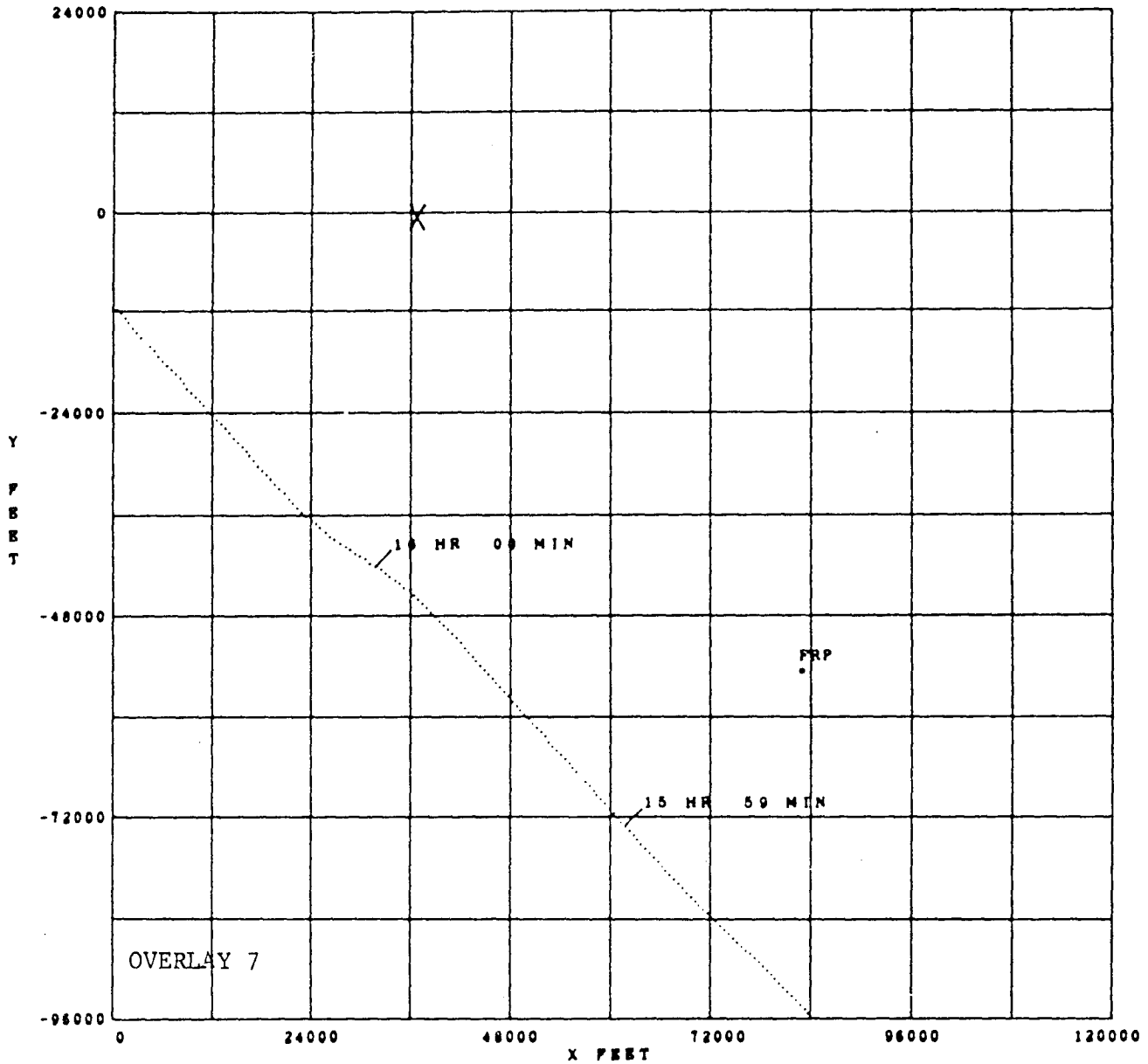
04092233
J9159

Figure 3-18 (U) Aircraft Altitude and Terrain Profile (Part 2 of 2)



04092233
J9159 167

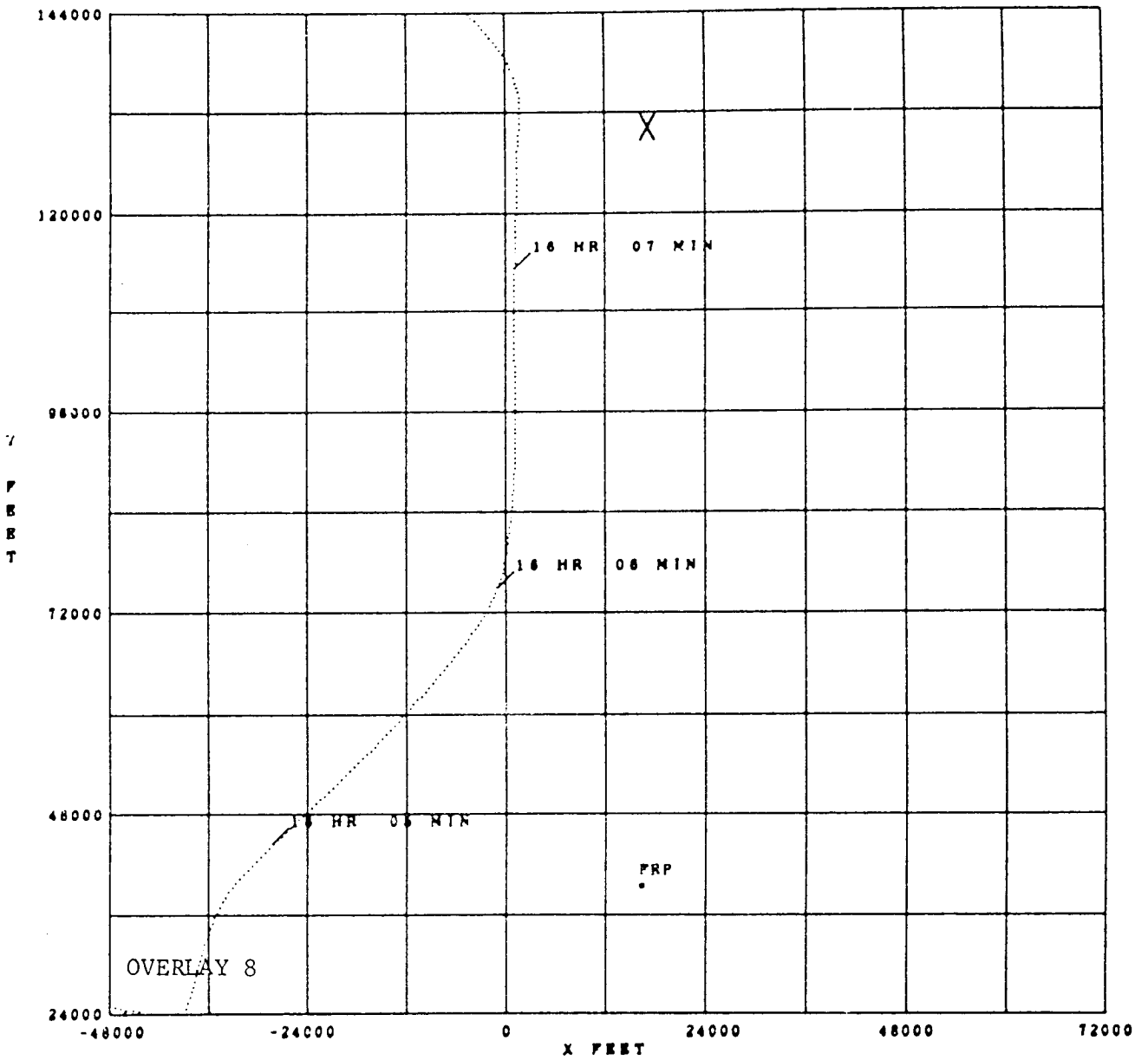
Figure 3-19 (U) Aircraft Position Data (Part 1 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 33000 FEET
MINIMUM GROUND DISTANCE QUALIFIER = ESTIMATED
SORTIE NUMBER 292A
TARGET WEST 1

04092233
J9159 168

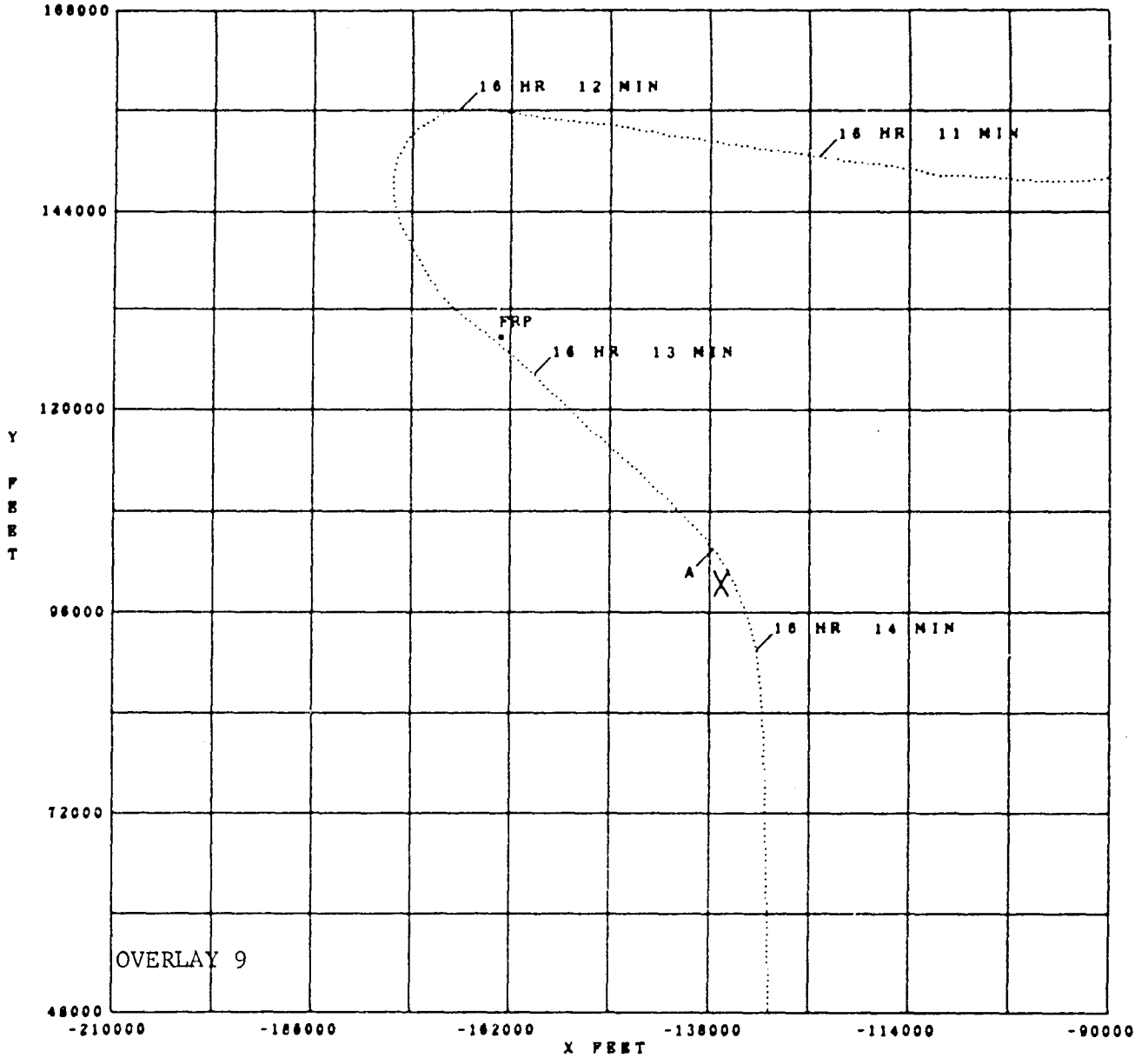
Figure 3-19 (U) Aircraft Position Data (Part 2 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 15612 FEET
MINIMUM GROUND DISTANCE QUALIFIER = ONE
SORTIE NUMBER 292A
TARGET WEST 2

04092233
J9159 169

Figure 3-19 (U) Aircraft Position Data (Part 3 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 1349 FEET
MINIMUM GROUND DISTANCE QUALIFIER = ONE
SORTIE NUMBER 292A
TARGET WEST 3

04092233
J9159 170

Figure 3-19 (U) Aircraft Position Data (Part 4 of 5)

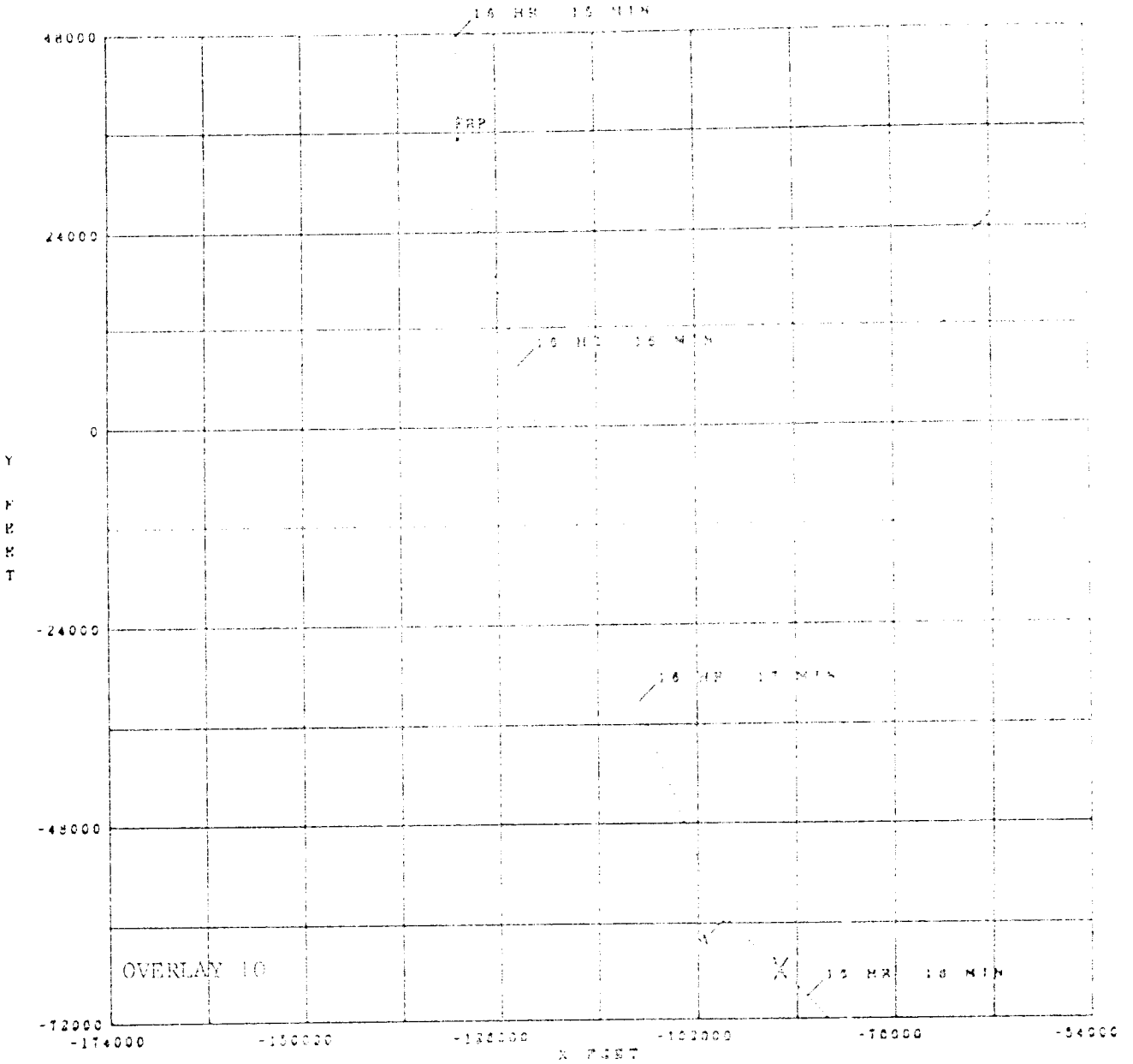


Figure 3-19 (U) Aircraft Position Data (Part 5 of 5)

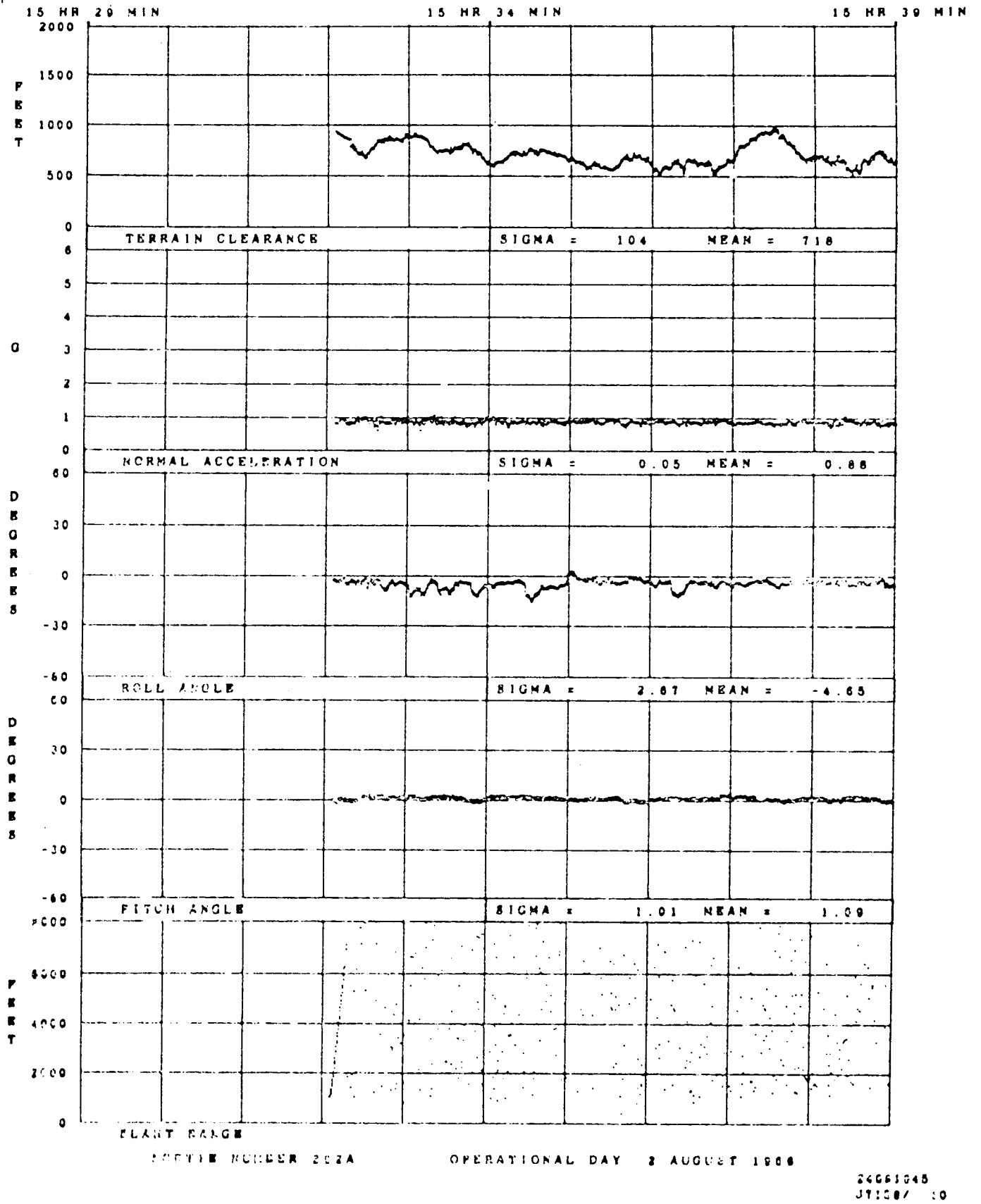


Figure 3-20 (U) Telemetered Data (Part 1 of 5)

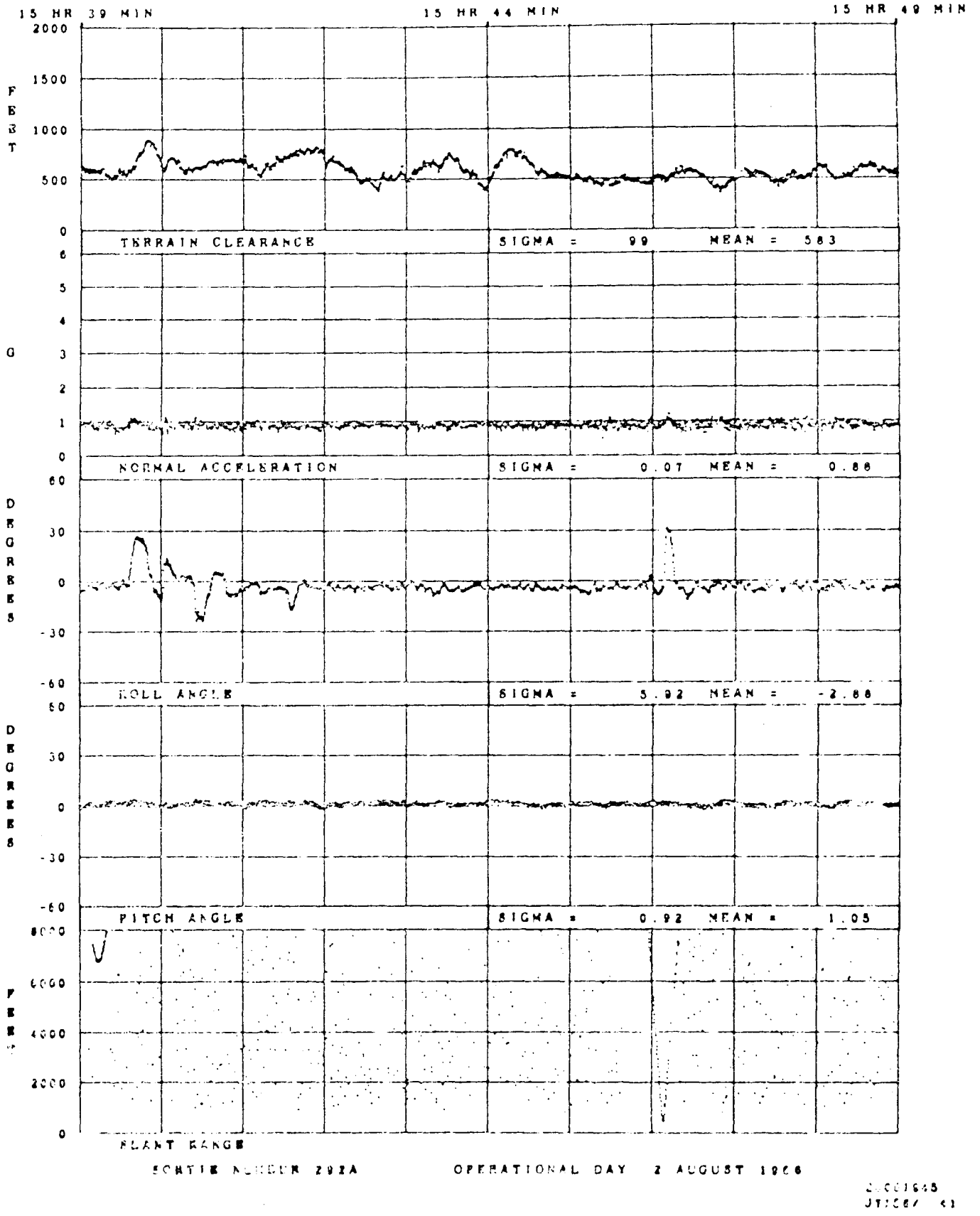


Figure 3-20 (U) Telemetered Data (Part 2 of 5)

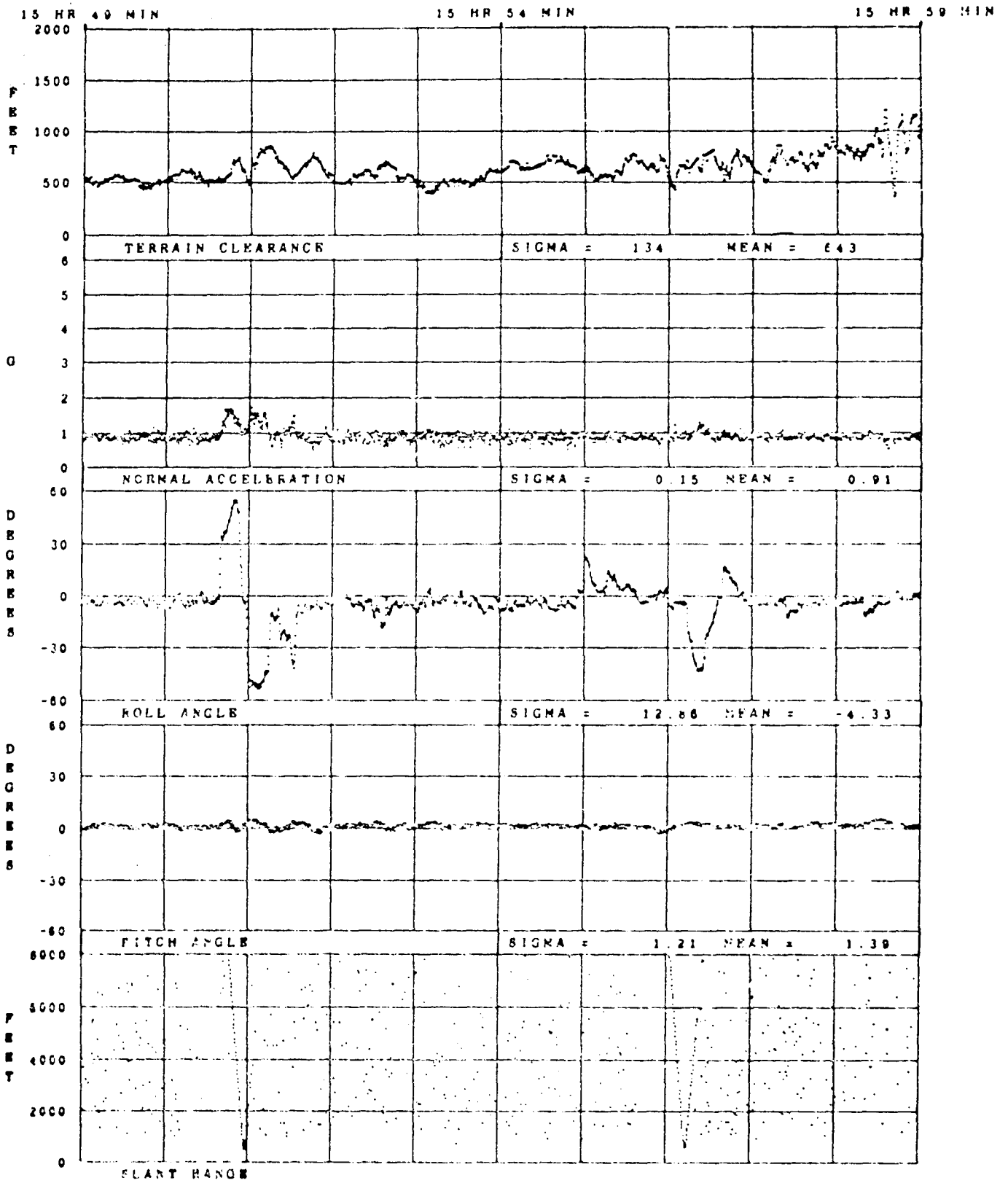


Figure 3-20 (U) Telemetered Data (Part 3 of 5)

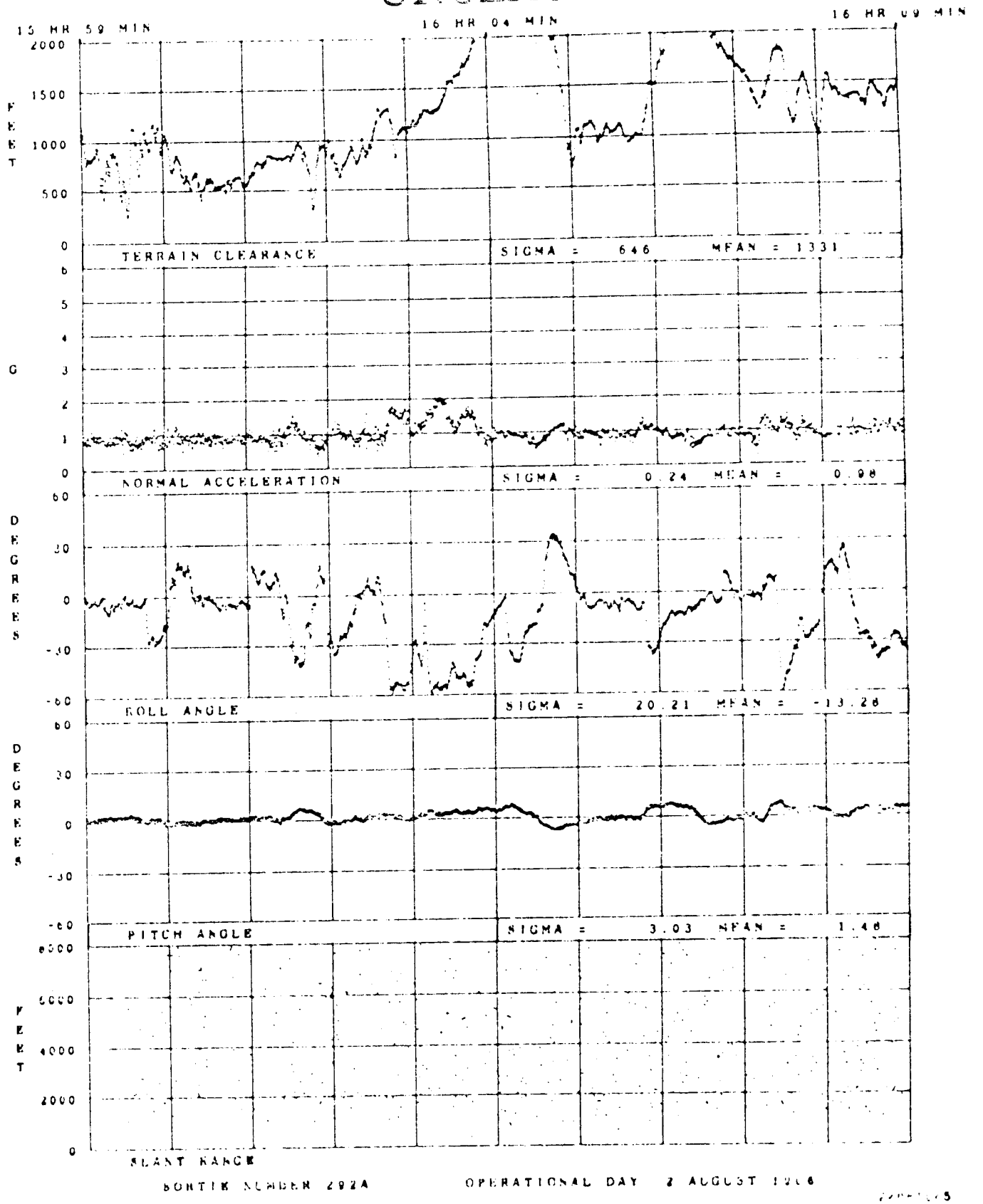


Figure 3-20 (U) Telemetered Data (Part 4 of 5)

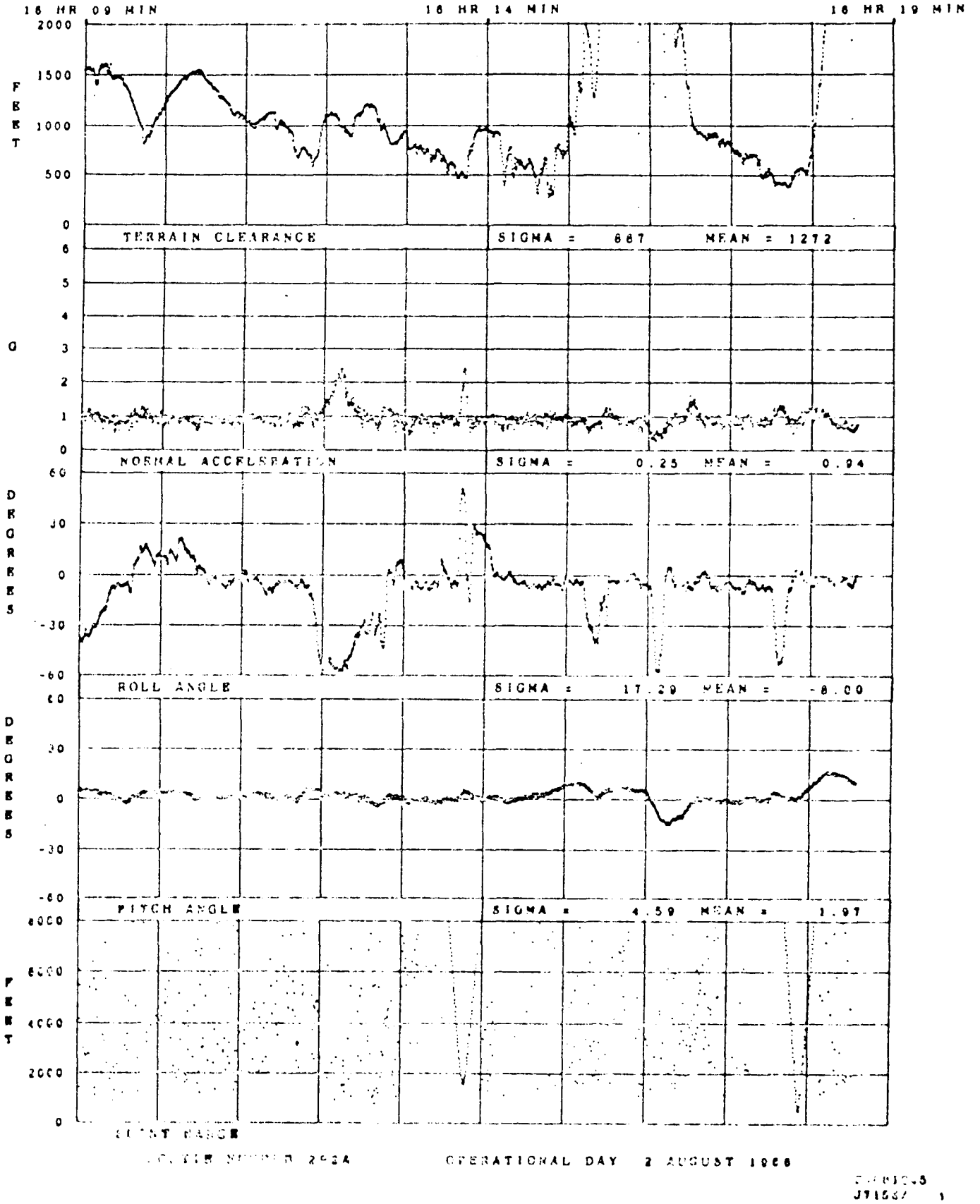
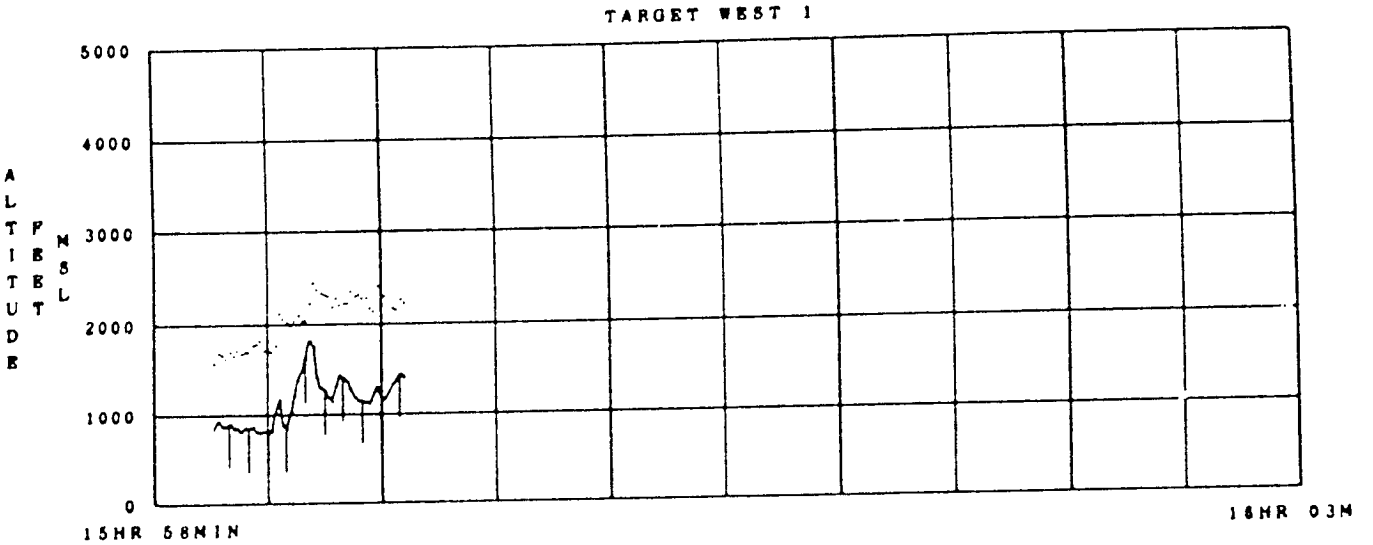
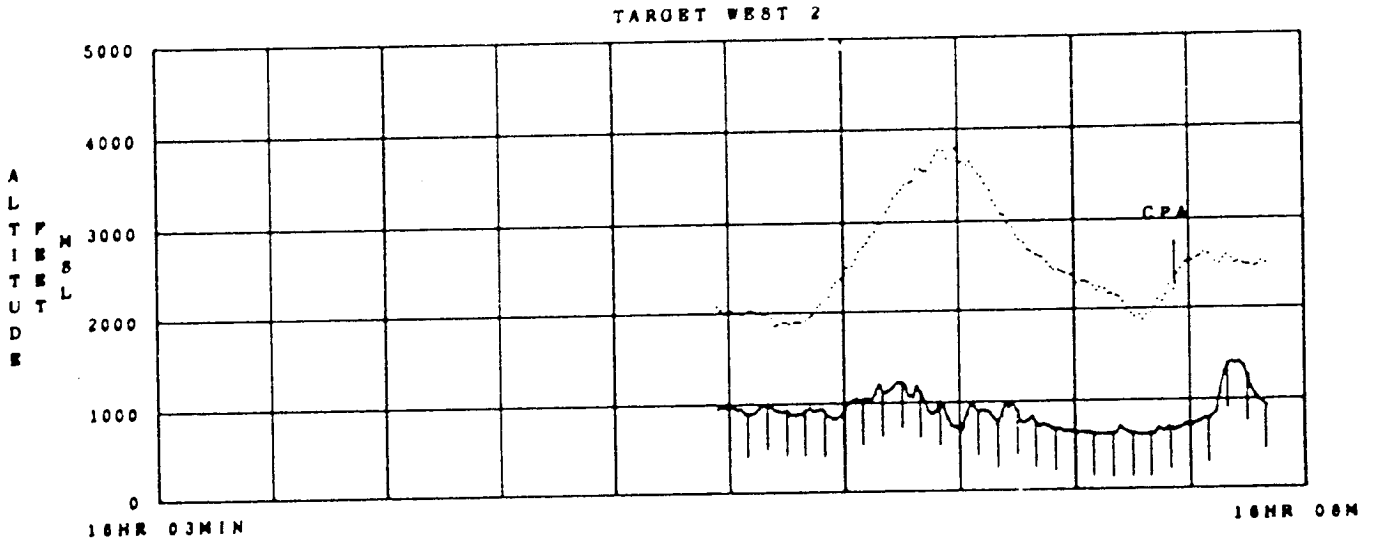


Figure 3-20 (U) Telemetered Data (Part 5 of 5)

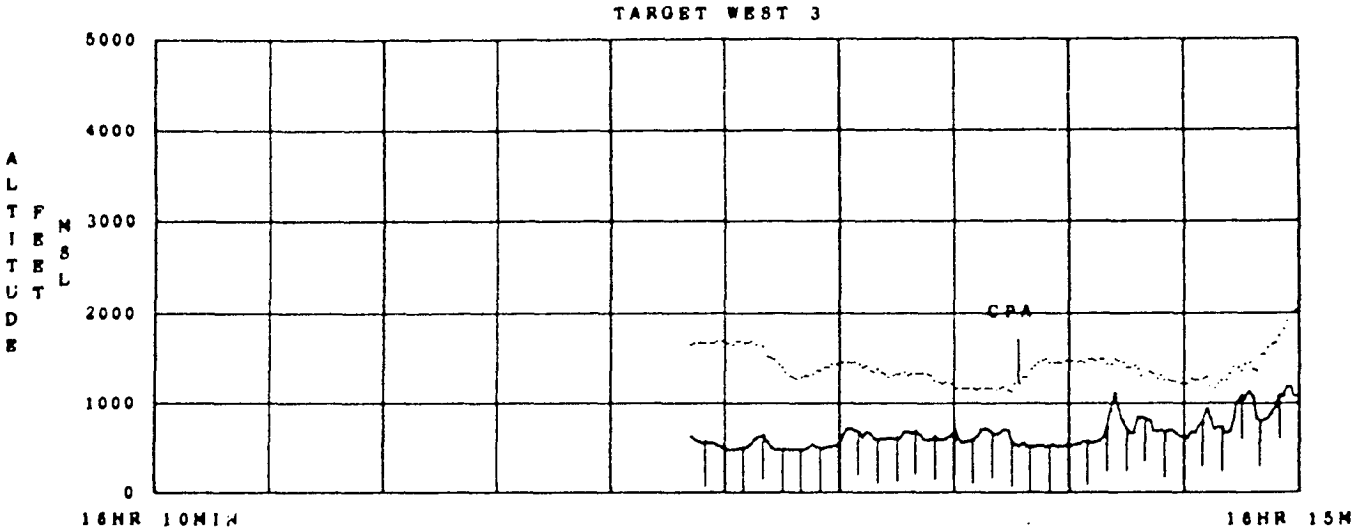


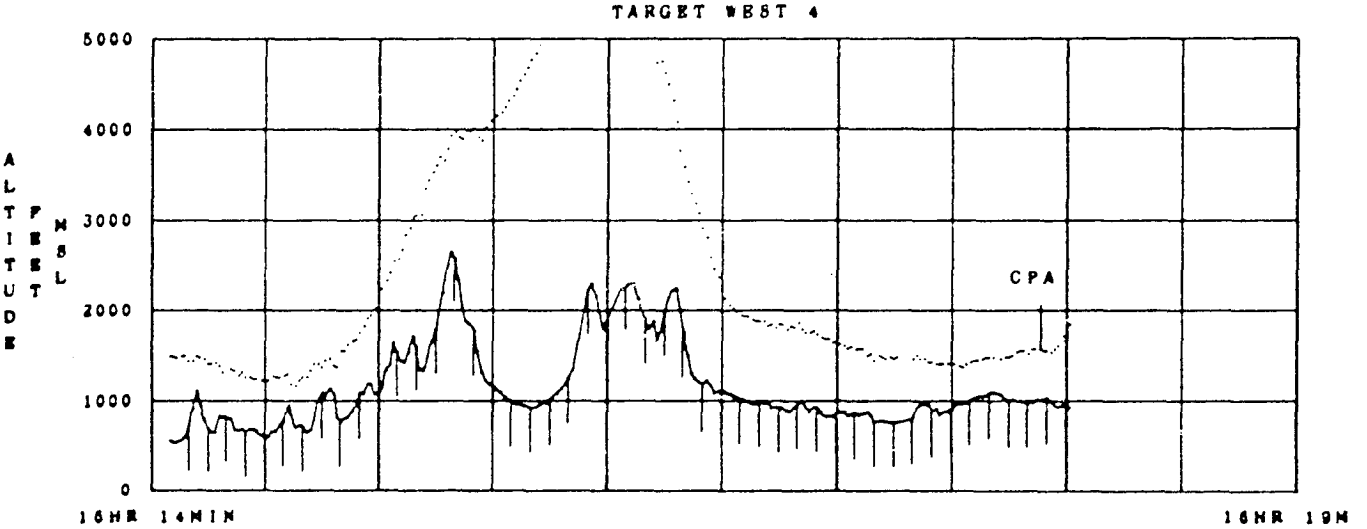


SORTIE NUMBER 292A

04092233
J9159

Figure 3-21 (U) Aircraft Altitude and Terrain Profile (Part 1 of 2)

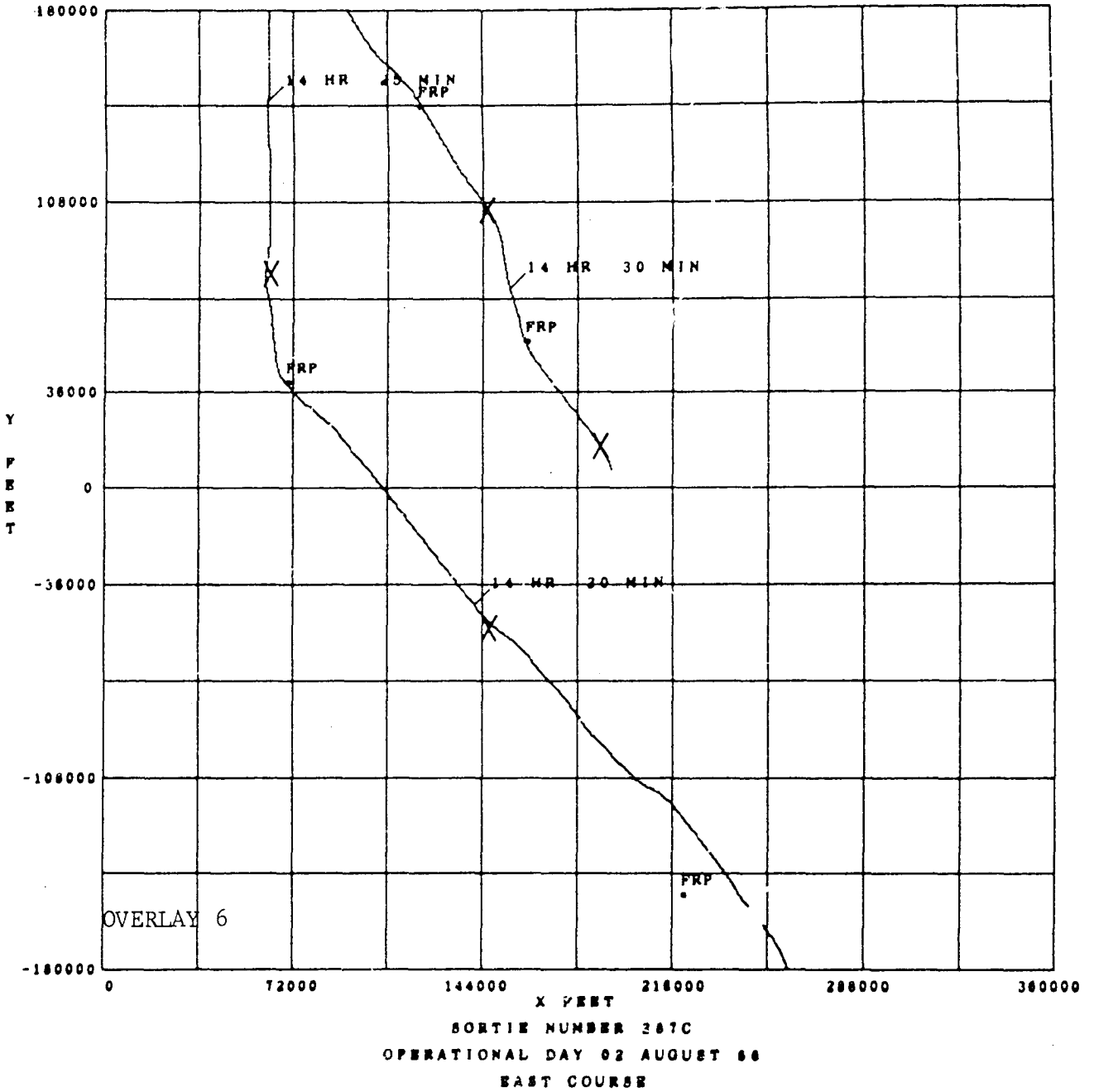




SORTIE NUMBER 292A

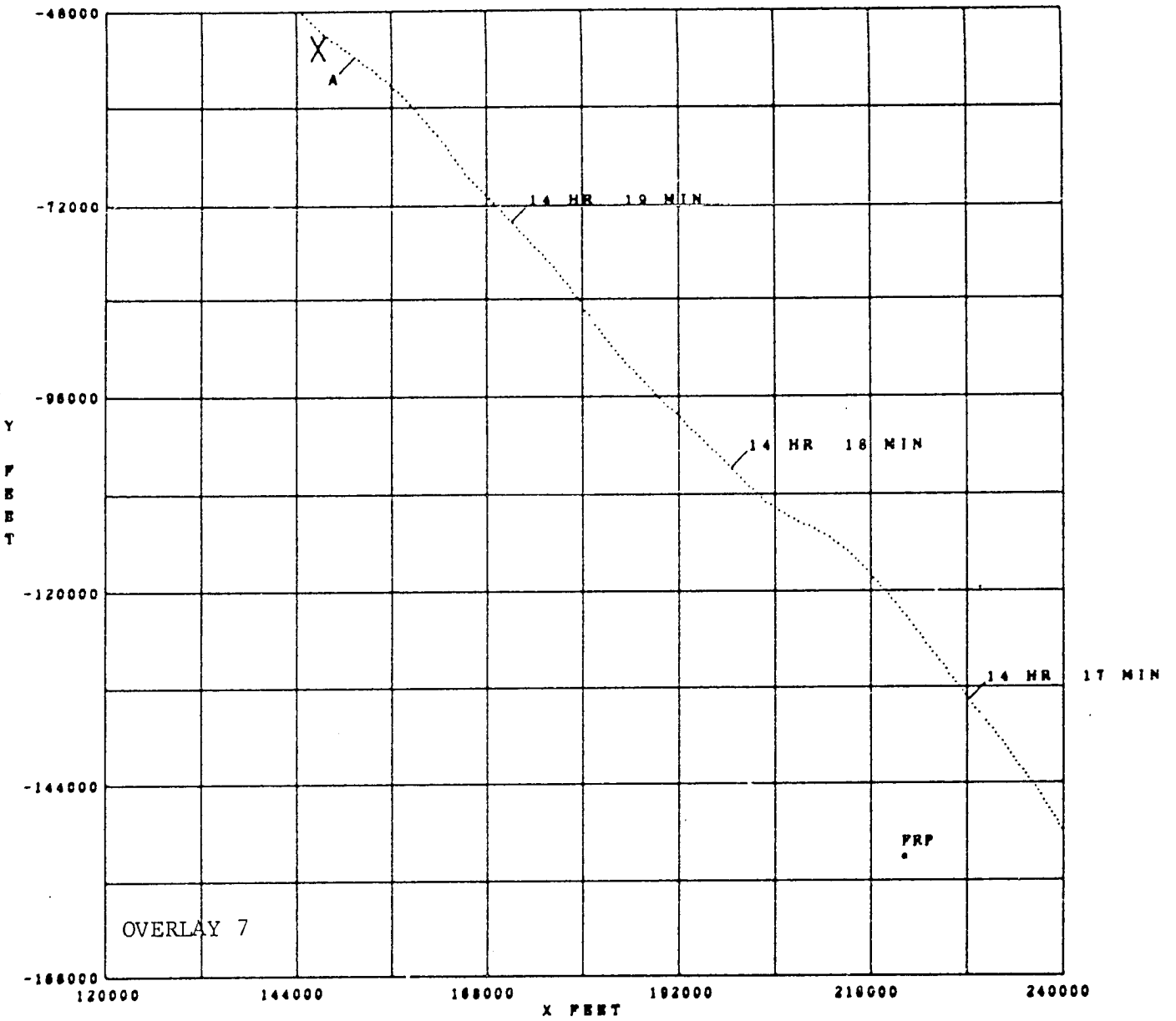
04092233
J9159

Figure 3-21 (U) Aircraft Altitude and Terrain Profile (Part 2 of 2)



04092230
J9159 119

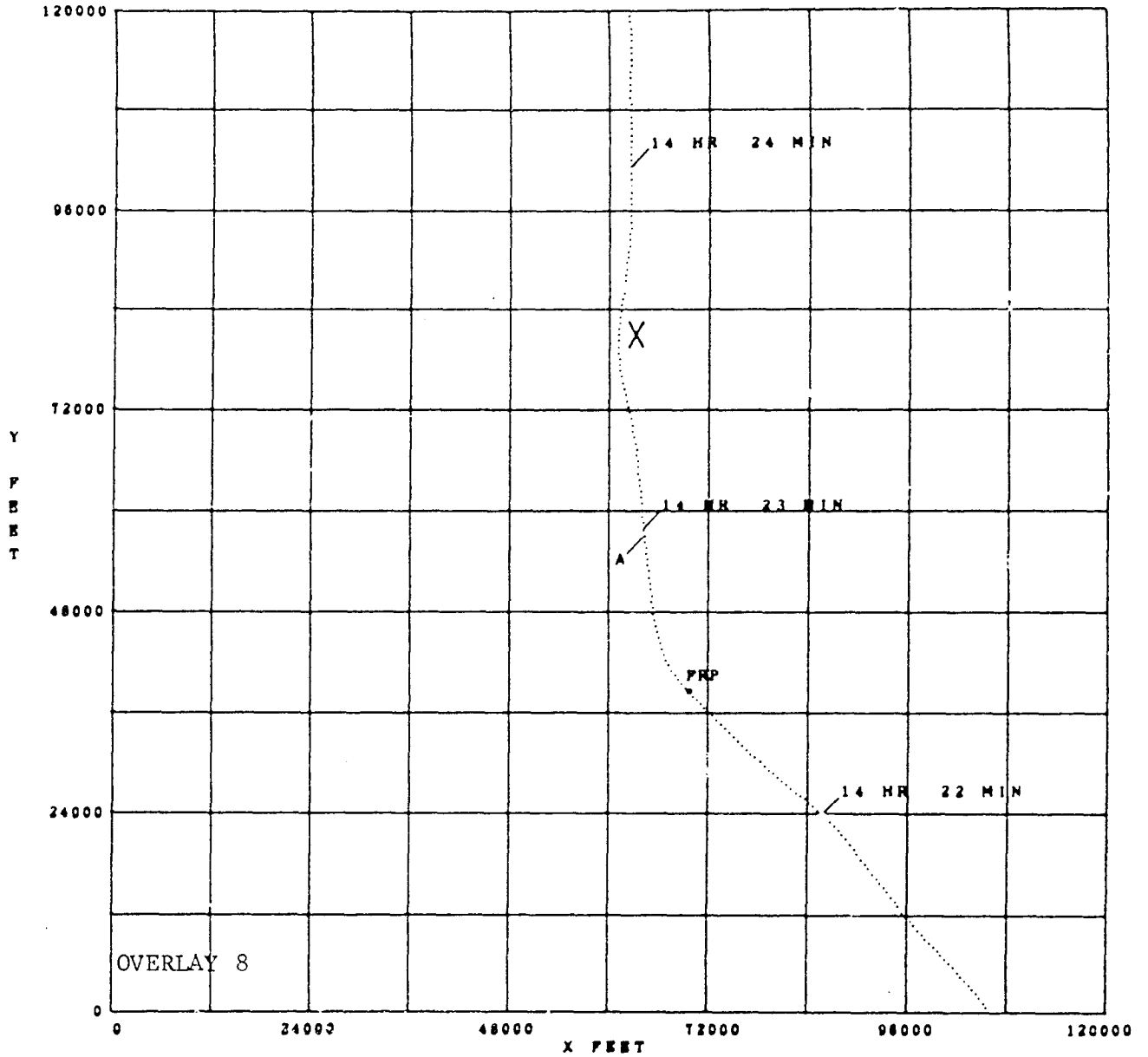
Figure 3-22 (U) Aircraft Position Data (Part 1 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 1887 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 287C
TARGET EAST 1

04092230
J9159 120

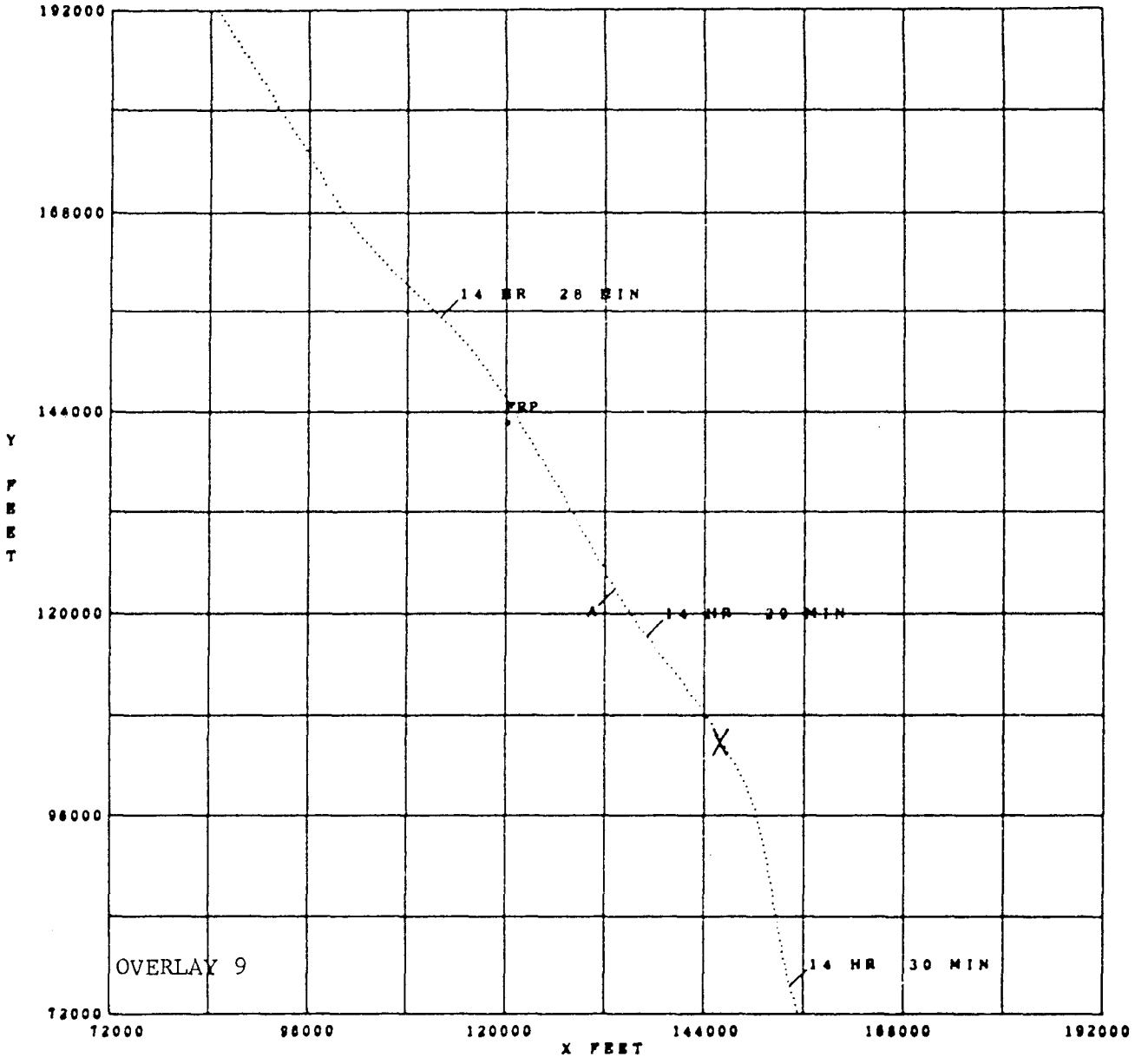
Figure 3-22 (U) Aircraft Position Data (Part 2 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 2032 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 287C
TARGET EAST 2

04092230
J9159 121

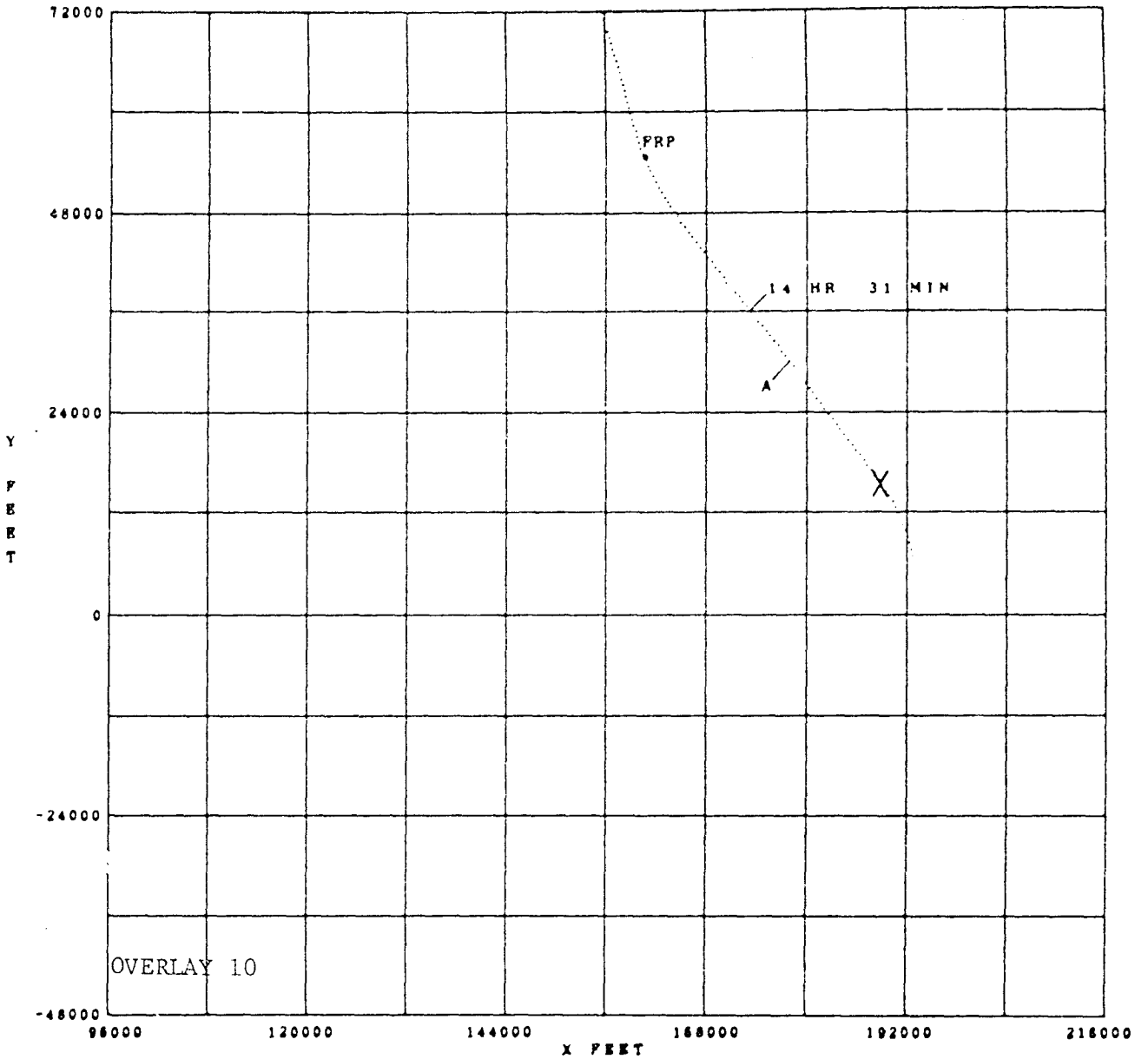
Figure 3-22 (U) Aircraft Position Data (Part 3 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 0 FEET
MINIMUM GROUND DISTANCE QUALIFIER = C-BAND
SORTIE NUMBER 287C
TARGET EAST 3

04092230
J9159 122

Figure 3-22 (U) Aircraft Position Data (Part 4 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 134 FEET
MINIMUM GROUND DISTANCE QUALIFIER = ONE
SORTIE NUMBER 287C
TARGET EAST 4

04092230
J9159 123

Figure 3-22 (U) Aircraft Position Data (Part 5 of 5)

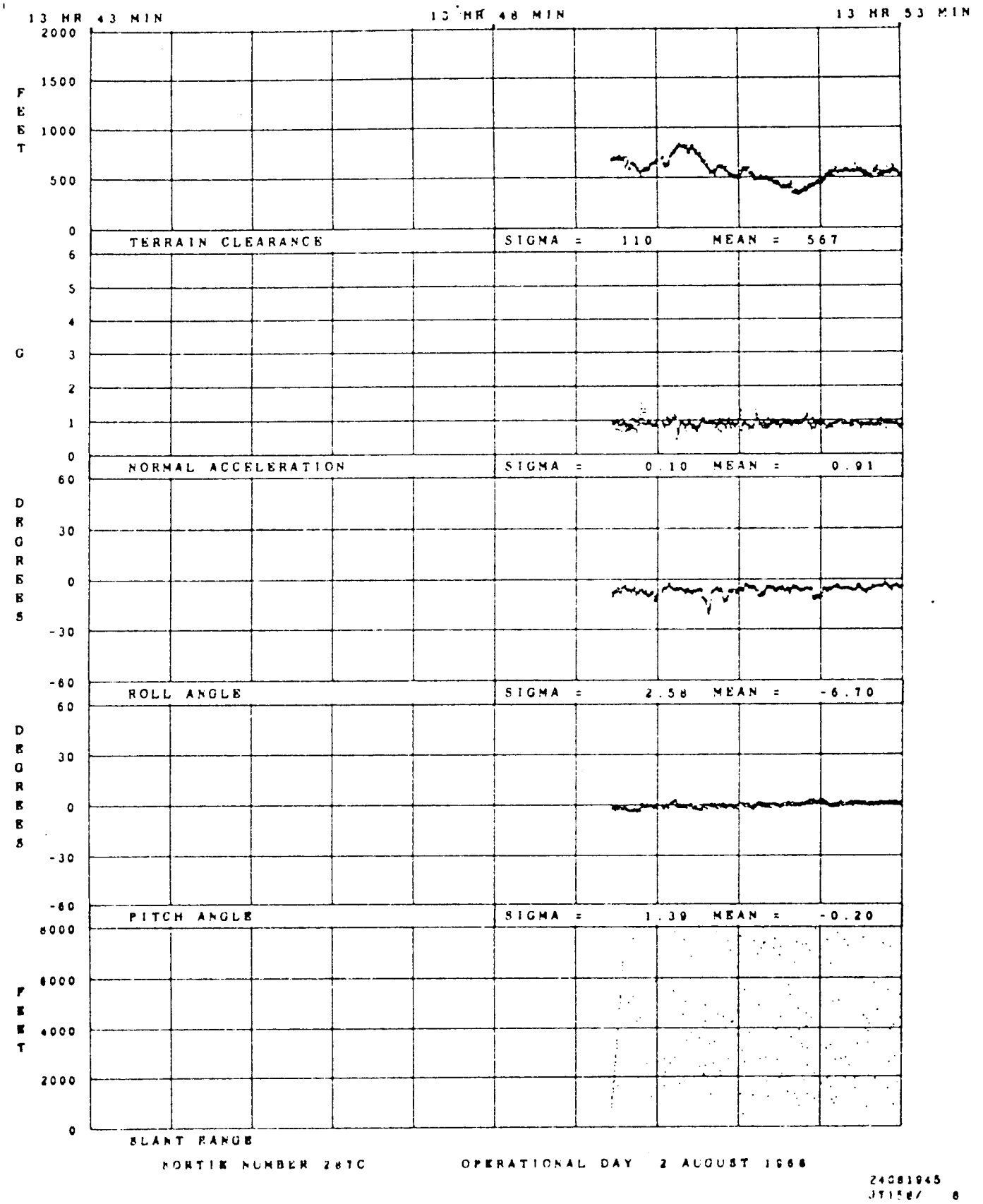


Figure 3-23 (U) Telemetered Data (Part 1 of 5)

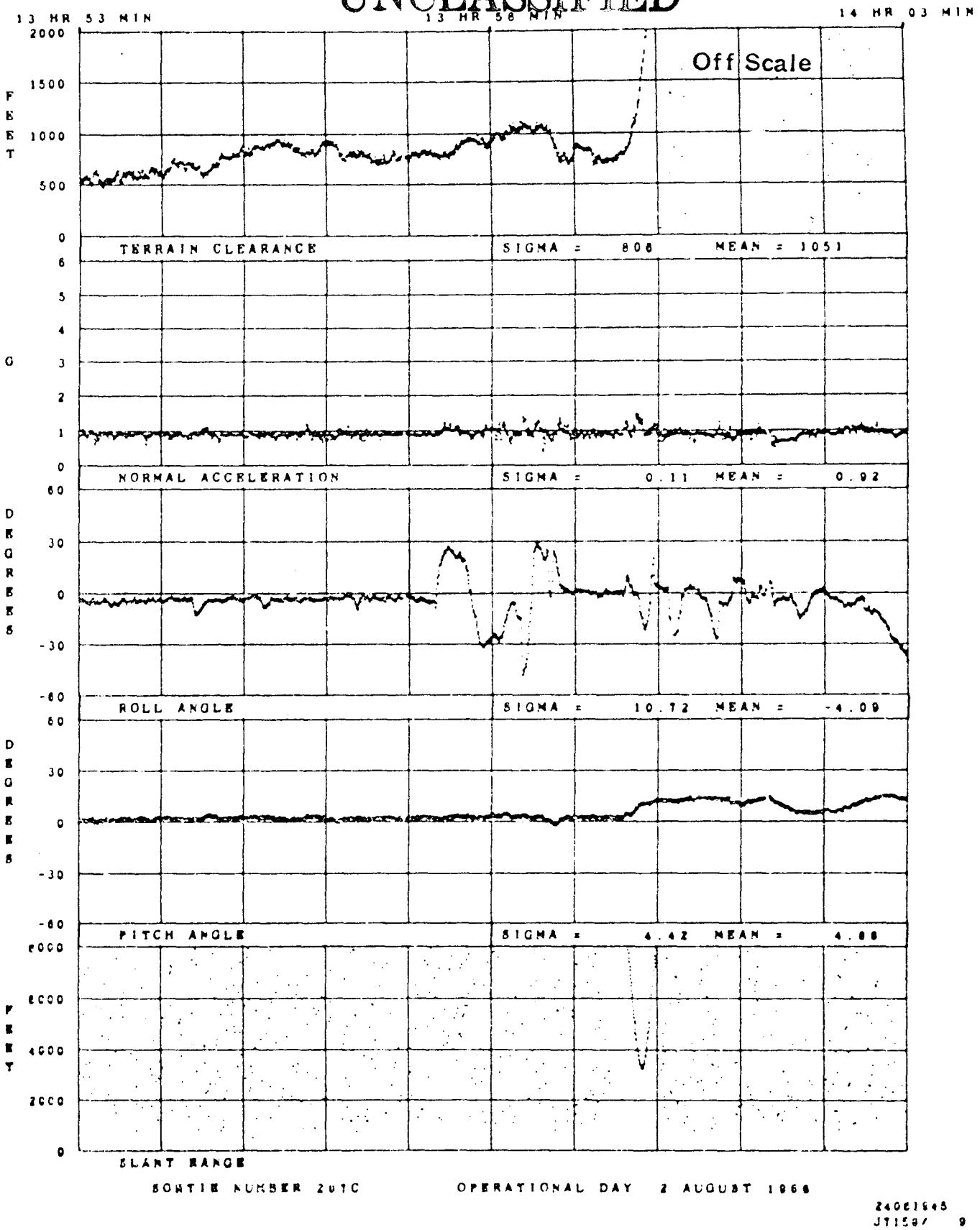


Figure 3-23 (U) Telemetered Data (Part 2 of 5)

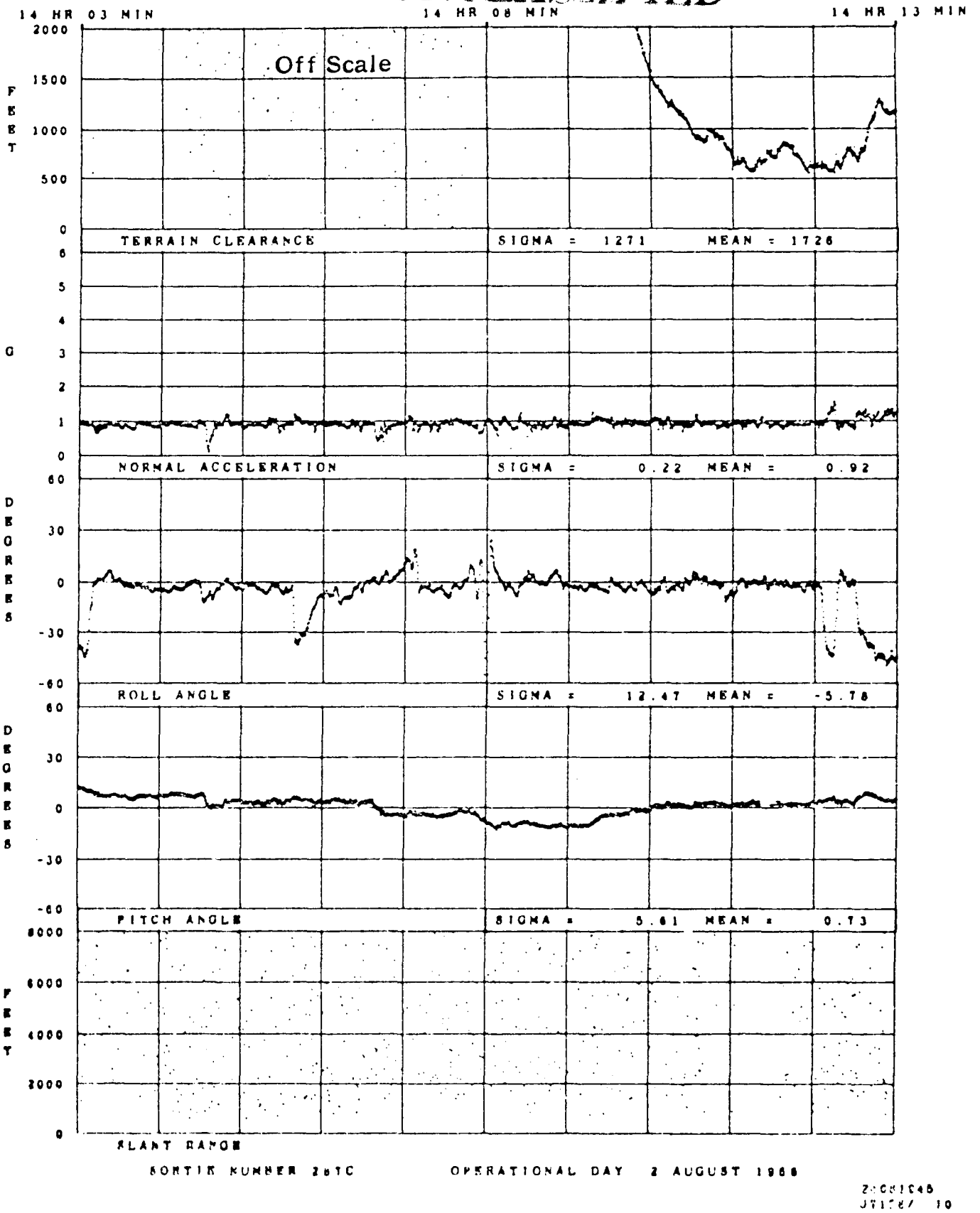


Figure 3-23 (U) Telemetered Data (Part 3 of 5)

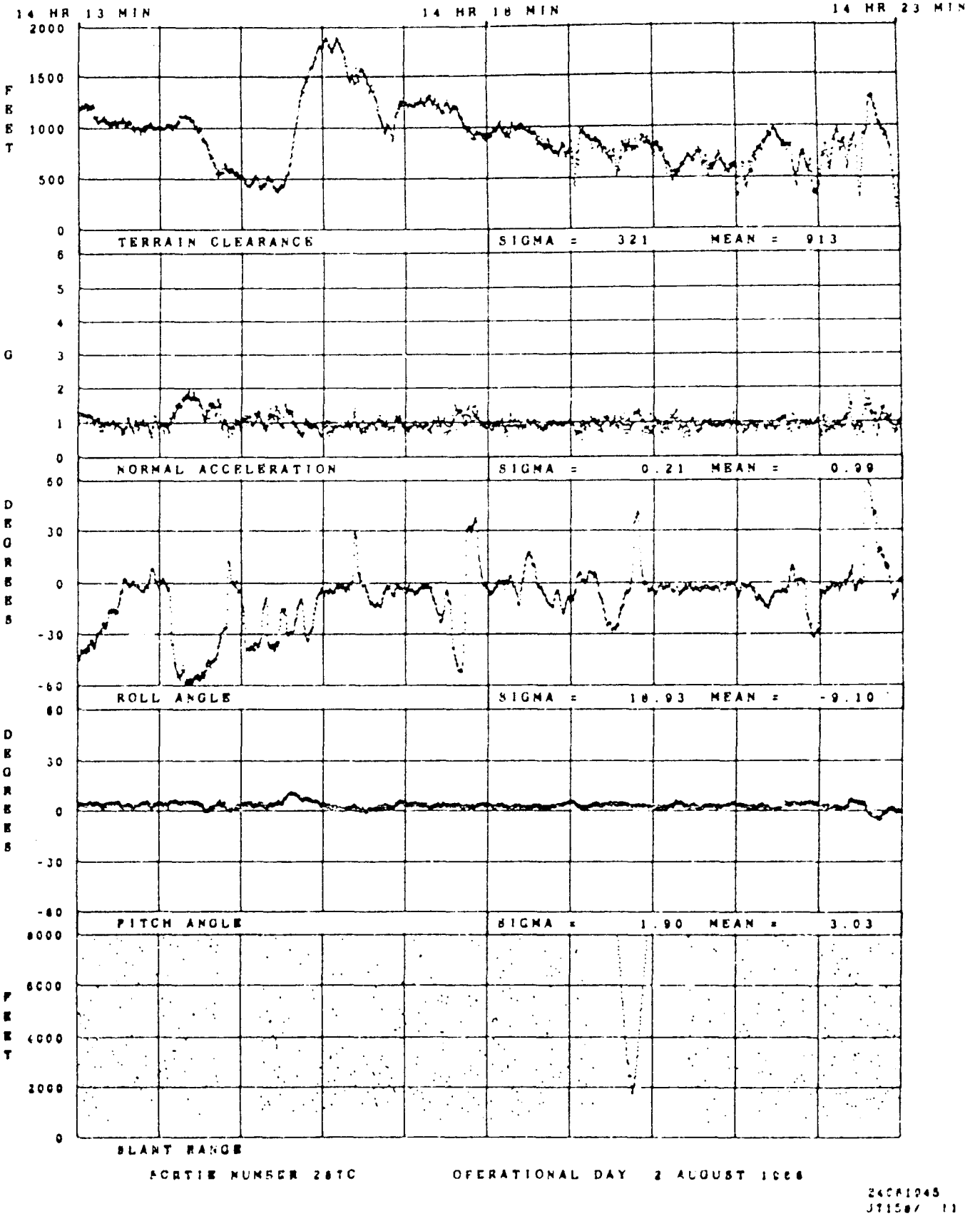


Figure 3-23 (U) Telemetered Data (Part 4 of 5)

