

XU7CJA と F0-29 で交信するための戦略メモ

Edited by JK2XXX

Ver. 1.0 2008-Sep-05 初版
 Ver. 2.0 2008-Sep-06 JAとのウィンドウが開く時間帯の詳細を追記
 Ver. 2.1 2008-Oct-25 最新の軌道要素に基づき全体的に修正

===== XU7CJA と JK2XXX/2 との通過時刻の比較 =====

Satellite #24278 : F0-29 [P] (JAS-2)
 Data File : tlex.dat
 Element Set Number: 854 (Orbit 59502)
 Element Set Epoch : 03Sep08 19:22:48.030 UTC (1.7 days ago)
 Orbit Geometry : 797.57 km x 1319.84 km at 98.579 deg
 Propagation Model : SGP4

XU7CJA (10.3639N 103.415E --- OK10QI)											JK2XXX/2 (35.50222N 137.48166E --- PM85RM)										
Date (JST)	Time (JST) of			Duration of Pass	Azimuth at			Peak Elev	Vis	Orbit	Date (JST)	Time (JST) of			Duration of Pass	Azimuth at			Peak Elev	Vis	Orbit
	AOS	MEL	LOS		AOS	MEL	LOS					AOS	MEL	LOS							
Fri 07Nov08	00:47:28	00:55:38	01:03:09	00:15:41	15	101	188	72.0*	NNN	60366	00:39:10	00:45:55	00:52:13	00:13:03	352	302	250	13.0	NNN	60366	
	10:43:56	10:49:19	10:54:43	00:10:47	101	69	37	4.9	DDD	60372	10:43:39	10:53:56	11:04:13	00:20:35	181	260	342	51.7*	DDD	60372	
	12:23:08	12:33:17	12:43:47	00:20:39	159	75	354	64.9*	DDD	60373	12:34:25	12:40:14	12:46:07	00:11:42	241	276	311	5.5	DDD	60373	
	23:53:53	00:00:38	00:07:01	00:13:08	40	99	158	16.7	NNN	60379	23:43:28	23:51:50	23:59:26	00:15:58	4	293	219	36.4	NNN	60379	
Sat 08Nov08	11:29:54	11:38:51	11:47:56	00:18:01	134	73	12	22.5	DDD	60386	11:35:22	11:44:31	11:53:40	00:18:18	206	267	331	22.0	DDD	60386	
Sun 09Nov08	00:42:51	00:50:52	00:58:23	00:15:32	17	101	186	64.7*	NNN	60393	00:34:33	00:41:17	00:47:36	00:13:03	353	302	248	13.7	NNN	60393	
	10:39:52	10:44:46	10:49:40	00:09:48	98	69	40	4.0	DDD	60399	10:38:57	10:49:23	10:59:32	00:20:35	179	260	342	54.8*	DDD	60399	
	12:18:30	12:28:43	12:39:05	00:20:35	158	75	355	60.6*	DDD	60400	12:29:22	12:35:32	12:41:42	00:12:21	238	275	313	6.3	DDD	60400	
	23:49:24	23:55:52	00:02:02	00:12:38	43	99	155	14.7	NNN	60406	23:38:50	23:47:08	23:54:39	00:15:49	4	292	217	38.6	NNN	60406	
Mon 10Nov08	11:25:25	11:34:17	11:43:14	00:17:49	132	73	14	20.9	DDD	60413	11:30:36	11:39:54	11:49:07	00:18:31	204	267	331	23.4	DDD	60413	

===== XU7CJA における F0-29 の通過予報詳細 =====

【11月7日】

JST	Azimuth [deg]	Elev [deg]	Range [km]	Sun Ang [deg]	Doppler [kHz]	Loss [dB]	Phs	Md	V
00:47:37	15.5	0.8	3526.8	79.4	+9.65	156.2	212	J	N
00:48:27	16.2	3.7	3194.8	76.4	+9.65	155.3	214	J	N
00:49:17	16.9	7.0	2863.4	73.0	+9.62	154.4	216	J	N
00:50:07	17.8	10.8	2533.8	69.1	+9.54	153.3	218	J	N
00:50:57	19.1	15.3	2208.4	64.5	+9.37	152.1	220	J	N
00:51:47	20.7	20.9	1890.6	58.8	+9.08	150.8	222	J	N
00:52:37	23.2	28.0	1586.5	51.4	+8.55	149.2	224	J	N

