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CORONA J

PERFORMANCE EVALUATION REPORT

MISSIONS 1043-1 and 1043-2

FTV 1637 J-42

21 JUNE 1968

APPROVED [redacted]
Manager
Advanced Projects

APPROVED [redacted]
for Program Manager

[redacted]

FOREWORD

This report details the performance of the payload system during the operational phase of the Progra[redacted] Flight Test Vehicle 1637.

Lockheed Missiles and Space Company has the responsibility for evaluating payload performance under the Level of Effort and "J" System contracts.

This document is the final payload test and performance evaluation report for Missions 1043-1 and 1043-2 which was launched on August 7 1967.

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INTRODUCTION

This report presents the final performance evaluation of CORONA Mission 1043. The purpose of this report is to define the performance characteristics of the J-2 payload system and to evaluate the technical characteristics of the Mission, including analysis of any inflight anomalies.

The payload system was assembled, tested, and certified for flight at the Advanced Projects (A/P) facility of Lockheed Missiles and Space Company (LMSC). A/P also provided flight support, and mission reports to the community. The initial evaluation of the recovered film was made by NPIC personnel at the processing facility. The full Performance Evaluation Team included representatives of LMSC, ITEK Corporation, Eastman Kodak Company, and cognizant government organizations. The P.E.T. meeting took place at NPIC. Off-line evaluation, using engineering photography acquired over the United States, was performed at facilities of individual contractors.

The quantitative data summarized in this report is obtained from diverse organizations. The Diffuse Density measurements and MTF/AIM resolution data are produced by the Air Force Special Projects Production Facility. Vehicle attitude readings and frame correlation times are provided by NPIC. The Processing Summary report is published by [redacted]

These quantitative data are used by A/P computer programs to provide processed information allowing correlation of operational photographic conditions with image quality. Analyses are made of image smear components and limiting ground resolution, and also of illumination/exposure, processing components in order to investigate exposure criteria.

SECTION 1

MISSION SUMMARY

A. MISSION OBJECTIVES

The CORONA/J1 payload J42 was designed and programmed to acquire and return search, cartographic, and reconnaissance photography of selected areas of the earth from orbital altitudes. Two seven-day mission segments were planned, both nominally to return over 5900 panoramic frames of photography, each covering approximately 1725 square nautical miles.

The payload section was a standard J1 configuration consisting of a space structure containing two panoramic cameras and associated control/support equipment, with separate stellar-index cameras and recovery subsystems for each mission segment. Figure 1-1 presents an inboard profile of the J42 configuration.

On-orbit support was provided by AGENA satellite vehicle #1637. These functions included real-time command and telemetry links, electrical power, stored payload program timer, and attitude stabilization and control.

B. MISSION DESCRIPTION

The payload was launched from Vandenburg Air Force Base at 2142.75 Z on 7 August 1967, on THORAD SLV #510. The booster burned to propellant depletion, but failed to attain the required velocity by 254 feet/second. This resulted in the AGENA vehicle also burning to propellant depletion, with 39 feet/second velocity lacking at the end of burn. The resultant orbit was low at perigee,

apogee, and in period; the parameters were outside the anticipated three-sigma dispersions.

The comparison of planned and actual orbit parameters is tabulated as follows:

ORBITAL PARAMETERS

ORBIT PARAMETERS AND OAS EFFECTS

Parameter	Predicted	Actuals
Period (Min.)	90.11	89.62
Apogee (N.M.)	204.5	181.33
Perigee (N.M.)	99.4	95.10
Eccentricity	0.0147	0.0121
Inclination (Deg.)	80.00	79.98
Argument of Perigee (Deg.)	163	188

Single OAS rockets were fired on Rev 2, Rev 7, and Rev 19. All telemetry monitors and subsequent orbital parameters confirmed successful operation. The three rockets added velocities of 15.6, 15.2, and 14.4 feet per second, respectively. The nominal orbital period was achieved after the third OAS firing:

OAS ROCKET PERFORMANCE

Parameter	Rev 20 Actuals
Period (N.M.)	90.07
Apogee (N.M.)	197.60
Perigee (N.M.)	102.80
Eccentricity	0.0132
Inclination (Deg.)	79.97
Argument of Perigee (Deg.)	173.07

Tracking and control support was effected by the Air Force Satellite Control Facility, under central control of the Satellite Test Center at Sunnyvale, California. Tracking and command stations are located at [redacted]

Mission segment 1043-1 consisted of a seven-day operation followed by air recovery of the capsule on 14 August. Mission segment 1043-2 was completed with an air recovery on 22 August, following an eight-day photographic operation.

C. PANORAMIC CAMERAS

The forward camera suffered a loss in image quality due to an erratic scan rate which finally caused complete film pull-out of the rails on Rev 228. All film transport functions ceased on Rev 230.

The aft camera performed satisfactorily throughout the mission and the image quality of the aft material was good and consistent throughout.

D. STELLAR-INDEX CAMERAS

The "A" S/I operated satisfactorily. Flare affected approximately 50 percent of each stellar frame.

The "B" S/I operated normally. Minor fog appeared intermittently throughout the entire mission on the Index camera.

E. RADIATION DOSAGE

Radiation encountered during the mission was well below the levels which would degrade the photograpny, as indicated by the dosimeter packets.

F. OTHER SUB-SYSTEMS

The clock, instrumentation, pressure make-up, command and thermal control subsystems performed satisfactorily.

SCHEMATIC INBOARD PROFILE - CORONA J-42 SYSTEM

MISSION 1043

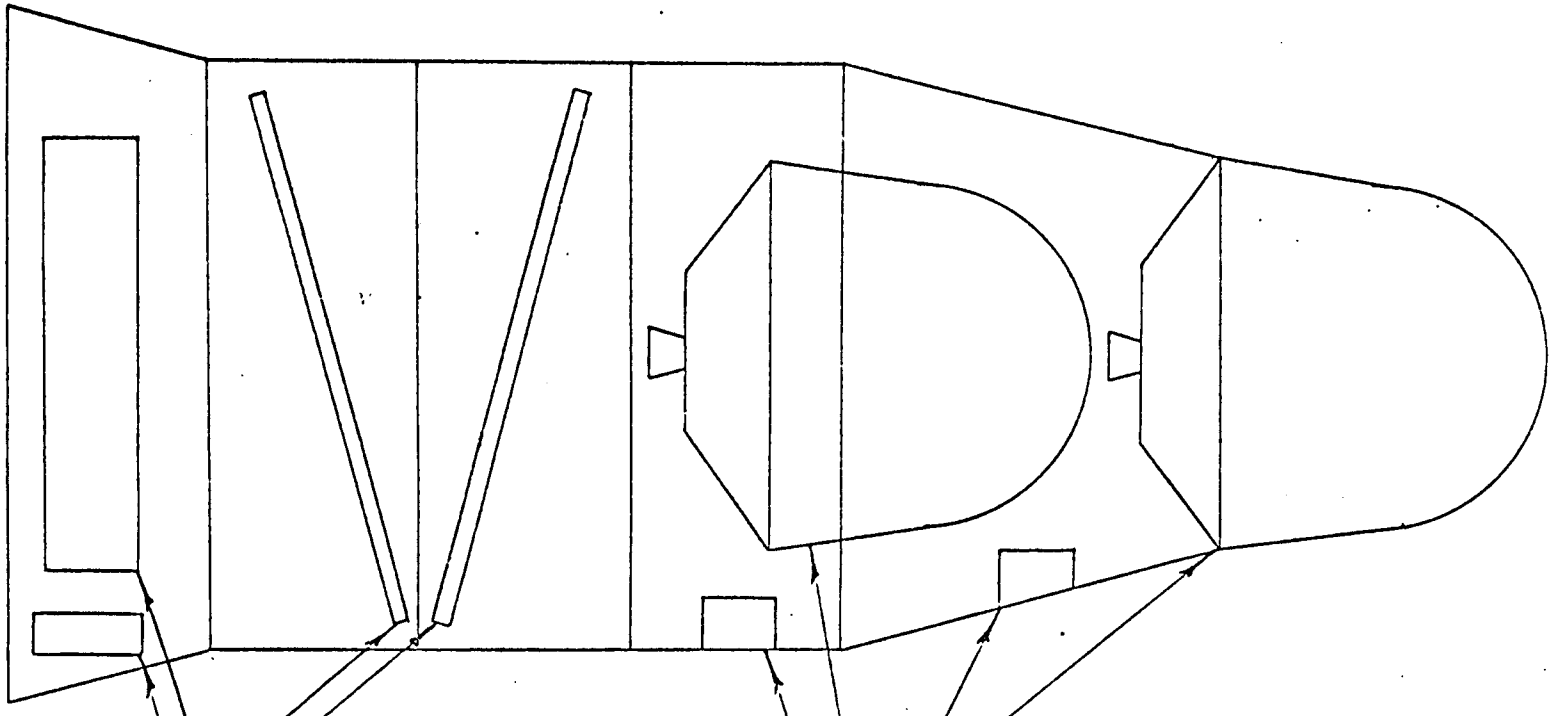


FIGURE 1-1

MASTER PANORAMIC CAMERA

A. COMPONENT ASSIGNMENT

Component	Serial Number
Main Camera Serial	200
Main Camera Lens	2092435
Input Horizon Camera	286-G6
Input Horizon Camera Lens	E12841
Output Horizon Camera	286-G5
Output Horizon Camera Lens	E12870
Supply Cassette	SC-48

B. CAMERA DATA AND FLIGHT SETTINGS

Panoramic Camera:

Lens	24"f/3.5
Slit Width	0.200 in.
Filter Type	Wratten 23A
Film Type	Eastman 3404

Horizon Cameras:

	Input (Port)	Output (Starboard)
Lens	55 mm f/6.3	55 mm f/6.3
Aperture Setting	f/6.3	f/8.0
Exposure Time	1/100 second	1/100 second
Filter Type	Wratten 25	Wratten 25

SLAVE PANORAMIC CAMERA

A. COMPONENT ASSIGNMENT

Component	Serial Number
Main Camera Serial	201
Main Camera Lens	2152435
Input Horizon Camera	204-G6
Input Horizon Camera Lens	E12837
Output Horizon Camera	304-G5
Output Horizon Camera Lens	E12862
Supply Cassette	SC-48

B. CAMERA DATA AND FLIGHT SETTINGS

Main Camera:

Lens	24"f/3.5
Slit Width	0.150 in.
Filter Type	Wratten 21
Film Type	Eastman 3404

Horizon Cameras:

	Input(Starboard)	Output (Port)
Lens	55 mm f/6.3	55 mm f/6.3
Aperture Setting	f/8.0	f/6.3
Exposure Time	1/100 second	1/100 second
Filter Type	Wratten 25	Wratten 25

STELLAR-INDEX CAMERAS

	Mission 1043-1	Mission 1043-2
A. Component Assignment		
Camera, Assembly No.	D/107	D-112
Index Reseau No.	135	143
Stellar Reseau No.	135	139
B. Camera Data and Settings		
Stellar Camera		
Lens Type	85 mm f/1.8	85 mm f/1.8
Exposure Time	1 second	2 seconds
Film Type	Eastman 3401	Eastman 3401
Index Camera		
Lens Type	38 mm f/4.5	38 mm f/4.5
Exposure Time	1/500 second	1/500 second
Film Type	Eastman 3400	Eastman 3400
Filter Type	Wratten 21	Wratten 21

SECTION 2

PRE-FLIGHT SYSTEMS TEST

A. ENVIRONMENTAL TESTING

1. Test Objective

As a standard procedure, the J payload systems are subjected to thermal/altitude testing, which simulates on-orbit environment. The purpose is to demonstrate proper electrical and mechanical function under simulated operational conditions. One of the test objectives is to determine the degree of system susceptability to Corona discharge, which fogs the film and degrades operational photography.

2. Test Summary

The J-42 altitude environmental test was conducted in the HIVOS facility from 13 to 19 October 1966. Performance of the payload system was adequate to demonstrate satisfactory performance, and to define certain problem areas. Problems evident during the test were individually remedied without altitude retesting; these include the pan geometry data recording, "two-pi" corona, cycle rate differences, and miscellaneous minor anomalies. The general appearance of the film was good.

A total of 109 operations were run during the test, including 4 mono operations for each camera; the Master consumed 4584 frames (12125 ft) and the Slave 4474 frames (11835 ft). This does not include the pre-HIVOS PG confidence test or the post-HIVOS exposure check. Chamber pressures ranged as low as 0.7 microns.

Both panoramic cameras evidenced various problems concerning the PG data recording; the lens scan lines and rail hole images on both had occasional abnormalities. In general, PG performance was disappointing, but the lack of specific acceptance criteria made evaluation difficult.

Rail hole images appeared generally adequate, when seen, the Master camera being better. The Master dots were initially fairly light, but diminished in density during the HIVOS test so that detection was very difficult by test end. These dots appeared normal during both the pre-and post-HIVOS tests. This situation is similar to the tests of J-36 and J-38, where acceptable flight data recording resulted.

The Slave data block-side rail showed a variable history, with up to 6 images missing and 20 rated as relatively light or faint. The time trace side images were generally elongated. The Slave rail lamps blinked off shortly after each scan start in the pre-chamber test and the first HIVOS operation because of abraded lamp wiring. This anomaly has not been noted since the wires were replaced after the test.

The Master lens scan lines were noted missing on 9 frames and partially missing on 50 others; six operations were affected. The line near the time trace disappeared into the format edge $2\frac{1}{2}$ inches before scan end. Density and width varied between lines in the HIVOS test; densities ranged from heavy to unacceptably light. Lines on the pre-chamber test could not be evaluated because of high background fog level, those on the post-chamber test appeared much more even.

The Slave lens scan lines were noted to turn on after scan start on the first frame of 3 operations, and were noted missing on the last frame of 8 others. A moderate density variation occurred both between the lines within a frame, and occasionally for a single line within a frame. The lines were frequently relatively faint, especially during the faster operations. The lines appeared more even in the material from the post-chamber test.

Startup corona occurred with faint to light density on 10 master operations, and with medium density on a single Slave operation. Instrument pressures ranged from 1 to 15 microns. This type and frequency of corona marking is considered acceptable.

Light to medium density two-pi type marking was found on the master film early in the "A" test, at internal pressures of 20 to 26 microns. Twenty frames in five successive operations were marked at 6.3 inch intervals. In all cases, the affected film was well within the supply cassette at the start of camera operation, indicating a gradual potential buildup on the metering roller. While two-pi marking is defined as unacceptable, customer waiver was recommended because of (a) lack of severity of the marking, and (b) the pressure range at which the marks occurred, being too high for no PMU augmentation, and too low with PMU for a sustained flight situation.

The unacceptably slow Slave camera cycle rates were subsequently adjusted. Based upon P/E frame counts, rate differences up to 9% were noted between Master and Slave cameras. There is a possible correlation with the appearance of the Slave time trace and lens scan lines (above) which showed

irregular movement of the scan arm during several operations, at start-up or at slow rates. This irregularity may also be related to the interlock assemblies, which required modification prior to a successful resolution test.

The binary data recording and block area was adequate on both instruments. All binary bits were observed. The start-of-pass marks, serial numbers, and indices were present. The index bit near the serial numbers of both cameras were heavy and bloomed; lamp attenuation was recommended. Occasional dim serial number, block indices, etc., were noted on the Slave, but minor in effect; it is attributed to variation in voltage supplied the system via HIVOS chamber cabling.

One clock word was missing on the Slave; the block serial number and indices were present. No action was recommended, for this frequency of occurrence.

The horizon camera data recording was adequate. Slave fiducials were good; Master fiducials, while usable, were enlarged and not sharp. Both slave H.O.'s exhibit characteristic minor pressure marks.

The 200 PPS time trace was adequate on both cameras. Extra non-periodic time pips were frequently noted near the center-of-format switch closures and occasionally by the blanking pulses. An extra pip occurred in the Slave blank pulse during the pre-HIVOS test. These anomalies were acceptable, in that it was unlikely that they would cause problems in timing the slit position during post flight analysis.

Very light rail scratches and edge marks were encountered on film from both cameras. The characteristic scan head roller scratches appear at scan start, near the data block, and near the blank pulse. There were

relatively few discharge marks. The film generally appeared very clean, excepting frequent heavy multiple scratches on the Master, in particular, which were caused by the film processor. These scratches made it difficult to detect any marks made by the camera during the tests. Film retrieval caused much less marking than normal.

There were no Stellar/Index cameras installed for this test. The -3 Programmer functioned properly.

Clock accuracy was satisfactory with a total offset of .072 seconds in five (5) days when compared to IRIG C.

The Pressure Make-Up system operated normally. Average gas consumption was 7.2 PSIA per minute of operate. Internal pressure increased to 45 microns during PMU operates.

The Command System operated properly with the exception of the off command brush for one program. It did not function the first time it was given. However, the second attempt was successful. This problem was traced to a defective Brush 47 switch in the test control console.

Transfer from A to B was accomplished by KZ-38 and all transfer functions occurred normally.

Both recovery sequence of events occurred properly.

The O.S.F.G. operation was satisfactory during the test. One complete O.S.F.G. operation period was run in each of the A and B modes of the test.

B. RESOLUTION TESTS

Resolution and Theodolite testing was performed on 1 November 1966 and 23 November 1966 respectively. Evaluation of the low contrast resolution data of the first test indicated the slave camera (No. 201) did not meet acceptance criteria. Slave camera resolution at the collimator zero

focus position, 75 lines/mm, was less than the 90 lines/mm required; peak focus occurred 0.002 inches behind the film plane. The master camera was well within specification with peak resolution of 113 lines/mm at the zero position.

A retest of J-42 system resolution was accomplished. Evaluation of low-contrast data indicated that both cameras performed well within acceptance criteria. The camera system had been modified by adjustment of the detent mechanism and the cycle rates. Results of the 2nd thru-focus resolution tests of pan instruments 200 and 201 showed the following characteristics:

Master Pan Instrument No. 200

Maximum high contrast resolution 195 lines/mm at zero focal position.

Maximum low contrast resolution 118 lines/mm at zero focal position.

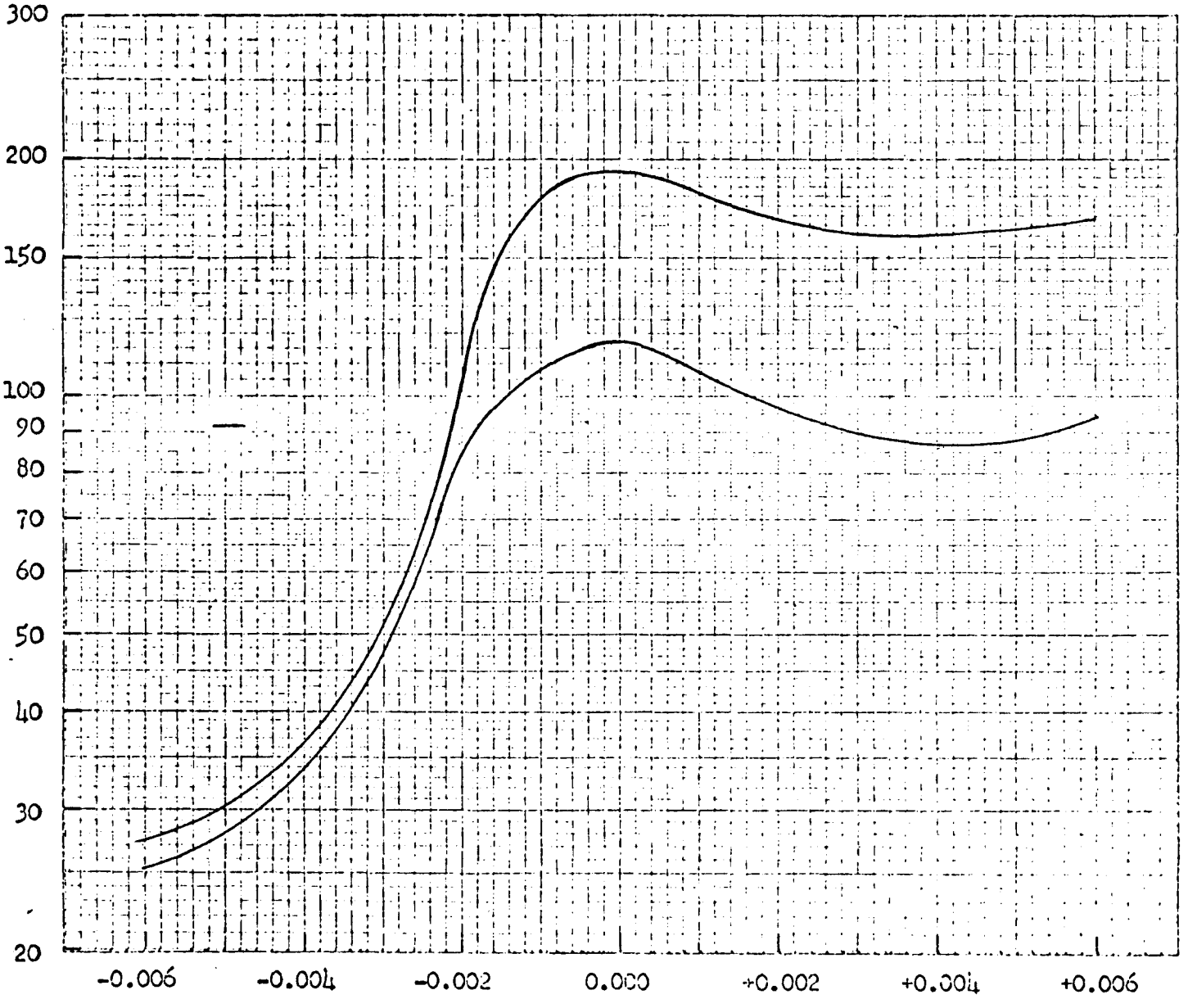
Slave Instrument No. 201

Maximum high contrast resolution 194 lines/mm at +.001 focal position.

Maximum low contrast resolution 116 lines/mm at +.001 focal position.

The test data for both instruments is shown in Figures 2-1 and 2-2. Both instruments met the system requirements specification.

PRE-FLIGHT DYNAMIC RESOLUTION



Camera No: 200

Payload No: J-42

Resolution (1/mm)

High Contrast: 195

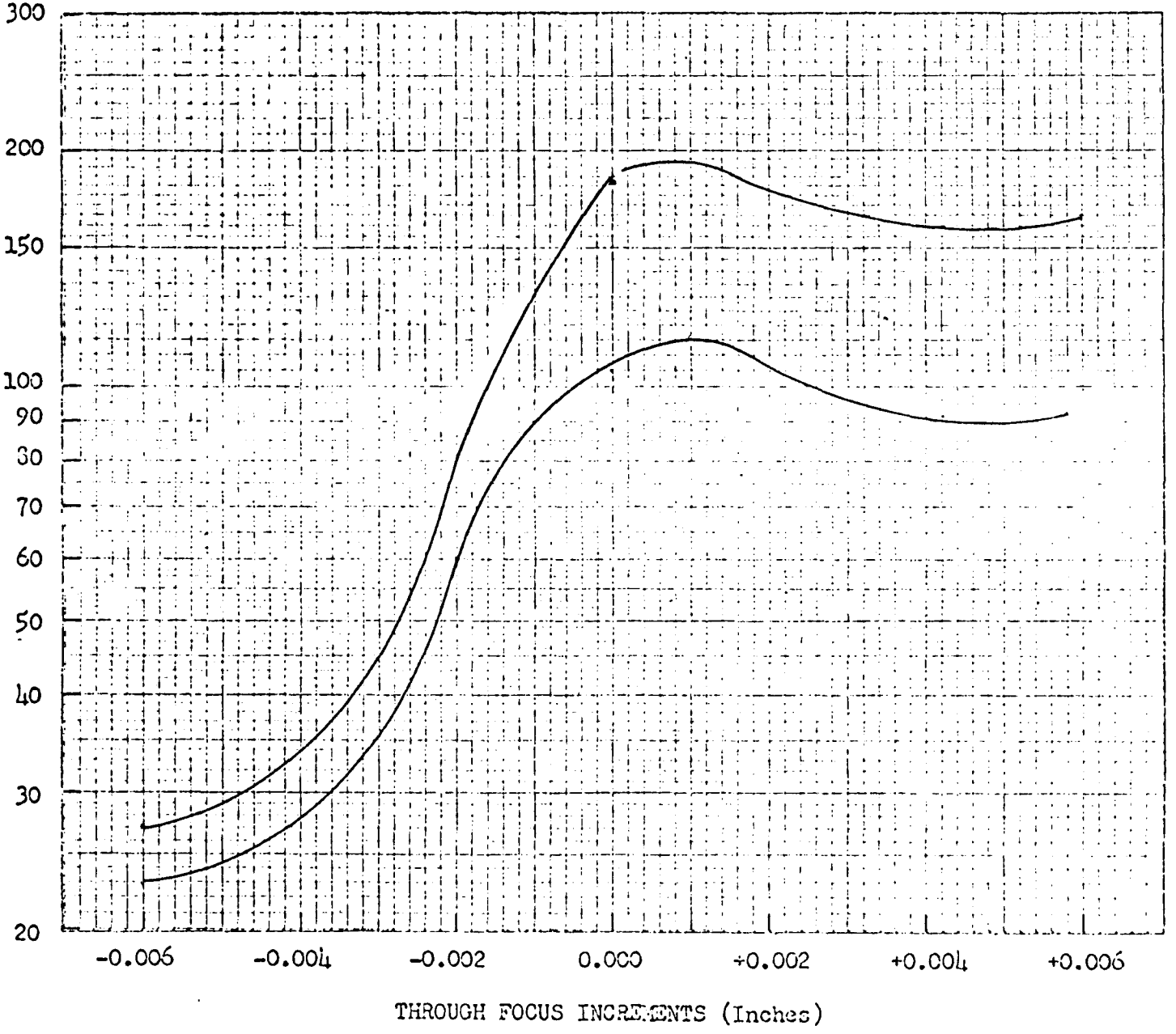
Low Contrast: 118

Film Type: 3404

Test Date: 11/28/66

FIGURE 2-1

PRE-FLIGHT DYNAMIC RESOLUTION



Camera No: 201

Payload No: J-42

Resolution (l/mm)

High Contrast: 194

Low Contrast: 116

Film Type: 3404

Test Date: 11/28/66

[redacted]

FIGURE 2-2

C. LIGHT LEAK TEST

The J-42 system was tested for light leaks on 14 November, 1966. Several apparent leaks were identified, the heaviest being from the master input H.O. boot area. Other leaks were from both drum boots, from the slave input H.O. boot, and from the top of the "A" forebody.

The master input H.O. boot leak was located, and repair verified by photomultiplier tests. The other leaks were relatively minor. Because of their relatively low level, photomultiplier verification of repair was considered adequate. Light leakage characteristics of the J-42 system were considered acceptable for flight.

D. FLIGHT READINESS AND CERTIFICATION

The flight readiness test of J-42 (PG-3) system demonstrated the capability of both pan cameras (#200 and #201) to produce excellent-appearing material. Data recording and uniformity of format fogging were considered acceptable by both performance evaluation and customer representatives; no rework or retest was necessary. The H. O. fiducials somewhat bloomed, but acceptable. The only questionable area involved the rail holes, where a relatively large number of unacceptable images were found on instrument #201, nine on the time word rail and three on both rails of instrument 200. However, the unacceptable images were within the then-current P.G. acceptance criteria (less than 10 unacceptable images on any rail, with no opposing pairs).

Evaluation of material from the post-storage test of Stellar/Index cameras D107 and D112 indicated generally good-appearing formats. The "B" index (#112) had a dirt particle entrapped behind the reseau plate,

which is inaccessible for cleaning. The fiducials on both stellars were somewhat dense, but the intersections were clearly visible.

The primary flight film spools were loaded into the pan supply cassette without incident. Samples from the pan and S/I supply spools indicated proper sensitometric performance. No marks or scratches on any film were noted.

The system was assembled and operated for the pre-flight acceptance run. These operations indicated normal system performance. Tracking appeared proper. No film marking or scratching was noted; operation appeared exceptionally clean.

The J-42 system was accepted for flight. Customer review and final buyoff was concluded on 26 July 1967.

SECTION 3

FLIGHT OPERATIONS

A. SUMMARY

Launch ascent, and injection events occurred as programmed, with the exception of low terminal THORAD velocity and the resultant orbit dispersion. Inflight operations support proceeded normally at A/P, and the STC, with no major problems encountered.

The panoramic cameras appeared to operate properly (per telemetry data) until the middle of the second mission, when indications of possible master film transport problems appeared. This continued until failure was indicated on the last engineering pass prior to recovery. The slave camera operated satisfactorily throughout the flight.

Both stellar-index cameras, the clock system, the instrumentation system, and the yaw steering control operated properly for the duration of the flight. Some command and control difficulties were experienced; the FMC programmer failed to turn off on Rev 1 and continued to run constantly through Rev 5, operating normally thereafter. Only one short operation was affected. The FMC programmer was not started on Rev 120, because of resetting the orbital timer; one operation was seriously degraded. Real-time commands controlling the dual intermix double-stepped on three occasions during the flight, but the errors were corrected by the flight controllers.

B. PANORAMIC CAMERA OPERATIONS

The telemetry monitors on the film transport system first indicated possible oscillations in Master film motion during a photographic cycle on Rev 175 and continued to deteriorate through Rev 221. The most notable film motion change occurred between photographic scan portions of succeeding cycles. However, this apparent change in film motion has been present on previous systems in which the camera system performance was not degraded.

The cycle rates on both instruments decreased approximately one and one half percent from Rev 159 through the end of the mission.

The relationship of the Master camera center of format and lens rotation monitors had changed on the last engineering pass at Rev 239. This condition is indicative of a stoppage in the film transport system.

The cut and wrap operation and transfer to the -2 recovery system occurred as programmed utilizing the KIK-ZORRO 38 command (early -1 to -2 switchover) on Rev 104 by the [redacted] Tracking Station.

FMC Match

The FMC programmer failed to turn off on Rev 1 and ran continuously until normal turnoff on Rev 5. The probable cause was temporary failure of a cam-driven switch.

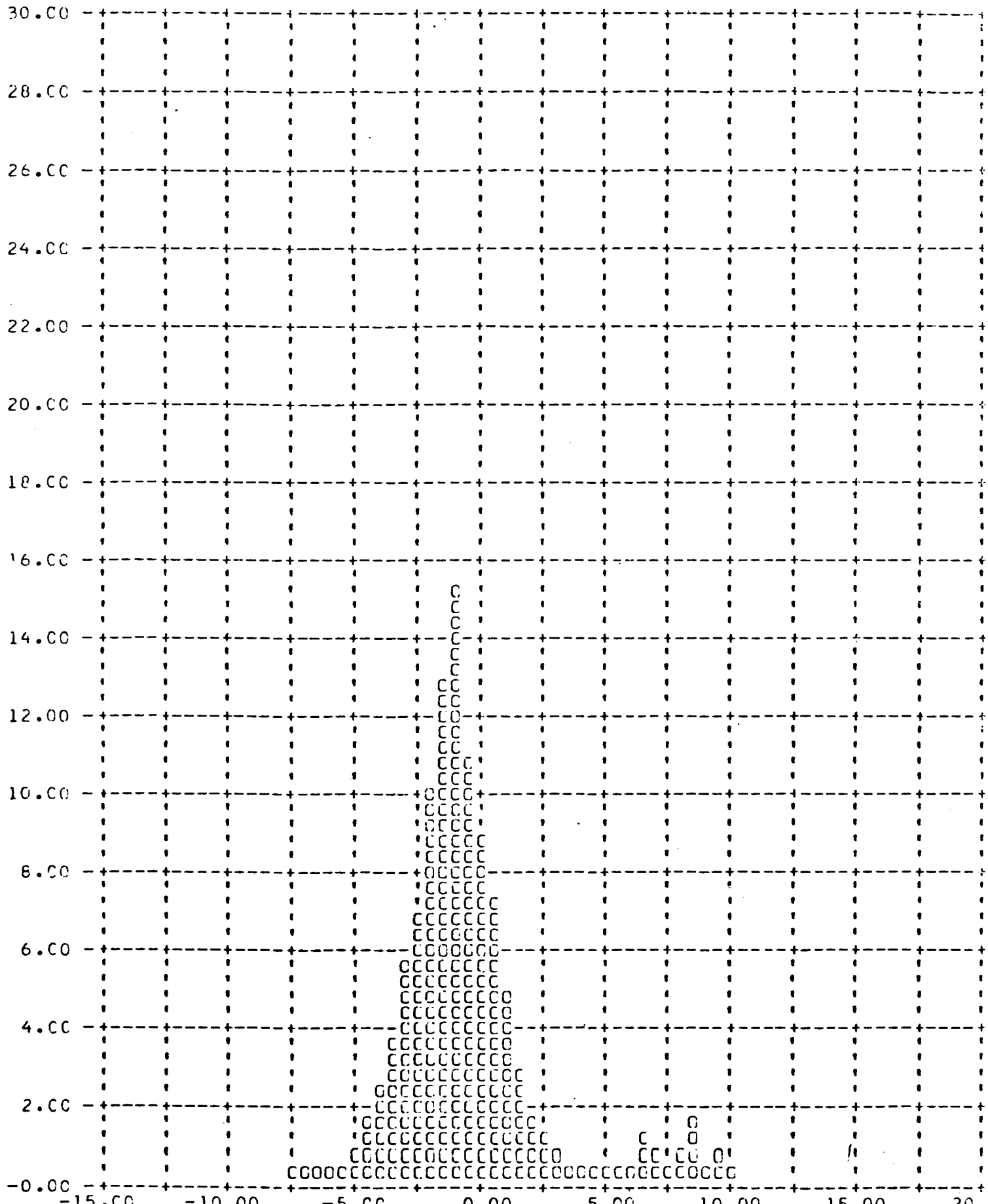
The V/h ramp to orbit match was otherwise acceptable throughout the flight except for one occasion. On Rev 120 the orbital timer was reset over the V/h start command. This resulted in the FMC programmer remaining at the bottom of the ramp causing the instruments to operate at a very slow cycle rate. The single operation on Rev 120 experienced a high degree of FMC mismatch because of this problem.

The following settings of RTC 6, 8, and 10 were utilized to obtain the optimum FMC match during the flight. The design of the J-1 ramp programmer limits this optimum FMC match to a nominal band of latitude defining areas of primary interest.

	RTC Commands			Remarks
	6	8	10	
RTC Positions	7	5	6	Launch thru Rev 12
	7	5	9	Rev 13 thru Rev 28
	7	5	10	Rev 29 thru Rev 172
	6	6	10	Rev 173 thru Rev 203
	6	6	11	Rev 204 thru the end of the mission.

The frequency distribution of the V/h errors, Figures 3-1 through 3-4, are computer plotted to show the statistical deviation.

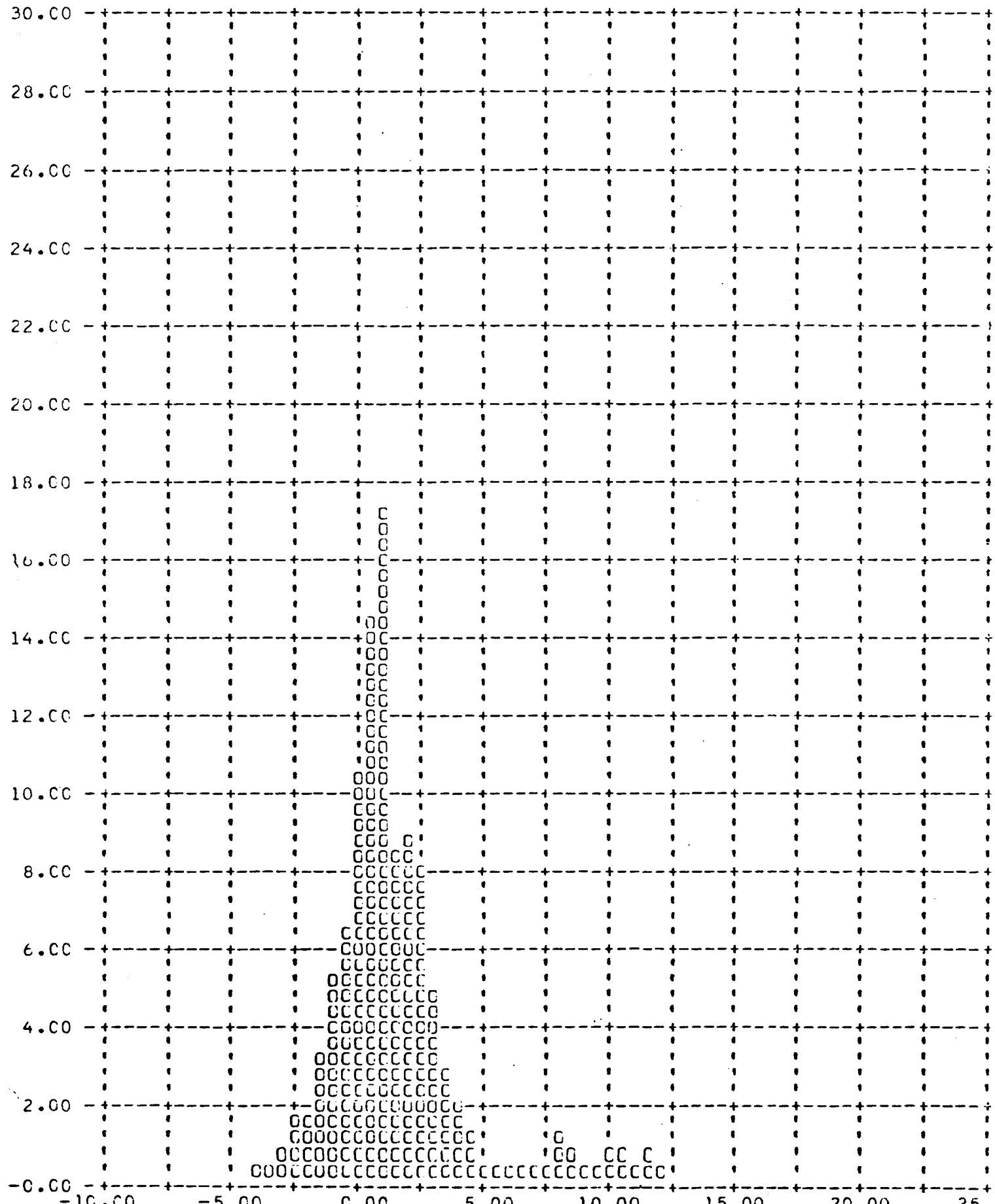
Y V/H RATIO ERROR - PERCENT (X) VERSUS FREQUENCY - PERCENT (Y)



MISSION 1043A2 ~~TOP SECRET~~ C[redacted] - CONTROL NO. [redacted]

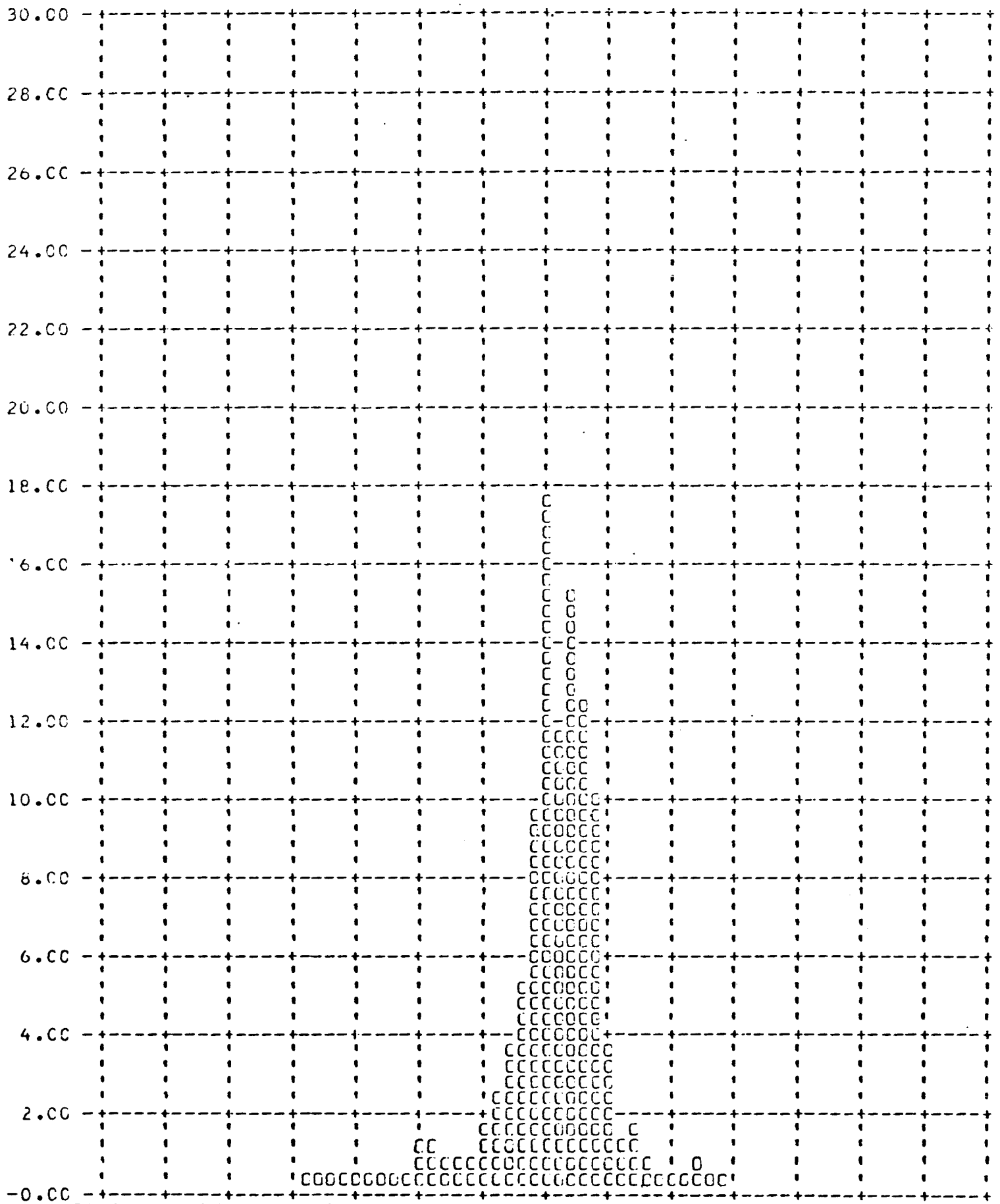
FRAMES 1-8 OF EACH OF OMITTED 90 PERCENT = 3.5

Y V/H RATIO ERROR - PERCENT (X) VERSUS FREQUENCY - PERCENT (Y)



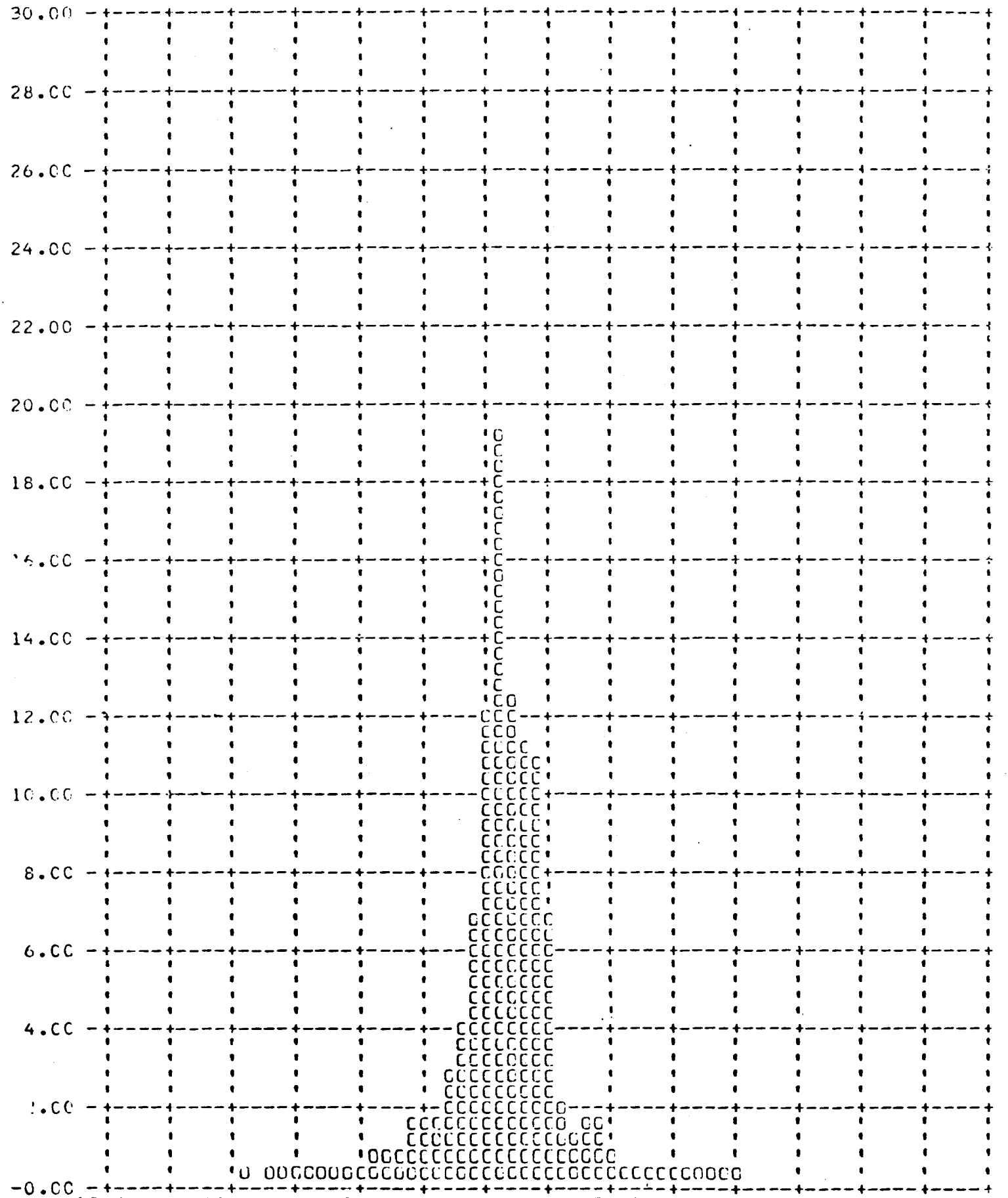
MISSION 1043A2 ~~TOP SECRET~~ C[redacted] - CONTROL NO. [redacted]

Y V/H RATIO ERROR - PERCENT (X) VERSUS FREQUENCY - PERCENT (Y)



FRAMES 1-6 OF EACH GP OMITTED 90 PERCENT = 5.09

Y V/H RATIO ERROR - PERCENT (X) VERSUS FREQUENCY - PERCENT (Y)



C. STELLAR/INDEX CAMERA OPERATION

Both Stellar/Index cameras operated satisfactorily on all monitored engineering passes. Telemetry data indicated that the programmer, metering functions, and shutter monitors performed satisfactorily.

D. INSTRUMENTATION AND COMMAND SYSTEM PERFORMANCE

The command system performance was satisfactory for both missions. Real time command (RTC) 12 double-stepped on Rev 87[redacted] and RTC 15 double-stepped on Rev 70[redacted] and Rev 198[redacted] On two of the above occasions the command verification tone dropped out momentarily causing the stepper switch to advance an extra position. The other anomaly could not conclusively be traced to a beacon tone drop-out. All RTC's were recommanded to their proper positions prior to acquisition fade, and therefore did not compromise the mission effectiveness. It is assumed that this anomaly was a tracking station problem rather than a command system failure.

This command system had been modified to eliminate the capability of resetting the intermix sequence and the four step counter by commanding RTC 15.

The instrumentation system performed normally throughout the total mission.

E. CLOCK SYSTEM PERFORMANCE

The clock system operation was normal for the duration of the flight. Satisfactory time correlation between the flight clock and [redacted] Tracking Station time was obtained. The ratio of clock time to system time was 1.00000014391.

F. PRESSURE MAKE-UP SYSTEM PERFORMANCE

The pressure make-up system performance was normal throughout the flight. Average gas consumption was approximately 9.2 PSI/min for the 255 minutes of total operate time. The system had a surplus of 340 PSIA at the end of the flight.

G. THERMAL ENVIRONMENT

The thermal control pattern on this payload system was modified prior to launch to produce a nominal thermal environment of $70^{\circ} \pm 10^{\circ}$F.

Temperature data from [redacted] acquisitions are included in Tables 3-1 through 3-4. The average instrument temperatures ranged from a high of 68°F and 65°F and a low of 57°F and 54°F on the Master and Slave instruments respectively. Internal temperatures for complete orbits are included in Tables 3-5 and 3-6.

H. RECOVERY SYSTEM

The 1043 first recovery capsule was successfully recovered by air-catch on Rev 113 at 1643 PDT on 14 August. Capsule impact was close to the predicted point. All re-entry events appeared normal and occurred within one second of the predictions.

	Latitude	Longitude
Predicted	25° 00' N	158° 48' W
Actual	24° 54' N	158° 18' W

The second recovery capsule was successfully recovered by air-catch on Rev 240 at 1451 PDT on 22 August. All re-entry events appeared normal and occurred within one second of the predictions. Capsule impact was approximately 23 N.M. north of the predicted point.

	Latitude	Longitude
Predicted	22° 26.5' N	149° 19.1' W
Actual	22° 50.8' N	149° 15.0' W

I. RADIATION DOSAGE

Each recovery system flown on a Corona mission contains a sealed packet of Eastman Type 3401 and Royal X Pan emulsions to determine the total radiation received at the take-up cassette. Both film types have been irradiated by LMSC at various levels and the base plus fog densities recorded after controlled processing.

Following recovery the film dosimeter packets are removed and processed at A/P with a pre-flight sample of the same film type and sensitometric control film. The resulting base-plus fog density measurement of the dosimeter strips is used to ascertain the total radiation level. The table below presents the base plus fog readings for the dosimeter strips and the radiation level equivalents.

	Mission 1043-1		Mission 1043-2	
Emulsion	B + F Density	Radiation	B + F Density	Radiation
Type 3401	0.17	0.6 R	0.21	0.9 R
Royal X Pan	0.22	0.3 R	0.29	0.6 R

These levels are below that which will degrade the photography.

REAL TIME DATA
PRELIMINARY
MARKED - FAIR

VEHICLE 1637

SENSOR — ORBITS ACQUIRED

Position/Barrel #1 (A) (B)	L/O IND.	8	16	24	32	40	47	56	63	72	79	88	95	103
1	173	34	61	33	52	33	45	29	45	33	42	29	42	29
2	191	6	-1	3	-4	-4	-4	-1	-4	3	-1	3	-4	6
3	166	0	10	-7	10	-10	0	-7	6	-3	3	-7	3	-3
4	197	45	46	42	43	32	45	33	42	38	40	36	42	36
5	179	58	58	51	54	42	45	45	45	48	45	45	45	45
6	139	50	76	44	63	34	57	41	50	41	44	33	44	40
Barrel No. 2														
1	96	44	50	30	47	31	44	31	41	35	38	31	36	29
2	81	37	72	34	69	24	63	30	60	30	53	27	42	27
3	137	56	90	53	84	44	24	53	81	56	61	53	61	53
4	138	52	42	45	42	42	45	45	45	42	45	48	42	38
5	139	45	45	38	45	35	42	38	45	45	45	48	42	42
Cone Adapter														
1	62	49	52	45	49	36	43	43	43	43	42	38	41	36
Press. Make-Up Bottle														
1	54	93	76	84	76	79	73	76	69	79	69	73	69	73
2	58	93	80	88	80	77	78	80	74	83	74	78	93	83
Clock														
1	40	47	60	65	62	60	62	60	60	65	60	63	60	60
2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thrust Cone "A" to "B"														
1 (Main)	80	43	35	36	33	33	38	35	38	36	38	37	38	37
2 (Redu)	68	59	40	49	44	44	43	46	43	43	42	42	43	42
Cable Connects "A" SRV														
2	63	65	62	62	62	61	62	63	63	65	63	62	63	63
Recovery Cable "B" SRV														
1	68	67	64	63	62	61	62	61	62	63	62	60	60	59

[redacted]

REAL TIME DATA
TEMPERATURE SUMMARY
DEGREES - FAHR

PAYLOAD J-42

VEHICLE 1637

SENSOR

ORBITS ACQUIRED

Fairing/Barrel #1 ("A") ("B")	111	120	127	136	143	152	159	168	175	184	191	199	207	215	223	232	238
1	79	60	70	57	63	57	66	54	66	57	73	60	76	57	76	56	76
2	1	48	55	48	48	51	58	45	59	51	61	55	70	48	64	49	73
3	3	49	92	52	78	52	84	46	87	52	75	52	81	46	65	45	72
4	43	17	43	21	30	17	34	11	34	11	21	11	21	4	8	4	11
5	38	19	25	19	19	15	19	9	19	9	19	9	15	2	9	2	15
6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Barrel No. 2																	
1	31	18	22	16	18	15	18	9	18	12	18	9	15	5	12	5	15
2	43	17	37	17	27	17	27	11	26	11	17	11	17	4	4	4	7
3	75	44	84	50	72	50	78	44	82	47	69	50	75	41	63	42	69
4	48	48	48	55	23	48	55	45	57	52	58	55	67	48	61	50	71
5	45	32	38	29	32	29	32	29	32	32	38	38	42	28	42	33	49
Conic Adapter																	
1	23	23	17	23	17	20	13	17	17	17	13	13	10	10	10	0	13
Press. Make-Up Bottle																	
1	63	63	55	57	48	54	48	48	46	46	45	48	42	42	39	40	43
2	61	61	49	58	46	55	46	46	44	49	43	49	40	40	36	38	43
Clock																	
1	60	56	47	54	47	52	50	50	49	52	50	54	52	50	50	51	52
2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thrust Cone "A" to "B"																	
1 (Main)	32	53	49	53	48	50	48	49	48	50	49	53	49	52	53	53	54
2 (Retro)	52	55	54	53	52	53	52	50	50	52	50	52	50	52	52	53	54
Master Cassette "A" SRV																	
2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Recovery Batt. "B" SRV																	
1	83	79	79	79	86	84	79	83	83	79	80	83	83	80	84	79	83

REAL TIME DATA
TEMPERATURE SUMMARY
DEGREES - FAHR

PAYLOAD J-48

VEHICLE 1637

SENSOR — ORBITS ACQUIRED

Number	I/O	0	16	24	32	40	47	56	63	72	79	88	95	104
3	62	67	66	61	59	59	58	50	58	59	58	59	58	59
4	66	77	71	73	69	70	67	71	67	70	67	69	67	69
5	67	76	71	73	70	70	68	70	68	70	67	68	67	68
6	66	79	73	74	72	71	70	71	69	70	68	68	66	68
7	68	77	73	72	71	70	71	70	69	72	69	68	69	67
8	66	79	72	75	71	72	69	72	70	71	67	71	67	70
9	61	79	71	74	71	71	70	71	68	72	67	70	67	69
11	64	79	72	74	68	69	68	68	66	68	66	66	64	66
12	65	75	67	70	65	67	66	68	64	66	63	67	63	67
13	58	75	70	70	68	67	66	68	65	66	65	64	65	65
AVG. EXTR. TEMP.	63	76	70	72	68	68	67	67	66	69	66	67	65	67
Drive														
3	62	75	69	69	67	65	66	66	63	65	62	63	62	61
4	65	78	69	72	67	69	67	70	66	70	64	68	63	68
5	63	73	67	68	66	66	64	67	64	67	63	65	64	65
6	59	69	62	63	61	61	62	61	60	61	59	61	59	60
7	65	74	70	70	69	67	67	68	67	68	66	67	66	66
8	62	74	66	68	65	66	64	66	63	66	62	65	62	65
9	61	71	64	66	63	64	62	65	62	65	62	64	62	64
11	68	67	62	63	65	62	60	64	61	65	62	63	60	62
12	64	76	67	70	66	67	64	68	64	67	63	68	62	64
13	59	66	60	60	61	59	58	59	59	60	59	59	57	58
AVG. INTER. TEMP.	63	73	66	67	65	65	64	66	63	65	62	64	62	62
Supply Spool														
1	63	68	63	62	60	61	60	62	61	64	60	62	60	62
2	68	69	63	65	61	62	60	64	61	65	61	63	61	62

[redacted] Work Sheet No. [redacted]

TABLE 3-3

REAL TIME DATA
TEMPERATURE SUMMARY
[redacted] - PAIR

PAYLOAD J-42

VEHICLE 1037

SENSOR

ORBITS ACQUIRED

Sensor	111	120	127	136	143	152	159	168	175	183	191	199	207	215	223	232	239
3	56	54	50	54	49	52	49	51	49	52	50	54	52	53	52	54	52
4	65	64	59	64	57	62	58	62	56	62	59	64	60	63	60	64	63
5	63	63	59	62	57	60	56	59	54	59	57	59	57	59	57	59	61
6	64	62	58	59	56	58	55	59	53	55	54	56	54	55	55	55	58
7	63	64	59	61	59	59	58	60	57	58	58	59	58	58	57	58	62
8	65	66	59	64	58	62	57	60	56	60	58	62	59	61	59	62	62
9	63	63	57	61	56	59	55	57	53	57	55	58	55	56	54	56	59
11	61	58	53	56	51	55	51	53	50	54	49	52	51	52	51	54	56
12	62	63	56	60	55	61	55	60	55	60	57	62	58	61	58	63	63
13	61	59	54	55	52	53	51	52	50	53	52	53	51	52	52	53	56
AVG. INSTR. TEMP.	63	63	57	60	56	59	55	56	54	56	55	59	56	57	56	59	60

[redacted]

3	58	56	51	53	49	51	47	49	45	49	46	49	46	47	44	48	50
4	62	61	55	59	53	57	52	54	50	55	52	55	52	53	51	53	54
5	61	59	55	58	53	56	53	55	52	55	54	56	54	55	54	56	57
6	58	55	51	53	49	51	48	50	48	51	50	53	51	51	51	53	55
7	65	62	58	60	56	58	56	58	55	58	57	60	58	59	58	61	62
8	61	61	55	59	53	57	53	55	51	55	53	56	53	55	53	57	57
9	61	60	55	58	54	57	54	56	53	57	55	59	56	57	56	58	59
11	60	58	52	55	51	55	51	52	50	54	51	55	53	54	53	55	56
12	60	58	53	56	50	58	50	52	48	53	49	53	49	51	50	53	54
13	57	53	49	51	48	49	48	47	47	50	49	50	49	50	49	51	51
AVG. INSTR. TEMP.	60	58	54	56	52	54	51	52	50	53	52	54	52	53	52	54	55

Supply Panel

1	60	58	52	55	52	54	52	52	50	53	52	54	52	52	52	54	54
2	60	58	52	55	50	54	50	51	50	51	50	53	50	51	52	53	53

TABLE 3-4

ORBITAL T PERATURES

J-42

ORBIT 39

ORBIT SEGMENT		#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	#16	#17
QUADRANT-DEG		119	133	157	175	277	260	240	220	301	321	341	360	377	476	458	439	420
Instrument No. 1																		
SENSOR	03	62	62	62	63	61	61	60	59	59	59	59	59	60	59	60	60	60
	04	73	74	74	74	74	73	72	70	70	69	70	69	70	70	71	72	73
	05	72	73	73	73	73	72	71	70	70	70	71	70	70	71	71	72	73
	06	74	74	74	74	74	73	72	72	72	72	72	72	72	72	73	73	74
	07	73	73	73	73	73	73	73	72	73	72	71	71	71	71	71	71	72
	08	75	75	75	75	75	74	73	71	72	72	71	71	72	72	73	73	74
	09	75	75	75	75	74	74	72	71	71	71	71	71	71	72	72	72	73
	11	73	75	75	76	76	76	74	73	71	70	66	66	69	69	70	70	71
	12	71	72	71	71	71	69	68	67	67	67	66	66	67	67	68	68	69
SENSOR	13	70	70	70	70	70	69	68	68	69	68	67	68	69	69	69	69	69
Instrument No. 2																		
SENSOR	03	70	71	71	71	70	70	69	68	68	67	67	67	66	66	67	68	68
	04	73	73	73	73	72	72	70	69	69	68	68	68	68	69	70	71	72
	05	69	69	69	68	68	67	69	67	67	67	66	67	67	68	67	68	68
	06	63	65	63	65	63	63	62	62	63	63	63	62	62	62	62	63	63
	07	70	71	71	71	71	71	71	70	70	70	69	69	68	68	69	69	69
	08	69	70	69	69	68	68	66	65	65	66	65	65	66	66	67	68	68
	09	67	67	67	67	67	66	65	64	64	64	63	64	63	63	65	66	66
	11	65	66	66	66	65	66	64	64	63	63	64	62	62	62	63	64	64
	12	72	73	73	72	72	71	69	68	67	66	66	66	66	66	67	69	70
SENSOR	13	60	60	60	60	60	60	60	59	59	59	59	59	59	59	60	60	60

TABLE 3-5

[redacted]

[redacted]

[redacted]

ORBITAL TEMPERATURES

J-42

ORBIT 167

ORBIT SEGMENT	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	#16	#17
QUADRANT-DEG	119	139	158	176	277	259	239	219	302	322	342	361	377	476	459	440	420
Instrument No. 1																	
SENSOR 03	52	51	51	50	50	49	49	49	49	49	50	50	51	52	52	52	52
04	63	62	61	60	59	58	58	58	58	58	59	60	61	62	62	62	63
05	60	59	59	57	57	56	56	56	56	56	57	57	58	58	59	59	59
06	57	57	57	56	55	55	55	55	55	55	55	55	56	56	57	57	57
07	58	58	59	58	58	58	58	58	58	58	58	58	58	59	59	58	58
08	62	60	61	60	58	58	58	57	58	57	58	59	60	61	62	62	62
09	59	57	57	56	56	55	56	55	56	56	56	57	58	59	60	59	59
11	55	54	53	52	51	51	51	52	53	54	56	56	57	57	57	56	56
12	61	60	59	58	57	56	56	56	56	57	59	60	62	62	62	62	62
SENSOR 13	54	53	53	53	53	53	52	52	52	52	53	55	54	53	54	54	54
Instrument No. 2																	
SENSOR 03	50	49	49	49	48	47	47	47	47	47	48	48	49	50	51	52	52
04	56	55	55	54	53	53	52	52	52	52	52	53	54	55	56	56	56
05	55	55	55	55	55	54	53	54	53	53	54	54	55	55	55	56	56
06	51	51	51	50	51	49	49	49	49	49	49	49	50	50	51	51	51
07	56	56	56	55	55	55	55	55	56	56	57	57	58	59	59	58	57
08	56	56	55	54	53	53	52	52	53	52	54	54	55	56	56	57	57
09	57	56	56	55	55	54	53	54	54	54	55	56	57	58	58	58	57
11	53	53	52	51	51	51	50	51	51	51	52	53	55	54	56	55	54
12	54	53	53	52	50	49	49	49	49	50	52	53	54	54	55	54	54
SENSOR 13	48	48	48	48	48	48	47	46	48	47	48	48	48	48	49	49	48

TABLE 3-6

TOP SECRET C[redacted]

TOP SECRET [redacted]

SECTION 4

PHOTOGRAPHIC PERFORMANCE

A. GENERAL

A total of 11,306 titled panoramic frames (30,489 feet) were returned from both mission segments, along with 928 stellar and index frames (109 and 218 feet, respectively). Master photography was missing for the last ten operations because of a camera transport failure.* The last 200 feet of recovered master film was severely degraded during operations with the film pulled out of the support nails.*

	Stellar/Index		Fwd Pan			Aft Pan		
	Frames	Feet	Frames	Feet	No Opns	Frames	Feet	No Opns
Preflight				331			339	
First Mission	443	54/111	2838	7474	84	2888	7609	84
Second Mission	485	55/107	2553	6737	79	3027	7999	89
TOTAL	928	109/218	5391	14542	163	5915	15947	173
* Missing	0	0/8	533	1405	10	0	0	0

The panoramic image quality was good and comparable to recent missions, prior to the occurrence of system malfunctions. The aft-looking camera performed satisfactorily throughout the mission and image quality was consistent throughout. A MIP of 85 was assigned both missions, using the aft-looking record. Material returned from the foreward-looking camera was good and consistent until operations on Rev 61, after which the quality deteriorated with increasingly erratic scan rate. The master quality was considered slightly

lower in sharpness than that of the aft record, by visual comparison at 10x to 60x magnification of the original negative. This arises from the added effect of haze light in the forward-looking unit, and from the wider slit.