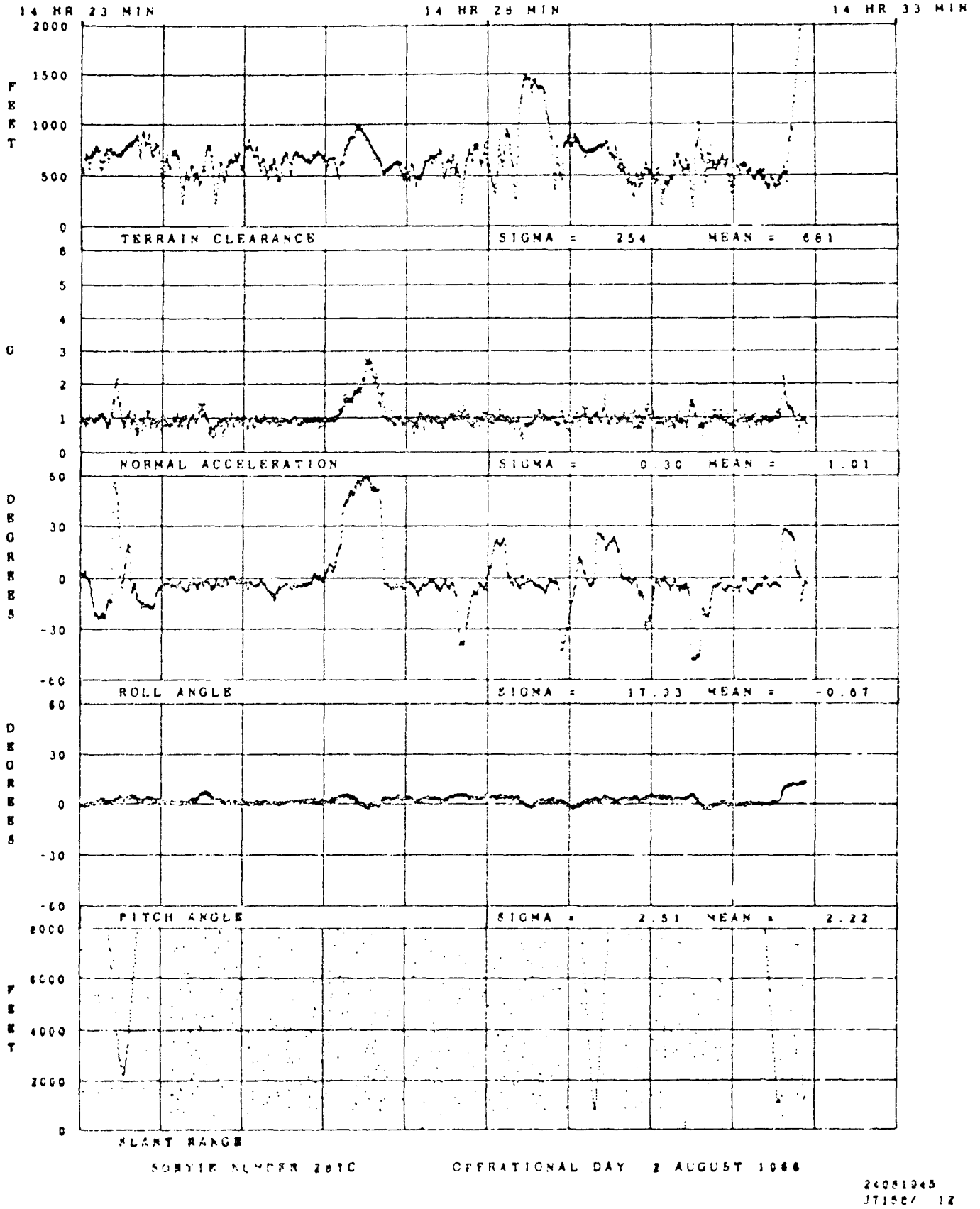
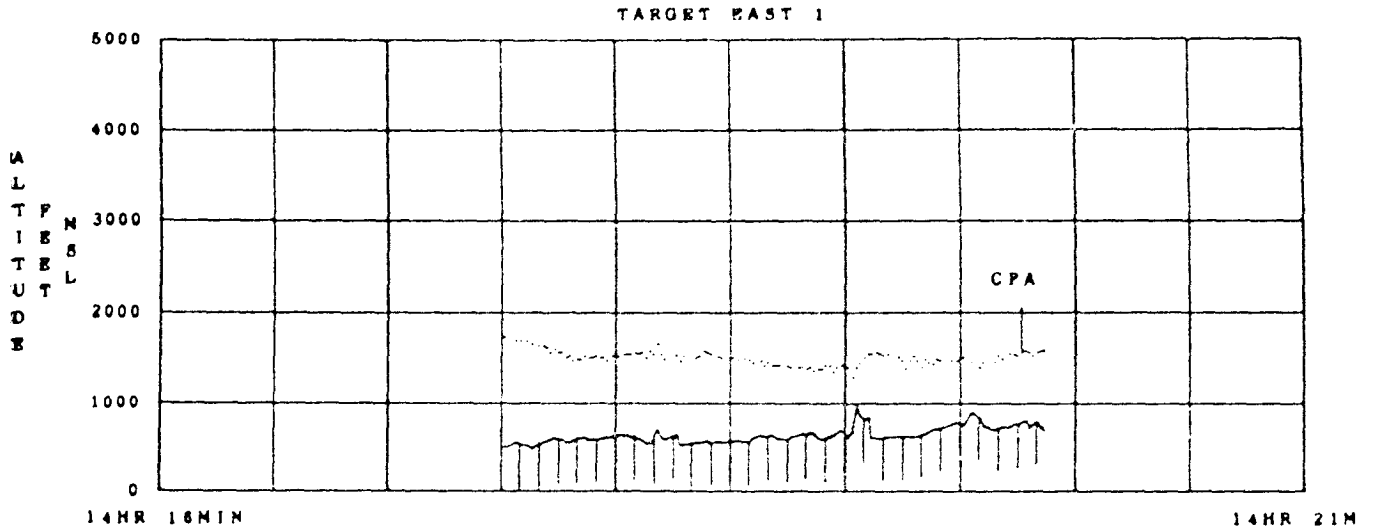
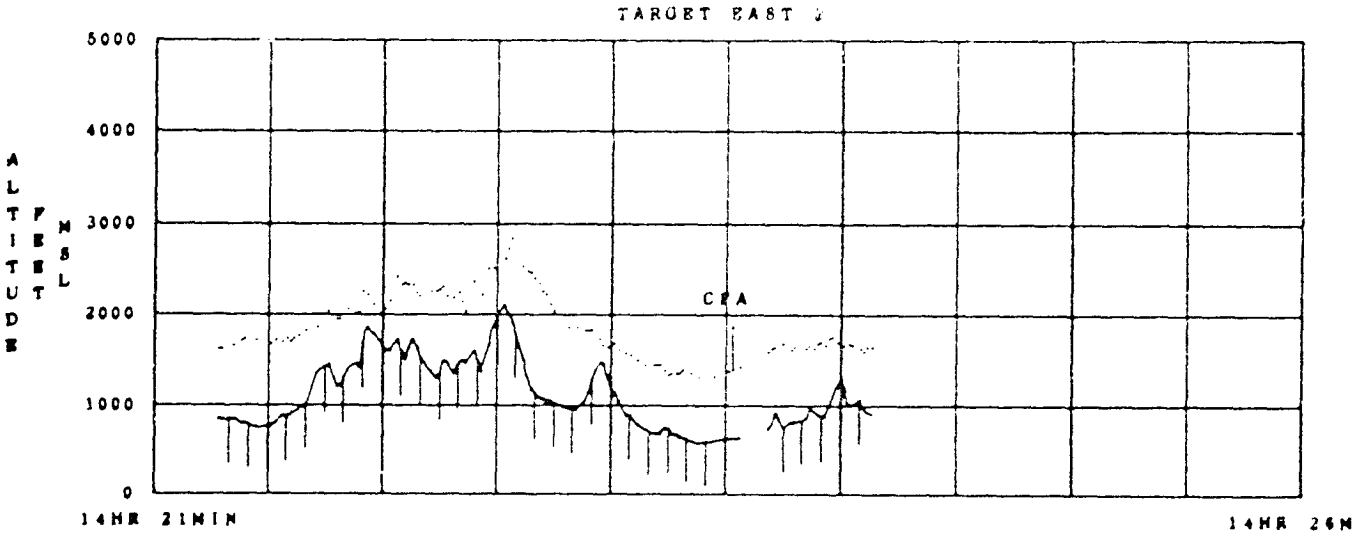


Figure 3-23 (U) Telemetered Data (Part 5 of 5)

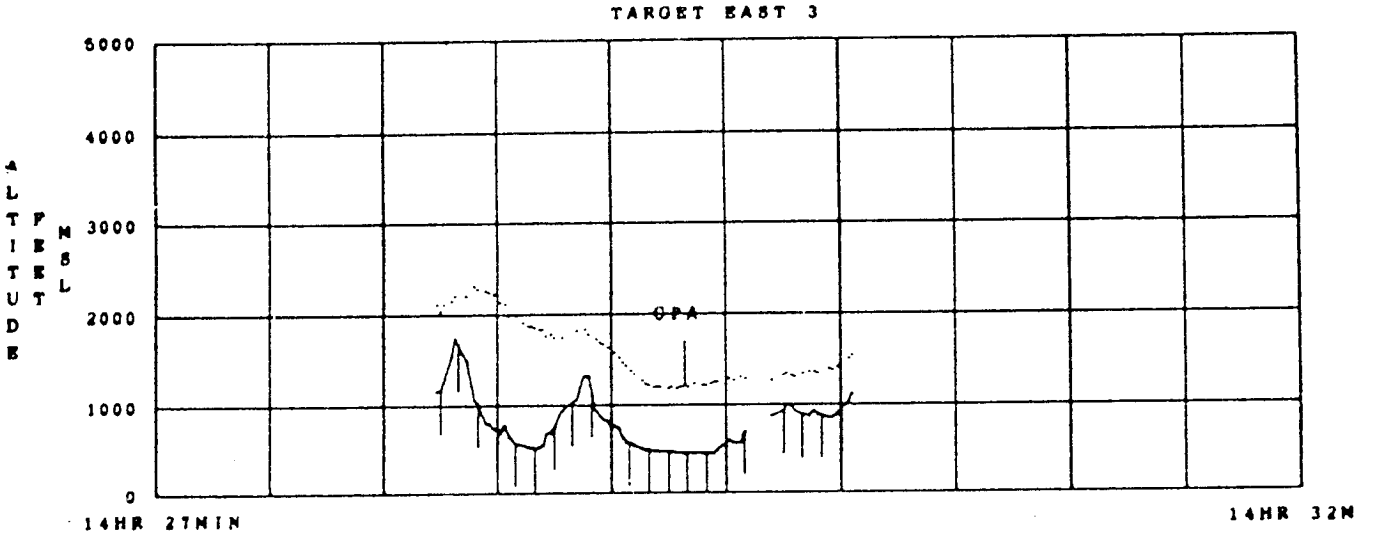


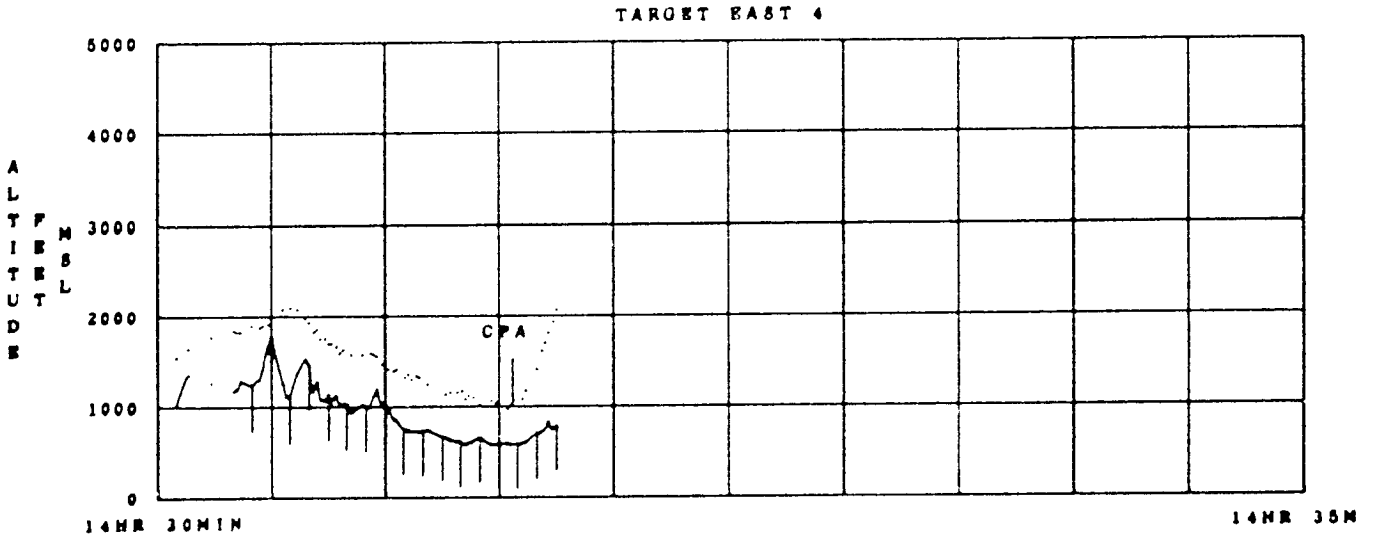


SORTIE NUMBER 28TC

04092230
J9159

Figure 3-24 (U) Aircraft Altitude and Terrain Profile (Part 1 of 2)

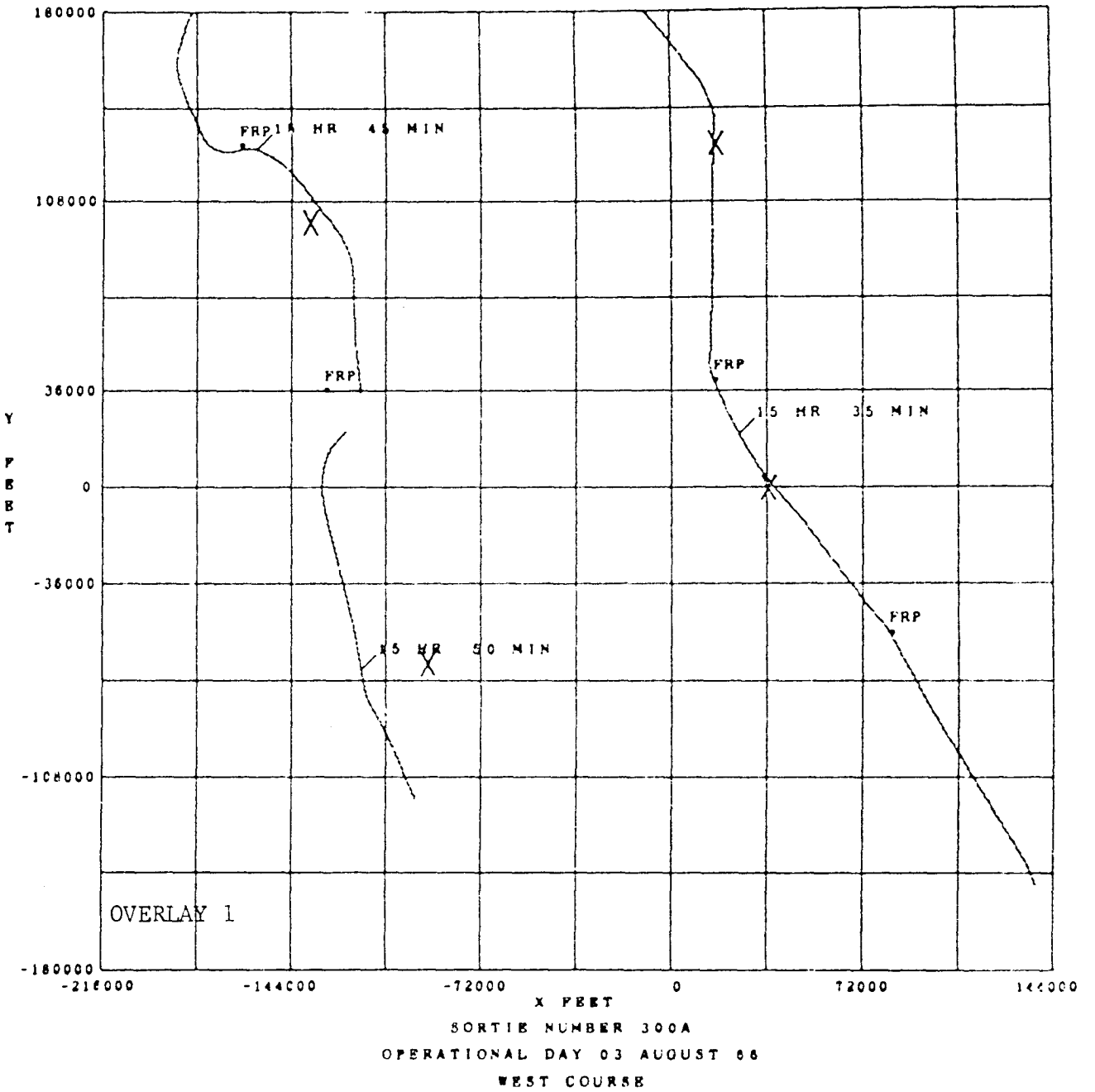




SORTIE NUMBER 287C

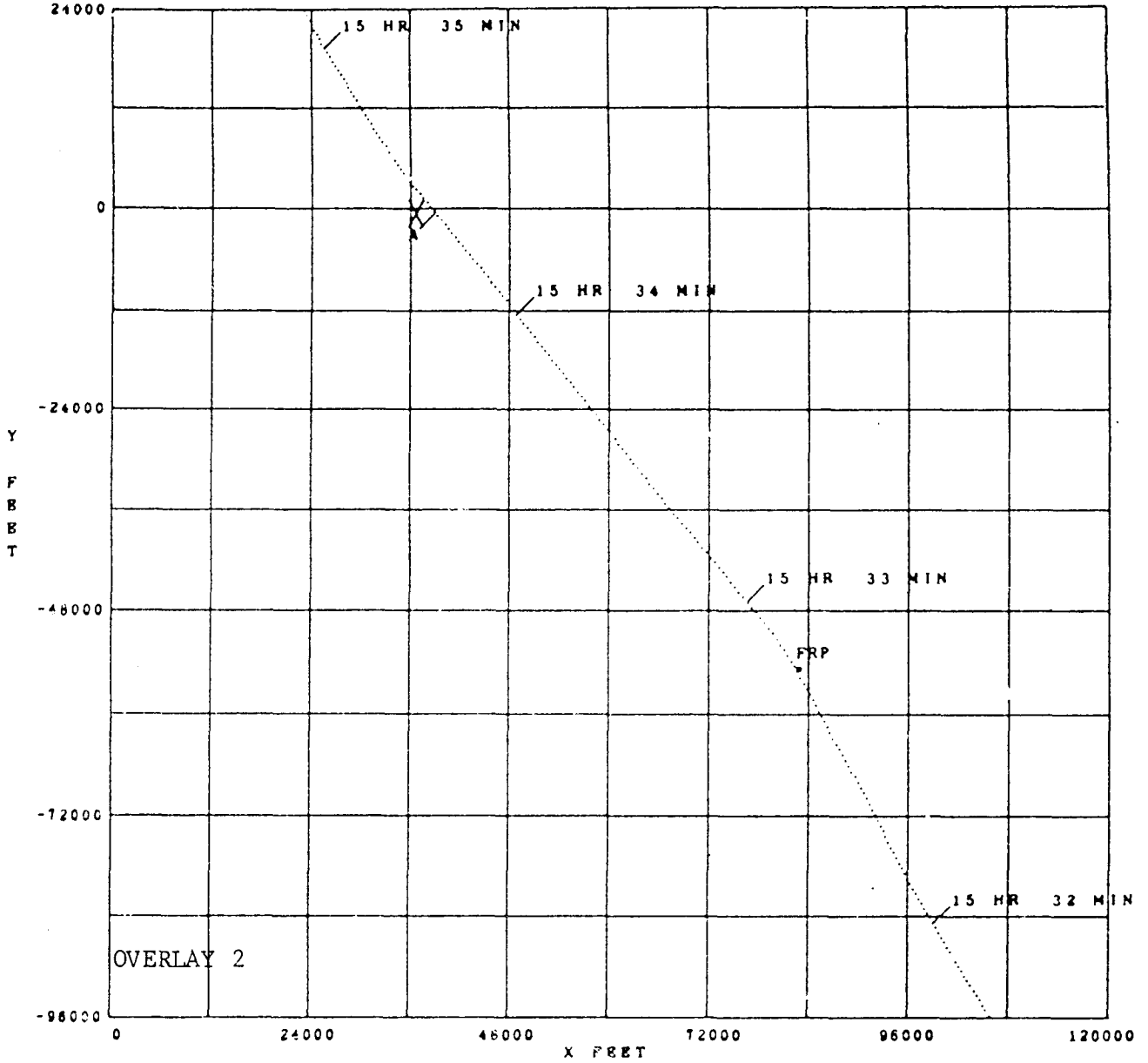
04092230
J9159

Figure 3-24 (U) Aircraft Altitude and Terrain Profile (Part 2 of 2)



04092302
J9156 7

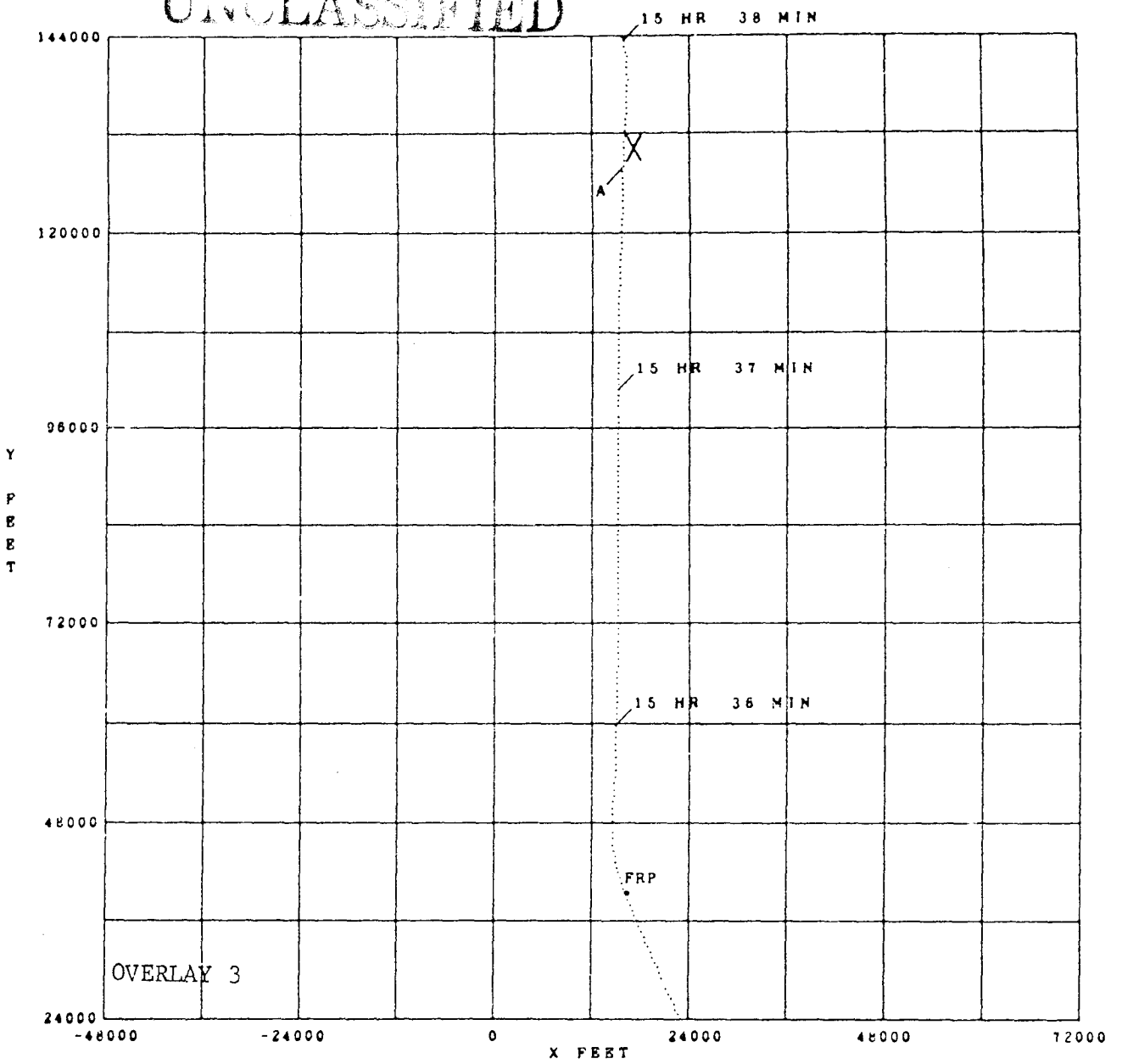
Figure 3-25 (U) Aircraft Position Data (Part 1 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 1927 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 300A
TARGET WEST 1

04093302
J9156 71

, Figure 3-25 (U) Aircraft Position Data (Part 2 of 5)

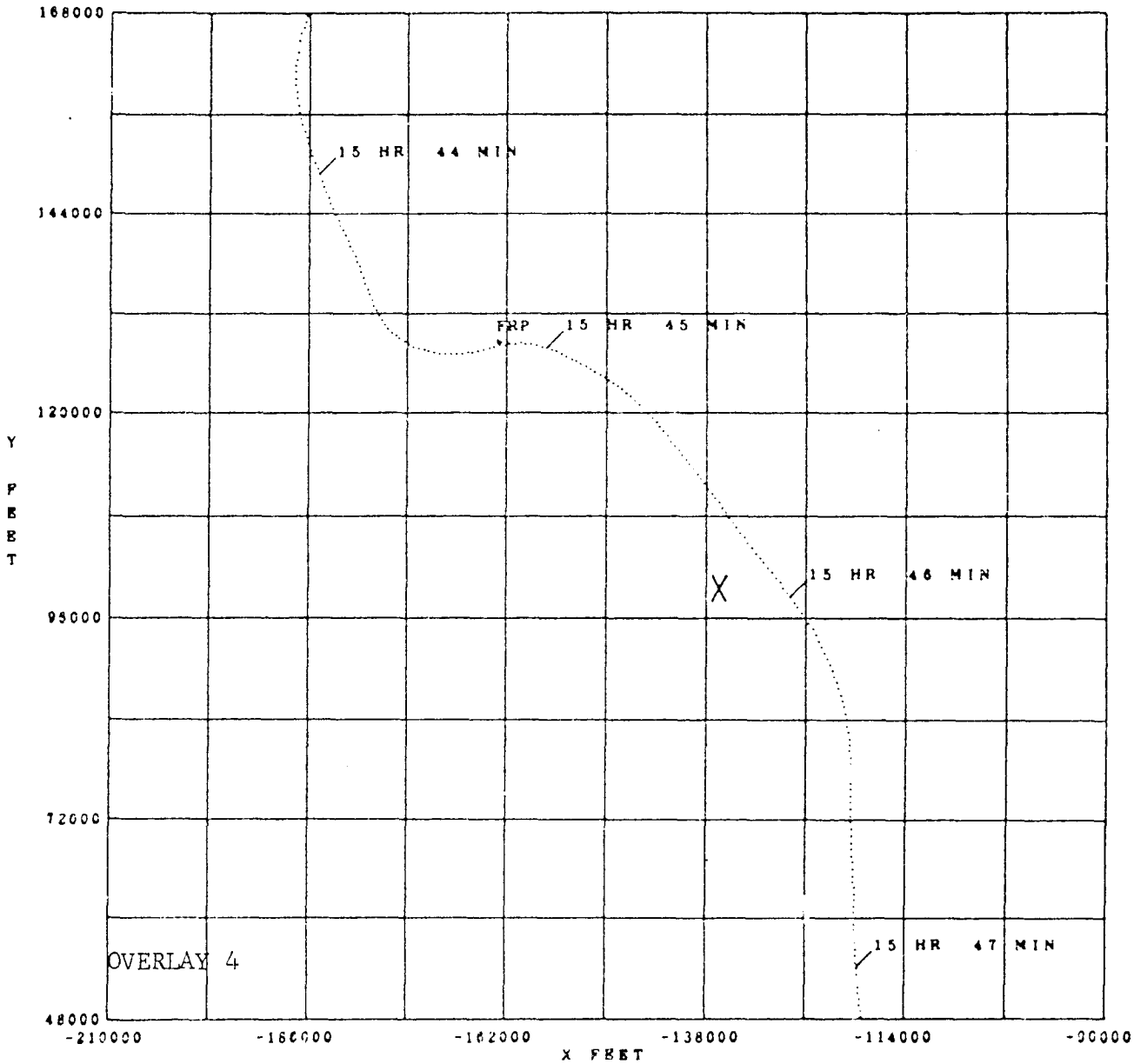


MINIMUM GROUND DISTANCE TO TARGET = 1346 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 300A
TARGET WEST 2

04092302
J9156 T

Figure 3-25 (U) Aircraft Position Data (Part 3 of 5)

UNCLASSIFIED

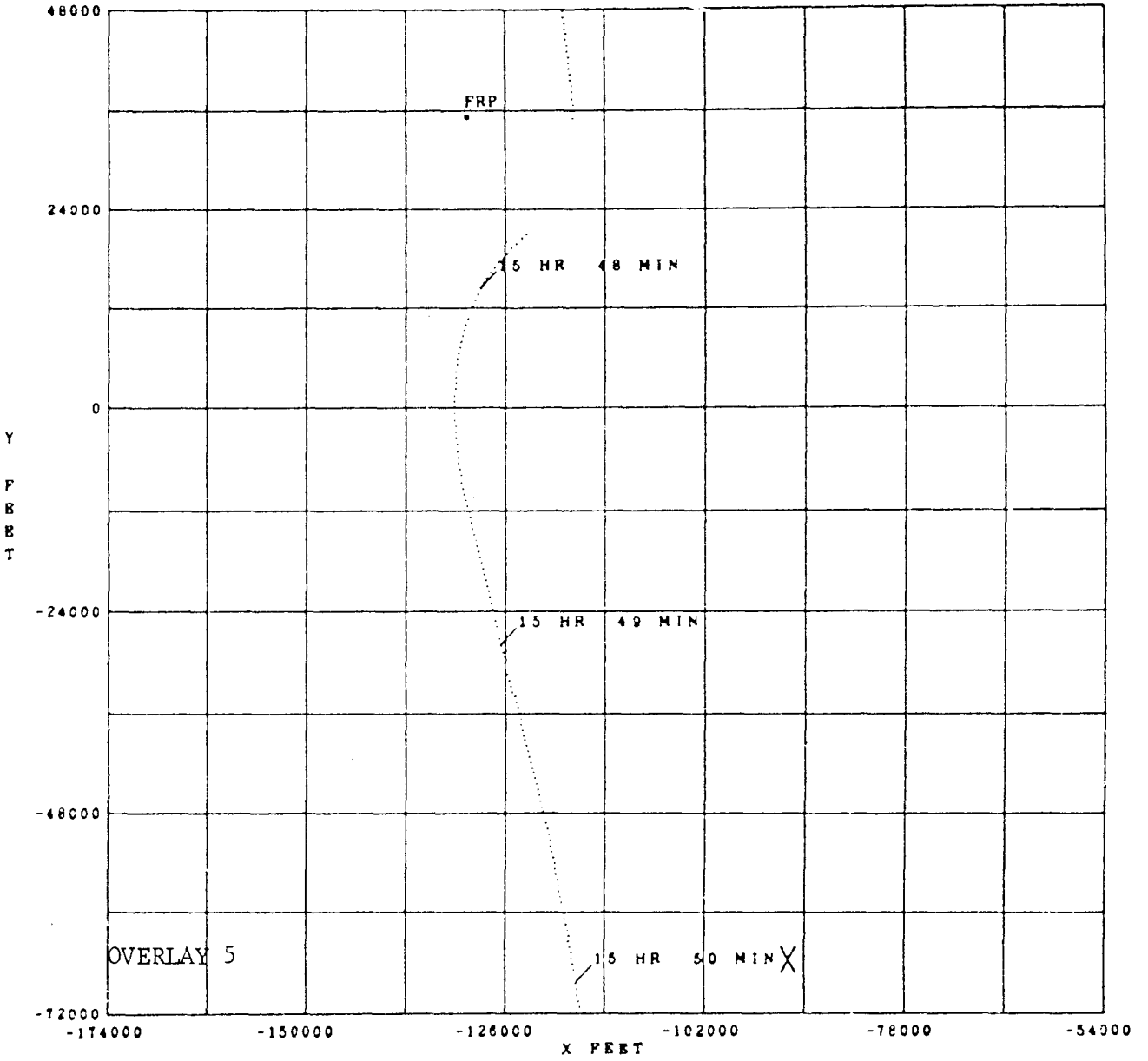


MINIMUM GROUND DISTANCE TO TARGET = 6060 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 300A
TARGET WEST 3

04092302
J9156 TE

Figure 3-25 (U) Aircraft Position Data (Part 4 of 5)

UNCLASSIFIED



MINIMUM GROUND DISTANCE TO TARGET = 25681 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 300A
TARGET WEST 4

04092302
J9156 7

Figure 3-25 (U) Aircraft Position Data (Part 5 of 5)

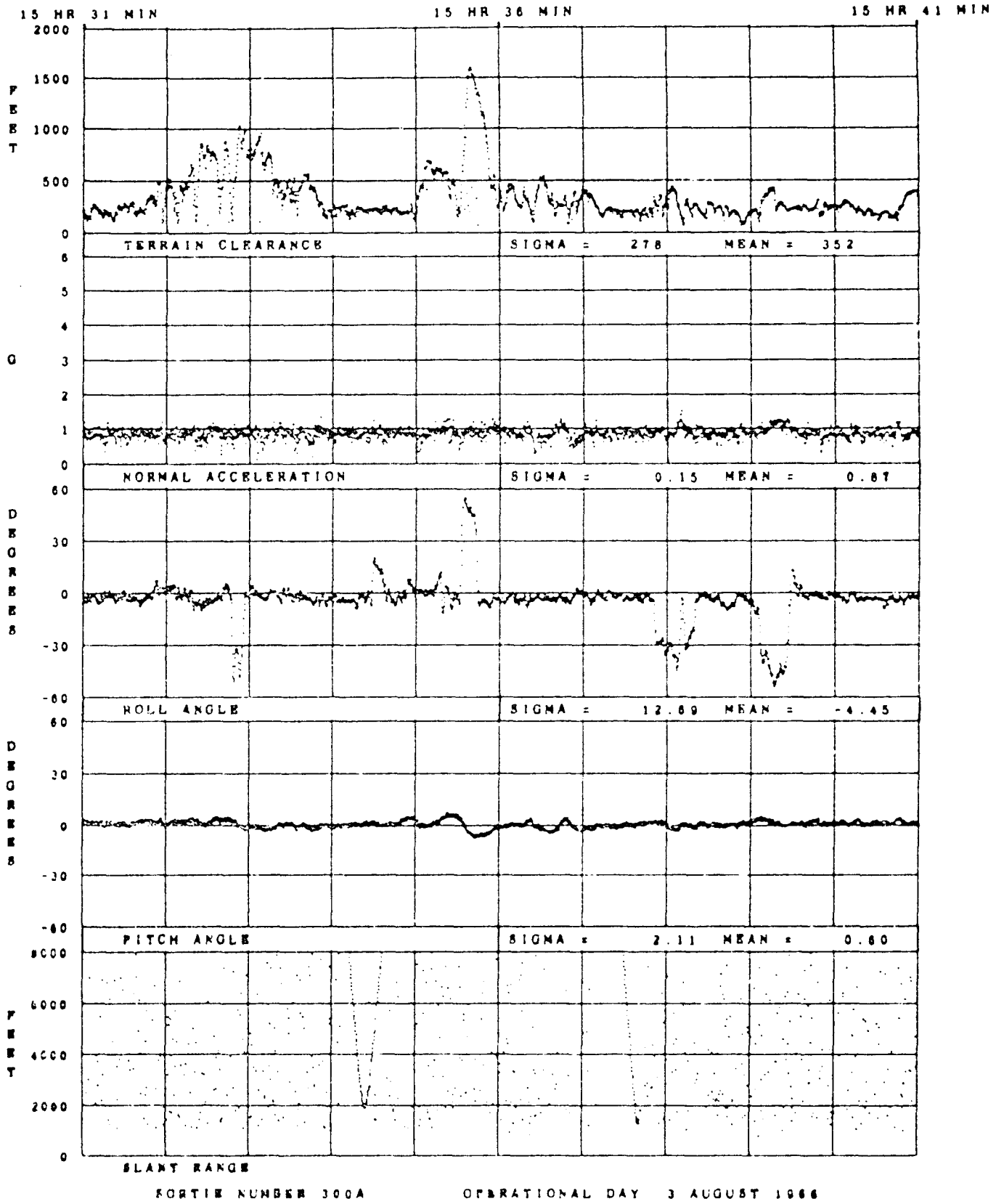


Figure 3-26 (U) Telemetered Data (Part 1 of 2)

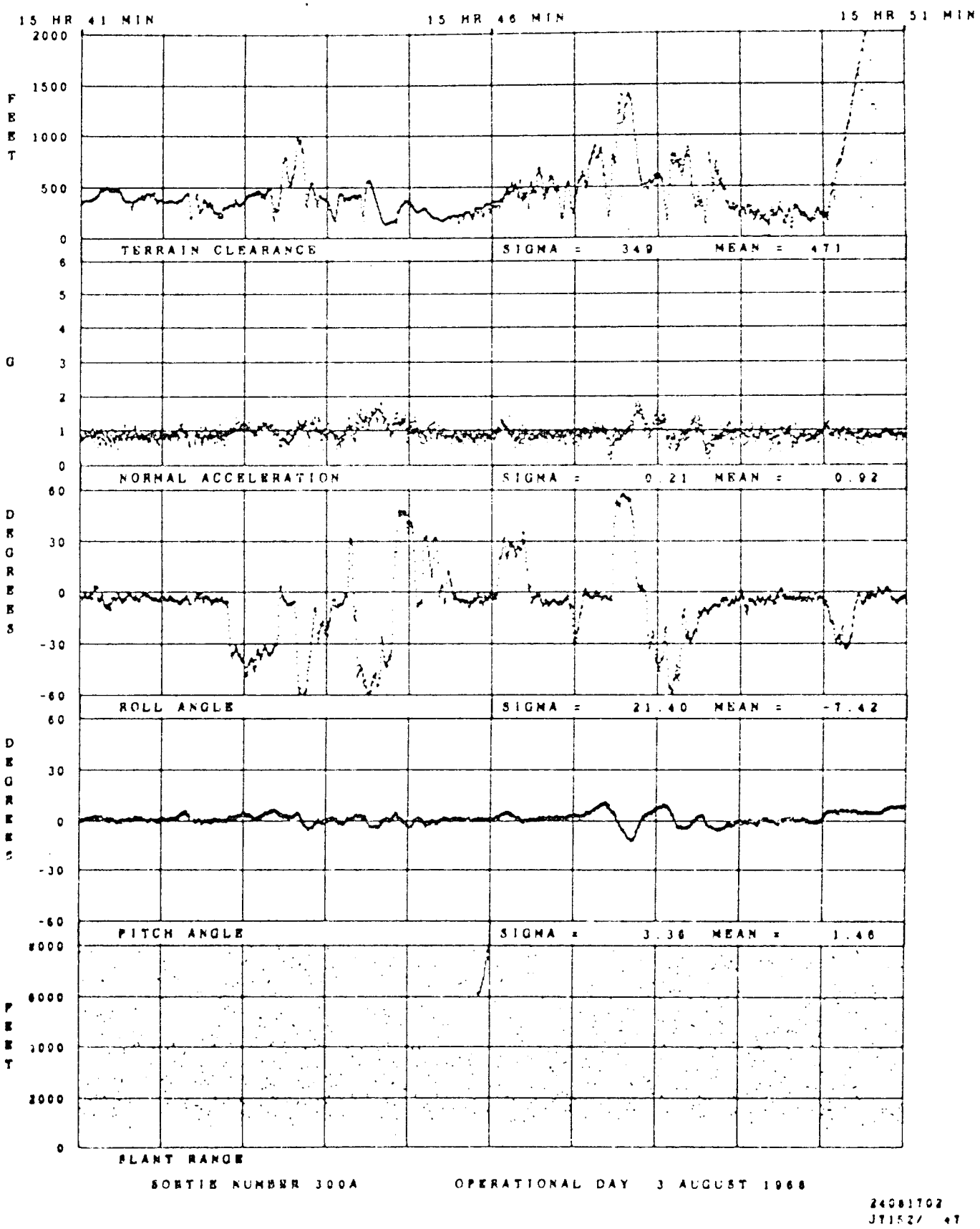
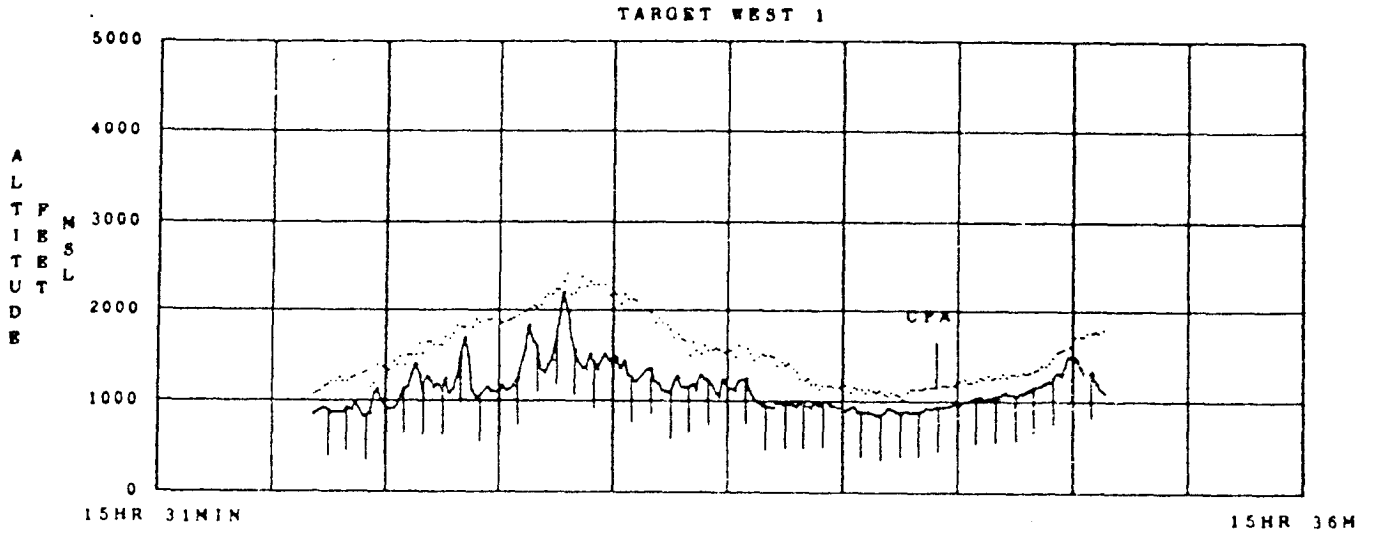
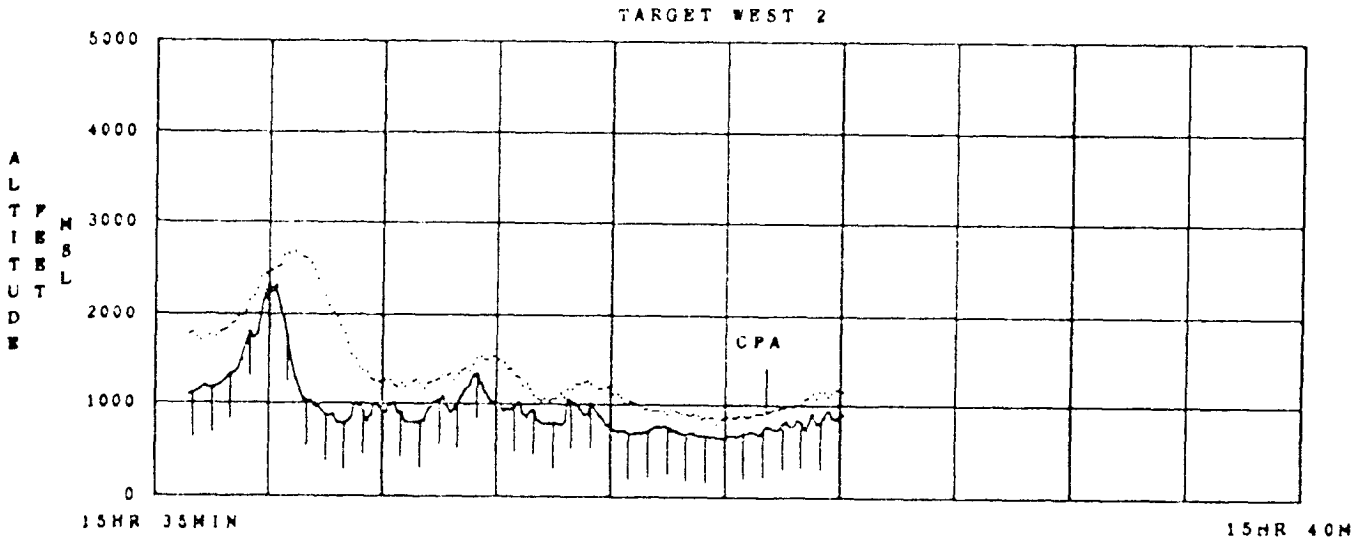


Figure 3-26 (U) Telemetered Data (Part 2 of 2)

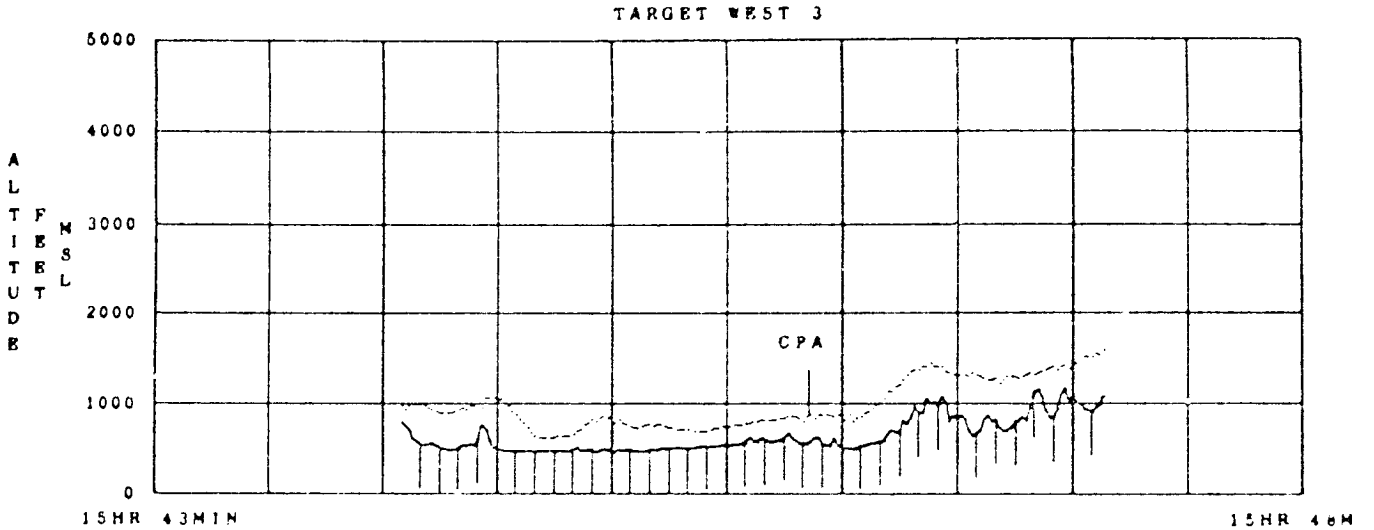


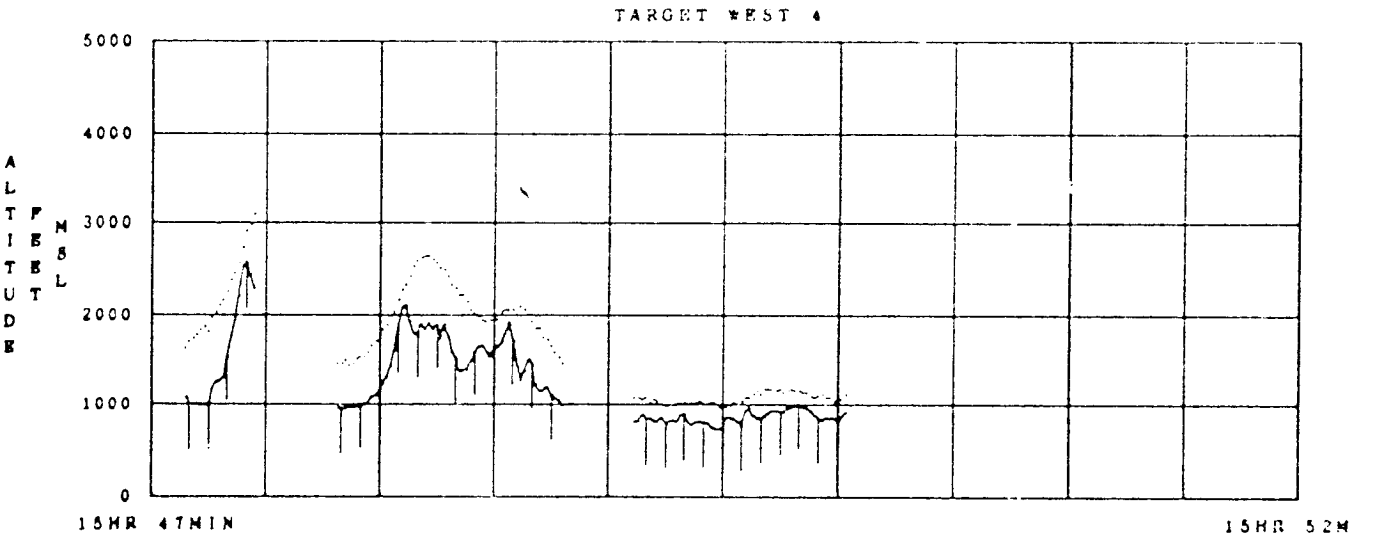


SORTIE NUMBER 300A

04092302
J9156

Figure 3-27 (U) Aircraft Altitude and Terrain Profile (Part 1 of 2)

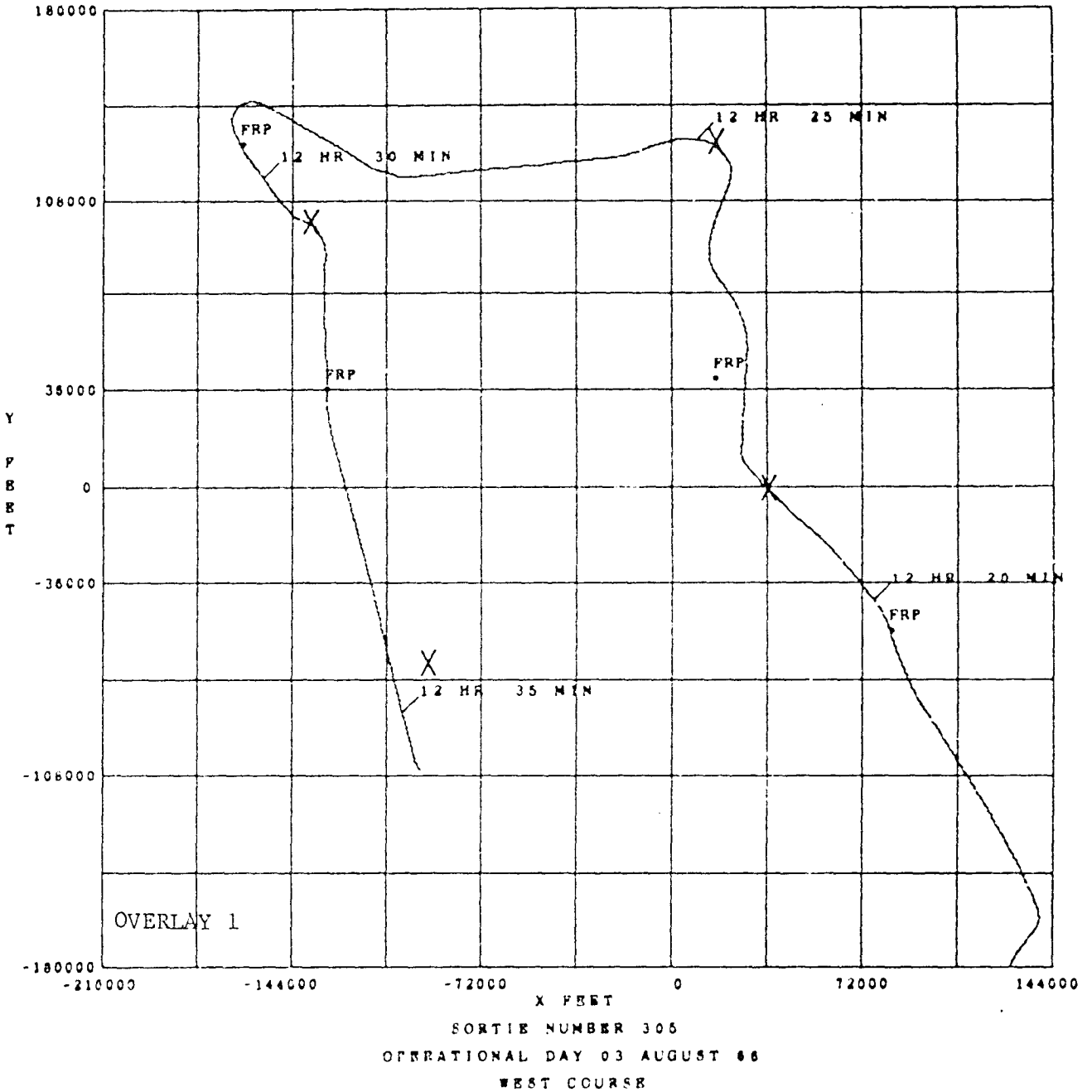




SORTIE NUMBER 300A

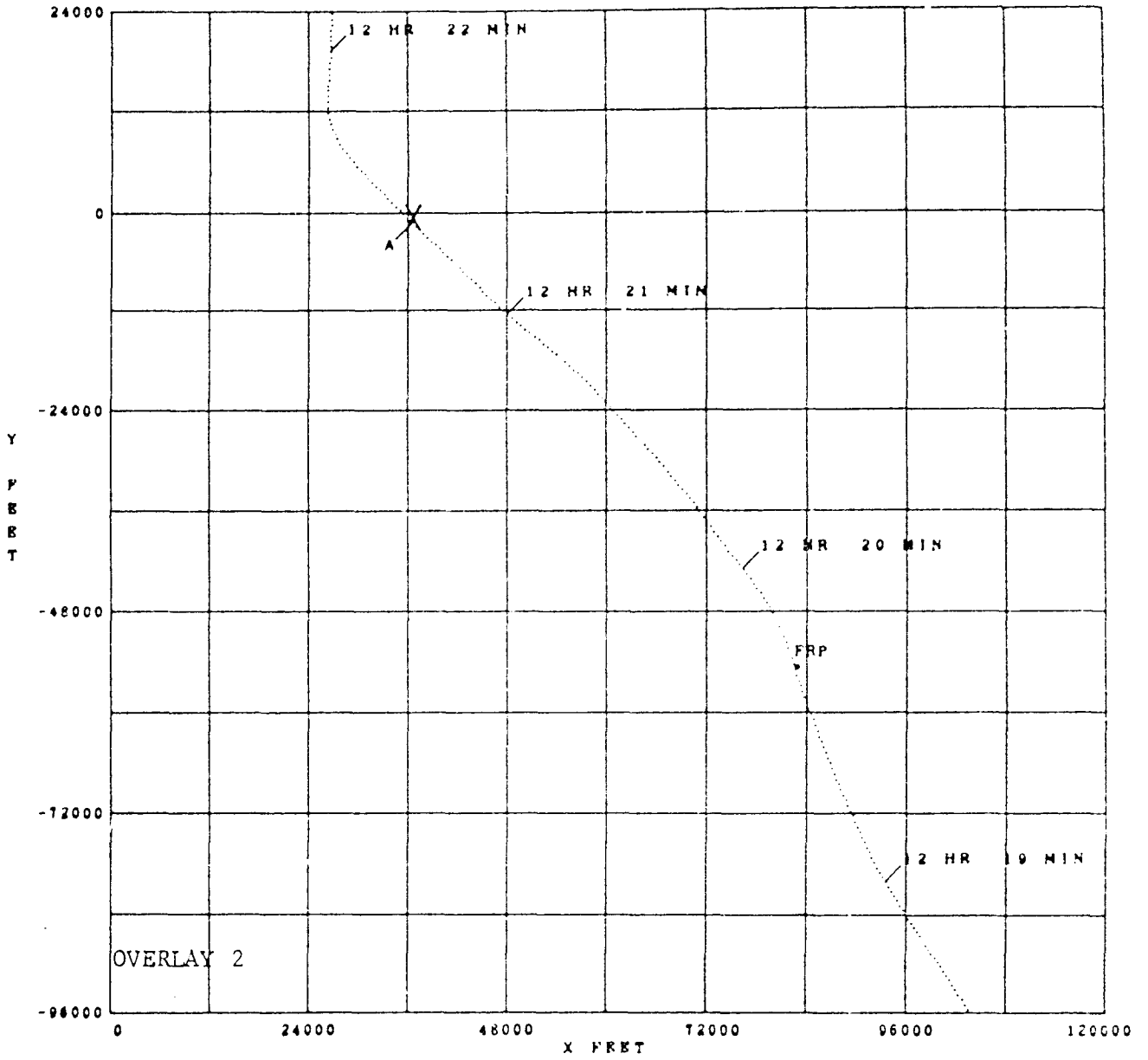
04092302
J9156

Figure 3-27 (U) Aircraft Altitude and Terrain Profile (Part 2 of 2)



04092302
J9156 67

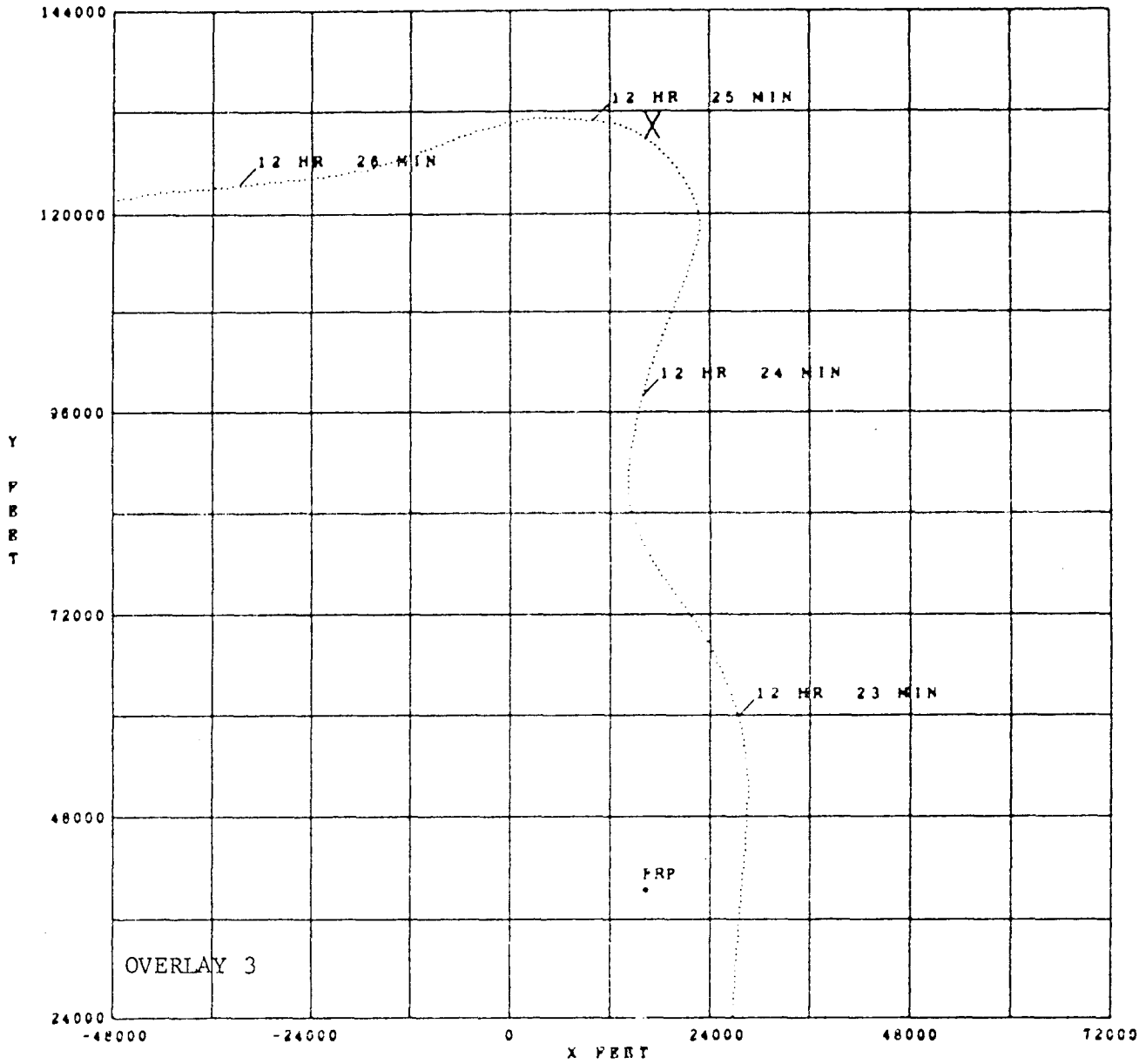
Figure 3-28 (U) Aircraft Position Data (Part 1 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 472 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 305
TARGET WEST 1

04092302
J9156 61

Figure 3-28 (U) Aircraft Position Data (Part 2 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 1693 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 305
TARGET WEST 2

04092302
J9156 69

Figure 3-28 (U) Aircraft Position Data (Part 3 of 5)

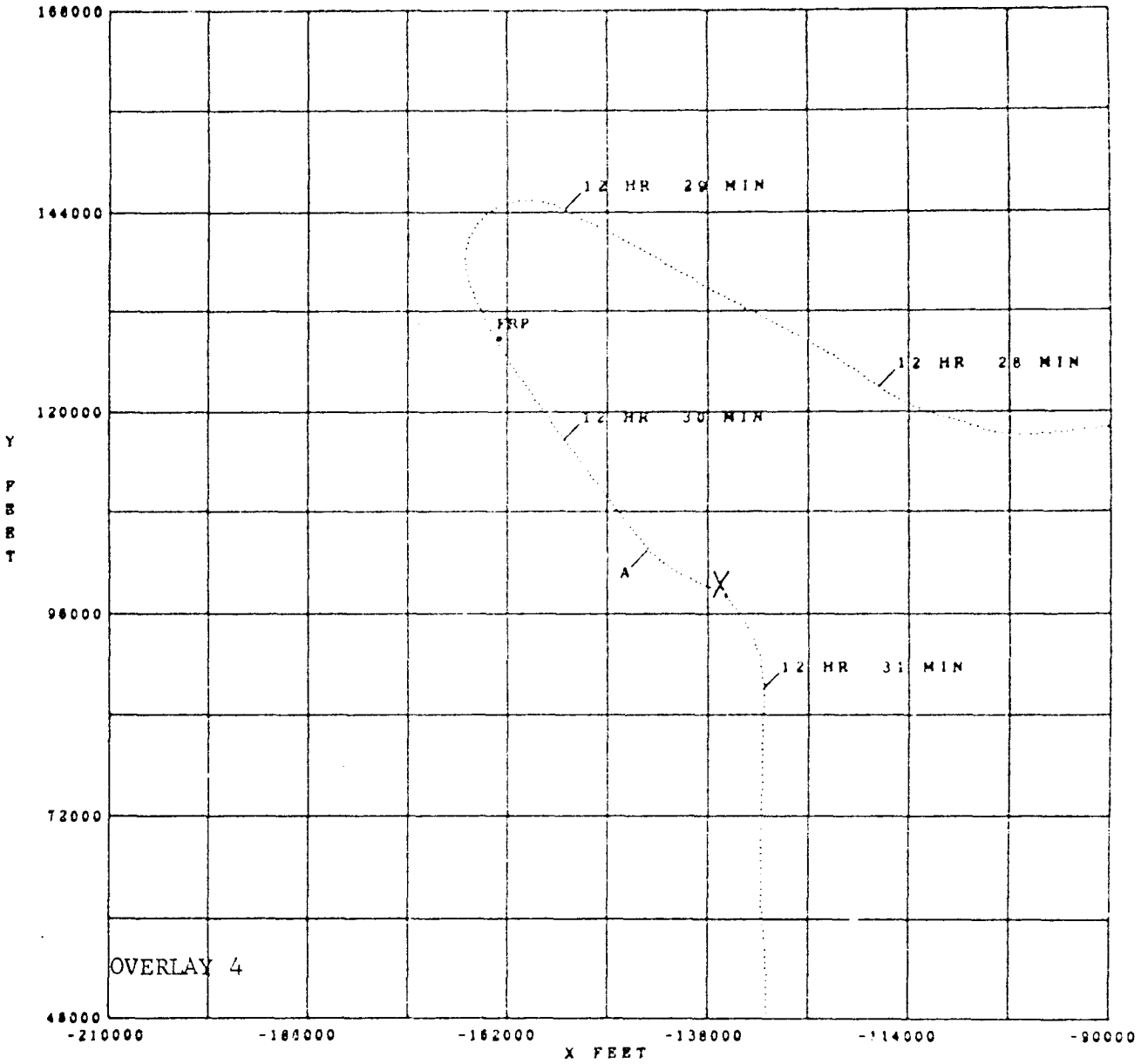
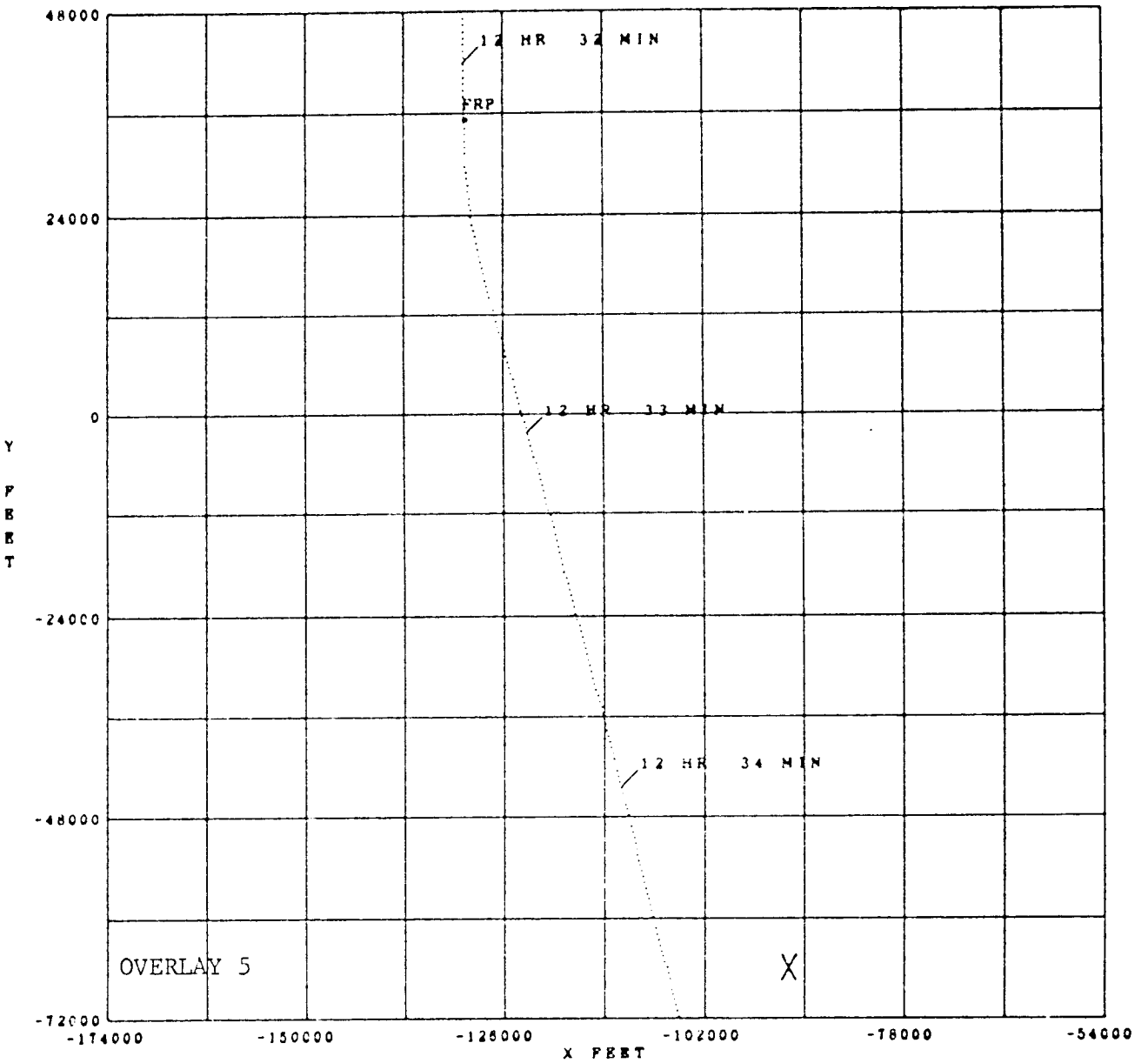


Figure 3-28 (U) Aircraft Position Data (Part 4 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 14241 FEET

MINIMUM GROUND DISTANCE QUALIFIER = ONE

SORTIE NUMBER 305

TARGET WEST 4

04092302
J9156 T1

Figure 3-28 (U) Aircraft Position Data (Part 5 of 5)

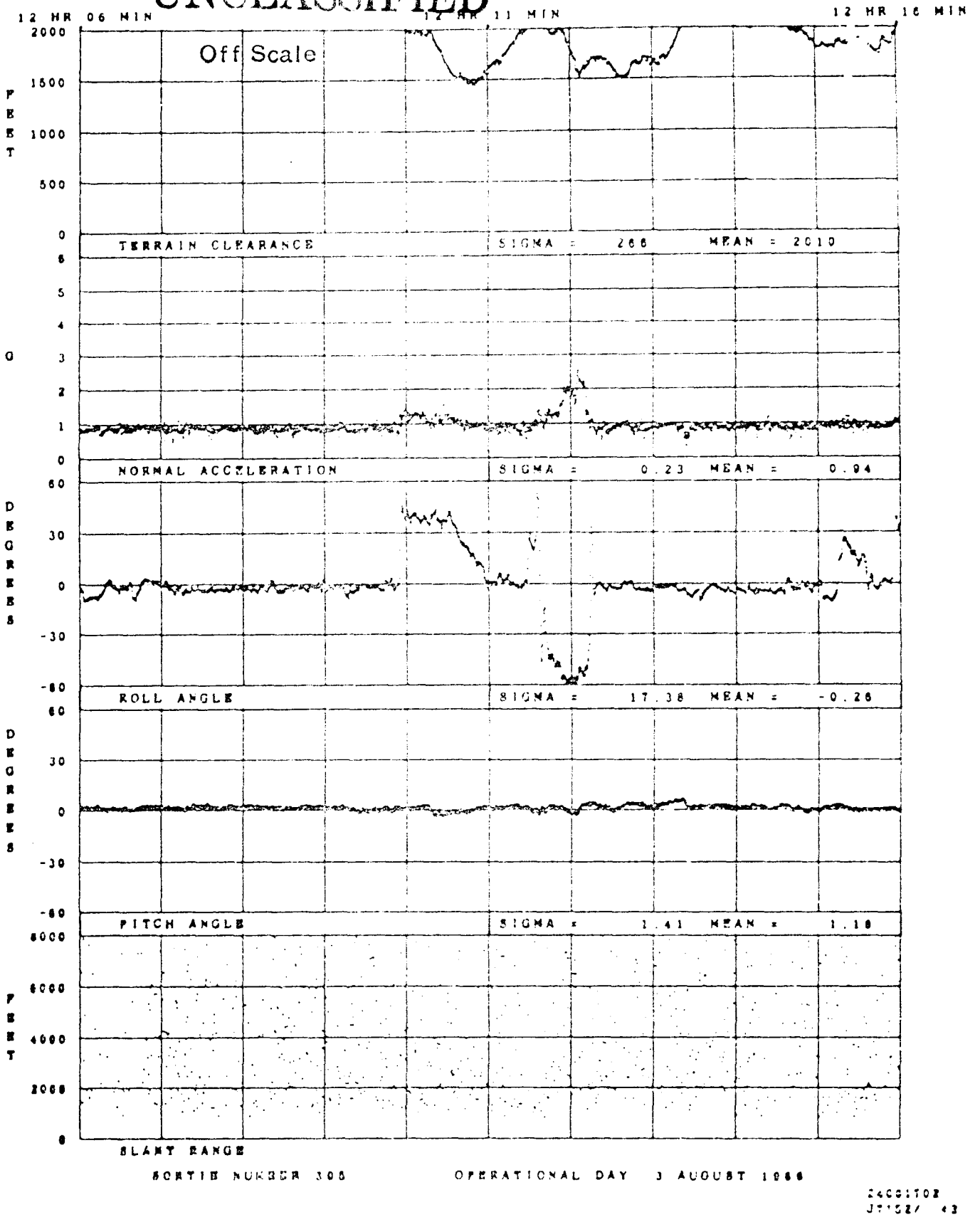


Figure 3-29 (U) Telemetered Data (Part 1 of 3)

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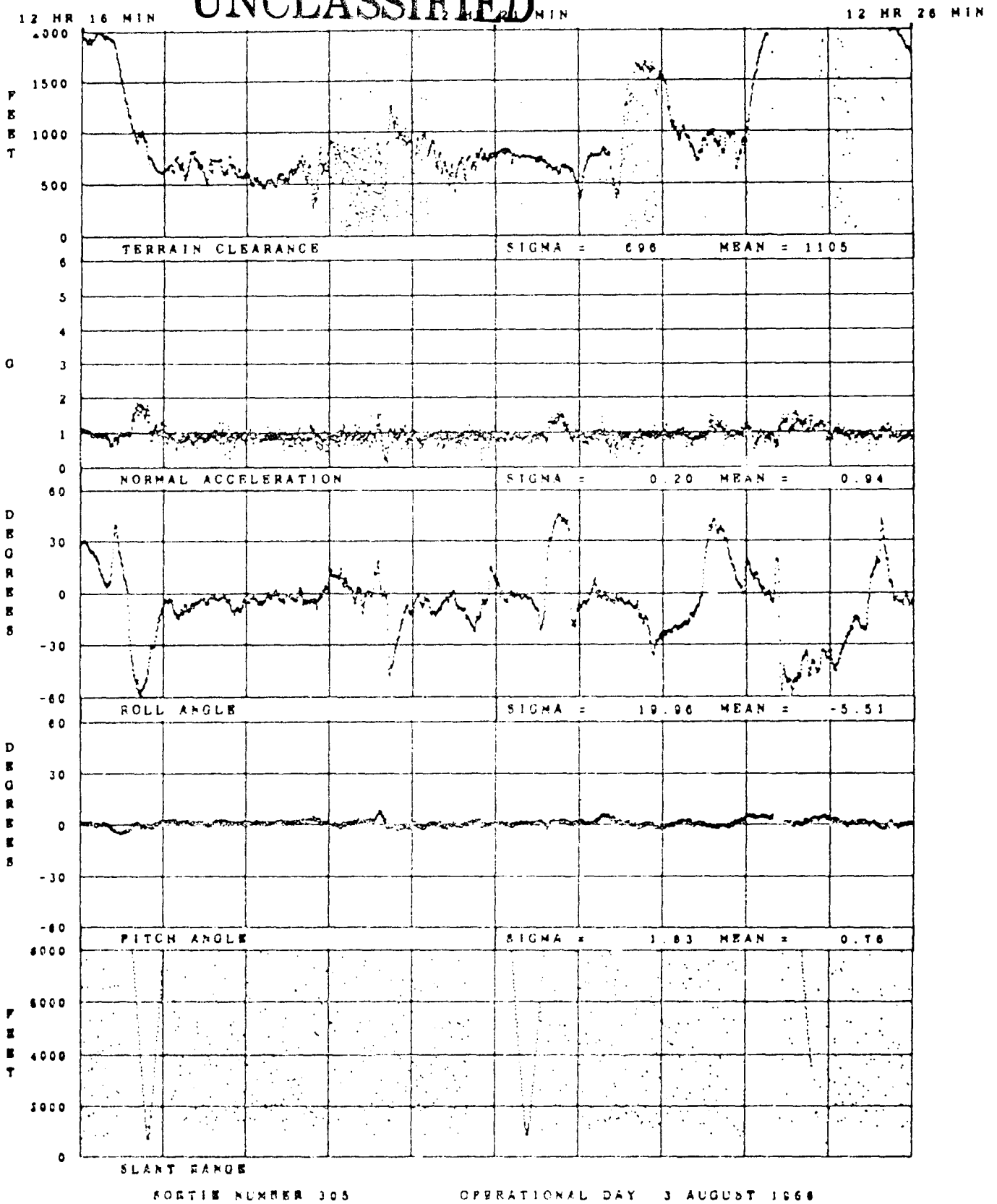


Figure 3-29 (U) Telemetered Data (Part 2 of 3)

UNCLASSIFIED

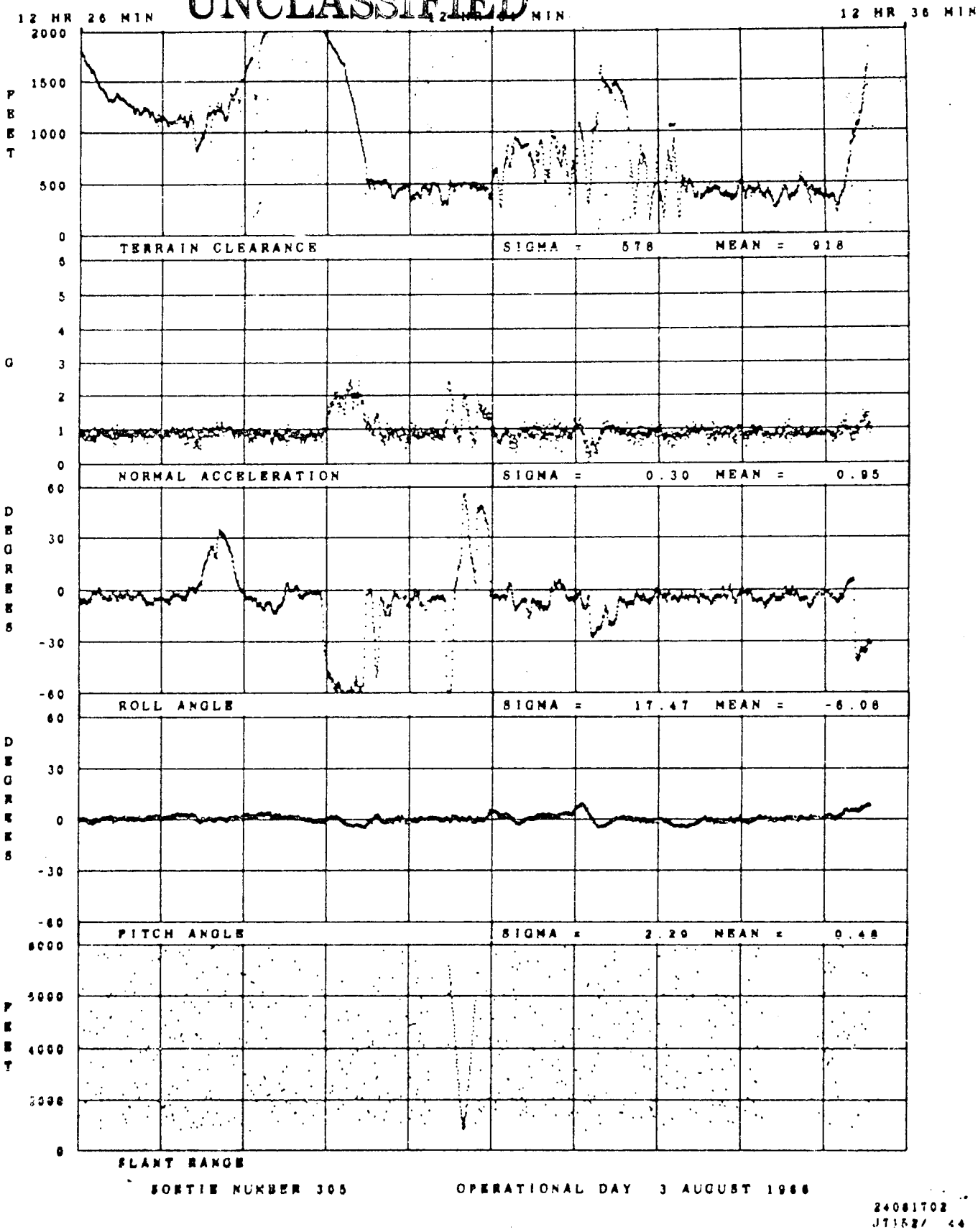
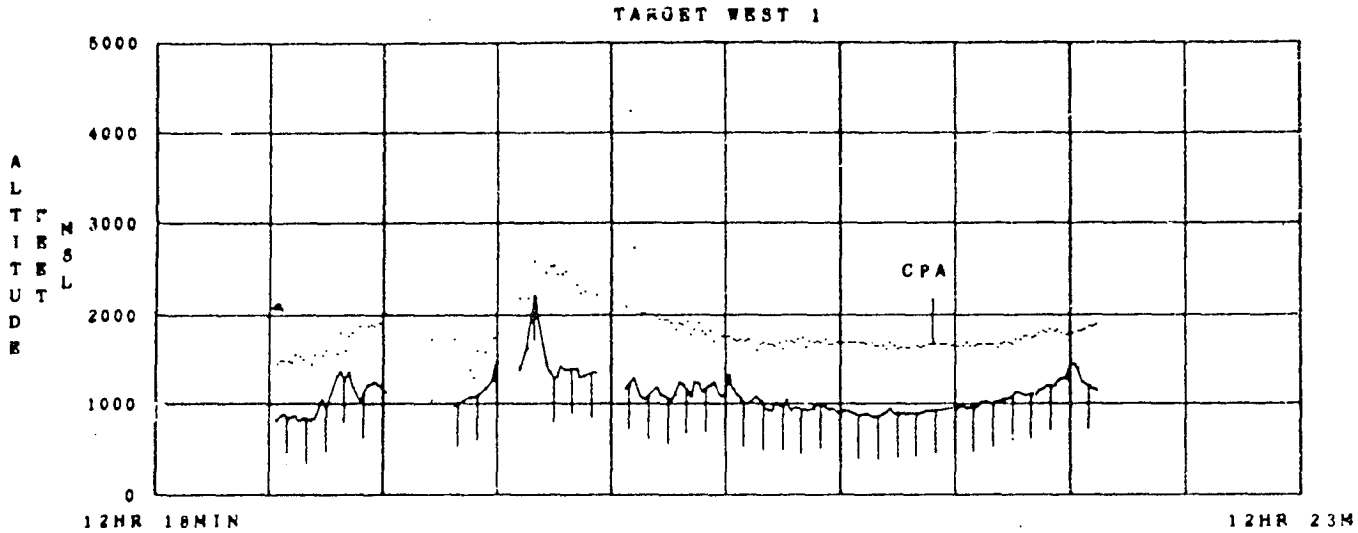
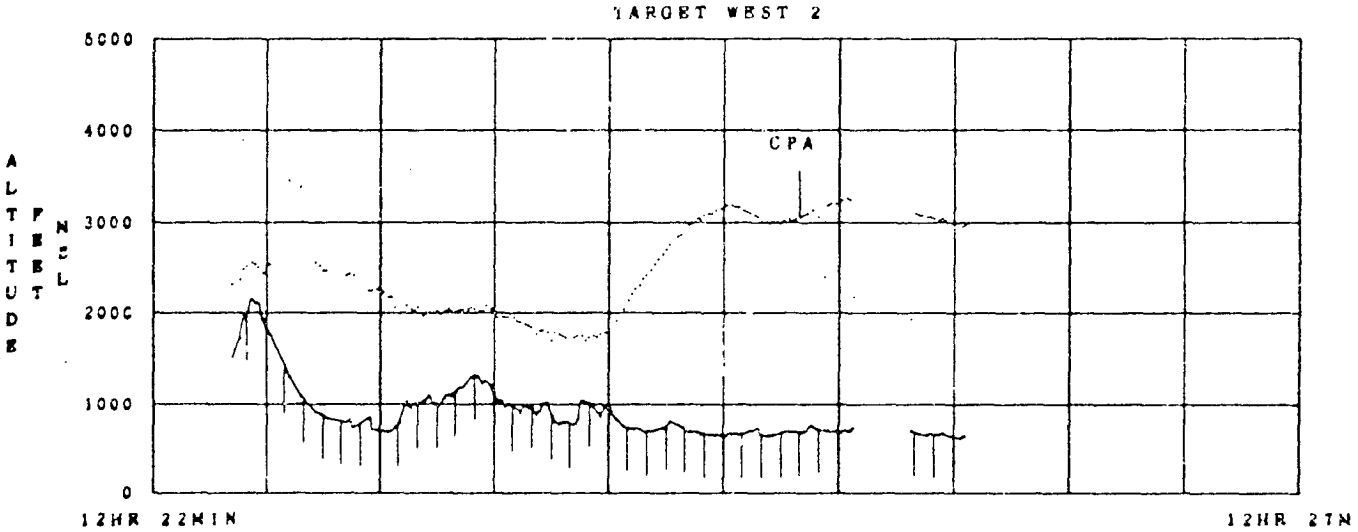


