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FAIRCHILD CAMERA AND INSTRUMENT CORPORATION
SPACE AND DEFENSE SYSTEMS DIVISION
SYOSSET, L. I., NEW YORK

CALIBRATION REPORT

CAMERA TYPE - DISIC SYSTEM 1162-A1

SYSTEM NO. 1

NOV 22 1967

Prepared By: [REDACTED]

Optronics Laboratory

Approved By: [REDACTED]

Optronics Laboratory

Declassified and Released by the NRO

In Accordance with E. O. 12958

on NOV 26 1997

Approved By: [REDACTED]

Quality & Reliability Dept.

~~Classified by [REDACTED]~~
~~EXEMPT FROM GENERAL DECLASSIFICATION~~
~~SCHEDULE COMBONITIVE ORDER 11-52~~
~~EXEMPTION CATEGORY... Para 2D. 2 + 3~~
~~DECLASSIFY ON... [REDACTED]~~

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Certified By: [REDACTED]

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CALIBRATION CERTIFICATE

Submitted By

FAIRCHILD CAMERA AND INSTRUMENT CORPORATION
SPACE AND DEFENSE SYSTEMS

SYOSSET, L. I., NEW YORK

DATE 1/21/67

Camera Type _____

Camera No. _____

Lens and Cone No. 104 (Distortion Balanced within 42.5°)

a) Make and Type Ikogon

b) Nominal Focal Length 3"

c) Maximum Aperture f/4.5



Camera Calibration Laboratory

This Certificate applies to the above subject precision camera with lens as stated herein. It was tested at maximum aperture. All measurements were made with parallel light incident on the lens. The light source is white light, rated at 3500° K. Test exposures were made under simulated altitude conditions at an ambient pressure of 0.500 mm Hg.



Ikogon 3" f/4.5

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Date 1/21/67

Lens No. 104

By Wm. B.

I. FOCAL LENGTH

Flange Focal Distance	Equivalent Focal Length	Calibrated Focal Length
MM N. A.	MM 76.359	MM 76.240

The probable errors of these determinations of focal length do not exceed 0.010 mm.

II. DISTORTION

Distortion Referred to the Calibrated Focal Length

7.5°	15°	22.5°	27.5°	30°	32.5°	35°	37.5°	40°	42.5°	45°
+ .015	+ .027	+ .037	+ .033	+ .030	+ .029	+ .024	+ .014	- .008	- .038	- .063

The values of the distortion are measured in millimeters and indicate the displacement of the image from its distortion-free position. A positive value indicates a displacement from the center of the plate. The probable error is approximately 0.003 mm.

Tangential Distortion

The Tangential distortion is (See mm. Diagram)

III. AVERAGE RESOLVING POWER (HIGH CONTRAST)

Emulsion: 4400

AWAR 88.4 L/mm

	0°	7.5°	15°	22.5°	27.5°	30°	32.5°	35°	37.5°	40°	42.5°	45°
Tangential	102	102	100	91	91	92	102	81	72	61	51	41
Radial	102	102	105	97	114	92	97	81	65	57	46	37

The values of the resolving power are given at specified intervals from the center of the field and are obtained by photographing suitable test charts comprised of patterns of parallel lines. The series of patterns of the test chart are imaged on the negative with lines per millimeter spaced from 4 to 129 in $\sqrt{2}$ intervals.

The row marked "Tangential" gives the number of lines per millimeter in the image on the negative of the finest pattern of the test chart that is distinctly resolved into separate lines when the lines lie perpendicular to the radius drawn from the center of the field. The row marked "Radial" gives similar values for the pattern of test lines lying parallel to the radius.

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Ikogon 3" f/4.5

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Date 1/21/67

Lens Number 104

By Wm. B.

Low Contrast Resolution Values as per El Segundo Report

RESOLVING POWER

FILM 4400

TARGET CONTRAST 2:1

PROCESSING D-19 8 min. @ 68°F

AWAR 63.2 L/mm

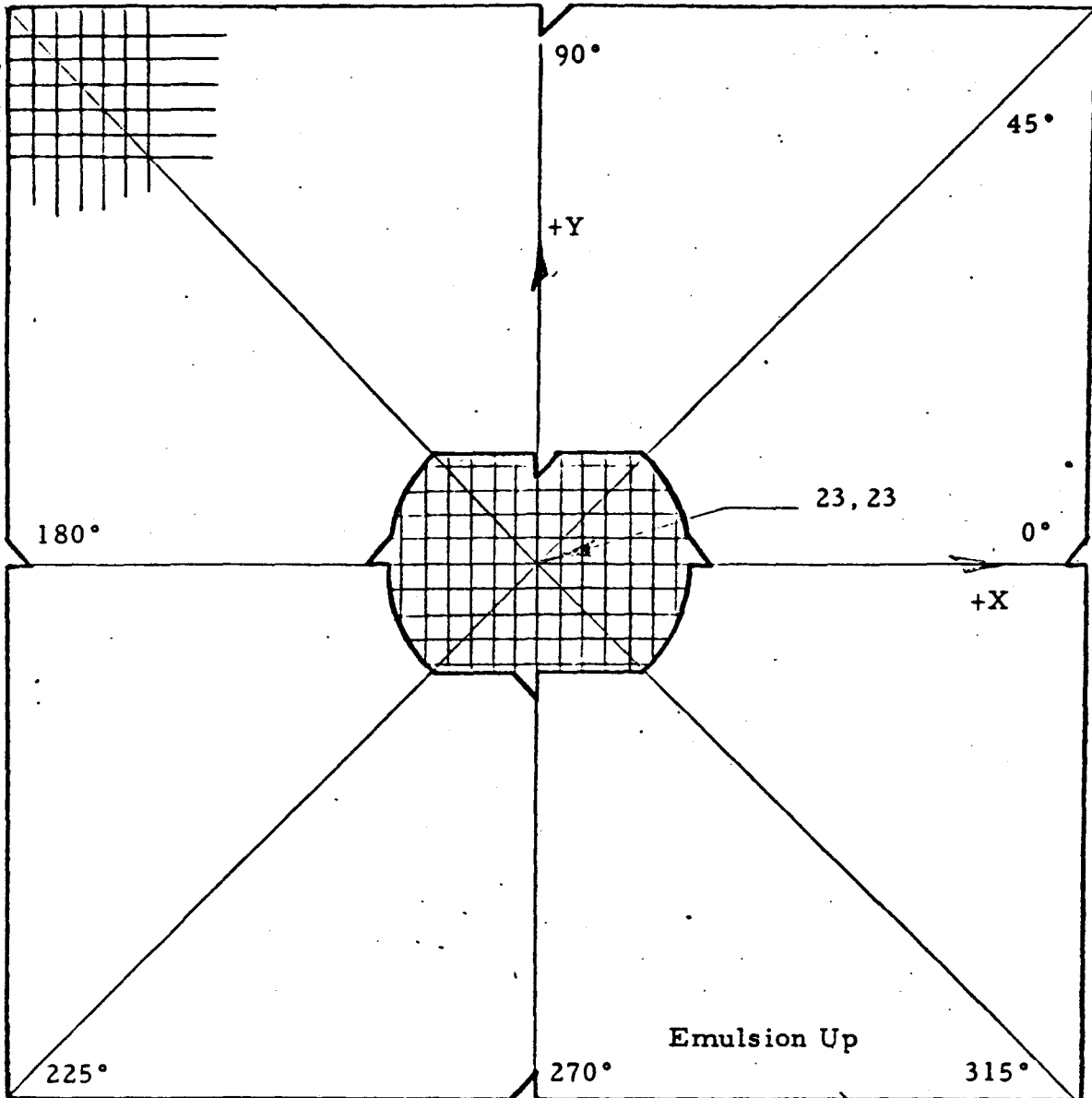
	0°	5°	10°	15°	20°	25°	30°	35°	40°	45°
Radial	71	78	79	73	75	71	74	66	59	36
Tangential	67	75	73	58	65	64	59	56	44	25

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Column →
1 2 3 4 5

Row ↓
1
2
3
4
5



Normal matrix notation is being used on this program with columns being the verticals and rows the horizontals reading from left to right for the former and up to down, the latter.

The same orientation applies to both grids, the only difference being the size. It should be noted that in both systems, the orientation is established by the fiducials. The natural fiducials that point in the same direction are in the positive Y direction.

The values for tangential and radial distortion in millimeters, referred to the Point of Symmetry and the Calibrated Focal Length are tabulated for each radial diagonal. Positive radial distortion indicates a displacement away from the center of the grid. Positive tangential distortion indicates a displacement in a counterclockwise direction from 0°.

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CALIBRATION TRANSFORMATION PROGRAM

IKOGON SERIAL NO 104

PROGRAM INPUT

CALIBRATED FOCAL LENGTH = 76.2400 MM

PRIN. POINT OF AUTOCOLLIMATION (MM)

X = 0.006000 Y = -0.001000

POINT OF SYMMETRY (MM)

X = 0.002000 Y = 0.002000

RADIAL VECTOR FOR 0. DEGREES		
FIELD ANGLE	RADIAL DISTORTION	TANGENTIAL DISTORTION
DEGREES	(MM)	(MM)
0.	0.	0.
7.50	0.016000	0.
15.00	0.028000	-0.001000
22.51	0.037000	-0.001000
27.51	0.034000	-0.002000
30.01	0.030000	-0.002000
32.51	0.029000	-0.002000
35.01	0.025000	-0.002000
37.51	0.013000	-0.002000
40.01	-0.010000	-0.002000

RADIAL VECTOR FOR 45.00 DEGREES		
FIELD ANGLE	RADIAL DISTORTION	TANGENTIAL DISTORTION
DEGREES	(MM)	(MM)
0.	0.	0.
7.50	0.014000	-0.001000
15.00	0.025000	-0.001000
22.51	0.034000	-0.002000
27.51	0.039000	0.002000
30.01	0.033000	0.001000
32.51	0.027000	-0.001000
35.01	0.023000	-0.002000
37.51	0.012000	-0.002000
40.01	-0.010000	0.
42.52	-0.038000	0.002000
45.02	-0.065000	0.005000

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RADIAL VECTOR FOR 90.00 DEGREES

FIELD ANGLE	RADIAL DISTORTION	TANGENTIAL DISTORTION
DEGREES	(MM)	(MM)
0.	0.	0.
7.50	0.015000	0.
15.00	0.026000	0.
22.51	0.036000	-0.001000
27.51	0.036000	-0.001000
30.01	0.032000	0.
32.51	0.028000	0.
35.01	0.024000	0.
37.51	0.013000	-0.001000
40.01	-0.010000	-0.001000

RADIAL VECTOR FOR 135.00 DEGREES

FIELD ANGLE	RADIAL DISTORTION	TANGENTIAL DISTORTION
DEGREES	(MM)	(MM)
0.	0.	0.
7.50	0.016000	-0.001000
15.00	0.028000	0.001000
22.51	0.041000	0.002000
27.51	0.033000	0.001000
30.01	0.030000	0.
32.51	0.030000	0.
35.01	0.026000	0.
37.51	0.013000	0.001000
40.01	-0.009000	0.001000
42.52	-0.035000	0.001000
45.02	-0.060000	0.001000

RADIAL VECTOR FOR 180.00 DEGREES

FIELD ANGLE	RADIAL DISTORTION	TANGENTIAL DISTORTION
DEGREES	(MM)	(MM)
0.	0.	0.
7.50	0.015000	0.
15.00	0.028000	0.001000
22.51	0.038000	0.001000
27.51	0.035000	0.002000
30.01	0.032000	0.002000
32.51	0.029000	0.002000
35.01	0.024000	0.002000
37.51	0.014000	0.002000
40.01	-0.007000	0.002000

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RADIAL VECTOR FOR 225.00 DEGREES

FIELD ANGLE	RADIAL DISTORTION	TANGENTIAL DISTORTION
DEGREES	(MM)	(MM)
0.	0.	0.
7.50	0.014000	0.
15.00	0.027000	-0.002000
22.51	0.035000	0.
27.51	0.037000	-0.001000
30.01	0.034000	-0.001000
32.51	0.027000	0.001000
35.01	0.021000	0.
37.51	0.015000	0.
40.01	-0.004000	0.
42.52	-0.035000	-0.001000
45.02	-0.065000	-0.001000

RADIAL VECTOR FOR 270.00 DEGREES

FIELD ANGLE	RADIAL DISTORTION	TANGENTIAL DISTORTION
DEGREES	(MM)	(MM)
0.	0.	0.
7.50	0.016000	0.
15.00	0.029000	0.
22.51	0.038000	0.001000
27.51	0.034000	0.001000
30.01	0.030000	0.
32.51	0.026000	0.
35.01	0.024000	0.
37.51	0.015000	0.001000
40.01	-0.006000	0.001000

RADIAL VECTOR FOR 315.00 DEGREES

FIELD ANGLE	RADIAL DISTORTION	TANGENTIAL DISTORTION
DEGREES	(MM)	(MM)
0.	0.	0.
7.50	0.017000	-0.001000
15.00	0.031000	0.
22.51	0.040000	0.001000
27.51	0.030000	0.001000
30.01	0.027000	-0.001000
32.51	0.030000	-0.001000
35.01	0.027000	0.
37.51	0.014000	-0.001000
40.01	-0.009000	-0.002000
42.52	-0.037000	-0.002000
45.02	-0.063000	-0.001000

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IKOGUN SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
1	1	-55.0414	55.0345
	2	-52.5394	55.0338
	3	-50.0328	55.0290
	4	-47.5272	55.0244
	5	-45.0216	55.0200
	6	-42.5193	55.0157
	7	-40.0129	55.0112
	8	-37.5112	55.0072
	9	-35.0104	55.0035
	10	-32.5070	55.0001
	11	-30.0031	54.9959
	12	-27.5028	54.9918
	13	-24.9979	54.9879
	14	-22.4963	54.9841
	15	-19.9959	54.9806
	16	-17.4960	54.9787
	17	-14.9961	54.9771
	18	-12.4951	54.9757
	19	-9.9948	54.9746
	20	-7.4952	54.9738
	21	-4.9969	54.9733
	22	-2.4952	54.9730
	23	0.0043	54.9731
	24	2.5003	54.9734
	25	5.0012	54.9740
	26	7.5019	54.9749
	27	10.0032	54.9761
	28	12.4918	54.9775
	29	15.0015	54.9792
	30	17.5006	54.9811
	31	19.9984	54.9832
	32	22.5011	54.9869
	33	25.0012	54.9909
	34	27.5037	54.9950
	35	30.0063	54.9991
	36	32.5097	55.0034
	37	35.0110	55.0070
	38	37.5140	55.0109
	39	40.0162	55.0152
	40	42.5252	55.0198
	41	45.0261	55.0244
	42	47.5350	55.0291
	43	50.0423	55.0340
	44	52.5474	55.0390
	45	55.0515	55.0398