The good image quality was obtained when atmospheric conditions were favorable. There was, however, a prevalence of adverse conditions, with additional degradation attributed to surface winds and blowing sand in some heavily-targeted areas.

Both stellar-index cameras operated properly during the mission segment.

Rail hole imagery deteriorated throughout the mission culminating in a 75% loss. This loss, caused by emulsion bits filling the rail holes, was not considered deleterious because the system was not flown as a Pan Geometry mission. The lens scan lines were programmed on only for selected stateside engineering passes.

B. MASTER CAMERA PERFORMANCE EVALUATION

Performance characteristics of the master camera changed during flight operations, terminating in failure of the transport mechanism. Performance was normal prior to Rev 61, where a slowing of scan note during the last third of the format was noted on three frames. This became generally apparent by Rev 68. The retardation effect gradually progressed until approximately Rev 159, where scan rate errors over 50% were common at the end of the formats, causing a significant loss of image quality. This was not noted on telemetry, since the camera responded with a speedup after the scan end, yielding a net cycle period close to nominal. Variations in all telemetered parameters were within the envelope describing normal operation.

This condition persisted for ten days of operation, until Rev 228, frame 119. The next frame, 120, pulled from the rails. Photographic quality was severely degraded, although there were some usable areas of the formats. Operation continued for 80 cycles until the transport system failed completely. The last material returned was six inches of Rev 230, Frame 13.

Exhaustive investigation by A/P and ITEK specialists did not disclose the specific failure mode. The general conclusion was that a mechanical malfunction occurred in the oscillating mechanism of the instrument which was manifested in the cyclic and progressive slowdown of velocity during scan. Film tensions gradually increased so that the material eventually pulled from the rails, with subsequent complete failure of the transport mechanism.

Another problem encountered on master unit photography was the appearance of a defocused stripe along one edge of all formats. The filter apparently distorted in flight so that one edge curled away from the slit and acted as a cylindrical lens, distorting the imagery and modifying exposure in the affected area.

An additional problem, of lesser significance, was encountered in reading the binary time words. The mask which provided the image for both serial number and time word index dot was canted so that the dot was misaligned with the inner row of binary bits, confusing the automatic reader.

Auxillary data recording, as horizon camera imagery and fiducials,

binary time word, serial number, start of pass mark, 200 PPS time trace, blanking pulse, and S/I slur pulse was operational throughout the mission, until pass 228. Although extensive effort had been directed towards elimination of light leaks, typical minor drum leaks were evident at the beginning of many operations, causing very minor degradation.

C. SLAVE CAMERA PERFORMANCE EVALUATION

Performance characteristics of the slave camera remained stable throughout the mission; good photography was attained. The MIP-85 frames for both mission segments were from this camera.

Several minor anomalies were observed, the more prevalent of which were intermittent light minus-density streaks noted during operations on seven revs. Foreign particles apparently were entrapped in the lens stove, between the fifth lens element and the field flattener. Occasionally, one or more temporarily adhered to the field flattener and moved with it during photographic scan.

Additional anomalies included the time trace missing for a few inches on the startup frame of two operations, and minor edge static on material from three operations. These anomalies are common, and not degrading. A periodic minus density spot along the format center of one operation is believed to be pressure marks caused by particles of foreign material (probably scraped emulsion) on a metering roller. A similar problem in reading the time word was encountered as on the master camera record, for the same cause.

Auxillary data recording, as H.O. imagery and fiducials, binary time word, serial number, start of pass mark, 200 PPS time trace, and blanking pulse was operational throughout the mission. Minor light leaks at the drum were apparent at the beginning of many operations, causing very minor

degradation.

D. STELLAR-INDEX EVALUATION

1. Index photography for the first mission is good, and comparable to that obtained from other recent missions. No significant anomalies occurred.

Stellar photography shows approximately fifty percent of each format affected by flare. Fifteen to twenty stellar images are visible in each frame; many frames have slightly elongated images, indicating slight attitude perturbations during exposure.

2. Index photographic quality for the second mission was good, and compared favorably with recent missions. Several minute minus-density spots, probably caused by foreign particles adhering to the reseau, are imaged on each frame. Minor edge fog appeared intermittently throughout the record. Heavy fog patterns were noted on the first two frames.

The stellar photography shows a normal area of each format affected by flare. Twenty to twenty-five stellar images are visible in each frame, with no major attitude perturbations noted. A small minus-density spot, probably caused by foreign particles adhering to the reseau plate, is imaged on each frame. Some fogging affects formats from the latter few operations of the mission.

E. OBSERVED DATA

Detailed evaluation of selected original negative, and of the stateside engineering materials available at A/P, was undertaken in an attempt to determine the extent of information reduction caused by the Master camera malfunction.

Atmospherics played an important role, for this mission, in terms of terrain information content. Content over the Z.I. was degraded to some extent.

during portions of most passes, with few exceptions. Several operations were performed over controlled range network resolution targets, both fixed and mobile, several of which were obscured by clouds or rendered marginal by haze.

In general, ground resolution of the aft-looking camera was equal with the forward-looking, (scan component) or one group better, throughout the mission. However, the FMC component of the forward looking unit was usually an additional group lower than in the scan direction. The best indicated ground target resolution was 11 feet, but this was not believed to represent mission photography during the better operations - those less affected by atmospheric conditions. Considerable image distortion is evident in some areas, probably as a result of thermal gradients and/or local surface air currents.

Effects of the Master camera scan problem are evident near the end scan area of the format. The apparent information content drops off significantly, relative to the format center area. Smear is noted in higher-contrast imagery in the affected area near the end of the mission. In general, however, the scan rate anomaly did not severely degrade the forward looking photography, especially when viewed stereoscopically. In conjunction with the aft looking coverage, there was not a serious information loss, until the failure on the last day of the mission.

F. PERFORMANCE MEASUREMENTS

The photography acquired by both panoramic cameras during Missions 1043-1 and 1043-2 received a MIP rating of 85. A summary is tabulated below of the MTF/AIM resolution values measured by AFSPPF and reported in cycles/mm. The

microdensitometer slit used was 1 micron by 80 microns.

Mission	Camera	Cycles/mm	Avg.	Ground Resolution
1043-1	FWD	65	65	15.3 Feet
1043-2	FWD	65		
1043-1	AFT	67	71	16.0 Feet
1043-2	AFT	75		

Edge scan analysis of random scene edges verifies that the Slave Camera provided better ground resolution than the Master camera. Values from both cameras were similar to those obtained by Mission 1039. Due to the large scale of this photography, the mobile CORN edge targets could not be traced using AFSPPF standard techniques.

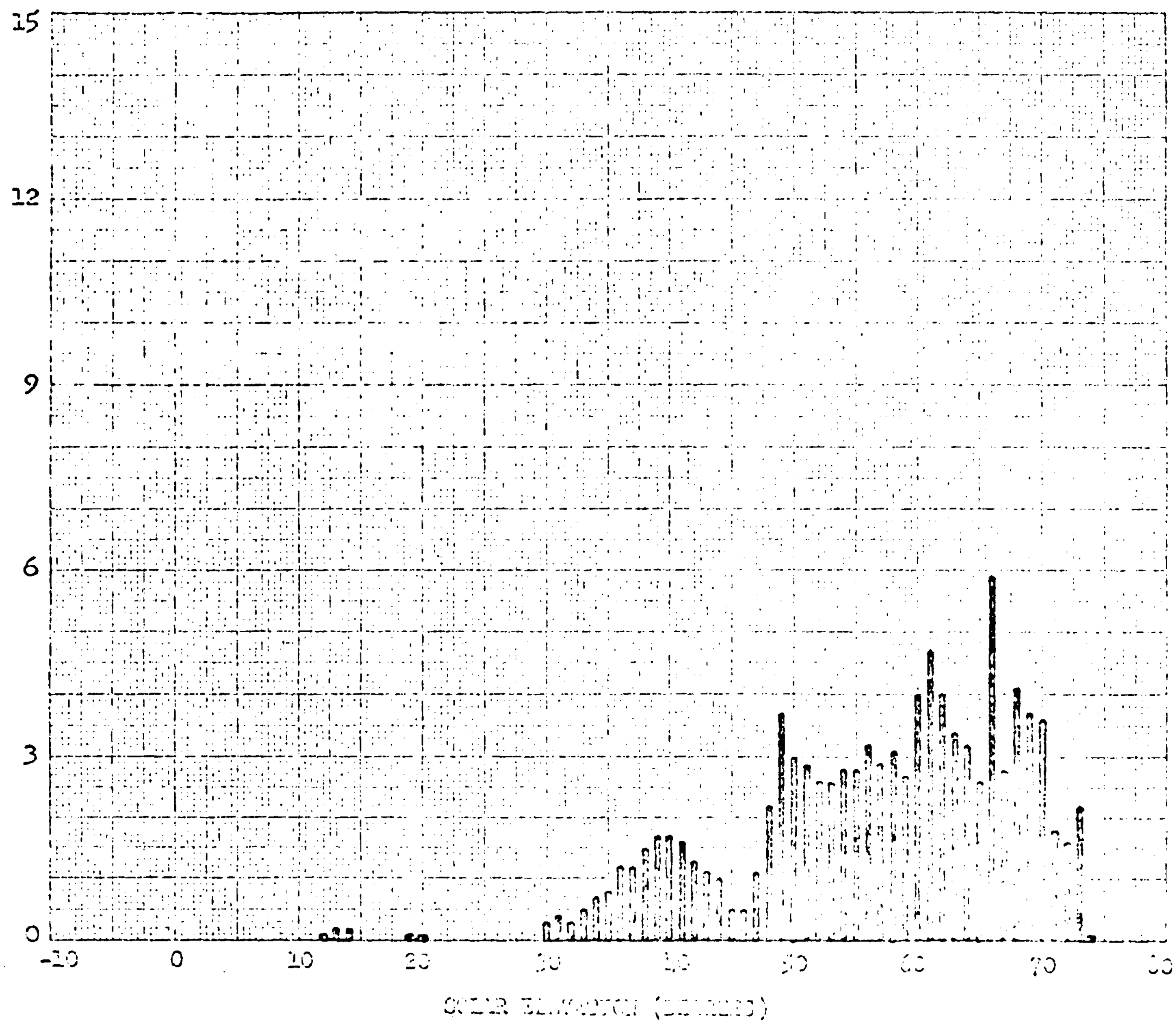
The details of the measurement and computing techniques, targets measured and target locations are fully reported in the evaluation report published by AFSPPF and are not included in this report. These values were determined by using the "Interim MTF/AIM Program" technique.

SECTION 5

PANORAMIC CAMERA EXPOSURE

The slits, filters and launch window for the panoramic cameras were chosen so as to place nominal exposure between the Eastman full and intermediate processing curves. A 0.200 inch slit/Wratten 23A combination was selected for the forward looking unit, and a 0.150 inch slit/Wratten 21 combination for the aft-looking unit, with a recommended launch window between 2145Z and 2245Z. Establishment of 2145Z (1345 PST) as the early cutoff was done because of possible flare off the stellar baffles late in the mission. Actual launch was 2142Z.

The slit/filter combinations were typical of recent summer flights. Considerations in their choice included maximization of northern coverage, minimizing exposure time for IMC tolerance and coverage at lower latitudes with high scene illuminance, and maximization of scene contrast. Frequency distributions of solar elevations and directions actually encountered during photographic operations are shown in Figures 5-1 thru 5-4. Nominal exposure of the cameras, based on actual orbit parameters at the start, middle, and end of the mission are shown as a function of latitude in Figure 5-5 thru 5-10. Generally, exposure was well within the tolerances which produce acceptable photography.



Mission No: 1043-1

Payload No: J-42

Camera No: 200

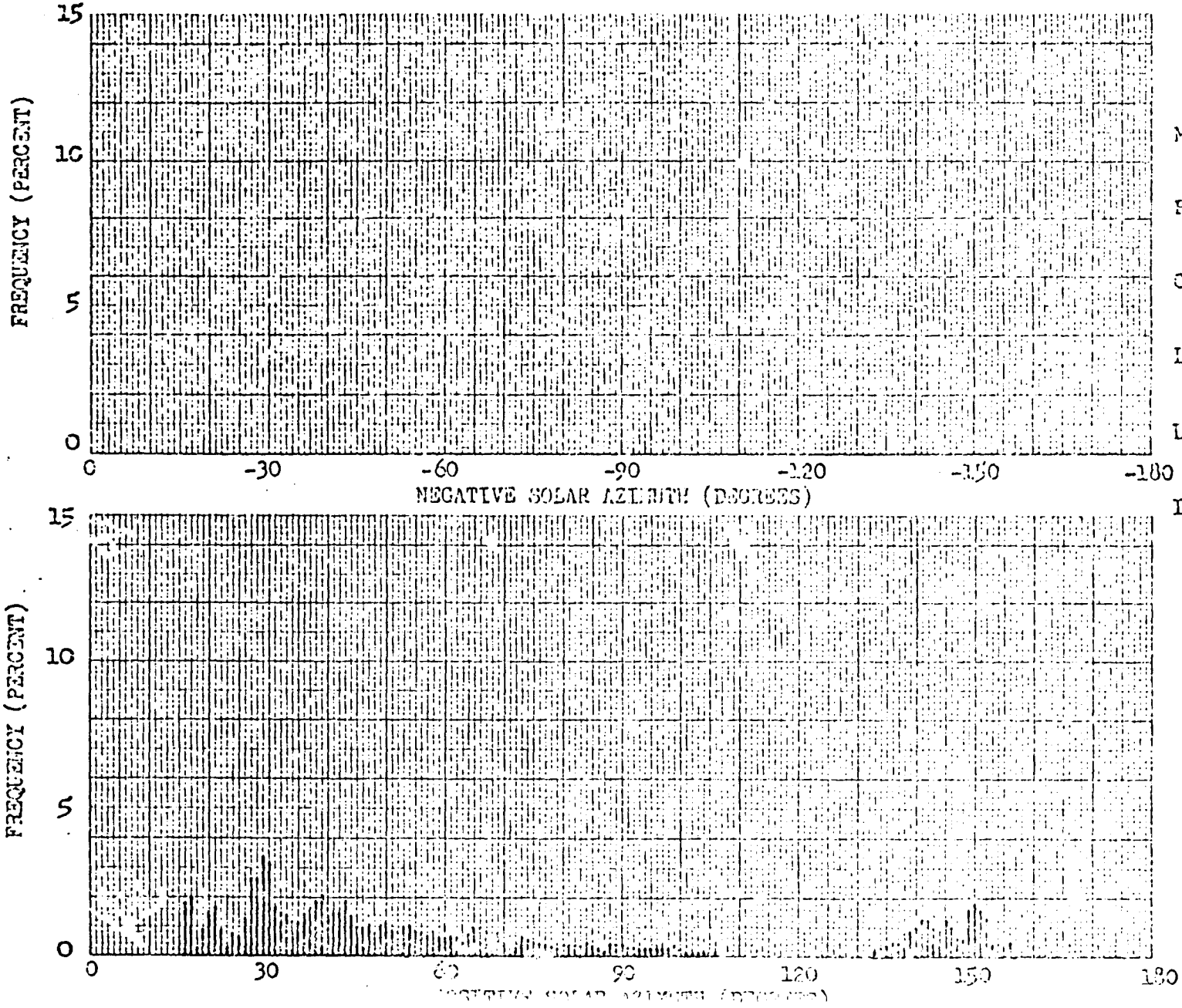
Launch Date: 8/14/67

Launch Time: 2144 Z

Inclination: 80

FIGURE 5-1

SOLAR AZIMUTH FREQUENCY DISTRIBUTION



Mission No: 1043-1

Payload No: J-42

Camera No: 200

Launch Date: 8/14/67

Launch Time: 2114 Z

Inclination: 80

SIGN NOTATION

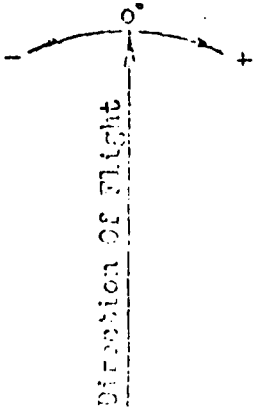


FIGURE 5-2

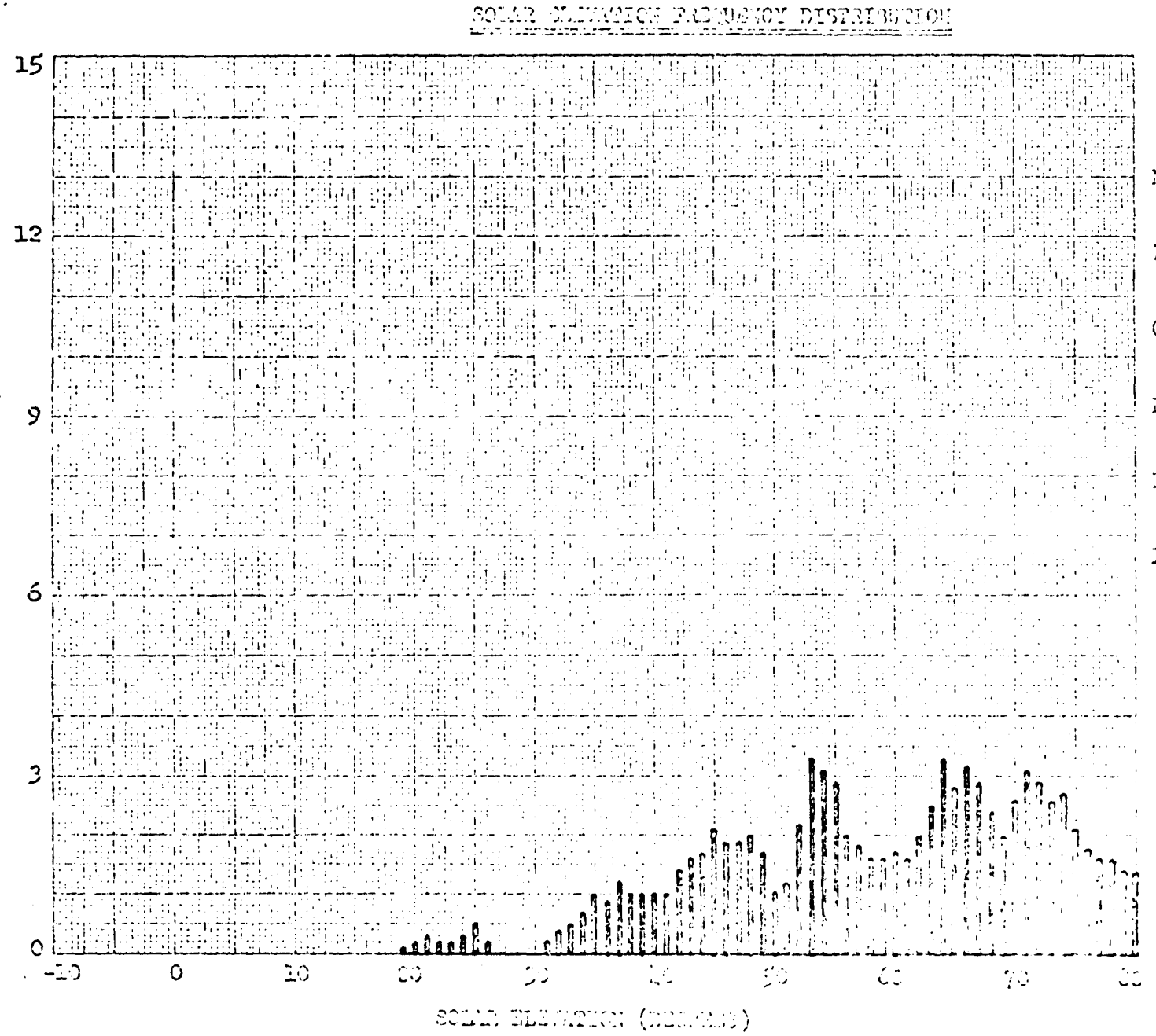
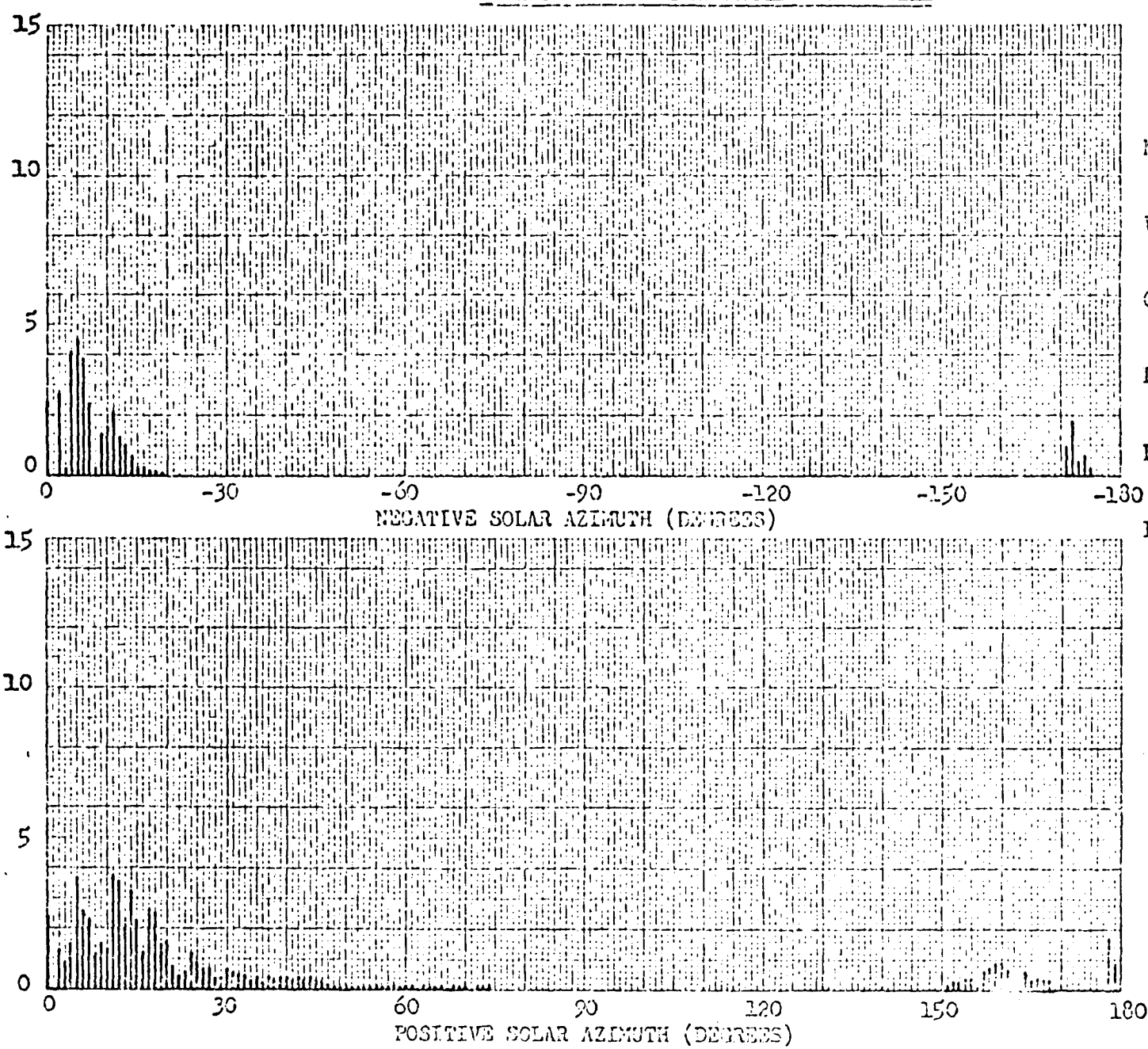

SOLAR ELEVATION FREQUENCY DISTRIBUTION
15
12
9
6
3
0
-10
0
10
20
30
40
50
60
70
80
SOLAR ELEVATION (DEGREES)
Mission No: 1043-2
Payload No: J-42
Camera No: 200
Launch Date: 8/14/67
Launch Time: 2144 Z
Inclination: 80°

FIGURE 5-3

SOLAR AZIMUTH FREQUENCY DISTRIBUTION



Mission No: 1043-2

Payload No: J-42

Camera No: 200

Launch Date: 8/14/67

Launch Time: 2144 Z

Inclination: 80°

SIGN NOTATION

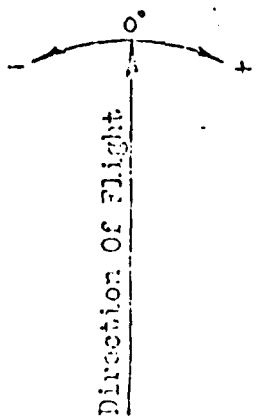
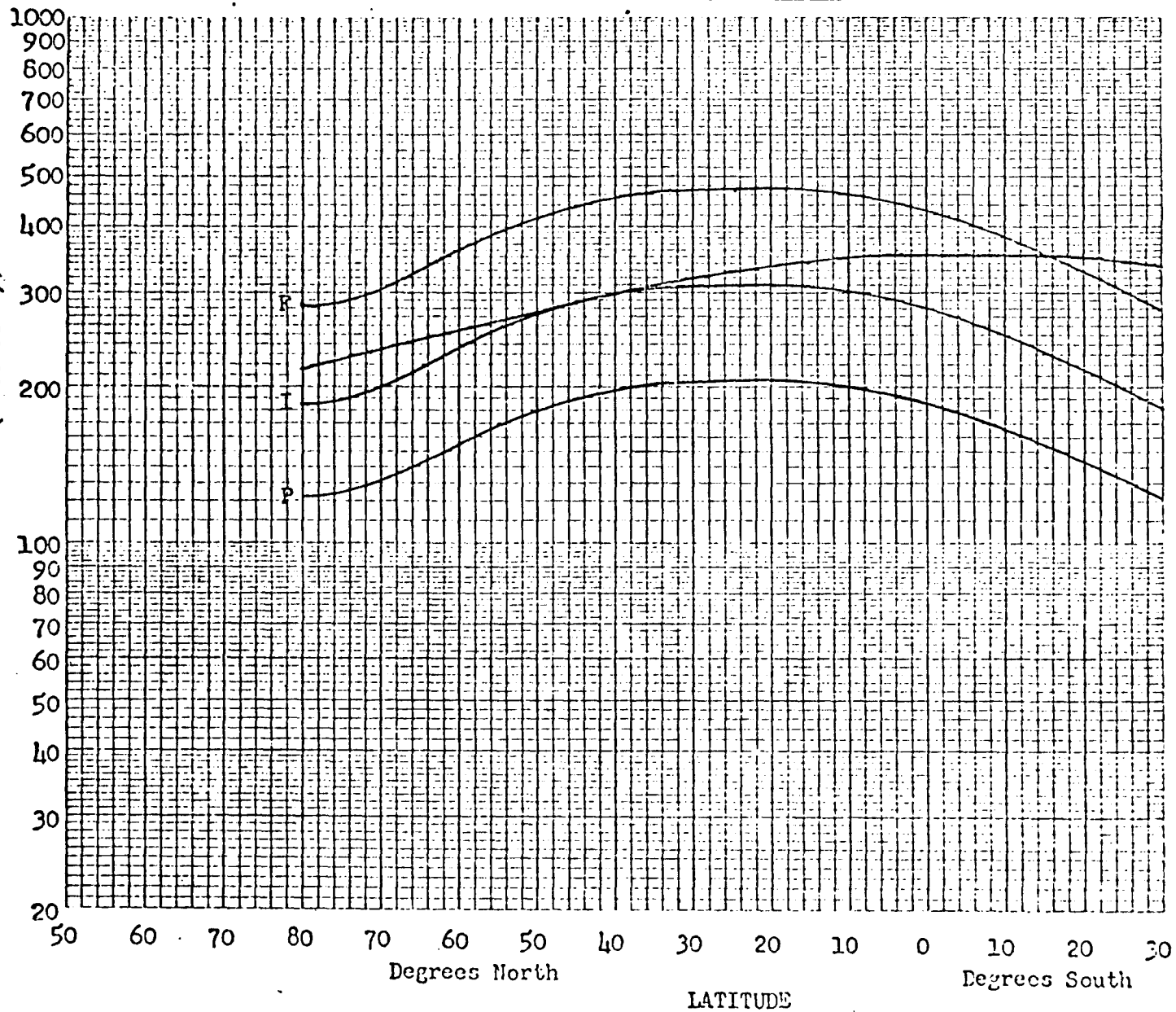


FIGURE 5-4

EXPOSURE POINTS



Mission No: 1043

Payload No: J-42

Camera No: 200

Pass No: 1

Launch Date: 8/7/67

Launch Time: 2144 Z

Slit Width: .200

Filter Type: Wratten 23A

Film Type: 3404

FIGURE 5-5

EXPOSURE POINTS

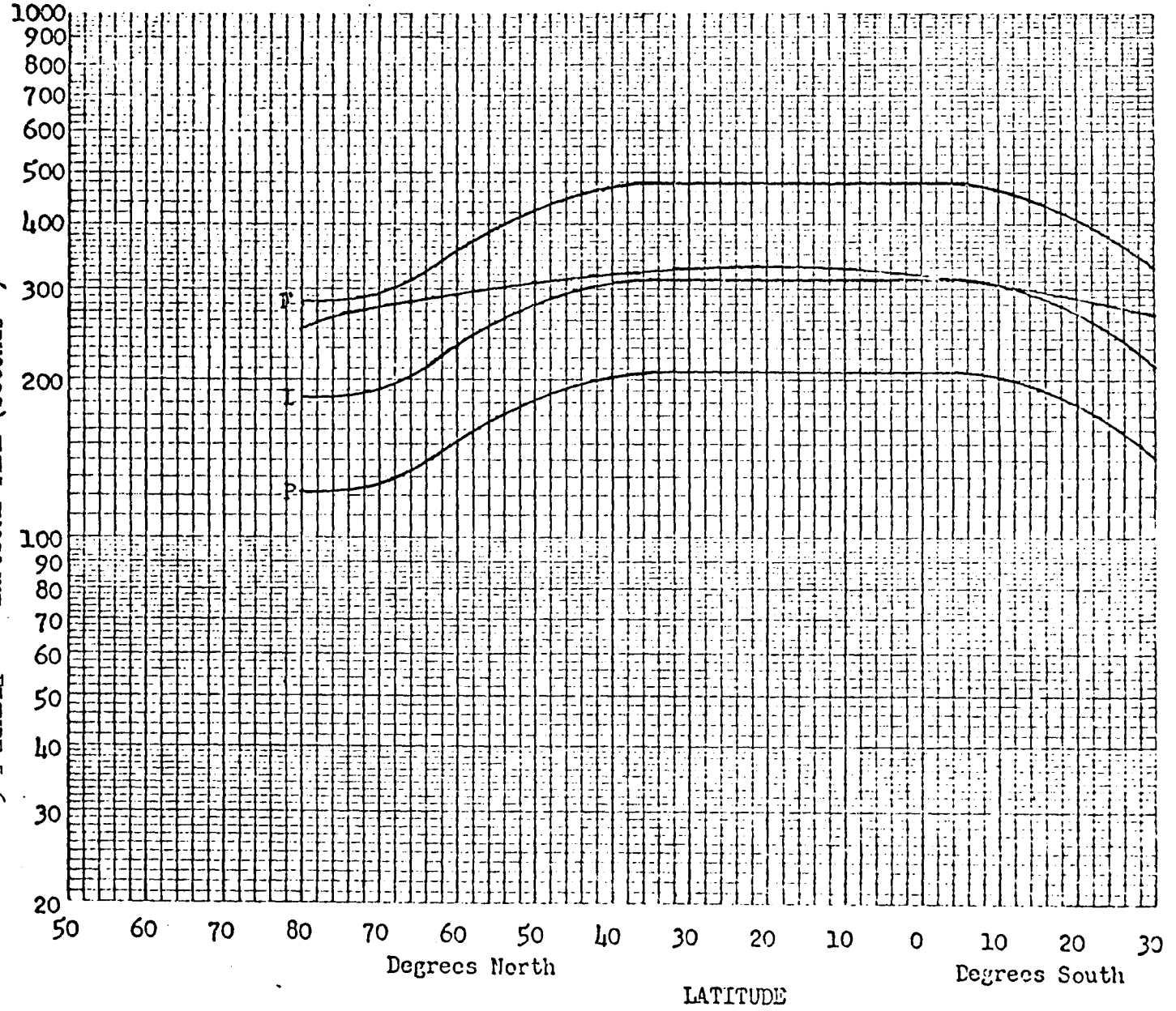


FIGURE 5-6

Mission No: 1043

Payload No: J-42

Camera No: 200

Pass No: 113

Launch Date: 8/7/67

Launch Time: 2144 Z

Slit Width: .200

Filter Type: Wratten 23A

Film Type: 3404

EXPOSURE POINTS

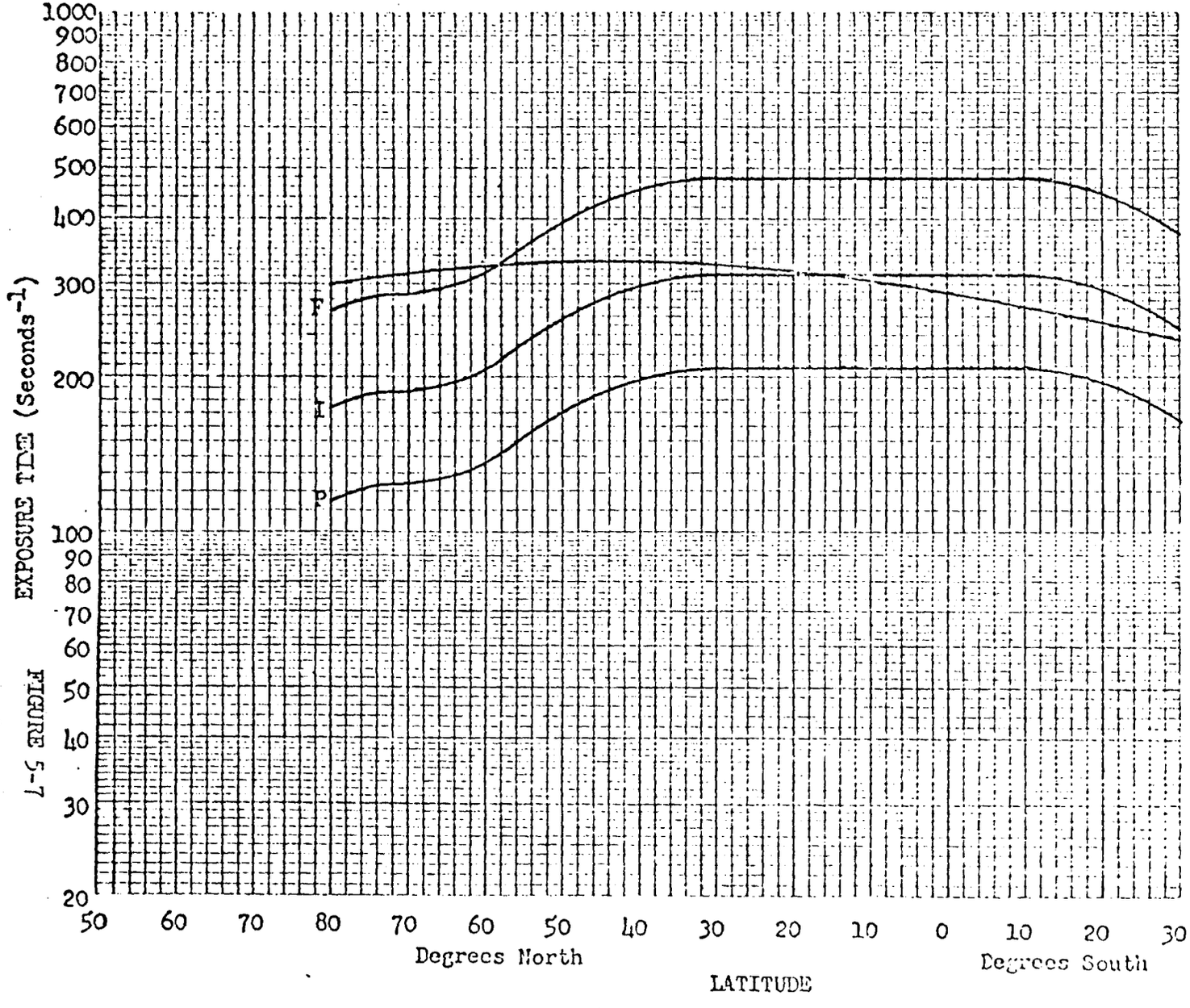


FIGURE 5-7

Mission No: 1043

Payload No: J-42

Camera No: 200

Pass No: 240

Launch Date: 8/7/67

Launch Time: 2144 Z

Slit Width: .200

Filter Type: Wratten 23A

Film Type: 3404

EXPOSURE POINTS

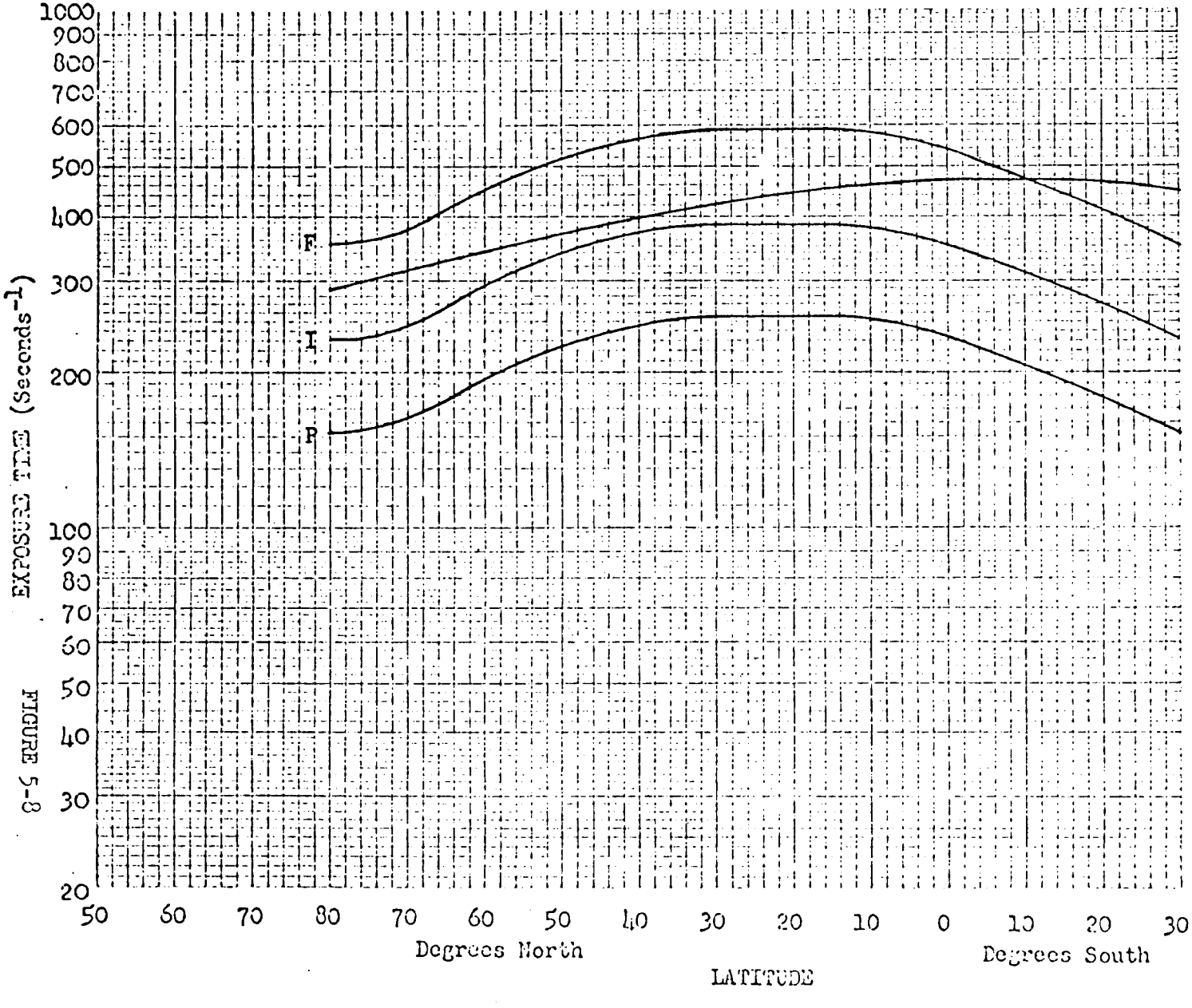


FIGURE 5-8

Mission No: 1043

Payload No: J-42

Camera No: 201

Pass No: 1

Launch Date: 8/7/67

Launch Time: 2144 Z

Slit Width: .150

Filter Type: Wratten 21

Film Type: 3404

[redacted]

[redacted]

[redacted]

EXPOSURE POINTS

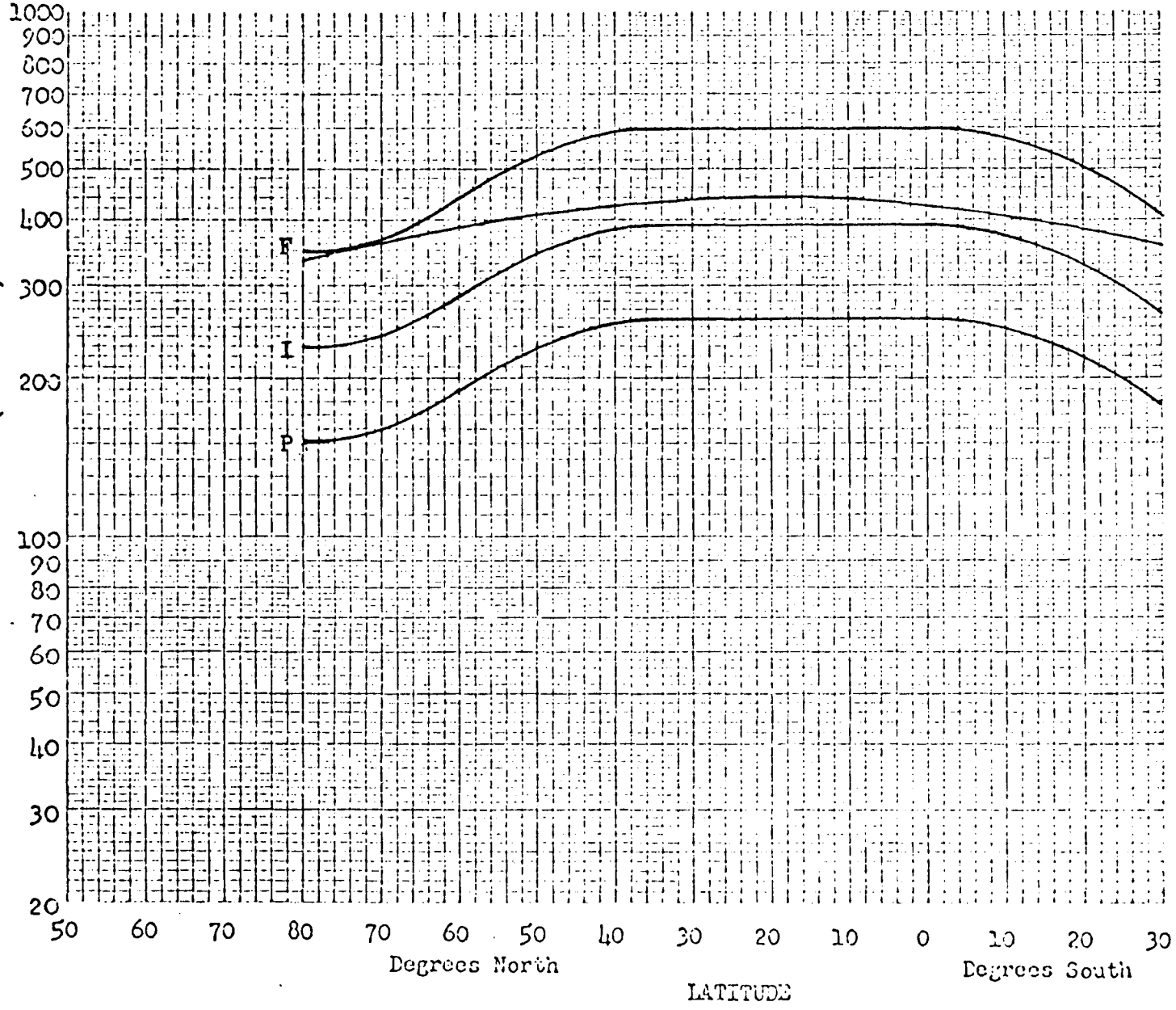


FIGURE 5-9

Mission No: 1043

Payload No: J-42

Camera No: 201

Pass No: 113

Launch Date: 8/7/67

Launch Time: 2144 Z

Slit Width: .150

Filter Type: Wratten 21

Film Type: 3404

[redacted]

[redacted]

[redacted]

EXPOSURE POINTS

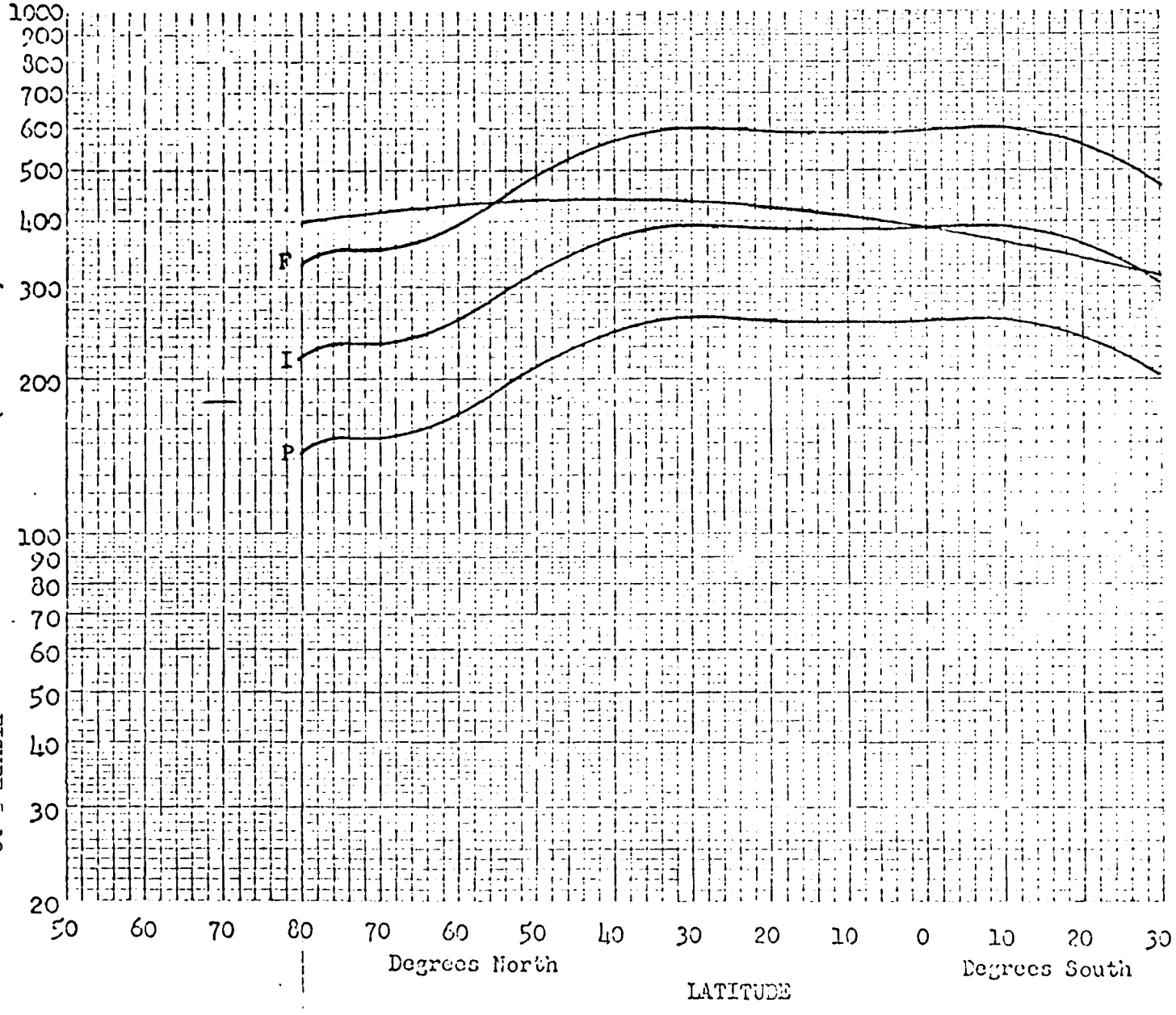


FIGURE 5-10

Mission No: 1043

Payload No: J-42

Camera No: 201

Pass No: 240

Launch Date: 8/7/67

Launch Time: 2144 Z

Slit Width: .150

Filter Type: Wratten 21

Film Type: 3404

[redacted]

[redacted]

[redacted]

SECTION 6

DIFFUSE DENSITY MEASUREMENTS

The diffuse density measurements made by AFSPPF were processed by computer at A/P to permit analysis of the density ranges encountered at the three processing levels. A study of sorting techniques has shown that no absolute method is available to separate the density values. The sorting technique selected uses arbitrary base-plus-fog density values where measurements up to 0.09 density are considered as having received Primary processing, 0.10 to 0.17 as Intermediate, and above 0.17 density as Full. The percentage of original negative that was processed at each level, based on the computer sort, is tabulated below with the predicted and reported processing percentages.

Mission	Camera		Primary	Intermediate	Full	Transition
1043-1	FWD	Predicted	0	20	80	-
		Reported	6	14	68	12
		Computed	4	26	70	-
1043-1	AFT	Predicted	0	3	97	-
		Reported	6	8	74	12
		Computed	2	27	71	1
1043-2	FWD	Predicted	1	19	80	-
		Reported	2	11	73	14
		Computed	1	39	60	-
1043-2	AFT	Predicted	0	7	93	-
		Reported	5	16	63	16
		Computed	1	37	62	-

A summary of the processing and exposure analysis is shown in Table 6-1. The terrain D-Min criteria (range) for proper exposure and processing is 0.40 to 0.90 density units. The area measured for D-Min is selected subjectively and is not necessarily the absolute D-Min in the photography.

A density range chart, Figure 6-1, is included in this report. Data prior to mission 1041 is included in the A/P final reports for Missions 1031 and 1040.

These charts are produced from the same density measurements previously mentioned in this section. The computer produced the mean, median and range figures for the various processing levels used. The chart includes the number of frames (samples) in which the density measurements were made. These measurements are made on approximately every tenth frame throughout the mission.

MISSION 1043-1 INSTR - FWD 1/9/68 PROCESSING AND EXPOSURE ANALYSIS

PROCESS LEVEL	SAMPLE SIZE	UNDER EXPOSED	UNDER PROCESSED	CORRECT EXP&PROC	OVER PROCESSED	OVER EXPOSED
PRIMARY	10	0 PC	0 PC	90 PC	0 PC	10 PC
INTERMEDIATE	66	2 PC	15 PC	65 PC	15 PC	3 PC
FULL	175	28 PC	0 PC	67 PC	5 PC	0 PC
ALL LEVELS	251	20 PC	4 PC	67 PC	8 PC	1 PC

MISSION 1043-1 INSTR - AFT 1/9/68 PROCESSING AND EXPOSURE ANALYSIS

PROCESS LEVEL	SAMPLE SIZE	UNDER EXPOSED	UNDER PROCESSED	CORRECT EXP&PROC	OVER PROCESSED	OVER EXPOSED
PRIMARY	4	0 PC	0 PC	50 PC	0 PC	50 PC
INTERMEDIATE	71	0 PC	7 PC	69 PC	18 PC	6 PC
FULL	187	23 PC	0 PC	73 PC	4 PC	0 PC
ALL LEVELS	262	16 PC	2 PC	71 PC	8 PC	2 PC

MISSION 1043-2 INSTR - FWD 1/9/68 PROCESSING AND EXPOSURE ANALYSIS

PROCESS LEVEL	SAMPLE SIZE	UNDER EXPOSED	UNDER PROCESSED	CORRECT EXP&PROC	OVER PROCESSED	OVER EXPOSED
PRIMARY	1	0 PC	0 PC	100 PC	0 PC	0 PC
INTERMEDIATE	72	0 PC	14 PC	72 PC	14 PC	0 PC
FULL	114	35 PC	0 PC	62 PC	3 PC	0 PC
ALL LEVELS	187	21 PC	5 PC	66 PC	7 PC	0 PC

MISSION 1043-2 INSTR - AFT 1/9/68 PROCESSING AND EXPOSURE ANALYSIS

PROCESS LEVEL	SAMPLE SIZE	UNDER EXPOSED	UNDER PROCESSED	CORRECT EXP&PROC	OVER PROCESSED	OVER EXPOSED
PRIMARY	5	0 PC	0 PC	60 PC	0 PC	40 PC
INTERMEDIATE	90	0 PC	29 PC	60 PC	11 PC	0 PC
FULL	152	29 PC	0 PC	67 PC	4 PC	0 PC
ALL LEVELS	247	18 PC	11 PC	64 PC	6 PC	1 PC

PROCESS LEVEL	BASE & FOG	UNDER EXPOSED	UNDER PROCESSED	CORRECT EXP&PROC	OVER PROCESSED	OVER EXPOSED
PRIMARY	0.01-0.09	0.01-0.13	0.14-0.39	0.40-0.90	---------	0.91 AND UP
INTERMED	0.10-0.17	0.01-0.20	0.21-0.39	0.40-0.90	0.91-1.34	1.35 AND UP
FULL	0.18 AND UP	0.01-0.39	---------	0.40-0.90	0.91-1.69	1.70 AND UP

TABLE 6-1

J MISSION DENSITY RANGES

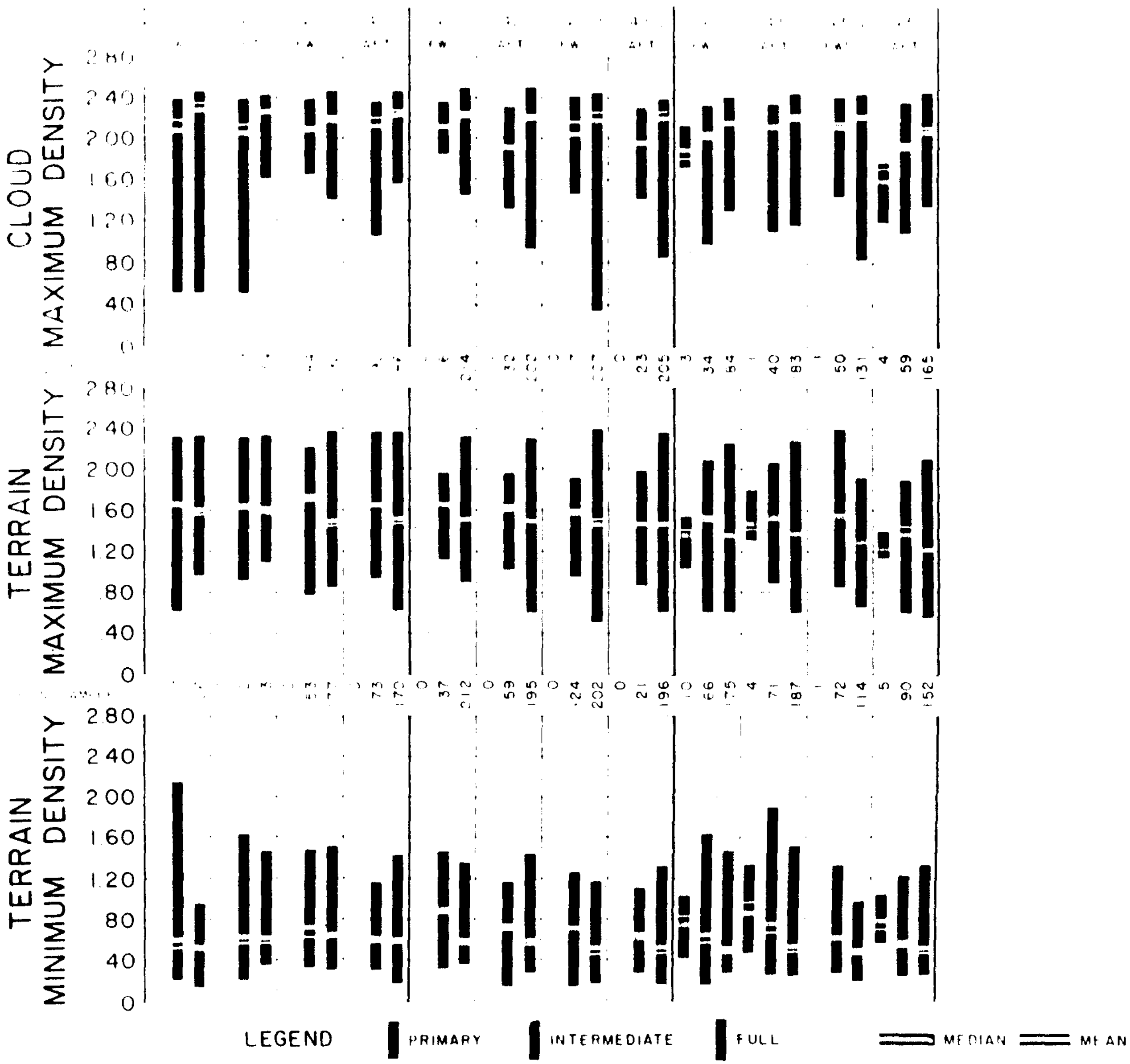


FIGURE 6-1

SECTION 7

VEHICLE ATTITUDE

The vehicle attitude errors for both Mission 1043-1 and 1043-2 were derived from the reduction of the Stellar camera photography. This attitude data is supplied to A/P by NPIC.