Figure 3-29 (U) Telemetered Data (Part 3 of 3)

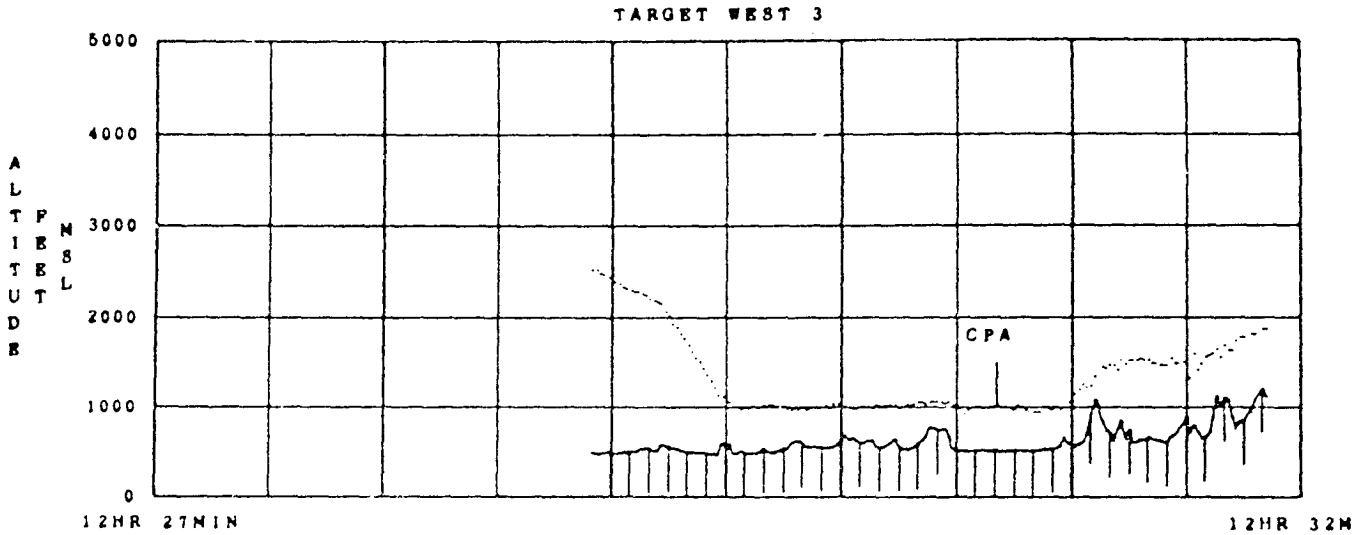


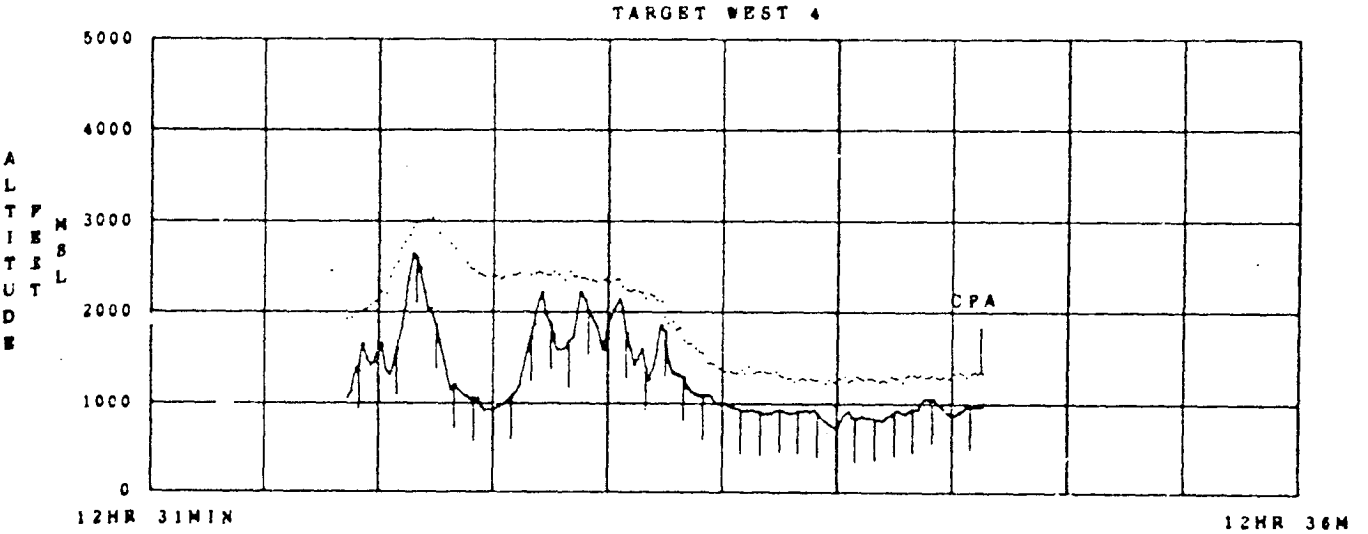


SORTIE NUMBER 305

04002302
J9156

Figure 3-30 (U) Aircraft Altitude and Terrain Profile (Part 1 of 2)

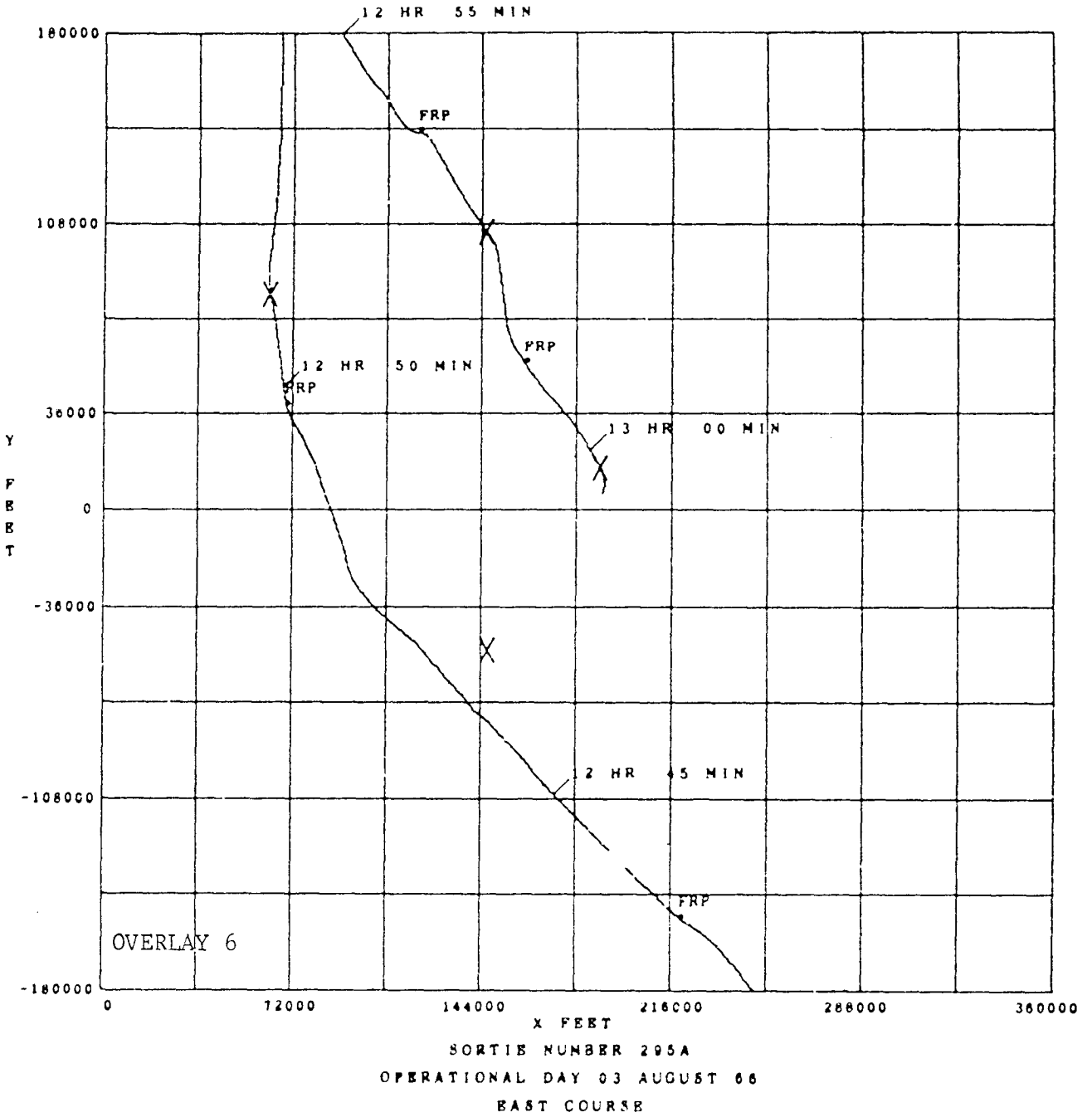




SORTIE NUMBER 305

04092302
J9156

Figure 3-30 (U) Aircraft Altitude and Terrain Profile (Part 2 of 2)



04092257
J9156 11

Figure 3-31 (U) Aircraft Position Data (Part 1 of 5)

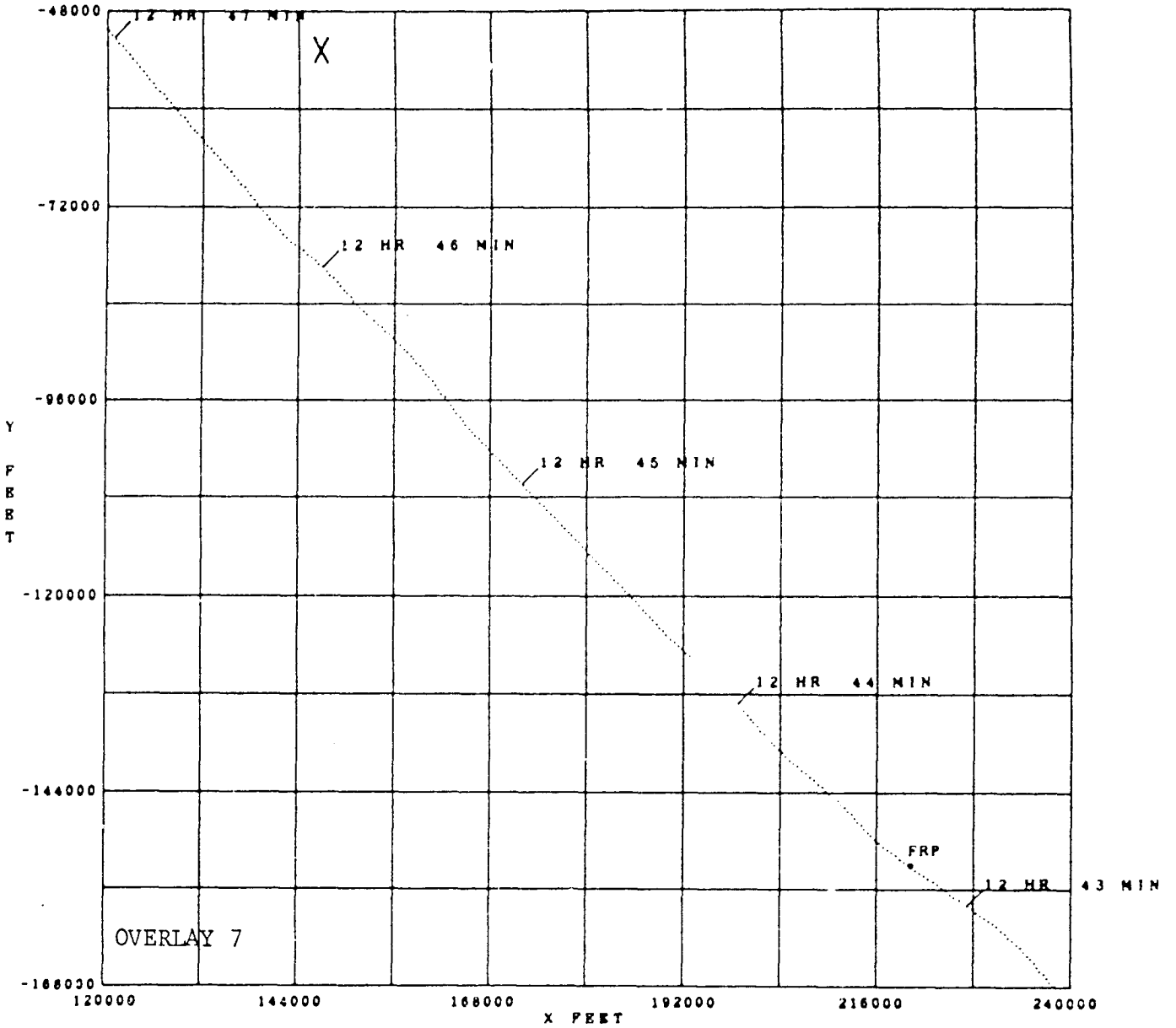
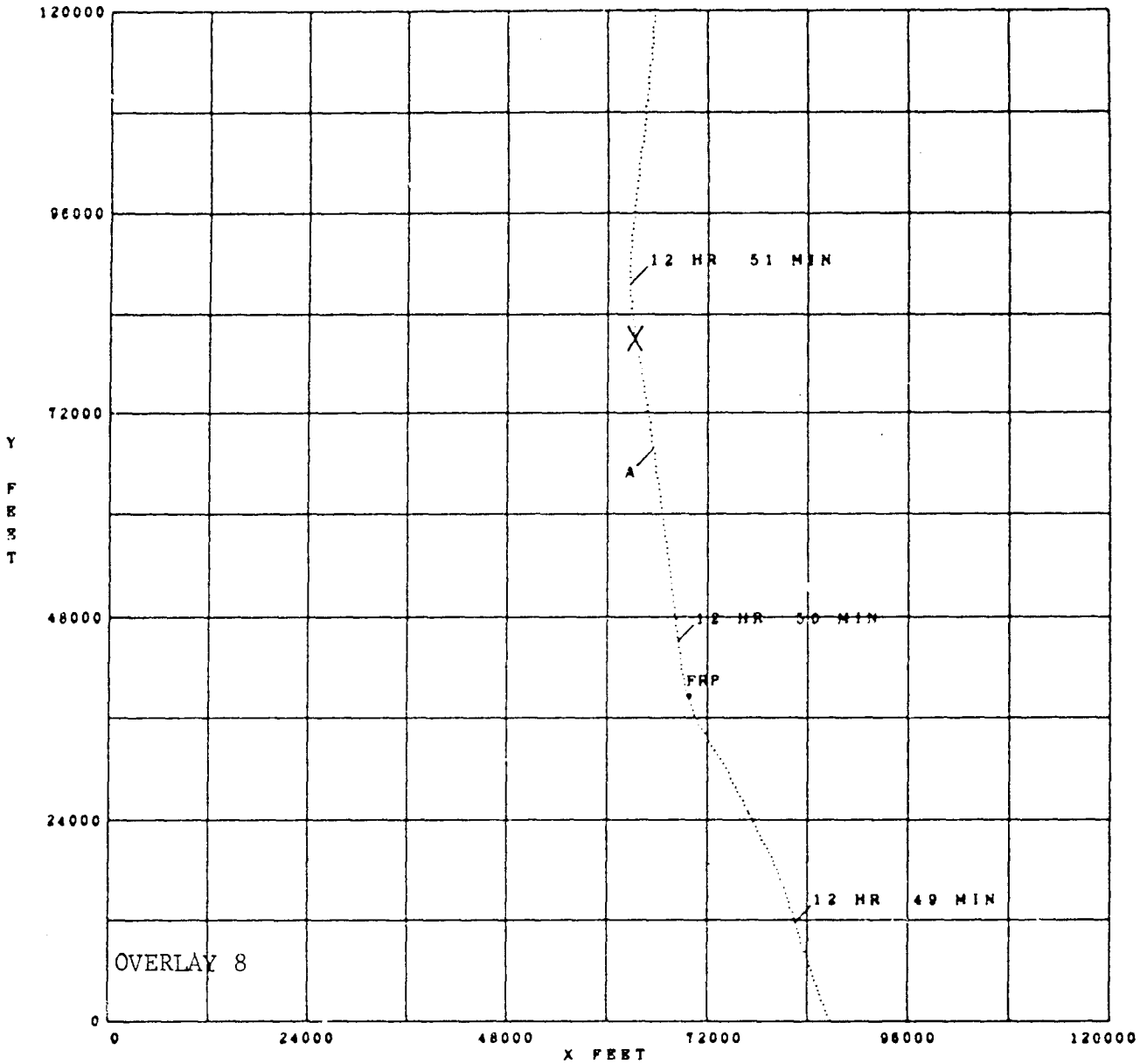


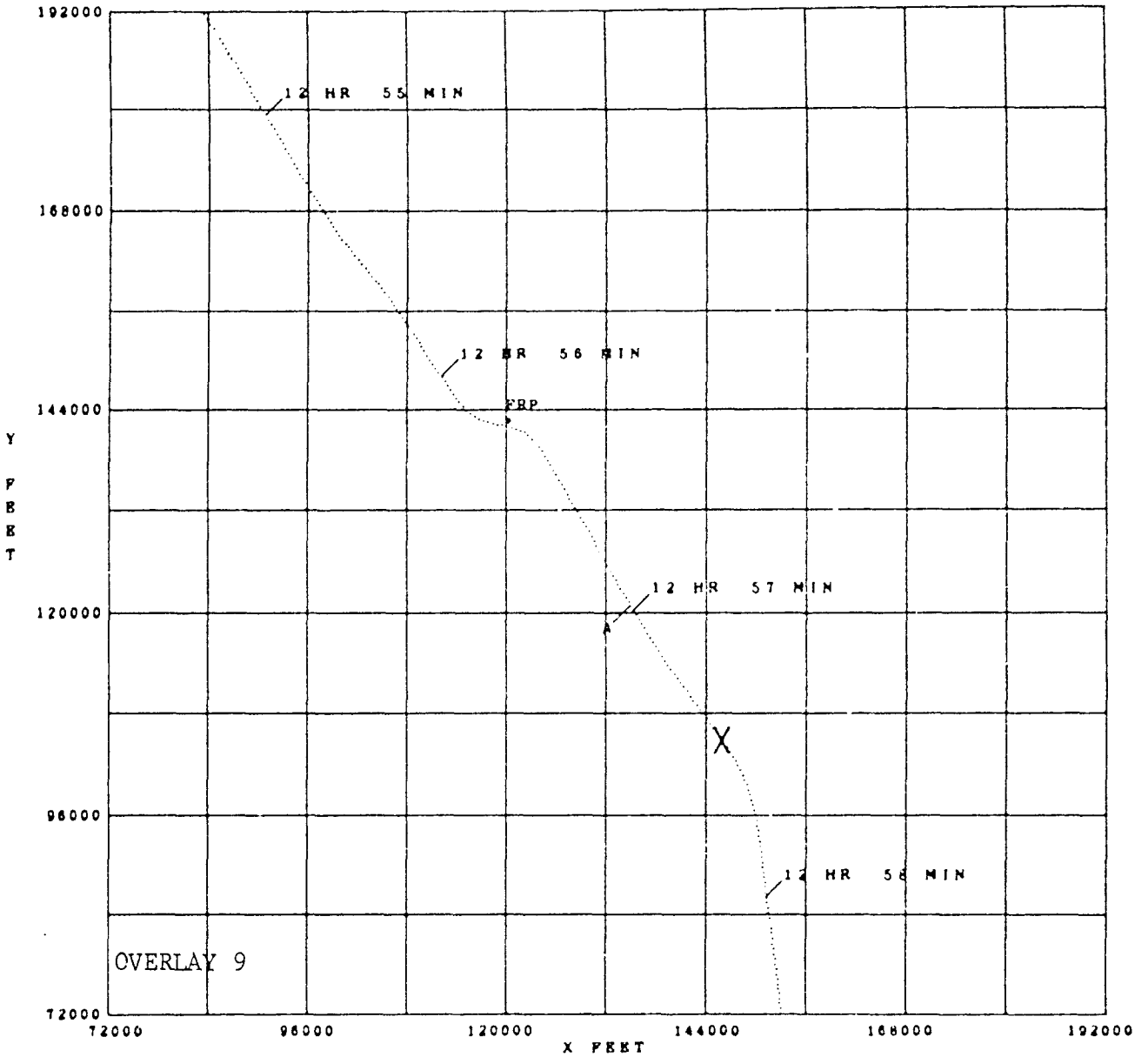
Figure 3-31 (U) Aircraft Position Data (Part 2 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 196 FEET
MINIMUM GROUND DISTANCE QUALIFIER = ONE
SORTIE NUMBER 295A
TARGET EAST 2

04092257
J9156 13

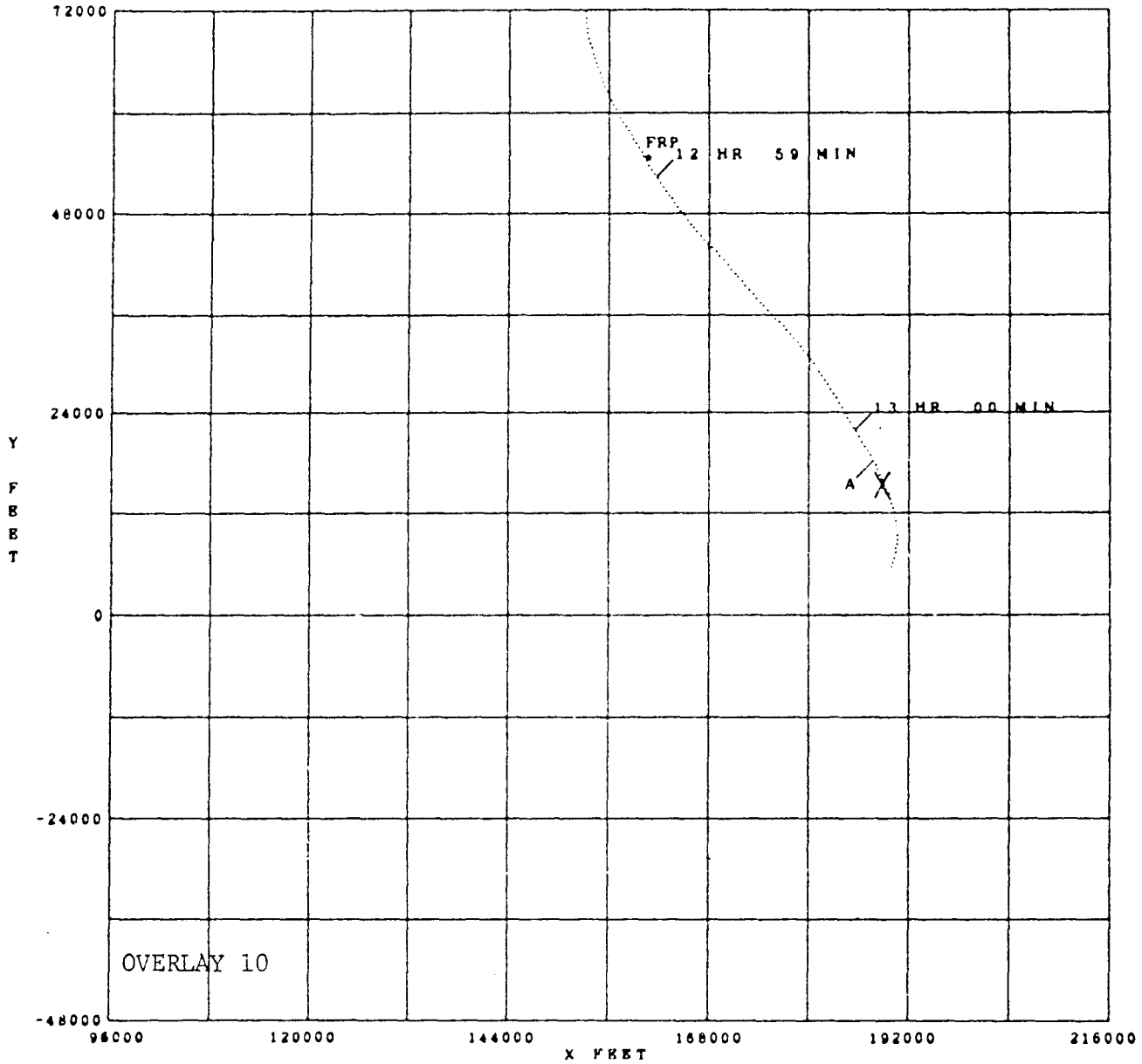
Figure 3-31 (U) Aircraft Position Data (Part 3 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 111 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 295A
TARGET EAST 3

04092257
J9156 14

Figure 3-31 (U) Aircraft Position Data (Part 4 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 304 FEET
MINIMUM GROUND DISTANCE QUALIFIER = ONE
SORTIE NUMBER 295A
TARGET EAST <

04092257
J9158 15

Figure 3-31 (U) Aircraft Position Data (Part 5 of 5)

UNCLASSIFIED

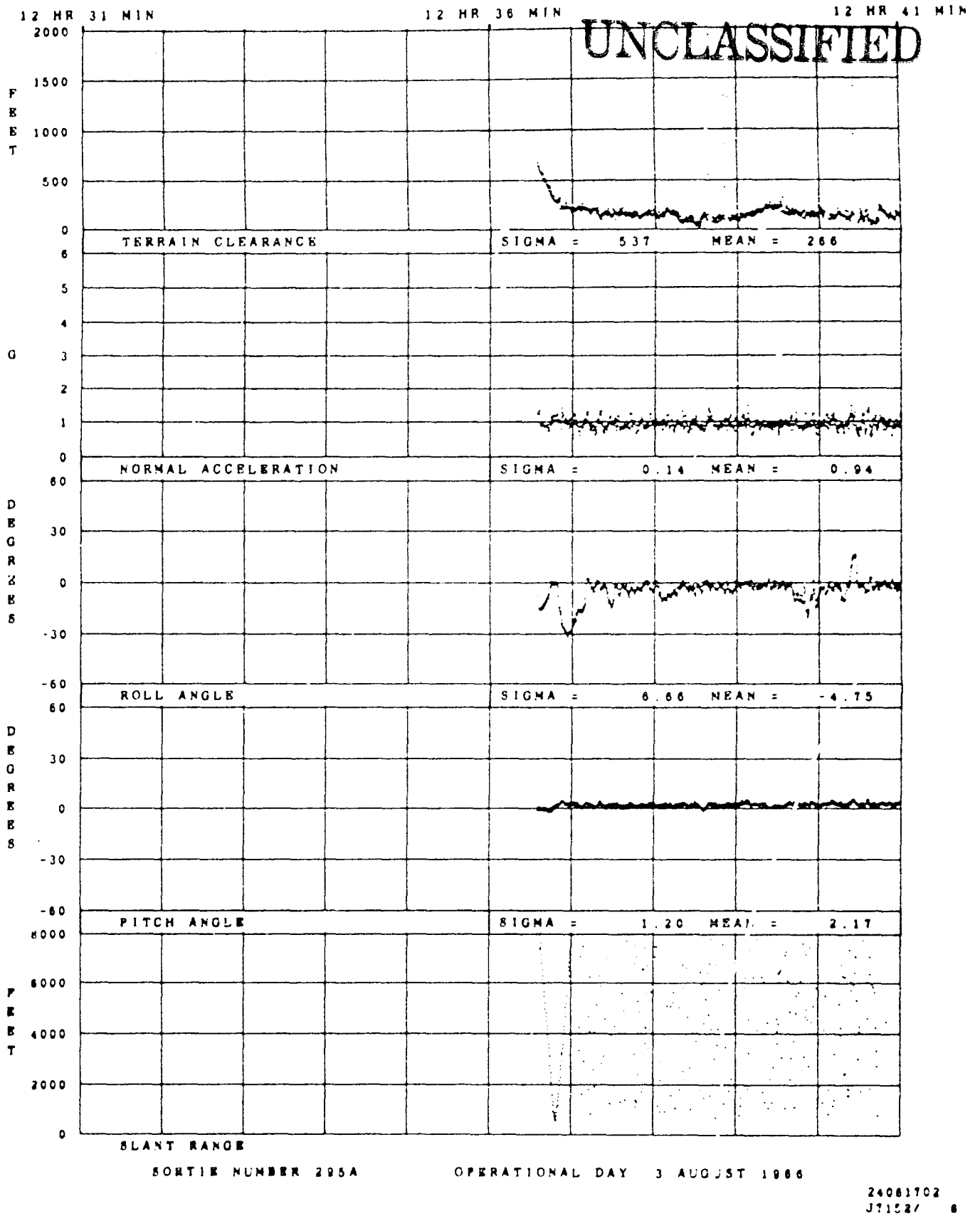


Figure 3-32 (U) Telemetered Data (Part 1 of 3)

UNCLASSIFIED

UNCLASSIFIED

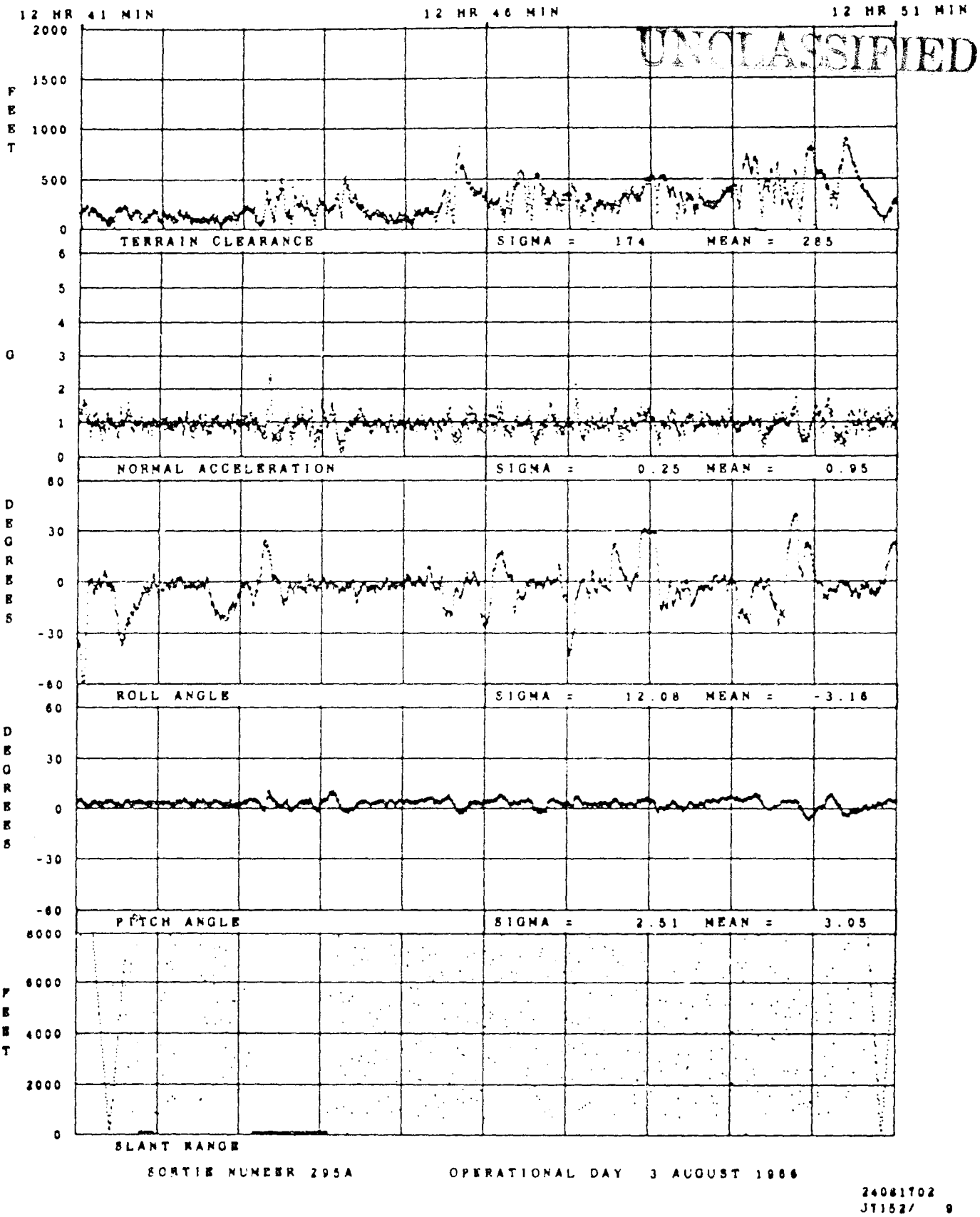


Figure 3-32 (U) Telemetered Data (Part 2 of 3)

UNCLASSIFIED

UNCLASSIFIED

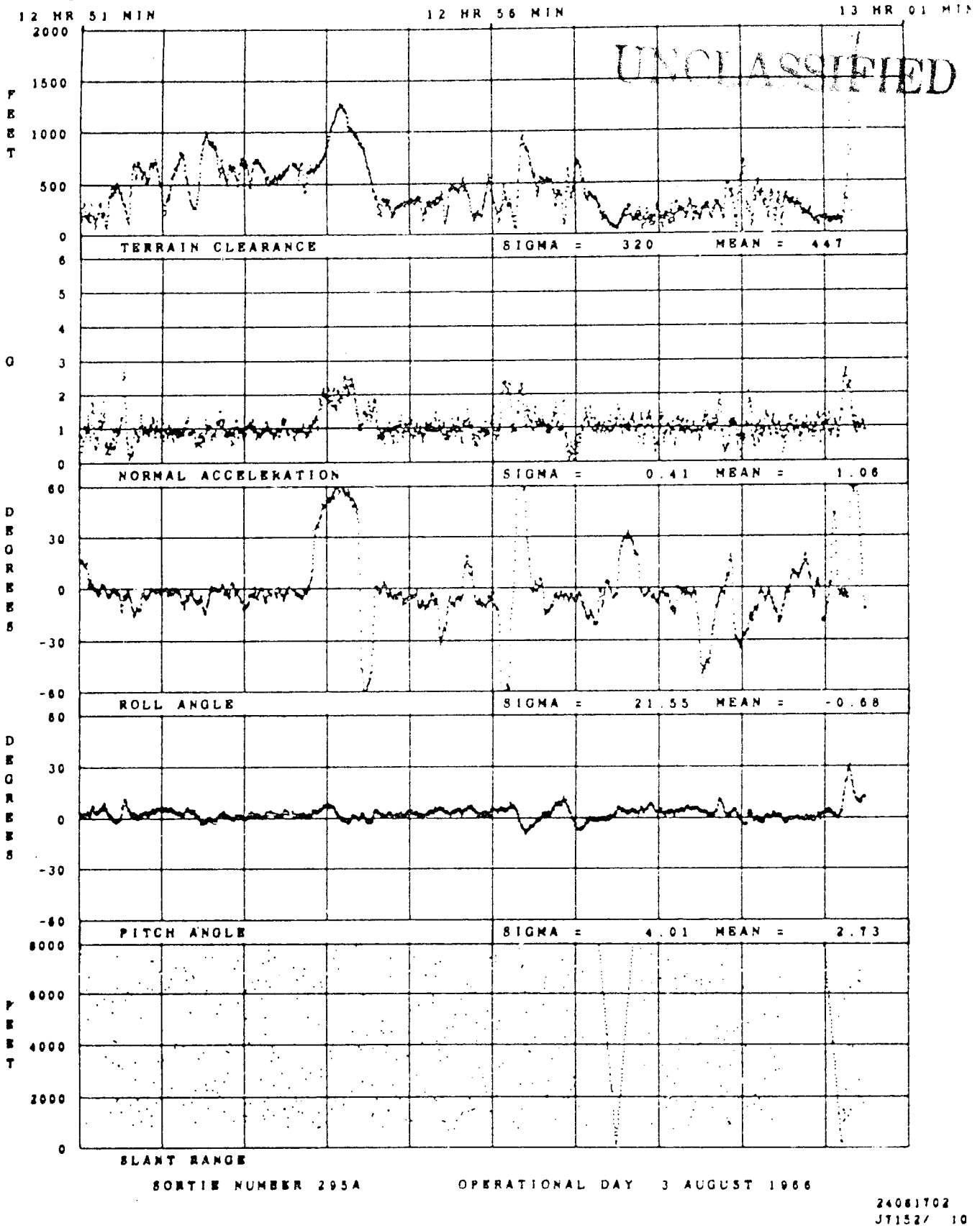
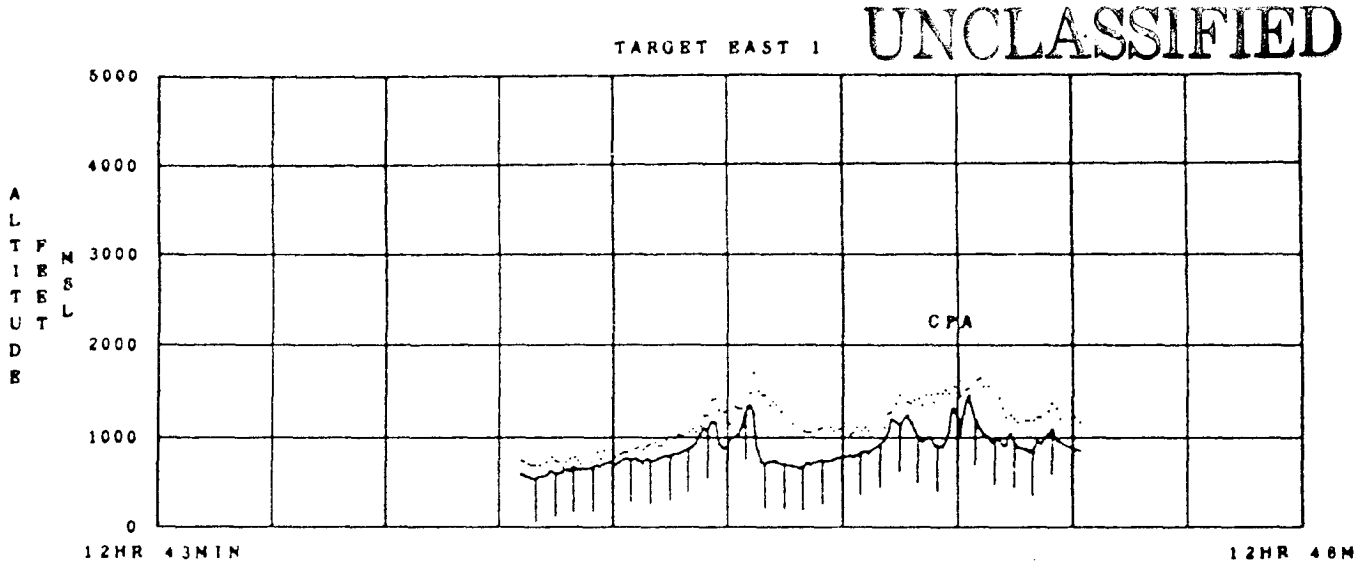
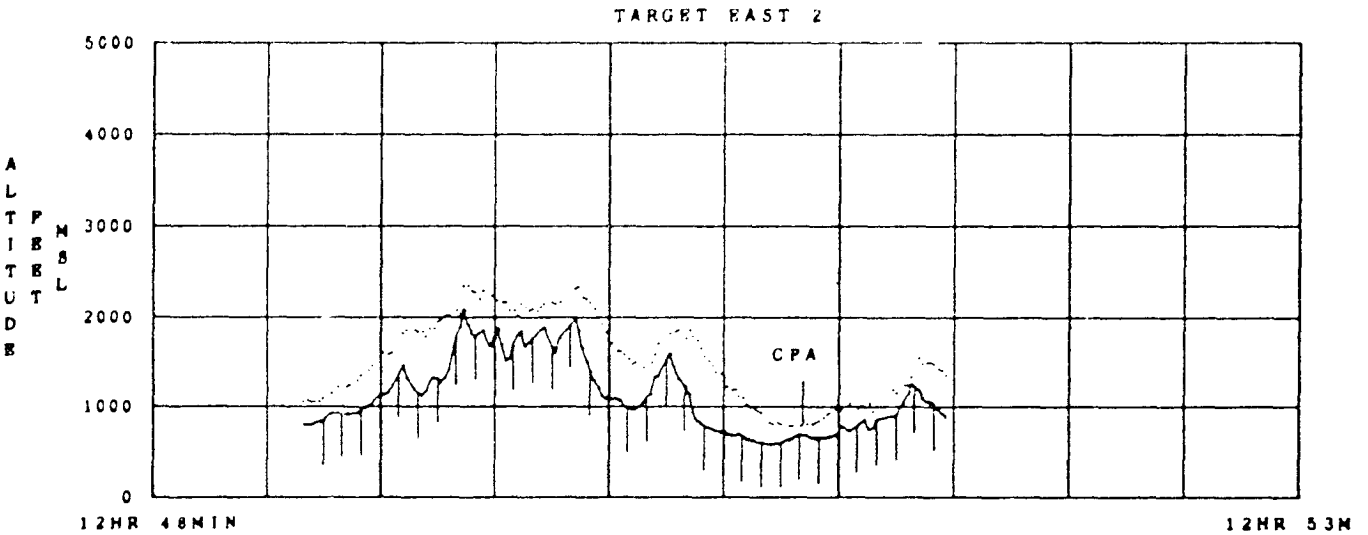


Figure 3-32 (U) Telemetered Data (Part 3 of 3)

UNCLASSIFIED



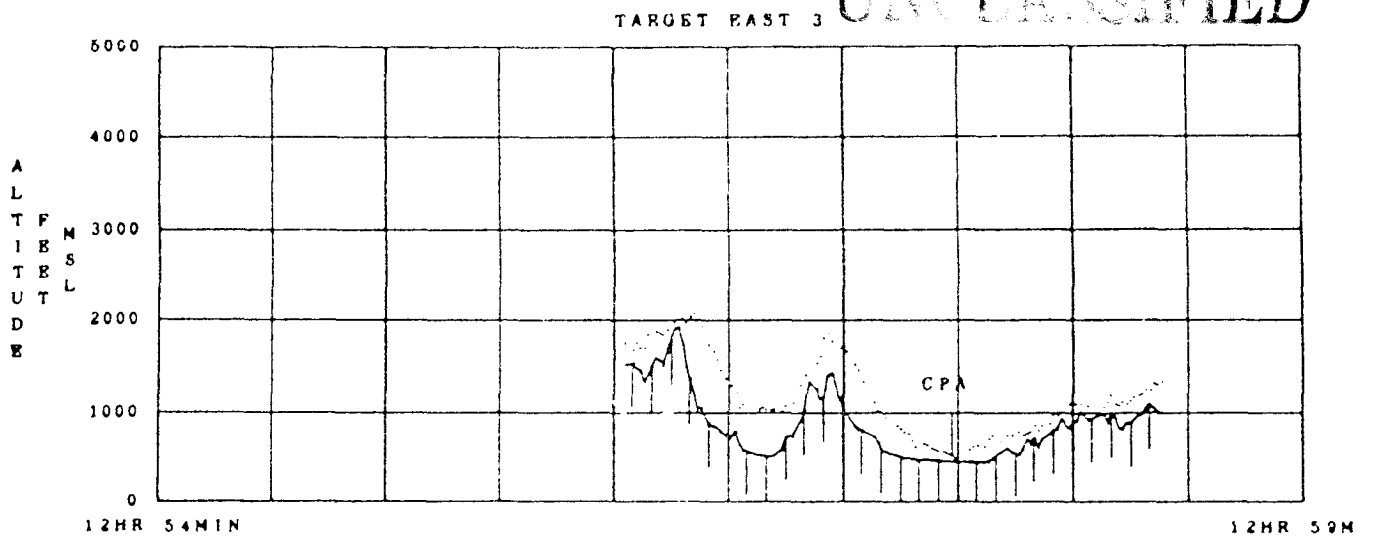


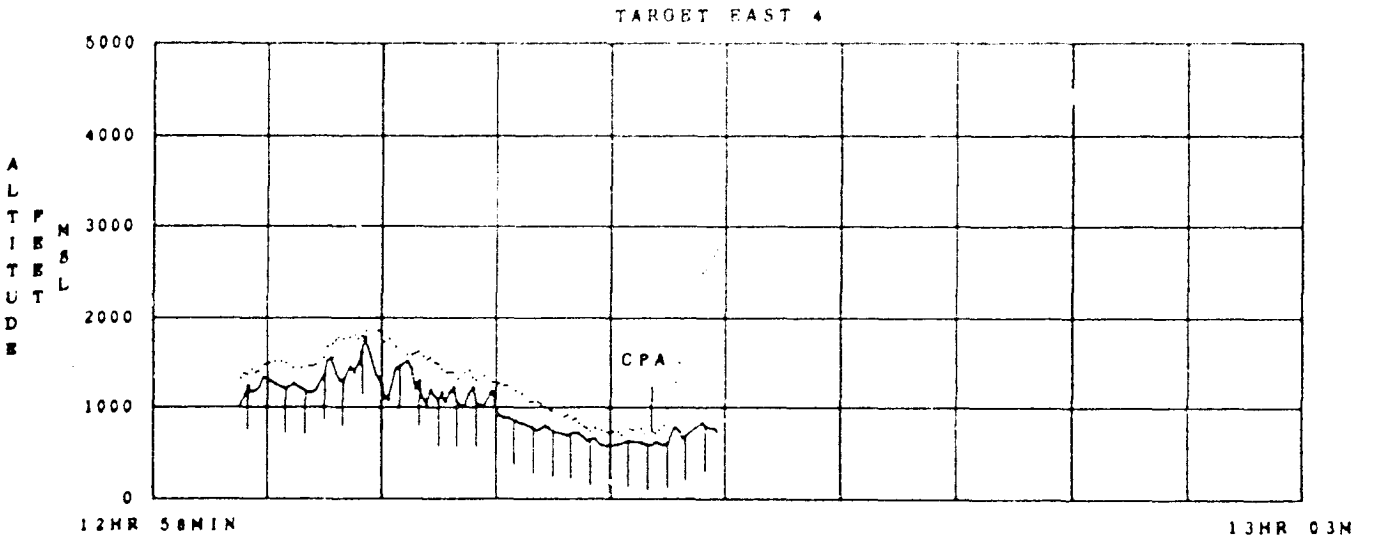
SORTIE NUMBER 295A

04092257
J9156

Figure 3-33 (U) Aircraft Altitude and Terrain Profile (Part 1 of 2)

UNCLASSIFIED





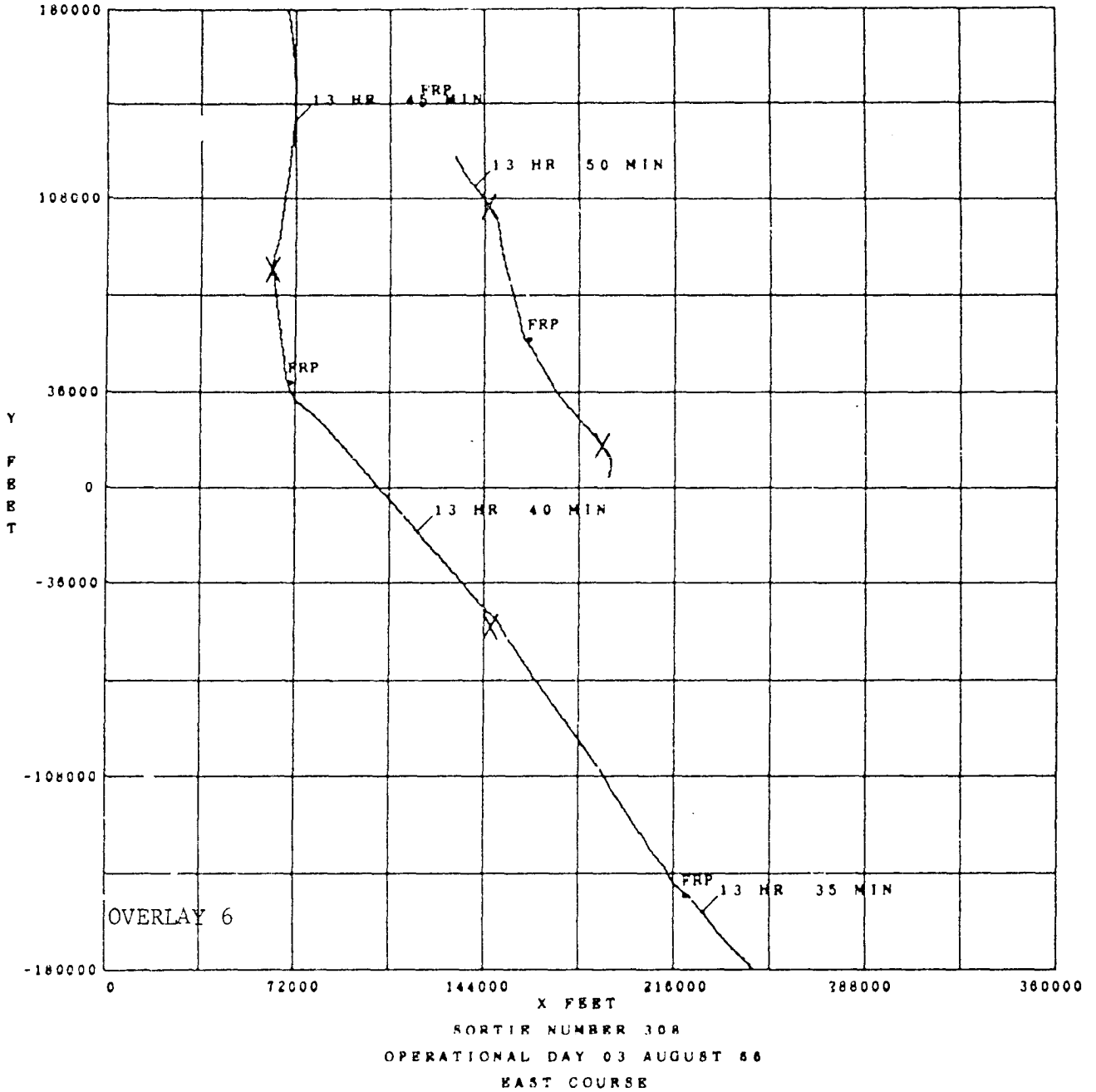
SORTIE NUMBER 295A

04092257
J9156

Figure 3-33 (U) Aircraft Altitude and Terrain Profile (Part 2 of 2)

UNCLASSIFIED

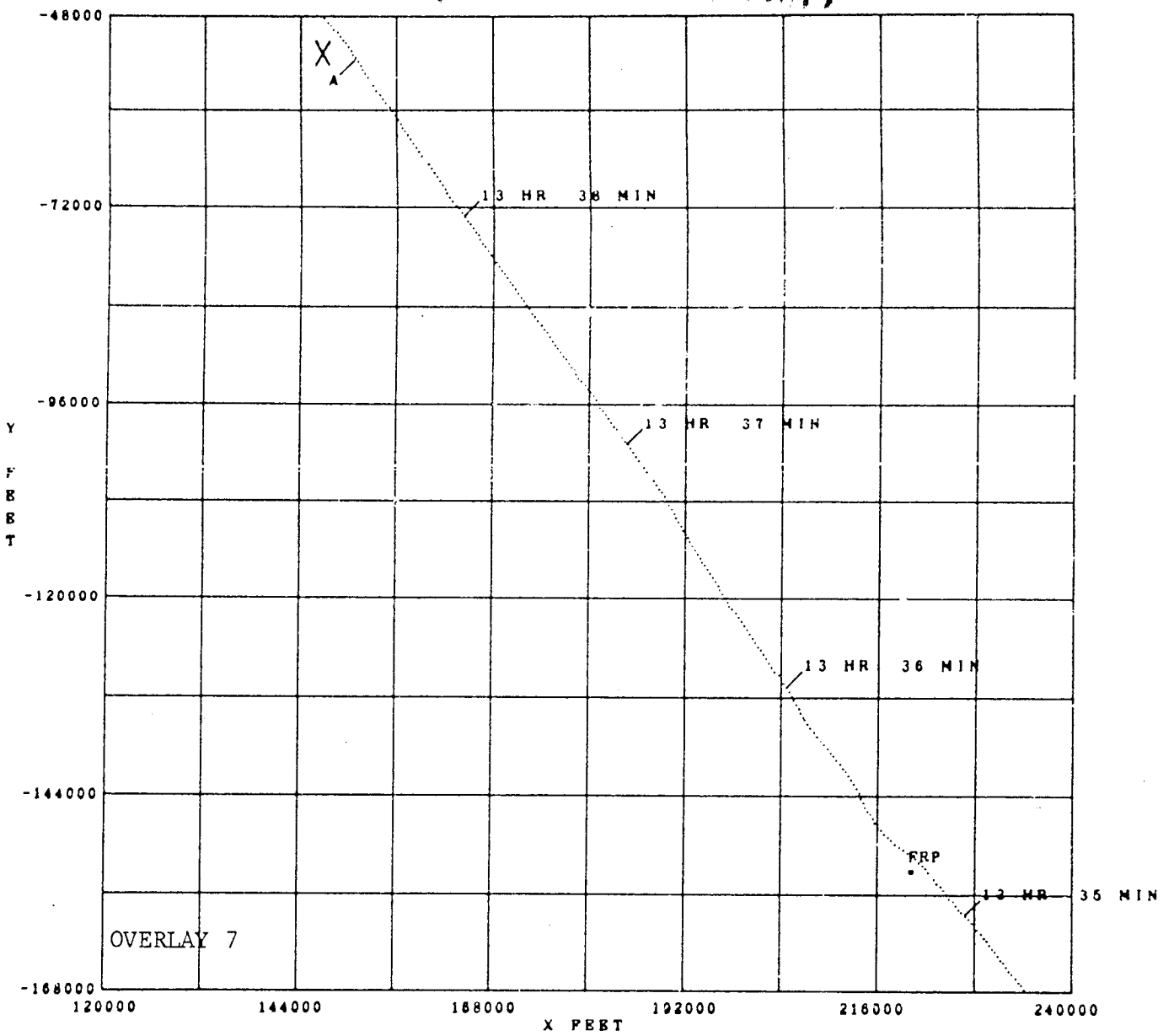
UNCLASSIFIED



04092257
J9156 19

Figure 3-34 (U) Aircraft Position Data (Part 1 of 5)

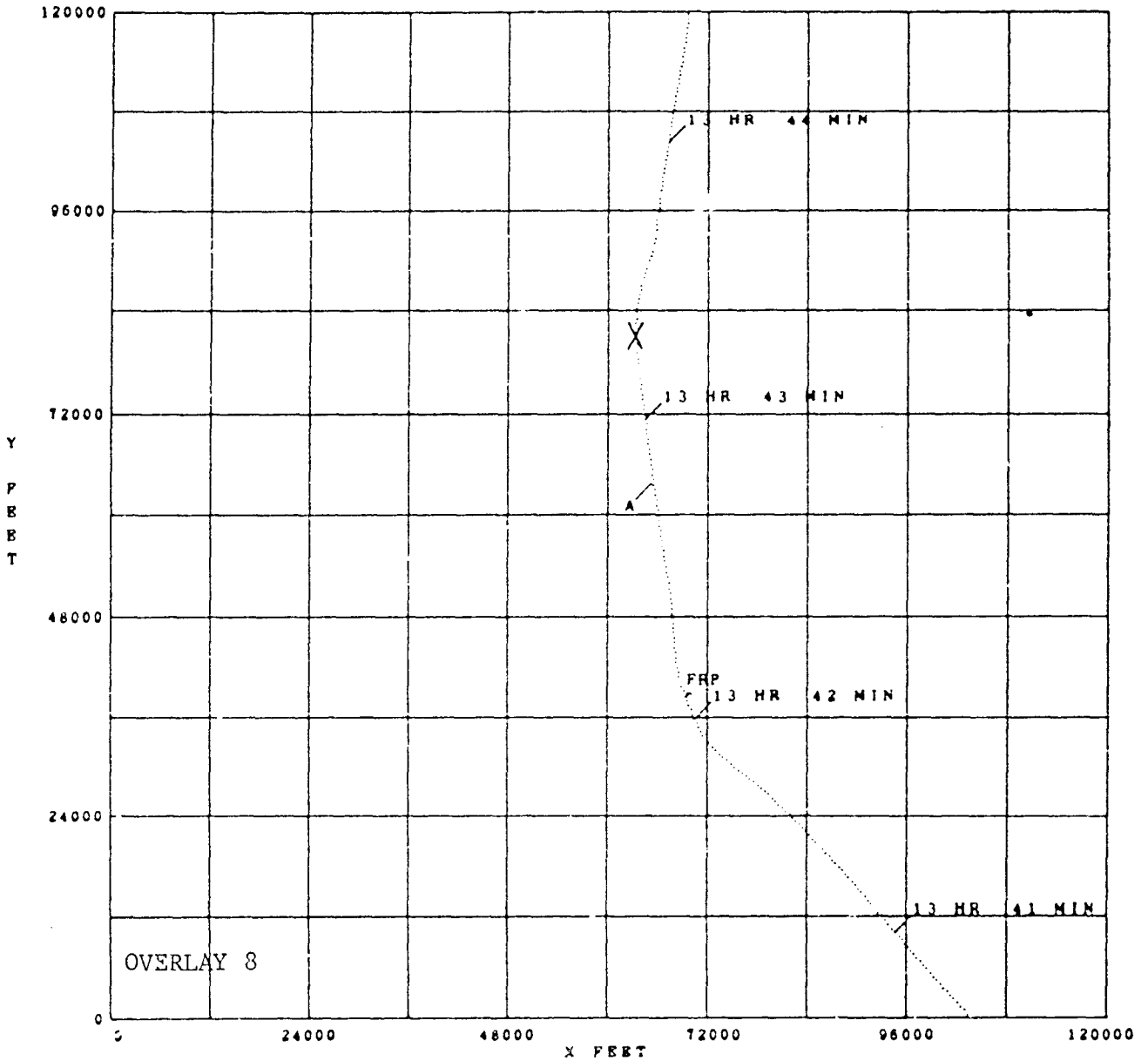
UNCLASSIFIED



MINIMUM GROUND DISTANCE TO TARGET = 3030 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 308
TARGET EAST 1

04092257
J9156 20

Figure 3-34 (U) Aircraft Position Data (Part 2 of 5)

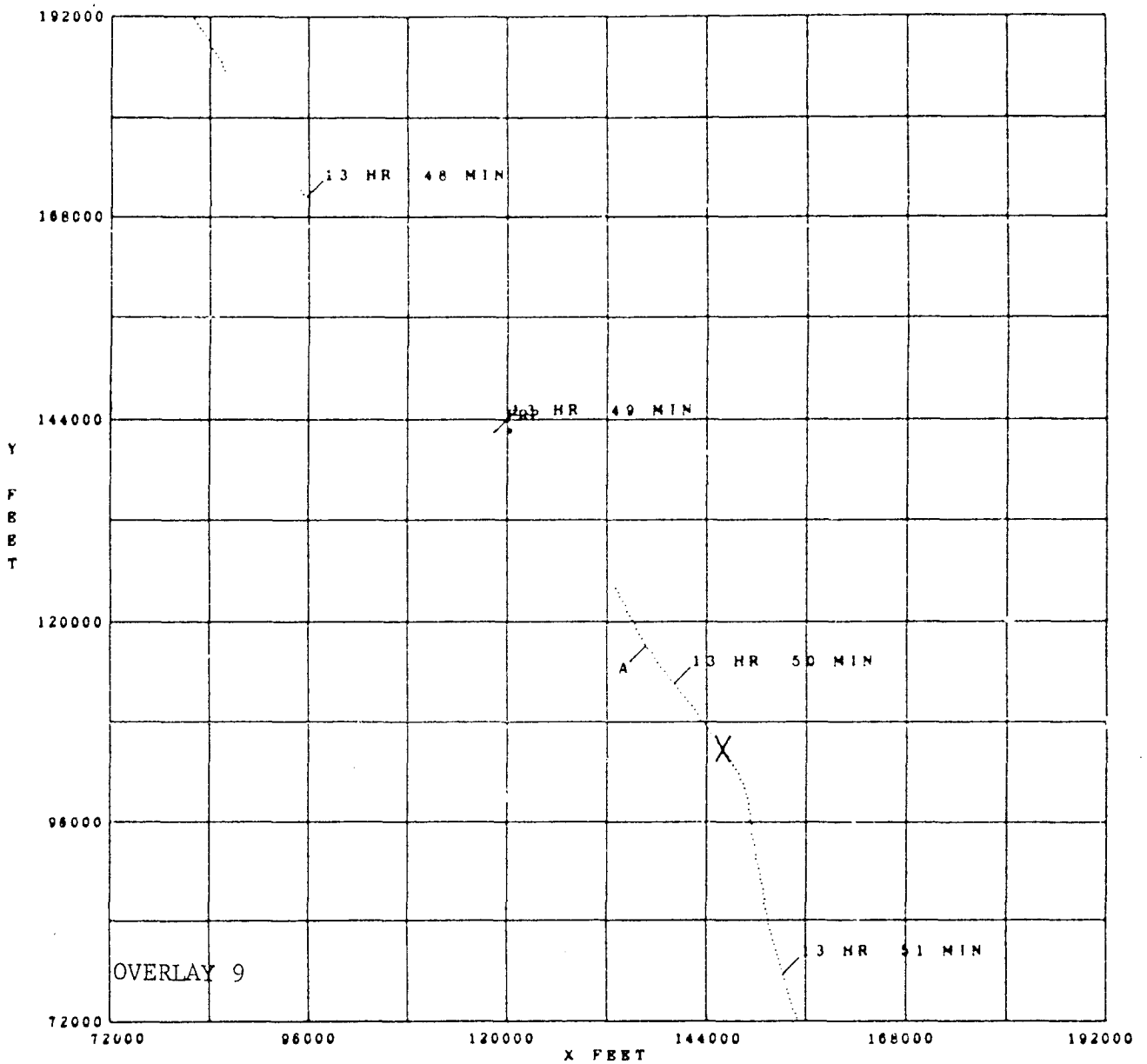


MINIMUM GROUND DISTANCE TO TARGET = 71 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 308
TARGET EAST 2

04092257
J9156 21

Figure 3-34 (U) Aircraft Position Data (Part 3 of 5)

UNCLASSIFIED



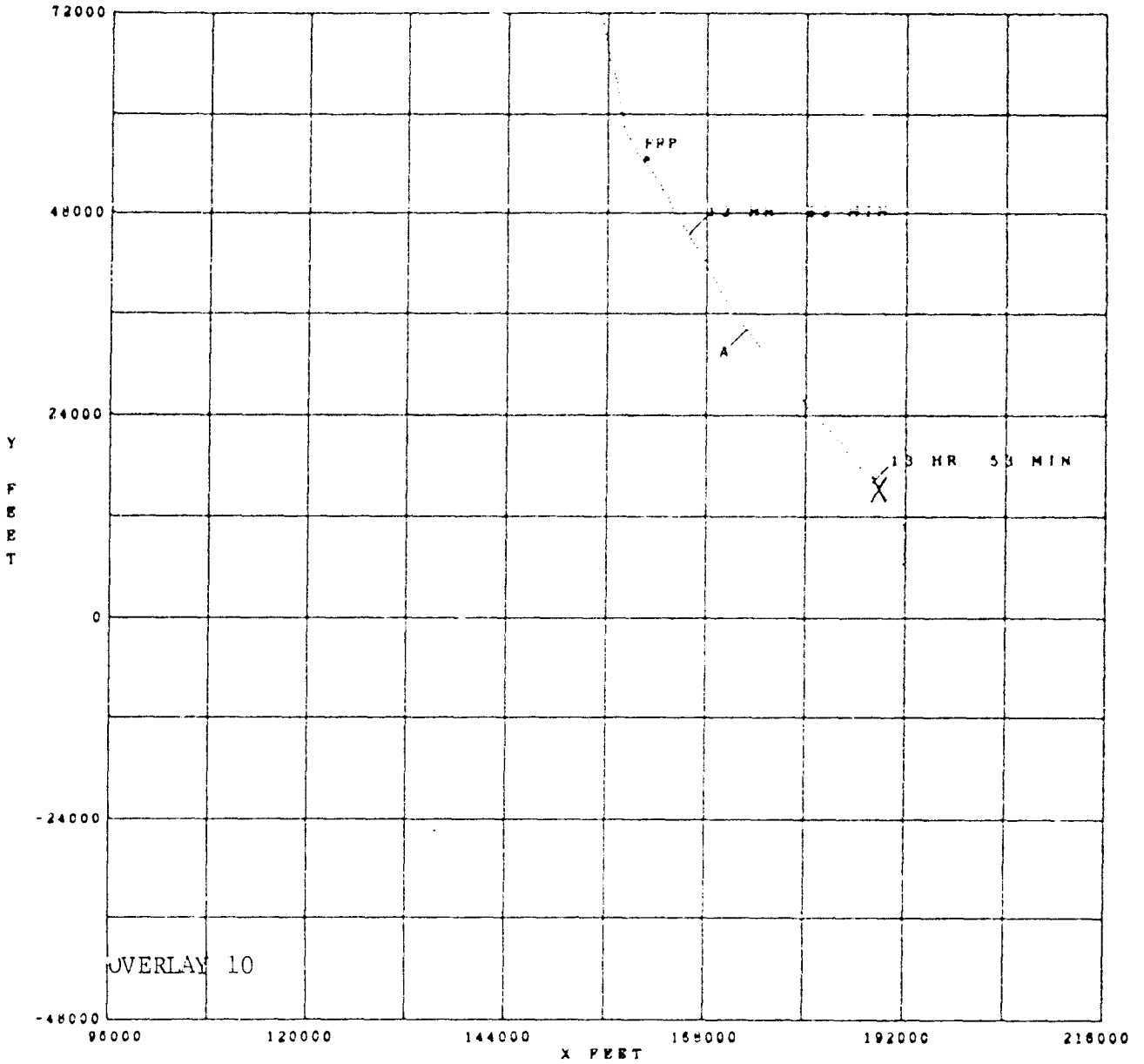
MINIMUM GROUND DISTANCE TO TARGET = 87 FEET
MINIMUM GROUND DISTANCE QUALIFIER = ONE
SORTIE NUMBER 308
TARGET EAST 3

04092257
J9156 22

Figure 3-34 (U) Aircraft Position Data (Part 4 of 5)

UNCLASSIFIED

UNCLASSIFIED



MINIMUM GROUND DISTANCE TO TARGET = 29 FEET
MINIMUM GROUND DISTANCE QUALIFIER = ONE
SORTIE NUMBER 308
TARGET EAST 4

04094457
J9156 73

Figure 3-34 (U) Aircraft Position Data (Part 5 of 5)

UNCLASSIFIED

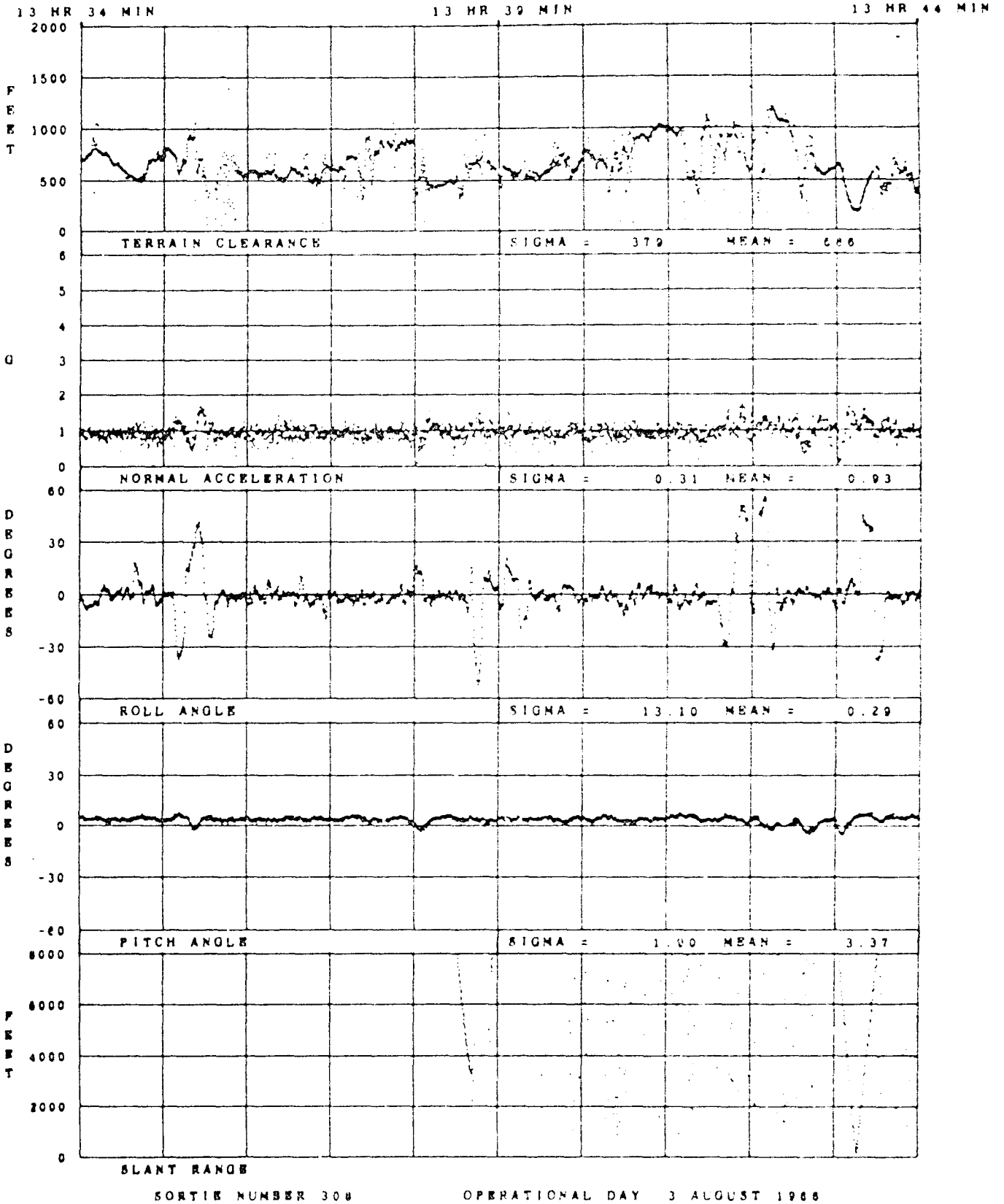


Figure 3-35 (U) Telemetered Data (Part 1 of 2)

UNCLASSIFIED

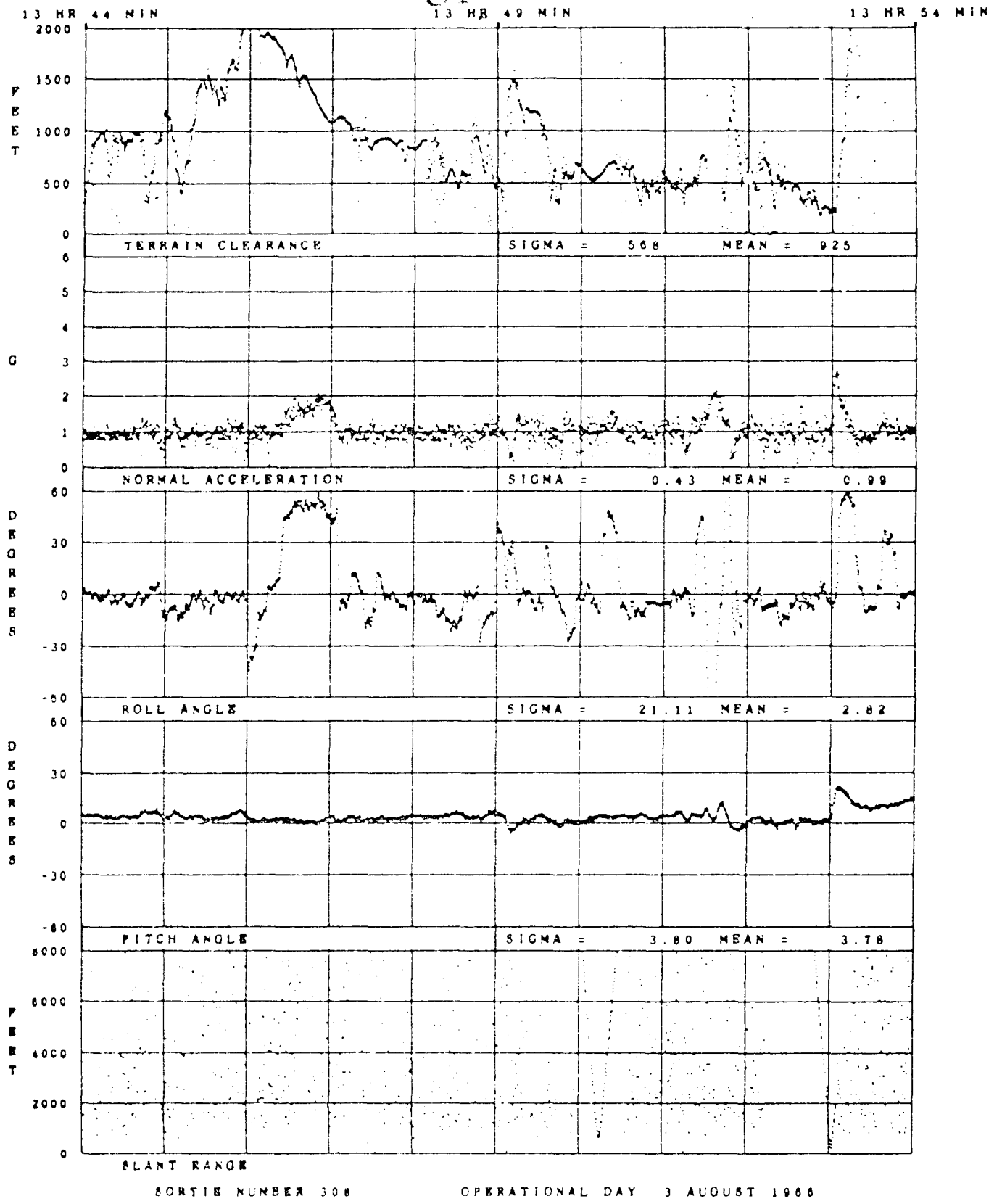
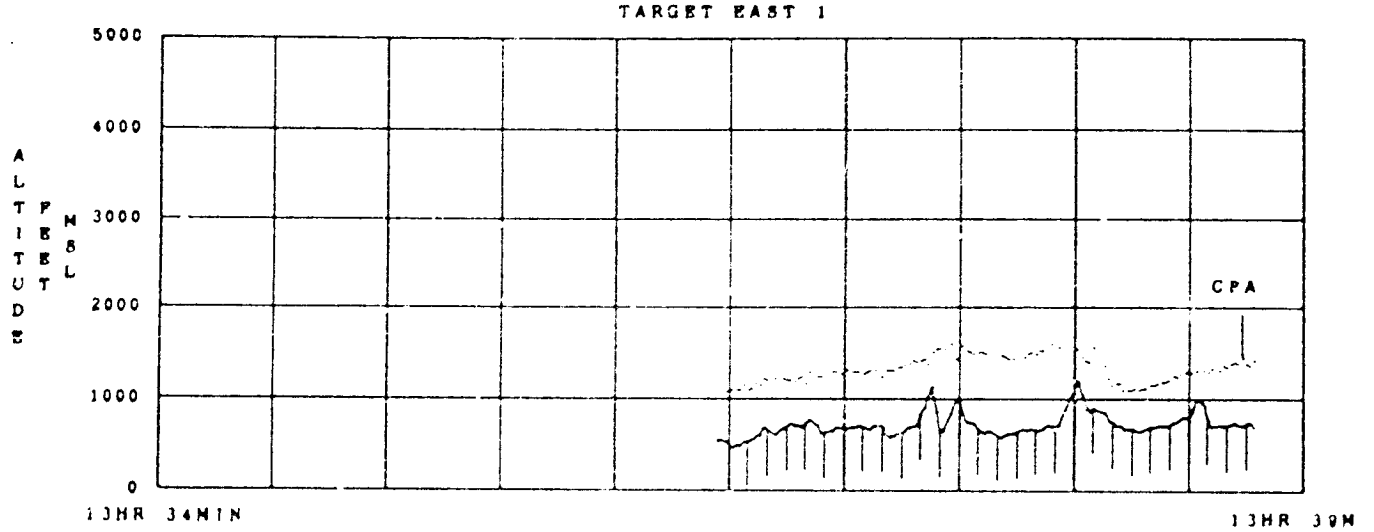
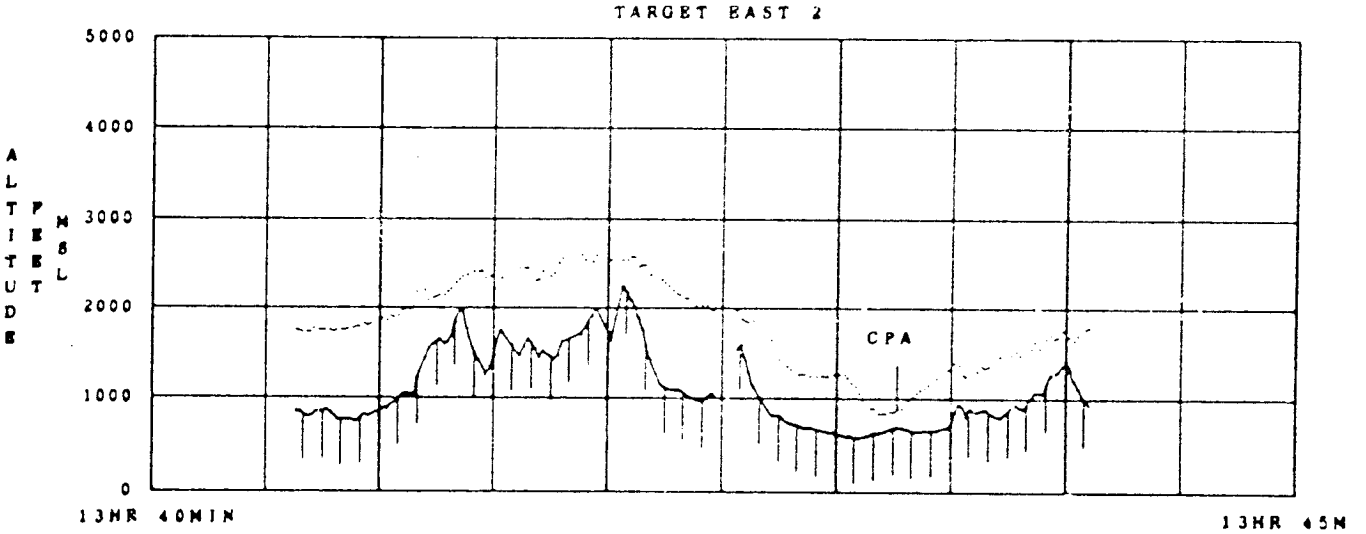


Figure 3-35 (U) Telemetered Data (Part 2 of 2)

UNCLASSIFIED



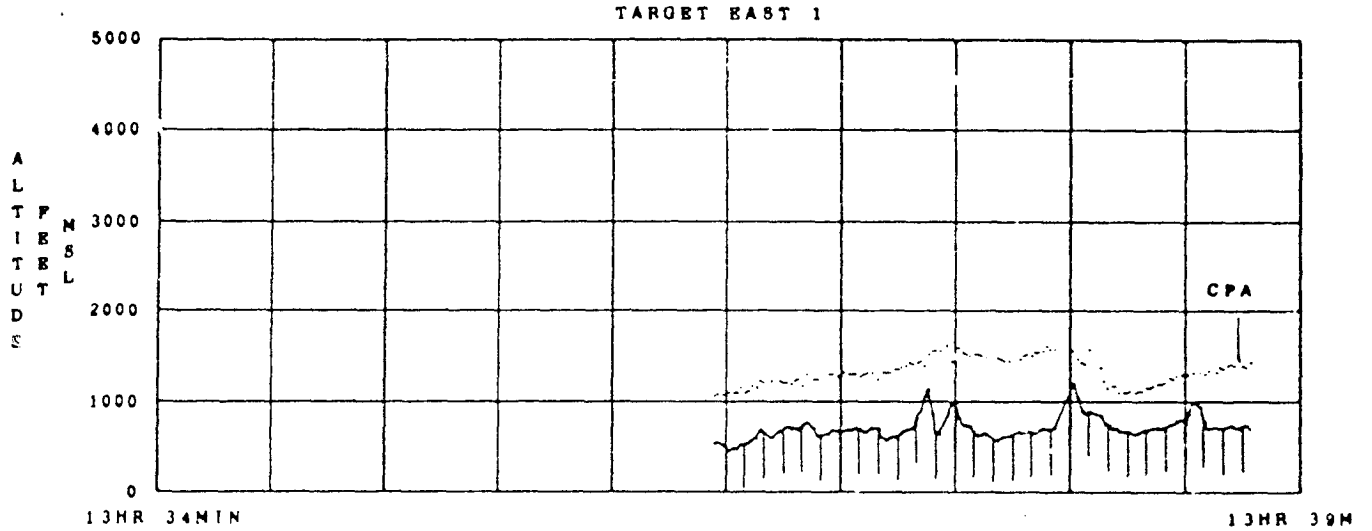


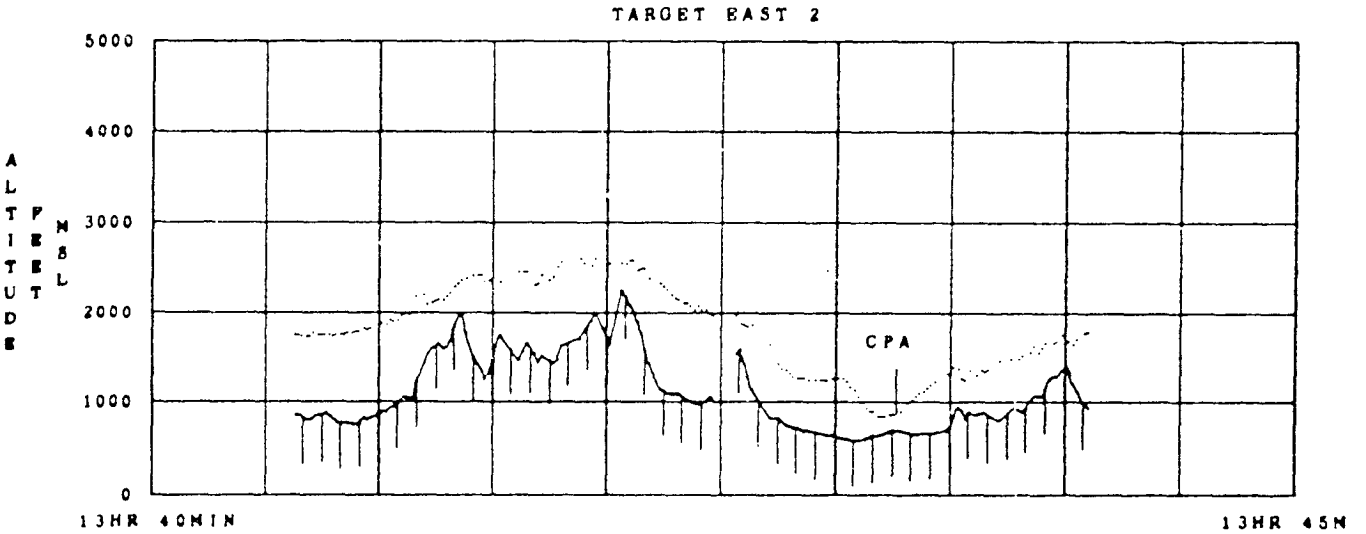
SORTIE NUMBER 308

04092258
J9158

Figure 3-36 (U) Aircraft Altitude and Terrain Profile (Part 1 of 2)

