UVIS ENCELADUS BOOK.

The intent of this UVIS Enceladus book is to give readers an idea of the observational geometry for each observation, along with a sense of the data quality.

For some observations, we include a calibrated average spectrum to demonstrate the brightness of any reflected solar emission lines (especially at λ<165 nm) which are likely the most appropriate demonstration of moon reflectance at these short wavelengths.

We also include an off-body background spectrum (to save space, we show this as a calibrated spectrum overplotted on the average moon spectrum though technically the background is subtracted off before calibration)

Many Enceladus observations have the planet and/or rings in the same rows as the moon and pulling out the Enceladus-only signal is non-trivial so we do not derive reflectance spectra for those observations here.

The reflectance of Enceladus and the other icy satellites generally becomes very low at wavelengths shortward of the water ice absorption edge (~165 nm). At these short wavelengths, water ice is very dark; any apparent spectral structure at these short wavelengths is not necessarily real

We note that there are a number of Enceladus ICYATM and ICYPLU observations that are not included here; these are often distant observations and often do not have Enceladus in the UVIS slit; these will be included in a future edition of this book.

This book covers FUV data only; EUV data are also available.

Name of observation

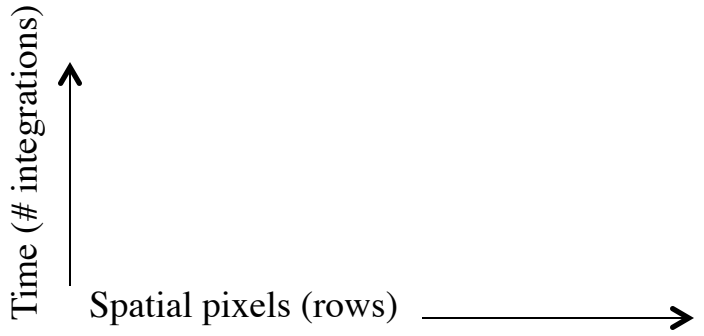
ISS image

Planning/geometer graphic

UVIS observation name
Date
Altitude (average)
Sub s/c longitude (avg)
Sub s/c latitude (avg)
Phase angle (avg)

Note: The geometry given is usually the average over the observing time; if an observation has multiple parts, the geometry is usually the average from the first part

Long wavelength (170-180nm) image (scaled to max value) (sometimes Ly-a)



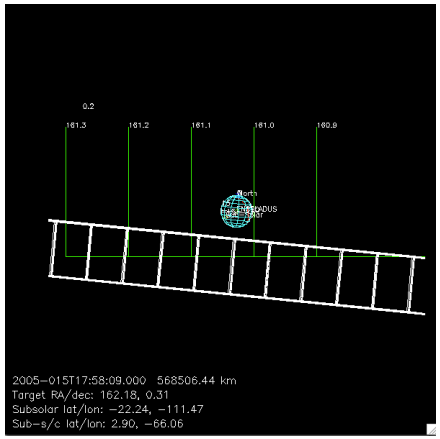
For many observations we also include:

Plot of signal vs. background

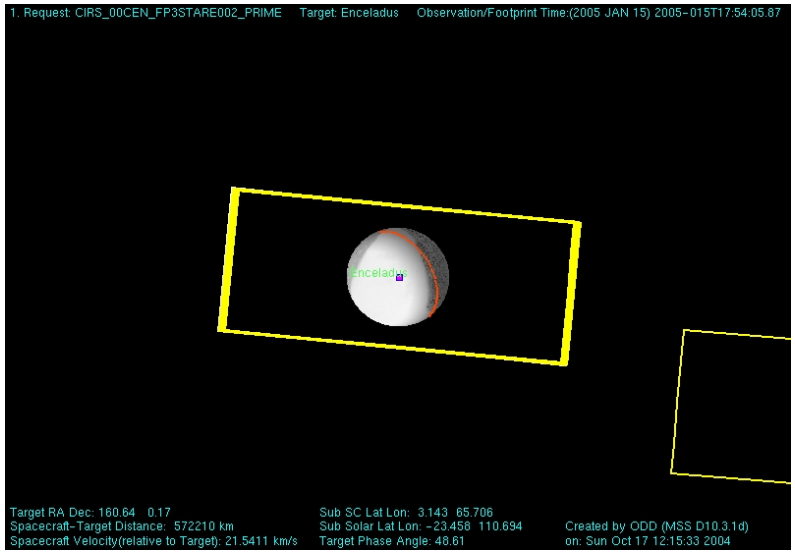
Plot of reflectance

Note: most ICYLON observations using the low-res slit and 120 sec integration periods. Most ICYMAP observations use the high-res slit and 30-sec integration periods.

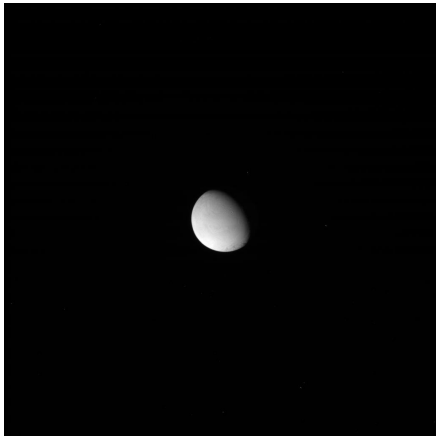
00CEN_ICYLON001_CIRS
2005-015T17:58
Alt= 563,016 km
Longitude=66°W
Latitude=3°N
Phase=49°

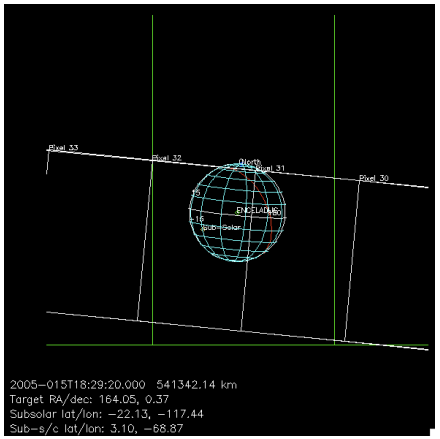


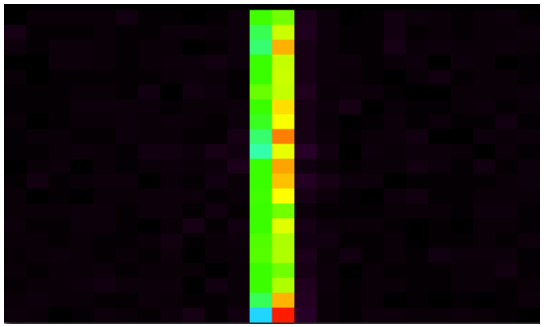
Enceladus not in UVIS slit



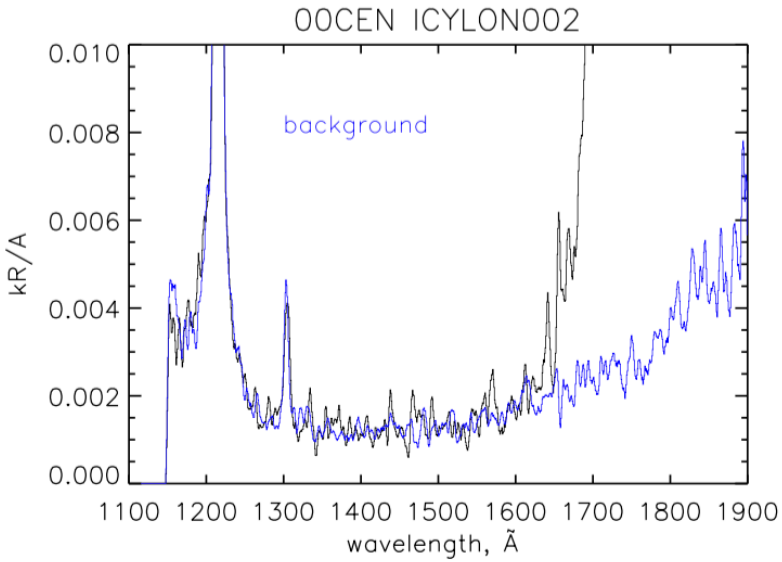
00CEN ENCELADUS photom001

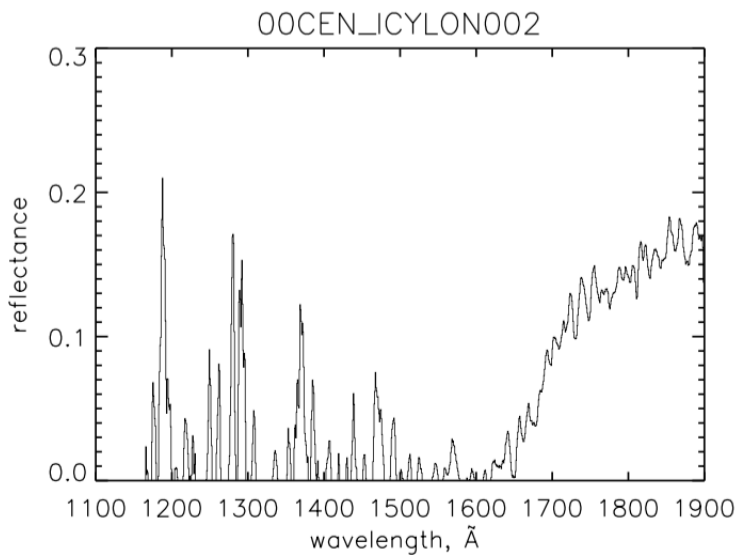




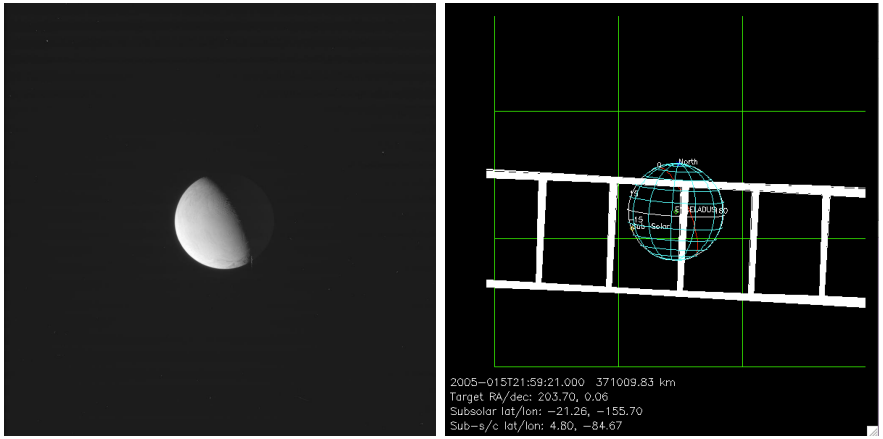


00CEN_ICYLON002_ISS
2005-015T18:30
Alt= 523,841 km
Longitude=71°W
Latitude=3°N
Phase=53°

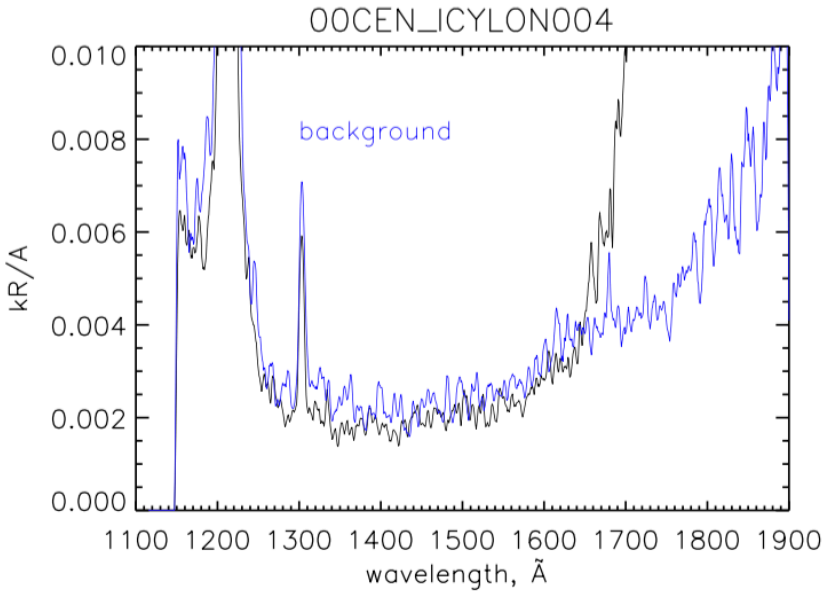


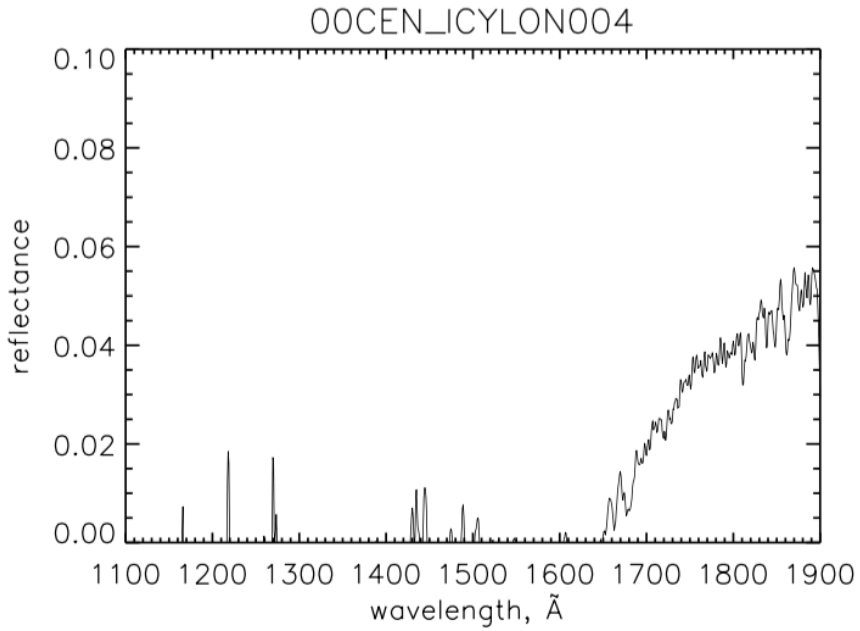


ENCELADUS photom002



00CEN_ICYLON004_ISS
2005-015T22:00
Alt= 331,650 km
Longitude=87°W
Latitude=5°N
Phase=80°





2-part 00CEN_ICYLON010_PRIME

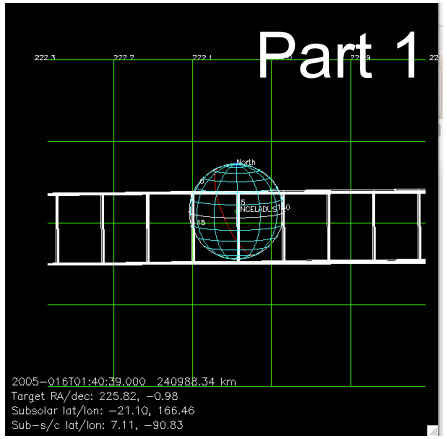
2005-016T01:41

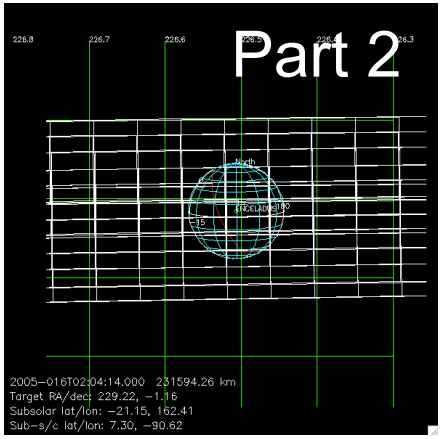
Alt= 236,674 km

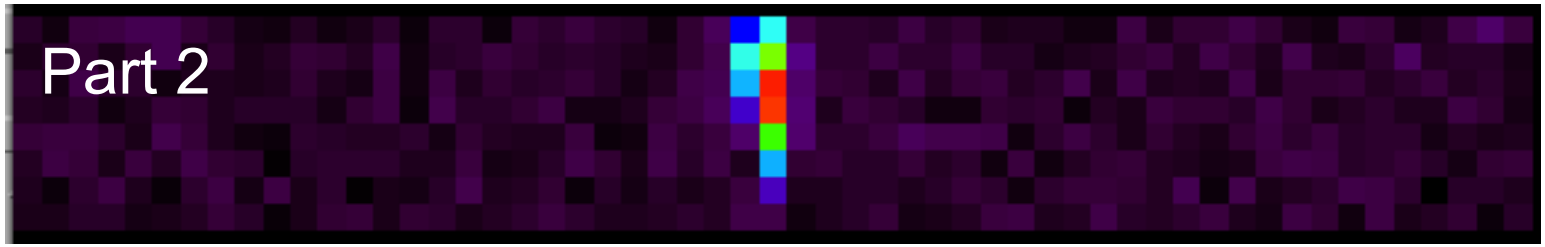
Longitude=91°W

Latitude=7°N

Phase=107°

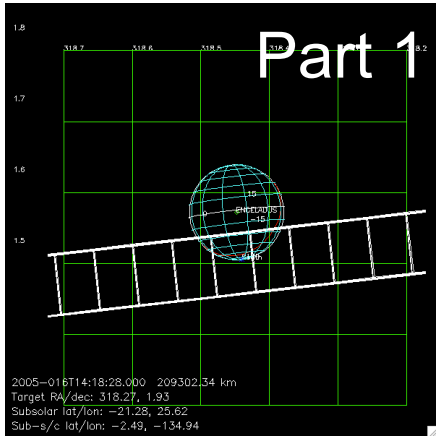


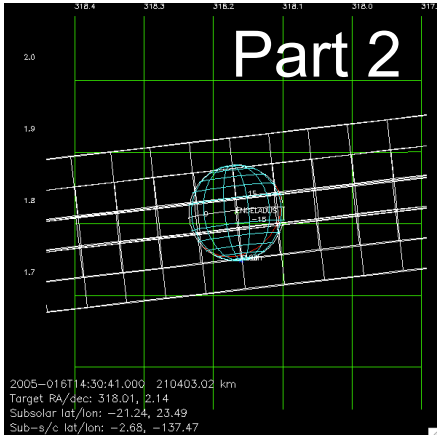




2-part

00CEN_ICYLON015_PRIME
2005-016T01:41
Alt= 209,399 km
Longitude=136°W
Latitude=2.6°S
Phase=148°

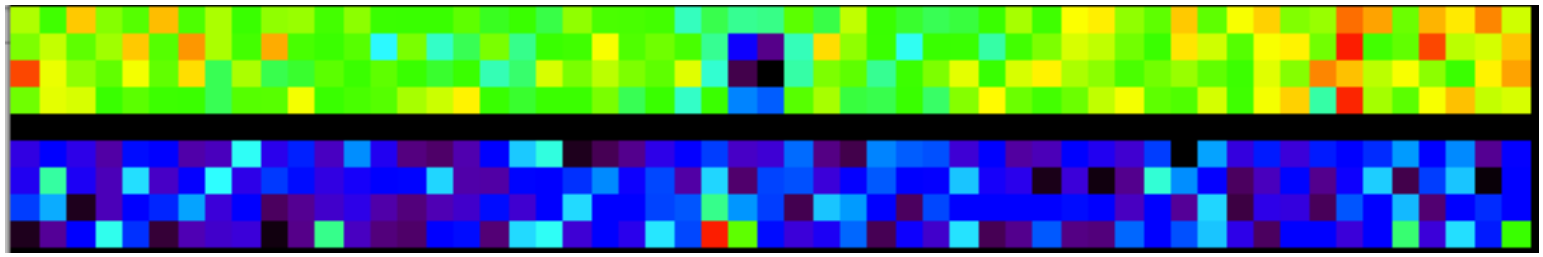




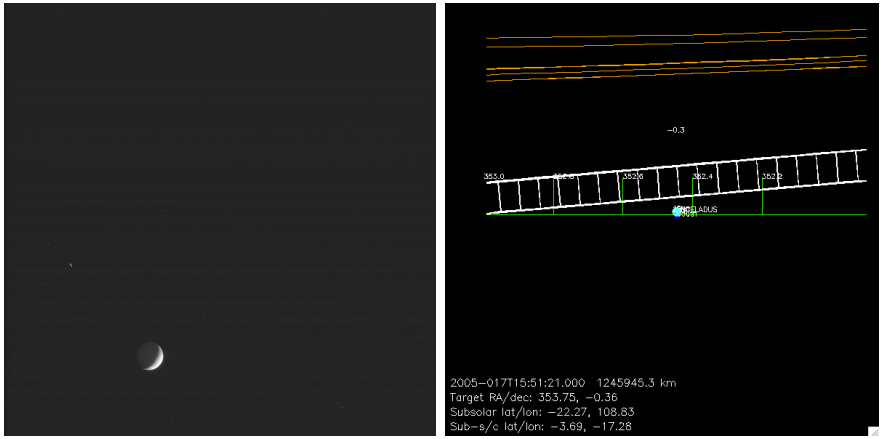
Part 2

Ly-a

Long waves



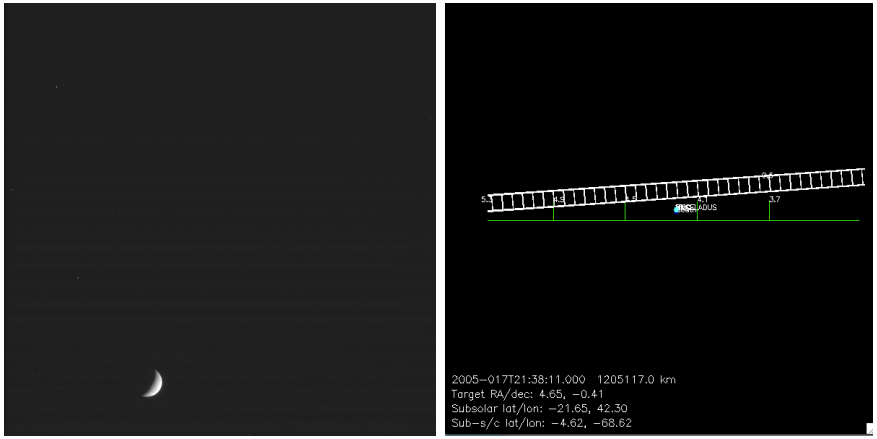
ENCELADUS lonpha001



00CEN_ICYLON012_ISS
2005-017T15:52

(not in UVIS slit)

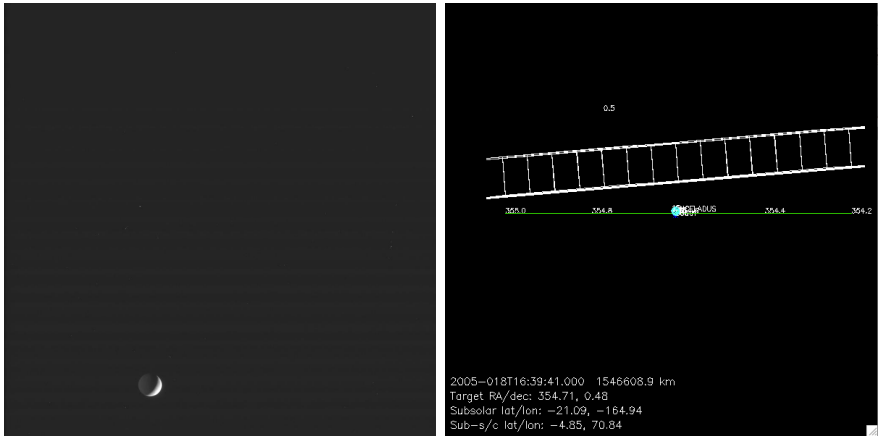
ENCELADUS lonpha002



00CEN_ICYLON016_ISS
2005-017T21:39

(not in UVIS slit)

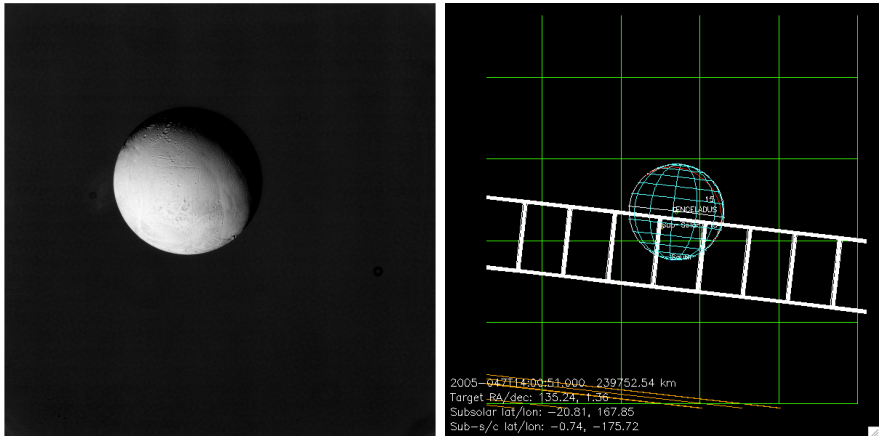
ENCELADUS lonpha006

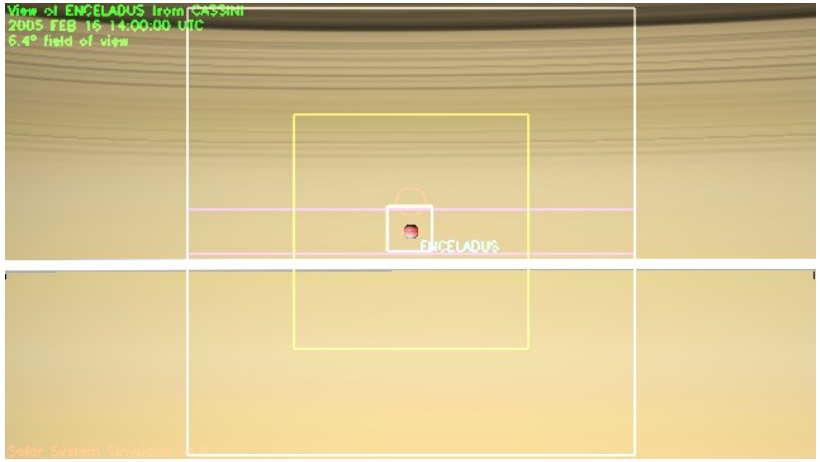


00CEN_ICYLON017_ISS
2005-018T16:40

(not in UVIS slit)

003EN_geolog001

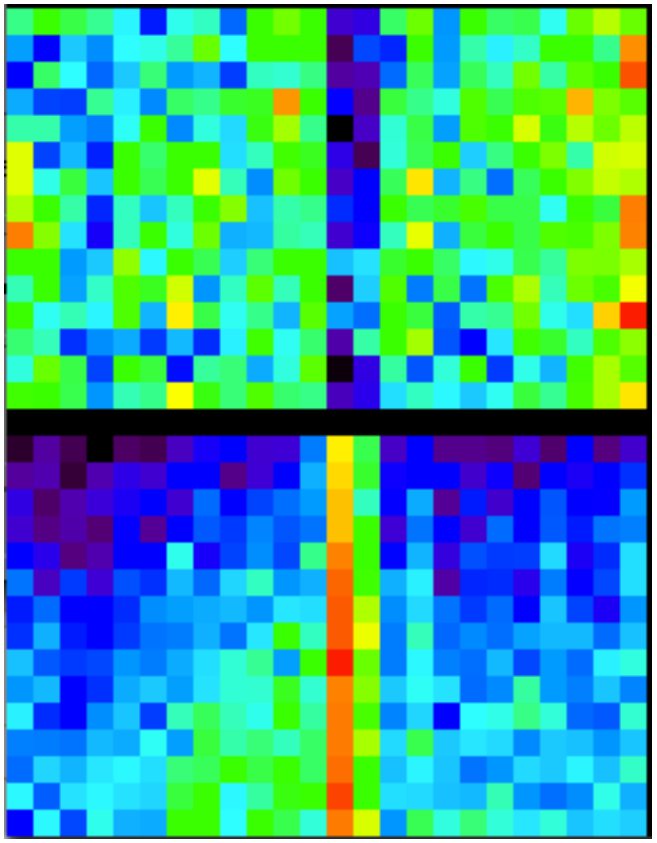




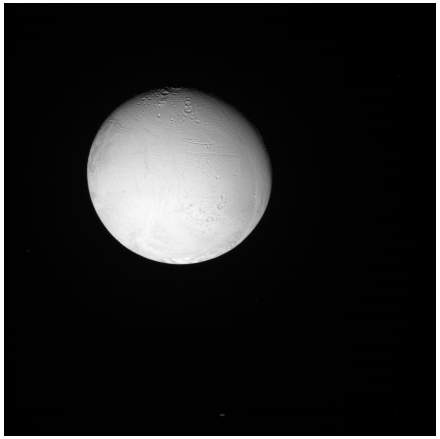
003EN_ICYLON001_ISS
2005-047T14:01
Alt= 232,239 km
Longitude= 179°W
Latitude=0.75°S
Phase= 27.2°

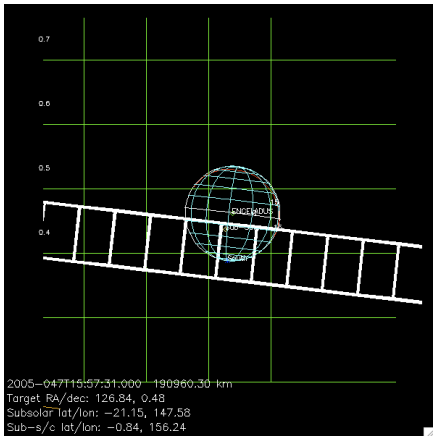
Ly-a

Long waves



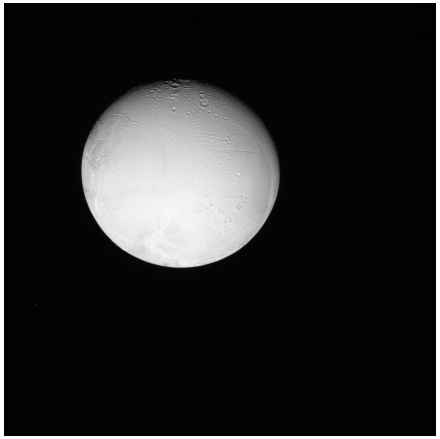
003EN_geolog002

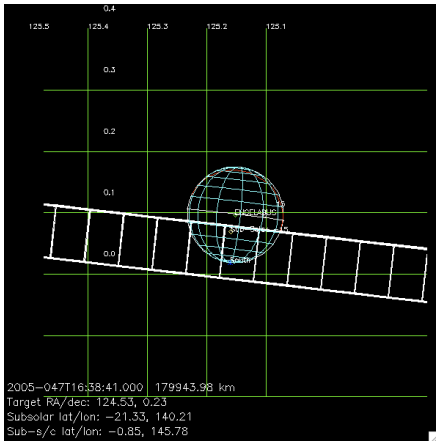




003EN_ICYLON002_ISS
2005-047T15:58
Alt= 187,802 km
Longitude= 206°W
Latitude=0.84°S
Phase= 23.1°

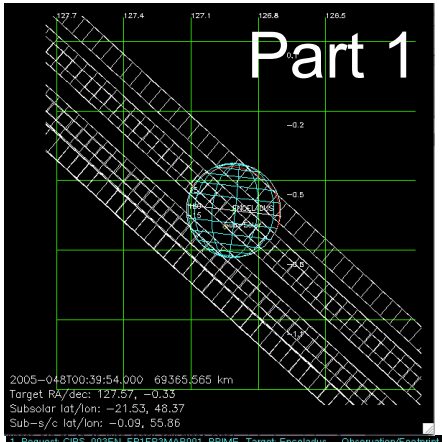
003EN_geolog003

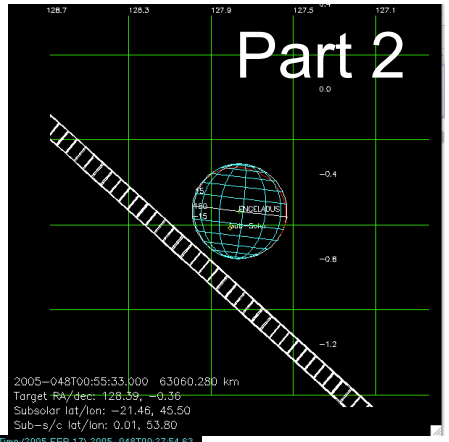


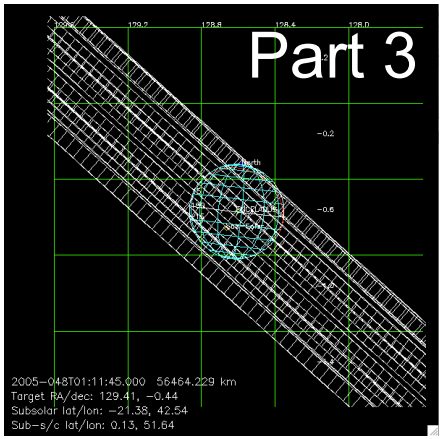


003EN_ICYLON003_ISS
2005-047T16:39
Alt= 178,770 km
Longitude= 215°W
Latitude=0.9°S
Phase= 22.3°

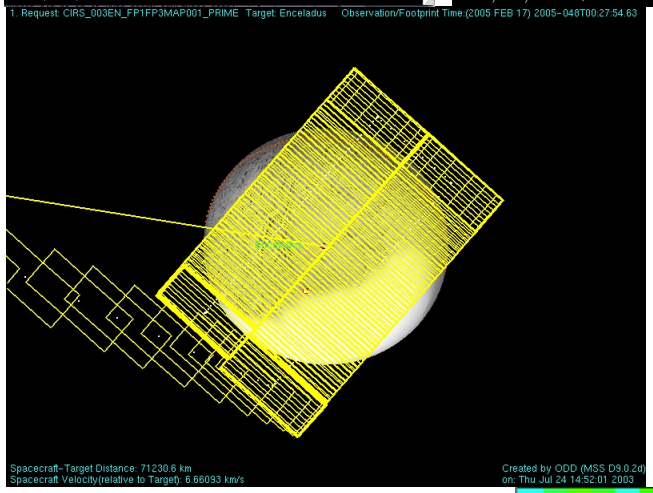
003EN_fp1fp3map001 3-part 003EN_ICYLON004_CIRS







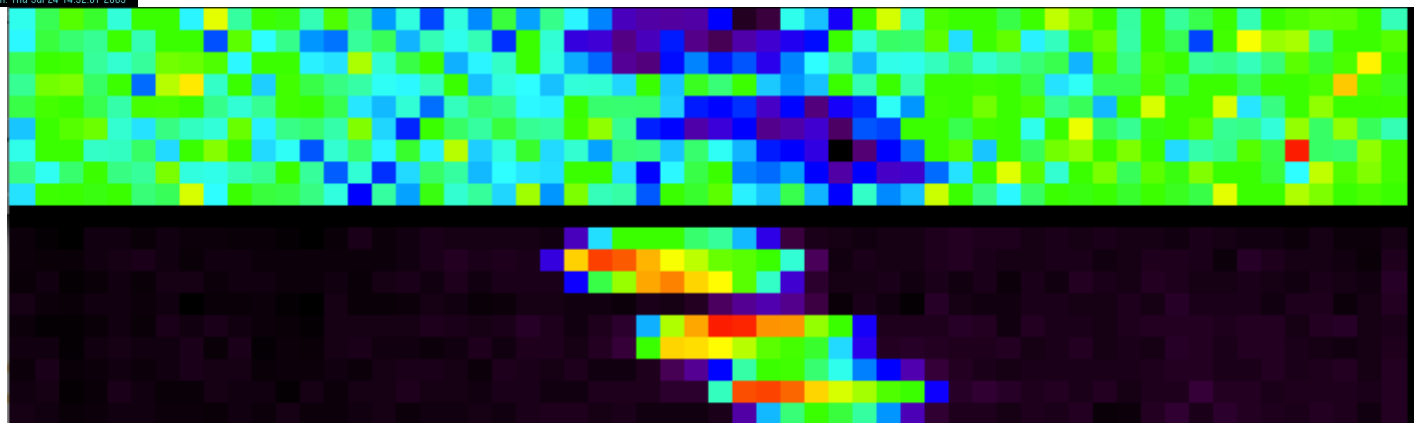
2005-048T00:40
Alt= 66,705 km
Longitude= 305°W
Latitude=0.1°S
Phase= 23.7°



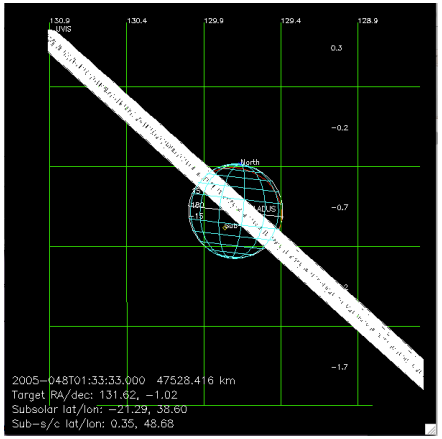
Part 3

Ly-a

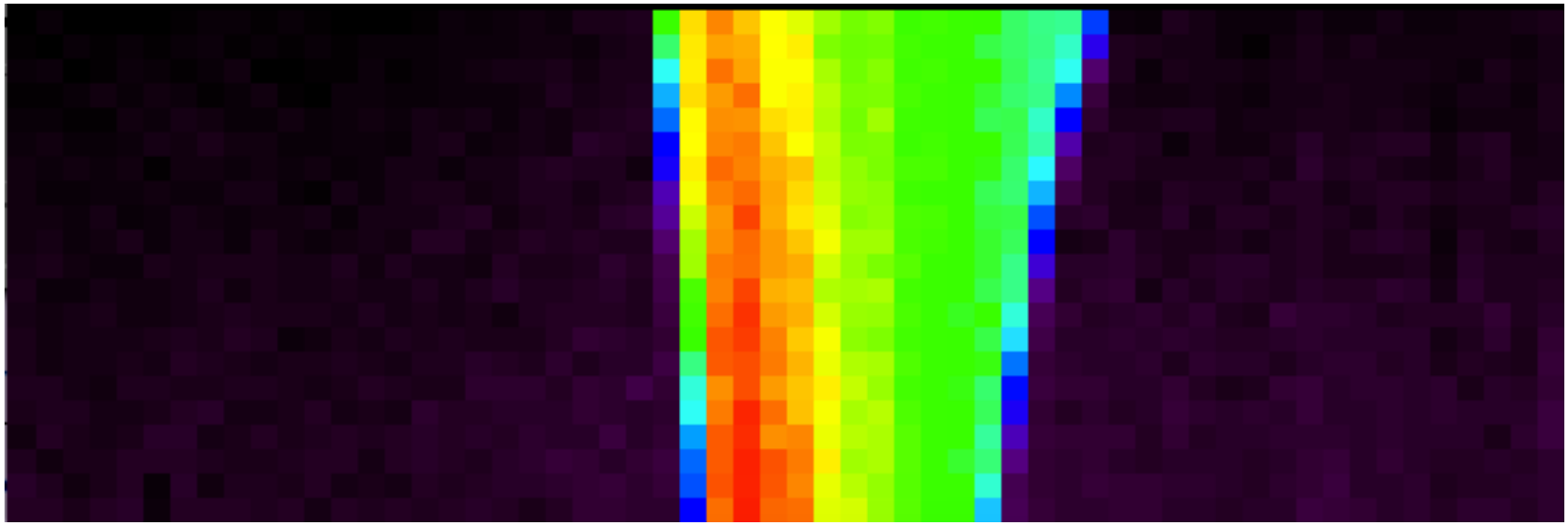
Long waves



VIMS_003EN_enceladus006

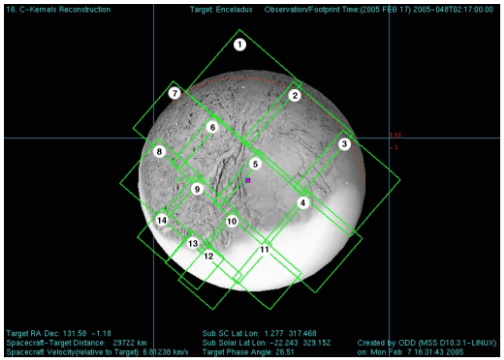


003EN_ICYLON005_VIMS
2005-048T01:34
Alt= 39,072 km
Longitude= 314°W
Latitude=0.7°N
Phase= 25.6°



003EN_limbtopo004

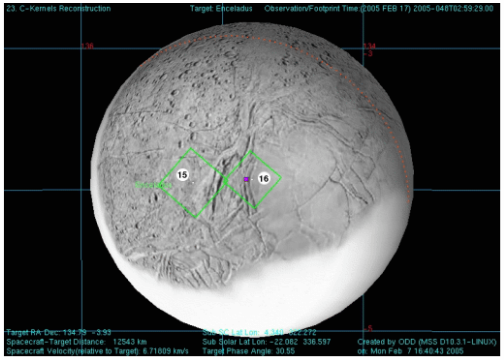
13-part

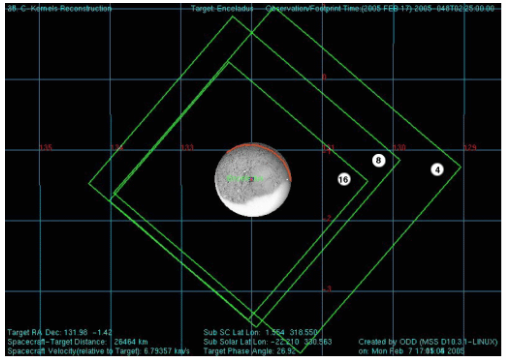


ISS_003EN_LIMTOP004_PRIME

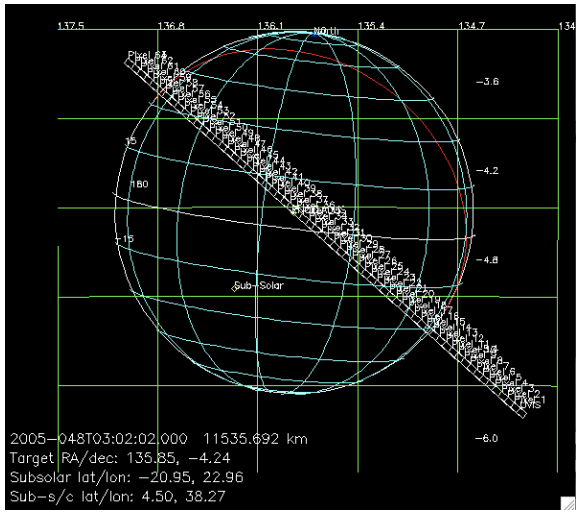
Start: GMB_E003_Enceladus -000T01:15:00 (2005-048T02:15:29) Dur: 00:50:00
NAC to Enceladus, -X to RA/DEC (198/-47) Est. Data Volume: 88.0804 Mb
Range: 30341 km to 10146 km Scale: 175 m/px to 50 m/px
Phase Angle: 26.4 to 32.1 Subspacecraft Point: (1N, 315W) to (6N, 320W)

F	DWELL	FILTERS		F	DWELL	FILTERS
1	00:02:08	NAC CL1_CL2		9	00:02:05	NAC CL1_CL2
2	00:02:05	NAC CL1_CL2		10	00:02:04	NAC CL1_CL2
3	00:02:04	NAC CL1_CL2		11	00:02:04	NAC CL1_CL2
4	00:02:17	BOT CL1_CL2		12	00:02:31	NAC CL1_CL2
5	00:02:05	NAC CL1_CL2		13	00:02:05	NAC CL1_CL2
6	00:02:25	NAC CL1_CL2		14	00:02:04	NAC CL1_CL2
7	00:02:04	NAC CL1_CL2		15	00:03:06	NAC CL1_CL2 NAC CL1_UV3 NAC CL1_GRN NAC CL1_IR3
8	00:02:35	BOT CL1_CL2		16	00:02:00	NAC CL1_CL2



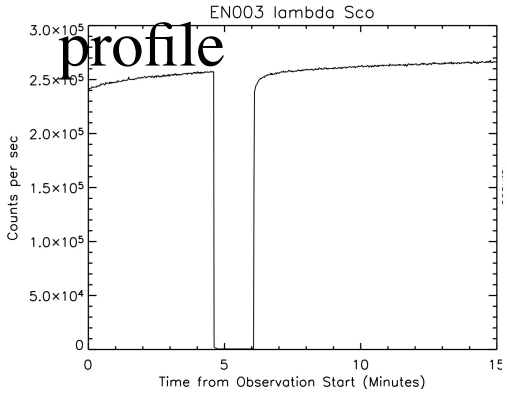


003EN_ICYMAP001_ISS
2005-048T02:17
Alt= 29,034 km
Longitude= 317°W
Latitude=1°N
Phase= 27°



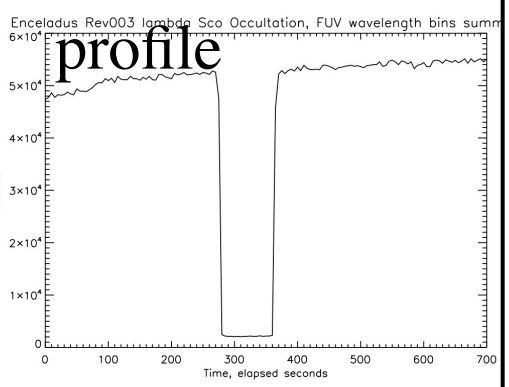
UVIS_003EN_ICYEXO005_CDA
2005-048T03:27
Ingress lat/lon: 16.5 / 299.5
Egress lat/lon: -31.5 / 138.8
Star: lamda Sco

HSP profile

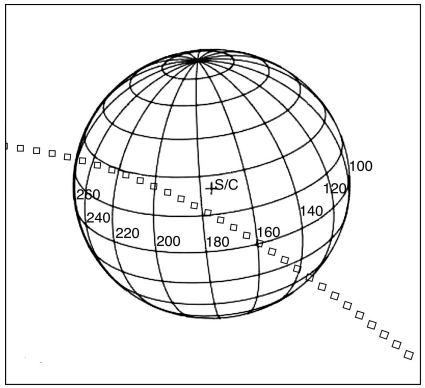


Slow return to full count rate at egress is HSP warmup artifact

FUV profile



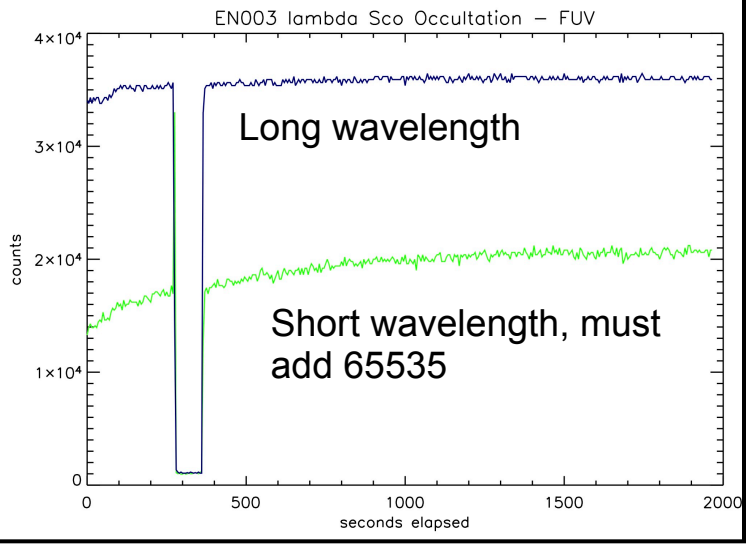
FUV was binned into two wavelength ranges, summed here to give full counts detected



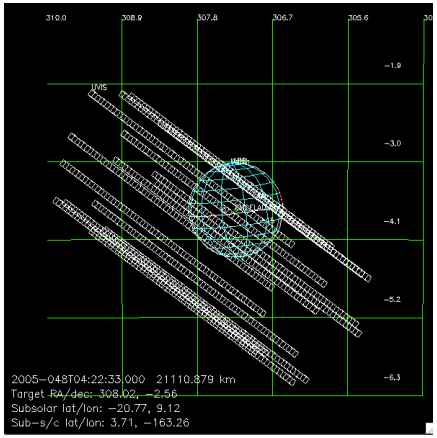
Spectra of I, I_0 (counts per integration period vs wavelength)

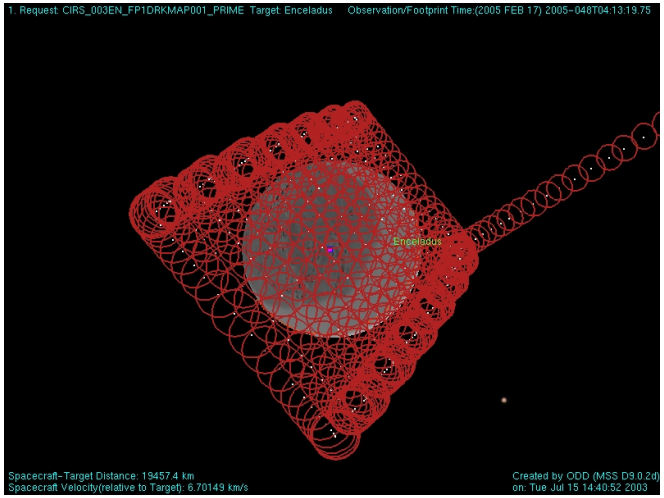
The FUV was inadvertently configured such that all wavelength data was summed over two ranges. The combination of the windowing and exposure time led to roll-over of the counts. This means that 65535 must be added to the short wavelength bin counts.