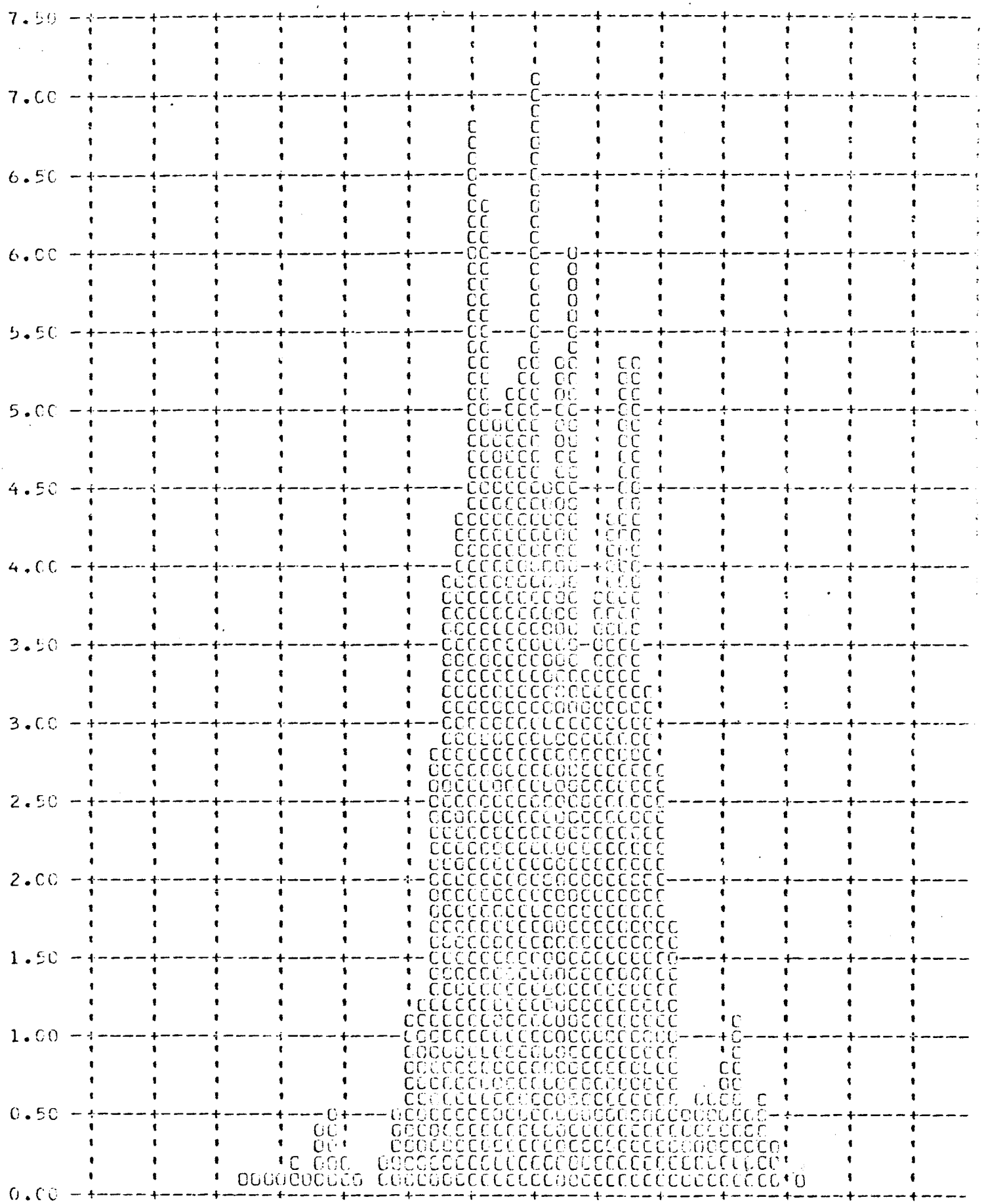
The attitude errors for each frame and the attitude control rates are calculated at the A/P computer facility. The computer also plots the frequency distribution of the rates and errors. Figures 7-1 through 7-6 show these distributions for Mission 1043-1 and Figures 7-7 through 7-12 for Mission 1043-2.

The summary table below lists the maximum attitude errors and rates that were experienced during 90% of the FWD camera photographic operations, excluding the first six frames of each operation, and the total range of the errors and rates.

	Mission 1043-1		Mission 1043-2	
Value	90%	Range	90%	Range
Pitch Error (°)	0.28	-0.36 to +0.52	0.30	-0.19 to +0.50
Roll Error (°)	0.23	-0.32 to +0.40	0.34	-0.50 to +0.26
Yaw Error (°)	3.11	-3.20 to +0.40	2.73	-2.95 to +0.40
Pitch Rate (°/hr.)	23.87	-38 to +60	29.16	-34 to +72
Roll Rate (°/hr.)	22.03	-90 to +55	31.58	-90 to +65
Yaw Rate (°/hr.)	41.54	-96 to +15	47.91	-98 to +38

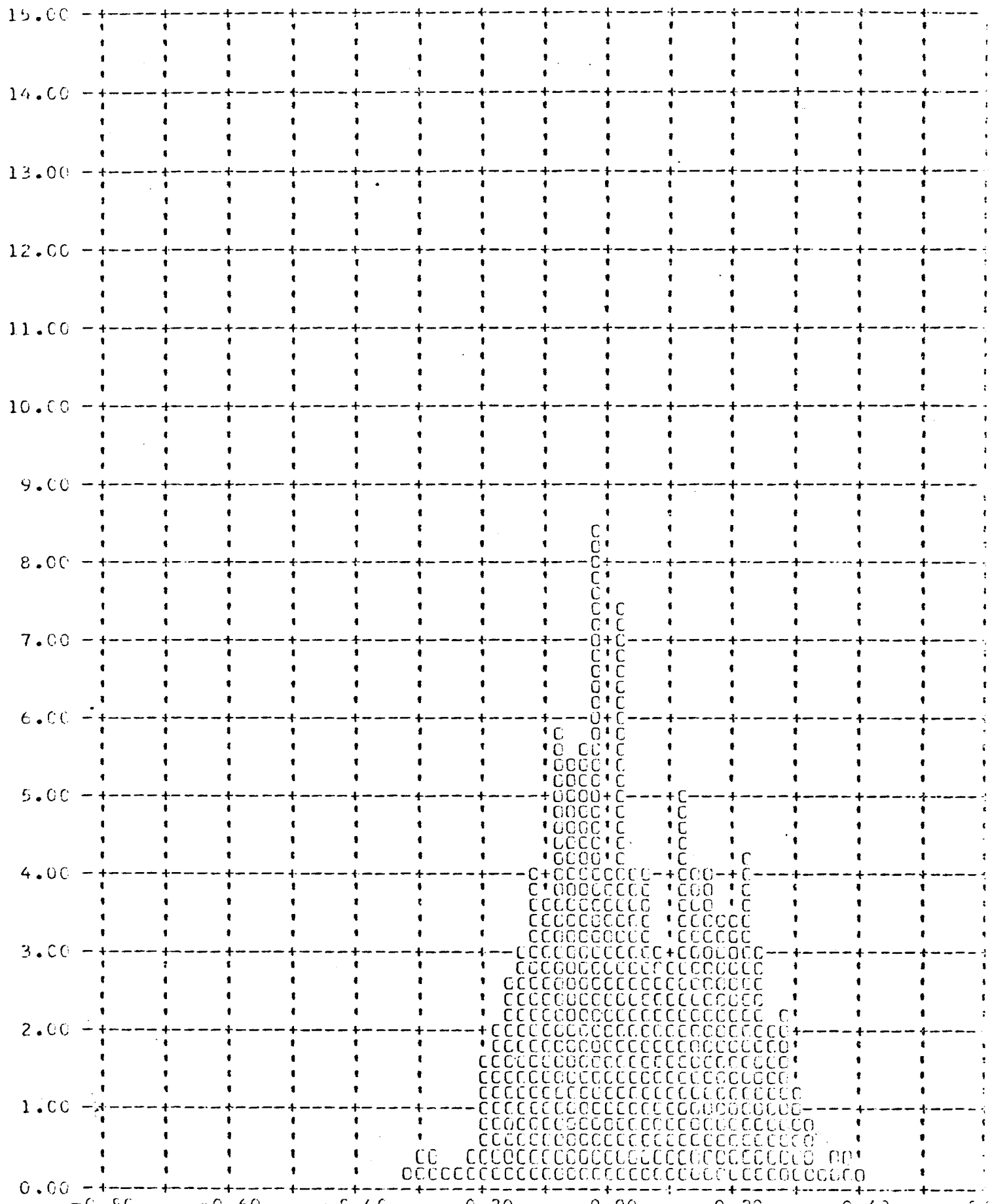
The performance of the attitude control system is comparable to the control systems used on recent missions. The panoramic photography was not degraded by the attitude control system.

Y PITCH ANGLE ERROR - DEGREES (X) VERSUS FREQUENCY - PERCENT (Y)

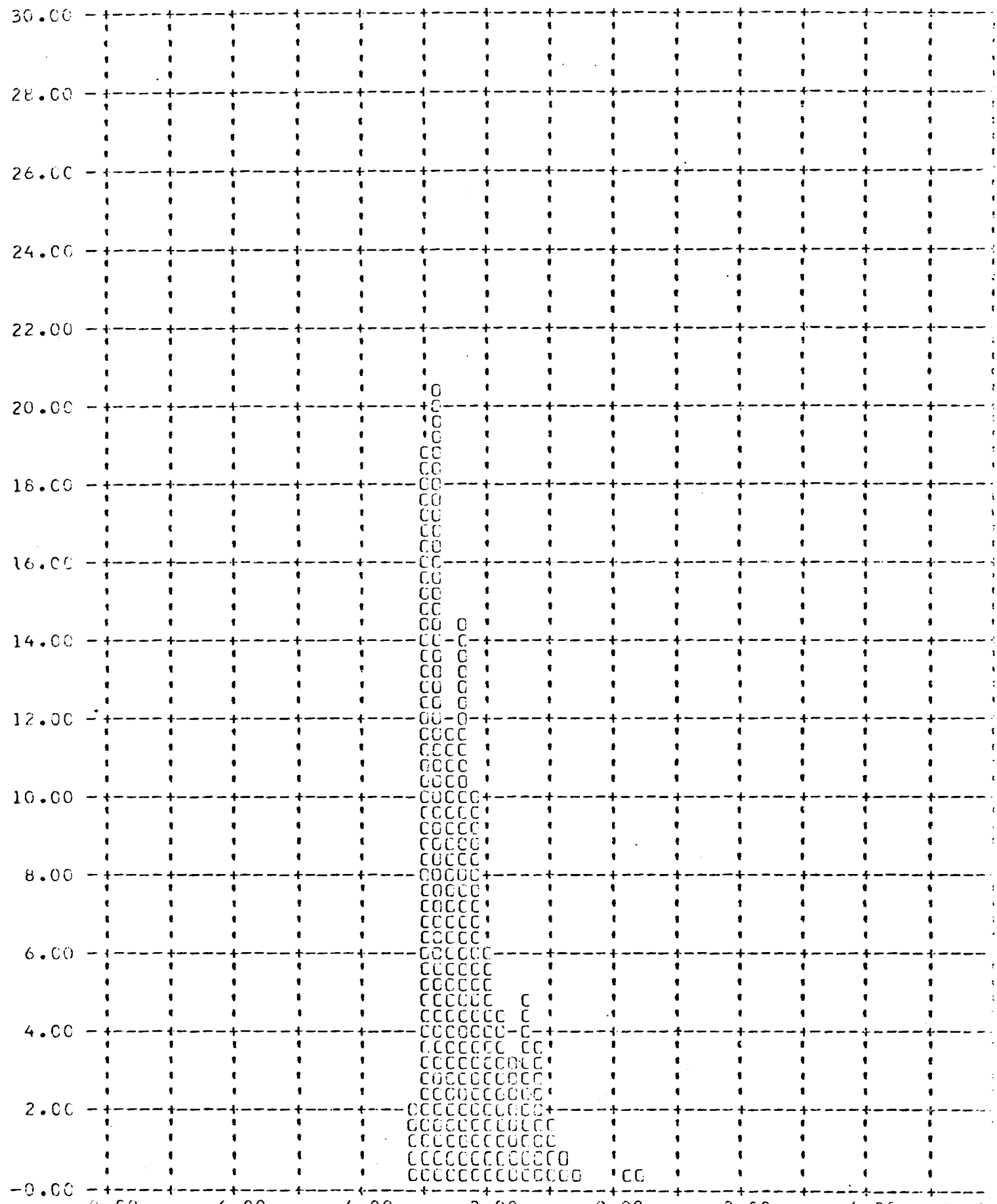


MISSION 1043A1 ~~TOP SECRET~~ C[redacted] - CONTROL NO. [redacted]
FRAMES 1-8 OF EACH CP OMITTED 90 PERCENT = 0.

Y ROLL ANGLE ERROR - DEGREES (X) VERSUS FREQUENCY - PERCENT (Y)

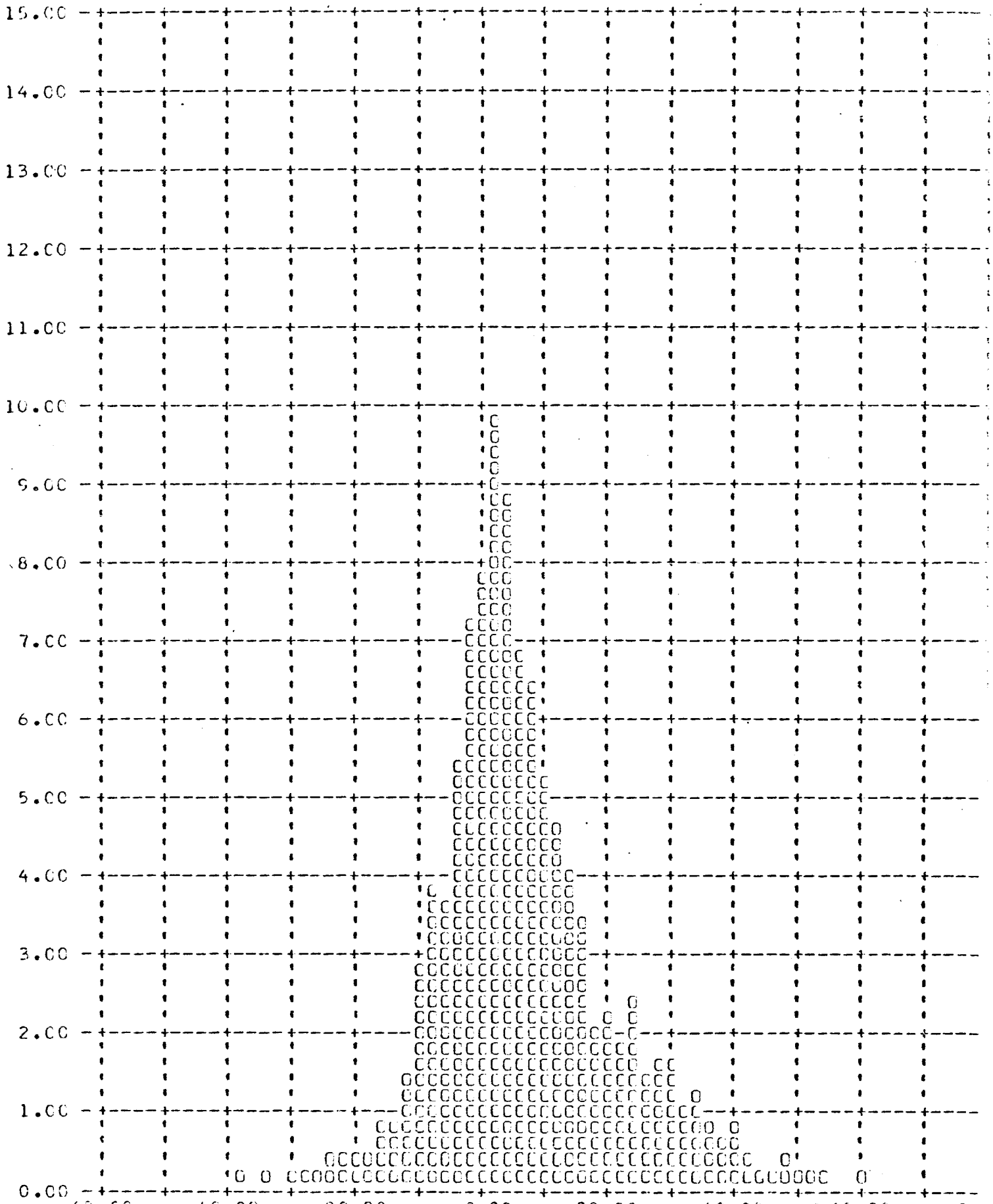


Y YAW ANGLE ERROR - DEGREES (X) VERSUS FREQUENCY - PERCENT (Y)

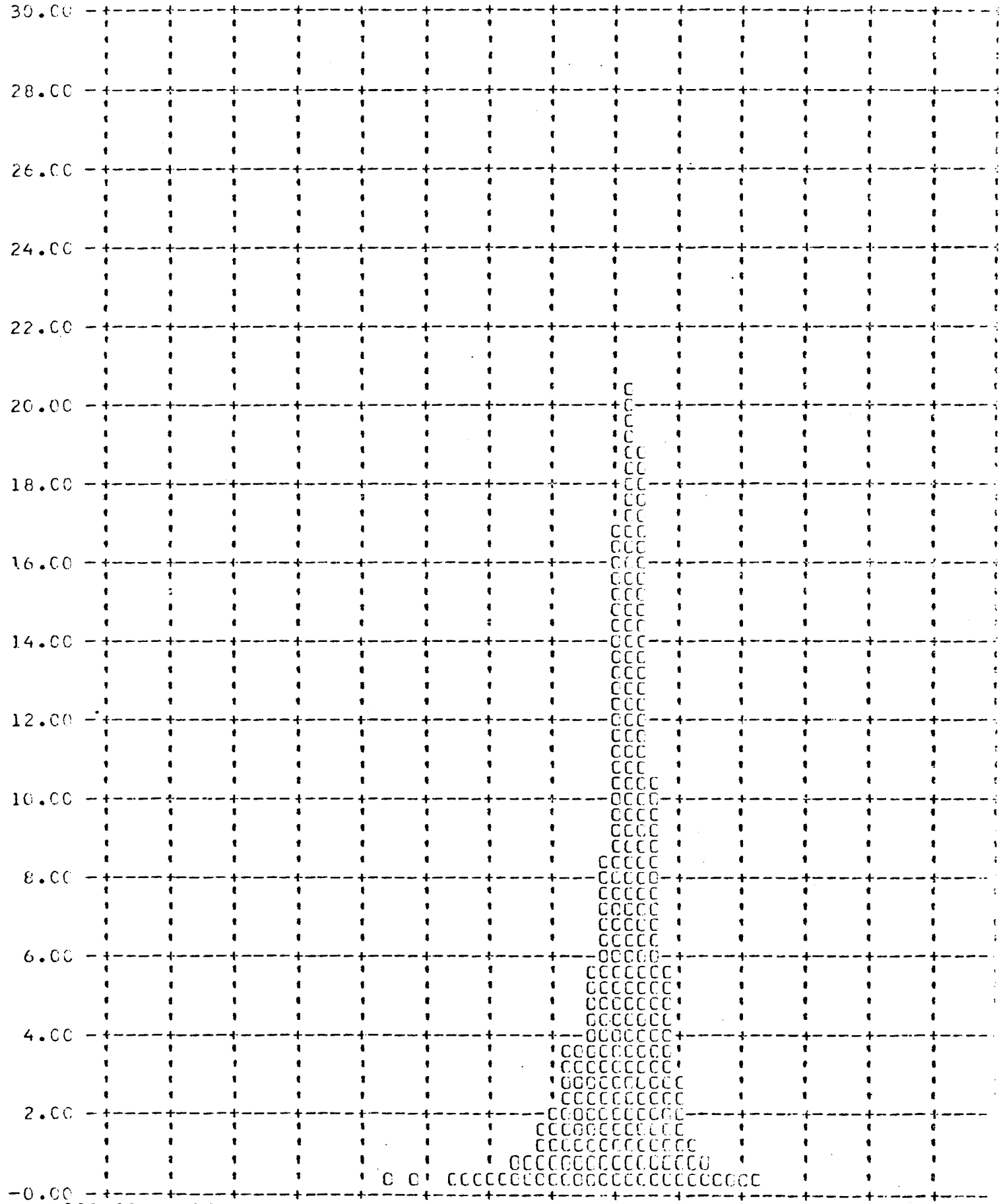


FRAMES 1-6 OF EACH CP OMITTED 90 PERCENT = 23.

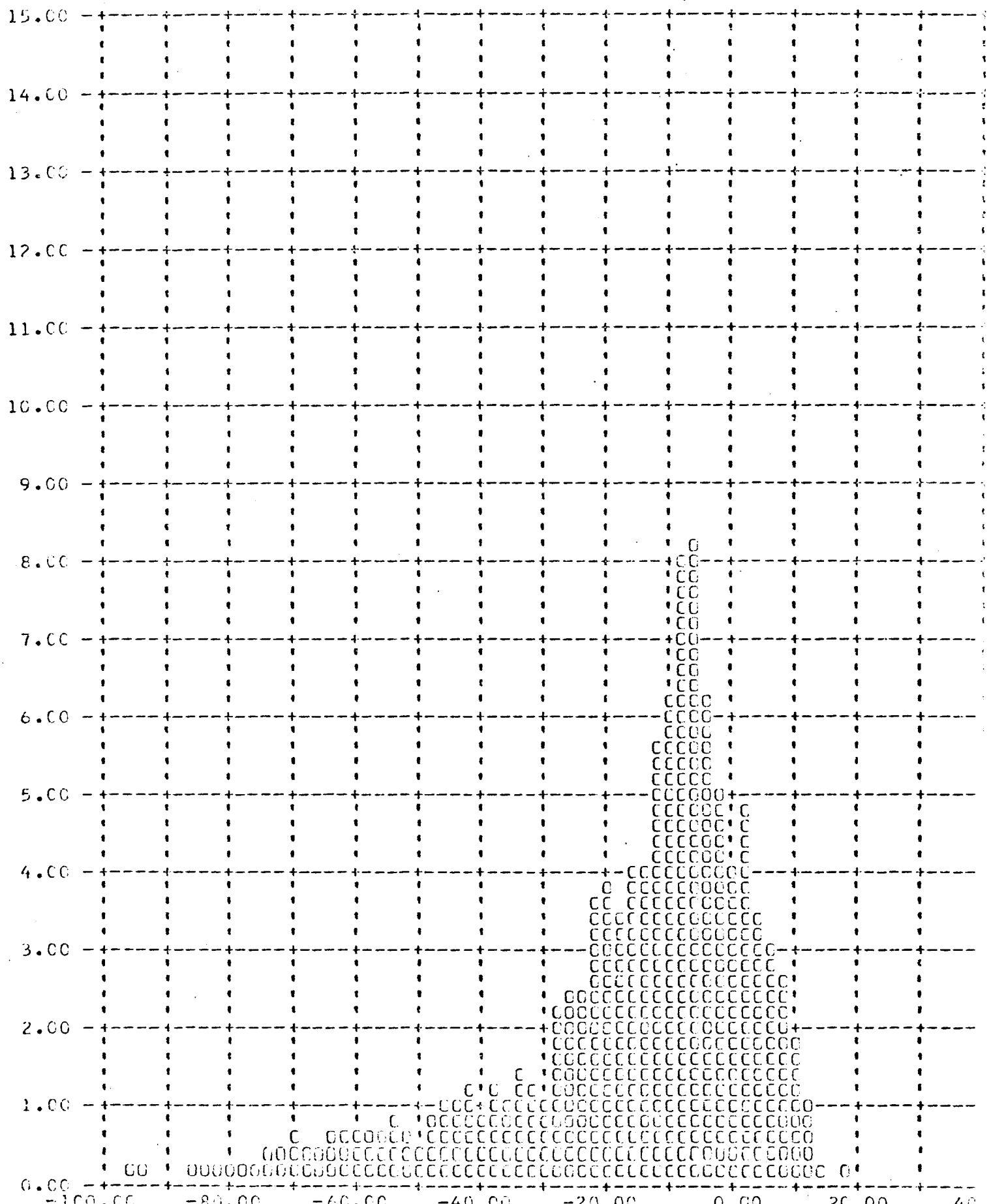
Y PITCH RATE ERROR - DEG/HOUR (X) VERSUS FREQUENCY - PERCENT (Y)



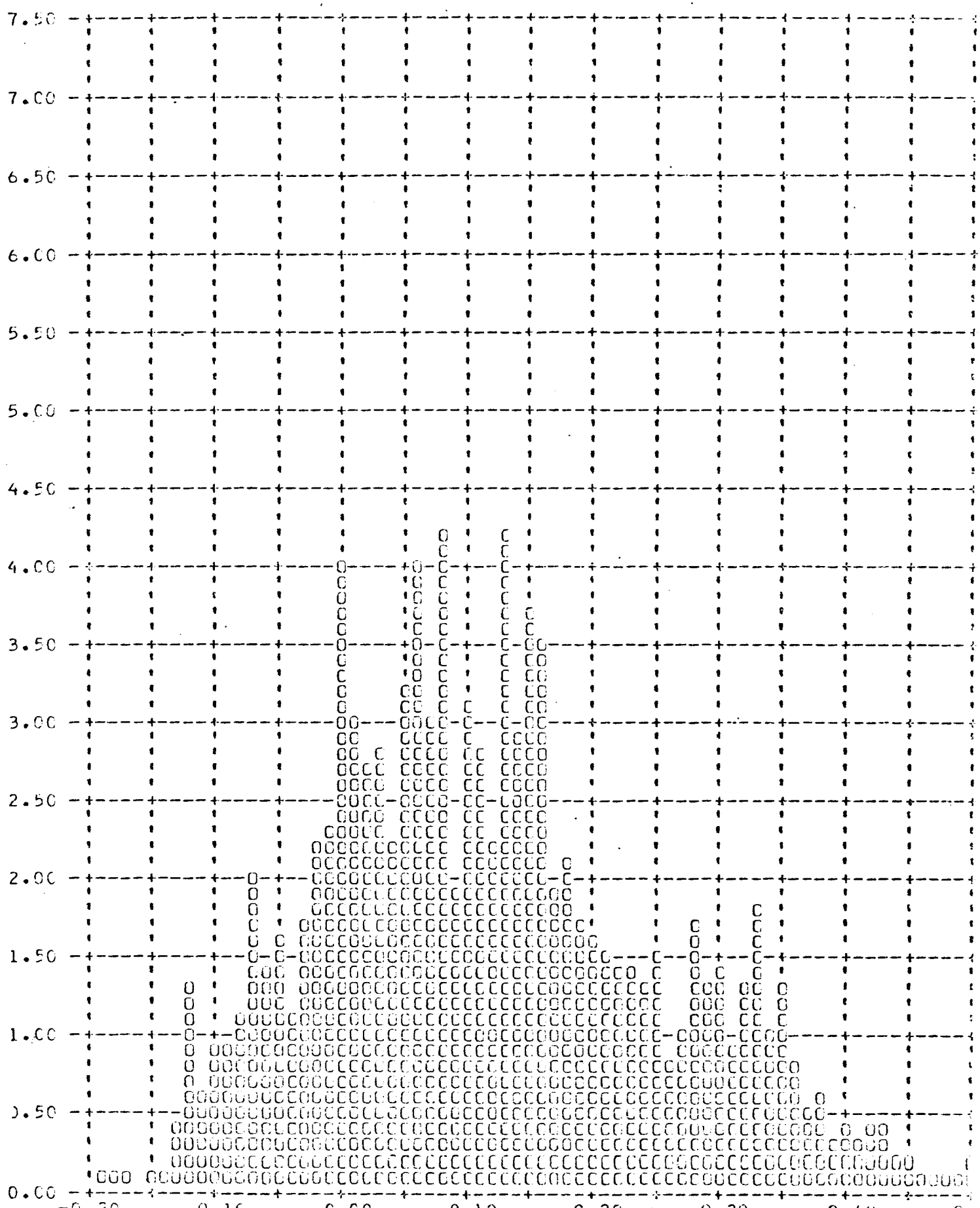
Y ROLL RATE ERROR - DEG/HOUR (X) VERSUS FREQUENCY - PERCENT (Y)



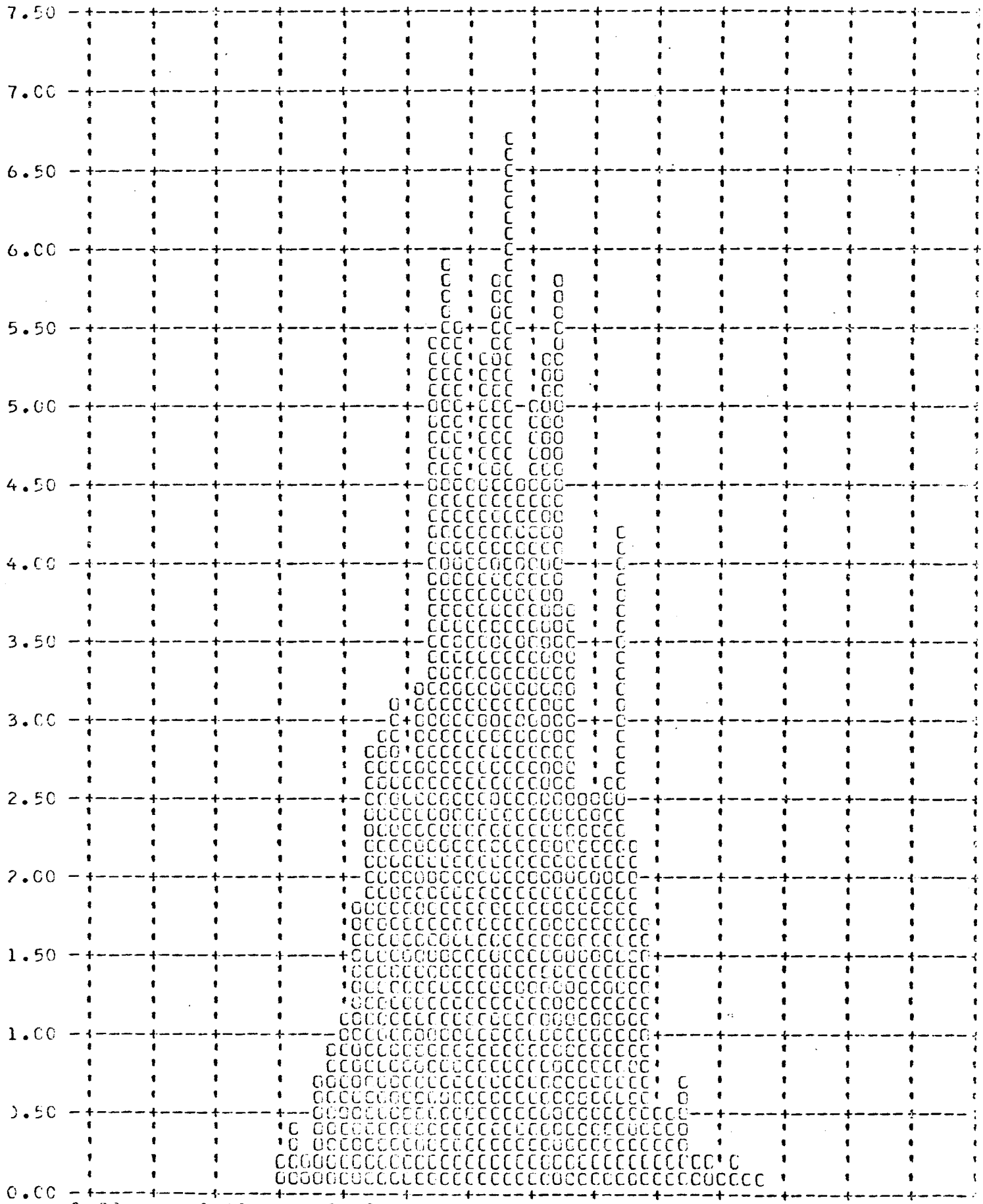
Y YAW RATE ERROR - DEG/HOUR (X) VERSUS FREQUENCY - PERCENT (Y)



Y PITCH ANGLE ERROR - DEGREES (X) VERSUS FREQUENCY - PERCENT (Y)

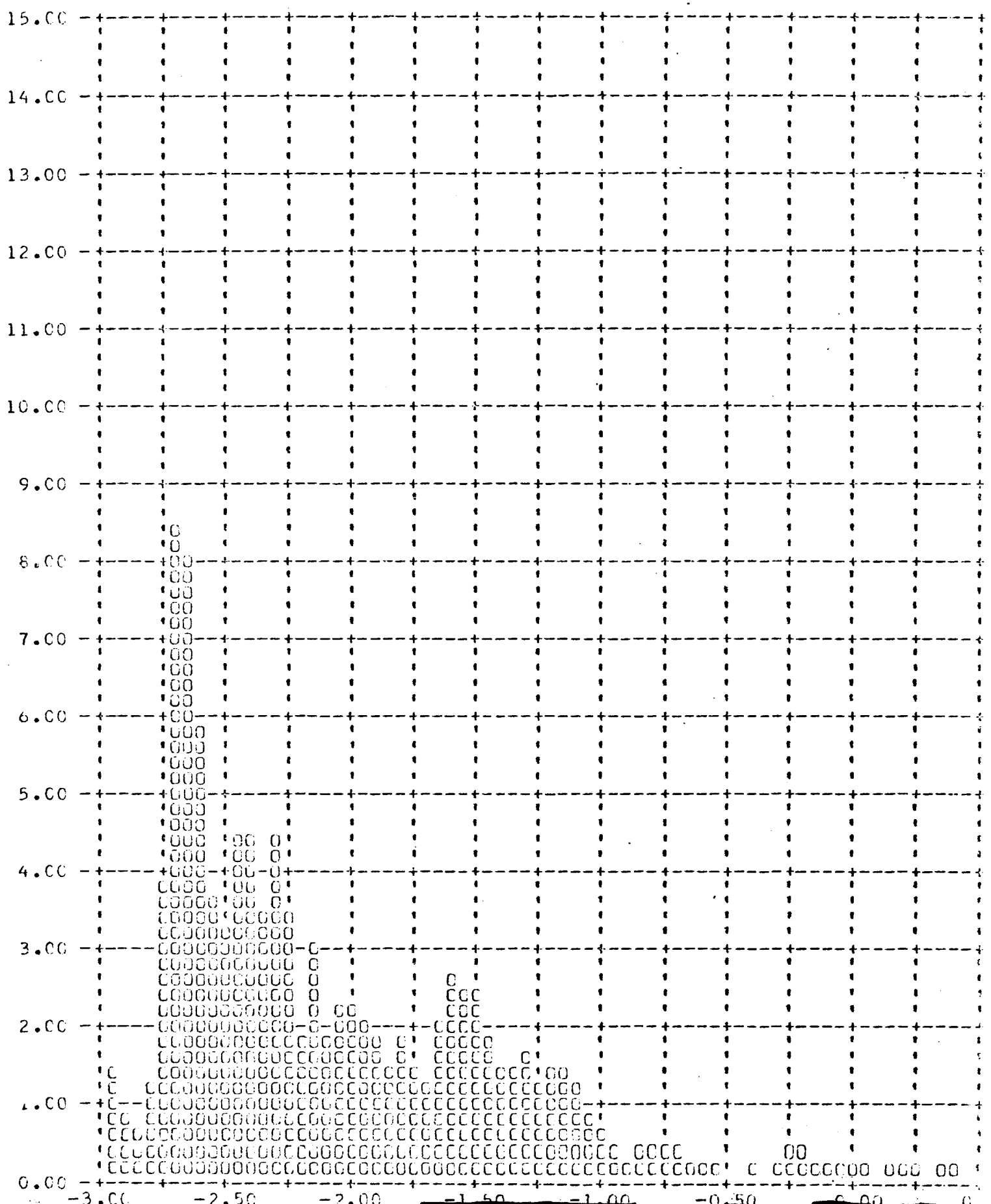


Y ROLL ANGLE ERROR - DEGREES (X) VERSUS FREQUENCY - PERCENT (Y)



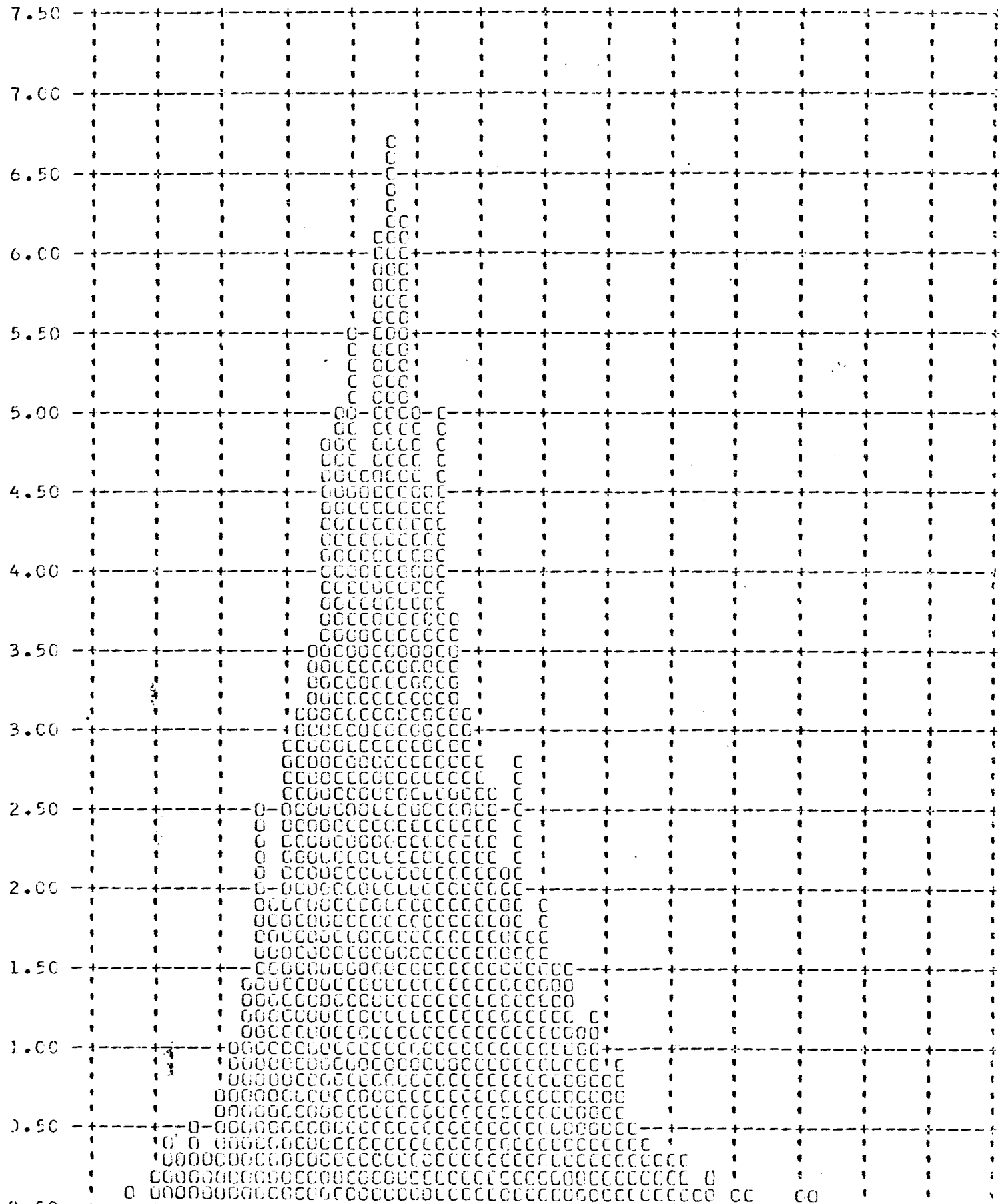
FRAMES 1-6 OF EACH CP OMITTED 90 PERCENT = 2.7

Y YAW ANGLE ERROR - DEGREES (X) VERSUS FREQUENCY - PERCENT (Y)



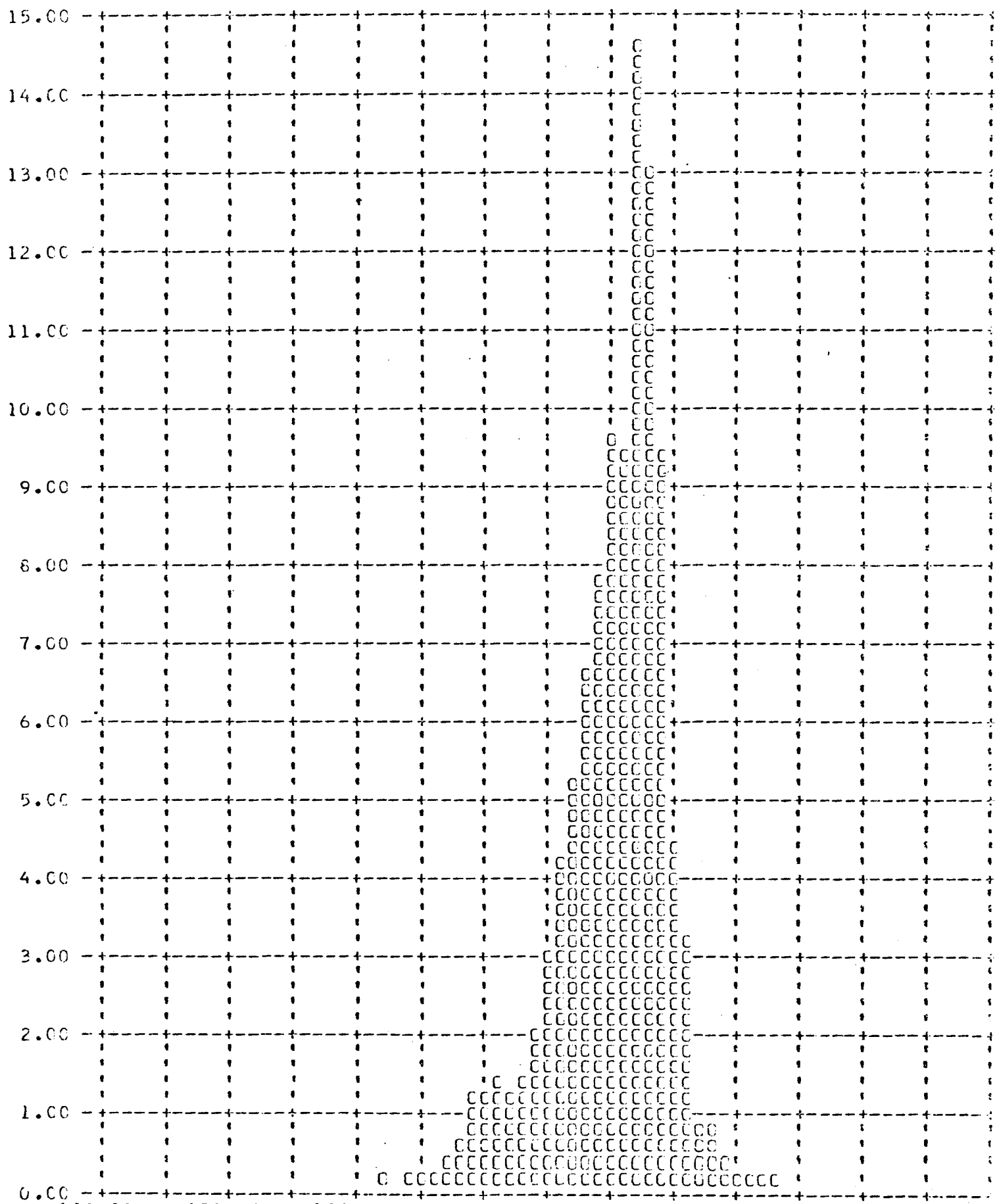
FRAMES 1-6 OF EACH CP OMITTED 90 PERCENT = 29.1

Y PITCH RATE ERROR - DEG/HOLR (X) VERSUS FREQUENCY - PERCENT (Y)

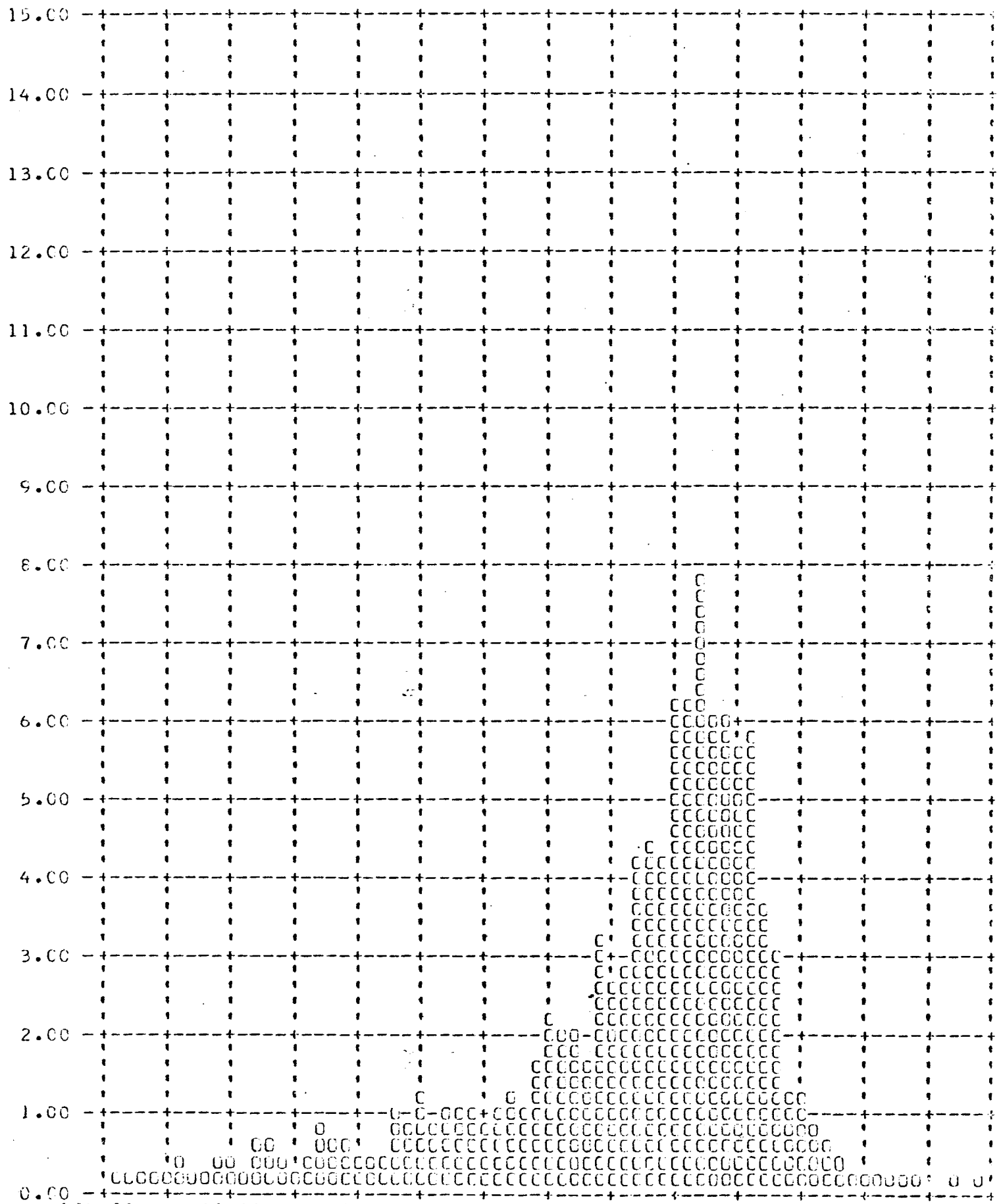


MISSION 1043B1 ~~TOP SECRET~~ C[redacted] - CONTROL NO. [redacted]
FRAMES 1-6 OF EACH CP OMITTED 90 PERCENT = 31.5

Y ROLL RATE ERROR - DEG/HOUR (X) VERSUS FREQUENCY - PERCENT (Y)



Y YAW RATE ERROR - DEG/HOUR (X) VERSUS FREQUENCY - PERCENT (Y)



SECTION 8

IMAGE SMEAR ANALYSIS

The frame correlation tape supplied to A/P by NPIC contains the binary time word of each frame of photography. A computer program has been assembled at A/P which calculates the exposure time of each frame and compares the camera cycle rate with the ephemeris to calculate the FMC mismatch (Section 3), which is then combined with the vehicle attitude error and rate values of each frame and the crab error caused by earth rotation at the latitude of each frame. The program outputs the total along-track and cross-track IMC error and the limit of ground resolution that can be acquired by a camera regardless of focal length and system capabilities.

The computer rejects the first six frames of all operations as the FMC large error induced by camera start-up is not representative of the overall system operations. The frequency distribution of the FMC errors and resolution limits are computer plotted and are shown in Figures 8-1 through 8-12.

The summary table 8-1 presents the maximum FMC ratio errors and resolution limits that existed during 90% of the photographic operations, and the total range of values during all operations that were computed.

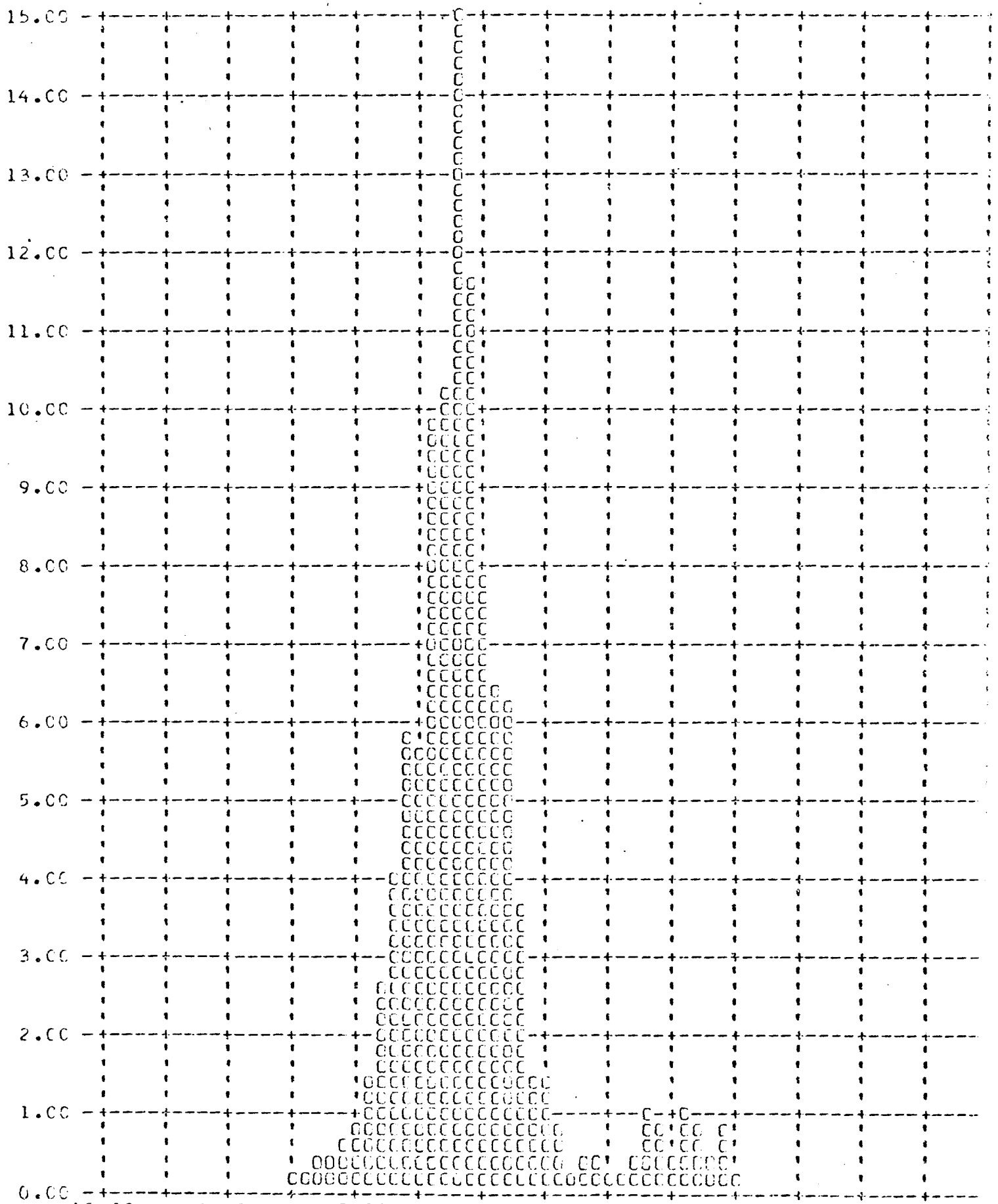
Because of the abnormal nonlinearity of scan rate to cycle rate for the forward camera, it is difficult to extrapolate actual photographic quality from these data.