UNCLASSIFIED



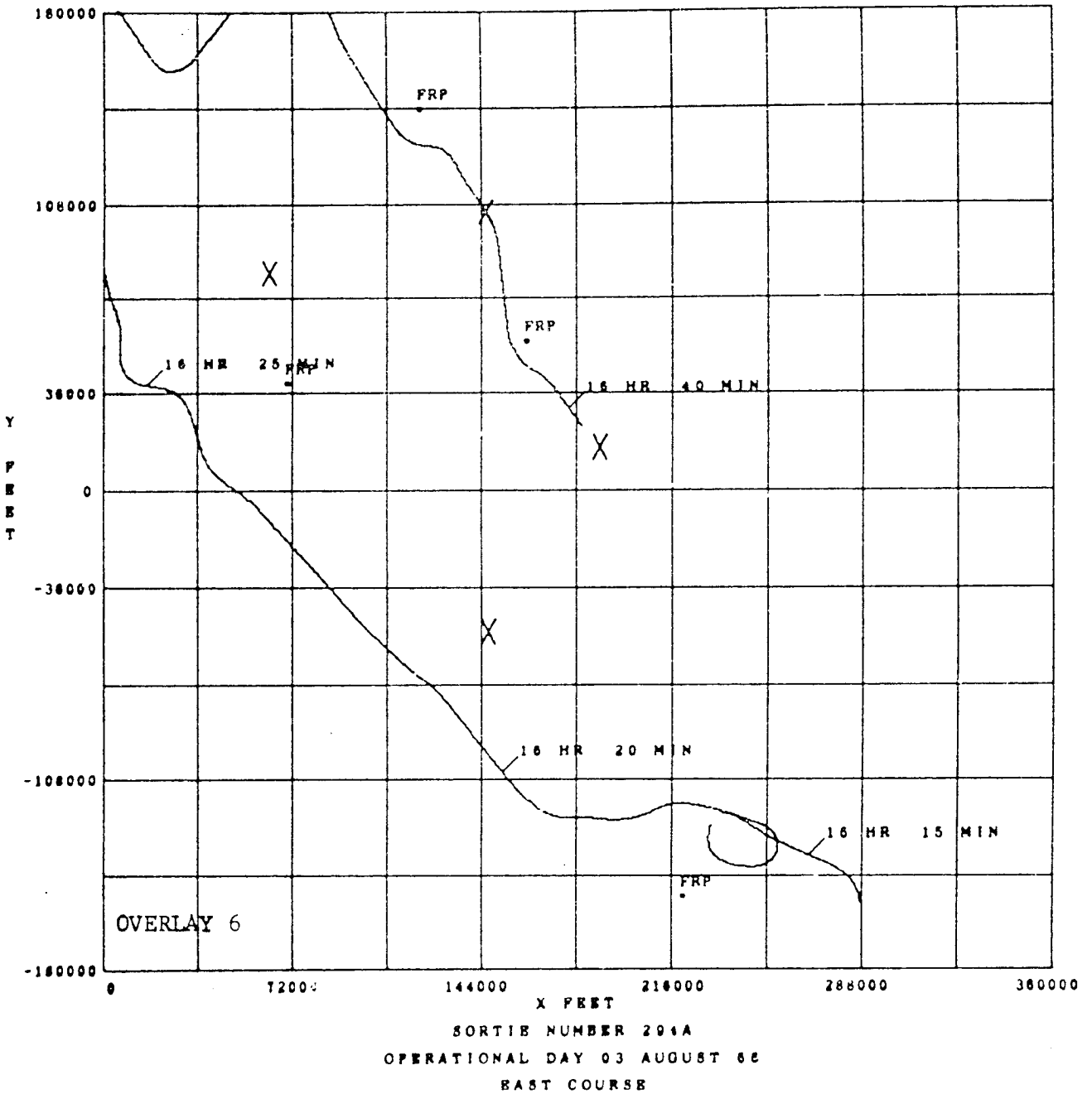


SORTIE NUMBER 308

04092258
J9156

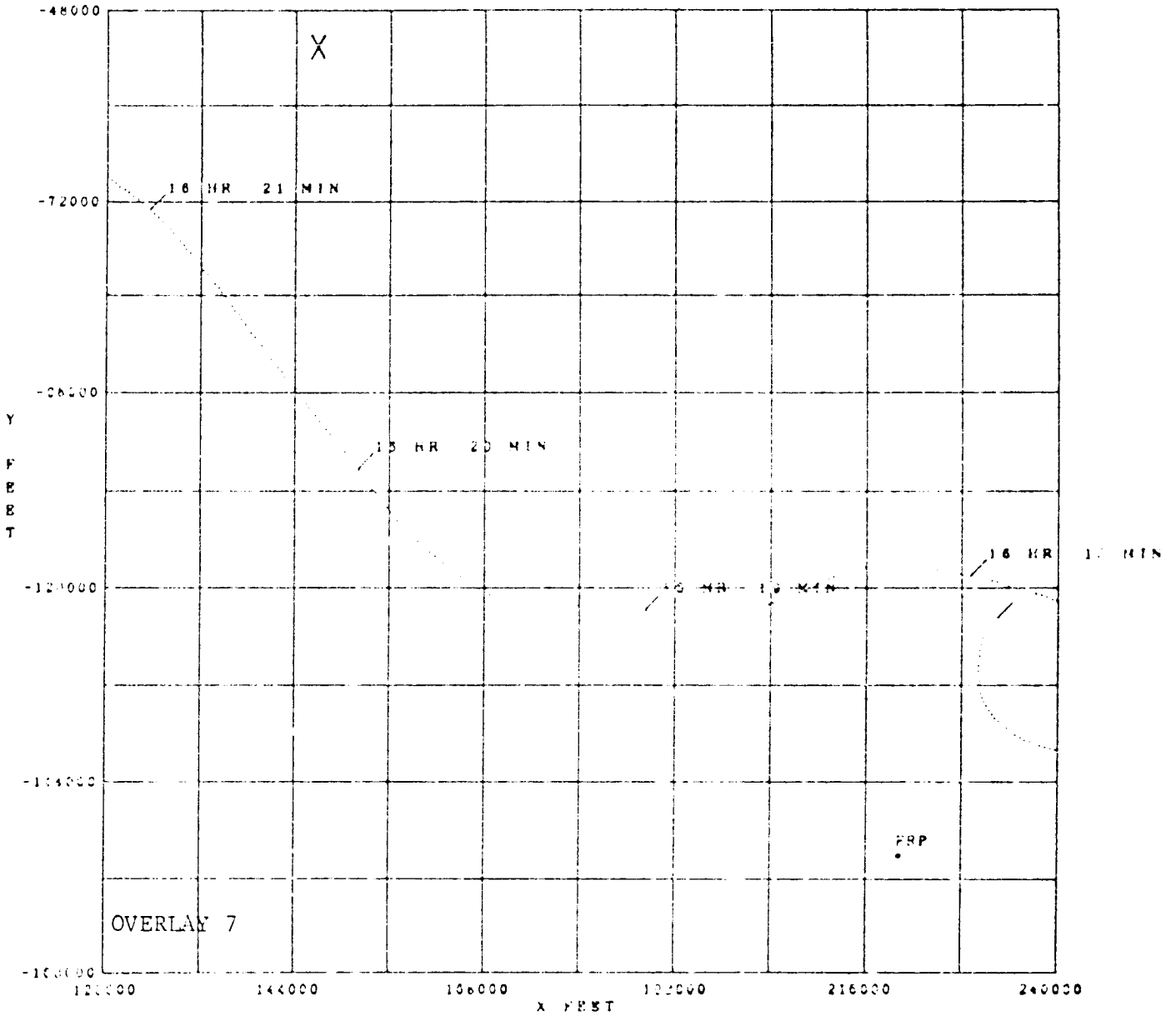
Figure 3-36 (U) Aircraft Altitude and Terrain Profile (Part 2 of 2)

UNCLASSIFIED



04092300
J9156 51

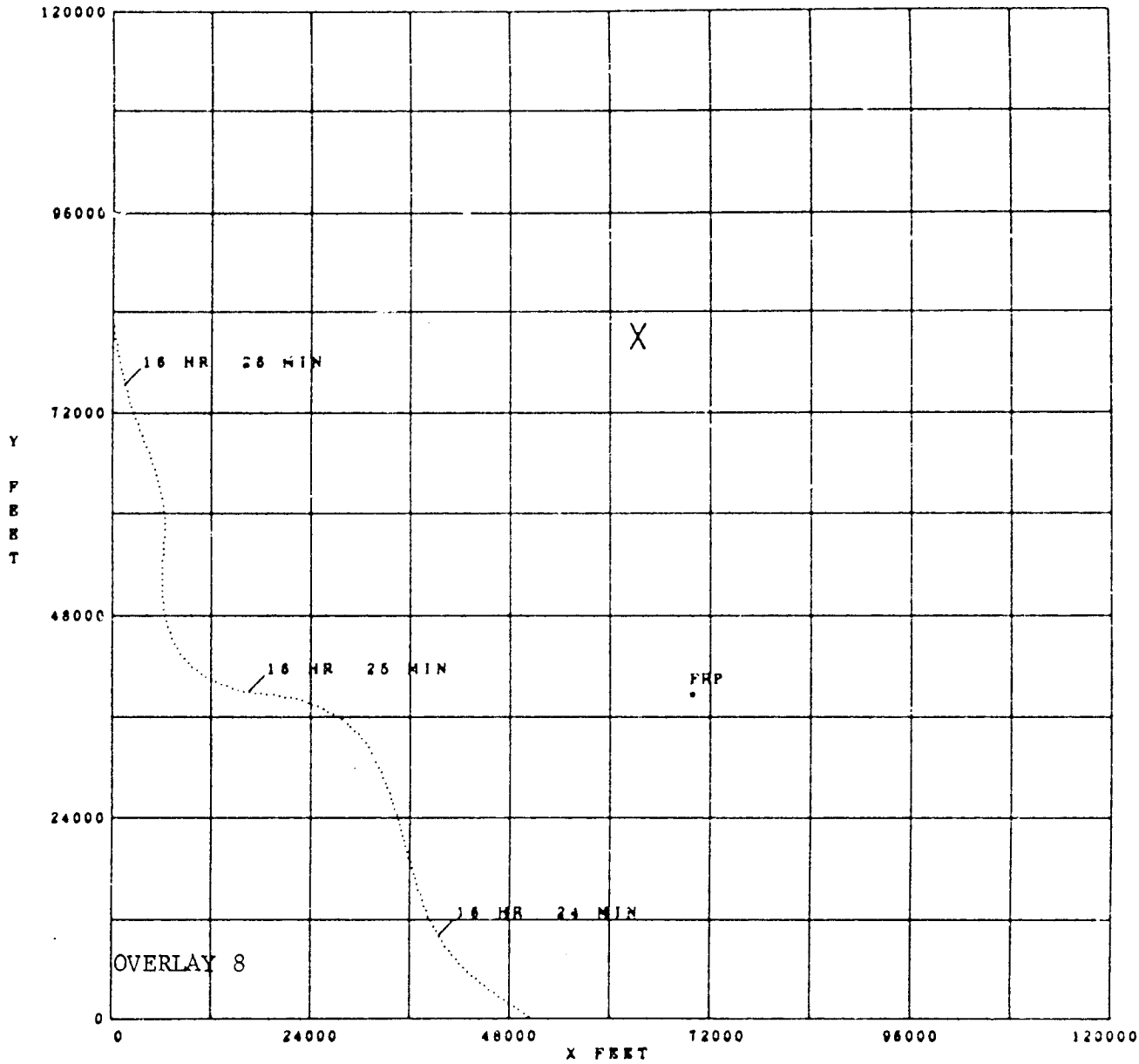
Figure 3-37 (U) Aircraft Position Data (Part 1 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 29376 FEET
MINIMUM GROUND DISTANCE QUALIFIER = ONE
SORTIE NUMBER 204A
TARGET PAST 1

04092300
J9156 52

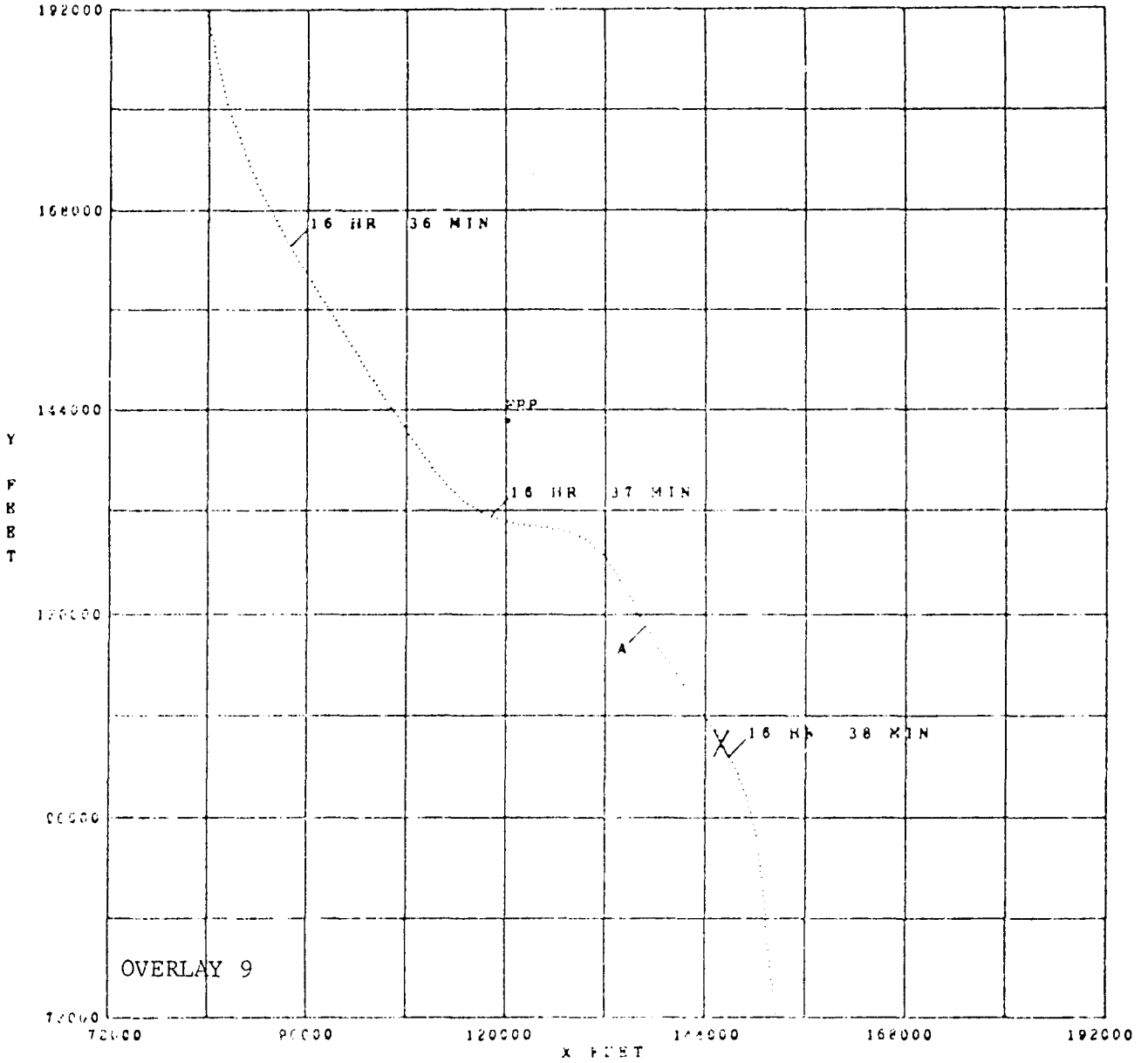
Figure 3-37 (U) Aircraft Position Data (Part 2 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 57389 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 294A
TARGET EAST 2

04092300
J9156 53

Figure 3-37 (U) Aircraft Position Data (Part 3 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 174 FEET

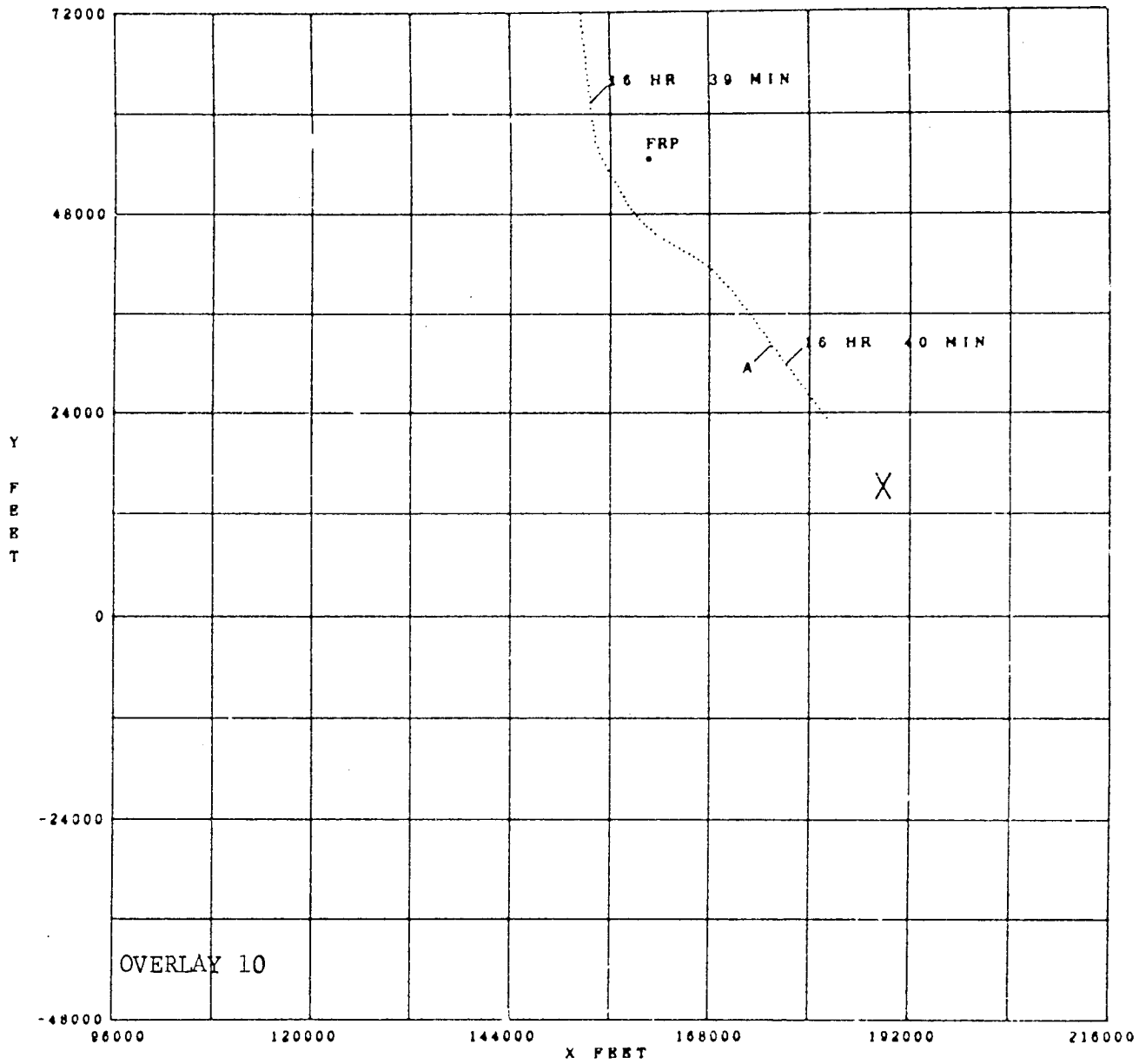
MINIMUM GROUND DISTANCE QUALIFIER = DHB

SORTIE NUMBER 224A

TARGET EAST 3

04092300
J9156 54

Figure 3-37 (U) Aircraft Position Data (Part 4 of 5)

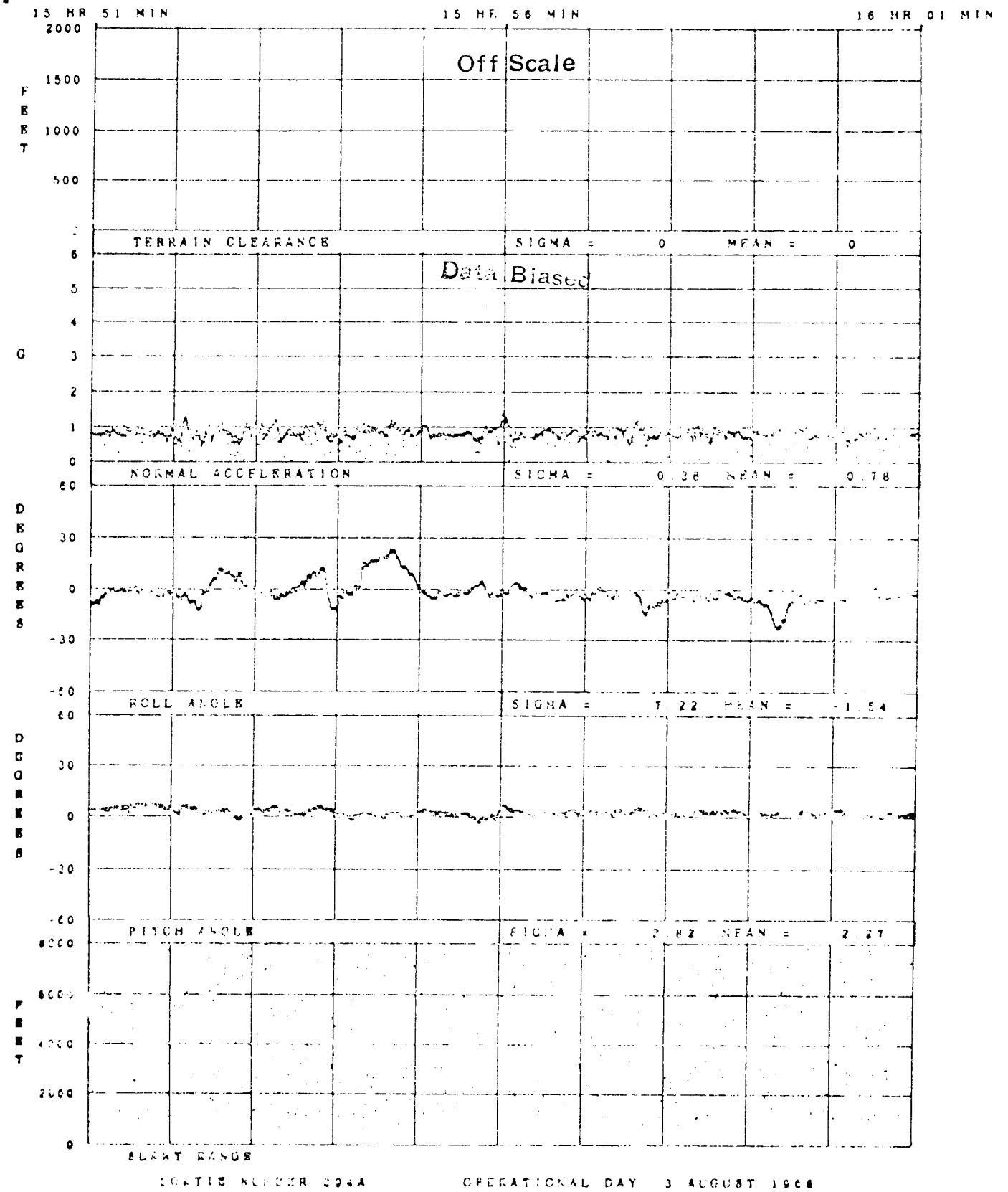


MINIMUM GROUND DISTANCE TO TARGET = 0 FEET
MINIMUM GROUND DISTANCE QUALIFIER = ESTIMATED
SORTIE NUMBER 294A
TARGET EAST 4

04092300
J9156 55

Figure 3-37 (U) Aircraft Position Data (Part 5 of 5)

UNCLASSIFIED



UNCLASSIFIED

Figure 3-38 (U) Telemetered Data (Part 1 of 5)

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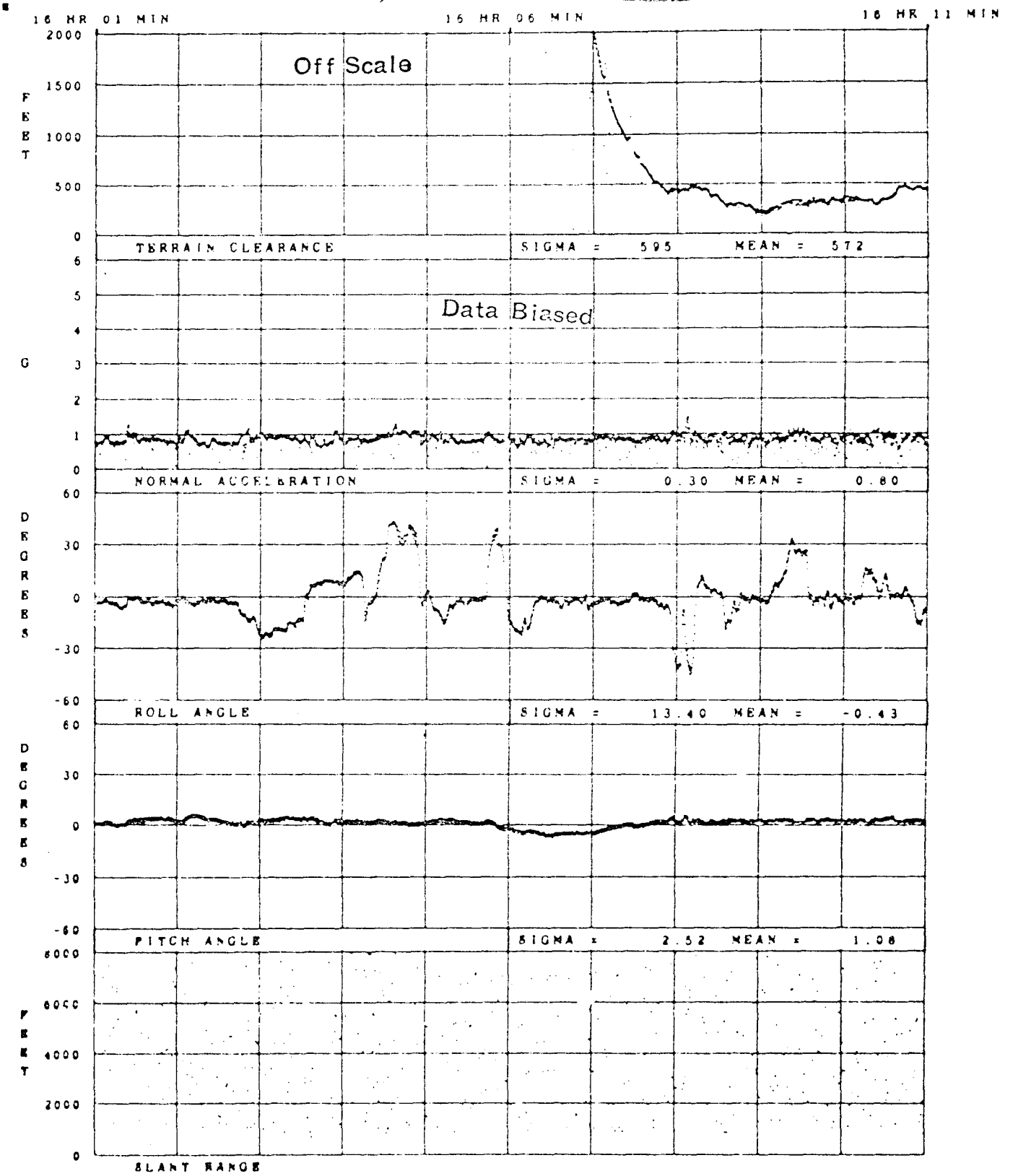
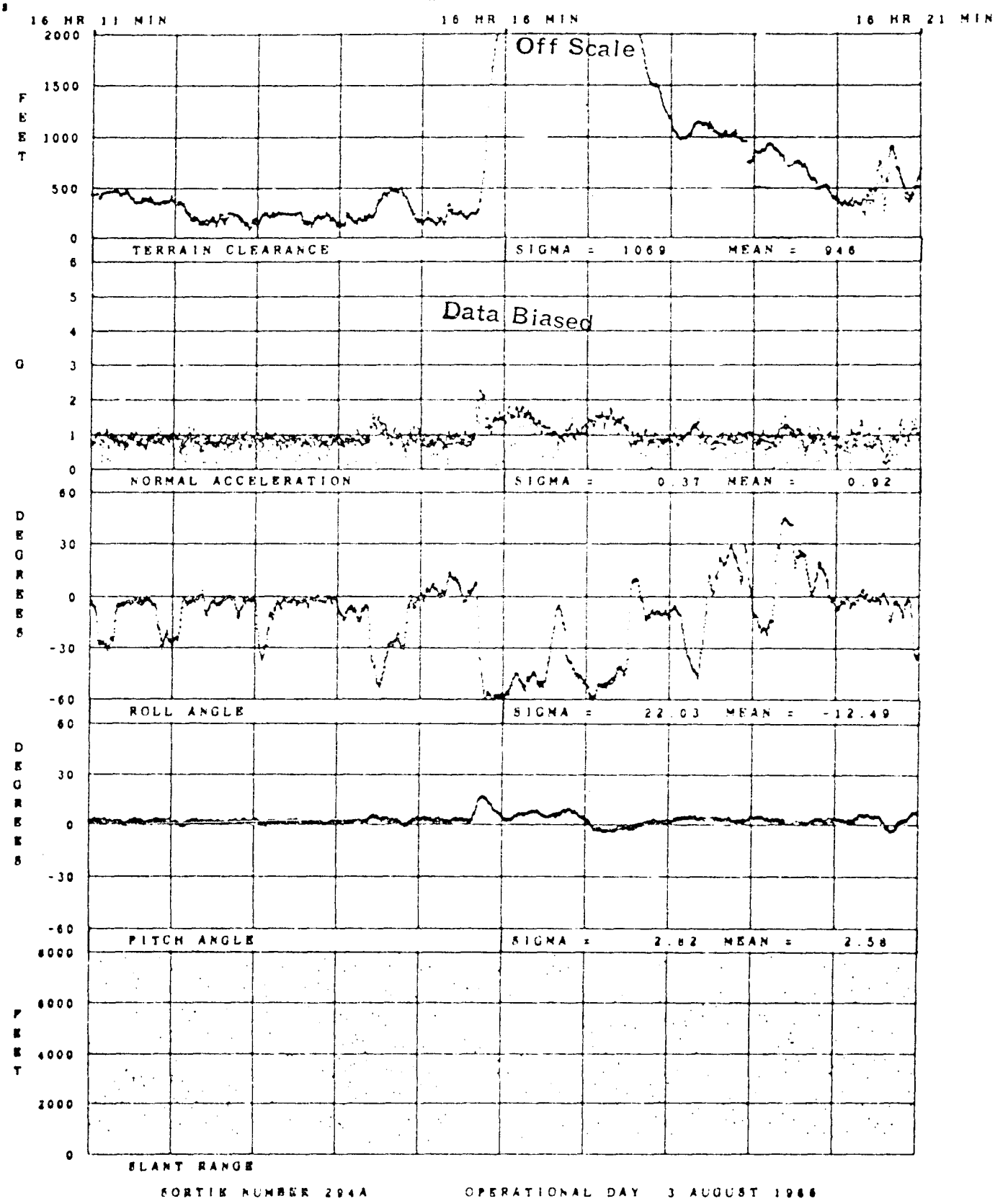


24061702
JT152/ 31

UNCLASSIFIED

Figure 3-38 (U) Telemetered Data (Part 2 of 5)

UNCLASSIFIED



SORTIE NUMBER 294A

OPERATIONAL DAY 3 AUGUST 1966

UNCLASSIFIED

Figure 3-38 (U) Telemetered Data (Part 3 of 5)

UNCLASSIFIED

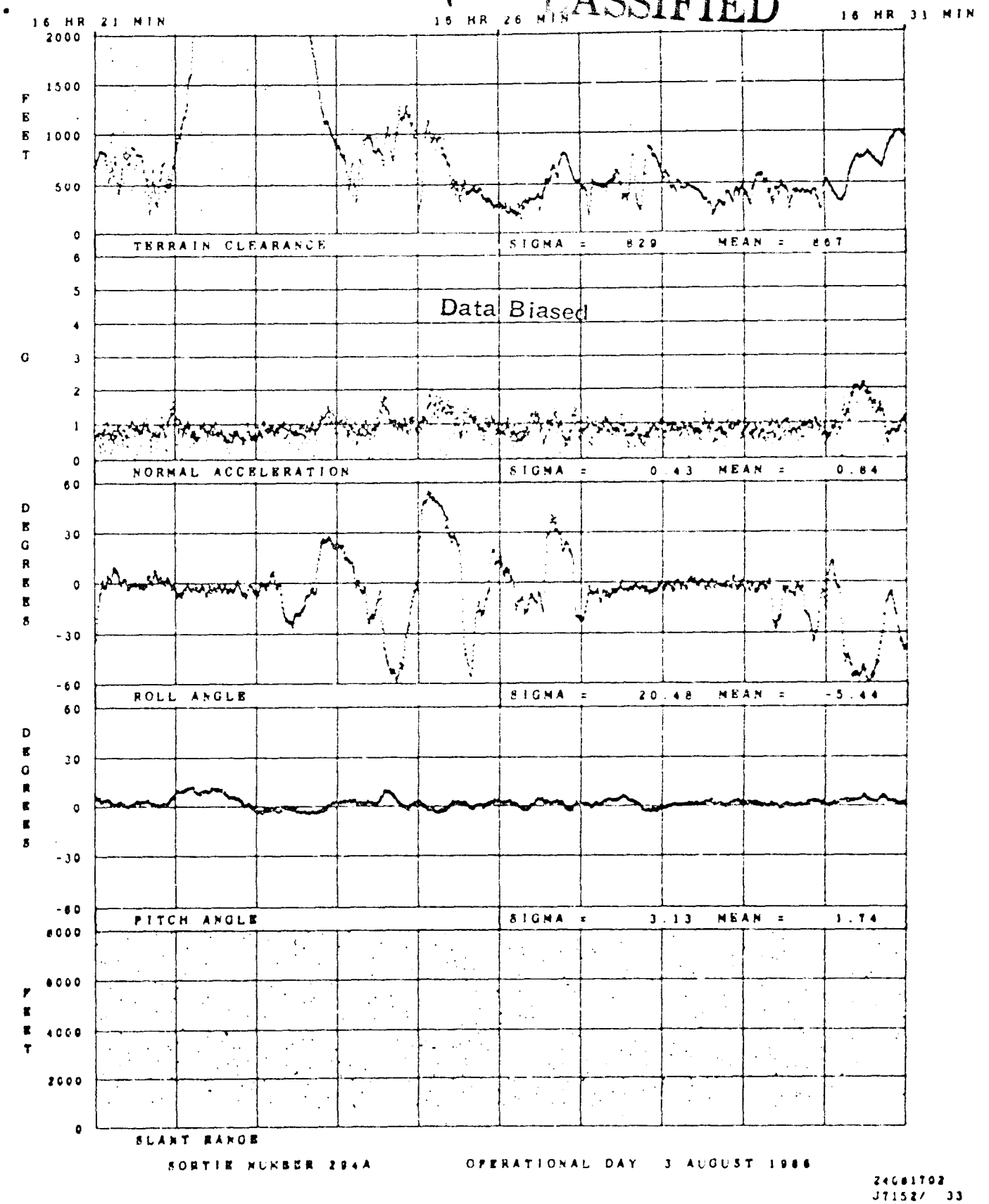
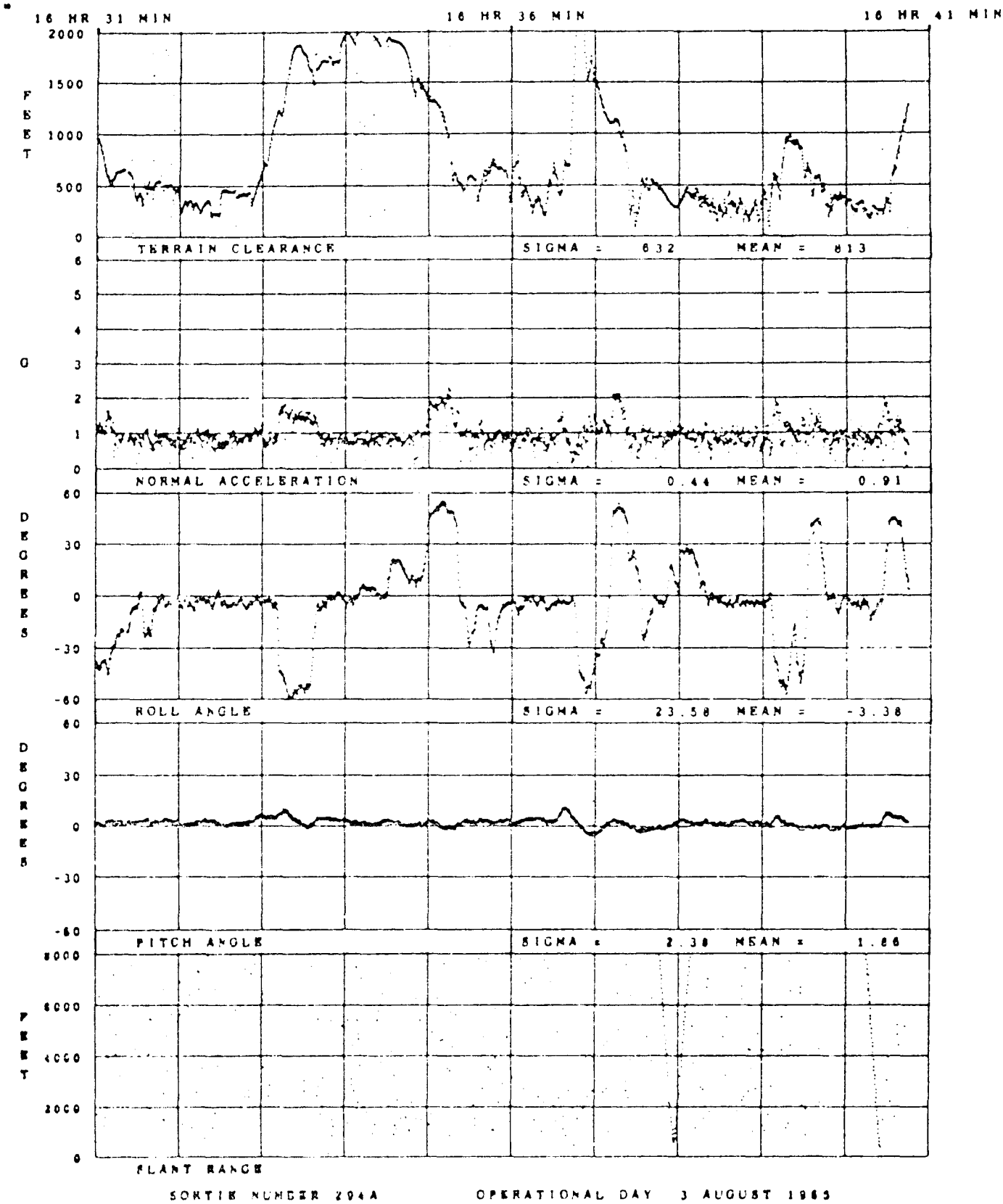


Figure 3-38 (U) Telemetered Data (Part 4 of 5)

UNCLASSIFIED

UNCLASSIFIED

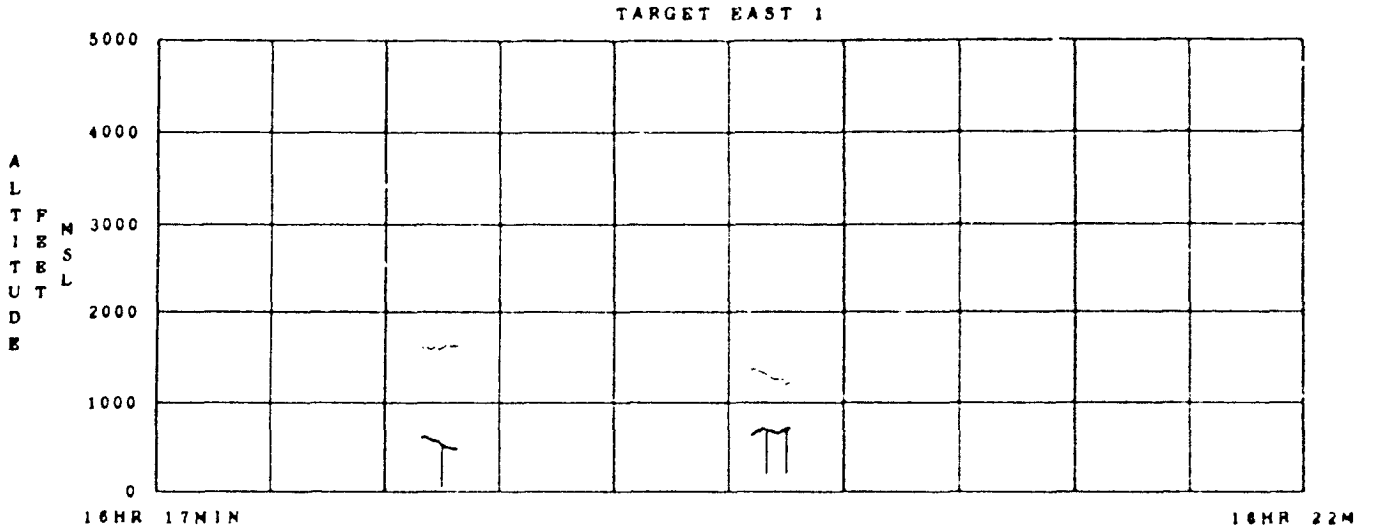


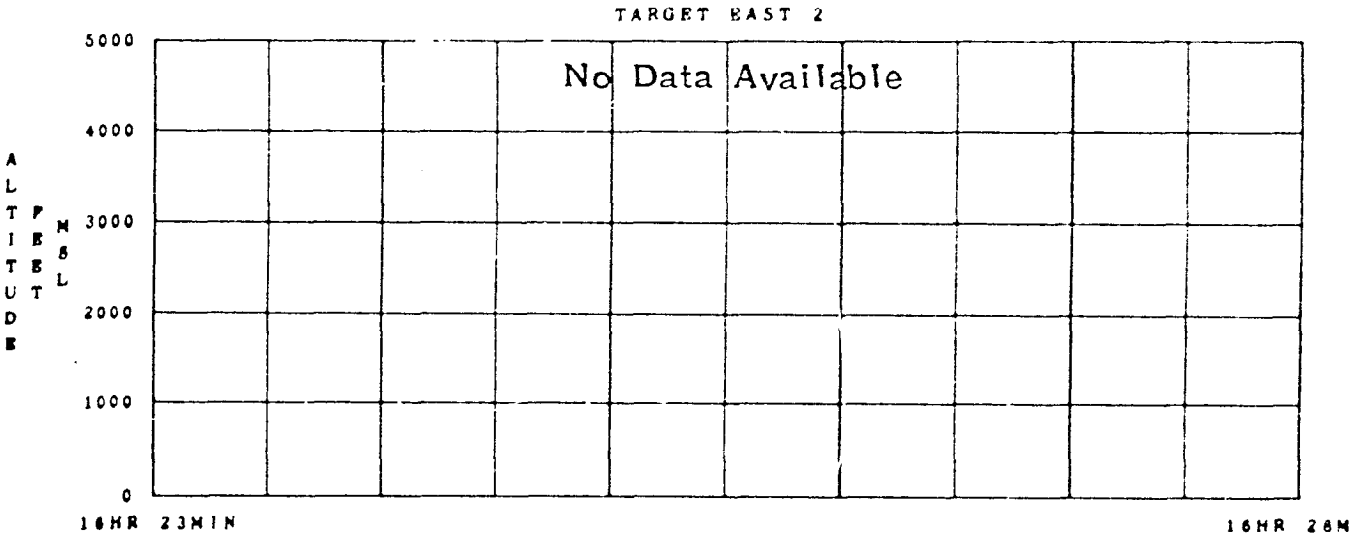
2<0C1T02
J71527 34

Figure 3-38 (U) Telemetered Data (Part 5 of 5)

UNCLASSIFIED

UNCLASSIFIED



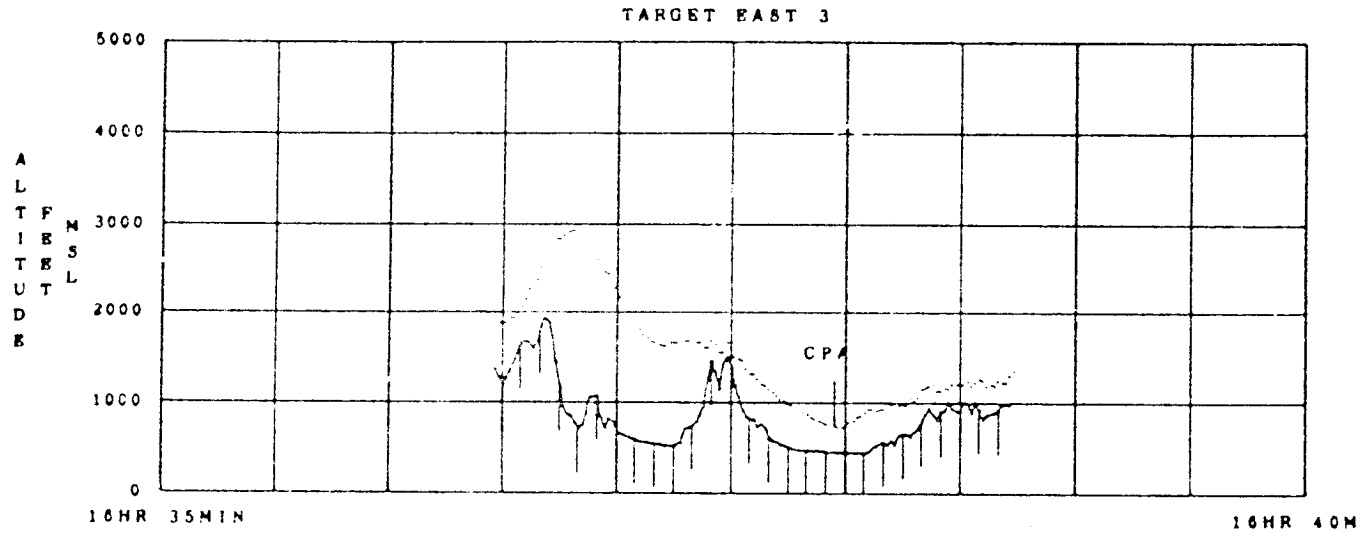


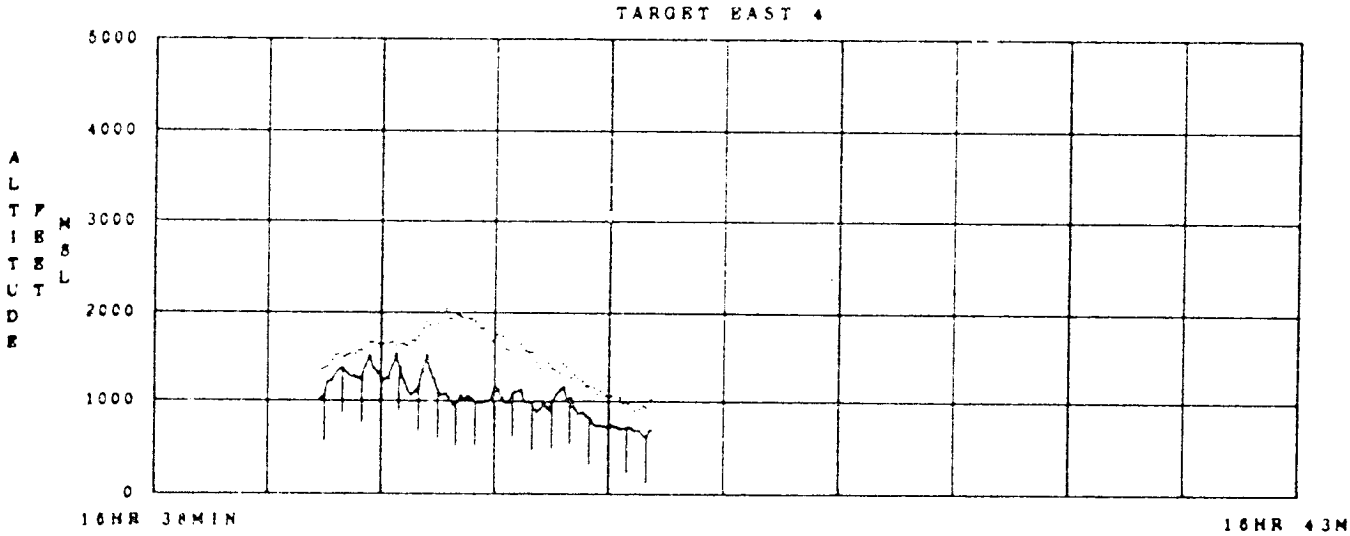
SORTIE NUMBER 294A

04092300
J9156

Figure 3-39 (U) Aircraft Altitude and Terrain Profile (Part 1 of 2)

UNCLASSIFIED

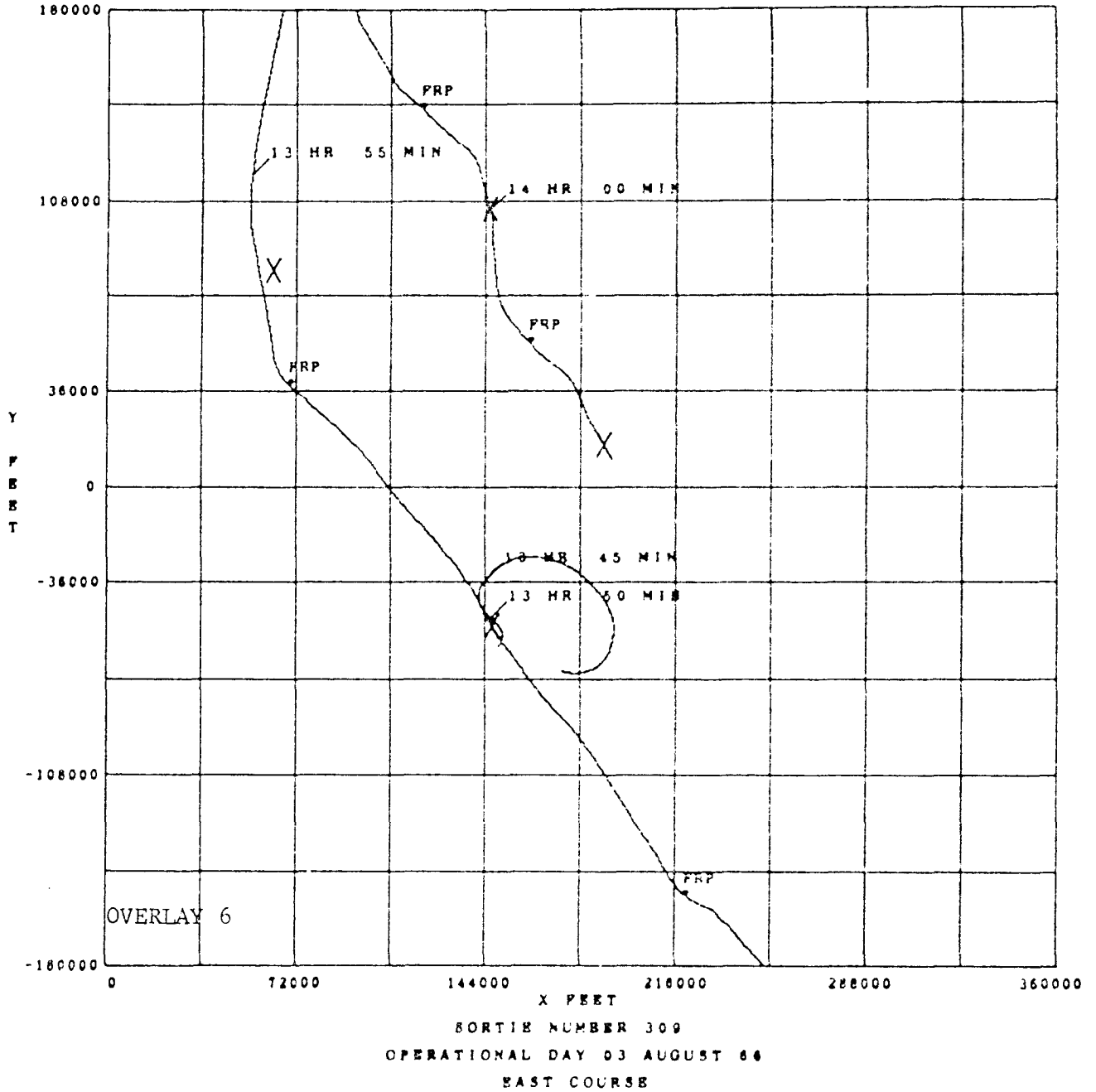




SORTIE NUMBER 294A

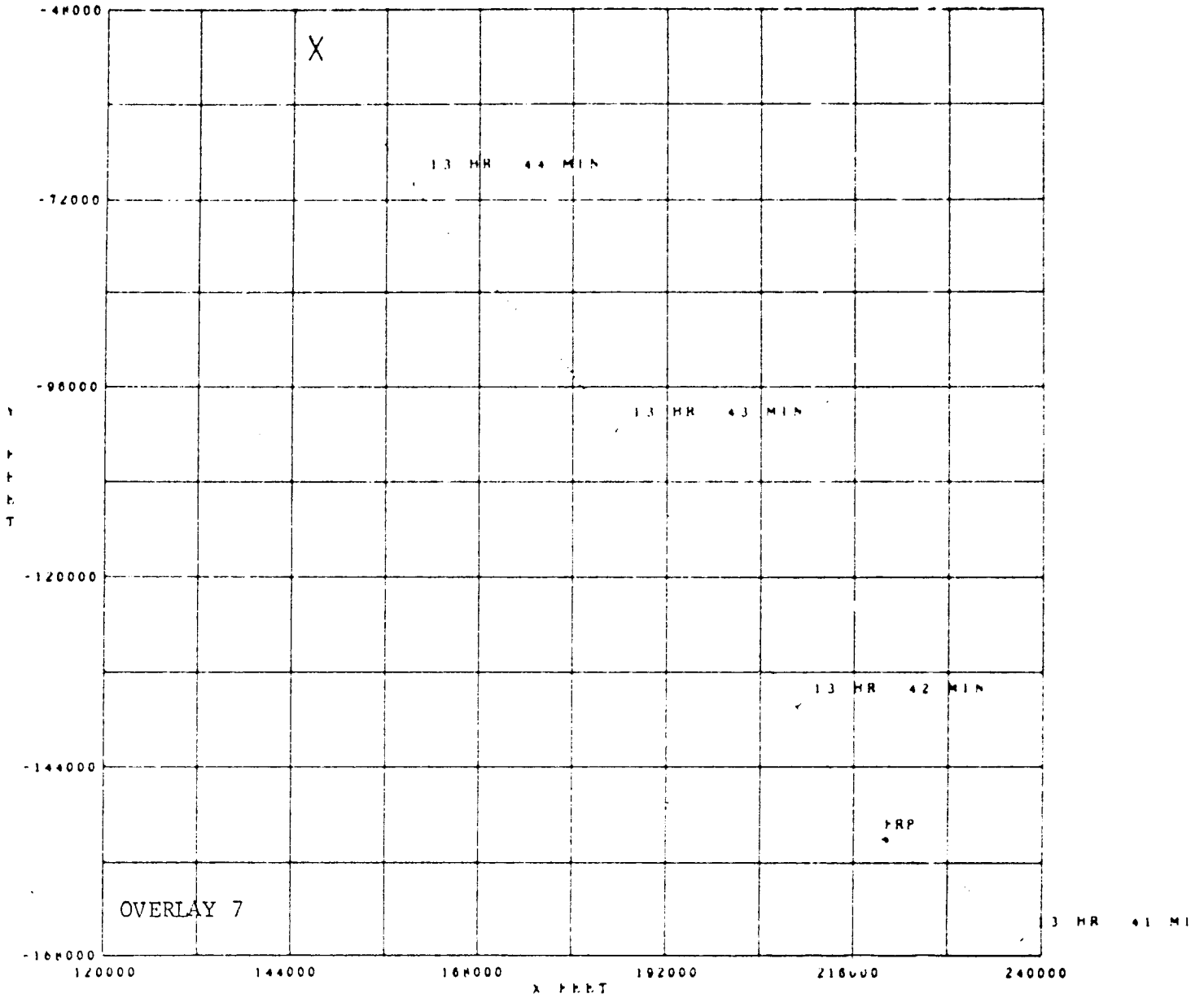
04092300
J9155

Figure 3-39 (U) Aircraft Altitude and Terrain Profile (Part 2 of 2)



04092300
J9156 4

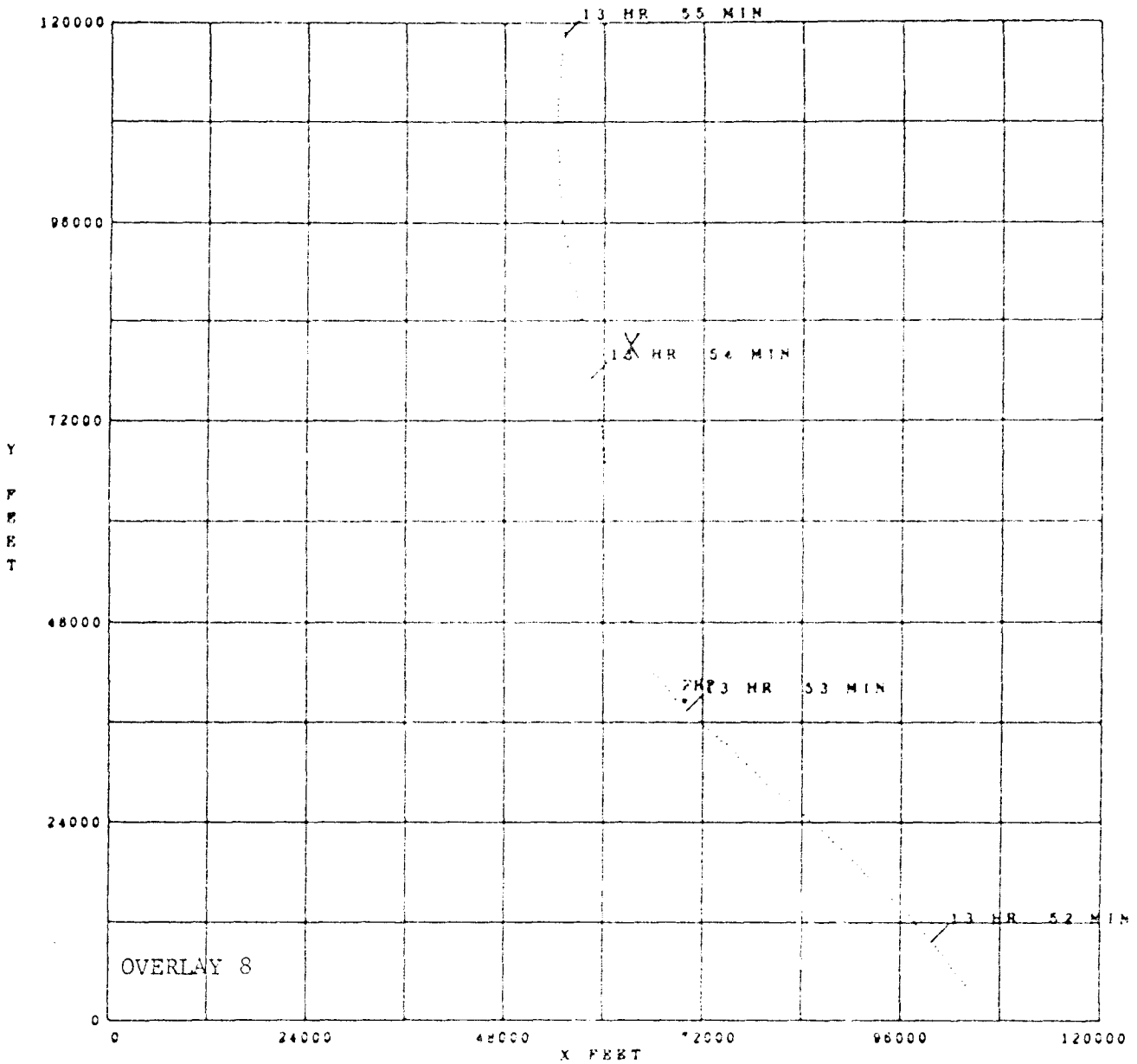
Figure 3-40 (U) Aircraft Position Data (Part 1 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 175 FEET
MINIMUM GROUND DISTANCE QUALIFIER = ONE
SORTIE NUMBER 309
TARGET EAST 1

24091557
J7013 23

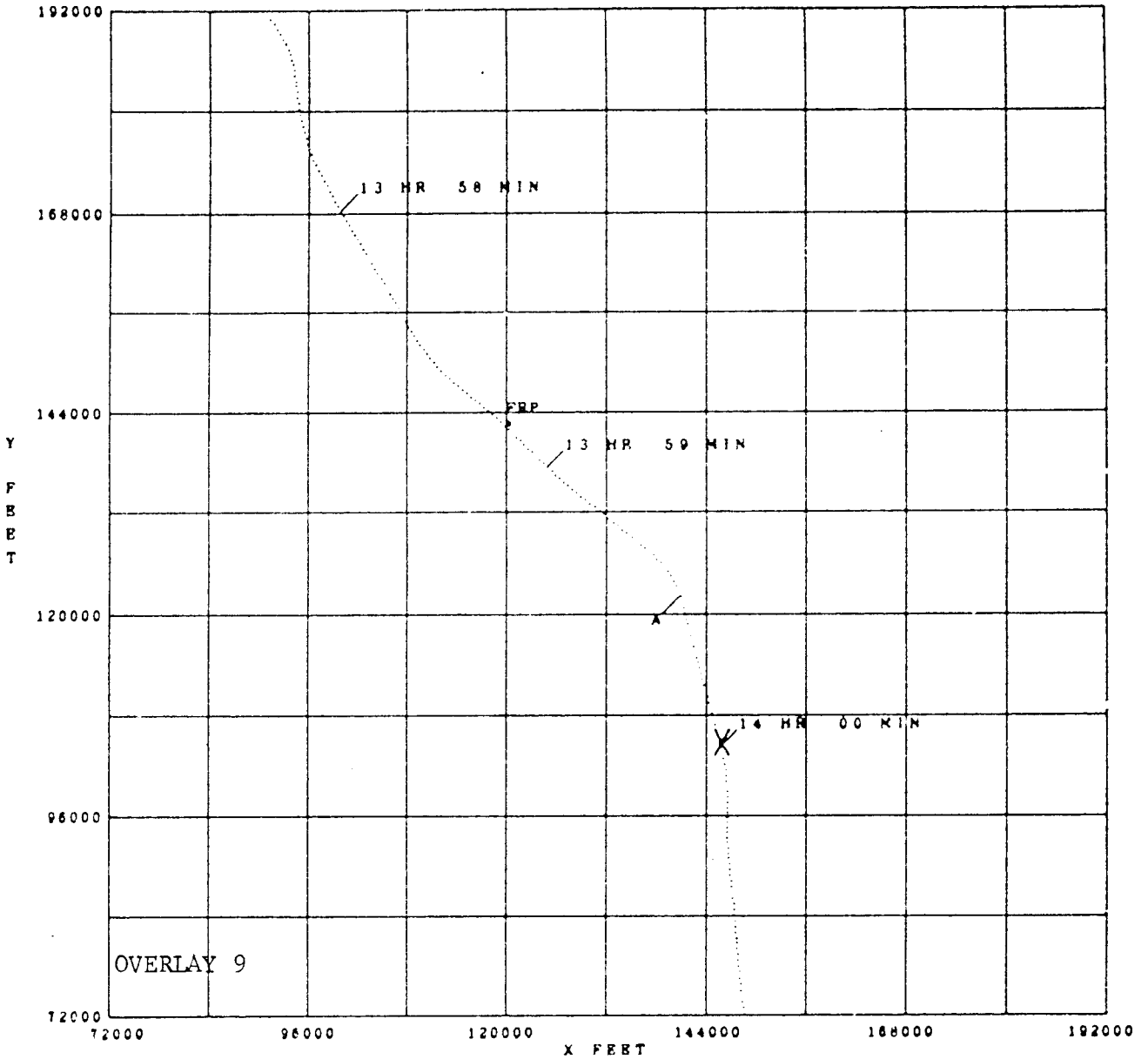
Figure 3-40 (U) Aircraft Position Data (Part 2 of 5)



MINIMUM GROUND DISTANCE TO T NOET = 5379 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 309
TARGET EAST 2

04092300
J9158 45

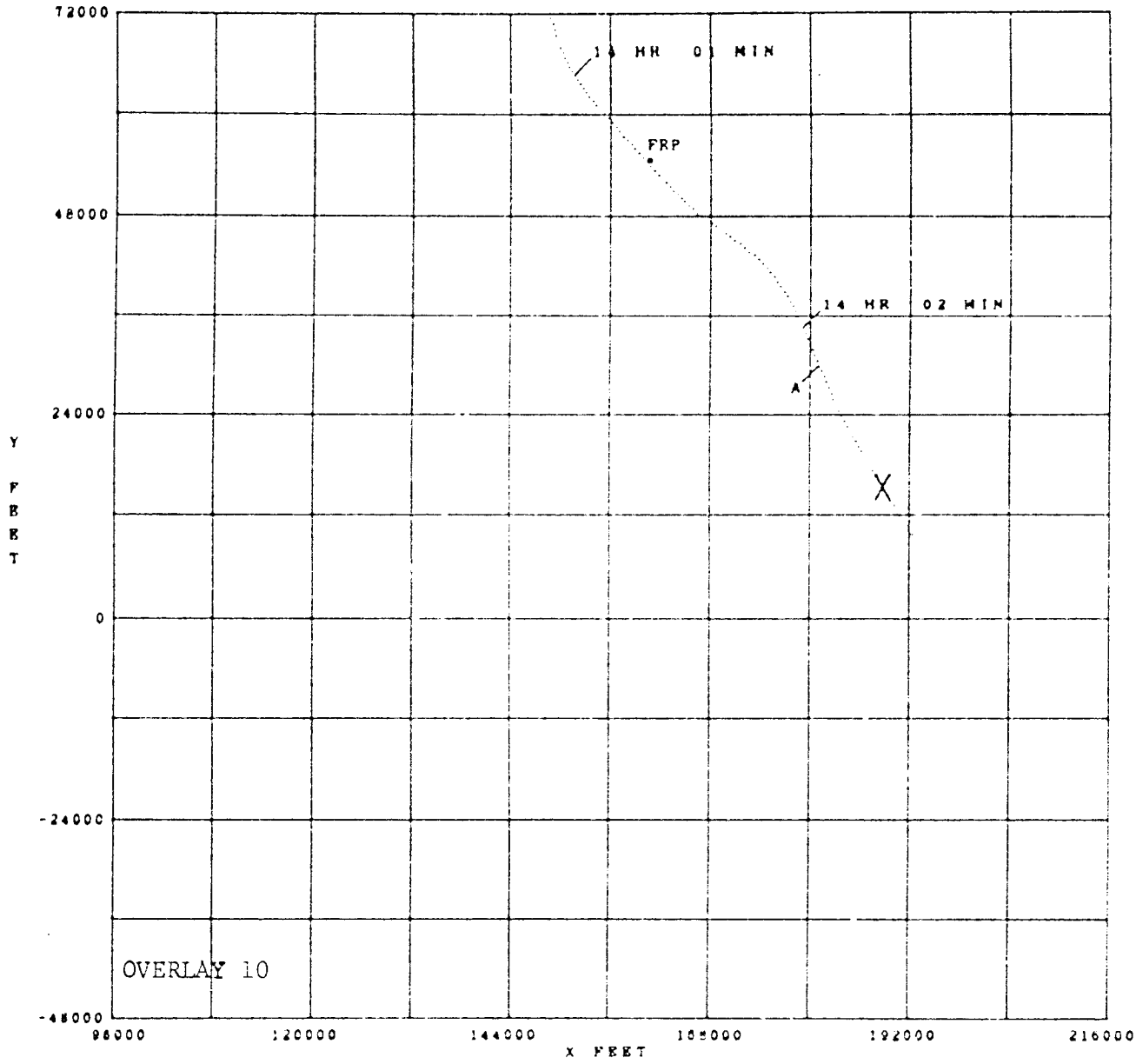
Figure 3-40 (U) Aircraft Position Data (Part 3 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 294 FEET
MINIMUM GROUND DISTANCE QUALIFIER = ONE
SORTIE NUMBER 309
TARGET EAST 3

04092300
J9156 46

Figure 3-40 (U) Aircraft Position Data (Part 4 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 112 FEET

MINIMUM GROUND DISTANCE QUALIFIER = DME

SORTIE NUMBER 309

TARGET EAST 4

04092300
J9158 4

Figure 3-40 (U) Aircraft Position Data (Part 5 of 5)

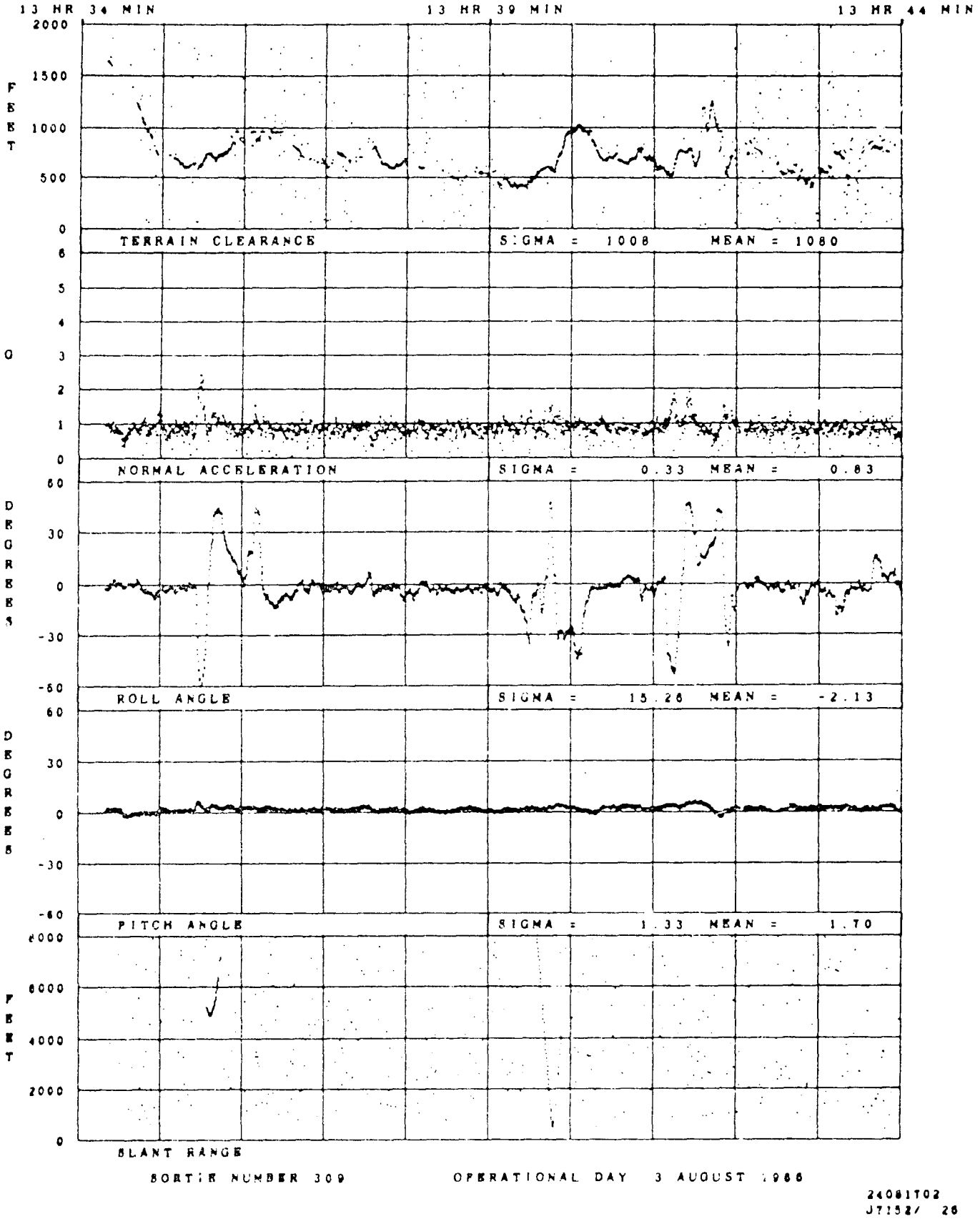


Figure 3-41 (U) Telemetered Data (Part 1 of 3)

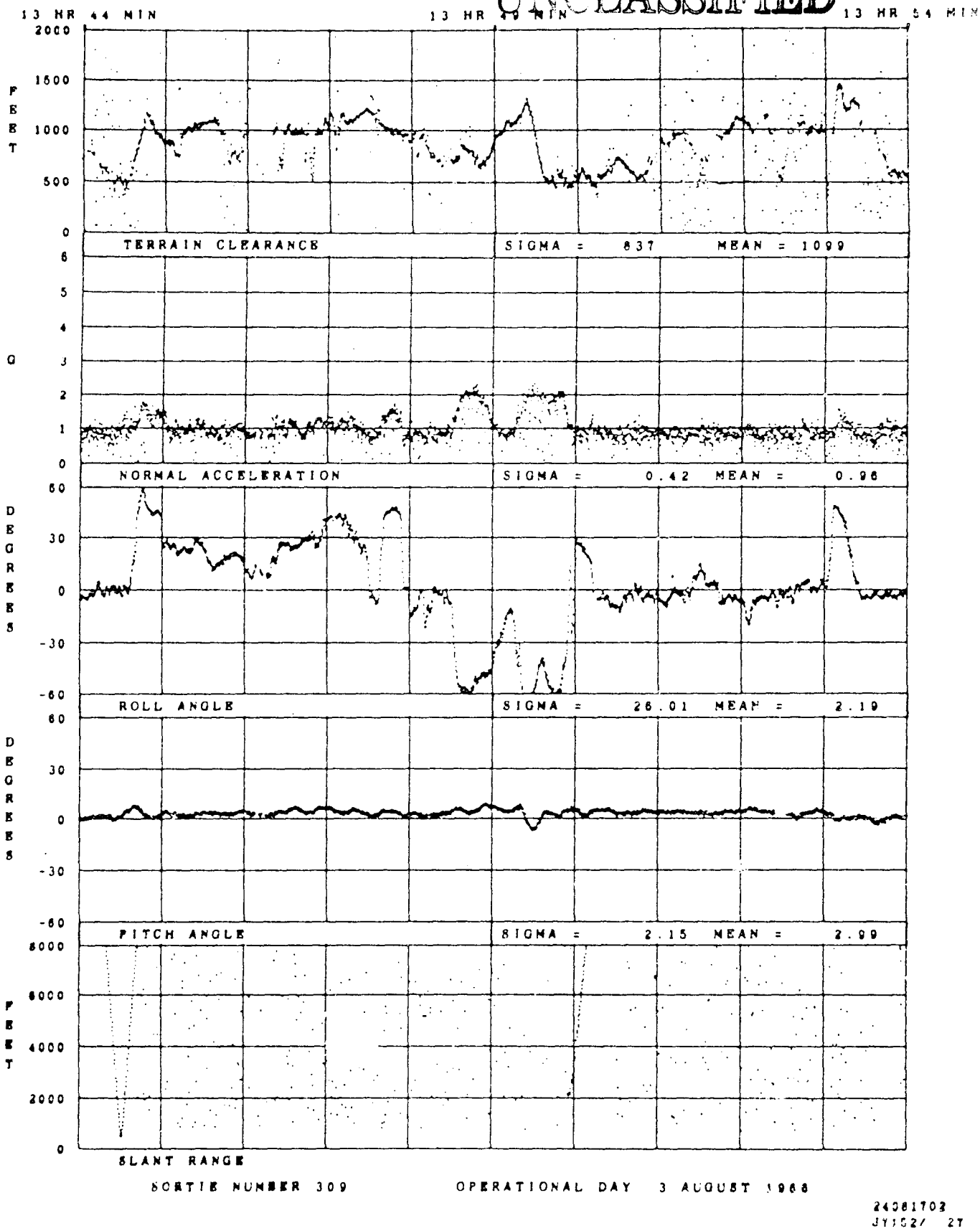


Figure 3-41 (U) Telemetered Data (Part 2 of 3)

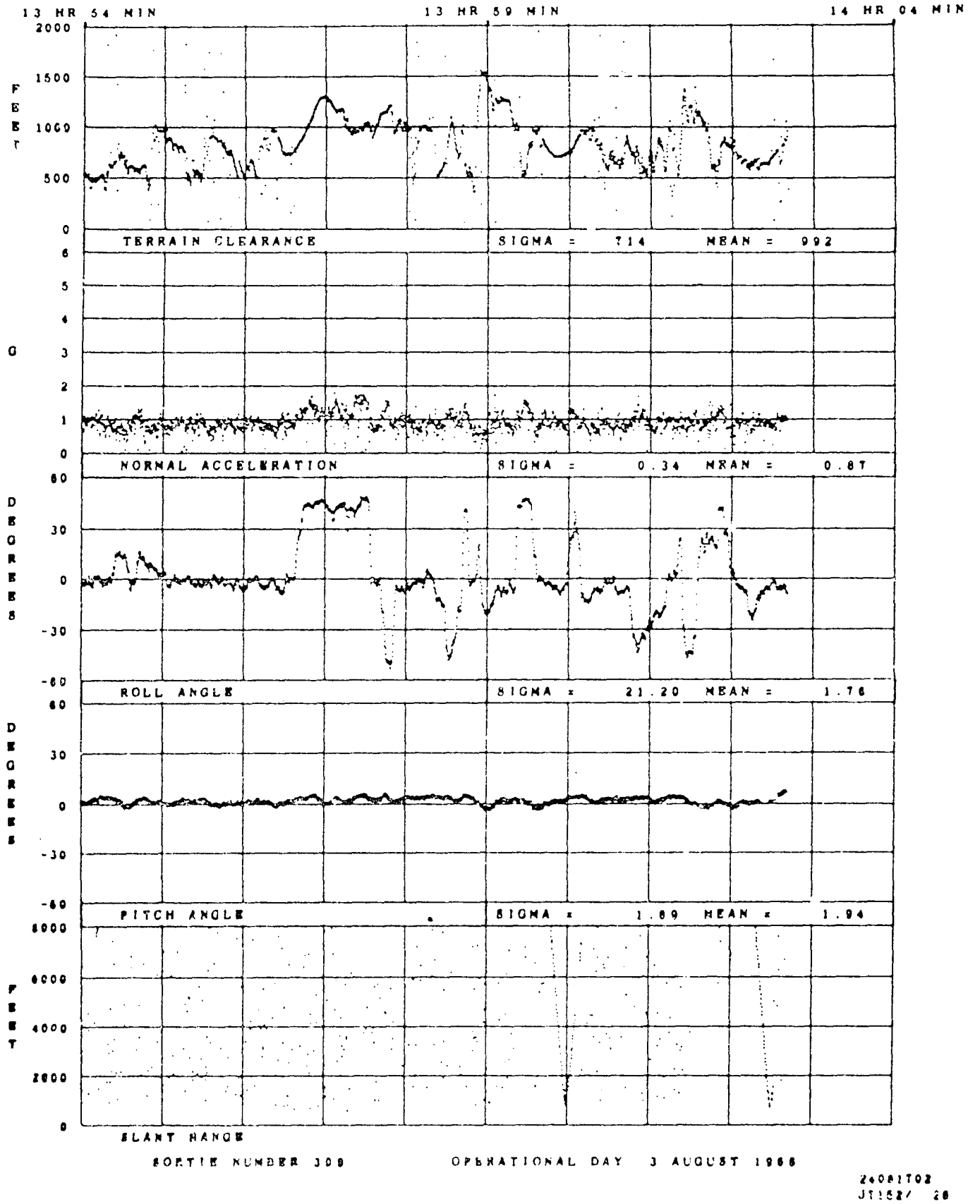
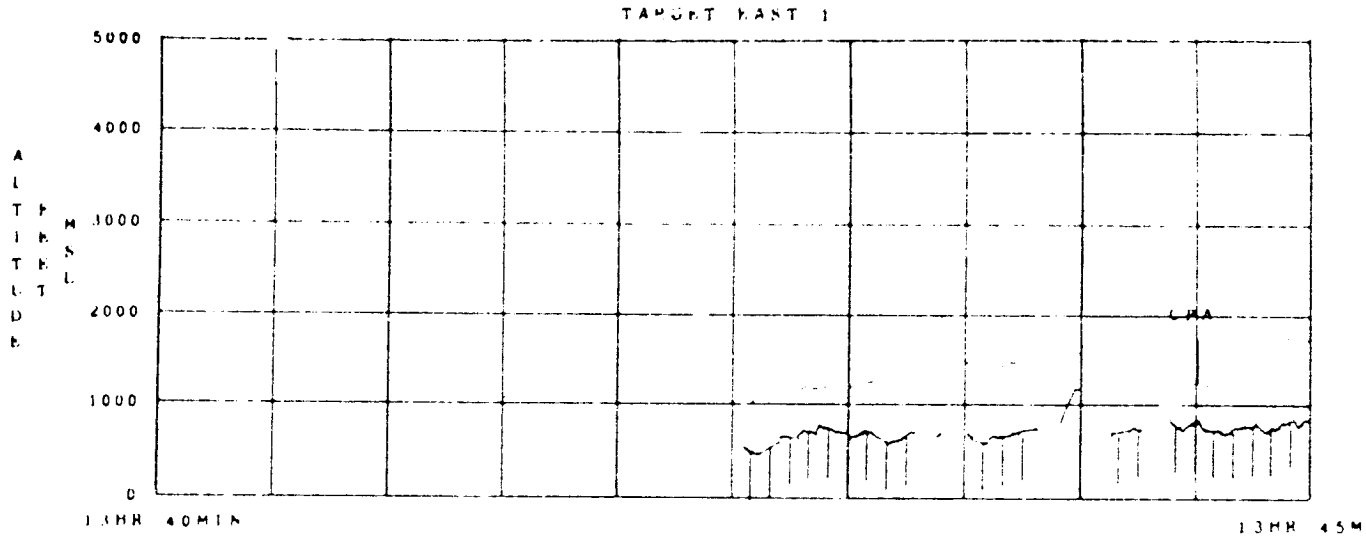
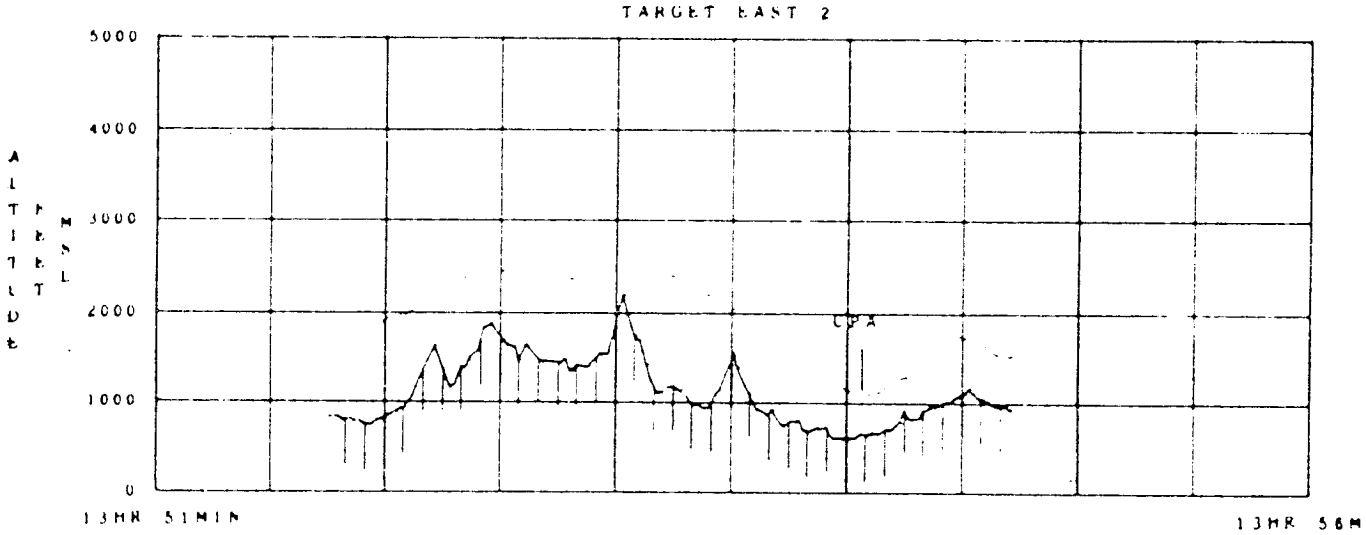