AZ 15.5 => 23.2
EL 0.8 => 28.0

EL ≥ 5.0 の AZ 約 16.5 => 23.2

ウィンドウ後半はJA側がLOSとなる点に留意
∴ AZ: 20.0 (±5.0) / EL: 10.0 / Duration 約3分30秒 / Doppler +9.65 => +8.90

JST	Azimuth [deg]	Elev [deg]	Range [km]	Sun Ang [deg]	Doppler [kHz]	Loss [dB]	Phs	Md	V
10:44:19	99.0	0.9	4214.5	139.0	+3.75	157.7	111	J	D
10:45:09	94.5	2.0	4094.5	137.7	+3.22	157.5	113	J	D
10:45:59	89.7	3.0	3993.4	135.8	+2.64	157.3	115	J	D
10:46:49	84.7	3.8	3913.2	133.3	+2.02	157.1	117	J	D
10:47:39	79.5	4.4	3855.3	130.2	+1.35	157.0	119	J	D
10:48:29	74.1	4.8	3821.0	126.6	+0.65	156.9	121	J	D
10:49:19	68.7	4.9	3811.0	122.7	-0.07	156.9	123	J	D
10:50:09	63.3	4.8	3825.7	118.4	-0.78	156.9	125	J	D
10:50:59	58.0	4.4	3864.8	114.0	-1.49	157.0	127	J	D
10:51:49	52.9	3.8	3927.6	109.5	-2.16	157.1	129	J	D
10:52:39	47.9	3.0	4012.9	105.0	-2.79	157.3	131	J	D
10:53:29	43.2	1.9	4119.2	100.6	-3.38	157.5	133	J	D
10:54:19	38.7	0.8	4244.8	96.3	-3.91	157.8	135	J	D

AZ 99.0 => 38.7
EL 0.9 => 4.9 => 0.8

MELが4.9なので、MEL付近 (EL ≥ 3.0) だけ交信可能と仮定すると
AZ 89.7 => 47.9

∴ AZ: 70.0 (±20.0) / EL: 0.0 / Duration 約6分30秒 / Doppler +2.66 => -2.70

JST	Azimuth [deg]	Elev [deg]	Range [km]	Sun Ang [deg]	Doppler [kHz]	Loss [dB]	Phs	Md	V
12:33:27	67.8	64.6	1429.6	144.5	-0.60	148.3	118	J	D
12:34:17	39.7	59.6	1486.2	131.0	-2.65	148.7	120	J	D
12:35:07	23.0	51.3	1607.9	118.7	-4.36	149.4	122	J	D
12:35:57	13.5	42.8	1781.1	108.2	-5.65	150.2	124	J	D
12:36:47	7.7	35.2	1992.1	99.4	-6.57	151.2	126	J	D
12:37:37	3.9	28.7	2229.7	92.2	-7.21	152.2	128	J	D
12:38:27	1.2	23.1	2486.0	86.1	-7.66	153.1	130	J	D
12:39:17	359.2	18.2	2755.2	80.9	-7.97	154.0	132	J	D
12:40:07	357.6	14.0	3033.3	76.5	-8.19	154.9	134	J	D
12:40:57	356.4	10.3	3317.7	72.5	-8.34	155.7	136	J	D
12:41:47	355.5	6.9	3606.2	69.0	-8.44	156.4	138	J	D
12:42:37	354.7	3.9	3897.5	65.8	-8.50	157.1	140	J	D
12:43:27	354.0	1.1	4190.3	62.9	-8.53	157.7	142	J	D

JA側のAOS待ちとなるパスなので
AZ 39.7 => 354.0
EL 59.6 => 1.1

EL ≥ 5.0 の AZ 39.7 => 355.0

JA側が低仰角なので、実際に使えるのは12:40:00 ± 3分ぐらいか
AZ 7.7 => 355.0
EL 35.2 => 5.0

∴ AZ: 0.0 (±5.0) / EL: 10.0 / Duration 約5分30秒 / Doppler -6.30 => -8.46

JST	Azimuth [deg]	Elev [deg]	Range [km]	Sun Ang [deg]	Doppler [kHz]	Loss [dB]	Phs	Md	V
23:53:53	40.1	0.4	3506.2	66.3	+8.08	156.1	219	J	N
23:54:43	43.9	2.7	3233.1	63.1	+7.78	155.4	221	J	N
23:55:33	48.3	5.1	2972.2	59.8	+7.36	154.7	223	J	N
23:56:23	53.6	7.6	2728.3	56.3	+6.79	154.0	225	J	N
23:57:13	60.0	10.1	2507.2	52.9	+6.03	153.2	227	J	N
23:58:03	67.6	12.5	2316.4	49.8	+5.02	152.5	229	J	N
23:58:53	76.5	14.6	2164.9	47.7	+3.74	151.9	231	J	N
23:59:43	86.8	16.1	2062.1	47.3	+2.20	151.5	233	J	N