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IKOGUN SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
2	1	-55.0405	52.5312
	2	-52.5364	52.5283
	3	-50.0297	52.5235
	4	-47.5241	52.5189
	5	-45.0183	52.5142
	6	-42.5156	52.5094
	7	-40.0092	52.5049
	8	-37.5075	52.5008
	9	-35.0064	52.4965
	10	-32.5026	52.4920
	11	-29.9987	52.4876
	12	-27.4906	52.4832
	13	-24.9942	52.4796
	14	-22.4940	52.4772
	15	-19.9958	52.4750
	16	-17.4941	52.4731
	17	-14.9943	52.4714
	18	-12.4936	52.4699
	19	-9.9935	52.4688
	20	-7.4942	52.4684
	21	-4.9963	52.4683
	22	-2.4943	52.4682
	23	0.0044	52.4684
	24	2.5001	52.4687
	25	5.0008	52.4691
	26	7.5012	52.4696
	27	10.0022	52.4704
	28	12.4907	52.4720
	29	14.9999	52.4738
	30	17.4988	52.4758
	31	19.9964	52.4780
	32	22.4980	52.4804
	33	24.9989	52.4829
	34	27.4987	52.4867
	35	30.0012	52.4912
	36	32.5045	52.4957
	37	35.0063	52.5002
	38	37.5094	52.5045
	39	40.0115	52.5089
	40	42.5204	52.5135
	41	45.0238	52.5185
	42	47.5311	52.5234
	43	50.0385	52.5284
	44	52.5437	52.5334
	45	55.0501	52.5366

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IKOGUN SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
3	1	-55.0356	50.0266
	2	-52.5315	50.0236
	3	-50.0262	50.0203
	4	-47.5202	50.0152
	5	-45.0142	50.0101
	6	-42.5113	50.0052
	7	-40.0049	50.0007
	8	-37.5030	49.9959
	9	-35.0017	49.9912
	10	-32.4979	49.9864
	11	-29.9943	49.9820
	12	-27.4954	49.9791
	13	-24.9917	49.9764
	14	-22.4916	49.9739
	15	-19.9916	49.9716
	16	-17.4922	49.9701
	17	-14.9930	49.9693
	18	-12.4923	49.9687
	19	-9.9930	49.9682
	20	-7.4939	49.9678
	21	-4.9962	49.9676
	22	-2.4949	49.9676
	23	0.0042	49.9677
	24	2.4998	49.9680
	25	5.0003	49.9684
	26	7.5005	49.9690
	27	10.0014	49.9698
	28	12.4999	49.9707
	29	14.9985	49.9718
	30	17.4983	49.9729
	31	19.9942	49.9743
	32	22.4957	49.9773
	33	24.9945	49.9800
	34	27.4953	49.9822
	35	29.9962	49.9856
	36	32.4991	49.9901
	37	35.0008	49.9948
	38	37.5041	49.9995
	39	40.0063	50.0041
	40	42.5151	50.0088
	41	45.0166	50.0138
	42	47.5264	50.0191
	43	50.0343	50.0243
	44	52.5373	50.0279
	45	55.0442	50.0312

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INOCN SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
4	1	-55.0309	47.5200
	2	-52.5267	47.5169
	3	-50.0210	47.5132
	4	-47.5157	47.5088
	5	-45.0095	47.5036
	6	-42.5066	47.4986
	7	-40.0001	47.4938
	8	-37.4980	47.4888
	9	-34.9967	47.4839
	10	-32.4939	47.4801
	11	-29.9915	47.4769
	12	-27.4926	47.4739
	13	-24.9890	47.4711
	14	-22.4895	47.4696
	15	-19.9903	47.4686
	16	-17.4913	47.4676
	17	-14.9922	47.4668
	18	-12.4921	47.4661
	19	-9.9924	47.4656
	20	-7.4935	47.4652
	21	-4.9960	47.4650
	22	-2.4949	47.4649
	23	0.0040	47.4650
	24	2.4994	47.4652
	25	4.9998	47.4657
	26	7.4999	47.4664
	27	10.0000	47.4672
	28	12.4692	47.4682
	29	14.9975	47.4694
	30	17.4958	47.4706
	31	19.9920	47.4720
	32	22.4936	47.4735
	33	24.9910	47.4754
	34	27.4925	47.4784
	35	29.9933	47.4814
	36	32.4947	47.4845
	37	34.9951	47.4882
	38	37.4965	47.4931
	39	40.0007	47.4979
	40	42.5094	47.5025
	41	45.0128	47.5076
	42	47.5203	47.5130
	43	50.0280	47.5176
	44	52.5321	47.5215
	45	55.0385	47.5249

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ROW	COL	X (MM)	Y (MM)
5	1	-55.0264	45.0157
	2	-52.5219	45.0124
	3	-50.0158	45.0083
	4	-47.5104	45.0037
	5	-45.0044	44.9988
	6	-42.5017	44.9938
	7	-39.9950	44.9888
	8	-37.4929	44.9836
	9	-34.9931	44.9801
	10	-32.4908	44.9767
	11	-29.9884	44.9734
	12	-27.4901	44.9711
	13	-24.9874	44.9698
	14	-22.4882	44.9686
	15	-19.9891	44.9674
	16	-17.4903	44.9664
	17	-14.9913	44.9657
	18	-12.4914	44.9650
	19	-9.9919	44.9644
	20	-7.4932	44.9638
	21	-4.9958	44.9633
	22	-2.4949	44.9630
	23	0.0037	44.9629
	24	2.4991	44.9631
	25	4.9993	44.9634
	26	7.4992	44.9640
	27	9.9998	44.9649
	28	12.4885	44.9659
	29	14.9984	44.9672
	30	17.4946	44.9688
	31	19.9915	44.9703
	32	22.4923	44.9719
	33	24.9903	44.9735
	34	27.4900	44.9752
	35	29.9902	44.9777
	36	32.4917	44.9809
	37	34.9914	44.9840
	38	37.4926	44.9872
	39	39.9949	44.9922
	40	42.5037	44.9970
	41	45.0067	45.0015
	42	47.5142	45.0066
	43	50.0216	45.0113
	44	52.5262	45.0154
	45	55.0330	45.0190

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IKOGON SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
6	1	-55.0219	42.5115
	2	-52.5170	42.5078
	3	-50.0108	42.5036
	4	-47.5053	42.4990
	5	-44.9995	42.4941
	6	-42.4906	42.4891
	7	-39.9900	42.4840
	8	-37.4896	42.4804
	9	-34.9899	42.4768
	10	-32.4875	42.4732
	11	-29.9863	42.4716
	12	-27.4866	42.4702
	13	-24.9860	42.4688
	14	-22.4870	42.4676
	15	-19.9861	42.4663
	16	-17.4894	42.4659
	17	-14.9905	42.4649
	18	-12.4907	42.4640
	19	-9.9913	42.4631
	20	-7.4928	42.4622
	21	-4.9959	42.4615
	22	-2.4952	42.4610
	23	0.0032	42.4608
	24	2.4983	42.4609
	25	4.9985	42.4612
	26	7.4963	42.4617
	27	9.9989	42.4626
	28	12.4677	42.4636
	29	14.9952	42.4650
	30	17.4933	42.4665
	31	19.9901	42.4683
	32	22.4909	42.4703
	33	24.9863	42.4722
	34	27.4865	42.4740
	35	29.9861	42.4758
	36	32.4864	42.4778
	37	34.9861	42.4811
	38	37.4894	42.4844
	39	39.9893	42.4875
	40	42.4973	42.4923
	41	45.0010	42.4970
	42	47.5061	42.5015
	43	50.0155	42.5062
	44	52.5203	42.5104
	45	55.0275	42.5141

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IKOGUN SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
7	1	-55.0173	40.0073
	2	-52.5124	40.0036
	3	-50.0081	39.9995
	4	-47.5005	39.9948
	5	-44.9944	39.9899
	6	-42.4916	39.9849
	7	-39.9887	39.9812
	8	-37.4882	39.9775
	9	-34.9867	39.9741
	10	-32.4858	39.9726
	11	-29.9847	39.9711
	12	-27.4870	39.9696
	13	-24.9849	39.9688
	14	-22.4880	39.9679
	15	-19.9873	39.9669
	16	-17.4885	39.9657
	17	-14.9895	39.9643
	18	-12.4899	39.9630
	19	-9.9908	39.9618
	20	-7.4925	39.9608
	21	-4.9953	39.9600
	22	-2.4956	39.9595
	23	0.0024	39.9592
	24	2.4974	39.9593
	25	4.9974	39.9596
	26	7.4969	39.9602
	27	9.9974	39.9611
	28	12.4883	39.9622
	29	14.9936	39.9636
	30	17.4918	39.9652
	31	19.9886	39.9671
	32	22.4893	39.9692
	33	24.9872	39.9715
	34	27.4869	39.9739
	35	29.9865	39.9759
	36	32.4887	39.9779
	37	34.9850	39.9799
	38	37.4860	39.9831
	39	39.9880	39.9864
	40	42.4921	39.9895
	41	44.9952	39.9942
	42	47.5025	39.9988
	43	50.0098	40.0033
	44	52.4147	40.0075
	45	54.0220	40.01 3

HANDLE VIA CONTROL SYSTEM ONE

~~SECRET~~

~~SECRET~~

ROW	COL	X (MM)	Y (MM)
8	1	-55.0131	37.5048
	2	-52.5082	37.5012
	3	-50.0014	37.4968
	4	-47.4955	37.4920
	5	-44.9893	36.4870
	6	-42.4863	37.4834
	7	-39.9834	37.4796
	8	-37.4831	37.4761
	9	-34.9849	37.4746
	10	-32.4841	37.4730
	11	-29.9833	37.4718
	12	-27.4861	37.4709
	13	-24.9839	37.4700
	14	-22.4850	37.4688
	15	-19.9859	37.4672
	16	-16.4871	37.4656
	17	-14.9883	37.4640
	18	-12.4889	37.4625
	19	-9.9900	37.4616
	20	-7.4921	37.4608
	21	-4.9957	37.4604
	22	-2.4957	37.4601
	23	0.0021	37.4601
	24	2.4968	37.4602
	25	4.9966	37.4604
	26	7.4955	37.4607
	27	9.9960	37.4609
	28	12.4948	37.4612
	29	14.9916	37.4625
	30	17.4897	37.4642
	31	19.9886	37.4661
	32	22.4874	37.4682
	33	24.9854	37.4706
	34	27.4851	37.4732
	35	29.9848	37.4759
	36	32.4851	37.4782
	37	34.9834	37.4803
	38	37.4820	37.4824
	39	39.9826	37.4853
	40	42.4828	37.4885
	41	44.9894	37.4917
	42	47.4909	37.4964
	43	50.0044	37.5009
	44	52.5096	37.5052
	45	55.0168	37.5088

HANDLE VIA ~~SECRET~~
CONTROL SYSTEM ONLY~~SECRET~~

~~SECRET~~

ROW	COL	X (MM)	Y (MM)
9	1	-55.0093	35.0016
	2	-52.5039	34.9978
	3	-49.9986	34.9932
	4	-47.4906	34.9884
	5	-44.9861	34.9846
	6	-42.4851	34.9809
	7	-39.9802	34.9773
	8	-37.4814	34.9755
	9	-34.9831	34.9737
	10	-32.4827	34.9725
	11	-29.9824	34.9718
	12	-27.4852	34.9708
	13	-24.9826	34.9694
	14	-22.4833	34.9676
	15	-19.9843	34.9658
	16	-17.4856	34.9640
	17	-14.9870	34.9625
	18	-12.4879	34.9612
	19	-9.9892	34.9603
	20	-7.4915	34.9596
	21	-4.9954	34.9592
	22	-2.4957	34.9591
	23	0.0019	34.9592
	24	2.4964	34.9594
	25	4.9959	34.9598
	26	7.4949	34.9602
	27	9.9949	34.9607
	28	12.4838	34.9611
	29	14.9901	34.9615
	30	17.4877	34.9618
	31	19.9842	34.9629
	32	22.4851	34.9651
	33	24.9833	34.9675
	34	27.4831	34.9701
	35	29.9827	34.9729
	36	32.4832	34.9758
	37	34.9817	34.9783
	38	37.4813	34.9803
	39	39.9794	34.9822
	40	42.4853	34.9852
	41	44.9860	34.9883
	42	47.4912	34.9917
	43	49.9890	34.9962
	44	52.5046	35.0005
	45	55.0121	35.0043

HANDED VIA [REDACTED]
CONTROL SYSTEM

~~SECRET~~

~~SECRET~~ [REDACTED]

ROW	COL	X (MM)	Y (MM)
10	1	-55.0058	32.5010
	2	-52.4994	32.4967
	3	-49.9918	32.4922
	4	-47.4869	32.4881
	5	-44.9830	32.4846
	6	-42.4818	32.4809
	7	-39.9786	32.4790
	8	-37.4797	32.4772
	9	-34.9818	32.4758
	10	-32.4819	32.4750
	11	-29.9816	32.4741
	12	-27.4830	32.4726
	13	-24.9807	32.4708
	14	-22.4813	32.4688
	15	-19.9825	32.4669
	16	-17.4840	32.4651
	17	-14.9855	32.4635
	18	-12.4866	32.4621
	19	-9.9882	32.4611
	20	-7.4908	32.4605
	21	-4.9950	32.4602
	22	-2.4956	32.4603
	23	0.0017	32.4606
	24	2.4958	32.4610
	25	4.9951	32.4615
	26	7.4939	32.4622
	27	9.9937	32.4628
	28	12.4827	32.4635
	29	14.9886	32.4640
	30	17.4862	32.4645
	31	19.9825	32.4647
	32	22.4826	32.4648
	33	24.9807	32.4670
	34	27.4806	32.4697
	35	29.9805	32.4724
	36	32.4811	32.4754
	37	34.9797	32.4785
	38	37.4795	32.4809
	39	39.9777	32.4828
	40	42.4819	32.4847
	41	44.9827	32.4879
	42	47.4873	32.4908
	43	49.9936	32.4945
	44	52.4995	32.4988
	45	54.0079	32.5028