MISSION 1043

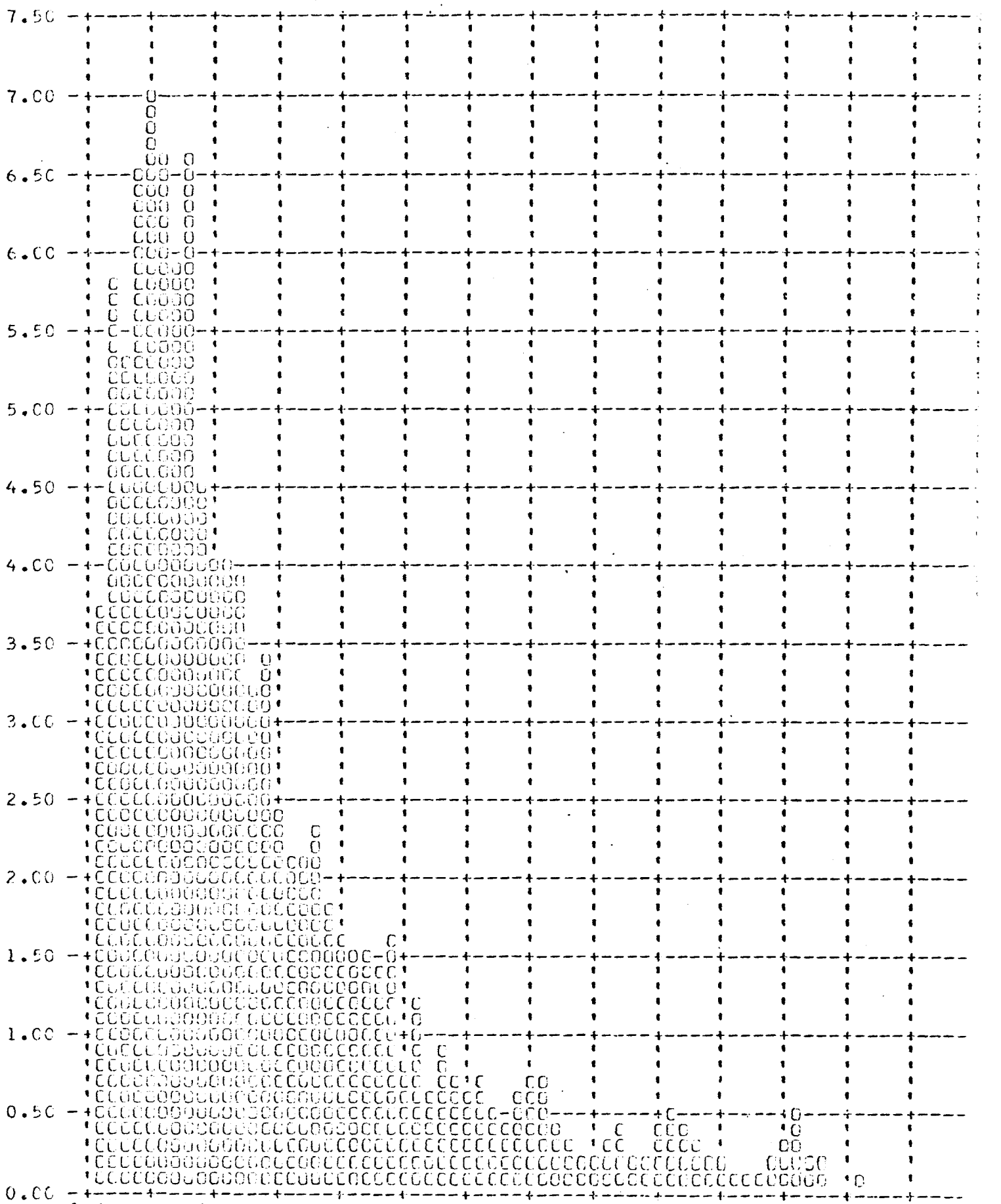
FMC ERROR AND RESOLUTION LIMITS

VALUE	UNITS	CAMERA	MISSION 1043-1 90%	MISSION 1043-1 Range	MISSION 1043-2 90%	MISSION 1043-2 Range
FMC Error	%	FWD	4.21	-7.5 to +10.0	4.44	-12.0 to +4.0
		AFT	3.26	-4.5 to +12.0	3.21	-10.0 to +9.5
Along-Track Resolution Limit	Feet	FWD	5.41	0.2 to 12.2	5.29	+0.2 to +17.5
		AFT	2.77	0.2 to 10.2	2.77	+0.2 to +10.2
Cross-Track Resolution Limit	Feet	FWD	1.51	0.2 to 4.4	2.22	+0.2 to + 4.0
		AFT	0.82	0.2 to 4.0	0.92	0.2 to + 2.30

TABLE 8-1

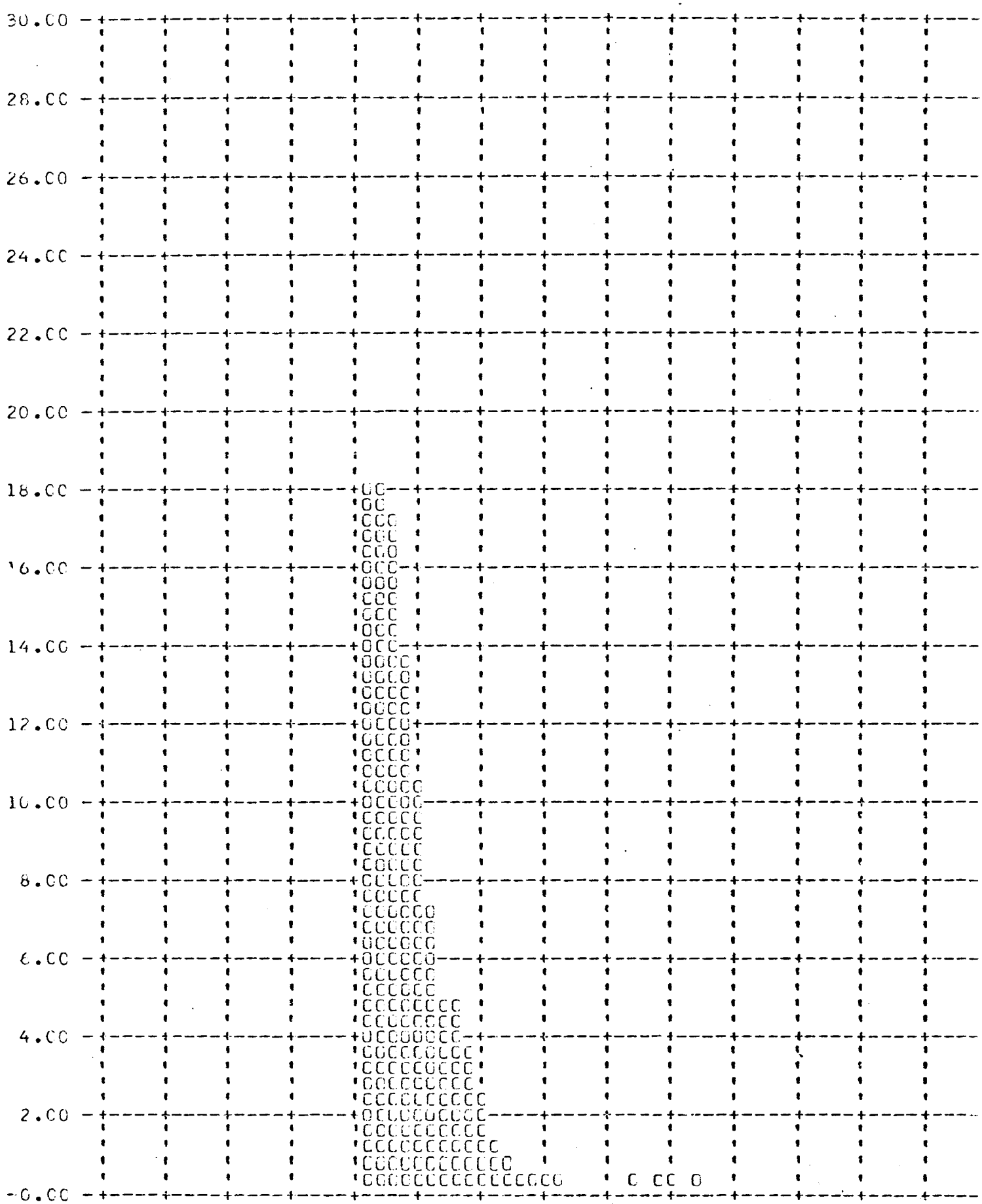

Y INC, ERROR -- PERCENT (X) VERSUS FREQUENCY -- PERCENT (Y)
15.00
14.00
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
-15.00
-10.00
-5.00
0.00
5.00
10.00
15.00

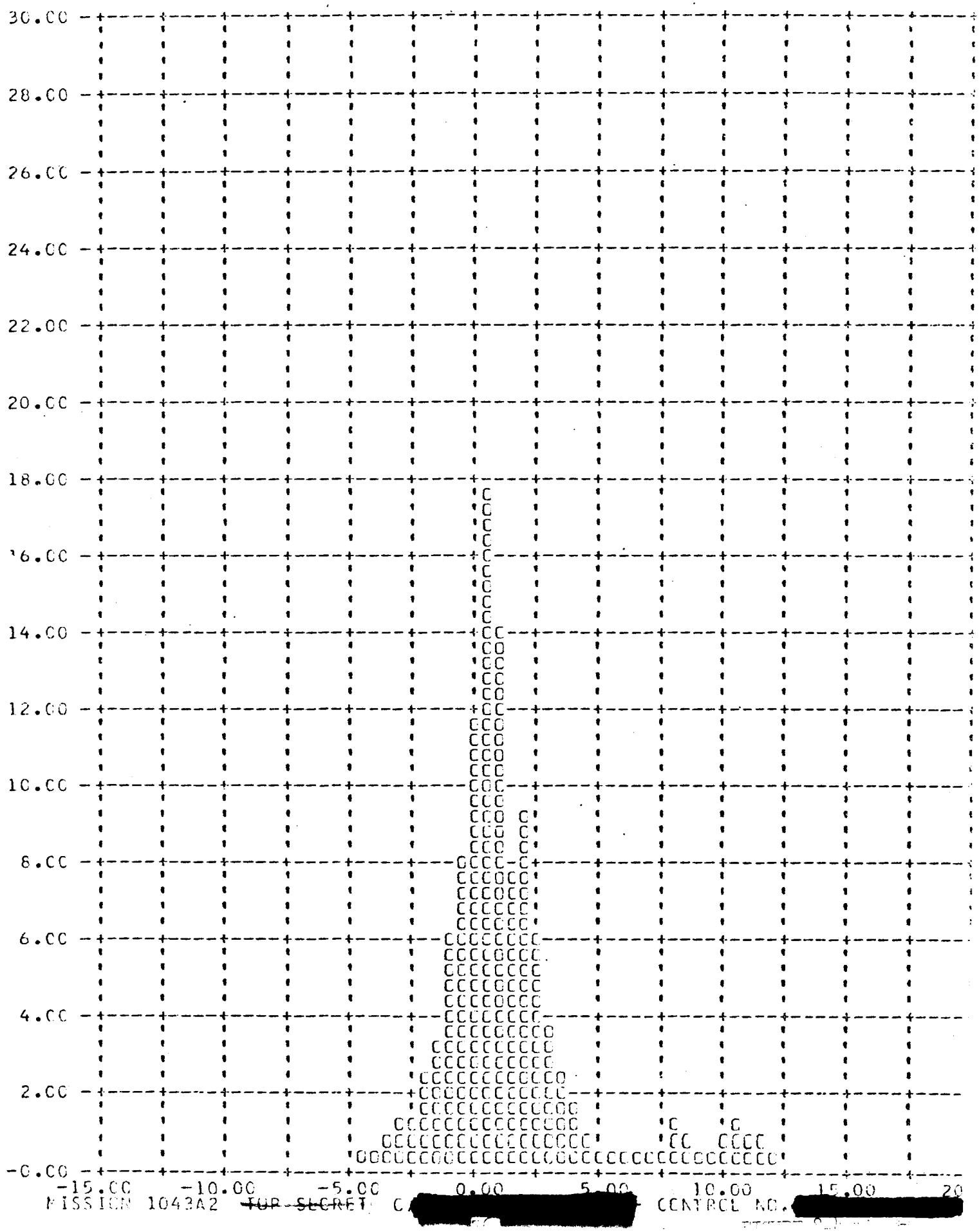
Y ALONG TRACK RESOLUTION LIMIT - FEET (X) VERSUS FREQUENCY - PERCENT (



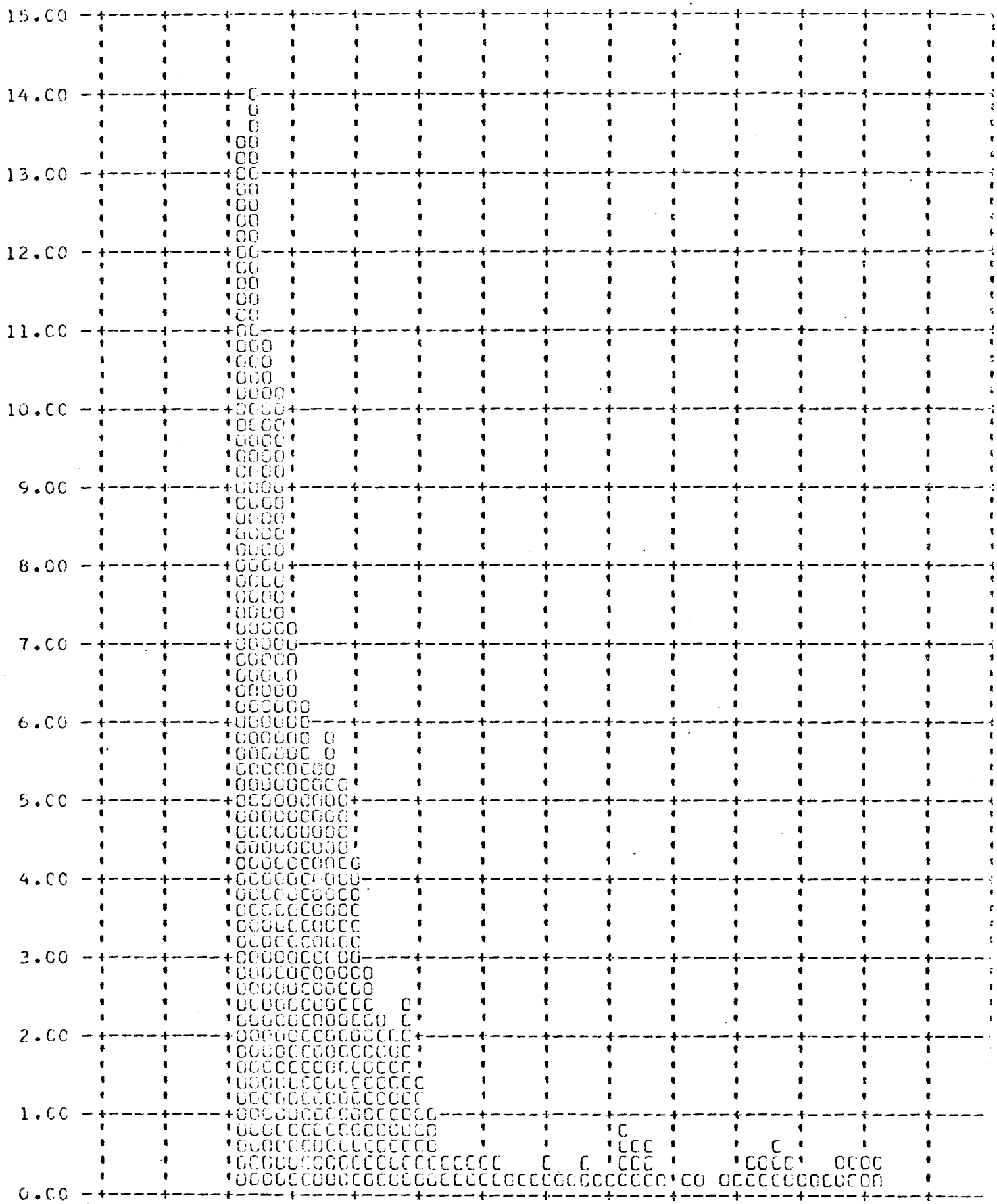
FRAMES 1-6 OF EACH CP OMITTED 90 PERCENT = 1.

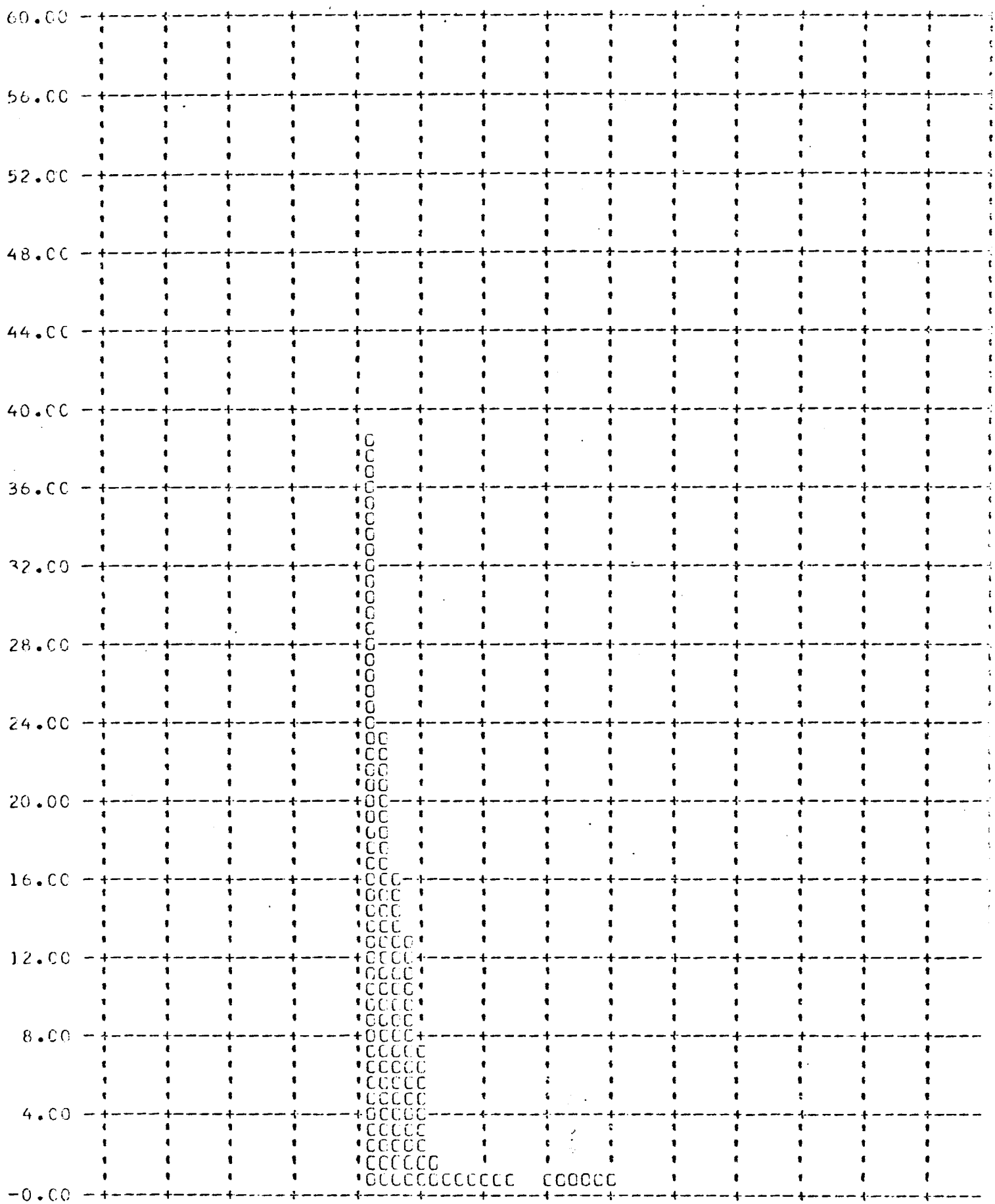
Y CROSS TRACK RESOLUTION LIMIT - FEET (X) VERSUS FREQUENCY - PERCENT (



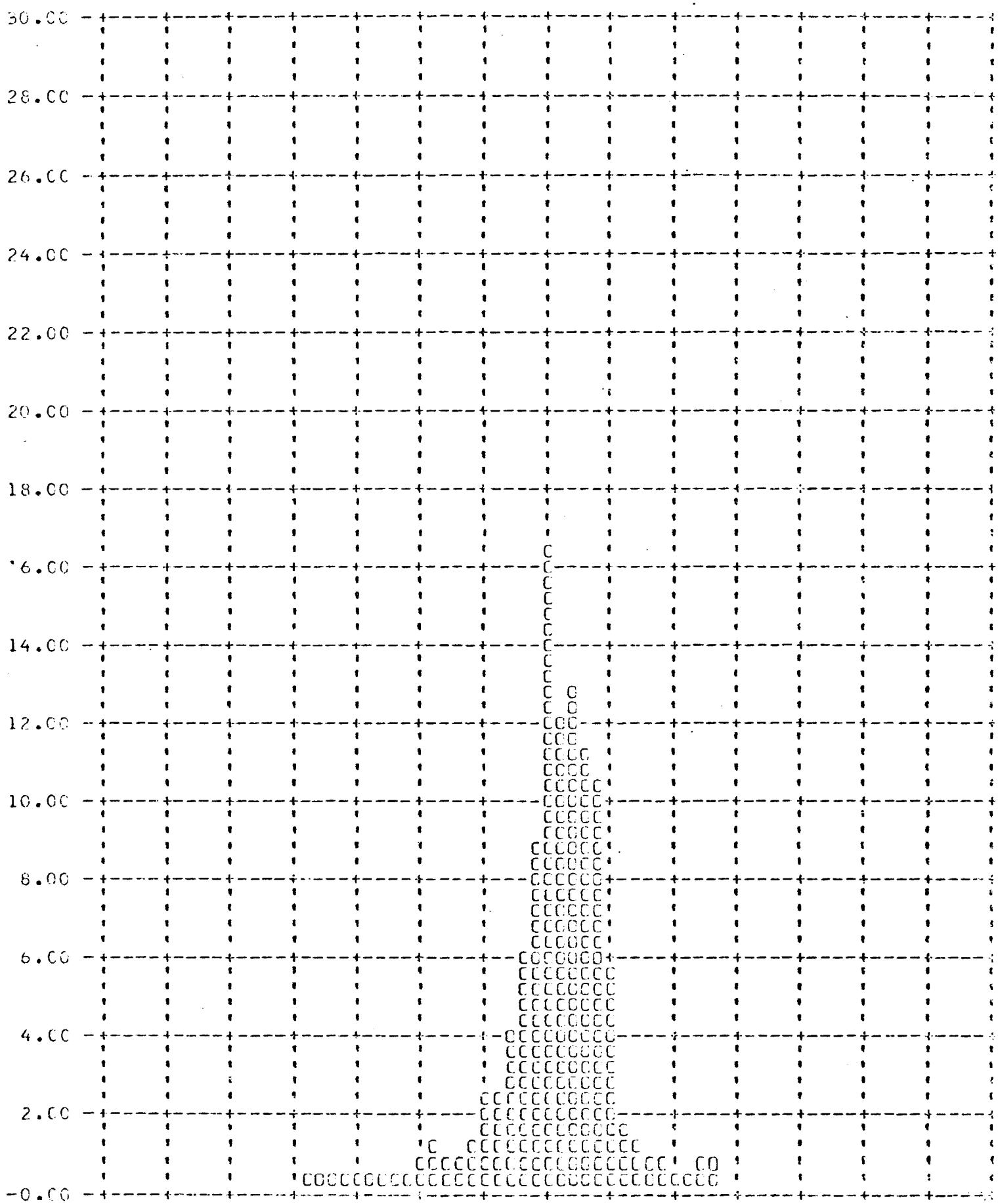

Y IMC ERROR -- PERCENT (X) VERSUS FREQUENCY -- PERCENT (Y)
30.00
28.00
26.00
24.00
22.00
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
-0.00
-15.00
-10.00
-5.00
0.00
5.00
10.00
15.00
20

Y ALONG TRACK RESOLUTION LIMIT - FEET (X) VERSUS FREQUENCY - PERCENT (Y



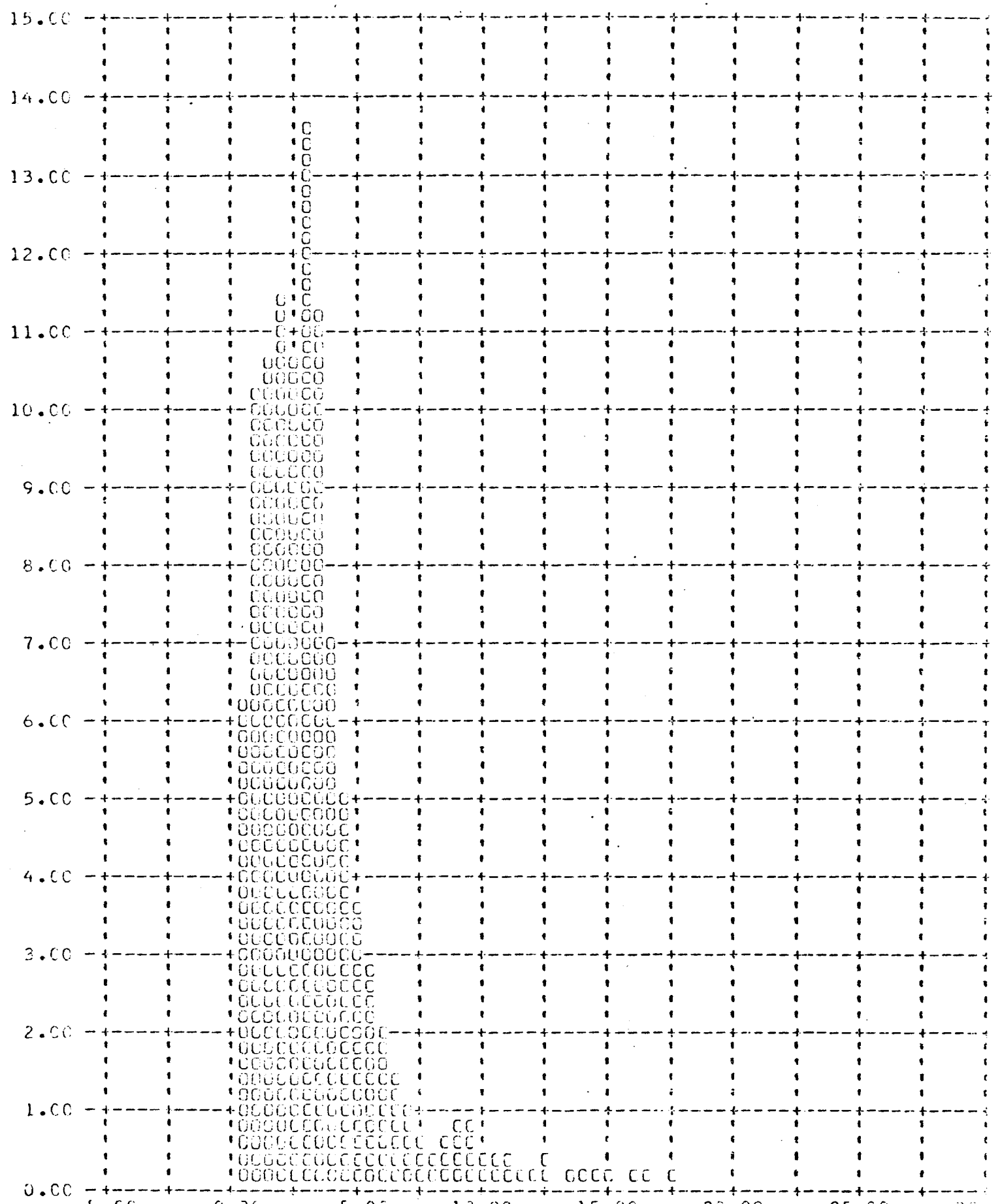

Y CROSS TRACK RESOLUTION LIMIT - FEET (X) VERSUS FREQUENCY - PERCENT (
60.00
56.00
52.00
48.00
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
-0.00
-4.00
-2.00
0.00
2.00
4.00
6.00
8.00
10

Y IMC ERROR -- PERCENT (X) VERSUS FREQUENCY -- PERCENT (Y)

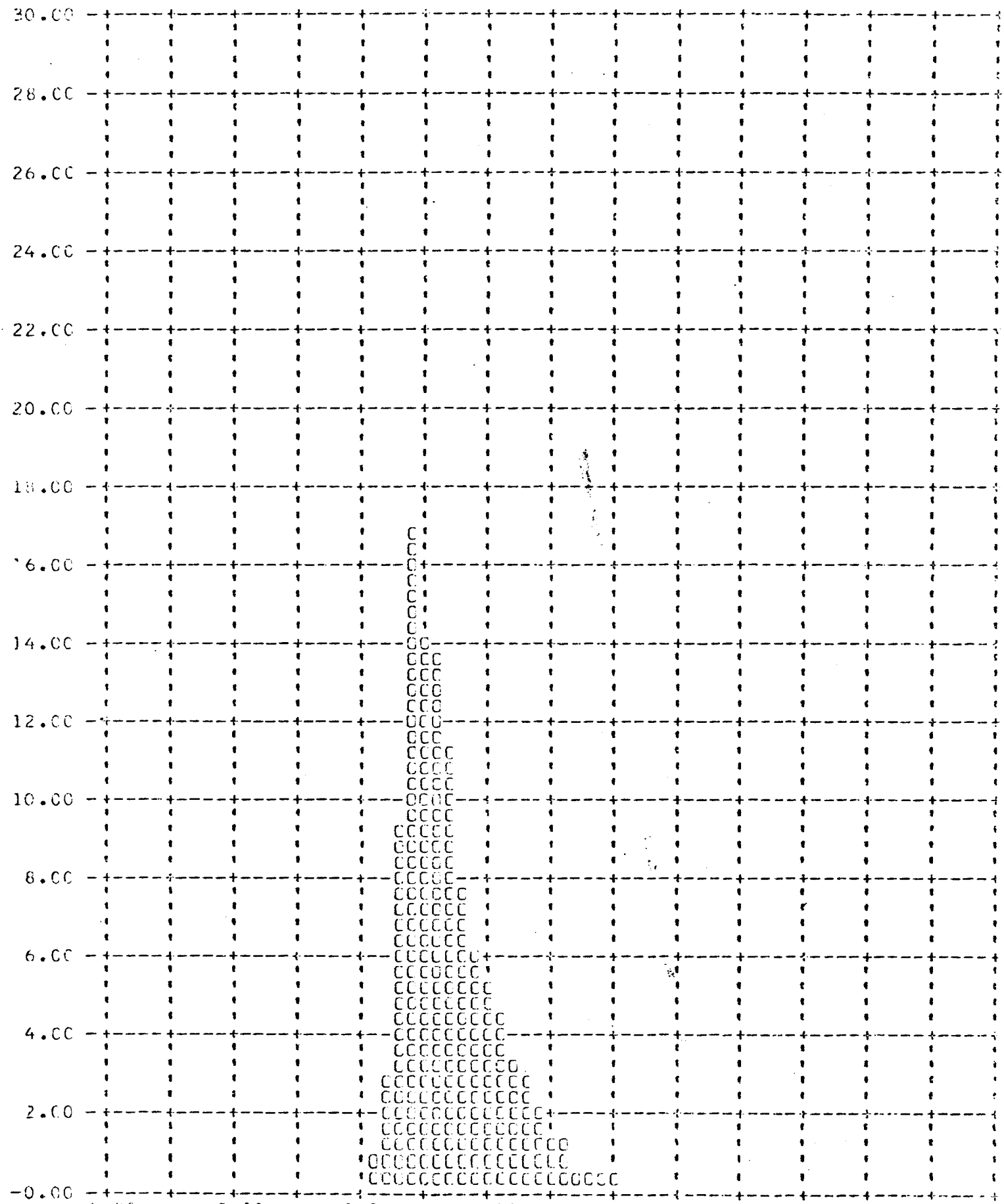


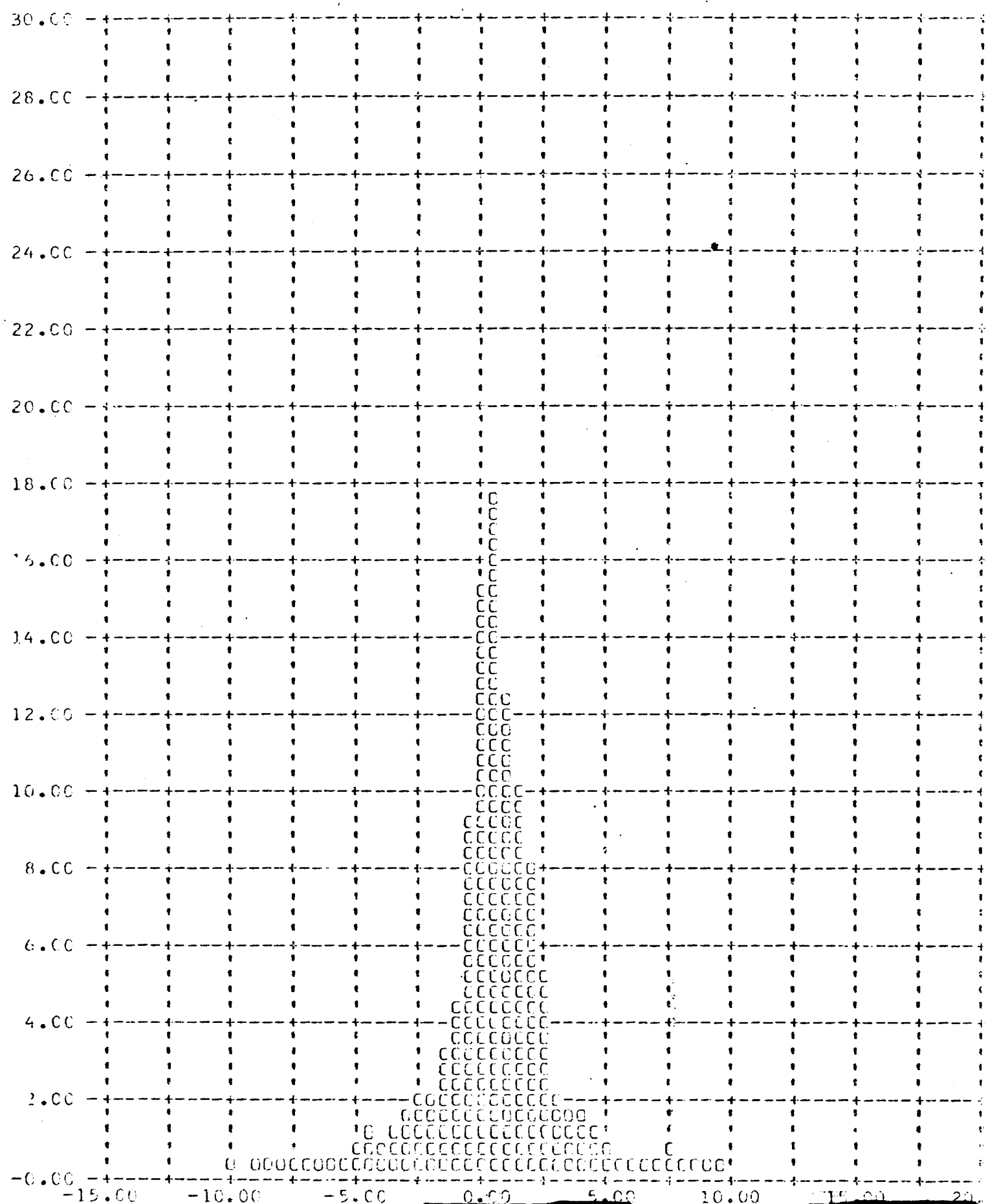
FRAMES 1-8 OF EACH CP OMITTED 99 PERCENT = 5.2

Y ALONG TRACK RESOLUTION LIMIT - FEET (X) VERSUS FREQUENCY - PERCENT (Y



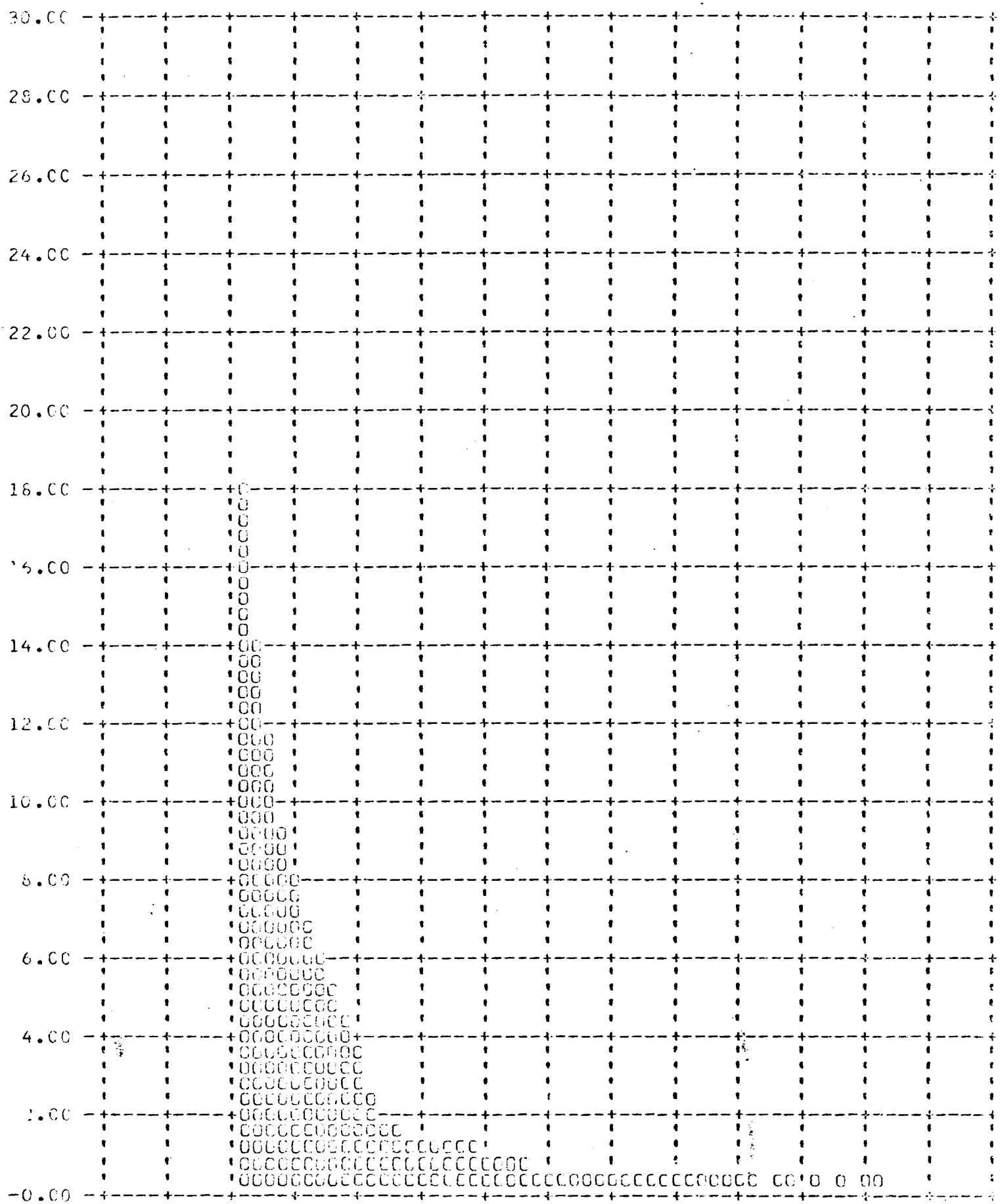
Y CROSS TRACK RESOLUTION LIMIT - FEET (X) VERSUS FREQUENCY - PERCENT (Y



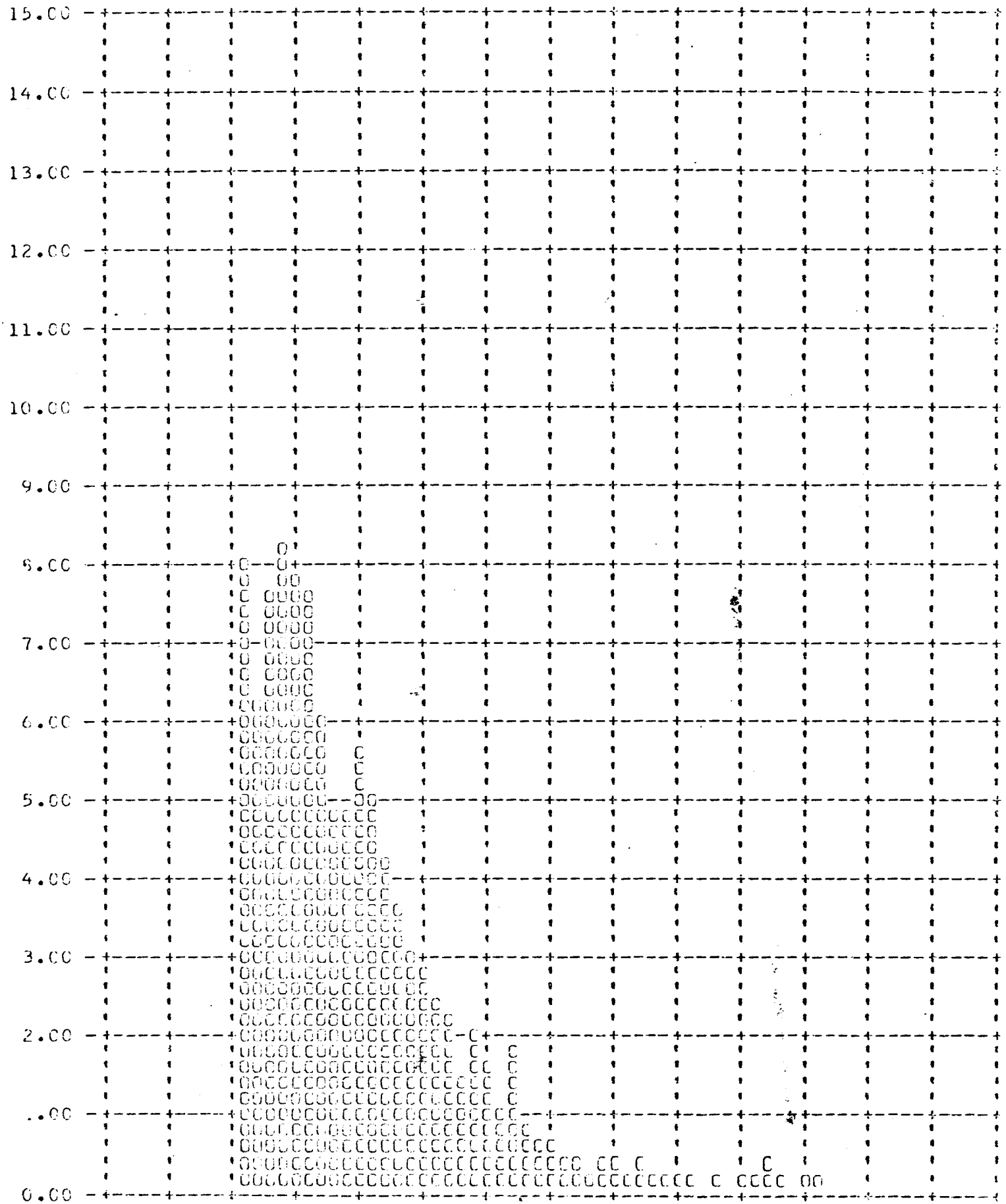

Y INC ERROR -- PERCENT (X) VERSUS FREQUENCY -- PERCENT (Y)
30.00
28.00
26.00
24.00
22.00
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
-0.00
-15.00
-10.00
-5.00
0.00
5.00
10.00
15.00
20.

FRAMES 1-6 OF EACH CP OMITTED 90 PERCENT = 2.7

Y ALONG TRACK RESOLUTION LIMIT - FEET (X) VERSUS FREQUENCY - PERCENT (Y)



Y CROSS TRACK RESOLUTION LIMIT - FEET (X) VERSUS FREQUENCY - PERCENT (Y



SECTION 9

SYSTEM RELIABILITY

Reliability calculations for the payload are based on a sample beginning with M-7. Hence both the major part of the Mural Program and the "J" Program are covered in the calculation. For certain auxiliaries, i.e., the stellar-index camera and the horizon cameras, the sample size is changed to recognize incorporation of modified equipment or new designs where reliability was one of the principal reasons for the modification. However, for primary mission function, the sample size is consistent with reliability reporting for the vehicle.

The reliability estimates of this section deal exclusively with the payload. Failures to achieve orbit or vehicle induced failures are thereby excluded. Recoveries before a complete mission has been completed are considered as full missions providing that early termination was caused by reasons not connected with payload operation. Film quality is not considered in the reliability estimate calculation. Hence, only electrical and mechanical functioning are considered.

The reliability estimate is also divided into primary and secondary functions. The primary functions are operation of the panoramic cameras, main camera door operation, operation of the payload clock, and recovery operations. The secondary mission functions are horizon camera operation excluding catastrophic open shutter failure mode, auxiliary data recording,

and stellar-index camera operation. A summary of estimated reliability is shown in Tables 9-1.

Panoramic Camera Reliability

Sample Size - 187 opportunities to operate.

Two Failures - S/I Programmer on System J-19
Film transport on System J-42

Assume - 3000 cycles per camera per mission.

Estimated Reliability + 98.6 at 50% confidence level.

Main Camera Door Reliability

Sample Size - 60 vehicles x 2 doors = 120 opportunities to operate

Estimated Reliability = 99.4% at 50

Payload Command and Control

Sample Size - 10,896 hours operation in sample

Two failures

Estimated Reliability = 97.7 at 50% confidence level

Payload Clock Reliability

Sample Size - 10,896 hours operation in sample

No failures

Estimated Reliability = 99.4% at 50% confidence level

Estimated Reliability of Payload Functioning on orbit = 97.2 at 50% confidence level

Recovery System Reliability

85 opportunities to recover

1 failure - improper separation due to water seal - cutter failure
Estimated Reliability = 98.0 at 50% confidence level

Stellar-Index Camera Reliability

Sample begins with J5

Sample size = 27,630 cycles

Four failures

Estimated Reliability = 93.1% at 50% confidence level

Horizon Camera Reliability

Sample begins with J5 - 109,000 cycles

Estimated Reliability of Single Camera = 99.0% at 50% confidence level.

Estimated Reliability of Four Horizon Cameras at a Parallel Redundant System = 99.9% at 50% confidence level.

ESTIMATED RELIABILITY SUMMARY

(AT 50% CONFIDENCE LEVEL)

MISSION NUMBER	PRIMARY FUNCTIONS						SECONDARY FUNCTIONS	
	PANORAMIC CAMERA	PANORAMIC CAMERA DOORS	COMMAND & CONTROL SYSTEM	PAYLOAD CLOCK	ON-ORBIT FUNCTIONS	RECOVERY SYSTEM	STELLAR-INDEX CAMERAS	HORIZON CAMERAS
	SAMPLE / FAILURES / RELIABILITY	SAMPLE / FAILURES / RELIABILITY	SAMPLE / FAILURES / RELIABILITY	SAMPLE / FAILURES / RELIABILITY	RELIABILITY	SAMPLE / FAILURES / RELIABILITY	SAMPLE / FAILURES / RELIABILITY	SAMPLE / FAILURES / RELIABILITY
9038 TO 1008	60 OPERATIONS / 1 / 97.3	52 DOORS / 0 / 93.6	3124 HOURS / 0 / 98.0	3124 HOURS / 0 / 98.0	96.1	18 CAPSULES / 1 / 90.7	3400 CYCLES / 3 / 63.1	12,000 CYCLES / 0 / 91.7
1009	64 / 1 / 97.4	54 / 0 / 93.7	3216 / 0 / 98.0	3216 / 0 / 98.0	96.2	20 / 1 / 91.5	4250 / 3 / 69.3	15,000 / 0 / 93.4
1010	68 / 1 / 97.6	56 / 0 / 98.8	3432 / 0 / 98.1	3432 / 0 / 98.1	96.4	22 / 1 / 92.5	5100 / 3 / 73.7	18,000 / 0 / 94.4
1011	72 / 1 / 97.7	58 / 0 / 98.9	3600 / 0 / 98.1	3600 / 0 / 98.1	96.8	24 / 1 / 93.0	5525 / 0* / 94.7	21,000 / 0 / 95.2
1012	76 / 1 / 97.8	60 / 0 / 98.9	3720 / 0 / 98.2	3720 / 0 / 98.2	95.9	26 / 1 / 93.5	5525 / 0 / 94.7	24,000 / 0 / 95.8
1013	78 / 1 / 97.8	62 / 0 / 99.0	3940 / 1 / 95.9	3940 / 0 / 98.3	96.0	28 / 1 / 94.0	5950 / 0 / 95.1	25,500 / 0 / 96.0
1014	82 / 1 / 97.9	64 / 0 / 99.0	4056 / 1 / 96.1	4056 / 0 / 98.3	96.1	30 / 1 / 94.4	6375 / 1 / 89.6	28,500 / 0 / 96.4
1015	86 / 1 / 98.0	66 / 0 / 99.0	4320 / 1 / 96.3	4320 / 0 / 98.4	96.1	32 / 1 / 94.6	7225 / 1 / 90.4	31,500 / 0 / 96.7
1016	90 / 1 / 98.1	68 / 0 / 99.0	4560 / 1 / 96.5	4560 / 0 / 98.5	96.4	34 / 1 / 95.2	7650 / 1 / 91.0	34,500 / 0 / 97.0
1017	94 / 0* / 99.3	70 / 0 / 99.0	4760 / 1 / 96.7	4760 / 0 / 98.6	97.6	36 / 1 / 95.4	8925 / 1 / 92.3	37,500 / 0 / 97.3
1018	98 / 1 / 98.3	72 / 0 / 99.1	4920 / 1 / 96.8	4920 / 0 / 98.7	96.7	38 / 1 / 95.6	8980 / 1 / 92.3	40,500 / 0 / 97.5
1019	102 / 1 / 98.4	74 / 0 / 99.1	5136 / 1 / 96.9	5136 / 0 / 98.7	96.8	39 / 1 / 95.8	6075** / 1 / 91.5	43,500 / 0 / 97.6

* DESIGN FIX NEGATED PREVIOUS FAILURE CONSIDERATIONS

** 1013 SAMPLE OUT OF SEQUENCE

TABLE 9-1

ESTIMATED RELIABILITY SUMMARY

(AT 50% CONFIDENCE LEVEL)

MISSION NUMBER	PRIMARY FUNCTIONS						SECONDARY FUNCTIONS	
	PANORAMIC CAMERA	PANORAMIC CAMERA DOORS	COMMAND & CONTROL SYSTEM	PAYLOAD CLOCK	ON-ORBIT FUNCTIONS	RECOVERY SYSTEM	STELLAR-INDEX CAMERAS	HORIZON CAMERAS
	SAMPLE / FAILURES / RELIABILITY	SAMPLE / FAILURES / RELIABILITY	SAMPLE / FAILURES / RELIABILITY	SAMPLE / FAILURES / RELIABILITY	RELIABILITY	SAMPLE / FAILURES / RELIABILITY	SAMPLE / FAILURES / RELIABILITY	SAMPLE / FAILURES / RELIABILITY
1020	108 / 1 / 98.5	78 / 0 / 99.1	5544 / 1 / 97.1	5544 / 0 / 98.9	96.9	43 / 1 / 96.1	10,680 / 2 / 89.9	48,000 / 0 / 97.9
1021	104 / 1 / 98.5	76 / 0 / 99.1	5376 / 1 / 97.0	5376 / 0 / 98.8	96.9	41 / 1 / 96.0	9830 / 2 / 89.1	46,500 / 0 / 97.8
1022	112 / 1 / 98.5	80 / 0 / 99.2	5784 / 1 / 97.3	5784 / 0 / 98.9	96.9	45 / 1 / 96.3	11,550 / 2 / 90.7	51,000 / 0 / 98.0
1023	114 / 1 / 98.6	82 / 0 / 99.2	6000 / 2 / 95.8	6000 / 0 / 98.9	96.2	47 / 1 / 96.5	12,190 / 2 / 91.1	54,000 / 0 / 98.1
1024	118 / 1 / 98.6	84 / 0 / 99.2	6240 / 2 / 96.0	6240 / 0 / 98.9	96.3	49 / 1 / 96.6	13,040 / 2 / 91.6	57,000 / 0 / 98.2
1025	122 / 1 / 98.6	86 / 0 / 99.2	6480 / 2 / 96.1	6480 / 0 / 99.0	96.4	51 / 1 / 96.7	13,890 / 2 / 92.1	60,000 / 0 / 98.3
1026	126 / 1 / 98.7	88 / 0 / 99.2	6720 / 2 / 96.3	6720 / 0 / 99.0	96.5	53 / 1 / 96.8	14,740 / 2 / 92.6	63,000 / 0 / 98.4
1027	128 / 1 / 98.7	90 / 0 / 99.2	6744 / 2 / 96.3	6744 / 0 / 99.0	96.5	55 / 1 / 97.0	15,165 / 3 / 90.0	64,500 / 0 / 98.4
1028	132 / 1 / 98.7	92 / 0 / 99.2	6960 / 2 / 96.4	6960 / 0 / 99.0	96.7	57 / 1 / 97.1	16,015 / 3 / 90.7	67,500 / 0 / 98.5
1029	136 / 1 / 98.8	94 / 0 / 99.3	7200 / 2 / 96.5	7200 / 0 / 99.1	96.8	59 / 1 / 97.1	16,580 / 4 / 88.7	70,500 / 0 / 98.5
1030	140 / 1 / 98.9	96 / 0 / 99.3	7440 / 2 / 96.6	7440 / 0 / 99.1	96.9	61 / 1 / 97.2	17,430 / 4 / 89.3	73,500 / 0 / 98.6
1031	143 / 1	98 / 0	7704 / 2	7704 / 0	96.9	63 / 1 / 97.3	18,280 / 4 / 89.7	76,500 / 0 / 98.6

ESTIMATED RELIABILITY SUMMARY

(AT 50% CONFIDENCE LEVEL)

MISSION NUMBER	PRIMARY FUNCTIONS								SECONDARY FUNCTIONS			
	PANORAMIC CAMERA		PANORAMIC CAMERA DOORS		COMMAND & CONTROL SYSTEM		PAYLOAD CLOCK		ON-ORBIT FUNCTIONS	RECOVERY SYSTEM	STELLAR-INDEX CAMERAS		HORIZON CAMERAS	
	SAMPLE	RELIABILITY	SAMPLE / FAILURES	RELIABILITY	SAMPLE / FAILURES	RELIABILITY	SAMPLE / FAILURES	RELIABILITY	RELIABILITY	SAMPLE / FAILURES / RELIABILITY	SAMPLE / FAILURES	RELIABILITY	SAMPLE / FAILURES	RELIABILITY
1033	147 / 1	98.9	100 / 0	99.3	7908 / 2	96.8	7908 / 0	99.2	97.1	55 / 1	19,130 / 4	90.2	79,500 / 0	98.7
1034	151 / 1	98.9	102 / 0	99.3	8208 / 2	96.9	8208 / 0	99.2	97.2	67 / 1	19,980 / 4	90.5	82,500 / 0	98.7
1035	99 / 1	99.0	96 / 0	99.4	8700 / 2	97.1	8700 / 0	99.2	97.4	71 / 1	21,680 / 4	91.3	88,500 / 0	98.8
1036	155 / 1	98.9	104 / 0	99.3	8520 / 2	97.0	8520 / 0	99.2	97.3	69 / 1	20,830 / 4	90.9	85,500 / 0	98.8
1037	163 / 1	99.0	106 / 0	99.4	9048 / 2	97.2	9048 / 0	99.3	97.4	73 / 1	22,530 / 4	91.6	91,500 / 0	98.9
1038	167 / 1	99.0	110 / 0	99.4	9336 / 2	97.3	9336 / 0	99.3	97.5	75 / 1	23,380 / 4	91.9	94,500 / 0	98.9
1039	171 / 1	99.0	112 / 0	99.4	9600 / 2	97.4	9600 / 0	99.3	97.5	77 / 1	24,230 / 4	92.1	97,500 / 0	98.9
1040	175 / 1	99.0	114 / 0	99.4	9840 / 2	97.4	9840 / 0	99.3	97.5	79 / 1	25,080 / 4	92.4	100,500 / 0	99.0
1041	179 / 1	99.1	116 / 0	99.4	10,176 / 2	97.5	10,176 / 0	99.3	97.6	81 / 1	25,930 / 4	92.6	103,500 / 0	99.0
1042	183 / 1	99.1	118 / 0	99.4	10,536 / 2	97.6	10,536 / 0	99.4	97.7	83 / 1	26,780 / 4	92.8	106,500 / 0	99.0
1043	187 / 2	98.6	120 / 0	99.4	10,896 / 2	97.7	10,896 / 0	99.4	97.2	85 / 1	27,630 / 4	93.1	109,000 / 0	99.0

RELIABILITY CRITERIA UPDATED FOR SUBSEQUENT MISSIONS

TABLE 9-1

SECTION 10

SUMMARY DATA

The comparison of the operating parameters and the performance achieved by previous missions has been difficult due to the large volume of data that results from each mission. Some of the pertinent characteristics from prior missions have been summarized in Tables 10-1 through 10-3.

The summary data was started with Mission 1004 as the J-05 camera system was the first to incorporate the major modifications of the titanium drum and scan arm, four roller scan head and Corona J capabilities. Only those missions that culminated in the recovery of some photography have been listed, therefore Missions 1003, 1005 and 1032 are deleted.

MISSION SUMMARY

MISSION NUMBER	PAYLOAD NUMBER	VEHICLE NUMBER	LAUNCH DATE	LAUNCH TIME	ORBIT INCLINATION (°)	PERIGEE ALTITUDE (NM)	PERIGEE LOCATION (°N)	RECOVERY PASS	MASTER CAMERA CAMERA NUMBER	MASTER CAMERA SLIT (")	MASTER CAMERA FILTER TYPE	SLAVE CAMERA CAMERA NUMBER	SLAVE CAMERA SLIT (")	SLAVE CAMERA FILTER TYPE	STELLAR-INDEX CAMERA NUMBER
1004	J-05	1174	2/15/64	2138 Z	74.9	99.9	29.0	49/112	124	0.250	W-21	125	0.250	W-21	D29/29/29 / D42/42/37
1006	J-03	1176	6/4/64	2259 Z	79.9	84.0	63.2	65/128	148	0.200	W-21	149	0.200	W-21	D45/47/45 / D49/53/42
1007	J-07	1609	6/19/64	2318 Z	85.0	99.2	41.5	65/128	144	0.250	W-25	145	0.200	W-21	D43/43/43 / D54/56/51
1008	J-10	1177	7/10/64	2314 Z	85.0	99.4	40.8	49/112	150	0.200	W-21	151	0.200	W-21	D48/45/48 / D33/28/33
1009	J-12	1605	8/5/64	2316 Z	80.1	99.6	39.5	49/128	154	0.200	W-21	155	0.200	W-21	D56/54/56 / D38/38/34
1010	J-11	1178	9/14/64	2254 Z	84.9	97.4	42.5	65/144	152	0.175	W-21	153	0.175	W-21	D41/41/41 / D44/46/44
1011	J-3X	1170	10/5/64	2150 Z	79.9	99.3	20.9	65/—	160	0.175	W-21	161	0.175	W-21	D30/30/30 / D57/57/57
1012	J-13	1179	10/17/64	2202 Z	75.0	96.2	32.4	49/81	156	0.200	W-21	157	0.200	W-21	D51/51/47 / D46/52/53
1013	J-15	1173	11/2/64	2130 Z	80.0	100.0	25.0	65/81	158	0.225	W-21	159	0.225	W-21	D52/49/55 / D47/48/54
1014	J-16	1180	11/18/64	2036 Z	70.0	103.2	65.6	81/145	162	0.250	W-25	139	0.175	W-21	D53/59/49 / D50/44/46
1015	J-17	1607	12/19/64	2110 Z	74.9	96.7	21.5	81/175	138	0.250	W-25	141	0.175	W-21	D61/61/61 / D58/58/58
1016	J-18	1608	1/15/65	2101 Z	74.9	99.4	30.2	81/159	132	0.250	W-25	133	0.175	W-21	D55/55/50 / D59/50/59
1017	J-14	1611	2/25/65	2144 Z	75.0	97.2	25.9	81/145	140	0.250	W-25	165	0.175	W-21	D21/21/21 / D60/61/1
1018	J-19	1612	3/25/65	2111 Z	96.0	100.2	40.3	66/99	122	0.250	W-25	123	0.175	W-21	D20/20/20 / D22/22/22
1019	J-04	1614	4/29/65	2144 Z	85.0	99.1	27.1	80/—	118	0.250	W-25	119	0.175	W-21	D39/39/35 / D19/18/19
1020	J-20	1613	6/9/65	2158 Z	75.1	97.1	40.6	97/113	136	0.250	W-25	137	0.175	W-21	D67/85/80 / D62/65/65
1021	J-21	1615	5/18/65	1803 Z	75.0	109.2	24.3	81/161	166	0.175	W-21	167	0.250	W-25	D63/69/69 / D25/27/25
1022	J-22	1617	7/19/65	2201 Z	85.0	99.7	30.3	65/144	168	0.250	W-25	169	0.175	W-21	D65/77/70 / D24/24/24
1023	J-23	1618	8/17/65	2100 Z	70.0	97.8	29.0	81/144	170	0.225	W-25	171	0.150	W-21	D17/19/82 / D66/75/72
1024	J-24	1619	9/22/65	2131 Z	60.0	95.9	18.4	81/161	172	0.225	W-25	173	0.150	W-21	D69/72/84 / D64/82/66
1025	JX-28	1616	10/5/65	1746 Z	75.0	112.9	44.3	81/161	142	0.175	W-21	127	0.175	W-21	D72/78/89 / D70/89/81
1026	J-25	1620	10/28/65	2117 Z	75.0	93.0	17.0	81/160	174	0.225	W-25	175	0.150	W-21	D75/92/93 / D72/89/85
1027	JX-27	1621	12/9/65	2110 Z	80.0	97.4	17.3	17/33	164	0.250	W-25	163	0.175	W-21	D71/87/87 / D68/74/83
1028	J-26	1610	12/24/65	2106 Z	80.0	97.6	28.4	81/144	176	0.250	W-25	177	0.175	W-21	D77/91/97 / D74/76/95

REC/JDM
4/65

MISSION SUMMARY

MISSION NUMBER	PAYLOAD NUMBER	VEHICLE NUMBER	LAUNCH DATE	LAUNCH TIME	ORBIT INCLINATION (°)	PERIGEE ALTITUDE (NM)	PERIGEE LOCATION (°N)	RECOVERY PASS	MASTER CAMERA CAMERA NUMBER	MASTER CAMERA SLIT (")	MASTER CAMERA FILTER TYPE	SLAVE CAMERA CAMERA NUMBER	SLAVE CAMERA SLIT (")	SLAVE CAMERA FILTER TYPE	STELLAR-INDEX CAMERA NUMBER
1029	J-27	1623	2/2/66	2132 Z	75.1	99.3	22.5	31 / 160	178	0.275	W-25	179	0.175	W-21	D79/94/91 / D76/70/94
1030	J-29	1622	3/9/66	2202 Z	75.0	97.5	18.7	81 / 159	182	0.275	W-25	183	0.175	W-21	D94/100/107 / D82/135/102
1031	J-30	1627	4/7/66	2202 Z	75.1	104.5	23.3	113 / 177	184	0.225	W-23A	185	0.150	W-21	D93/101/89 / D86/106/86
1032	J-28	1625	5/3/66	1925 Z	—	—	—	— / —	180	0.150	W-21	181	0.150	W-21	D81/97/101 / D80/73/100
1033	J-33	1630	5/24/66	2213 Z	66.1	102.0	60.7	82 / 176	194	0.200	W-21	195	0.200	W-21	D91/105/109 / D84/102/75
1034	J-31	1626	6/21/66	2131 Z	80.1	105.4	18.2	81 / 161	186	0.200	W-23A	187	0.150	W-21	D85/109/76 / D87/107/105
1035	J-36	1623	9/20/66	2114 Z	65.0	99.5	29.1	81 / 160	188	0.225	W-23A	189	0.175	W-21	D95/112/113 / D96/104/116
1036	J-32	1631	8/9/66	2046 Z	100.0	102.4	22.9	115 / 212	190	0.200	W-23A	191	0.150	W-21	D89/110/111 / D80/108/106
1037	J-38	1632	11/8/66	1957 Z	100.0	91.8	14.5	66 / 197	193	0.225	W-23A	199	0.175	W-21	D101/128/128 / D106/130/134
1038	J-34	1629	1/14/67	2119 Z	80.1	96.9	29.2	81 / 193	192	0.225	W-23A	193	0.175	W-21	D93/86/112 / D90/111/108
1039	J-39	1635	2/22/67	2202 Z	80.0	97.0	30.2	81 / 177	206	0.225	W-23A	207	0.175	W-21	D103/131/132 / D100/125/125
1040	J-35	1636	3/30/67	1854 Z	85.1	99.7	28.3	81 / 145	196	0.175	W-21	197	0.225	W-23A	D78/95/96 / D92/79/110
1041	J-40	1634	5/9/67	2152 Z	85.1	100.1	33.0	93 / 215	208	0.225	W-23A	209	0.175	W-21	D105/134/133 / D102/127/127
1042	J-37	1633	6/16/67	2135 Z	80.0	96.5	29.1	97 / 240	204	0.200	W-23A	205	0.150	W-21	D97/120/117 / D93/121/118
1043	J-42	1637	8/7/67	2144 Z	80.0	102.1	16.3	113 / 240	200	0.200	W 23A	201	0.150	W-21	D107/135/135 / D112/143/139

