

Ancillary Data

This data set contains the Peter Thomas shape model for Saturn's satellite Hyperion (Saturn VII), based on optical data from the Cassini Imaging Science Subsystem (ISS) Narrow-Angle Camera (NAC) instrument. The current version of this data set contains the following shape model file:

Hyperion_30k_plt.tab

This shape model file also has a detached label file, with a suffix of .xml, which describes the format and content. The shape model is in a plate model format and only represents the model shape, with no gravity or slope information.

Coordinate System

There is no International Astronomical Union (IAU)-approved coordinate system for Hyperion because of its chaotic rotation. A longitude reference was chosen by Davies et al. (1983) before the chaotic rotation was confirmed. As the prior reference, this crater, Bahloo, is retained at longitude 196°W in this model (Archinal et al. 2018) even though the spin pole assumed for the 1983 work is more than 100 degrees different from spin vectors observed during Cassini's orbital tour. In chaotic rotation, the spin vector moves within the body as well as across the sky. The coordinate system here is based upon the spin observed during the closest Cassini flyby of Hyperion 26 September 2005. Spin vectors that were determined at several other flybys varied by up to 10s of degrees (Thomas et al., 2007). We have iteratively connected other flyby images' body-centered positions to the closest approach view by matching manually picked control points approximately and then solving for the best position adjustments among the views (Thomas et al., 2002). Images for which these adjustments have been made are listed below. Any other default information for Hyperion images will not be consistent with these body-centered positions in Table 1. Our solutions still have relative errors in body-centered positions among flybys in the control point solutions, thus there are errors in the model up to a few km in some regions.

For information on using SPICE kernels, please see pck_req.asc - "PCK Required Reading", PCK required reading document, last revised on 2009 Apr 15 by B.V. Semenov.

Confidence Level Notes

Images used and their associated viewing geometries are listed in Table 1 below. Areas captured in the best flyby, roughly 140° to 300° W near the equator, and from ~45°S to 70° N at longitudes near 200°W have relative uncertainties of less than a km. Uncertainties of points on the opposite side relative to this side are as much as 6 km.

Limitations

The shape model is intended for global geometric, geologic, and geophysical studies. The morphology of small craters is not reliably included; some relatively large craters can show approximate measures such as depth/diameter. Regional slopes can be calculated to accuracies estimated by the listed uncertainties.

Acknowledgements

The following people helped in the development of the software and/or models during the Cassini mission: Beatrice Mueller and Conor Kingston for direct assistance in formatting and submitting the data sets, Brian Carcich for software development used to derive the shape models, Matt Tiscareno for preparing small body kernels that improved the accuracy of the models, Mike Evans for assistance in modifying the plate model format to meet PDS Requirements, Chuck Acton for assistance in archiving kernels, Pam Smith for data management.

Table 1. Cassini ISS Images used for Hyperion shape model

Filter: filters used in each filter wheel. CL: clear; UV: ultraviolet; VIO: violet; BL: blue; GRN: green; MT: methane; RED: red; CB: methane continuum; IR: infrared; P: polarization. Details of filter bandpasses and use in Porco et al. (2004).

SC lat lon: Sub spacecraft position in degrees. Lon is West longitude where 90°W is the leading point.

Solar lat lon: sub solar position in degrees

Range: distance to object center from spacecraft, km

Noraz: image orientation of the projected object spin axis, degrees clockwise from up.

Samp: object center x-coordinate in image 0 is at left of image in pixels

Line: object center y-coordinate in image; 0 is at top of image in pixels

Phase: solar phase angle at center of image in degrees.

Images used in construction of model of HYPERION:

Image	filt		S/C		Solar		range	noraz	samp	line	phase
	CL1	CL2	lat	lon	lat	lon					
N1497116847_1	CL1	CL2	22.75	91.91	10.53	90.44	205649.6	83.64	499.60	416.40	12.30
N1497117082_1	CL1	CL2	22.68	92.38	10.53	90.64	204982.4	83.79	498.40	419.40	12.26
N1506351439_1	CL1	CL2	11.35	168.67	11.11	221.92	244073.1	329.28	493.00	507.10	52.15
N1506351472_1	CL1	CL2	11.35	168.70	11.11	221.94	243883.3	329.28	494.40	507.00	52.14
N1506351505_1	CL1	CL2	11.35	168.73	11.11	221.97	243693.1	329.28	496.00	506.60	52.14
N1506361723_1	CL1	CL2	11.39	177.40	11.11	230.48	185073.1	329.67	448.90	483.70	51.98
N1506361968_1	CL1	CL2	11.39	177.61	11.11	230.69	183674.2	329.32	446.40	483.00	51.98
N1506362001_1	CL1	CL2	11.39	177.64	11.11	230.71	183486.5	329.32	485.90	506.40	51.97
N1506372696_1	CL1	CL2	11.40	186.73	11.11	239.62	122652.4	329.35	495.00	474.20	51.80
N1506376183_1	CL1	CL2	11.38	189.71	11.11	242.53	102893.9	329.34	447.00	470.50	51.73
N1506376428_1	CL1	CL2	11.38	189.92	11.11	242.73	101506.7	329.37	442.60	471.80	51.72
N1506376461_1	CL1	CL2	11.38	189.94	11.11	242.76	101320.6	329.37	474.00	511.90	51.73
N1506376843_1	CL1	CL2	11.38	190.27	11.11	243.08	99157.3	329.37	467.80	509.50	51.72
N1506377152_1	CL1	CL2	11.38	190.54	11.11	243.33	97408.3	329.37	442.70	470.60	51.70
N1506378363_1	CL1	CL2	11.37	191.58	11.11	244.34	90555.6	329.38	468.80	520.30	51.67
N1506381083_1	CL1	CL2	11.34	193.93	11.11	246.61	75173.5	329.38	711.50	553.20	51.60
N1506382339_1	CL1	CL2	11.32	195.03	11.11	247.65	68074.6	329.38	330.20	588.60	51.54
N1506383441_1	CL1	CL2	11.30	196.00	11.11	248.57	61848.1	329.39	479.20	428.20	51.49
N1506383760_1	CL1	CL2	11.29	196.28	11.11	248.84	60046.5	329.42	472.60	426.10	51.49
N1506385183_1	CL1	CL2	11.25	197.55	11.11	250.02	52008.3	329.37	769.10	646.10	51.40
N1506385238_1	CL1	CL2	11.25	197.60	11.11	250.07	51697.7	329.49	768.50	599.40	51.40
N1506385329_1	CL1	CL2	11.25	197.68	11.11	250.14	51183.7	329.44	768.40	523.80	51.39
N1506385384_1	CL1	CL2	11.25	197.73	11.11	250.19	50873.2	329.41	768.10	476.50	51.39
N1506385479_1	CL1	CL2	11.24	197.82	11.11	250.27	50336.6	329.41	766.40	396.90	51.38
N1506385534_1	CL1	CL2	11.24	197.87	11.11	250.31	50026.1	329.41	765.40	348.80	51.37
N1506386529_1	CL1	CL2	11.20	198.78	11.11	251.14	44407.6	329.39	263.40	87.60	51.30