Figure 3-41 (U) Telemetered Data (Part 3 of 3)

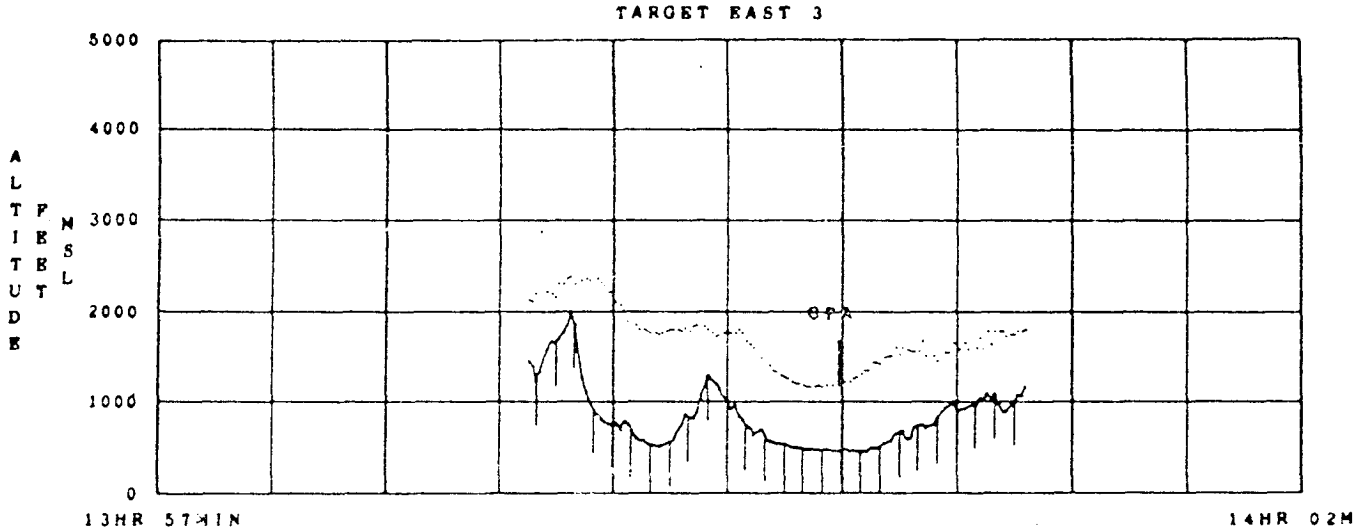


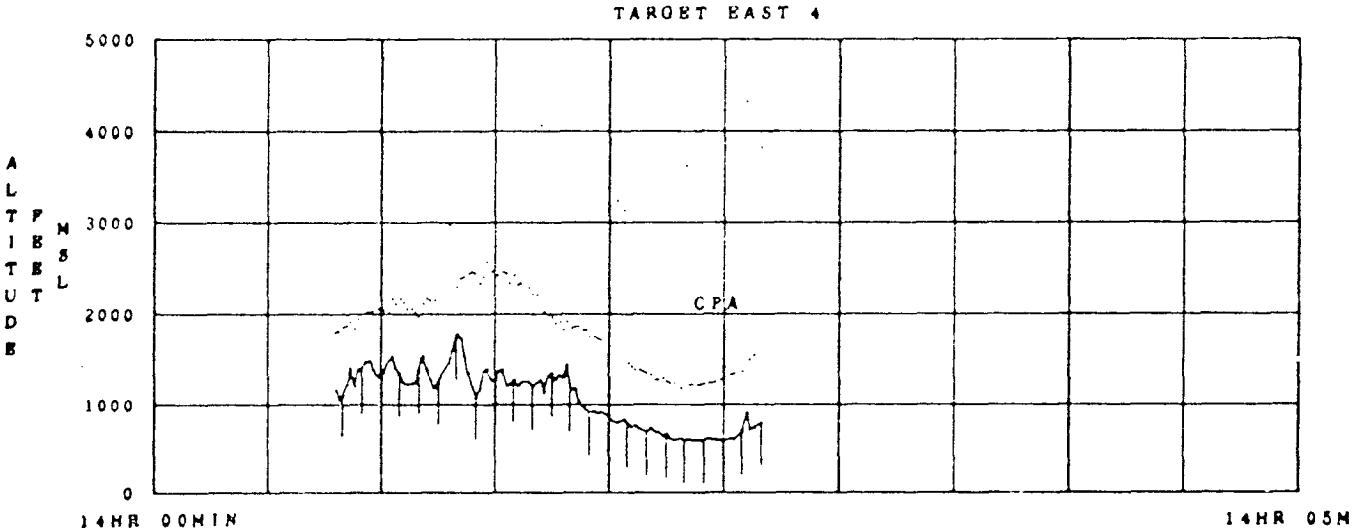


SORTIE NUMBER 309

24091557
J7013

Figure 3-42 (U) Aircraft Altitude and Terrain Profile (Part 1 of 2)

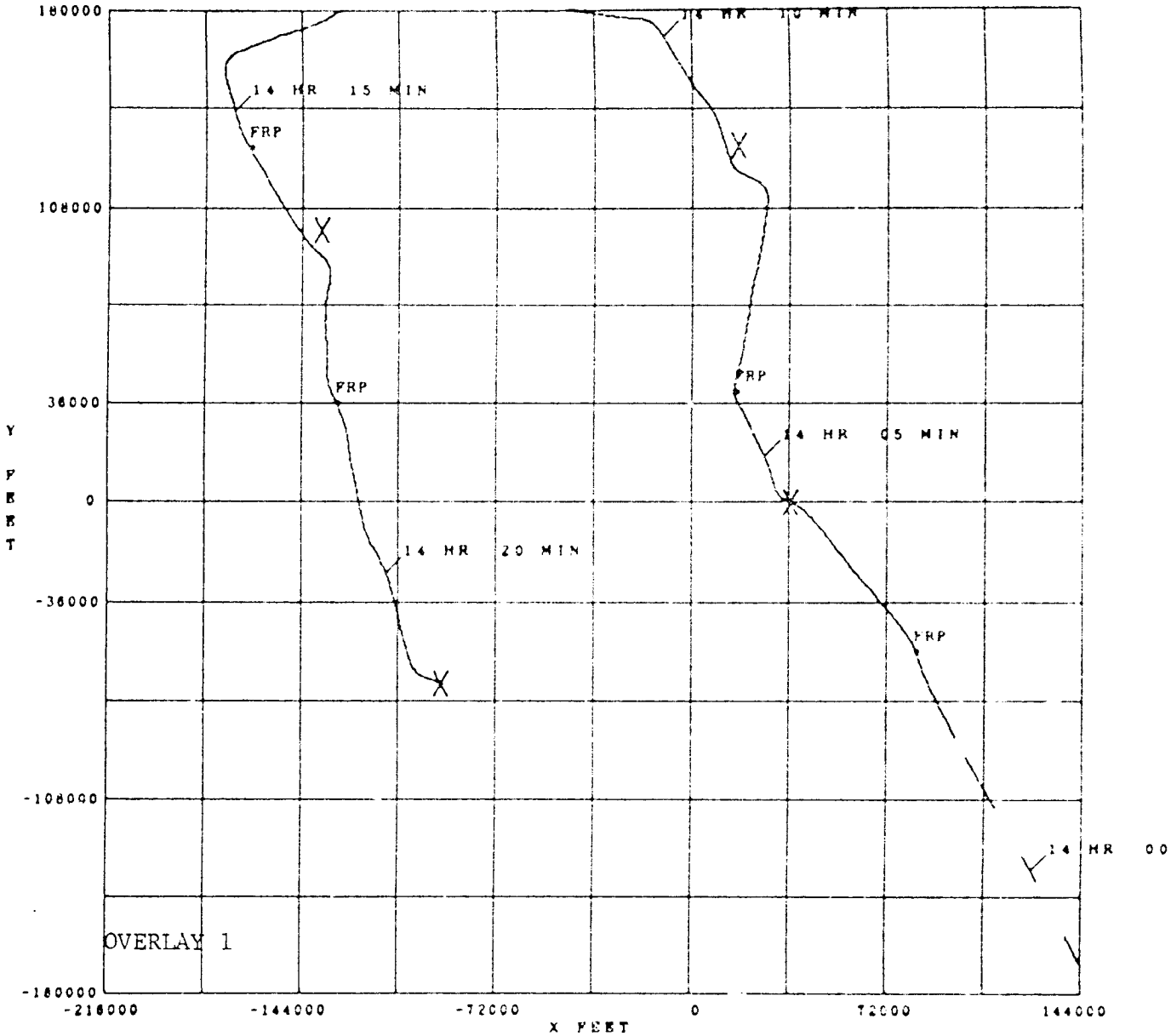




SORTIE NUMBER 309

04092300
J9156

Figure 3-42 (U) Aircraft Altitude and Terrain Profile (Part 2 of 2)

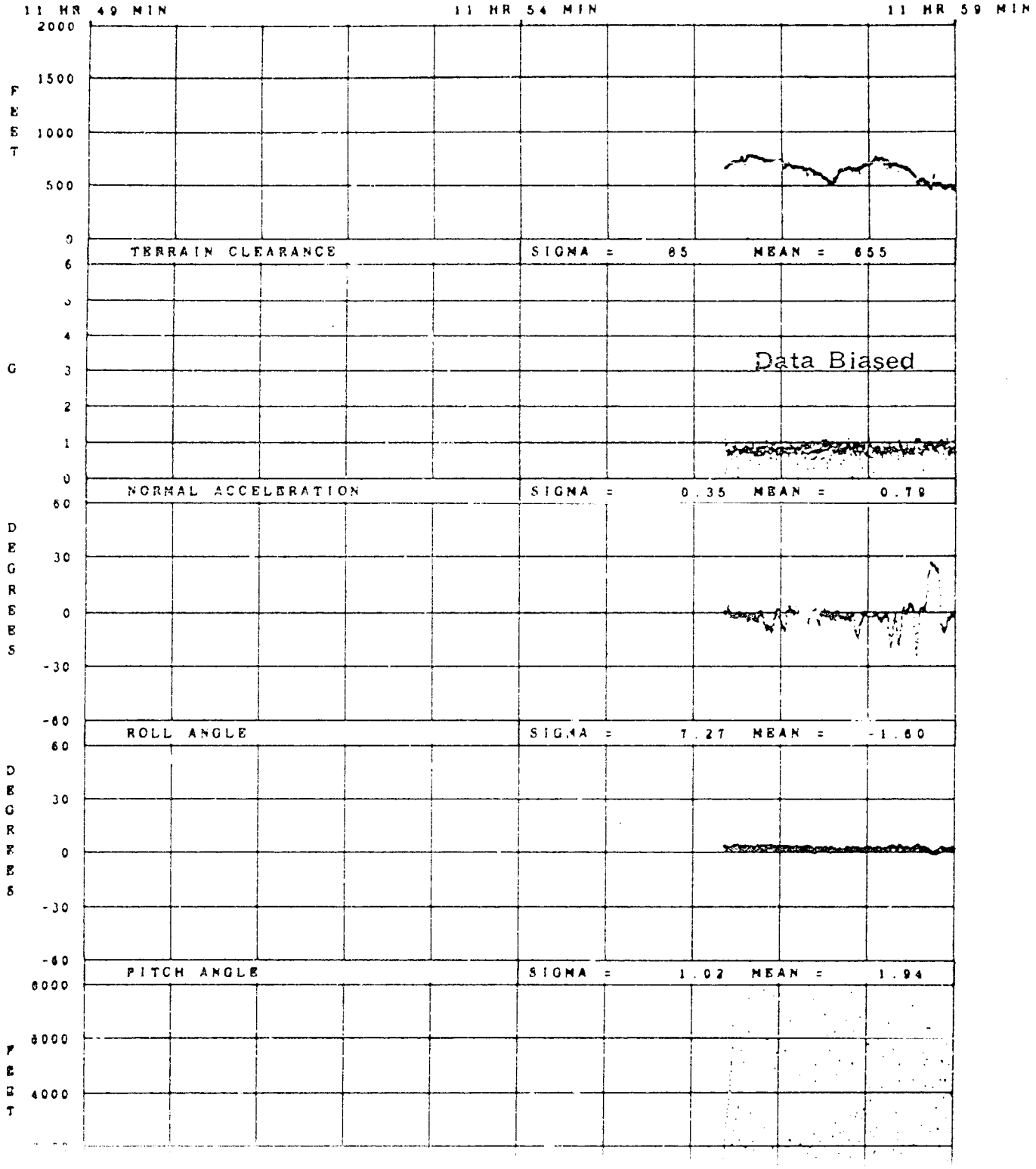


SORTIE NUMBER 317
OPERATIONAL DAY 04 AUGUST 66
WEST COURSE

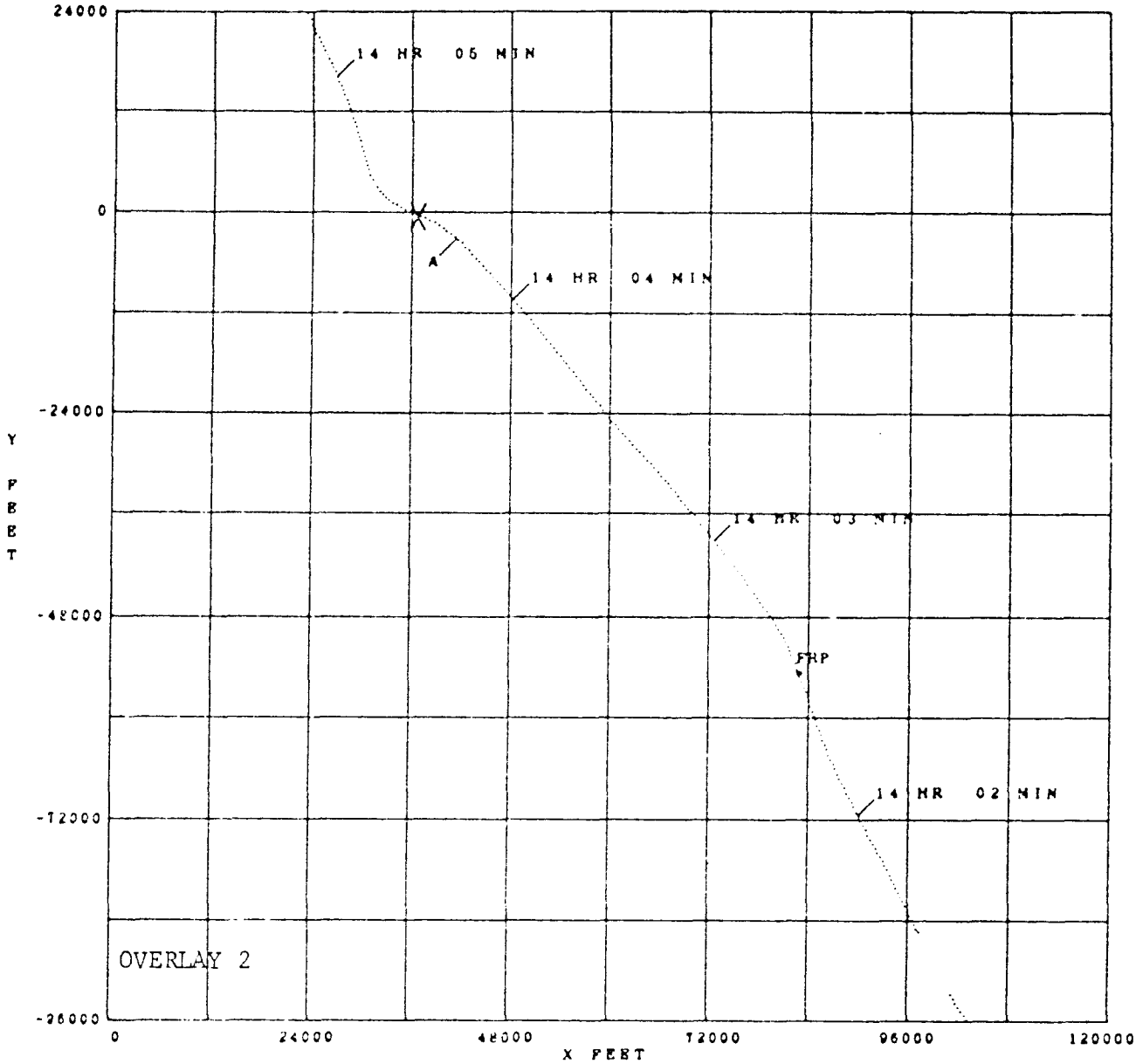
04092303
J9156 84

Figure 3-43 (U) Aircraft Position Data (Part 1 of 5)

UNCLASSIFIED



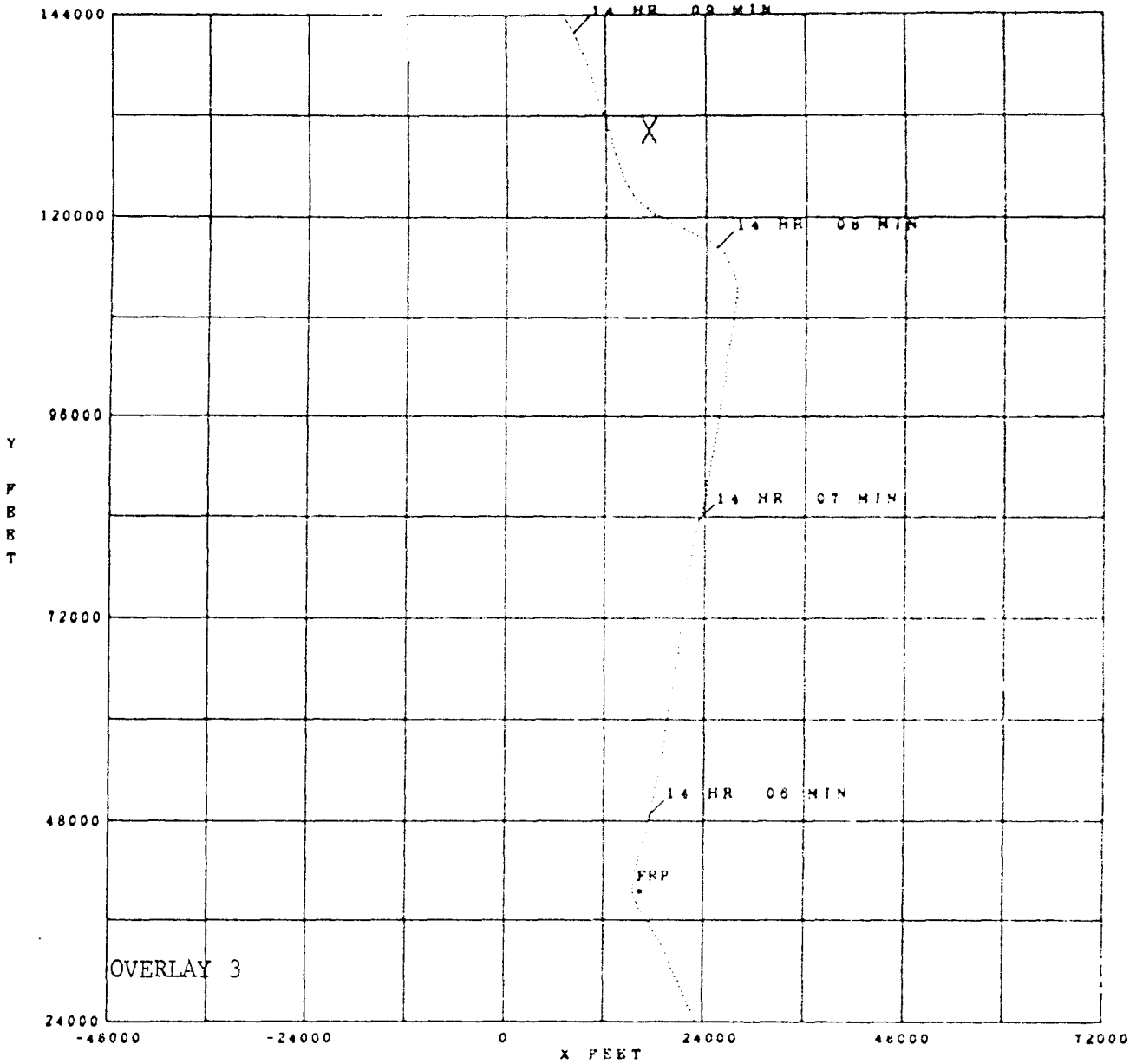
UNCLASSIFIED



MINIMUM GROUND DISTANCE TO TARGET = 431 FEET
MINIMUM GROUND DISTANCE QUALIFIER = ONE
SORTIE NUMBER 317
TARGET WEST 1

04092303
J9156 85

Figure 3-43 (U) Aircraft Position Data (Part 2 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 4734 FEET

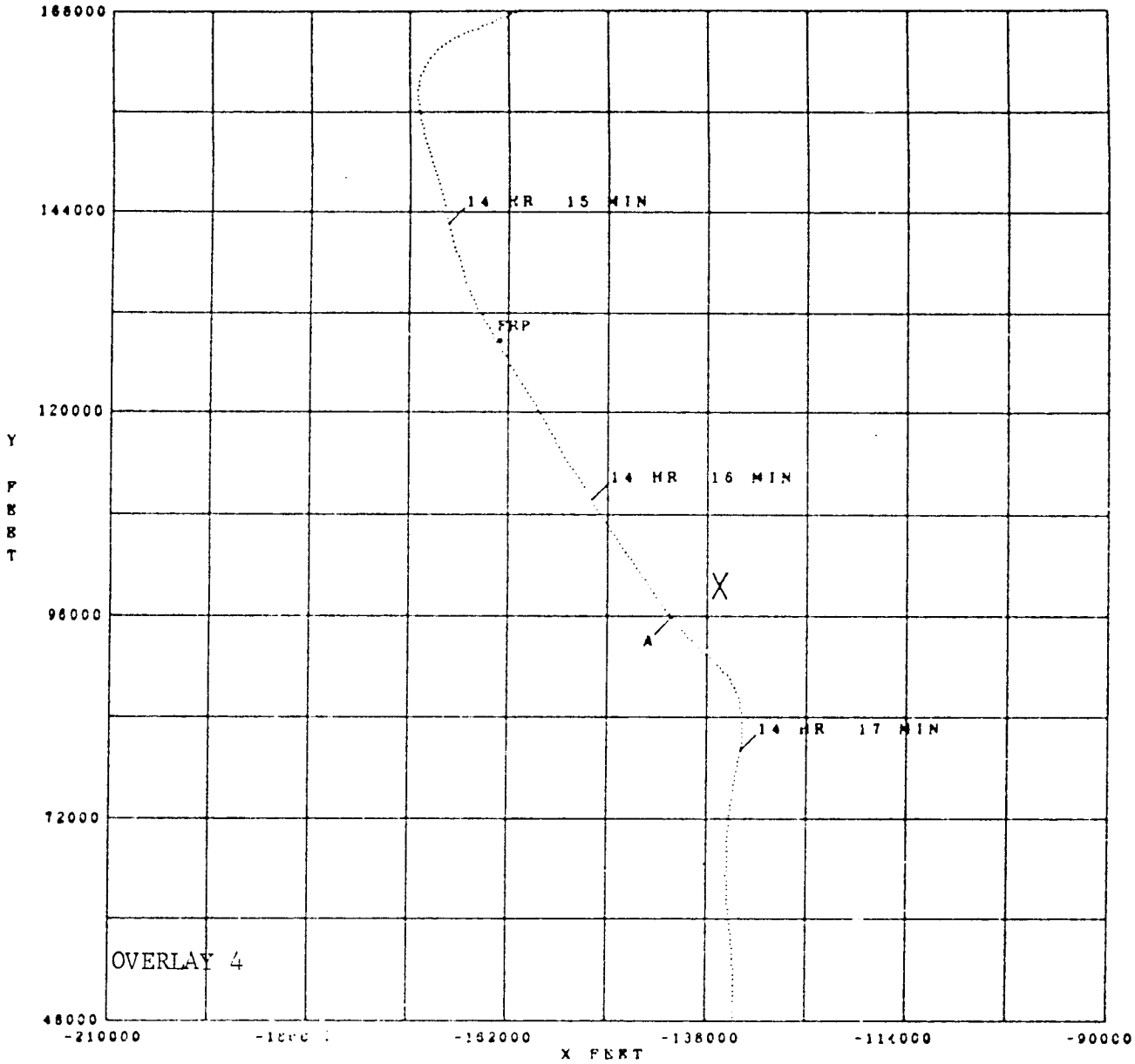
MINIMUM GROUND DISTANCE QUALIFIER = DME

SORTIE NUMBER 317

TARGET REST 2

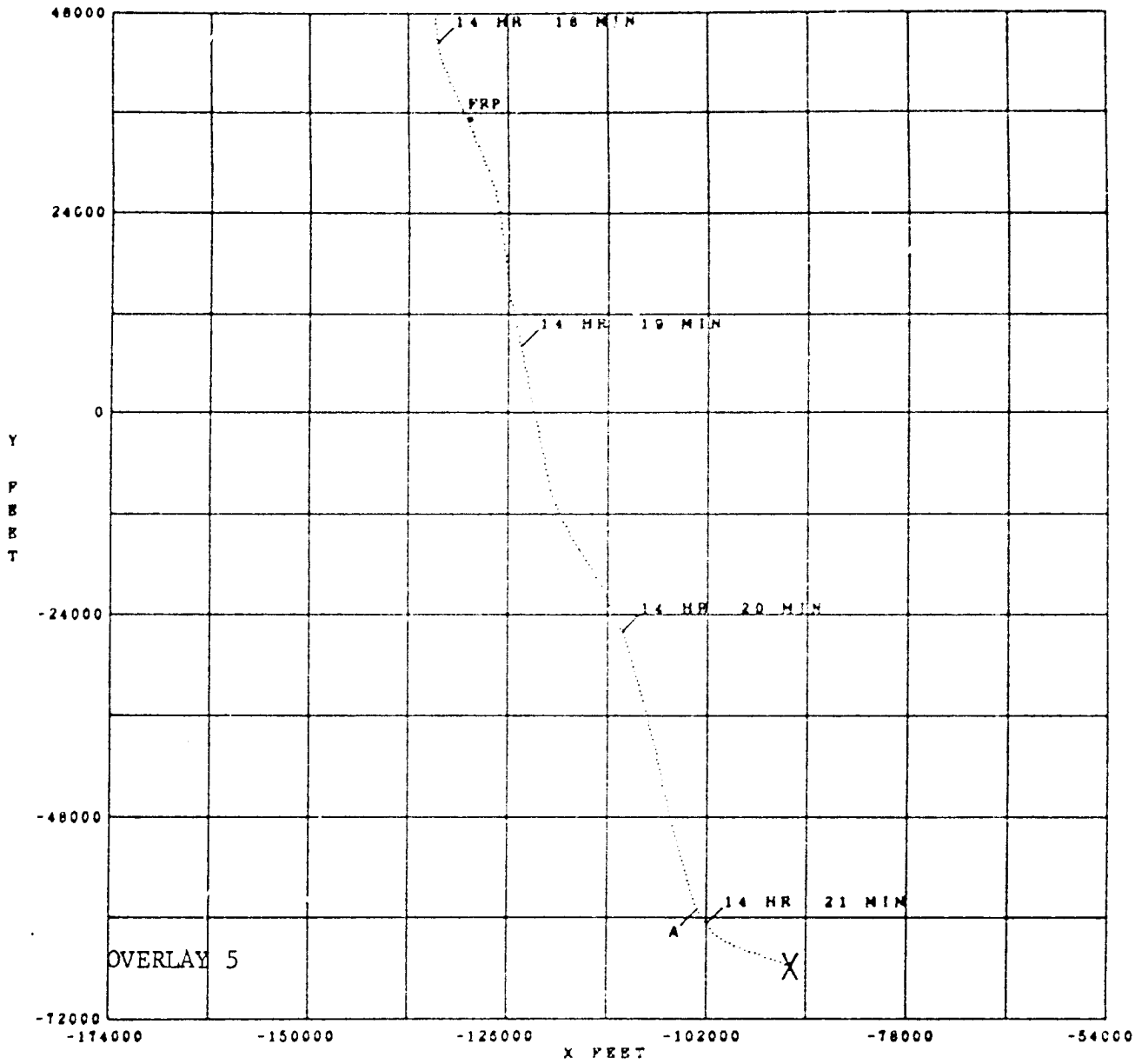
04092303
J9156 86

Figure 3-43 (U) Aircraft Position Data (Part 3 of 5)



04092303
J9156 87

Figure 3-43 (U) Aircraft Position Data (Part 4 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 194 FEET
MINIMUM GROUND DISTANCE QUALIFIER = ONE
SORTIE NUMBER 317
TARGET WEST 4

04092303
J9156

Figure 3-43 (U) Aircraft Position Data (Part 5 of 5)

UNCLASSIFIED

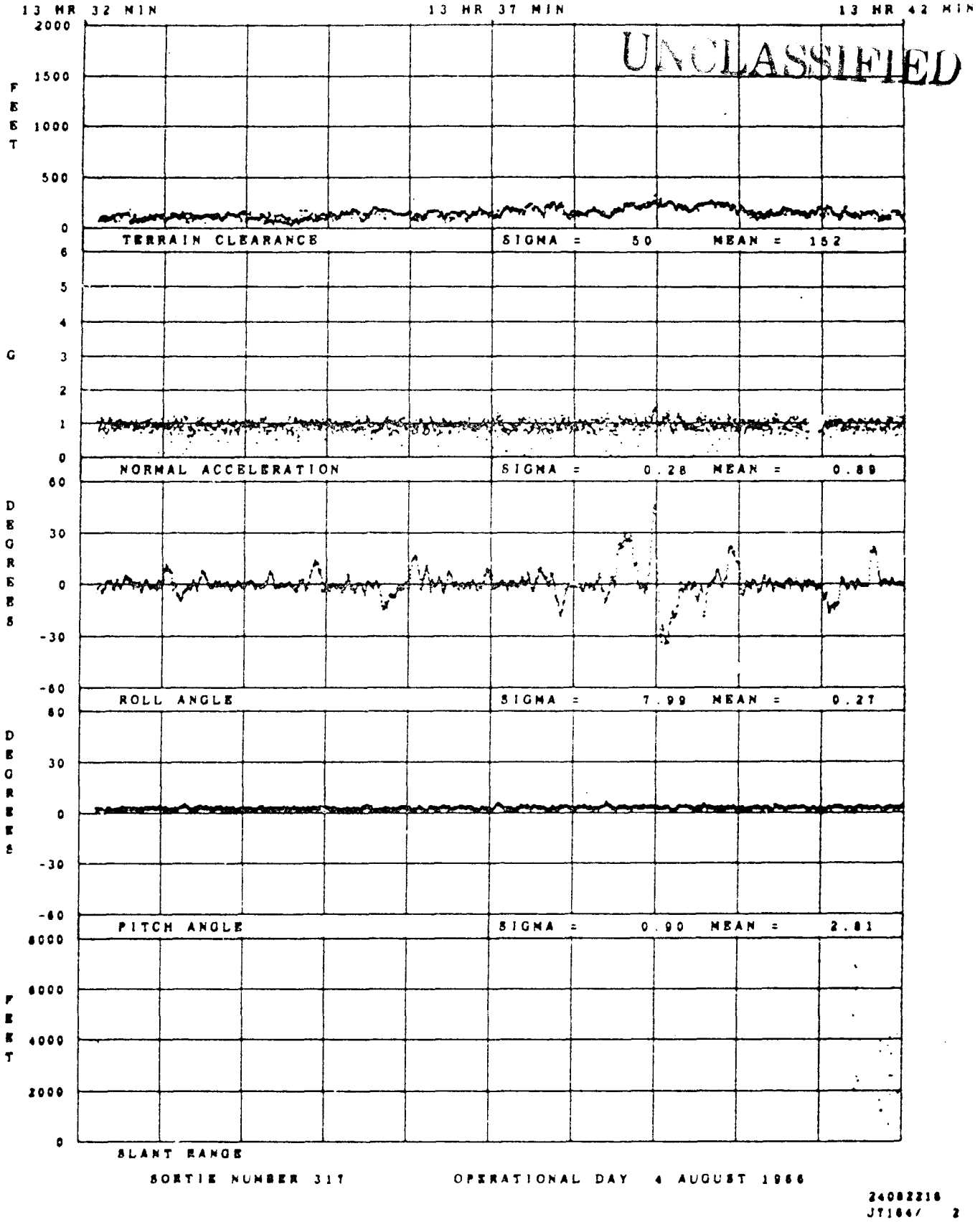


Figure 3-44 (U) Telemetered Data (Part 1 of 5)

UNCLASSIFIED

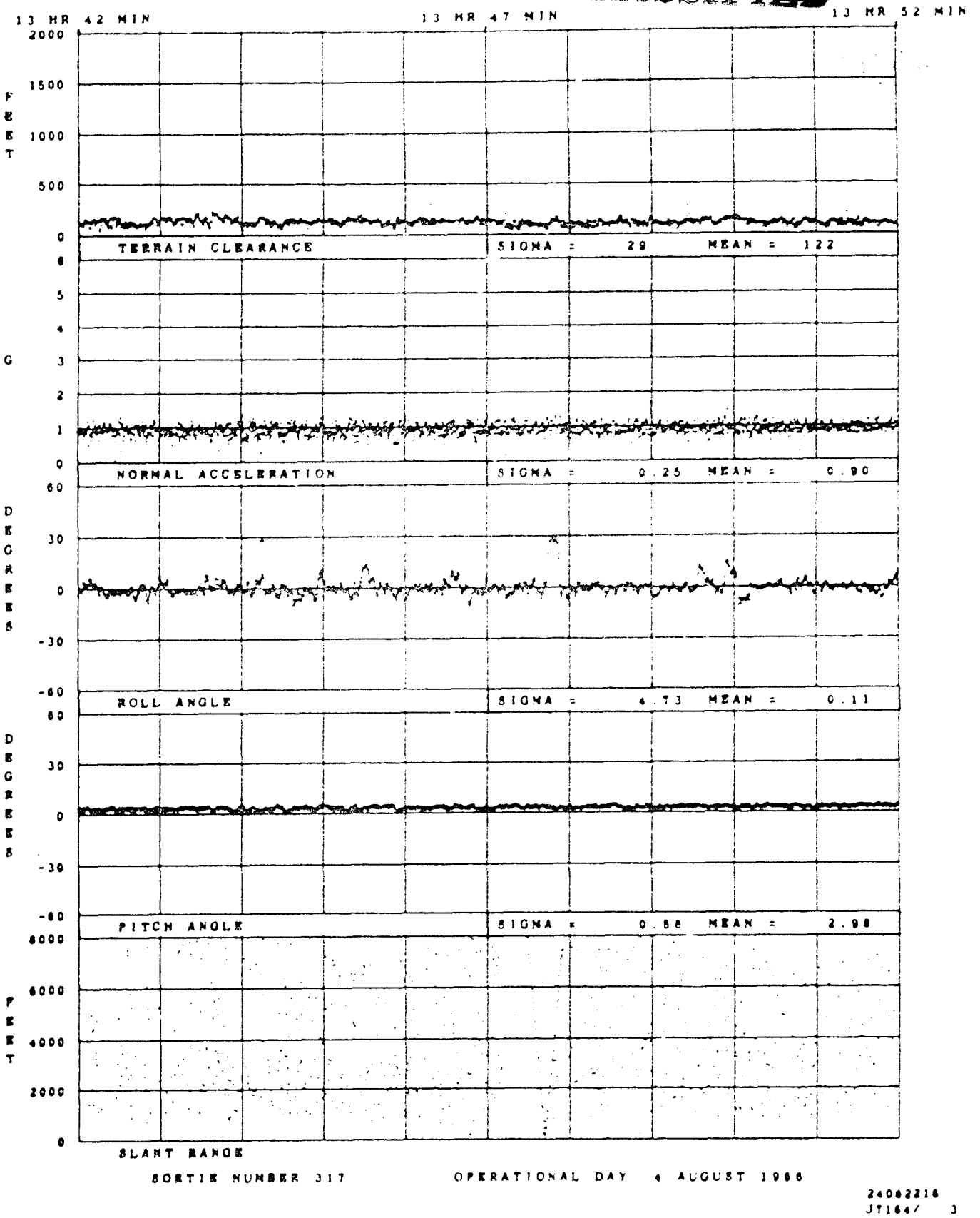


Figure 3-44 (U) Telemetered Data (Part 2 of 5)

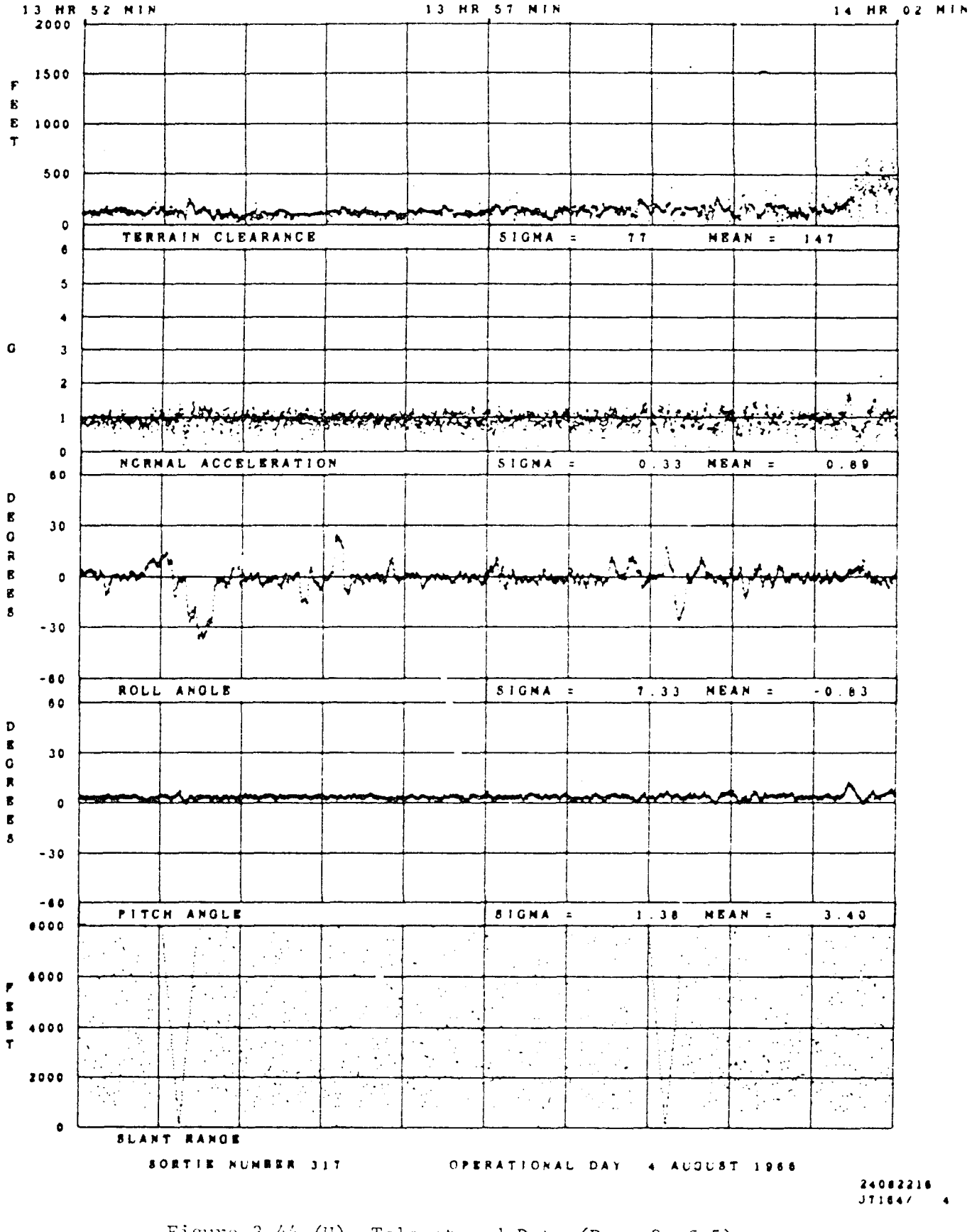


Figure 3-44 (U) Telemetered Data (Part 3 of 5)

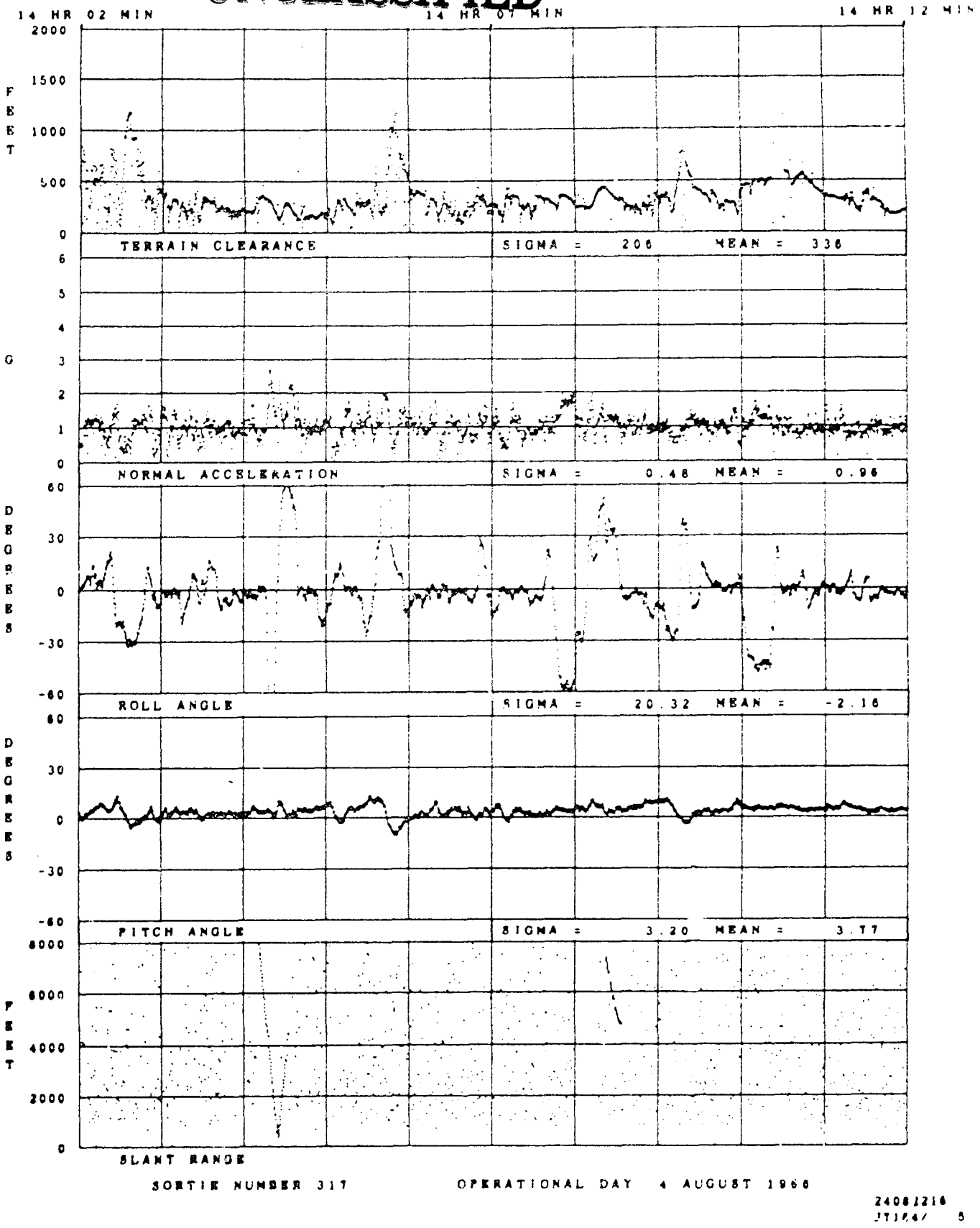


Figure 3-44 (U) Telemetered Data (Part 4 of 5)

UNCLASSIFIED

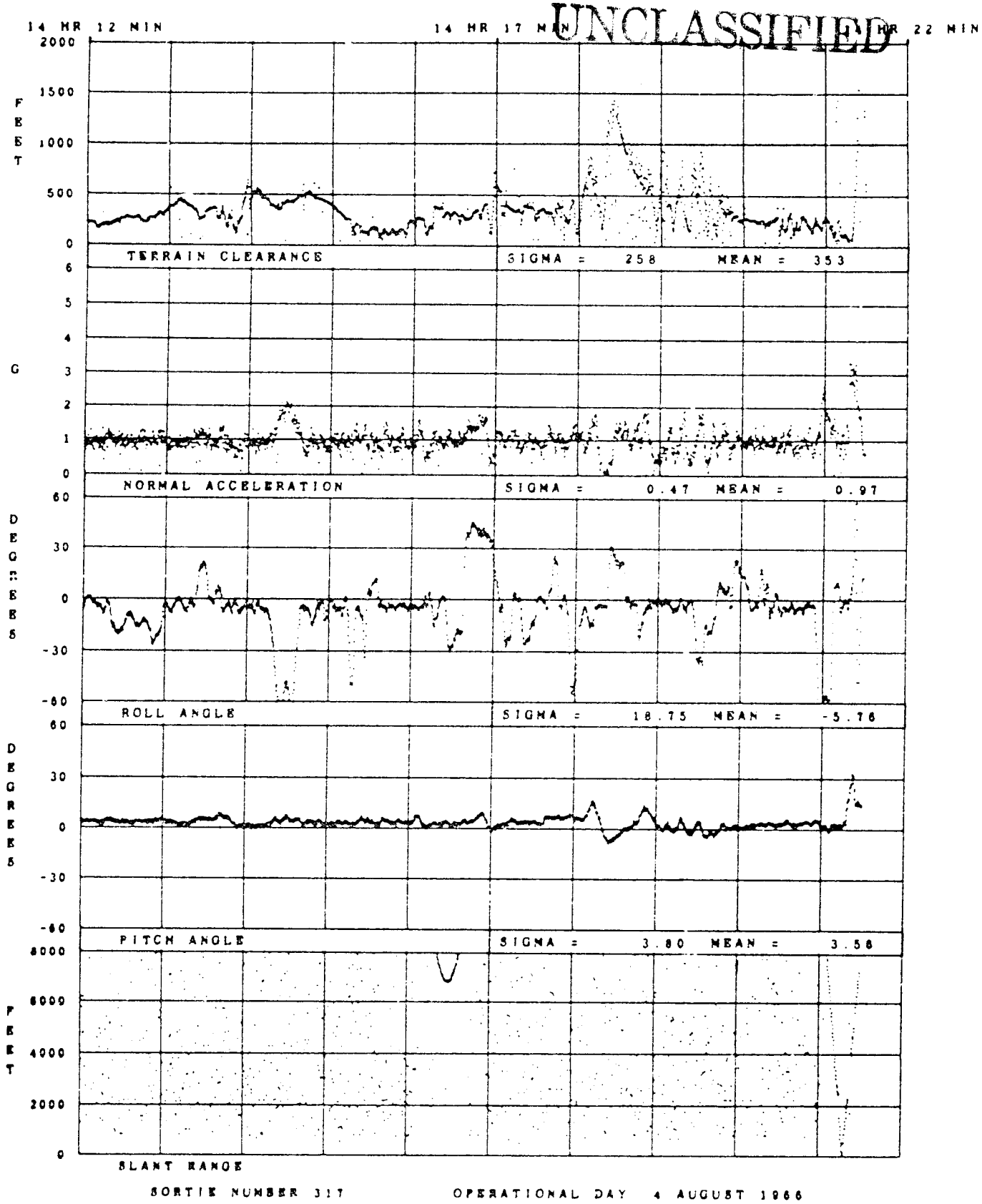


Figure 3-44 (U) Telemetered Data (Part 5 of 5)

UNCLASSIFIED

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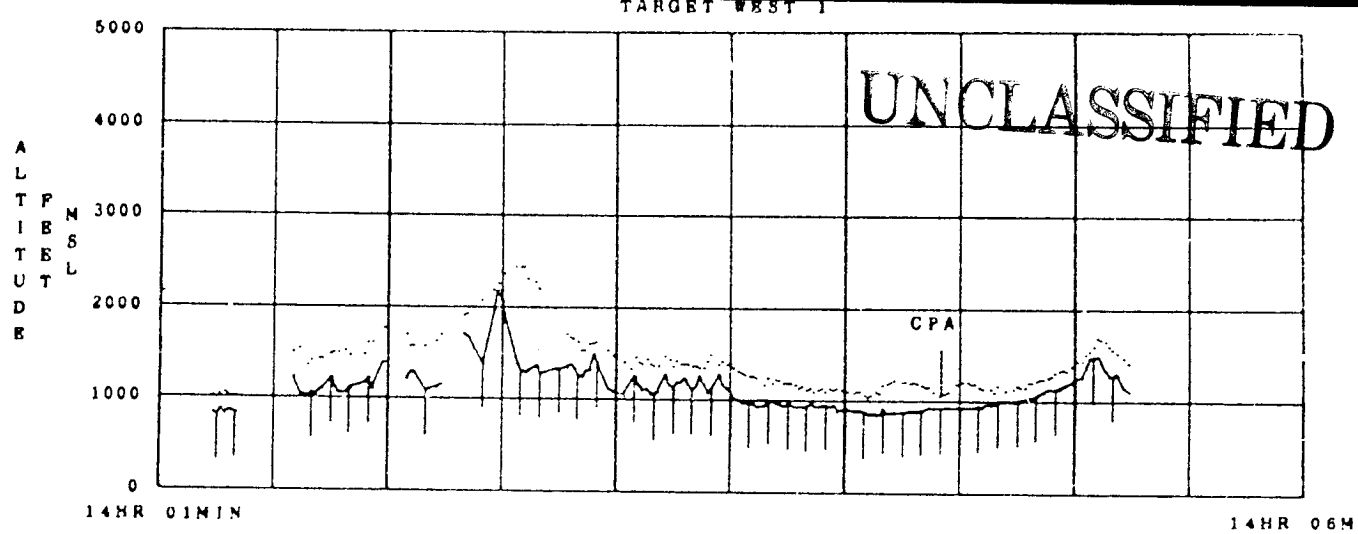
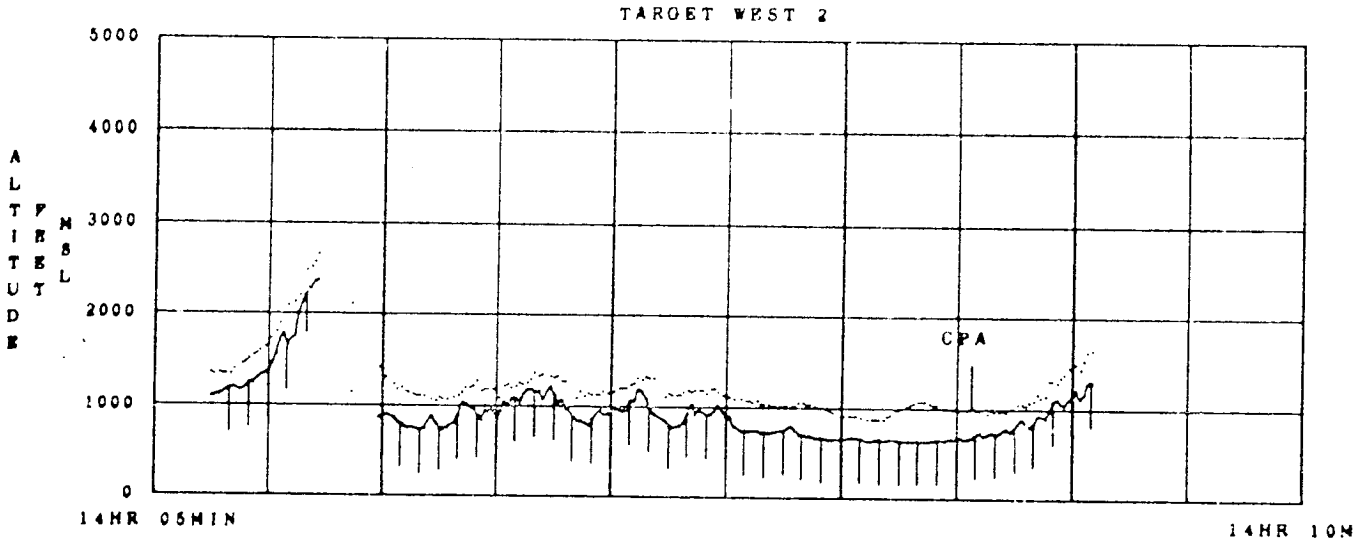




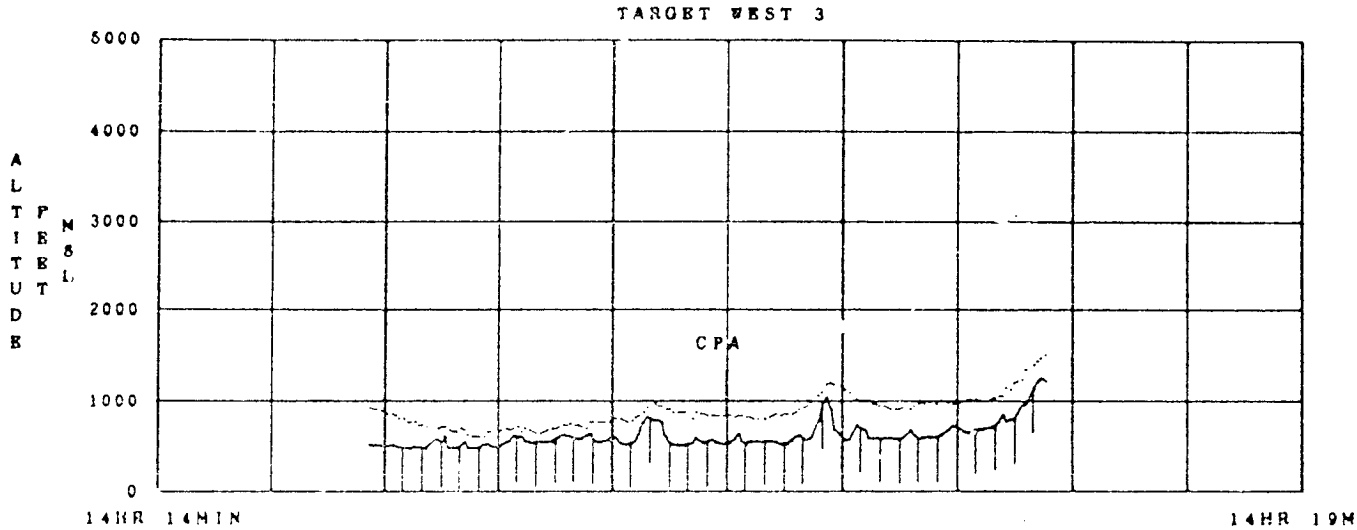
SORTIE NUMBER 317

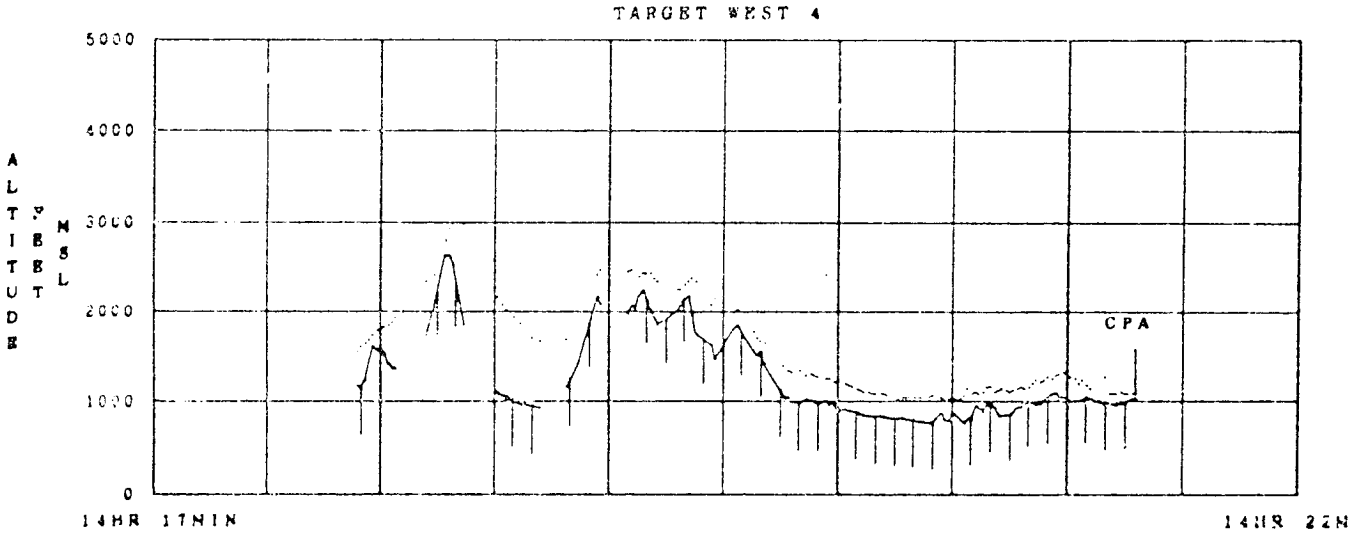
04092303
J9158

Figure 3-45 (U) Aircraft Altitude and Terrain Profile (Part 1 of 2)

UNCLASSIFIED

UNCLASSIFIED





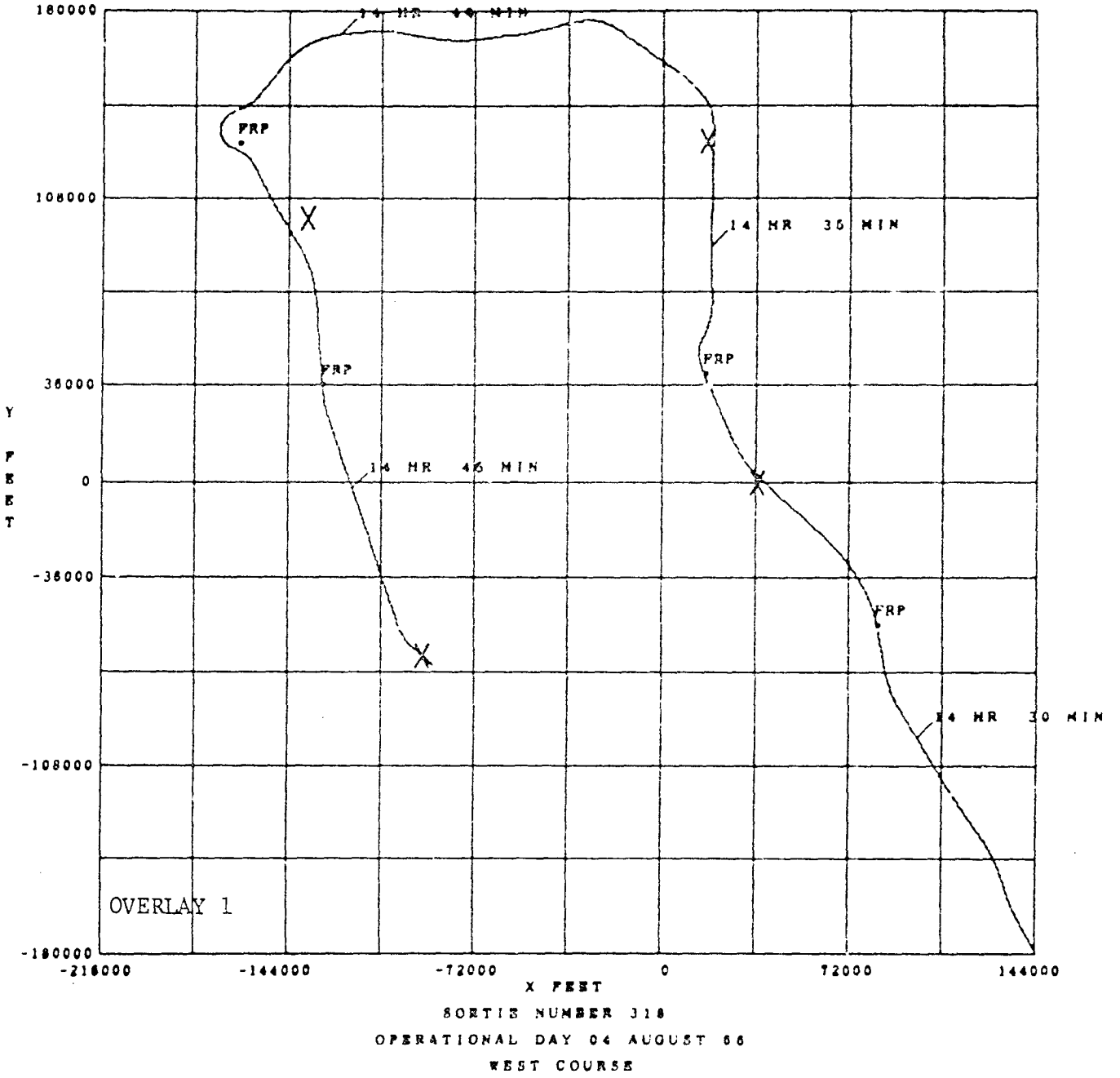
SORTIE NUMBER 317

04092303
J9156

Figure 3-45 (U) Aircraft Altitude and Terrain Profile (Part 2 of 2)

SIFIED

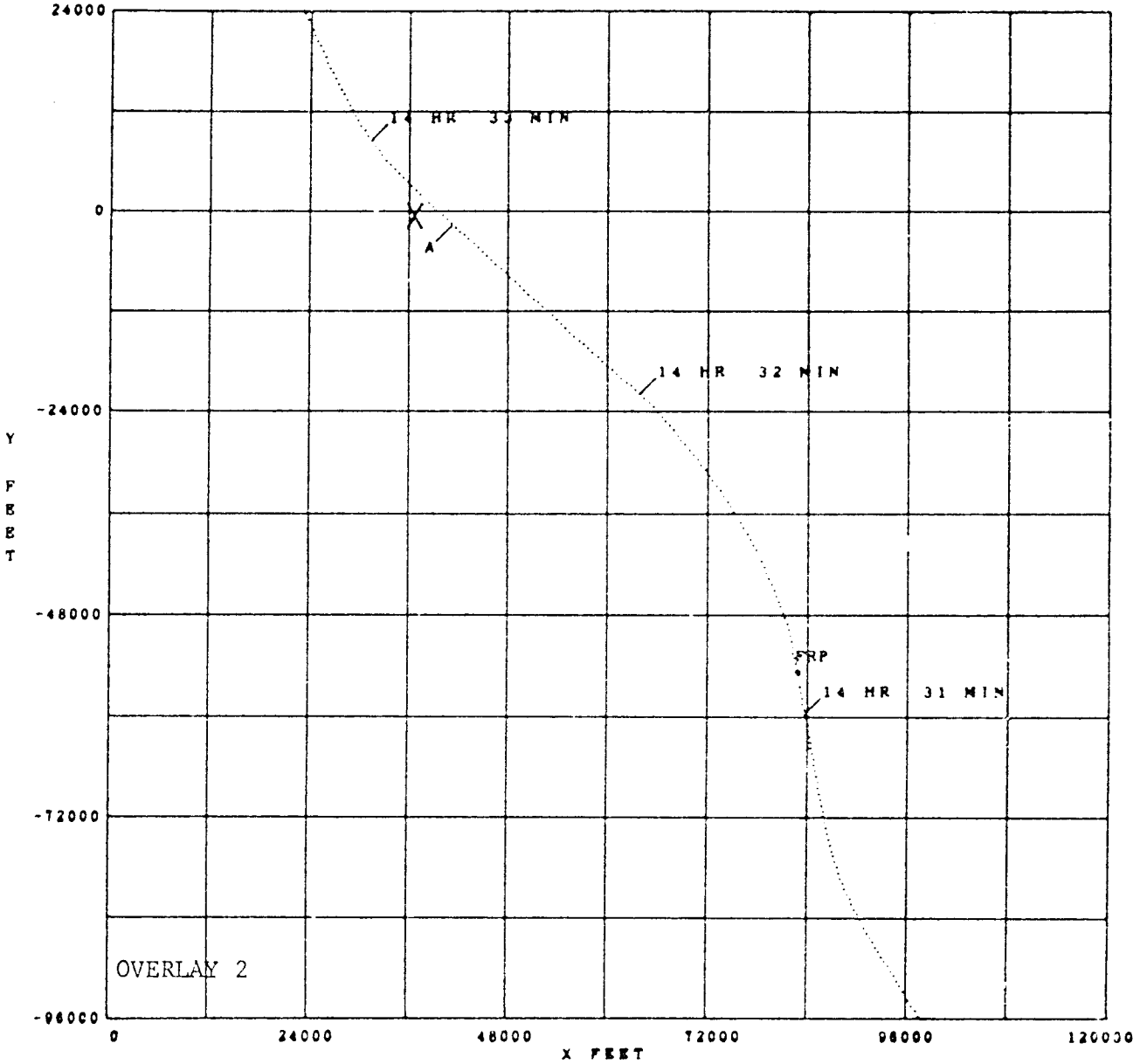
UNCLASSIFIED



04092307
J9156 14(

Figure 3-46 (U) Aircraft Position Data (Part 1 of 5)

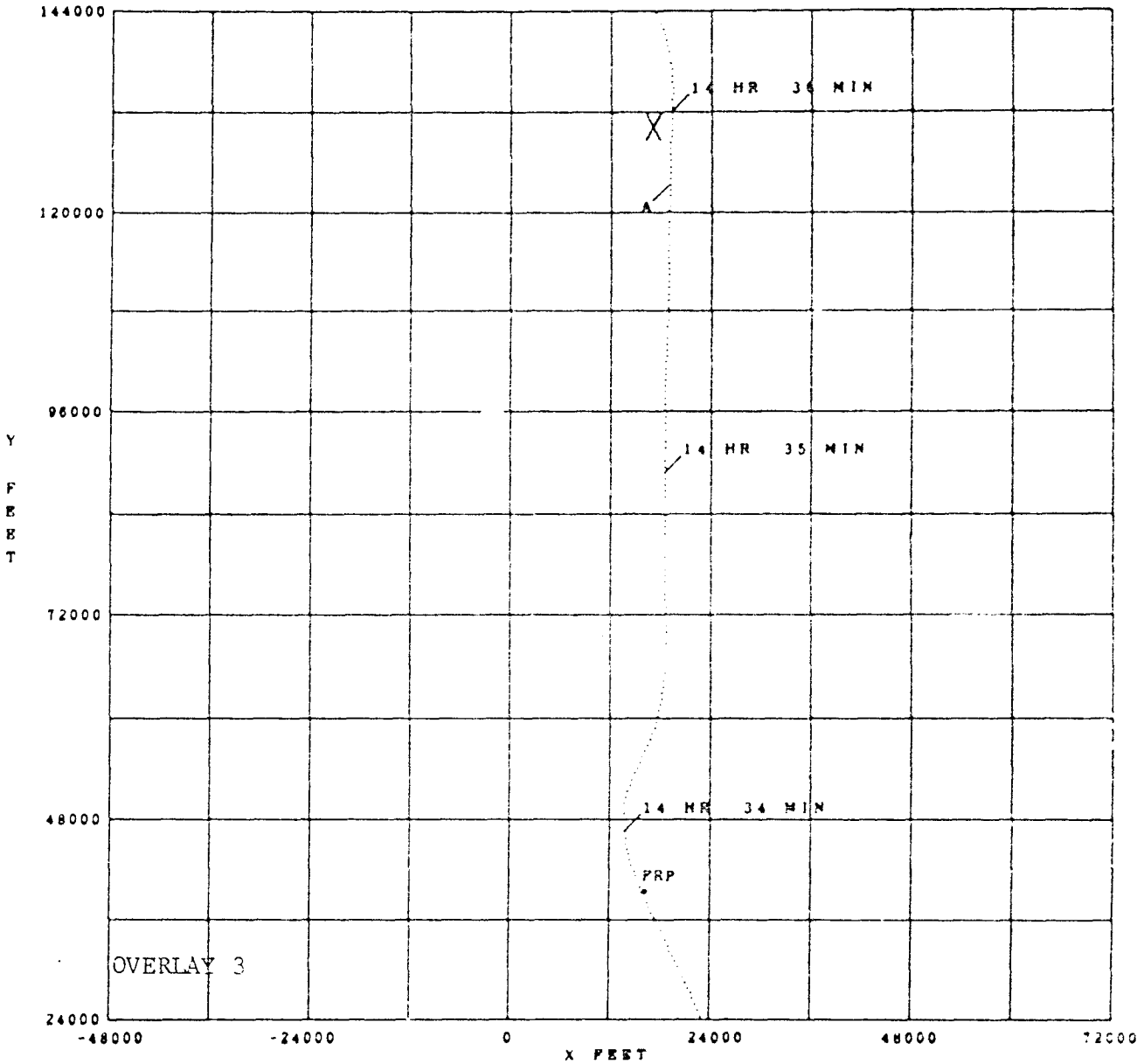
UNCLASSIFIED



MINIMUM GROUND DISTANCE TO TARGET = 2461 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 318
TARGET WEST 1

04092307
J9153 14

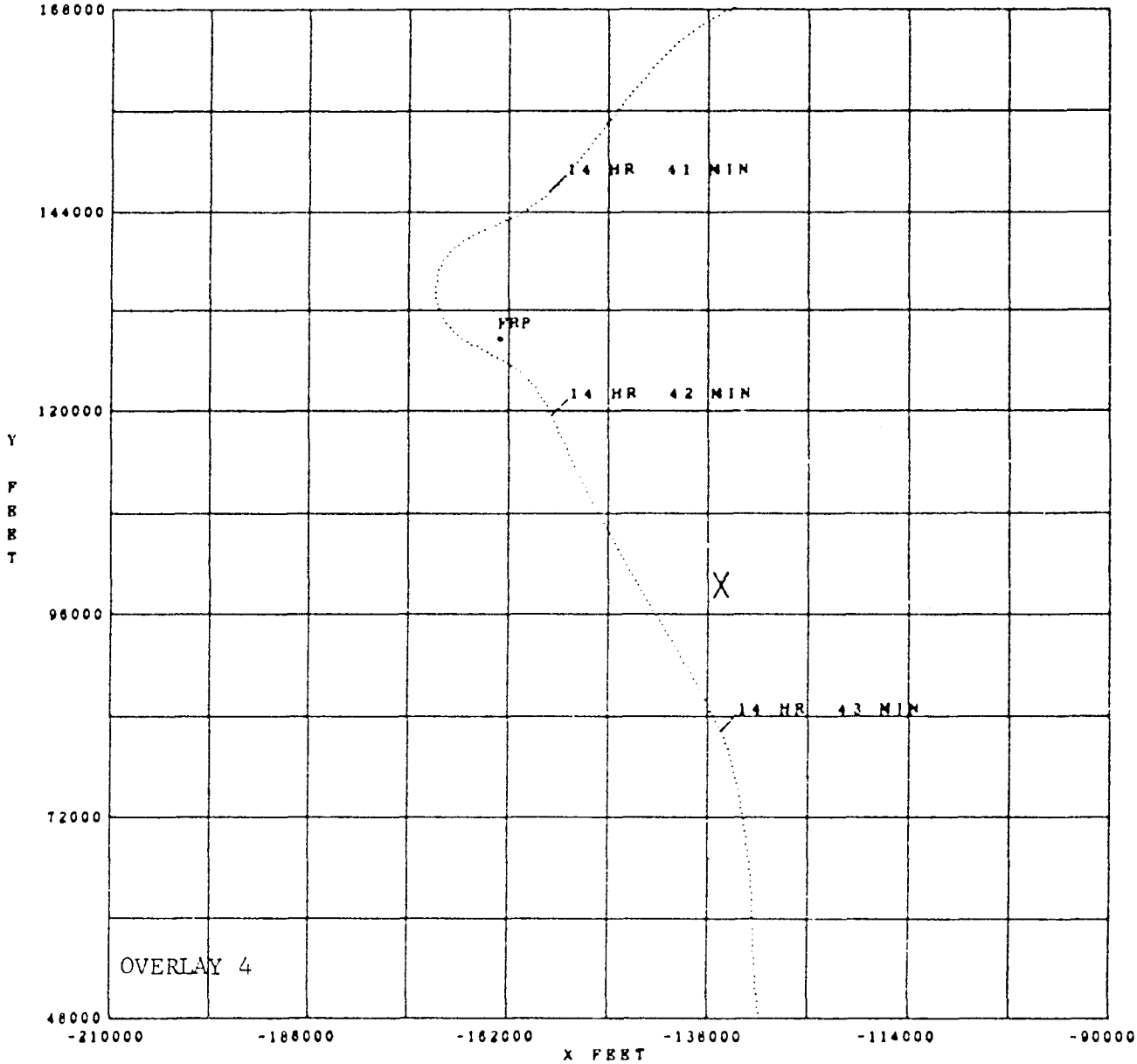
Figure 3-46 (U) Aircraft Position Data (Part 2 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 2029 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 318
TARGET WEST 2

04092307
J9156 14

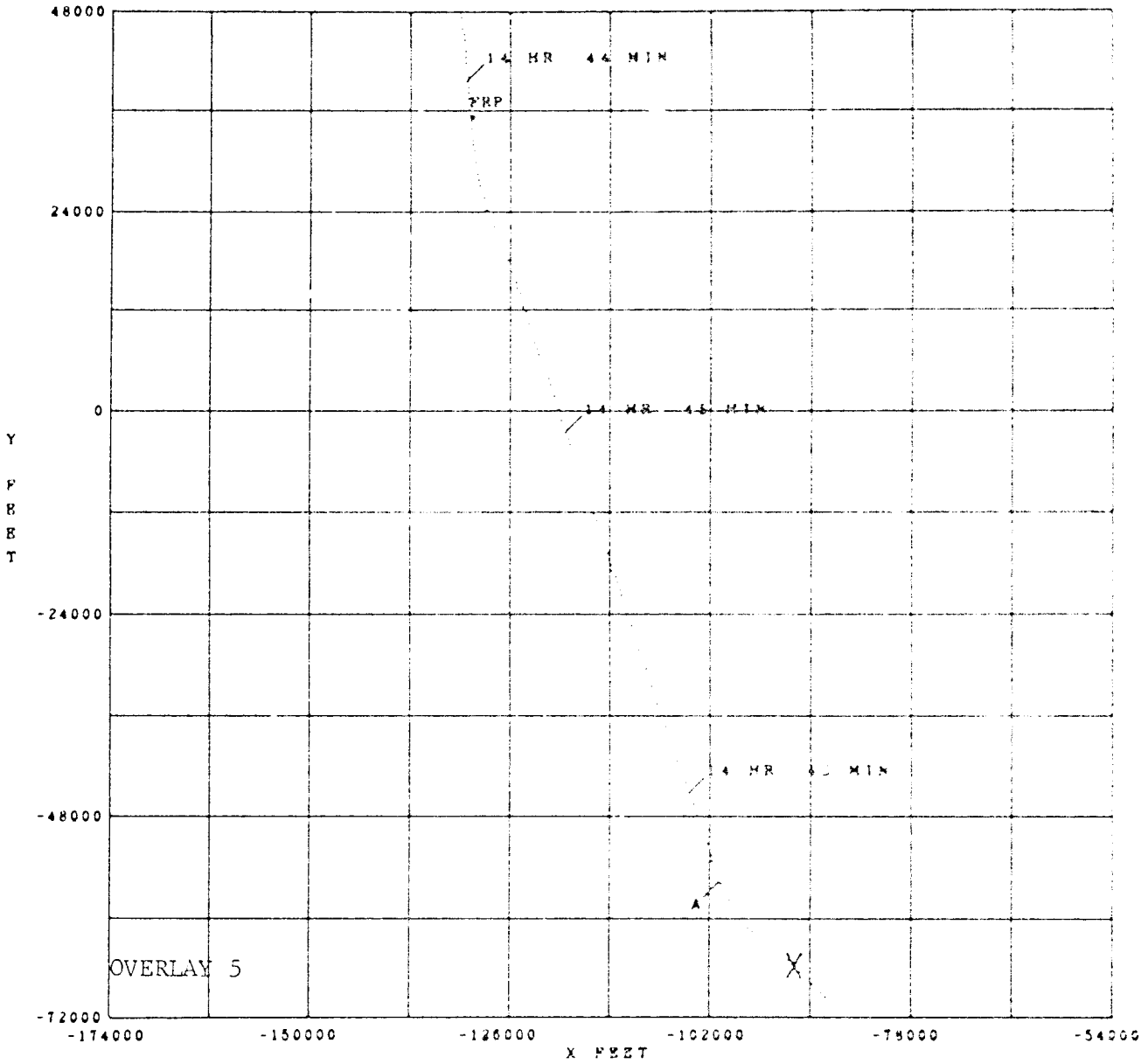
Figure 3-46 (U) Aircraft Position Data (Part 3 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 8542 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 318
TARGET WEST 3

04092307
J9156 14

Figure 3-46 (U) Aircraft Position Data (Part 4 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 78 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 318
TARGET WEST 4

04092308
J9158 144

Figure 3-46 (U) Aircraft Position Data (Part 5 of 5)