HANDLE VIA [REDACTED]
CONTROL SYSTEM ONLY~~SECRET~~ [REDACTED]

~~SECRET~~

ROW	COL	X (MM)	Y (MM)
11	1	-55.0016	29.9971
	2	-52.4949	29.9928
	3	-49.9875	29.9884
	4	-47.4840	29.9852
	5	-44.9799	29.9817
	6	-42.4801	29.9793
	7	-39.9769	29.9775
	8	-37.4782	29.9759
	9	-34.9809	29.9749
	10	-32.4810	29.9740
	11	-29.9793	29.9726
	12	-27.4816	29.9708
	13	-24.9786	29.9688
	14	-22.4793	29.9665
	15	-19.9805	29.9644
	16	-17.4821	29.9624
	17	-14.9837	29.9607
	18	-12.4852	29.9592
	19	-9.9870	29.9582
	20	-7.4902	29.9583
	21	-4.9943	29.9586
	22	-2.4955	29.9590
	23	0.0016	29.9595
	24	2.4956	29.9598
	25	4.9946	29.9602
	26	7.4930	29.9606
	27	9.9924	29.9611
	28	12.4815	29.9619
	29	14.9871	29.9627
	30	17.4847	29.9632
	31	19.9810	29.9636
	32	22.4811	29.9637
	33	24.9784	29.9636
	34	27.4778	29.9652
	35	29.9778	29.9680
	36	32.4783	29.9712
	37	34.9775	29.9743
	38	37.4776	29.9771
	39	39.9759	29.9792
	40	42.4800	29.9811
	41	44.9793	29.9832
	42	47.4841	29.9861
	43	49.9887	29.9889
	44	52.4945	29.9928
	45	55.0031	29.9968

HANDLE WITH CARE
CONTROL SYSTEMS DIV.~~SECRET~~

~~SECRET~~



ROW	COL	X (MM)	Y (MM)
12	1	-54.9975	27.4949
	2	-52.4906	27.4907
	3	-49.9847	27.4873
	4	-47.4811	27.4841
	5	-44.9776	27.4813
	6	-42.4735	27.4796
	7	-39.9752	27.4778
	8	-37.4773	27.4769
	9	-34.9799	27.4759
	10	-32.4790	27.4745
	11	-29.9776	27.4730
	12	-27.4795	27.4712
	13	-24.9763	27.4688
	14	-22.4769	27.4664
	15	-19.9782	27.4642
	16	-17.4793	27.4620
	17	-14.9819	27.4605
	18	-12.4844	27.4606
	19	-9.9867	27.4607
	20	-7.4900	27.4609
	21	-4.9947	27.4611
	22	-2.4955	27.4615
	23	0.0017	27.4619
	24	2.4955	27.4622
	25	4.9945	27.4626
	26	7.4928	27.4630
	27	9.9921	27.4635
	28	12.4810	27.4641
	29	14.9857	27.4647
	30	17.4831	27.4654
	31	19.9795	27.4659
	32	22.4796	27.4661
	33	24.9770	27.4661
	34	27.4756	27.4658
	35	29.9750	27.4677
	36	32.4761	27.4710
	37	34.9752	27.4741
	38	37.4754	27.4769
	39	39.9741	27.4795
	40	42.4782	27.4814
	41	44.9768	27.4832
	42	47.4809	27.4856
	43	49.9853	27.4883
	44	52.4896	27.4914
	45	54.9904	27.4952

HANDLE VIA CONTROL SYSTEM C

~~SECRET~~



~~SECRET~~

IKOGUN SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
13	1	-54.9936	24.9946
	2	-52.4671	24.9909
	3	-49.9821	24.9881
	4	-47.4764	24.9851
	5	-44.9762	24.9834
	6	-42.4770	24.9817
	7	-39.9743	24.9805
	8	-37.4763	24.9796
	9	-34.9762	24.9784
	10	-32.4769	24.9770
	11	-29.9754	24.9753
	12	-27.4770	24.9732
	13	-24.9736	24.9708
	14	-22.4742	24.9684
	15	-19.9755	24.9659
	16	-17.4765	24.9652
	17	-14.9816	24.9652
	18	-12.4841	24.9652
	19	-9.9865	24.9652
	20	-7.4898	24.9654
	21	-4.9946	24.9656
	22	-2.4954	24.9659
	23	0.0017	24.9663
	24	2.4954	24.9666
	25	4.9944	24.9670
	26	7.4925	24.9675
	27	9.9918	24.9681
	28	12.4869	24.9687
	29	14.9853	24.9694
	30	17.4822	24.9701
	31	19.9780	24.9707
	32	22.4762	24.9711
	33	24.9756	24.9711
	34	27.4742	24.9712
	35	29.9727	24.9714
	36	32.4734	24.9737
	37	34.9728	24.9768
	38	37.4734	24.9796
	39	39.9721	24.9822
	40	42.4763	24.9844
	41	44.9751	24.9851
	42	47.4778	24.9879
	43	49.9828	24.9906
	44	52.4856	24.9931
	45	54.9959	24.9965

HANDLE VIA [REDACTED]
CONTROL SYSTEM ONLY

~~SECRET~~

~~SECRET~~

IRGON SERIAL NO 104

ROI	COL	X (MM)	Y (MM)
14	1	-54.9898	22.4935
	2	-52.4847	22.4906
	3	-49.9796	22.4880
	4	-47.4768	22.4857
	5	-44.9743	22.4843
	6	-42.4757	22.4829
	7	-39.9734	22.4819
	8	-37.4750	22.4809
	9	-34.9763	22.4796
	10	-32.4749	22.4782
	11	-29.9732	22.4763
	12	-27.4746	22.4741
	13	-24.9711	22.4717
	14	-22.4712	22.4691
	15	-19.9747	22.4686
	16	-17.4782	22.4684
	17	-14.9813	22.4683
	18	-12.4832	22.4682
	19	-9.9863	22.4682
	20	-7.4896	22.4683
	21	-4.9944	22.4684
	22	-2.4954	22.4687
	23	0.0017	22.4691
	24	2.4953	22.4694
	25	4.9942	22.4698
	26	7.4922	22.4703
	27	9.9915	22.4709
	28	12.4867	22.4716
	29	14.9849	22.4724
	30	17.4818	22.4731
	31	19.9774	22.4739
	32	22.4763	22.4745
	33	24.9742	22.4745
	34	27.4729	22.4746
	35	29.9714	22.4748
	36	32.4708	22.4752
	37	34.9703	22.4780
	38	37.4713	22.4808
	39	39.9702	22.4833
	40	42.4745	22.4856
	41	44.9734	22.4874
	42	47.4759	22.4890
	43	49.9800	22.4911
	44	52.4830	22.4935
	45	54.9897	22.4963

~~SECRET~~

HANDLE VIA [REDACTED]
CONTROL SYSTEM ONLY

~~SECRET~~ [REDACTED]

IKOGUN SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
15	1	-54.9864	19.9934
	2	-52.4826	19.9911
	3	-49.9773	19.9886
	4	-47.4756	19.9871
	5	-44.9734	19.9856
	6	-42.4748	19.9845
	7	-39.9724	19.9836
	8	-37.4733	19.9824
	9	-34.9744	19.9811
	10	-32.4729	19.9795
	11	-29.9711	19.9775
	12	-27.4724	19.9753
	13	-24.9687	19.9729
	14	-22.4711	19.9719
	15	-19.9744	19.9715
	16	-17.4780	19.9712
	17	-14.9811	19.9710
	18	-12.4837	19.9708
	19	-9.9861	19.9707
	20	-7.4895	19.9706
	21	-4.9943	19.9706
	22	-2.4953	19.9707
	23	0.0017	19.9710
	24	2.4952	19.9712
	25	4.9940	19.9715
	26	7.4919	19.9721
	27	9.9911	19.9727
	28	12.4805	19.9734
	29	14.9844	19.9741
	30	17.4813	19.9749
	31	19.9770	19.9756
	32	22.4782	19.9759
	33	24.9728	19.9762
	34	27.4715	19.9763
	35	29.9701	19.9765
	36	32.4697	19.9769
	37	34.9678	19.9779
	38	37.4691	19.9806
	39	39.9685	19.9829
	40	42.4728	19.9850
	41	44.9718	19.9868
	42	47.4743	19.9883
	43	49.9772	19.9898
	44	52.4805	19.9920
	45	54.9857	19.9941

HANDLE VIA [REDACTED]
CONTROL SYSTEM ONLY

~~SECRET~~ [REDACTED]

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IKOGUN SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
10	1	-54.9845	17.4927
	2	-52.4807	17.4907
	3	-49.9758	17.4886
	4	-47.4744	17.4874
	5	-44.9723	17.4862
	6	-42.4740	17.4853
	7	-39.9712	17.4843
	8	-37.4717	17.4832
	9	-34.9727	17.4819
	10	-32.4710	17.4802
	11	-29.9691	17.4784
	12	-27.4703	17.4763
	13	-24.9683	17.4749
	14	-22.4713	17.4745
	15	-19.9747	17.4741
	16	-17.4777	17.4735
	17	-14.9808	17.4733
	18	-12.4835	17.4731
	19	-9.9859	17.4729
	20	-7.4894	17.4727
	21	-4.9944	17.4727
	22	-2.4955	17.4729
	23	0.0015	17.4731
	24	2.4949	17.4734
	25	4.9936	17.4738
	26	7.4915	17.4742
	27	9.9906	17.4746
	28	12.4802	17.4753
	29	14.9839	17.4761
	30	17.4803	17.4769
	31	19.9763	17.4773
	32	22.4755	17.4777
	33	24.9720	17.4781
	34	27.4701	17.4784
	35	29.9689	17.4787
	36	32.4685	17.4790
	37	34.9681	17.4794
	38	37.4670	17.4814
	39	39.9668	17.4836
	40	42.4712	17.4856
	41	44.9702	17.4872
	42	47.4728	17.4886
	43	49.9752	17.4899
	44	52.4761	17.4918
	45	54.9834	17.4937

~~HANDLE VIA~~
~~CONTROL SYSTEM ON~~

~~SECRET~~

~~SECRET~~

IKOGON SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
17	1	-54.9829	14.9944
	2	-52.4790	14.9925
	3	-49.9743	14.9911
	4	-47.4734	14.9900
	5	-44.9716	14.9890
	6	-42.4731	14.9881
	7	-39.9699	14.9872
	8	-37.4702	14.9861
	9	-34.9711	14.9848
	10	-32.4694	14.9833
	11	-29.9674	14.9815
	12	-27.4689	14.9797
	13	-24.9685	14.9793
	14	-22.4715	14.9789
	15	-19.9749	14.9784
	16	-17.4779	14.9780
	17	-14.9806	14.9775
	18	-12.4834	14.9771
	19	-9.9859	14.9768
	20	-7.4895	14.9766
	21	-4.9946	14.9766
	22	-2.4957	14.9767
	23	0.0013	14.9769
	24	2.4945	14.9772
	25	4.9932	14.9777
	26	7.4910	14.9782
	27	9.9902	14.9787
	28	12.4799	14.9792
	29	14.9833	14.9798
	30	17.4801	14.9802
	31	19.9756	14.9807
	32	22.4748	14.9811
	33	24.9713	14.9815
	34	27.4689	14.9818
	35	29.9676	14.9822
	36	32.4674	14.9826
	37	34.9652	14.9830
	38	37.4651	14.9840
	39	39.9650	14.9860
	40	42.4693	14.9877
	41	44.9688	14.9892
	42	47.4714	14.9905
	43	49.9739	14.9916
	44	52.4759	14.9930
	45	54.9813	14.9947

HANDLE VIA [REDACTED]
CONTROL SYSTEM ONLY

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IKOGON SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
18	1	-54.9815	12.4965
	2	-52.4776	12.4949
	3	-49.9740	12.4938
	4	-47.4725	12.4928
	5	-44.9709	12.4920
	6	-42.4723	12.4912
	7	-39.9686	12.4903
	8	-37.4688	12.4893
	9	-34.9698	12.4881
	10	-32.4680	12.4866
	11	-29.9660	12.4850
	12	-27.4692	12.4841
	13	-24.9687	12.4837
	14	-22.4716	12.4832
	15	-19.9750	12.4828
	16	-17.4779	12.4823
	17	-14.9806	12.4817
	18	-12.4833	12.4811
	19	-9.9858	12.4806
	20	-7.4895	12.4803
	21	-4.9947	12.4802
	22	-2.4959	12.4803
	23	0.0010	12.4805
	24	2.4941	12.4808
	25	4.9927	12.4813
	26	7.4905	12.4819
	27	9.9897	12.4825
	28	12.4797	12.4830
	29	14.9826	12.4830
	30	17.4792	12.4833
	31	19.9748	12.4837
	32	22.4741	12.4841
	33	24.9706	12.4845
	34	27.4682	12.4848
	35	29.9663	12.4851
	36	32.4663	12.4855
	37	34.9642	12.4860
	38	37.4635	12.4864
	39	39.9635	12.4880
	40	42.4687	12.4896
	41	44.9677	12.4908
	42	47.4701	12.4918
	43	49.9727	12.4928
	44	52.4739	12.4938
	45	54.9795	12.4952

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HANDLE VIA

~~CONTROL SYSTEM ONLY~~

~~SECRET~~

IKOGUN SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
19	1	-54.9804	9.9968
	2	-52.4764	9.9955
	3	-49.9733	9.9947
	4	-47.4718	9.9939
	5	-44.9703	9.9932
	6	-42.4714	9.9926
	7	-39.9676	9.9916
	8	-37.4678	9.9909
	9	-34.9687	9.9898
	10	-32.4689	9.9886
	11	-29.9649	9.9872
	12	-27.4694	9.9868
	13	-24.9689	9.9865
	14	-22.4717	9.9861
	15	-19.9750	9.9857
	16	-17.4779	9.9852
	17	-14.9807	9.9846
	18	-12.4834	9.9839
	19	-9.9857	9.9832
	20	-7.4894	9.9828
	21	-4.9947	9.9826
	22	-2.4980	9.9827
	23	0.0008	9.9829
	24	2.4937	9.9833
	25	4.9922	9.9840
	26	7.4899	9.9848
	27	9.9892	9.9854
	28	12.4793	9.9855
	29	14.9819	9.9856
	30	17.4783	9.9857
	31	19.9739	9.9861
	32	22.4733	9.9865
	33	24.9899	9.9869
	34	27.4875	9.9872
	35	29.9850	9.9874
	36	32.4852	9.9879
	37	34.9834	9.9884
	38	37.4830	9.9888
	39	39.9822	9.9899
	40	42.4876	9.9911
	41	44.9887	9.9921
	42	47.4890	9.9930
	43	49.9716	9.9938
	44	52.4722	9.9945
	45	54.9778	9.9957