FUV profile for two wavelength ranges



003EN_fp1drkmap001





003EN_ICYLON006_CIRS

2005-048T04:23

Alt= 27,049 km

Longitude= 166°W

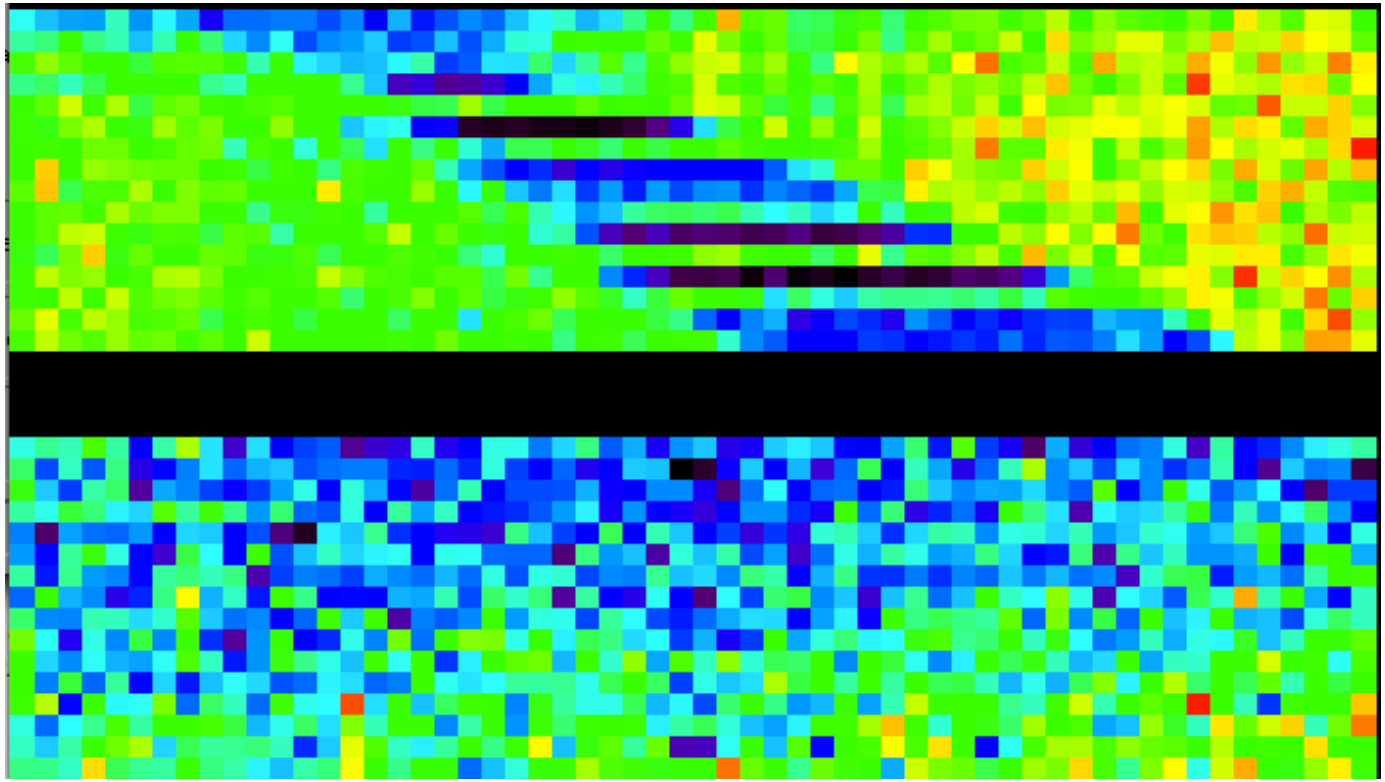
Latitude=3°N

Phase= 159.1°

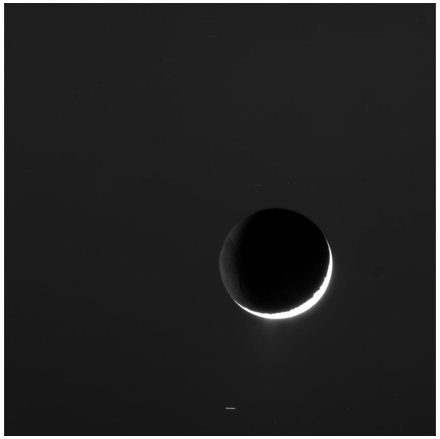
Fast FP1 scan

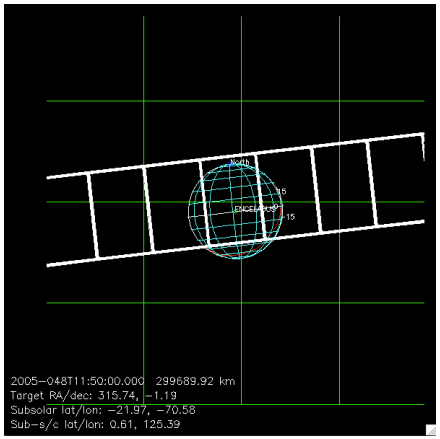
Ly-a

Long waves



003EN_plume001

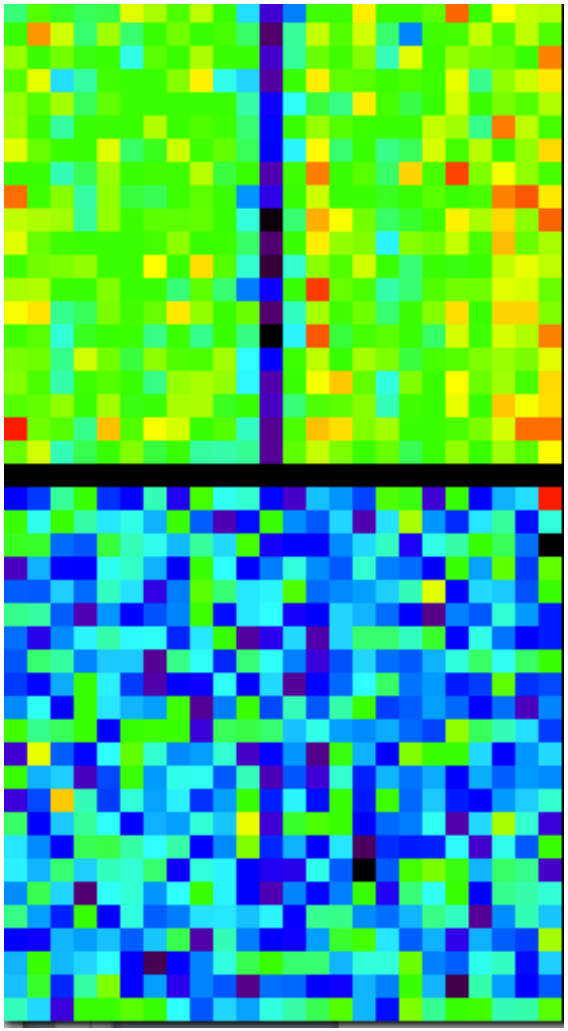




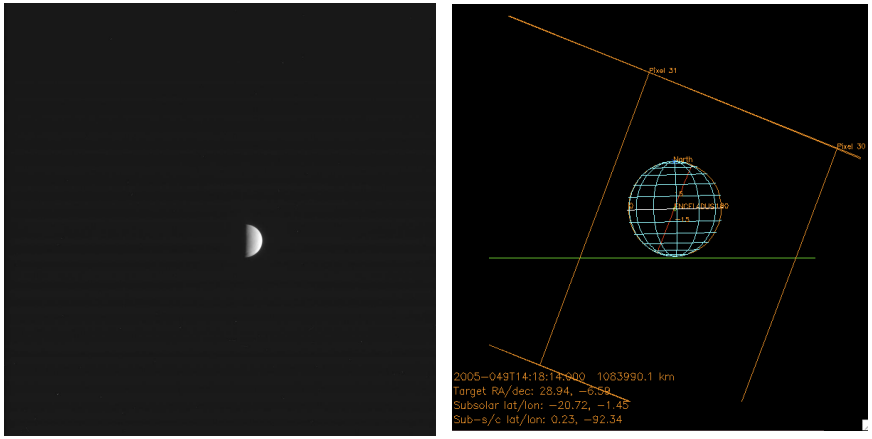
003EN_ICYLON007_ISS
2005-048T11:51
Alt= 319,086 km
Longitude= 238°W
Latitude=0.6°N
Phase= 153°

Ly-a

Long
waves



003EN_094W091PH001



003EN_ICYLON006_ISS

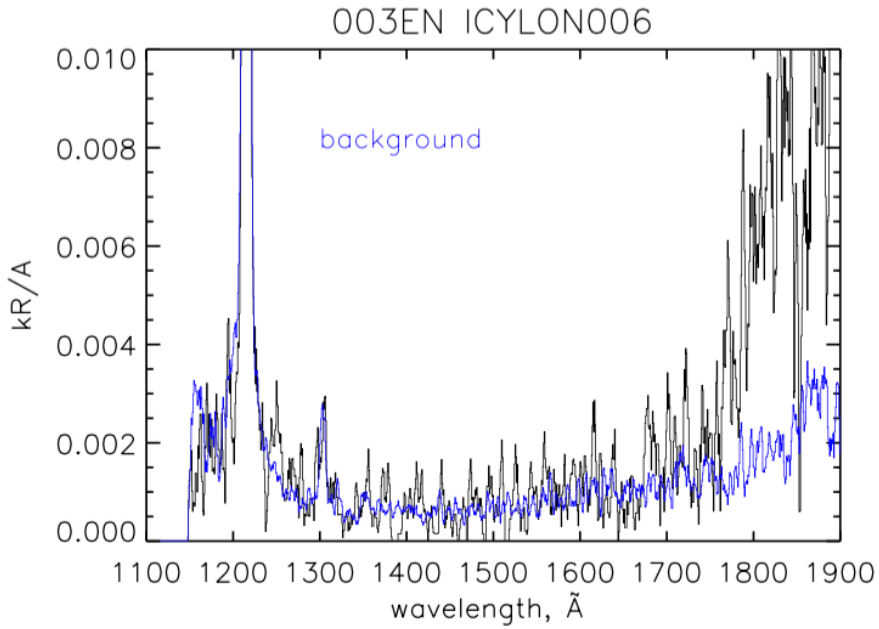
2005-049T14:19

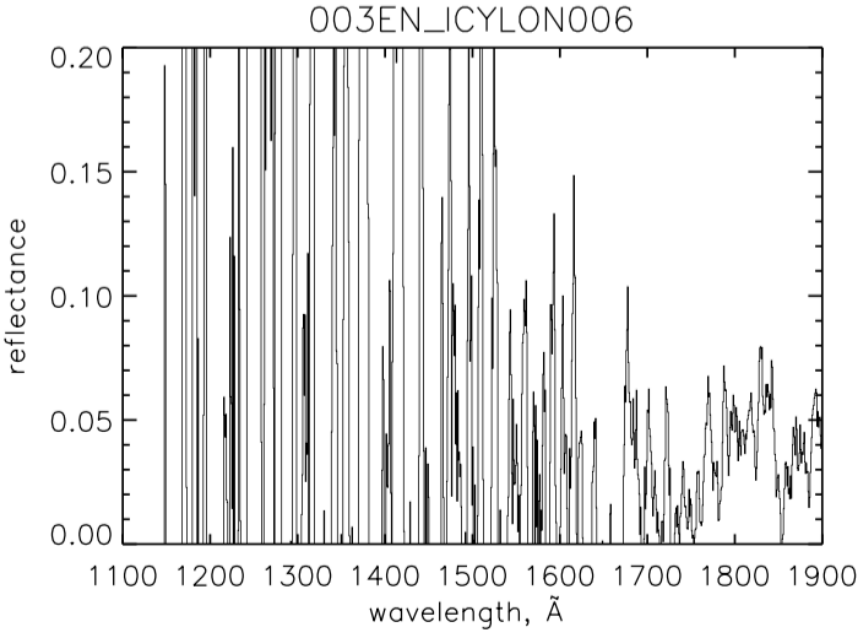
Alt= 1,082,170 km

Longitude= 93°W

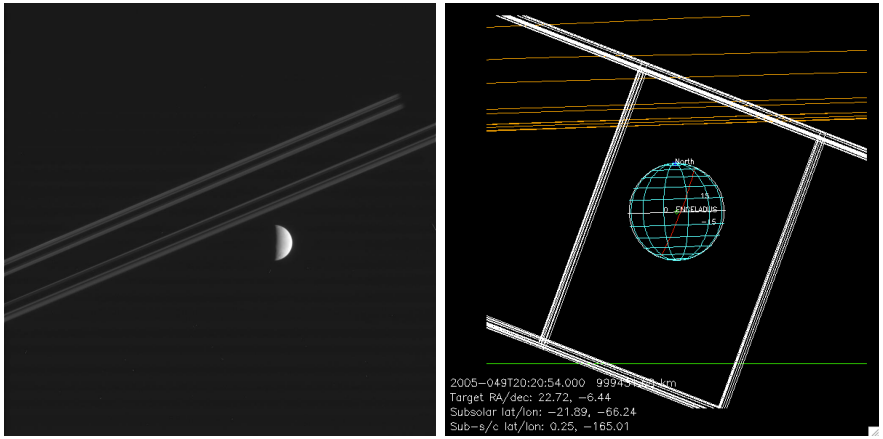
Latitude=0.2°N

Phase= 90.6°





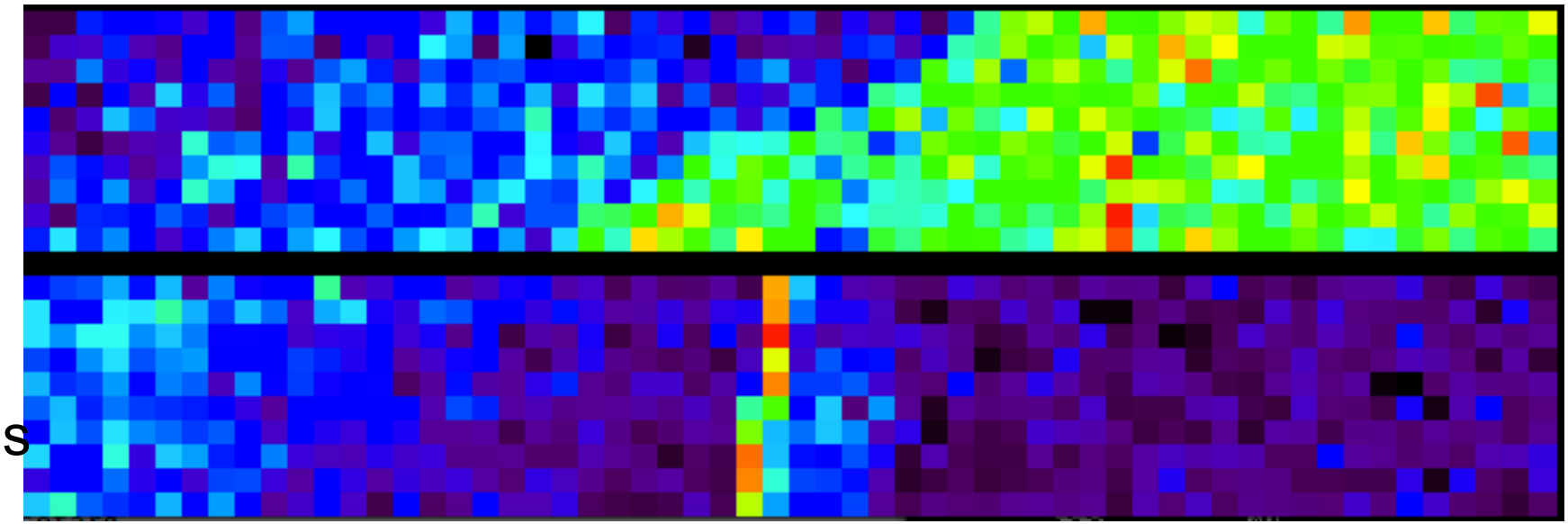
003EN_166W096PH001



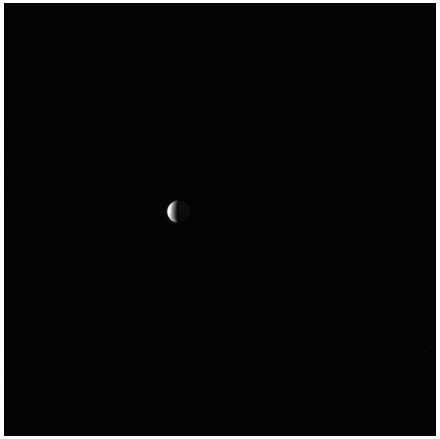
003EN_ICYLON008_ISS
2005-049T20:21
Alt= 1,000,180 km
Longitude= 167°W
Latitude=0.25°N
Phase= 96°

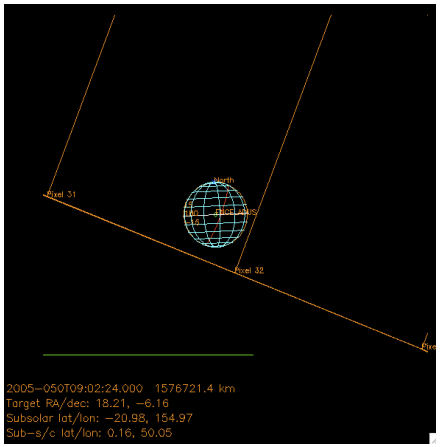
Ly-a

Long waves



003EN_310W101PH001





003EN_ICYLON009_ISS

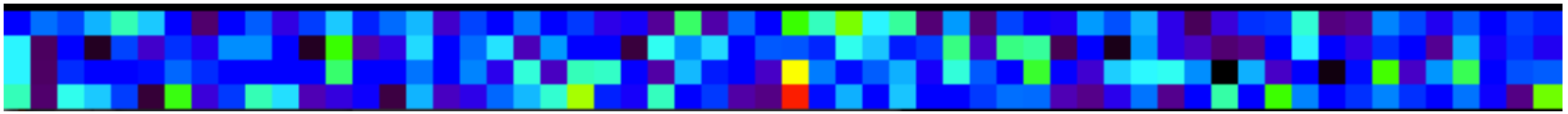
2005-050T09:03

Alt= 1,578,980 km

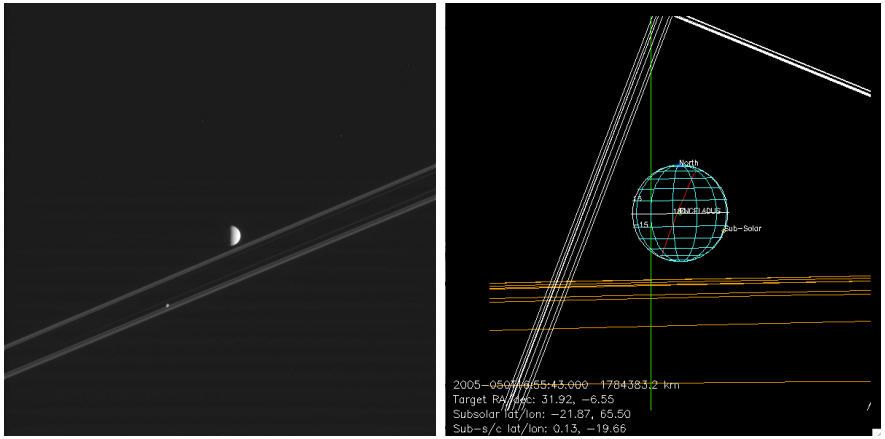
Longitude= 310°W

Latitude=0.16°N

Phase= 100.4°



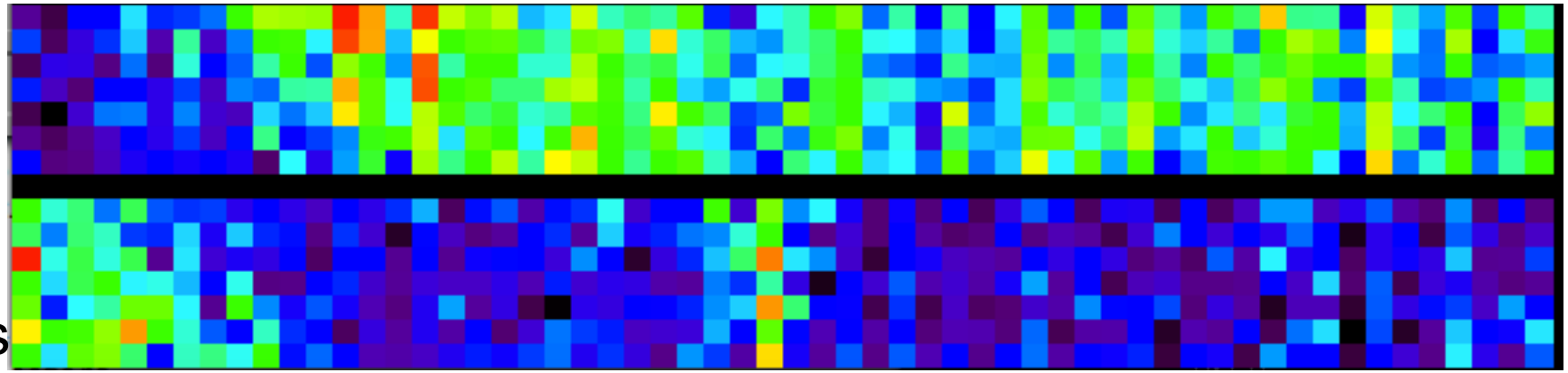
003EN_022W088PH001



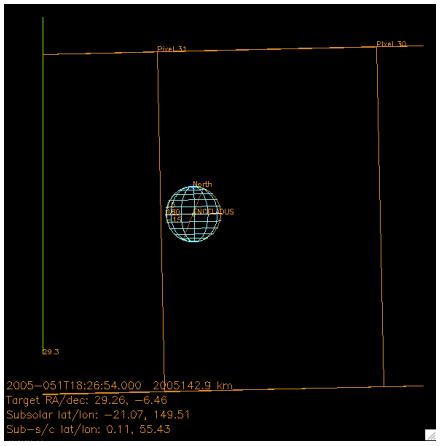
003EN_ICYLON010_ISS
2005-050T16:56
Alt= 1,784,035 km
Longitude= 22°W
Latitude
Phase= 88.1°

Ly-a

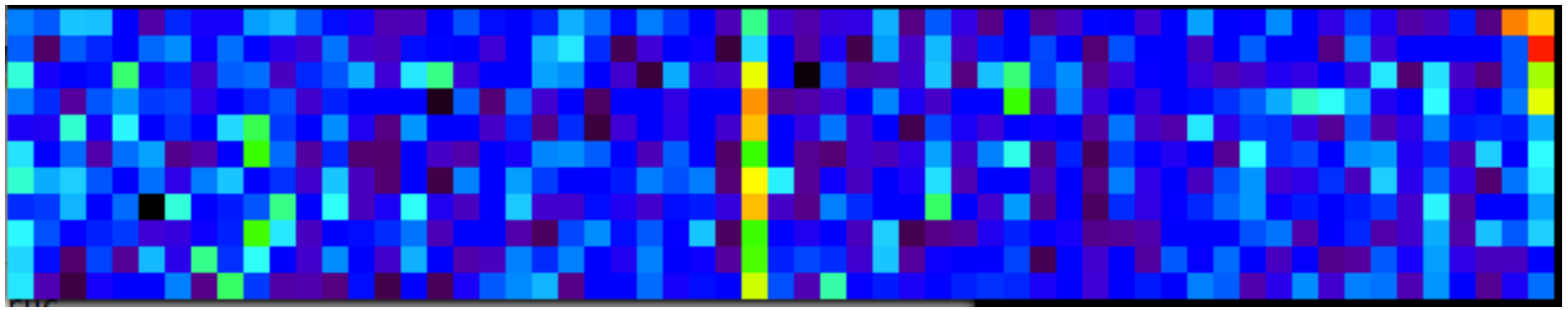
Long waves



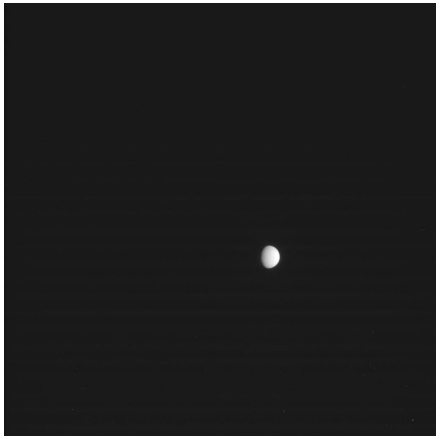
003EN_310W090PH001

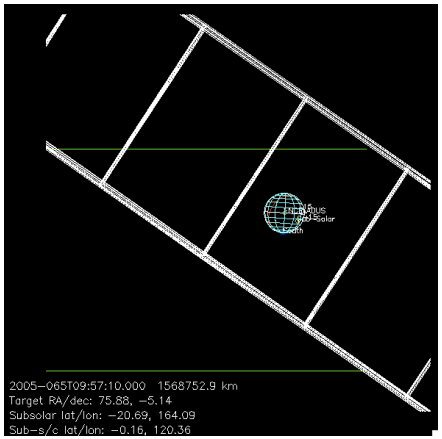


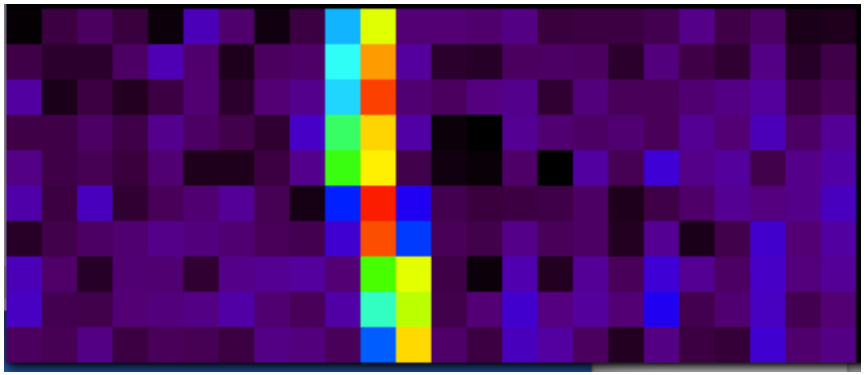
003EN_ICYLON011_ISS
2005-051T18:27
Alt= 2,012,934 km
Longitude= 306°W
Latitude=0.1°N
Phase= 90.2°

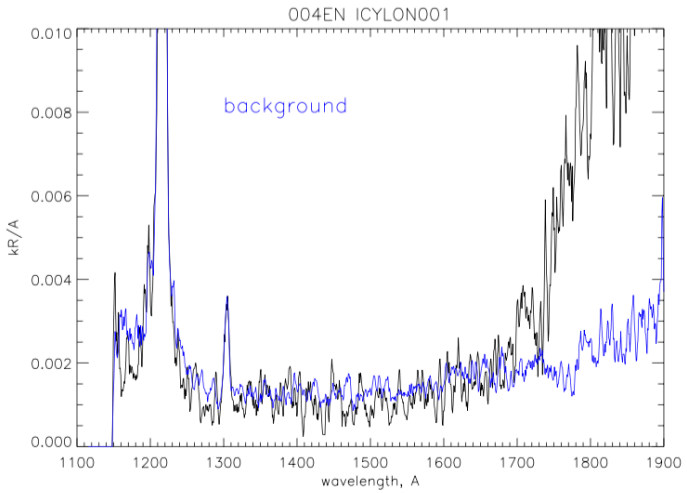


004EN_238W049PH001

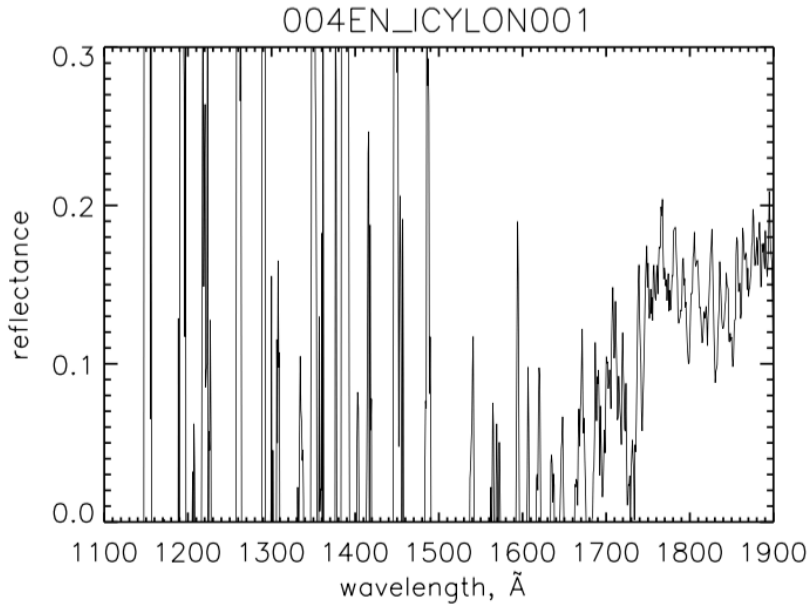




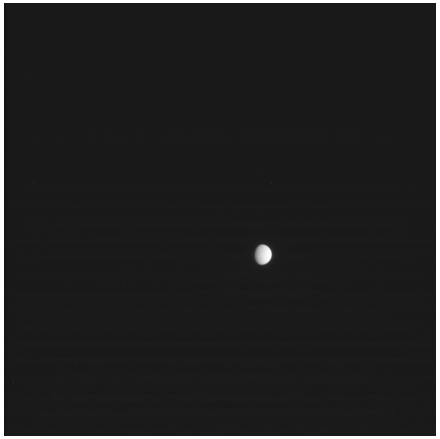


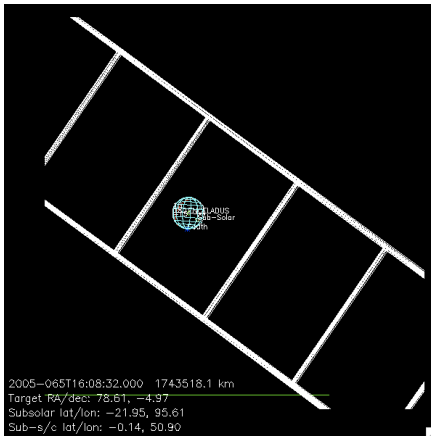


004EN_ICYLON001_ISS
2005-065T09:58
Alt= 1,572,427 km
Longitude= 241°W
Latitude=0.2°S
Phase= 48.6°

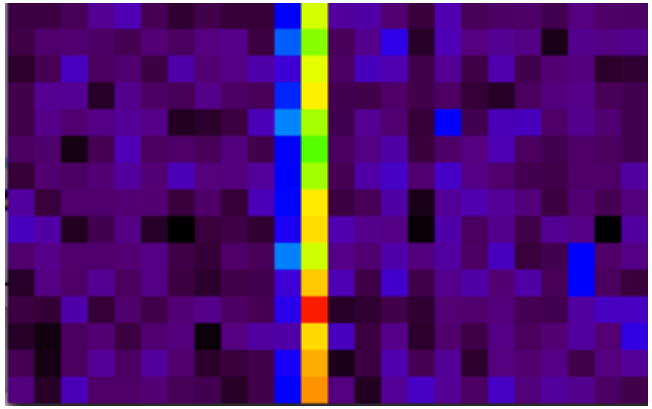


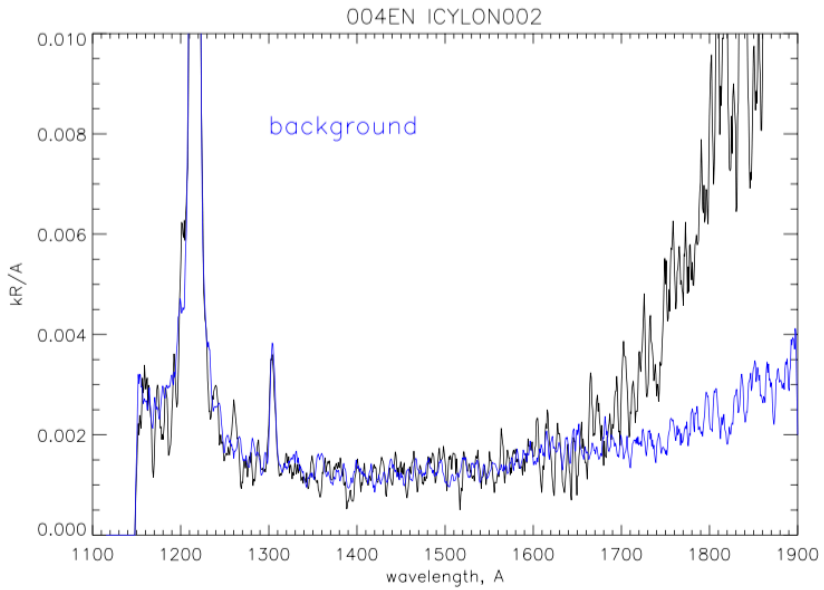
004EN_310W047PH001

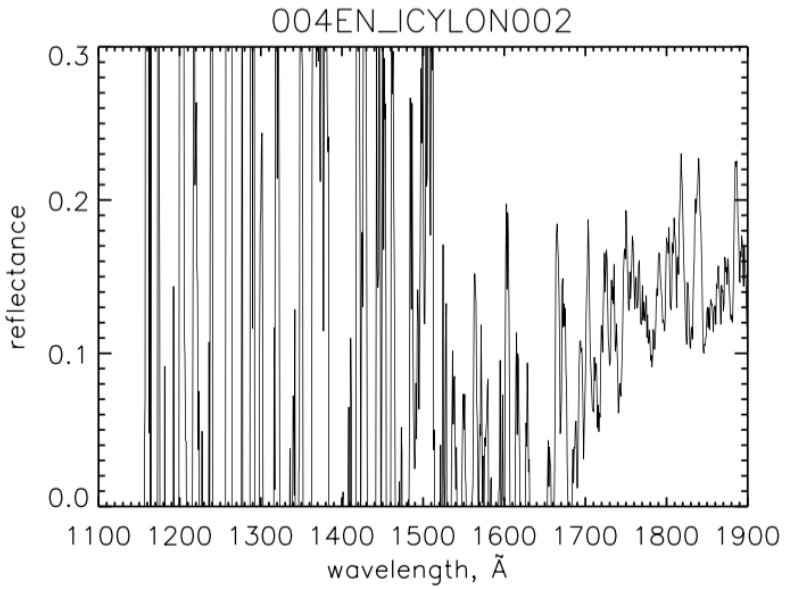




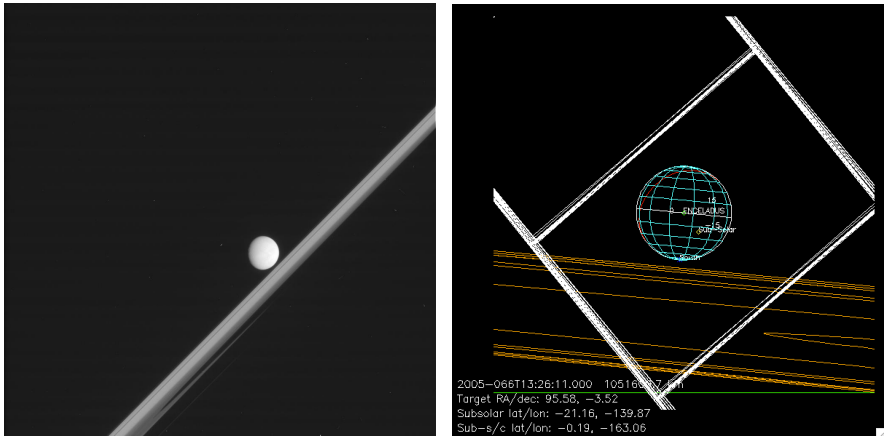
004EN_ICYLON002_ISS
2005-065T16:09
Alt= 1,748,105 km
Longitude= 311°W
Latitude=0.14°S
Phase= 46.6°



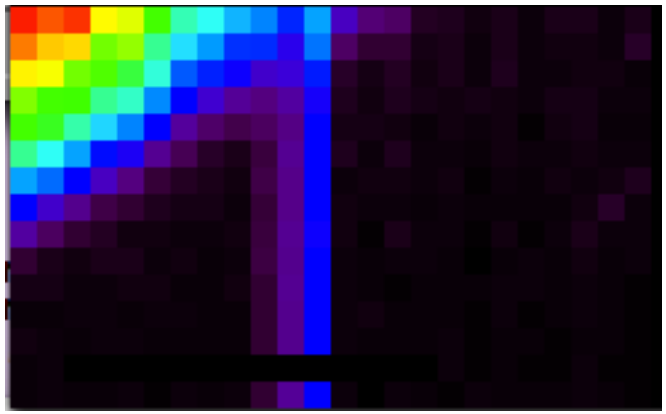




004EN_166W033PH001_ISS

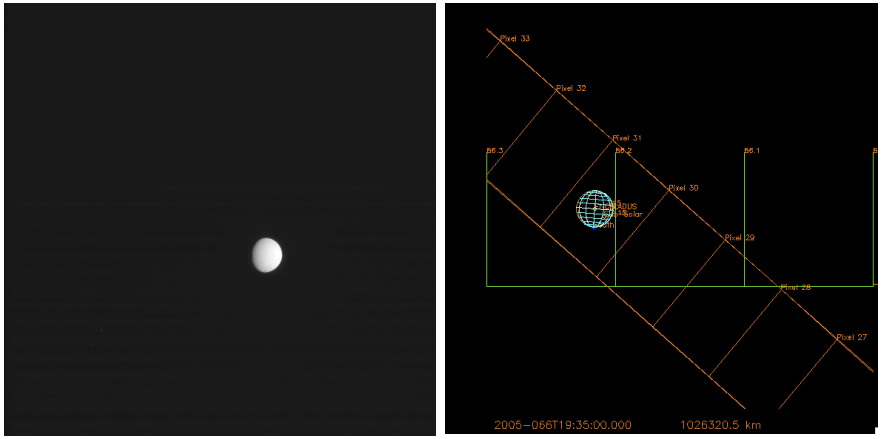


004EN_ICYLON003_ISS
2005-066T13:27
Alt= 1,044,335 km
Longitude= 166°W
Latitude=0.19°S
Phase= 32.5°



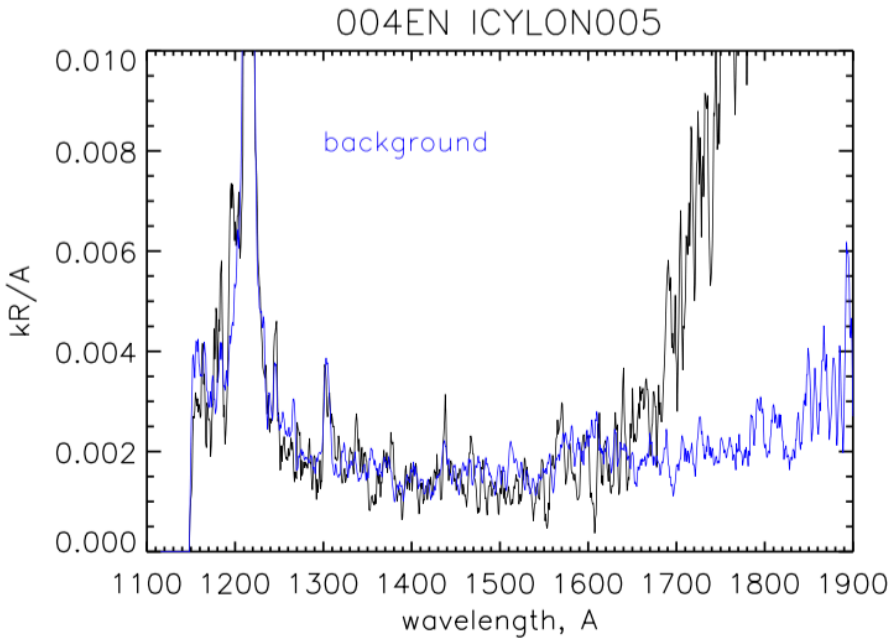
Enceladus in same row as rings

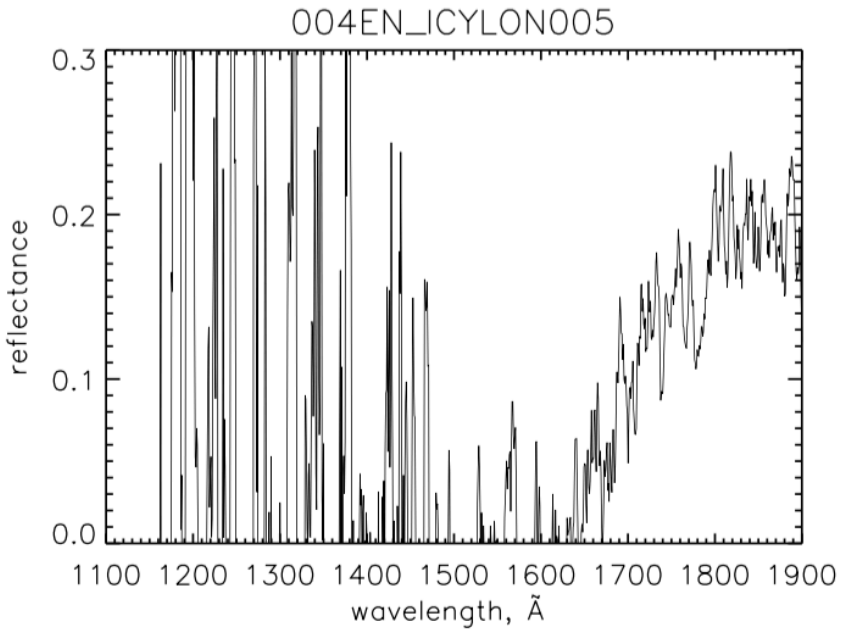
004EN_238W040PH001_ISS



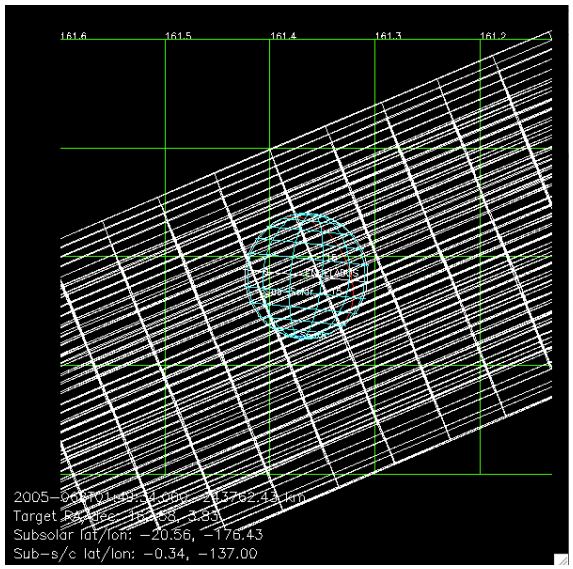
004EN_ICYLON005_ISS

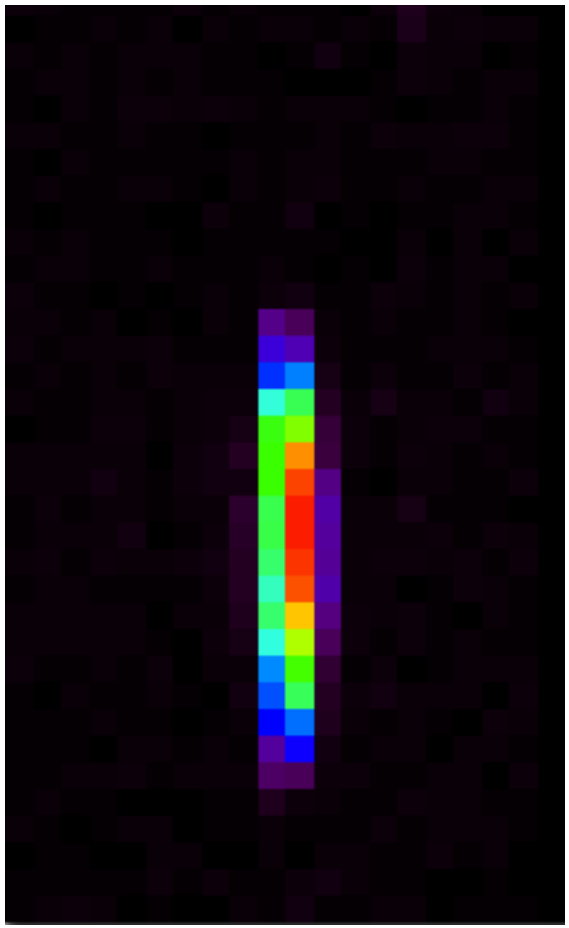
2005-066T19:34
Alt= 1,027,304.3 km
Longitude= 238°W
Latitude=0.2°S
Phase= 40.08°



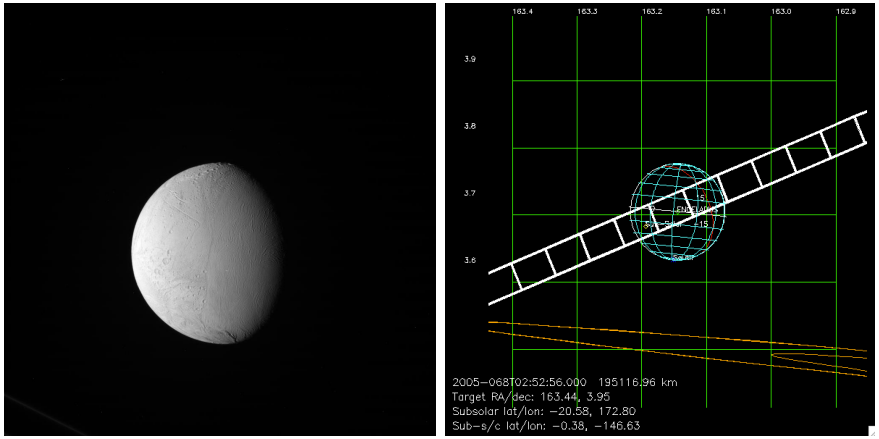


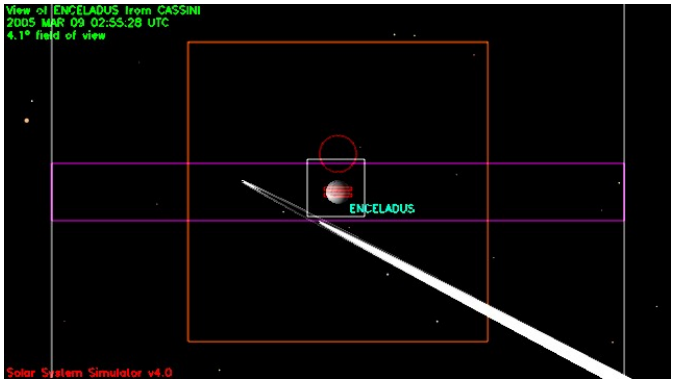
004EN_ICYMAP001_CIRS
2005-068T01:50
Alt= 227,413 km
Longitude= 140°W
Latitude=0.35°S
Phase= 46.3°

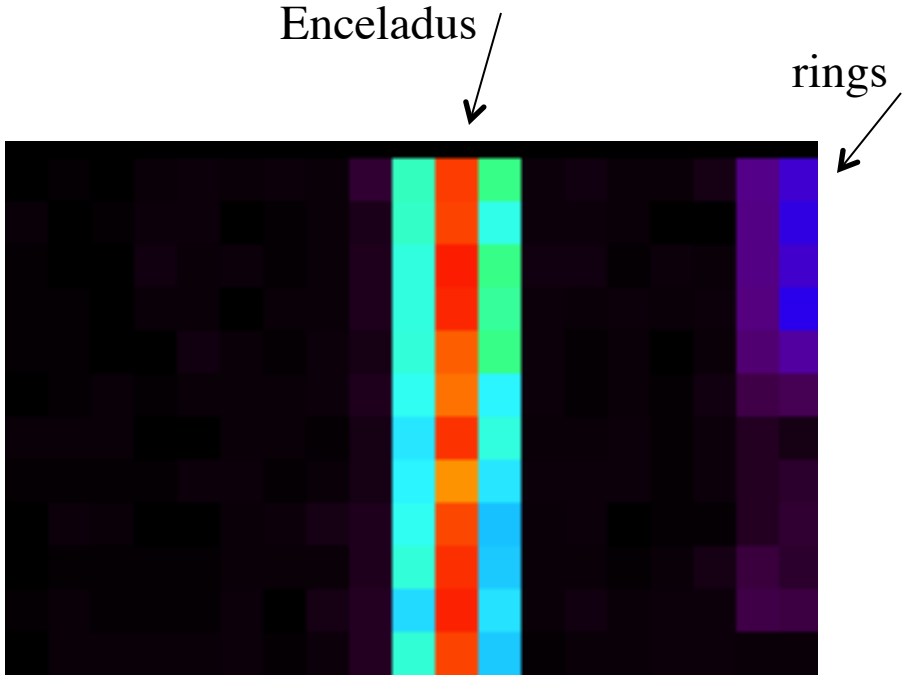




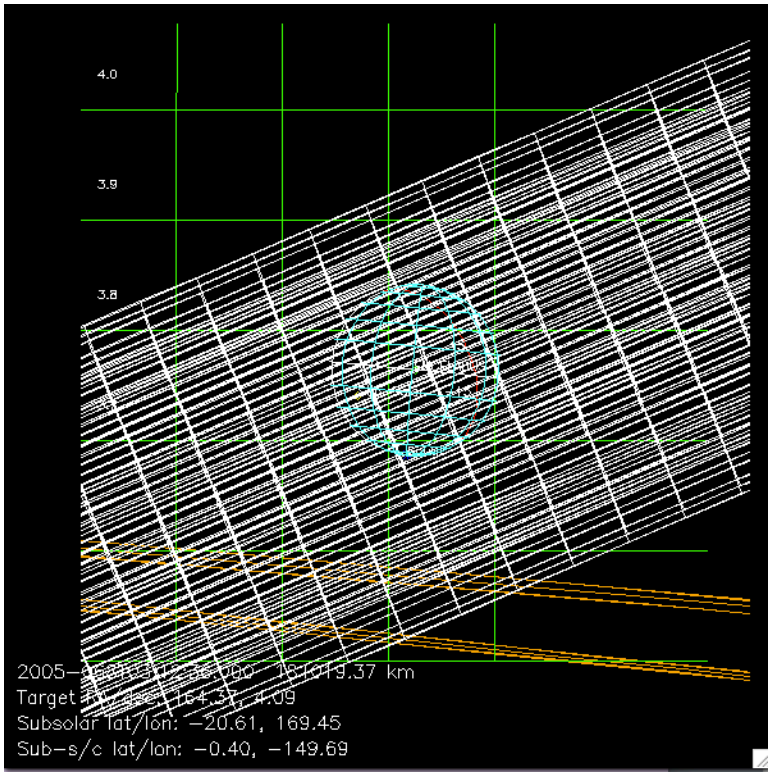
004EN_ICYMAP002_ISS
2005-068T02:53
Alt= 190,089 km
Longitude= 148°W
Latitude=0.39°S
Phase= 47.4°

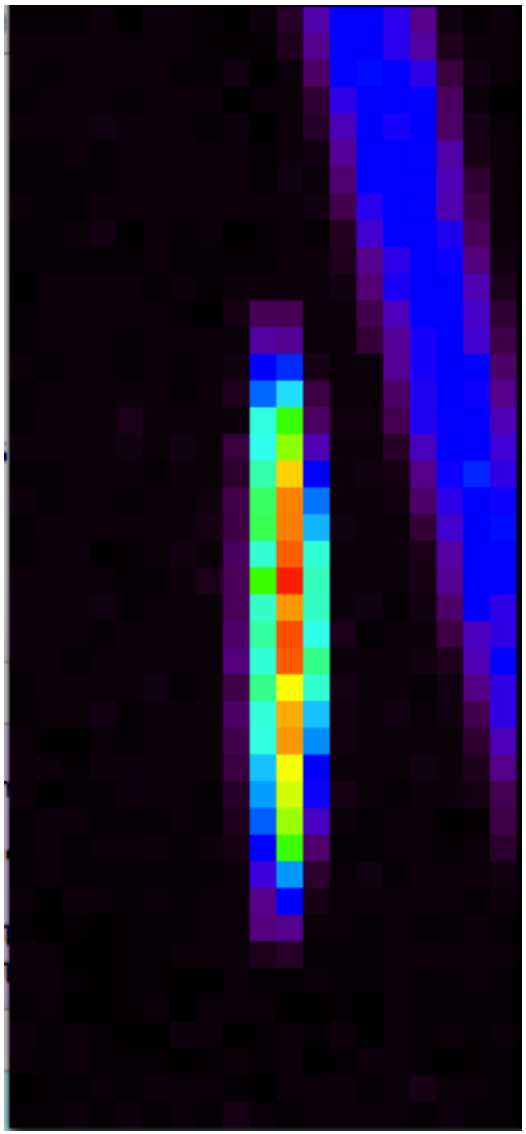




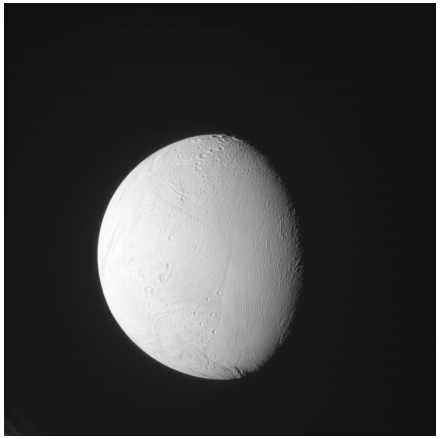


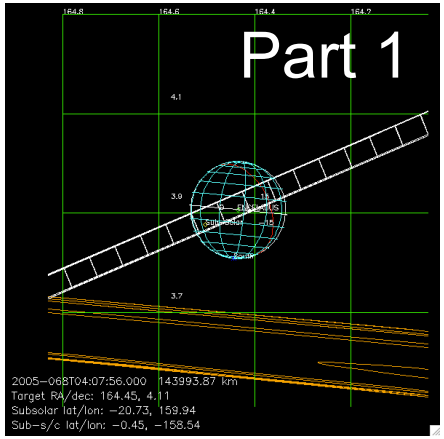
004EN_ICYMAP003_CIRS
2005-068T03:13
Alt= 163,956 km
Longitude= 154°W
Latitude=0.42°S
Phase= 48.°

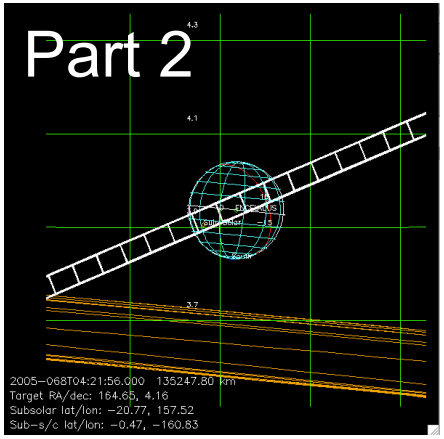


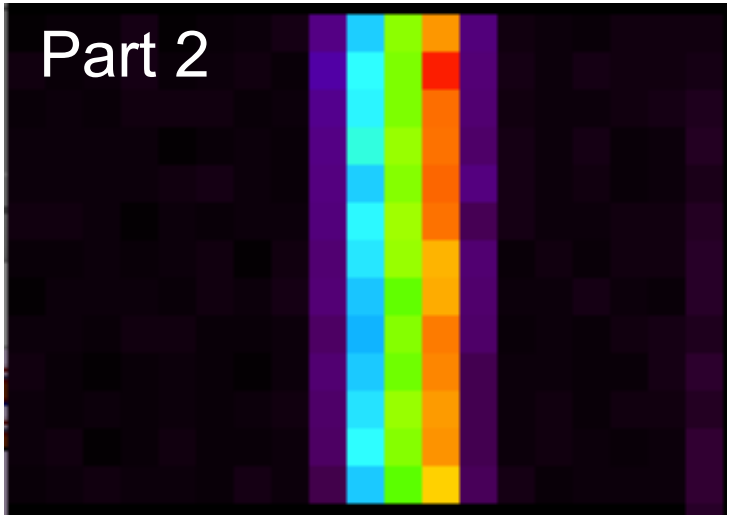


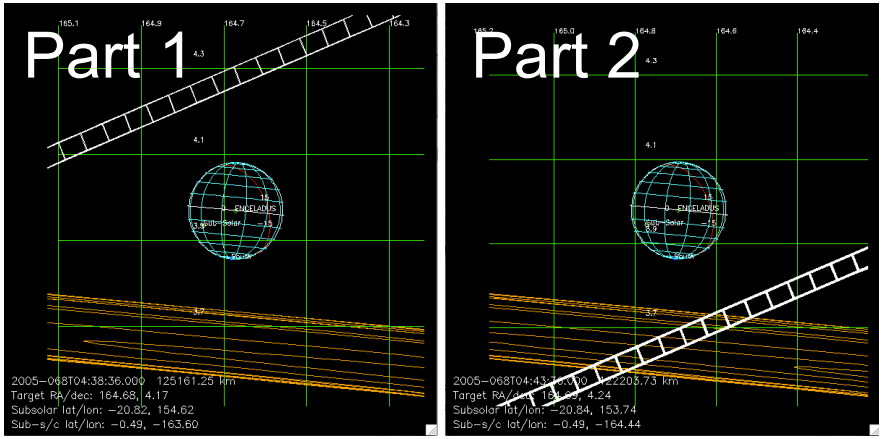
004EN_ICYMAP004_ISS
2005-068T04:08
Alt= 143,359 km
Longitude= 158°W
Latitude=0.45°S
Phase= 48.3°