REC/JCM
1/68

PERFORMANCE SUMMARY

MISSION NUMBER	CAMERA	SIGNAL (dB)	W.I.P. (%)	V.C.S.S. (%)	ACQUISITION TIME (SEC) SUN	ACQUISITION TIME (SEC) AVERAGE	[redacted] SUN	[redacted] AVERAGE	[redacted] AZIMUTH	[redacted] ELEVATION	90% ATTITUDE ERROR (°) PITCH	90% ATTITUDE ERROR (°) ROLL	90% ATTITUDE ERROR (°) YAW	90% ATTITUDE RATES (°/HR) PITCH	90% ATTITUDE RATES (°/HR) ROLL	90% ATTITUDE RATES (°/HR) YAW	90% V/H ERROR (%)	90% RESOLUTION (M.) ALONG TRACK	90% RESOLUTION (M.) CROSS TRACK
1004-1	FWD	124	85	79	350	97	43	109	320	115	127	0.45	0.42	1.08	30.0	25.0	21.0	5.1	7.7	6.1
	AFT			86		89		95		117	124									
1004-2	FWD	125	85	79		98		113		82	90	0.74	0.50	0.91	44.0	30.0	29.0	4.9	6.6	6.5
	AFT			83		83		100		89	95									
1006-1	FWD	149	90	78	350	85	43	88	320	84	97	0.41	0.42	1.14	26.8	28.5	27.8	15.4	13.8	6.7
	AFT			74		71		90		87	92									
1006-2	FWD	140	90	80		64		81		94	99	0.49	0.40	1.08	31.1	27.9	30.0	11.6	10.1	7.0
	AFT			83		72		90		87	94									
1007-1	FWD	144	85	80	350	80	43	87	320	82	91	0.58	0.46	1.43	37.6	23.9	29.9	3.6	3.1	5.4
	AFT			86		83		83		97	110							4.6	2.1	7.6
1007-2	FWD	145	85	79		72		81		68	74	0.64	0.47	——	43.0	25.8	——	3.2	2.4	——
	AFT			81		77		92		74	81							4.2	1.8	——
1008-1	FWD	150	85	80	350	80	43	95	320	81	89	0.59	0.39	0.94	43.8	23.9	29.6	2.9	4.9	5.9
	AFT			83		83		91		86	95									
1008-2	FWD	151	85	82		84		96		83	92	0.63	0.36	0.71	42.9	24.0	32.5	2.8	4.2	5.4
	AFT			79		91		83		85	91									
1009-1	FWD	154	85	80	350	80	—	——	80	75	83	0.65	0.65	0.71	29.2	22.7	27.6	3.3	5.3	5.8
	AFT			83		85				75	83									
1009-2	FWD	155	85	84		89				76	84	0.48	0.65	0.59	33.6	23.9	27.2	2.6	4.9	5.9
	AFT			77		87				72	79									
1010-1	FWD	152	85	80	350	90	80	88	80	87	95	0.93	0.30	0.87	39.1	23.6	30.8	4.5	2.3	4.4
	AFT			88		86		80		92	103									
1010-2	FWD	153	85	92		81		82		82	93	0.59	0.70	1.21	45.4	23.6	30.7	4.6	7.5	3.8
	AFT			90		82		85		87	98									
1011-1	FWD	160	90	84	350	76	80	86	80	78	87	0.77	0.39	0.97	43.1	28.9	31.1	2.3	5.3	5.6
	AFT	161		84		77		86		83	93									
1012-1	FWD	156	85	92	——	——	80	91	80	84	98	0.65	0.51	——	47.1	33.2	——	1.5	4.8	——
	AFT			91				87		89	100									
1012-2	FWD	157	85	91				89		84	91	0.97	0.77	0.51	45.2	30.7	20.4	5.9	3.3	5.9
	AFT			89				95		85	98									
1013-1	FWD	158	85	89	——	——	80	94	80	85	99	0.64	0.32	1.34	36.0	29.0	32.3	3.7	7.8	8.3
	AFT	159		77				97		81	103	0.64	0.32	1.34	36.9	29.0	32.3	4.5	9.6	8.2
1014-1	FWD	162	80	87	——	——	80	78	80	74	86	0.62	0.41	1.46	35.0	36.1	38.5	2.2	6.2	6.8
	AFT			83				80		95	107	0.62	0.41	1.44	34.8	35.0	38.3	3.3	2.8	6.3
1014-2	FWD	139	80	83				75		70	77	1.06	0.55	——	36.4	36.4	——	1.4	6.4	——
	AFT			86				84		80	88	1.06	0.59	——	38.1	35.0	——	3.2	2.2	——
1015-1	FWD	138	85	87	——	——	80	76	80	90	——	0.65	0.38	0.53	47.0	29.4	38.2	5.0	5.5	7.8
	AFT			97				73		97		0.64	0.39	0.53	46.9	29.2	38.2	6.3	3.4	5.5
1015-2	FWD	141	85	83				72		89		0.50	0.61	0.64	39.1	27.1	36.2	3.2	6.0	7.5
	AFT			82				72		90		0.50	0.61	0.64	39.1	27.0	36.3	3.3	4.6	5.3
1016-1	FWD	132	85	85	——	——	80	56	80	81	——	0.72	0.83	2.01	48.9	30.2	40.4	2.0	5.5	10.5
	AFT			83				61		94		0.72	0.83	2.01	48.4	30.1	40.4	2.8	3.4	7.4
1016-2	FWD	133	85	90				55		92		0.83	0.93	2.19	42.2	27.2	39.9	1.5	4.0	8.0
	AFT			91				56		91		0.83	0.93	2.19	42.2	27.3	39.9	2.3	3.3	7.1
1017-1	FWD	140	85	72	——	——	80	57	80	78	86	0.49	0.76	2.50	35.5	32.2	38.4	3.3	9.8	11.6
	AFT			75				70		94	107	0.49	0.76	2.49	35.3	32.0	38.5	4.3	8.3	8.1
1017-2	FWD	165	85	85				65		80	94	0.69	0.45	——	36.5	34.0	——	1.8	6.2	——
	AFT			85				69		86	101	0.69	0.45	——	36.3	33.8	——	2.3	5.3	——
1018-1	FWD	122	85	79	——	——	80	70	80	82	92	0.91	0.48	——	47.4	36.7	——	3.4	5.6	——
	AFT			77				74		96	109	0.90	0.47	——	46.2	36.2	——	3.2	3.7	——
1018-2	FWD	123	85	84				75		77	89	0.84	0.63	——	34.7	30.7	——	3.1	5.6	——
	AFT			88				71		91	103	0.85	0.63	——	34.9	30.7	——	2.8	4.1	——

TOP SECRET C[redacted]

NO. [redacted]

ACCESSION 4765

PERFORMANCE SUMMARY

MISSION NUMBER	CAMERA	SERIAL NUMBER	[illegible] VALUE	VISUAL [illegible]	[illegible] SLIT (μ)	[illegible] AVERAGE	[illegible] SLIT (μ)	[illegible] AVERAGE	SLIT (μ)	[redacted] AVERAGE ALL	[redacted] AVERAGE HIGH	90% ATTITUDE ERROR (°) PITCH	90% ATTITUDE ERROR (°) ROLL	90% ATTITUDE ERROR (°) YAW	90% ATTITUDE RATES (°/HR) PITCH	90% ATTITUDE RATES (°/HR) ROLL	90% ATTITUDE RATES (°/HR) YAW	90% V/H ERROR (%)	90% RESOLUTION LIMIT (FEET) ALONG TRACK	90% RESOLUTION LIMIT (FEET) CROSS TRACK
1019-1	FWD	118	85	[illegible]	—	—	80	76	80	88	104	0.43	0.36	0.97	31.6	34.7	33.0	3.3	9.3	9.1
	AFT	119		[illegible]				63		87	101	0.44	0.37	0.96	31.6	34.9	33.1	3.8	5.0	6.5
1020-1	FWD	136	80	93	—	—	80	69	80	78	90	0.46	0.35	0.78	37.4	31.8	26.7	5.4	5.8	8.4
	AFT			63				82		94	105	0.46	0.35	0.73	37.4	31.8	26.7	5.3	4.2	5.9
1020-2	FWD	137	—	—				—		—	—	0.41	0.17	1.06	42.6	23.8	42.5	3.5	6.4	7.6
	AFT			—				—		—	—	0.41	0.17	1.06	42.6	23.8	42.5	3.4	4.5	2.8
1021-1	FWD	166	85	63	—	—	80	77	80	86	99	0.55	0.37	0.81	34.9	32.6	26.2	2.7	8.8	8.0
	AFT			90				90		93	109	0.55	0.33	0.81	34.8	33.0	26.3	5.4	8.6	5.5
1021-2	FWD	167	85	65				74		83	112	0.59	0.65	—	44.7	50.6	—	3.1	9.2	—
	AFT			74				62		—	—	—	—	—	—	—	—	—	—	—
1022-1	FWD	168	85	88	—	—	80	66	80	78	91	0.47	0.51	0.89	28.3	27.1	23.8	3.5	9.8	8.6
	AFT			91				83		101	111	0.47	0.51	0.90	27.9	26.6	23.8	3.0	6.2	6.1
1022-2	FWD	169	85	90				68		74	84	0.40	0.51	0.90	29.4	27.3	31.0	2.6	8.0	8.4
	AFT			92				92		99	110	0.40	0.51	0.90	29.4	27.3	31.1	1.8	4.9	5.9
1023-1	FWD	170	85	—	—	—	80	94	80	97	110	0.49	0.33	0.50	33.0	28.7	23.5	3.4	4.0	6.4
	AFT							87		83	101	0.49	0.33	0.50	32.9	28.7	23.5	3.5	2.7	4.3
1023-2	FWD	171	85					71		76	87	0.42	0.36	0.53	29.7	21.0	28.6	2.4	3.9	6.3
	AFT							89		68	76	0.43	0.37	0.53	29.6	21.3	28.6	2.5	2.7	4.2
1024-1	FWD	172	85	—	—	—	80	79	80	90	102	0.42	0.25	0.62	32.2	24.9	30.5	2.6	5.9	6.8
	AFT							95		94	105	0.42	0.25	0.62	32.2	24.9	30.4	2.1	3.8	4.5
1024-2	FWD	173	85					86		89	101	0.36	0.31	0.93	30.4	24.5	36.4	5.5	4.7	5.4
	AFT							95		100	114	0.36	0.31	0.93	30.6	23.0	36.4	5.1	3.3	3.6
1025-1	FWD	142	85	—	—	—	80	87	80	60	97	0.50	0.41	0.85	28.1	28.7	25.9	2.0	3.9	6.7
	AFT							97		101	114	0.51	0.42	0.85	28.6	29.7	25.7	3.2	2.8	6.8
1025-2	FWD	127	85					85		96	107	0.52	0.44	0.82	28.0	26.1	29.0	1.7	4.7	6.9
	AFT							91		89	103	0.52	0.44	0.82	28.1	26.0	29.0	1.8	6.7	6.9
1026-1	FWD	174	85	—	—	—	80	76	80	80	92	0.65	0.24	0.70	37.9	33.2	28.5	6.1	13.5	6.2
	AFT							88		98	113	0.65	0.24	0.70	37.9	33.2	28.5	6.1	9.1	4.1
1026-2	FWD	175	85					85		92	104	0.55	0.56	0.87	41.1	46.5	30.8	6.1	5.5	6.7
	AFT							93		90	103	0.59	0.65	0.68	43.3	50.0	27.7	6.7	3.3	4.5
1027-1	FWD	164	85	—	—	—	80	69	80	80	—	0.51	0.37	0.74	47.2	25.5	26.4	4.7	10.5	7.2
	AFT	163						79		92		0.51	0.37	0.74	47.3	25.2	26.2	3.8	6.0	5.2
1028-1	FWD	176	85	—	—	—	80	81	80	99	—	0.52	0.37	0.50	36.6	28.0	30.5	3.9	4.8	3.0
	AFT							92		93		0.52	0.37	0.50	36.6	28.0	30.5	3.1	4.0	5.6
1028-2	FWD	177	85					88		87		0.76	0.52	—	42.7	25.7	—	3.2	4.2	—
	AFT							77		84		0.76	0.52	—	42.5	25.6	—	2.9	3.3	—
1029-1	FWD	178	85	—	80	INTERIM 69	80	STANDARD 91	80	77	—	0.67	0.34	0.77	29.1	31.3	34.4	2.9	7.8	7.4
	AFT					91		95		73		0.68	0.33	0.77	28.5	30.8	34.6	4.6	3.3	4.8
1029-2	FWD	179	85			83		82		77		0.64	0.48	0.44	38.8	32.5	25.7	2.3	7.5	7.5
	AFT					91		94		81		0.65	0.48	0.44	37.5	32.1	25.7	3.6	2.9	4.9
1030-1	FWD	182	85	—	80	95	80	76	80	66	—	0.67	0.25	0.89	29.6	22.7	36.1	3.9	8.9	8.6
	AFT					74		79		77		0.67	0.25	0.89	29.6	22.8	35.9	5.4	5.1	5.6
1030-2	FWD	163	85			77		81		71		0.70	0.27	0.87	28.4	22.7	36.3	4.9	11.2	8.6
	AFT					91		74		71		0.70	0.26	0.87	28.2	21.9	36.3	5.0	6.6	5.5
1031-1	FWD	184	85	—	80	65	80	76	80	90	—	0.50	0.47	0.96	16.2	17.3	26.6	6.1	13.8	6.4
	AFT					57		71		66		0.54	0.41	0.91	18.1	18.7	22.9	6.0	12.0	5.6
1031-2	FWD	185	85			91		94		74		0.57	0.20	0.75	19.0	19.3	15.7	5.4	10.3	4.9
	AFT					—		—		—		—	—	—	—	—	—	—	—	—
1033-1	FWD	194	85	—	80	77	80	94	80	87	—	0.11	0.33	0.80	11.3	34.9	27.3	3.5	8.2	6.2
	AFT					67		93		72		0.15	0.27	0.30	8.2	59.6	18.8	4.9	8.1	5.6
1033-2	FWD	195	85			75		90		98		0.21	0.24	1.09	22.3	49.3	17.5	2.6	5.8	6.9
	AFT					93		92		73		0.20	0.24	1.05	22.3	50.7	17.4	2.9	7.3	6.7

PERFORMANCE SUMMARY

MISSION NUMBER	CAMERA	SERIAL NUMBER	M.I.P. VALUE	AFSPPF MTF/AIM AVERAGE	SLIT (μ)	AVERAGE	90% ATTITUDE ERROR (°) PITCH	ROLL	YAW	90% ATTITUDE RATES (°/HR.) PITCH	ROLL	YAW	90% V/H ERROR (%)	90% RESOLUTION LIMIT (FEET) ALONG TRACK	CROSS TRACK	I.M.C. ERROR
1034-1	FWD	186	80	75	80	81	0.20	0.19	0.99	19.3	20.4	24.9	15.0	17.8	5.9	—
	AFT			93		90	0.20	0.19	0.99	19.3	20.4	24.9	15.2	13.6	4.5	—
1034-2	FWD	187	80	74		89	0.34	0.36	0.33	21.1	28.9	16.2	8.7	10.4	7.1	—
	AFT			69		86	0.34	0.36	0.33	21.1	29.0	16.2	8.9	8.0	5.3	—
1035-1	FWD	189	85	66	80	—	0.16	0.55	2.39	18.9	27.9	33.9	4.0	4.8	3.7	4.0
	AFT			[illegible]			0.17	0.54	2.43	19.3	23.4	32.2	4.1	3.7	2.4	4.1
1035-2	FWD	[illegible]	85	81			0.16	0.50	3.02	18.4	30.1	27.5	3.2	4.0	3.5	3.2
	AFT			[illegible]			0.17	0.51	3.02	19.9	24.7	26.3	3.4	3.3	2.4	3.4
1036-1	FWD	190	85	[illegible]	80	—	0.76	0.56	0.60	31.2	25.6	29.5	3.4	5.1	6.8	—
	AFT			94			0.76	0.96	0.60	31.1	25.5	29.4	3.3	3.6	5.1	—
1036-2	FWD	191	85	73			0.94	0.70	0.40	33.0	29.7	23.3	3.3	3.8	6.5	—
	AFT			84			0.94	0.70	0.40	32.9	23.7	23.3	3.1	2.7	4.9	—
1037-1	FWD	[illegible]	85	[illegible]	80	—	0.25	0.25	1.50	28.8	40.0	29.3	9.5	10.1	8.0	9.8
	AFT			[illegible]			0.25	0.27	1.51	28.7	30.9	32.4	10.1	8.0	6.1	10.3
1037-2	FWD	[illegible]	85	[illegible]			0.24	0.30	1.17	26.5	52.5	20.2	6.3	6.6	7.5	6.5
	AFT			81			0.27	0.32	1.18	33.8	36.6	53.4	6.6	5.4	5.9	7.0
1038-1	FWD	192	60	[illegible]	80	—	0.22	0.25	2.98	18.7	33.7	39.9	3.6	4.1	3.7	3.5
	AFT			76			0.27	0.24	2.99	41.8	27.2	34.4	3.4	3.3	2.5	3.7
1038-2	FWD	93	80	[illegible]			0.39	0.51	2.87	20.0	46.7	27.8	3.4	3.6	3.8	3.1
	AFT			77			0.39	0.51	2.90	50.4	28.3	27.3	3.4	3.6	2.4	3.9
1039-1	FWD	206	65	59	80	—	0.21	0.43	3.03	19.0	27.8	39.2	5.1	6.2	4.6	5.2
	AFT			71			0.20	0.41	3.05	37.5	23.0	28.5	5.2	4.8	3.2	5.2
1039-2	FWD	207	85	71			0.30	0.54	2.50	33.1	30.2	25.0	4.6	5.5	5.4	4.7
	AFT			65			0.34	0.53	2.52	27.1	24.2	23.9	4.8	4.6	3.8	5.0
1040-1	FWD	196	85	94	80	—	0.33	0.56	2.99	26.0	22.2	28.4	2.6	3.9	2.1	2.8
	AFT			68			0.30	0.56	3.00	22.1	23.2	28.5	2.1	1.9	2.5	2.1
1040-2	FWD	197	85	61			0.32	0.49	2.96	27.5	30.0	32.5	1.6	2.2	2.0	1.7
	AFT			75			0.29	0.46	2.96	27.2	26.4	28.7	2.7	2.5	2.2	2.6
1041-1	FWD	208	85	72	80	—	0.34	0.16	3.05	14.7	14.0	12.7	5.1	6.4	3.4	5.2
	AFT			82			0.35	0.16	3.05	15.8	13.5	13.0	5.9	5.7	3.0	5.7
1041-2	FWD	209	85	73			0.26	0.23	2.94	22.9	15.7	18.8	4.9	6.4	2.1	4.9
	AFT			78			0.28	0.24	3.01	23.9	16.2	21.0	5.6	5.5	2.0	5.5
1042-1	FWD	204	85	79	80	—	0.31	0.22	2.86	22.1	38.3	27.0	3.1	3.3	1.5	3.1
	AFT			85			0.32	0.24	2.83	23.4	33.0	25.9	3.2	2.7	1.1	3.4
1042-2	FWD	205	95	70			0.31	0.38	2.39	16.1	46.1	31.4	2.1	2.5	2.2	2.3
	AFT			74			0.32	0.37	2.31	19.9	33.6	25.6	2.6	2.3	1.3	2.8
1043-1	FWD	200	85	65	80	—	0.28	0.23	3.11	23.9	22.0	41.5	4.2	5.4	1.5	4.2
	AFT			67			0.31	0.23	3.14	25.4	20.5	34.9	3.3	2.8	0.8	3.3
1043-2	FWD	201	85	65			0.30	0.34	2.73	29.2	31.6	47.9	4.3	5.3	2.2	4.4
	AFT			75			0.34	0.34	2.78	27.3	29.9	45.1	3.1	2.8	0.9	3.2

TABLE 10-2

[redacted]

EXPOSURE - PROCESSING SUMMARY

MISSION NUMBER	CAMERA	SOLAR ELEVATION RANGE (°)		SOLAR AZIMUTH RANGE (°)		PREDICTED PROCESSING (%)			REPORTED PROCESSING (%)			COMPUTED PROCESSING (%)			TERRAIN D-MIN				TERRAIN D-MAX				CLOUD D-MAX				UNDER EXPOSED (%)	UNDER PROCESSED (%)	NOMINAL EXP & PRO (%)	OVER PROCESSED (%)	OVER EXPOSED (%)	CLOUD COVER (%)
		LOW	HIGH	LOW	HIGH	P	I	F	P	I	F	P	I	F	RANGE LOW	RANGE HIGH	MEAN	MEDIAN	RANGE LOW	RANGE HIGH	MEAN	MEDIAN	RANGE LOW	RANGE HIGH	MEAN	MEDIAN						
1004-1	FWD	-3	61	25	124	5	76	19	4	79	17	0	79	21	0.26	1.89	0.83	0.78	0.43	2.43	1.97	2.02	1.00	2.43	2.04	2.08	0	4	60	31	5	35
	AFT	-3	61	25	124	5	74	21	4	79	17	0	80	20	0.22	1.56	0.76	0.70	0.93	2.45	1.92	1.94	1.08	2.43	1.98	2.03	1	4	67	26	3	35
1004-2	FWD	-4	58	10	131	7	76	17	37	50	13	4	83	13	0.29	1.80	0.83	0.78	0.36	2.30	1.84	1.90	0.41	2.37	1.87	1.93	0	4	59	27	9	35
	AFT	-4	68	10	131	7	76	17	37	50	13	4	77	19	0.29	1.91	0.81	0.73	0.36	2.39	1.89	1.99	0.43	2.46	1.89	1.98	0	4	67	20	9	35
1006-1	FWD	38	56	52	140	1	99	0	1	51	48	0	51	49	0.23	1.81	0.71	0.68	0.80	2.31	1.58	1.52	1.31	2.40	2.20	2.24	0	5	72	21	1	60
	AFT	38	56	52	140	1	99	0	0	23	77	0	24	76	0.36	1.66	0.87	0.84	0.96	2.35	1.72	1.72	1.14	2.40	2.24	2.28	0	1	58	40	1	60
1006-2	FWD	32	64	36	147	2	98	0	30	41	29	11	59	30	0.21	1.14	0.53	0.50	0.56	2.28	1.49	1.50	1.30	2.33	2.11	2.16	2	21	72	4	0	45
	AFT	32	64	36	147	2	98	0	35	40	25	21	54	25	0.26	1.34	0.62	0.58	0.65	2.19	1.48	1.47	1.56	2.50	2.12	2.16	0	11	77	9	3	45
1007-1	FWD	12	49	50	103	0	5	95	1	20	79	0	25	75	0.26	1.22	0.52	0.47	0.62	2.20	1.44	1.40	1.22	1.36	2.17	2.21	20	8	67	5	0	60
	AFT	11	49	48	102	0	100	0	10	42	48	6	77	17	0.26	1.76	0.58	0.55	0.78	2.31	1.52	1.52	1.54	2.39	2.20	2.24	1	13	80	5	1	60
1007-2	FWD	32	57	43	112	0	25	75	3	28	69	0	26	74	0.26	1.23	0.51	0.48	0.70	2.32	1.44	1.40	0.90	2.37	2.15	2.20	18	9	71	2	0	65
	AFT	31	57	38	111	0	100	0	19	41	40	3	88	9	0.24	1.56	0.60	0.56	0.44	2.27	1.50	1.52	0.84	2.41	2.17	2.25	1	16	74	9	1	65
1008-1	FWD	30	51	50	102	0	100	0	4	32	64	1	35	64	0.32	1.48	0.66	0.62	0.78	2.24	1.55	1.54	1.46	2.35	2.21	2.24	2	2	86	8	1	45
	AFT	30	51	50	102	0	100	0	4	27	69	0	34	66	0.32	1.57	0.71	0.69	0.81	2.21	1.57	1.58	1.08	2.37	2.21	2.24	1	1	84	13	0	45
1008-2	FWD	29	56	42	105	0	100	0	3	31	66	0	27	73	0.14	1.81	0.76	0.72	0.57	2.10	1.54	1.55	1.09	2.40	2.20	2.25	2	1	73	23	1	65
	AFT	29	56	42	105	0	100	0	3	30	67	0	29	71	0.32	1.64	0.77	0.76	0.73	2.10	1.55	1.55	1.10	2.35	2.18	2.22	1	3	69	27	0	65
1009-1	FWD	12	49	42	132	0	100	0	1	26	73	0	34	66	0.32	1.40	0.65	0.62	0.85	2.41	1.53	1.52	0.83	2.51	2.30	2.36	5	4	77	14	0	50
	AFT	12	49	42	132	0	100	0	0	40	60	0	45	55	0.28	1.42	0.70	0.64	0.92	2.28	1.58	1.55	0.63	2.51	2.32	2.36	1	5	73	20	0	50
1009-2	FWD	23	58	35	138	2	98	0	3	21	76	0	40	60	0.29	1.55	0.69	0.64	0.73	2.37	1.53	1.53	1.06	2.45	2.25	2.30	4	4	74	17	0	55
	AFT	23	58	35	138	2	98	0	4	47	49	0	56	44	0.26	1.47	0.69	0.64	0.44	2.42	1.61	1.60	1.61	2.50	2.31	2.34	1	4	77	18	0	55
1010-1	FWD	18	47	45	83	0	21	79	0	13	87	0	9	91	0.28	1.14	0.52	0.47	0.43	2.32	1.38	1.32	1.11	2.42	2.16	2.20	18	3	75	4	0	49
	AFT	18	47	45	83	0	21	79	0	19	81	0	16	84	0.27	1.25	0.57	0.52	0.78	2.42	1.45	1.41	0.96	2.46	2.20	2.26	9	4	81	6	0	49
1010-2	FWD	15	52	38	76	0	50	50	0	16	84	0	13	87	0.26	1.51	0.55	0.50	0.52	2.36	1.41	1.38	1.00	2.44	2.14	2.20	22	4	67	6	0	45
	AFT	15	52	38	76	0	50	50	0	23	77	0	25	75	0.20	1.48	0.59	0.56	0.30	2.40	1.47	1.45	1.29	2.49	2.19	2.22	13	3	76	8	0	45
1011-1	FWD	2	55	33	66	0	64	36	2	23	75	2	23	75	0.18	0.99	0.50	0.46	0.56	2.36	1.48	1.43	0.78	2.40	2.07	2.16	17	11	70	2	0	40
	AFT	2	55	33	66	0	67	33	3	47	50	0	37	63	0.24	1.48	0.60	0.56	0.50	2.35	1.57	1.55	0.74	2.37	2.11	2.18	3	7	81	8	0	40
1012-1	FWD	0	45	38	71	0	64	36	7	56	37	0	65	35	0.25	1.30	0.59	0.53	0.54	2.39	1.40	1.42	0.90	2.39	1.93	2.00	6	17	68	10	0	60
	AFT	0	45	38	71	0	64	36	0	33	67	0	49	51	0.26	1.40	0.61	0.58	0.47	2.27	1.44	1.40	0.72	2.32	1.89	1.95	5	10	74	11	0	60
1012-2	FWD	0	57	34	106	0	77	23	6	44	50	0	49	51	0.30	1.20	0.58	0.55	0.73	2.32	1.49	1.42	0.67	2.34	1.91	2.00	4	9	80	7	0	40
	AFT	0	57	34	106	0	77	23	3	15	82	0	10	90	0.30	1.27	0.68	0.62	0.48	2.33	1.55	1.58	0.70	2.38	1.96	2.02	4	0	72	23	0	40
1013-1	FWD	0	56	28	83	0	64	36	0	42	58	0	55	45	0.20	1.66	0.56	0.36	0.52	2.29	1.56	1.59	1.21	2.41	2.03	2.10	7	13	75	4	0	47
	AFT	0	56	26	82	0	64	36	2	7	91	0	33	67	0.28	1.56	0.66	0.48	0.64	2.28	1.53	1.63	1.10	2.36	1.97	2.03	5	5	74	16	0	47
1014-1	FWD	0	59	15	71	0	21	79	1	38	61	0	63	37	0.17	0.99	0.40	0.36	0.26	2.36	1.40	1.42	1.01	2.38	1.94	2.05	27	33	39	1	0	40
	AFT	0	59	14	69	0	31	69	0	13	87	0	36	64	0.18	1.26	0.51	0.48	0.25	2.38	1.42	1.49	0.42	2.43	1.91	2.00	19	12	64	5	0	40
1014-2	FWD	0	77	0	36	0	21	79	0	26	74	0	61	39	0.17	1.06	0.36	0.31	0.23	2.32	1.30	1.36	0.42	2.36	1.72	1.60	31	40	27	2	0	40
	AFT	0	76	0	34	0	29	71	0	5	95	0	68	32	0.18	1.49	0.44	0.40	0.27	2.28	1.34	1.45	0.26	2.44	1.71	1.64	19	29	50	2	0	40
1015-1	FWD	5	68	19	68	0	8	92	2	2	96	0	2	98	0.25	1.70	0.54	0.47	0.54	2.28	1.44	1.46	0.46	2.41	1.86	1.90	28	0	65	7	0	45
	AFT	4	68	18	67	0	30	70	0	5	95	0	4	96	0.29	1.20	0.60	0.56	0.46	2.28	1.49	1.50	0.80	2.36	1.86	1.95	14	0	77	8	0	45
1015-2	FWD	0	80	-2	71	0	10	90	0	10	90	0	11	89	0.22	1.10	0.50	0.46	0.34	2.07	1.29	1.30	0.28	2.34	1.69	1.78	28	4	65	3	0	40
	AFT	0	79	-2	71	0	21	79	0	9	91	0	9	91	0.26	1.21	0.59	0.52	0.36	2.22	1.37	1.38	0.38	2.40	1.74	1.80	17	1	70	12	0	40
1016-1	FWD	5	69	13	76	0	7	93	1	41	58	0	59	41	0.13	1.55	0.51	0.45	0.70	2.43	1.67	1.68	0.95	2.44	1.91	1.90	19	17	56	8	1	45
	AFT	4	69	12	76	0	27	73	0	26	74	0	42	53	0.22	1.65	0.64	0.58	0.62	2.34	1.69	1.72	0.93	2.46	1.90	1.92	11	9	62	17	1	45
1016-2	FWD	1	84	-4	76	0	8	92	0	31	69	0	48	52	0.18	1.56	0.48	0.44	0.29	2.35	1.45	1.44	0.34	2.50	1.76	1.82	22	13	56	3	0	40
	AFT	0	84	-4	76	0	19	81	1	27	72	0	40	60	0.20	1.88	0.55	0.49	0.26	2.32	1.52	1.60	0.30	2.40	1.75	1.82	23	5	65	6	1	40
1017-1	FWD	-11	50	21	99	0	0	100	13	63	24	0	82	18	0.20	1.65	0.66	0.61	0.46	2.23	1.74	1.78	0.60	2.37	1.93	2.00	1	8	77	13	1	25
	AFT	-1	57	19	98	0	17	83	24	58	18	4	90	6	0.20	1.62	0.64	0.60	0.60	2.20	1.75	1.75	1.18	2.36	1.89	1.90	1	13	74	11	2	25
1017-2	FWD	1	78	9	139	0	0	100	5	62	33	7	77	16	0.22	1.22	0.58	0.53	0.37	2.30	1.70	1.80	0.86	2.37	1.93	1.94	3	14	74	9	0	30
	AFT	1	79	7	135	0	7	93	13	62	20	0	80	11	0.20	1.54	0.54	0.52	0.30	2.30	1.62	1.69	0.38	2.34	1.85	1.92	2	13	74	10	1	30
1018-1	FWD	6	77	13	134	0	0	100	9	63	28	1	83	16	0.19	1.46	0.56	0.52	0.64	2.22	1.66	1.73	1.00	2.32	1.96	1.99	2	19	71	7	0	35
	AFT	6	78	10	125	0	22	78	9	53	38	5	72	23	0.18	1.35	0.62	0.58	0.68	2.20	1.68	1.80	1.03	2.28	1.95	2.00	1	12	77	9	2	35
1018-2	FWD	8	77	14	134	0	0	100	18	74	8	17	79	4	0.15	1.79	0.57	0.49	0.50	2.24	1.50	1.54	0.90	2.26	1.85	1.91	1	31	56	9	4	45
	AFT	8	77	10	132	0	15	85	1	50	49	0	74	26	0.22	1.50	0.81	0.79	0.94	2.26	1.70	1.74	1.09	[illegible]	1.95	2.04	0	5	50	35	2	45

EXPOSURE - PROCESSING SUMMARY

MISSION NUMBER	CAMERA	SOLAR ELEVATION RANGE (°)		SOLAR AZIMUTH RANGE (°)		PREDICTED PROCESSING (%)			REPORTED PROCESSING (%)			COMPUTED PROCESSING (%)			TERRAIN D-MIN				TERRAIN D-MAX				CLOUD D-MAX				UNDER EXPOSED (%)	UNDER PROCESSED (%)	NOMINAL EXP & PRO (%)	OVER PROCESSED (%)	OVER EXPOSED (%)	CLOUD COVER (%)
															RANGE				RANGE				RANGE									
		LOW	HIGH	LOW	HIGH	P	I	F	P	I	F	P	I	F	LOW	HIGH	MEAN	MEDIAN	LOW	HIGH	MEAN	MEDIAN	LOW	HIGH	MEAN	MEDIAN						
1019-1	FWD	24	70	24	152	0	21	79	22	32	46	4	56	40	0.26	1.92	0.71	0.61	0.60	2.15	1.45	1.50	0.84	2.26	1.94	2.00	4	7	64	17	7	45
	AFT	23	70	21	152	0	92	8	26	55	19	3	87	10	0.13	1.70	0.66	0.60	0.39	2.26	1.46	1.45	0.80	2.30	1.96	2.02	1	13	70	14	3	45
1020-1	FWD	30	75	19	156	0	19	81	13	48	39	1	58	41	0.23	1.30	0.55	0.52	0.80	2.28	1.57	1.54	1.40	2.38	2.10	2.16	1	18	78	4	0	42
	AFT	29	75	17	156	0	64	36	15	56	29	0	74	26	0.23	1.20	0.55	0.54	0.70	2.20	1.47	1.46	1.22	2.29	2.04	2.10	0	18	76	5	0	42
1020-2	FWD	47	69	18	35	INSUFFICIENT DATA																										
	AFT	46	68	17	33																											
1021-1	FWD	15	66	-146	-23	0	68	32	14	39	47	1	52	47	0.25	1.90	0.64	0.58	0.74	2.18	1.50	1.50	0.97	2.36	1.92	2.00	5	9	72	11	3	35
	AFT	14	66	-147	-25	0	99	1	15	38	47	0	57	43	0.17	1.70	0.65	0.57	0.54	2.24	1.45	1.42	0.85	2.30	1.90	2.00	5	5	75	12	3	35
1021-2	FWD	13	52	-133	-41	0	29	71	13	41	46	0	57	43	0.18	1.52	0.54	0.50	0.60	2.36	1.36	1.34	1.05	2.23	1.82	1.85	14	13	66	6	0	20
	AFT	13	52	-133	-41	0	100	0	53	25	22	0	50	50	0.33	1.38	0.76	0.76	0.70	2.30	1.52	1.50	1.30	2.36	1.94	1.94	6	0	71	21	1	20
1022-1	FWD	28	67	30	150	0	36	64	8	36	56	0	42	58	0.18	1.49	0.45	0.40	0.54	2.42	1.57	1.60	1.32	2.55	2.24	2.29	30	19	47	3	0	35
	AFT	27	67	28	150	0	89	11	7	42	51	0	53	47	0.24	1.48	0.57	0.50	0.52	2.30	1.63	1.63	1.30	2.47	2.21	2.25	4	15	71	9	1	35
1022-2	FWD	29	74	21	152	0	8	92	1	37	62	0	43	57	0.20	0.99	0.39	0.35	0.62	2.05	1.45	1.45	1.16	2.45	2.23	2.28	35	28	35	1	0	45
	AFT	28	74	19	152	0	100	0	10	44	46	0	53	47	0.21	1.40	0.48	0.44	0.50	2.32	1.51	1.52	1.45	2.49	2.25	2.28	10	25	61	4	0	45
1023-1	FWD	22	82	8	164	0	5	95	19	54	27	0	72	28	0.15	1.26	0.39	0.35	0.43	2.41	1.22	1.22	0.87	2.41	2.06	2.11	20	44	34	2	0	35
	AFT	20	81	5	163	0	11	89	0	39	61	0	42	58	0.20	1.40	0.53	0.48	0.41	2.21	1.31	1.37	0.94	2.45	2.15	2.20	13	14	65	7	0	35
1023-2	FWD	29	81	-13	177	0	7	93	0	19	81	0	18	82	0.22	1.36	0.48	0.42	0.41	2.03	1.18	1.22	0.90	2.41	2.03	2.11	35	2	60	2	1	35
	AFT	28	80	-13	178	0	3	97	0	34	66	0	28	72	0.22	1.60	0.52	0.48	0.44	2.31	1.24	1.24	1.08	2.46	2.10	2.17	13	10	75	4	0	35
1024-1	FWD	10	61	24	137	0	0	100	0	57	43	0	72	28	0.17	1.74	0.35	0.32	0.40	2.25	1.22	1.15	0.53	2.34	1.97	2.03	27	49	23	0	0	35
	AFT	9	61	21	136	0	0	100	0	28	72	0	82	18	0.20	1.22	0.40	0.37	0.46	2.32	1.30	1.24	0.94	2.40	1.97	2.06	13	46	39	2	0	35
1024-2	FWD	9	79	11	151	0	0	100	12	19	69	0	25	75	0.24	1.17	0.46	0.42	0.35	2.40	1.30	1.27	1.01	2.45	1.91	1.99	36	3	56	2	0	35
	AFT	8	79	9	151	0	0	100	1	22	77	0	66	34	0.20	1.39	0.47	0.40	0.29	2.26	1.31	1.32	0.90	2.40	1.89	1.95	20	25	50	5	0	35
1025-1	FWD	1	70	-123	-18	0	63	38	10	41	49	0	56	44	0.18	1.42	0.43	0.37	0.20	2.36	1.37	1.39	0.40	2.35	1.86	1.92	33	25	38	4	1	35
	AFT	0	70	-121	-19	0	72	28	8	49	43	0	61	39	0.18	1.65	0.49	0.42	0.26	2.26	1.33	1.38	0.25	2.32	1.75	1.85	25	20	47	7	1	35
1025-2	FWD	0	56	-124	-31	0	71	29	3	42	55	0	56	44	0.18	1.22	0.45	0.39	0.26	2.24	1.32	1.33	0.63	2.29	1.76	1.83	29	21	45	4	0	35
	AFT	0	56	-122	-33	0	73	27	3	45	52	0	51	49	0.21	1.32	0.53	0.48	0.29	2.16	1.31	1.35	0.48	2.33	1.71	1.79	19	12	61	8	1	35
1026-1	FWD	0	57	23	135	0	4	96	0	21	79	0	24	76	0.20	1.26	0.38	0.33	0.31	2.27	1.22	1.22	0.40	2.38	1.77	1.87	57	13	28	2	0	45
	AFT	0	57	21	135	0	5	95	0	4	96	0	38	62	0.20	1.16	0.39	0.34	0.24	2.36	1.29	1.30	0.37	2.40	1.78	1.85	39	27	33	1	0	45
1026-2	FWD	1	72	8	84	0	0	100	1	5	94	0	5	95	0.19	1.32	0.36	0.30	0.23	2.17	1.05	1.02	0.45	2.24	1.63	1.70	73	2	19	1	0	45
	AFT	0	57	13	78	0	0	100	2	5	93	0	15	85	0.21	1.35	0.39	0.32	0.27	2.20	1.08	1.05	0.30	2.29	1.61	1.70	60	12	25	3	0	45
1027-1	FWD	3	63	26	110	0	0	100	0	0	100	0	3	97	0.26	1.54	0.52	0.46	0.53	2.38	1.45	1.52	0.71	2.39	2.03	2.10	36	2	53	4	0	55
	AFT	2	63	26	108	0	0	100	0	21	79	0	20	80	0.26	1.34	0.50	0.53	0.34	2.30	1.46	1.46	0.49	2.40	1.96	2.06	12	3	79	7	0	55
1028-1	FWD	5	73	15	135	0	4	96	0	4	96	0	11	89	0.22	1.03	0.37	0.32	0.40	2.32	1.42	1.42	0.60	2.30	1.77	1.83	65	6	26	1	0	50
	AFT	1	73	14	133	0	5	95	0	16	84	0	11	89	0.20	1.01	0.41	0.36	0.30	2.24	1.35	1.40	0.63	2.26	1.72	1.77	56	5	37	1	0	55
1028-2	FWD	2	81	5	48	0	3	97	1	9	90	0	15	85	0.23	0.98	0.40	0.35	0.37	2.20	1.36	1.38	0.53	2.33	1.72	1.77	53	3	37	1	0	55
	AFT	1	80	5	43	0	10	90	0	6	94	0	6	94	0.22	1.40	0.50	0.40	0.38	2.21	1.40	1.43	0.38	2.35	1.69	1.75	47	1	44	7	1	50
1029-1	FWD	3	63	18	130	0	8	92	1	16	83	0	14	86	0.25	1.60	0.54	0.54	0.50	2.30	1.72	1.76	0.46	2.39	2.03	2.08	20	0	62	14	3	55
	AFT	2	62	16	128	0	20	80	0	21	79	0	25	75	0.16	1.73	0.57	0.43	0.20	2.32	1.62	1.65	0.55	2.40	1.91	1.95	24	5	46	10	1	55
1029-2	FWD	0	80	4	146	0	4	96	2	28	70	0	30	70	0.22	1.68	0.54	0.45	0.31	2.56	1.52	1.59	0.49	2.40	1.98	2.05	33	3	50	11	2	55
	AFT	0	80	3	145	0	10	90	2	24	74	0	25	75	0.20	1.58	0.56	0.49	0.30	2.34	1.52	1.60	0.34	2.40	1.87	1.93	23	5	59	11	2	55
1030-1	FWD	5	63	27	130	0	58	42	3	32	65	1	52	47	0.30	1.96	0.81	0.75	0.61	2.34	1.75	1.79	0.78	2.38	2.01	2.07	4	3	61	28	4	40
	AFT	4	63	22	129	0	53	47	0	16	84	0	71	29	0.26	1.64	0.75	0.66	0.48	2.30	1.69	1.74	0.60	2.40	1.97	2.05	1	9	64	23	4	40
1030-2	FWD	3	78	10	158	1	42	57	0	53	47	0	70	30	0.23	1.65	0.64	0.57	0.36	2.50	1.61	1.70	0.57	2.36	1.99	2.05	5	9	51	3	1	35
	AFT	2	78	7	157	1	23	76	0	28	72	0	30	70	0.34	1.94	0.82	0.77	0.53	2.40	1.70	1.80	0.63	2.43	2.06	2.10	2	0	66	30	2	35
1031-1	FWD	17	70	20	140	0	90	1	18	34	48	0	61	39	0.25	1.67	0.71	0.63	0.51	2.23	1.46	1.50	0.51	2.44	2.00	2.08	2	6	70	14	1	45
	AFT	17	70	13	140	0	14	86	15	43	42	0	47	53	0.24	1.56	0.71	0.62	0.53	2.21	1.65	1.70	1.15	2.35	2.00	2.05	4	4	77	11	4	45
1031-2	FWD	19	82	6	67	0	99	1	8	53	39	0	60	40	0.26	1.53	0.60	0.72	0.46	2.26	1.73	1.82	1.62	2.57	2.08	2.13	0	5	68	22	5	40
	AFT	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1033-1	FWD	10	47	46	135	0	89	11	0	3	97	0	2	98	0.28	1.10	0.54	0.50	0.70	2.26	1.55	1.59	1.26	2.42	2.14	2.20	11	1	55	3	0	45
	AFT	11	47	45	135	0	10	90	3	8	89	0	3	97	0.30	1.20	0.53	0.50	0.64	2.32	1.45	1.46	0.84	2.44	2.13	2.20	8	1	55	1	0	45
1033-2	FWD	0	54	34	131	0	84	16	1	4	95	0	0	100	0.30	1.52	0.55	0.49	0.45	2.30	1.30	1.36	0.54	2.41	2.15	2.21	16	0	79	5	0	50
	AFT	0	54	34	131	0	86	14	0	5	95	0	1	99	0.26	1.28	0.54	0.50	0.50	2.32	1.29	1.30	0.58	2.44	2.19	2.24	12	0	58	8	0	50

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EXPOSURE - PROCESSING SUMMARY

MISSION NUMBER	CAMERA	SOLAR ELEVATION RANGE (°)		SOLAR AZIMUTH RANGE (°)		PREDICTED PROCESSING (%)			REPORTED PROCESSING (%)			COMPUTED PROCESSING (%)			TERRAIN D-MIN				TERRAIN D-MAX				CLOUD D-MAX				UNDER EXPOSED (%)	UNDER PROCESSED (%)	NOMINAL EXP. & PRO. (%)	OVER PROCESSED (%)	OVER EXPOSED (%)	CLOUD COVER (%)
															RANGE				RANGE				RANGE									
		LOW	HIGH	LOW	HIGH	P	I	F	P	I	F	P	I	F	LOW	HIGH	MEAN	MEDIAN	LOW	HIGH	MEAN	MEDIAN	LOW	HIGH	MEAN	MEDIAN						
1034-1	FWD	23	77	16	165	0	96	4	3	21	76	0	20	80	0.25	1.80	0.57	0.50	0.55	2.42	1.58	1.61	0.88	2.45	2.22	2.26	18	3	70	7	2	35
	AFT	23	77	10	165	0	55	45	2	31	67	0	16	84	0.29	1.63	0.56	0.50	0.41	2.35	1.55	1.60	0.97	2.44	2.19	2.25	18	4	71	7	0	35
1034-2	FWD	29	86	0	178	0	88	12	9	26	65	0	27	73	0.19	1.52	0.57	0.52	0.72	2.40	1.63	1.60	1.21	2.47	2.25	2.31	12	4	76	8	0	45
	AFT	30	86	0	178	0	41	59	6	37	57	0	34	66	0.26	1.60	0.54	0.49	0.70	2.32	1.59	1.62	1.08	2.46	2.22	2.29	12	10	73	4	2	45
1035-1	FWD	13	68	19	144	0	17	83	0	11	89	0	5	95	0.28	1.90	0.52	0.45	0.61	2.44	1.40	1.40	1.06	2.43	2.15	2.22	23	1	71	4	1	30
	AFT	13	68	18	144	0	5	95	1	14	85	0	9	91	0.24	1.39	0.50	0.43	0.60	2.42	1.48	1.53	0.90	2.55	2.15	2.24	27	3	66	5	0	30
1035-2	FWD	4	81	10	158	0	22	78	4	18	78	0	18	82	0.21	1.50	0.52	0.47	0.43	2.33	1.32	1.30	0.96	2.50	2.09	2.18	24	5	66	4	0	40
	AFT	3	81	8	158	0	23	77	1	20	79	0	12	88	0.21	1.39	0.55	0.51	0.50	2.25	1.34	1.30	0.74	2.60	2.09	2.16	14	3	76	7	0	40
1036-1	FWD	13	82	7	170	0	66	34	8	14	78	1	14	85	0.20	1.91	0.48	0.42	0.80	2.40	1.54	1.53	1.10	2.47	2.26	2.33	33	5	59	2	1	40
	AFT	15	83	5	171	0	5	95	3	9	88	0	10	90	0.24	1.65	0.55	0.51	0.55	2.25	1.49	1.52	1.20	2.43	2.23	2.29	12	2	80	5	0	40
1036-2	FWD	10	78	12	167	0	15	85	1	19	80	0	18	82	0.26	1.43	0.47	0.42	0.50	2.20	1.30	1.36	1.18	2.60	2.12	2.16	38	6	53	3	0	35
	AFT	12	78	9	168	0	4	96	3	20	77	0	17	83	0.26	1.14	0.48	0.44	0.48	2.10	1.37	1.40	1.54	2.40	2.15	2.20	28	4	64	4	0	35
1037-1	FWD	9	84	-172	-6	0	29	71	8	10	82	0	11	89	0.31	1.47	0.64	0.58	0.61	2.38	1.54	1.53	1.05	2.46	2.07	2.14	4	1	83	12	0	35
	AFT	9	84	-171	-6	0	25	75	0	19	81	0	12	88	0.25	1.45	0.66	0.61	0.64	2.33	1.48	1.44	1.15	2.45	2.02	2.10	3	2	79	16	0	35
1037-2	FWD	8	87	-175	-3	0	25	75	14	26	60	0	12	88	0.26	1.20	0.66	0.61	0.62	2.43	1.51	1.46	0.90	2.50	2.04	2.12	4	0	84	13	0	20
	AFT	8	87	-173	-3	0	24	76	11	33	56	0	23	77	0.25	1.80	0.67	0.64	0.55	2.33	1.51	1.45	1.10	2.43	2.03	2.10	4	5	77	14	0	20
1038-1	FWD	5	68	18	131	0	22	78	2	16	82	1	15	84	0.16	1.11	0.51	0.46	0.84	2.36	1.56	1.52	1.18	2.46	2.11	2.19	29	3	65	3	0	35
	AFT	5	69	18	130	0	22	78	1	13	86	0	14	86	0.25	1.37	0.53	0.47	0.52	2.31	1.53	1.52	1.13	2.43	2.05	2.16	33	3	57	6	0	35
1038-2	FWD	7	80	1	164	1	37	62	0	15	85	0	13	83	0.21	1.40	0.58	0.51	0.55	2.42	1.57	1.54	1.00	2.50	1.99	2.06	23	1	65	10	0	40
	AFT	7	80	1	164	3	29	68	0	27	73	0	26	74	0.19	1.78	0.61	0.49	0.47	2.39	1.56	1.57	0.35	2.48	1.96	2.01	14	12	56	17	1	40
1039-1	FWD	7	65	27	140	0	62	38	8	22	70	1	24	75	0.24	1.53	0.65	0.58	0.79	2.39	1.76	1.80	1.11	2.68	2.14	2.18	3	4	79	14	0	40
	AFT	7	65	25	140	0	60	40	6	30	64	0	31	69	0.27	1.55	0.67	0.62	0.77	2.39	1.75	1.79	1.11	2.47	2.13	2.13	4	3	77	15	1	40
1039-2	FWD	8	75	10	144	4	61	35	19	38	43	3	41	56	0.30	1.38	0.65	0.59	1.06	2.35	1.69	1.66	0.84	2.50	2.04	2.12	2	5	81	12	0	35
	AFT	8	75	10	144	2	47	51	20	45	35	7	57	36	0.27	1.60	0.67	0.65	0.83	2.30	1.61	1.60	0.77	2.51	2.02	2.09	1	4	81	12	2	35
1040-1	FWD	11	73	-149	-15	0	79	21	10	31	59	2	35	63	0.25	1.71	0.71	0.63	0.94	2.38	1.71	1.74	1.16	2.40	2.04	2.10	0	3	79	17	0	35
	AFT	11	73	-149	-16	0	67	33	14	42	44	2	53	45	0.20	1.62	0.66	0.60	0.85	2.38	1.65	1.64	0.96	2.41	2.06	2.15	1	6	79	15	1	35
1040-2	FWD	12	68	-149	-21	0	66	34	7	30	63	3	29	68	0.24	1.67	0.77	0.72	0.77	2.58	1.61	1.61	1.08	2.45	2.01	2.06	1	1	72	25	1	40
	AFT	11	68	-149	-24	1	58	41	3	35	62	0	32	68	0.11	1.43	0.68	0.65	0.90	2.43	1.72	1.74	1.07	2.45	2.03	2.12	3	2	70	25	0	30
1041-1	FWD	10	66	30	129	0	100	0	7	40	53	0	46	54	0.14	2.14	0.56	0.51	0.62	2.33	1.62	1.58	0.17	2.46	2.19	2.26	6	10	79	4	1	45
	AFT	9	69	21	129	0	99	1	9	43	48	0	47	53	0.22	1.62	0.62	0.57	0.92	2.33	1.62	1.58	0.15	2.43	2.15	2.23	1	5	66	8	1	45
1041-2	FWD	28	78	14	126	1	99	0	7	26	67	0	23	77	0.31	1.51	0.66	0.62	0.78	2.36	1.54	1.51	1.40	2.46	2.15	2.19	4	2	80	13	1	45
	AFT	28	80	11	130	1	99	0	6	30	64	0	30	70	0.17	1.42	0.60	0.57	0.62	2.37	1.55	1.54	1.05	2.47	2.19	2.25	9	3	83	5	0	40
1042-1	FWD	9	76	16	163	0	19	81	9	9	82	0	15	85	0.33	1.47	0.63	0.57	0.89	2.33	1.53	1.55	1.45	2.49	2.22	2.26	7	0	80	11	0	37
	AFT	9	76	15	164	0	7	93	5	8	87	0	13	77	0.14	1.44	0.62	0.57	0.61	2.31	1.52	1.53	0.93	2.49	2.15	2.21	5	1	76	11	0	37
1042-2	FWD	37	88	-179	177	0	11	89	5	16	79	0	11	89	0.14	1.26	0.54	0.47	0.52	2.39	1.48	1.55	0.35	2.45	2.17	2.25	24	0	66	9	0	35
	AFT	37	88	-179	177	0	10	90	8	16	76	0	10	90	0.15	1.31	0.52	0.47	0.62	2.37	1.47	1.48	0.85	2.39	2.17	2.25	20	2	75	4	0	35
1043-1	FWD	12	74	16	156	0	20	80	6	26	68	4	26	70	0.15	1.63	0.54	0.47	0.61	2.25	1.40	1.39	0.98	2.41	2.13	2.16	20	4	67	8	1	35
	AFT	12	74	12	157	0	3	97	9	12	79	2	27	71	0.24	1.89	0.50	0.53	0.61	2.28	1.42	1.43	1.11	2.44	2.18	2.23	16	2	71	8	2	35
1043-2	FWD	19	86	-175	179	1	19	80	5	16	79	0	39	61	0.19	1.32	0.54	0.50	0.66	2.39	1.39	1.39	0.84	2.44	2.18	2.23	21	5	66	7	0	35
	AFT	19	86	-175	179	0	7	93	14	21	65	2	36	62	0.25	1.32	0.54	0.50	0.55	2.08	1.27	1.27	1.09	2.46	2.02	2.06	18	11	64	6	1	35