~~HANDLER VIA [REDACTED]~~
~~CONTROL SYSTEM ONLY~~

~~SECRET~~

ROW	COL	X (MM)	Y (MM)
20	1	-54.9796	7.4987
	2	-52.4700	7.4978
	3	-49.9729	7.4972
	4	-47.4715	7.4965
	5	-44.9698	7.4960
	6	-42.4706	7.4954
	7	-39.9667	7.4948
	8	-37.4670	7.4940
	9	-34.9679	7.4931
	10	-32.4662	7.4920
	11	-29.9651	7.4911
	12	-27.4696	7.4908
	13	-24.9691	7.4905
	14	-22.4715	7.4901
	15	-19.9750	7.4897
	16	-17.4780	7.4892
	17	-14.9808	7.4886
	18	-12.4834	7.4880
	19	-9.9856	7.4872
	20	-7.4893	7.4862
	21	-4.9948	7.4864
	22	-2.4962	7.4869
	23	0.0005	7.4873
	24	2.4934	7.4876
	25	4.9918	7.4881
	26	7.4893	7.4887
	27	9.9885	7.4887
	28	12.4788	7.4888
	29	14.9811	7.4889
	30	17.4776	7.4891
	31	19.9750	7.4894
	32	22.4725	7.4897
	33	24.9692	7.4900
	34	27.4669	7.4902
	35	29.9643	7.4904
	36	32.4642	7.4908
	37	34.9626	7.4912
	38	37.4624	7.4917
	39	39.9613	7.4923
	40	42.4566	7.4933
	41	44.9600	7.4940
	42	47.4661	7.4946
	43	49.9707	7.4952
	44	52.4713	7.4957
	45	54.9764	7.4965

HANDLE VIA [REDACTED]
CONTROL SYSTEM ONLY

~~SECRET~~

IKOGUN SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
21	1	-54.9790	5.0001
	2	-52.4758	4.9994
	3	-49.9725	4.9990
	4	-47.4712	4.9985
	5	-44.9694	4.9981
	6	-42.4701	4.9977
	7	-39.9661	4.9972
	8	-37.4665	4.9966
	9	-34.9674	4.9958
	10	-32.4657	4.9949
	11	-29.9654	4.9944
	12	-27.4699	4.9941
	13	-24.9692	4.9939
	14	-22.4719	4.9936
	15	-19.9751	4.9932
	16	-17.4761	4.9927
	17	-14.9808	4.9922
	18	-12.4834	4.9916
	19	-9.9855	4.9908
	20	-7.4892	4.9903
	21	-4.9948	4.9902
	22	-2.4964	4.9906
	23	0.0004	4.9910
	24	2.4933	4.9914
	25	4.9913	4.9918
	26	7.4889	4.9916
	27	9.9877	4.9916
	28	12.4783	4.9917
	29	14.9803	4.9919
	30	17.4768	4.9921
	31	19.9721	4.9922
	32	22.4717	4.9925
	33	24.9685	4.9927
	34	27.4662	4.9928
	35	29.9636	4.9929
	36	32.4633	4.9932
	37	34.9619	4.9936
	38	37.4620	4.9940
	39	39.9607	4.9944
	40	42.4659	4.9950
	41	44.9654	4.9955
	42	47.4674	4.9956
	43	49.9699	4.9962
	44	52.4706	4.9965
	45	54.9753	4.9969

HANDLE VIA [REDACTED]
CONTROL SYSTEM ONLY

~~SECRET~~

~~SECRET~~

INOCUL SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
22	1	-54.9788	2.4997
	2	-52.4757	2.4994
	3	-49.9724	2.4991
	4	-47.4711	2.4989
	5	-44.9692	2.4986
	6	-42.4698	2.4984
	7	-39.9658	2.4982
	8	-37.4602	2.4977
	9	-34.9672	2.4971
	10	-32.4656	2.4966
	11	-29.9658	2.4962
	12	-27.4702	2.4961
	13	-24.9695	2.4959
	14	-22.4720	2.4958
	15	-19.9752	2.4955
	16	-17.4783	2.4952
	17	-14.9809	2.4947
	18	-12.4835	2.4943
	19	-9.9855	2.4937
	20	-7.4893	2.4936
	21	-4.9948	2.4935
	22	-2.4964	2.4934
	23	0.0002	2.4938
	24	2.4932	2.4943
	25	4.9915	2.4941
	26	7.4884	2.4940
	27	9.9868	2.4939
	28	12.4777	2.4941
	29	14.9795	2.4943
	30	17.4761	2.4946
	31	19.9713	2.4948
	32	22.4709	2.4949
	33	24.9673	2.4950
	34	27.4656	2.4951
	35	29.9630	2.4951
	36	32.4625	2.4953
	37	34.9614	2.4956
	38	37.4617	2.4960
	39	39.9604	2.4963
	40	42.4655	2.4966
	41	44.9651	2.4968
	42	47.4670	2.4970
	43	49.9692	2.4971
	44	52.4700	2.4973
	45	54.9744	2.4975

~~HANDLE VIA~~
~~CONTROL SYSTEM ONLY~~

~~SECRET~~

~~SECRET~~

IKOGON SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
23	1	-54.9788	0.0039
	2	-52.4758	0.0038
	3	-49.9725	0.0037
	4	-47.4712	0.0036
	5	-44.9692	0.0036
	6	-42.4697	0.0035
	7	-39.9686	0.0034
	8	-37.4661	0.0030
	9	-34.9673	0.0026
	10	-32.4658	0.0022
	11	-29.9661	0.0020
	12	-27.4706	0.0019
	13	-24.9697	0.0019
	14	-22.4723	0.0018
	15	-19.9754	0.0016
	16	-17.4785	0.0013
	17	-14.9812	0.0010
	18	-12.4838	0.0007
	19	-9.9853	0.0003
	20	-7.4897	0.0003
	21	-4.9952	0.0002
	22	-2.4966	0.0001
	23	0.0000	-0.0000
	24	2.4927	-0.0001
	25	4.9909	-0.0002
	26	7.4877	-0.0003
	27	9.9860	-0.0004
	28	12.4771	-0.0002
	29	14.9783	-0.0000
	30	17.4754	0.0001
	31	19.9707	0.0003
	32	22.4703	0.0002
	33	24.9673	0.0001
	34	27.4650	0.0000
	35	29.9625	-0.0000
	36	32.4620	-0.0000
	37	34.9611	0.0002
	38	37.4617	0.0004
	39	39.9605	0.0006
	40	42.4654	0.0005
	41	44.9649	0.0004
	42	47.4606	0.0004
	43	49.9608	0.0003
	44	52.4696	0.0002
	45	54.9739	0.0001

HANDLE WITH CARE
CONTROL SYSTEM ONLY

~~SECRET~~

~~SECRET~~

IKOGUN SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
24	1	-54.9791	-2.4967
	2	-52.4762	-2.4965
	3	-49.9728	-2.4954
	4	-47.4715	-2.4964
	5	-44.9693	-2.4964
	6	-42.4698	-2.4963
	7	-39.9657	-2.4962
	8	-37.4663	-2.4963
	9	-34.9676	-2.4965
	10	-32.4663	-2.4966
	11	-29.9666	-2.4967
	12	-27.4710	-2.4968
	13	-24.9702	-2.4969
	14	-22.4727	-2.4970
	15	-19.9753	-2.4971
	16	-17.4769	-2.4973
	17	-14.9815	-2.4976
	18	-12.4842	-2.4977
	19	-9.9863	-2.4978
	20	-7.4901	-2.4979
	21	-4.9957	-2.4981
	22	-2.4971	-2.4983
	23	-0.0062	-2.4979
	24	2.4925	-2.4975
	25	4.9965	-2.4977
	26	7.4972	-2.4978
	27	9.9856	-2.4980
	28	12.4768	-2.4982
	29	14.9782	-2.4984
	30	17.4748	-2.4985
	31	19.9761	-2.4985
	32	22.4698	-2.4987
	33	24.9668	-2.4990
	34	27.4645	-2.4992
	35	29.9619	-2.4994
	36	32.4617	-2.4996
	37	34.9610	-2.4997
	38	37.4618	-2.4997
	39	39.9607	-2.4998
	40	42.4656	-2.5001
	41	44.9649	-2.5003
	42	47.4664	-2.5005
	43	49.9665	-2.5008
	44	52.4693	-2.5011
	45	54.9737	-2.5014

~~HANDLE VIA~~
~~CONTROL SYSTEM ONLY~~

~~SECRET~~

ROW	COL	X (MM)	Y (MM)
25	1	-54.9796	-4.9965
	2	-52.4768	-4.9962
	3	-49.9734	-4.9959
	4	-47.4720	-4.9957
	5	-44.9697	-4.9956
	6	-42.4700	-4.9955
	7	-39.9661	-4.9952
	8	-37.4666	-4.9951
	9	-34.9681	-4.9951
	10	-32.4670	-4.9950
	11	-29.9671	-4.9950
	12	-27.4715	-4.9951
	13	-24.9707	-4.9952
	14	-22.4731	-4.9954
	15	-19.9761	-4.9955
	16	-17.4792	-4.9957
	17	-14.9818	-4.9958
	18	-12.4846	-4.9959
	19	-9.9868	-4.9959
	20	-7.4905	-4.9960
	21	-4.9961	-4.9963
	22	-2.4971	-4.9960
	23	-0.0004	-4.9956
	24	2.4924	-4.9953
	25	4.9905	-4.9949
	26	7.4870	-4.9951
	27	9.9855	-4.9956
	28	12.4768	-4.9961
	29	14.9777	-4.9966
	30	17.4743	-4.9968
	31	19.9696	-4.9971
	32	22.4694	-4.9976
	33	24.9664	-4.9980
	34	27.4641	-4.9984
	35	29.9615	-4.9988
	36	32.4617	-4.9992
	37	34.9612	-4.9997
	38	37.4621	-5.0001
	39	39.9612	-5.0004
	40	42.4659	-5.0009
	41	44.9649	-5.0012
	42	47.4663	-5.0016
	43	49.9664	-5.0021
	44	52.4692	-5.0026
	45	54.9737	-5.0033

HANDLE VIA [REDACTED]
 CONTINUE SYSTEM ON [REDACTED]

SECRET [REDACTED]

~~SECRET~~ [REDACTED]

IKOGON SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
26	1	-54.9804	-7.4959
	2	-52.4775	-7.4953
	3	-49.9741	-7.4948
	4	-47.4727	-7.4943
	5	-44.9703	-7.4941
	6	-42.4705	-7.4937
	7	-39.9666	-7.4932
	8	-37.4671	-7.4929
	9	-34.9687	-7.4926
	10	-32.4679	-7.4922
	11	-29.9676	-7.4919
	12	-27.4720	-7.4919
	13	-24.9712	-7.4920
	14	-22.4736	-7.4921
	15	-19.9766	-7.4921
	16	-17.4794	-7.4922
	17	-14.9820	-7.4922
	18	-12.4849	-7.4922
	19	-9.9871	-7.4921
	20	-7.4908	-7.4920
	21	-4.9900	-7.4916
	22	-2.4972	-7.4912
	23	-0.0000	-7.4907
	24	2.4923	-7.4904
	25	4.9904	-7.4900
	26	7.4870	-7.4897
	27	9.9855	-7.4905
	28	12.4760	-7.4912
	29	14.9774	-7.4916
	30	17.4738	-7.4920
	31	19.9694	-7.4925
	32	22.4691	-7.4931
	33	24.9661	-7.4936
	34	27.4637	-7.4941
	35	29.9611	-7.4945
	36	32.4621	-7.4952
	37	34.9617	-7.4960
	38	37.4626	-7.4966
	39	39.9619	-7.4971
	40	42.4605	-7.4976
	41	44.9651	-7.4980
	42	47.4662	-7.4984
	43	49.9635	-7.4990
44	52.4692	-7.4987	
45	54.9741	-7.5006	

RENDER VIA [REDACTED]
CONTROL SYSTEM ONLY

~~SECRET~~ [REDACTED]

~~SECRET~~ [REDACTED]

IKOGUN SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
27	1	-54.9813	-9.9950
	2	-52.4734	-9.9941
	3	-49.9750	-9.9934
	4	-47.4735	-9.9925
	5	-44.9711	-9.9922
	6	-42.4712	-9.9917
	7	-39.9673	-9.9910
	8	-37.4677	-9.9903
	9	-34.9694	-9.9898
	10	-32.4689	-9.9892
	11	-29.9683	-9.9885
	12	-27.4726	-9.9886
	13	-24.9718	-9.9886
	14	-22.4742	-9.9886
	15	-19.9772	-9.9886
	16	-17.4794	-9.9886
	17	-14.9821	-9.9886
	18	-12.4850	-9.9885
	19	-9.9872	-9.9884
	20	-7.4907	-9.9878
	21	-4.9960	-9.9871
	22	-2.4974	-9.9864
	23	-0.0009	-9.9858
	24	2.4921	-9.9856
	25	4.9904	-9.9855
	26	7.4870	-9.9856
	27	9.9854	-9.9857
	28	12.4768	-9.9864
	29	14.9770	-9.9869
	30	17.4733	-9.9874
	31	19.9692	-9.9882
	32	22.4689	-9.9889
	33	24.9658	-9.9895
	34	27.4634	-9.9901
	35	29.9603	-9.9905
	36	32.4528	-9.9917
	37	34.9624	-9.9928
	38	37.4634	-9.9936
	39	39.9628	-9.9943
	40	42.4672	-9.9949
	41	44.9652	-9.9953
	42	47.4662	-9.9957
	43	49.9657	-9.9965
	44	52.4694	-9.9973
	45	54.9748	-9.9985

HANDLE VIA [REDACTED]
CONTROL SYSTEM ONLY

~~SECRET~~ [REDACTED]

~~SECRET~~ [REDACTED]