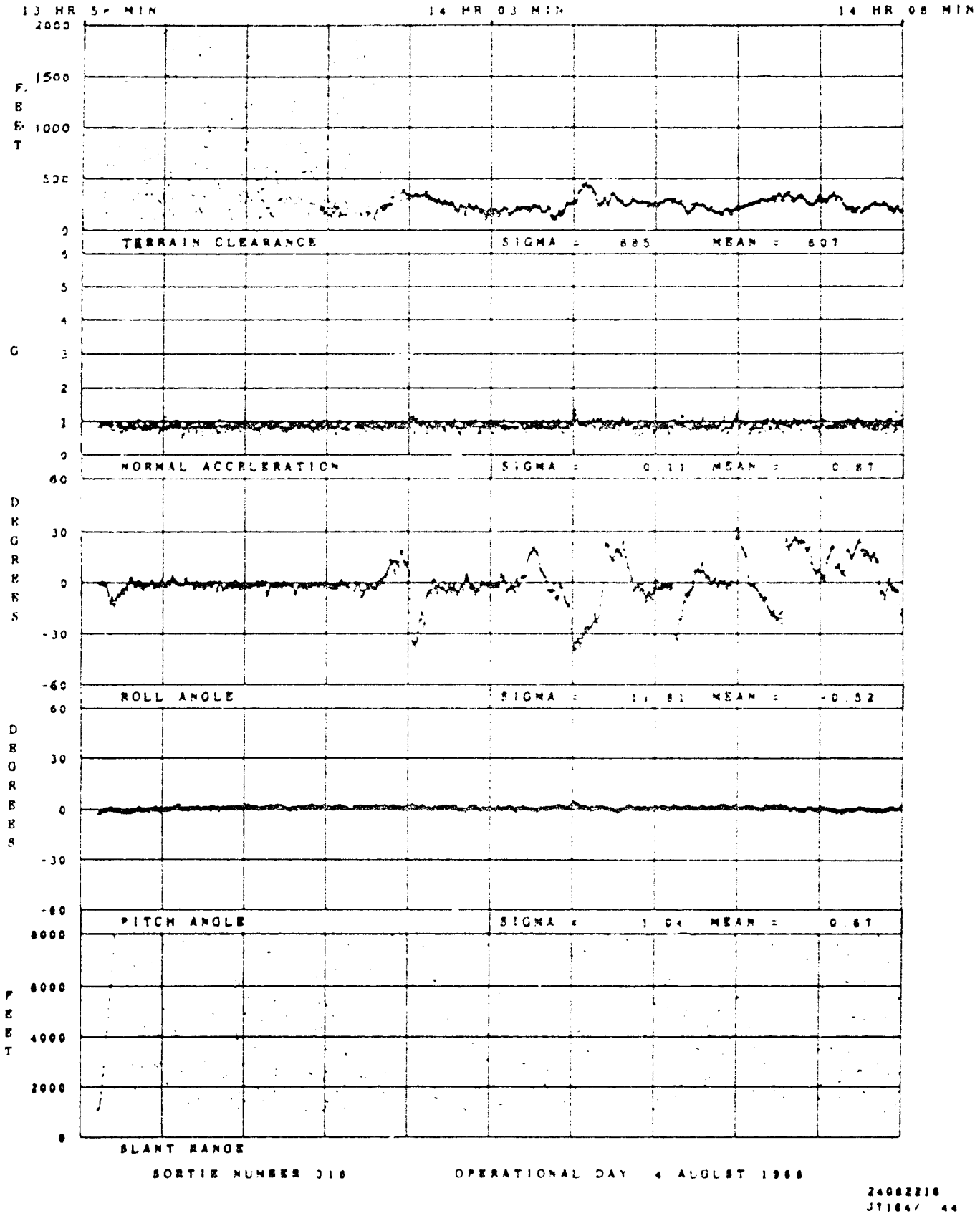


Figure 3-47 (U) Telemetered Data (Part 1 of 5)

UNCLASSIFIED

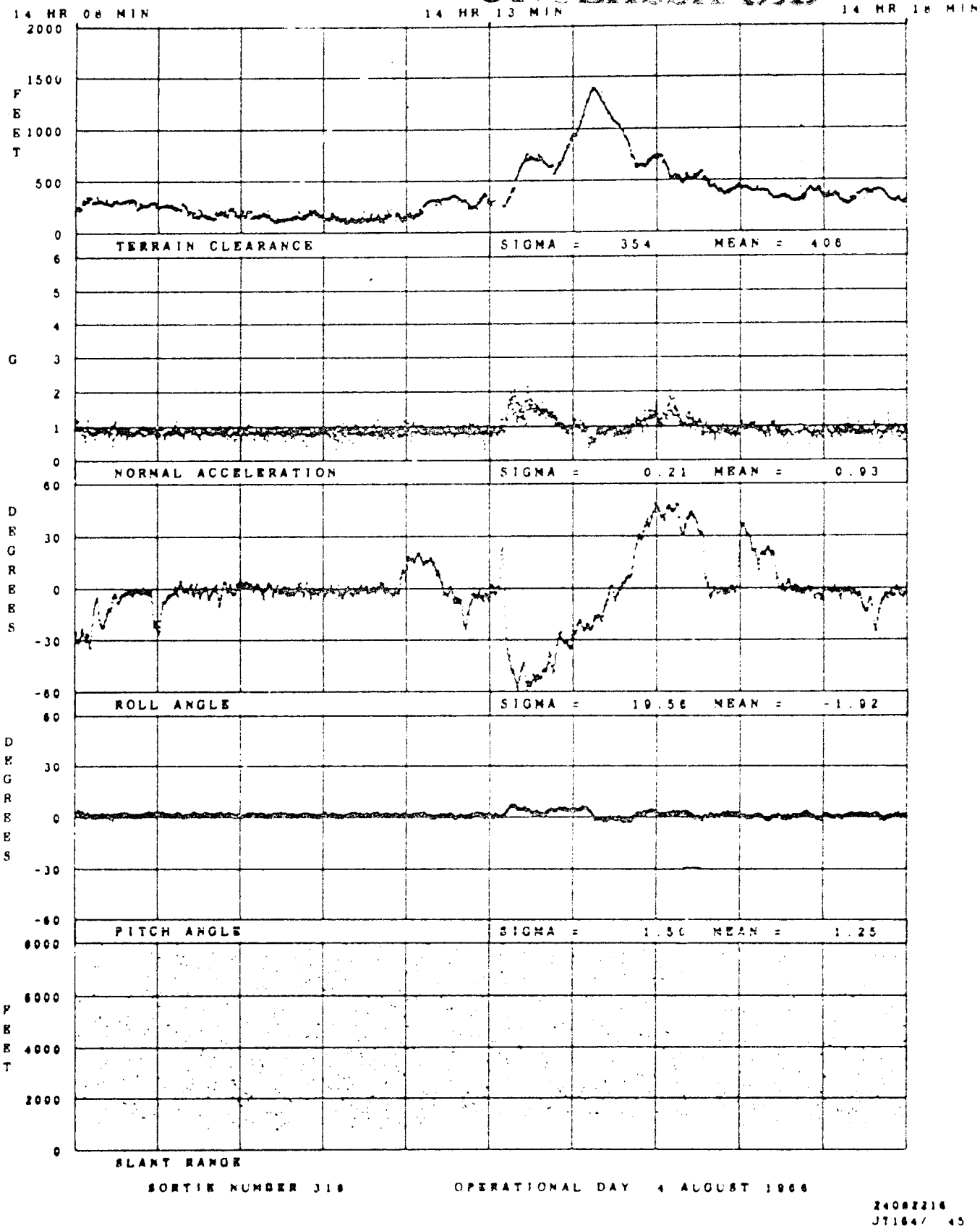


Figure 3-47 (U) Telemetered Data (Part 2 of 5)

UNCLASSIFIED

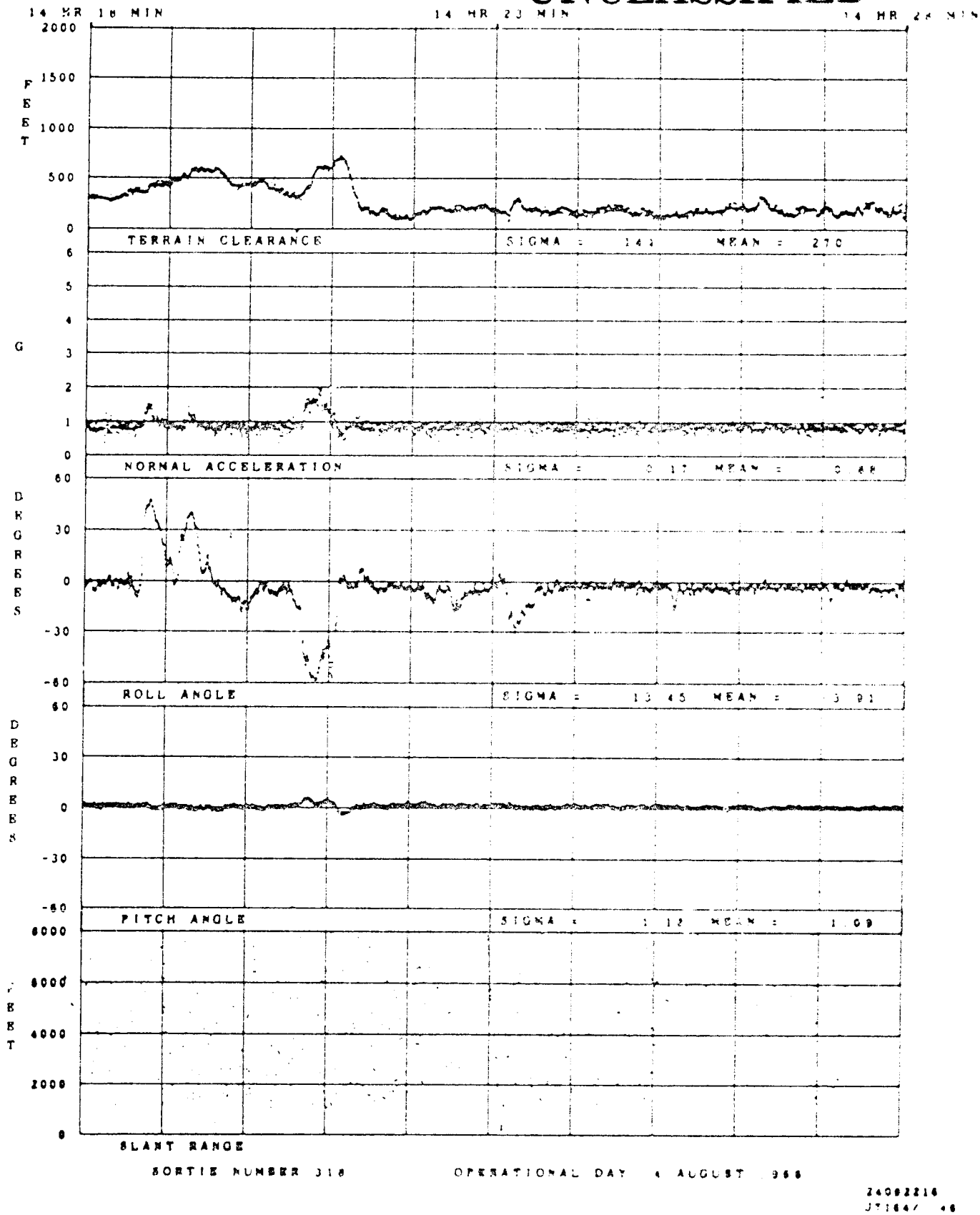


Figure 3-47 (U) Telemetered Data (Part 3 of 5)

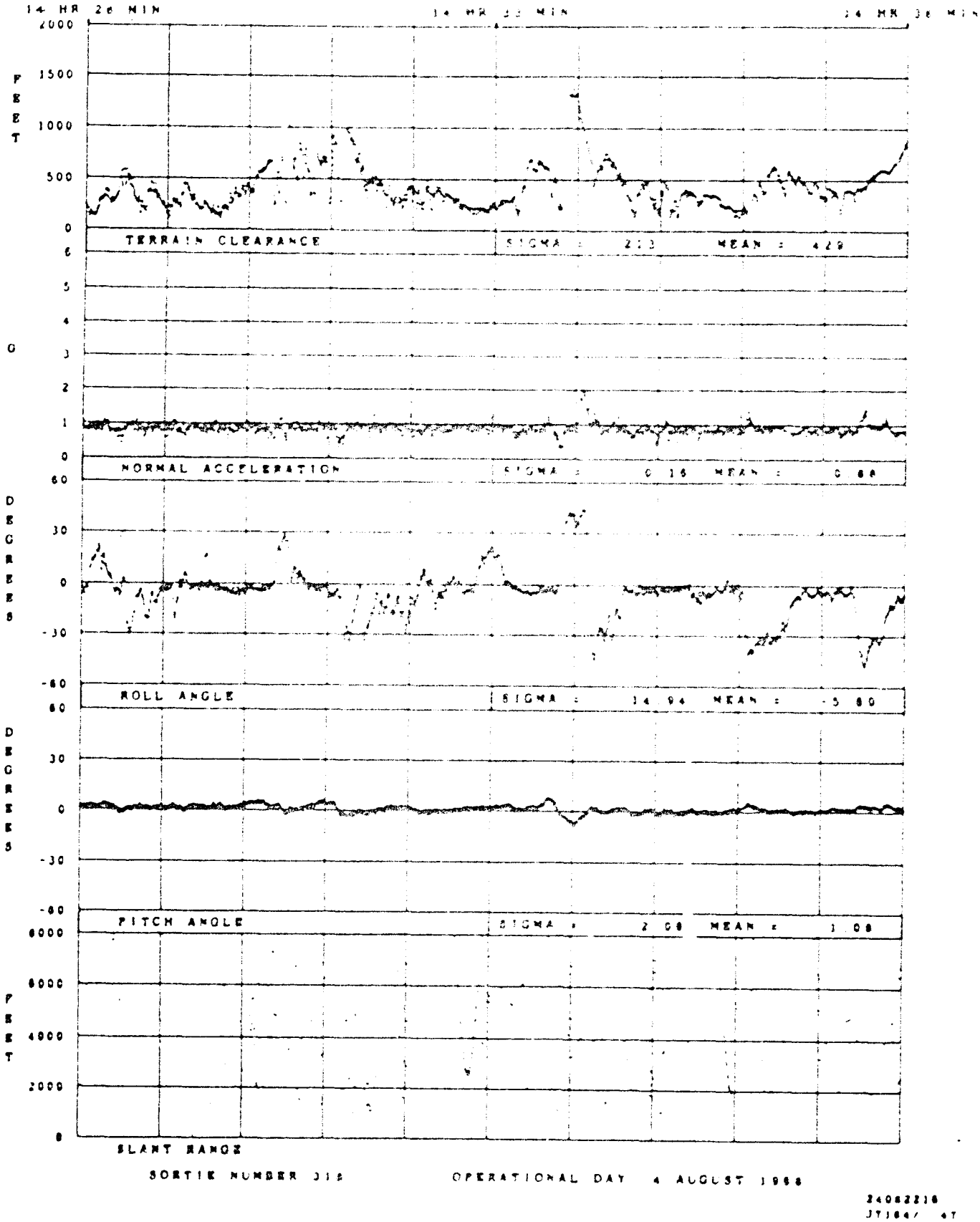


Figure 3-47 (U) Telemetered Data (Part 4 of 5)

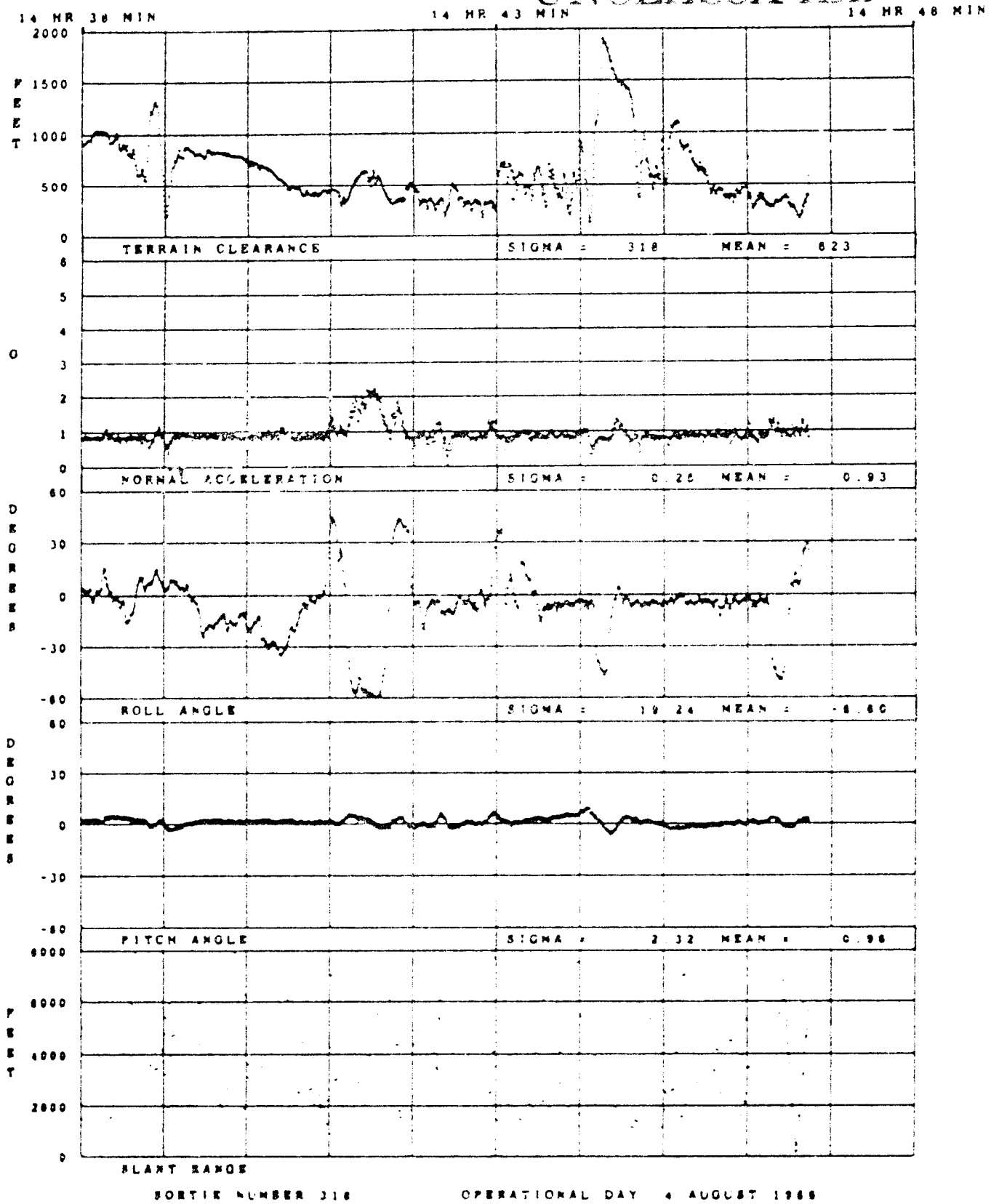
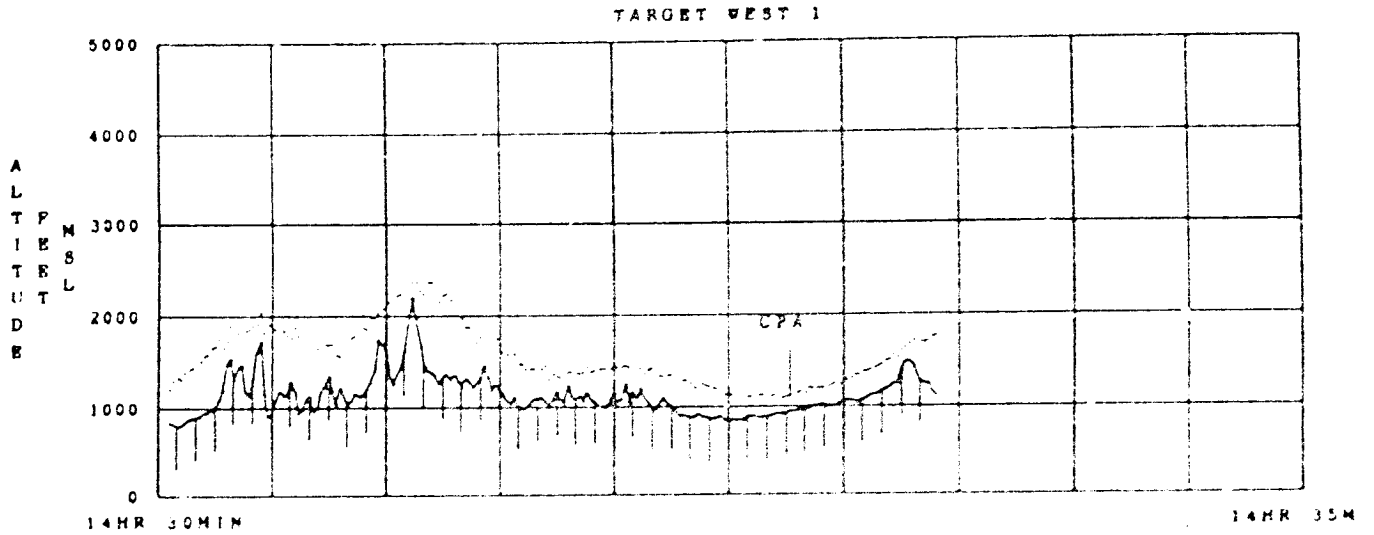
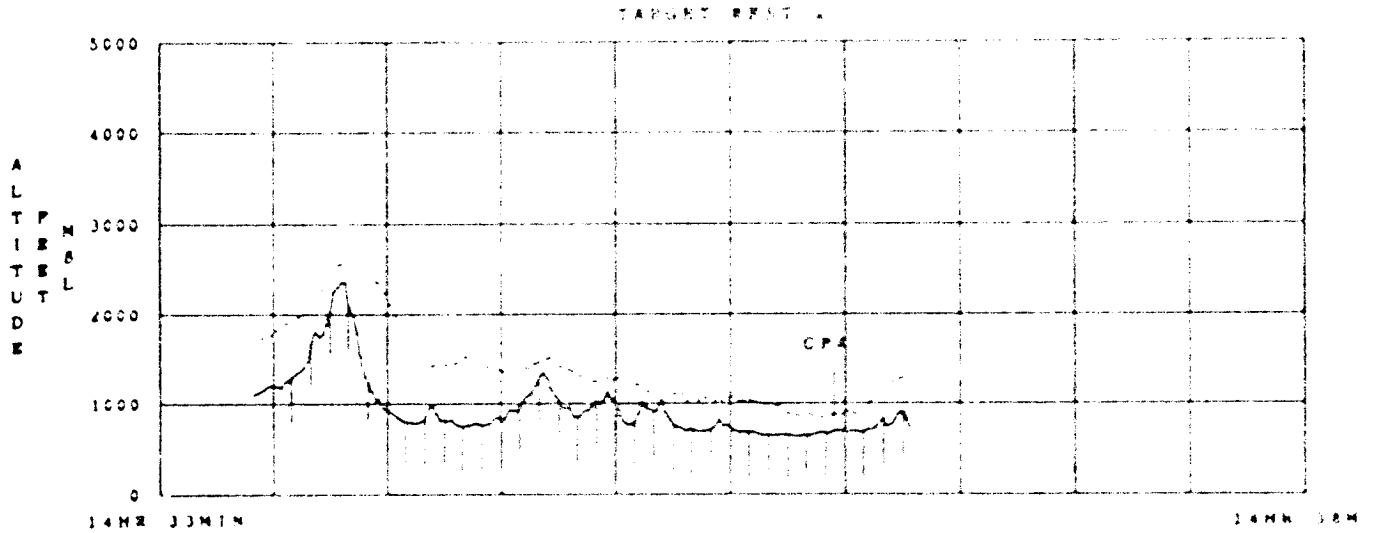


Figure 3-17 (U) Telemetered Data (Part 5 of 5)

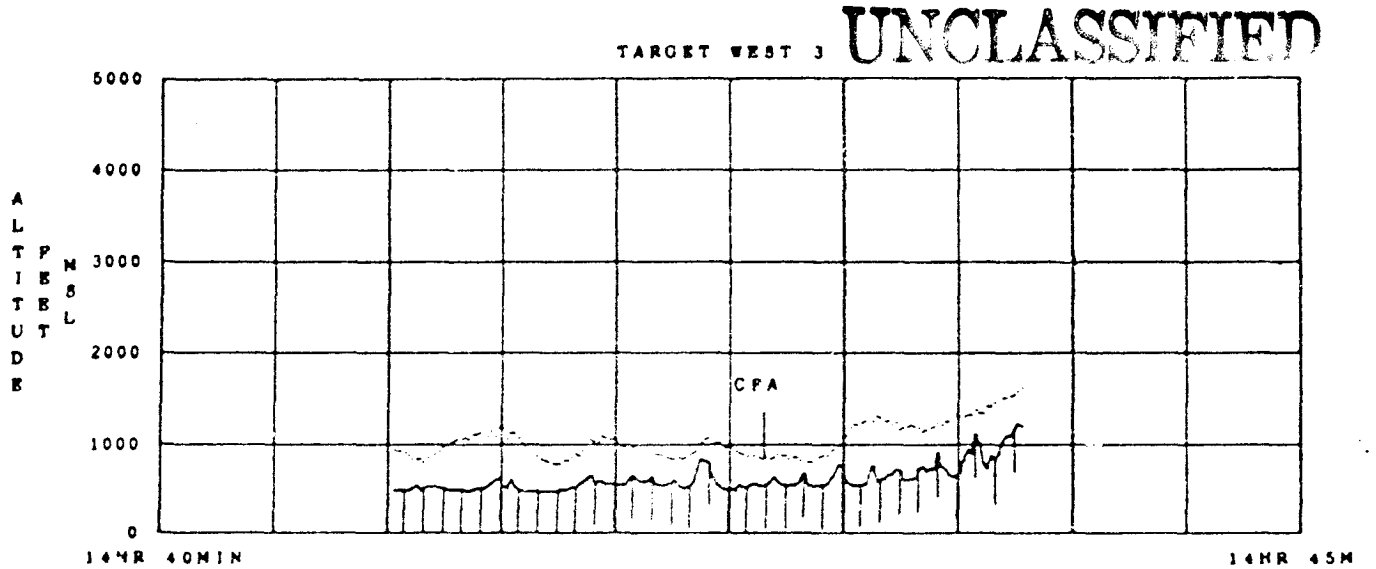


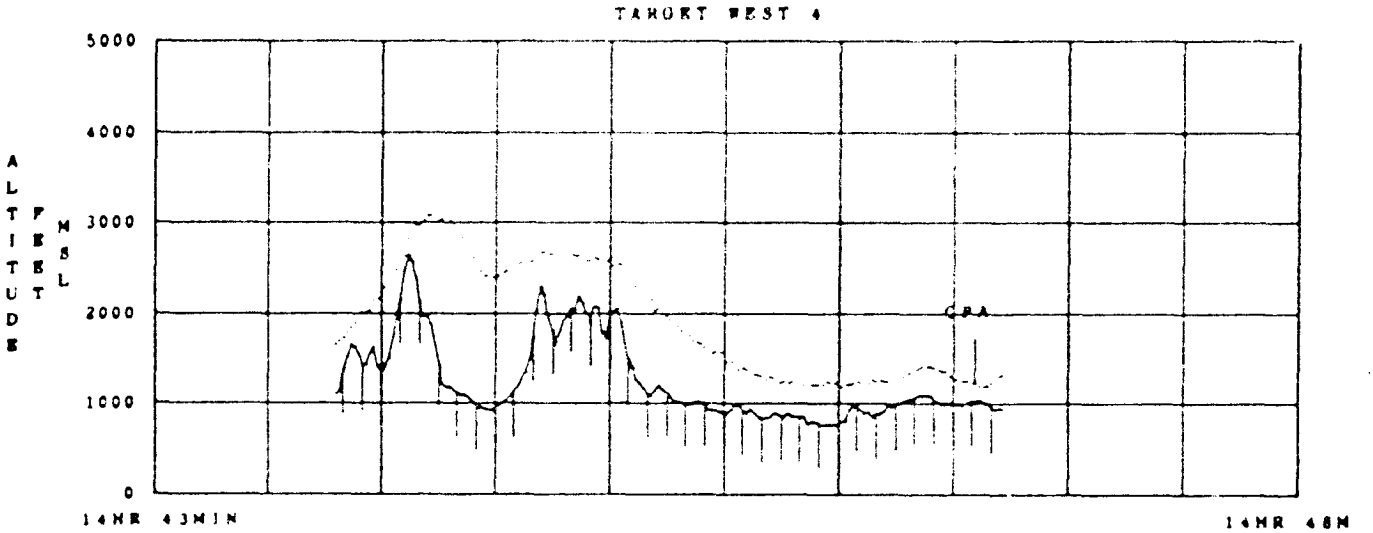


SORTIE NUMBER 318

04052308
J9156

Figure 3-48 (U) Aircraft Altitude and Terrain Profile (Part 1 of 2)

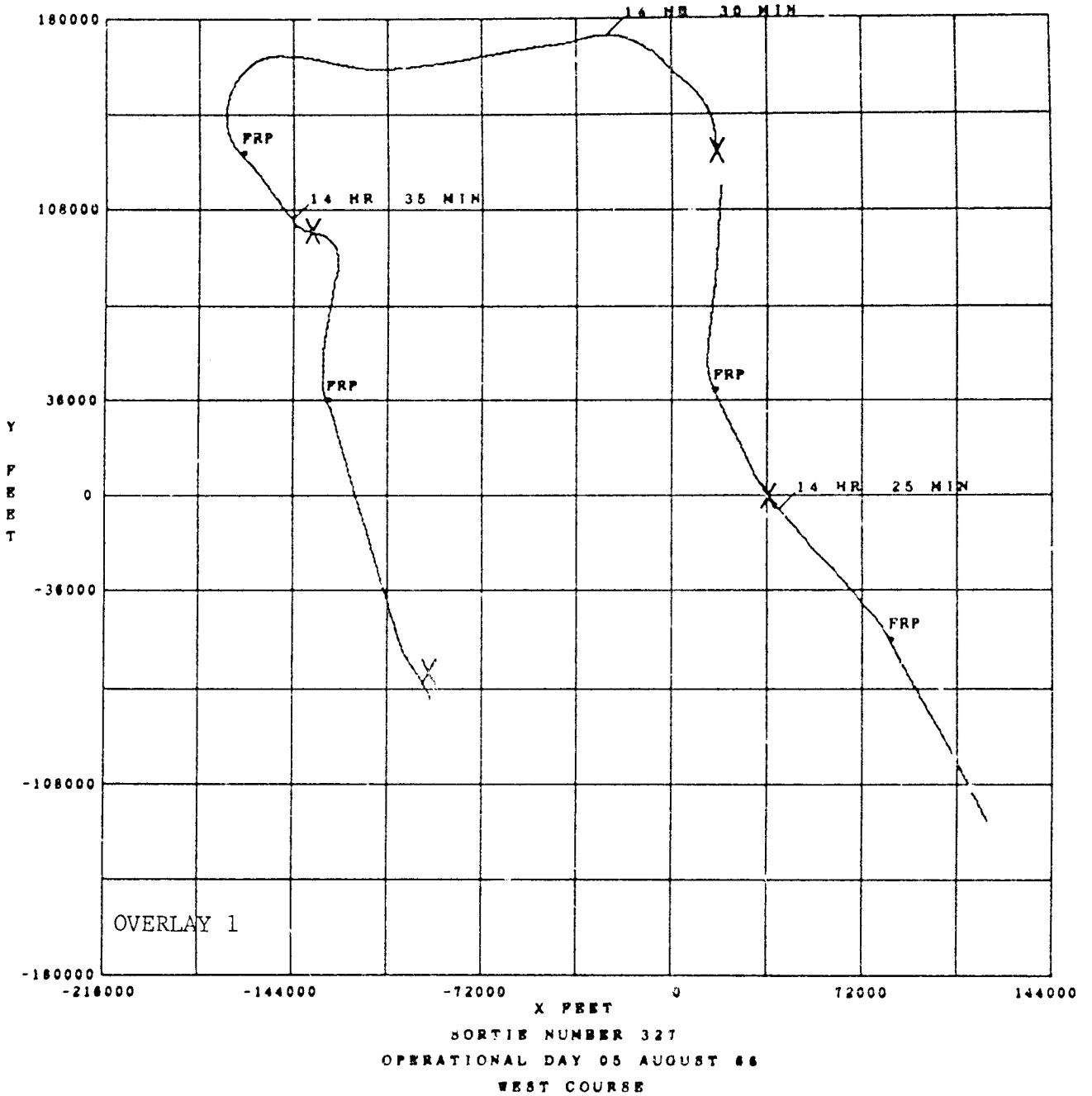




SORTIE NUMBER 318

C4092308
J9156

Figure 3-48 (U) Aircraft Altitude and Terrain Profile (Part 2 of 2)



04092311
J916* 173

Figure 3-49 (U) Aircraft Position Data (Part 1 of 5)

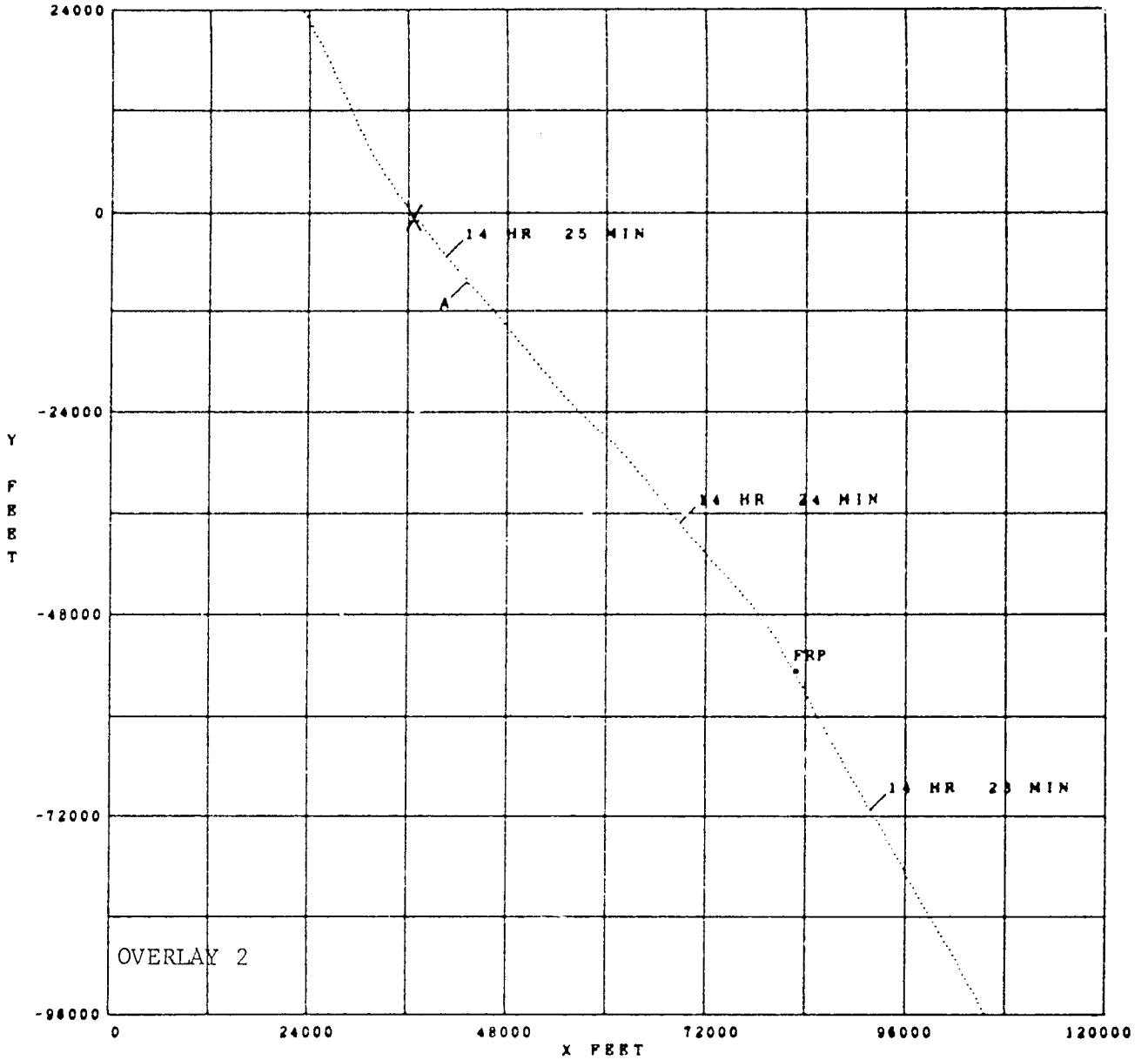
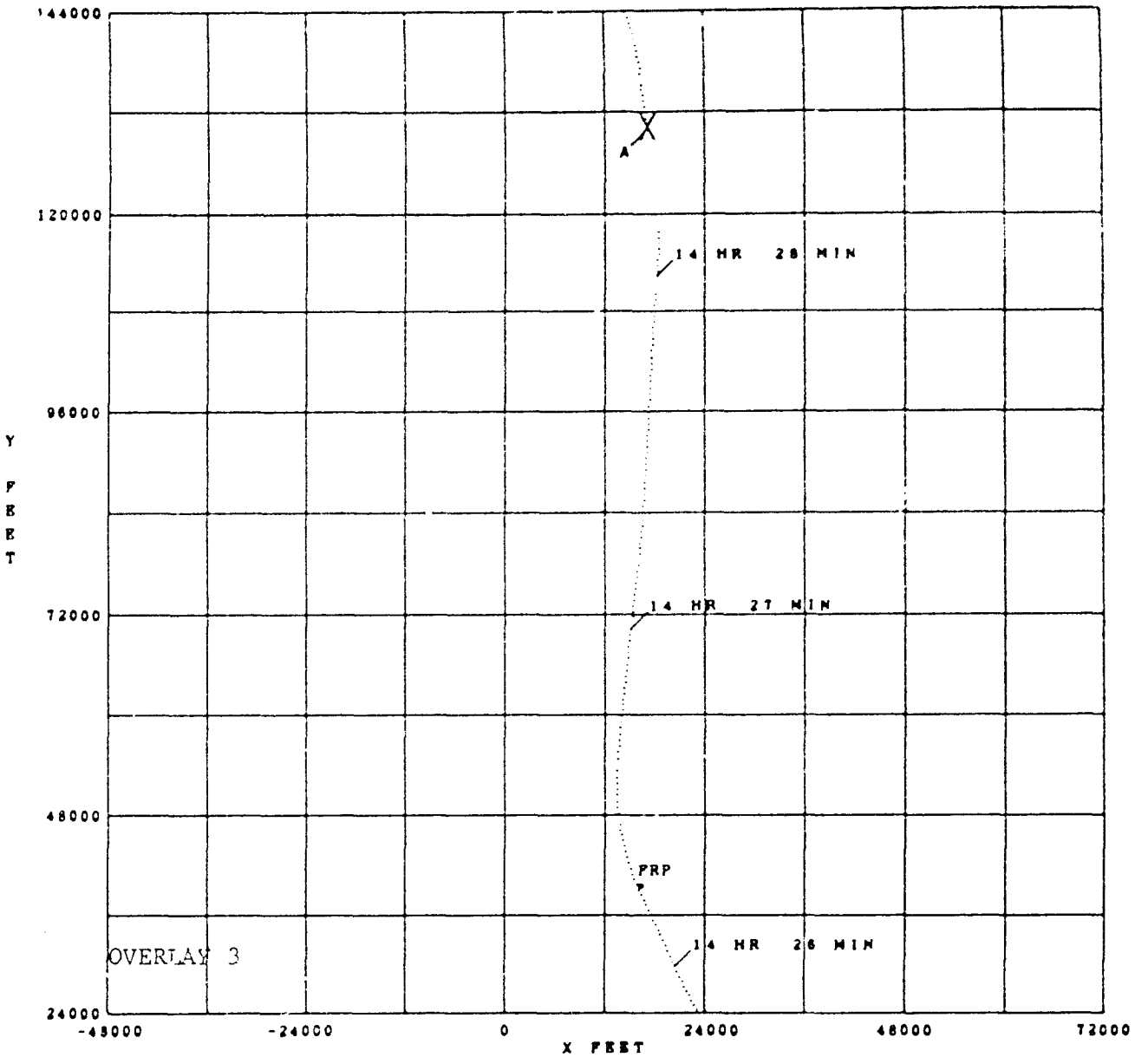


Figure 3-49 (U) Aircraft Position Data (Part 2 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 74 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 327
TARGET WEST 2

04092311
J9156 175

Figure 3-49 (U) Aircraft Position Data (Part 3 of 5)

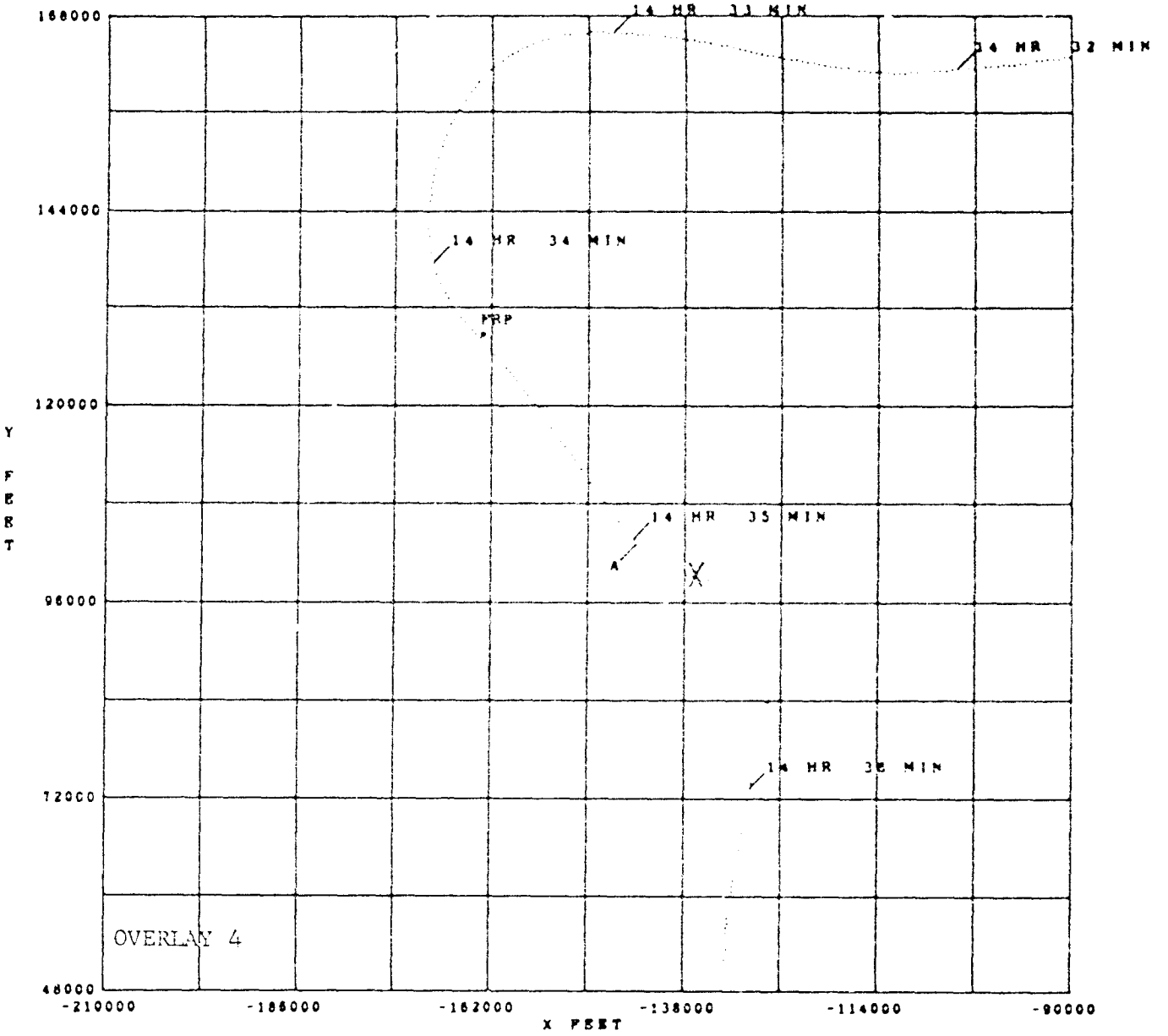
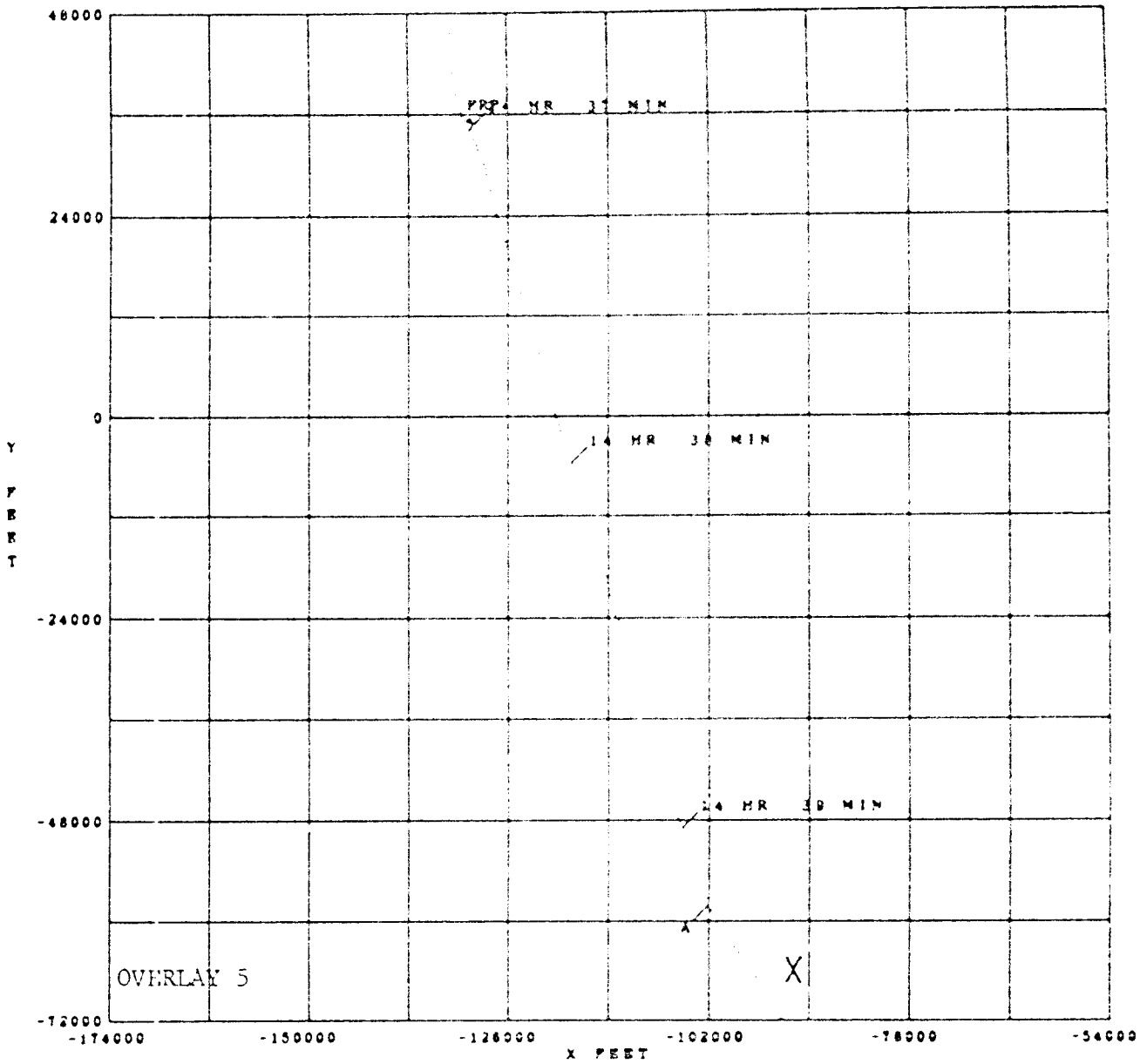


Figure 3-49 (U) Aircraft Position Data (Part 4 of 5)



04092311
J8156 177

Figure 3-49 (U) Aircraft Position Data (Part 5 of 5)

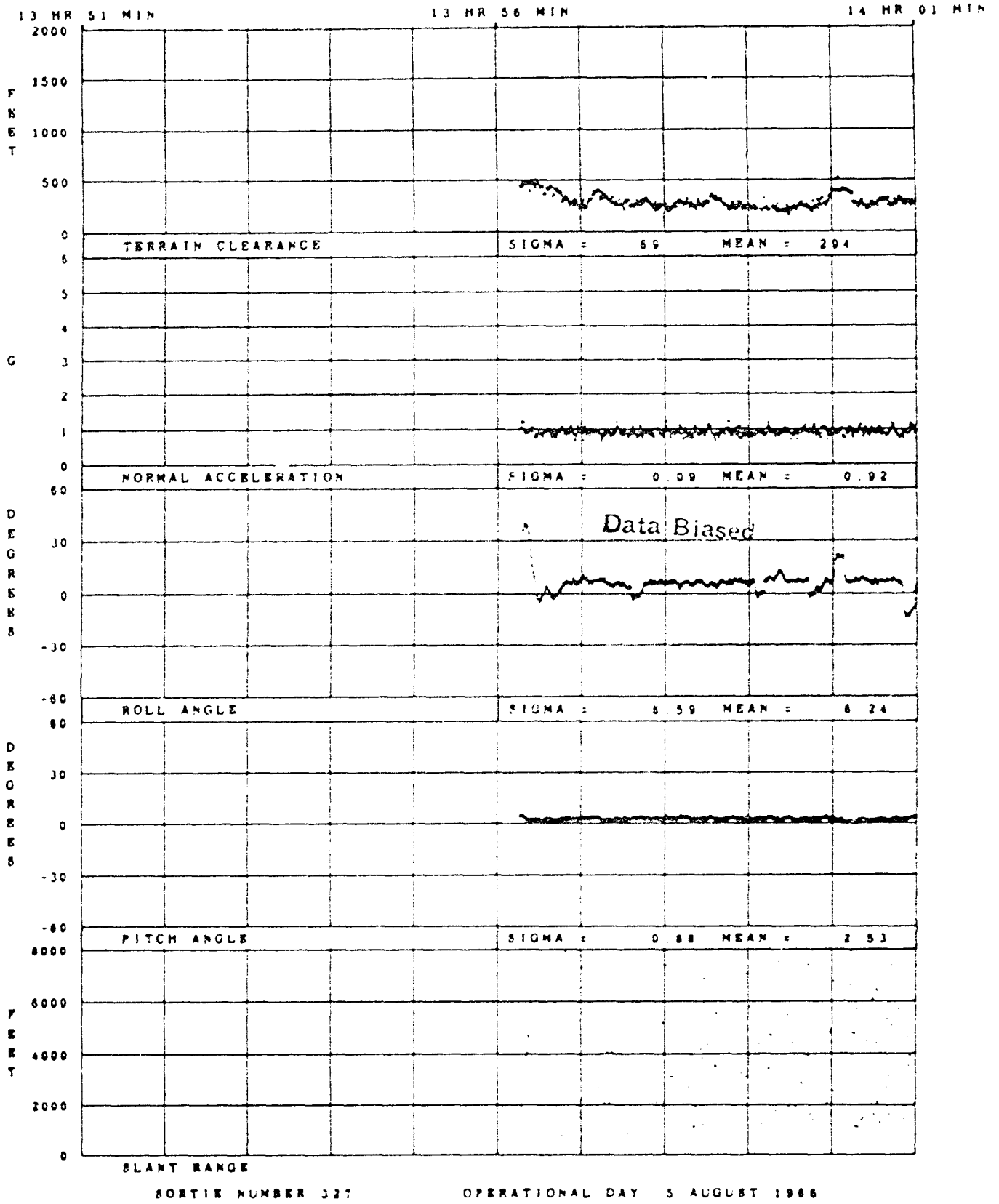


Figure 3-50 (U) Telemetered Data (Part 1 of 5)

UNCLASSIFIED

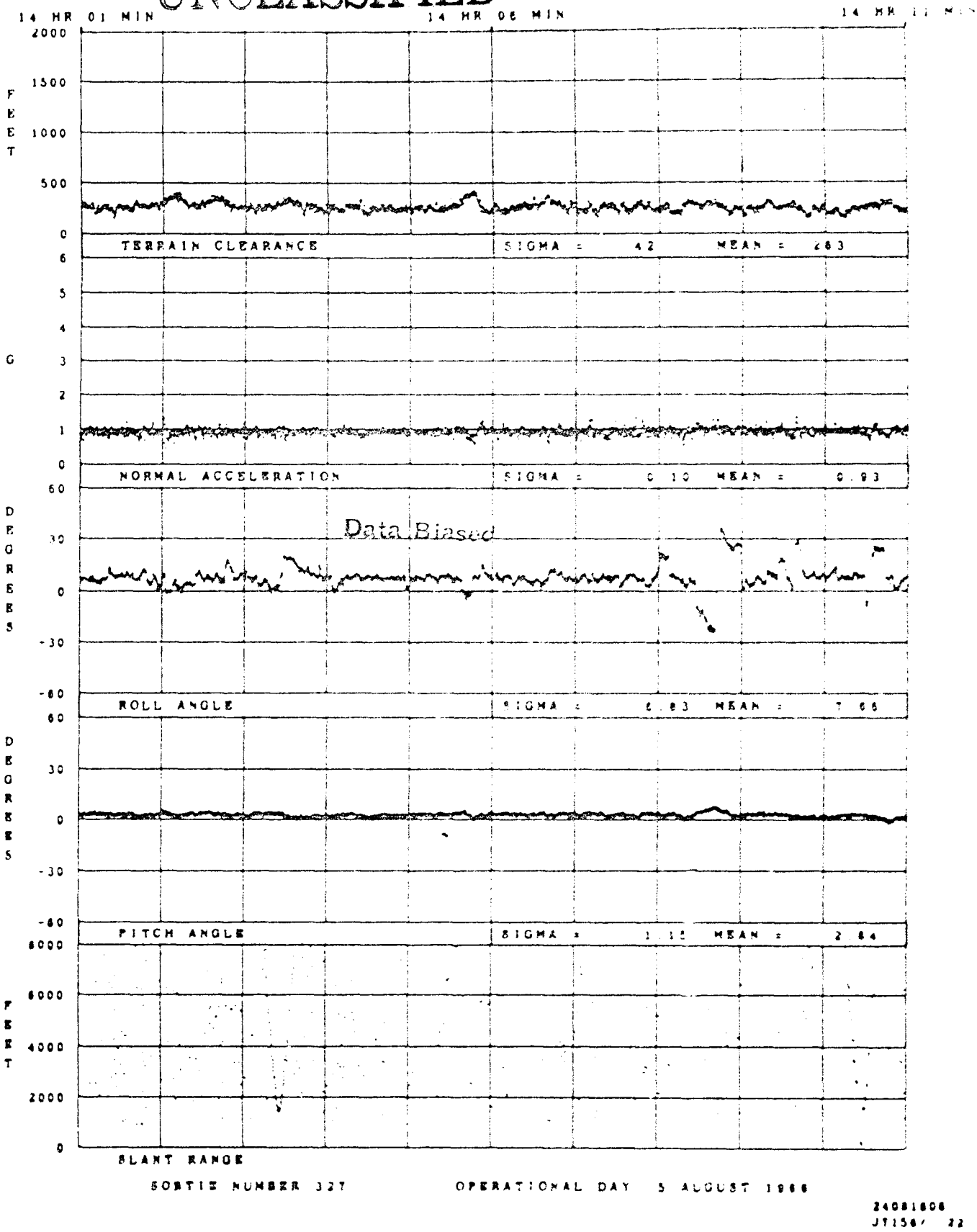


Figure 3-50 (U) Telemetered Data (Part 2 of 5)

UNCLASSIFIED

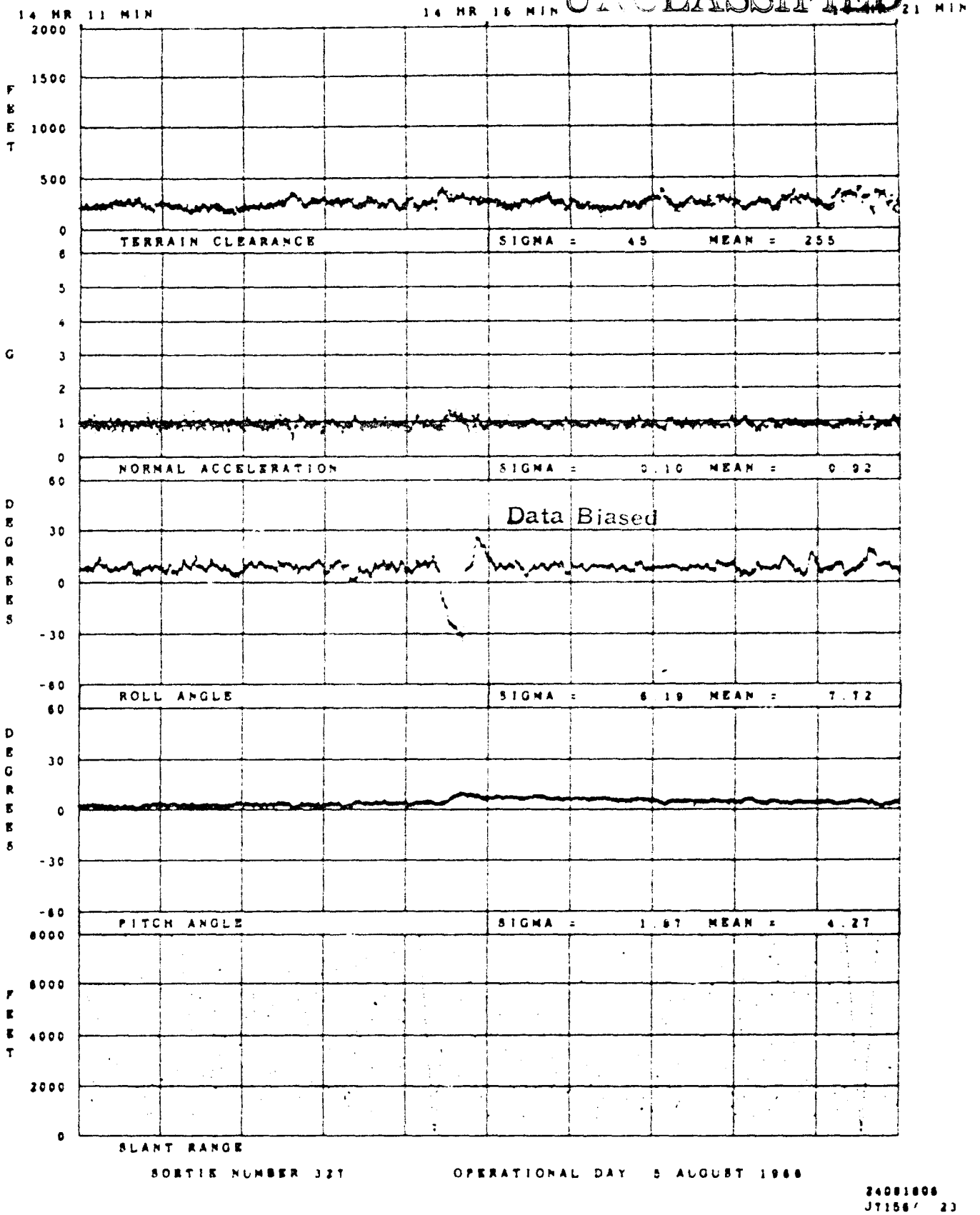


Figure 3-50 (U) Telemetered Data (Part 3 of 5)

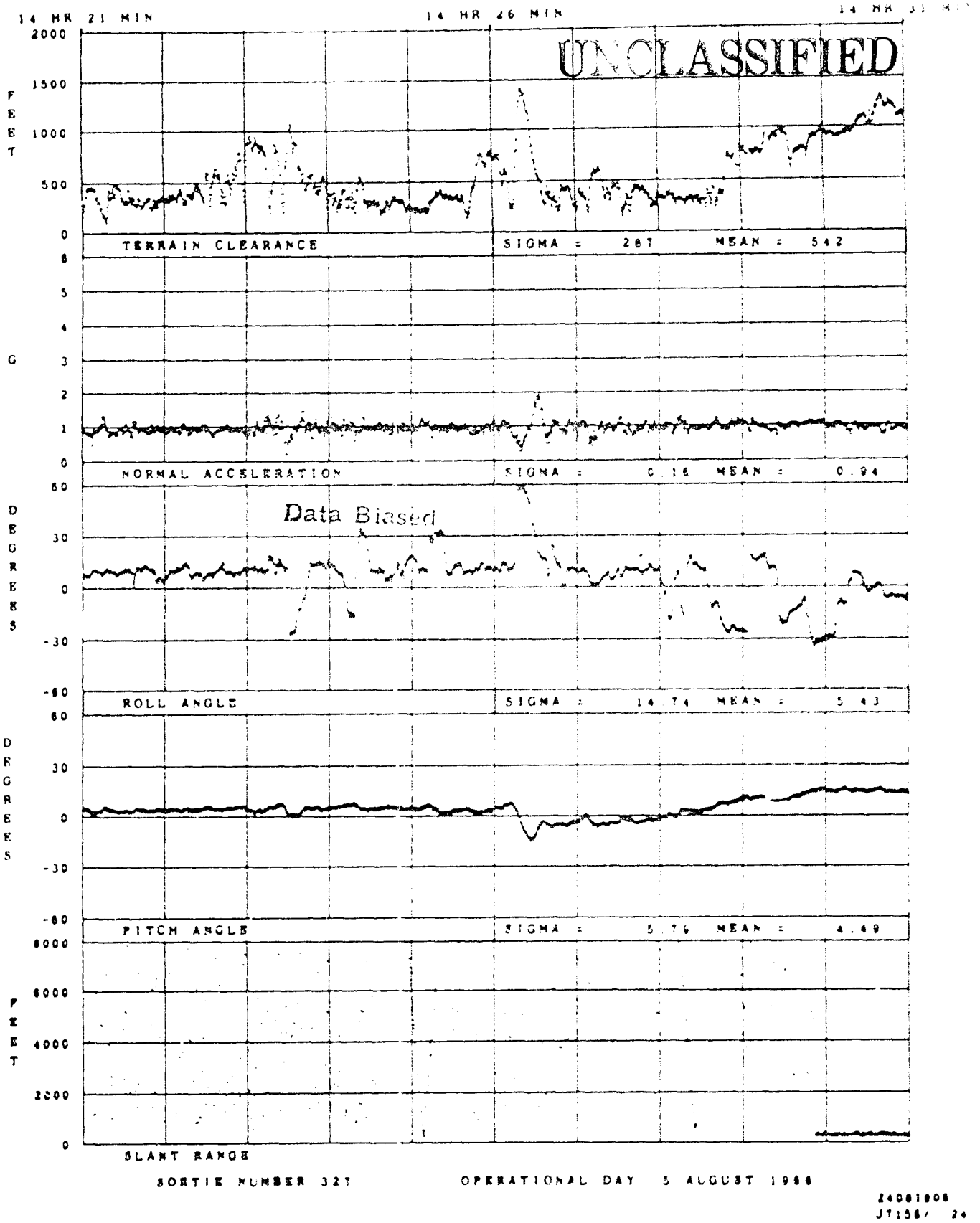


Figure 3-50 (U) Telemetered Data (Part 4 of 5)

UNCLASSIFIED

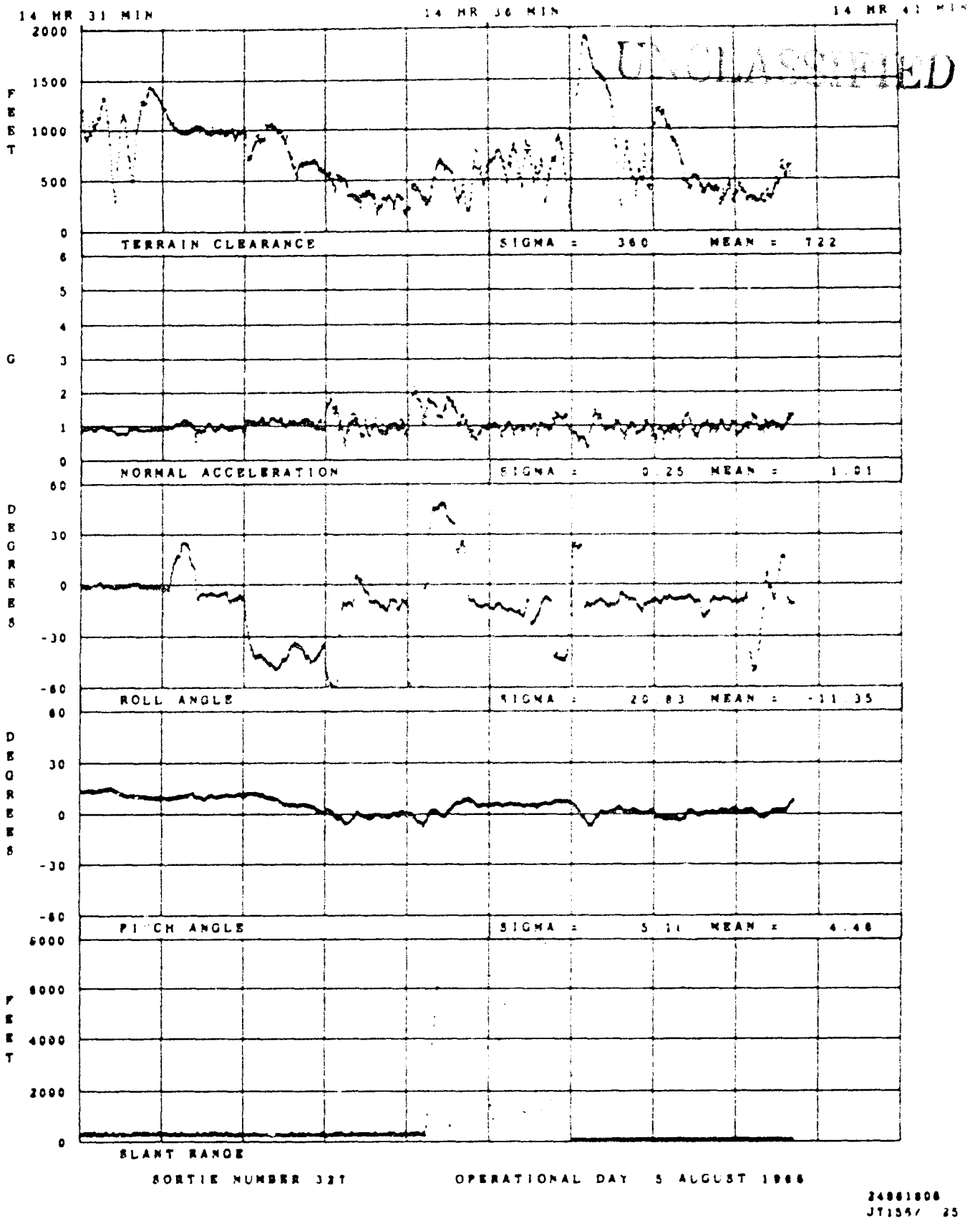
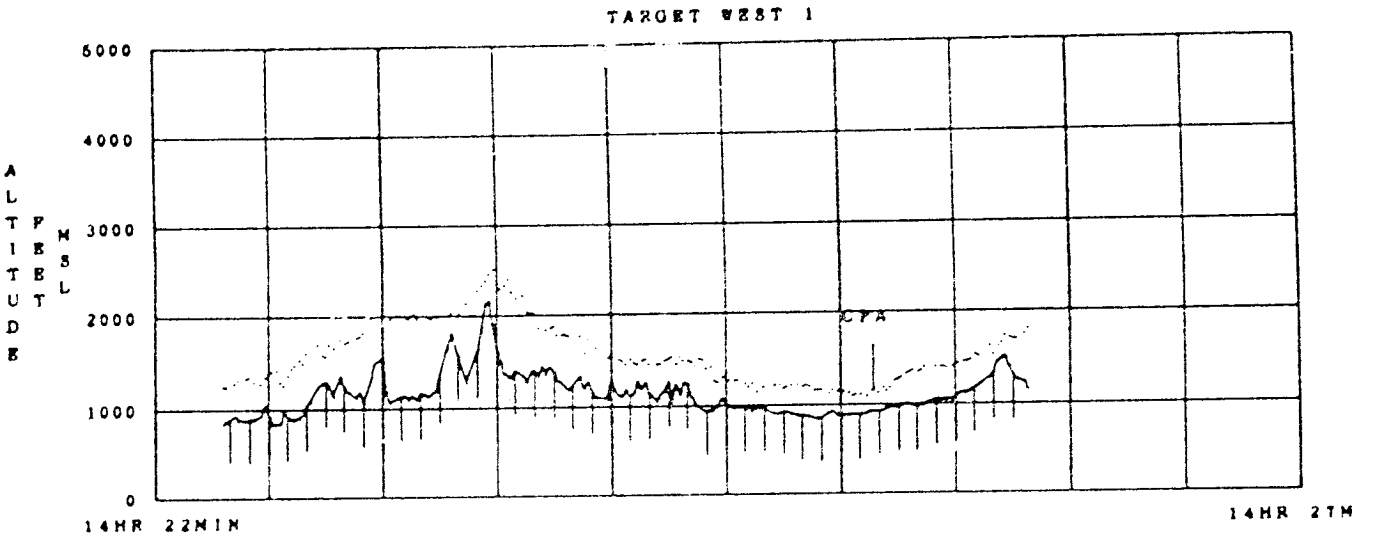
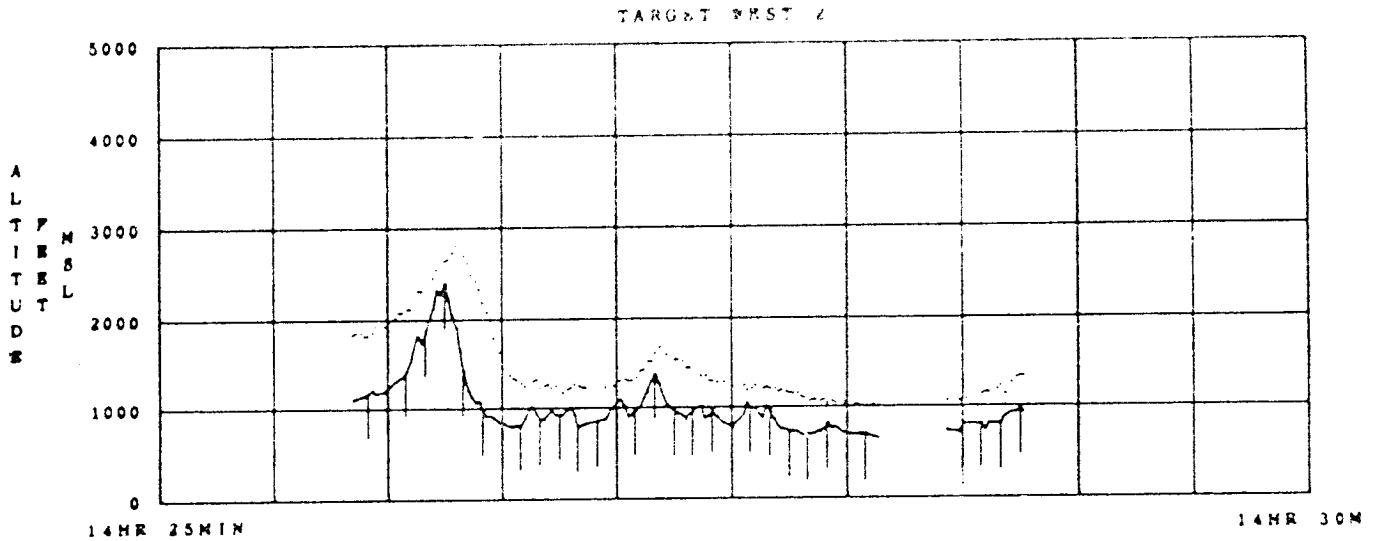


Figure 3-50 (U) Telemetered Data (Part 5 of 5)

UNCLASSIFIED



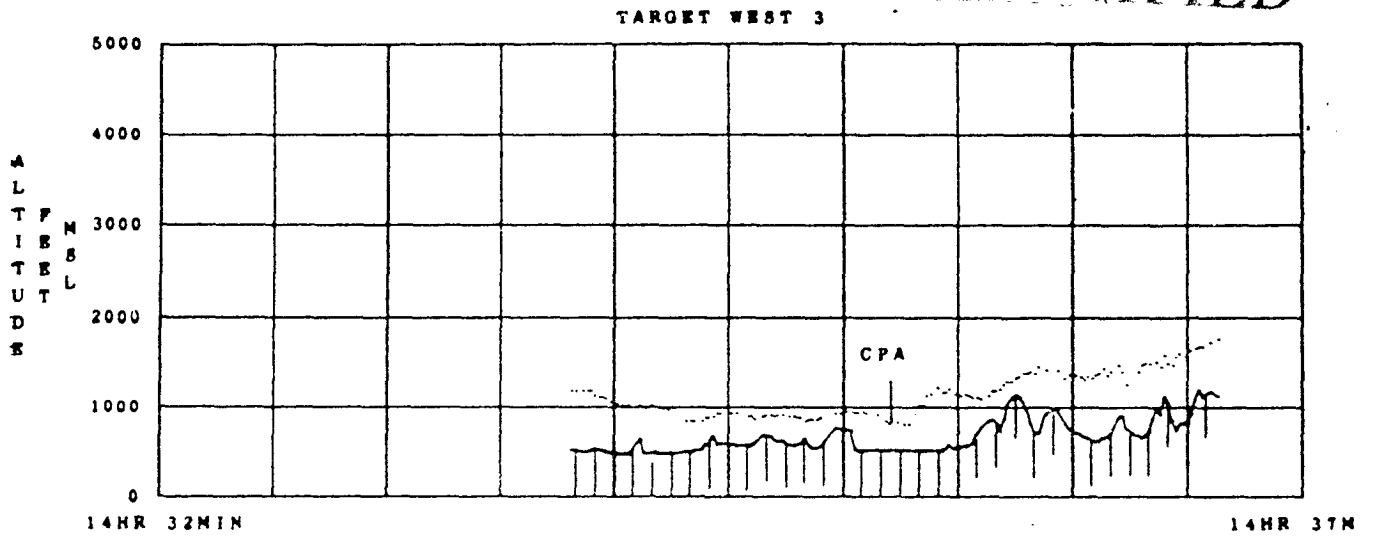


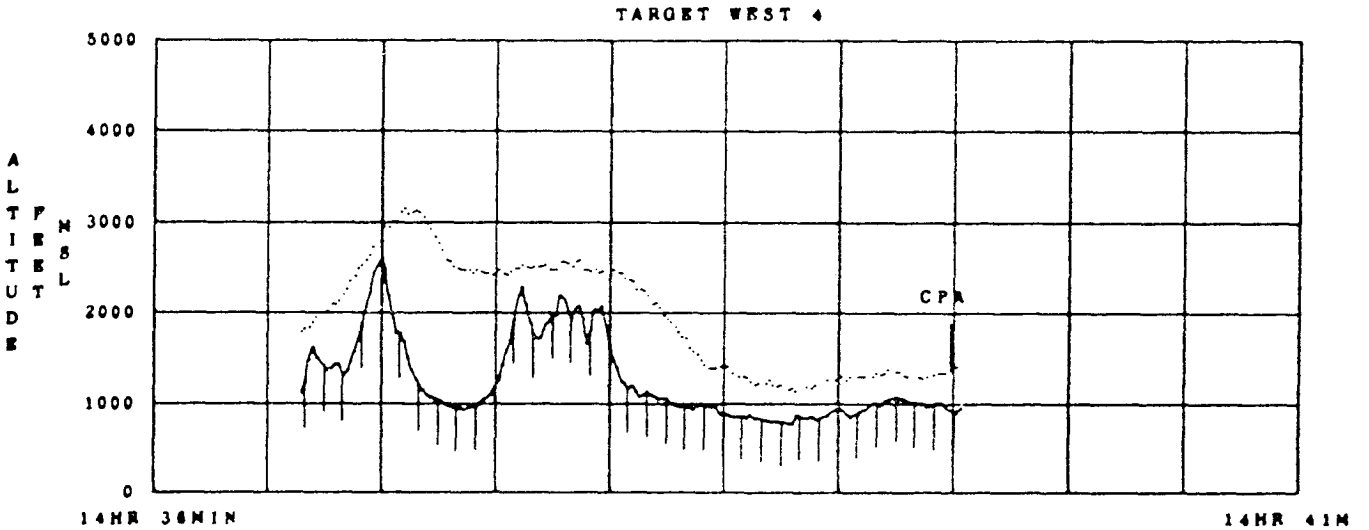
SORTIE NUMBER 327

04092311
J9156

Figure 3-51 (U) Aircraft Altitude and Terrain Profile (Part 1 of 2)

UNCLASSIFIED





SORTIE NUMBER 327

04092311
J9156

Figure 3-51 (U) Aircraft Altitude and Terrain Profile (Part 2 of 2)

UNCLASSIFIED

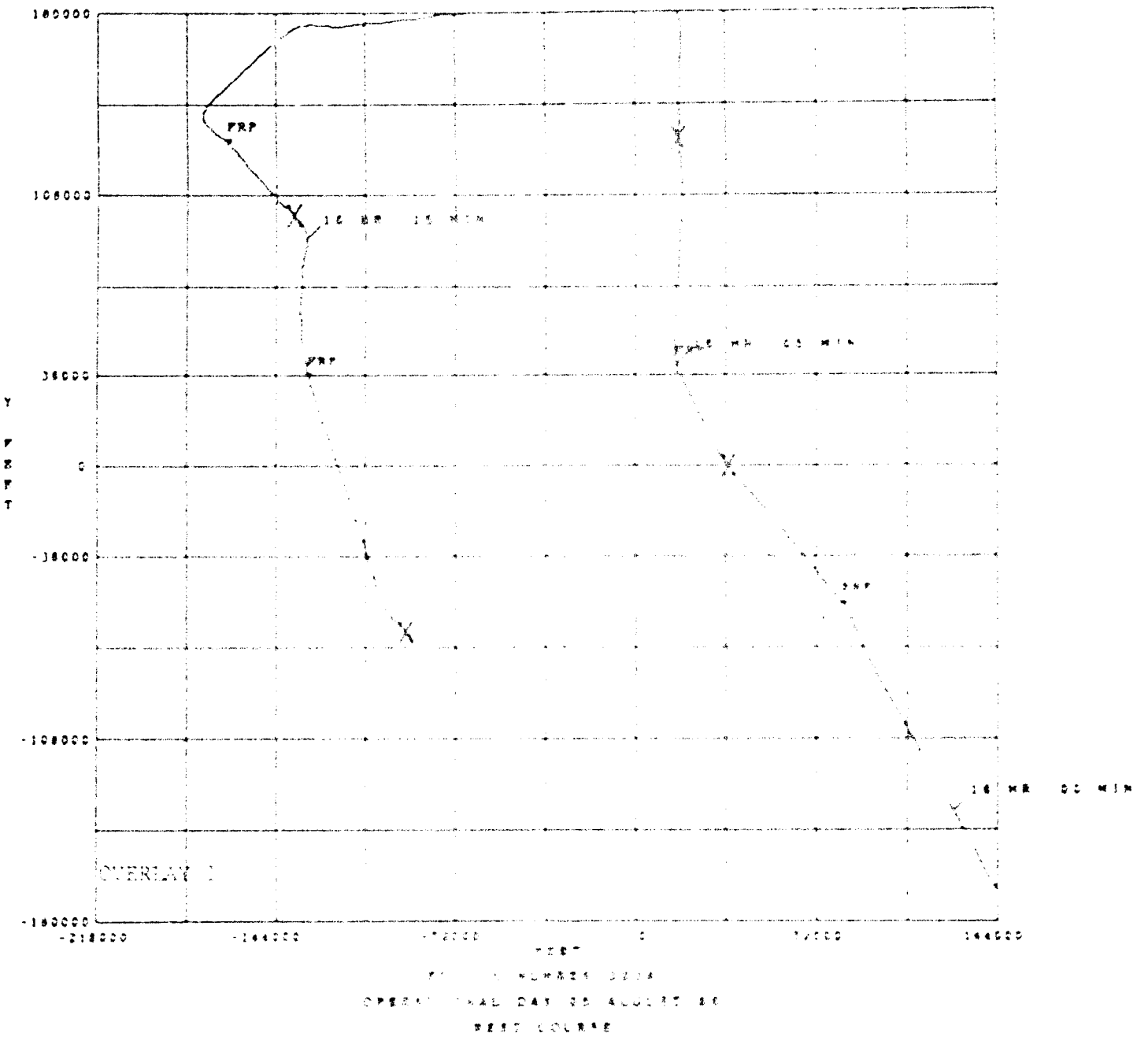
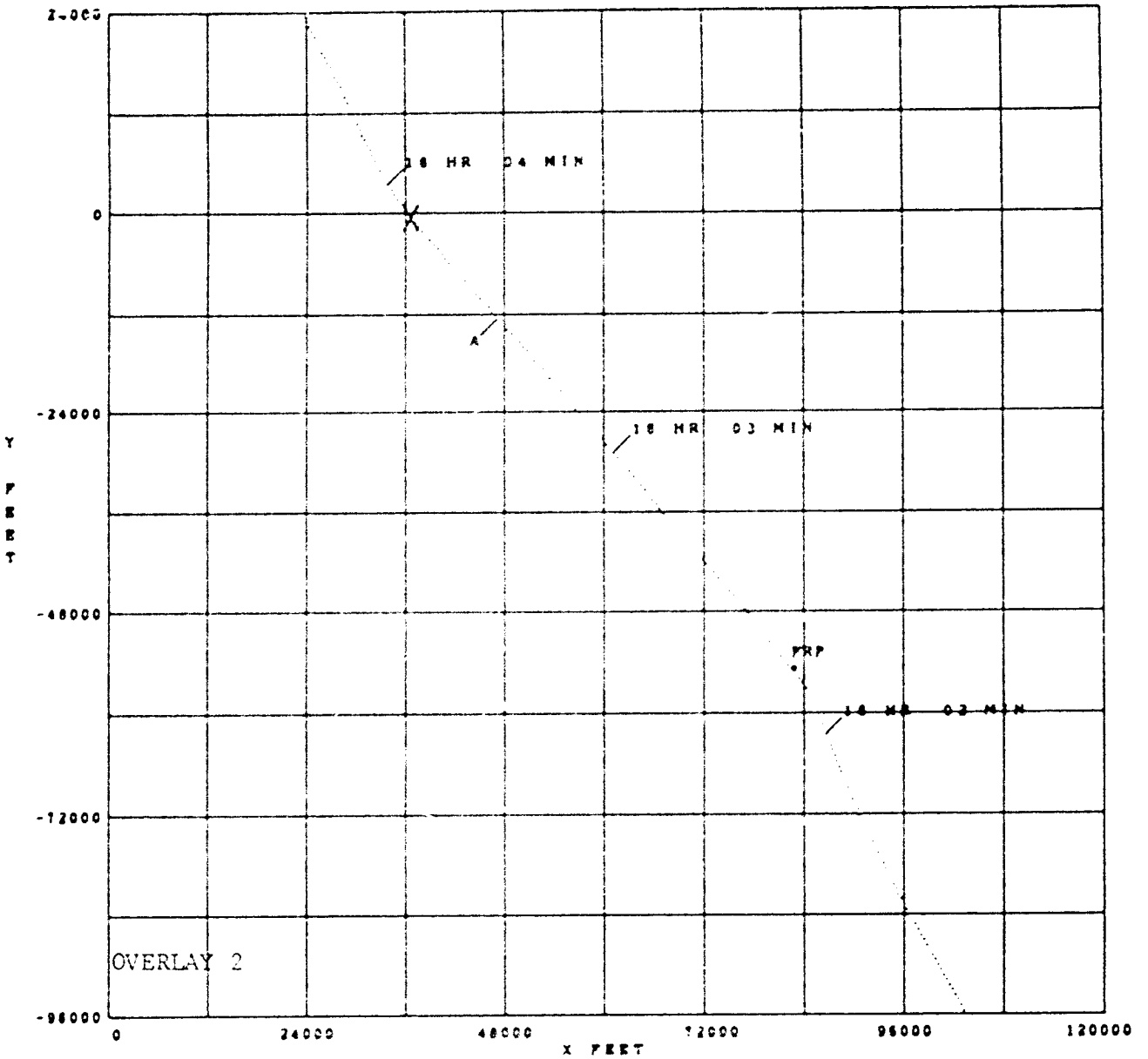


