

~~TOP SECRET~~ [REDACTED]



NO. _____

27 May 1966

TO: Chief Satellite Operations Center
FROM: Resident Office
SUBJECT: ORBIT DISPERSION STUDY

Attached, per your request, are two Orbit Dispersion Studies recently completed at A/P. The first [REDACTED] is a historical record of dispersions on the past years Corona flights. A summary at the end of the report provides information on average dispersions, and also on the average latitude at which photographic operations were programmed. From the study it was observed that a lower average height of photography could have been obtained had perigee been rotated to approx. 35° N.

A second study was prepared which compares seven library case orbits to describe the difference in estimated injection dispersions for orbits with perigees rotated to 35° N. descending as compared to perigee at injection. All estimated dispersions in this study were based on Explicit Guidance Equations. If you desire any further analysis please advise us.

Enclosure

cc: [REDACTED]

Declassified and Released by the NRO
In Accordance with E. O. 12958
on NOV 26 1997

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NO. _____

IF ENCLOSURES ARE WITHDRAWN OR NOT ATTACHED THE CLASSIFICATION OF THIS DOCUMENT IS UNCLASSIFIED

J-04 Launched 1:44:57 PM PST 29 April 1965

Orbit Parameters - Rev. 0

	<u>Inclination</u>	<u>Period</u>	<u>Eccentricity</u>	<u>Perigee Height</u>	<u>Perigee Latitude</u>	<u>Apogee Height</u>
Predicted	85.001	91.06	.02145	99.98	21.72	255.05
Actual	85.033	91.12	.02219	99.08	27.14	259.73
Delta	+ .032	+ .06	+ .0074	- .90	+5.42	+ 3.68

<u>Mission</u>	<u>Duration</u>	<u>Avg. Frame/Operation</u>		<u>Average Latitude</u>		<u>Average Height</u>	
		<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>
1019-A	5 Days	36	37	44.4	45.1	111.9	111.5
1019-B	4 Days	46	46	41.4	42.5	110.0	109.9

J-21 Launched 10:02:39 AM PST 18 May 1965

Orbit Parameters - Rev. 0

	<u>Inclination</u>	<u>Period</u>	<u>Eccentricity</u>	<u>Perigee Height</u>	<u>Perigee Latitude</u>	<u>Apogee Height</u>
Predicted	75.00	89.87	.01016	109.99	22.3	182.51
Actual	75.04	89.85	.00993	108.60	18.1	180.40
Delta	+ .04	- .02	- .00023	-1.39	- 4.2	- 2.11

<u>Mission</u>	<u>Duration</u>	<u>Avg. Frame/Operation</u>		<u>Average Latitude</u>		<u>Average Height</u>	
		<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>
1021-A	5 Days	38	39	21.0	22.0	116.7	116.7
1021-B	5 Days	41	45	26.1	26.6	114.8	115.1

J-20 Launched 1:58:16 PM PST 9 June 1965

Orbit Parameters - Rev. 0

	<u>Inclination</u>	<u>Period</u>	<u>Eccentricity</u>	<u>Perigee Height</u>	<u>Perigee Latitude</u>	<u>Apogee Height</u>
Predicted	75.00	90.012	.01398	99.998	22.24	200.11
Actual	75.07	89.876	.01437	95.996	32.61	199.09
Delta	+ .07	- .136	+ .00039	-4.002	+10.37	- 1.02

<u>Mission</u>	<u>Duration</u>	<u>Avg. Frame/Operation</u>		<u>Average Latitude</u>		<u>Average Height</u>	
		<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>
1020-A	6 Days	42	42	40.1	41.0	102.3	102.3
1020-B	1 Day	53	53	59.0	59.7	100.9	100.9

J-22 Launched 2:01 PM PST 19 July 1965

Orbit Parameters - Rev. 0

	<u>Inclination</u>	<u>Period</u>	<u>Eccentricity</u>	<u>Perigee Height</u>	<u>Perigee Latitude</u>	<u>Apogee Height</u>
Predicted	85.00	91.06	.02140	99.98	21.72	255.24
Actual	85.05	91.05	.02144	99.12	22.52	255.24
Delta	+ .05	- .01	+ .00004	- .86	+ .80	0