ROW	COL	X (MM)	Y (MM)
28	1	-54.9825	-12.4951
	2	-52.4797	-12.4941
	3	-49.9761	-12.4932
	4	-47.4747	-12.4923
	5	-44.9721	-12.4917
	6	-42.4720	-12.4911
	7	-39.9682	-12.4903
	8	-37.4663	-12.4894
	9	-34.9702	-12.4888
	10	-32.4699	-12.4882
	11	-29.9696	-12.4874
	12	-27.4733	-12.4871
	13	-24.9724	-12.4872
	14	-22.4748	-12.4873
	15	-19.9779	-12.4873
	16	-17.4799	-12.4873
	17	-14.9819	-12.4872
	18	-12.4849	-12.4872
	19	-9.9870	-12.4866
	20	-7.4907	-12.4860
	21	-4.9961	-12.4854
	22	-2.4976	-12.4849
	23	-0.0010	-12.4845
	24	2.4919	-12.4843
	25	4.9963	-12.4843
	26	7.4870	-12.4843
	27	9.9854	-12.4845
	28	12.4767	-12.4847
	29	14.9765	-12.4854
	30	17.4732	-12.4862
	31	19.9692	-12.4872
	32	22.4688	-12.4881
	33	24.9657	-12.4889
	34	27.4632	-12.4895
	35	29.9618	-12.4906
	36	32.4638	-12.4922
	37	34.9634	-12.4935
	38	37.4645	-12.4946
	39	39.9639	-12.4954
	40	42.4678	-12.4962
	41	44.9653	-12.4966
	42	47.4666	-12.4972
	43	49.9690	-12.4983
	44	52.4714	-12.4994
	45	54.9757	-12.5009

~~SECRET~~ [REDACTED]HANDLE VIA [REDACTED]
CONTROL SYSTEM ONLY

~~SECRET~~ [REDACTED]

IKOGUN SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
29	1	-54.9837	-14.9931
	2	-52.4812	-14.9920
	3	-49.9772	-14.9909
	4	-47.4760	-14.9897
	5	-44.9734	-14.9888
	6	-42.4733	-14.9881
	7	-39.9692	-14.9872
	8	-37.4693	-14.9862
	9	-34.9710	-14.9853
	10	-32.4709	-14.9846
	11	-29.9708	-14.9837
	12	-27.4740	-14.9829
	13	-24.9731	-14.9830
	14	-22.4755	-14.9831
	15	-19.9766	-14.9831
	16	-17.4807	-14.9831
	17	-14.9822	-14.9830
	18	-12.4848	-14.9823
	19	-9.9809	-14.9817
	20	-7.4907	-14.9811
	21	-4.9963	-14.9806
	22	-2.4978	-14.9802
	23	-0.0012	-14.9798
	24	2.4917	-14.9797
	25	4.9902	-14.9796
	26	7.4869	-14.9796
	27	9.9854	-14.9798
	28	12.4769	-14.9800
	29	14.9763	-14.9806
	30	17.4753	-14.9817
	31	19.9692	-14.9828
	32	22.4687	-14.9837
	33	24.9656	-14.9845
	34	27.4630	-14.9853
	35	29.9632	-14.9872
	36	32.4651	-14.9890
	37	34.9646	-14.9906
	38	37.4658	-14.9918
	39	39.9651	-14.9927
	40	42.4681	-14.9934
	41	44.9654	-14.9938
	42	47.4671	-14.9947
	43	49.9694	-14.9959
	44	52.4718	-14.9974
	45	54.9769	-14.9992

~~SECRET~~ [REDACTED]

~~SECRET~~

IKOGUN SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
30	1	-54.9850	-17.4902
	2	-52.4827	-17.4890
	3	-49.9786	-17.4878
	4	-47.4775	-17.4865
	5	-44.9749	-17.4853
	6	-42.4748	-17.4845
	7	-39.9703	-17.4836
	8	-37.4706	-17.4824
	9	-34.9718	-17.4813
	10	-32.4719	-17.4805
	11	-29.9720	-17.4797
	12	-27.4752	-17.4788
	13	-24.9739	-17.4784
	14	-22.4763	-17.4785
	15	-19.9795	-17.4786
	16	-17.4815	-17.4786
	17	-14.9831	-17.4780
	18	-12.4853	-17.4773
	19	-9.9809	-17.4765
	20	-7.4908	-17.4760
	21	-4.9964	-17.4756
	22	-2.4980	-17.4753
	23	-0.0014	-17.4750
	24	2.4915	-17.4749
	25	4.9901	-17.4749
	26	7.4868	-17.4750
	27	9.9853	-17.4751
	28	12.4774	-17.4758
	29	14.9769	-17.4767
	30	17.4733	-17.4776
	31	19.9692	-17.4787
	32	22.4666	-17.4797
	33	24.9655	-17.4806
	34	27.4644	-17.4823
	35	29.9648	-17.4847
	36	32.4626	-17.4867
	37	34.9661	-17.4884
	38	37.4672	-17.4896
	39	39.9664	-17.4906
	40	42.4682	-17.4912
	41	44.9655	-17.4917
	42	47.4677	-17.4930
	43	49.9698	-17.4944
	44	52.4734	-17.4964
	45	54.9764	-17.4984

~~SECRET~~

HANDLE VIA

~~CONTROL SYSTEM ONLY~~

~~SECRET~~ [REDACTED]

ROW	COL	X (MM)	Y (MM)
31	1	-54.9864	-19.9916
	2	-52.4844	-19.9903
	3	-49.9862	-19.9888
	4	-47.4790	-19.9874
	5	-44.9766	-19.9859
	6	-42.4766	-19.9848
	7	-39.9719	-19.9838
	8	-37.4719	-19.9825
	9	-34.9729	-19.9812
	10	-32.4726	-19.9802
	11	-29.9731	-19.9793
	12	-27.4764	-19.9784
	13	-24.9748	-19.9774
	14	-22.4771	-19.9773
	15	-19.9803	-19.9774
	16	-17.4824	-19.9769
	17	-14.9840	-19.9764
	18	-12.4863	-19.9757
	19	-9.9879	-19.9750
	20	-7.4912	-19.9743
	21	-4.9967	-19.9736
	22	-2.4982	-19.9732
	23	-0.0016	-19.9730
	24	2.4913	-19.9729
	25	4.9899	-19.9730
	26	7.4867	-19.9733
	27	9.9856	-19.9739
	28	12.4780	-19.9746
	29	14.9773	-19.9753
	30	17.4737	-19.9762
	31	19.9692	-19.9770
	32	22.4686	-19.9780
	33	24.9660	-19.9794
	34	27.4664	-19.9822
	35	29.9667	-19.9847
	36	32.4684	-19.9868
	37	34.9678	-19.9885
	38	37.4667	-19.9895
	39	39.9671	-19.9904
	40	42.4663	-19.9908
	41	44.9660	-19.9916
	42	47.4663	-19.9932
	43	49.9711	-19.9948
	44	52.4753	-19.9972
	45	54.9800	-19.9993

HANDLE WITH [REDACTED]
CONTROL SYSTEM ONLY

~~SECRET~~ [REDACTED]

~~SECRET~~

ROW	COL	X (MM)	Y (MM)
32	1	-54.9897	-22.4922
	2	-52.4860	-22.4902
	3	-49.9820	-22.4888
	4	-47.4807	-22.4873
	5	-44.9764	-22.4857
	6	-42.4706	-22.4842
	7	-39.9740	-22.4831
	8	-37.4733	-22.4818
	9	-34.9744	-22.4804
	10	-32.4735	-22.4790
	11	-29.9740	-22.4781
	12	-27.4775	-22.4773
	13	-24.9759	-22.4765
	14	-22.4760	-22.4757
	15	-19.9811	-22.4753
	16	-17.4832	-22.4749
	17	-14.9849	-22.4744
	18	-12.4873	-22.4739
	19	-9.9888	-22.4733
	20	-7.4921	-22.4728
	21	-4.9975	-22.4723
	22	-2.4988	-22.4720
	23	-0.0020	-22.4718
	24	2.4911	-22.4719
	25	4.9898	-22.4721
	26	7.4868	-22.4725
	27	9.9857	-22.4730
	28	12.4765	-22.4737
	29	14.9775	-22.4744
	30	17.4740	-22.4752
	31	19.9695	-22.4760
	32	22.4668	-22.4772
	33	24.9624	-22.4804
	34	27.4586	-22.4833
	35	29.9567	-22.4858
	36	32.4703	-22.4881
	37	34.9695	-22.4893
	38	37.4704	-22.4904
	39	39.9672	-22.4909
	40	42.4683	-22.4914
	41	44.9668	-22.4929
	42	47.4690	-22.4945
	43	49.9753	-22.4968
	44	52.4774	-22.4994
	45	54.9833	-22.5024

~~SECRET~~~~HANDLE WITH
CONTROL SYSTEM ONLY~~

~~SECRET~~ [REDACTED]

IRONGUN SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
33	1	-54.9930	-24.9943
	2	-52.4877	-24.9912
	3	-49.9839	-24.9897
	4	-47.4824	-24.9881
	5	-44.9802	-24.9865
	6	-42.4806	-24.9847
	7	-39.9763	-24.9832
	8	-37.4754	-24.9818
	9	-34.9760	-24.9803
	10	-32.4751	-24.9787
	11	-29.9748	-24.9773
	12	-27.4783	-24.9765
	13	-24.9769	-24.9756
	14	-22.4790	-24.9746
	15	-19.9820	-24.9734
	16	-17.4841	-24.9727
	17	-14.9857	-24.9723
	18	-12.4882	-24.9718
	19	-9.9897	-24.9714
	20	-7.4929	-24.9709
	21	-4.9982	-24.9705
	22	-2.4994	-24.9702
	23	-0.0025	-24.9701
	24	2.4907	-24.9701
	25	4.9897	-24.9703
	26	7.4867	-24.9706
	27	9.9858	-24.9711
	28	12.4788	-24.9716
	29	14.9777	-24.9723
	30	17.4742	-24.9730
	31	19.9702	-24.9743
	32	22.4716	-24.9774
	33	24.9708	-24.9805
	34	27.4703	-24.9832
	35	29.9708	-24.9857
	36	32.4722	-24.9873
	37	34.9713	-24.9884
	38	37.4708	-24.9891
	39	39.9672	-24.9894
	40	42.4688	-24.9903
	41	44.9676	-24.9921
	42	47.4702	-24.9939
	43	49.9757	-24.9968
	44	52.4796	-24.9995
	45	54.9869	-25.0033

~~SECRET~~ [REDACTED]

HANDLE VIA [REDACTED]
CONTROL SYSTEM ONLY

SECRET

IKOGUN SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
34	1	-54.9966	-27.4955
	2	-52.4908	-27.4919
	3	-49.9857	-27.4897
	4	-47.4845	-27.4881
	5	-44.9820	-27.4865
	6	-42.4826	-27.4847
	7	-39.9788	-27.4828
	8	-37.4780	-27.4814
	9	-34.9779	-27.4797
	10	-32.4768	-27.4781
	11	-29.9761	-27.4765
	12	-27.4750	-27.4752
	13	-24.9778	-27.4744
	14	-22.4800	-27.4734
	15	-19.9831	-27.4724
	16	-17.4850	-27.4712
	17	-14.9865	-27.4701
	18	-12.4890	-27.4698
	19	-9.9904	-27.4694
	20	-7.4937	-27.4691
	21	-4.9989	-27.4688
	22	-2.5000	-27.4686
	23	-0.0029	-27.4685
	24	2.4904	-27.4687
	25	4.9895	-27.4689
	26	7.4866	-27.4692
	27	9.9858	-27.4697
	28	12.4791	-27.4703
	29	14.9778	-27.4709
	30	17.4764	-27.4731
	31	19.9727	-27.4759
	32	22.4740	-27.4788
	33	24.9732	-27.4817
	34	27.4751	-27.4847
	35	29.9728	-27.4865
	36	32.4741	-27.4877
	37	34.9725	-27.4886
	38	37.4708	-27.4889
	39	39.9672	-27.4893
	40	42.4697	-27.4911
	41	44.9664	-27.4930
	42	47.4729	-27.4957
	43	49.9762	-27.4987
	44	52.4832	-27.5021
	45	54.9908	-27.5065

HANDLE VIA CONTROL SYSTEM ONLY

SECRET

IKOGON SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
35	1	-55.0002	-29.9975
	2	-52.4947	-29.9939
	3	-49.9876	-29.9902
	4	-47.4805	-29.9866
	5	-44.9840	-29.9869
	6	-42.4845	-29.9851
	7	-39.9809	-29.9832
	8	-37.4808	-29.9813
	9	-34.9808	-29.9796
	10	-32.4786	-29.9777
	11	-29.9779	-29.9761
	12	-27.4806	-29.9744
	13	-24.9783	-29.9730
	14	-22.4810	-29.9721
	15	-19.9842	-29.9711
	16	-17.4802	-29.9701
	17	-14.9876	-29.9690
	18	-12.4899	-29.9679
	19	-9.9912	-29.9668
	20	-7.4944	-29.9665
	21	-4.9996	-29.9663
	22	-2.5006	-29.9661
	23	-0.0033	-29.9660
	24	2.4901	-29.9661
	25	4.9892	-29.9663
	26	7.4864	-29.9666
	27	9.9857	-29.9671
	28	12.4799	-29.9689
	29	14.9794	-29.9710
	30	17.4775	-29.9734
	31	19.9749	-29.9760
	32	22.4702	-29.9787
	33	24.9753	-29.9815
	34	27.4751	-29.9837
	35	29.9749	-29.9852
	36	32.4753	-29.9862
	37	34.9724	-29.9864
	38	37.4707	-29.9866
	39	39.9881	-29.9881
	40	42.4706	-29.9900
	41	44.9703	-29.9923
	42	47.4757	-29.9955
	43	49.9809	-29.9986
	44	52.4874	-30.0031
	45	54.9947	-30.0075

~~SECRET~~ [REDACTED]
[REDACTED]