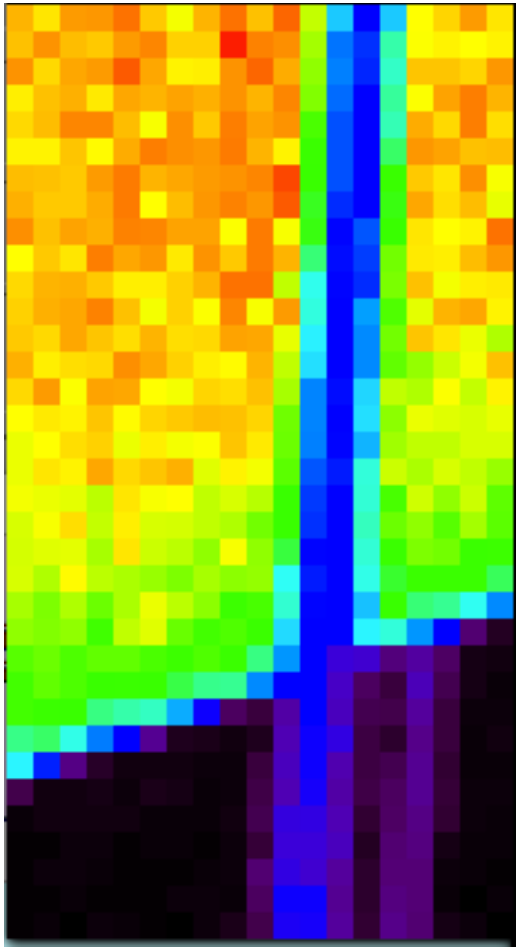






004EN_ICYMAP005_CIRS
2005-068T04:39
Alt= 124,549 km
Longitude= 164°W
Latitude=0.48°S
Phase= 48.5°

Part 2



UVIS slit is offset from Enceladus, pointing at rings as Enceladus moves in front on Saturn

004EN_ICYMAP006_ISS

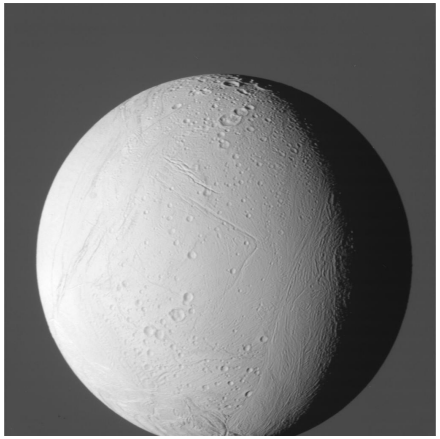
2005-068T05:29

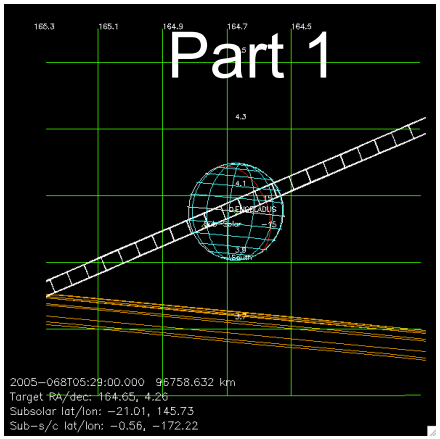
Alt= 95,413 km

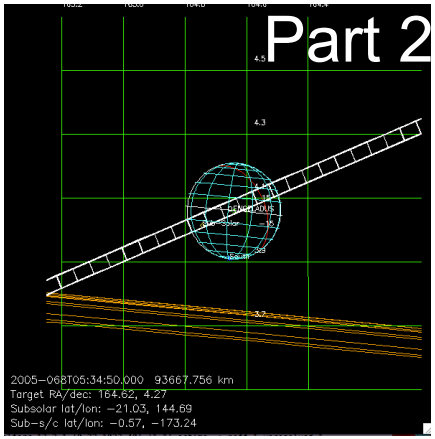
Longitude= 173°W

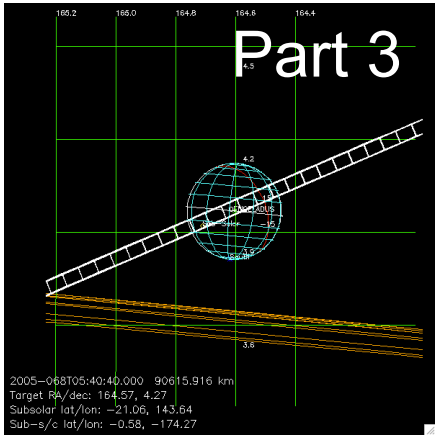
Latitude=0.56°S

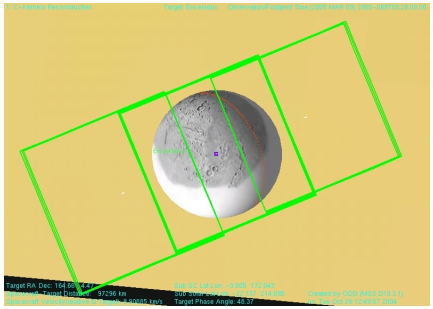
Phase= 48.5°







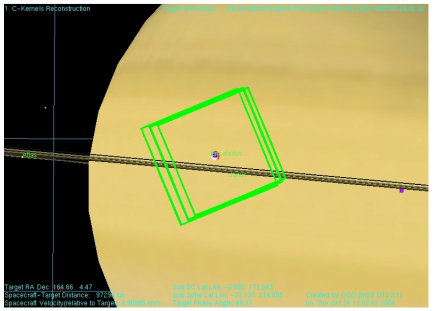


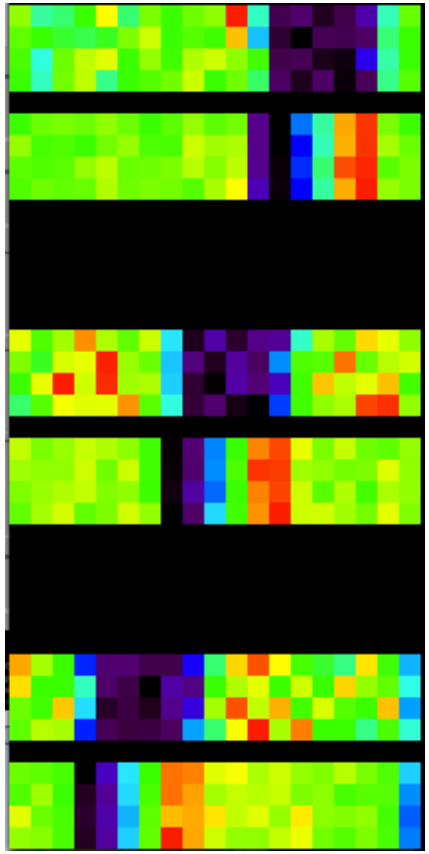


ISS_004EN_N4COLR004_PRIME

START: 2005-068T05:27:01
DUR: 000T00:25:00

	START	DWELL
Footprint 1	068T05:27:05	00:05:05.50
Footprint 2	068T05:32:55	00:05:05.50
Footprint 3	068T05:38:45	00:05:15.50





Part 3 Ly-a

Part 3 long waves

Part 2 Ly-a

Part 2 long waves

Part 1 Ly-a

Part 1 long waves

004EN_ICYMAP007_CIRS

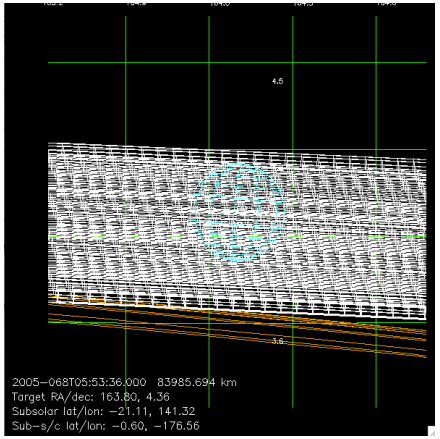
2005-068T05:54

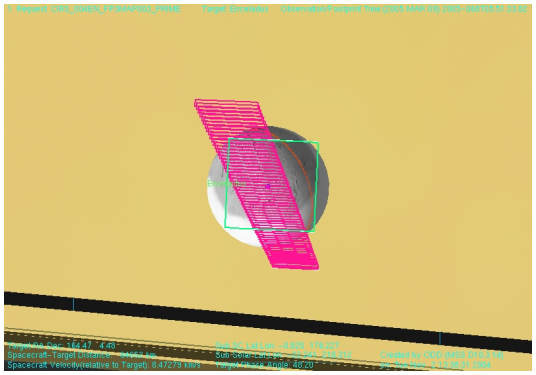
Alt= 71,151 km

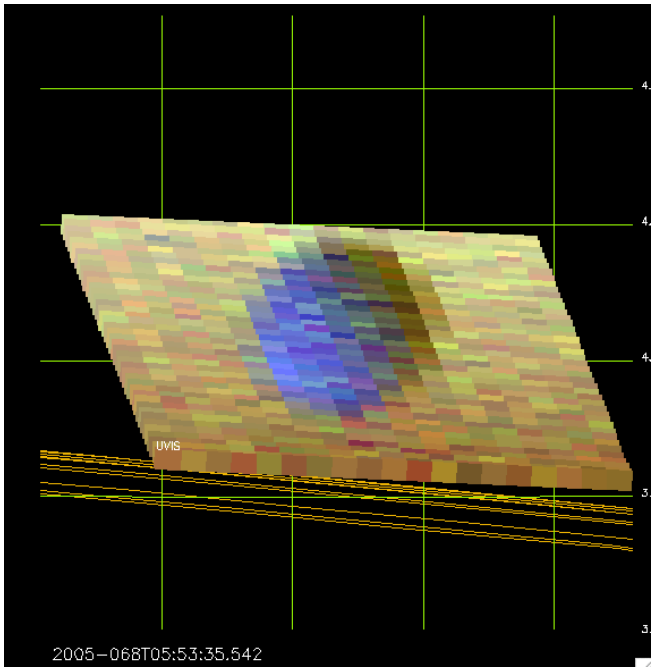
Longitude= 181°W

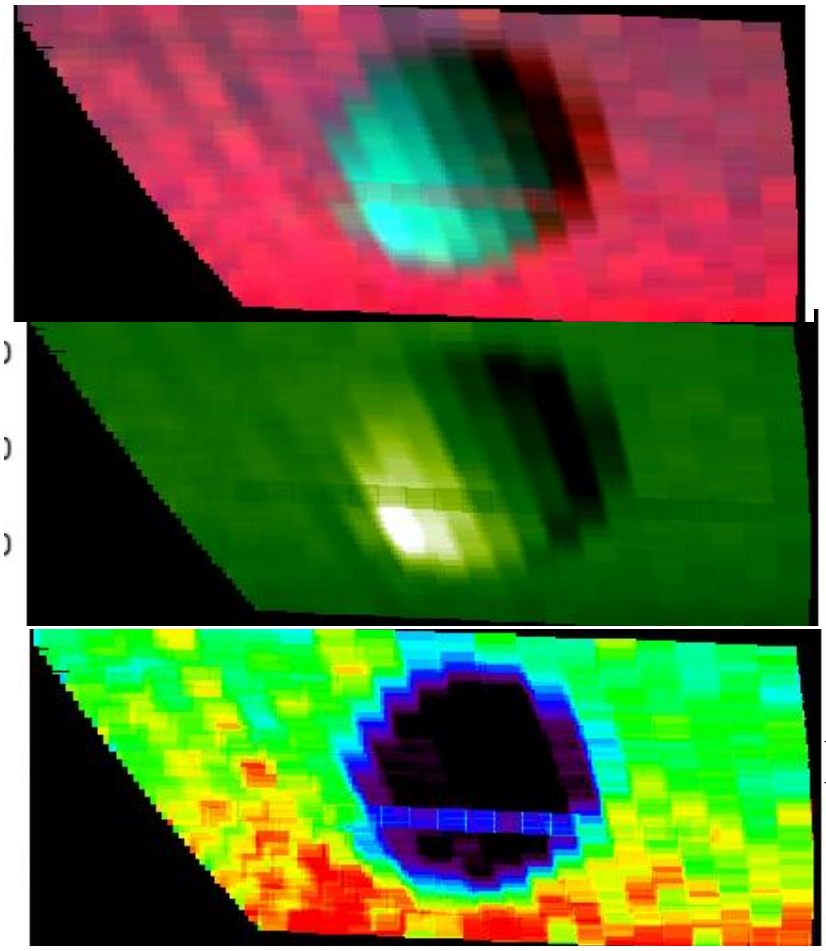
Latitude=0.66°S

Phase= 48°









LW

Ly-α

004EN_ICYMAP008_ISS

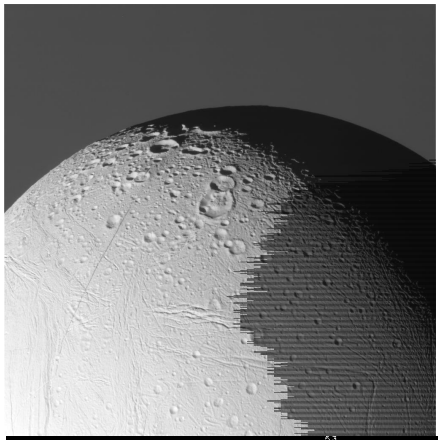
2005-068T06:49

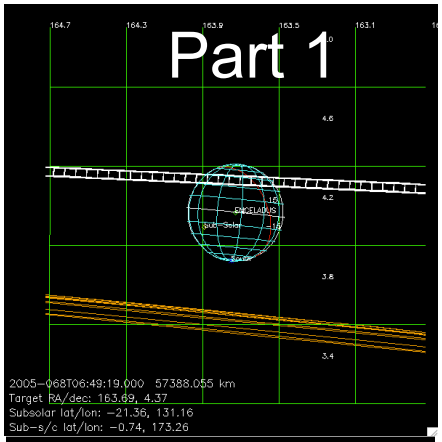
Alt= 56,681 km

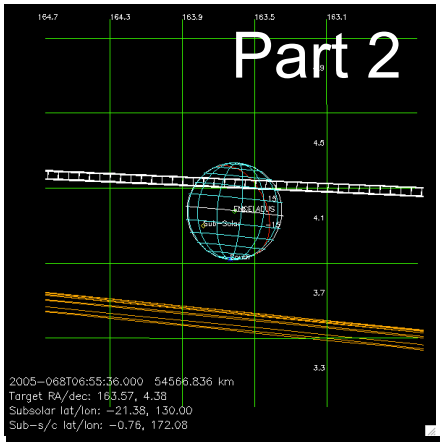
Longitude= 187°W

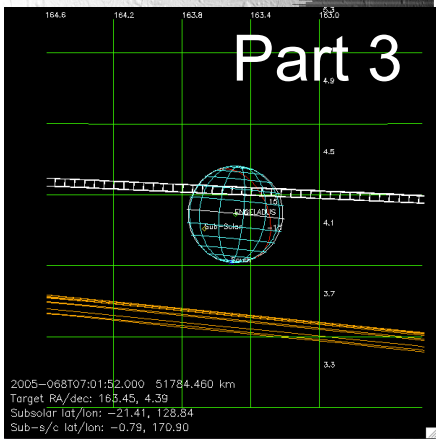
Latitude=0.75°S

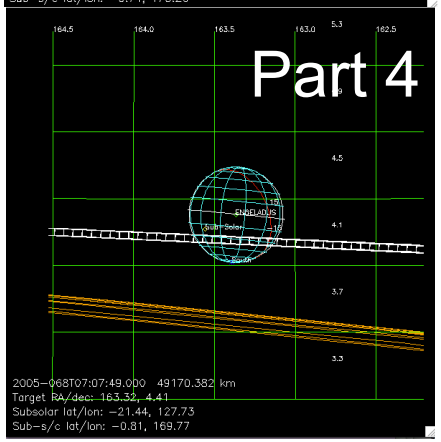
Phase= 47.5°

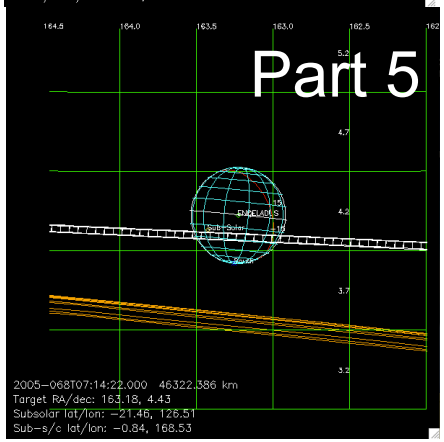


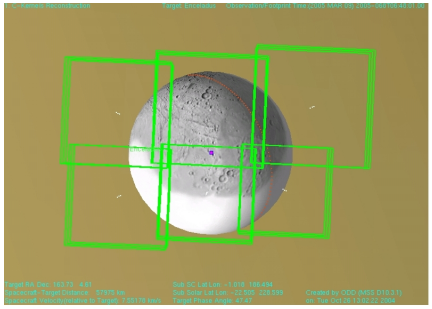










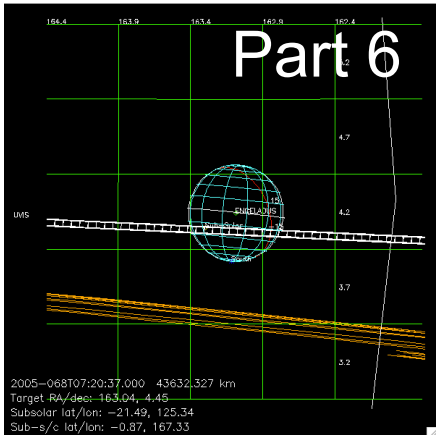


ISS_004EN_NGNPOL001_PRIME

START: 2005-068T06:47:01

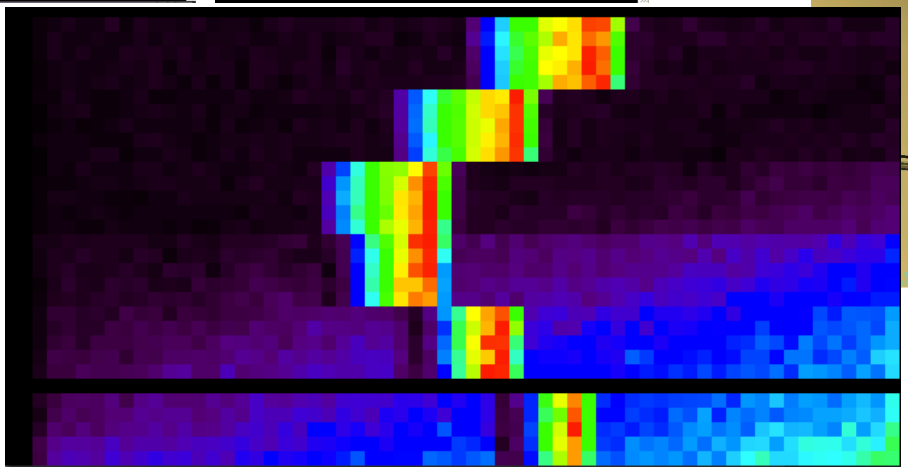
DUR: 000T00:40:00

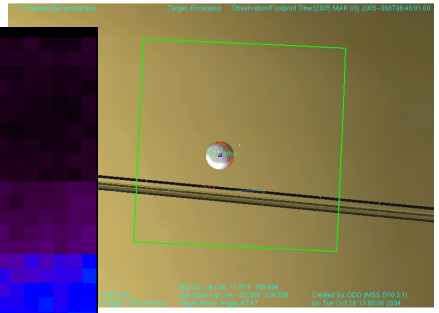
	START	DWELL		START	DWELL
Footprint 1	068T06:47:11	00:05:24.25	Footprint 4	068T07:05:40	00:05:41.00
Footprint 2	068T06:53:28	00:05:23.00	Footprint 5	068T07:12:13	00:05:23.00
Footprint 3	068T06:59:43	00:05:23.00	Footprint 6	068T07:18:28	00:05:43.00



Part 6

Part 1





004EN_ICYMAP009_CIRS

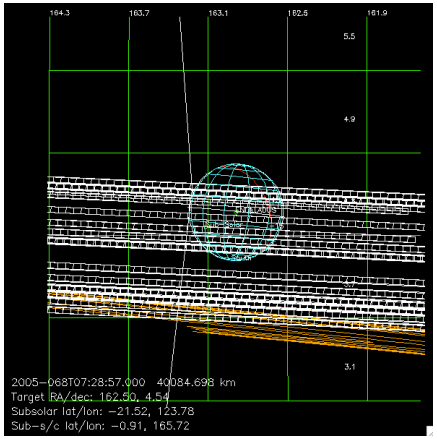
2005-068T07:29

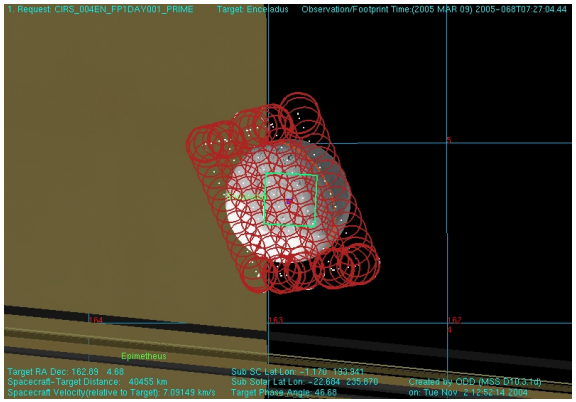
Alt= 36,677 km

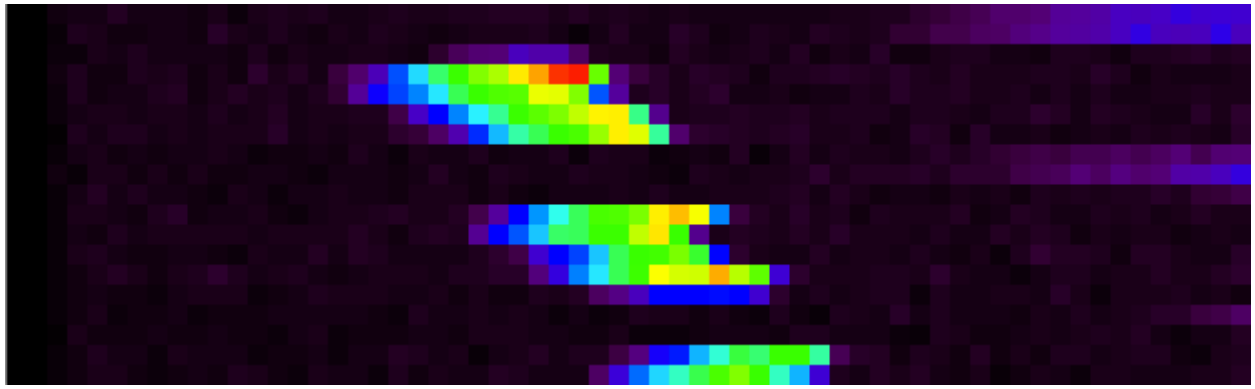
Longitude= 196°W

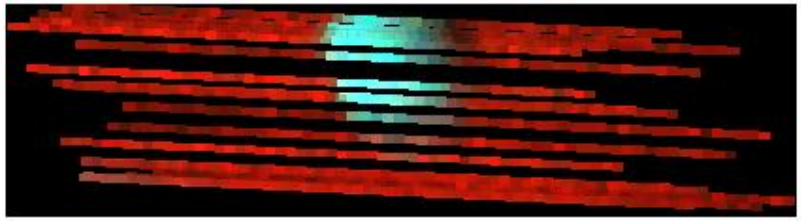
Latitude=1°S

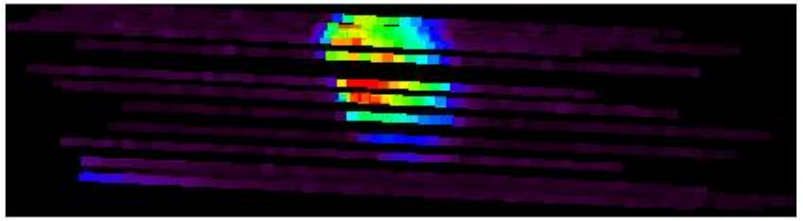
Phase= 46.6°





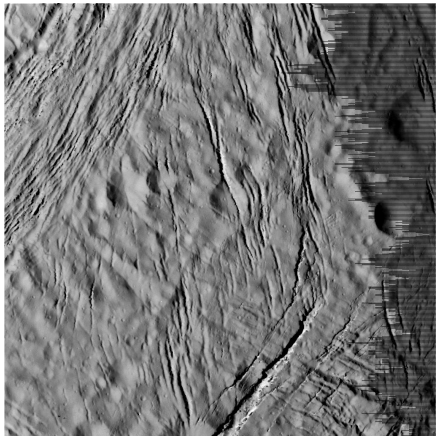


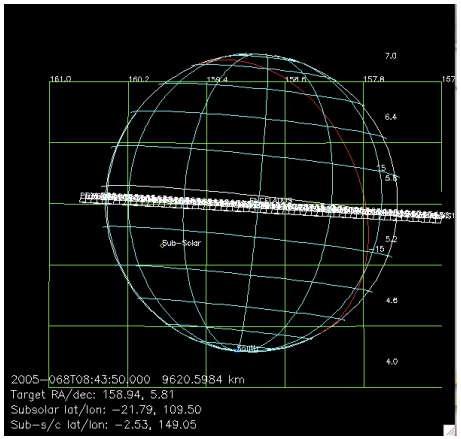


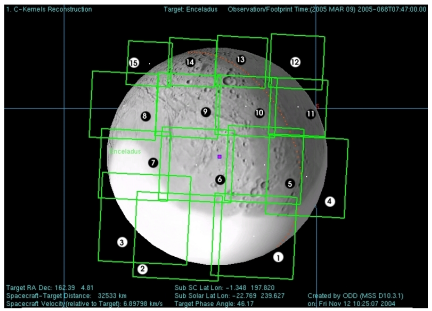


21-panel mosaic

004EN_ICYMAP010_ISS
2005-068T07:49
Alt= 31,357 km
Longitude= 198°W
Latitude=1.1°S
Phase= 46.2°



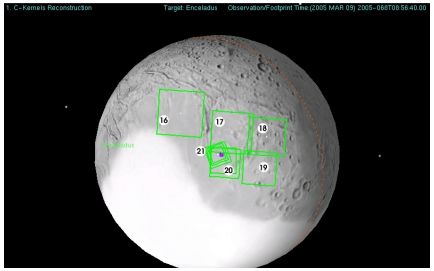


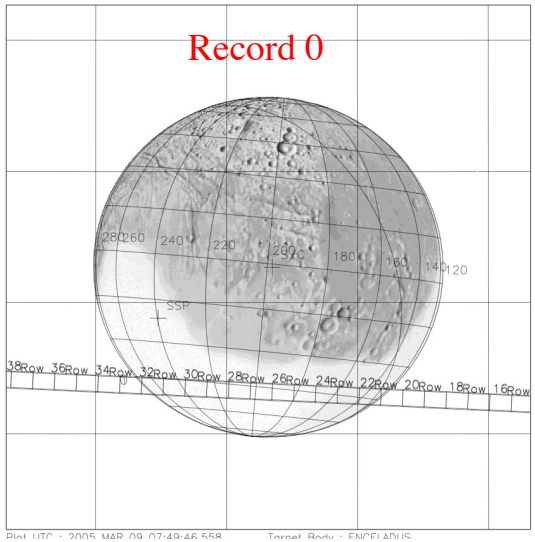


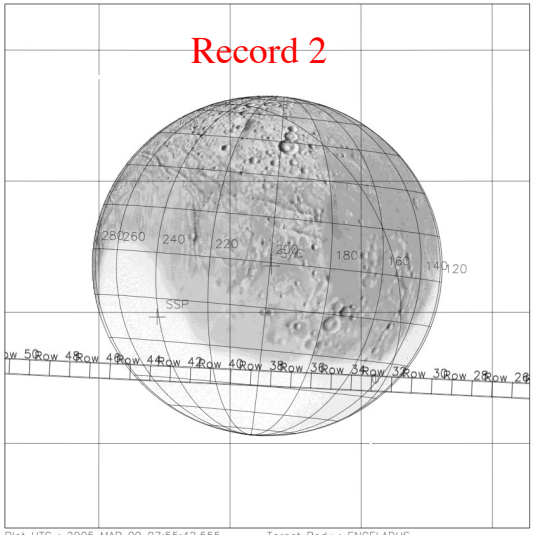
ISS_004EN_REGEO002_PRIME

START: 2005-068T07:47:01
DUR: 000T01:11:00

	START	DWELL		START	DWELL
Footprint 1	068T07:47:20	00:02:02.00	Footprint 11	068T08:15:56	00:02:00.00
Footprint 2	068T07:50:16	00:02:00.13	Footprint 12	068T08:18:31	00:02:00.50
Footprint 3	068T07:53:11	00:02:00.13	Footprint 13	068T08:21:27	00:02:00.25
Footprint 4	068T07:55:50	00:02:11.50	Footprint 14	068T08:24:23	00:02:00.25
Footprint 5	068T07:58:54	00:02:00.00	Footprint 15	068T08:27:19	00:02:00.25
Footprint 6	068T08:01:46	00:02:00.00	Footprint 16	068T08:30:19	00:02:00.38
Footprint 7	068T08:04:38	00:02:00.00	Footprint 17	068T08:33:14	00:02:01.13
Footprint 8	068T08:07:13	00:02:00.50	Footprint 18	068T08:36:10	00:01:59.13
Footprint 9	068T08:10:08	00:02:00.00	Footprint 19	068T08:38:45	00:02:00.50
Footprint 10	068T08:13:02	00:02:00.00	Footprint 20	068T08:41:41	00:03:19.25
			Footprint 21	068T08:51:41	00:04:59.99







004EN_ICYMAP011_CRIS

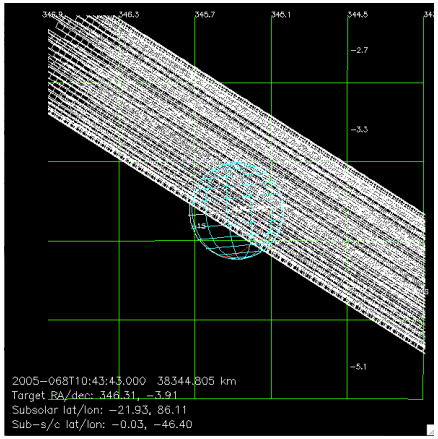
2005-068T10:44

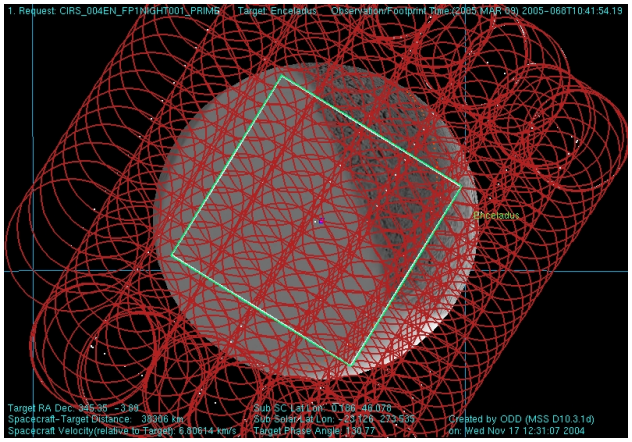
Alt= 44,875 km

Longitude= 49°W

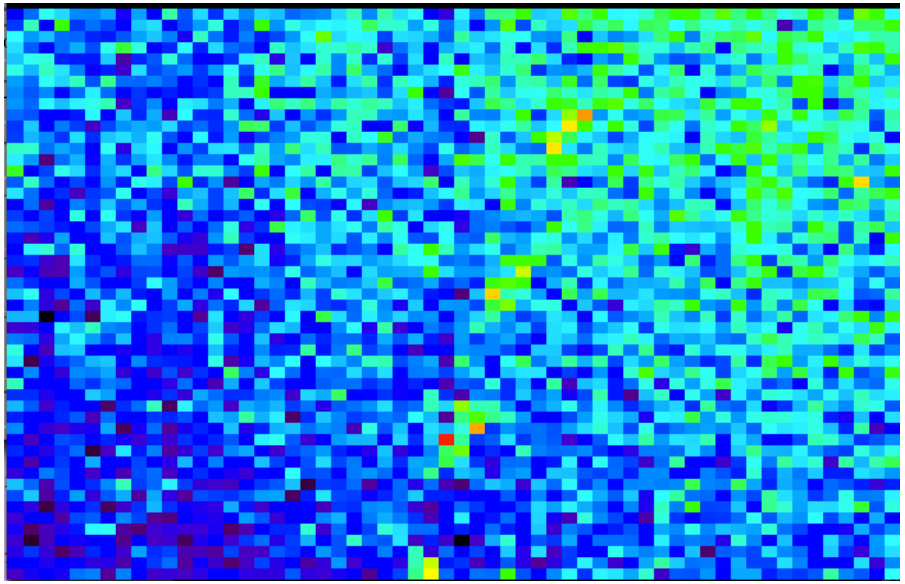
Latitude=0.05°N

Phase= 130.3°

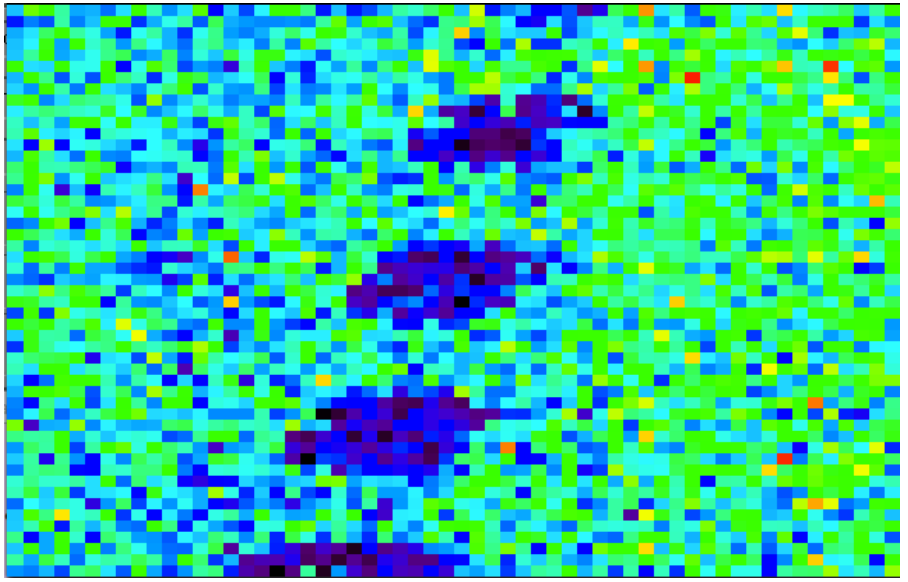




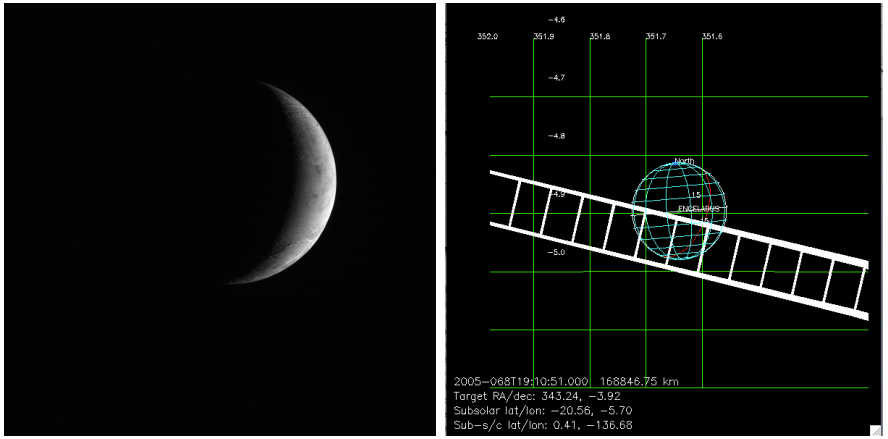
Long waves

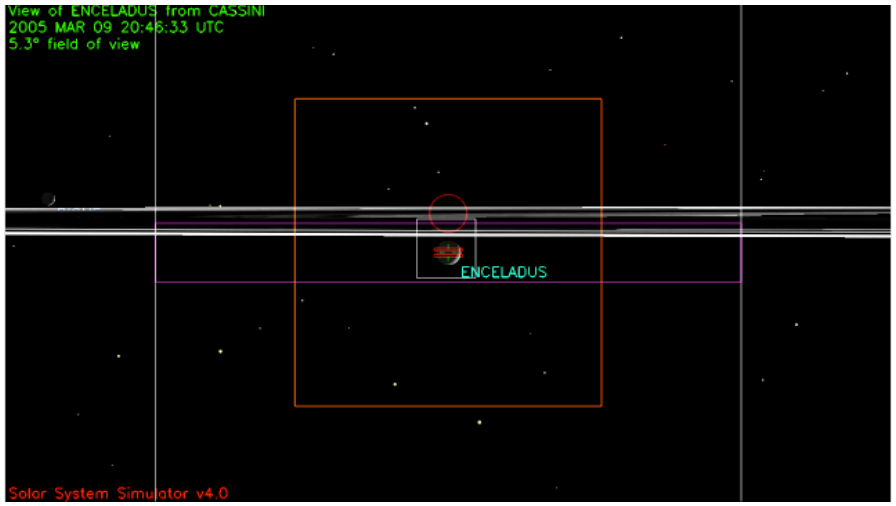


Ly-a

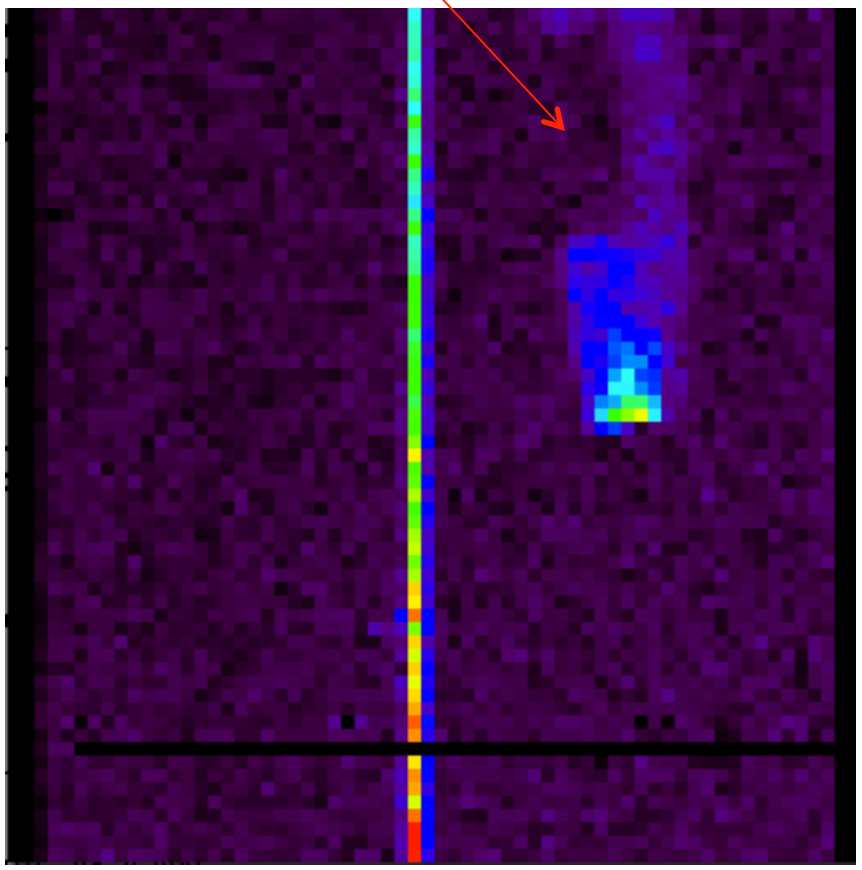


004EN_ICYLON012_ISS
2005-068T18:52
Alt= 180,830 km
Longitude= 150°W
Latitude=0.4°N
Phase= 129°

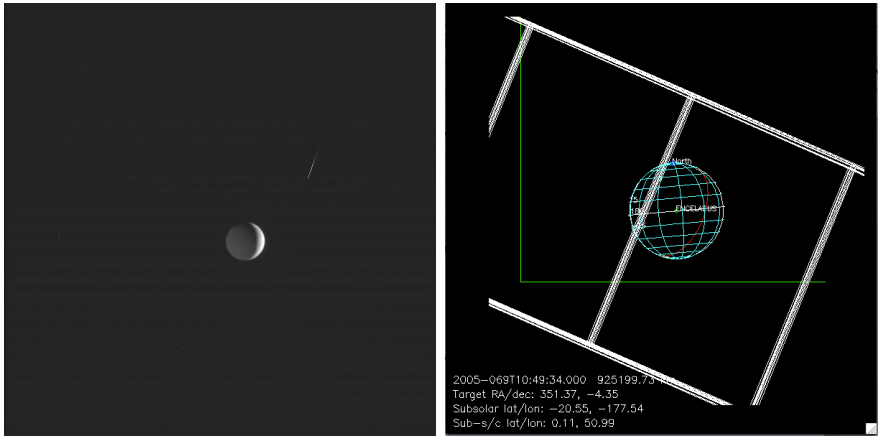




Rings skim through slit above/behind Enceladus

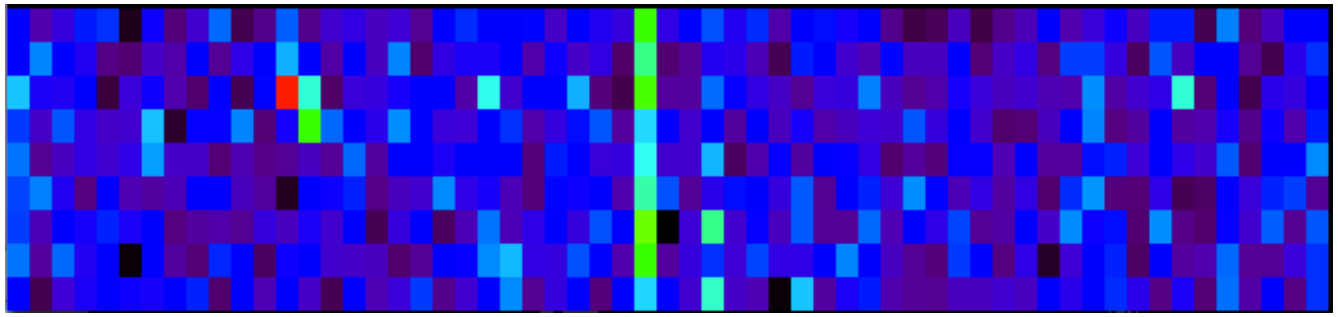


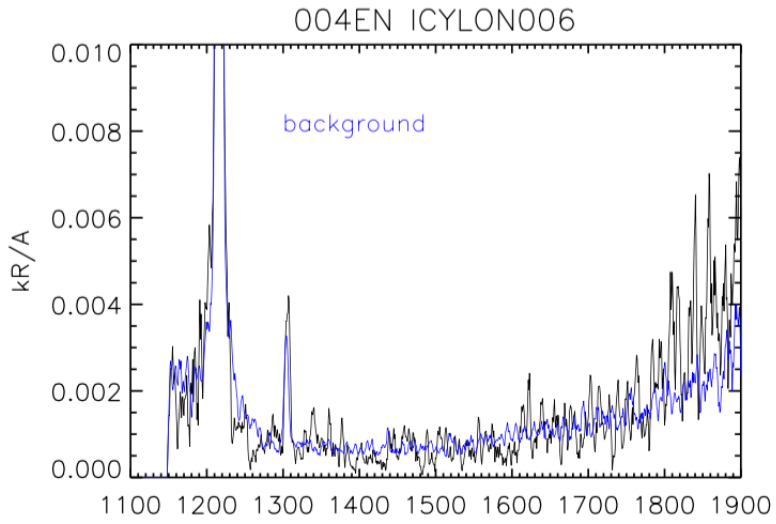
004EN_310W126PH001_ISS

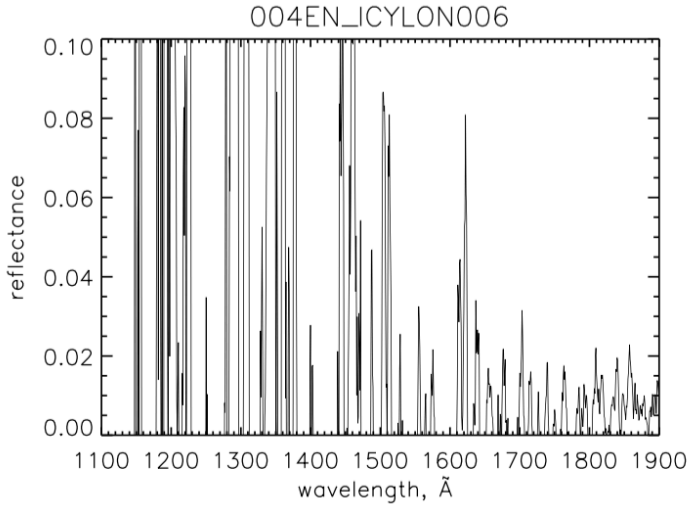


004EN_ICYLON006_ISS

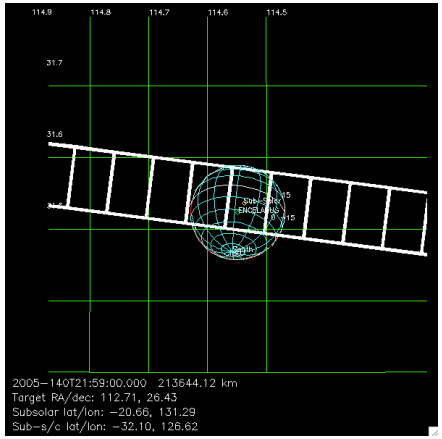
2005-069T10:50
Alt= 932,367 km
Longitude= 310°W
Latitude=0.1°N
Phase= 126°







008EN_ENCELADUS001_VIMS



008EN_ENCELADUS001_VIMS

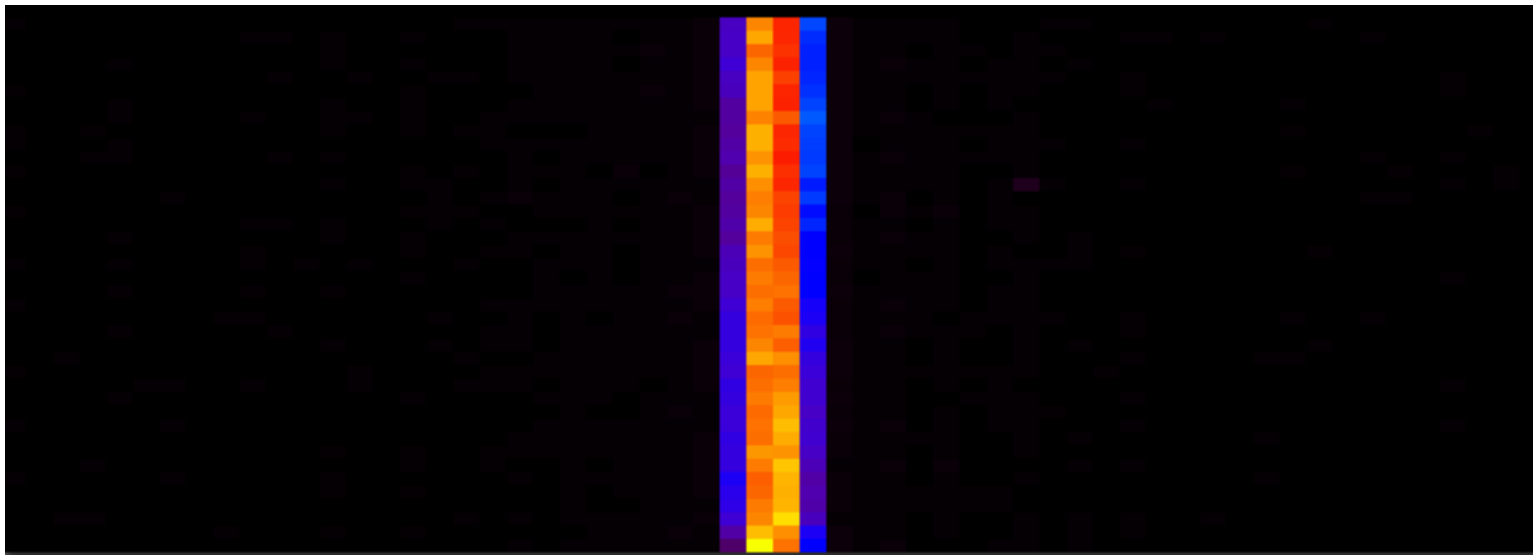
2005-140T22:00

Alt= 206,350 km

Longitude= 242°W

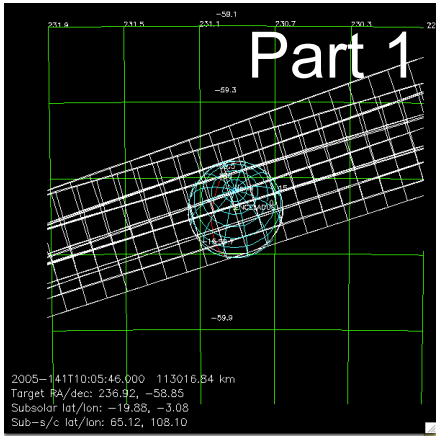
Latitude=30°S

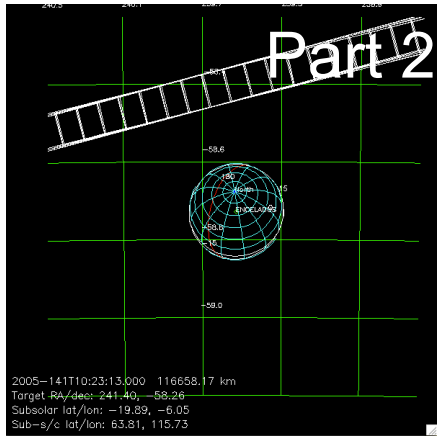
Phase= 11°

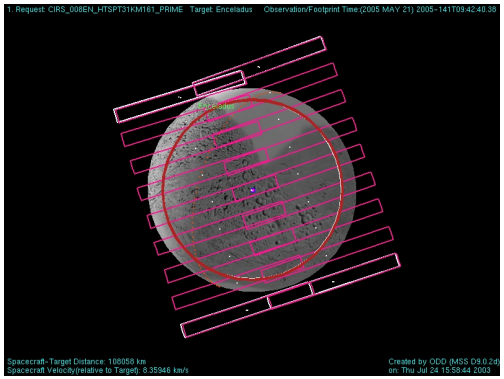


008EN_HTSPT31KM161_CIRS 2-part

008EN_htspt31km161_CIRS
2005-141T10:06
Alt= 113,977 km
Longitude= 249°W
Latitude=65°N
Phase= 119°