<u>Mission</u>	<u>Duration</u>	<u>Avg. Frame/Operation</u>		<u>Average Latitude</u>		<u>Average Height</u>	
		<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>
1022-A	4 Days	45	44	45.1	46.1	111.8	111.8
1022-B	5 Days	54	54	48.6	49.6	105.7	105.7

J-23 Launched 1:00 PM PST 17 August 1965

	<u>Inclination</u>	<u>Period</u>	<u>Eccentricity</u>	<u>Perigee Height</u>	<u>Perigee Latitude</u>	<u>Apogee Height</u>
Predicted	70.004	90.50	.017599	100.00	22.39	226.66
Actual	70.039	90.47	.017823	97.98	24.09	226.45
Delta	+ .035	- .03	+ .000224	-2.02	+1.70	-.19

<u>Mission</u>	<u>Duration</u>	<u>Avg. Frame/Operation</u>		<u>Average Latitude</u>		<u>Average Height</u>	
		<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>
1023-A	5 Days	54	54	41.9	42.7	107.3	107.3
1023-B	4 Days	62	68	41.7	42.9	105.8	104.2

J-24 Launched 1:31:14 PM PST 22 September 1965

Orbit Parameters - Rev. 0

	<u>Inclination</u>	<u>Period</u>	<u>Eccentricity</u>	<u>Perigee Height</u>	<u>Perigee Latitude</u>	<u>Apogee Height</u>
Predicted	80.00	90.87	.02010	100.01	21.87	245.47
Actual	80.06	90.16	.01560	95.01	8.25	207.89
Delta	+ .06	- .71	- .00450	-5.00	-13.62	-37.58

<u>Mission</u>	<u>Duration</u>	<u>Avg. Frame/Operation</u>		<u>Average Latitude</u>		<u>Average Height</u>	
		<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>
1024-A	5 Days	57	57	46.3	47.2	111.0	110.9
1024-B	5 Days	56	56	43.3	44.2	102.4	102.4

JX-28 Launched 9:45:58 PST 5 October 1965

	<u>Inclination</u>	<u>Period</u>	<u>Eccentricity</u>	<u>Perigee Height</u>	<u>Perigee Latitude</u>	<u>Apogee Height</u>
Predicted	75.01	89.87	.01050	109.4	26.0	184.2
Actual	75.04	89.80	.00971	112.2	39.4	180.6
Delta	+ .03	- .07	- .00079	+2.8	+13.4	-3.6

<u>Mission</u>	<u>Duration</u>	<u>Avg. Frame/Operation</u>		<u>Average Latitude</u>		<u>Average Height</u>	
		<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>
1025-A	5 Days	36	36	30.1	31.1	116.2	116.2
1025-B	5 Days	41	41	22.5	23.4	119.5	119.5

J-25 Launched 1:17:12 PST 28 October 1965

Orbit Parameters - Rev. 0

	<u>Inclination</u>	<u>Period</u>	<u>Eccentricity</u>	<u>Perigee Height</u>	<u>Perigee Latitude</u>	<u>Apogee Height</u>
Predicted	75.00	90.72	.01920	99.8	23.0	238.1
Actual	74.98	90.77	.02041	99.8	10.1	240.6
Delta	-.02	+.05	+.00121	0	-12.9	+2.5

<u>Mission</u>	<u>Duration</u>	<u>Avg. Frame/Operation</u>		<u>Average Latitude</u>		<u>Average Height</u>	
		<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>
1026-A	5 Days	47	46	43.9	44.7	115.1	115.2
1026-B	5 Days	57	57	47.7	48.6	104.4	104.4

JX-27 Launched 01:10:20 PM PST 9 December 1965

	<u>Inclination</u>	<u>Period</u>	<u>Eccentricity</u>	<u>Perigee Height</u>	<u>Perigee Latitude</u>	<u>Apogee Height</u>
Predicted	80.0	90.86	.0201	99.7	22.0	244.7
Actual	80.0	90.82	.0200	99.0	14.7	243.0
Delta	0	-.04	-.0001	-.7	-7.3	-1.7

<u>Mission</u>	<u>Duration</u>	<u>Avg. Frame/Operation</u>		<u>Average Latitude</u>		<u>Average Height</u>	
		<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>
1027-A	1 Day	84	83	26.5	27.5	110.6	110.7
1027-B	0	-	-	-	-	-	-