~~SECRET~~

IKOGON SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
36	1	-55.0039	-32.4966
	2	-52.4987	-32.4930
	3	-49.9914	-32.4891
	4	-47.4864	-32.4862
	5	-44.9861	-32.4846
	6	-42.4865	-32.4830
	7	-39.9829	-32.4811
	8	-37.4832	-32.4791
	9	-34.9839	-32.4772
	10	-32.4818	-32.4755
	11	-29.9801	-32.4735
	12	-27.4828	-32.4720
	13	-24.9806	-32.4704
	14	-22.4821	-32.4688
	15	-19.9853	-32.4681
	16	-17.4873	-32.4673
	17	-14.9887	-32.4665
	18	-12.4910	-32.4656
	19	-9.9922	-32.4649
	20	-7.4952	-32.4642
	21	-5.0003	-32.4636
	22	-2.5011	-32.4633
	23	-0.0037	-32.4633
	24	2.4899	-32.4636
	25	4.9894	-32.4644
	26	7.4869	-32.4655
	27	9.9869	-32.4669
	28	12.4816	-32.4687
	29	14.9810	-32.4708
	30	17.4792	-32.4731
	31	19.9767	-32.4756
	32	22.4761	-32.4782
	33	24.9773	-32.4803
	34	27.4770	-32.4820
	35	29.9765	-32.4834
	36	32.4756	-32.4837
	37	34.9721	-32.4838
	38	37.4712	-32.4850
	39	39.9691	-32.4871
	40	42.4715	-32.4891
	41	44.9734	-32.4926
	42	47.4786	-32.4959
	43	49.9852	-32.5001
	44	52.4919	-32.5049
	45	54.9989	-32.5095

~~SECRET~~

~~TOP SECRET~~
GENERAL SYSTEM ONLY

~~SECRET~~

ROW	COL	X (MM)	Y (MM)
37	1	-55.0077	-34.9996
	2	-52.5027	-34.9957
	3	-49.9955	-34.9917
	4	-47.4912	-34.9876
	5	-44.9880	-34.9854
	6	-42.4865	-34.9838
	7	-39.9848	-34.9821
	8	-37.4852	-34.9802
	9	-34.9864	-34.9781
	10	-32.4851	-34.9761
	11	-29.9835	-34.9743
	12	-27.4851	-34.9724
	13	-24.9826	-34.9709
	14	-22.4840	-34.9694
	15	-19.9866	-34.9679
	16	-17.4884	-34.9668
	17	-14.9897	-34.9662
	18	-12.4920	-34.9655
	19	-9.9931	-34.9650
	20	-7.4960	-34.9645
	21	-5.0009	-34.9642
	22	-2.5016	-34.9641
	23	-0.0039	-34.9642
	24	2.4900	-34.9648
	25	4.9898	-34.9656
	26	7.4876	-34.9667
	27	9.9878	-34.9681
	28	12.4830	-34.9698
	29	14.9824	-34.9718
	30	17.4807	-34.9740
	31	19.9785	-34.9762
	32	22.4801	-34.9780
	33	24.9793	-34.9798
	34	27.4764	-34.9811
	35	29.9762	-34.9814
	36	32.4752	-34.9817
	37	34.9724	-34.9827
	38	37.4722	-34.9847
	39	39.9699	-34.9867
	40	42.4748	-34.9901
	41	44.9765	-34.9936
	42	47.4823	-34.9973
	43	49.9899	-35.0024
	44	52.4964	-35.0073
	45	55.0022	-35.0116

HANDLE WITH CARE
~~CONTROL SYSTEM ONLY~~

~~SECRET~~

~~SECRET~~

IKOGON SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
38	1	-55.0121	-37.5042
	2	-52.5068	-37.4998
	3	-49.9997	-37.4956
	4	-47.4956	-37.4916
	5	-44.9900	-37.4873
	6	-42.4905	-37.4857
	7	-39.9868	-37.4841
	8	-37.4871	-37.4825
	9	-34.9883	-37.4804
	10	-32.4875	-37.4783
	11	-29.9867	-37.4763
	12	-27.4883	-37.4746
	13	-24.9851	-37.4729
	14	-22.4858	-37.4714
	15	-19.9884	-37.4701
	16	-17.4898	-37.4689
	17	-14.9908	-37.4677
	18	-12.4930	-37.4669
	19	-9.9939	-37.4665
	20	-7.4967	-37.4663
	21	-5.0015	-37.4662
	22	-2.5020	-37.4663
	23	-0.0041	-37.4666
	24	2.4900	-37.4673
	25	4.9901	-37.4682
	26	7.4882	-37.4694
	27	9.9886	-37.4708
	28	12.4843	-37.4725
	29	14.9837	-37.4743
	30	17.4825	-37.4761
	31	19.9804	-37.4779
	32	22.4821	-37.4796
	33	24.9803	-37.4805
	34	27.4783	-37.4810
	35	29.9760	-37.4814
	36	32.4757	-37.4826
	37	34.9734	-37.4845
	38	37.4730	-37.4864
	39	39.9730	-37.4897
	40	42.4761	-37.4933
	41	44.9796	-37.4968
	42	47.4873	-37.5022
	43	49.9947	-37.5073
	44	52.5067	-37.5121
	45	55.0359	-37.5163

~~SECRET~~

~~SECRET~~

IKOGON SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
39	1	-55.0169	-40.0095
	2	-52.5117	-40.0049
	3	-50.0038	-39.9998
	4	-47.4999	-39.9957
	5	-44.9945	-39.9915
	6	-42.4924	-39.9874
	7	-39.9887	-39.9858
	8	-37.4890	-39.9841
	9	-34.9900	-39.9822
	10	-32.4893	-39.9801
	11	-29.9888	-39.9781
	12	-27.4912	-39.9762
	13	-24.9879	-39.9746
	14	-22.4884	-39.9730
	15	-19.9903	-39.9716
	16	-17.4913	-39.9705
	17	-14.9921	-39.9695
	18	-12.4941	-39.9686
	19	-9.9947	-39.9679
	20	-7.4974	-39.9675
	21	-5.0020	-39.9673
	22	-2.5023	-39.9673
	23	-0.0042	-39.9677
	24	2.4901	-39.9684
	25	4.9905	-39.9694
	26	7.4889	-39.9706
	27	9.9898	-39.9719
	28	12.4860	-39.9734
	29	14.9854	-39.9749
	30	17.4843	-39.9765
	31	19.9818	-39.9775
	32	22.4824	-39.9782
	33	24.9803	-39.9787
	34	27.4783	-39.9790
	35	29.9766	-39.9807
	36	32.4767	-39.9824
	37	34.9744	-39.9841
	38	37.4761	-39.9874
	39	39.9765	-39.9910
	40	42.4814	-39.9945
	41	44.9850	-39.9997
	42	47.4923	-40.0049
	43	49.9995	-40.0099
	44	52.5050	-40.0146
	45	55.0101	-40.0189

~~SECRET~~

~~CONTROL SYSTEM ONLY~~

ROW	COL	X (MM)	Y (MM)
40	1	-55.0221	-42.5120
	2	-52.5170	-42.5075
	3	-50.0092	-42.5024
	4	-47.5042	-42.4971
	5	-44.9989	-42.4930
	6	-42.4967	-42.4888
	7	-39.9906	-42.4848
	8	-37.4909	-42.4832
	9	-34.9919	-42.4815
	10	-32.4910	-42.4798
	11	-29.9905	-42.4779
	12	-27.4929	-42.4762
	13	-24.9902	-42.4745
	14	-22.4908	-42.4731
	15	-19.9927	-42.4718
	16	-17.4933	-42.4708
	17	-14.9936	-42.4699
	18	-12.4951	-42.4693
	19	-9.9955	-42.4689
	20	-7.4978	-42.4686
	21	-5.0023	-42.4686
	22	-2.5023	-42.4688
	23	-0.0039	-42.4693
	24	2.4908	-42.4699
	25	4.9915	-42.4708
	26	7.4900	-42.4719
	27	9.9911	-42.4732
	28	12.4876	-42.4744
	29	14.9864	-42.4752
	30	17.4847	-42.4760
	31	19.9819	-42.4767
	32	22.4825	-42.4774
	33	24.9807	-42.4785
	34	27.4792	-42.4802
	35	29.9775	-42.4819
	36	32.4777	-42.4837
	37	34.9776	-42.4873
	38	37.4796	-42.4908
	39	39.9799	-42.4943
	40	42.4865	-42.4996
	41	44.9901	-42.5050
	42	47.4972	-42.5102
	43	50.0042	-42.5155
	44	52.5096	-42.5203
	45	55.0146	-42.5247

HANDLE VIA [REDACTED]
CONTROL SYSTEM ONLY

SECRET [REDACTED]

IKOGUN SERIAL NO 104

RO.	COL	X (MM)	Y (MM)
41	1	-55.0273	-45.0209
	2	-52.5226	-45.0169
	3	-50.0149	-45.0118
	4	-47.5098	-45.0062
	5	-45.0032	-45.0004
	6	-42.5012	-44.9964
	7	-39.9950	-44.9921
	8	-37.4929	-44.9878
	9	-34.9939	-44.9861
	10	-32.4930	-44.9844
	11	-29.9922	-44.9826
	12	-27.4944	-44.9809
	13	-24.9917	-44.9792
	14	-22.4925	-44.9777
	15	-19.9946	-44.9763
	16	-17.4953	-44.9751
	17	-14.9953	-44.9743
	18	-12.4966	-44.9736
	19	-9.9966	-44.9731
	20	-7.4986	-44.9728
	21	-5.0027	-44.9728
	22	-2.5024	-44.9730
	23	-0.0037	-44.9734
	24	2.4911	-44.9738
	25	4.9919	-44.9744
	26	7.4965	-44.9750
	27	9.9914	-44.9757
	28	12.4880	-44.9764
	29	14.9866	-44.9770
	30	17.4848	-44.9776
	31	19.9822	-44.9786
	32	22.4831	-44.9800
	33	24.9816	-44.9815
	34	27.4800	-44.9830
	35	29.9791	-44.9854
	36	32.4810	-44.9887
	37	34.9809	-44.9920
	38	37.4830	-44.9955
	39	39.9850	-45.0009
	40	42.4916	-45.0062
	41	44.9952	-45.0113
	42	47.5024	-45.0169
	43	50.0091	-45.0221
	44	52.5145	-45.0269
	45	55.0188	-45.0309

HANDLE VIA CONTROL SYSTEM ONLY

IKOGUN SERIAL NO 104

RO.	COL	X (MM)	Y (MM)
42	1	-55.0326	-47.5238
	2	-52.5282	-47.5201
	3	-50.0209	-47.5155
	4	-47.5159	-47.5100
	5	-45.0089	-47.5036
	6	-42.5057	-47.4978
	7	-39.9996	-47.4938
	8	-37.4975	-47.4896
	9	-34.9985	-47.4854
	10	-32.4950	-47.4829
	11	-29.9943	-47.4813
	12	-27.4963	-47.4796
	13	-24.9952	-47.4779
	14	-22.4958	-47.4764
	15	-19.9959	-47.4750
	16	-17.4985	-47.4739
	17	-14.9986	-47.4728
	18	-12.4979	-47.4720
	19	-9.9977	-47.4714
	20	-7.4995	-47.4710
	21	-5.0034	-47.4708
	22	-2.5029	-47.4709
	23	-0.0039	-47.4710
	24	2.4910	-47.4713
	25	4.9919	-47.4716
	26	7.4965	-47.4720
	27	9.9916	-47.4725
	28	12.4885	-47.4733
	29	14.9869	-47.4743
	30	17.4854	-47.4754
	31	19.9829	-47.4766
	32	22.4839	-47.4778
	33	24.9826	-47.4795
	34	27.4823	-47.4825
	35	29.9821	-47.4855
	36	32.4841	-47.4887
	37	34.9844	-47.4925
	38	37.4861	-47.4978
	39	39.9901	-47.5030
	40	42.4966	-47.5081
	41	45.0002	-47.5136
	42	47.5077	-47.5196
	43	50.0144	-47.5247
	44	52.5192	-47.5290
	45	55.0229	-47.5327

~~SECRET~~

ROW	COL	X (MM)	Y (MM)
43	1	-55.0382	-50.0288
	2	-52.5339	-50.0253
	3	-50.0269	-50.0214
	4	-47.5214	-50.0153
	5	-45.0145	-50.0091
	6	-42.5111	-50.0032
	7	-40.0040	-49.9977
	8	-37.5019	-49.9938
	9	-35.0009	-49.9898
	10	-32.4983	-49.9858
	11	-29.9963	-49.9822
	12	-27.4983	-49.9807
	13	-24.9952	-49.9792
	14	-22.4955	-49.9777
	15	-19.9972	-49.9763
	16	-17.4976	-49.9750
	17	-14.9975	-49.9741
	18	-12.4967	-49.9733
	19	-9.9984	-49.9727
	20	-7.5001	-49.9723
	21	-5.0039	-49.9720
	22	-2.5032	-49.9720
	23	-0.0042	-49.9720
	24	2.4969	-49.9723
	25	4.9920	-49.9727
	26	7.4967	-49.9732
	27	9.9918	-49.9739
	28	12.4891	-49.9747
	29	14.9873	-49.9756
	30	17.4859	-49.9767
	31	19.9838	-49.9784
	32	22.4855	-49.9809
	33	24.9851	-49.9836
	34	27.4849	-49.9864
	35	29.9848	-49.9894
	36	32.4880	-49.9940
	37	34.9894	-49.9991
	38	37.4930	-50.0041
	39	39.9949	-50.0092
	40	42.5012	-50.0144
	41	45.0047	-50.0200
	42	47.5122	-50.0259
	43	50.0194	-50.0317
	44	52.5237	-50.0356
	45	55.0273	-50.0393

HANDLE VIA [REDACTED]
CONTROL SYSTEM ONLY

IKOGUN SERIAL NO 104

ROW	COL	X (MM)	Y (MM)
44	1	-55.0440	-52.5379
	2	-52.5398	-52.5345
	3	-50.0312	-52.5288
	4	-47.5260	-52.5233
	5	-45.0195	-52.5176
	6	-42.5161	-52.5118
	7	-40.0090	-52.5064
	8	-37.5062	-52.5015
	9	-35.0052	-52.4975
	10	-32.5025	-52.4937
	11	-30.0003	-52.4900
	12	-27.5010	-52.4863
	13	-24.9971	-52.4835
	14	-22.4974	-52.4822
	15	-19.9991	-52.4809
	16	-17.4992	-52.4797
	17	-14.9988	-52.4785
	18	-12.4997	-52.4775
	19	-9.9991	-52.4766
	20	-7.5007	-52.4761
	21	-5.0044	-52.4758
	22	-2.5036	-52.4757
	23	-0.0044	-52.4758
	24	2.4908	-52.4760
	25	4.9920	-52.4763
	26	7.4908	-52.4768
	27	9.9921	-52.4774
	28	12.4898	-52.4788
	29	14.9881	-52.4805
	30	17.4873	-52.4824
	31	19.9856	-52.4846
	32	22.4876	-52.4869
	33	24.9874	-52.4895
	34	27.4880	-52.4934
	35	29.9891	-52.4980
	36	32.4926	-52.5028
	37	34.9940	-52.5076
	38	37.4975	-52.5123
	39	39.9991	-52.5171
	40	42.5053	-52.5223
	41	45.0088	-52.5278
	42	47.5157	-52.5333
	43	50.0223	-52.5386
	44	52.5282	-52.5442
	45	55.0317	-52.5477