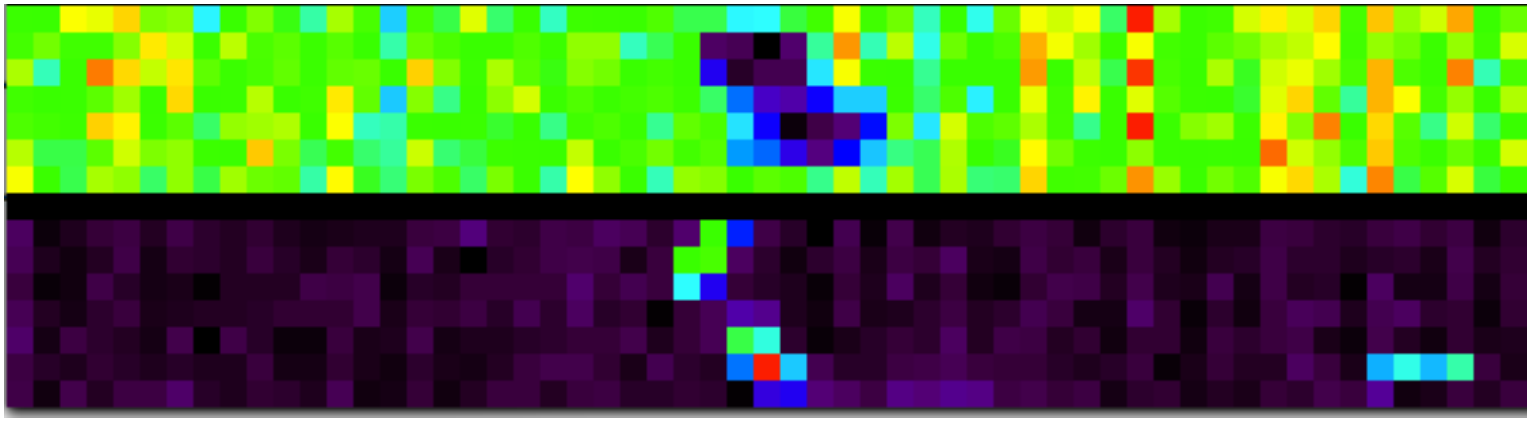






Ly-a

Long waves



CIRS_011EN_FP3MAP1001

011EN_ICYLON001_CIRS

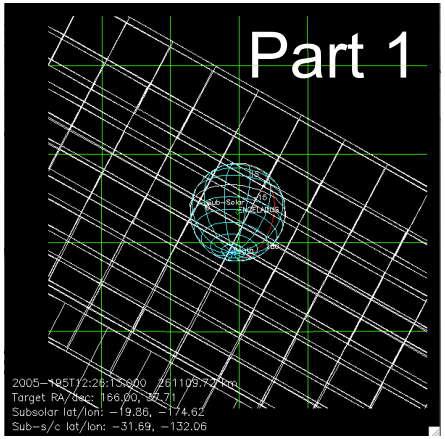
2005-195T12:27

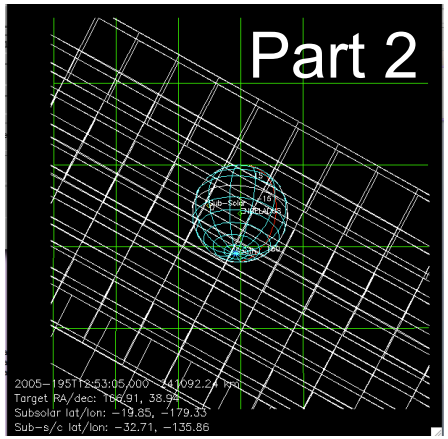
Alt= 251,859 km

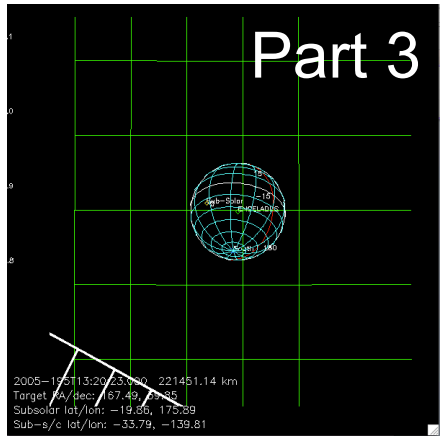
Longitude= 134°W

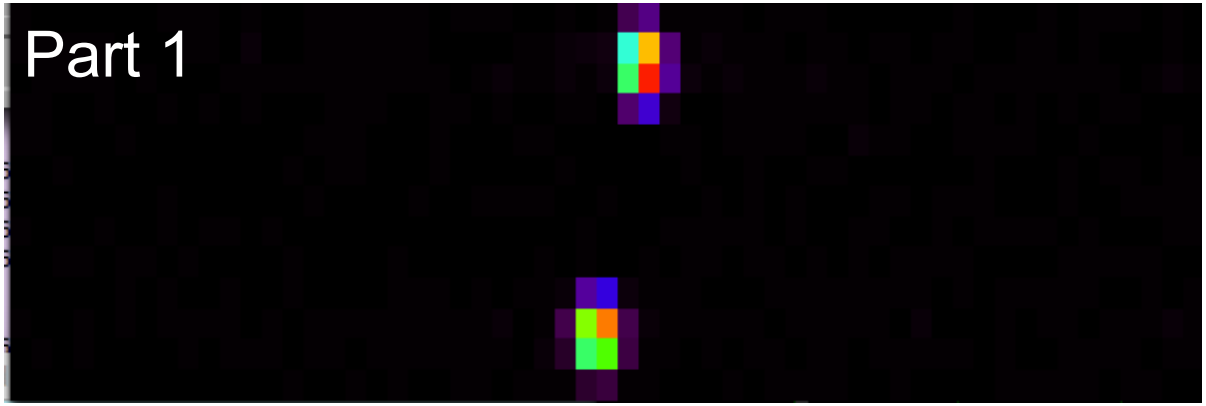
Latitude=32°S

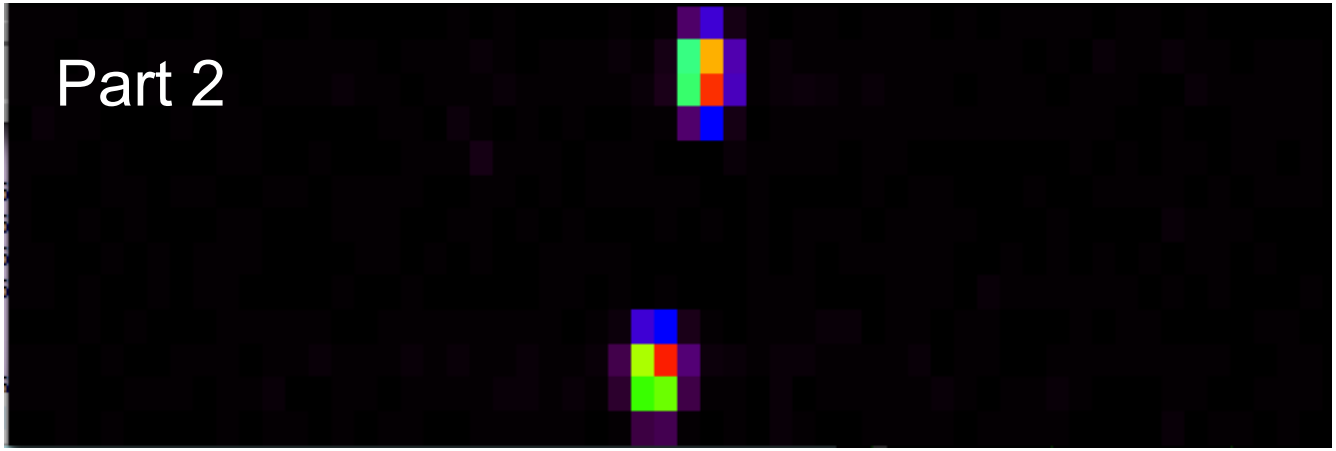
Phase= 40.7°



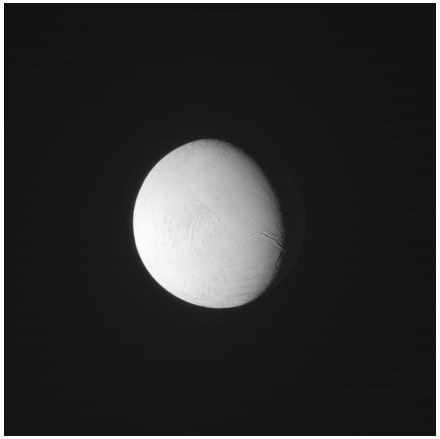


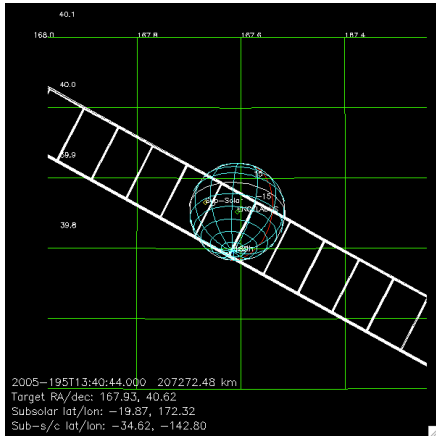






ISS_011EN_N3CPOL002





011EN_ICYLON002_ISS

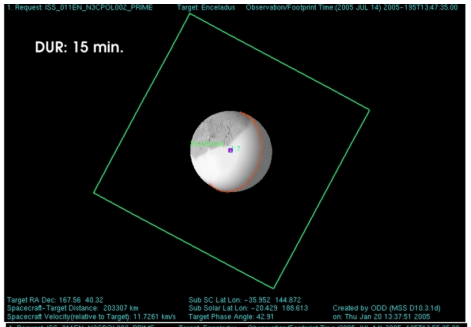
2005-195T13:41

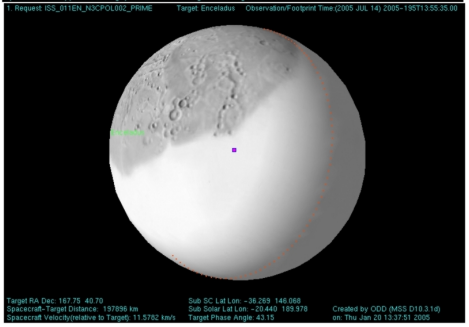
Alt= 202,922 km

Longitude= 144°W

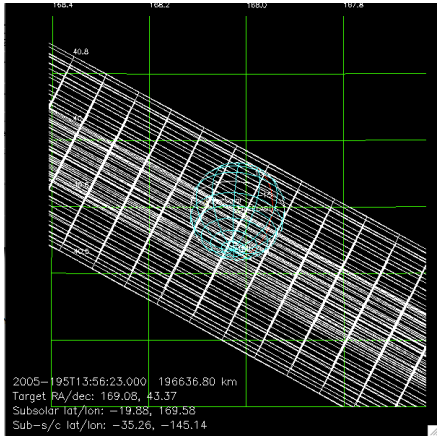
Latitude=35°S

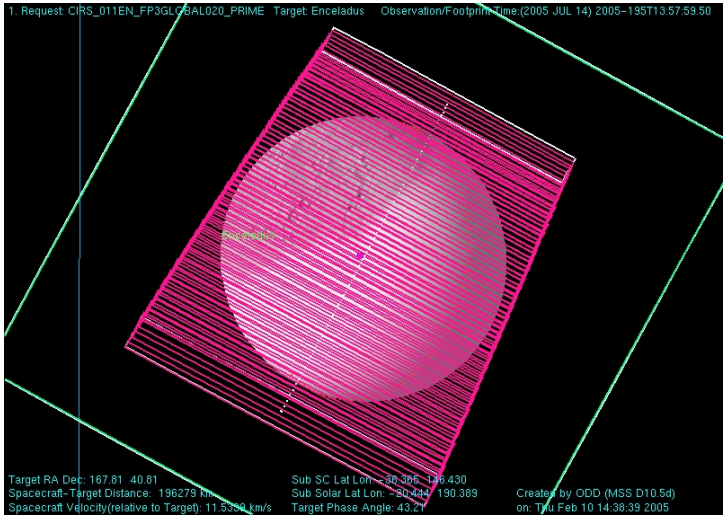
Phase= 43°





CIRS_011EN_FP3GLOBAL020





011EN_ICYLON003_CIRS

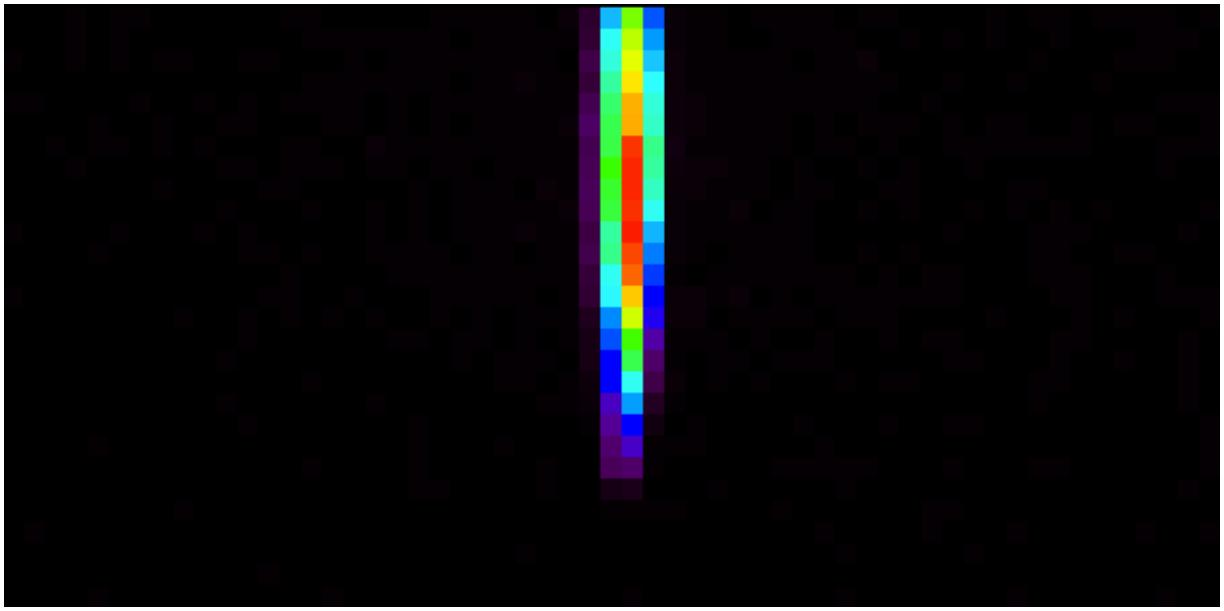
2005-195T13:57

Alt= 178,699 km

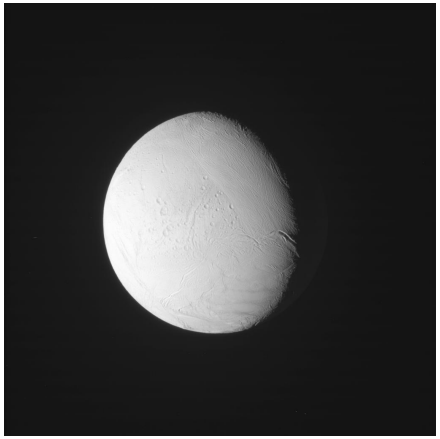
Longitude=149°W

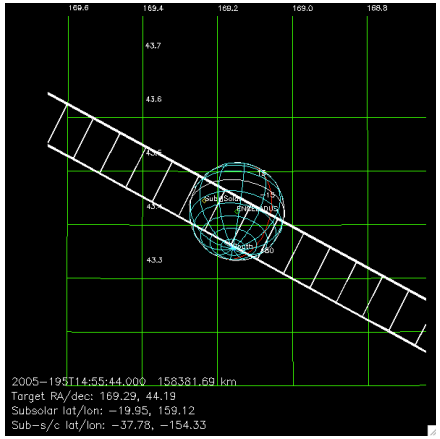
Latitude=36.4°S

Phase= 44.1°



ISS_011EN_N4COLR003





011EN_ICYLON004_ISS

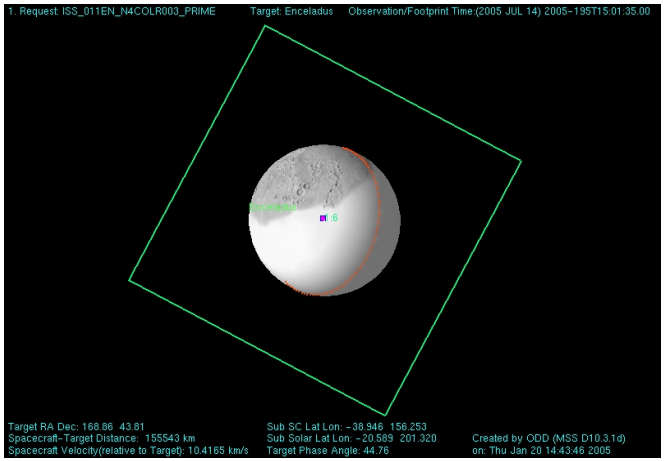
2005-195T14:56

Alt= 154,446 km

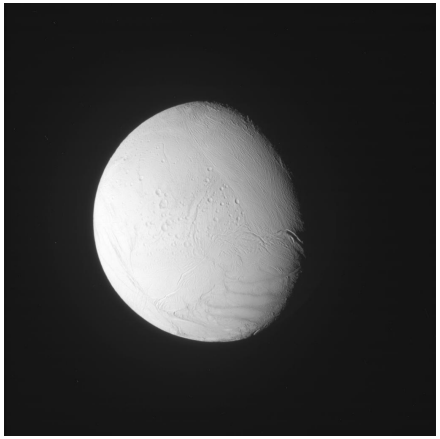
Longitude= 155°W

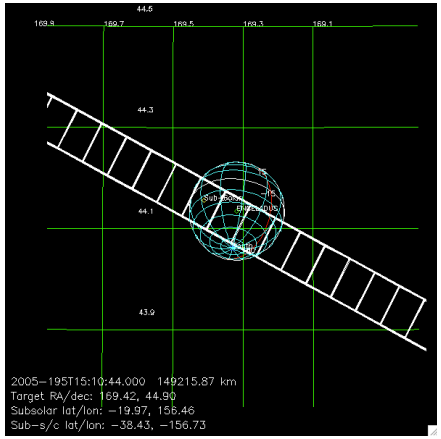
Latitude=38°S

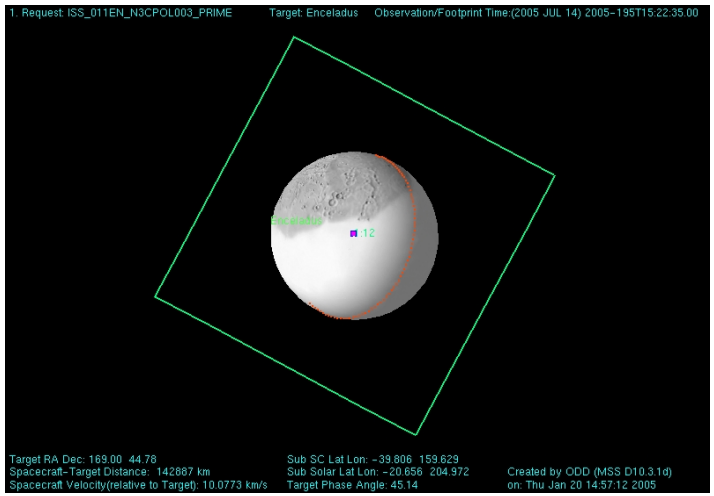
Phase= 45°



ISS_011EN_N3CPOL003







011EN_ICYLON005_ISS

2005-195T15:11

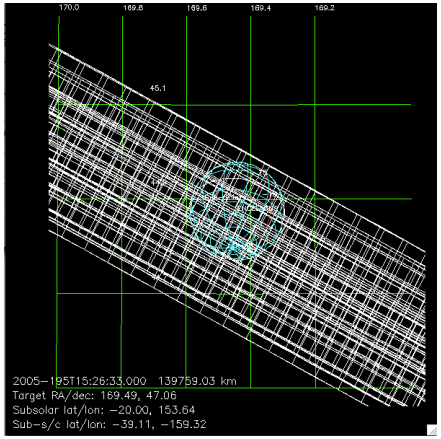
Alt= 145,358 km

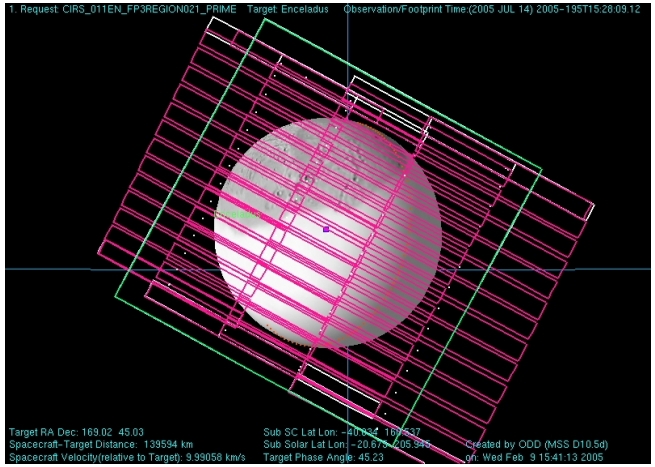
Longitude= 158°W

Latitude=39°S

Phase= 45.3°

CIRS_011EN_FP3REGION021





011EN_ICYLON006_CIRS

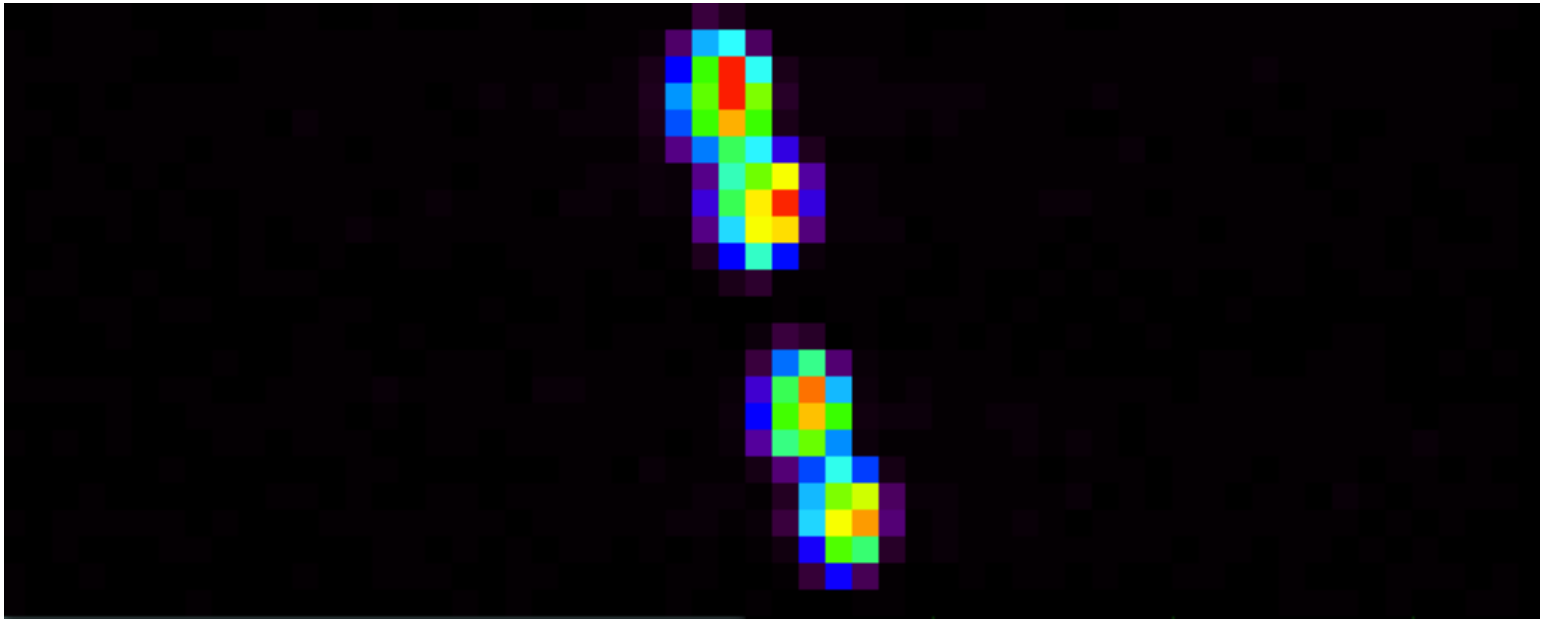
2005-195T15:27

Alt= 126,759 km

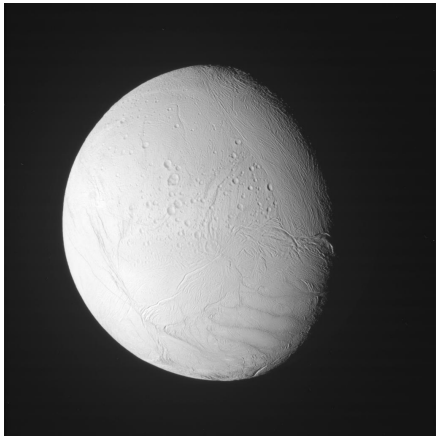
Longitude= 163°W

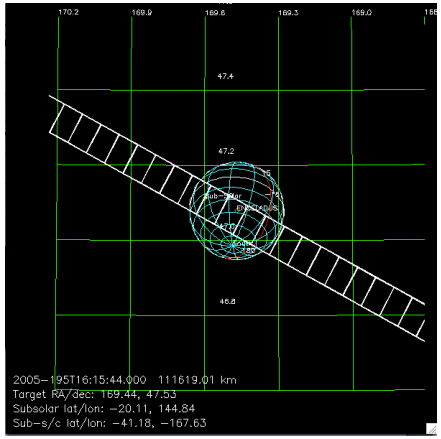
Latitude=40°S

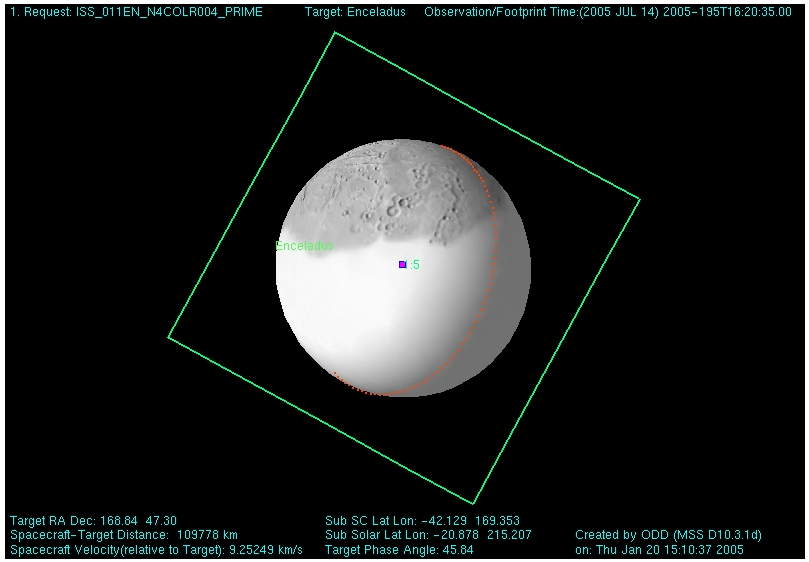
Phase= 45.9°



ISS_011EN_N4COLR004







011EN_ICYLON007_ISS

2005-195T16:16

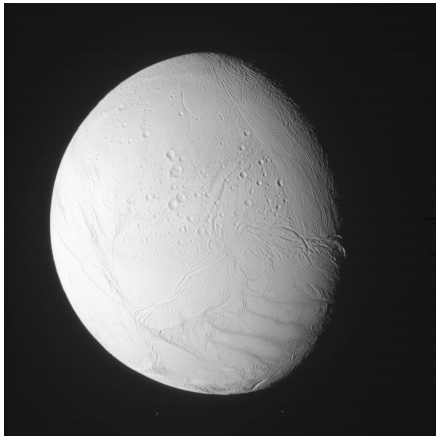
Alt= 109,709 km

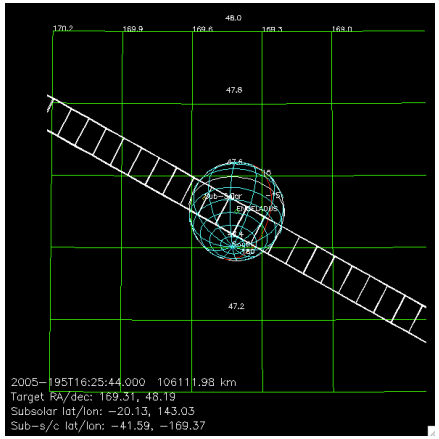
Longitude= 168°W

Latitude=41.3°S

Phase= 46.3°

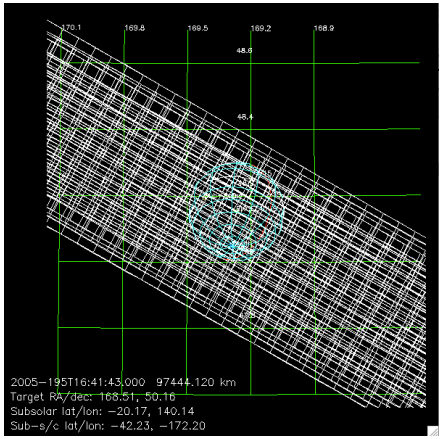
ISS_011EN_N3CPOL004

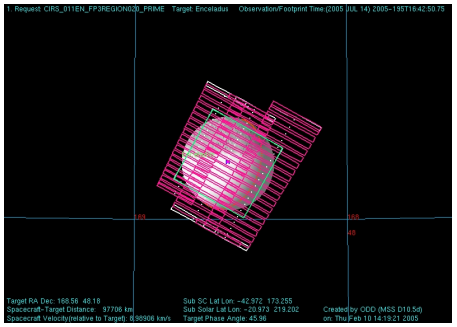


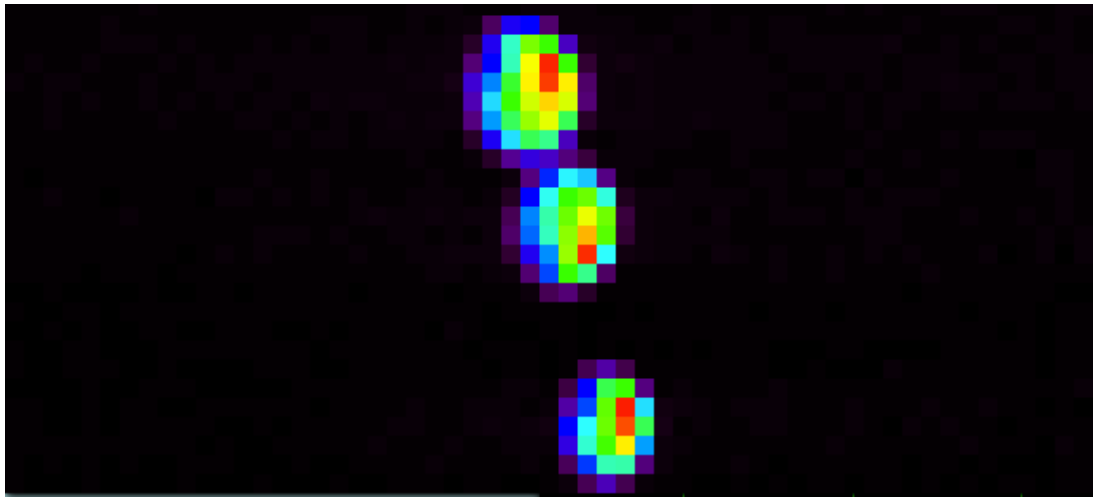


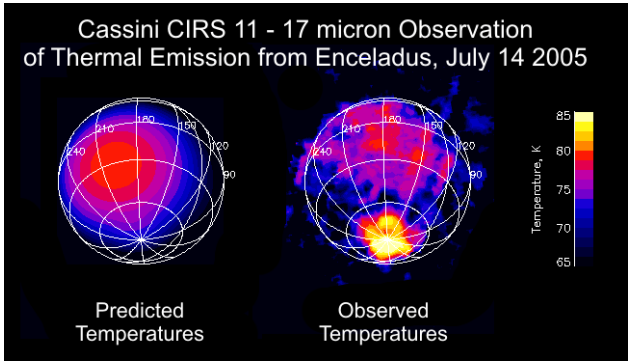
011EN_ICYLON008_ISS
2005-195T16:26
Alt= 102,592 km
Longitude= 170°W
Latitude=41.8°S
Phase= 46.4°

CIRS_011EN_FP3 REGION020









011EN_ICYLON009_CIRS

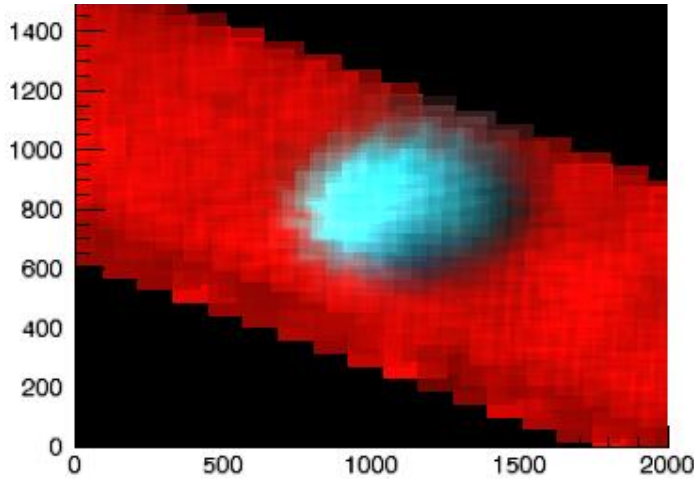
2005-195T16:42

Alt= 83,991 km

Longitude= 176.7°W

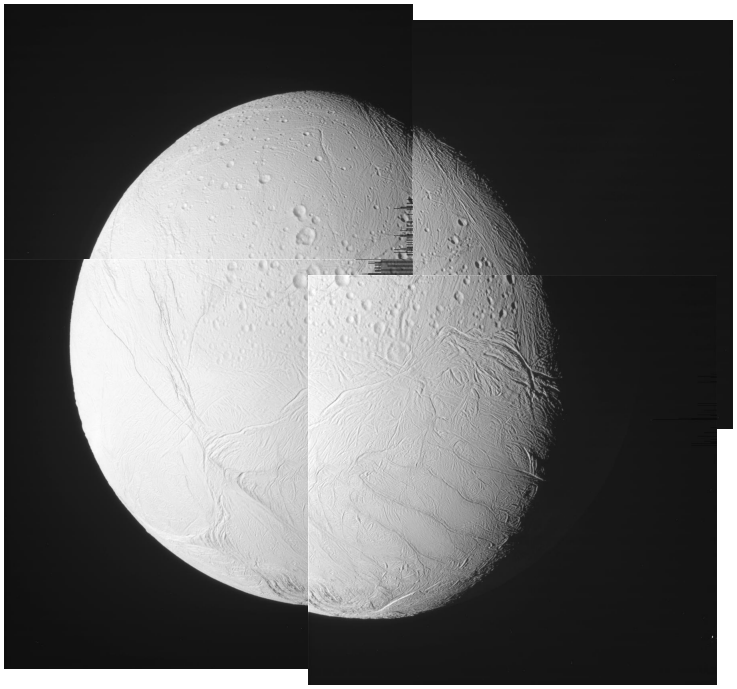
Latitude=43.2°S

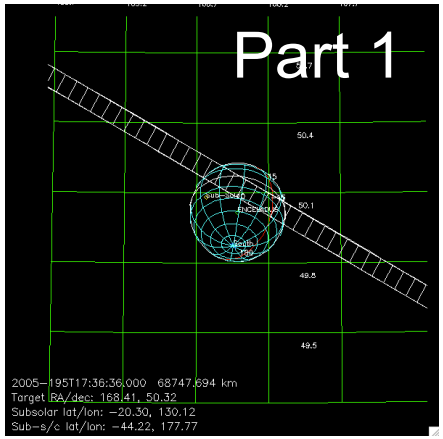
Phase= 46.6°

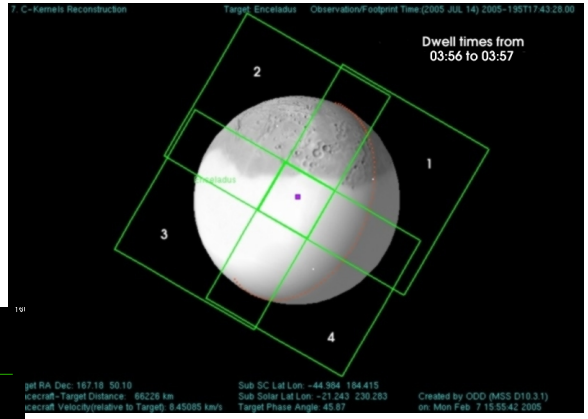


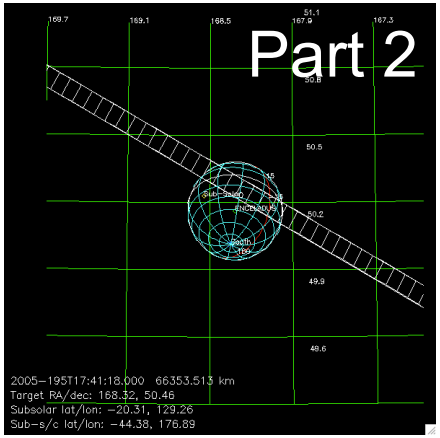
ISS_011EN_NGNPOL001

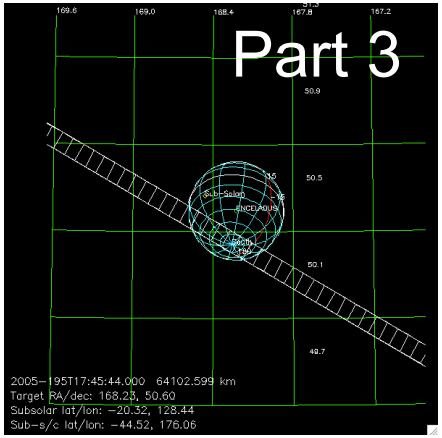
011EN_ICYLON010_ISS
2005-195T17:37
Alt= 68,495 km
Longitude= 182°W
Latitude=44°S
Phase= 46.7°