AZ 40.1 => 86.8

EL 0.4 => 16.1

EL ≥ 5.0 の AZ 48.0 => 86.8

ウィンドウ後半はJA側がLOSとなる点に留意

∴ AZ: 65.0 (±20.0) / EL: 10.0 / Duration 約3分30秒 / Doppler +7.42 => +3.50

【11月8日】

JST	Azimuth [deg]	Elev [deg]	Range [km]	Sun Ang [deg]	Doppler [kHz]	Loss [dB]	Phs	Md	V
11:35:00	108.7	15.6	2907.2	144.4	+4.61	154.5	113	J	D
11:35:50	102.2	17.9	2762.0	143.5	+3.81	154.1	115	J	D
11:36:40	94.9	19.9	2646.9	141.1	+2.87	153.7	117	J	D
11:37:30	86.8	21.5	2566.1	137.3	+1.81	153.4	119	J	D
11:38:20	78.2	22.3	2523.2	132.2	+0.67	153.3	121	J	D
11:39:10	69.4	22.4	2520.3	126.3	-0.50	153.3	123	J	D
11:40:00	60.8	21.7	2557.6	119.9	-1.66	153.4	125	J	D
11:40:50	52.6	20.4	2633.4	113.4	-2.73	153.6	127	J	D
11:41:40	45.1	18.5	2744.3	107.0	-3.70	154.0	129	J	D
11:42:30	38.5	16.2	2886.2	101.0	-4.53	154.4	131	J	D
11:43:20	32.7	13.8	3054.5	95.3	-5.23	154.9	133	J	D
11:44:10	27.7	11.2	3244.8	90.1	-5.81	155.5	135	J	D
11:45:00	23.4	8.7	3453.2	85.3	-6.29	156.0	137	J	D
11:45:50	19.6	6.1	3676.3	81.0	-6.67	156.5	139	J	D
11:46:40	16.3	3.7	3911.0	76.9	-6.97	157.1	141	J	D
11:47:30	13.5	1.4	4155.1	73.2	-7.21	157.6	143	J	D

JA側のAOS待ちとなるパスなので

AZ 108.7 => 13.5

EL 15.6 => 22.4 => 1.4

EL ≥ 5.0 の AZ 108.7 => 18.0

∴ AZ: 65.0 (±45.0) / EL: 10.0 / Duration 約11分00秒 / Doppler +4.61 => -6.75

AZ/ELともに固定で臨むのなら

∴ AZ: 40.0 (±20.0) / EL: 10.0 / Duration 約6分00秒 / Doppler -1.63 => -6.75

【11月9日】

JST	Azimuth [deg]	Elev [deg]	Range [km]	Sun Ang [deg]	Doppler [kHz]	Loss [dB]	Phs	Md	V
00:43:02	17.2	1.0	3467.5	77.9	+9.66	156.0	216	J	N
00:43:52	18.1	3.9	3135.4	74.9	+9.65	155.2	218	J	N
00:44:42	19.2	7.2	2804.2	71.4	+9.60	154.2	220	J	N
00:45:32	20.5	11.0	2475.5	67.4	+9.50	153.1	222	J	N
00:46:22	22.3	15.6	2151.9	62.6	+9.30	151.9	224	J	N
00:47:12	24.8	21.3	1837.5	56.6	+8.95	150.5	226	J	N
00:48:02	28.5	28.6	1539.3	48.8	+8.33	149.0	228	J	N