N1506386584_1	CL1	CL2	11.20	198.83	11.11	251.19	44097.1	329.42	263.40	131.00	51.30
N1506386679_1	CL1	CL2	11.20	198.92	11.11	251.27	43560.7	329.47	264.70	211.30	51.29
N1506386734_1	CL1	CL2	11.19	198.97	11.11	251.31	43250.2	329.42	265.00	254.90	51.28
N1506386829_1	CL1	CL2	11.19	199.06	11.11	251.39	42713.8	329.47	265.80	333.10	51.27
N1506386884_1	CL1	CL2	11.19	199.11	11.11	251.44	42403.3	329.47	265.10	376.70	51.27
N1506386979_1	CL1	CL2	11.18	199.20	11.11	251.52	41867.0	329.47	263.30	456.00	51.26
N1506387034_1	CL1	CL2	11.18	199.26	11.11	251.56	41556.5	329.48	263.90	499.80	51.24
N1506388174_1	CL1	CL2	11.11	200.35	11.11	252.51	35121.2	329.49	304.20	704.60	51.11
N1506388518_1	CL1	CL2	11.08	200.69	11.11	252.80	33179.5	329.53	794.80	693.60	51.07
N1506388840_1	CL1	CL2	11.06	201.02	11.11	253.07	31362.1	329.53	954.70	356.10	51.01
N1506389178_1	CL1	CL2	11.02	201.36	11.11	253.35	29454.5	329.66	792.40	-144.50	50.95
N1506389543_1	CL1	CL2	10.98	201.75	11.11	253.65	27394.5	329.56	-56.50	-8.10	50.87
N1506389543_1	CL1	CL2	10.98	201.75	11.11	253.65	27394.5	329.66	449.90	472.60	50.87
N1506390043_1	CL1	CL2	10.92	202.30	11.11	254.07	24573.0	329.59	-544.00	506.70	50.75
N1506390069_1	CL1	CL2	10.91	202.33	11.11	254.09	24426.3	329.59	-541.40	800.80	50.74
N1506390099_1	CL1	CL2	10.91	202.37	11.11	254.12	24257.0	329.57	-317.20	624.40	50.73
N1506390129_1	CL1	CL2	10.90	202.40	11.11	254.14	24087.8	329.24	-282.30	386.40	50.72
N1506390159_1	CL1	CL2	10.90	202.44	11.11	254.17	23918.5	329.60	-283.90	-781.40	50.71
N1506390279_1	CL1	CL2	10.88	202.58	11.11	254.27	23241.4	329.81	53.90	-869.90	50.67
N1506390309_1	CL1	CL2	10.88	202.61	11.11	254.29	23072.1	329.64	51.10	325.30	50.66
N1506390339_1	CL1	CL2	10.87	202.65	11.11	254.32	22902.8	329.59	71.20	616.00	50.66
N1506390369_1	CL1	CL2	10.87	202.68	11.11	254.34	22733.6	329.80	372.60	606.40	50.65
N1506390399_1	CL1	CL2	10.86	202.72	11.11	254.37	22564.3	329.74	390.30	252.00	50.64
N1506390429_1	CL1	CL2	10.85	202.75	11.11	254.39	22395.0	329.73	390.10	-966.30	50.63
N1506390549_1	CL1	CL2	10.83	202.90	11.11	254.49	21718.0	329.58	721.60	-725.30	50.58
N1506390579_1	CL1	CL2	10.83	202.93	11.11	254.52	21548.8	330.66	719.60	413.00	50.58