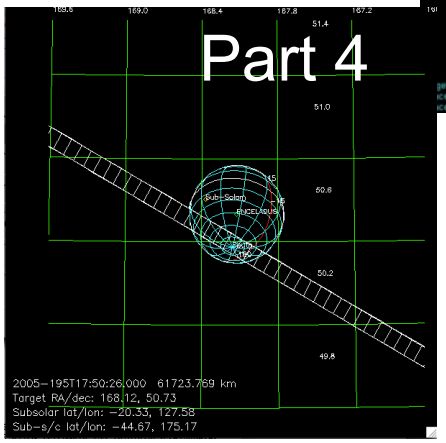












ISS_011EN_N3COL001

011EN_ICYMAP011_ISS

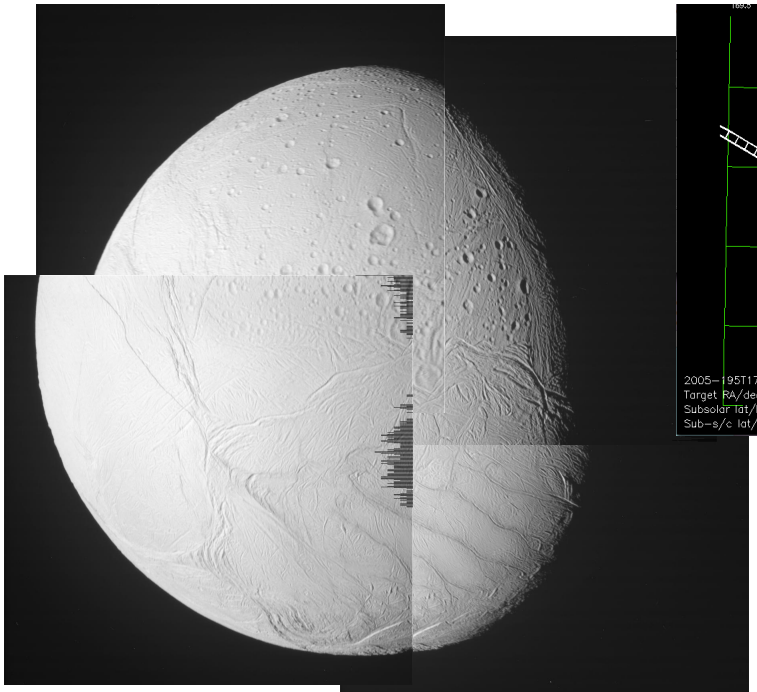
2005-195T17:56

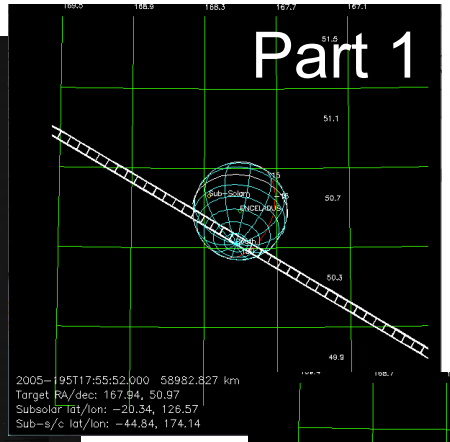
Alt= 57,976 km

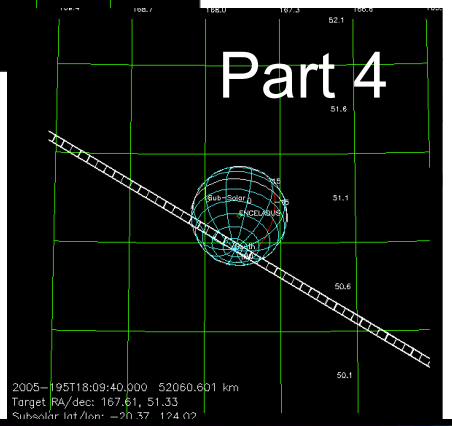
Longitude= 186°W

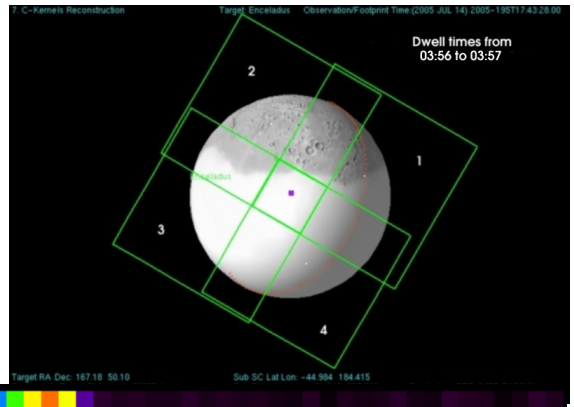
Latitude=45°S

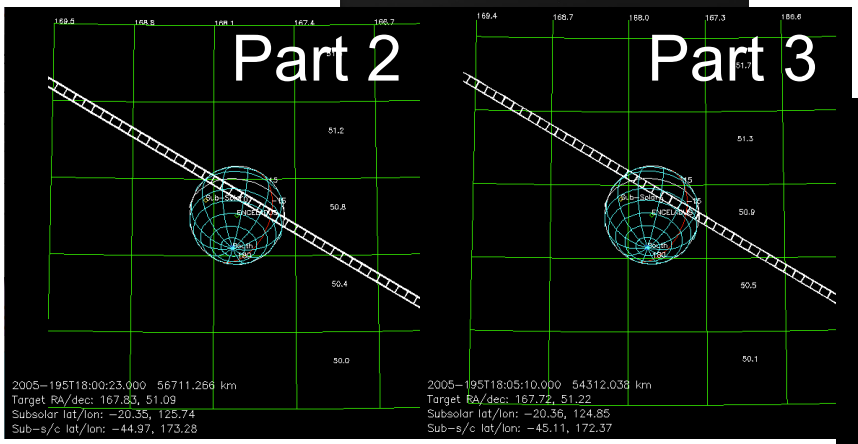
Phase= 46.7°

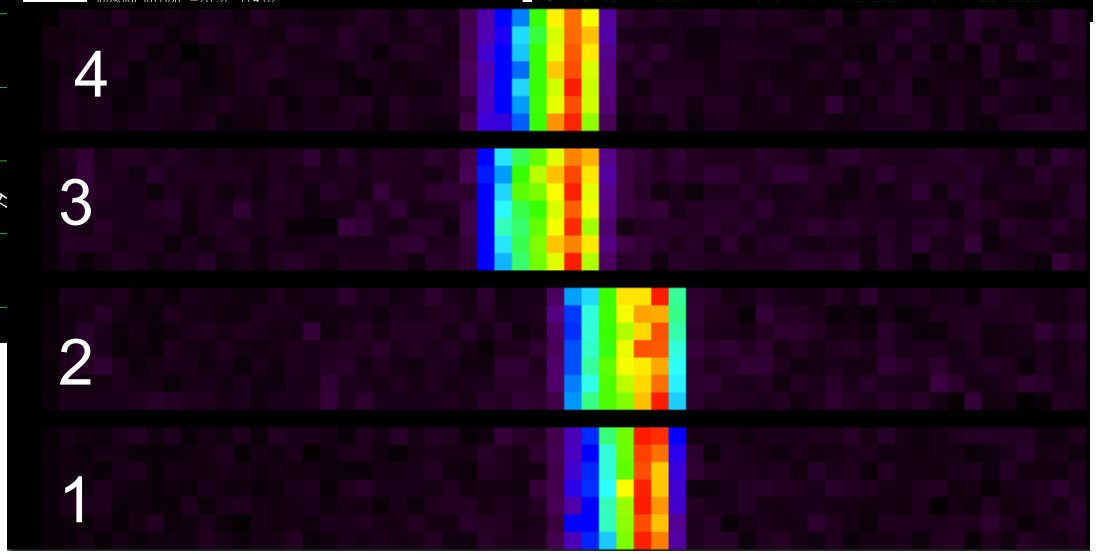




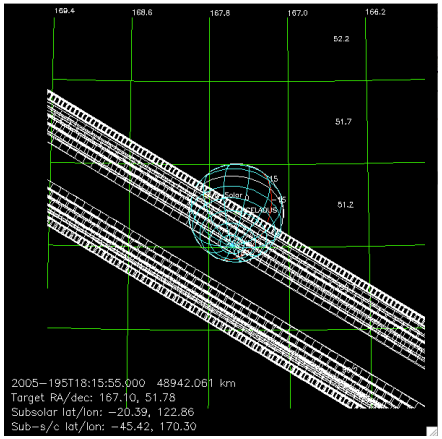


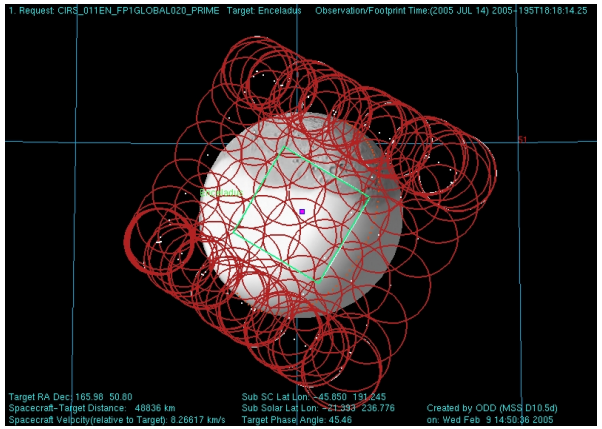






CIRS_011EN_FP1GLOBAL020





011EN_ICYMAP012_CIRS

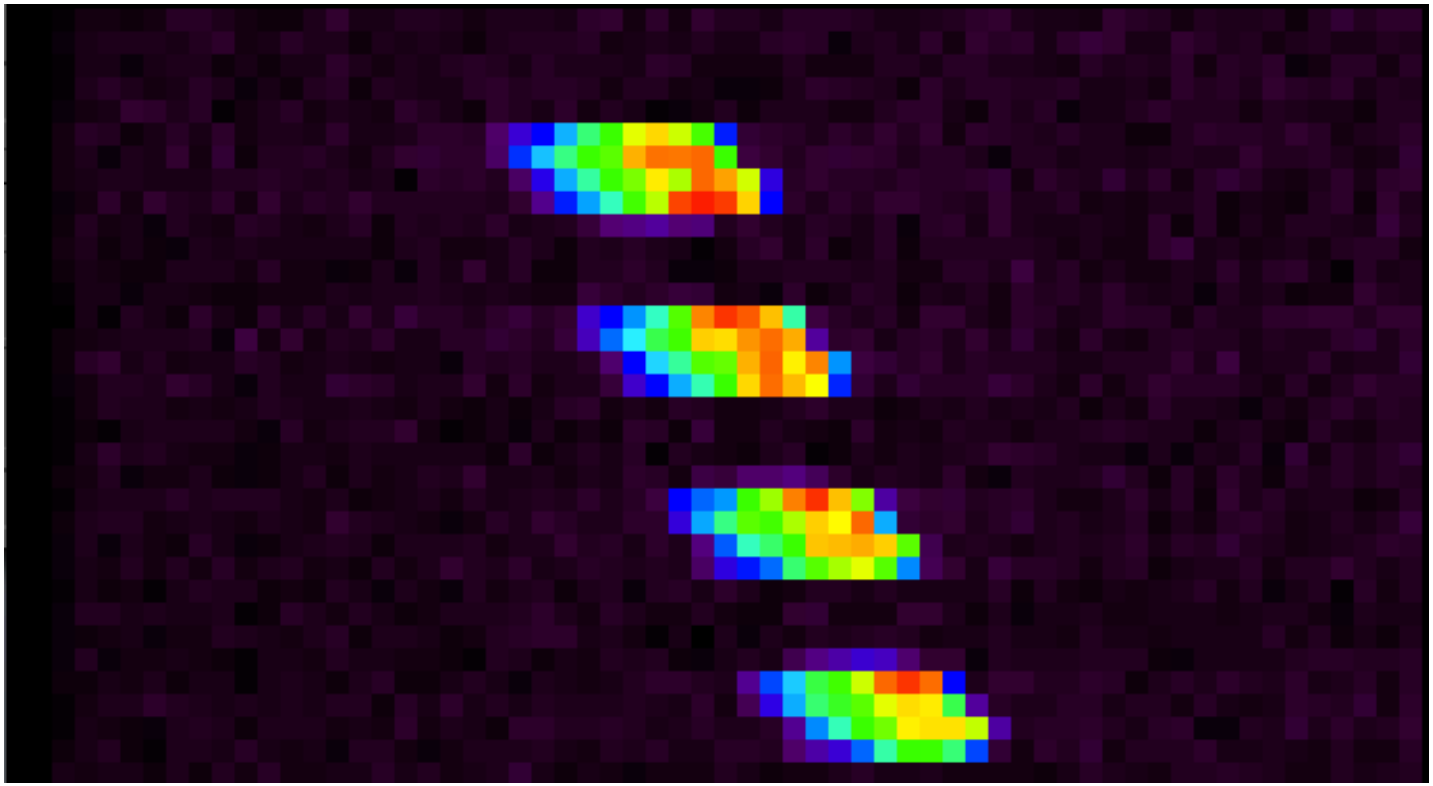
2005-195T18:16

Alt= 44,599 km

Longitude= 191°W

Latitude=45.6°S

Phase= 46.6°



ISS_011EN_REGEO002

011EN_ICYMAP013_ISS

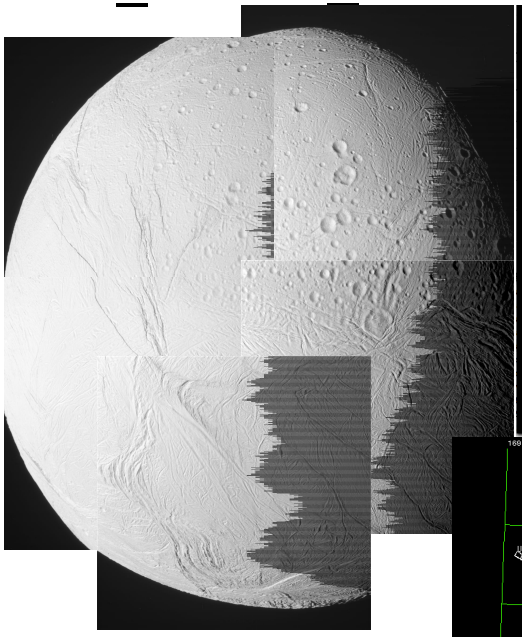
2005-195T18:36

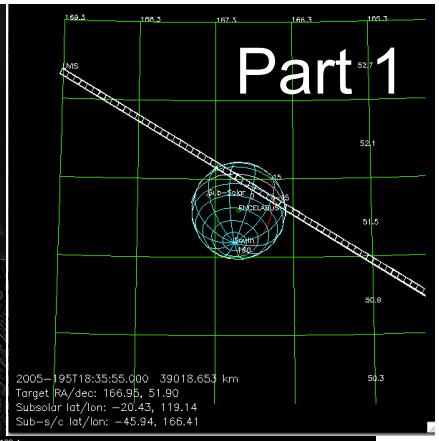
Range= 38,314 km

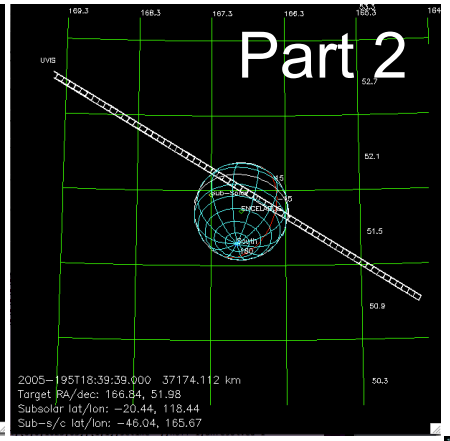
Longitude= 194°W

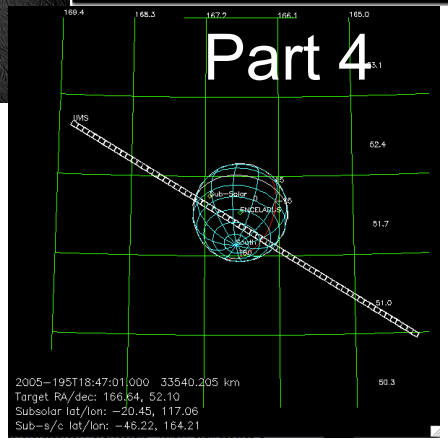
Latitude=46°S

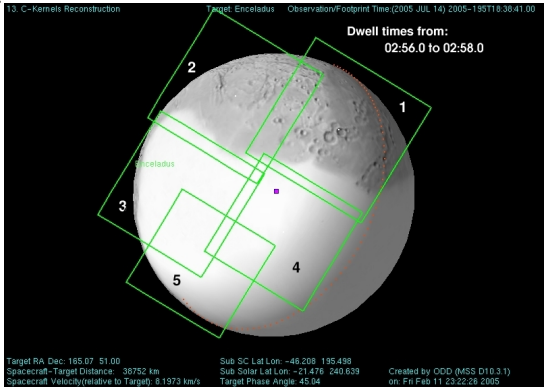
Phase= 46.5°

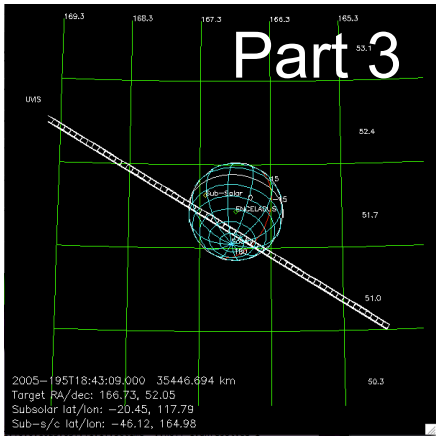


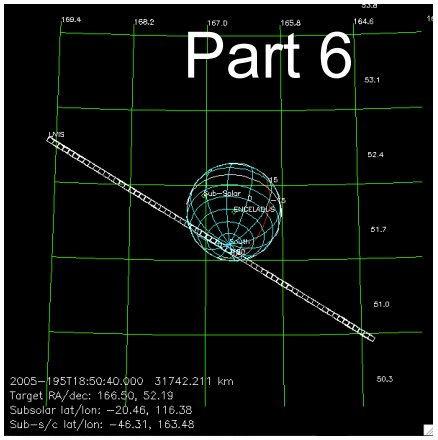


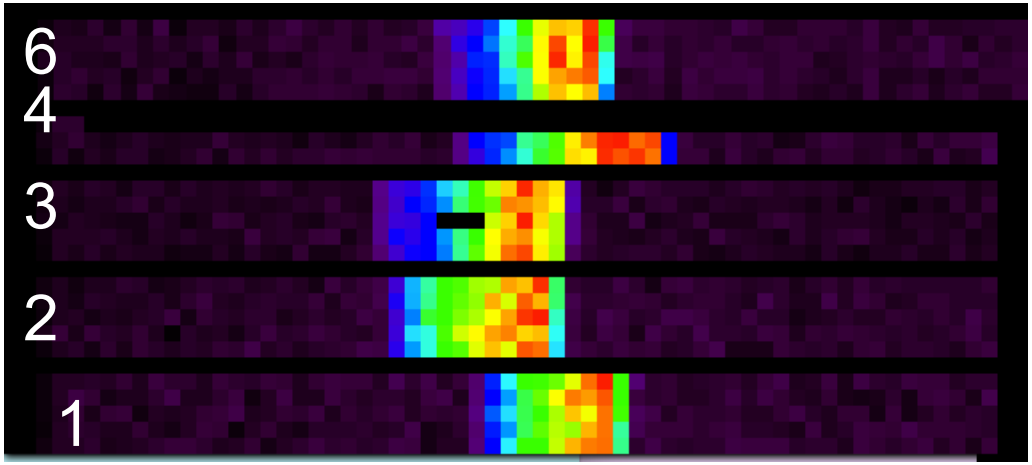




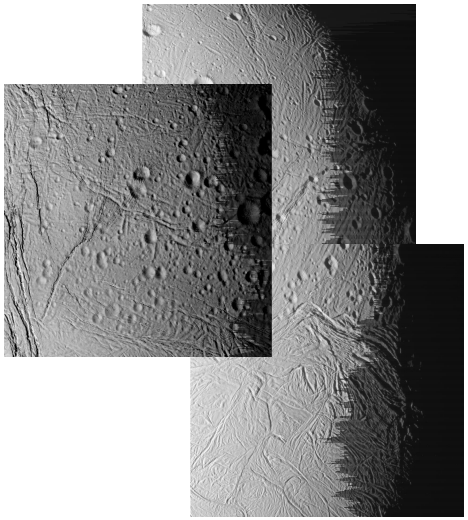


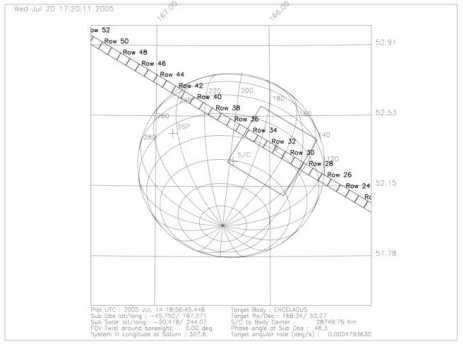






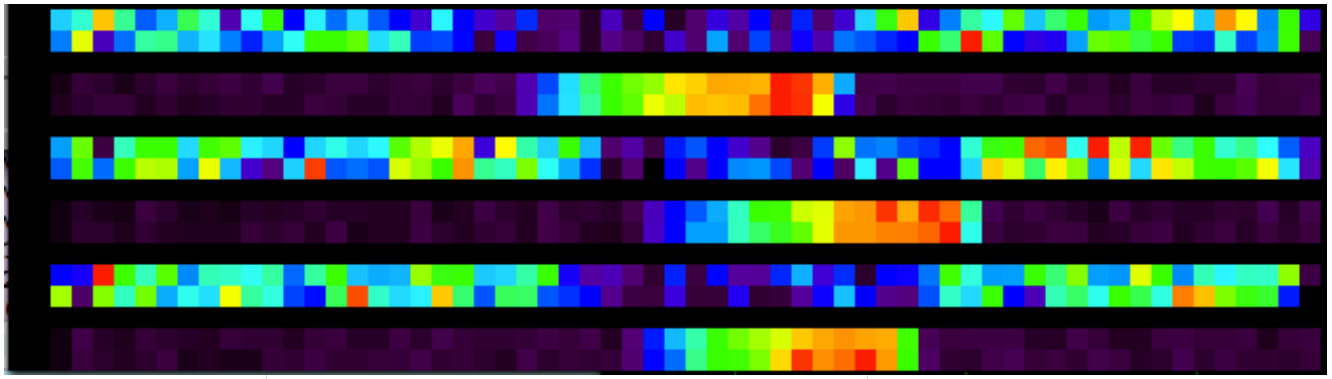
ISS_011EN_MORPH001





Part 1

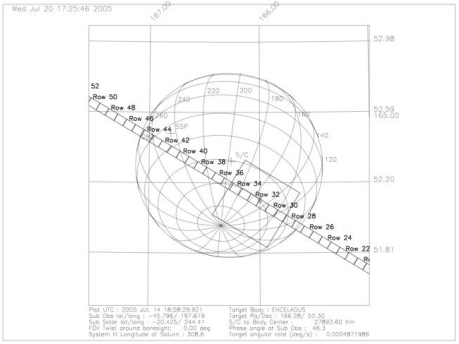
011EN_ICYMAP014_ISS
2005-195T18:56
Alt= 28,513 km
Longitude= 198°W
Latitude=46.5°S
Phase= 46.3°



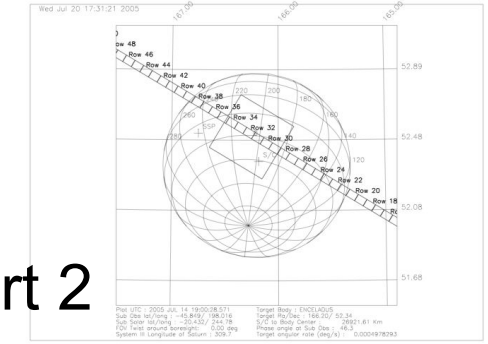
3

2

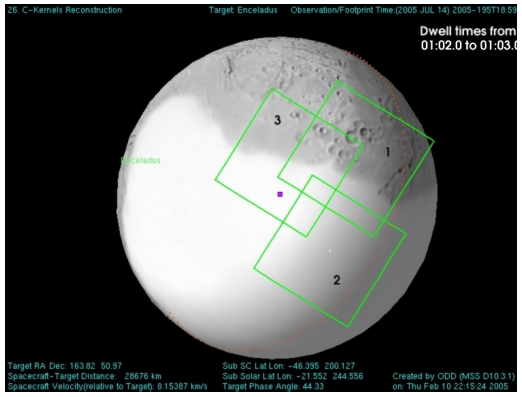
1



Part 2



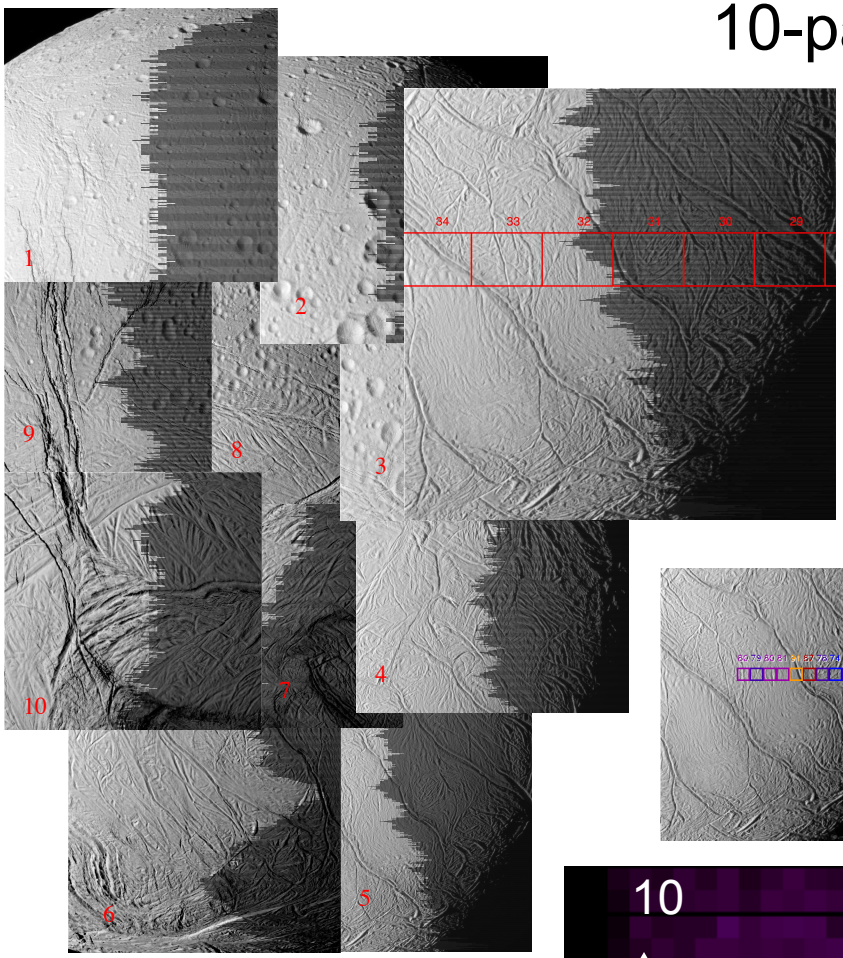
Part 3

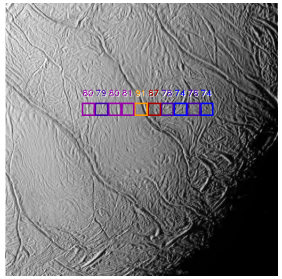


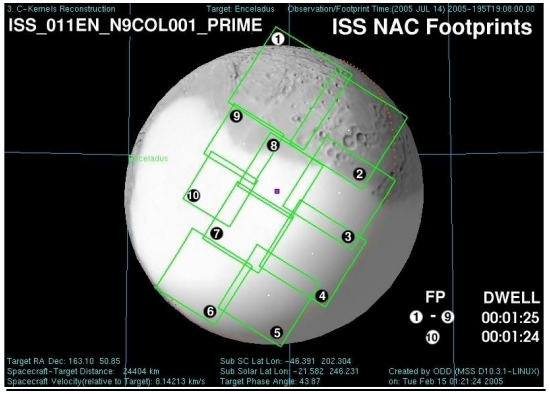
ISS_011EN_N9COL001

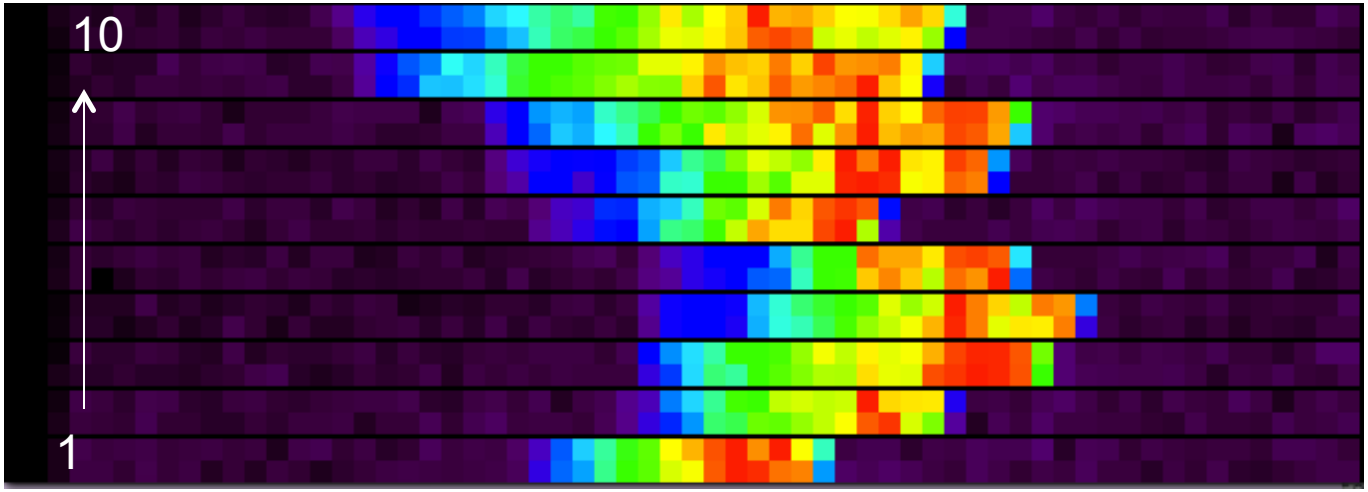
10-part mosaic

011EN_ICYMAP015_ISS
2005-195T19:05
Alt= 24,396 km
Longitude= 199°W
Latitude=46°S
Phase= 46.2°

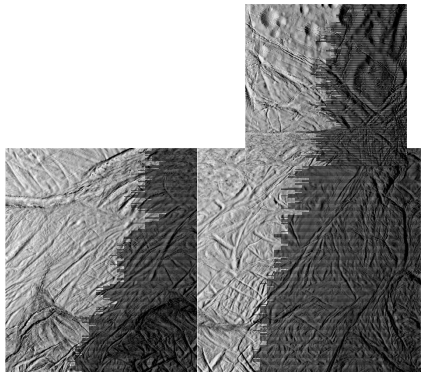




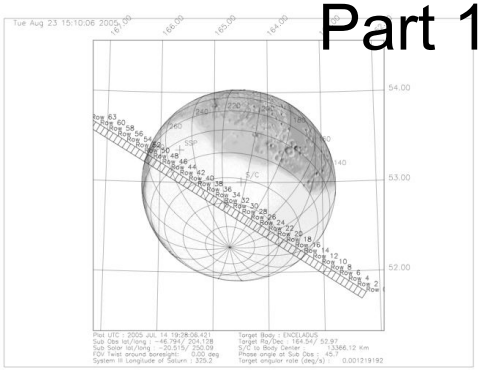


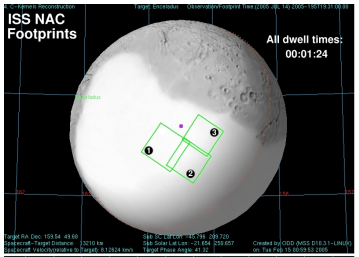


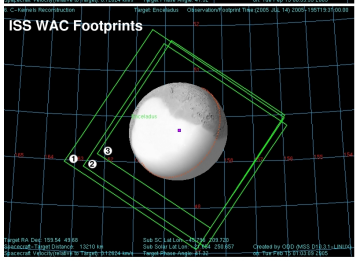
ISS_011EN_MORPH002



Part 1

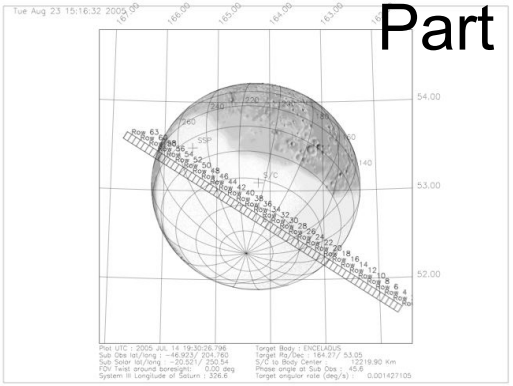




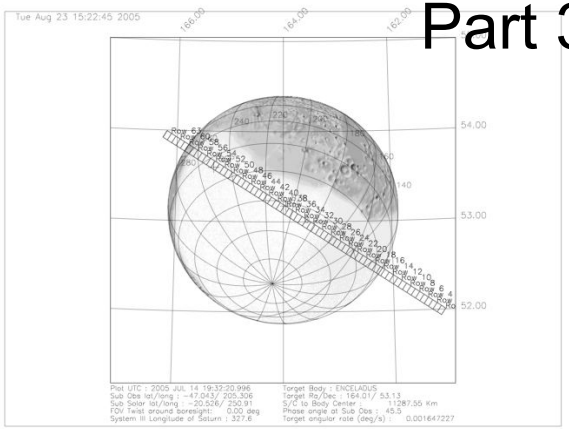


ISS_011EN_MORPH002_PRIME

Part 2



Part 3



011EN_ICYMAP016_ISS

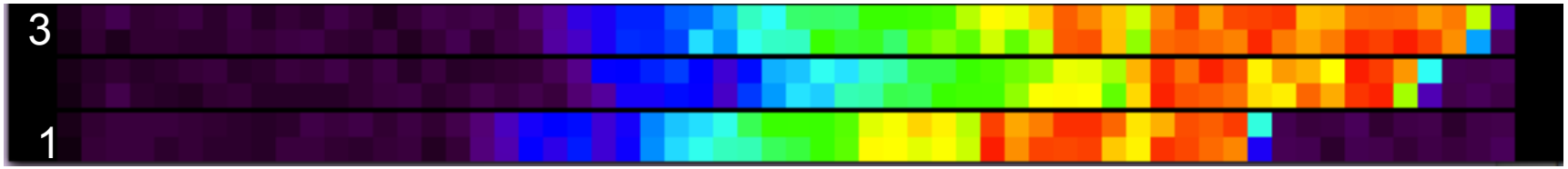
2005-195T

Alt= 13,124 km

Longitude= 204°W

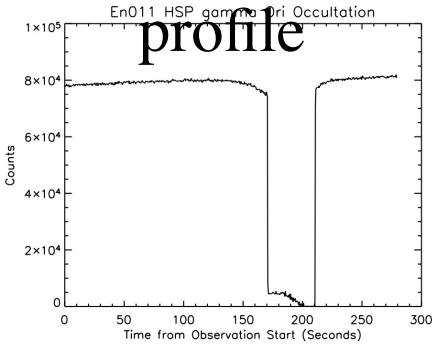
Latitude=46.8°S

Phase= 45.7°

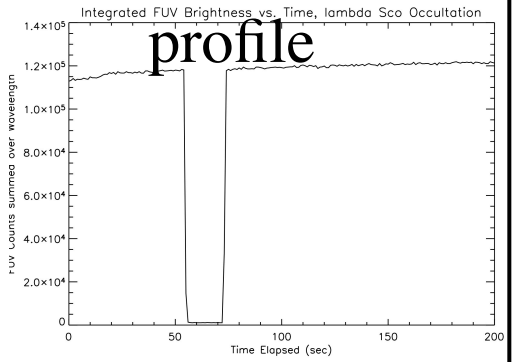


UVIS_011EN_ICYEXO001_PRIME
2005-195T19:52
Ingress lat/lon: -76.4 / 83.8
Egress lat/lon: -1.7 / 29.0
Star: gamma Orionis

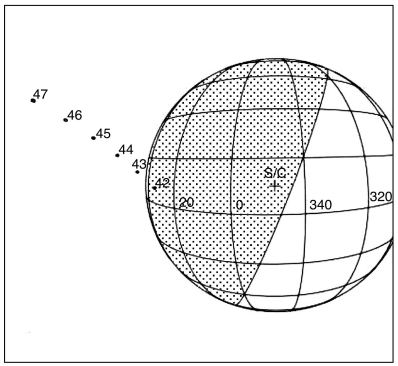
HSP profile

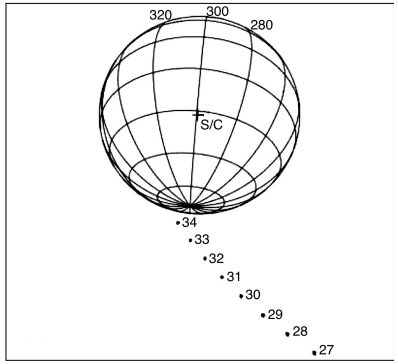


FUV profile



Summed over wavelength

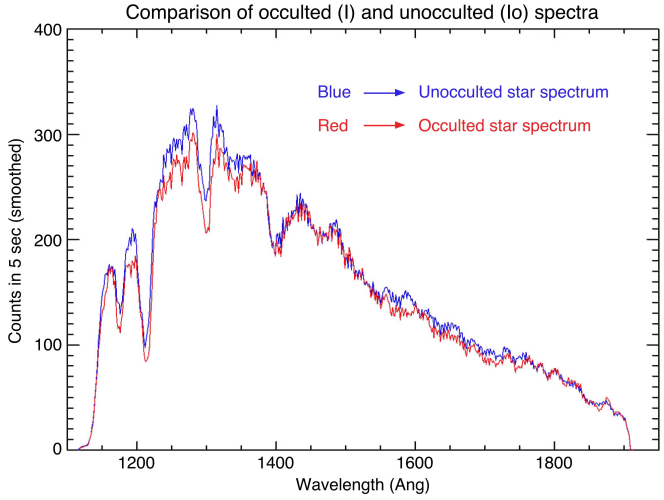




Egress

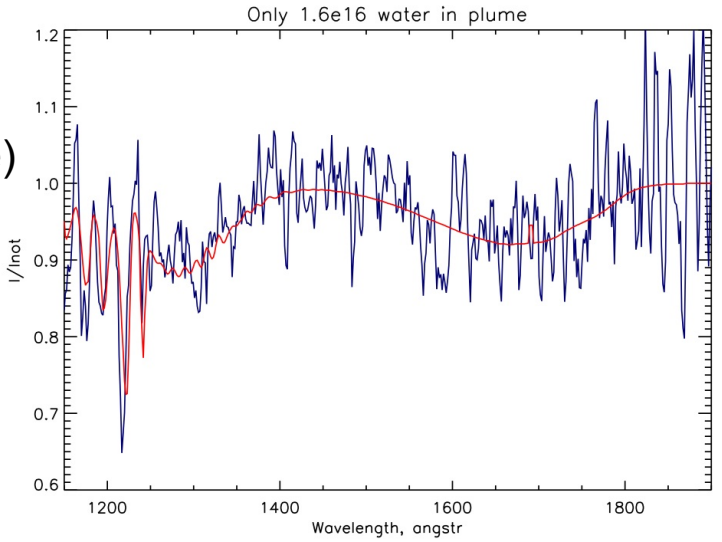
Ingress

Spectra of I, I_0 (counts per integration period vs wavelength); Plume detected on ingress but not egress

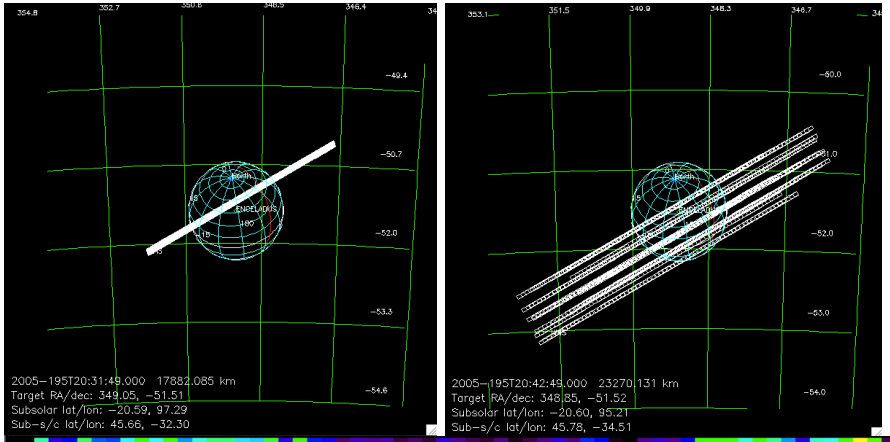


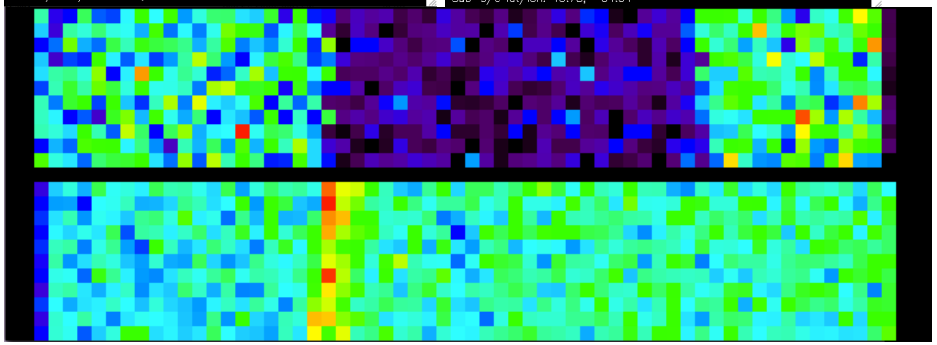
Spectrum of I/I_0

Ingress (blue) compared to water with column density 1.6 x 10^{16} cm^{-2}



CIRS_011EN_FP1NSSCAN020





Ly-a

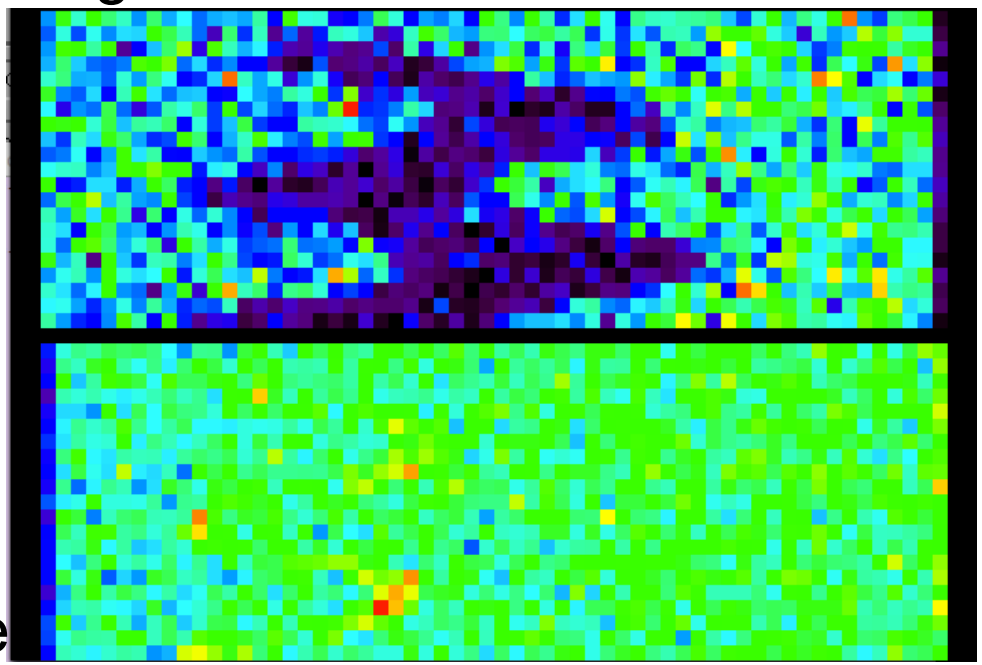
Long waves

Part1

011EN_ICYMAP017_CIRS
2005-195T20:32
Alt= 18,856 km
Longitude= 32.8°W
Latitude=45.7°N
Phase= 132.5°

Part2

Ly-a



High background,
Saturn shine

Long wave

ISS_011EN_NCPOL001

011EN_ICYMAP018_ISS

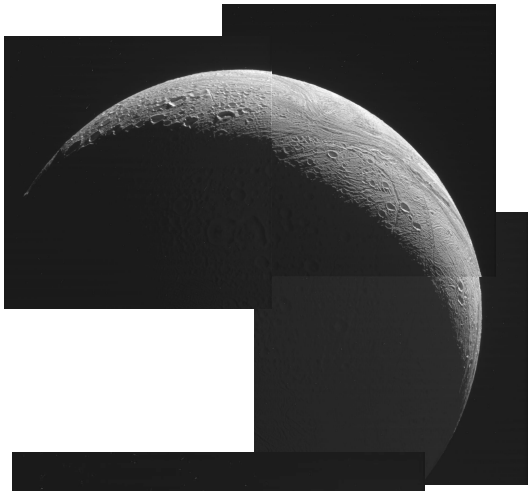
2005-195T21:23

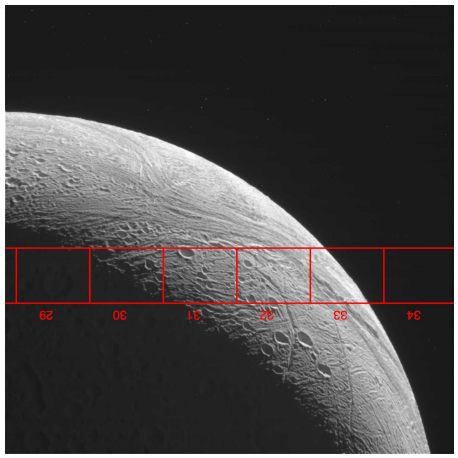
Alt= 41,927 km

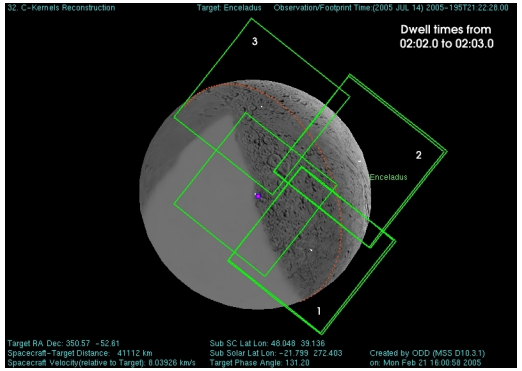
Longitude= 41.3°W

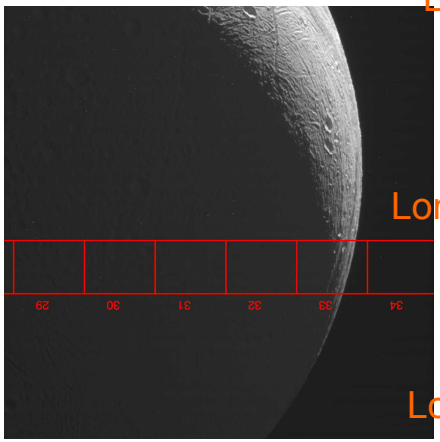
Latitude=45.7°N

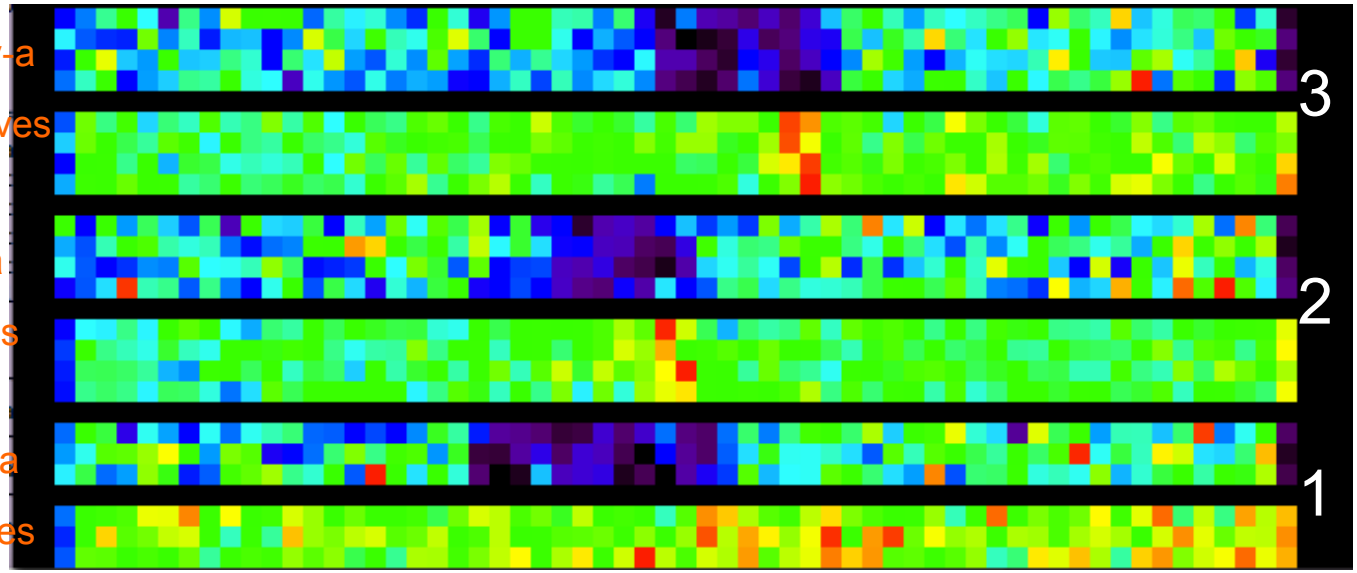
Phase= 132.5°











011EN_ICYLON019_PRIME

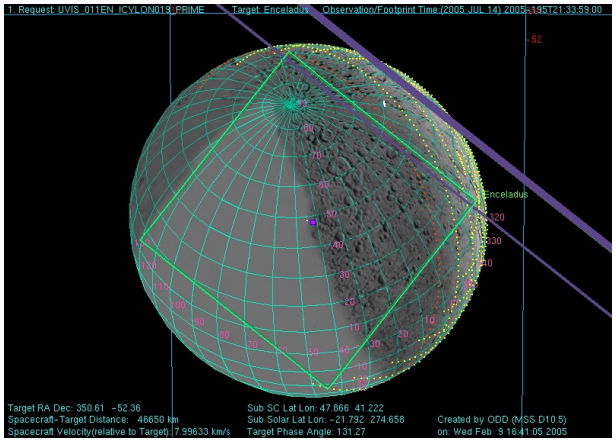
2005-195T21:30

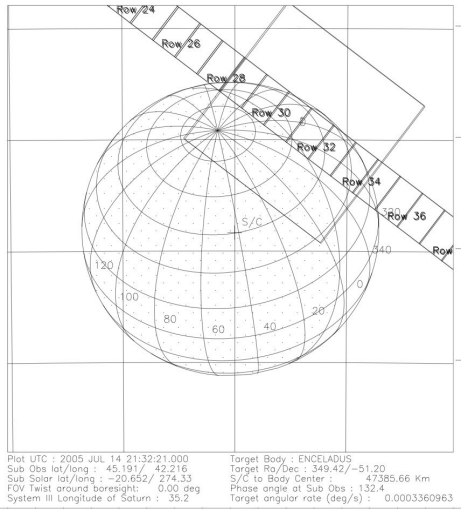
Alt= 50,420 km

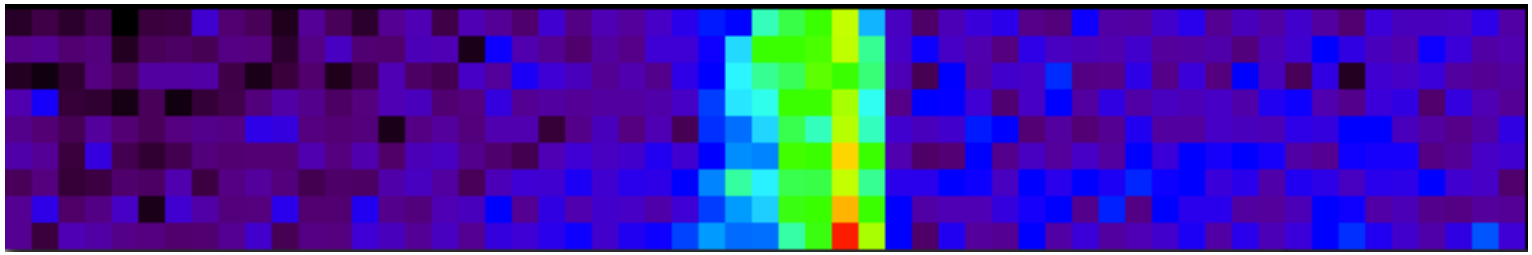
Longitude= 44°W

Latitude=45.5°N

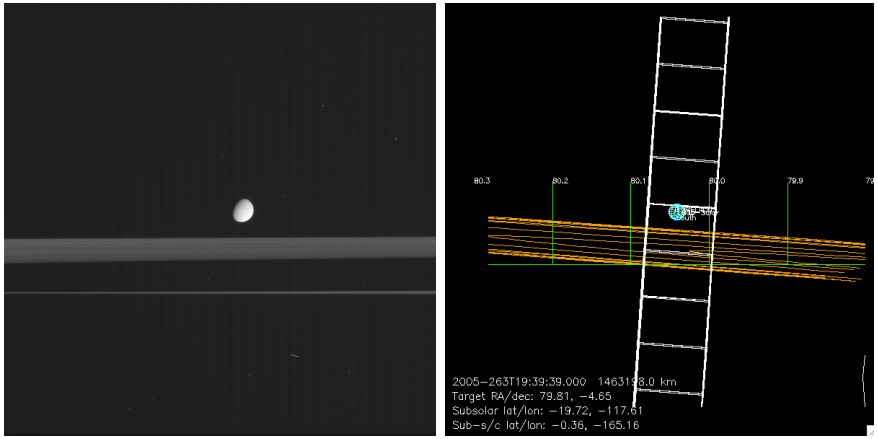
Phase= 132.3°





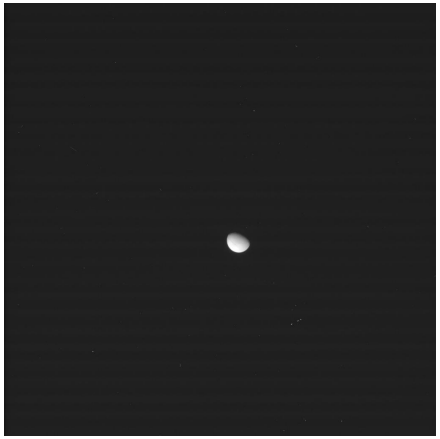


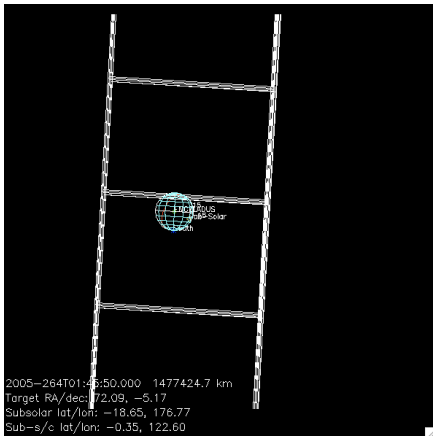
015EN_166W050PH_ISS



015EN_ICYLON006_ISS
2005-263T19:45
Alt= 1,460,905 km
Longitude= 166°W
Latitude=0.36°S
Phase= 51°

015EN_238W058PH_ISS





015EN_ICYLON011_ISS

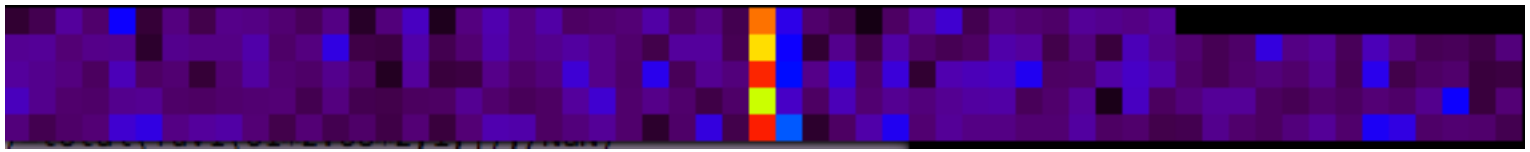
2005-264T01:40

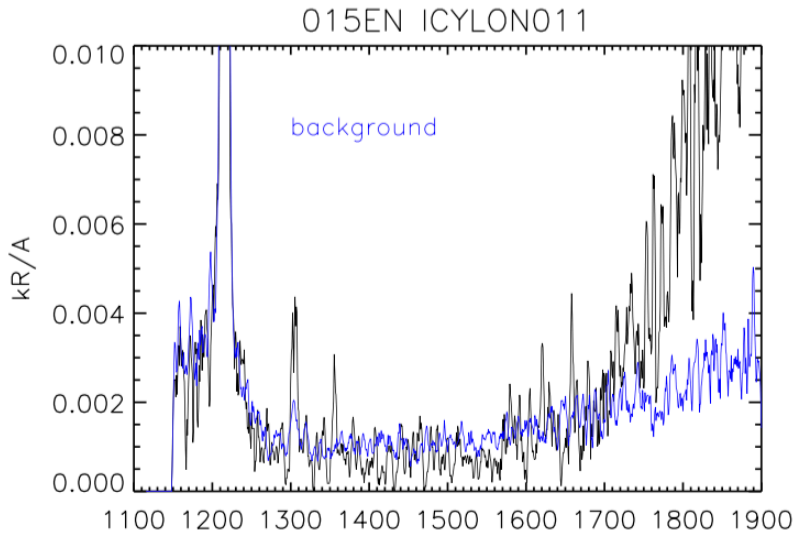
Alt= 1,478,838 km

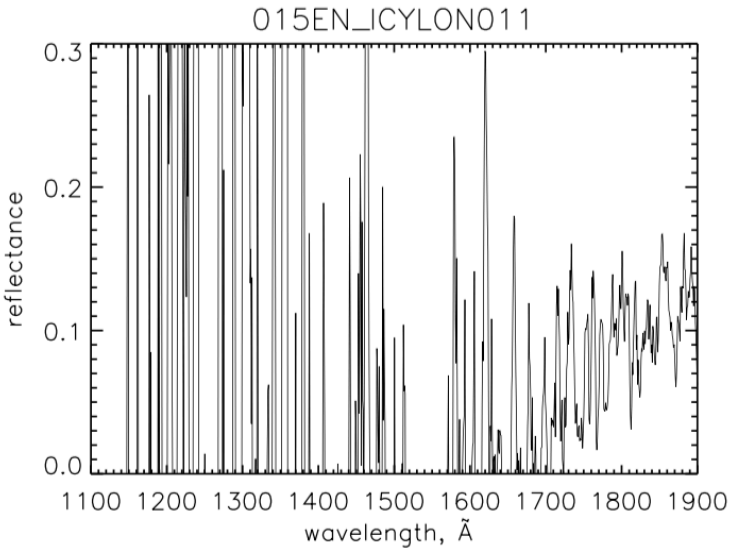
Longitude= 239°W

Latitude=0.35°S

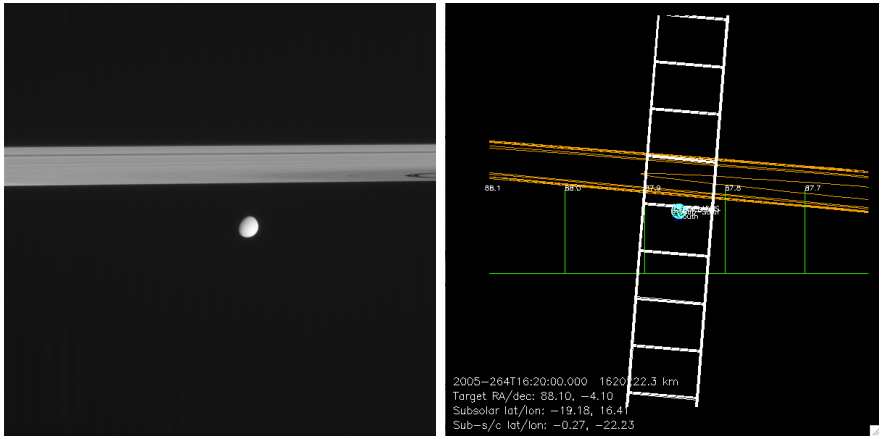
Phase= 58°







015EN_022W043PH_ISS

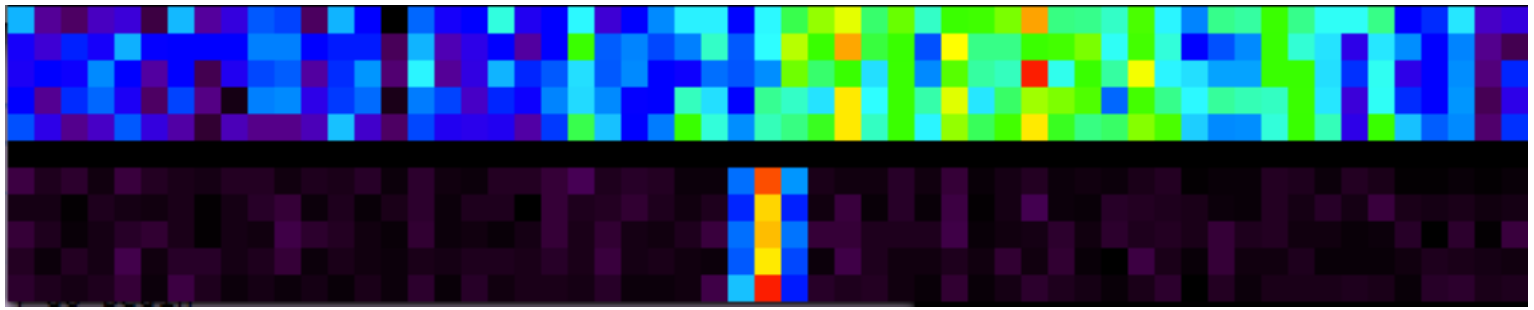


015EN_ICYLON016_ISS

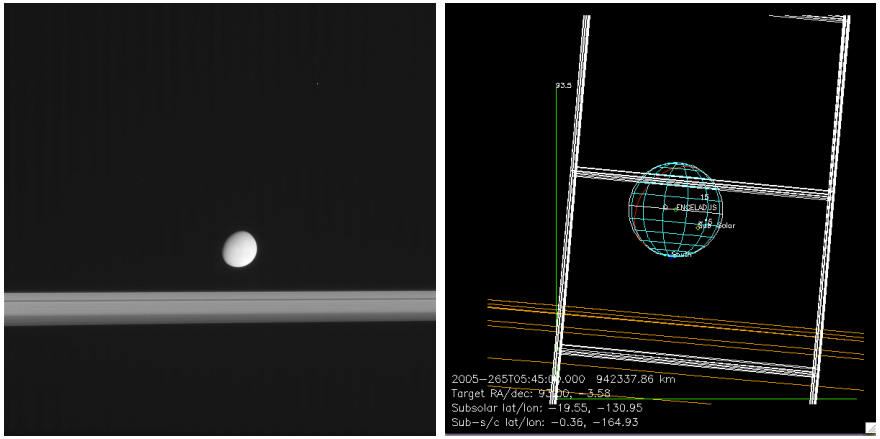
2005-264T16:15
Alt= 1,617,789 km
Longitude= 23°W
Latitude=0.27°S
Phase= 44°

Ly-a

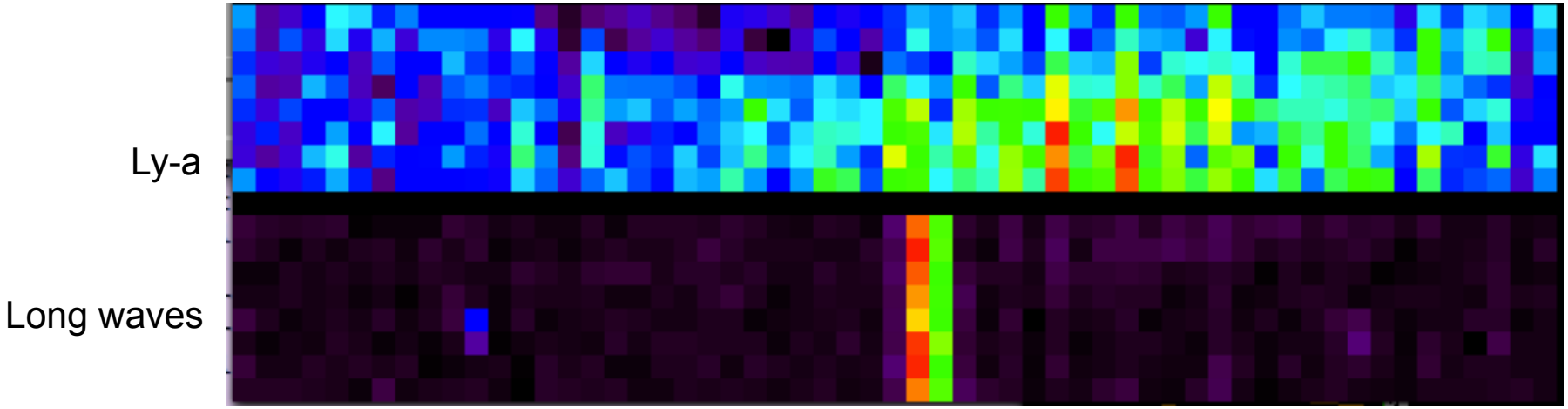
Long waves



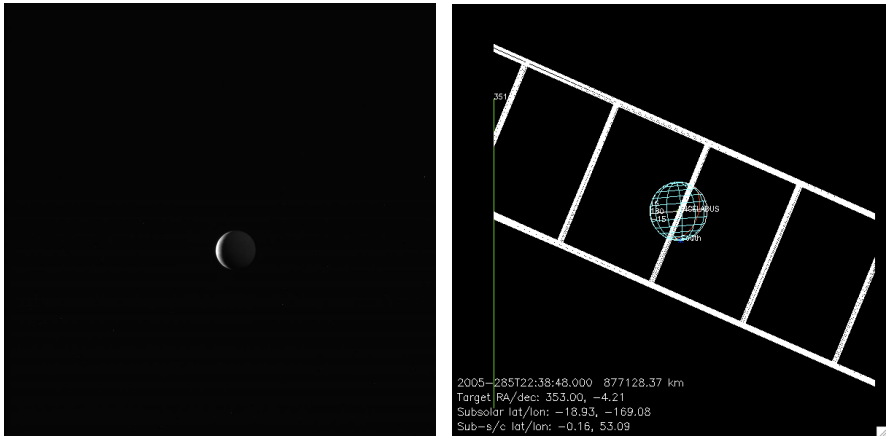
015EN_166W038PH_ISS



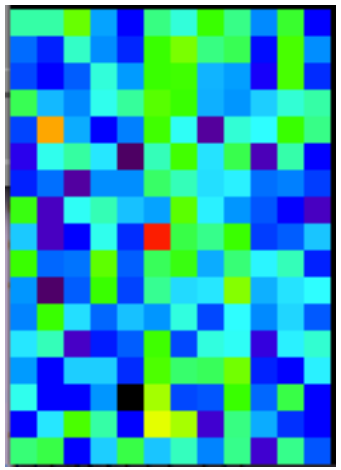
015EN_ICYLON022_ISS
2005-265T05:40
Alt= 938,547 km
Longitude= 166°W
Latitude=0.36°S
Phase= 39.4°



