

### Electro-Optical KeyHole Satellite Lifetime

by Ted Molczan

Name	KH-11 Block	Launch Vehicle	COSPAR Desig	SSN Number	Original Plane	Milestones				Mission Duration		
						Launch Date	De-orbit Date	Replaced Date	By	Primary Years	Extended Years	Total Years
OPS 5705	1-1	Titan 3D	1976-125A	9627	West	19-Dec-76	28-Jan-79	14-Jun-78	OPS 4515	1.48	0.62	2.11
OPS 4515	1-2	Titan 3D	1978-060A	10947	West	14-Jun-78	23-Aug-81	03-Sep-81	OPS 3984	3.19	0.00	3.19
OPS 2581	1-3	Titan 3D	1980-010A	11687	East	07-Feb-80	30-Oct-82	17-Nov-82	OPS 9627	2.73	0.00	2.73
OPS 3984	1-4	Titan 3D	1981-085A	12799	West	03-Sep-81	23-Nov-84	04-Dec-84	USA 6	3.22	0.00	3.22
OPS 9627	1-5	Titan 3D	1982-111A	13659	East	17-Nov-82	13-Aug-85	26-Oct-87	USA 27	2.74	0.00	2.74
USA 6	2-1	Titan 34D	1984-122A	15423	West	04-Dec-84	10-Nov-94	06-Nov-88	USA 33	3.93	6.01	9.94
N/A	2-2	Titan 34D	Failed to Orbit		East	28-Aug-85	Did Not Orbit	26-Oct-87	USA 27	0.00	0.00	0.00
USA 27	2-3	Titan 34D	1987-090A	18441	East	26-Oct-87	11-Jun-92	28-Nov-92	USA 86	4.63	0.00	4.63
USA 33	2-4	Titan 34D	1988-099A	19625	West	06-Nov-88	12-May-96	20-Dec-96	USA 129	7.52	0.00	7.52
USA 86	3-1	Titan 404A	1992-083A	22251	East	28-Nov-92	05-Jun-00	05-Dec-95	USA 116	3.02	4.50	7.52
USA 116	3-2	Titan 404A	1995-066A	23728	East	05-Dec-95	19-Nov-08	05-Oct-01	USA 161	5.84	7.13	12.97
USA 129	3-3	Titan 404A	1996-072A	24680	West	20-Dec-96		19-Oct-05	USA 186	8.84	7.87	16.71
USA 161	4-1	Titan 404B	2001-044A	26934	East	05-Oct-01		20-Jan-11	USA 224	9.30	2.61	11.91
USA 186	3-4	Titan 404B	2005-042A	28888	West	19-Oct-05		28-Aug-13	USA 245	7.86	0.01	7.87
USA 224	4-2	Delta 4H	2011-002A	37348	East	20-Jan-11				2.61	0.00	2.61
USA 245	4-3	Delta 4H	2013-043A	39232	West	28-Aug-13				0.01	0.00	0.01

Satellite name and block designations are the speculation of the author.

Block 1 orbit ~15.6 rev/d, ~270 x 500 km.

Block 2 inaugurated ~14.8 rev/d, ~270 x 1000 km orbit, used also by Blocks 3 and 4.

Block 2 and 3 eastern plane perigee ~40 - 130 km higher than western plane perigee. Extend orbital life to compensate for 1985 launch failure?

Block 1 and 2 typically de-orbited prior to launch of their replacements. Block 3 typically had extended missions of at least several years.

Block 3 and 4 s/c were about 1 visual magnitude fainter than Block 2.

Block 3 launches employed a 62 ft. fairing, which included the Titan Payload Adaptor to accommodate shuttle-unique design elements (SPDS).

Block 4 launch on Titan 4B employed a standard 66 ft. fairing, without the Titan Payload Adaptor; SPDS elements apparently designed-out.

Block 4 may have taken advantage of the performance of the Titan 4B and Delta IV-H to increase their propellant load over Block 3.

Block 4 probably first KH that was part of the Enhanced Imagery System; optimized for use with SDS 3 relays first launched in 2000 and 2001.

Note: mission duration is automatically recalculated based on the current date when the spreadsheet is opened.