~~TOP SECRET~~ SPECIAL HANDLING

AP-66-05046

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 A/P 66-05046 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: SP-7 - Col. Murphy w/att
OSP - Mr. Crowley w/att

~~TOP SECRET~~ SPECIAL HANDLING

AP-66-05046

NO. _____

IF ENCLOSURES ARE WITHDRAWN OR NOT ATTACHED THE CLASSIFICATION OF THIS DOCUMENT IS UNCLASSIFIED

ORBIT DISPERSION STUDY

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

Orbit Parameters - Rev. 0

	Inclination	Period	Eccentricity	Perigee Height	Perigee Latitude	Apogee Height
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

Mission	Duration	Avg. Frame/Operation Master	Avg. Frame/Operation Slave	Average Latitude Master	Average Latitude Slave	Average Height Master	Average Height Slave
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

	Inclination	Period	Eccentricity	Perigee Height	Perigee Latitude	Apogee Height
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

Mission	Duration	Avg. Frame/Operation Master	Avg. Frame/Operation Slave	Average Latitude Master	Average Latitude Slave	Average Height Master	Average Height Slave
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

	Inclination	Period	Eccentricity	Perigee Height	Perigee Latitude	Apogee Height
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

Mission	Duration	Avg. Frame/Operation Master	Avg. Frame/Operation Slave	Average Latitude Master	Average Latitude Slave	Average Height Master	Average Height Slave
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

	Inclination	Period	Eccentricity	Perigee Height	Perigee Latitude	Apogee Height
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

Mission	Duration	Avg. Frame/Operation Master	Avg. Frame/Operation Slave	Average Latitude Master	Average Latitude Slave	Average Height Master	Average Height Slave
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

	Inclination	Period	Eccentricity	Perigee Height	Perigee Latitude	Apogee Height
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

Mission	Duration	Avg. Frame/Operation Master	Avg. Frame/Operation Slave	Average Latitude Master	Average Latitude Slave	Average Height Master	Average Height Slave
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

	Inclination	Period	Eccentricity	Perigee Height	Perigee Latitude	Apogee Height
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

Mission	Duration	Avg. Frame/Operation Master	Avg. Frame/Operation Slave	Average Latitude Master	Average Latitude Slave	Average Height Master	Average Height Slave
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

	Inclination	Period	Eccentricity	Perigee Height	Perigee Latitude	Apogee Height
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

Mission	Duration	Avg. Frame/Operation Master	Avg. Frame/Operation Slave	Average Latitude Master	Average Latitude Slave	Average Height Master	Average Height Slave
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

	Inclination	Period	Eccentricity	Perigee Height	Perigee Latitude	Apogee Height
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

Mission	Duration	Avg. Frame/Operation Master	Avg. Frame/Operation Slave	Average Latitude Master	Average Latitude Slave	Average Height Master	Average Height Slave
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

	Inclination	Period	Eccentricity	Perigee Height	Perigee Latitude	Apogee Height
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

Mission	Duration	Avg. Frame/Operation Master	Avg. Frame/Operation Slave	Average Latitude Master	Average Latitude Slave	Average Height Master	Average Height Slave
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

	Inclination	Period	Eccentricity	Perigee Height	Perigee Latitude	Apogee Height
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

Mission	Duration	Avg. Frame/Operation Master	Avg. Frame/Operation Slave	Average Latitude Master	Average Latitude Slave	Average Height Master	Average Height Slave
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

	Inclination	Period	Eccentricity	Perigee Height	Perigee Latitude	Apogee Height
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

Mission	Duration	Avg. Frame/Operation Master	Avg. Frame/Operation Slave	Average Latitude Master	Average Latitude Slave	Average Height Master	Average Height Slave
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

	Inclination	Period	Eccentricity	Perigee Height	Perigee Latitude	Apogee Height
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

Mission	Duration	Avg. Frame/Operation Master	Avg. Frame/Operation Slave	Average Latitude Master	Average Latitude Slave	Average Height Master	Average Height Slave
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

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

Mission	Duration	Avg. Frame/Operation Master	Avg. Frame/Operation Slave	Average Latitude Master	Average Latitude Slave	Average Height Master	Average Height Slave
-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		309		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:	Inj.	35°	Inj.	35°	Inj.	35°	Inj.	35°	Inj.	35°	Inj.	35°	Inj.	35°
PERIOD	+.25 -.20	+.25 -.20	+.25 -.20	+.25 -.20	+.25 -.20	+.25 -.20	+.30 -.45	+.30 -.45	+.25 -.20	+.25 -.20	+.25 -.20	+.25 -.20	+.25 -.20	+.25 -.20
INCLINATION	+.16 -.10	+.16 -.10	+.16 -.10	+.16 -.10	+.16 -.10	+.16 -.10	+.12 -.08	+.12 -.08	+.16 -.10	+.16 -.10	+.16 -.10	+.16 -.10	+.16 -.10	+.16 -.10
PERIGEE HEIGHT	+3.5 -6.5	+3.5 -3.0	+3.5 -6.5	+3.5 -3.0	+3.5 -9.0	+3.5 -5.5	+3.5 -6.0	+3.5 -4.0	+3.5 -8.5	+3.5 -4.5	+3.5 -7.5	+3.5 -3.0	+3.5 -7.0	+3.5 -2.5
PERIGEE LATITUDE	+21.0 -8.5	+21.0 -8.0	+20.0 -8.0	+20.0 -7.5	+32.0 -14.0	+33.0 -12.0	+26.0 -20.0	+27.5 -19.0	+28.0 -12.0	+30.0 -11.0	+23.0 -10.0	+24.0 -9.0	+22.0 -9.0	+22.0 -8.5