J-26 Launched 01:06:15 PM PST 24 December 1965

	<u>Inclination</u>	<u>Period</u>	<u>Eccentricity</u>	<u>Perigee Height</u>	<u>Perigee Latitude</u>	<u>Apogee Height</u>
Predicted	79.99	90.856	.02008	99.99	19.11	244.71
Actual	80.01	90.840	.02033	97.44	19.06	244.35
Delta	+.02	-.016	+.00025	-2.55	-.05	-.36

<u>Mission</u>	<u>Duration</u>	<u>Avg. Frame/Operation</u>		<u>Average Latitude</u>		<u>Average Height</u>	
		<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>
1028-A	5 Days	51	52	41.0	41.9	109.3	109.3
1028-B	4 Days	55	55	40.2	41.1	103.1	103.1

J-27 Launched 01:32:14 PM PST 2 February 1966

	<u>Inclination</u>	<u>Period</u>	<u>Eccentricity</u>	<u>Perigee Height</u>	<u>Perigee Latitude</u>	<u>Apogee Height</u>
Predicted	75.00	90.68	.0188	99.49	20.00	236.00
Actual	75.05	90.66	.0188	99.60	22.52	235.12
Delta	+.05	-.02	0	+.11	+2.52	-.88

<u>Mission</u>	<u>Duration</u>	<u>Avg. Frame/Operation</u>		<u>Average Latitude</u>		<u>Average Height</u>	
		<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>
1029-A	5 Days	46	45	42.0	43.2	109.1	109.2
1029-B	5 Days	57	55	47.4	48.3	106.7	106.7

J-29 Launched 02:02 PM PST 9 March 1966

	<u>Inclination</u>	<u>Period</u>	<u>Eccentricity</u>	<u>Perigee Height</u>	<u>Perigee Latitude</u>	<u>Apogee Height</u>
Predicted	75.00	90.68	.01880	99.60	20.0	235.5
Actual	75.04	90.70	.01955	97.50	17.8	236.9
Delta	+ .04	+ .02	+ .00075	-2.10	-2.2	+1.4

<u>Mission</u>	<u>Duration</u>	<u>Avg. Frame/Operation</u>		<u>Average Latitude</u>		<u>Average Height</u>	
		<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>
1030-A	5 Days	49	50	49.5	50.7	115.8	116.1
1030-B	5 Days	50	52	47.7	48.1	107.6	107.4

SUMMARY:

ORBIT PARAMETERS - REV. 0

	<u>Inclination</u>	<u>Period</u>	<u>Eccentricity</u>	<u>Perigee Height</u>	<u>Perigee Latitude</u>	<u>Apogee Height</u>
Avg. of Deltas	+ .033	-.0655	+ .0006	-1.43	-.335	-3.00
Avg. of Abs. Deltas	.0345	.0934	.0014	1.89	5.86	4.17

<u>Mission</u>	<u>Duration</u>	<u>Avg. Frame/Operation</u>		<u>Average Latitude</u>		<u>Average Height</u>	
		<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>	<u>Master</u>	<u>Slave</u>
-A	4.7	46.2	46.3	39.4	41.1	111.3	111.3
-B	4.0	51.8	52.9	41.9	41.9	108.0	107.7

316

310

302

313

315

318

401

ORBIT PERIOD

90.87

91.06

89.77

89.87

90.01

90.50

90.72

INCLINATION

80

85

70

75

75

70

75

PERIGEE HEIGHT

100

100

100

100

100

100

100

DISPERSIONS:

Incl. 35°

Incl. 35°

Incl. 35°

Incl. 35°

Incl. 35°

Incl. 35°

Incl. 35°

PERIOD

+0.25
-0.20

+0.25
-0.20

+0.25
-0.20

+0.30
-0.45

+0.25
-0.20

+0.25
-0.20

+0.25
-0.20

INCLINATION

+0.16
-0.10

+0.16
-0.10

+0.16
-0.10

+0.12
-0.08

+0.16
-0.10

+0.16
-0.10

+0.16
-0.10

PERIGEE HEIGHT

+3.5
-6.5

+3.5
-6.5

+3.5
-9.0

+3.5
-6.0

+3.5
-8.5

+3.5
-7.5

+3.5
-7.0

PERIGEE LATITUDE

+21.0
-8.5

+20.0
-8.0

+32.0
-14.0

+26.0
-20.0

+28.0
-12.0

+23.0
-10.0

+22.0
-9.0