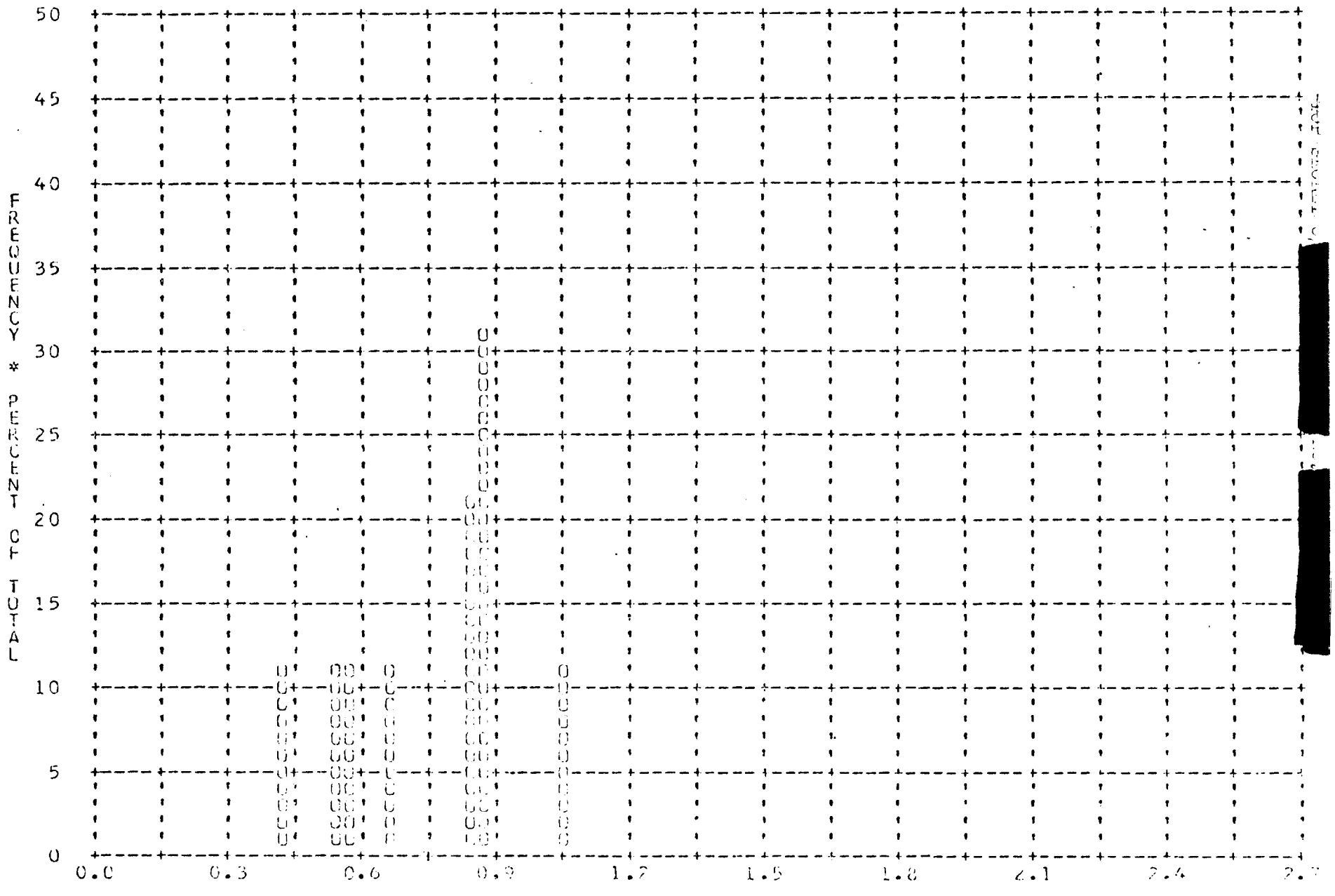
TABLE 10-3

SECTION A

APPENDIX

MISSION * 1043-1 * INSTR * FWD * 1/9/68 PLOT OF D MIN * TERRAIN * PROCESSING * PRIMARY

ARITH MEAN * 0.74 * MEDIAN * 0.83 * STD DEV * 0.19 * RANGE * 0.42 TO 1.03 WITH 10 SAMPLES



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A-1

FIGURE A-1

MISSION * 1043-1 * INSTR * FWD * 1/9/68 PLOT OF D MAX * TERRAIN * PROCESSING * PRIMARY

ARITH MEAN * 1.36 * MEDIAN * 1.42 * STD DEV * 0.18 * RANGE * 1.04 TO 1.54 WITH 10 SAMPLES

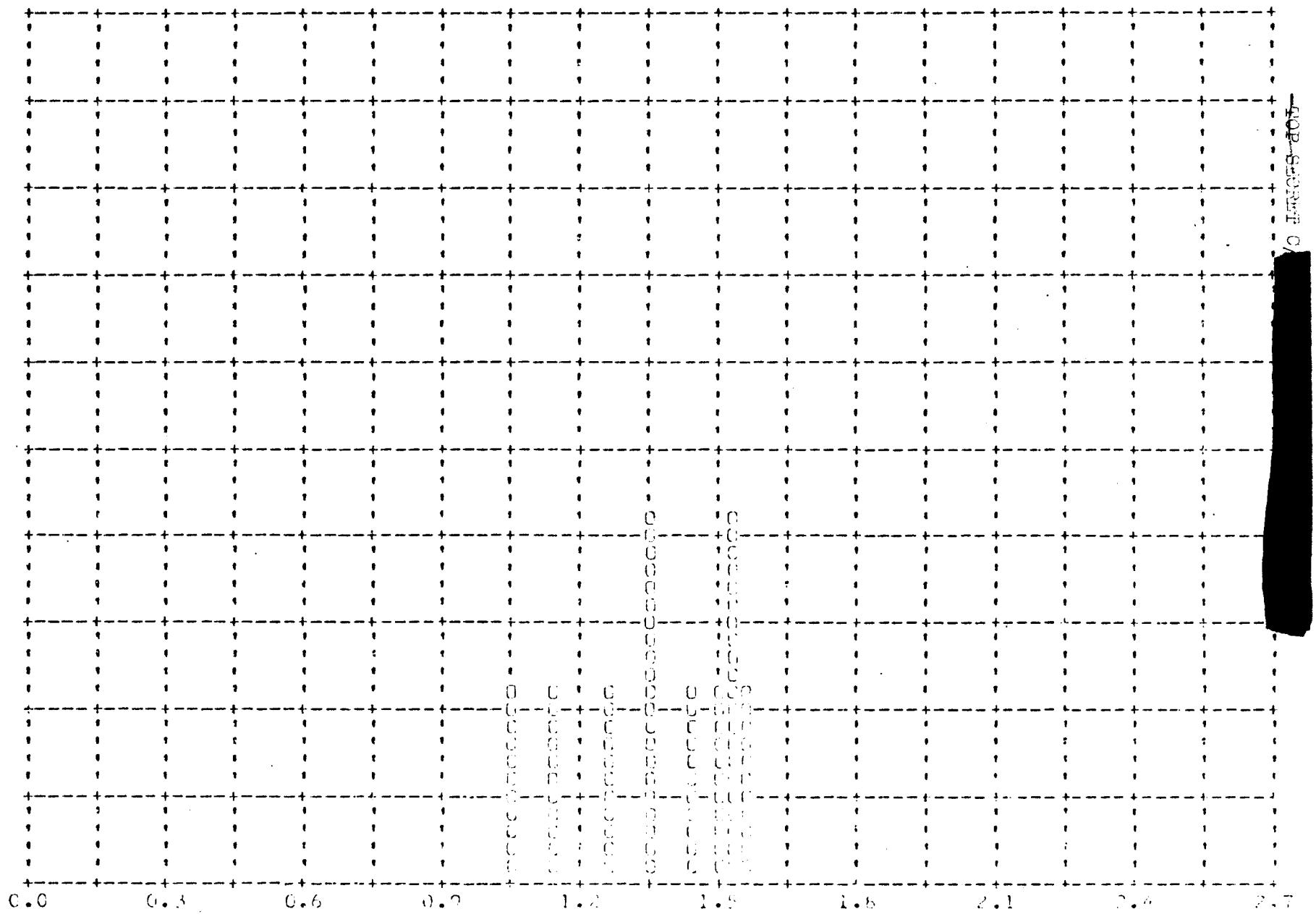


FIGURE A-1

MISSION * 1043-1 * INSTR * FWD * 1/9/68 PLOT OF D MAX * CLOUD * PROCESSING * PRIMARY

ARITH MEAN * 1.69 * MEDIAN * 1.81 * STD DEV * 0.22 * RANGE * 1.72 TO 2.13 WITH 3 SAMPLES

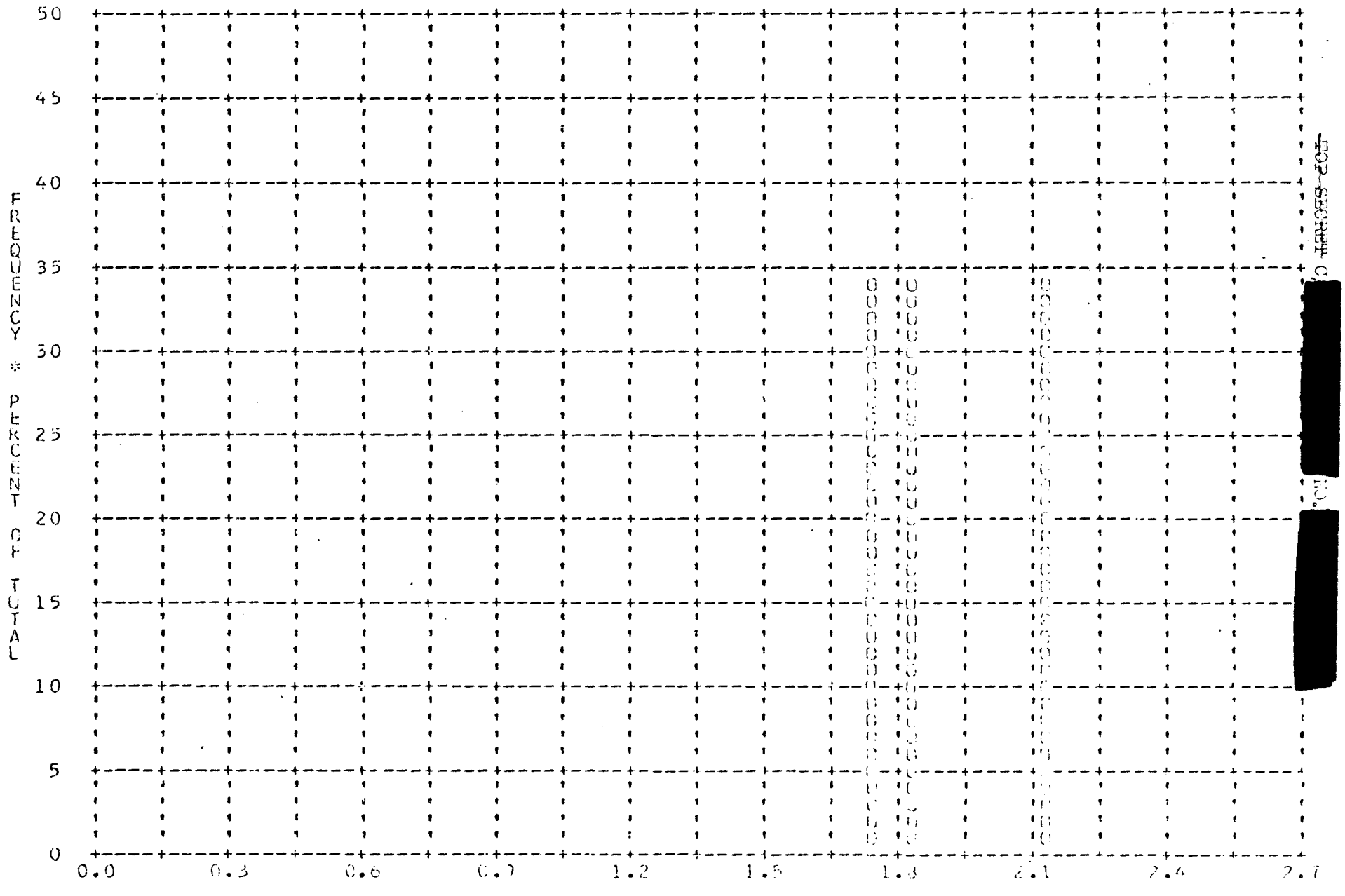


FIGURE A-1

MISSION * 1043-1 * INSTR * FWD * 1/9/68 PLOT OF D MIN * TERRAIN * PROCESSING * INTERMEDIATE

ARITH MEAN * 0.64 * MEDIAN * 0.57 * STD DEV * 0.29 * RANGE * 0.15 TO 1.63 WITH 66 SAMPLES

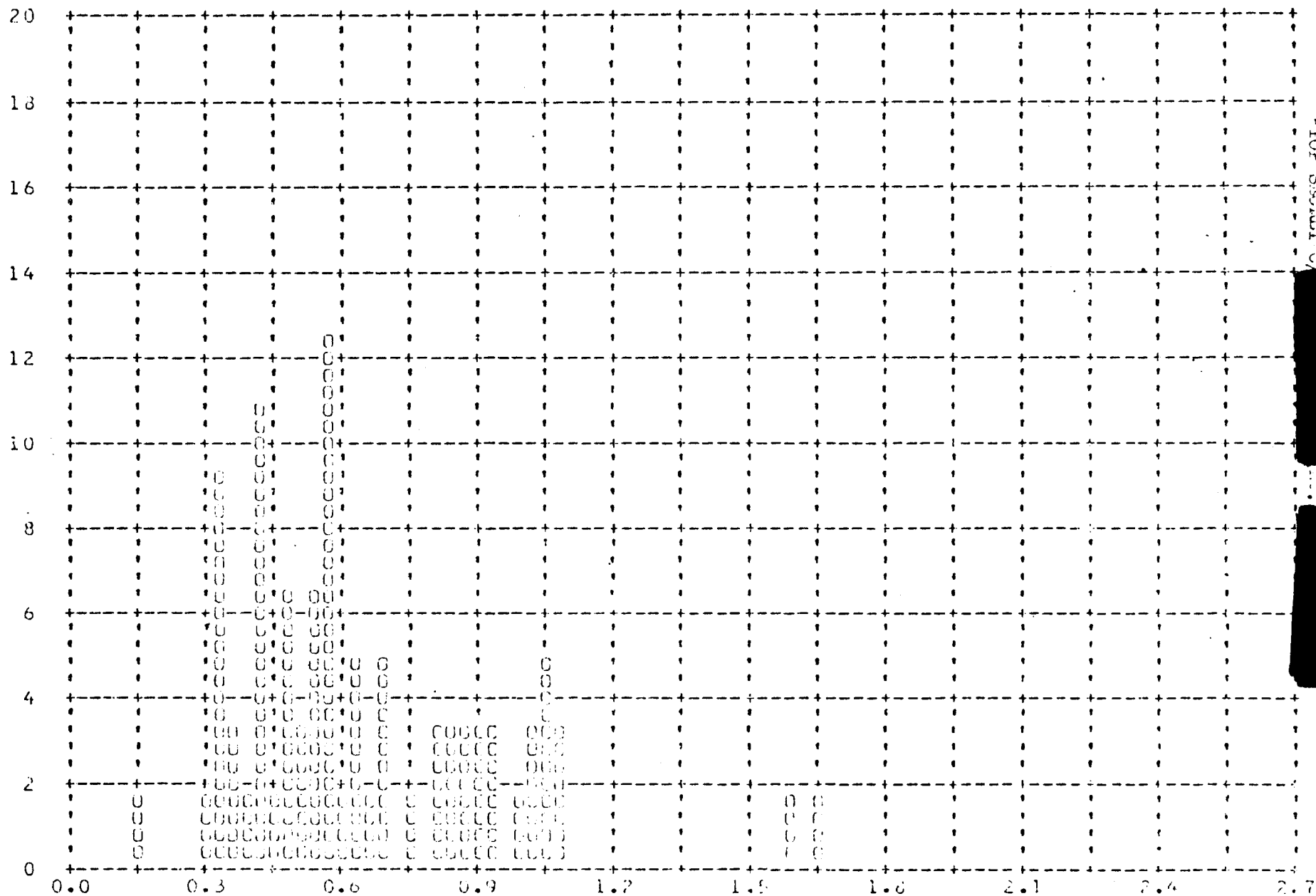


FIGURE A-1

TOP SECRET C/[redacted]

TOP SECRET C/[redacted]

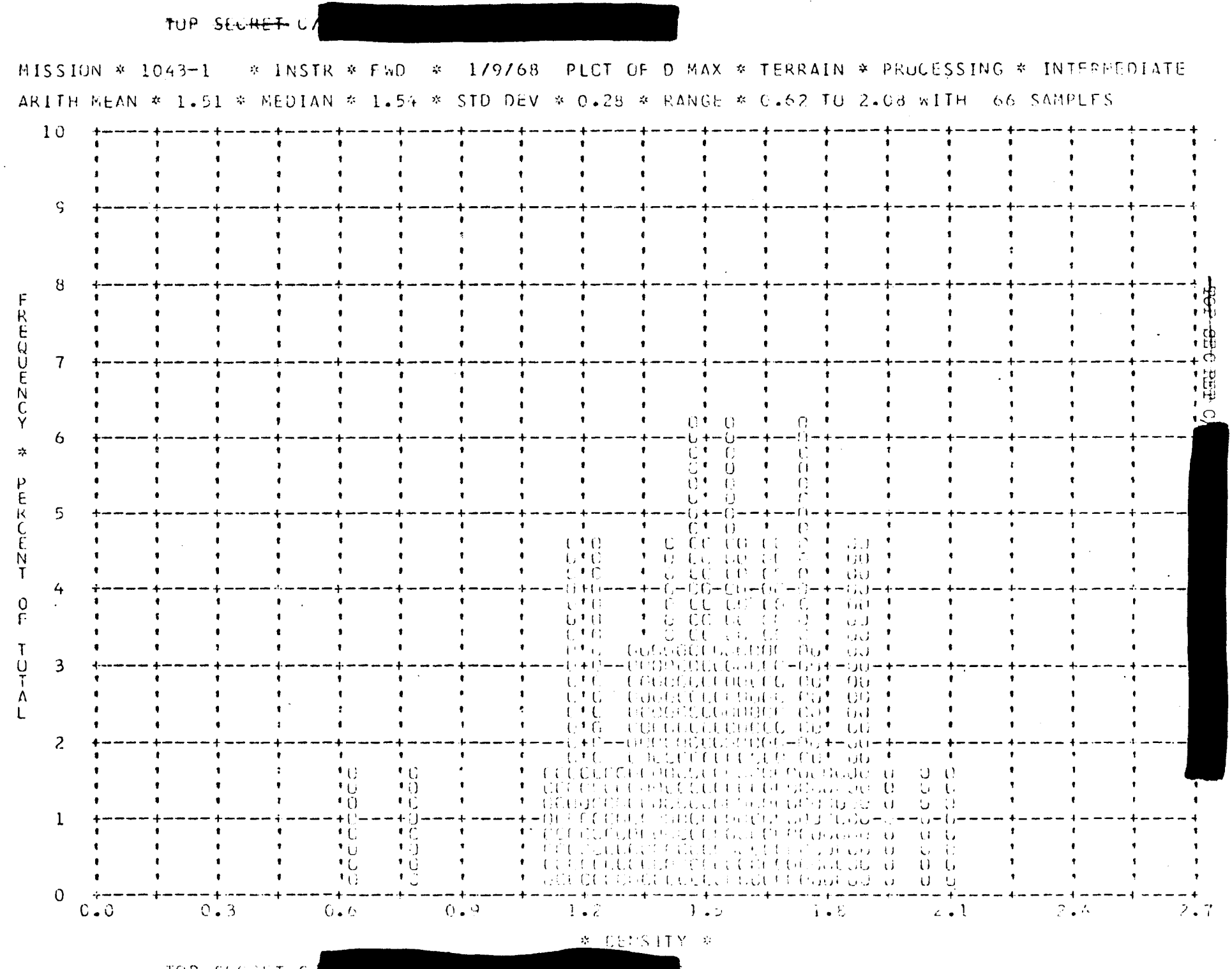

MISSION * 1043-1 * INSTR * FWD * 1/9/68 PLOT OF D MAX * TERRAIN * PROCESSING * INTERMEDIATE
ARITH MEAN * 1.51 * MEDIAN * 1.54 * STD DEV * 0.28 * RANGE * 0.62 TO 2.08 WITH 66 SAMPLES
FREQUENCY * PERCENT OF TOTAL
10
9
8
7
6
5
4
3
2
1
0
0.0
0.3
0.6
0.9
1.2
1.5
1.8
2.1
2.4
2.7
* DENSITY *

FIGURE A-1

MISSION * 1043-1 * INSTR * FWD * 1/9/68 PLOT OF D MAX * CLOUD * PROCESSING * INTERMEDIATE

ARITH MEAN * 2.01 * MEDIAN * 2.07 * STD DEV * 0.26 * RANGE * 0.98 TO 2.33 WITH 34 SAMPLES

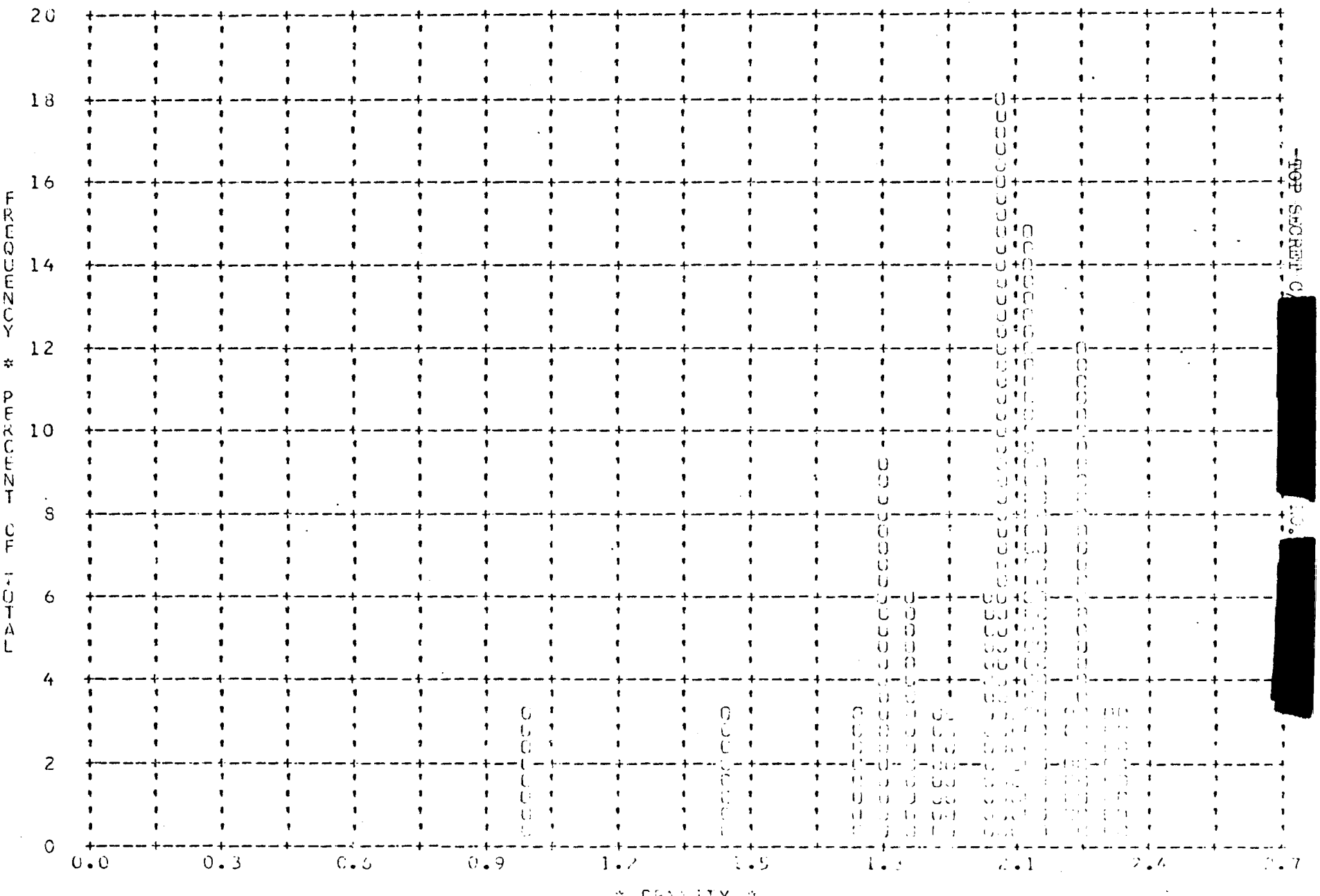


FIGURE A-1

MISSION * 1043-1 * INSTR * FWD * 1/9/68 PLOT OF D MIN * TERRAIN * PROCESSING * FULL

ARITH MEAN * 0.50 * MEDIAN * 0.46 * STD DEV * 0.19 * RANGE * 0.28 TO 1.47 WITH 175 SAMPLES

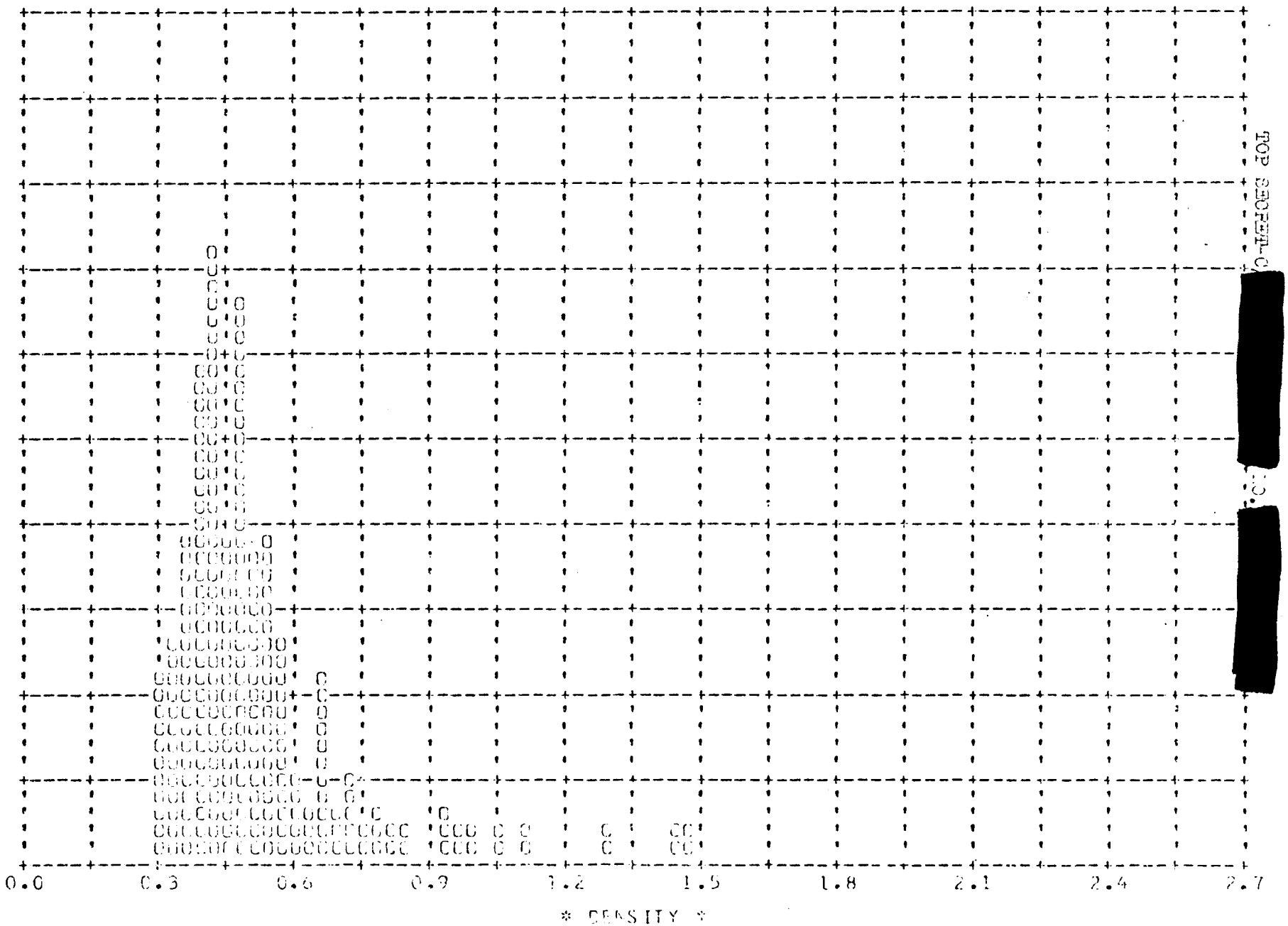


FIGURE A-1

MISSION * 1043-1 * INSTR * FWD * 1/9/68 PLOT OF D MAX * TERRAIN * PROCESSING * FULL

ARITH MEAN * 1.36 * MEDIAN * 1.35 * STD DEV * 0.33 * RANGE * 0.61 TO 2.25 WITH 175 SAMPLES

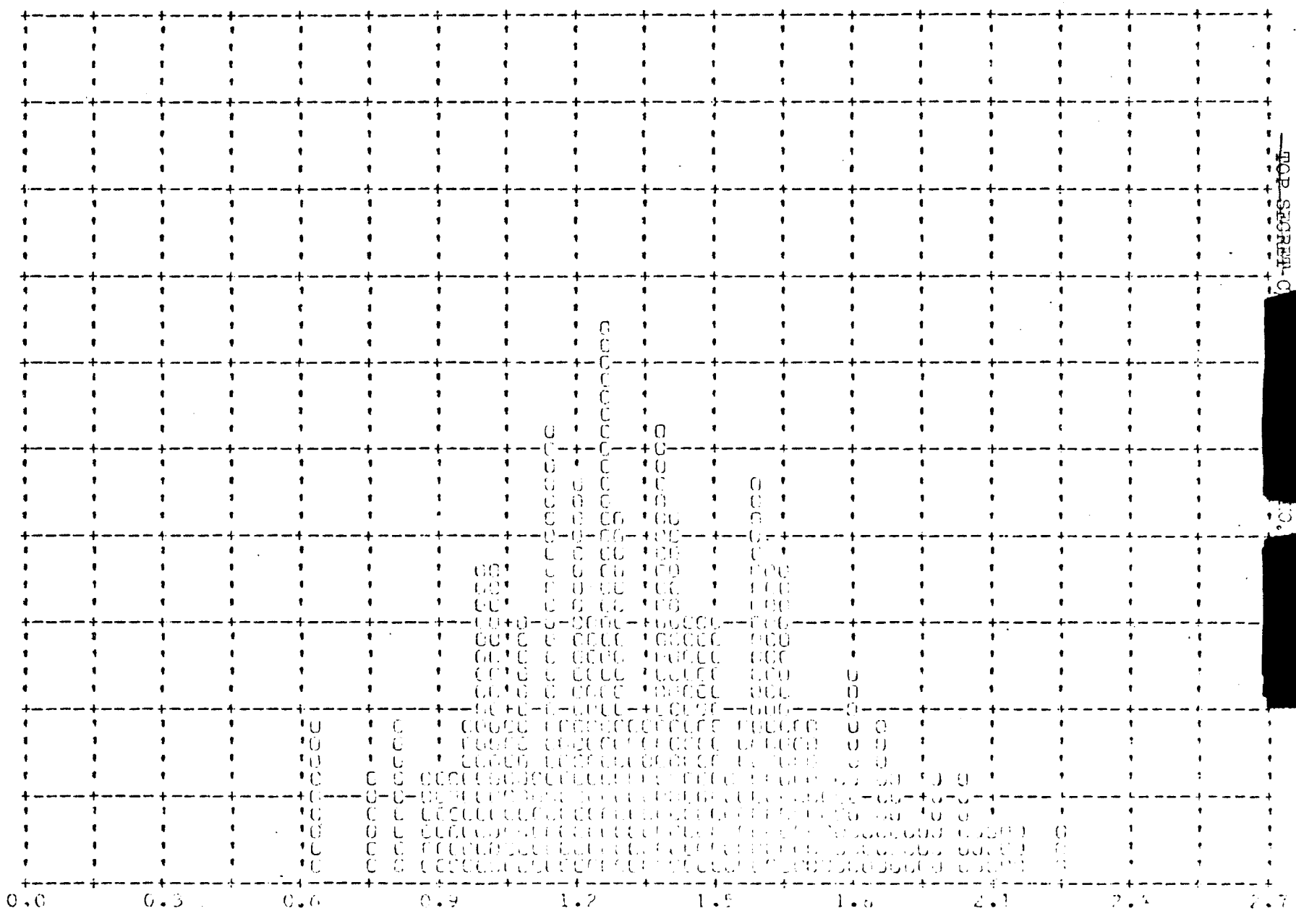
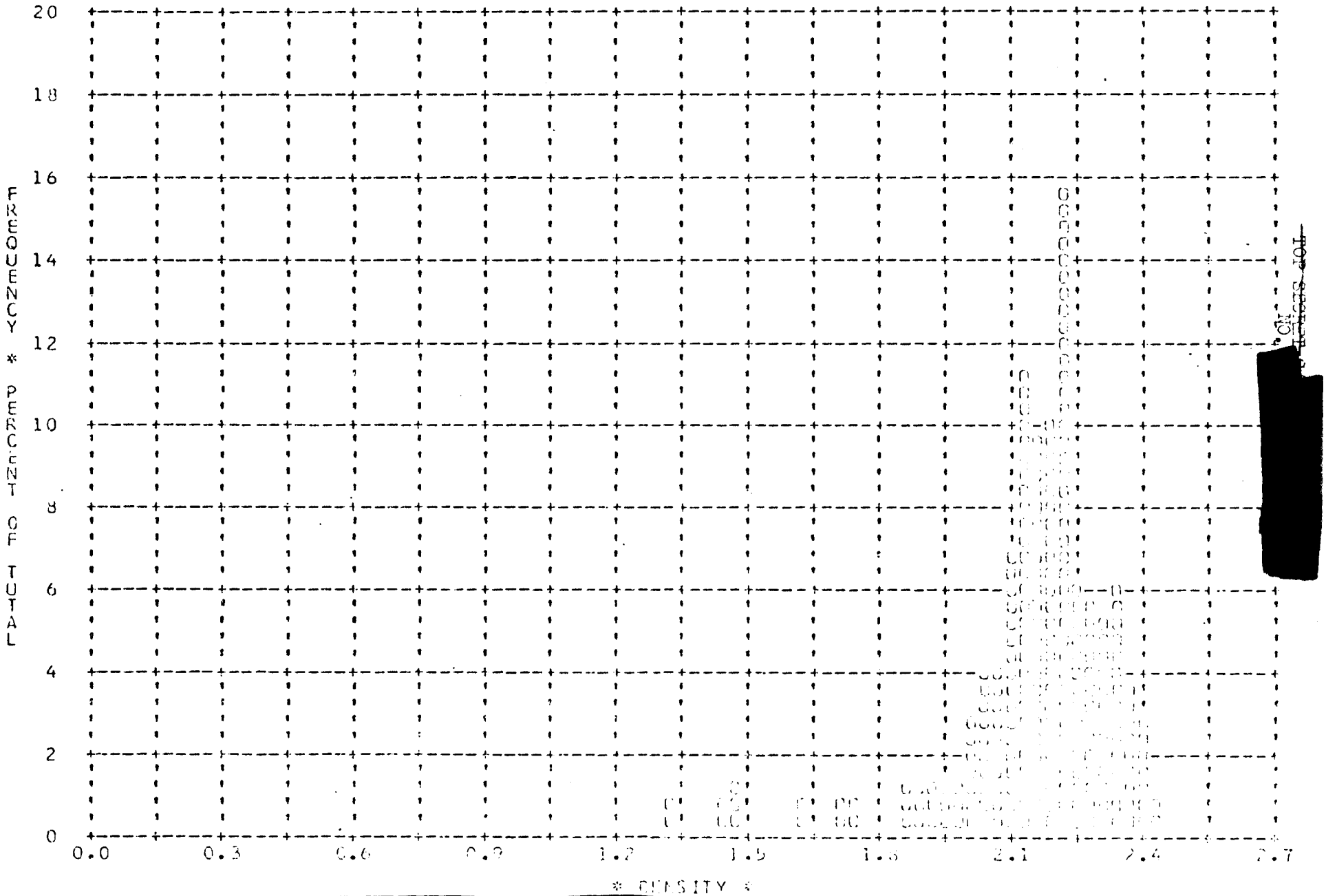


FIGURE A-1

~~TOP SECRET~~ C/[redacted]

MISSION * 1043-1 * INSTR * FWD * 1/9/68 PLOT OF D MAX * CLOUD * PROCESSING * FULL

ARITH MEAN * 2.15 * MEDIAN * 2.18 * STD DEV * 0.17 * RANGE * 1.30 TO 2.41 WITH 184 SAMPLES



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A-9

FIGURE A-1

~~TOP SECRET~~ C[redacted]