N1506390609	1	CL1	CL2	10.82	202.97	11.11	254.54	21379.5	329.54	773.20	599.40	50.56
N1506390639	1	CL1	CL2	10.82	203.01	11.11	254.57	21210.2	329.46	1050.10	588.50	50.55
N1506390669	1	CL1	CL2	10.81	203.05	11.11	254.59	21041.0	329.70	1056.90	96.20	50.53
N1506390699	1	CL1	CL2	10.80	203.08	11.11	254.62	20871.7	329.64	1054.00	-1153.00	50.53
N1506390819	1	CL1	CL2	10.78	203.24	11.11	254.72	20194.8	329.80	1392.80	-575.50	50.48
N1506390849	1	CL1	CL2	10.77	203.27	11.11	254.74	20025.5	329.31	1392.40	468.20	50.47
N1506390879	1	CL1	CL2	10.76	203.31	11.11	254.77	19856.3	329.66	1486.70	580.10	50.46
N1506390909	1	CL1	CL2	10.76	203.35	11.11	254.79	19687.0	329.66	1722.00	571.50	50.44
N1506390939	1	CL1	CL2	10.75	203.39	11.11	254.82	19517.8	329.66	1724.70	-86.40	50.43
N1506391247	1	CL1	CL2	10.67	203.81	11.11	255.07	17780.5	329.70	-87.00	-524.30	50.27
N1506391424	1	CL1	CL2	10.62	204.06	11.11	255.22	16782.2	328.60	73.00	388.20	50.18
N1506391600	1	CL1	CL2	10.56	204.33	11.11	255.37	15789.5	329.79	219.50	1271.20	50.07
N1506391791	1	CL1	CL2	10.48	204.64	11.11	255.53	14712.5	329.78	1045.60	908.50	49.93
N1506391975	1	CL1	CL2	10.40	204.96	11.11	255.68	13675.0	329.92	882.70	-31.30	49.77
N1506392151	1	CL1	CL2	10.31	205.29	11.11	255.82	12682.8	329.73	707.50	-978.80	49.60
N1506392342	1	CL1	CL2	10.19	205.68	11.11	255.98	11606.2	329.86	1526.10	-1015.60	49.38
N1506392522	1	CL1	CL2	10.06	206.10	11.11	256.13	10591.9	329.97	1935.50	-140.60	49.13
N1506392704	1	CL1	CL2	9.89	206.57	11.11	256.29	9566.7	330.03	2337.30	723.60	48.85
N1506392888	1	CL1	CL2	9.69	207.13	11.11	256.44	8530.7	330.27	2572.90	-667.70	48.47
N1506393074	1	CL1	CL2	9.42	207.81	11.11	256.59	7484.1	330.81	1951.90	-739.00	47.98
N1506393257	1	CL1	CL2	9.07	208.64	11.11	256.75	6455.5	330.37	1577.00	-206.30	47.36
N1506393440	1	CL1	CL2	8.59	209.73	11.11	256.90	5428.3	330.43	646.20	-995.50	46.50
N1506393614	1	CL1	CL2	7.92	211.16	11.11	257.04	4454.1	331.03	234.90	-851.40	45.32
N1506393778	1	CL1	CL2	6.95	213.15	11.11	257.18	3539.6	331.34	450.90	388.10	43.64
N1506393778	1	CL1	CL2	6.95	213.15	11.11	257.18	3539.8	331.20	-35.50	-870.20	43.64
N1506396059	1	CL1	CL2	-13.22	22.55	11.11	259.08	9408.1	31.22	2687.50	1654.70	124.81
N1506396299	1	CL1	CL2	-13.02	23.19	11.11	259.28	10760.1	31.14	683.80	1218.20	125.22
N1506396329	1	CL1	CL2	-12.99	23.26	11.11	259.30	10929.1	31.13	2056.50	1213.20	125.27
N1506396359	1	CL1	CL2	-12.97	23.33	11.11	259.33	11098.2	31.12	2694.20	1223.00	125.31
N1506396389	1	CL1	CL2	-12.95	23.40	11.11	259.35	11267.3	31.11	2739.80	1028.90	125.35
N1506396419	1	CL1	CL2	-12.93	23.46	11.11	259.38	11436.3	31.10	2712.90	759.70	125.38
N1506396659	1	CL1	CL2	-12.79	23.97	11.11	259.58	12789.1	31.04	450.70	328.50	125.67
N1506396689	1	CL1	CL2	-12.77	24.03	11.11	259.60	12958.2	31.04	1916.90	327.90	125.71
N1506396719	1	CL1	CL2	-12.76	24.08	11.11	259.63	13127.4	31.03	2646.00	330.60	125.73
N1506396749	1	CL1	CL2	-12.74	24.14	11.11	259.65	13296.5	31.02	2733.00	221.90	125.77
N1506396779	1	CL1	CL2	-12.73	24.19	11.11	259.68	13465.6	31.02	2726.70	-108.40	125.78
N1506396809	1	CL1	CL2	-12.71	24.25	11.11	259.70	13634.8	31.01	2286.80	-119.90	125.82
N1506398014	1	CL1	CL2	-12.33	26.05	11.11	260.71	20431.1	30.84	249.40	-559.20	126.56
N1506398268	1	CL1	CL2	-12.28	26.36	11.11	260.92	21864.4	30.82	253.50	-135.50	126.65
N1506398268	1	CL1	CL2	-12.28	26.36	11.11	260.92	21864.4	30.88	479.70	458.60	126.65