HANDLE VIA

ROW	COL	X (MM)	Y (MM)
45	1	-55.0449	-55.0434
	2	-52.5435	-55.0426
	3	-50.0350	-55.0370
	4	-47.5300	-55.0316
	5	-45.0237	-55.0264
	6	-42.5206	-55.0212
	7	-40.0134	-55.0159
	8	-37.5106	-55.0111
	9	-35.0092	-55.0067
	10	-32.5066	-55.0029
	11	-30.0043	-54.9995
	12	-27.5049	-54.9961
	13	-25.0006	-54.9928
	14	-22.4999	-54.9897
	15	-20.0009	-54.9867
	16	-17.5010	-54.9857
	17	-15.0004	-54.9847
	18	-12.5013	-54.9839
	19	-10.0005	-54.9832
	20	-7.5018	-54.9827
	21	-5.0053	-54.9823
	22	-2.5043	-54.9822
	23	-0.0049	-54.9822
	24	2.4905	-54.9826
	25	4.9920	-54.9832
	26	7.4910	-54.9840
	27	9.9926	-54.9852
	28	12.4908	-54.9866
	29	14.9892	-54.9882
	30	17.4886	-54.9901
	31	19.9873	-54.9922
	32	22.4902	-54.9961
	33	24.9910	-55.0001
	34	27.4921	-55.0044
	35	29.9934	-55.0088
	36	32.4969	-55.0134
	37	34.9978	-55.0174
	38	37.5011	-55.0218
	39	40.0027	-55.0266
	40	42.5089	-55.0318
	41	45.0119	-55.0368
	42	47.5183	-55.0419
	43	50.0248	-55.0473
	44	52.5306	-55.0528
	45	55.0322	-55.0540

~~SECRET~~ [REDACTED]

CALIBRATION CERTIFICATE
SUBMITTED BY
FAIRCHILD SPACE AND DEFENSE SYSTEMS
A DIVISION OF FAIRCHILD CAMERA AND INSTRUMENT CORPORATION
SYOSSET, L. I., NEW YORK

(Ref. Attached Lens Performance Information as per Fairchild
Space and Defense Systems, El Segundo, California).

Camera Type:	DISIC SYSTEM 1162-A1
Camera No.:	1
Lens and Cone No.:	2
Make and Type:	Ikotar
Nominal Focal Length:	3-Inch
Maximum Aperture:	f/2.8

[REDACTED]
Optronics Laboratory

[REDACTED]
Quality & Reliability Dept.

~~SECRET~~ [REDACTED]

FAIRCHILD SPACE AND DEFENSE SYSTEMS
 A Division of Fairchild Camera and Instrument Corporation
 Los Angeles, California

LENS TYPE Ikotar

SERIAL NUMBER 2

DATE March 18, 1966

I. FOCAL LENGTH

Equivalent Focal Length	Calibrated Focal Length
2.9877"	2.9901"

NO SHIM

II. RESOLVING POWER

FILM 4400

PROCESSING D-19 8 min. @68°F

TARGET CONTRAST USAF 1951 1000:1

AWAR 82.0 Diag. 1
80.4 Diag. 2

	0°	2.5°	5°	7.5°	10°						
Radial	80	88	85	88	84						
Tangential	80	76	84	73	76						

~~SECRET~~

56

~~HANDLE VIA~~ [REDACTED]
~~CONTROL SYSTEM ONLY~~

LENS TYPE Ikotar

~~SECRET~~ [REDACTED]

SERIAL NUMBER 2

DATE March 18, 1966

III. DISTORTION

Distortion was measured at the grid intersection points shown in Figure 1. The locations of the grid intersection points, measured radially from the center of the grid (Indicated Principal Point), are given in Table IA in inches and in Table IB in millimeters.

A. Radial Distortion

The values of the radial distortion in millimeters, referred to the Point of Symmetry and the calibrated Focal Length, are shown in Table II. The values indicate the displacement of the image from its distortion-free position. Positive values indicate a displacement away from the center of the plate.

The summary block below gives the average radial distortion along the semi-diagonals. The angles are those subtended by the appropriate grid intersection points.

AVERAGE RADIAL DISTORTION (MM)

2.7°	5.3°	8.0°	10.6°						
-.001	.000	.000	-.004						

A plot of radial distortion along two diagonals is shown in Figure 2.

B. Tangential Distortion

The maximum average tangential distortion is .003 mm.

A tabulation of tangential distortion values is given in Table III. The figures given are the average values for each line. Positive values indicate an upward displacement of the image from a horizontal straight line.

5) ~~SECRET~~ [REDACTED]

HANDLE VIA [REDACTED]
 CONTROL SYSTEM [REDACTED]

FABRICATED SPACE & DEFENSE SYSTEMS, LOS ANGELES, CALIF.
 PHOTOGRAPHIC SOLUTION TEST

TARGET

ILLUMINATION S100bc

FILM 4400 DEVELOPER D-19

TIME 8 min. TEMPERATURE 68°F

FILTER none N.D. 2.50

LENS Ikontar

SERIAL NO. 2 (Rework)

JOB NO. 955

PARFOCALIZED AT

DATE March 18, 1966

EFL APERTURE

BFL F.D.

COLLIMATOR F.L. 120" Defocused

SHIM THICKNESS .0759

	0°		2 1/2°		5°		7 1/2°		10°		0°		0°		0°		0°		0°		LWA AWA
	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	
R Diag. #1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	82.0
L	80	80	90	80	100	79	100	71	88	87	0	0	0	0	0	0	0	0	0	0	80.4
R Diag. #2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	80.4
L	80	80	80	71	71	89	80	88	88	78	0	0	0	0	0	0	0	0	0	0	80.4
R	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	80.4
L	80	80	90	71	80	89	80	71	88	69	0	0	0	0	0	0	0	0	0	0	80.4

~~SECRET~~

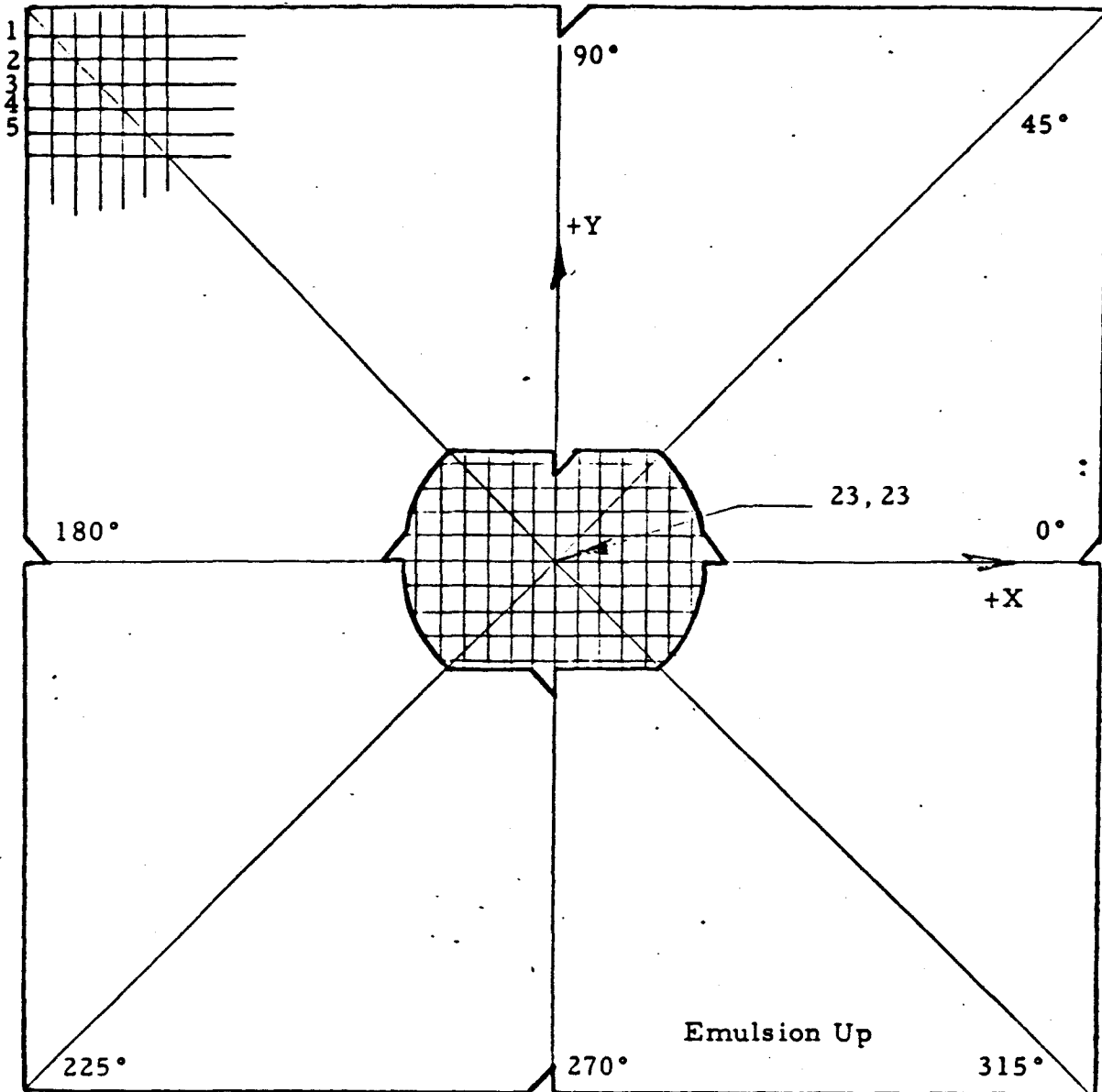
(C) (S)

STAMP

Column
1 2 3 4 5

~~SECRET~~

Row



Normal matrix notation is being used on this program with columns being the verticals and rows the horizontals reading from left to right for the former and up to down, the latter.

The same orientation applies to both grids, the only difference being the size. It should be noted that in both systems, the orientation is established by the fiducials. The natural fiducials that point in the same direction are in the positive Y direction.

The values for tangential and radial distortion in millimeters, referred to the Point of Symmetry and the Calibrated Focal Length are tabulated for each radial diagonal. Positive radial distortion indicates a displacement away from the center of the grid. Positive tangential distortion indicates a displacement in a counterclockwise direction from 0°.

~~HANDLE VIA~~
~~CONTROL SYSTEM ONLY~~

~~SECRET~~

IKCTAR SERIAL NO 2

PROGRAM INPUT

CALIBRATED FOCAL LENGTH = 75.9490 MM

PRIN. PCINT OF AUTOCOLLIMATION (MM)
X=-0.033000 Y= 0.021000

PCINT OF SYMMETRY (MM)
X=-0.302000 Y= 0.257000

RADIAL VECTOR FIELD ANGLE	FOR 0. RADIAL DISTORTION (MM)	DEGREES TANGENTIAL DISTORTION (MM)
DEGREES		
0.	0.	0.
1.90	-0.004000	0.
5.66	0.	0.
7.53	0.002000	0.
9.35	0.	0.
11.18	-0.004000	0.

RADIAL VECTOR FIELD ANGLE	FOR 45.00 RADIAL DISTORTION (MM)	DEGREES TANGENTIAL DISTORTION (MM)
DEGREES		
0.	0.	0.
2.66	-0.002000	0.001000
5.32	0.001000	0.001000
7.96	0.	-0.001000
10.56	-0.004000	-0.001000

RADIAL VECTOR FIELD ANGLE	FOR 90.00 RADIAL DISTORTION (MM)	DEGREES TANGENTIAL DISTORTION (MM)
DEGREES		
0.	0.	0.
1.87	0.	0.
5.63	-0.004000	0.
7.50	-0.006000	0.

RADIAL VECTOR FOR 135.00 DEGREES

FIELD ANGLE	RADIAL DISTORTION	TANGENTIAL DISTORTION
DEGREES	(MM)	(MM)
0.	0.	0.
2.64	-0.001000	0.002000
5.30	0.	0.003000
7.94	-0.002000	0.002000
10.54	-0.006000	0.002000

RADIAL VECTOR FOR 180.00 DEGREES

FIELD ANGLE	RADIAL DISTORTION	TANGENTIAL DISTORTION
DEGREES	(MM)	(MM)
0.	0.	0.
1.87	0.	0.
5.63	0.001000	0.
7.50	0.002000	0.
9.34	0.	0.
11.16	-0.004000	0.

RADIAL VECTOR FOR 225.00 DEGREES

FIELD ANGLE	RADIAL DISTORTION	TANGENTIAL DISTORTION
DEGREES	(MM)	(MM)
0.	0.	0.
2.67	0.	-0.001000
5.33	0.001000	-0.001000
7.96	0.	0.001000
10.56	-0.002000	0.001000

RADIAL VECTOR FOR 270.00 DEGREES

FIELD ANGLE	RADIAL DISTORTION	TANGENTIAL DISTORTION
DEGREES	(MM)	(MM)
0.	0.	0.
1.90	0.001000	0.
5.66	0.001000	0.
7.52	0.002000	0.