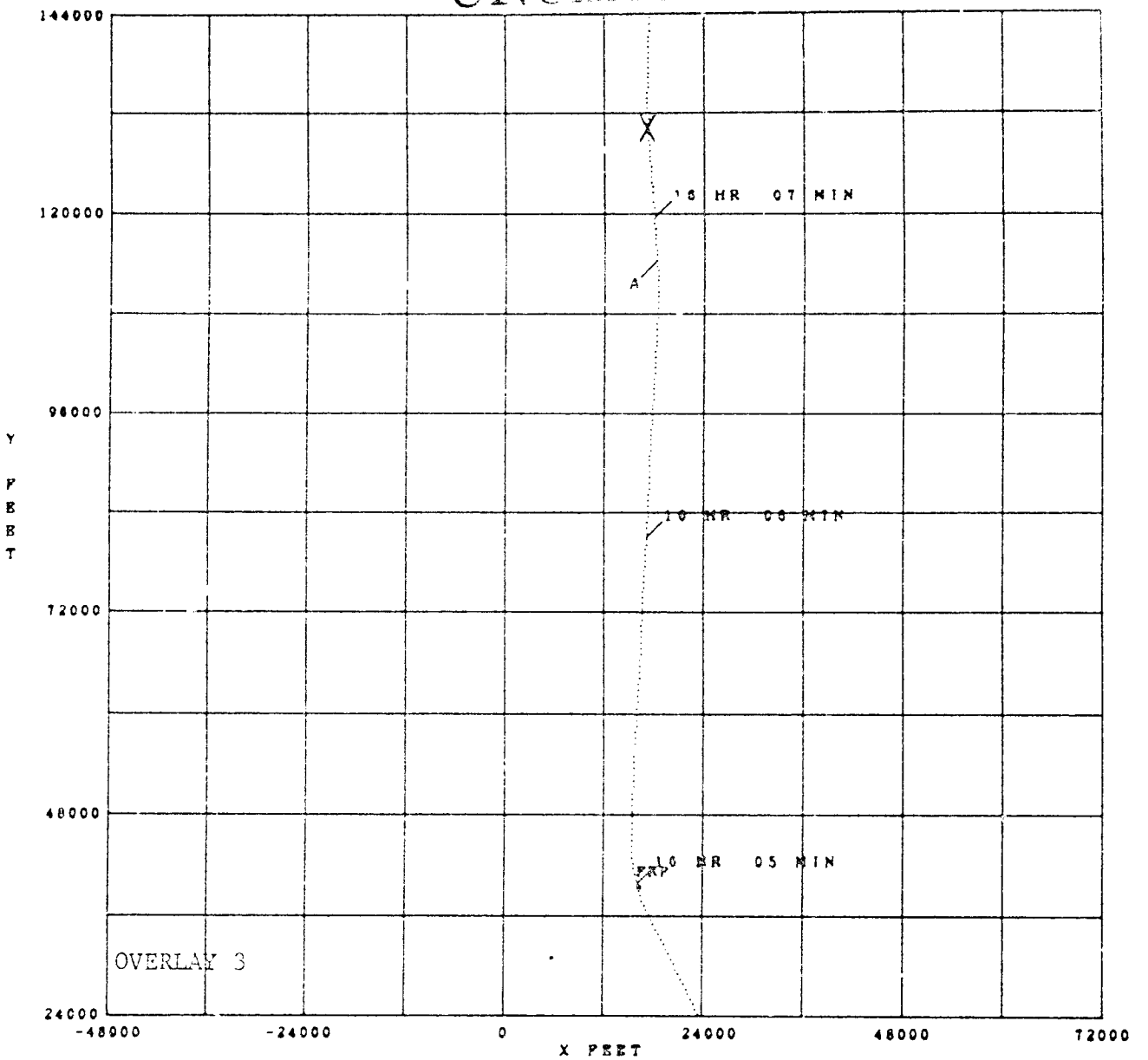
Figure 4-32 (U) Aircraft Plots - Day (Part 1 of 3)



MINIMUM GROUND DISTANCE TO TARGET = 65 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 323A
TARGET WEST 1

04092314
J9156 21

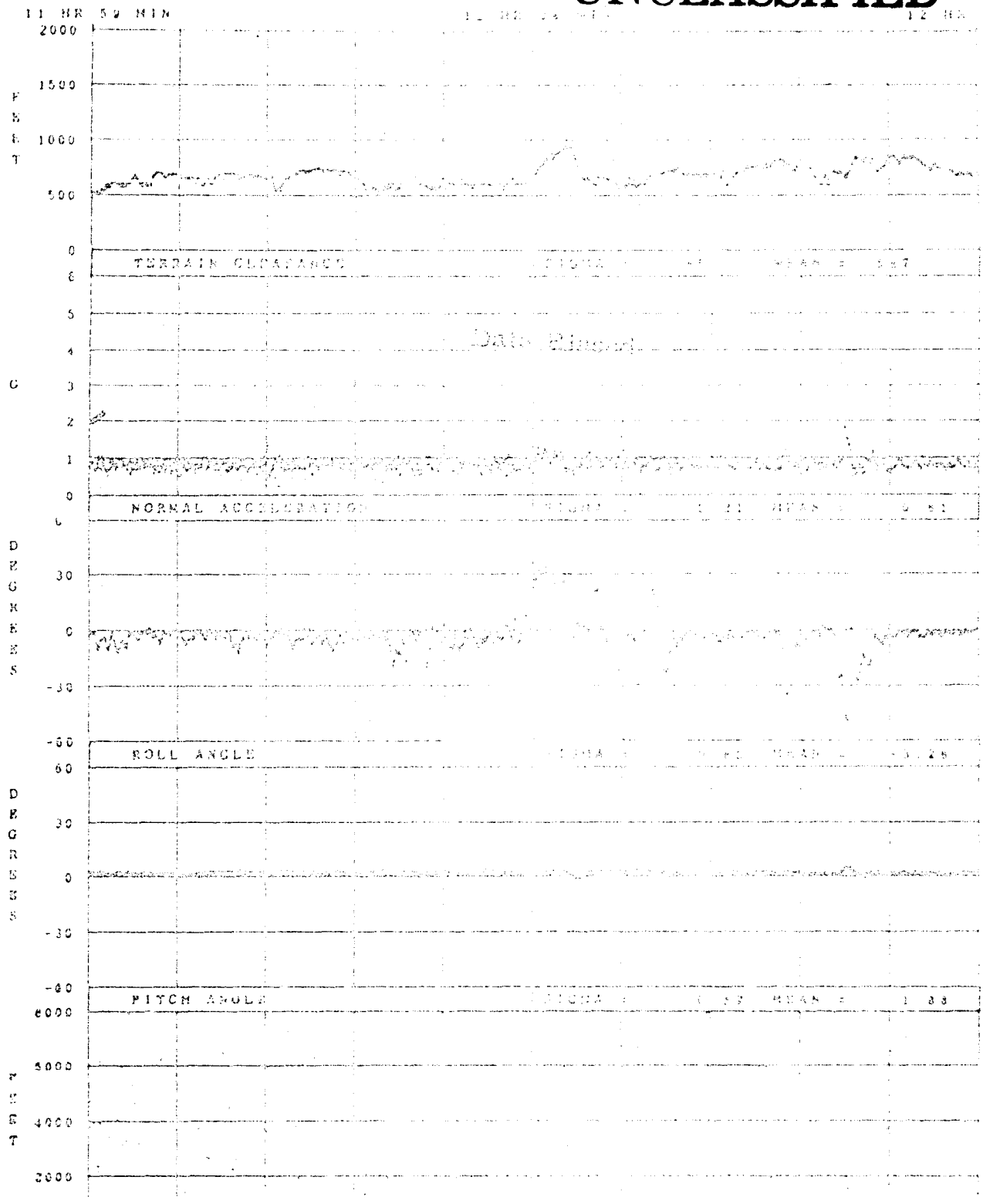
Figure 3-52 (U) Aircraft Position Data (Part 2 of 5)

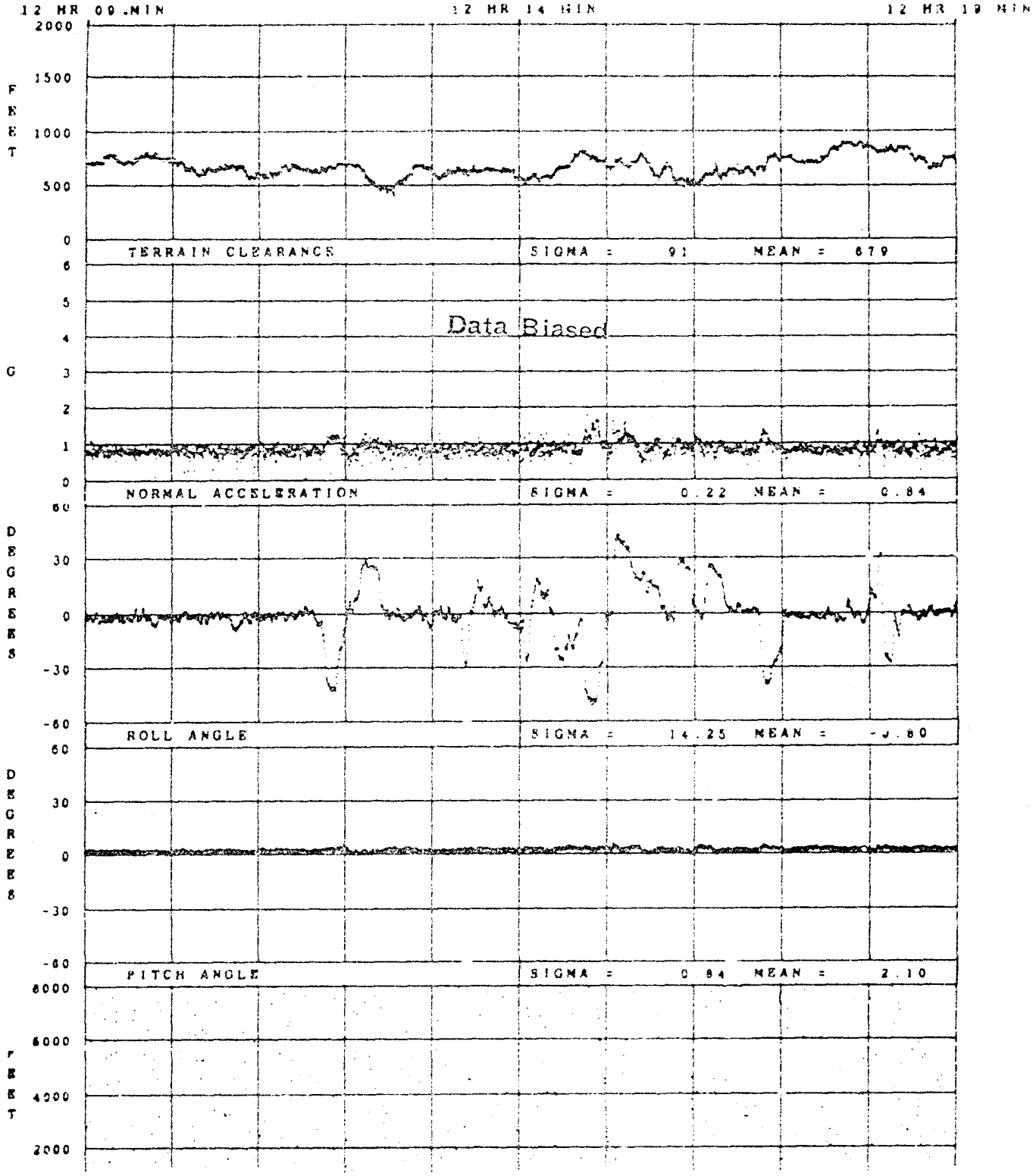


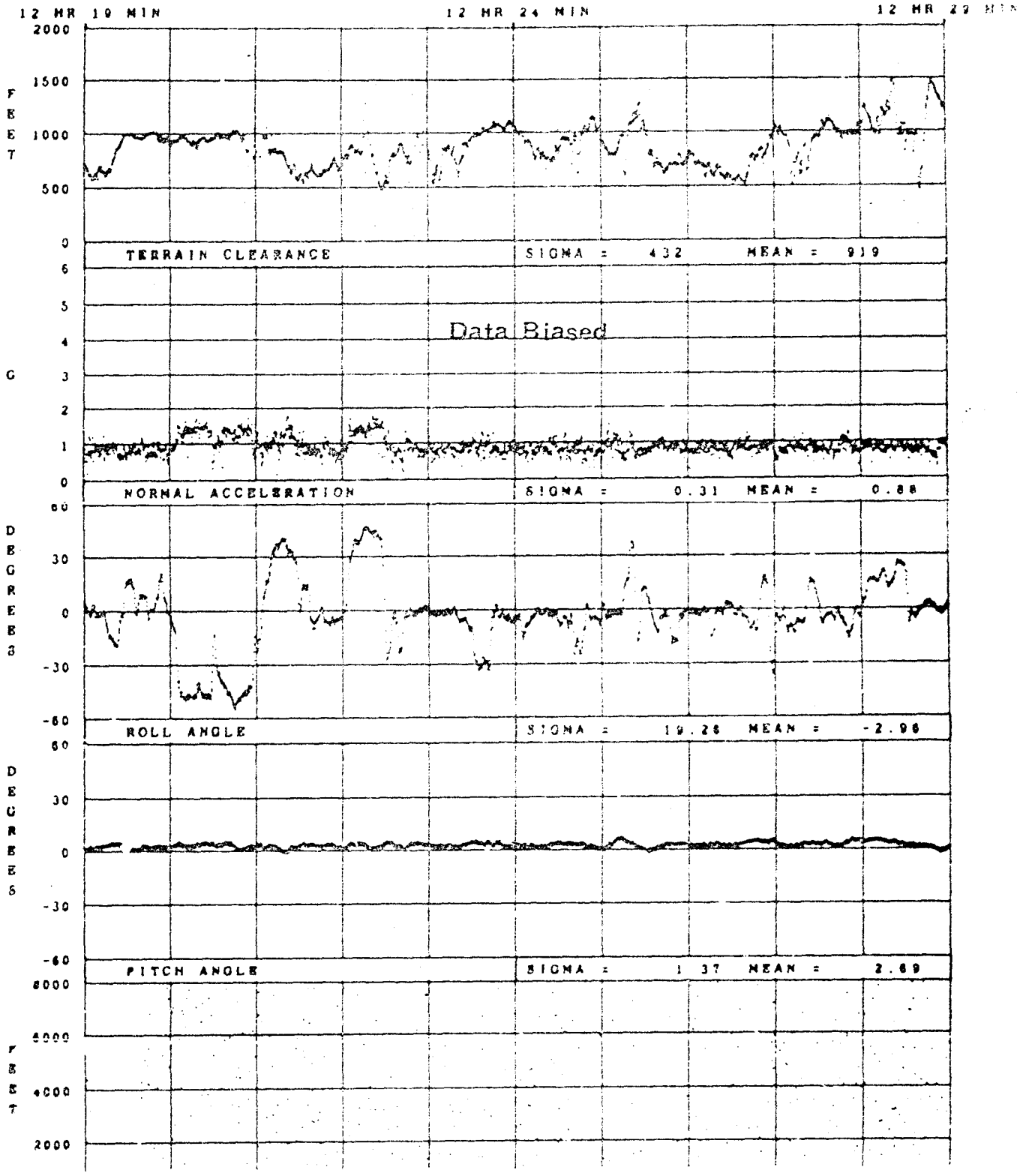
MINIMUM GROUND DISTANCE TO TARGET = 2 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 323A
TARGET WEST 2

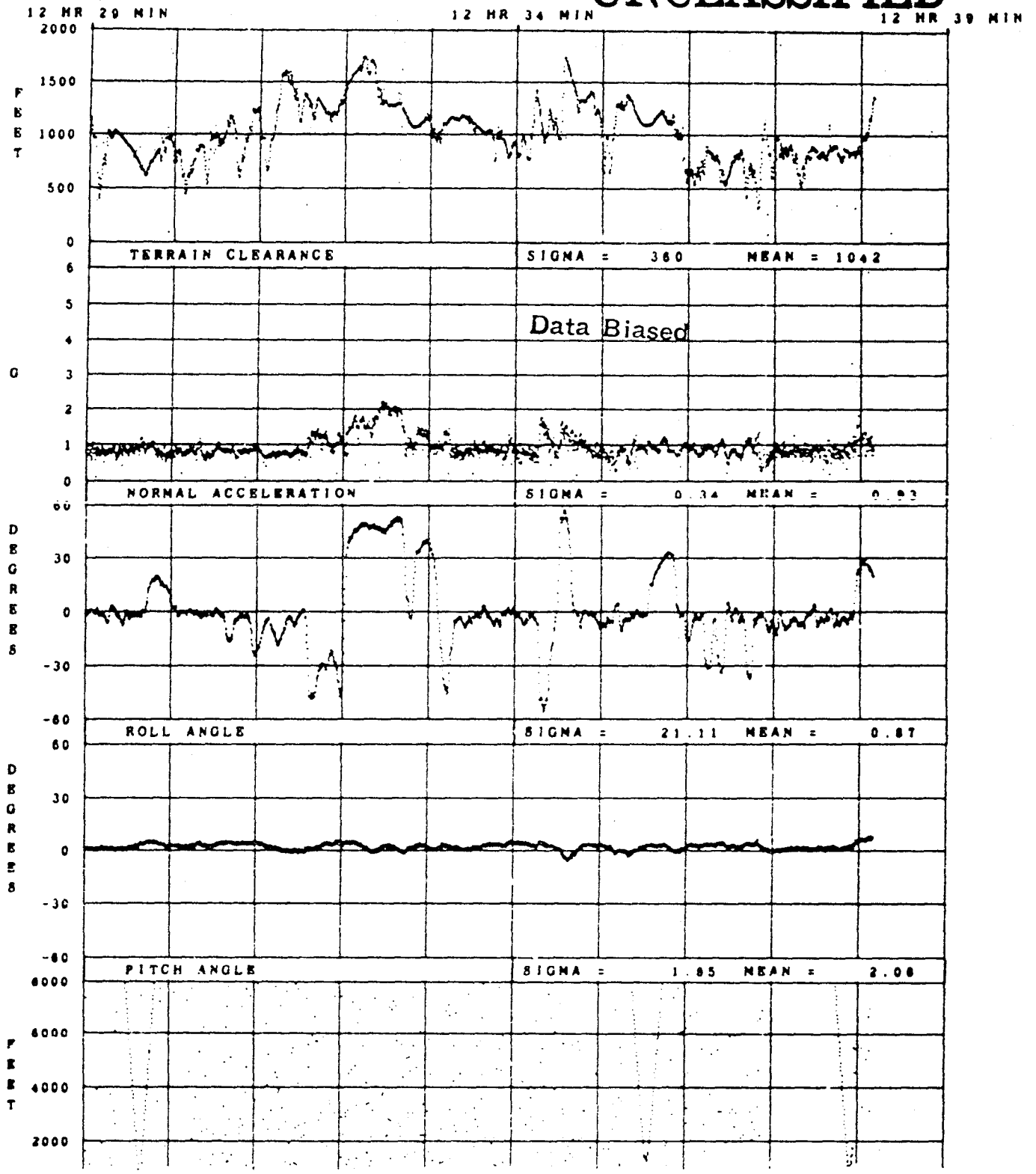
04092314
J9156 2

Figure 3-52 (U) Aircraft Position Data (Part 3 of 5)

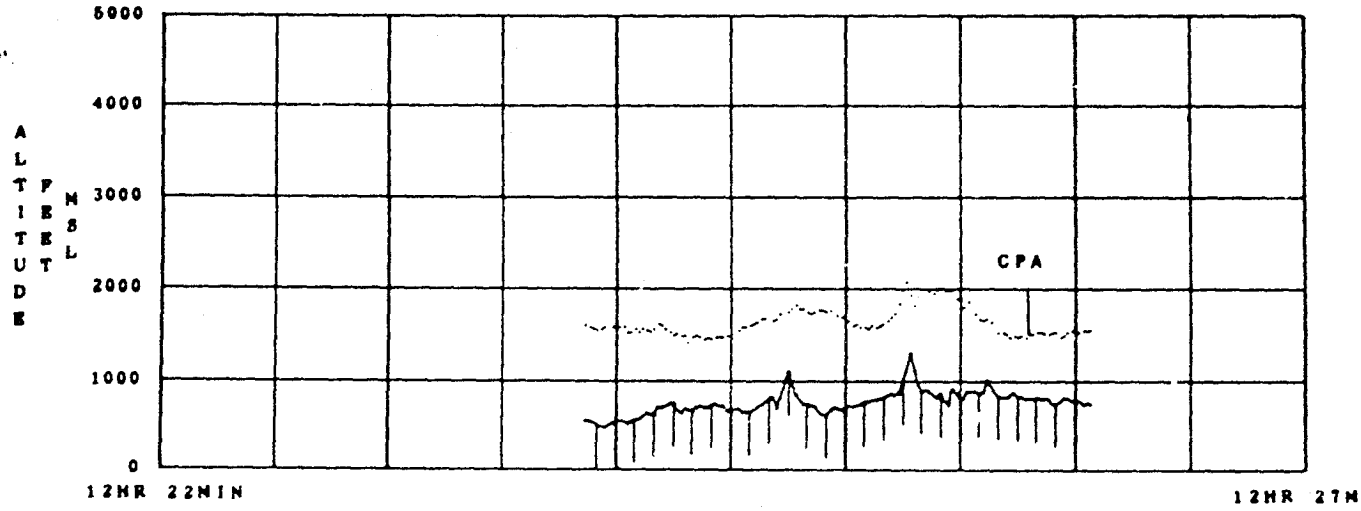

11 HR 59 MIN
12 HR
FEET
2000
1500
1000
500
0
TERRAIN CLEARANCE
G
8
5
4
3
2
1
0
NORMAL ACCELERATION
DEGREES
30
0
-30
ROLL ANGLE
DEGREES
60
30
0
-30
-60
PITCH ANGLE
FEET
6000
5000
4000
3000


12 HR 09 MIN
12 HR 14 MIN
12 HR 19 MIN
FEET
2000
1500
1000
500
0
TERRAIN CLEARANCE
SIGMA = 91
MEAN = 679
G
6
5
4
3
2
1
0
Data Biased
NORMAL ACCELERATION
SIGMA = 0.22
MEAN = 0.84
DEGREES
60
30
0
-30
-60
ROLL ANGLE
SIGMA = 14.25
MEAN = -0.80
DEGREES
60
30
0
-30
-60
PITCH ANGLE
SIGMA = 0.84
MEAN = 2.10
FEET
8000
6000
4000
2000

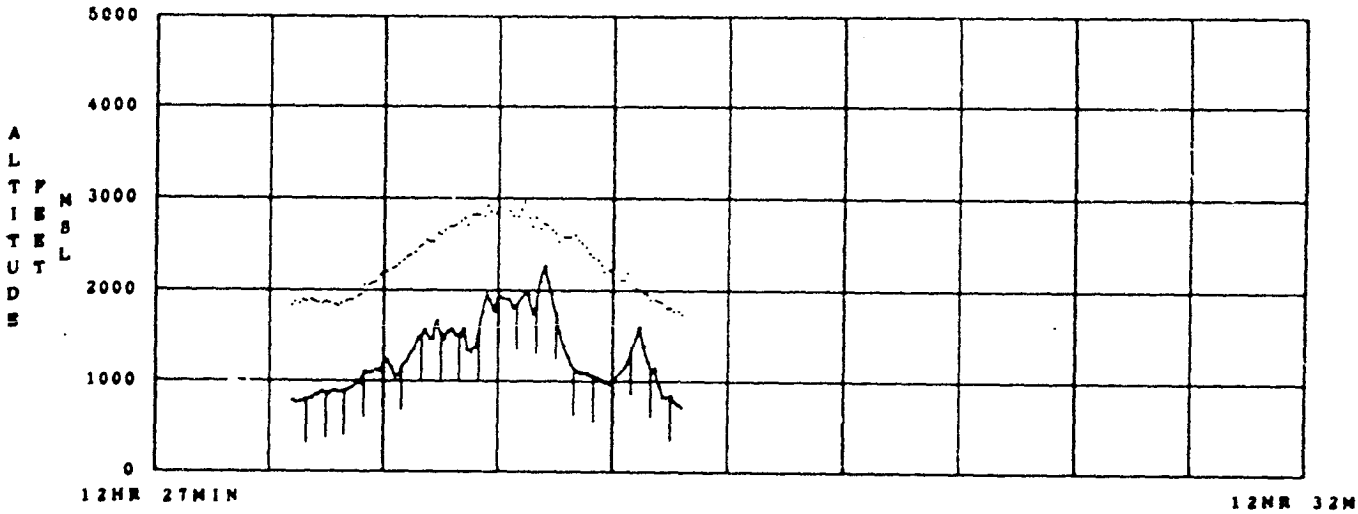

12 HR 19 MIN
12 HR 24 MIN
12 HR 29 MIN
FEET
2000
1500
1000
500
0
TERRAIN CLEARANCE
SIGMA = 432
MEAN = 919
G
6
5
4
3
2
1
0
Data Biased
NORMAL ACCELERATION
SIGMA = 0.31
MEAN = 0.88
DEGREES
60
30
0
-30
-60
ROLL ANGLE
SIGMA = 19.26
MEAN = -2.96
DEGREES
60
30
0
-30
-60
PITCH ANGLE
SIGMA = 1.37
MEAN = 2.69
FEET
6000
4000
2000


12 HR 29 MIN
12 HR 34 MIN
12 HR 39 MIN
FEET
2000
1500
1000
500
0
TERRAIN CLEARANCE
SIGMA = 360
MEAN = 1042
G
6
5
4
3
2
1
0
Data Biased
NORMAL ACCELERATION
SIGMA = 0.34
MEAN = 0.93
DEGREES
60
30
0
-30
-60
ROLL ANGLE
SIGMA = 21.11
MEAN = 0.87
DEGREES
60
30
0
-30
-60
PITCH ANGLE
SIGMA = 1.85
MEAN = 2.08
FEET
8000
6000
4000
2000

TARGET EAST 1



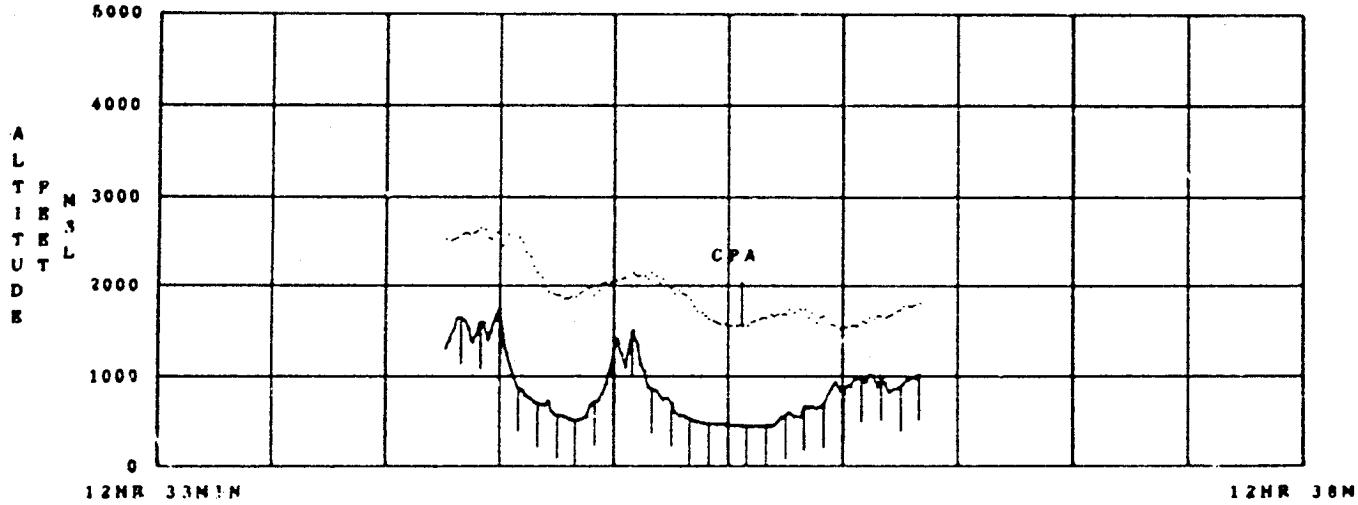
TARGET EAST 2



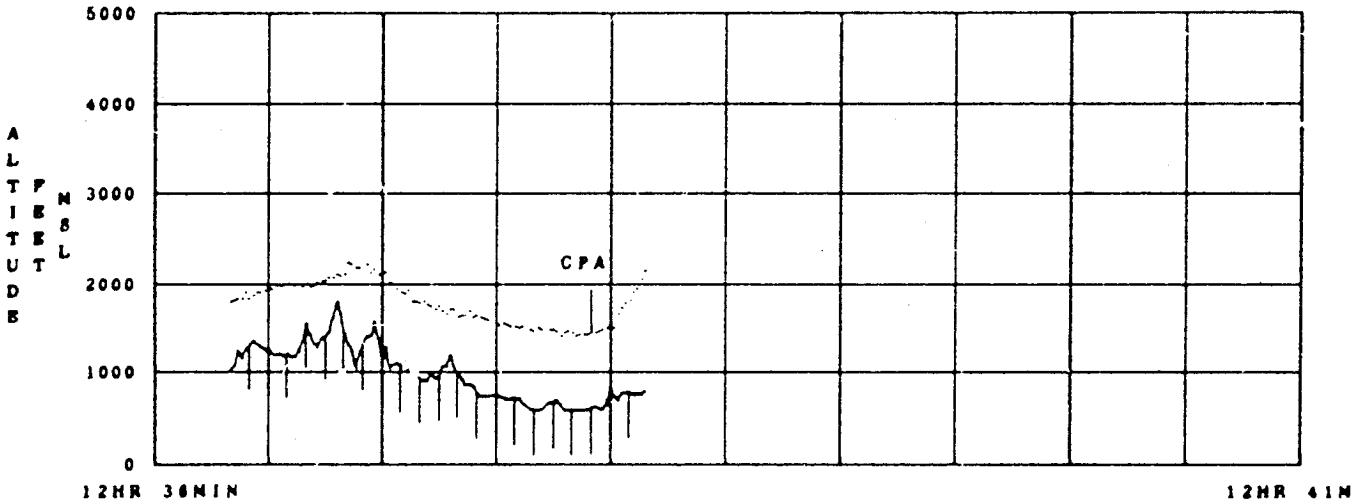
SORTIE NUMBER 325

04092313
J9158

TARGET EAST 3

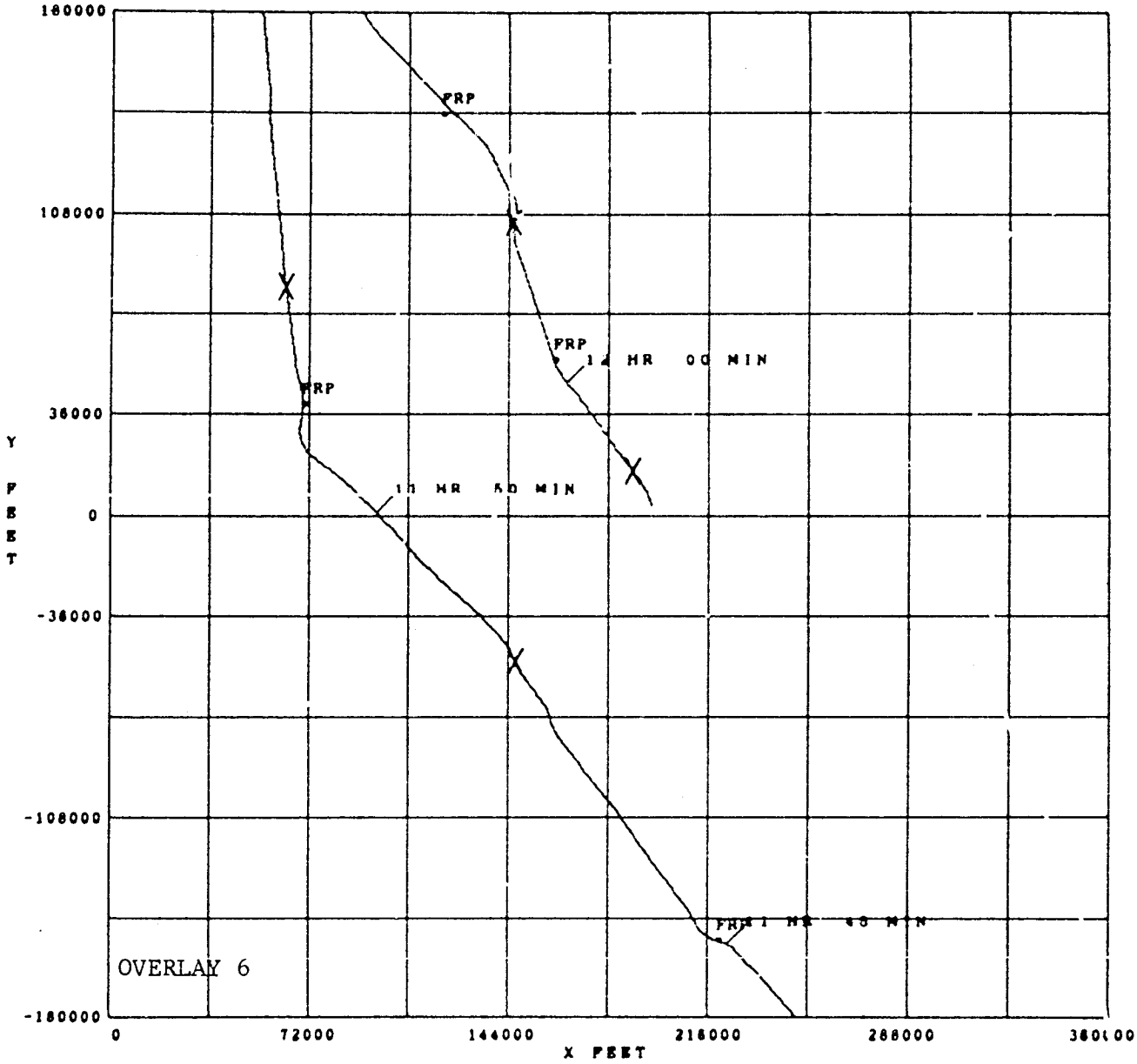


TARGET EAST 4



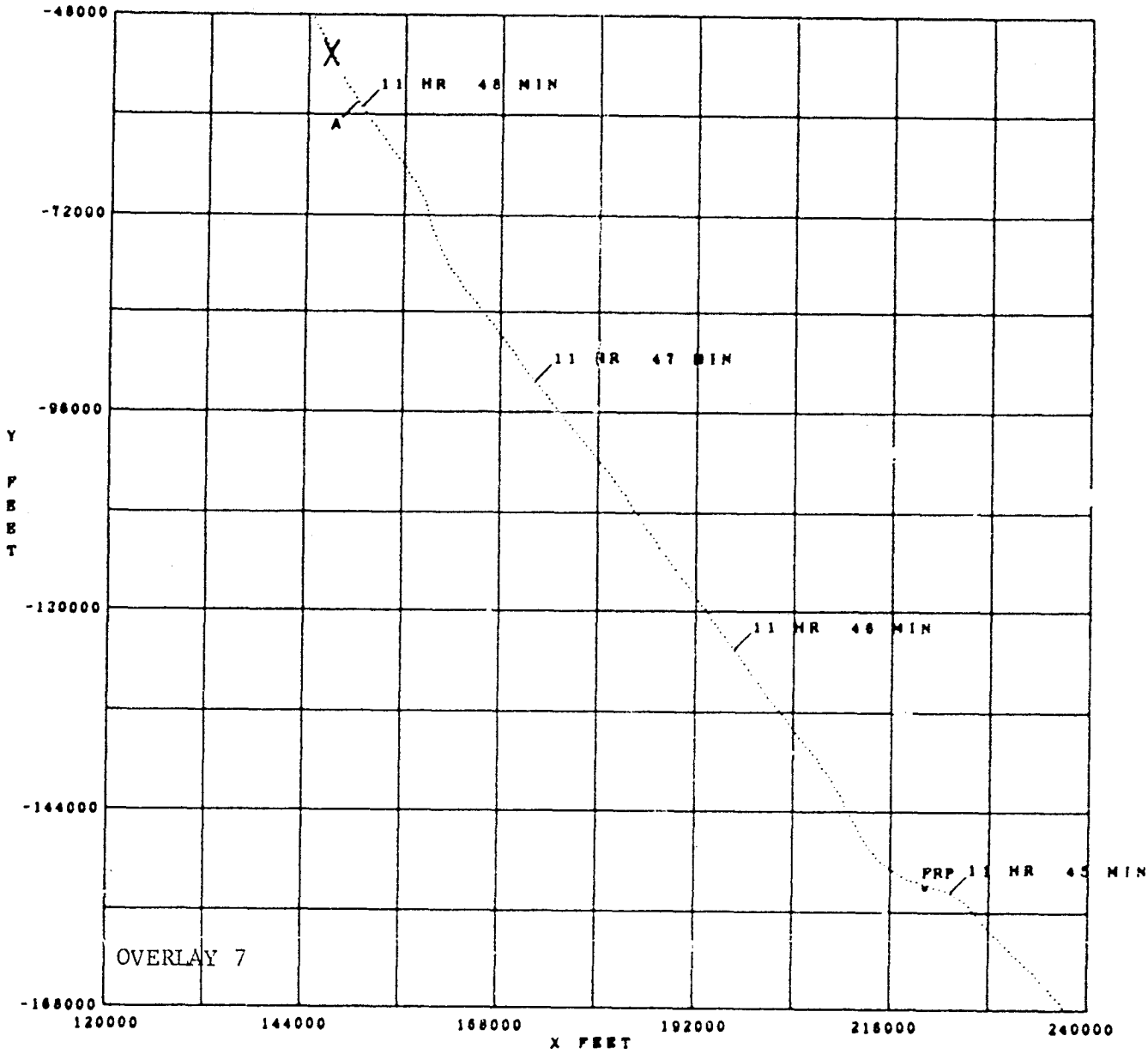
SORTIE NUMBER 325

04092314
J9156



SORTIE NUMBER 334
OPERATIONAL DAY 08 AUGUST 66
EAST COURSE

04092321
J6158 2T



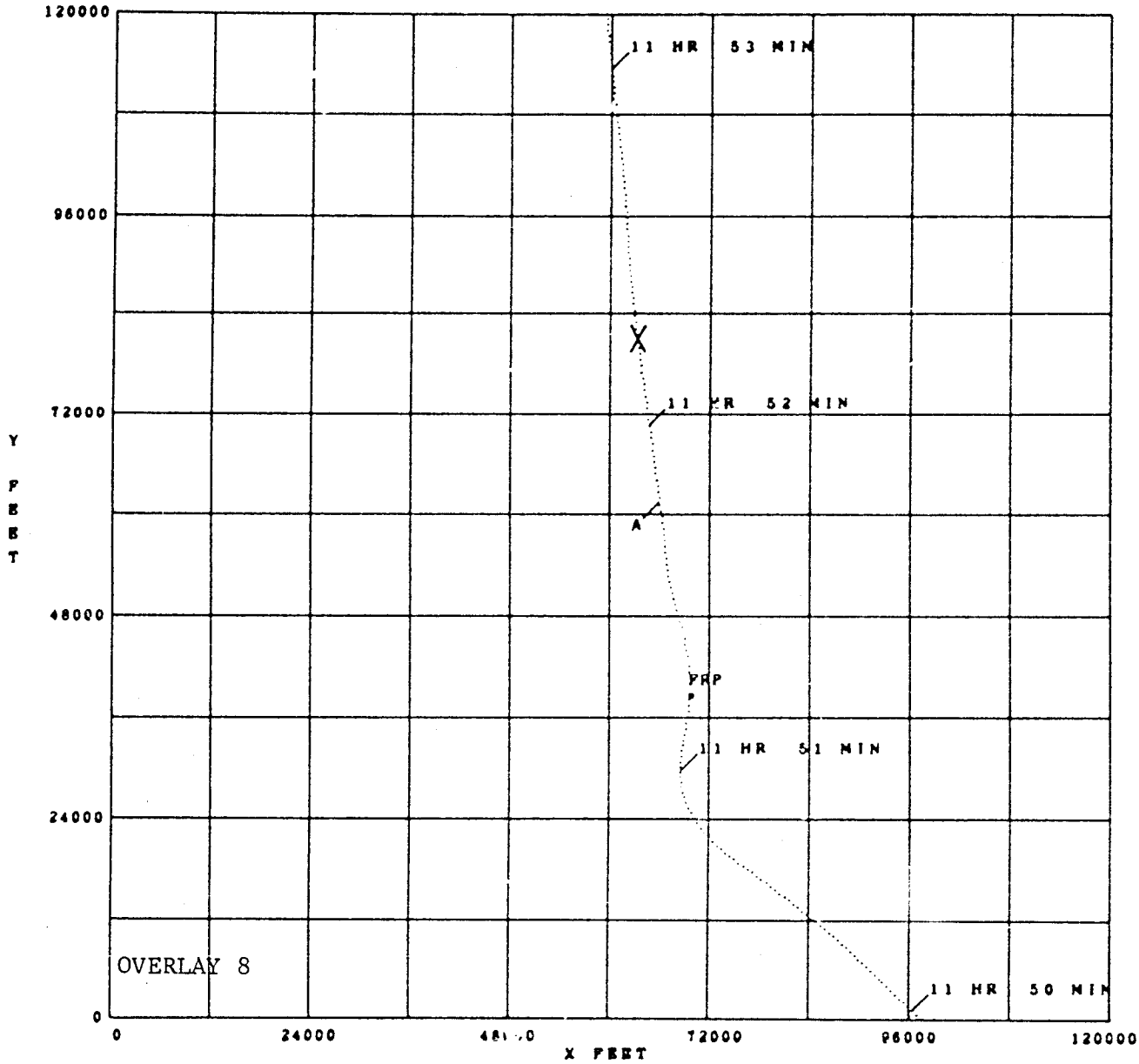
MINIMUM GROUND DISTANCE TO TARGET = 134 FEET

MINIMUM GROUND DISTANCE QUALIFIER = DME

SORTIE NUMBER 334

TARGET EAST 1

04092321
J0156 2T



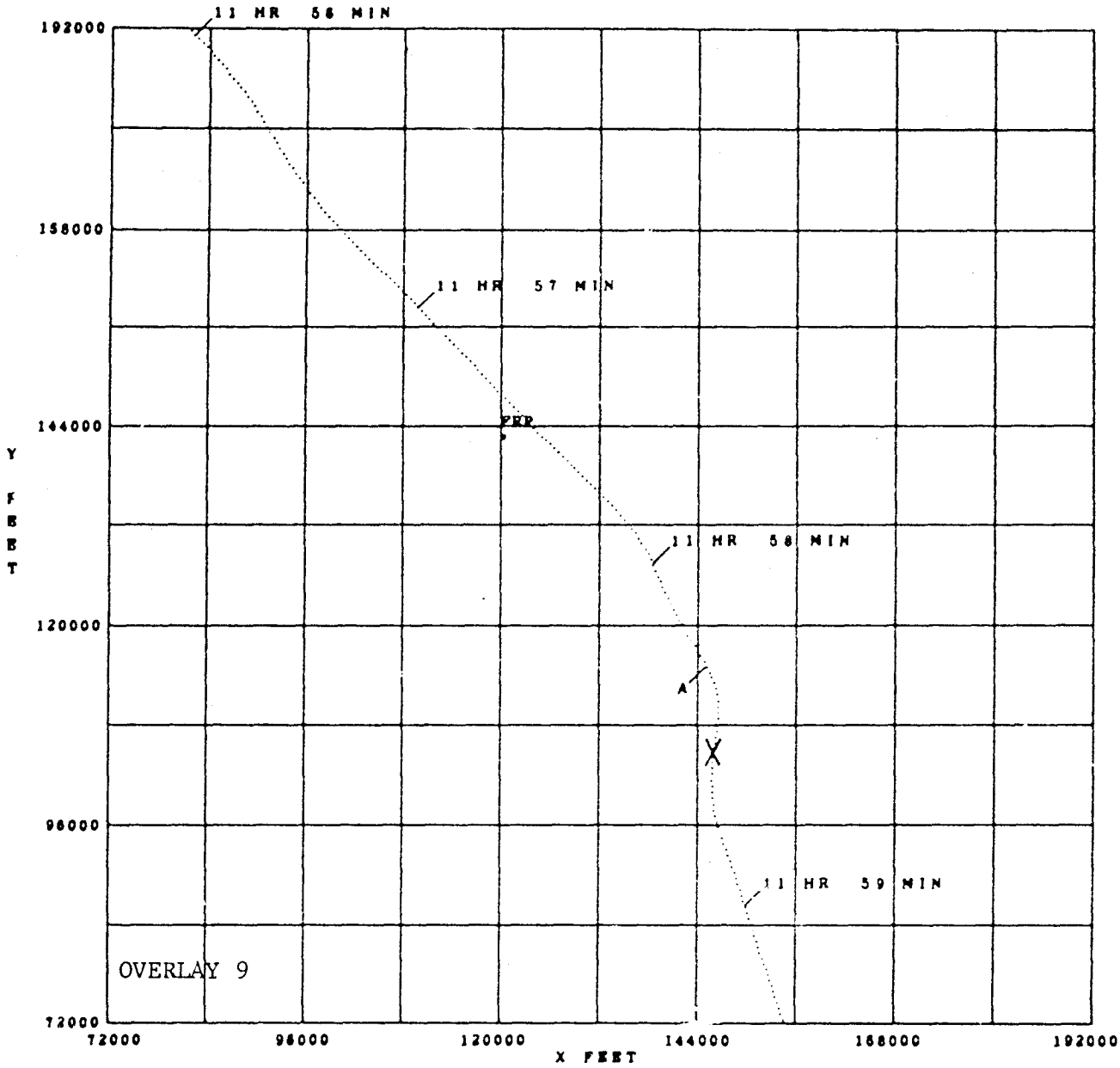
MINIMUM GROUND DISTANCE TO TARGET = 64 FEET

MINIMUM GROUND DISTANCE QUALIFIER = DME

SORTIE NUMBER 334

TARGET EAST 2

04092323
J9158 27.



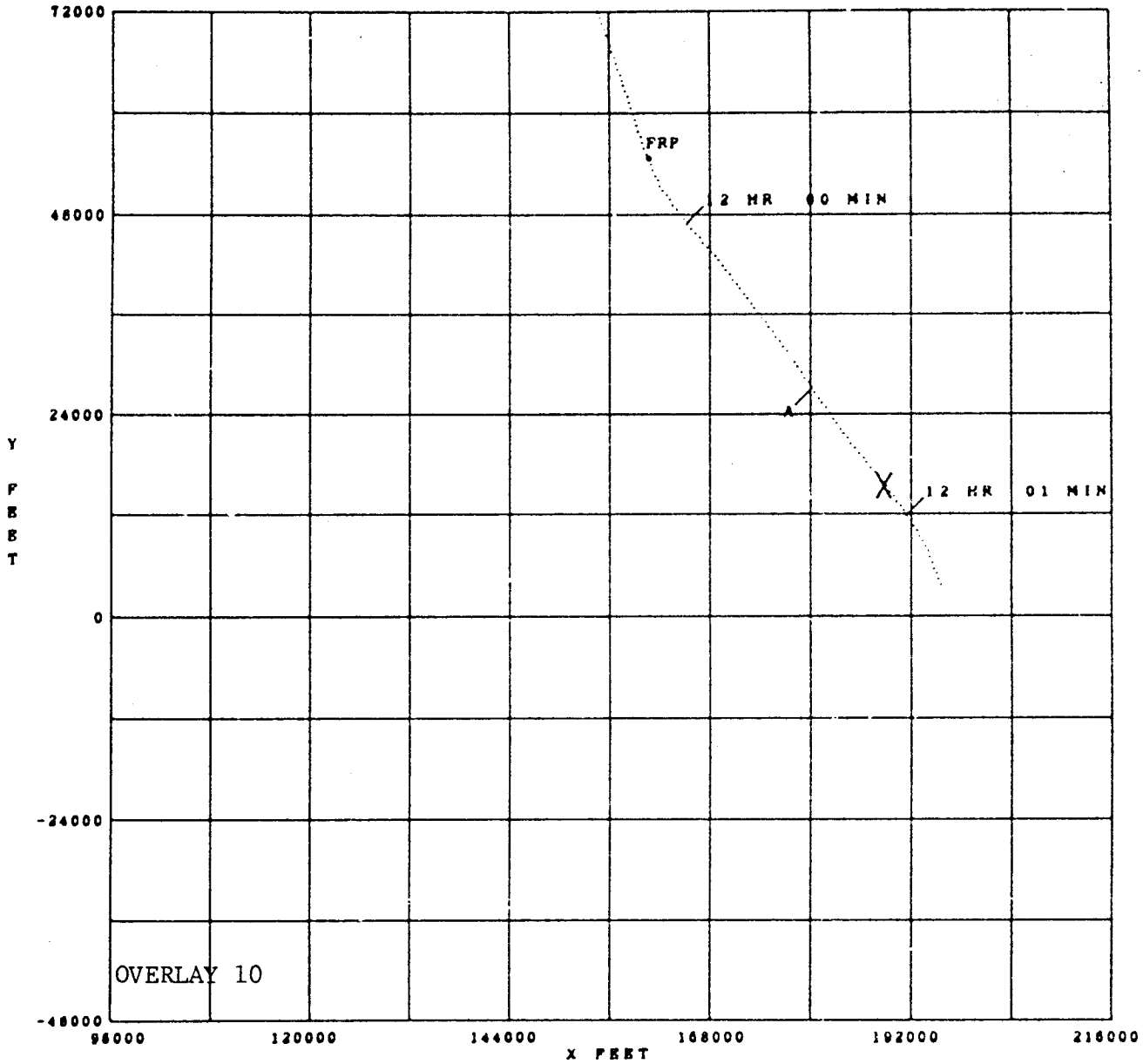
MINIMUM GROUND DISTANCE TO TARGET = 91 FEET

MINIMUM GROUND DISTANCE QUALIFIER = DME

SORTIE NUMBER 334

TARGET EAST 3

04092321
J9156 21



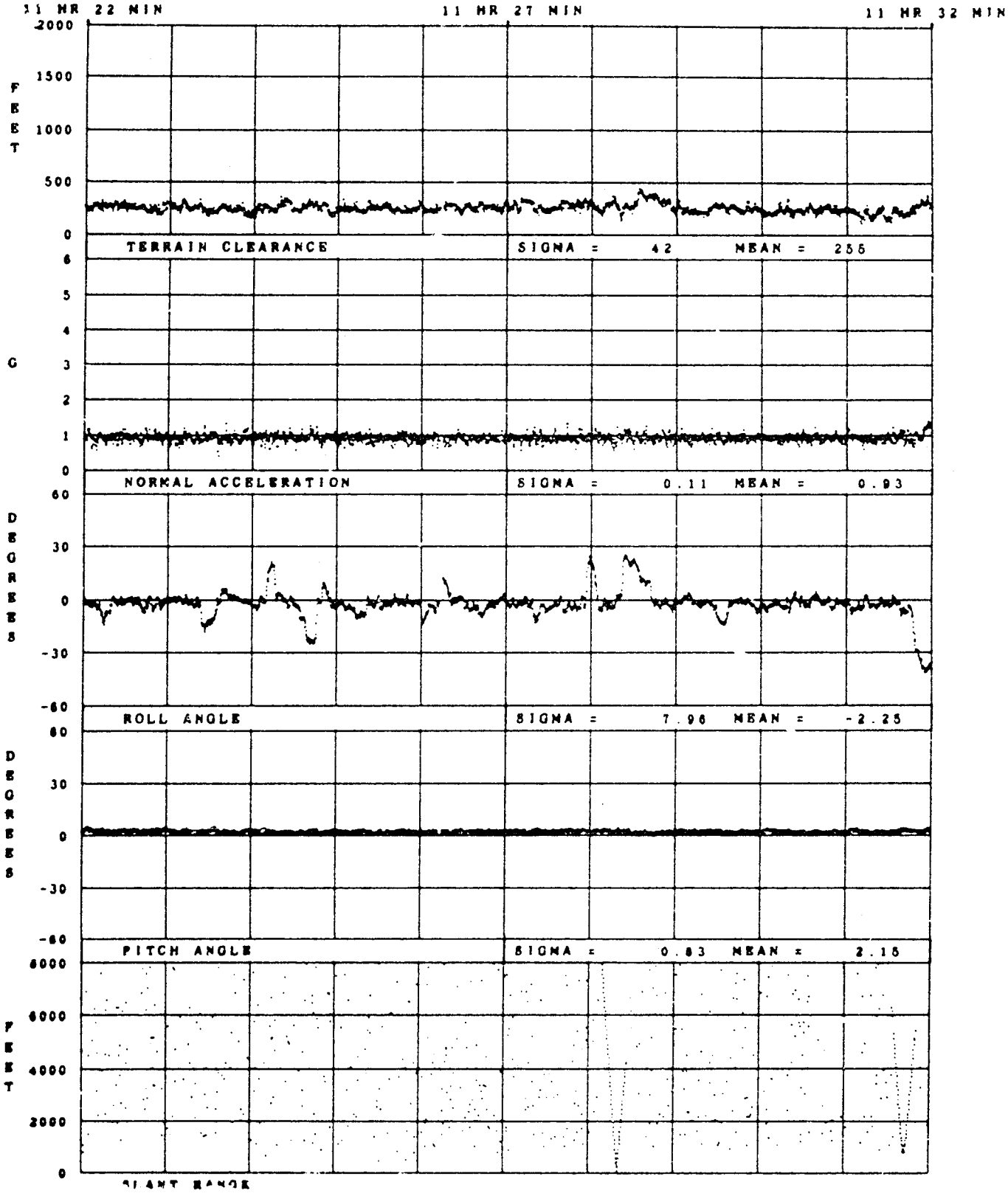
MINIMUM GROUND DISTANCE TO TARGET = 235 FEET

MINIMUM GROUND DISTANCE QUALIFIER = DME

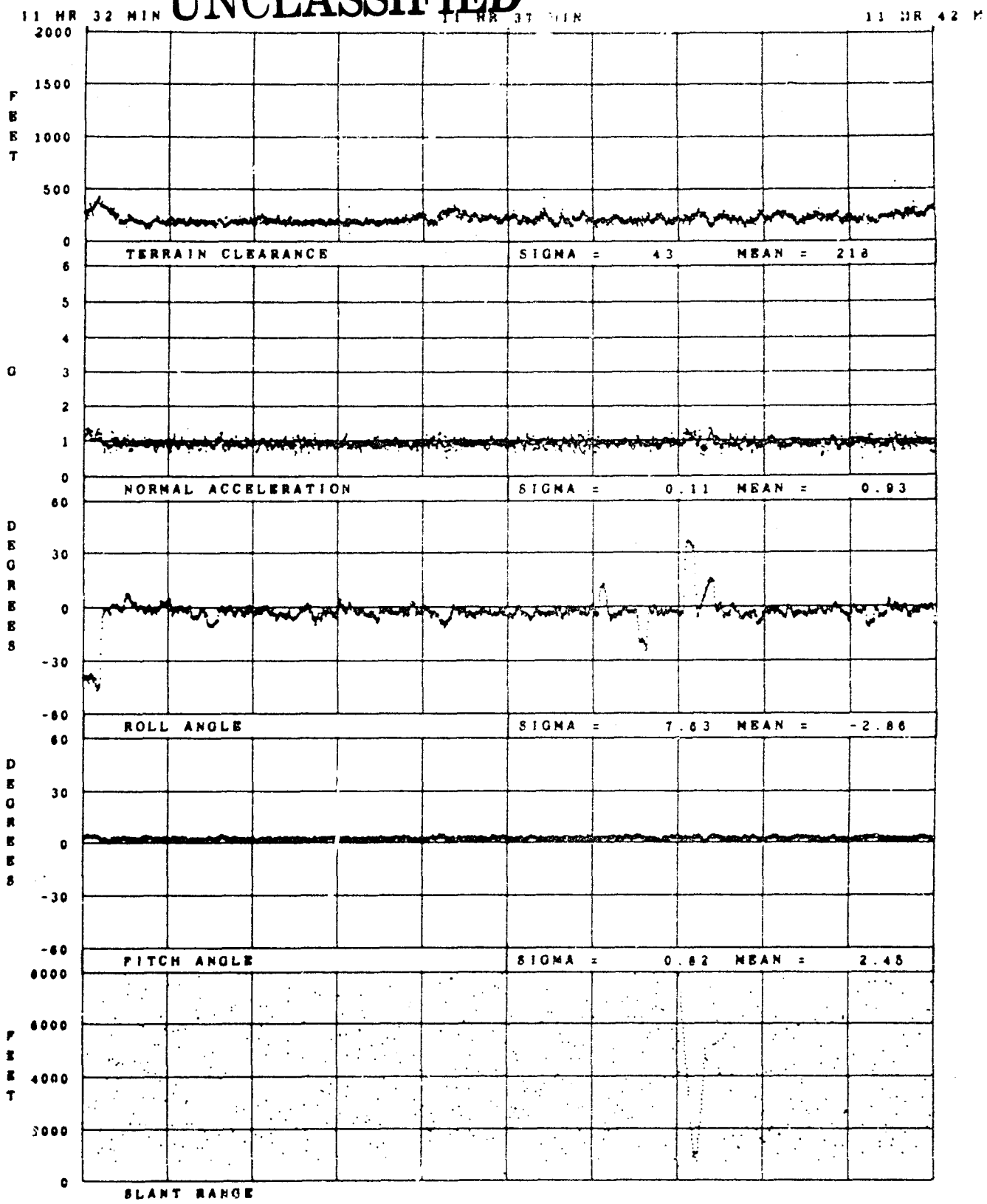
SORTIE NUMBER 334

TARGET EAST 4

04092321
J9156 27


11 HR 22 MIN
11 HR 27 MIN
11 HR 32 MIN
FEET
2000
1500
1000
500
0
TERRAIN CLEARANCE
SIGMA = 42 MEAN = 255
G
6
5
4
3
2
1
0
NORMAL ACCELERATION
SIGMA = 0.11 MEAN = 0.93
DEGREES
60
30
0
-30
-60
ROLL ANGLE
SIGMA = 7.96 MEAN = -2.25
DEGREES
60
30
0
-30
-60
PITCH ANGLE
SIGMA = 0.83 MEAN = 2.15
FEET
8000
6000
4000
2000
0
SLANT RANGE

UNCLASSIFIED



UNCLASSIFIED

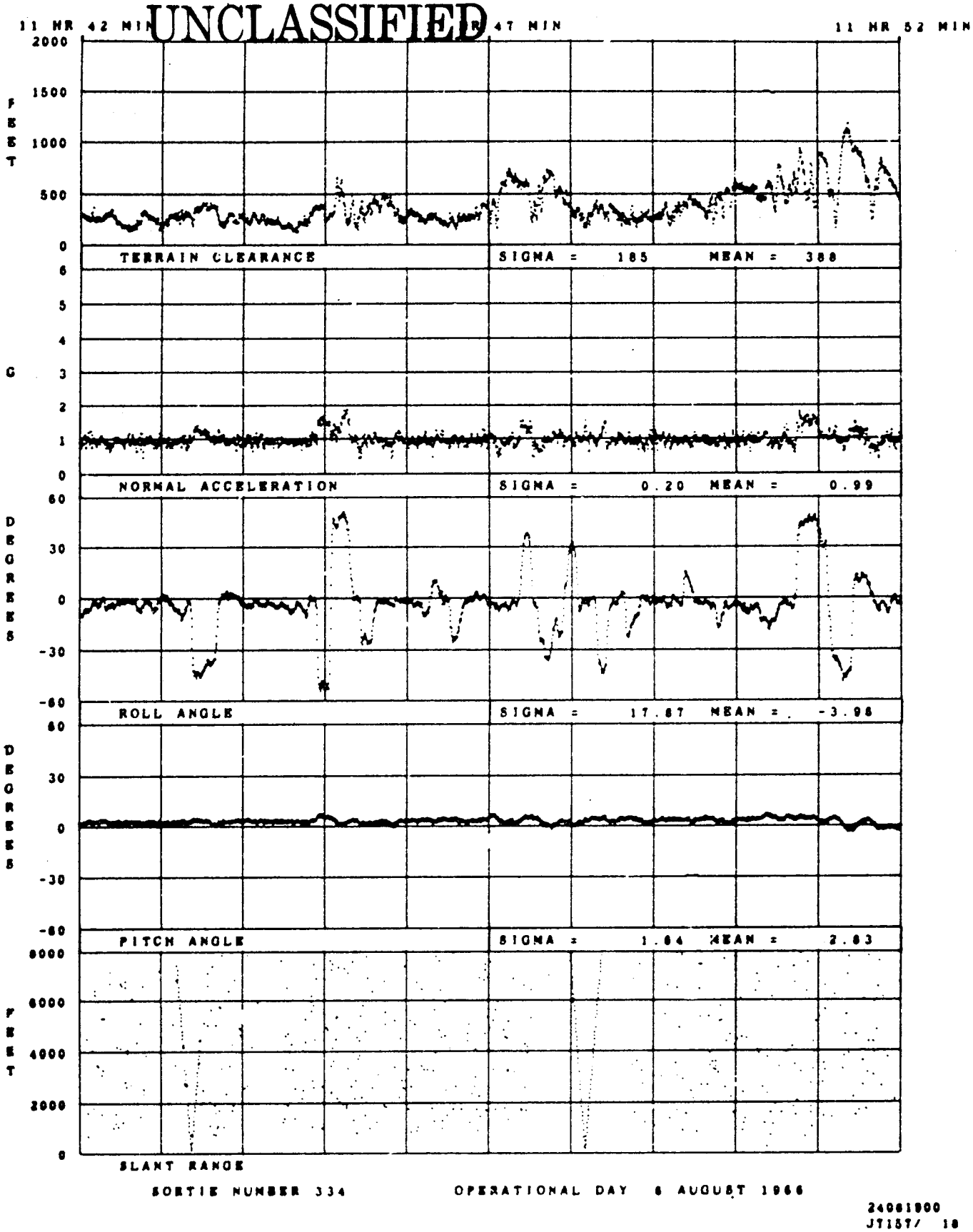


Figure 3-59 (U) Telemetered Data (Part 3 of 4)

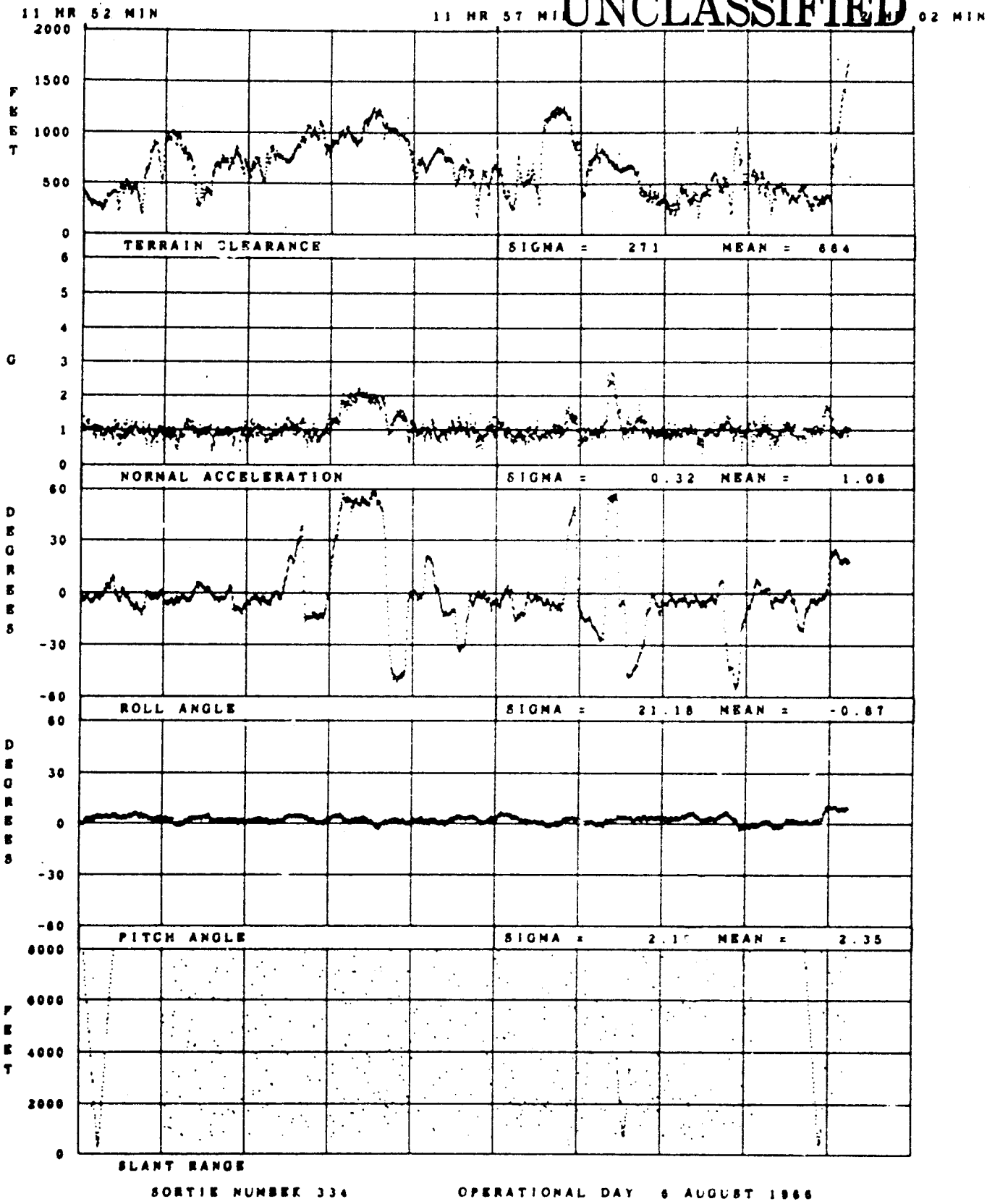
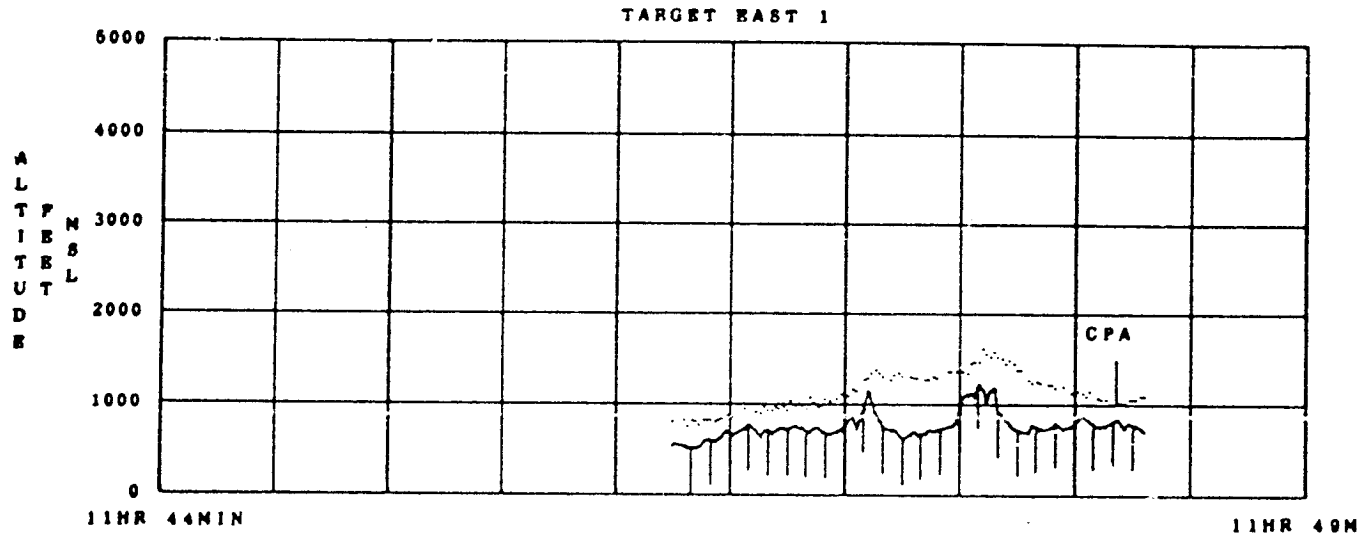
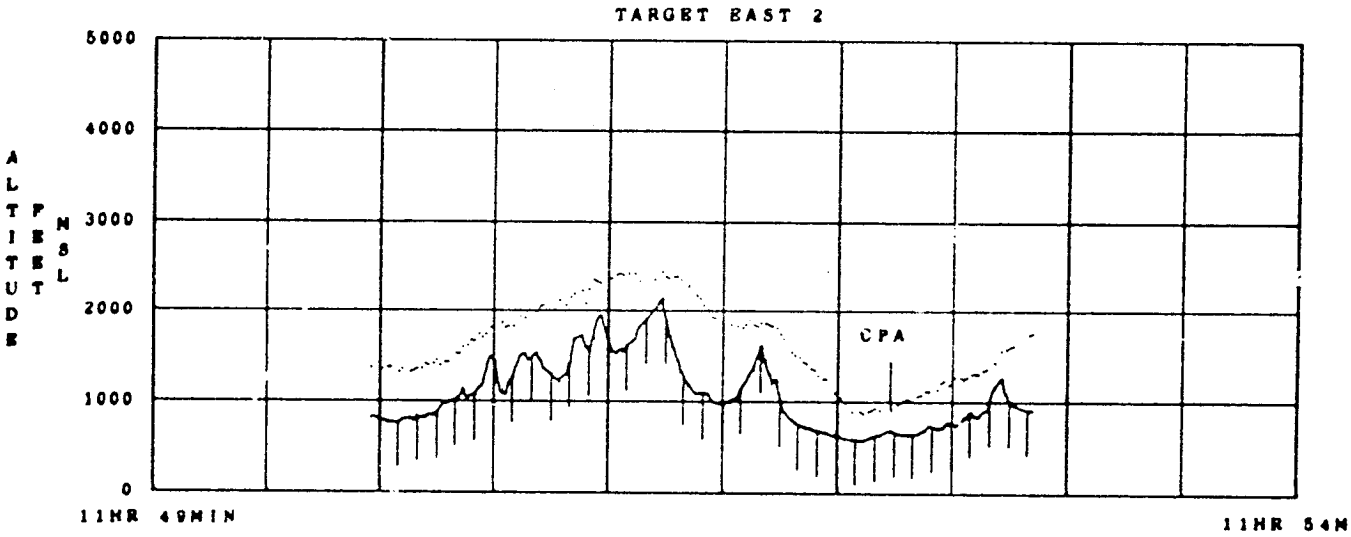


Figure 3-59 (U) Telemetered Data (Part 4 of 4)





SORTIE NUMBER 334

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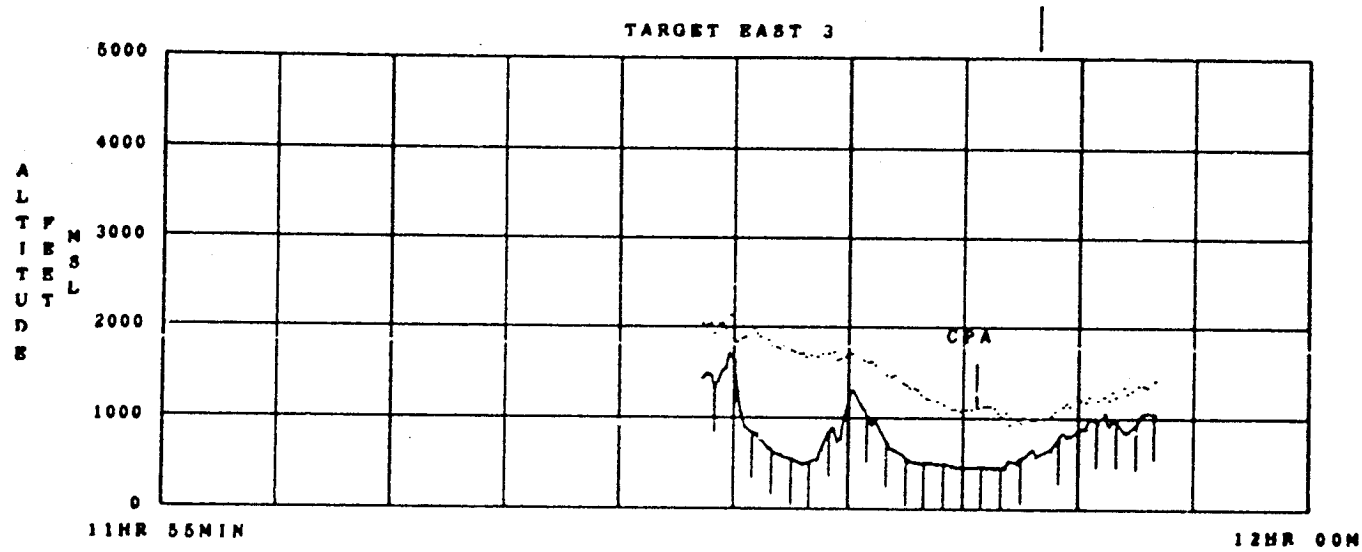
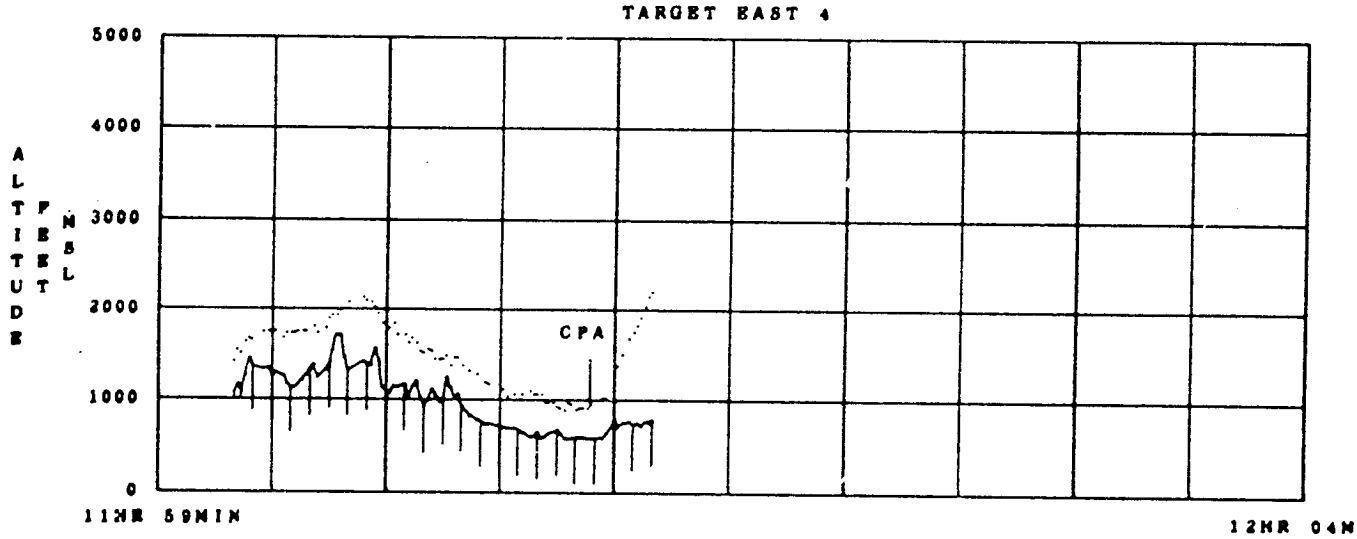
J9156

Figure 3-60 (U) Aircraft Altitude and Terrain Profile (Part 1 of 2)





SORTIE NUMBER 334

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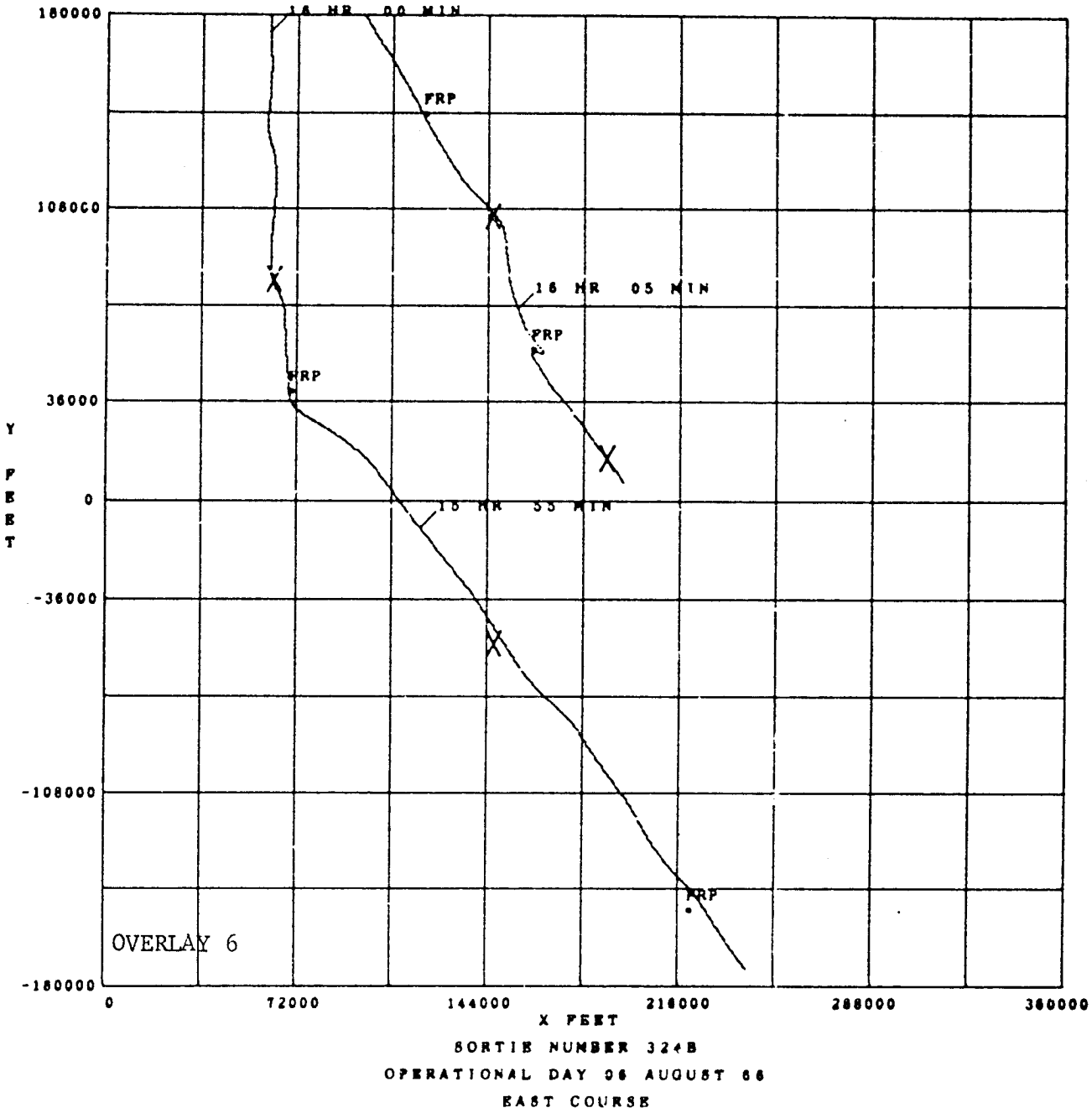
J915

Figure 3-60 (U) Aircraft Altitude and Terrain Profile (Part 2 of 2)



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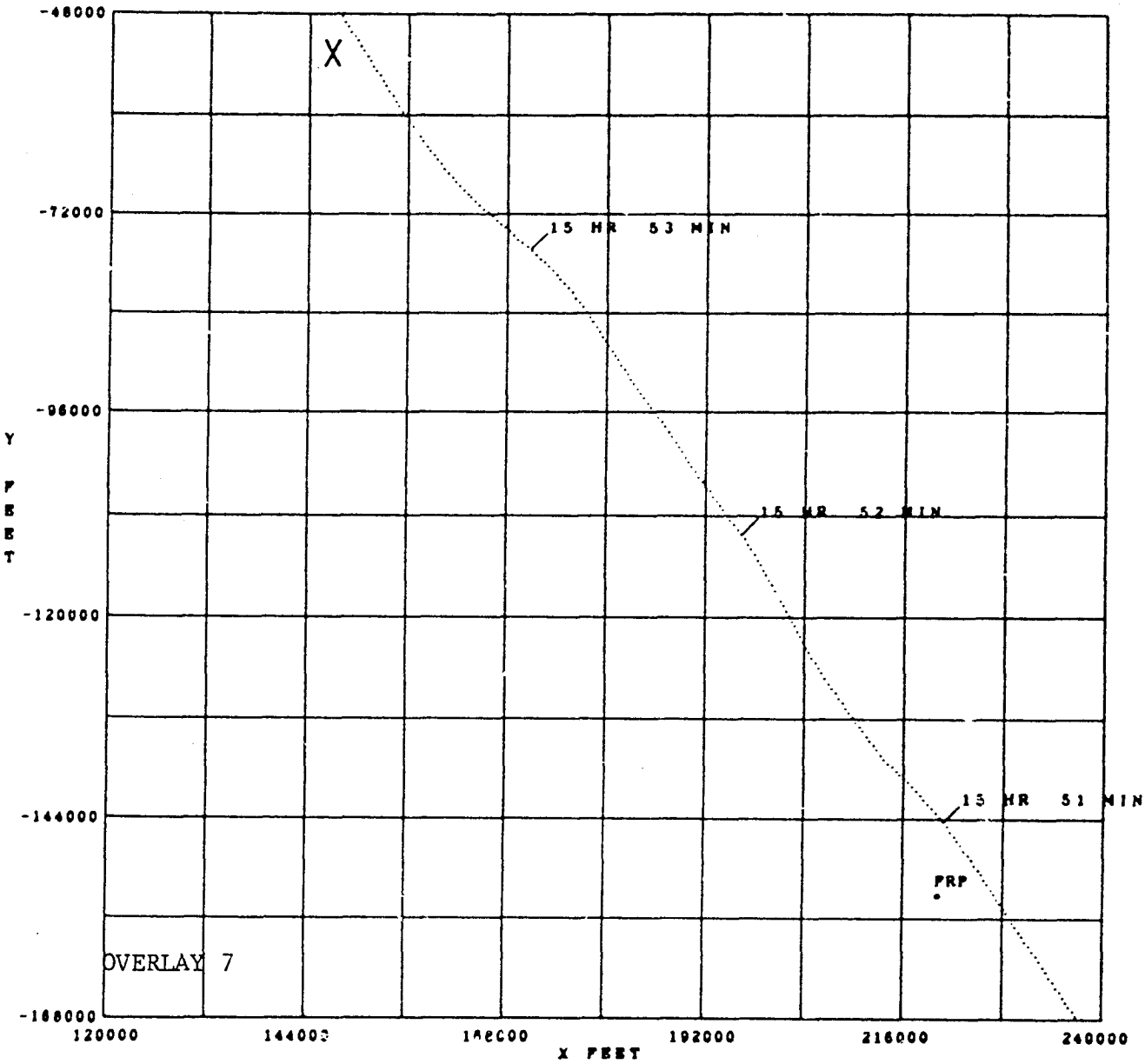
J9156 281