AZ 17.2 => 28.5

EL 1.0 => 28.6

EL ≥ 5.0 の AZ 18.5 => 28.5

ウィンドウ後半はJA側がLOSとなる点に留意

∴ AZ: 20.0 (±5.0) / EL: 10.0 / Duration 約2分30秒 / Doppler +9.62 => +9.02

JST	Azimuth [deg]	Elev [deg]	Range [km]	Sun Ang [deg]	Doppler [kHz]	Loss [dB]	Phs	Md	V
10:40:09	96.2	0.7	4250.6	138.5	+3.45	157.8	116	J	D
10:40:59	91.7	1.7	4140.9	136.9	+2.92	157.6	118	J	D
10:41:49	86.9	2.6	4050.4	134.6	+2.34	157.4	120	J	D
10:42:39	81.9	3.3	3980.7	131.7	+1.71	157.2	122	J	D
10:43:29	76.8	3.8	3933.2	128.4	+1.05	157.1	124	J	D
10:44:19	71.5	4.0	3908.9	124.6	+0.36	157.1	126	J	D
10:45:09	66.3	4.0	3908.3	120.6	-0.33	157.1	128	J	D
10:45:59	61.0	3.8	3931.6	116.3	-1.02	157.1	130	J	D
10:46:49	55.9	3.3	3978.3	111.9	-1.69	157.2	132	J	D
10:47:39	50.9	2.6	4047.7	107.4	-2.34	157.4	135	J	D
10:48:29	46.1	1.7	4138.6	103.0	-2.94	157.6	137	J	D
10:49:19	41.6	0.7	4249.4	98.7	-3.50	157.8	139	J	D

AZ 96.2 => 41.6
 EL 0.7 => 4.0 => 0.7

MELが4.0なので、MEL付近 (EL≧3.0) だけ交信可能と仮定すると
 AZ 84.0 => 53.0

∴ AZ: 70.0 (±15.0) / EL: 0.0 / Duration 約3分30秒 / Doppler +1.80 => -1.90

JST	Azimuth [deg]	Elev [deg]	Range [km]	Sun Ang [deg]	Doppler [kHz]	Loss [dB]	Phs	Md	V
12:28:02	97.3	58.7	1497.4	155.6	+1.58	148.7	120	J	D
12:28:52	69.9	60.5	1478.2	143.2	-0.48	148.6	122	J	D
12:29:42	44.9	56.5	1529.4	130.3	-2.47	148.9	124	J	D
12:30:32	28.3	49.4	1644.4	118.4	-4.16	149.6	126	J	D
12:31:22	18.0	41.6	1810.9	108.0	-5.46	150.4	128	J	D
12:32:12	11.4	34.5	2015.9	99.3	-6.41	151.3	130	J	D
12:33:02	7.0	28.2	2248.4	92.1	-7.08	152.3	132	J	D
12:33:52	3.8	22.7	2500.4	85.9	-7.55	153.2	134	J	D
12:34:42	1.4	18.0	2766.1	80.7	-7.88	154.1	136	J	D
12:35:32	359.6	13.8	3041.5	76.2	-8.12	154.9	138	J	D
12:36:22	358.1	10.1	3323.6	72.2	-8.28	155.7	140	J	D
12:37:12	357.0	6.7	3610.3	68.6	-8.39	156.4	142	J	D
12:38:02	356.0	3.7	3900.0	65.4	-8.46	157.1	144	J	D
12:38:52	355.2	0.9	4191.7	62.5	-8.50	157.7	146	J	D

JA側のAOS待ちとなるパスなので

AZ 44.9 => 355.2
 EL 56.5 => 0.9

EL≧5.0のAZ 44.9 => 356.5

JA側が低仰角なので、実際に使えるのは12:35:30±3分30秒ぐらいか

AZ 11.4 => 356.5
 EL 34.5 => 5.0

∴ AZ: 5.0 (±10.0) / EL: 10.0 / Duration 約6分00秒 / Doppler -5.65 => -8.42

JST	Azimuth [deg]	Elev [deg]	Range [km]	Sun Ang [deg]	Doppler [kHz]	Loss [dB]	Phs	Md	V
23:49:43	44.1	1.2	3362.5	63.3	+7.74	155.8	224	J	N
23:50:33	48.4	3.5	3103.0	60.0	+7.34	155.1	226	J	N
23:51:23	53.5	5.8	2859.6	56.7	+6.79	154.4	228	J	N
23:52:13	59.6	8.2	2637.7	53.5	+6.07	153.7	230	J	N
23:53:03	66.7	10.4	2444.4	50.7	+5.13	153.0	232	J	N
23:53:53	75.1	12.4	2287.5	48.6	+3.95	152.4	234	J	N
23:54:18	79.7	13.2	2225.4	48.1	+3.26	152.2	235	J	N
23:54:43	84.6	13.9	2175.7	48.0	+2.51	152.0	236	J	N