016EN_310W134PH_ISS

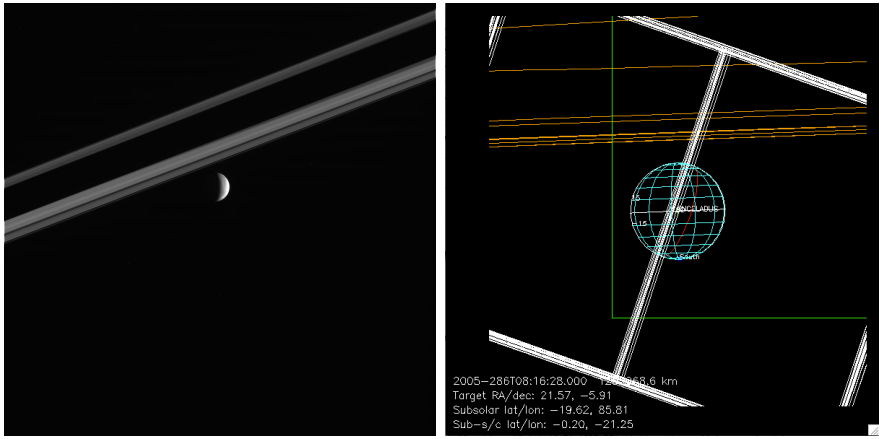


016EN_ICYLON007_ISS
2005-285T22:39
Alt= 892,023 km
Longitude= 309°W
Latitude=0.16°S
Phase= 133°



Low SNR

016EN_022W108PH_ISS



016EN_ICYLON008_ISS

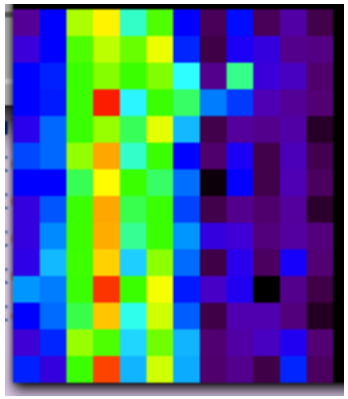
2005-286T08:17

Alt= 1,206,039 km

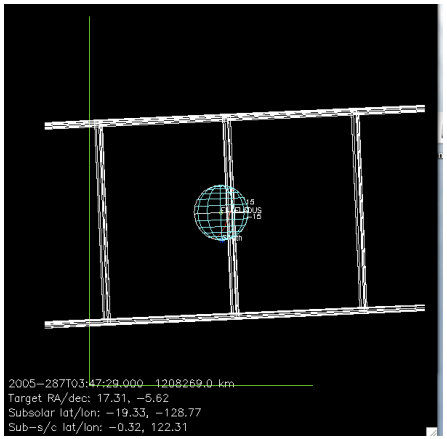
Longitude= 23°W

Latitude=0.2°S

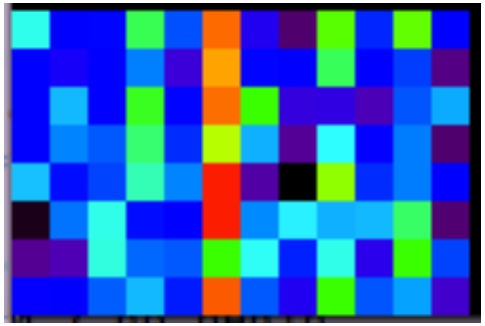
Phase= 106°



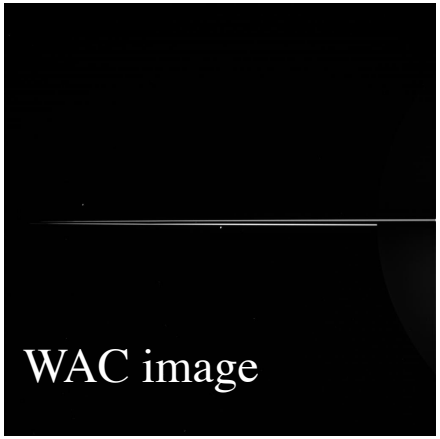
016EN_238W111PH_ISS

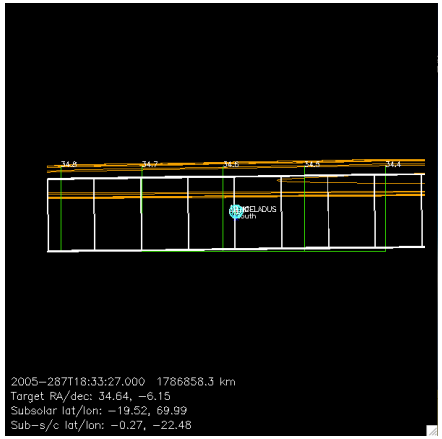


016EN_ICYLON009_ISS
2005-287T03:48
Alt= 1,214,277 km
Longitude= 239°W
Latitude=0.32°S
Phase= 109.7°



016EN_022W094PH_ISS





016EN_ICYLON010_ISS

2005-287T18:30

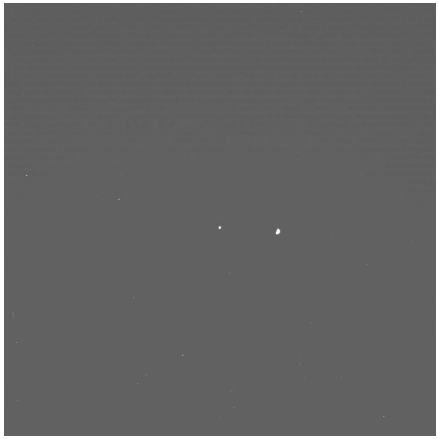
Alt= 1,786,553 km

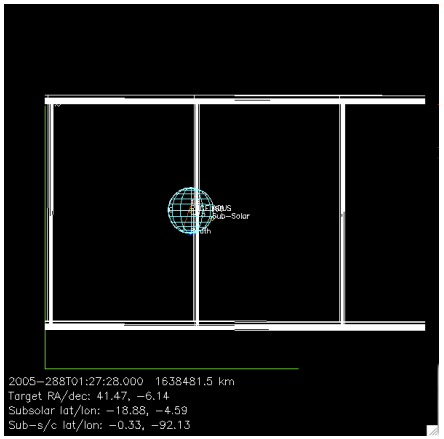
Longitude= 23°W

Latitude=0.27°S

Phase= 93.7°

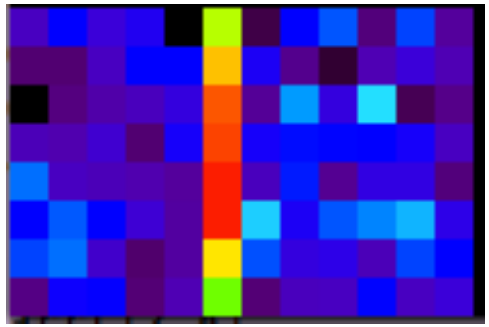
016EN_094W088PH_ISS





WAC image

Tethys in WAC too (larger)



016EN_ICYLON011_ISS

2005-288T01:20

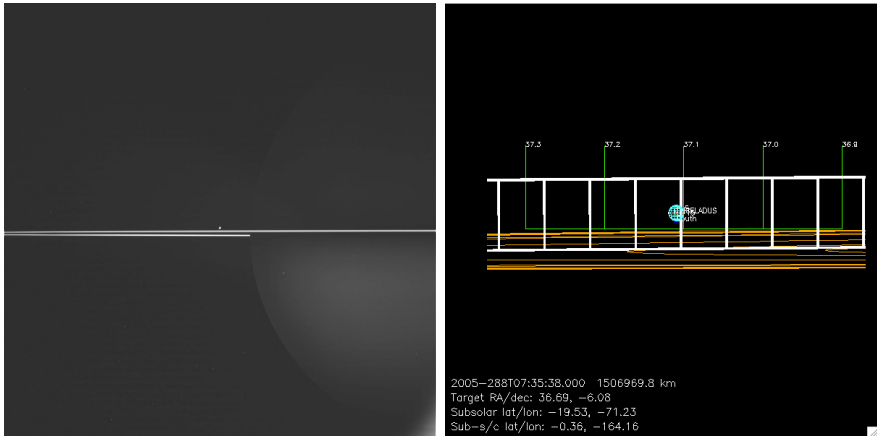
Alt= 1,634,536 km

Longitude= 93°W

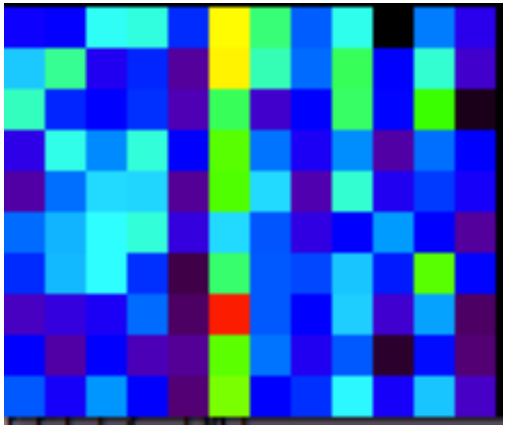
Latitude=0.33°S

Phase= 87.3°

016EN_166W092PH_ISS

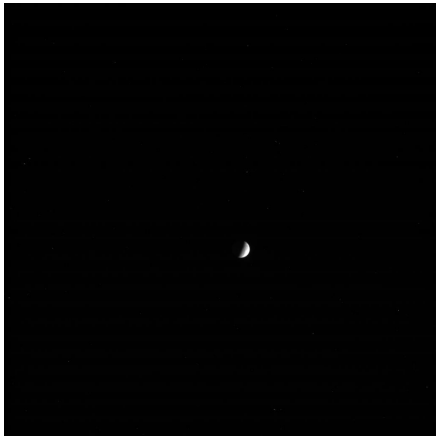


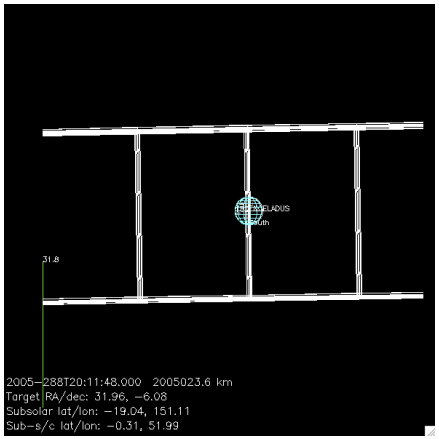
WAC image



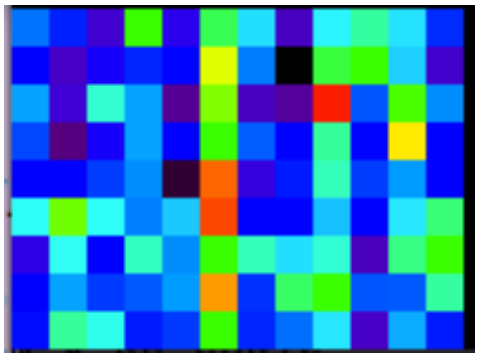
016EN_ICYLON012_ISS
2005-288T07:30
Alt= 1,506,618 km
Longitude= 166°W
Latitude=0.36°S
Phase= 91.6°

016EN_310W097PH_ISS

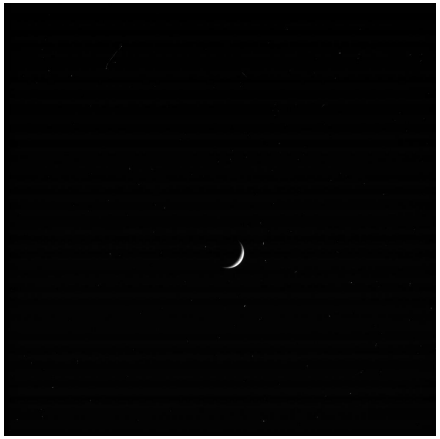


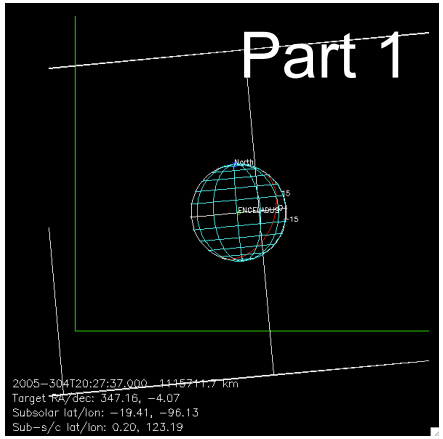


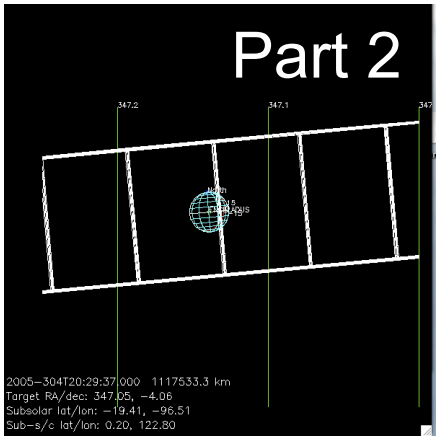
016EN_ICYLON013_ISS
2005-288T20:50
Alt= 2,010,876 km
Longitude= 309°W
Latitude=0.3°S
Phase= 96.3°



017EN_238W139PH_ISS 2-part

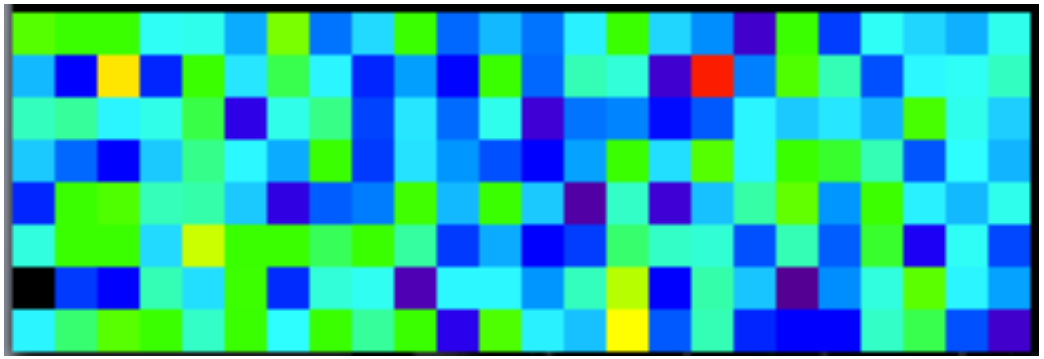




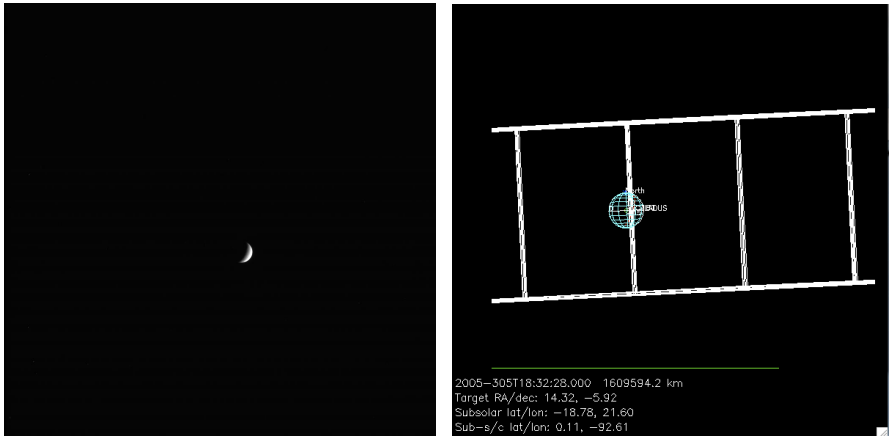


017EN_ICYLON001_ISS
2005-304T20:20
Alt= 1,115,459 km
Longitude= 237°W
Latitude=0.2°N
Phase= 138°

Low SNR

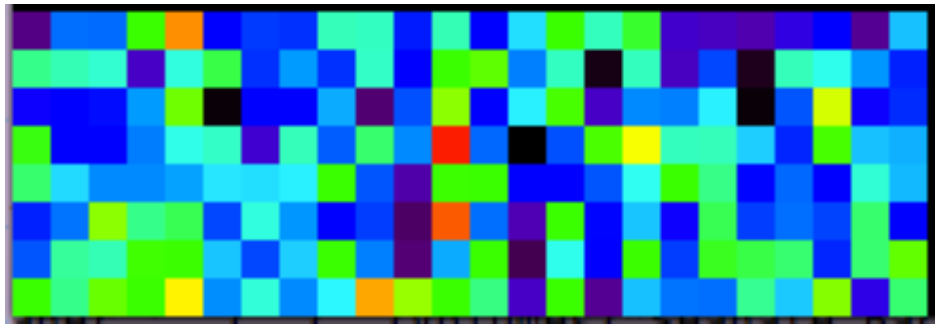


017EN_094W114PH_ISS

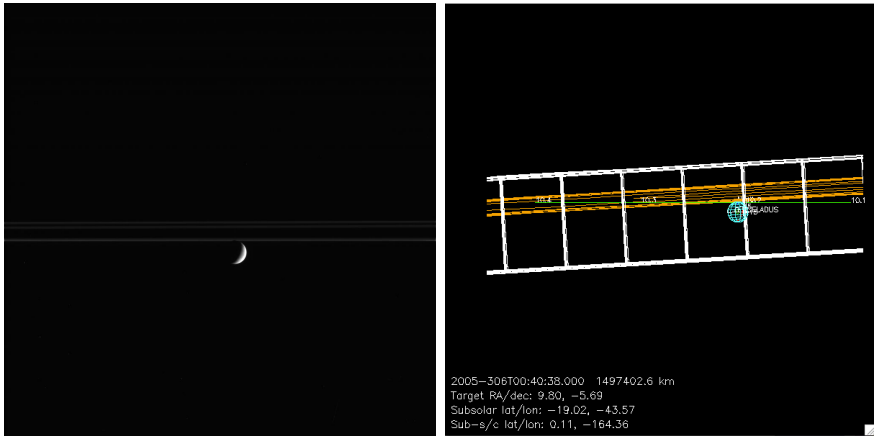


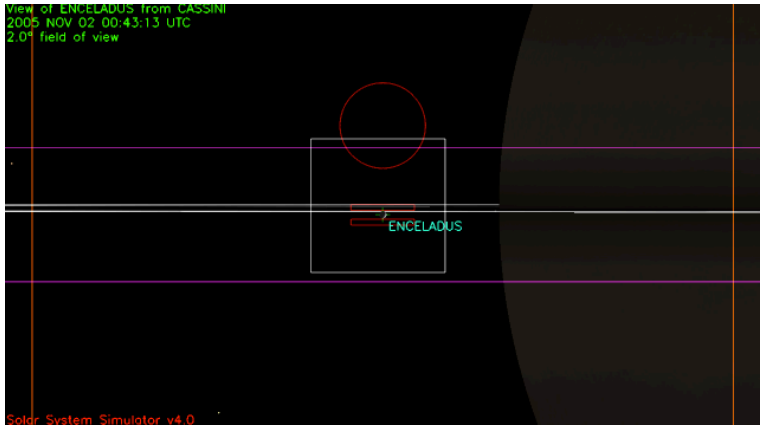
017EN_ICYLON002_ISS
2005-305T18:25
Alt= 1,605,997 km
Longitude= 94°W
Latitude=0.1°N
Phase= 113.4°

Low SNR



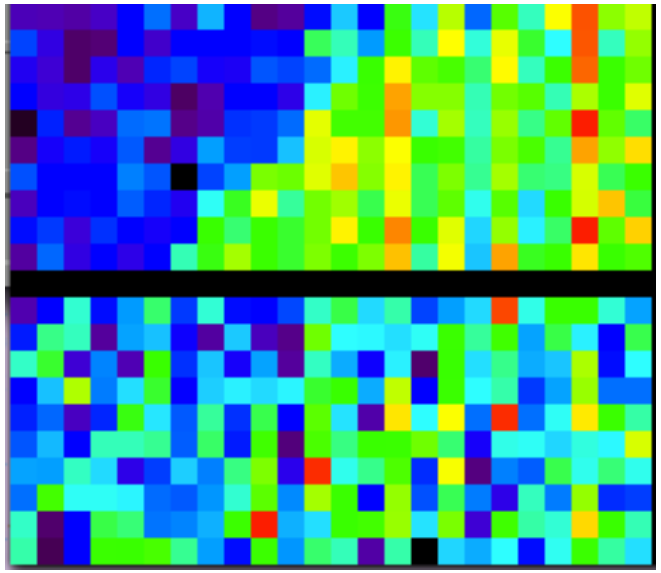
017EN_166W118PH_ISS



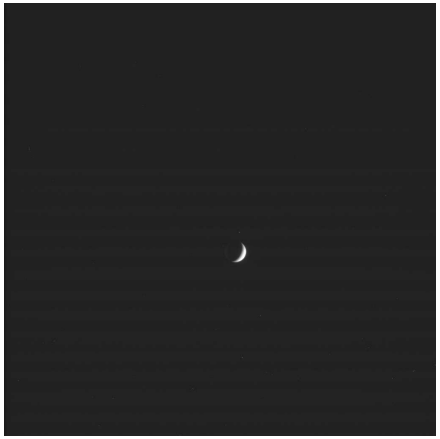


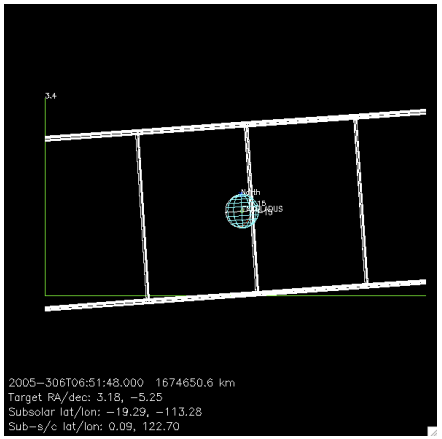
Encel is in front of rings, moves toward Saturn dark limb during obs

017EN_ICYLON003_ISS
2005-306T00:35
Alt= 1,497,512 km
Longitude= 166°W
Latitude0.1°N
Phase= 117.1°



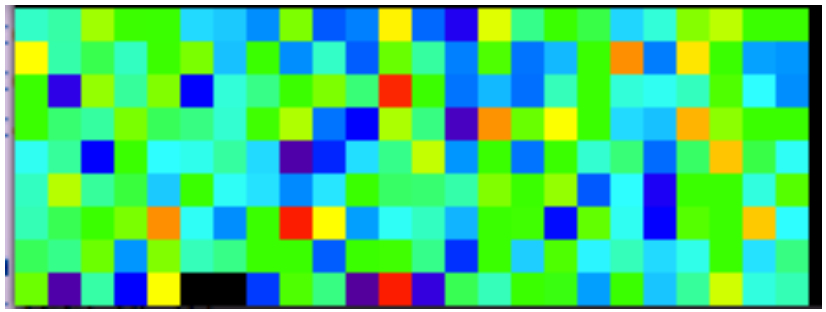
017EN_238W124PH_ISS





017EN_ICYLON004_ISS
2005-306T06:45
Alt= 1,681,285 km
Longitude= 239°W
Latitude=0.1°N
Phase= 123.6°

Low SNR



018EN_ICYLON001_PRIME

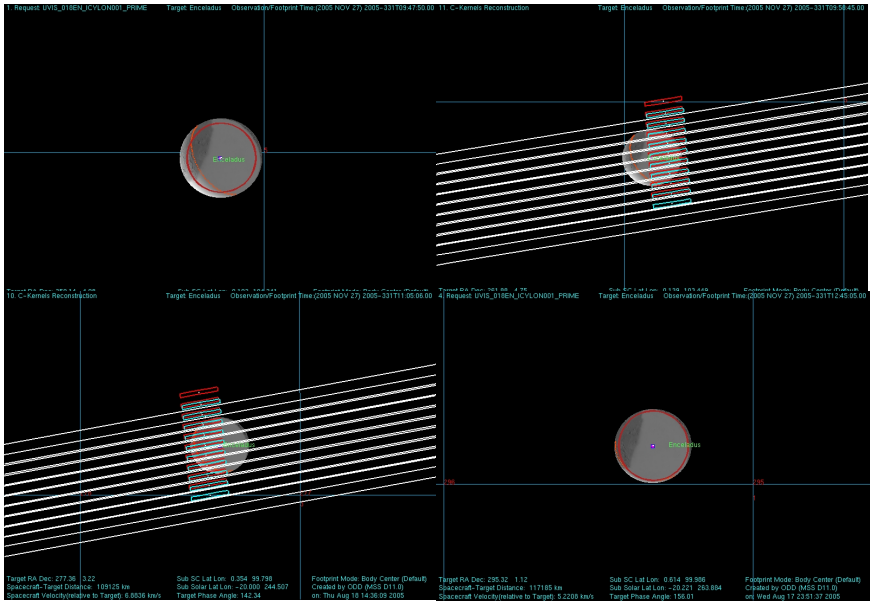
2005-331T09:47

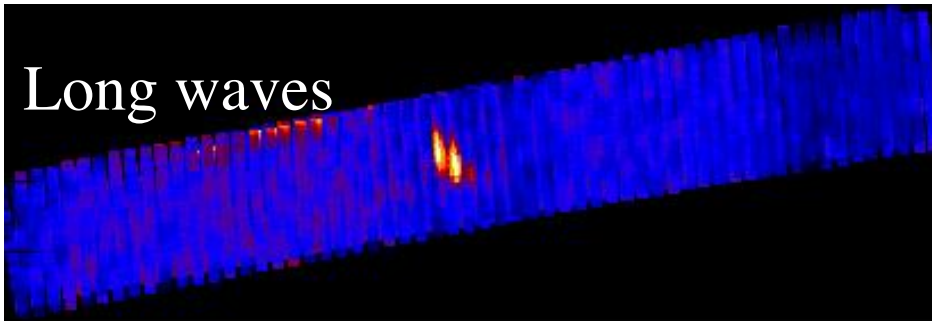
Alt= 108,852 km

Longitude= 103°W

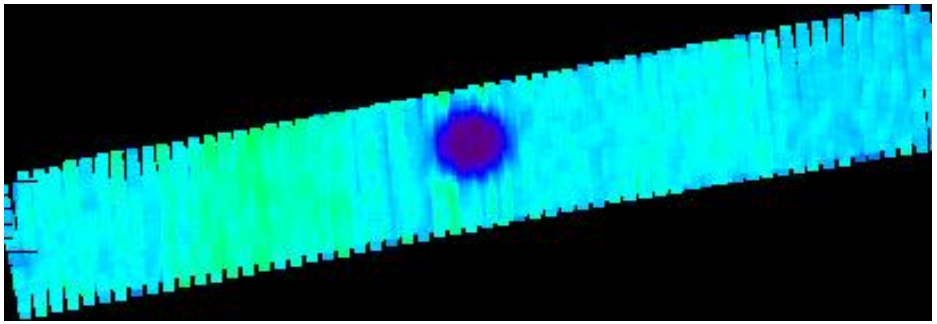
Phase= 126.2°

4-part



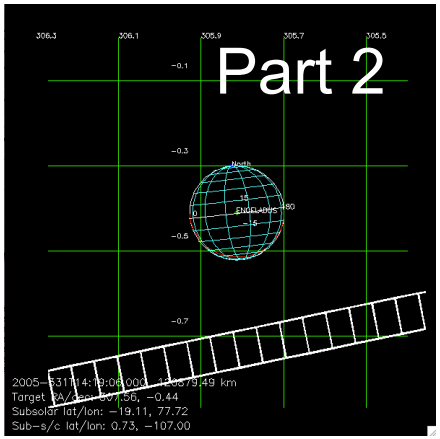


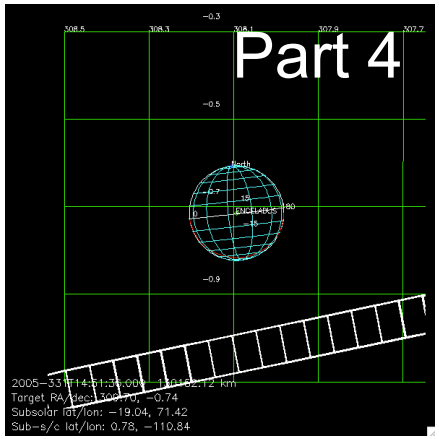
1216Å

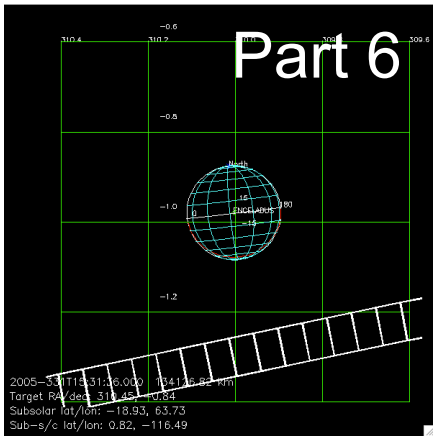


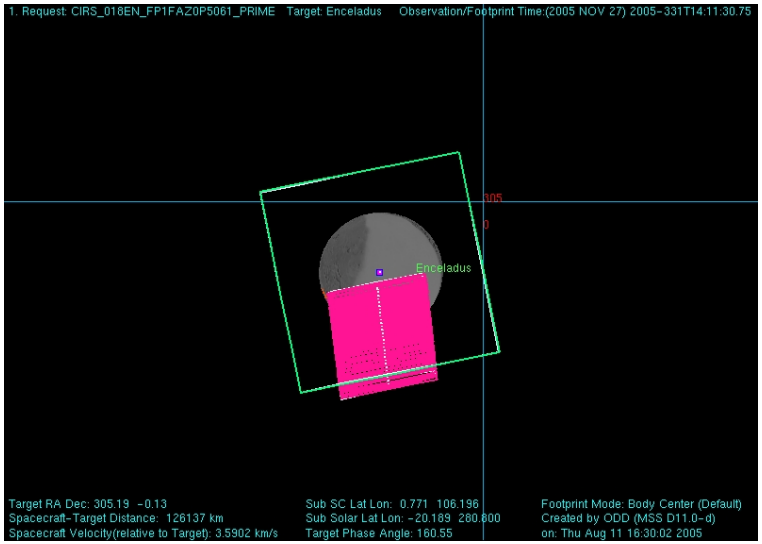
7-part

018EN_ICYLON002_CIRS
2005-331T14:10
Alt= 126,137 km
Longitude= 106°W
Phase= 160°

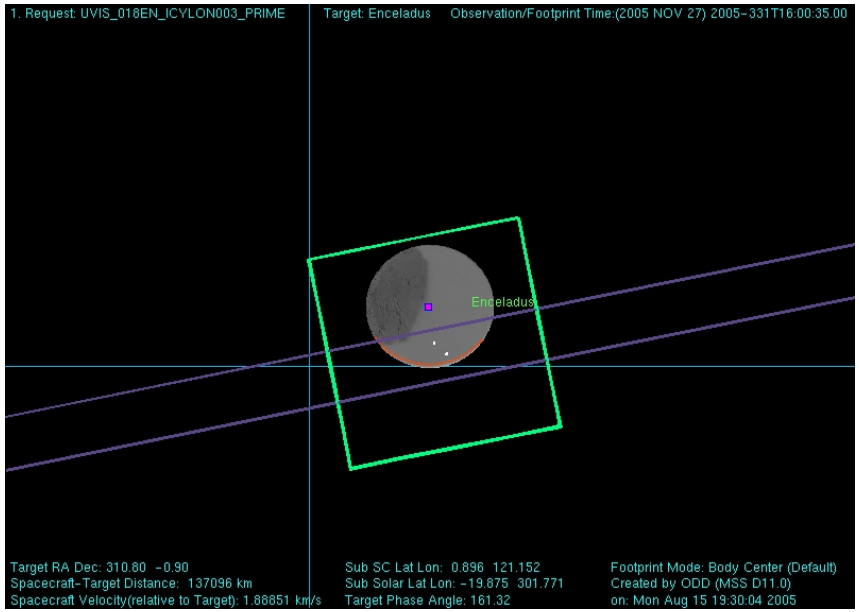


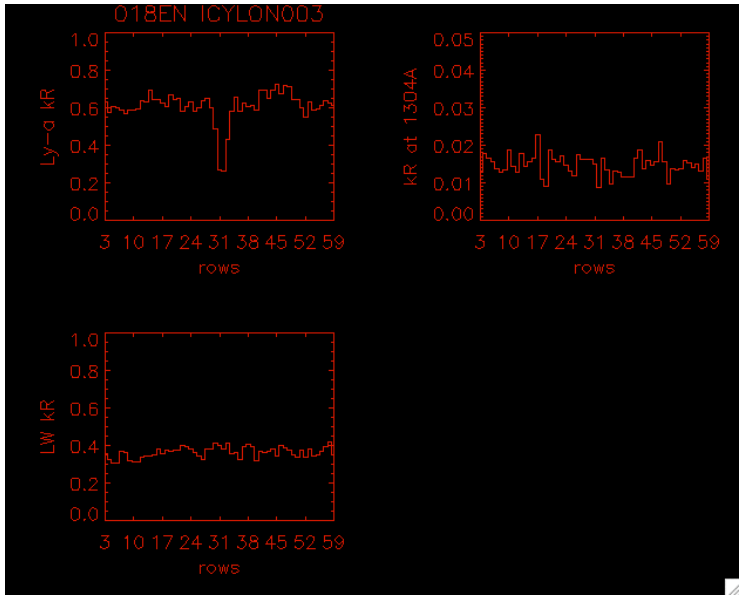




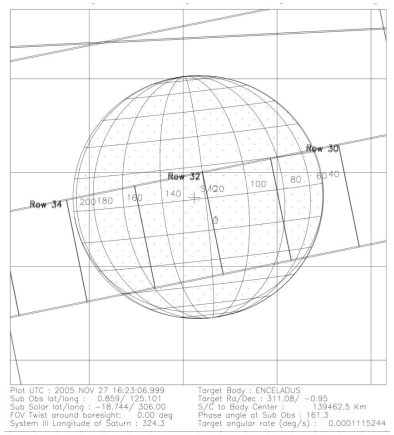


018EN_ICYLON003_PRIME
2005-331T16:00
Alt= 137,096 km
Longitude= 121°W
Phase= 161.3°



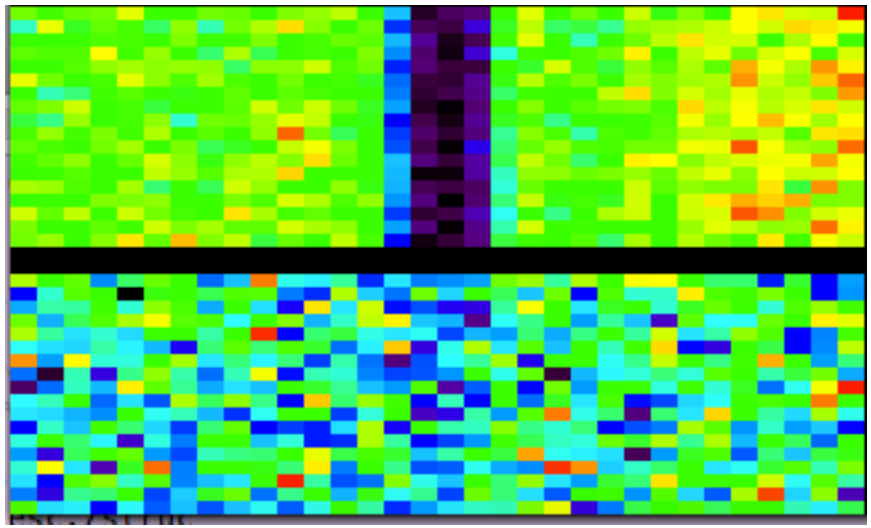


018EN_ICYLON004_VIMS
2005-331T16:20
Alt= 143,109 km
Longitude= 129°W
Phase= 161.4°



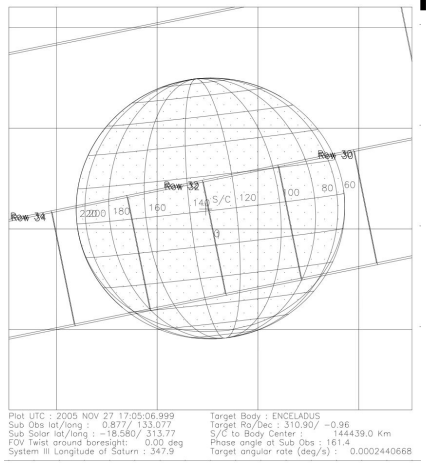
Ly-a

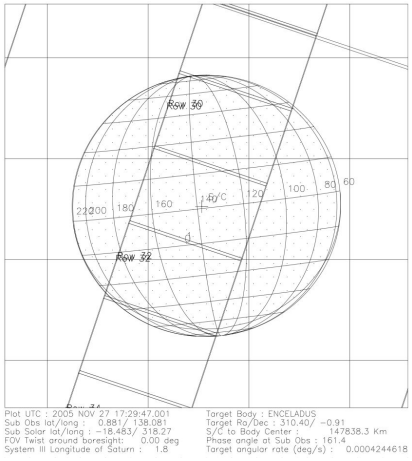
Long waves

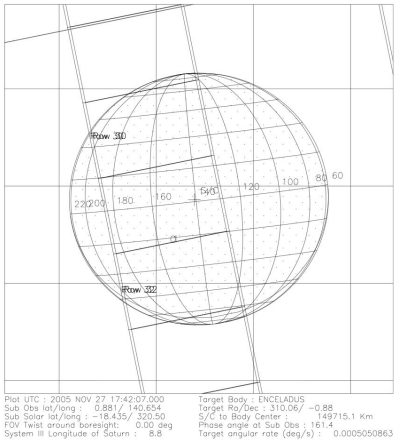


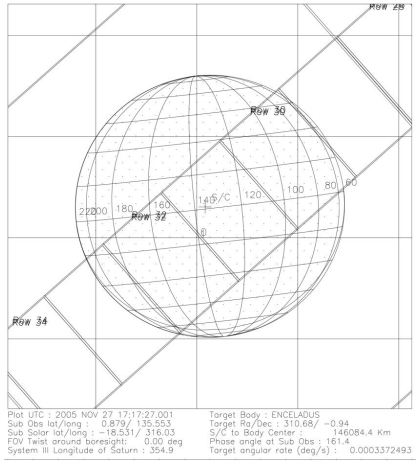
4-part

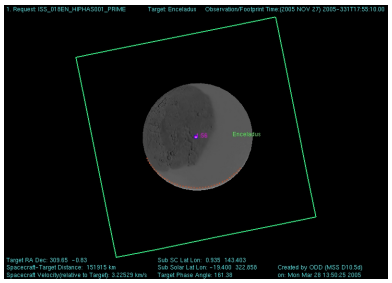
018EN_ICYLON005_ISS
2005-331T17:00
Alt= 147,850 km
Longitude= 136°W
Phase= 161.4°











018EN_ICYLON006_PRIME

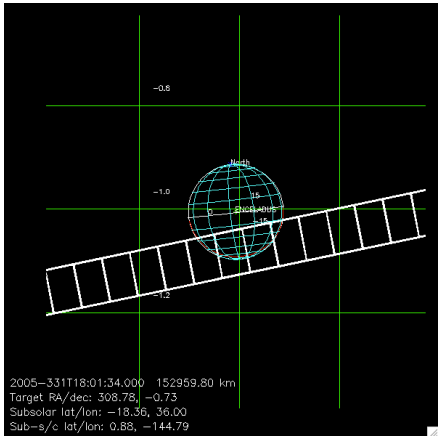
2005-331T18:00

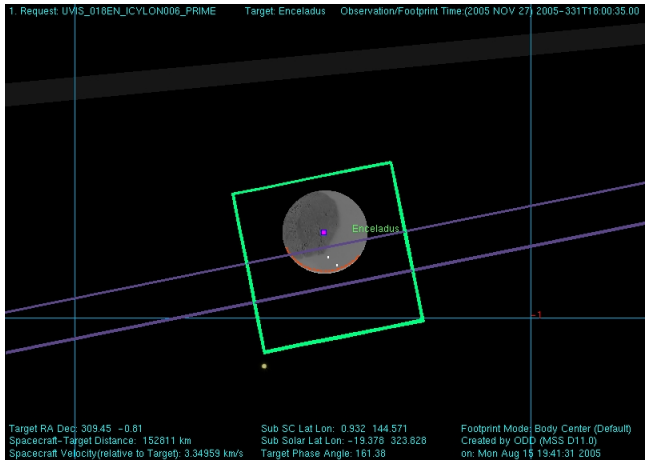
Alt= 155,168 km

Longitude= 147°W

Latitude=0.9°N

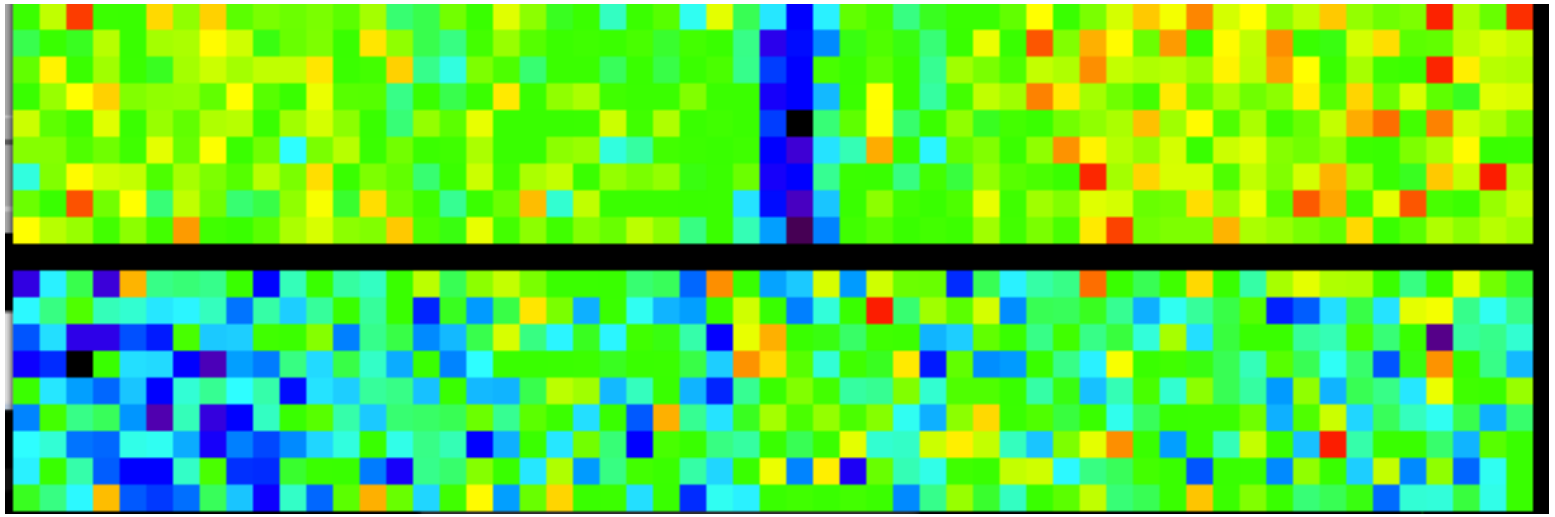
Phase= 161.4°



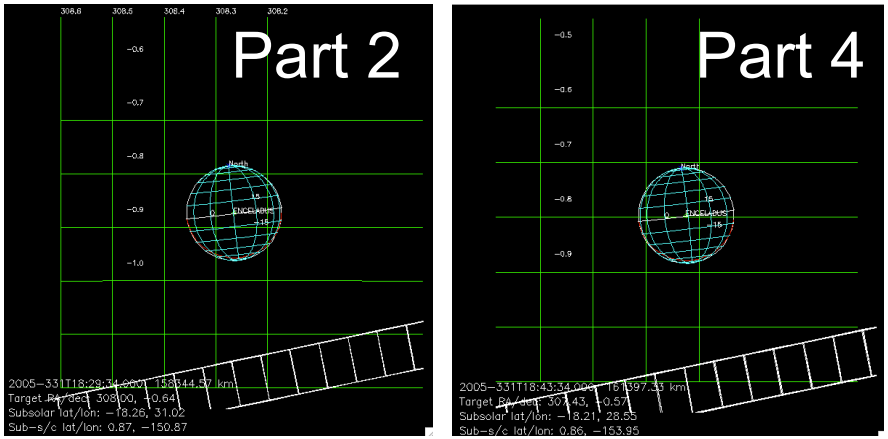


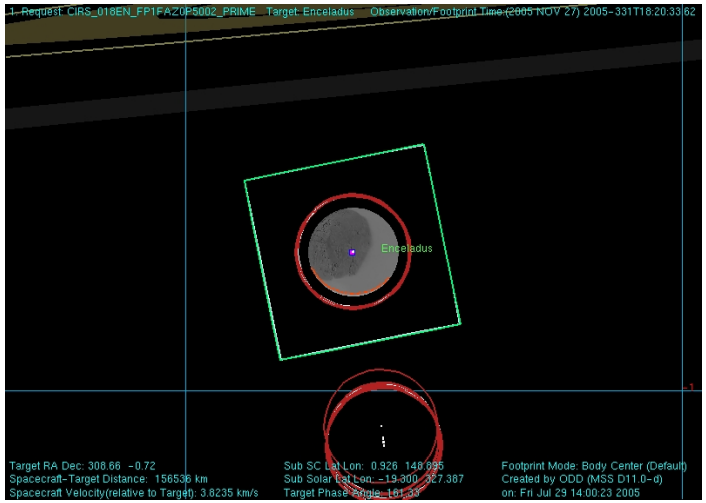
Ly-a

Long waves



5-part 018EN_ICYLON007_CIRS
2005-331T18:20
Range= 156,536 km
Longitude= 149°W
Phase= 161°

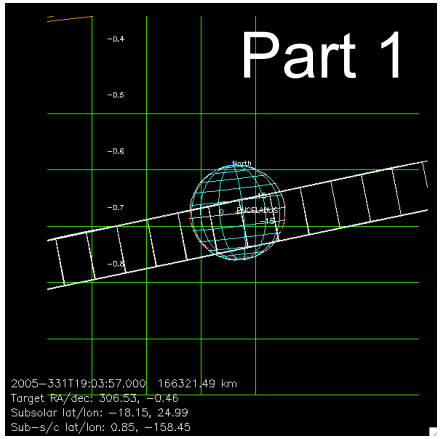


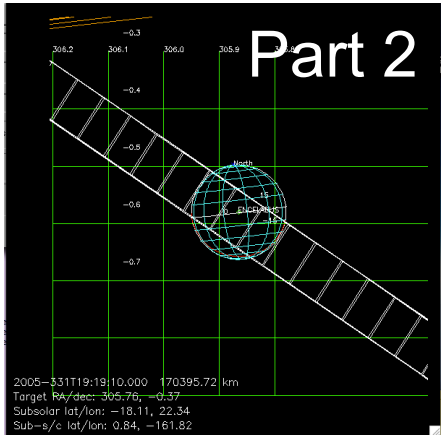


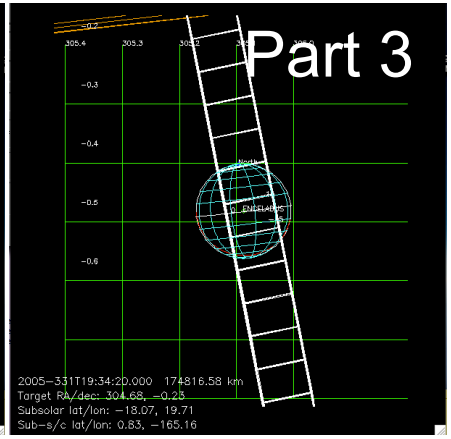
Enceladus not in UVIS slit …

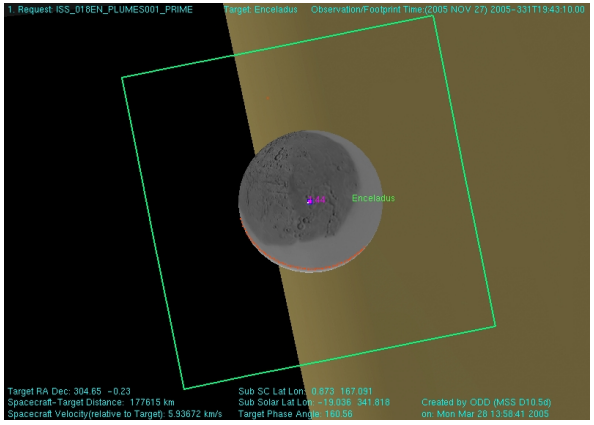
3-part

018EN_ICYLON008_ISS
2005-331T19:00
Alt= 166,325 km
Longitude= 159°W
Latitude=0.9°N
Phase= 161°









Part 3 Ly-a

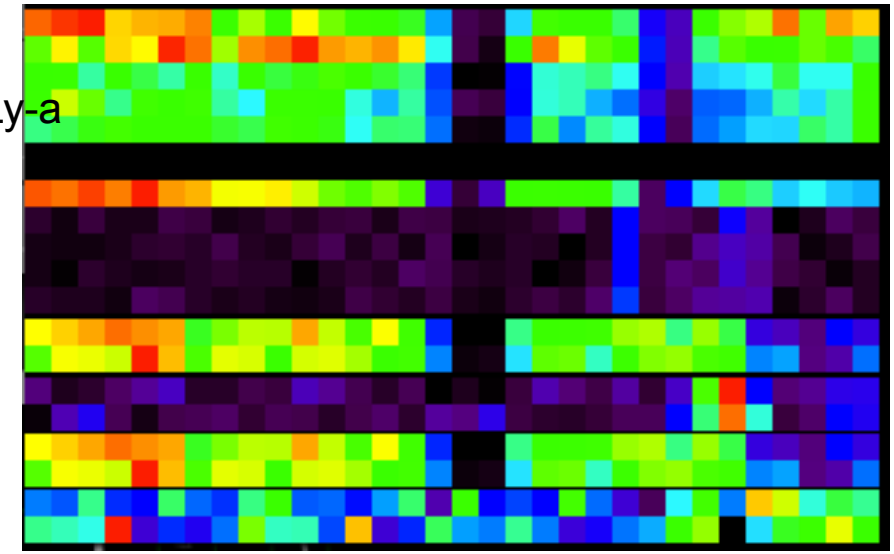
Part 3 Long waves

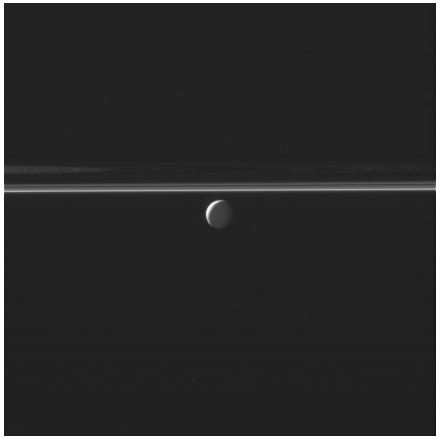
Part 2 Ly-a

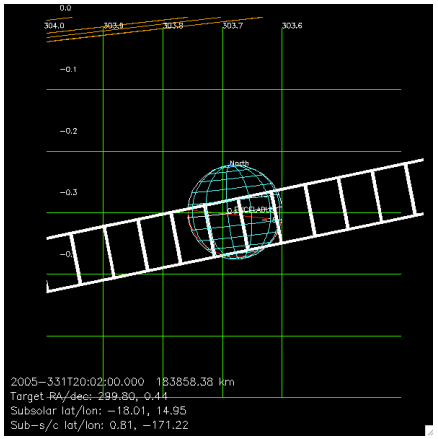
Part 2 Long waves

Part 1 Ly-a

Part 1 Long waves

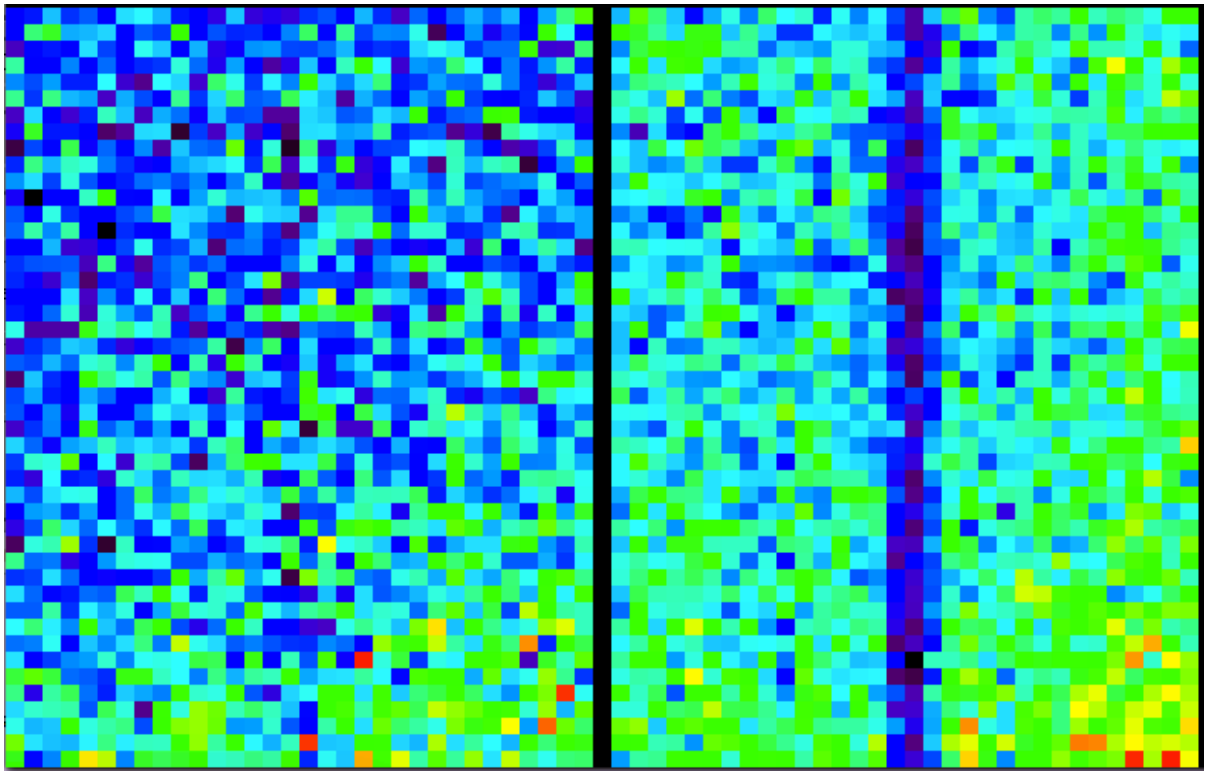






018EN_ICYLON009_VIMS
2005-331T20:00
Alt= 201,791 km
Longitude= 181°W
Latitude=0.8°N
Phase= 159.4°