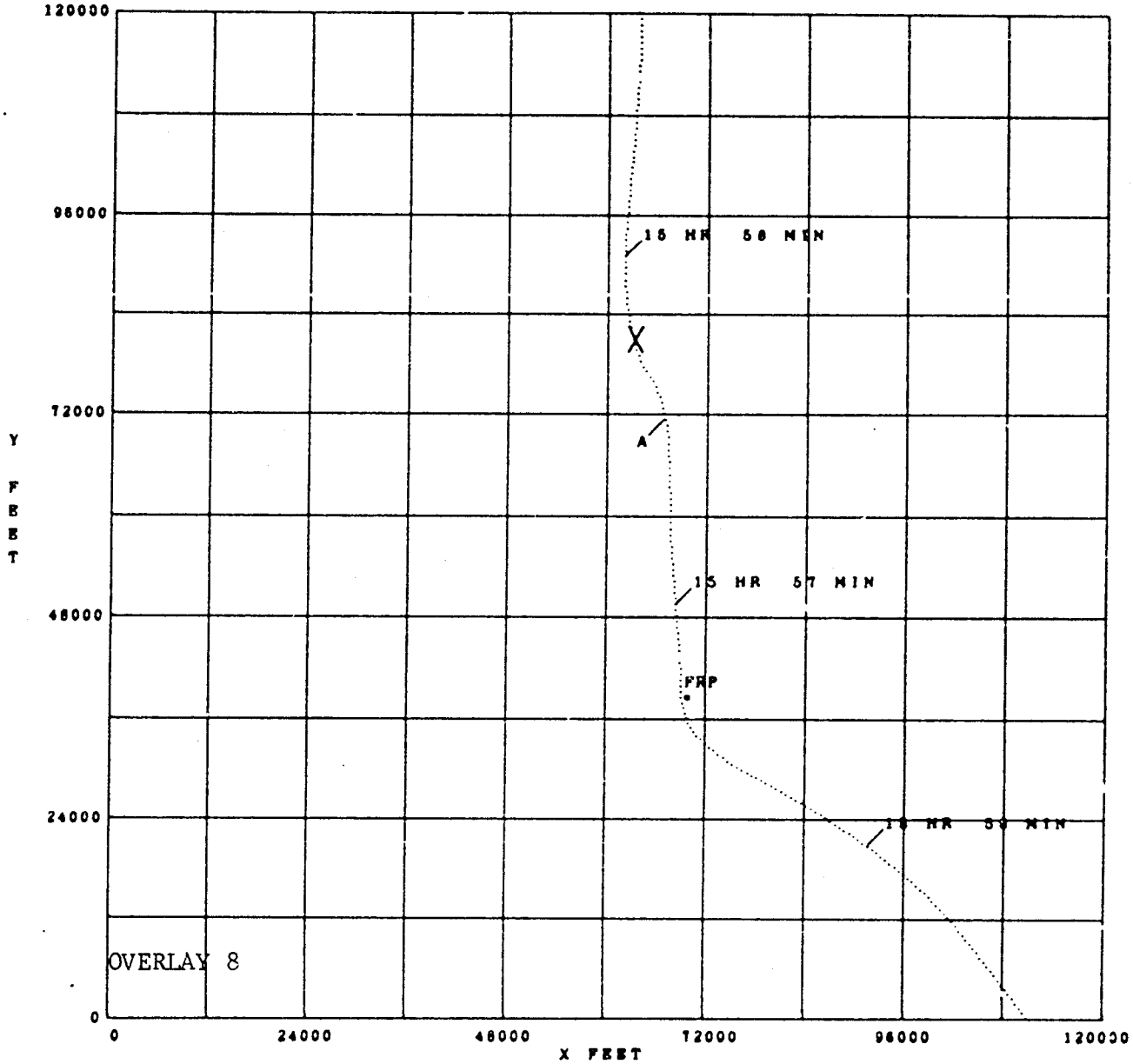
Figure 3-61 (U) Aircraft Position Data (Part 1 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 3270 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DNE
SORTIE NUMBER 324B
TARGET EAST 1

04092322
J9156 287

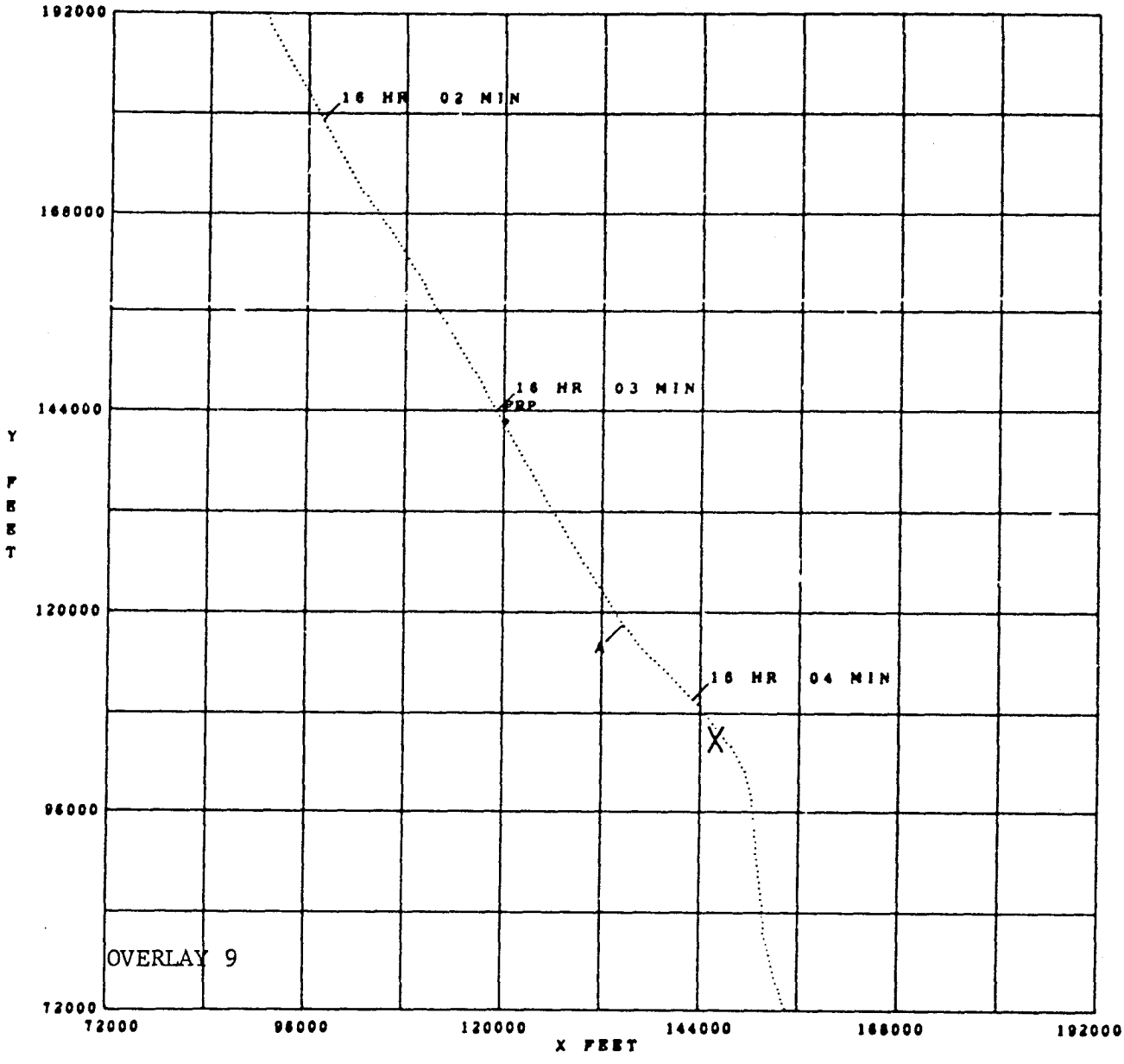
Figure 3-61 (U) Aircraft Position Data (Part 2 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 181 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 324B
TARGET EAST 2

04092322
J9156 284

Figure 3-61 (U) Aircraft Position Data (Part 3 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 981 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DNE
SORTIE NUMBER 324B
TARGET EAST 3

04092322
J9156 289

Figure 3-61 (U) Aircraft Position Data (Part 4 of 5)

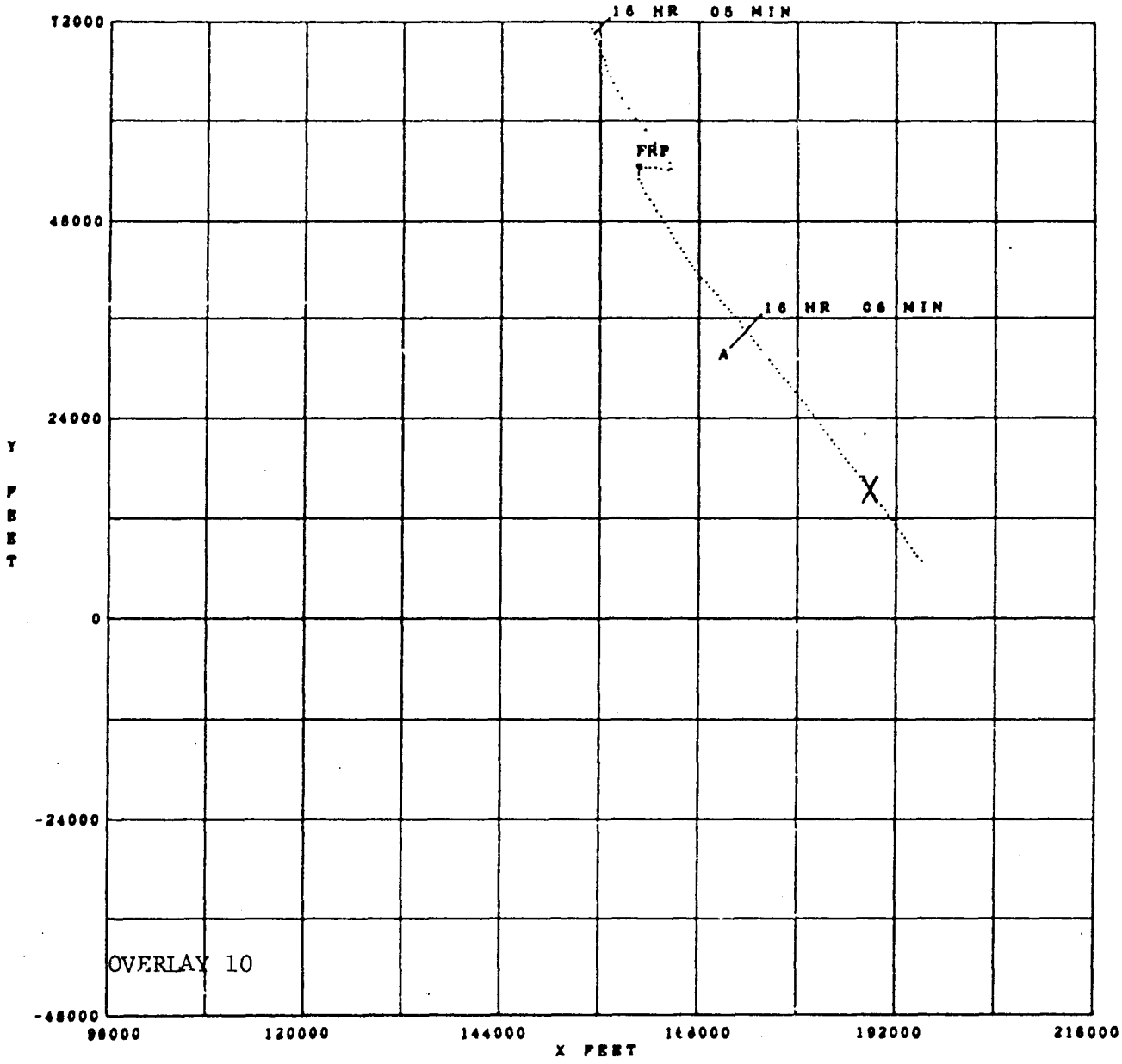


Figure 3-61 (U) Aircraft Position Data (Part 5 of 5)

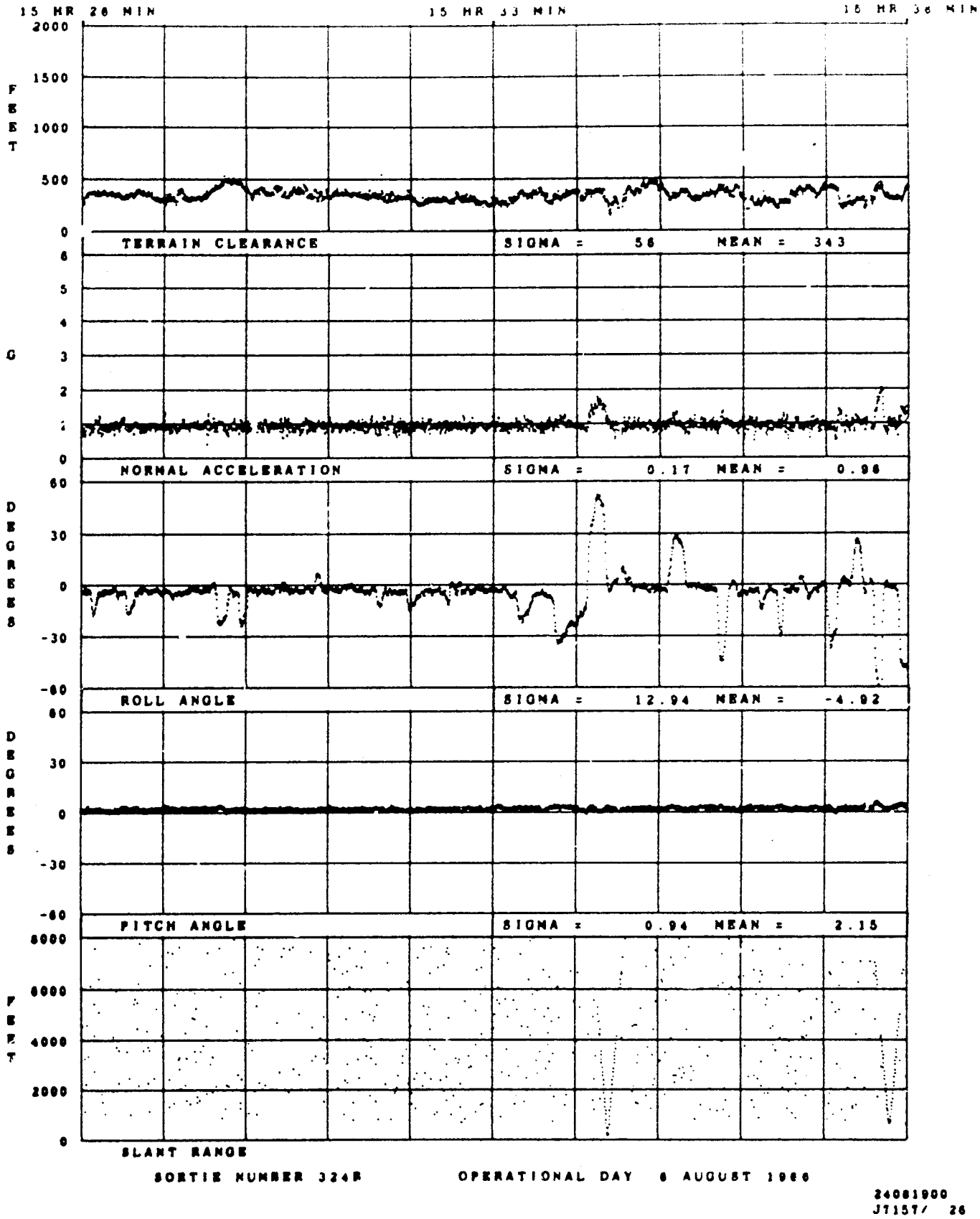


Figure 3-62 (U) Telemetered Data (Part 1 of 4)

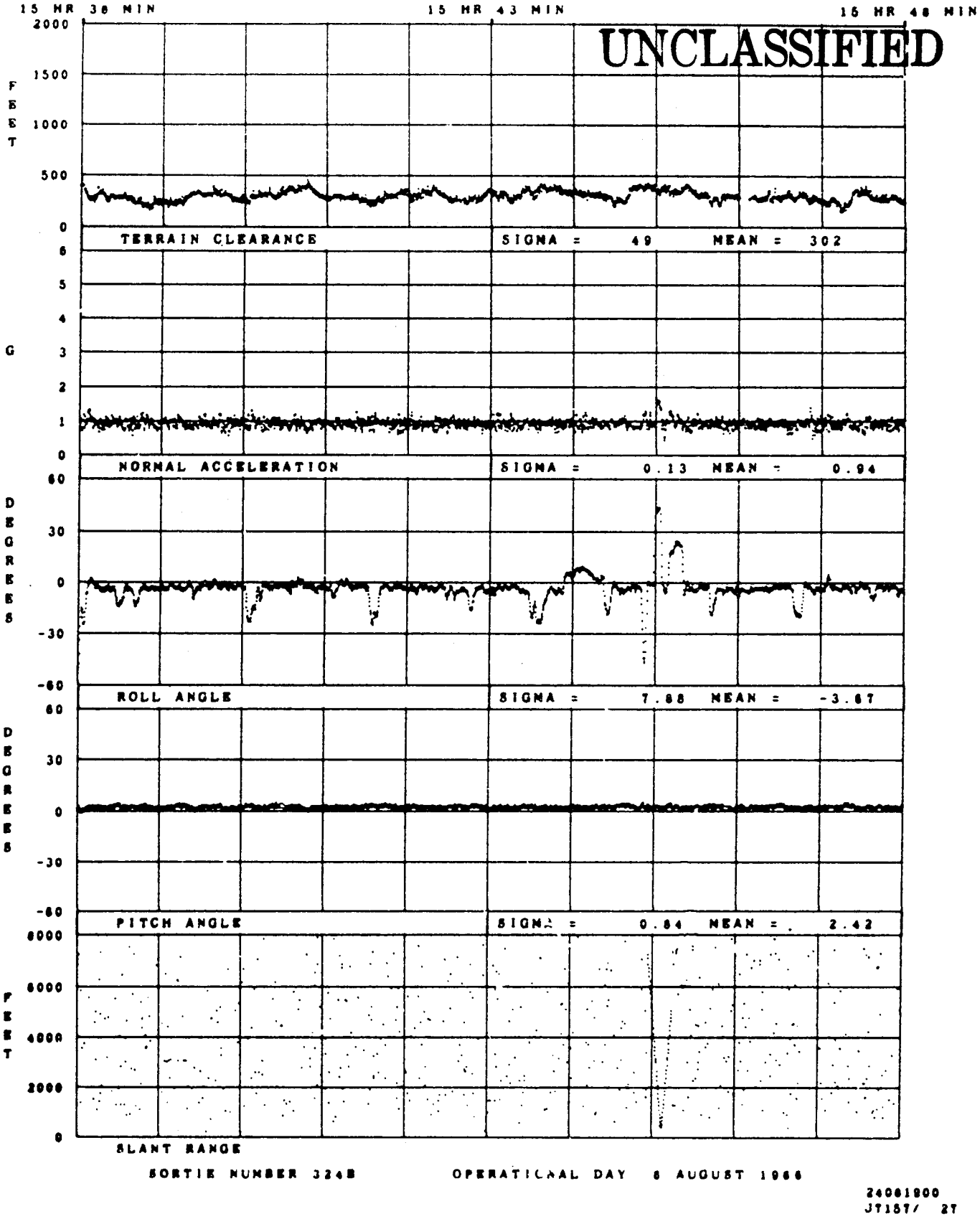


Figure 3-62 (U) Telemetered Data (Part 2 of 4)

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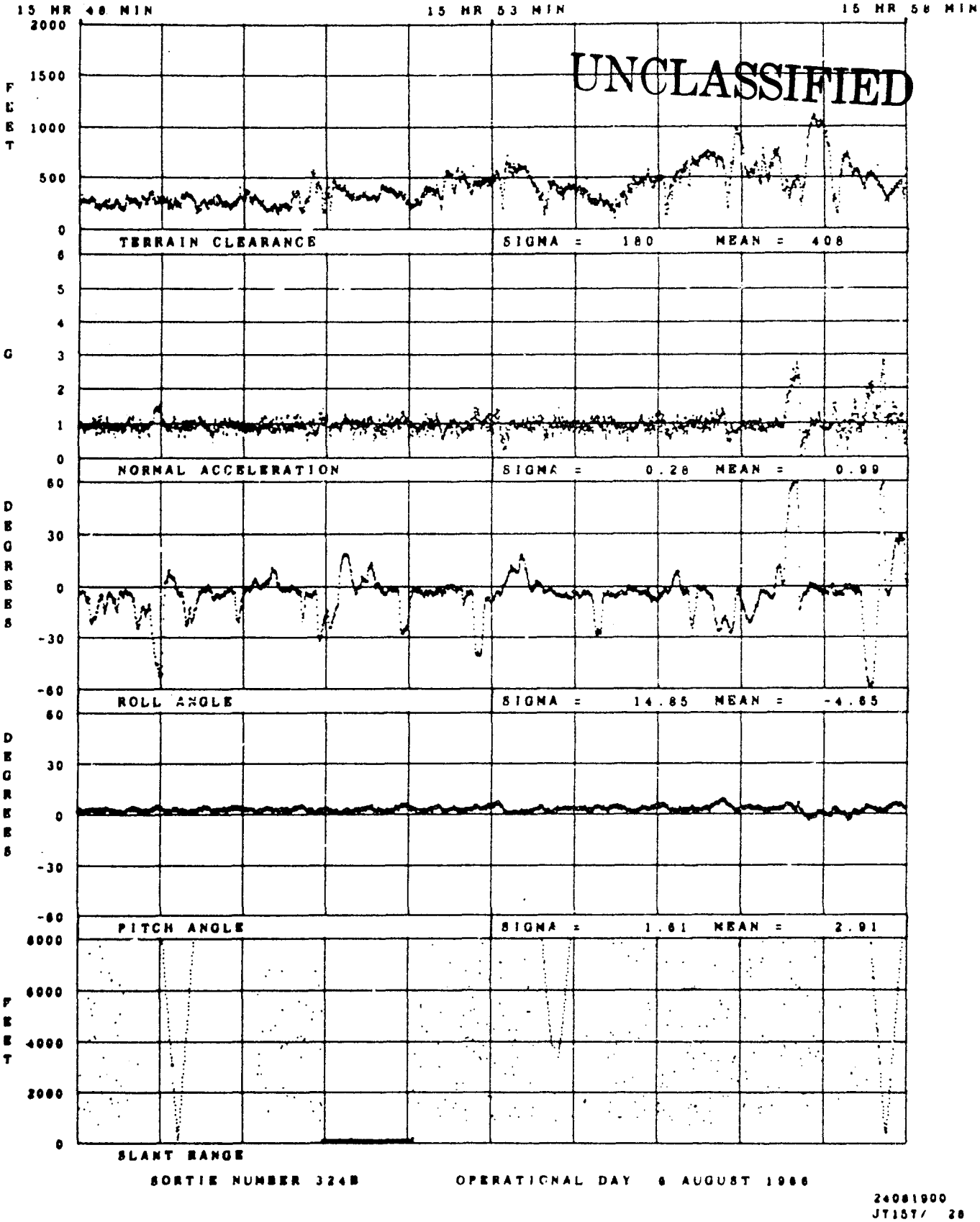
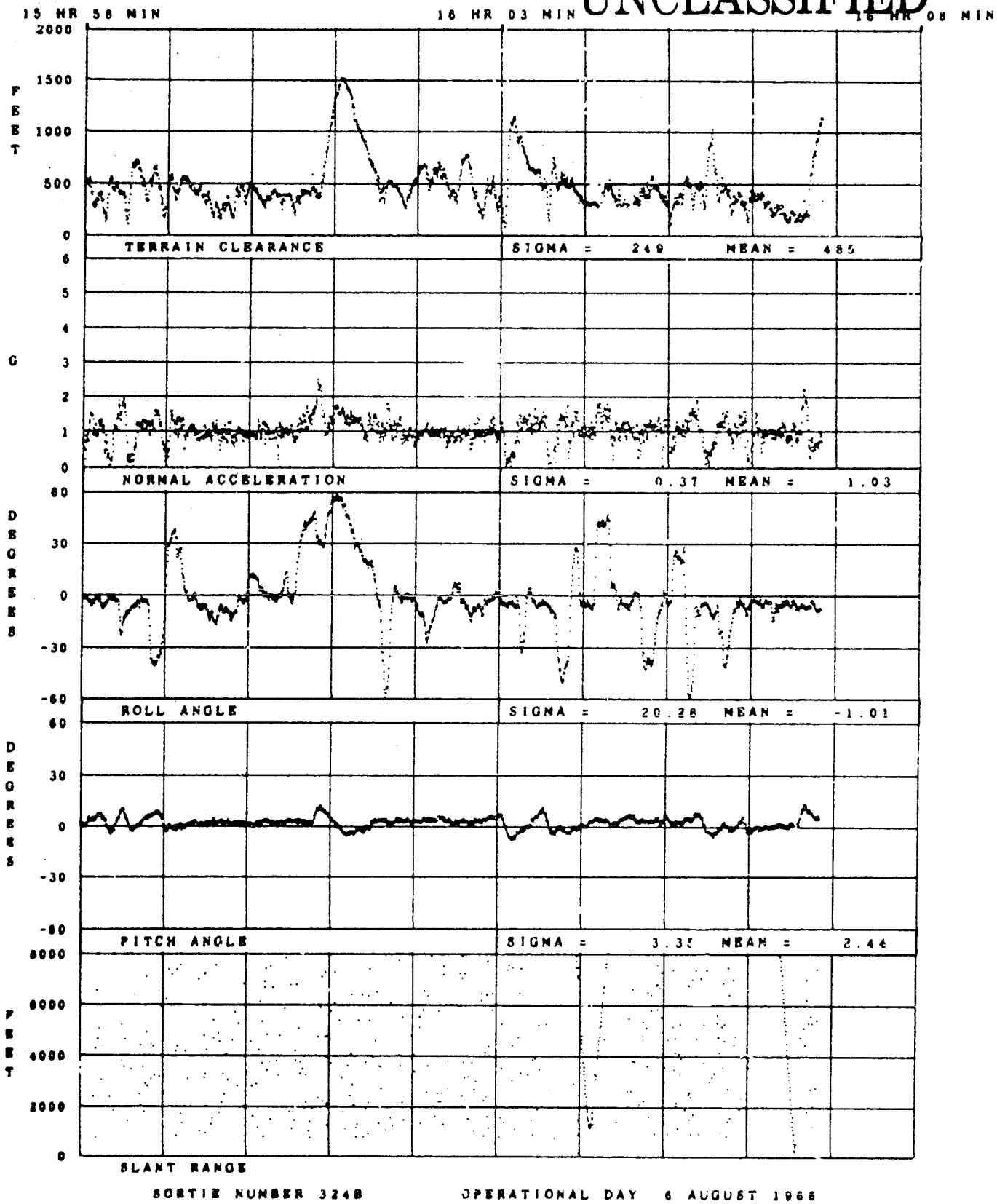
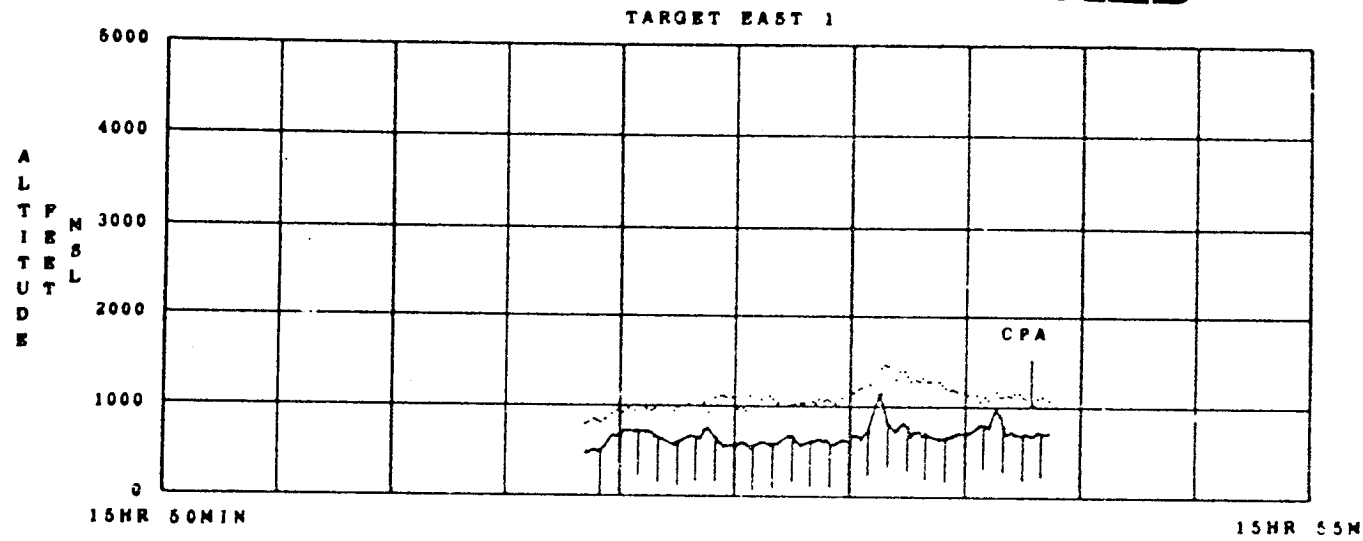


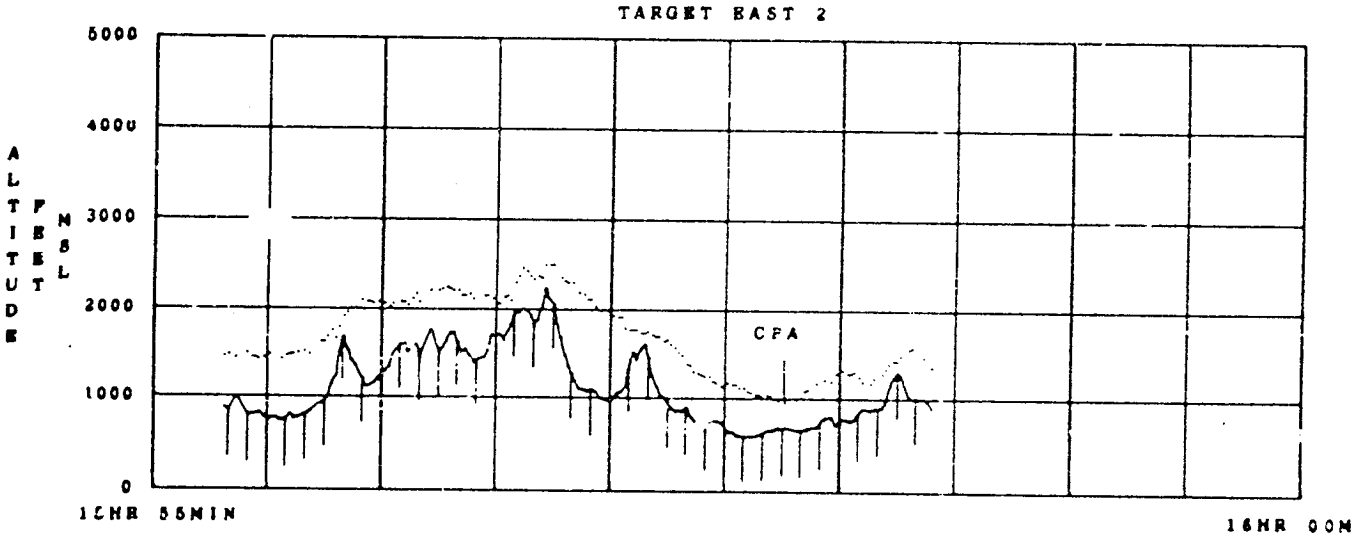
Figure 3-62 (U) Telemetered Data (Part 3 of 4)



24061900
J7157/ 29

Figure 3-62 (U) Telemetered Data (Part 4 of 4)





SORTIE NUMBER 324B

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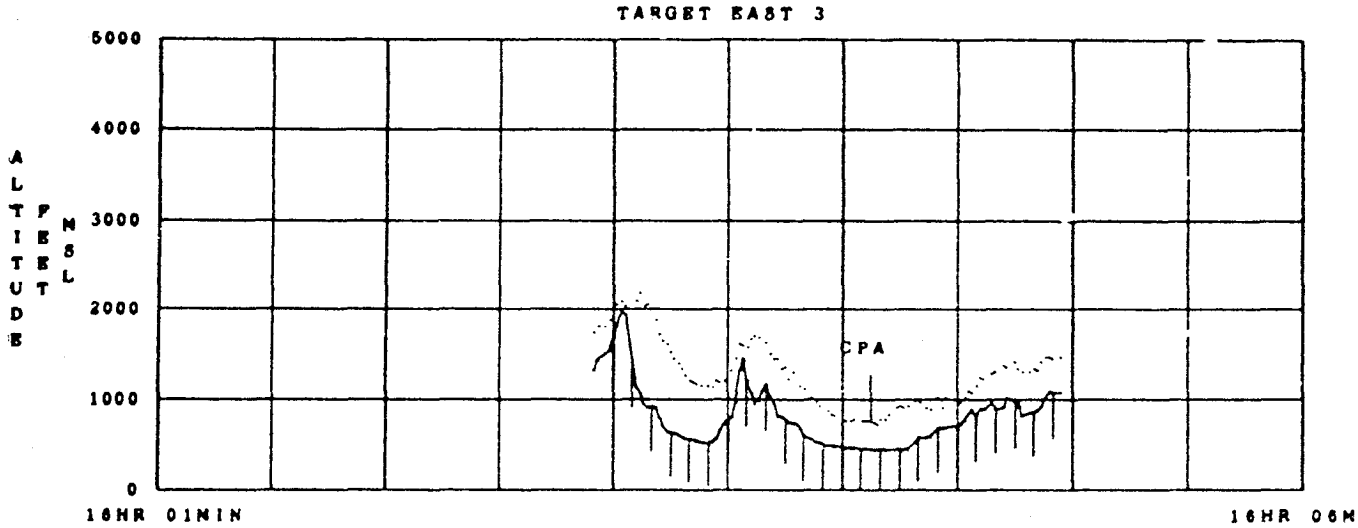
Figure 3-63 (U) Aircraft Altitude and Terrain Profile (Part 1 of 2)



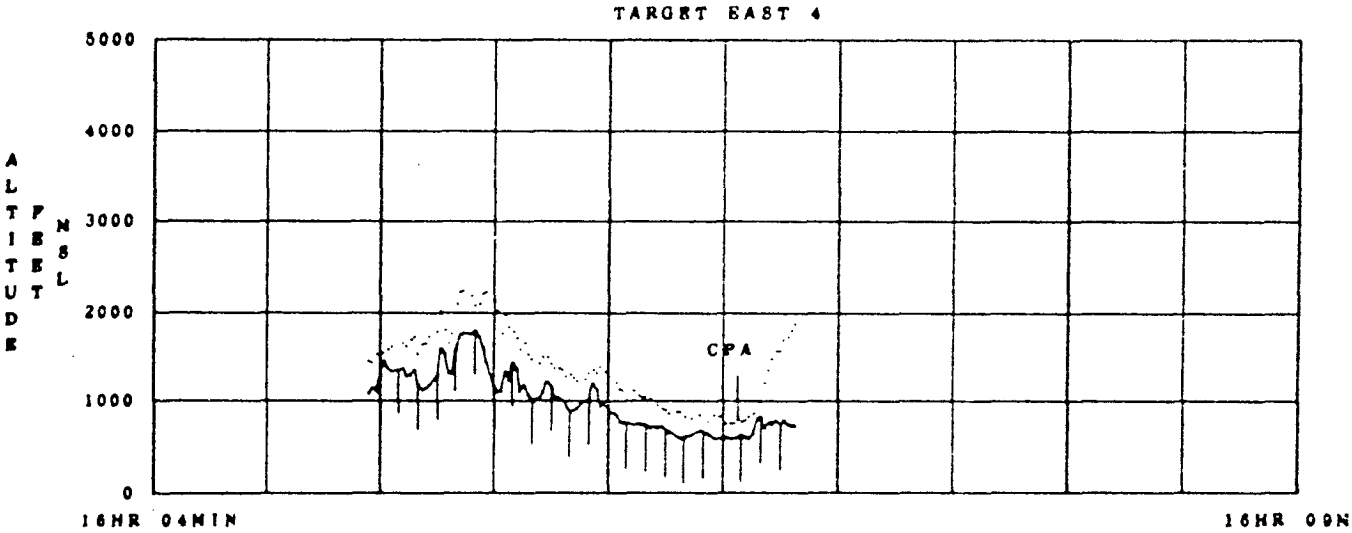


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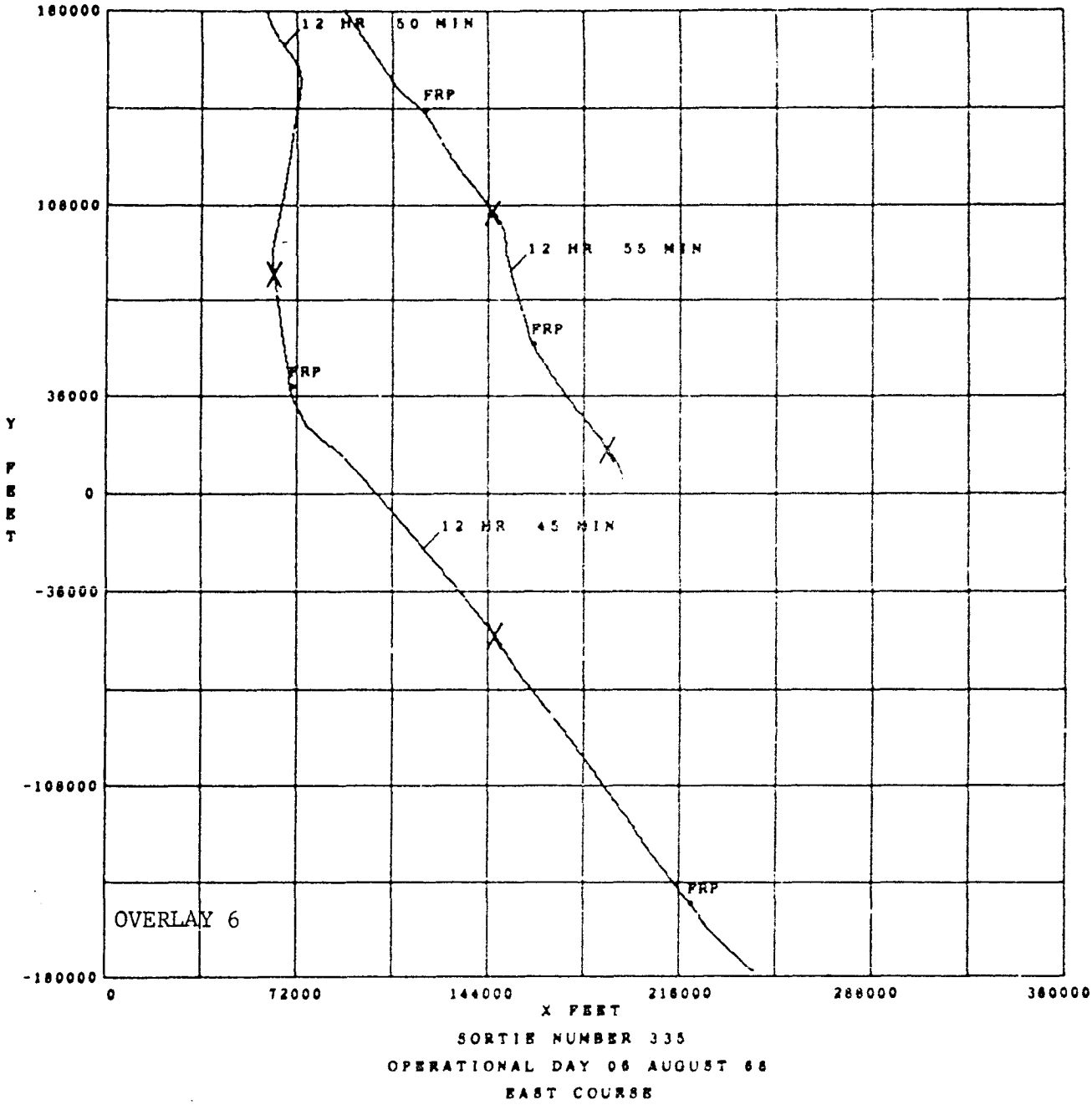
Figure 3-63 (U) Aircraft Altitude and Terrain Profile (Part 2 of 2)



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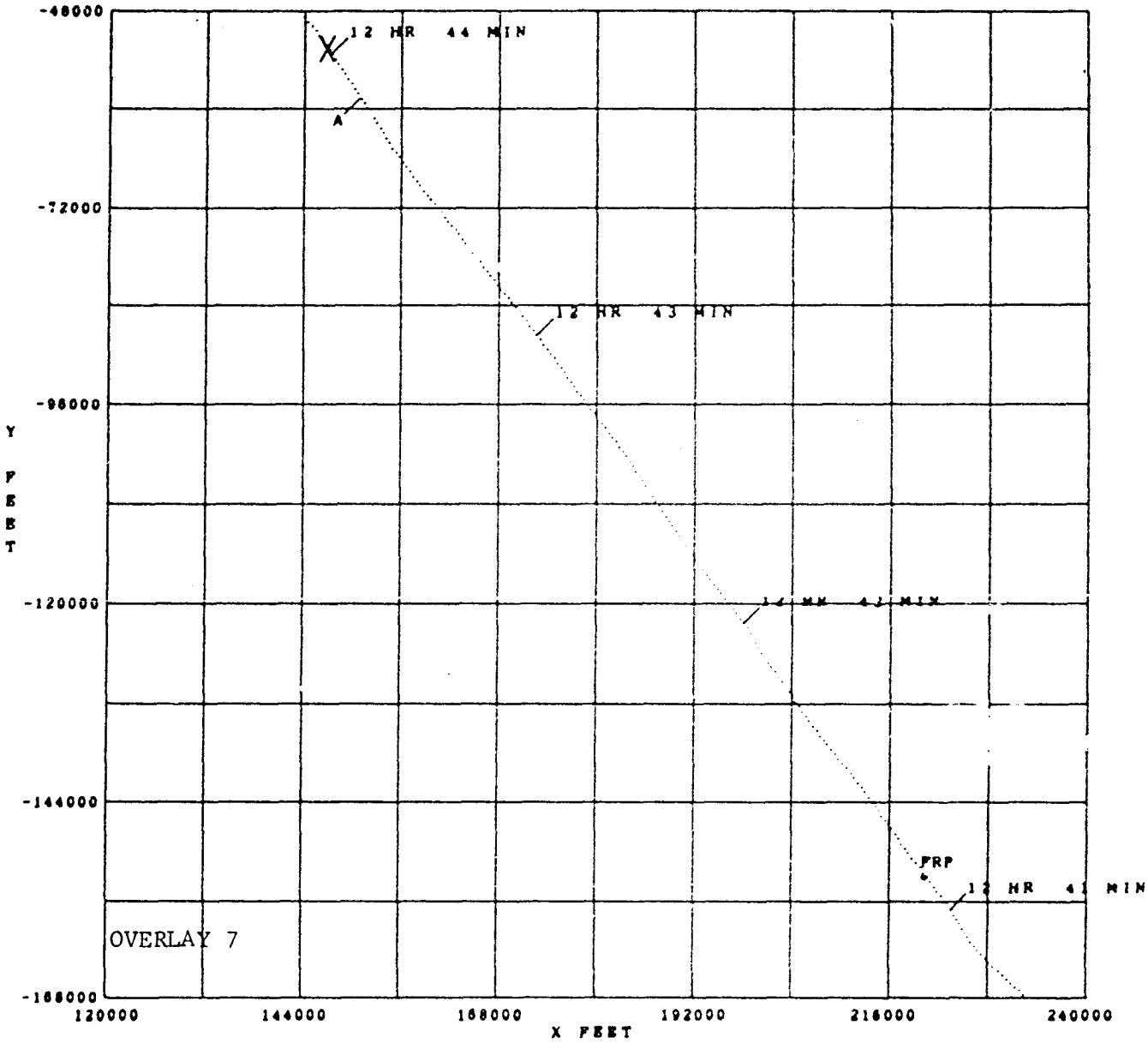
J9156 27

Figure 3-64 (U) Aircraft Position Data (Part 1 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 155 FEET

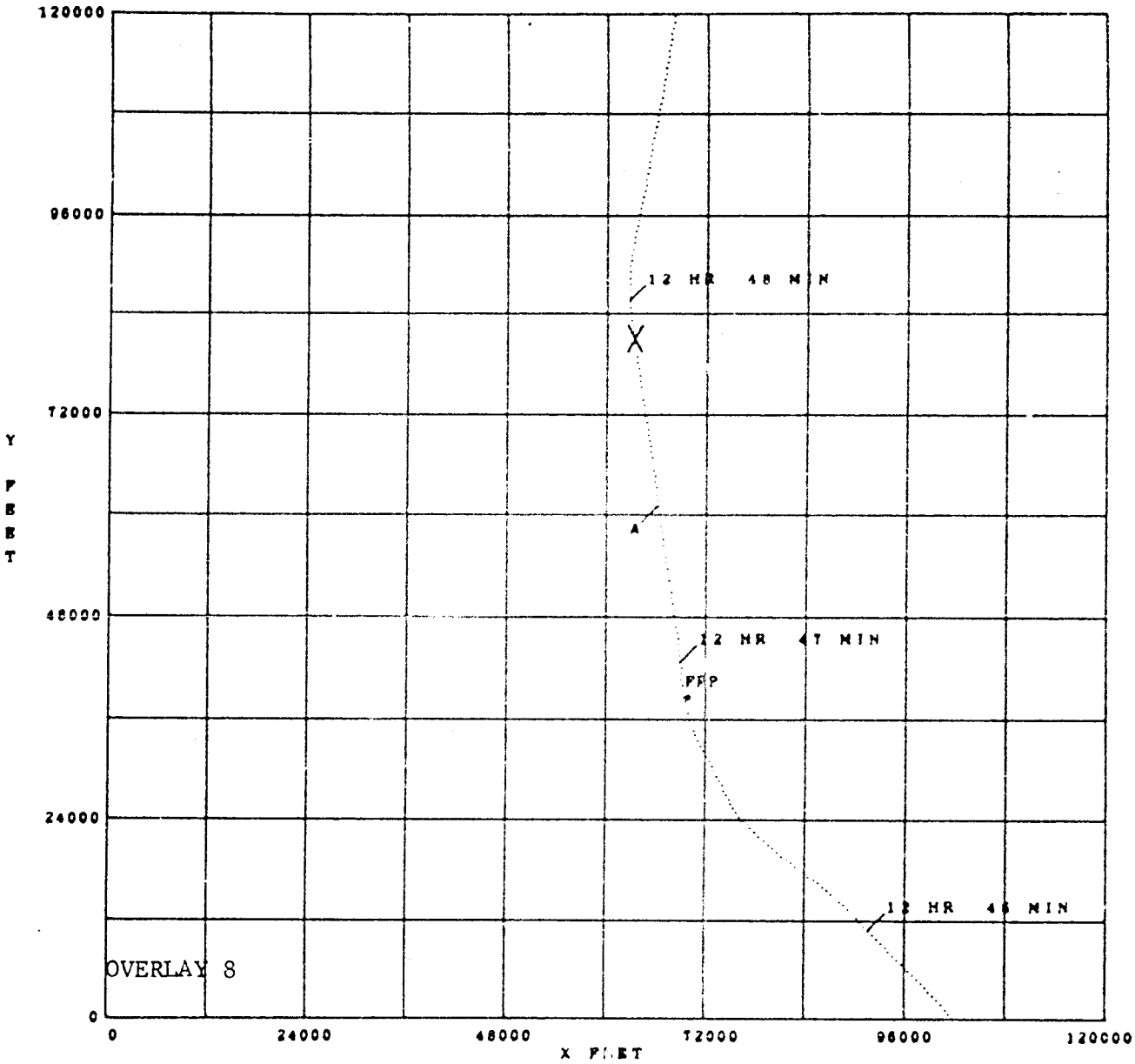
MINIMUM GROUND DISTANCE QUALIFIER = DME

SORTIE NUMBER 335

TARGET EAST 1

04092321
J9156 271

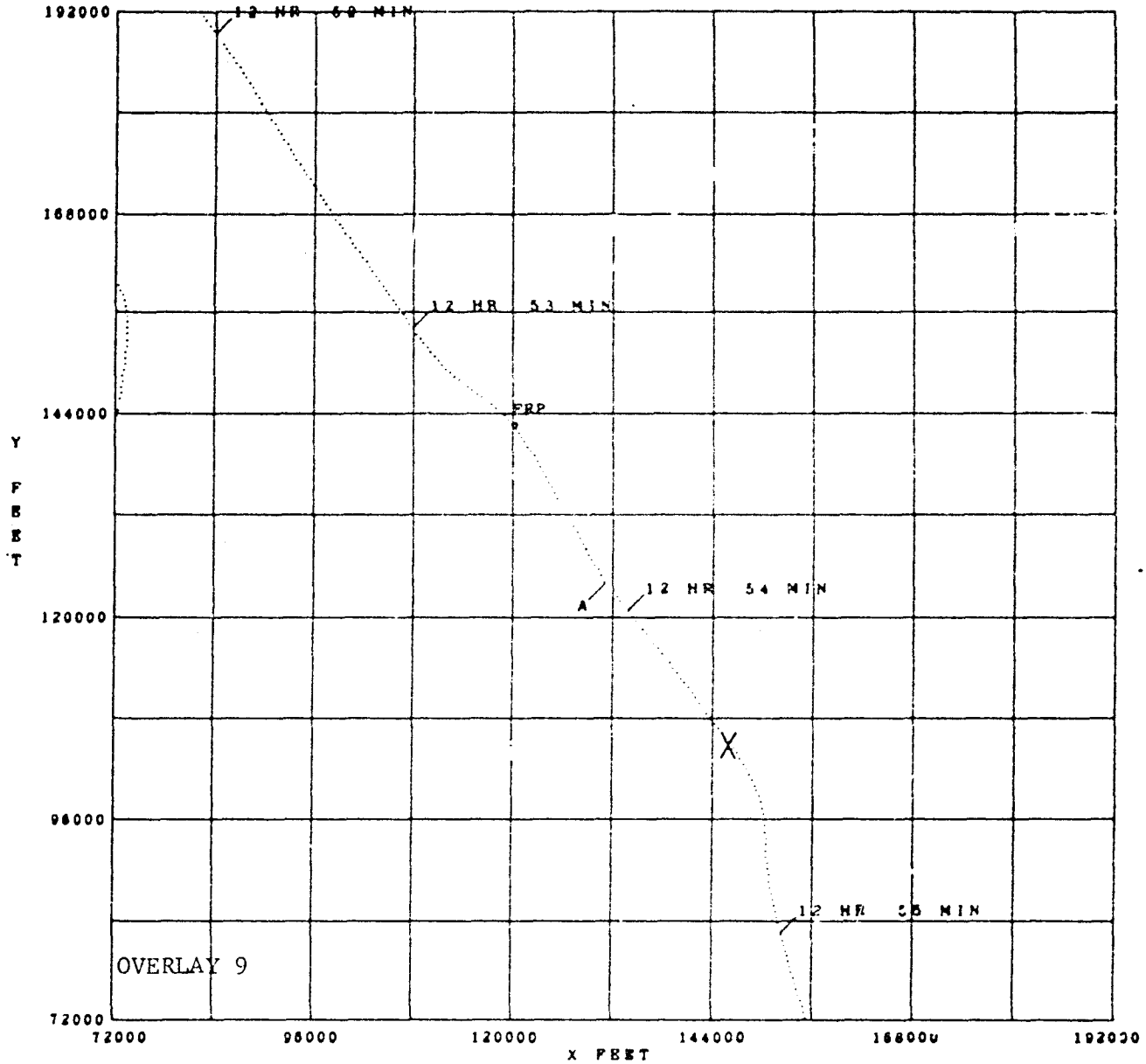
Figure 3-64 (U) Aircraft Position Data (Part 2 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 31 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 335
TARGET EAST 2

04092321
J9156 280

Figure 3-64 (U) Aircraft Position Data (Part 3 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 370 FEET

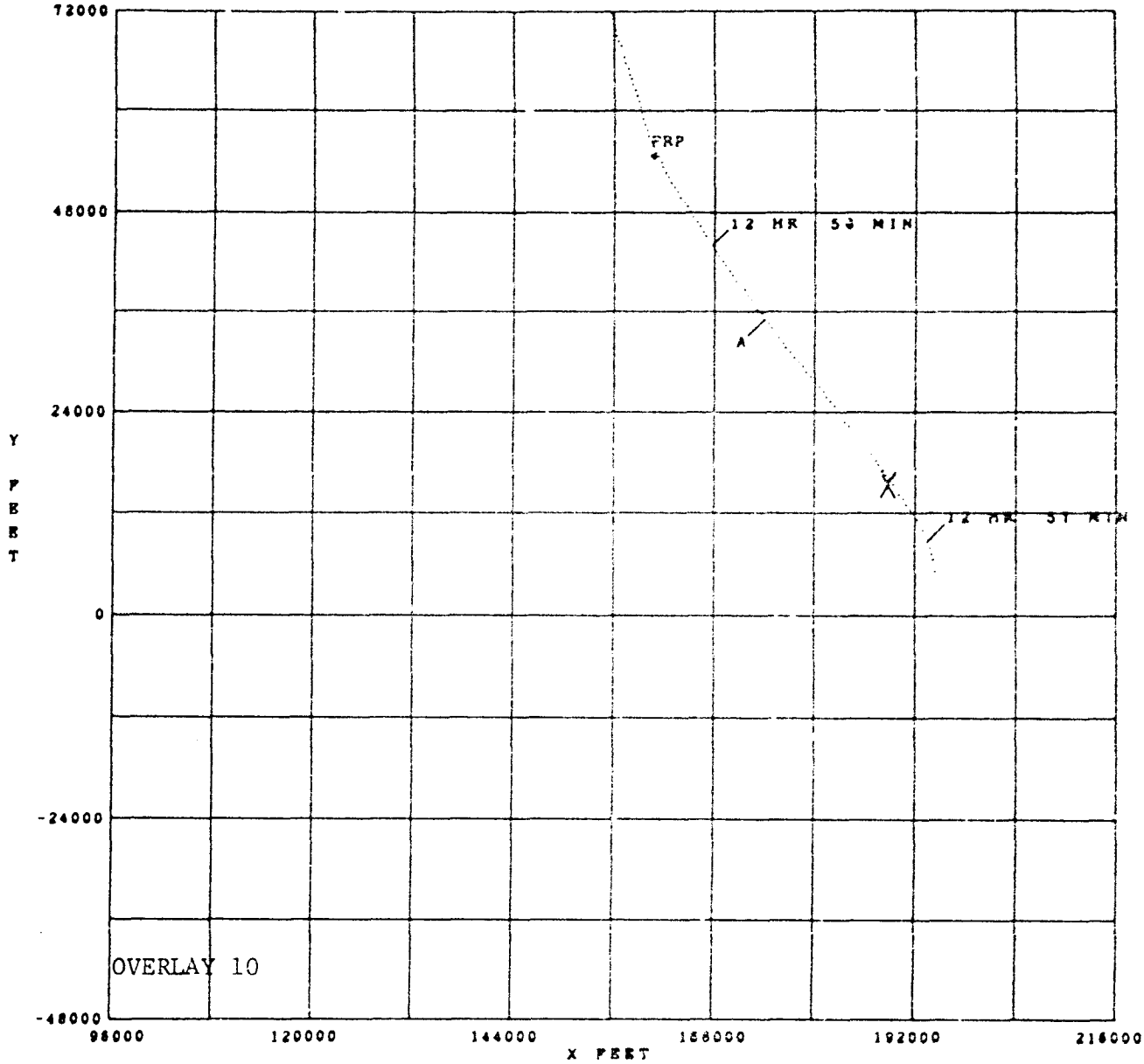
MINIMUM GROUND DISTANCE QUALIFIER = DME

SORTIE NUMBER 335

TARGET EAST 3

04092321
J9156 2C1

Figure 3-64 (U) Aircraft Position Data (Part 4 of 5)



MINIMUM GROUND DISTANCE TO TARGET = 537 FEET
MINIMUM GROUND DISTANCE QUALIFIER = DME
SORTIE NUMBER 335
TARGET EAST 4

04092321
J9156 29

Figure 3-64 (U) Aircraft Position Data (Part 5 of 5)

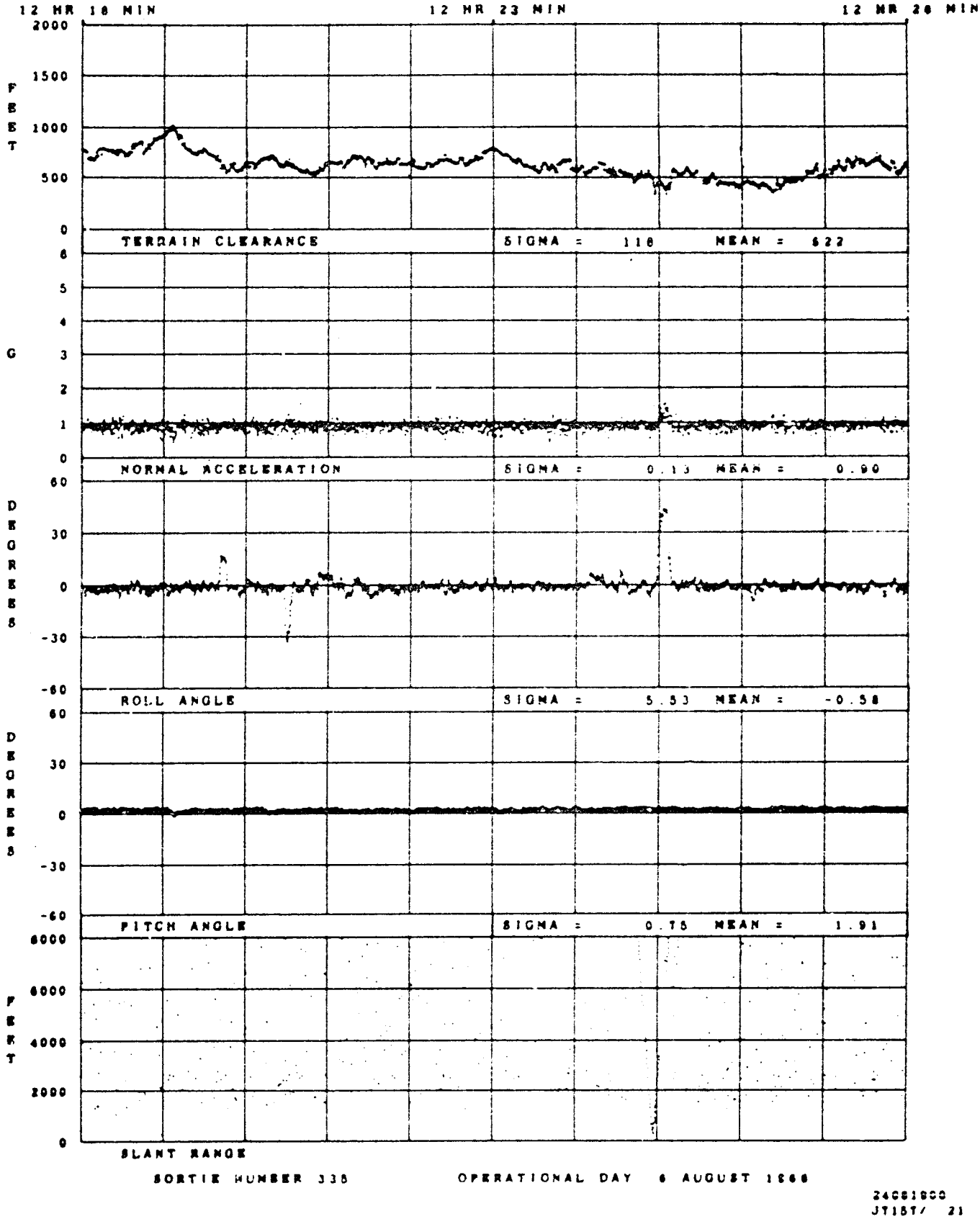


Figure 3-65 (U) Telemetered Data (Par 1 of 4)

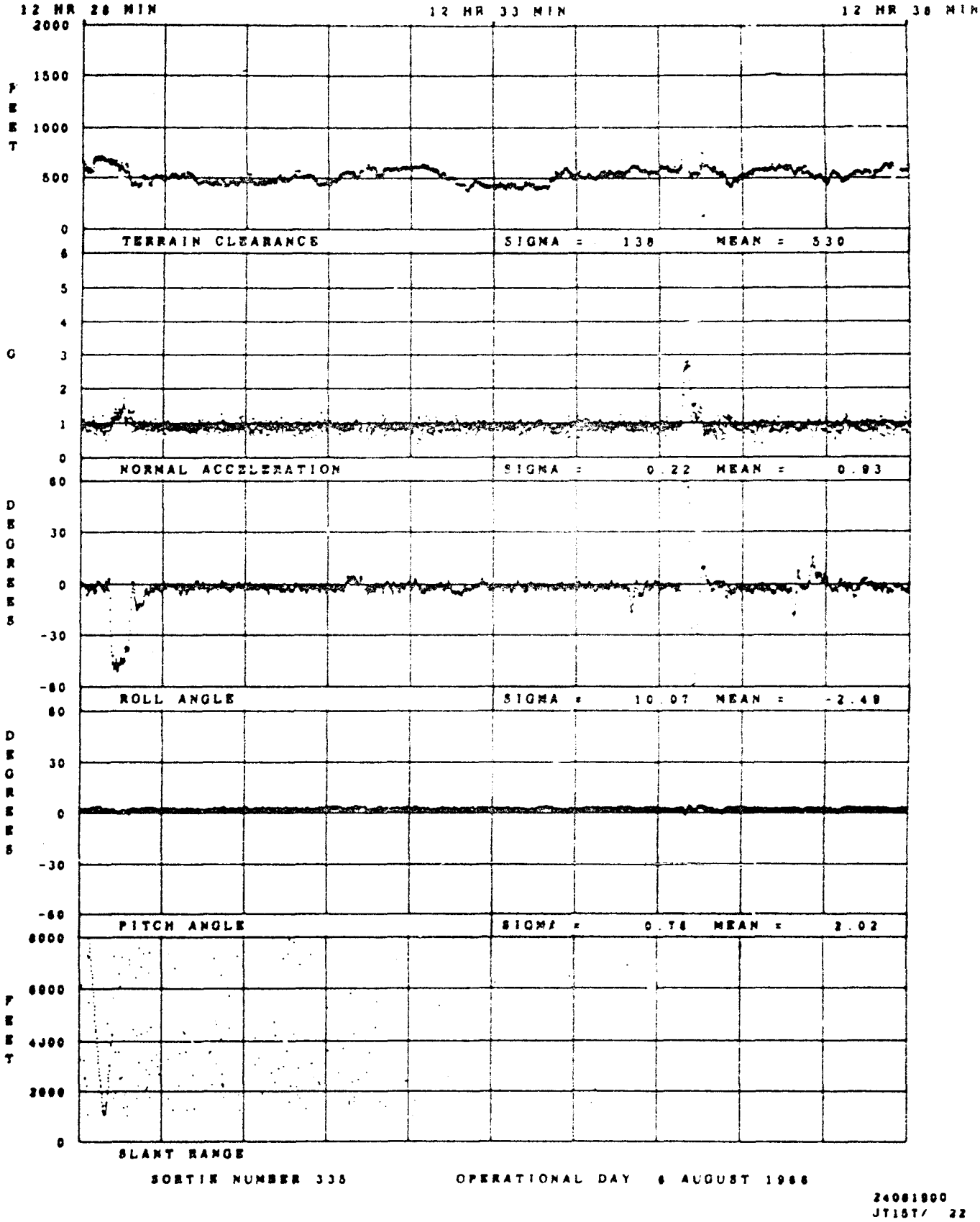


Figure 3-65 (U) Telemetered Data (Part 2 of 4)

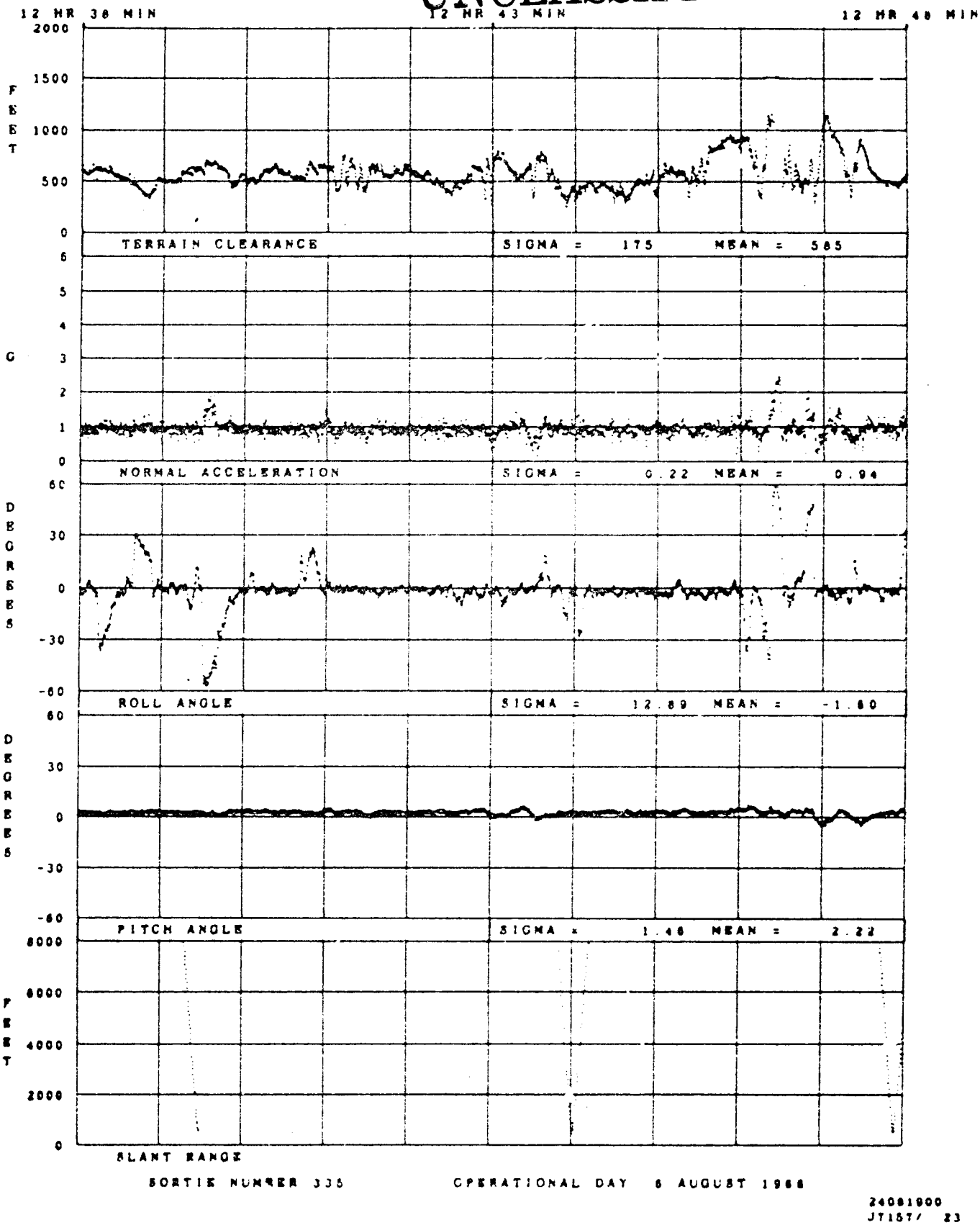


Figure 3-65 (U) Telemetered Data (Part 3 of 4)

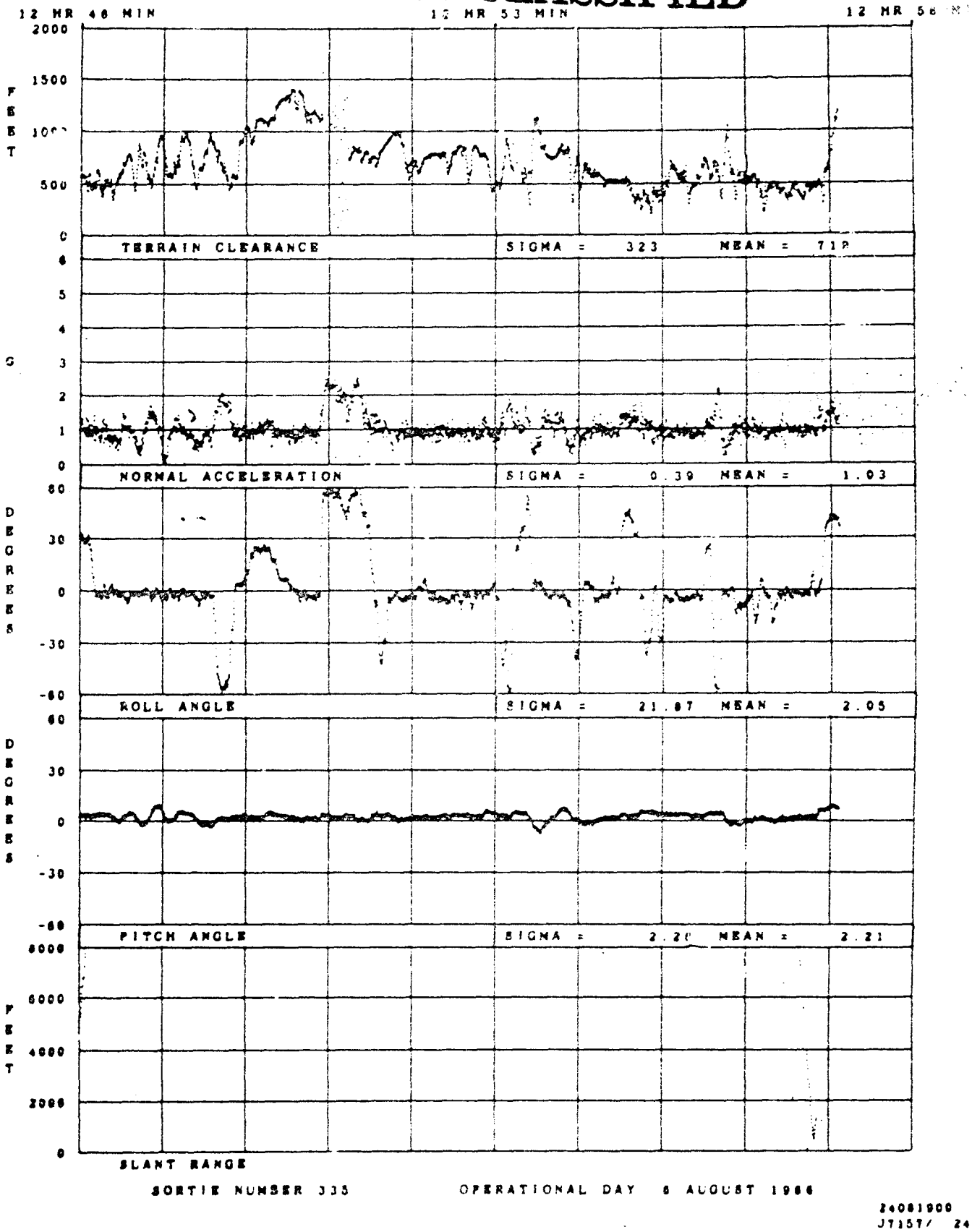
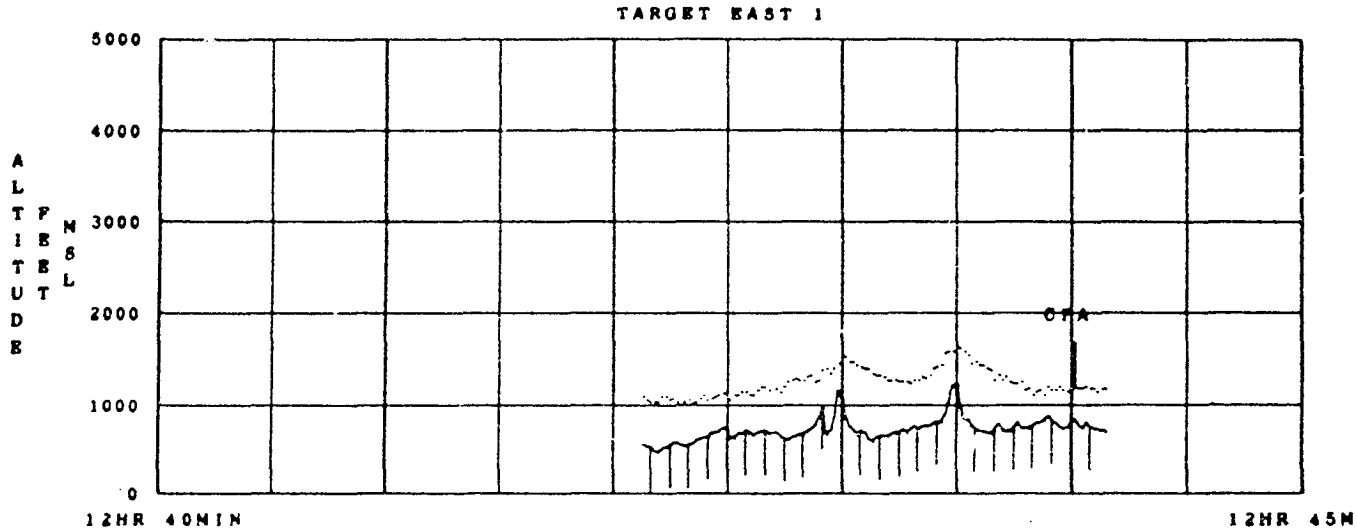


Figure 3-65 (U) Telemetered Data (Part 4 of 4)



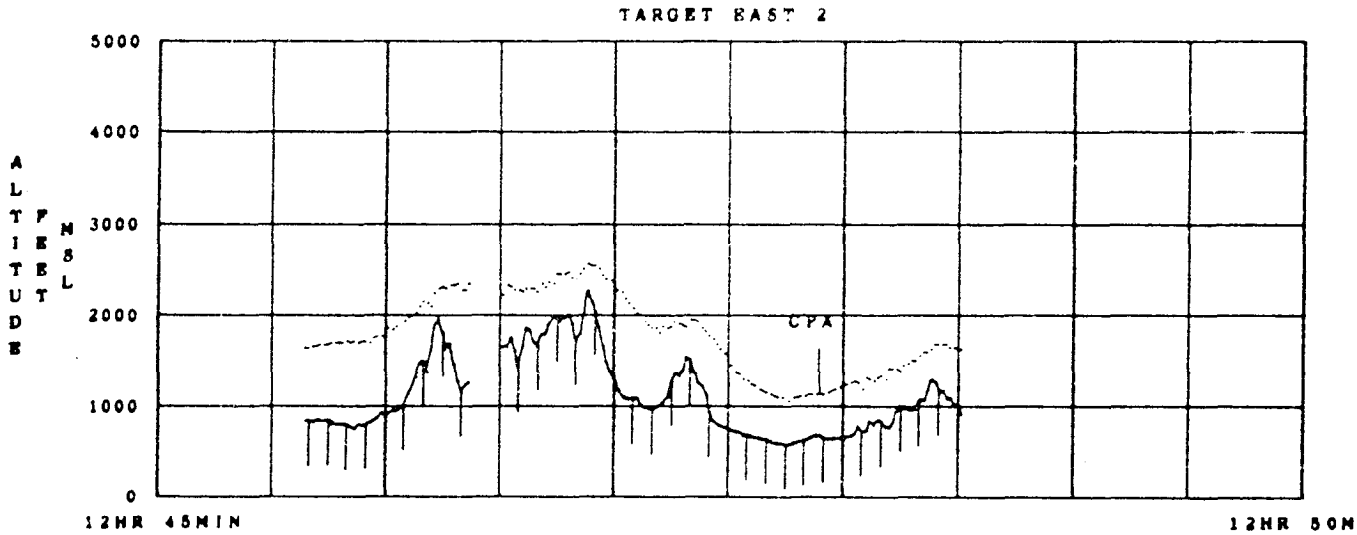


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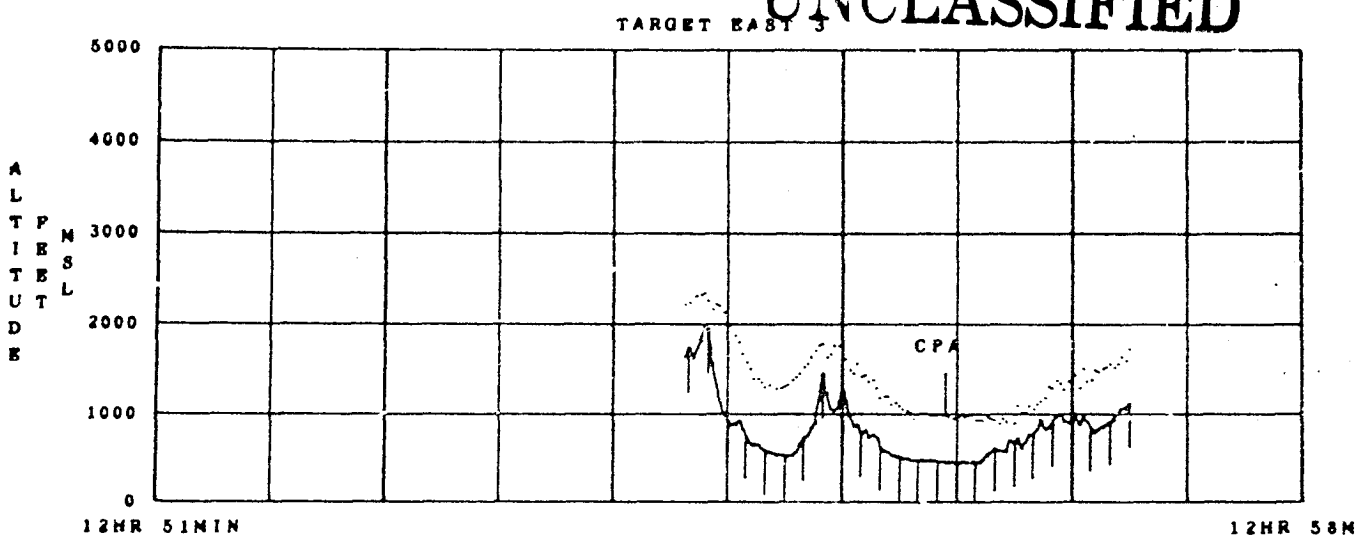
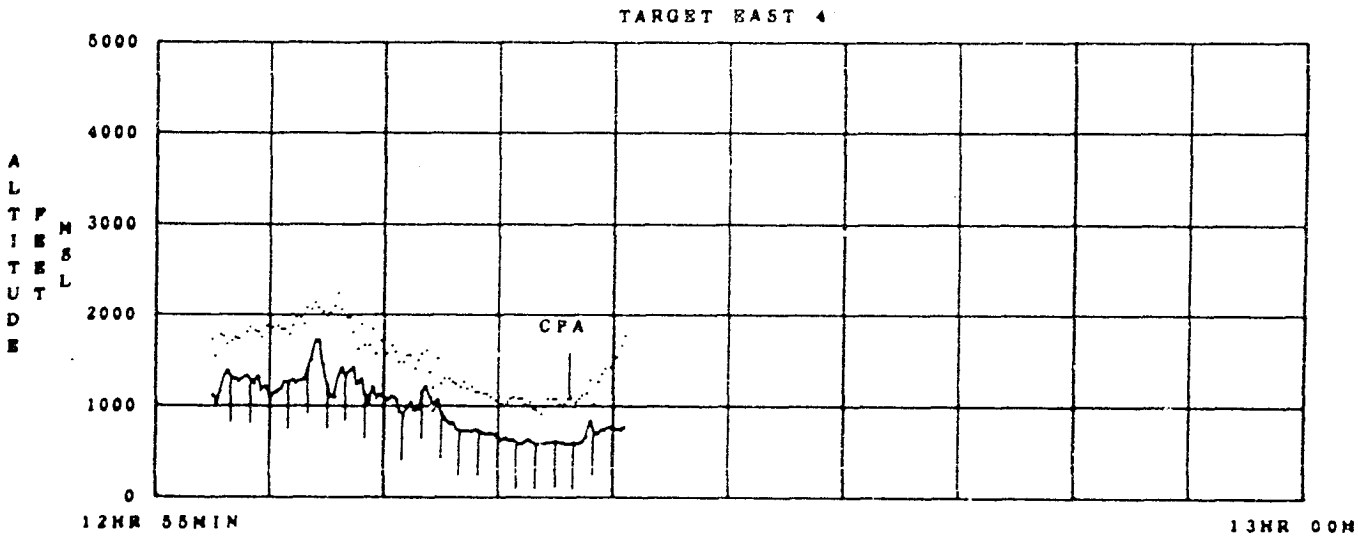
Figure 3-66 (U) Aircraft Altitude and Terrain Profile (Part 1 of 2)





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J9156

Figure 3-66 (U) Aircraft Altitude and Terrain Profile (Part 2 of 2)

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APPENDIX A

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