MISSION * 1043-1 * INSTR * FWD * 1/9/68 PLOT OF D MIN * TERRAIN * PROCESSING * ALL LEVELS

ARITH MEAN * 0.54 * MEDIAN * 0.47 * STD DEV * 0.23 * RANGE * 0.15 TO 1.63 WITH 251 SAMPLES

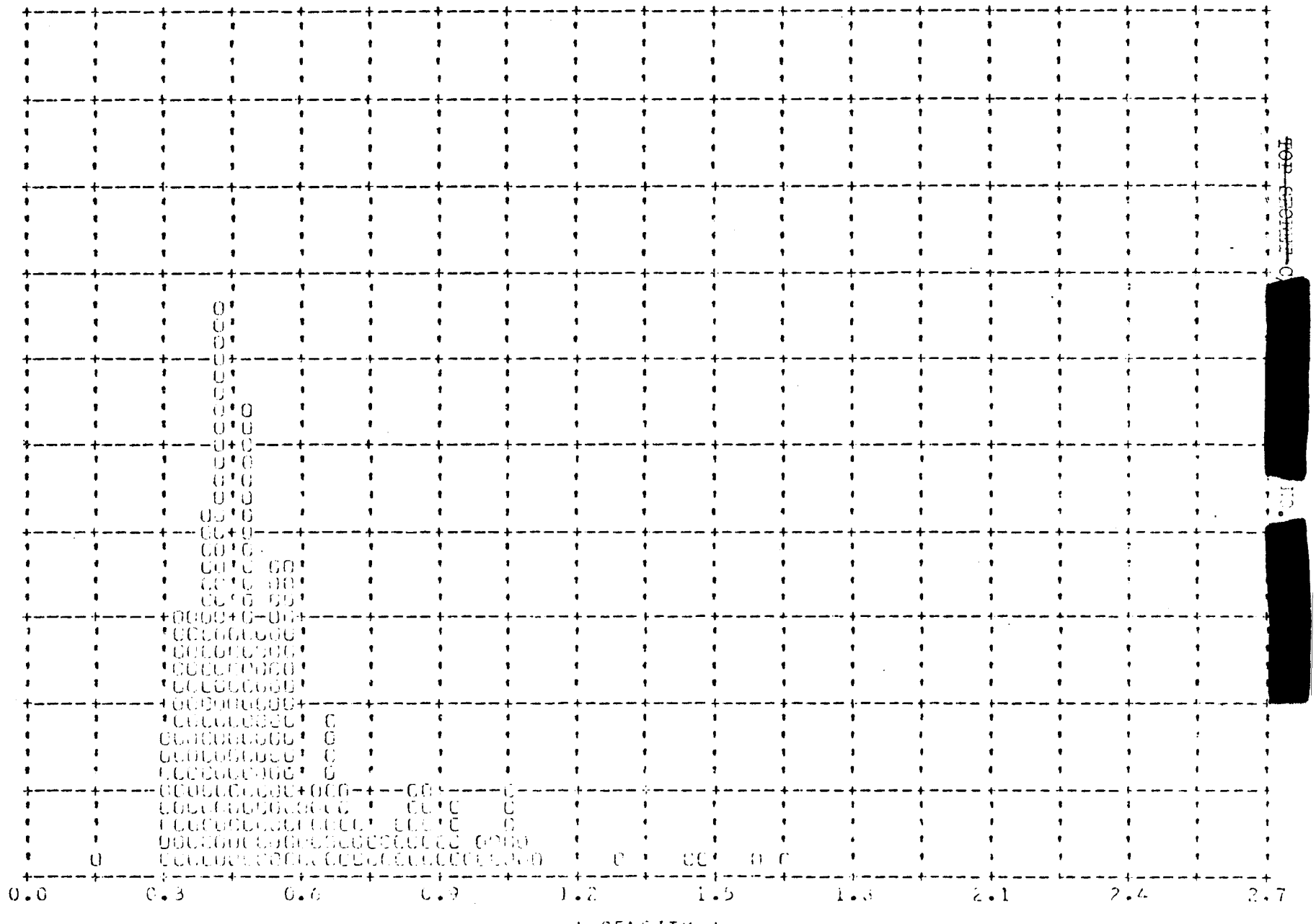

FIGURE A-1

MISSION * 1043-1 * INSTR * FWD * 1/9/68 PLOT OF D MAX * TERRAIN * PROCESSING * ALL LEVELS

ARITH MEAN * 1.40 * MEDIAN * 1.39 * STD DEV * 0.32 * RANGE * 0.61 TO 2.25 WITH 251 SAMPLES

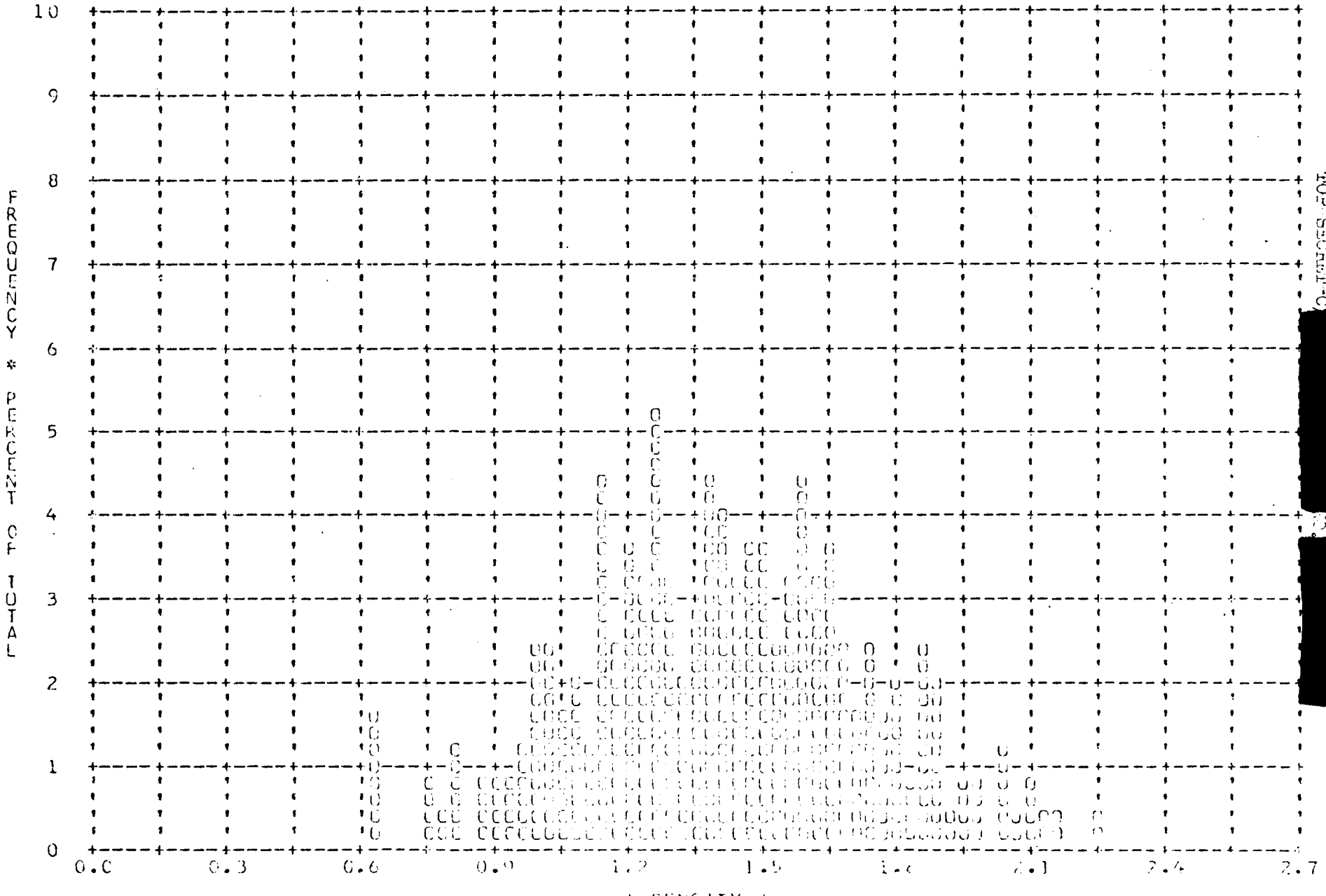

FIGURE A-1

MISSION * 1043-1 * INSTR * FWD * 1/9/68 PLOT OF D MAX * CLOUD * PROCESSING * ALL LEVELS

ARITH MEAN * 2.13 * MEDIAN * 2.16 * STD DEV * 0.20 * RANGE * 0.98 TO 2.41 WITH 221 SAMPLES

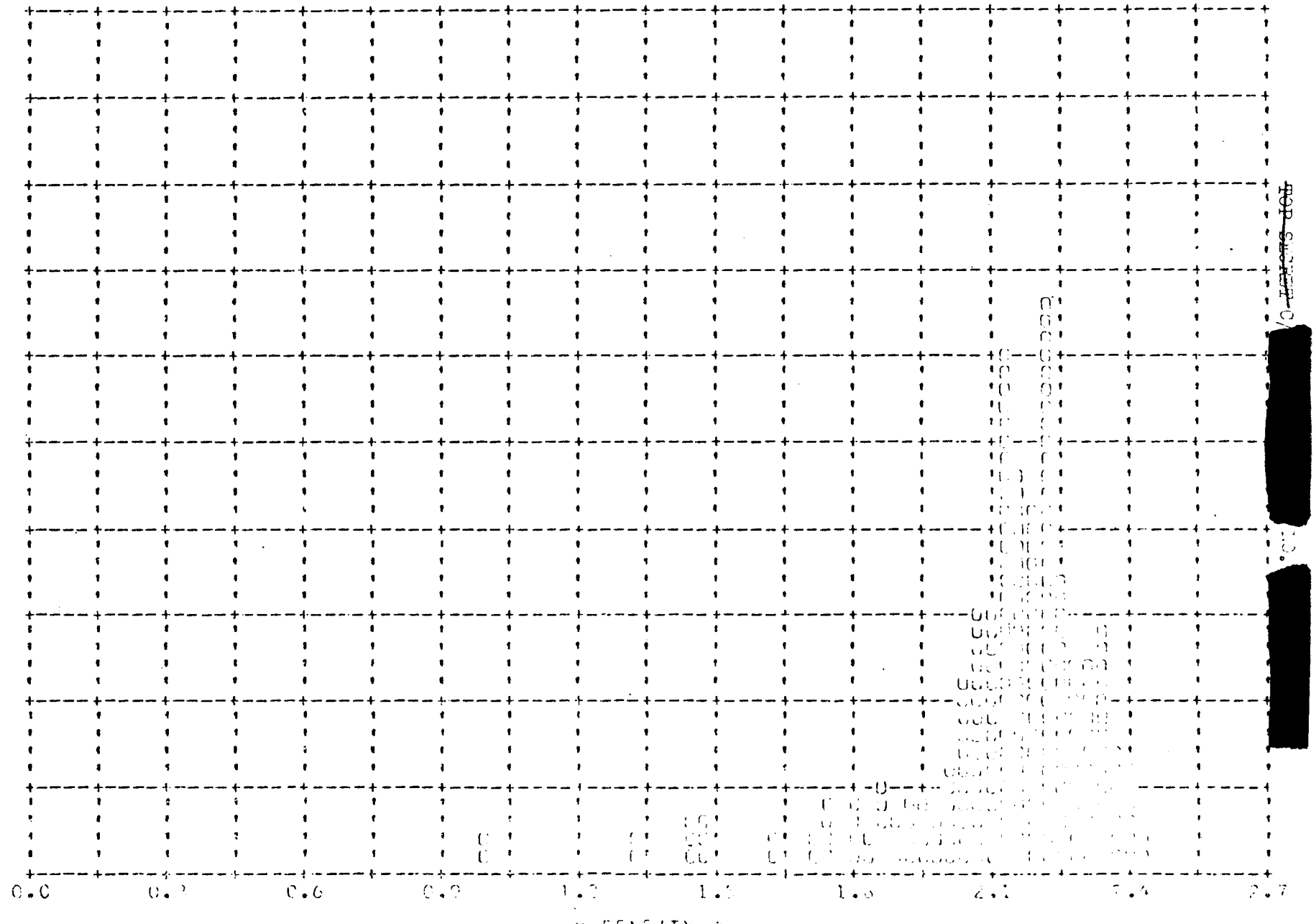

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FIGURE A-1

MISSION * 1043-1 * INSTR * AFT * 1/9/68 PLOT OF D MIN * TERRAIN * PROCESSING * PRIMARY

ARITH MEAN * 0.85 * MEDIAN * 0.96 * STD DEV * 0.38 * RANGE * 0.47 TO 1.33 WITH 4 SAMPLES

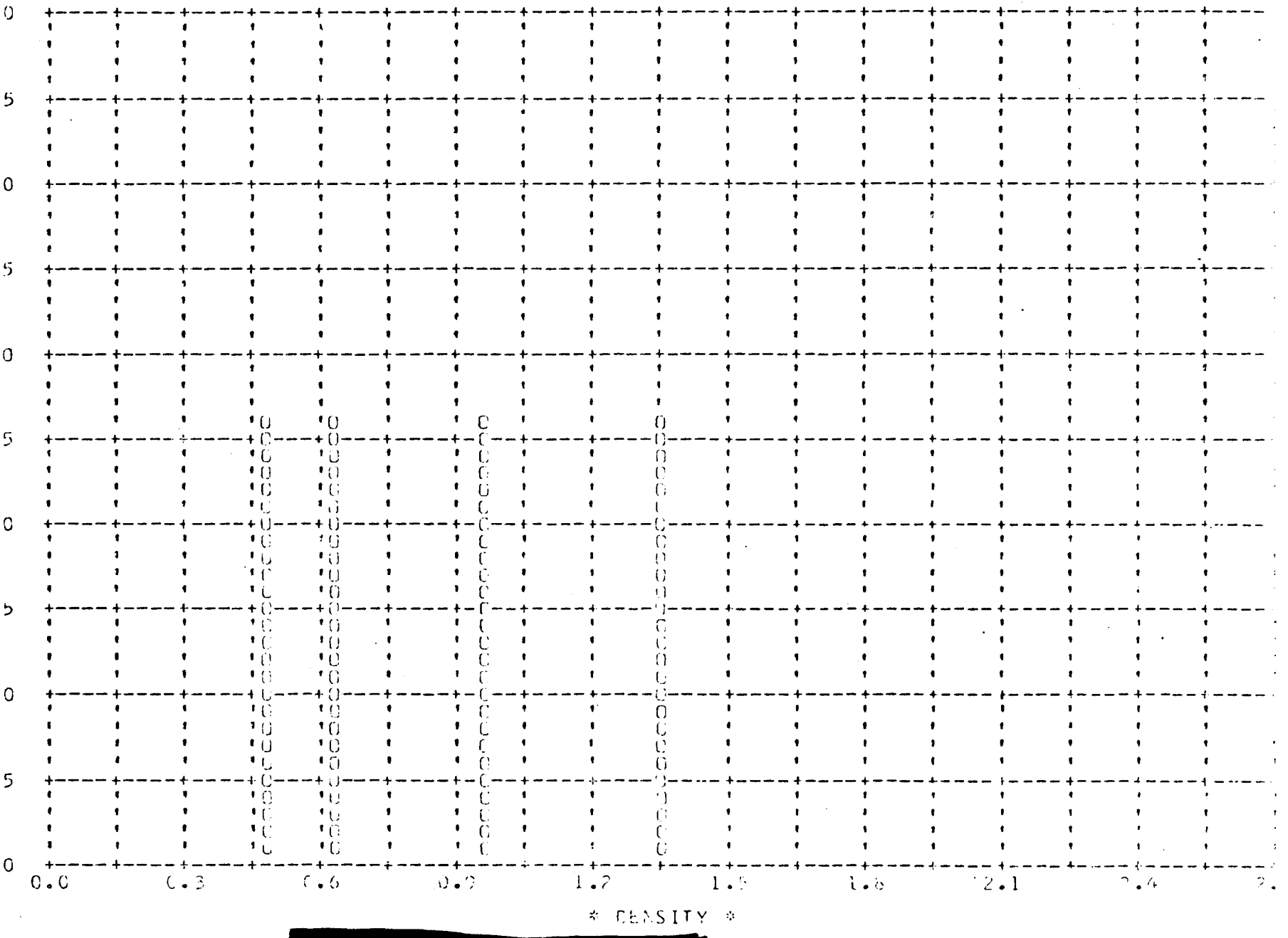


FIGURE A-2

MISSION * 1043-1 * INSTR * AFT * 1/9/68 PLOT OF D MAX * TERRAIN * PROCESSING * PRIMARY

ARITH MEAN * 1.47 * MEDIAN * 1.41 * STD DEV * 0.22 * RANGE * 1.32 TO 1.79 WITH 4 SAMPLES

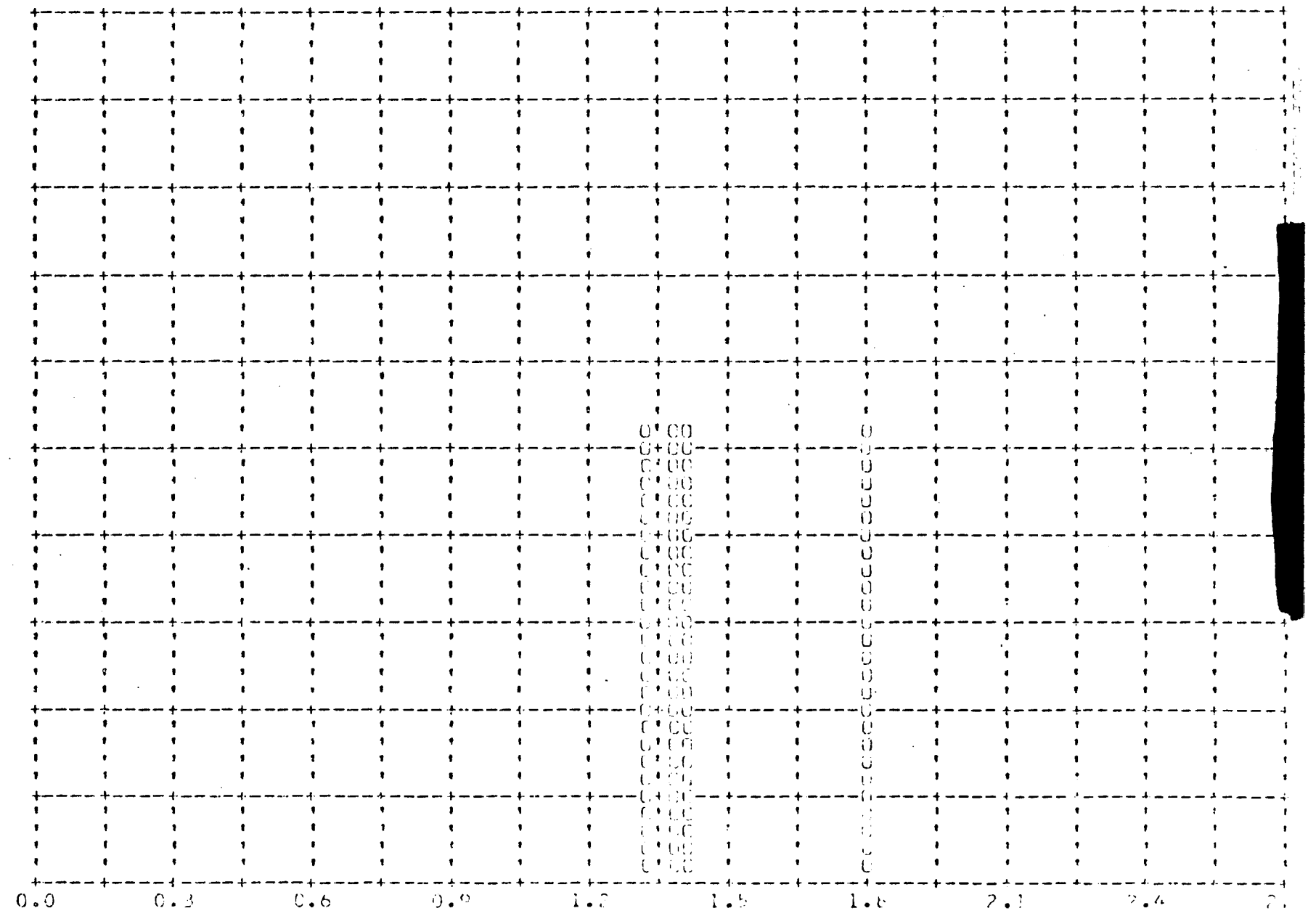


FIGURE A-2

MISSION * 1043-1 * INSTR * AFT * 1/9/68 PLOT OF D MAX * CLOUD * PROCESSING * PRIMARY

ARITH MEAN * 2.23 * MEDIAN * 2.23 * STD DEV * 0.00 * RANGE * 2.23 TO 2.23 WITH 1 SAMPLES

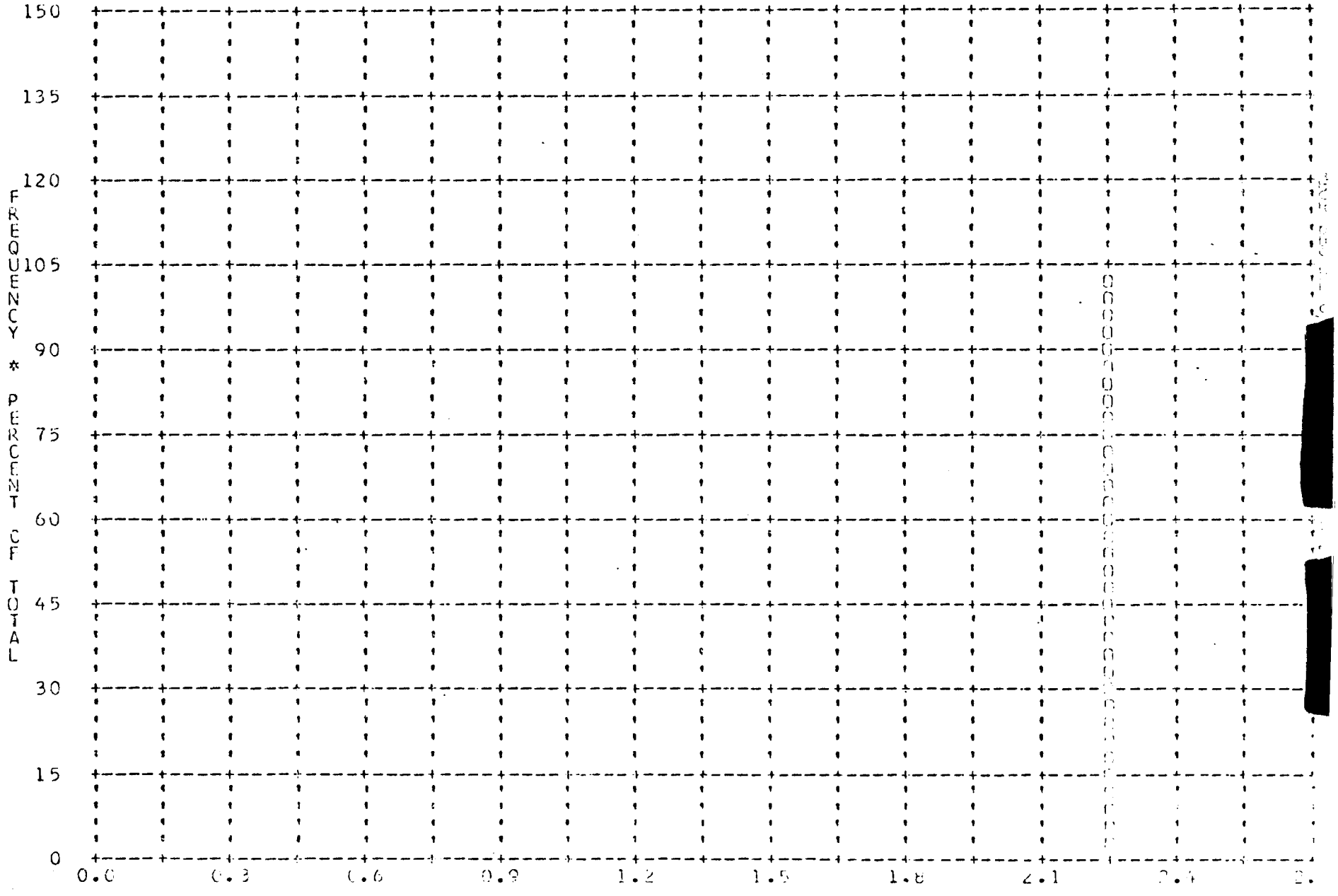


FIGURE A-2

MISSION * 1043-1 * INSTR * AFT * 1/9/68 PLOT OF D MIN * TERRAIN * PROCESSING * INTERMEDIATE

ARITH MEAN * 0.74 * MEDIAN * 0.67 * STD DEV * 0.31 * RANGE * 0.25 TO 1.69 WITH 71 SAMPLES

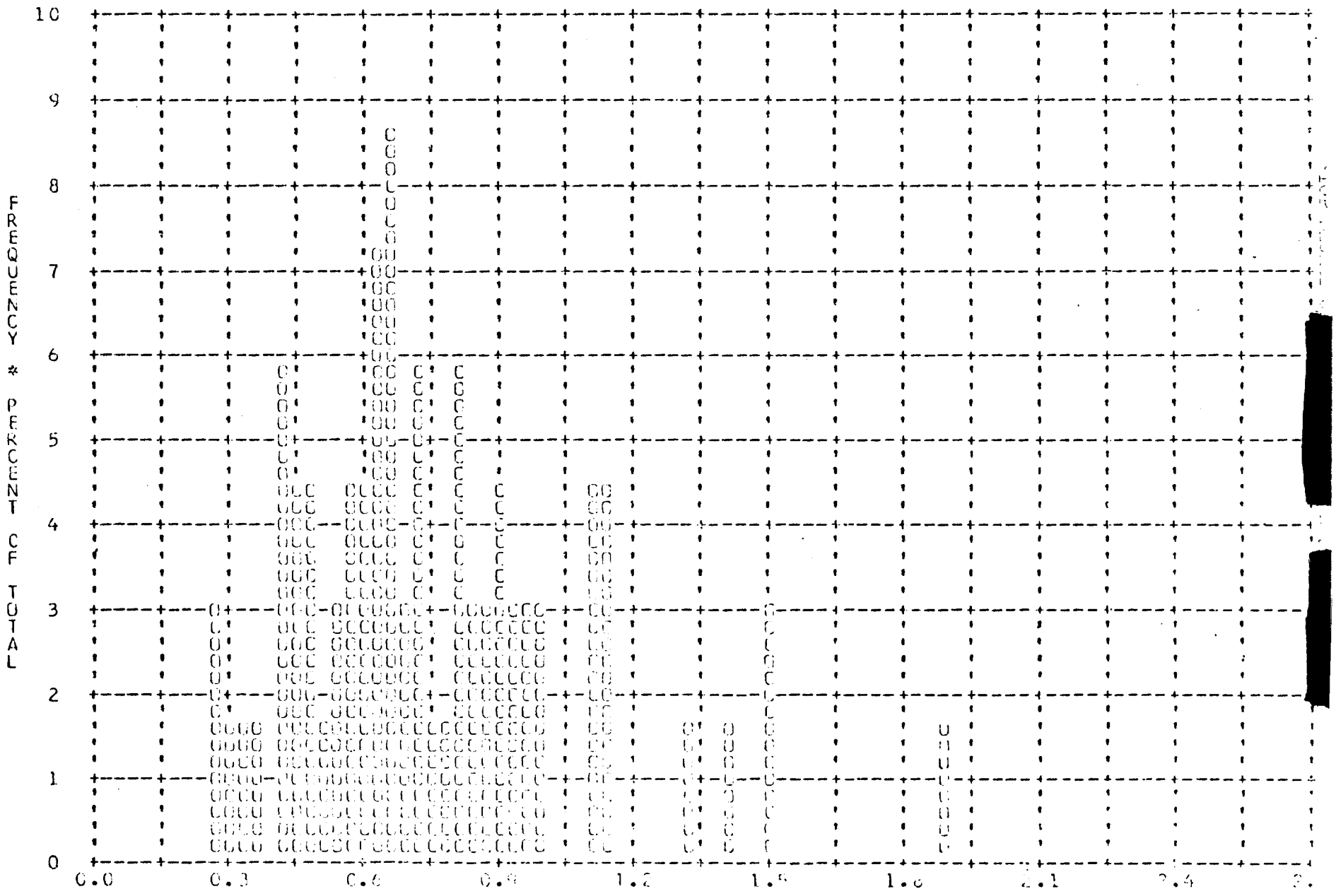


FIGURE A-2

MISSION * 1043-1 * INSTR * AFT * 1/9/68 PLOT OF D MAX * TERRAIN * PROCESSING * INTERMEDIATE

ARITH MEAN * 1.53 * MEDIAN * 1.51 * STD DEV * 0.26 * RANGE * 0.88 TO 2.06 WITH 71 SAMPLES

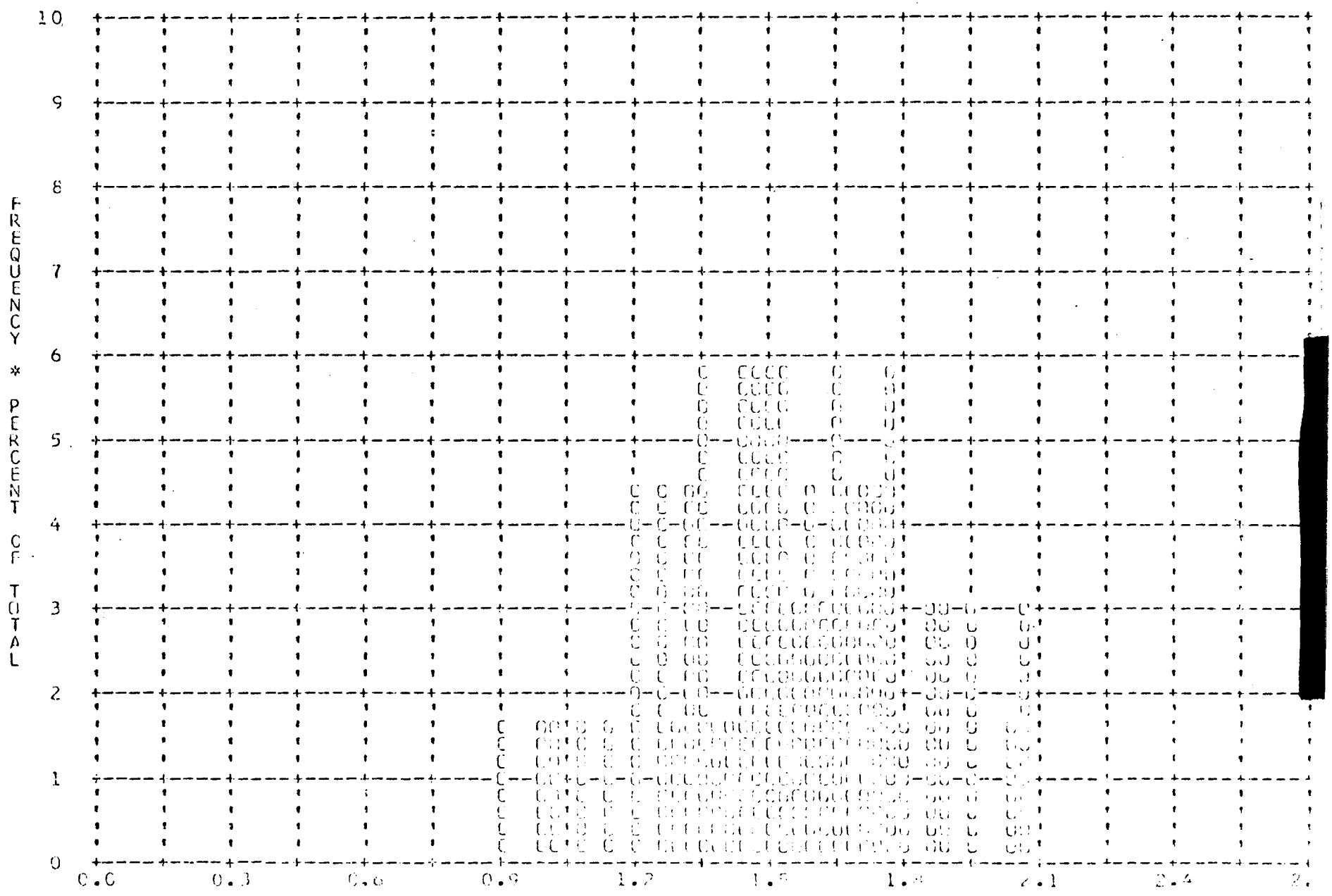


FIGURE A-2

MISSION * 1043-1 * INSTR * AFT * 1/9/68 PLOT OF D MAX * CLOUD * PROCESSING * INTERMEDIATE

ARITH MEAN * 2.12 * MEDIAN * 2.14 * STD DEV * 0.21 * RANGE * 1.11 TO 2.34 WITH 40 SAMPLES

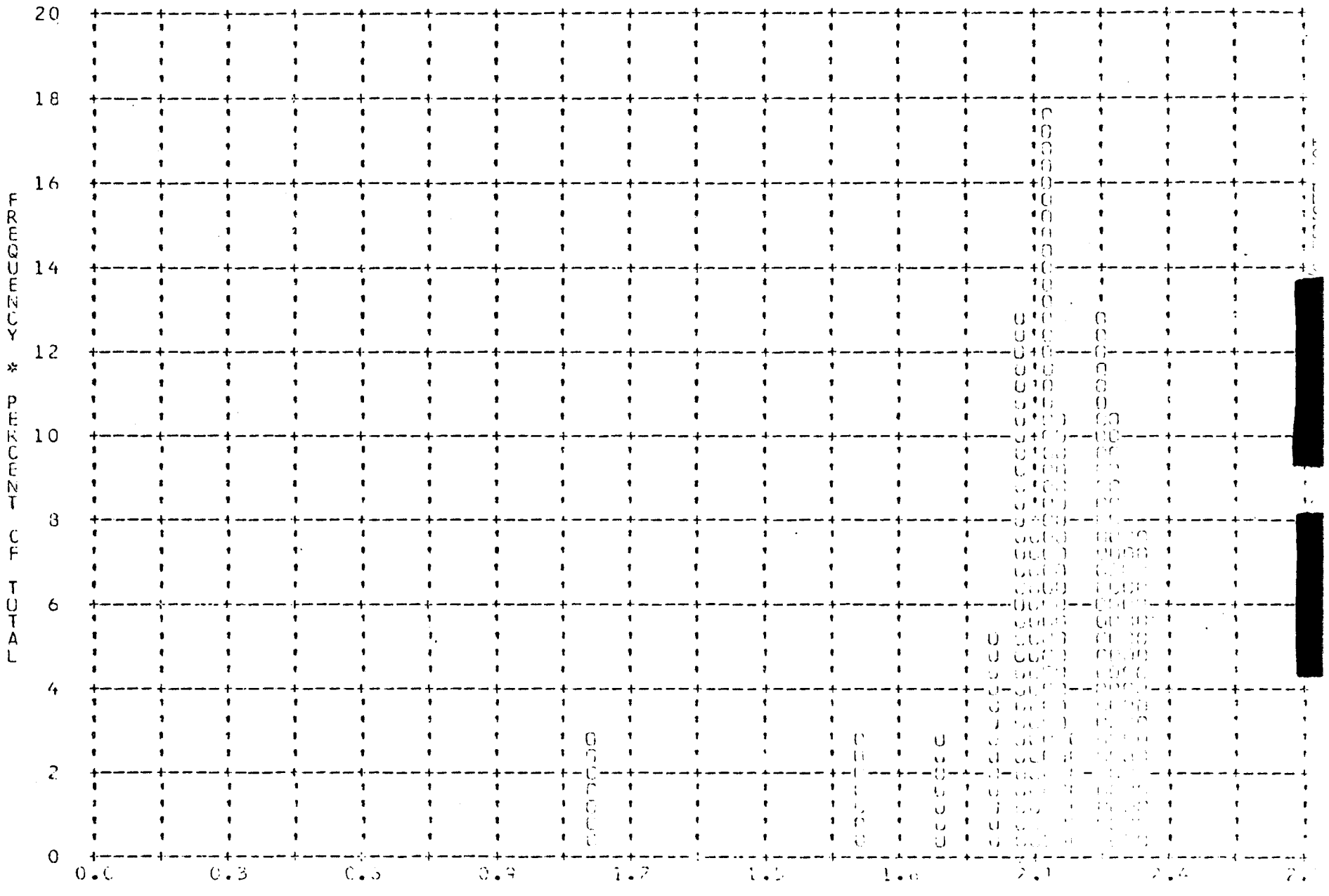


FIGURE A-2

MISSION * 1043-1 * INSTR * AFT * 1/9/68 PLOT OF D MIN * TERRAIN * PROCESSING * FULL

ARITH MEAN * 0.53 * MEDIAN * 0.47 * STD DEV * 0.21 * RANGE * 0.24 TO 1.51 WITH 187 SAMPLES

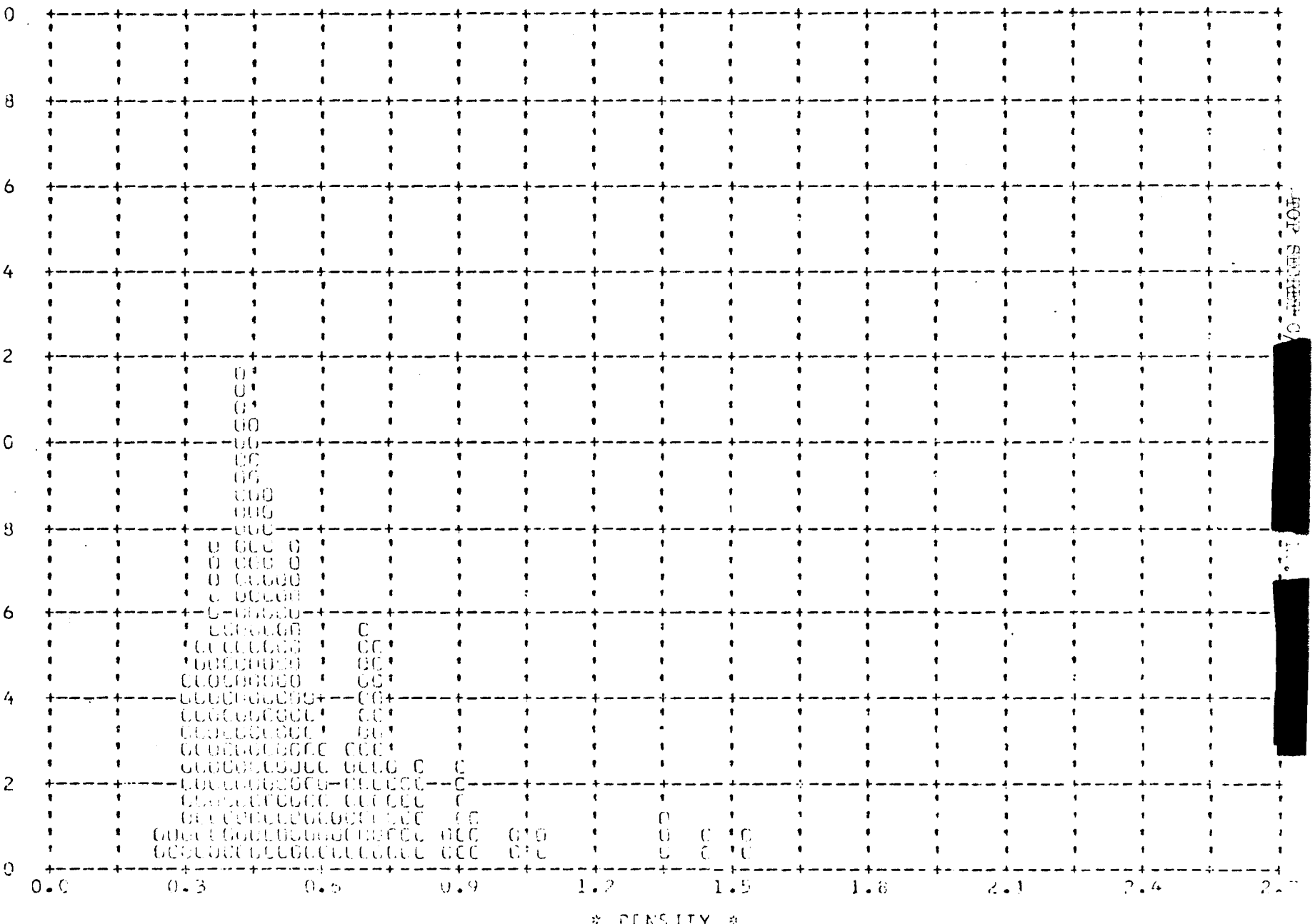


FIGURE A-2

MISSION * 1043-1 * INSTR * AFT * 1/9/68 PLOT OF D MAX * TERRAIN * PROCESSING * FULL

ARITH MEAN * 1.38 * MEDIAN * 1.37 * STD DEV * 0.33 * RANGE * 0.61 TO 2.28 WITH 187 SAMPLES

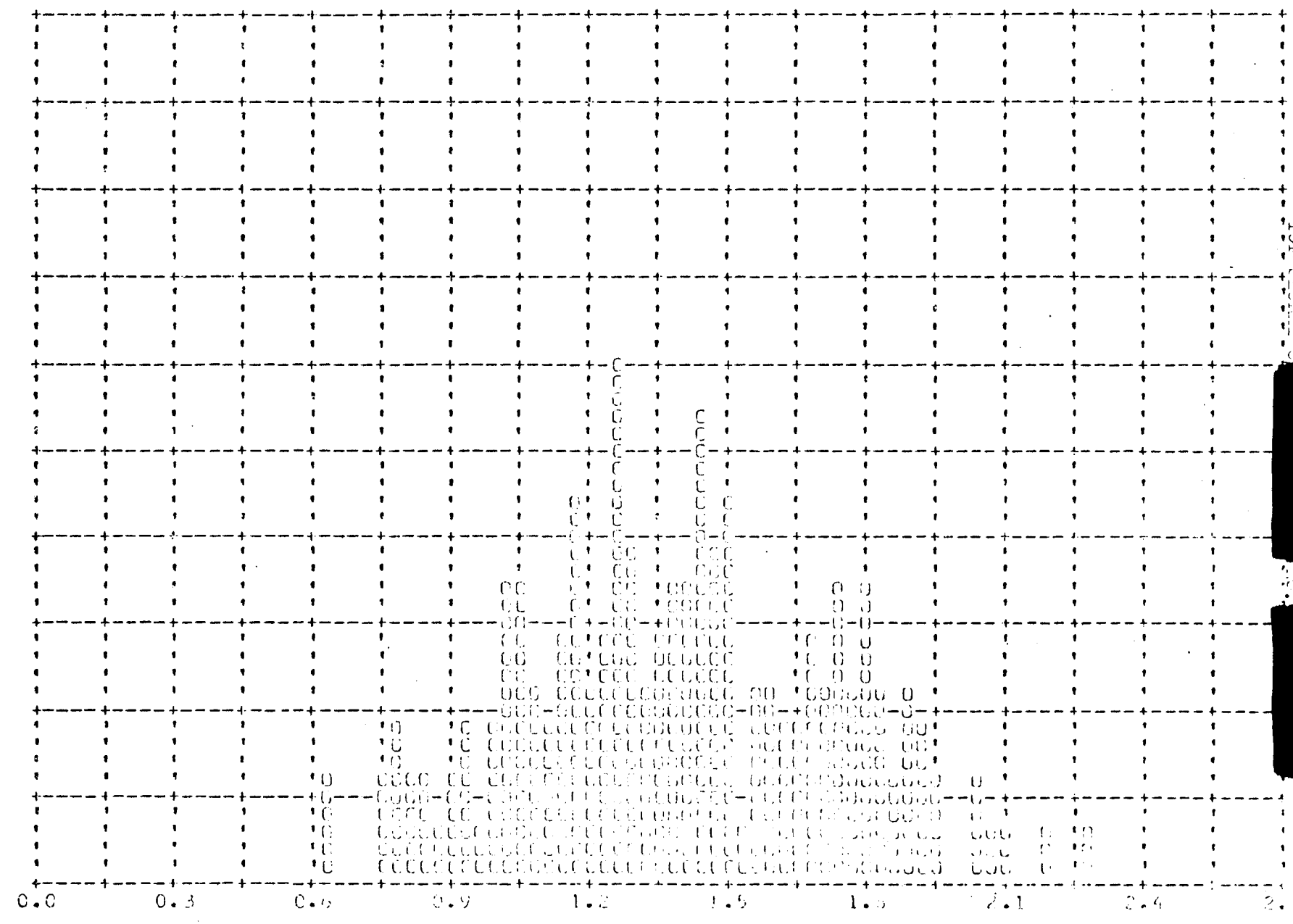


FIGURE A-2

MISSION * 1043-1 * INSTR * AFT * 1/9/69 PLOT OF D MAX * CLOUD * PROCESSING * FULL

ARITH MEAN * 2.20 * MEDIAN * 2.24 * STD DEV * 0.17 * RANGE * 1.17 TO 2.44 WITH 183 SAMPLES

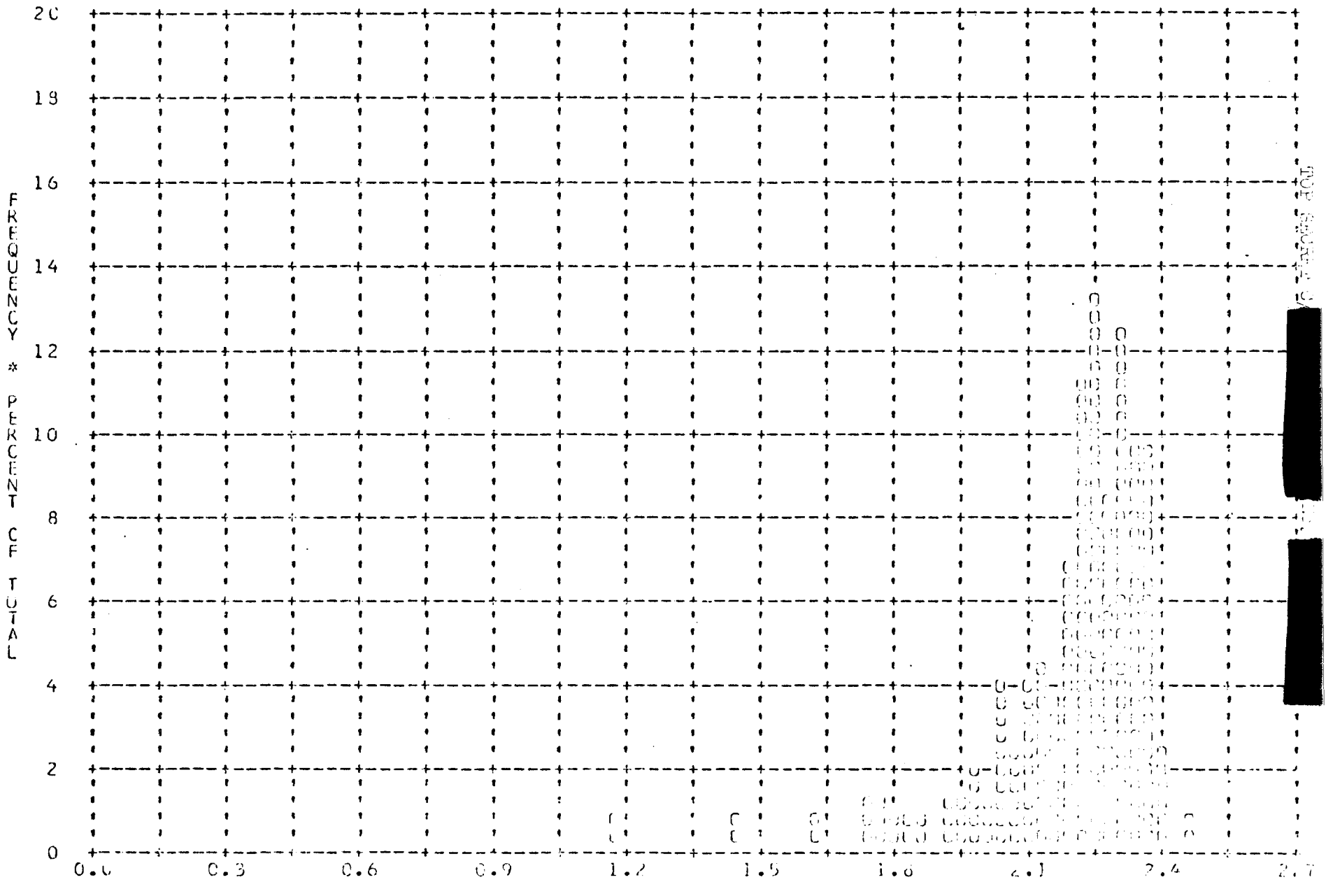
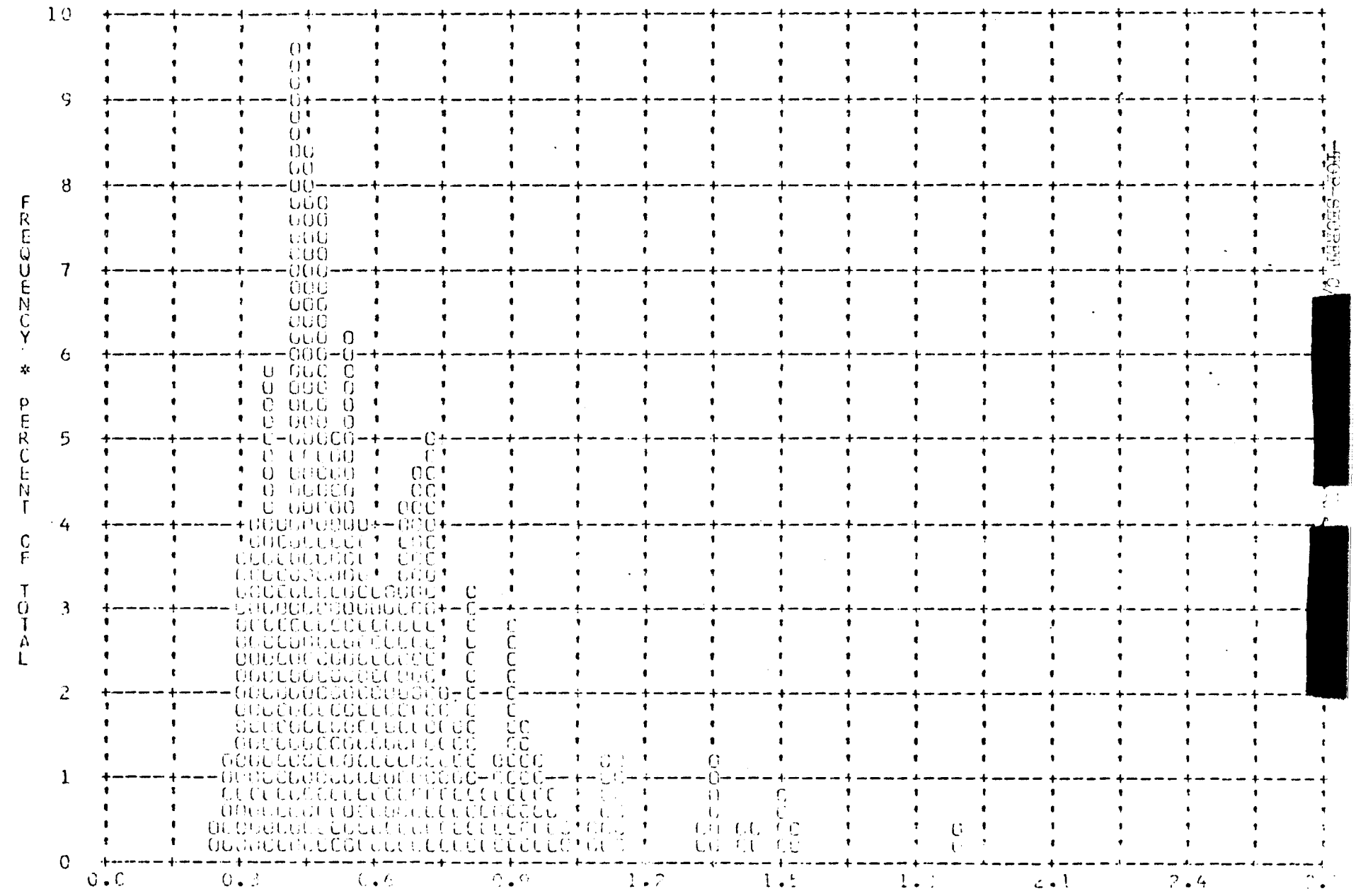


FIGURE A-2

MISSION * 1043-1 * INSIR * AFT * 1/9/68 PLOT OF 0 MIN * TERRAIN * PROCESSING * ALL LEVELS

ARITH MEAN * 0.59 * MEDIAN * 0.53 * STD DEV * 0.26 * RANGE * 0.24 TO 1.89 WITH 262 SAMPLES



MISSION * 1043-1 * INSTR * AFT * 1/9/68 PLOT OF D MAX * TERRAIN * PROCESSING * ALL LEVELS

ARITH MEAN * 1.42 * MEDIAN * 1.43 * STD DEV * 0.32 * RANGE * 0.61 TO 2.28 WITH 262 SAMPLES

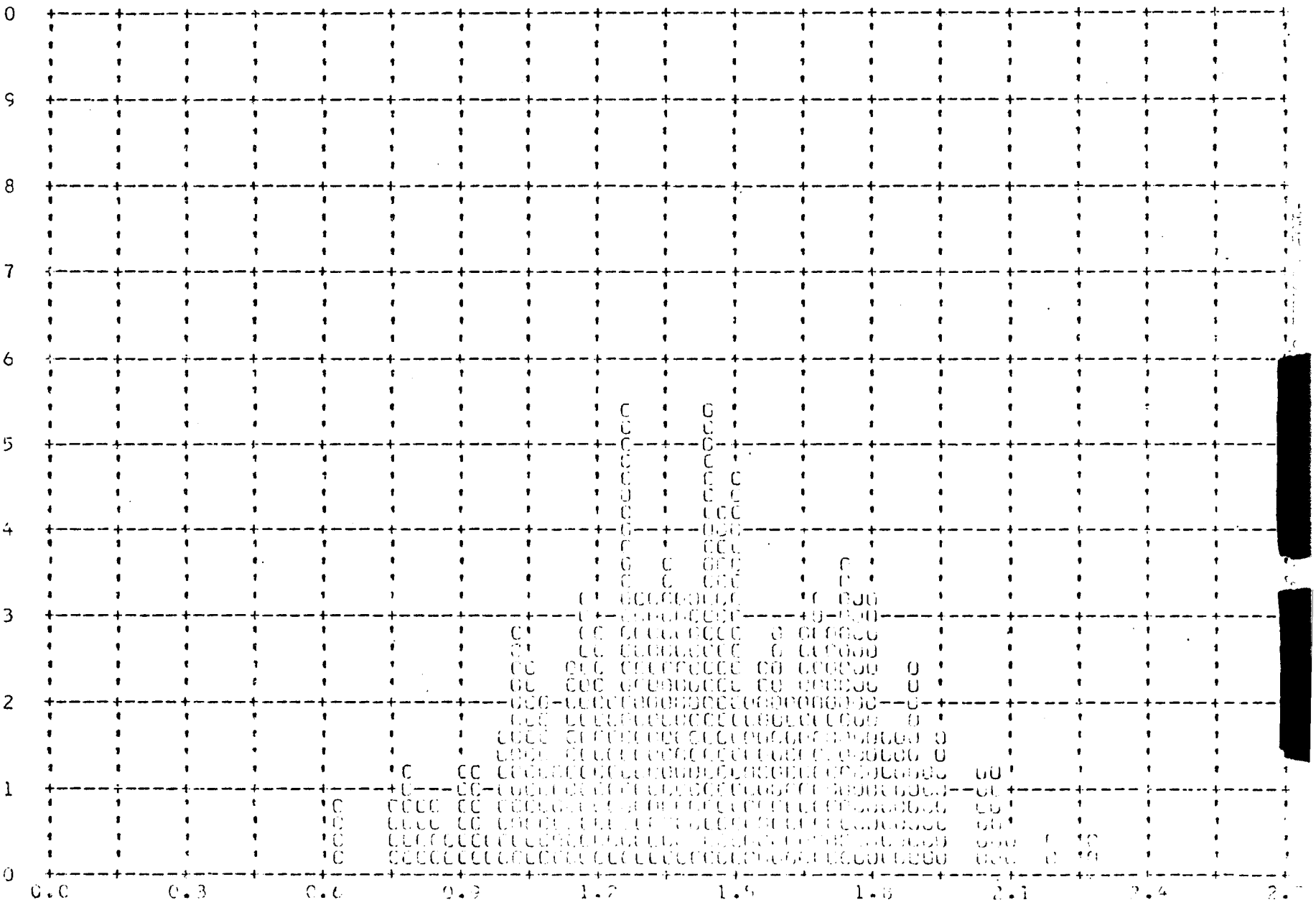


FIGURE A-2

MISSION * 1043-1 * INSTR * AFT * 1/9/68 PLOT OF D MAX * CLOUD * PROCESSING * ALL LEVELS

ARITH MEAN * 2.18 * MEDIAN * 2.23 * STD DEV * 0.18 * RANGE * 1.11 TO 2.44 WITH 224 SAMPLES

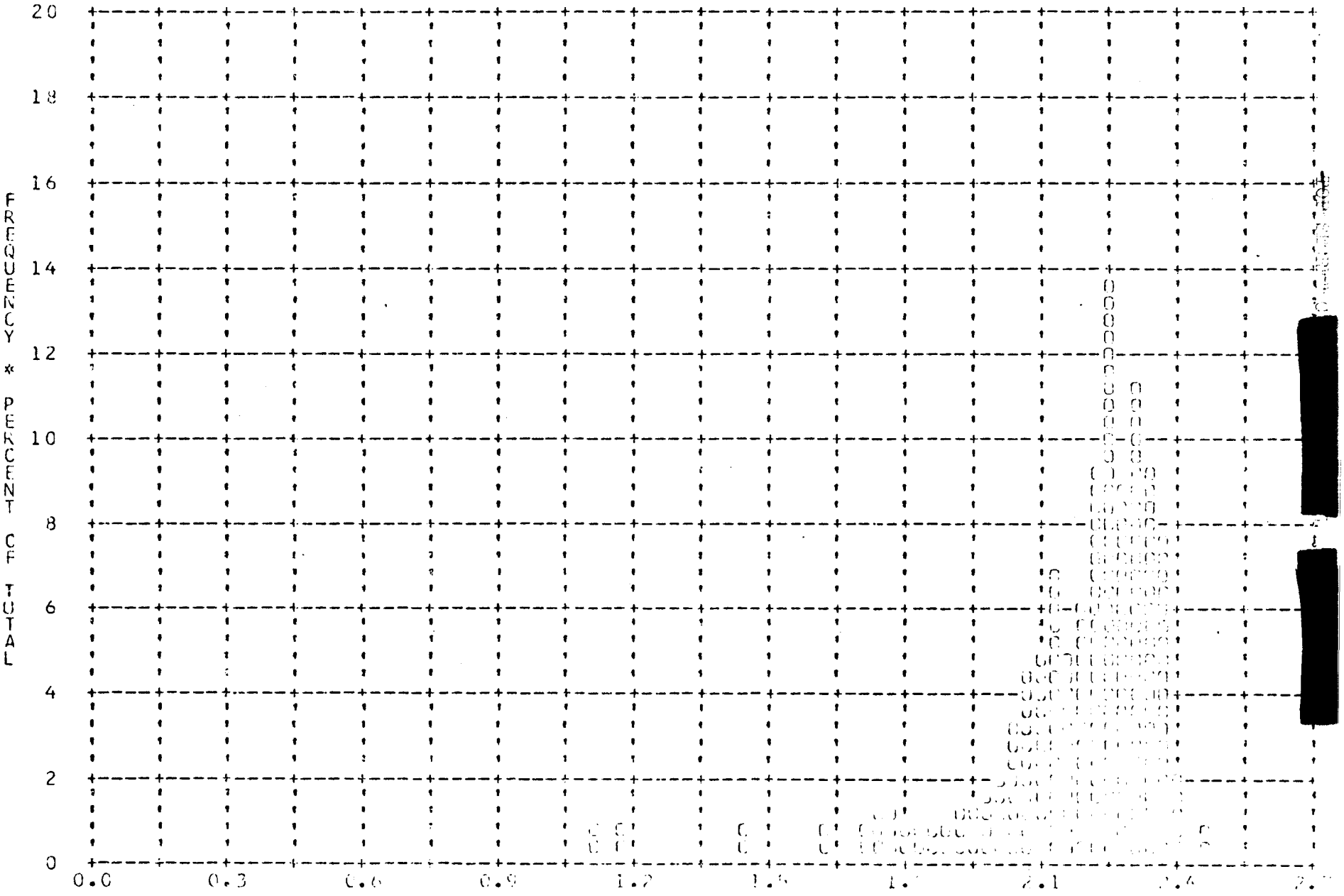


FIGURE A-2

MISSION * 1043-2 * INSTR * FWD * 1/9/68 PLOT OF D MIN * TERRAIN * PROCESSING * PRIMARY

ARITH MEAN * 0.54 * MEDIAN * 0.54 * STD DEV * 0.00 * RANGE * 0.54 TO 0.54 WITH 1 SAMPLES

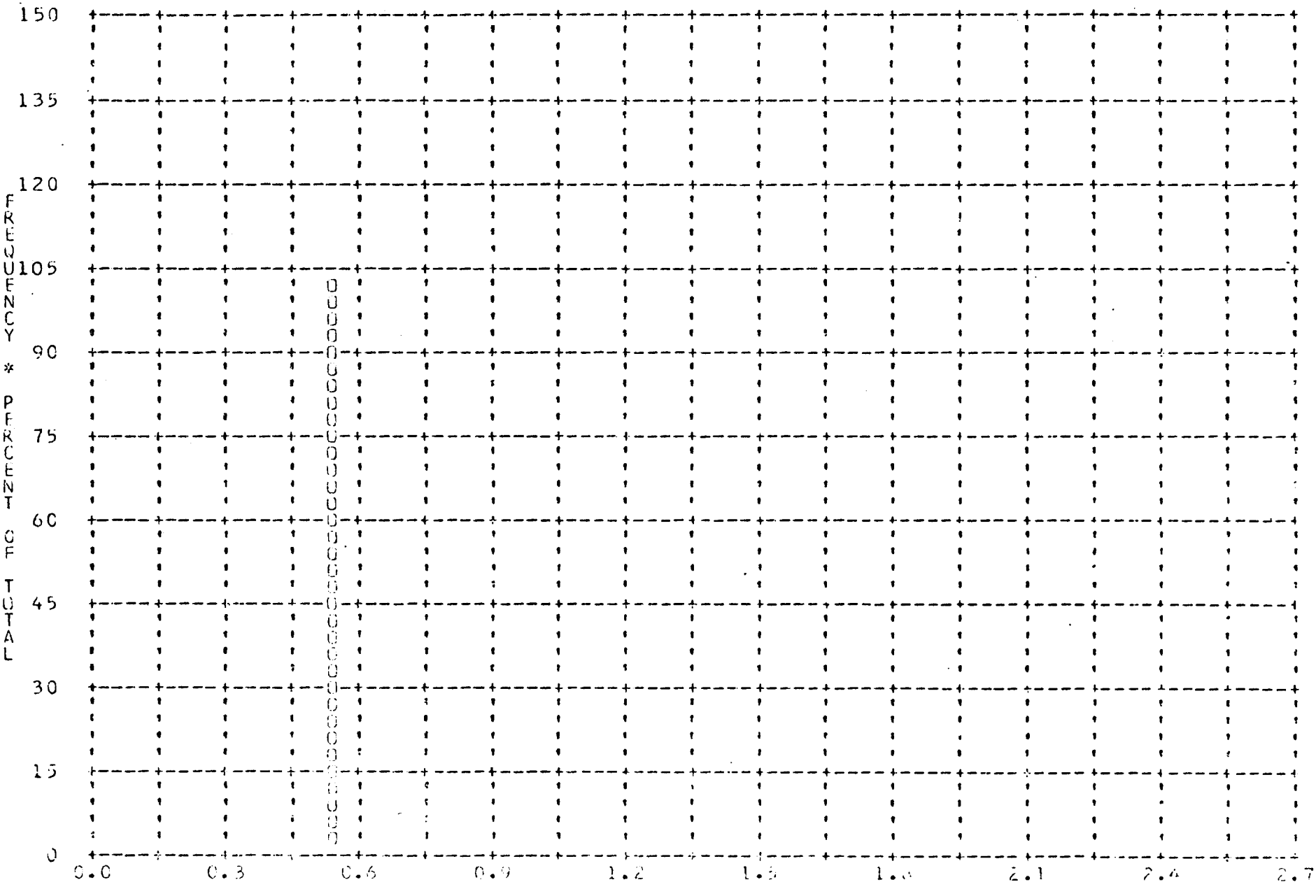


FIGURE A-3

MISSION * 1043-2 * INSTR * FWD * 1/9/68 PLOT OF D MAX * TERRAIN * PROCESSING * PRIMARY

ARITH MEAN * 1.32 * MEDIAN * 1.32 * STD DEV * 0.00 * RANGE * 1.32 TO 1.32 WITH 1 SAMPLES

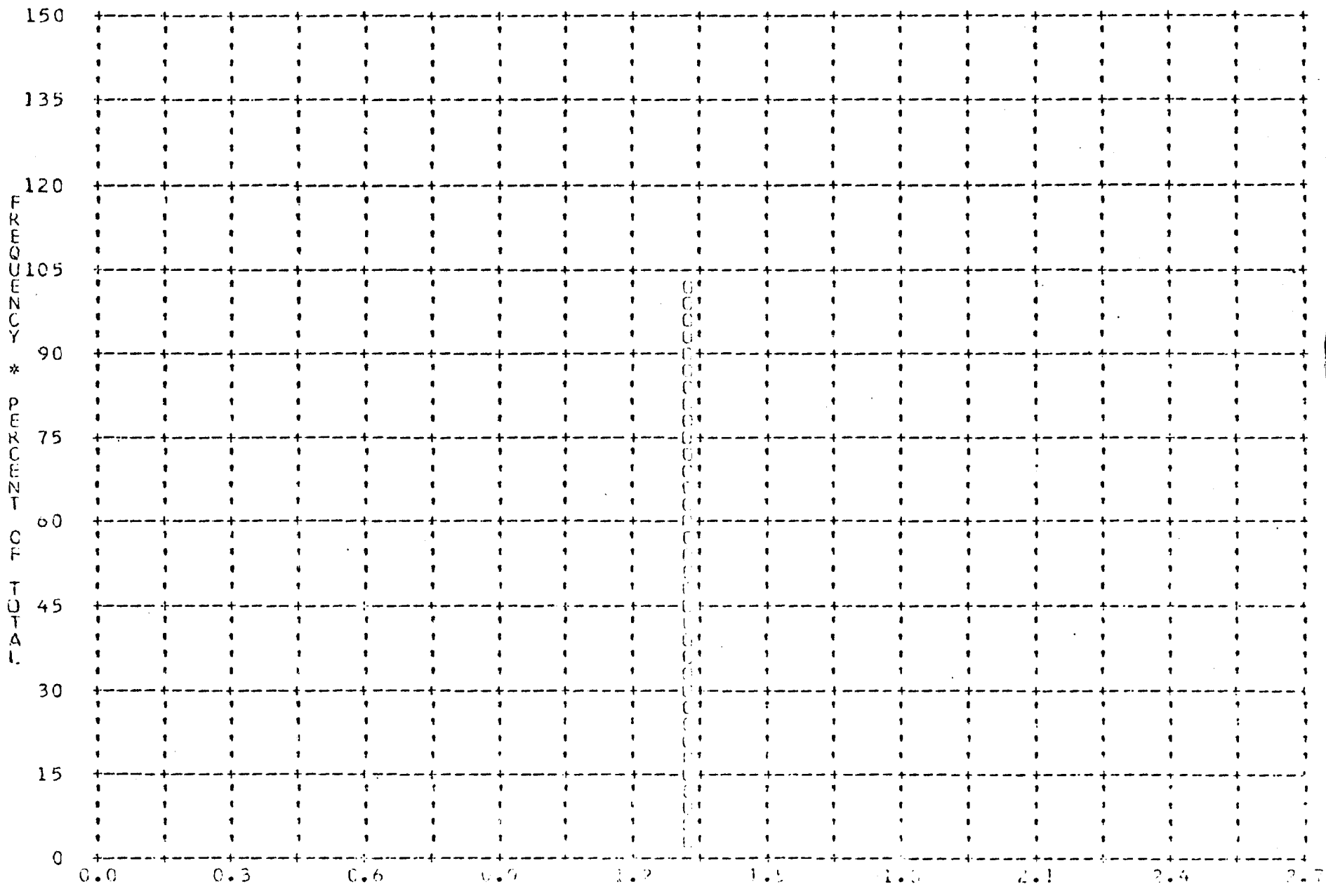


FIGURE A-3

MISSION * 1043-2 * INSTR * FWD * 1/9/68 PLOT OF D MAX * CLOUD * PROCESSING * PRIMARY

ARITH MEAN * 1.96 * MEDIAN * 1.96 * STD DEV * 0.00 * RANGE * 1.96 TO 1.96 WITH 1 SAMPLES

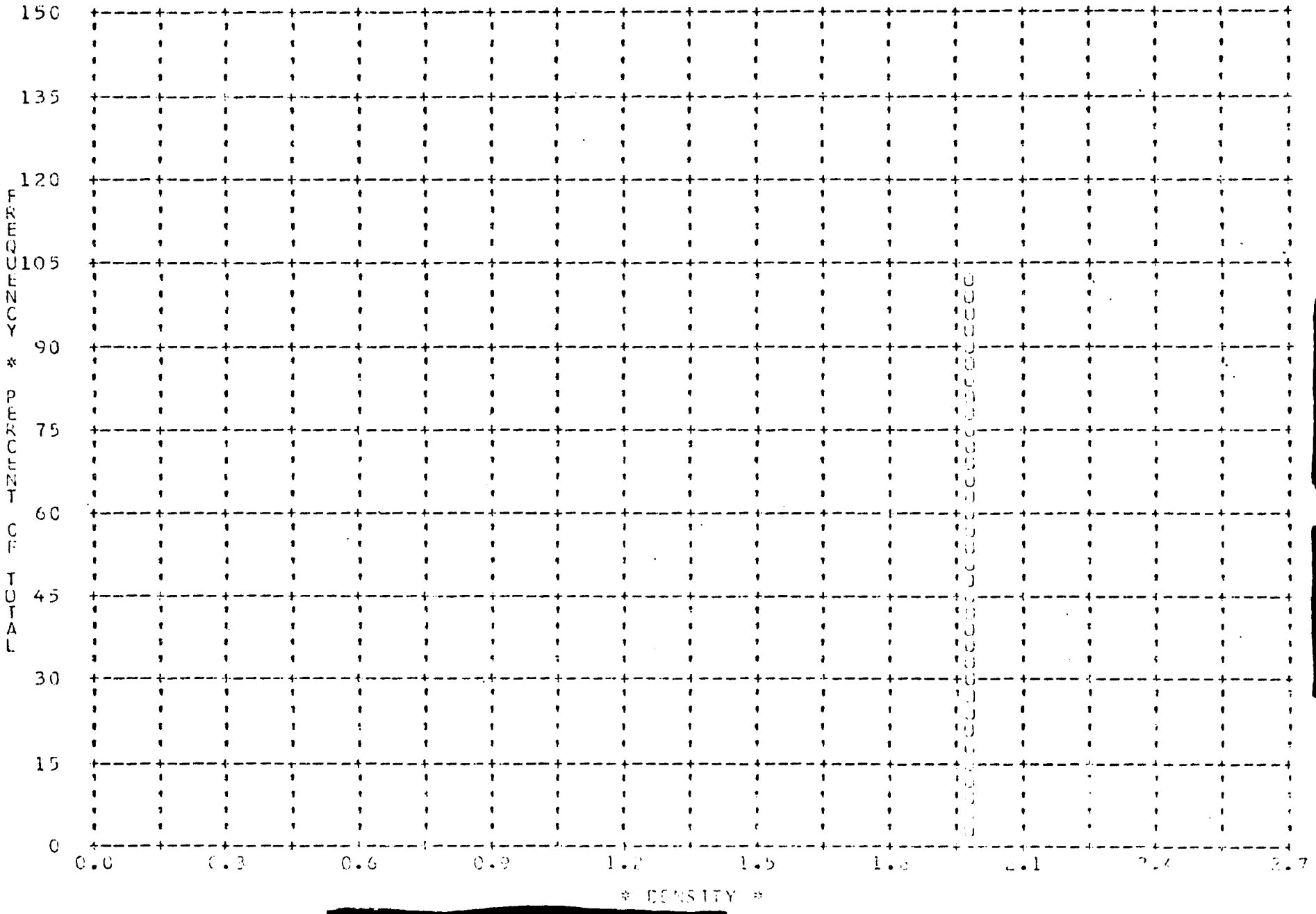


FIGURE A-3

MISSION * 1043-2 * INSTR * FWD * 1/9/68 PLOT OF D MIN * TERRAIN * PROCESSING * INTERMEDIATE

ARITH MEAN * 0.62 * MEDIAN * 0.59 * STD DEV * 0.24 * RANGE * 0.27 TO 1.32 WITH 72 SAMPLES

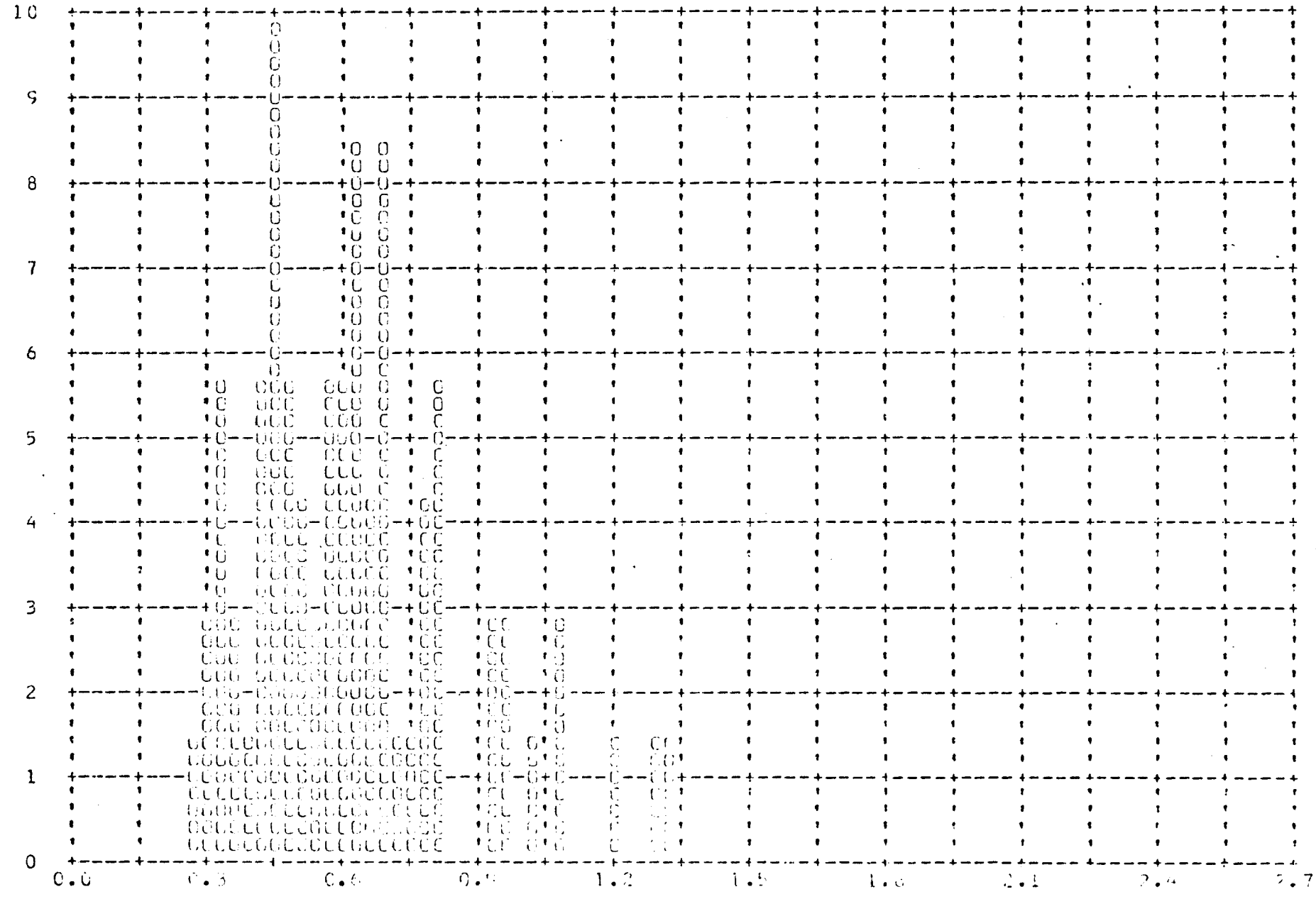


FIGURE A-3

TOP SECRET C[redacted]

TOP SECRET C[redacted]