Long waves Ly-a



018EN_ICYLON010_PRIME

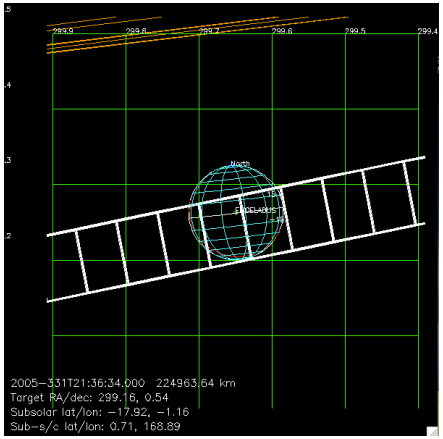
2005-331T21:35

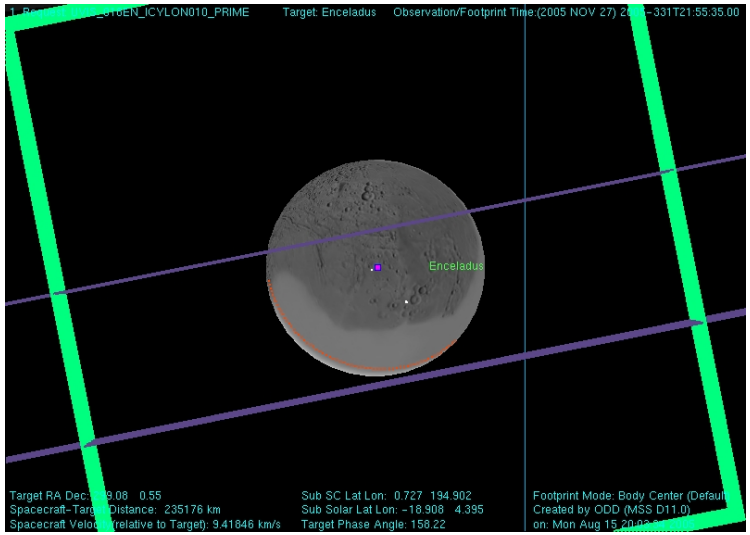
Alt= 228,946 km

Longitude= 193°W

Latitude=0.7°N

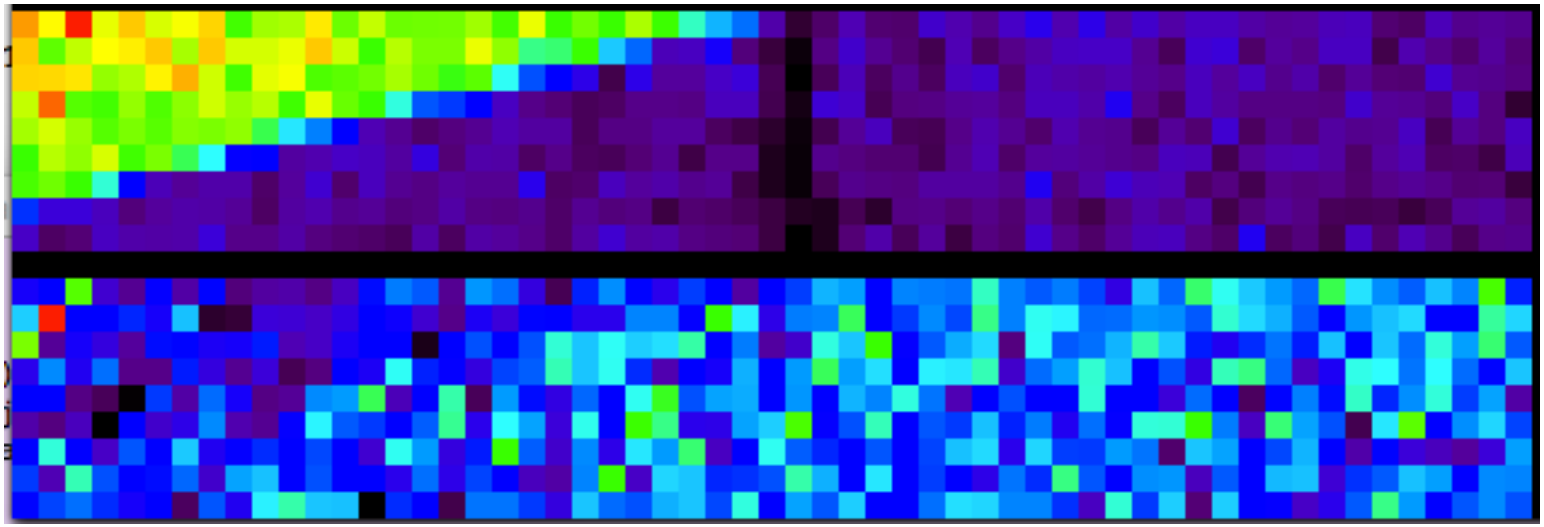
Phase= 158°



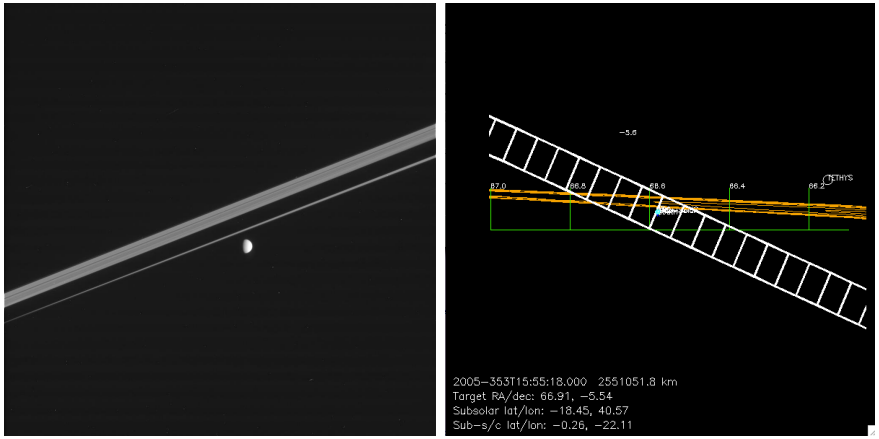


Ly-a

Long waves



019EN_022W066PH001_ISS



019EN_ICYLON001_ISS

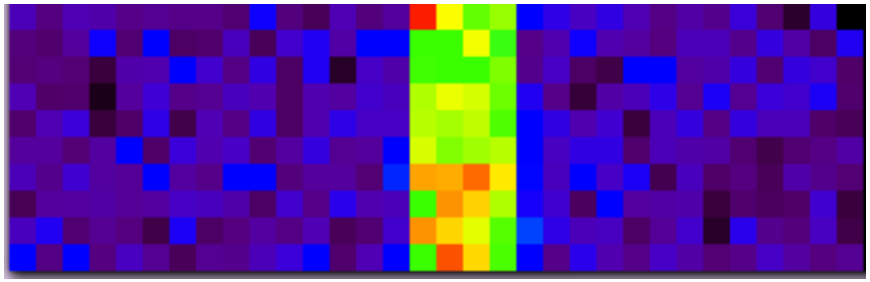
2005-353T15:50

Alt= 2,546,6475 km

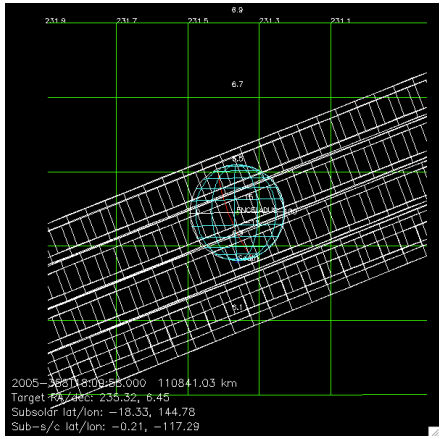
Longitude= 24°W

Latitude=0.26°S

Phase= 66°



019EN_FP3HOTSPT020_CIRS



019EN_ICYLON002_CIRS

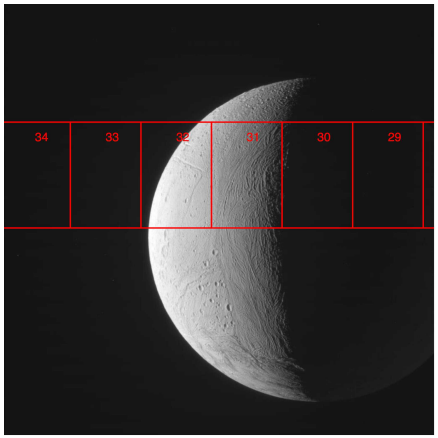
2005-358T17:55

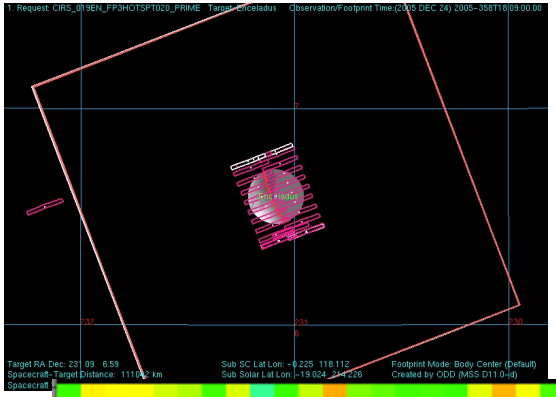
Alt= 108,661 km

Longitude= 117°W

Latitude=0.2°S

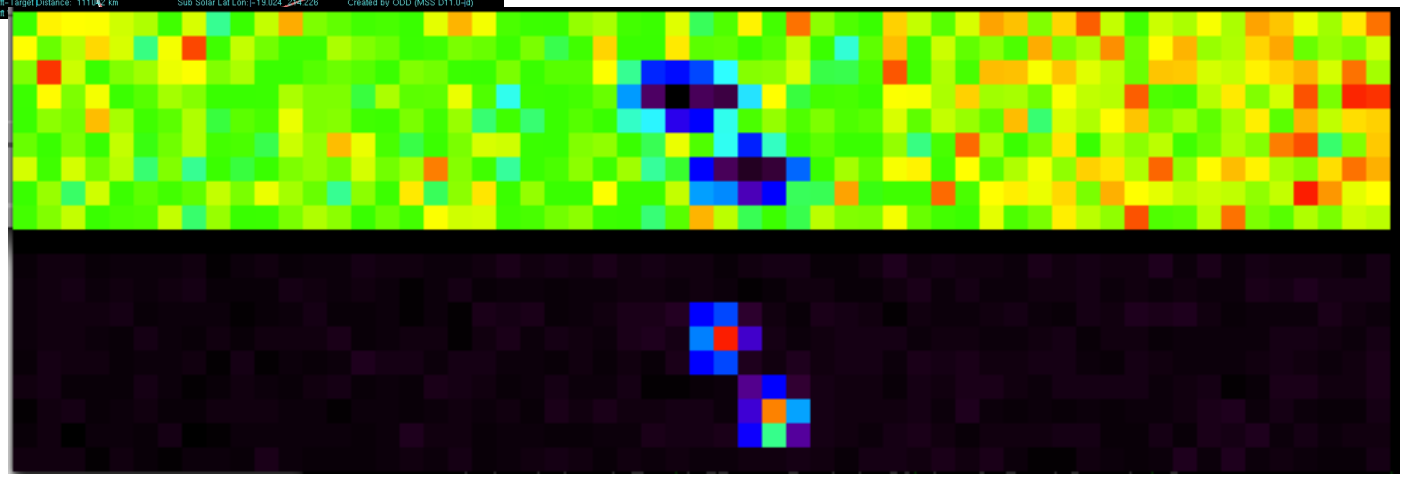
Phase= 101.2°



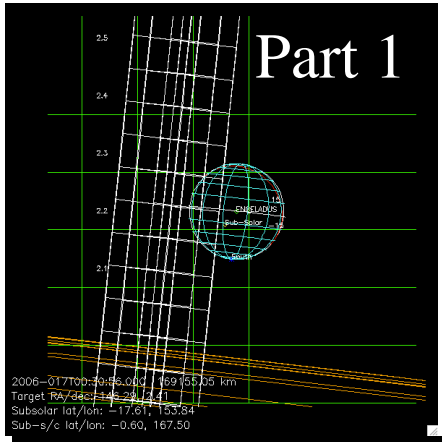


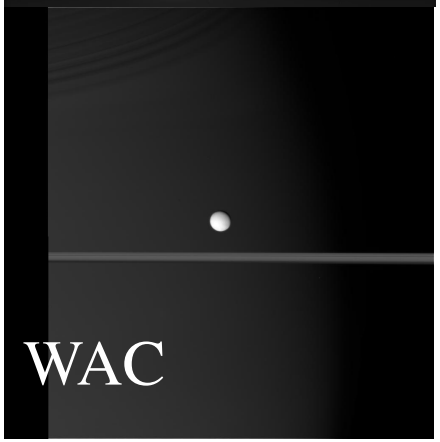
Ly-a

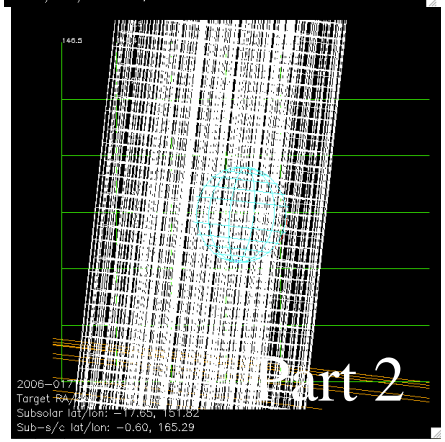
Long waves

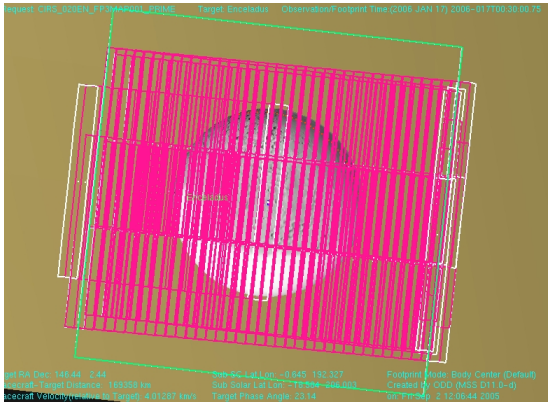


020EN_FP3MAP001_CIRS 2-part 020EN_ICYLON001_CIRS



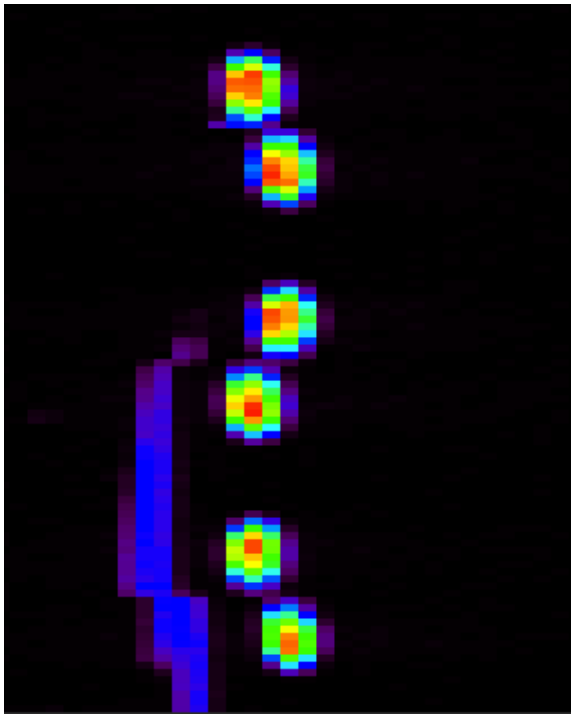






2006-017T00:26
Alt= 168,221 km
Longitude= 193°W
Latitude=0.6°S
Phase= 23°

Part 2



Tethys behind Enceladus for part; Saturn too

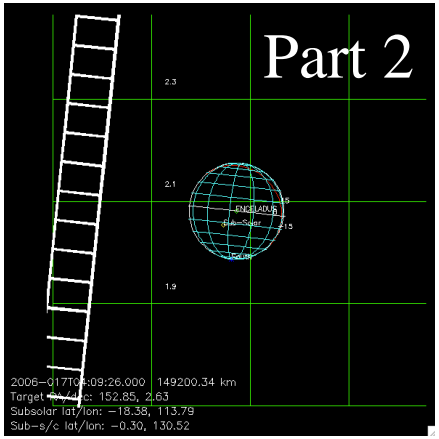
020EN_FP1COMP001_CIRS 3-part 020EN_ICYLON002_CIRS

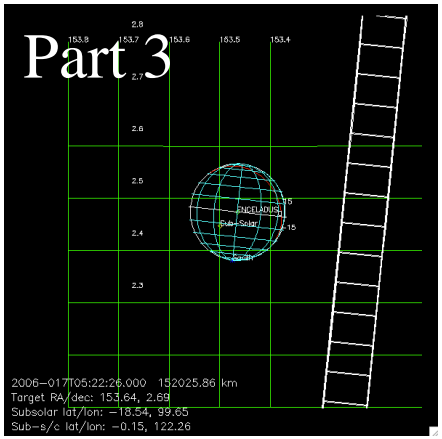
2006-017T04:00

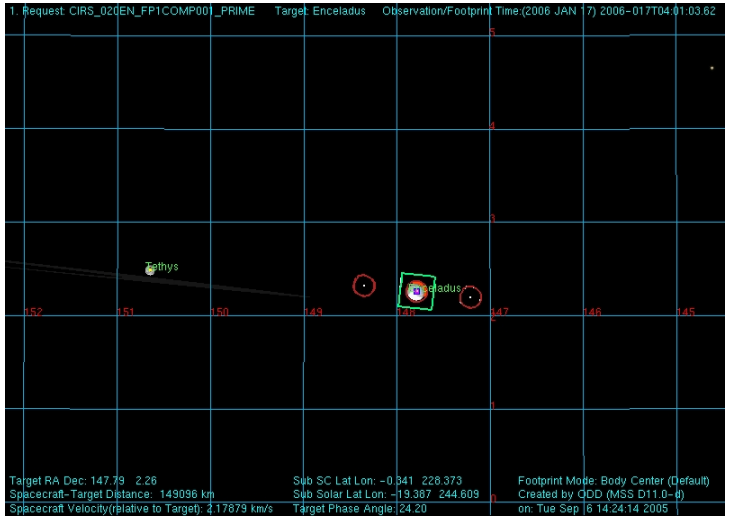
Alt= 150,522 km

Longitude= 237°W

Phase= 26.8°

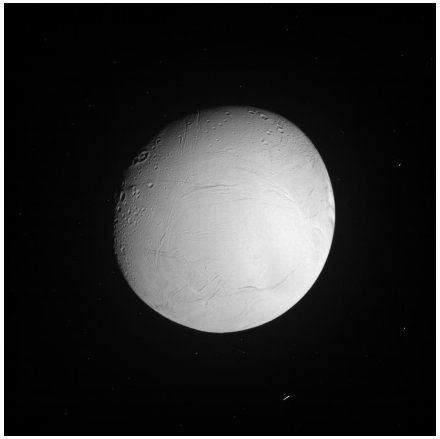


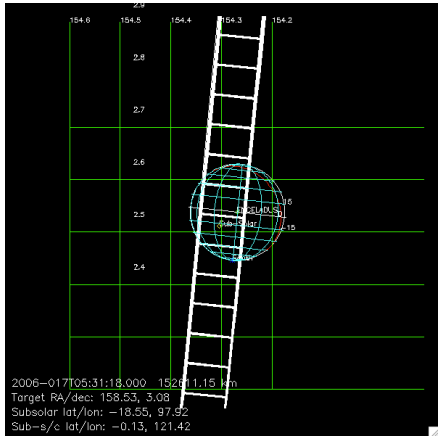


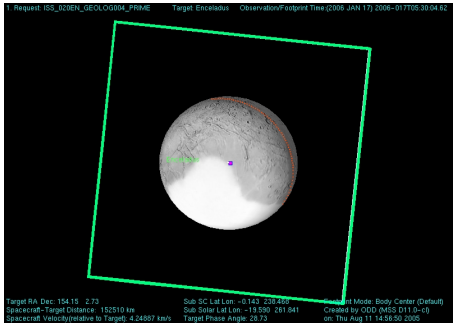


Enceladus not in UVIS slit

020EN_GEOLOG004_ISS







020EN_ICYLON003_ISS

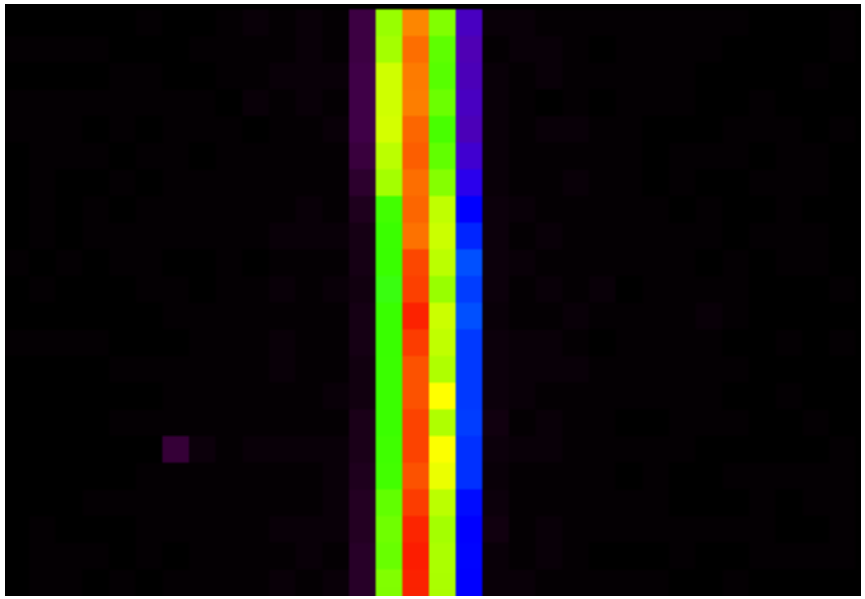
2006-017T05:30

Alt= 154,016 km

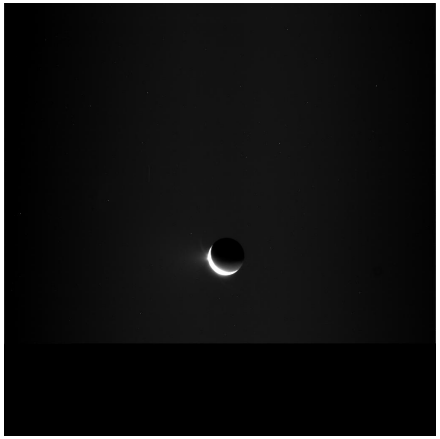
Longitude= 240°W

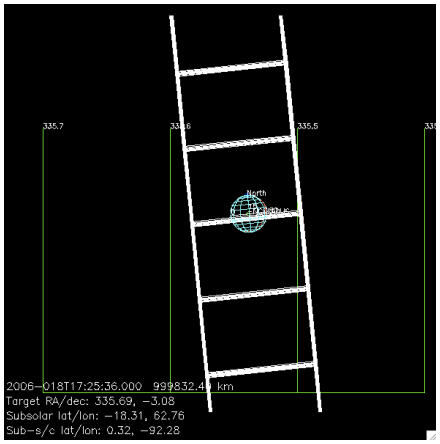
Latitude=0.1°S

Phase= 30°



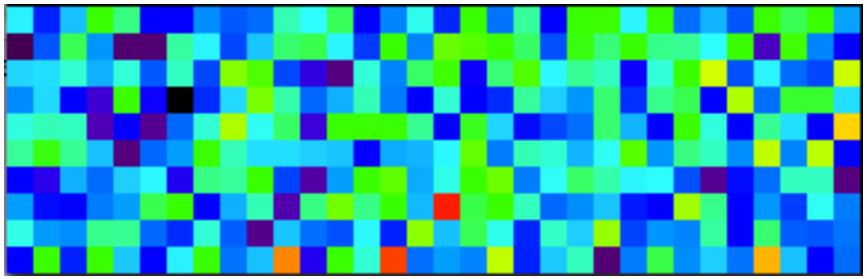
020EN_094W151PH001_ISS



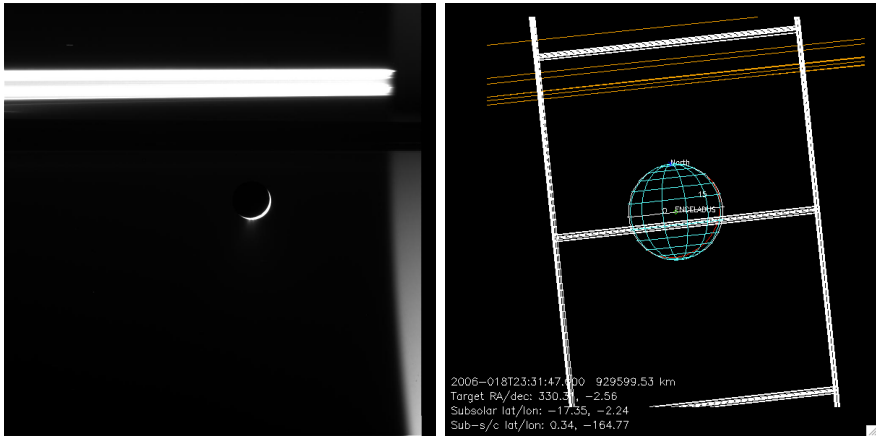


020EN_ICYLON004_ISS
2006-018T17:26
Alt= 996,422 km
Longitude= 94°W
Latitude=0.3°N
Phase= 150°

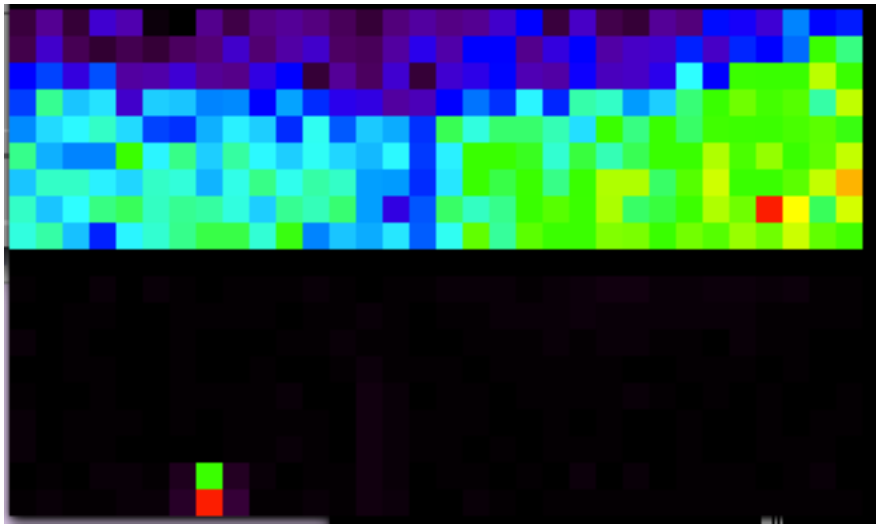
Low SNR



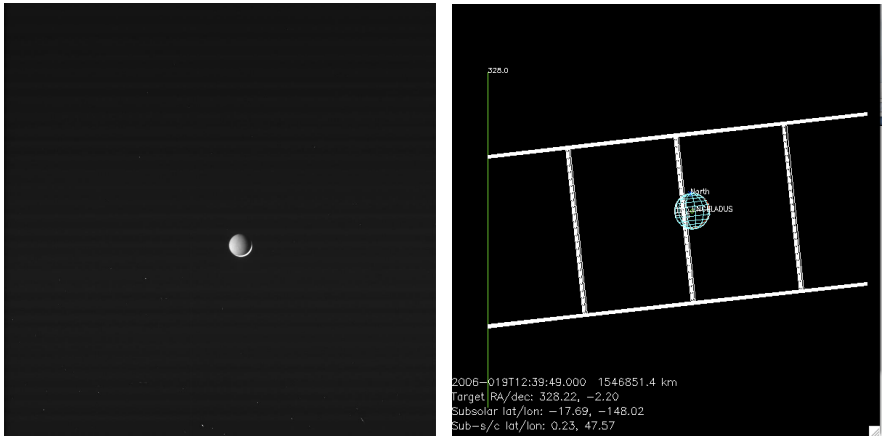
020EN_166W154PH001_ISS



020EN_ICYLON007_ISS
2006-018T23:25
Alt= 930,464 km
Longitude= 166°W
Latitude=0.34°N
Phase= 154°

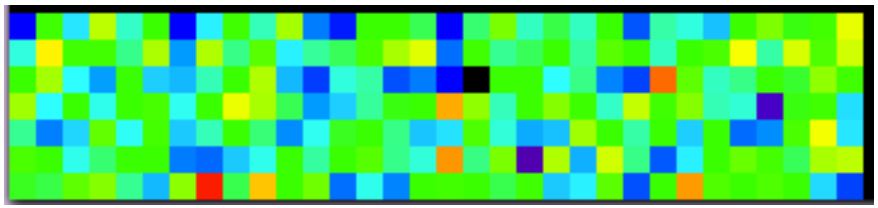


020EN_310W156PH001_ISS

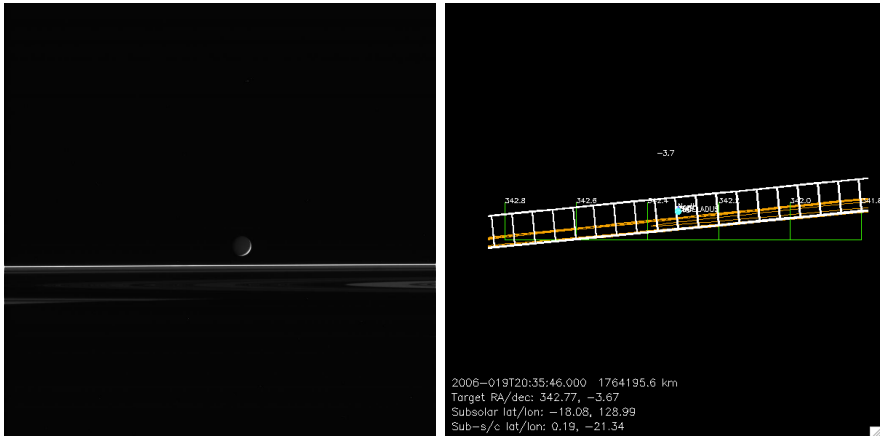


020EN_ICYLON010_ISS
2006-019T12:34
Alt= 1,551,726 km
Longitude= 313°W
Latitude=0.2°N
Phase= 155.7°

Low SNR

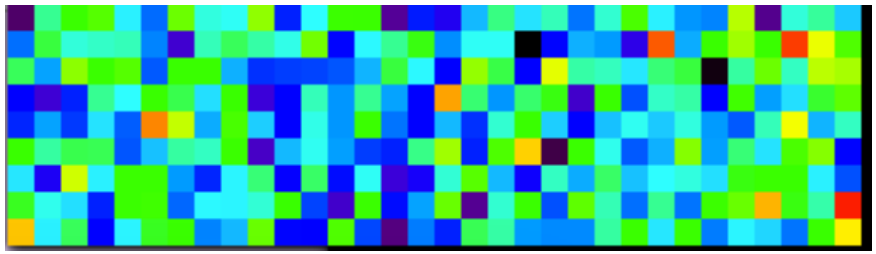


020EN_022W145PH001_ISS

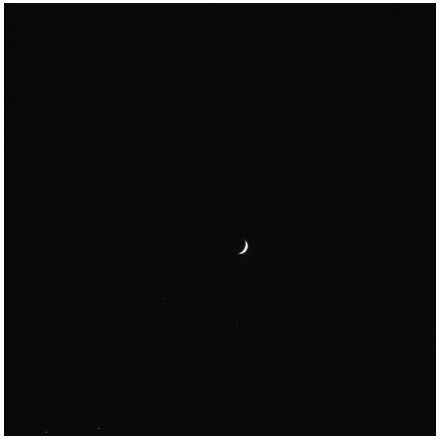


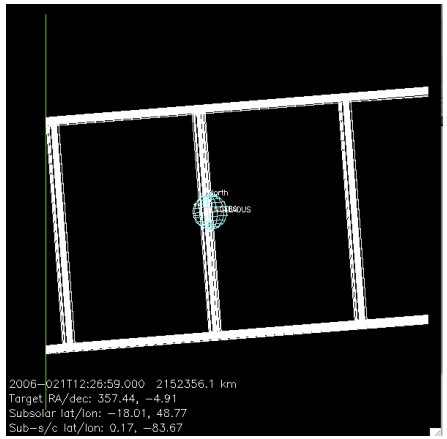
020EN_ICYLON014_ISS
2006-019T20:30
Alt= 1,763,906 km
Longitude= 23°W
Latitude0.2°N
Phase= 144.8°

Low SNR



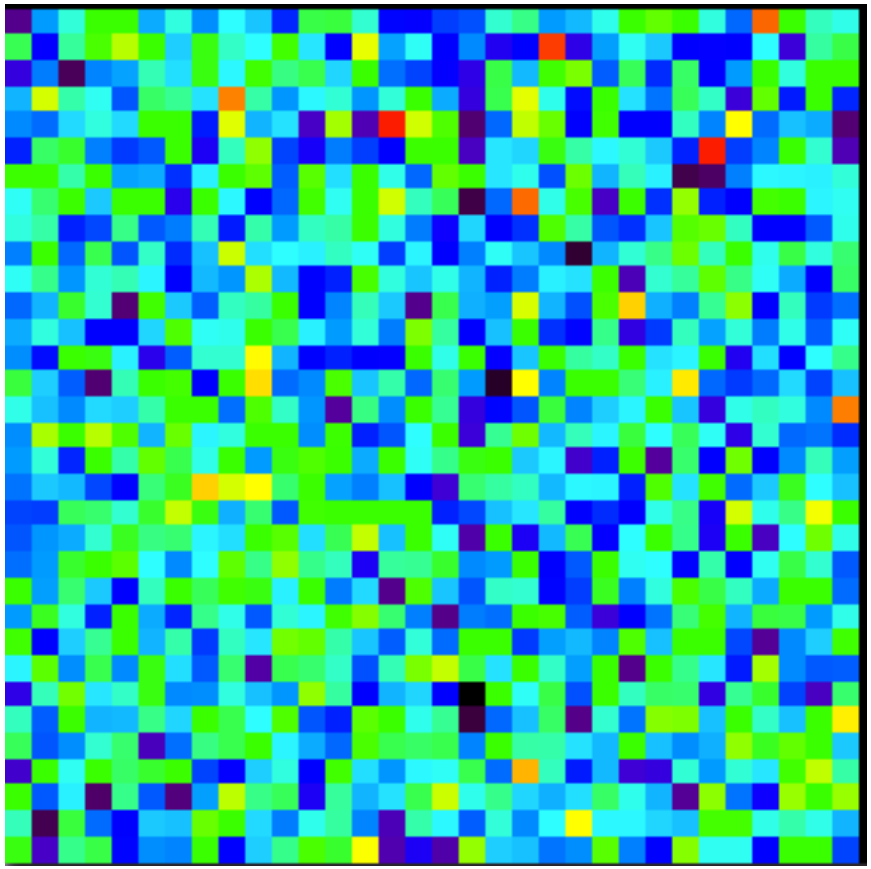
020EN_094W132PH001_ISS



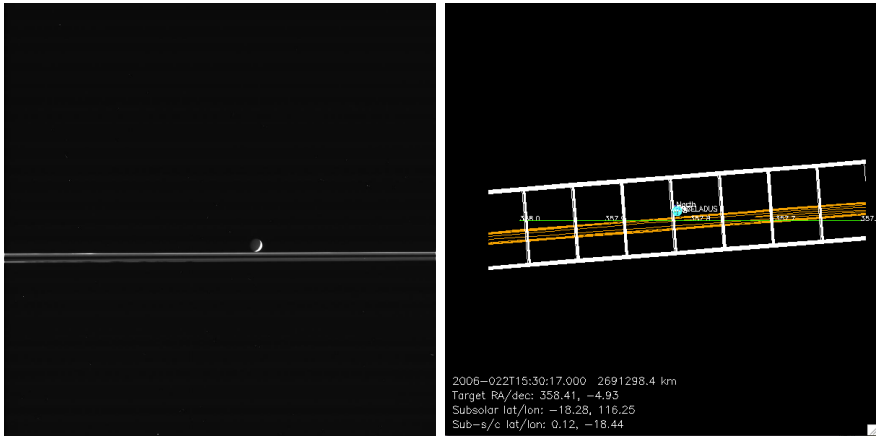


020EN_ICYLON018_ISS
2006-021T12:20
Alt= 2,135,361 km
Longitude= 90°W
Latitude=0.2°N
Phase= 132°

Low SNR



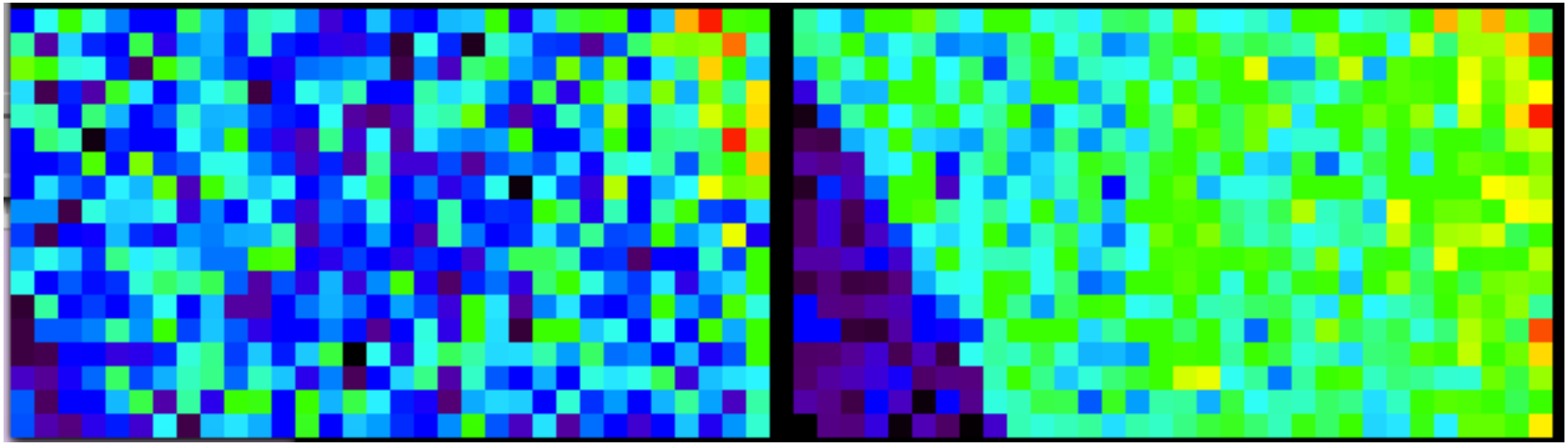
020EN_022W131PH001_ISS



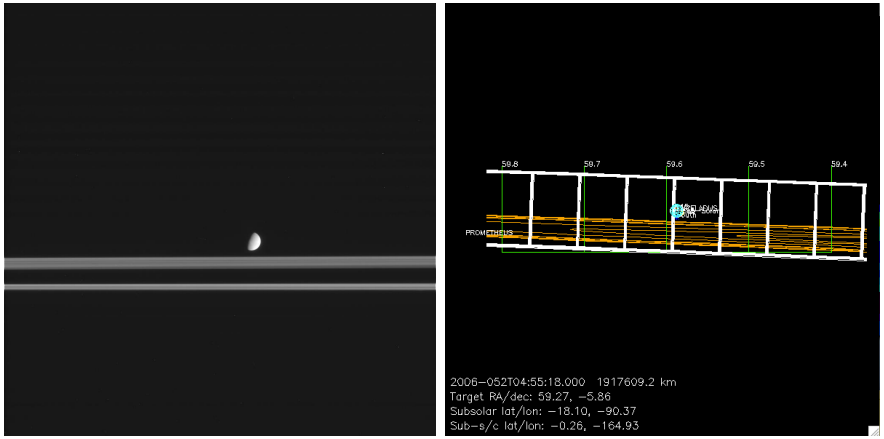
020EN_ICYLON021_ISS
2006-022T15:25
Alt= 2,689,667 km
Longitude= 21°W
Latitude=0.1°N
Phase= 131.2°

Long waves

Ly-a



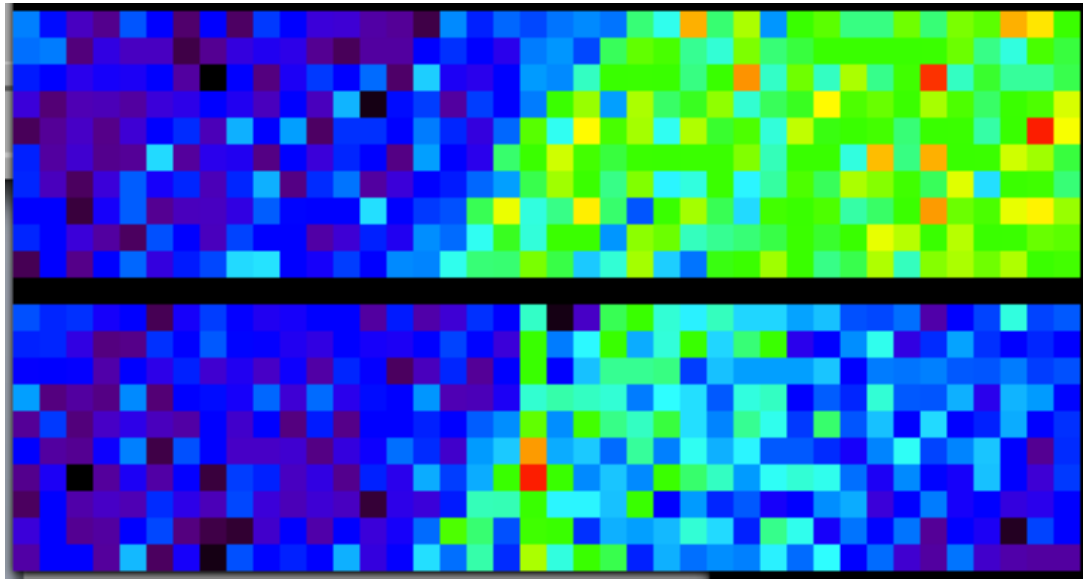
021EN_166W075PH001_ISS



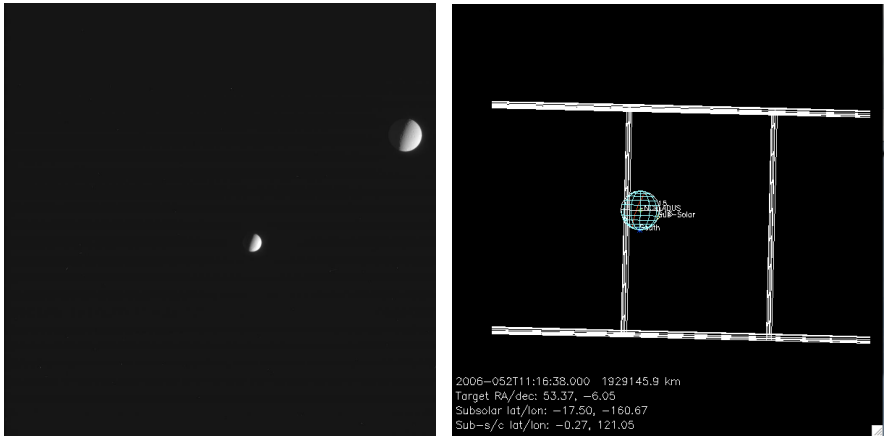
021EN_ICYLON001_ISS
2006-052T04:50
Alt= 1,913,612 km
Longitude= 167°W
Latitude=0.3°S
Phase= 74.9°

Ly-a

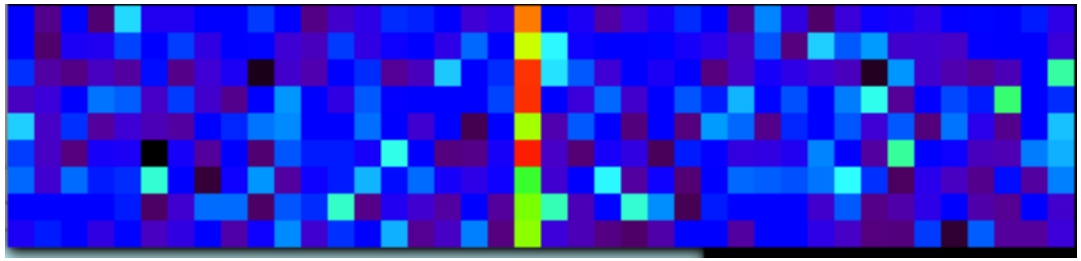
Long waves



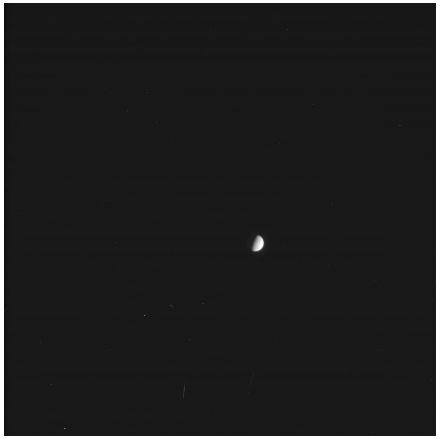
021EN_238W080PH001_ISS

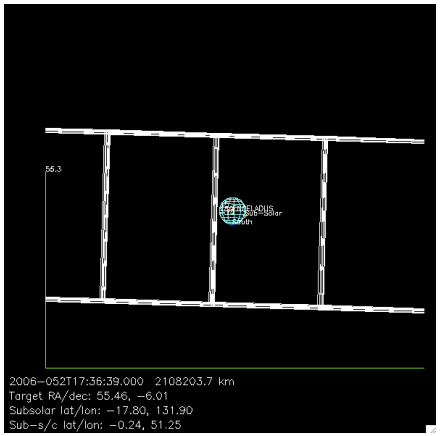


021EN_ICYLON002_ISS
2006-052T11:10
Alt= 1,9232,250 km
Longitude= 240°W
Latitude=0.3°S
Phase= 80.5°



021EN_310W079PH001_ISS





021EN_ICYLON003_ISS

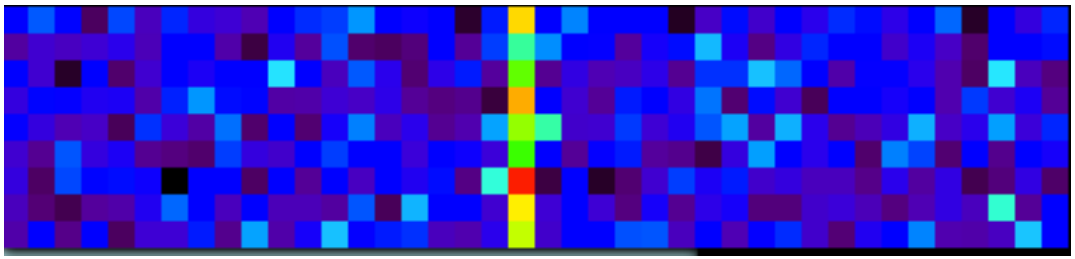
2006-052T17:30

Alt= 2,110,778 km

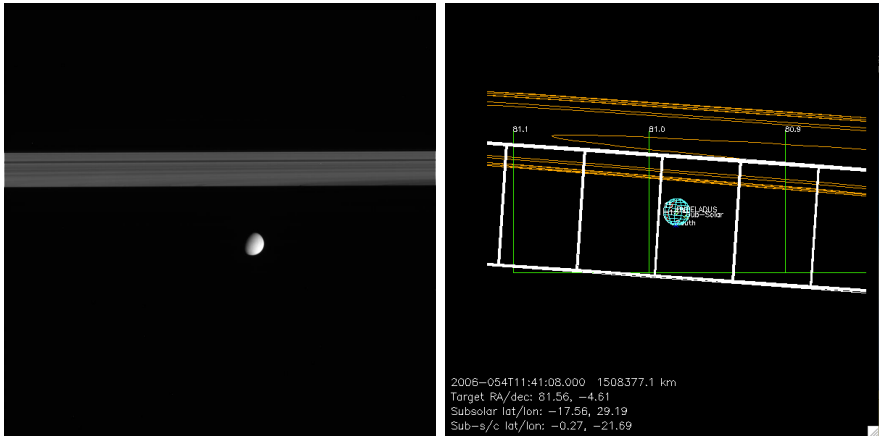
Longitude= 310°W

Latitude=0.24°S

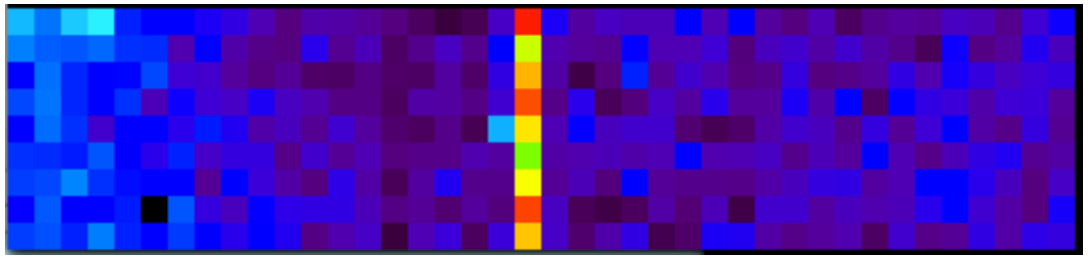
Phase= 78.8°



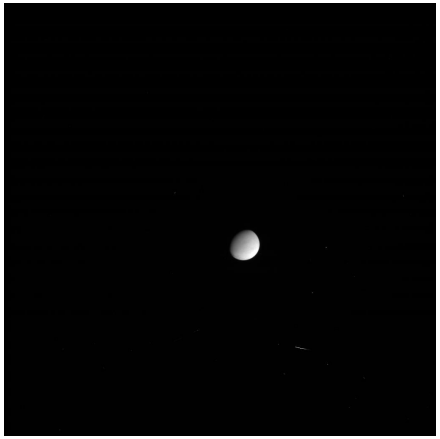
021EN_022W055PH001_ISS

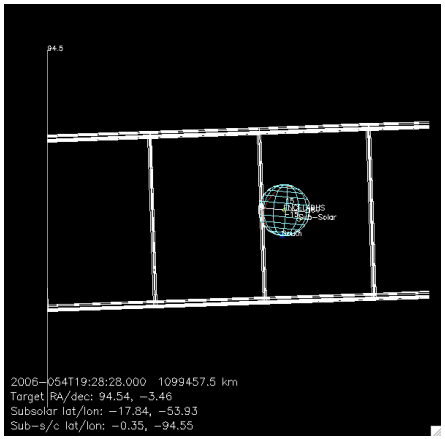


021EN_ICYLON004_ISS
2006-054T11:35
Alt= 1,503,401 km
Longitude= 23°W
Latitude=0.28°S
Phase= 54.6°