[REDACTED]

IKOTAR SERIAL NO 2

RADIAL VECTOR FOR 315.00 DEGREES

FIELD ANGLE DEGREES	RADIAL DISTORTION (MM)	TANGENTIAL DISTORTION (MM)
0.	0.	0.
2.69	-0.004000	-0.002000
5.35	-0.002000	-0.003000
7.98	-0.002000	-0.002000
10.58	-0.005000	-0.002000

~~HANDLE VIA [REDACTED]~~
~~CONTROL SYSTEM ONLY~~

IKCTAR SERIAL NO 2

ROW	COL	X (MM)	Y (MM)
19	17	-15.0057	10.0023
	18	-12.5047	10.0029
	19	-10.0030	10.0036
	20	-7.5016	10.0025
	21	-5.0026	10.0020
	22	-2.5000	10.0026
	23	0.0008	10.0038
	24	2.4983	10.0018
	25	5.0004	10.0005
	26	7.5017	10.0005
	27	10.0050	10.0012
28	12.4986	10.0008	
29	15.0046	10.0004	

ROW	COL	X (MM)	Y (MM)
20	17	-15.0062	7.5022
	18	-12.5052	7.5026
	19	-10.0021	7.5020
	20	-7.5004	7.5015
	21	-5.0017	7.5014
	22	-2.4995	7.5015
	23	0.0006	7.5024
	24	2.4983	7.5004
	25	5.0000	7.4992
	26	7.4997	7.4990
	27	10.0035	7.4999
28	12.4989	7.5007	
29	15.0047	7.5004	

ROW	COL	X (MM)	Y (MM)
21	17	-15.0065	5.0012
	18	-12.5043	5.0010
	19	-10.0010	5.0003
	20	-7.4999	5.0004
	21	-5.0002	5.0007
	22	-2.4992	5.0003
	23	0.0004	5.0005
	24	2.4982	4.9991
	25	4.9993	4.9969
	26	7.4995	4.9980
	27	10.0021	4.9987
28	12.4980	4.9994	
29	15.0047	4.9997	

~~HANDLE VIA [REDACTED]~~
~~CONTROL SYSTEMS [REDACTED]~~

ROW	COL	X (MM)	Y (MM)
22	17	-15.0066	2.4990
	18	-12.5030	2.4986
	19	-9.9998	2.4983
	20	-7.4999	2.4987
	21	-5.0018	2.4990
	22	-2.4995	2.4997
	23	0.0002	2.4976
	24	2.4990	2.4982
	25	5.0000	2.4973
	26	7.4995	2.4971
	27	10.0009	2.4973
	28	12.4968	2.4977
29	15.0047	2.4981	

ROW	COL	X (MM)	Y (MM)
23	17	-15.0064	0.0005
	18	-12.5019	0.0004
	19	-9.9988	0.0004
	20	-7.4999	0.0003
	21	-5.0022	0.0002
	22	-2.5004	0.0001
	23	0.0000	-0.0000
	24	2.5007	-0.0001
	25	5.0009	-0.0002
	26	7.4996	-0.0002
	27	9.9999	-0.0003
	28	12.4959	-0.0004
29	15.0045	-0.0005	

ROW	COL	X (MM)	Y (MM)
24	17	-15.0060	-2.5016
	18	-12.5026	-2.5012
	19	-9.9997	-2.5009
	20	-7.5000	-2.5015
	21	-5.0021	-2.5019
	22	-2.4999	-2.5025
	23	-0.0002	-2.5010
	24	2.5007	-2.5034
	25	5.0014	-2.5018
	26	7.5003	-2.5014
	27	10.0012	-2.5016
	28	12.4972	-2.5022
29	15.0044	-2.5028	

IKOTAR SERIAL NO 2

ROW	COL	X (MM)	Y (MM)
25	17	-15.0057	-5.0032
	18	-12.5038	-5.0029
	19	-10.0010	-5.0023
	20	-7.5006	-5.0026
	21	-5.0016	-5.0032
	22	-2.4999	-5.0030
	23	-0.0004	-5.0026
	24	2.4982	-5.0042
	25	5.0020	-5.0032
	26	7.5011	-5.0031
	27	10.0028	-5.0036
	28	12.4989	-5.0045
	29	15.0043	-5.0051

ROW	COL	X (MM)	Y (MM)
26	17	-15.0055	-7.5027
	18	-12.5047	-7.5028
	19	-10.0023	-7.5021
	20	-7.5020	-7.5016
	21	-5.0029	-7.5018
	22	-2.5005	-7.5017
	23	-0.0006	-7.5017
	24	2.4971	-7.5025
	25	5.0004	-7.5028
	26	7.5017	-7.5030
	27	10.0045	-7.5036
	28	12.5004	-7.5043
	29	15.0042	-7.5043

ROW	COL	X (MM)	Y (MM)
27	17	-15.0053	-10.0020
	18	-12.5047	-10.0021
	19	-10.0033	-10.0021
	20	-7.5024	-10.0014
	21	-5.0037	-10.0007
	22	-2.5011	-10.0002
	23	-0.0008	-9.9998
	24	2.4962	-10.0010
	25	4.9993	-10.0020
	26	7.5015	-10.0031
	27	10.0058	-10.0042
	28	12.5007	-10.0039
	29	15.0041	-10.0037

~~SECRET~~ [REDACTED]

~~SECRET~~ [REDACTED]

CALIBRATION CERTIFICATE
SUBMITTED BY
FAIRCHILD SPACE AND DEFENSE SYSTEMS
A DIVISION OF FAIRCHILD CAMERA AND INSTRUMENT CORPORATION
SYOSSET, L. I., NEW YORK

(Ref. Attached Lens Performance Information as per Fairchild
Space and Defense Systems, El Segundo, California).

Camera Type: DISIC SYSTEM 1162-A1
Camera No.: 1
Lens and Cone No.: 6P
Make and Type: Ikotar
Nominal Focal Length: 3-Inch
Maximum Aperture: f/2.8

[REDACTED]
Optronics Laboratory

[REDACTED]
Quality & Reliability Department

~~SECRET~~ [REDACTED]

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LENS TYPE Ikotar

SERIAL NUMBER 6P

DATE 1 November 1966

I. FOCAL LENGTH

Equivalent Focal Length	Calibrated Focal Length
3.0068"	3.0068"

NO SHIM

II. RESOLVING POWER

FILM 4400

PROCESSING D-19, 8 min. @68°F

TARGET CONTRAST 1000.1

Diag. 1 = 95.3
 AWAR Diag. 2 = 93.2

	0°	2½°	5°	7½°	10°							
Radial	101	99	91	95	91							
Tangential	101	99	95	95	93							

~~SECRET~~



LENS TYPE Ikotar

SERIAL NUMBER 6P

DATE 1 November 1966

III. DISTORTION

Distortion was measured at the grid intersection points shown in Figure 1. The locations of the grid intersection points, measured radially from the center of the grid (Indicated Principal Point), are given in Table IA in inches and in Table IB in millimeters.

A. Radial Distortion

The values of the radial distortion in millimeters, referred to the Point of Symmetry and the calibrated Focal Length, are shown in Table II. The values indicate the displacement of the image from its distortion-free position. Positive values indicate a displacement away from the center of the plate.

The summary block below gives the average radial distortion along the semi-diagonals. The angles are those subtended by the appropriate grid intersection points.

AVERAGE RADIAL DISTORTION (MM)

2.7°	5.3°	8.0°	10.6°						
.002	.004	.005	.002						

A plot of radial distortion along two diagonals is shown in Figure 2.

B. Tangential Distortion

The maximum average tangential distortion is .004 mm.

A tabulation of tangential distortion values is given in Table III. The figures given are the average values for each line. Positive values indicate an upward displacement of the image from a horizontal straight line.

CALIBRATION TRANSFORMATION PROGRAM

IKGTAR SERIAL NO 6P

PROGRAM INPUT

CALIBRATED FOCAL LENGTH = 76.3740 MM

PRIN. PCINT OF AUTOCLLIMATION (MM)
X=-0.001000 Y= 0.018000

PCINT OF SYMMETRY (MM)
X=-0.044000 Y=-0.107000

RADIAL VECTOR FIELD ANGLE	FOR 0. RADIAL DISTORTION (MM)	DEGREES TANGENTIAL DISTORTION (MM)
DEGREES		
0.	0.	0.
1.87	-0.004000	-0.001000
5.61	0.002000	-0.001000
7.46	0.005000	-0.001000
9.35	0.003000	-0.001000
11.18	0.001000	-0.001000

RADIAL VECTOR FIELD ANGLE	FOR 45.00 RADIAL DISTORTION (MM)	DEGREES TANGENTIAL DISTORTION (MM)
DEGREES		
0.	-0.	0.
2.66	-0.002000	0.001000
5.30	0.001000	0.001000
7.92	0.004000	-0.001000
10.51	0.002000	-0.002000

RADIAL VECTOR FIELD ANGLE	FOR 50.00 RADIAL DISTORTION (MM)	DEGREES TANGENTIAL DISTORTION (MM)
DEGREES		
0.	0.	0.
1.88	0.002000	0.
5.62	0.002000	0.
7.47	0.001000	0.

[REDACTED] SYSTEM ONLY

RADIAL VECTOR FOR 135.00 DEGREES

FIELD ANGLE	RADIAL DISTORTION (MM)	TANGENTIAL DISTORTION (MM)
DEGREES		
0.	0.	0.
2.66	0.005000	0.003000
5.30	0.007000	0.004000
7.92	0.006000	0.003000
10.50	0.002000	0.003000

RADIAL VECTOR FOR 180.00 DEGREES

FIELD ANGLE	RADIAL DISTORTION (MM)	TANGENTIAL DISTORTION (MM)
DEGREES		
0.	0.	0.
1.87	0.004000	0.001000
5.61	0.005000	0.001000
7.46	0.006000	0.001000
9.34	0.003000	0.001000
11.16	0.001000	0.001000

RADIAL VECTOR FOR 225.00 DEGREES

FIELD ANGLE	RADIAL DISTORTION (MM)	TANGENTIAL DISTORTION (MM)
DEGREES		
0.	-0.	0.
2.64	0.006000	-0.001000
5.28	0.007000	-0.001000
7.90	0.005000	0.001000
10.49	0.002000	0.002000

RADIAL VECTOR FOR 270.00 DEGREES

FIELD ANGLE	RADIAL DISTORTION (MM)	TANGENTIAL DISTORTION (MM)
DEGREES		
0.	0.	0.
1.86	0.004000	0.
5.60	0.006000	0.
7.45	0.005000	0.

RADIAL VECTOR FOR 315.00 DEGREES

FIELD ANGLE DEGREES	RADIAL DISTORTION (MM)	TANGENTIAL DISTORTION (MM)
0.	0.	0.
2.64	C.C01000	-0.003000
5.28	C.C02000	-0.004000
7.90	C.C05000	-0.003000
10.49	C.C02000	-0.003000

[REDACTED]

RCW	COL	X (MM)	Y (MM)
19	17	-14.9992	9.9991
	18	-12.4982	9.9990
	19	-9.9967	9.9986
	20	-7.4963	9.9967
	21	-4.9987	9.9955
	22	-2.4980	9.9956
	23	0.0008	9.9968
	24	2.4969	9.9961
	25	4.9979	9.9957
	26	7.4981	9.9964
	27	10.0000	9.9977
28	12.4934	9.9979	
29	14.9992	9.9981	

RCW	COL	X (MM)	Y (MM)
20	17	-14.9997	7.5000
	18	-12.4987	7.4999
	19	-9.9958	7.4986
	20	-7.4940	7.4965
	21	-4.9970	7.4957
	22	-2.4971	7.4953
	23	0.0006	7.4965
	24	2.4970	7.4966
	25	4.9982	7.4965
	26	7.4969	7.4962
	27	9.9994	7.4976
28	12.4936	7.4987	
29	14.9992	7.4988	

RCW	COL	X (MM)	Y (MM)
21	17	-15.0003	5.0002
	18	-12.4985	4.9997
	19	-9.9950	4.9985
	20	-7.4938	4.9976
	21	-4.9945	4.9965
	22	-2.4961	4.9955
	23	0.0004	4.9965
	24	2.4974	4.9975
	25	4.9993	4.9969
	26	7.4975	4.9969
	27	9.9984	4.9974
28	12.4933	4.9985	
29	14.9993	4.9989	

ROW	COL	X (MM)	Y (MM)
22	17	-15.0009	2.4991
	18	-12.4985	2.4987
	19	-9.9946	2.4980
	20	-7.4945	2.4979
	21	-4.9964	2.4975
	22	-2.4946	2.4962
	23	0.0002	2.4956
	24	2.4990	2.4982
	25	4.9994	2.4975
	26	7.4977	2.4971
	27	9.9976	2.4972
	28	12.4929	2.4979
29	14.9994	2.4983	

ROW	COL	X (MM)	Y (MM)
23	17	-15.0013	0.0015
	18	-12.4988	0.0014
	19	-9.9947	0.0014
	20	-7.4959	0.0013
	21	-4.9982	0.0012
	22	-2.4964	0.0011
	23	-0.0000	0.0000
	24	2.5006	0.0009
	25	4.9998	0.0008
	26	7.4976	0.0008
	27	9.9969	0.0007
	28	12.4928	0.0006
29	14.9994	0.0005	

ROW	COL	X (MM)	Y (MM)
24	17	-15.0015	-2.4998
	18	-12.4994	-2.4996
	19	-9.9958	-2.4992
	20	-7.4957	-2.4994
	21	-4.9976	-2.4992
	22	-2.4956	-2.4982
	23	-0.0002	-2.4979
	24	2.4979	-2.4992
	25	4.9990	-2.4995
	26	7.4976	-2.4994
	27	9.9974	-2.4996
	28	12.4933	-2.5004
29	14.9992	-2.5010	

~~HANDLE VIA [REDACTED]~~
~~CONTROL SYSTEM [REDACTED]~~

ROW	COL	X (MM)	Y (MM)
25	17	-15.0017	-5.0008
	18	-12.5004	-5.0006
	19	-9.9974	-4.9999
	20	-7.4965	-4.9996
	21	-4.9974	-4.9990
	22	-2.4976	-4.9982
	23	-0.0004	-4.9985
	24	2.4967	-5.0000
	25	4.9998	-4.9996
	26	7.4976	-4.9996
	27	9.9985	-5.0003
	28	12.4943	-5.0016
29	14.9991	-5.0023	

ROW	COL	X (MM)	Y (MM)
26	17	-15.0020	-7.4999
	18	-12.5016	-7.4997
	19	-9.9993	-7.4991
	20	-7.4985	-7.4981
	21	-5.0001	-7.4976
	22	-2.4989	-7.4968
	23	-0.0006	-7.4967
	24	2.4960	-7.4979
	25	4.9981	-7.4990
	26	7.4974	-7.4973
	27	10.0001	-7.4990
	28	12.4955	-7.5002
29	14.9992	-7.5006	

ROW	COL	X (MM)	Y (MM)
27	17	-15.0023	-9.9988
	18	-12.5021	-9.9987
	19	-10.0012	-9.9986
	20	-7.5003	-9.9978
	21	-5.0019	-9.9971
	22	-2.5002	-9.9967
	23	-0.0008	-9.9968
	24	2.4955	-9.9968
	25	4.9975	-9.9969
	26	7.4984	-9.9976
	27	10.0016	-9.9986
	28	12.4961	-9.9989
29	14.9993	-9.9992	