N1506398352	1	CL1	CL2	-12.27	26.46	11.11	260.99	22338.4	30.88	479.60	473.10	126.68
N1506399159	1	CL1	CL2	-12.15	27.38	11.11	261.66	26892.1	30.77	323.10	1201.20	126.91
N1506399192	1	CL1	CL2	-12.14	27.42	11.11	261.69	27078.1	30.77	365.10	1401.30	126.92
N1506399459	1	CL1	CL2	-12.11	27.70	11.11	261.91	28585.1	30.75	-126.40	1353.80	126.98
N1506399492	1	CL1	CL2	-12.11	27.74	11.11	261.94	28771.2	30.75	-156.30	1259.00	126.99
N1506400059	1	CL1	CL2	-12.05	28.32	11.11	262.41	31971.5	30.73	-24.20	447.90	127.09
N1506400114	1	CL1	CL2	-12.05	28.38	11.11	262.46	32281.7	30.72	-6.90	327.10	127.10
N1513999046	1	CL1	CL2	0.19	35.33	11.54	111.61	228024.2	327.28	501.40	496.70	76.52
N1513999212	1	CL1	CL2	0.05	35.24	11.54	111.75	228193.4	327.30	500.70	498.40	76.78
N1513999382	1	CL1	CL2	-0.10	35.16	11.54	111.89	228371.6	327.32	502.20	500.30	77.02
N1513999552	1	CL1	CL2	-0.24	35.07	11.54	112.03	228555.0	327.34	502.00	497.30	77.28
N1513999722	1	CL1	CL2	-0.39	34.98	11.54	112.17	228743.3	327.35	502.00	502.20	77.53
N1513999892	1	CL1	CL2	-0.53	34.90	11.54	112.31	228936.7	327.37	499.60	492.60	77.78
N1514000062	1	CL1	CL2	-0.68	34.82	11.54	112.46	229135.1	327.39	499.70	493.60	78.03
N1514000232	1	CL1	CL2	-0.82	34.73	11.54	112.60	229338.5	327.41	500.10	497.60	78.29
N1514000912	1	CL1	CL2	-1.40	34.40	11.54	113.16	230203.1	327.50	500.20	498.70	79.28
N1514001592	1	CL1	CL2	-1.97	34.07	11.54	113.73	231144.7	327.59	509.20	499.60	80.28
N1514003122	1	CL1	CL2	-3.23	33.35	11.54	115.01	233551.6	327.83	506.30	499.40	82.49
N1514004482	1	CL1	CL2	-4.33	32.75	11.54	116.14	236016.6	328.08	509.20	498.90	84.41
N1514005672	1	CL1	CL2	-5.27	32.25	11.54	117.13	238419.3	328.31	506.30	499.40	86.06
N1530182591	1	CL1	CL2	32.30	295.31	12.37	270.85	296942.7	88.45	519.00	520.50	30.00
N1530182624	1	CL1	CL2	-10.62	353.64	-33.72	332.79	296897.3	70.85	506.30	511.80	29.97
N1530184627	1	CL1	CL2	32.23	294.27	12.37	272.55	294339.3	86.97	530.50	498.50	28.13
N1530186599	1	CL1	CL2	32.11	293.22	12.37	274.19	292269.7	85.52	512.00	497.60	26.36
N1530186632	1	CL1	CL2	32.11	293.20	12.37	274.21	292238.9	85.50	518.20	511.80	26.34
N1530199525	1	CL1	CL2	29.84	286.19	12.37	284.95	290338.8	76.22	507.60	493.40	17.51
N1530200980	1	CL1	CL2	29.43	285.47	12.37	286.16	291414.9	75.25	522.10	537.30	17.07
N1530201013	1	CL1	CL2	-24.50	348.35	-41.50	346.59	291442.3	82.20	519.60	551.90	17.06
N1550270298	1	CL1	CL2	53.44	1.63	13.13	81.92	224785.5	212.41	516.20	508.50	73.72
N1550320098	1	CL1	CL2	-16.60	64.65	13.13	123.39	213576.1	236.48	516.50	504.80	65.20
N1669581376	1	CL1	CL2	-35.30	322.37	11.85	98.20	153566.0	263.72	496.50	479.00	133.76
N1669597931	1	CL1	CL2	-46.57	6.12	11.85	111.99	89978.3	234.88	444.90	436.50	109.46
N1669607131	1	CL1	CL2	-1.20	278.35	25.10	357.07	72514.6	250.68	535.30	459.60	80.32
N1692996957	1	CL1	CL2	13.54	202.97	10.61	162.04	66207.3	154.48	502.80	518.70	40.09
N1692997492	1	CL1	CL2	-26.20	213.35	12.05	204.33	68756.9	229.70	488.80	530.90	39.24
N1694888328	1	CL1	CL2	-39.00	239.55	-28.95	280.07	92274.3	297.00	494.90	594.40	34.76
N1694903386	1	CL1	CL2	-39.70	275.95	-27.14	294.81	156423.9	287.10	508.70	600.70	20.06

N1811772616_1	CL1	CL2	7.86	39.72	1.73	98.50	35231.5	190.32	370.00	223.00	58.85
N1811789468_1	CL1	CL2	21.34	337.72	1.73	112.53	74495.9	251.08	500.40	505.90	130.18
N1811808864_1	CL1	CL2	20.04	338.16	1.72	128.68	154300.6	211.14	532.50	588.10	143.82