AZ 44.1 => 84.6
 EL 1.2 => 13.9

EL≧5.0のAZ 51.0 => 84.6

ウィンドウ後半はJA側がLOSとなる点に留意

∴ AZ: 65.0 (±15.0) / EL: 10.0 / Duration 約3分00秒 / Doppler +7.10 => +3.85

【11月10日】

JST	Azimuth [deg]	Elev [deg]	Range [km]	Sun Ang [deg]	Doppler [kHz]	Loss [dB]	Phs	Md	V	
11:29:35	113.1	12.2	3163.3	144.1	+5.18	155.2	115	J	D	JA側のAOS待ちとなるパスなので
11:30:25	107.6	14.5	2996.2	144.1	+4.52	154.8	117	J	D	AZ 107.6 => 14.5
11:31:15	101.2	16.7	2853.8	142.9	+3.74	154.3	119	J	D	EL 14.5 => 20.8 => 0.9
11:32:05	94.2	18.5	2740.3	140.4	+2.84	154.0	121	J	D	
11:32:55	86.5	19.9	2659.9	136.6	+1.82	153.7	123	J	D	EL ≥ 5.0 の AZ 107.6 => 19.0
11:33:45	78.2	20.7	2615.8	131.6	+0.73	153.6	125	J	D	
11:34:35	69.8	20.8	2610.0	125.9	-0.40	153.6	127	J	D	∴ AZ: 65.0 (±45.0) / EL: 10.0 / Duration 約11分00秒 / Doppler +4.52 => -6.42
11:35:25	61.5	20.2	2642.9	119.7	-1.51	153.7	129	J	D	
11:36:15	53.6	19.0	2713.1	113.3	-2.56	153.9	131	J	D	AZ/ELともに固定で臨むのなら
11:37:05	46.4	17.3	2817.7	107.1	-3.51	154.2	133	J	D	∴ AZ: 40.0 (±20.0) / EL: 10.0 / Duration 約6分00秒 / Doppler -0.93 => -6.42
11:37:55	39.9	15.2	2952.9	101.1	-4.34	154.6	135	J	D	
11:38:45	34.1	12.9	3114.5	95.5	-5.04	155.1	137	J	D	
11:39:35	29.1	10.4	3298.5	90.3	-5.63	155.6	139	J	D	
11:40:25	24.7	8.0	3500.9	85.5	-6.12	156.1	141	J	D	
11:41:15	20.8	5.6	3718.5	81.1	-6.52	156.6	143	J	D	
11:42:05	17.5	3.2	3948.3	77.1	-6.84	157.2	145	J	D	
11:42:55	14.5	0.9	4187.9	73.3	-7.09	157.7	147	J	D	

===== XU7CJA における XU~JA とのウィンドウに合わせた運用プラン =====

【11月7日】

00時台	AZ: 20.0 (± 5.0)	/ EL: 10.0	/ 00:48:30~00:52:00(JST)	/ Duration 約3分30秒	/ Doppler +9.65 => +8.90
10時台	AZ: 70.0 (±20.0)	/ EL: 0.0	/ 10:46:00~10:52:30(JST)	/ Duration 約6分30秒	/ Doppler +2.66 => -2.70
12時台	AZ: 0.0 (± 5.0)	/ EL: 10.0	/ 12:36:30~12:42:00(JST)	/ Duration 約5分30秒	/ Doppler -6.30 => -8.46
23時台	AZ: 65.0 (±20.0)	/ EL: 10.0	/ 23:55:30~23:59:00(JST)	/ Duration 約3分30秒	/ Doppler +7.42 => +3.50

【11月8日】

11時台	AZ: 40.0 (±20.0)	/ EL: 10.0	/ 11:40:00~11:46:00(JST)	/ Duration 約6分00秒	/ Doppler -1.63 => -6.75
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【11月9日】

00時台	AZ: 20.0 (± 5.0)	/ EL: 10.0	/ 00:44:30~00:47:00(JST)	/ Duration 約2分30秒	/ Doppler +9.62 => +9.02
10時台	AZ: 70.0 (±15.0)	/ EL: 0.0	/ 10:42:30~10:47:00(JST)	/ Duration 約4分30秒	/ Doppler +1.80 => -1.90
12時台	AZ: 5.0 (±10.0)	/ EL: 10.0	/ 12:31:30~12:37:30(JST)	/ Duration 約6分00秒	/ Doppler -5.65 => -8.42
23時台	AZ: 65.0 (±15.0)	/ EL: 10.0	/ 23:51:00~23:54:00(JST)	/ Duration 約3分00秒	/ Doppler +7.10 => +3.85

【11月10日】

11時台	AZ: 40.0 (±20.0)	/ EL: 10.0	/ 11:35:00~11:41:00(JST)	/ Duration 約6分00秒	/ Doppler -0.93 => -6.42
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Ant は Radix・AY-207SAT (144MHz:3el/430MHz:6el) の使用を前提
 AZ/EL とともに固定で運用すると仮定すると、交信範囲は半値角の関係からビーム方向±20度までが限度か？！