MISSION * 1043-2 * INSTR * FWD * 1/9/68 PLOT OF D MAX * TERRAIN * PROCESSING * INTERMEDIATE

ARITH MEAN * 1.54 * MEDIAN * 1.55 * STD DEV * 0.31 * RANGE * 0.85 TO 2.39 WITH 72 SAMPLES

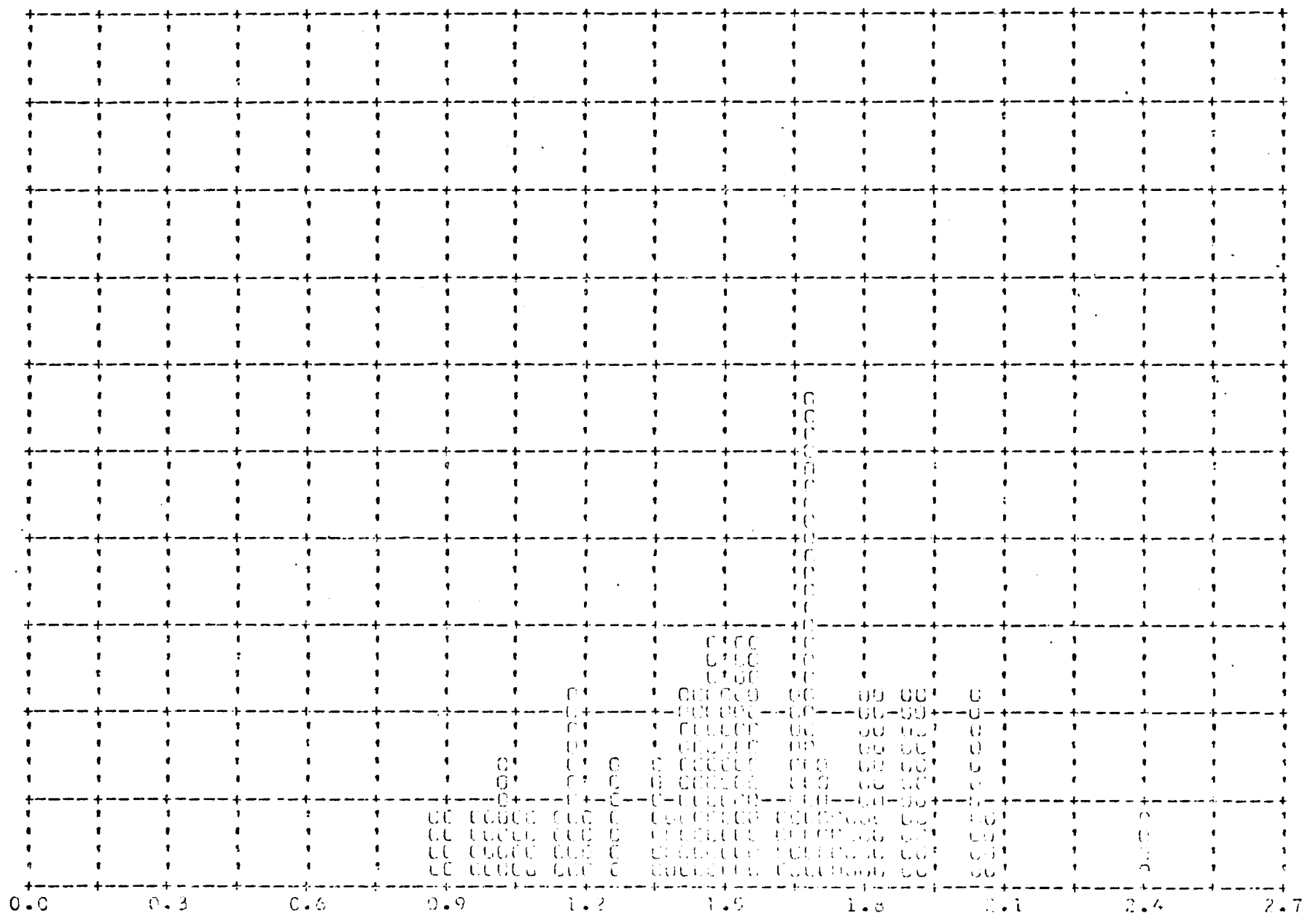


FIGURE A-3

MISSION * 1045-2 * INSTR * FWD * 1/9/68 PLOT OF D MAX * CLOUD * PROCESSING * INTERMEDIATE

ARITH MEAN * 2.11 * MEDIAN * 2.16 * STD DEV * 0.21 * RANGE * 1.45 TO 2.41 WITH 50 SAMPLES

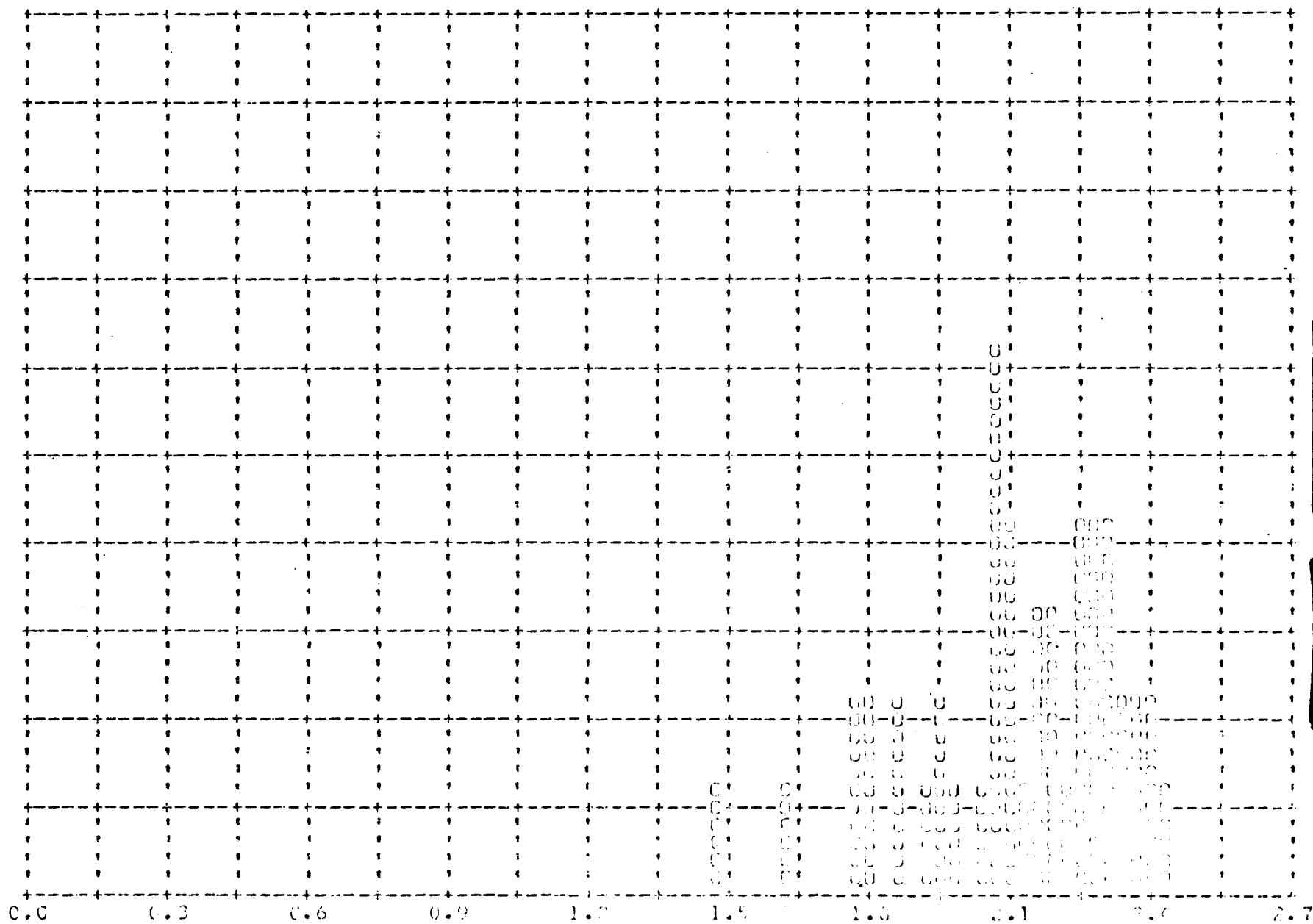


FIGURE A-3

MISSION * 1043-2 * INSTR * FWD * 1/9/68 PLOT OF D MIN * TERRAIN * PROCESSING * FULL

ARITH MEAN * 0.49 * MEDIAN * 0.45 * STD DEV * 0.16 * RANGE * 0.19 TO 0.97 WITH 114 SAMPLES

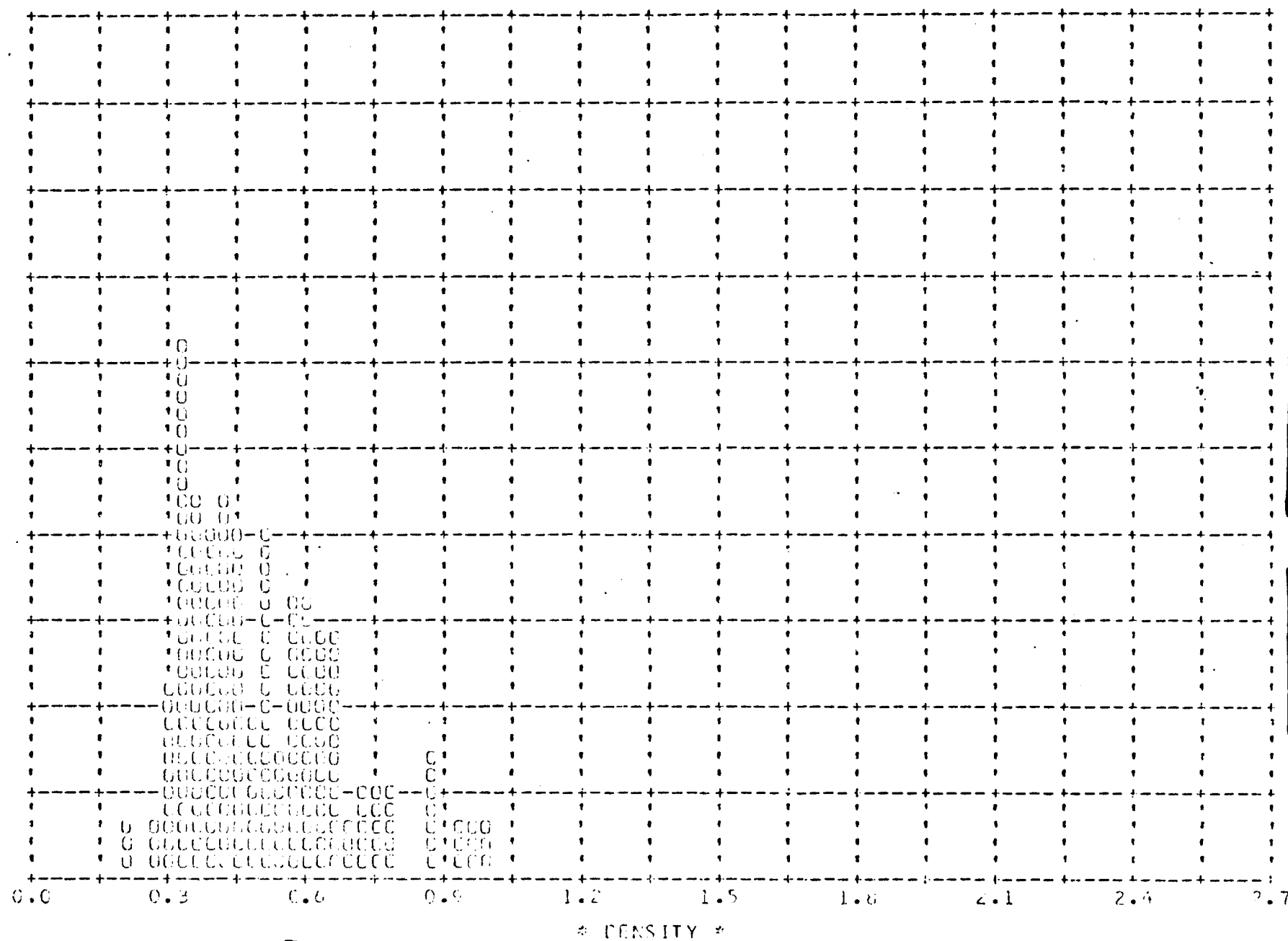


FIGURE A-3

MISSION * 1043-2 * INSTR * FWD * 1/9/68 PLOT OF D MAX * TERRAIN * PROCESSING * FULL

ARITH MEAN * 1.30 * MEDIAN * 1.28 * STD DEV * 0.30 * RANGE * 0.66 TO 1.91 WITH 114 SAMPLES

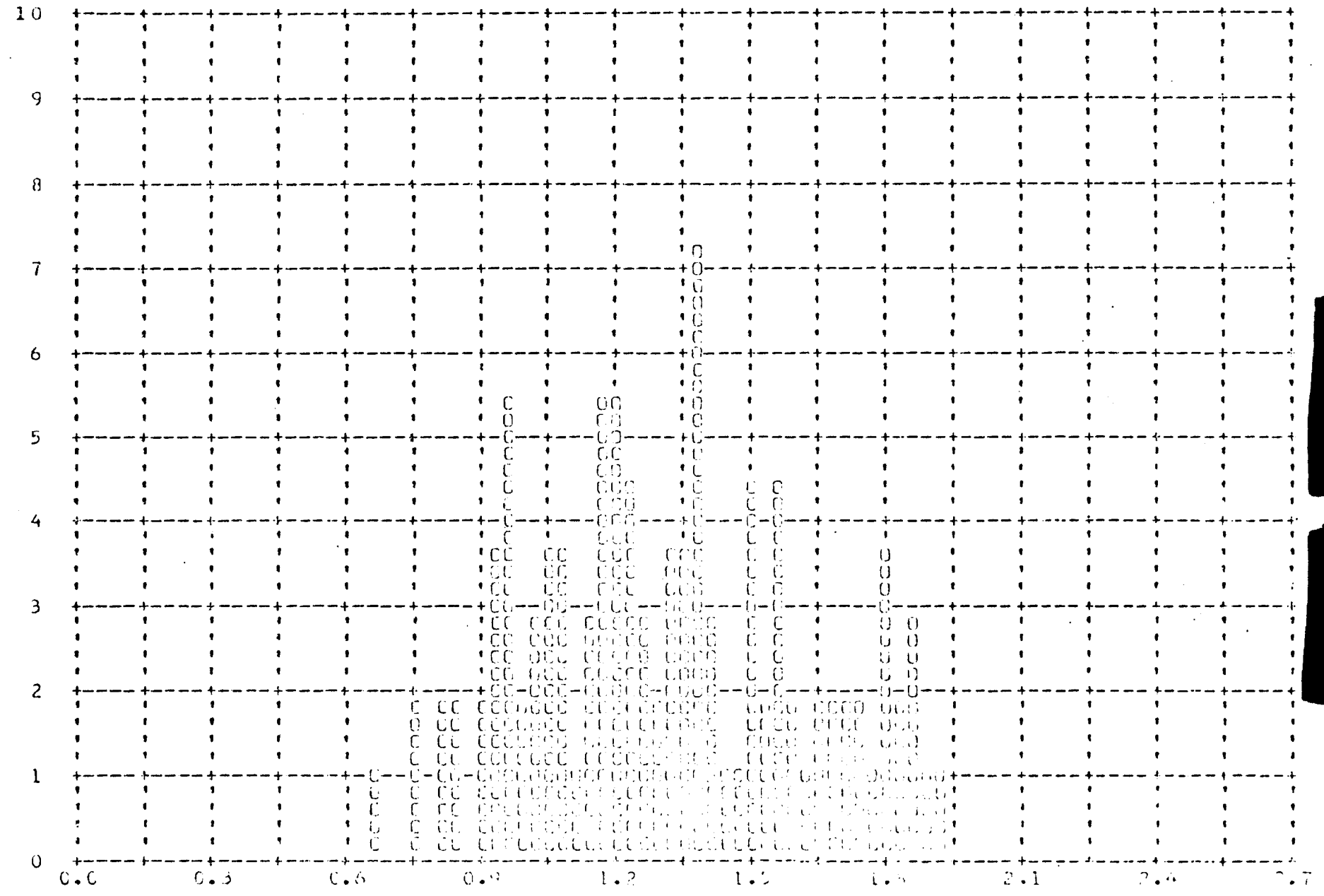


FIGURE A-3

MISSION * 1043-2 * INSTR * FWD * 1/9/68 PLOT OF D MAX * CLOUD * PROCESSING * FULL

ARITH MEAN * 2.21 * MEDIAN * 2.24 * STD DEV * 0.20 * RANGE * 0.84 TO 2.44 WITH 131 SAMPLES

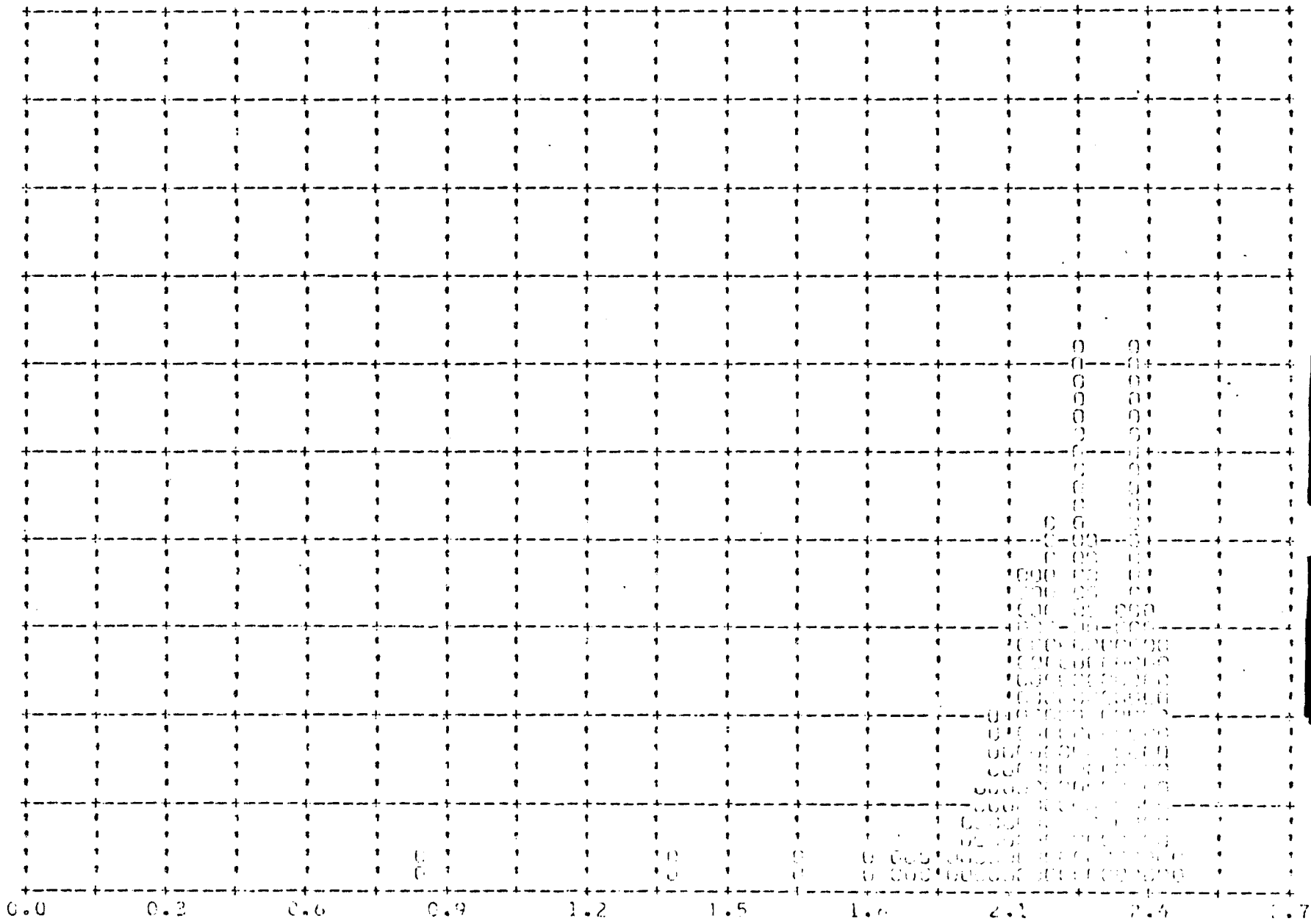


FIGURE A-3

MISSION * 1043-2 * INSTR * FWD * 1/9/68 PLOT OF D MIN * TERRAIN * PROCESSING * ALL LEVELS

ARITH MEAN * 0.54 * MEDIAN * 0.50 * STD DEV * 0.20 * RANGE * 0.19 TO 1.32 WITH 187 SAMPLES

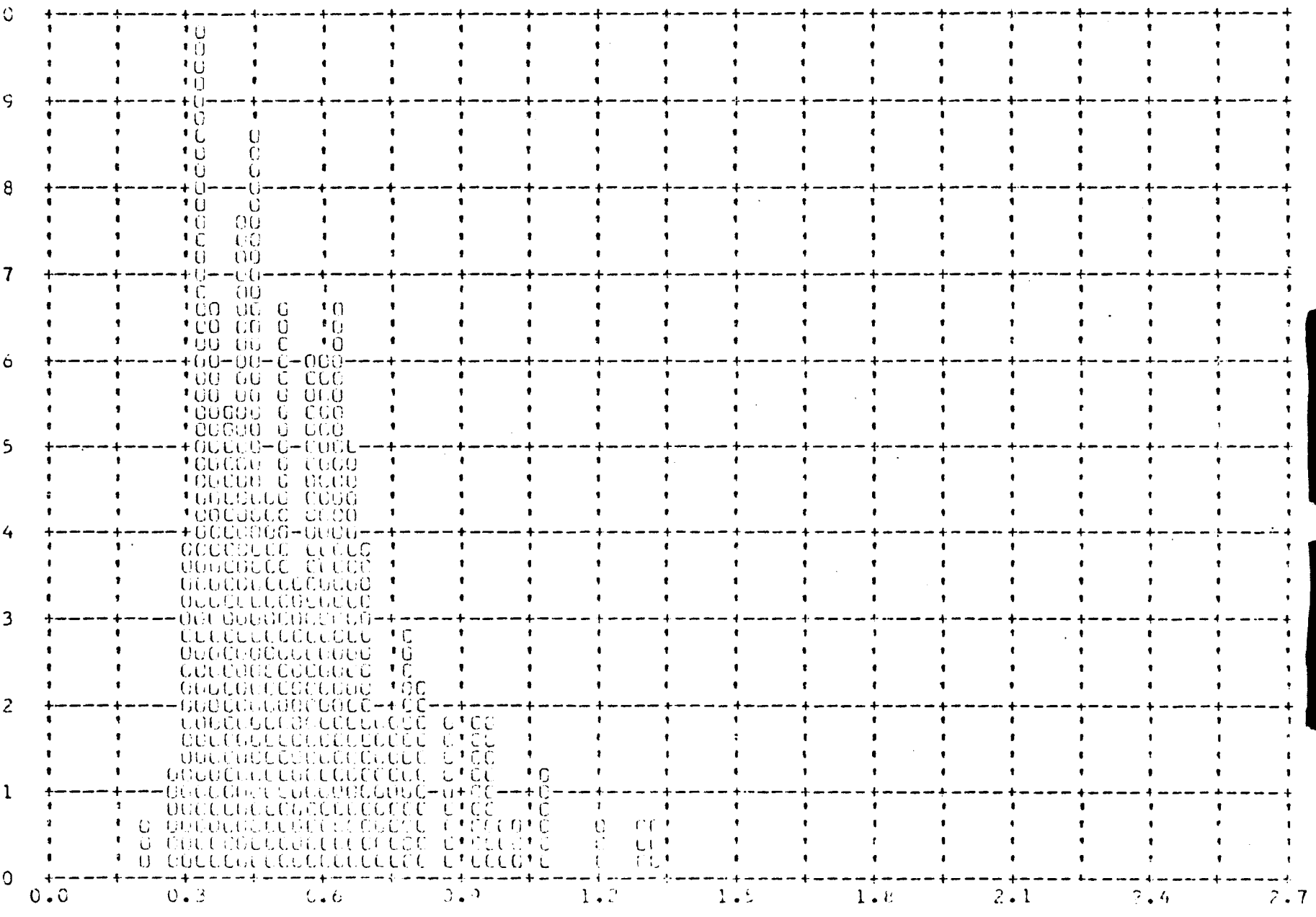


FIGURE A-3

MISSION * 1043-2 * INSTR * FWD * 1/9/68 PLOT OF D MAX * TERRAIN * PROCESSING * ALL LEVELS

ARITH MEAN * 1.39 * MEDIAN * 1.39 * STD DEV * 0.33 * RANGE * 0.66 TO 2.39 WITH 187 SAMPLES

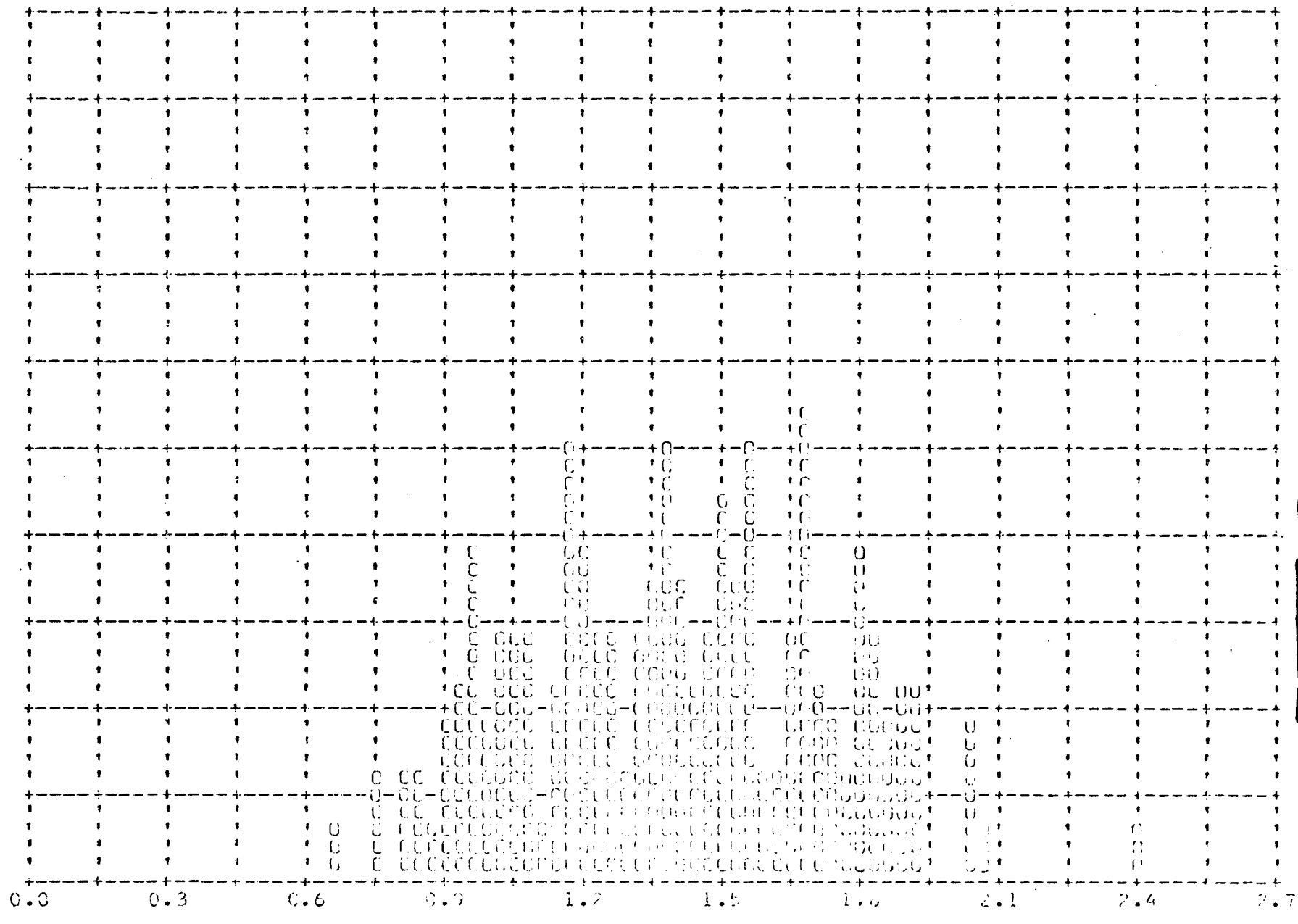
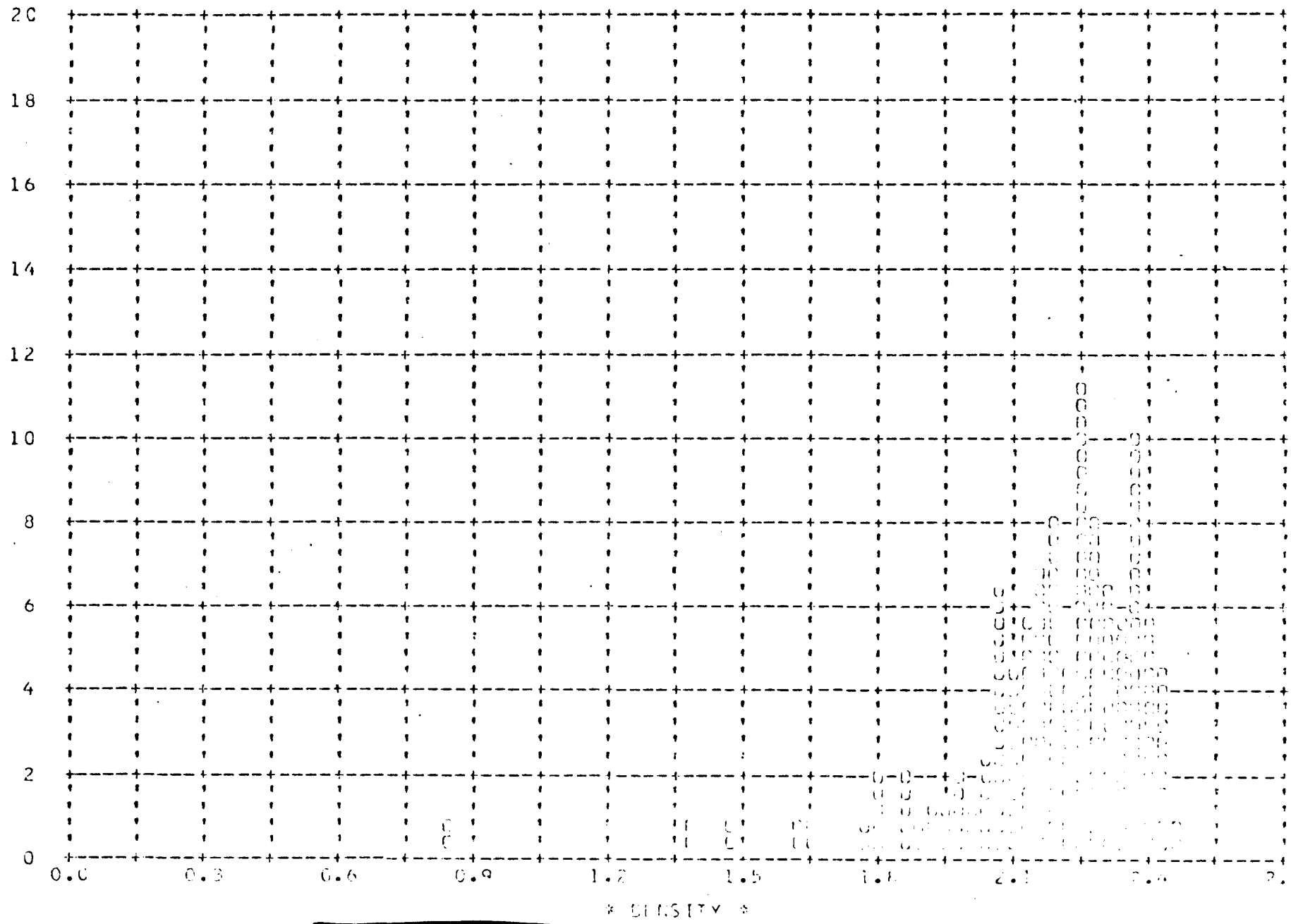


FIGURE A-3

[redacted]

MISSION * 1043-2 * INSTR * FWD * 1/9/68 PLOT OF D MAX * CLOUD * PROCESSING * ALL LEVELS

ARITH MEAN * 2.18 * MEDIAN * 2.23 * STD DEV * 0.21 * RANGE * 0.84 TO 2.44 WITH 182 SAMPLES



[redacted]

FIGURE A-3

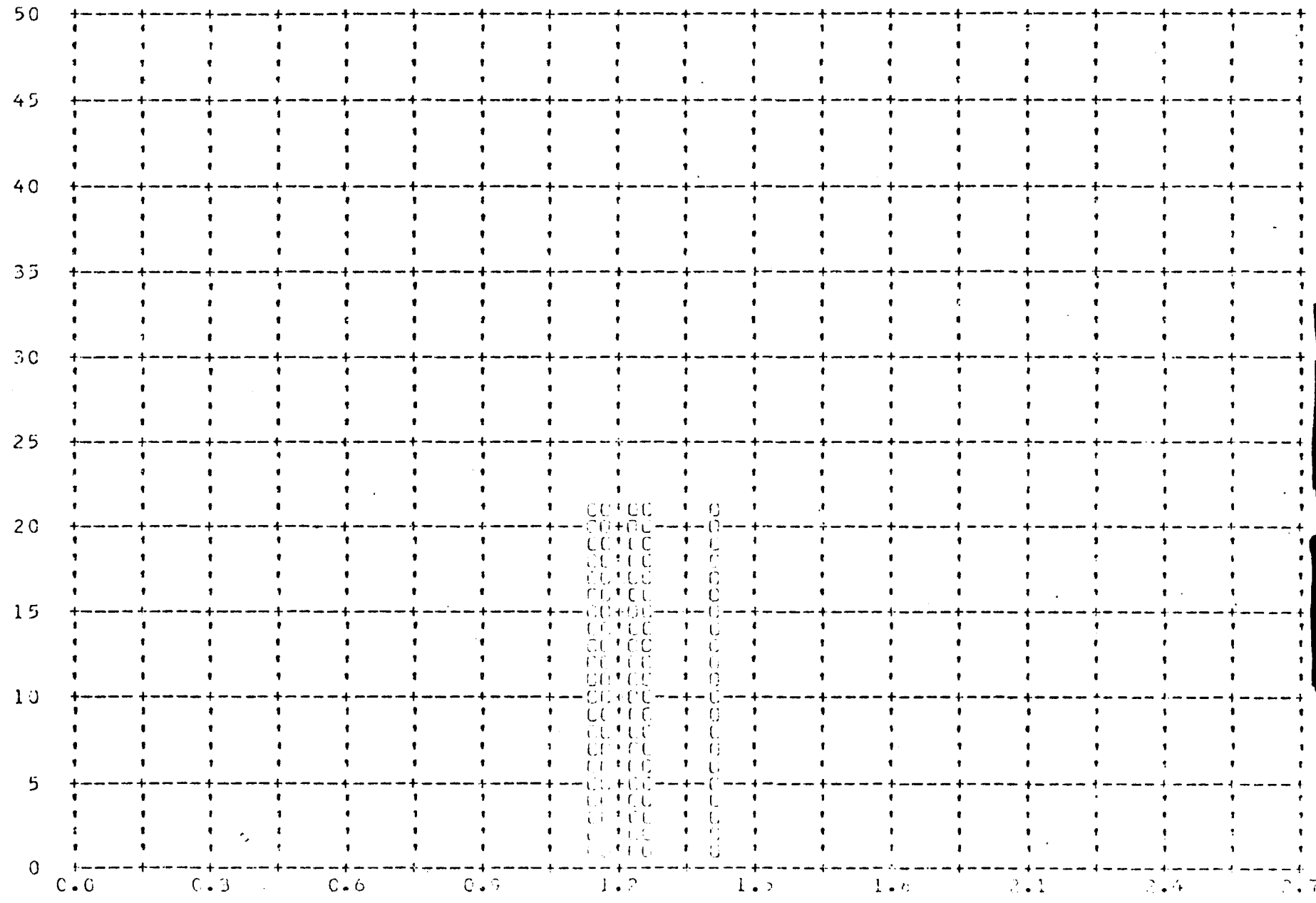
MISSION * 1043-2 * INSTR * AFT * 1/9/68 PLOT OF D MIN * TERRAIN * PROCESSING * PRIMARY

ARITH MEAN * 0.78 * MEDIAN * 0.70 * STD DEV * 0.22 * RANGE * 0.57 TO 1.04 WITH 5 SAMPLES

FIGURE A-4

MISSION * 1043-2 * INSTR * AFT * 1/9/68 PLOT OF D MAX * TERRAIN * PROCESSING * PRIMARY

ARITH MEAN * 1.23 * MEDIAN * 1.21 * STD DEV * 0.10 * RANGE * 1.14 TO 1.39 WITH 5 SAMPLES



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MISSION * 1043-2 * INSTR * AFT * 1/9/68 PLOT OF D MAX * CLOUD * PROCESSING * PRIMARY

ARITH MEAN * 1.59 * MEDIAN * 1.71 * STD DEV * 0.26 * RANGE * 1.20 TO 1.77 WITH 4 SAMPLES

FIGURE A-14

MISSION * 1043-2 * INSTR * AFT * 1/9/68 PLOT OF D MIN * TERRAIN * PROCESSING * INTERMEDIATE

ARITH MEAN * 0.59 * MEDIAN * 0.53 * STD DEV * 0.23 * RANGE * 0.25 TO 1.22 WITH 90 SAMPLES

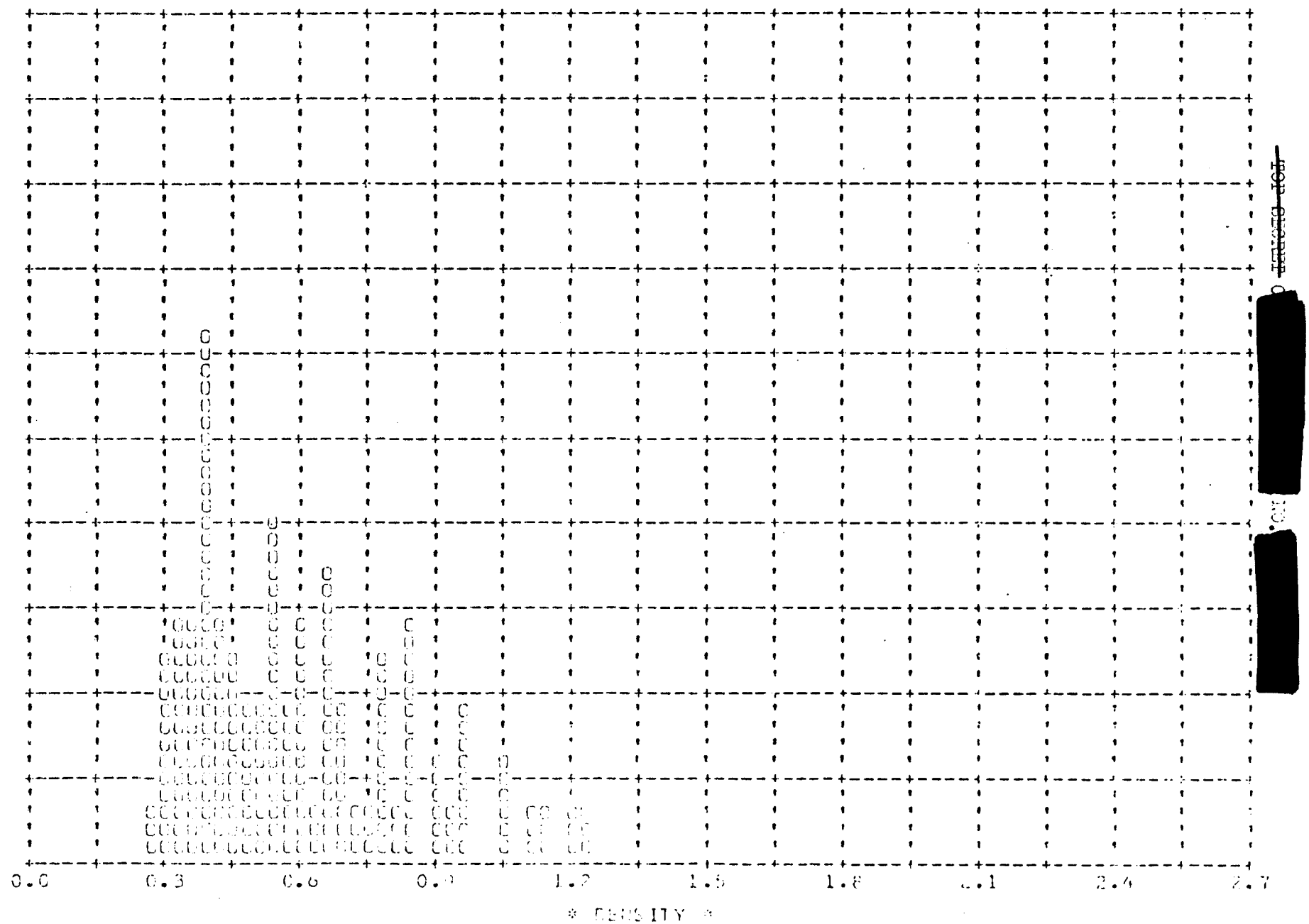

FIGURE A-4

MISSION * 1043-2 * INSTR * AFT * 1/9/68 PLOT OF D MAX * TERRAIN * PROCESSING * INTERMEDIATE

ARITH MEAN * 1.36 * MEDIAN * 1.44 * STD DEV * 0.29 * RANGE * 0.61 TO 1.88 WITH 90 SAMPLES

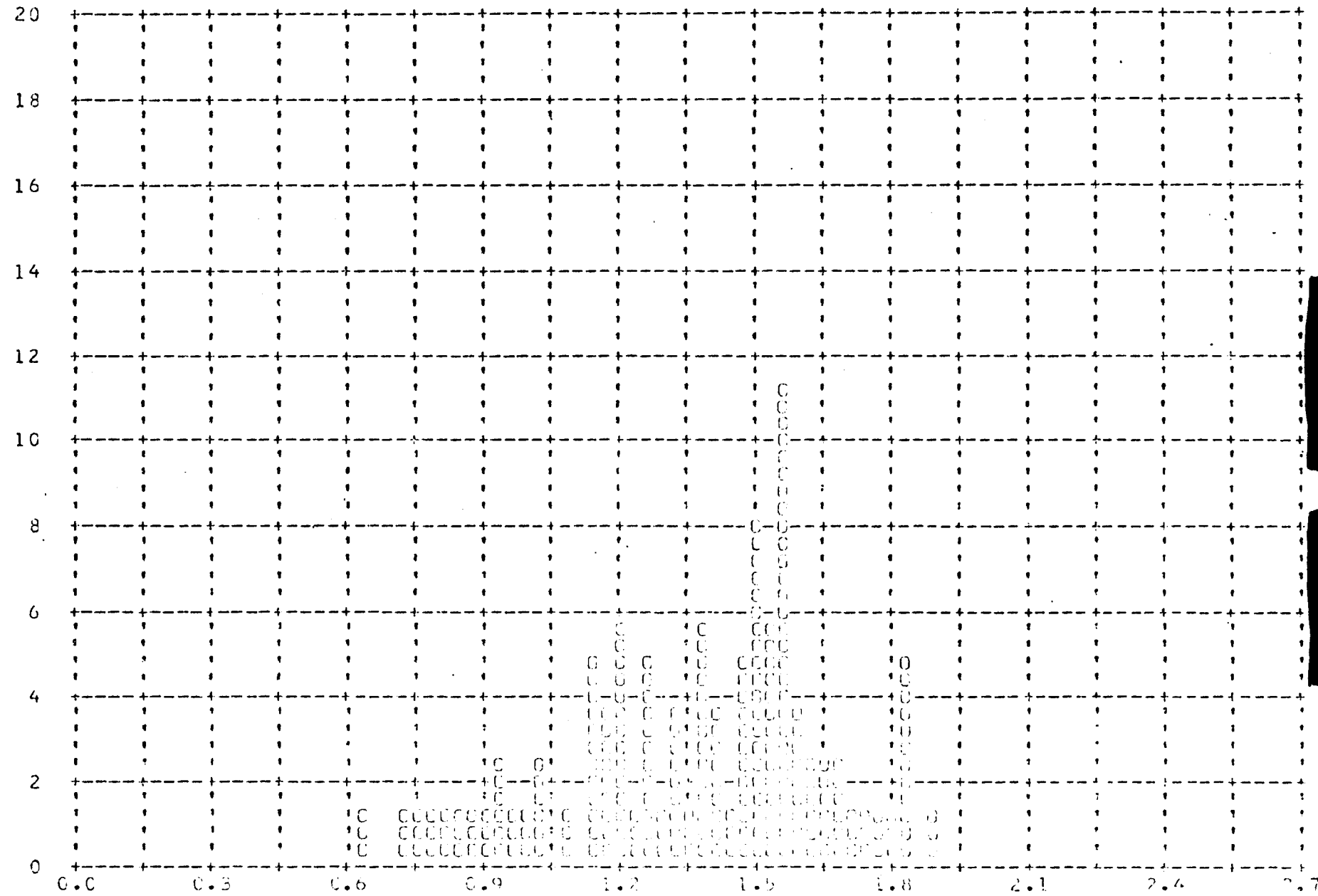

FIGURE A-4

MISSION * 1043-2 * INSTR * AFT * 1/9/68 PLOT OF D MAX * CLOUD * PROCESSING * INTERMEDIATE

ARITH MEAN * 1.92 * MEDIAN * 1.97 * STD DEV * 0.24 * RANGE * 1.09 TO 2.35 WITH 59 SAMPLES

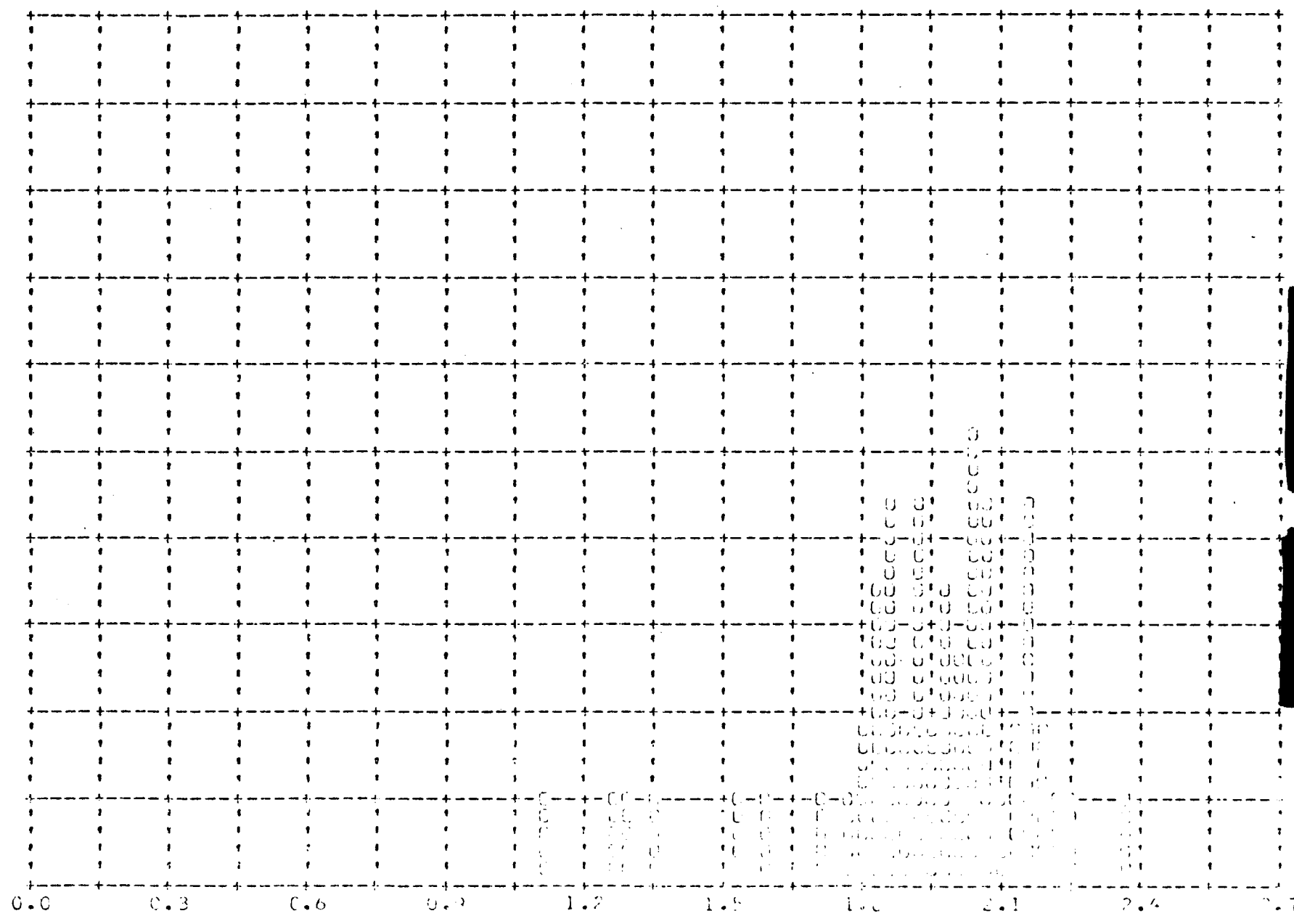

FIGURE A-4

MISSION * 1043-2 * INSTR * AFT * 1/9/68 PLOT OF D MIN * TERRAIN * PROCESSING * FULL

ARITH MEAN * 0.51 * MEDIAN * 0.47 * STD DEV * 0.19 * RANGE * 0.26 TO 1.32 WITH 152 SAMPLES

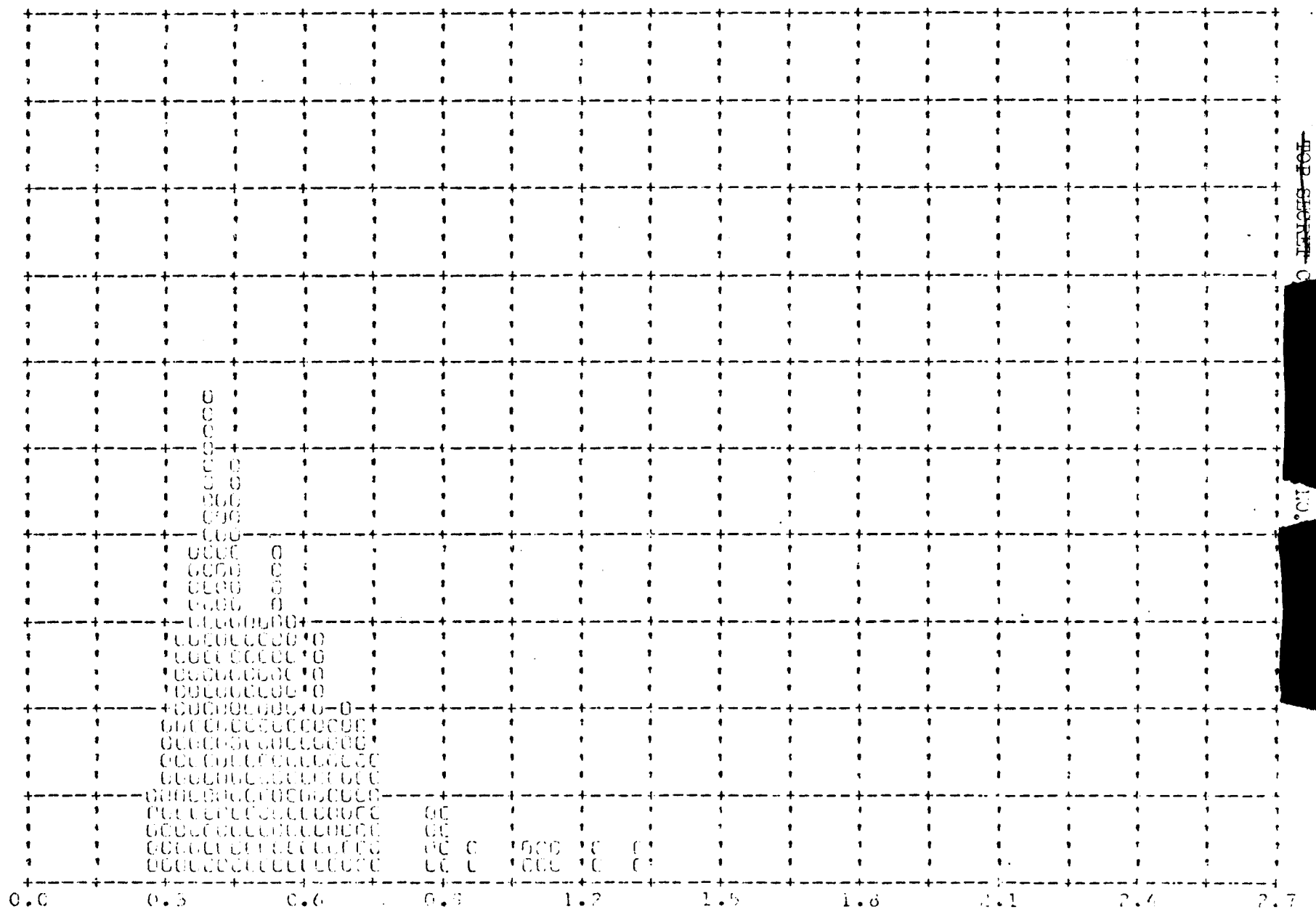

FIGURE A-4

MISSION * 1043-2 * INSTR * AFT * 1/9/68 PLOT OF D MAX * TERRAIN * PROCESSING * FULL

ARITH MEAN * 1.22 * MEDIAN * 1.21 * STD DEV * 0.32 * RANGE * 0.55 TO 2.06 WITH 152 SAMPLES

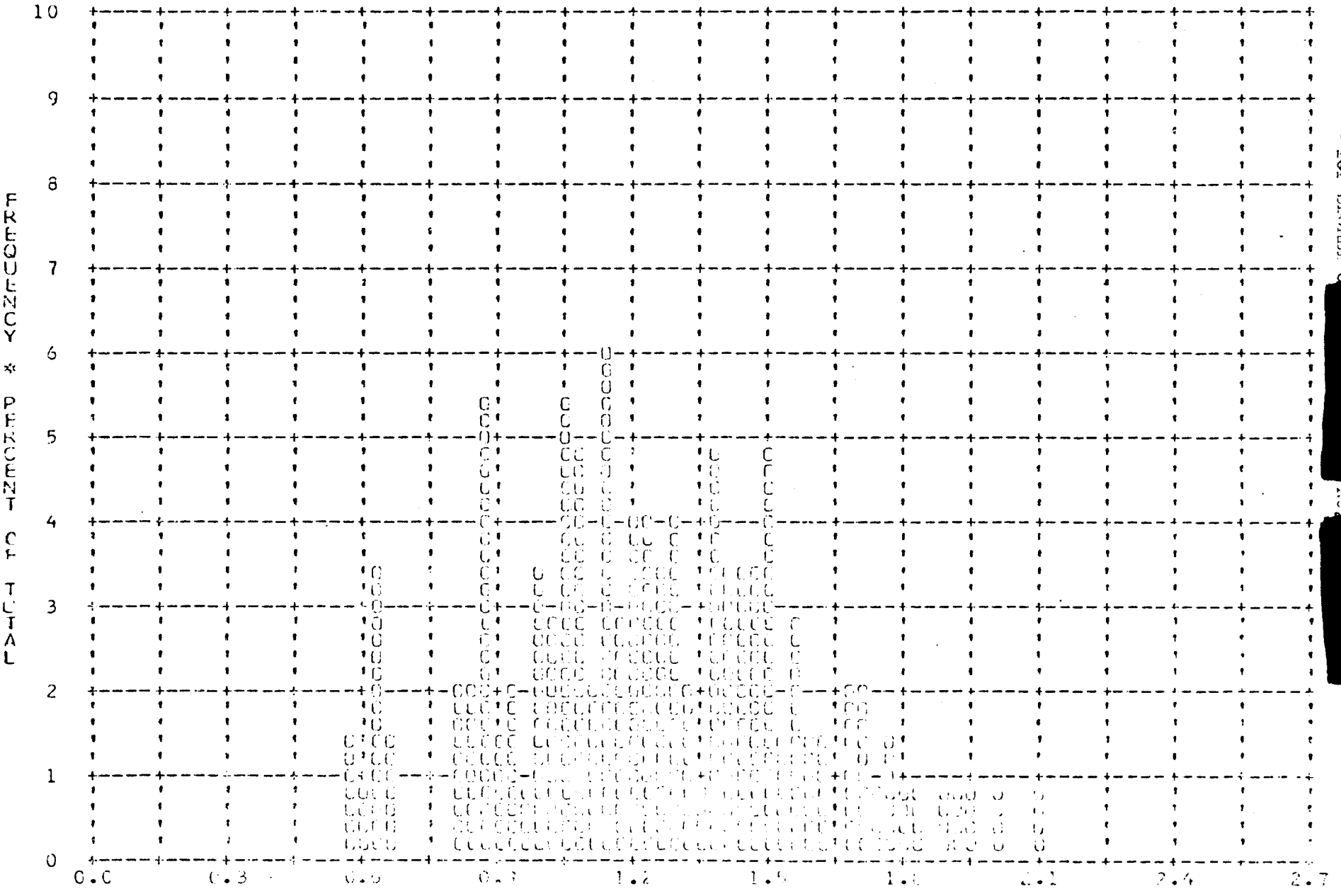

FIGURE A-4

[redacted]

MISSION * 1043-2 * INSTR * AFT * 1/9/68 PLOT OF D MAX * CLOUD * PROCESSING * FULL

ARITH MEAN * 2.07 * MEDIAN * 2.12 * STD DEV * 0.22 * RANGE * 1.35 TO 2.46 WITH 165 SAMPLES

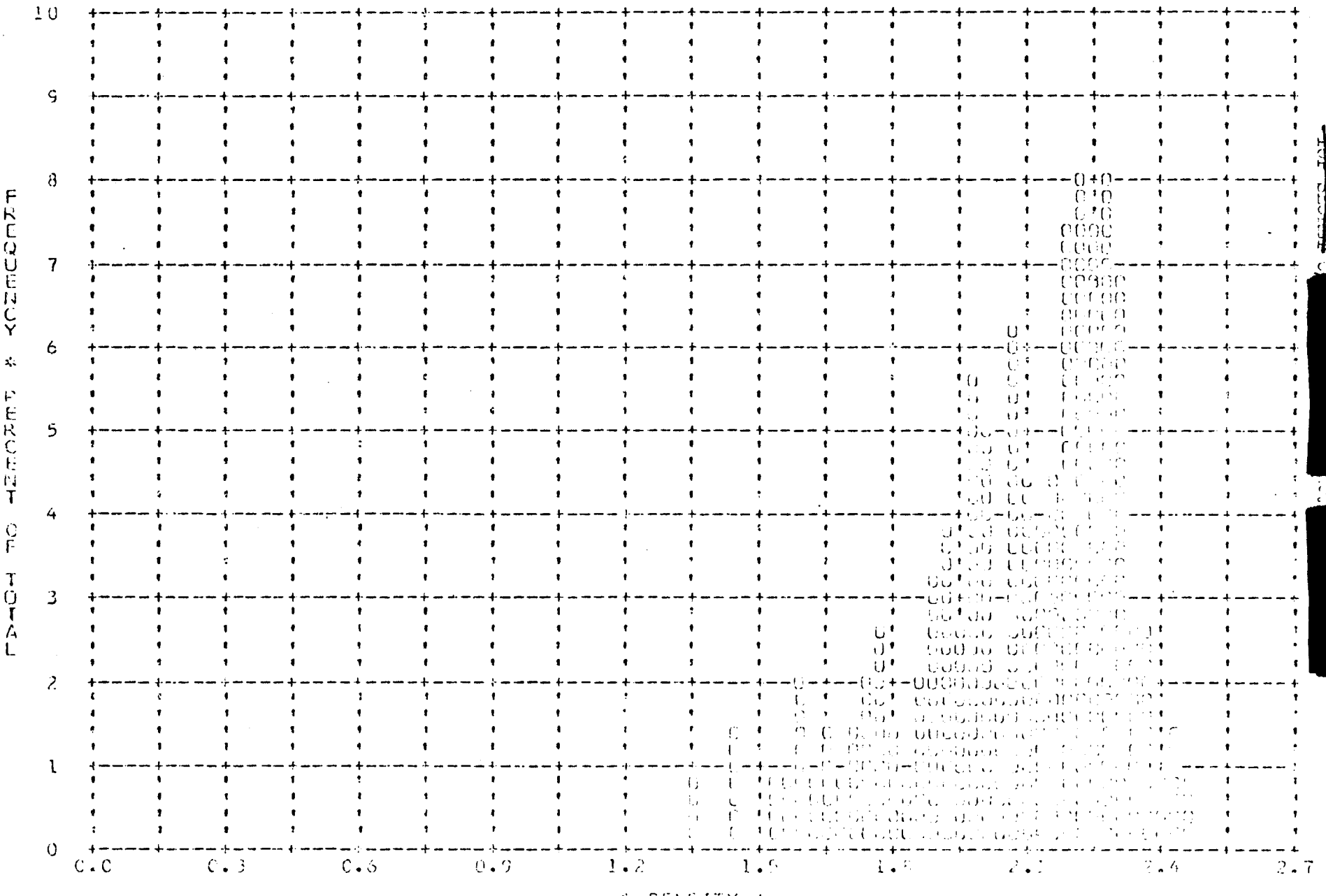

FIGURE A-4

[redacted]

MISSION * 1043-2 * INSTR * AFT * 1/9/68 PLOT OF D MIN * TERRAIN * PROCESSING * ALL LEVELS

ARITH MEAN * 0.54 * MEDIAN * 0.50 * STD DEV * 0.21 * RANGE * 0.25 TO 1.32 WITH 247 SAMPLES

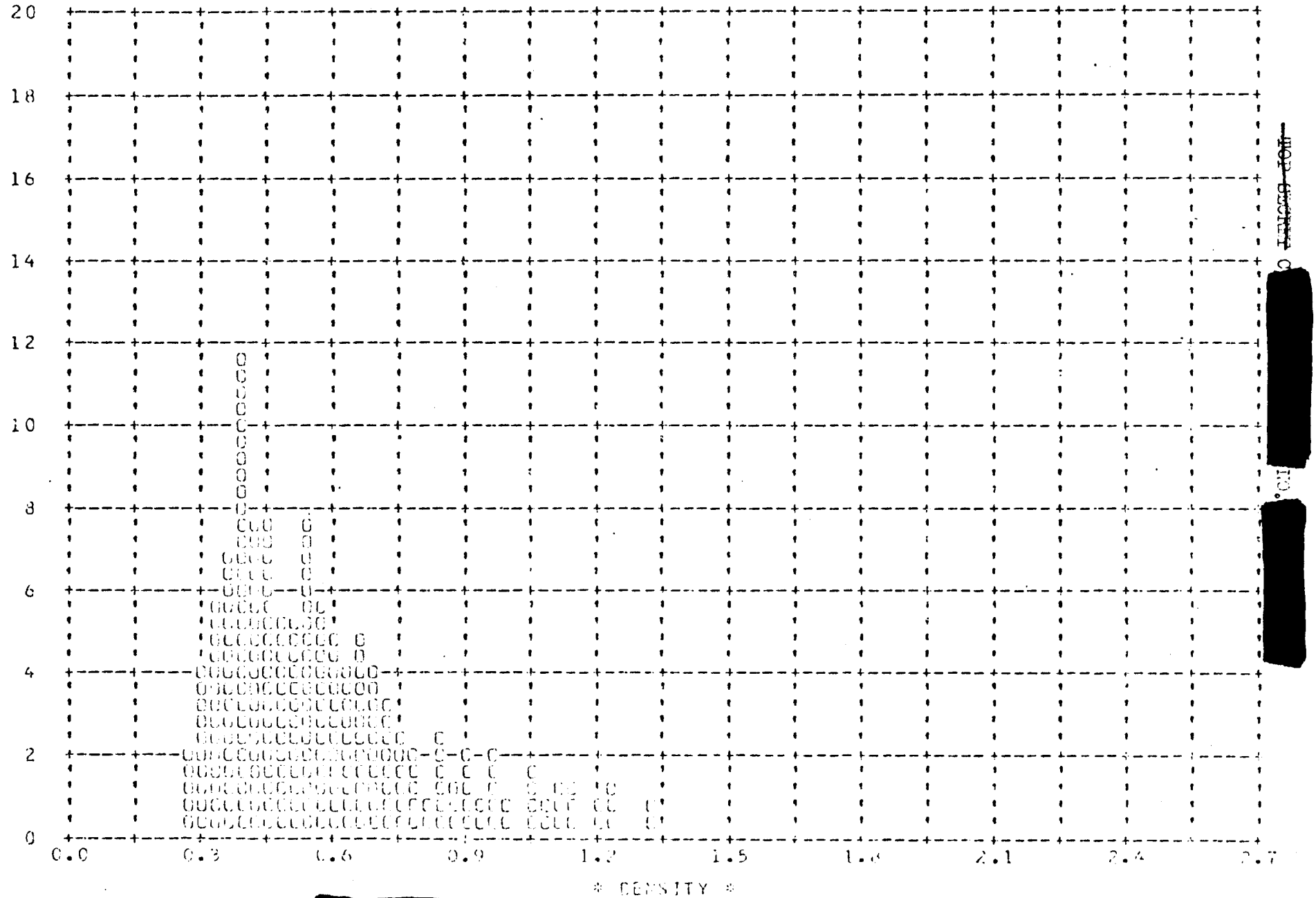

FIGURE A-4

MISSION * 1043-2 * INSTR * AFT * 1/9/68 PLOT OF D MAX * TERRAIN * PROCESSING * ALL LEVELS

ARITH MEAN * 1.27 * MEDIAN * 1.27 * STD DEV * 0.31 * RANGE * 0.55 TO 2.08 WITH 247 SAMPLES

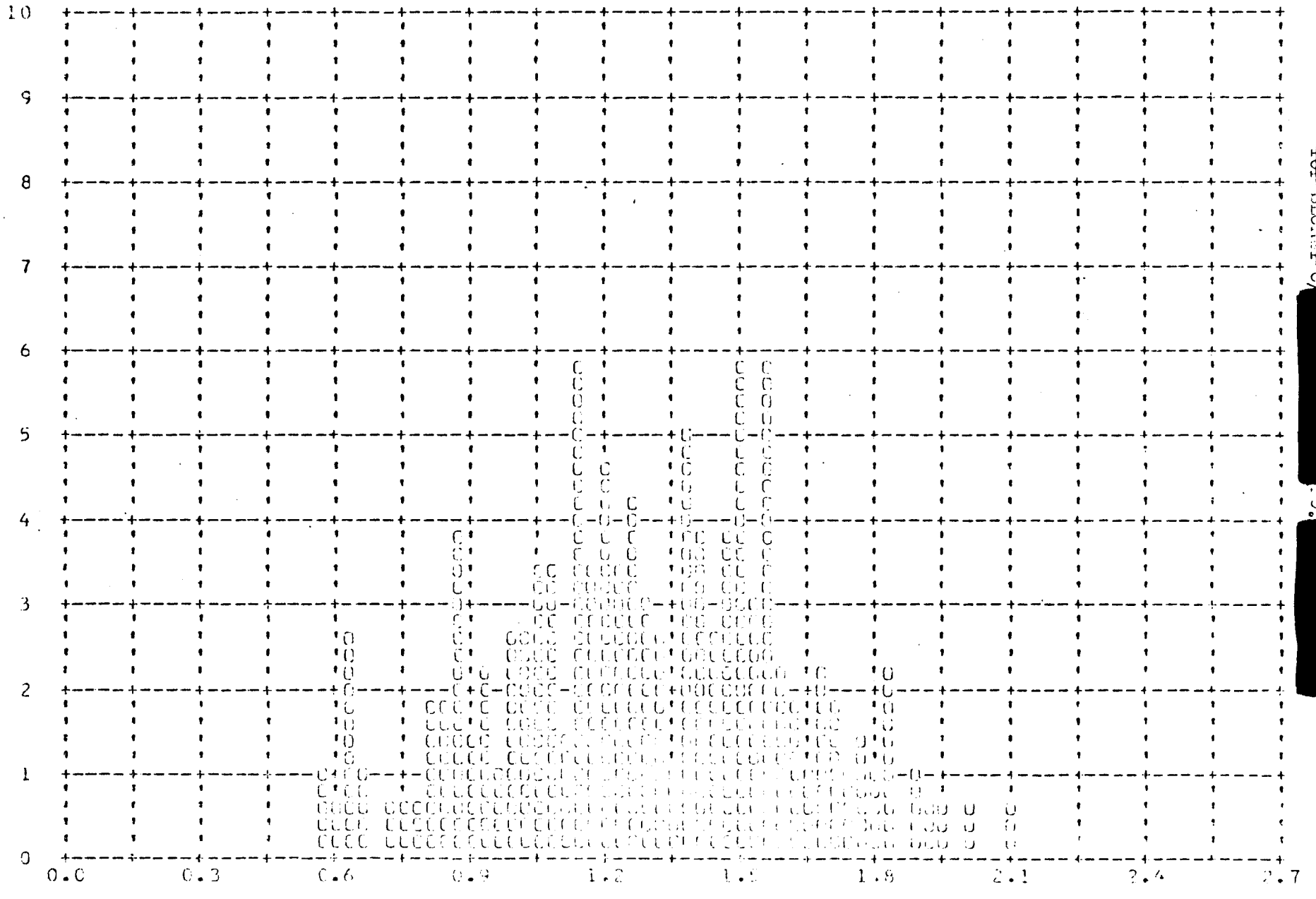

FIGURE A-14

MISSION * 1043-2 * INSTR * AFT * 1/9/69 PLOT OF D MAX * CLOUD * PROCESSING * ALL LEVELS

ARITH MEAN * 2.02 * MEDIAN * 2.06 * STD DEV * 0.24 * RANGE * 1.09 TO 2.46 WITH 228 SAMPLES

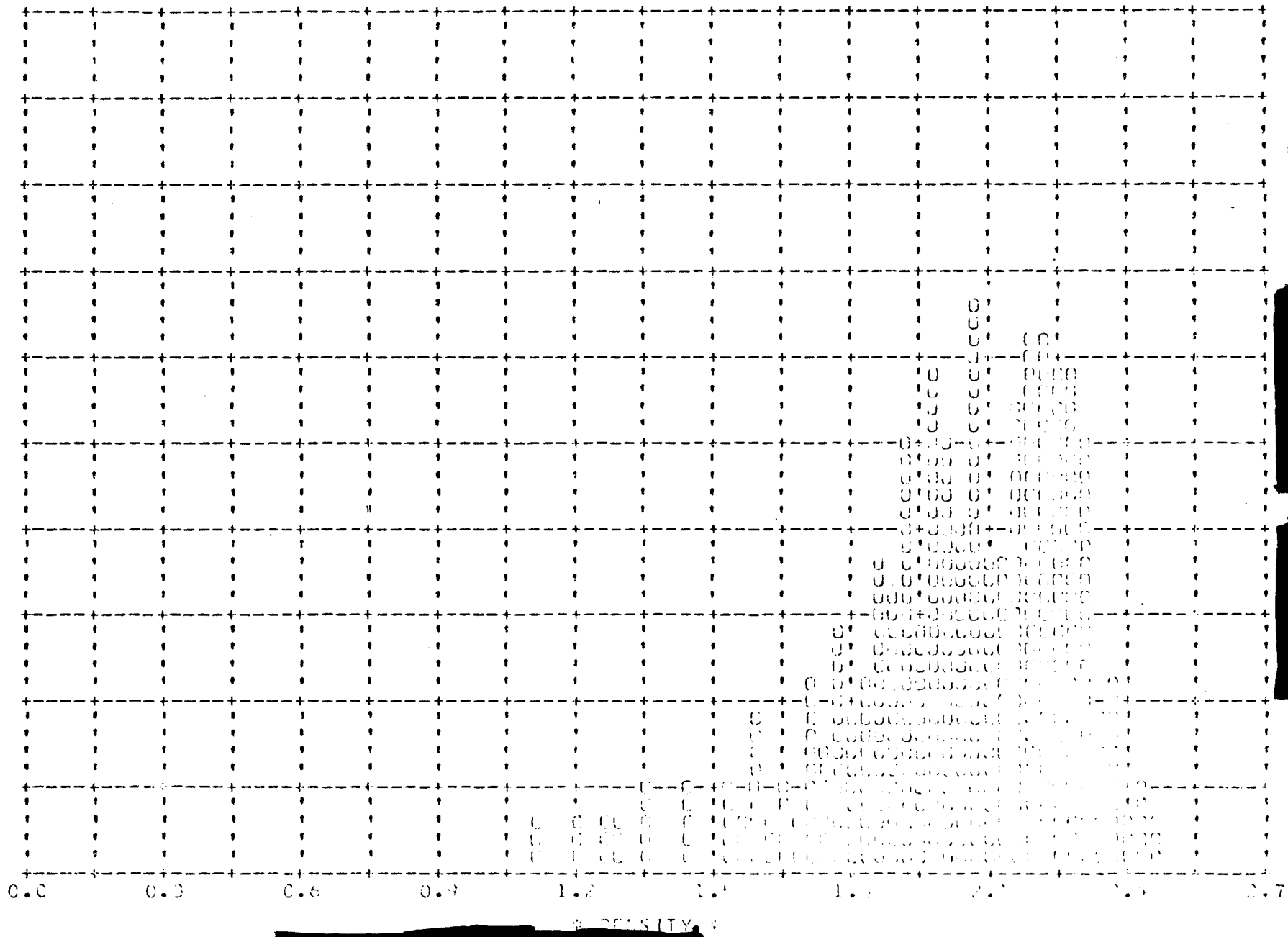

FIGURE A-4

Distribution:

[redacted]