021EN_094W043PH001_ISS





021EN_ICYLON005_ISS

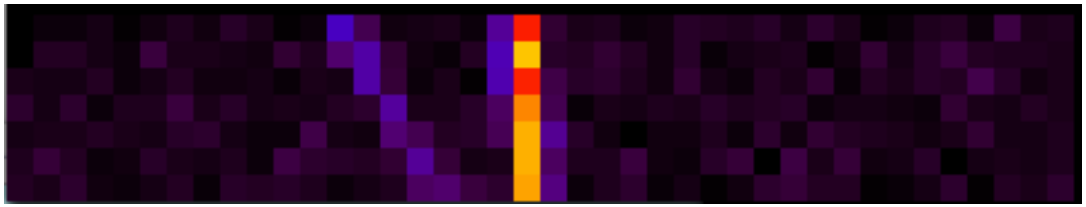
2006-054T19:20

Alt= 1,093,038 km

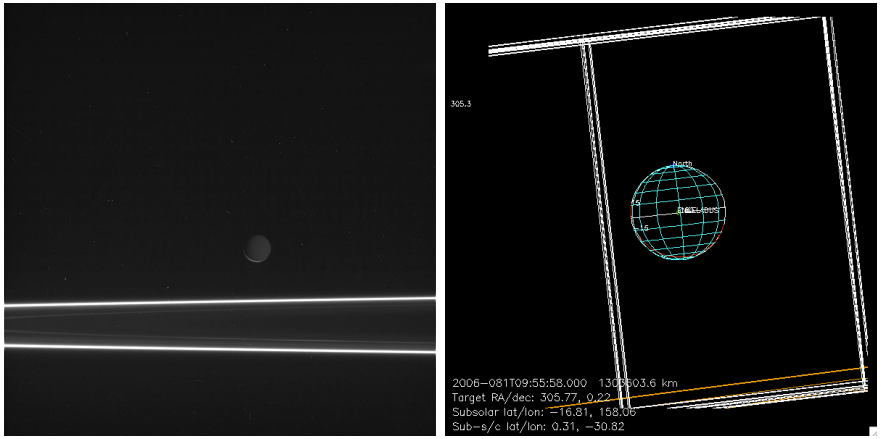
Longitude= 96°W

Latitude=0.36°S

Phase= 42.6°



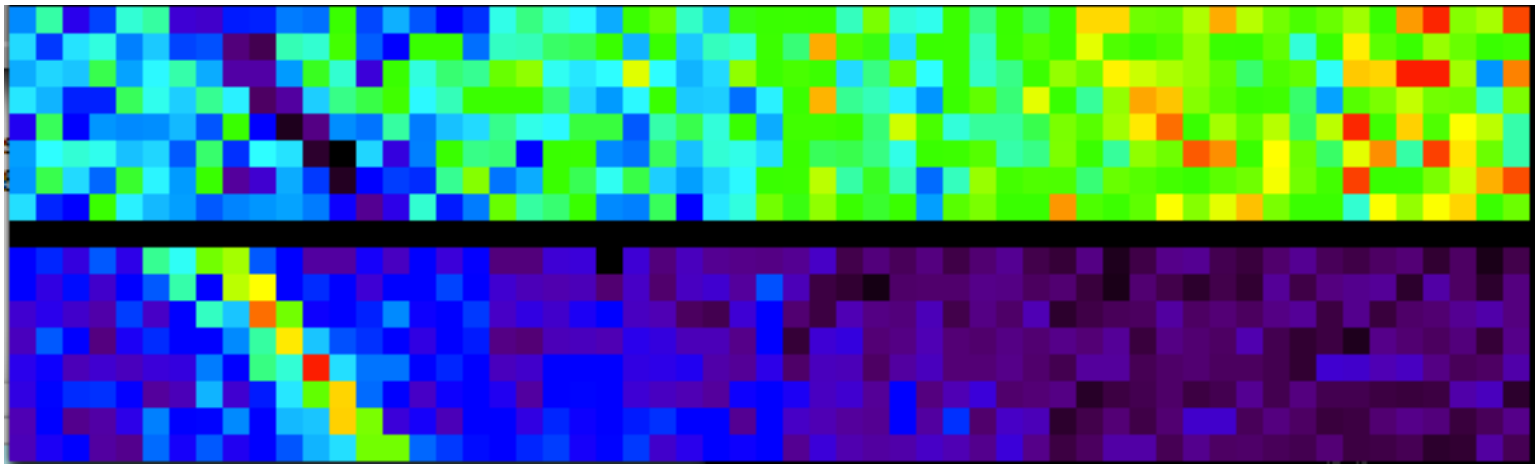
022EN_022W159PH001_ISS



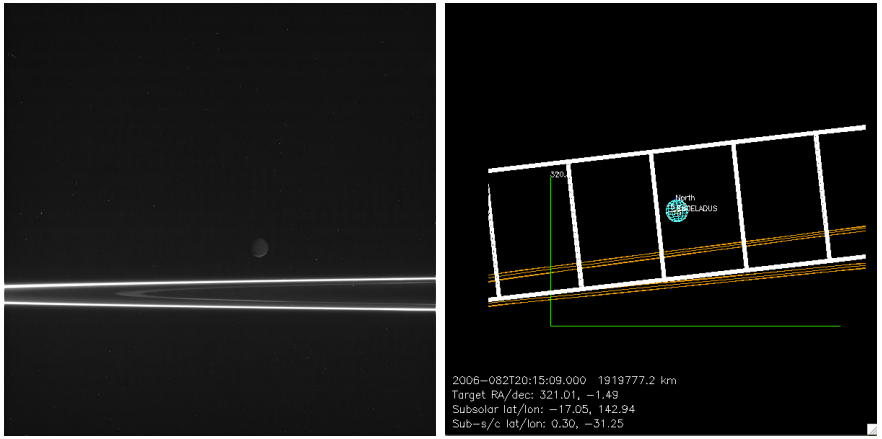
022EN_ICYLON001_ISS
2006-081T09:49
Alt= 1,303,073 km
Longitude= 32°W
Latitude=0.3°N
Phase= 160°

Ly-a

Long waves



022EN_022W162PH001_ISS



022EN_ICYLON002_ISS

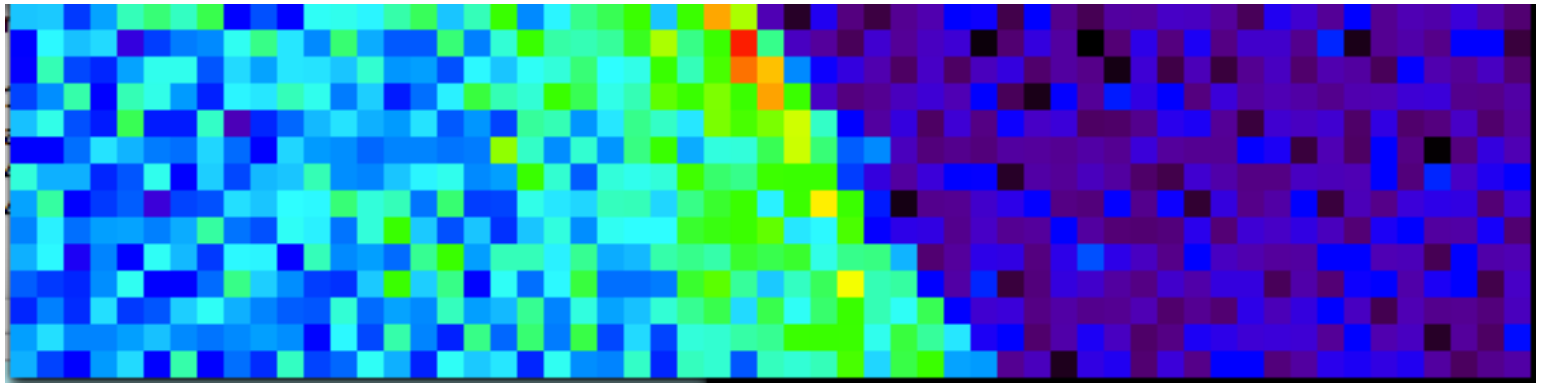
2006-082T20:09

Alt= 1,917,598 km

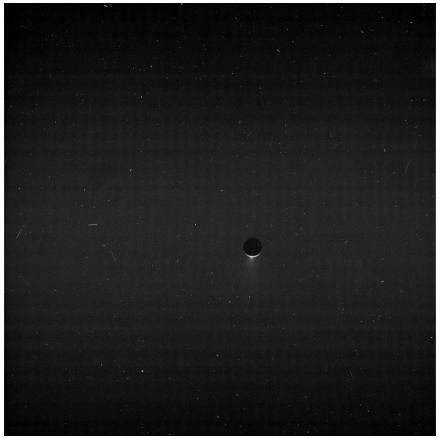
Longitude= 33°W

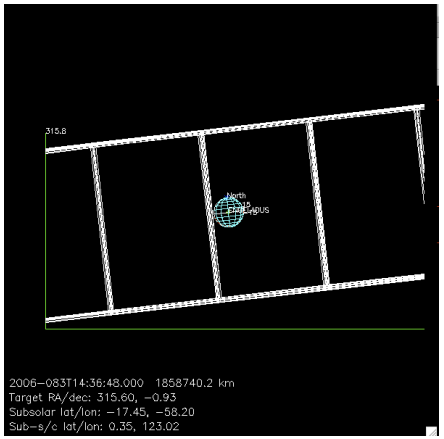
Latitude=0.3°N

Phase= 161°



022EN_238W162PH001_ISS





022EN_ICYLON003_ISS

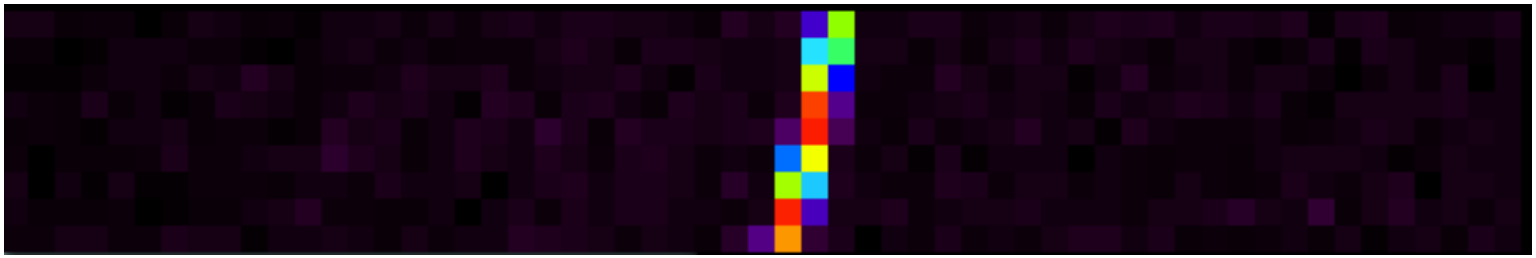
2006-083T14:30

Alt= 1,865,398 km

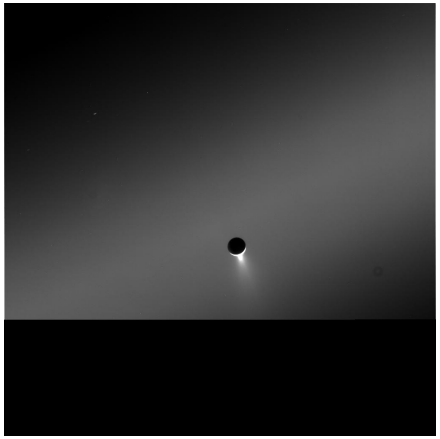
Longitude= 239°W

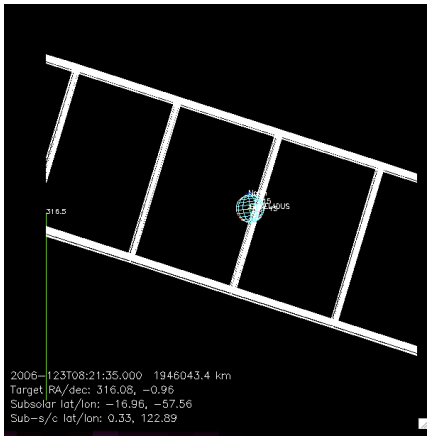
Latitude=0.35°N

Phase= 162.2°



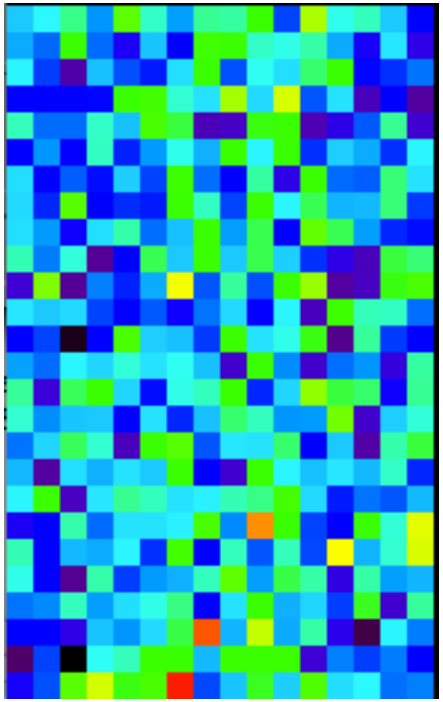
023EN_239W163PH001_ISS



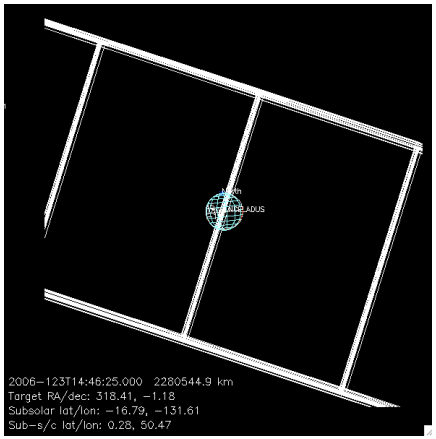


023EN_ICYLON070_ISS
2006-123T08:22
Alt= 1,966,396 km
Longitude=242°W
Latitude=0.33°N
Phase= 162.7°

Low SNR



023EN_310W163PH001_ISS



023EN_ICYLON071_ISS

2006-123T14:47

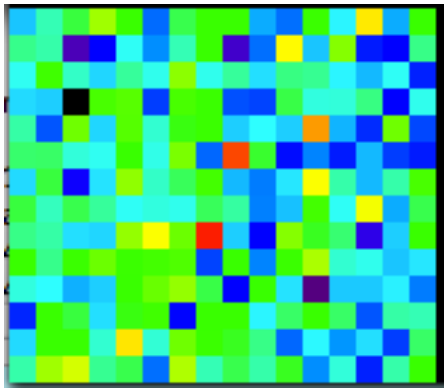
Alt= 2,290,097 km

Longitude=312°W

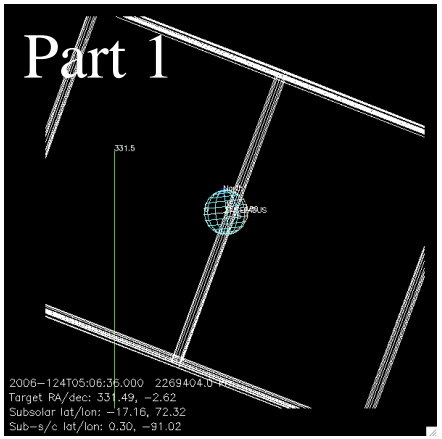
Latitude=0.28°N

Phase= 162.5°

Low SNR

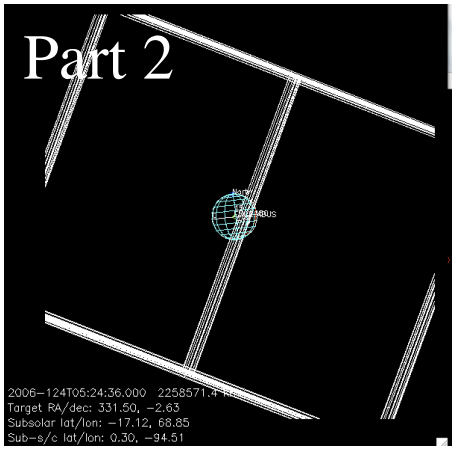


023EN_094W157PH001_ISS

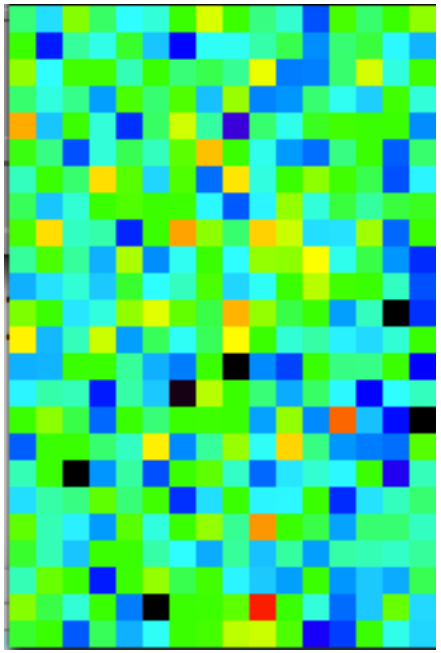


2-part

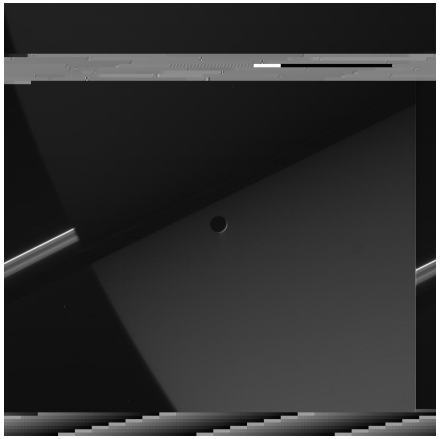
023EN_ICYLON072_ISS
2006-124T05:07
Alt= 2,264,340 km
Longitude= 93°W
Latitude=0.3°N
Phase= 156.9°

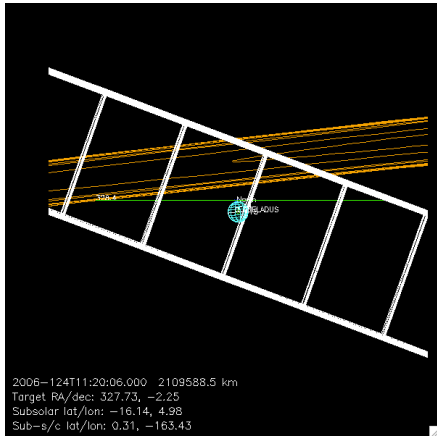


Low SNR



023EN_166W159PH001_ISS





023EN_ICYLON073_ISS

2006-124T11:21

Alt= 2,108,194 km

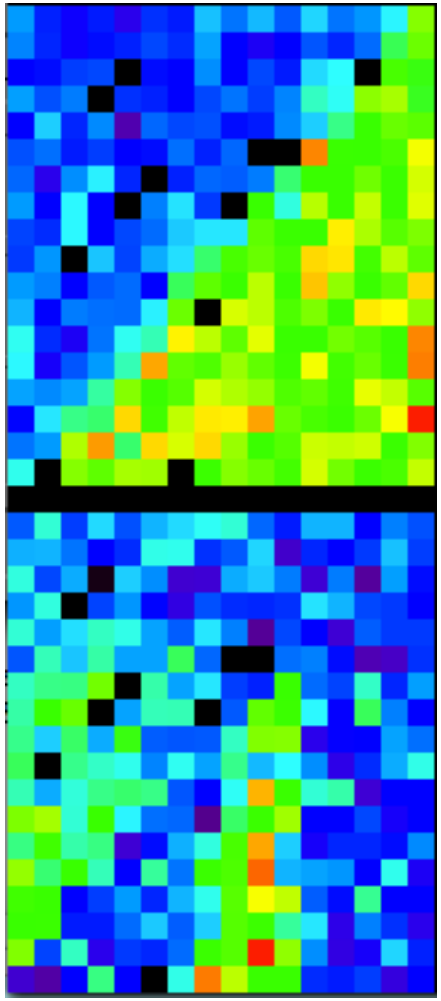
Longitude= 167°W

Latitude=0.3°N

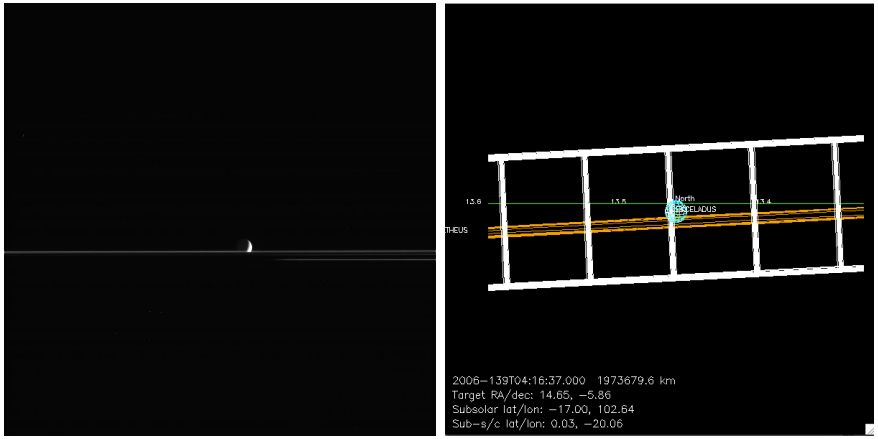
Phase= 159°

Ly-a

Long waves

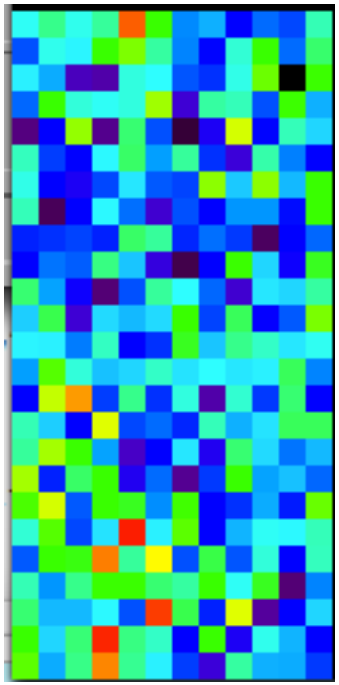


024EN_022W121PH001_ISS



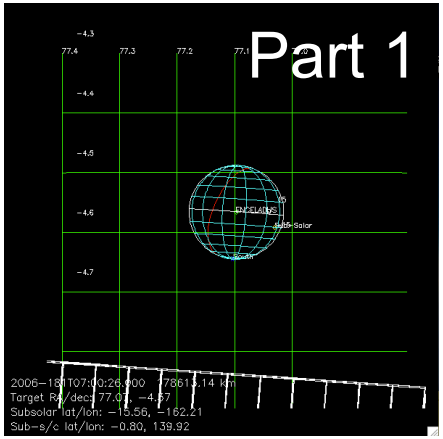
024EN_ICYLON068_ISS
2006-139T04:17
Alt= 1,961,187 km
Longitude= 24°W
Latitude=0°N
Phase= 120.7°

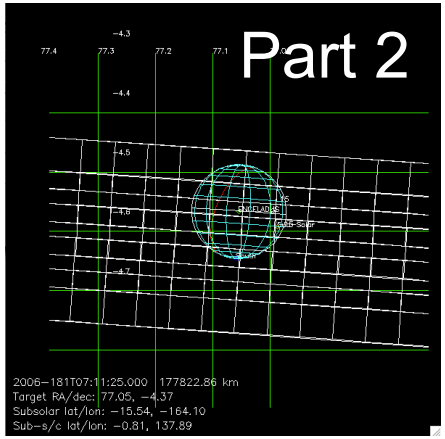
Low SNR

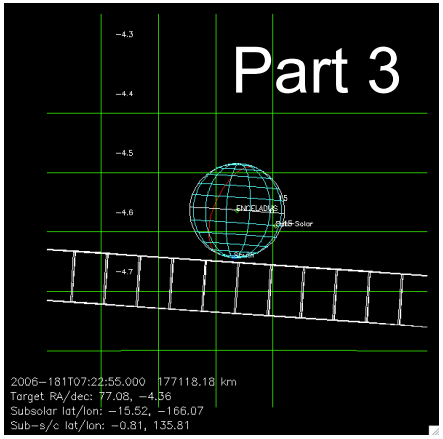


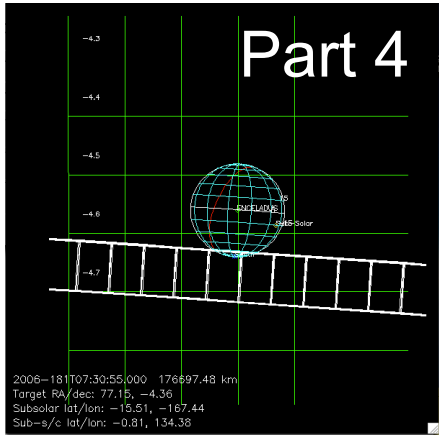
5-part

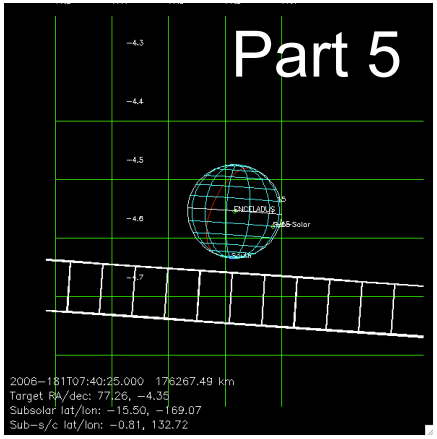
025EN_ICYLON001_CIRS
2006-181T07:01
Alt = 177,316 km
Longitude= 223°W
Latitude=0.8°S
Phase= 62.2°

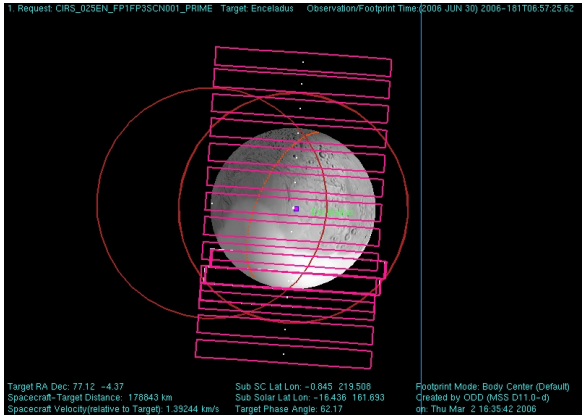




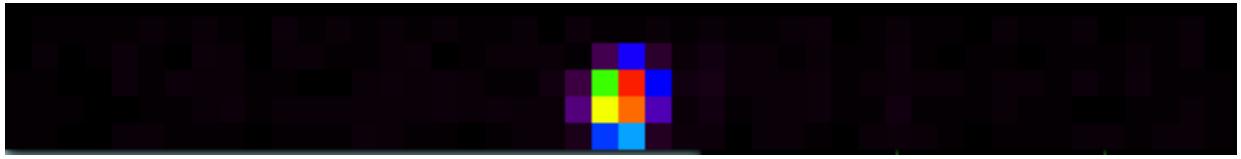




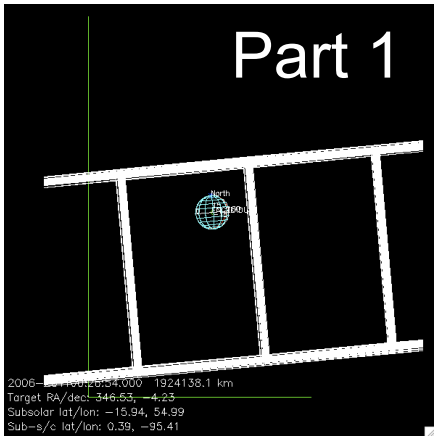




Part 2



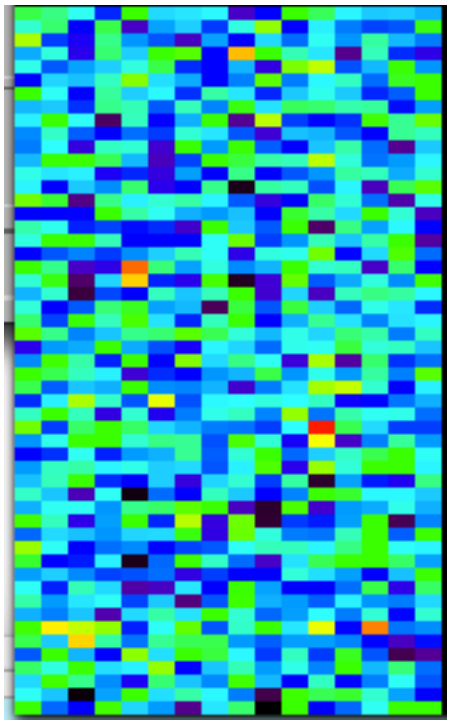
VIMS_026RE_E150PHASE002_PRIME



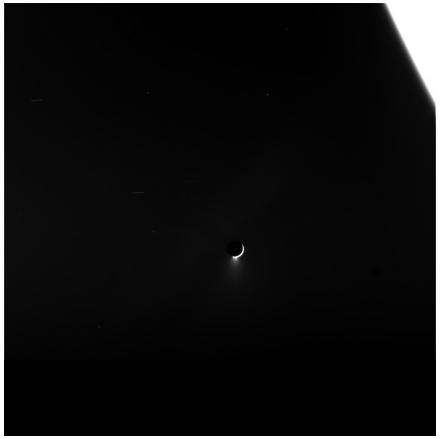
7-part

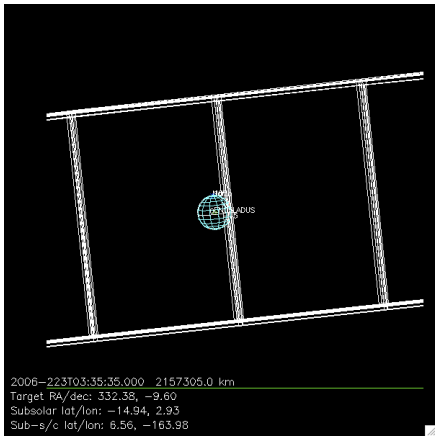
026EN_ICYLON027_VIMS
2006-201T00:27
Alt = 1,875,880 km
Longitude= 106°W
Latitude=0.4°N
Phase= 147.9°

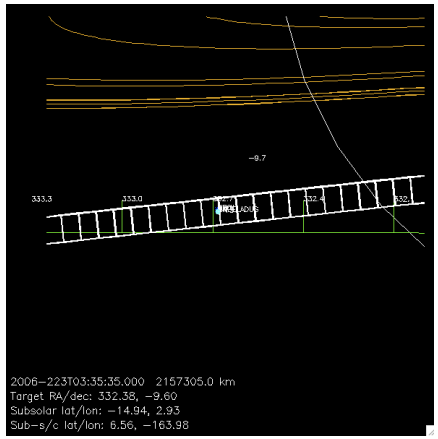
Low SNR



027EN_ISS_166W164PH



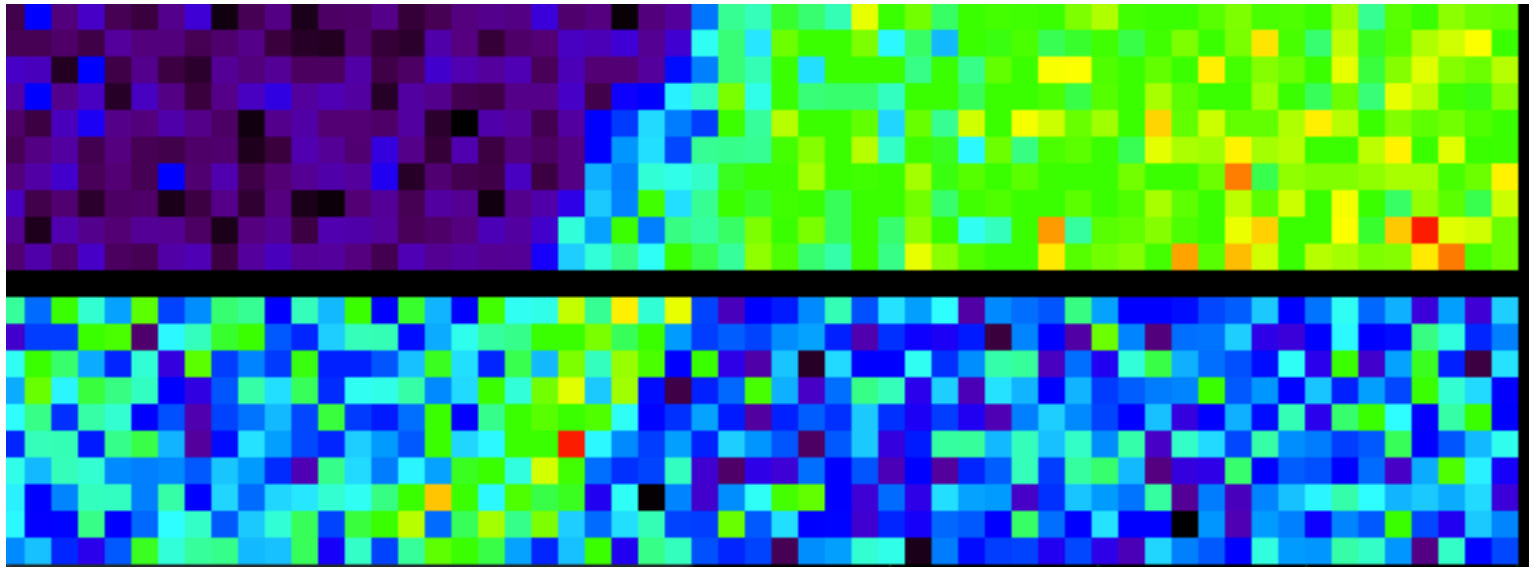




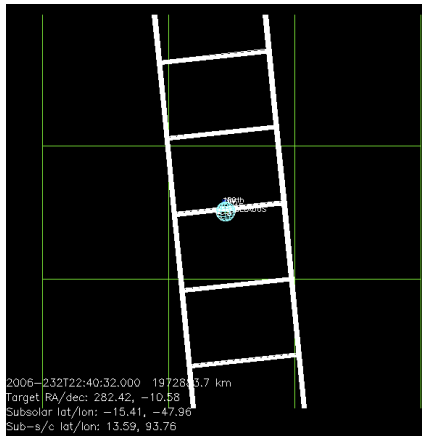
027EN_ICYLON001_ISS
2006-223T03:36
Alt= 2,153,929 km
Longitude= 166°W
Latitude=6.6°N
Phase= 163.6°

Ly-a

Long waves



027EN_ISS_PHOTOM007

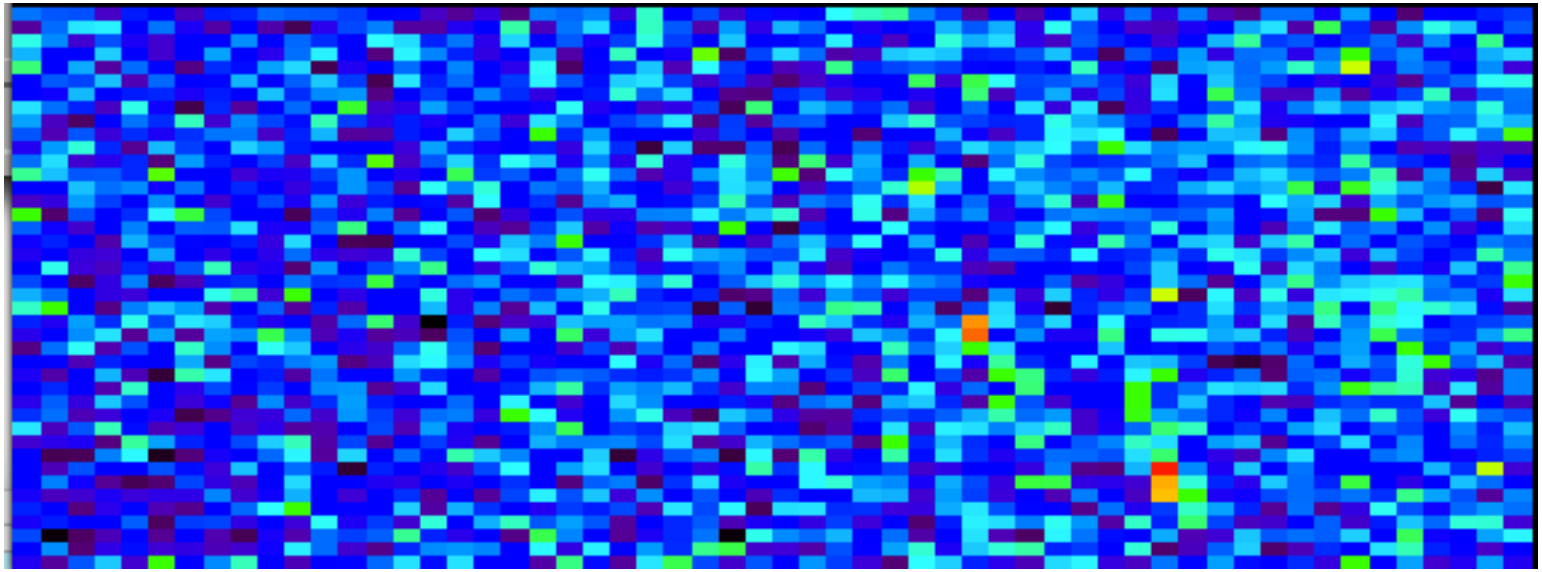


2-part

027EN_ICYLON002_ISS
2006-232T22:41
Alt=1,997,017 km
Longitude= 271°W
Latitude=13.4°N
Phase= 144.8°

Low SNR

Parts 1 & 2



3-part

028EN_ENCELORS001_CIRS

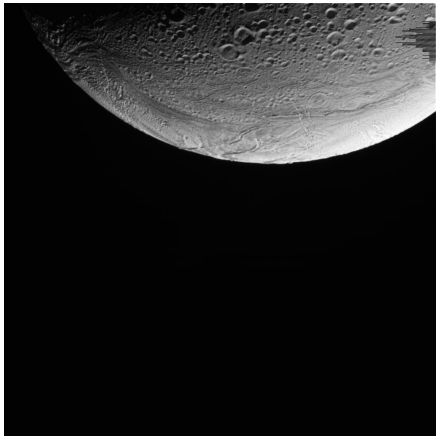
2006-252T21:33

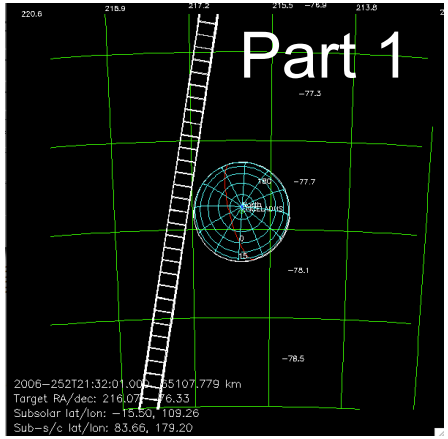
Alt=74,705 km

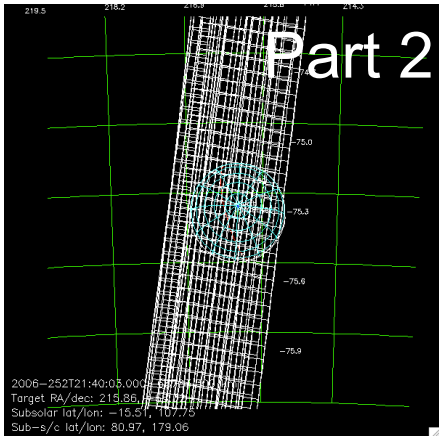
Longitude= 182°W

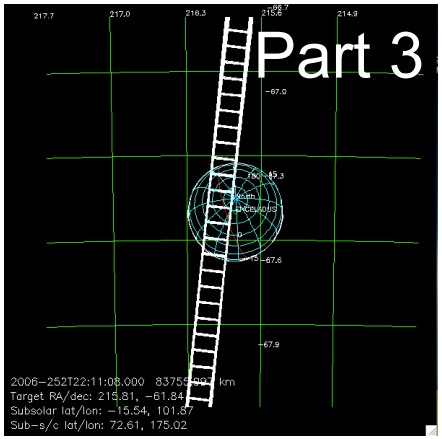
Latitude=77°N

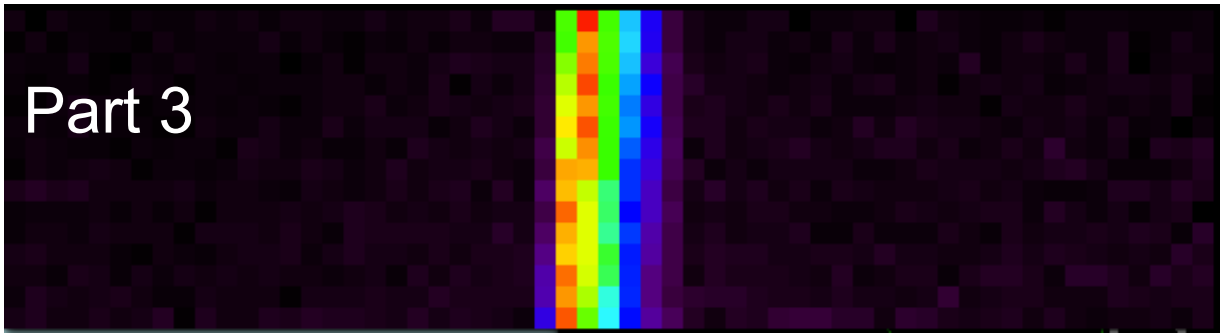
Phase= 102.1°

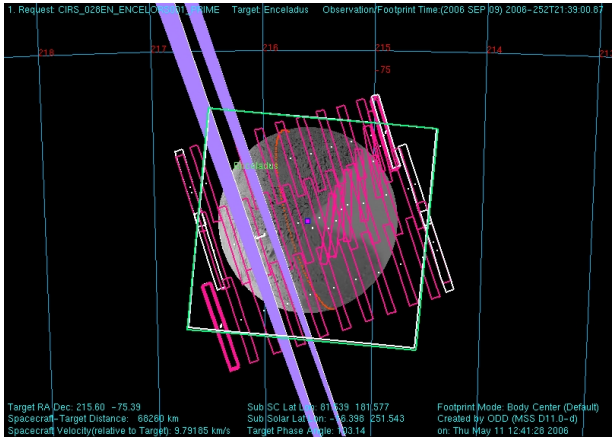


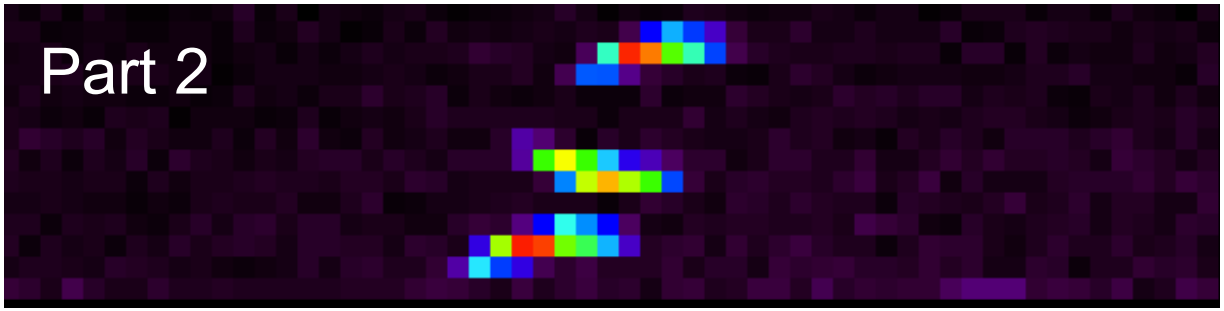












4-part 032EN_FP34HTSPT001_CIRS

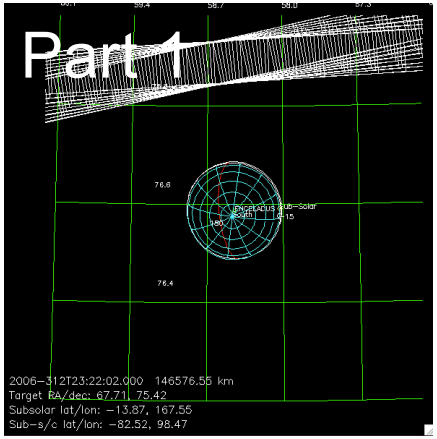
2006-312T23:23

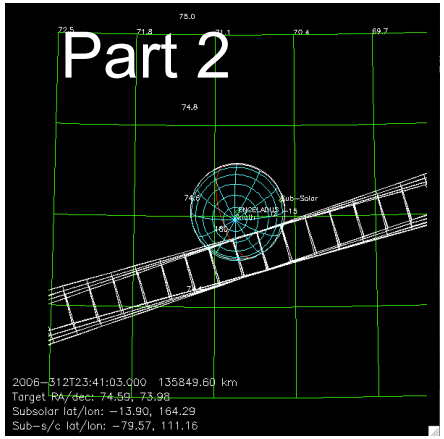
Alt= 133,944 km

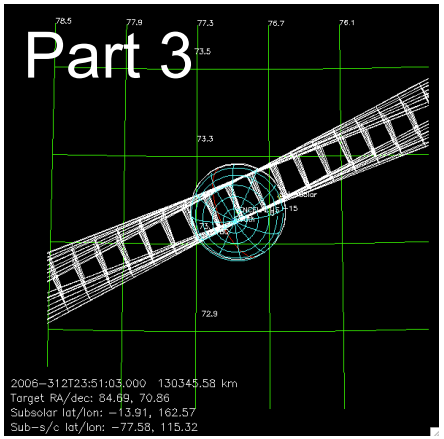
Longitude= 248°W

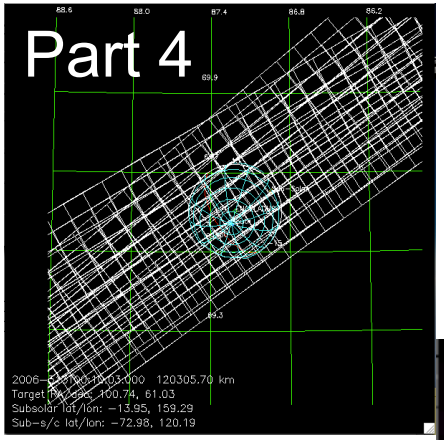
Latitude=79°S

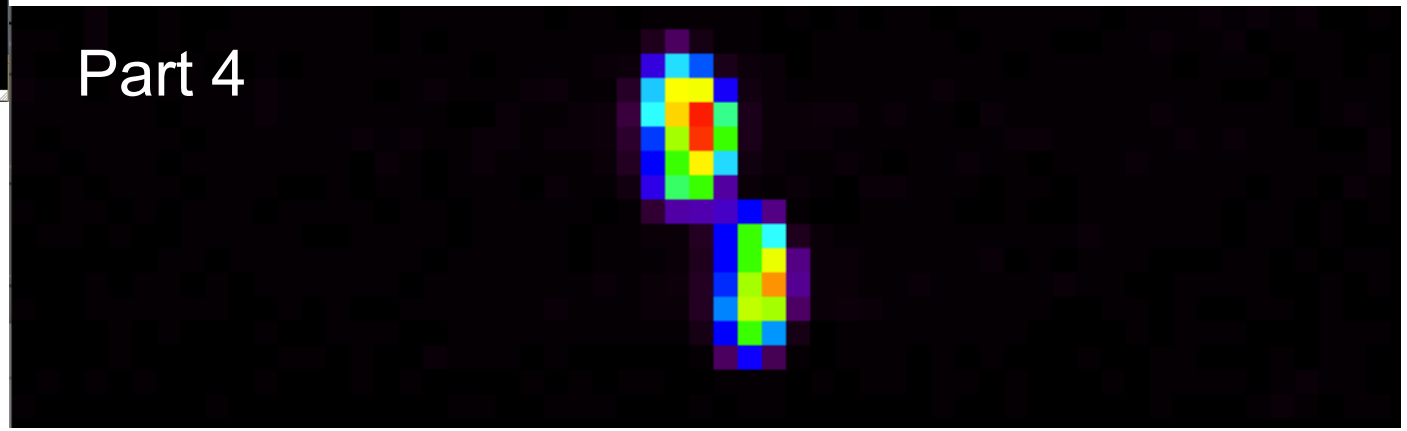
Phase= 68.4°











2-part

032EN_ENCELADUS001_VIMS

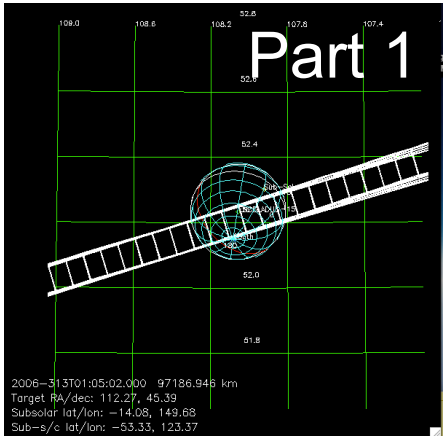
2006-313T01:06

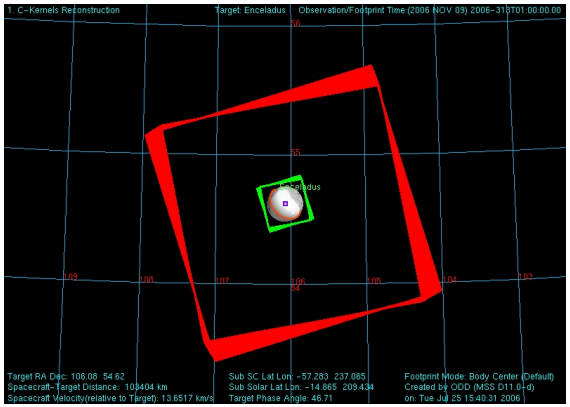
Alt= 94,826 km

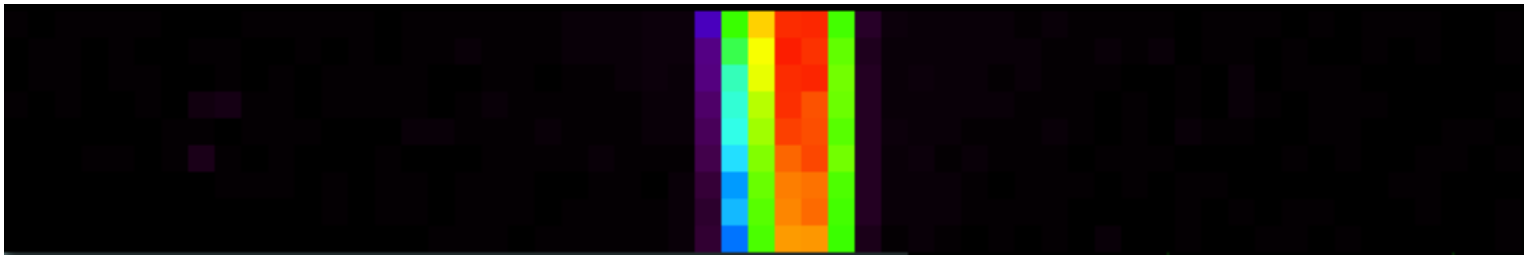
Longitude= 237°W

Latitude=50°S

Phase= 41.°







HSP
profile

UVIS_037EN_ICYOCC009_PRIME
2007-011T15:33
Ingress lat/lon:
Egress lat/lon:
Star: eps PsA

Star missed Enceladus

Spectra of I, I_0 (counts per integration period vs wavelength)

Spectrum of I/I_0

CIRS_037EN_ORS001_CIRS 4-part 037EN_ICYLON001_CIRS

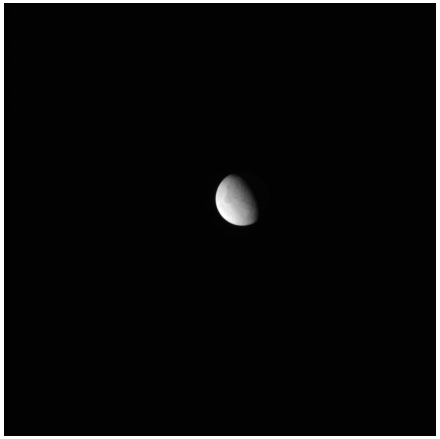
2007-016T08:00

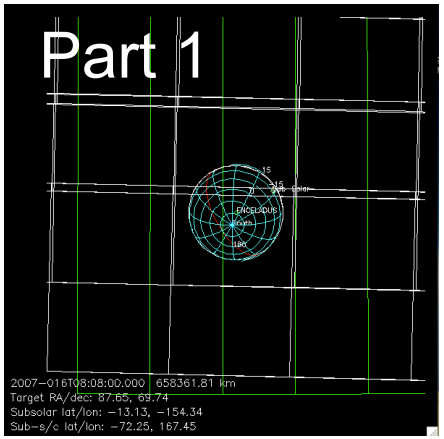
Alt= 657,911 km

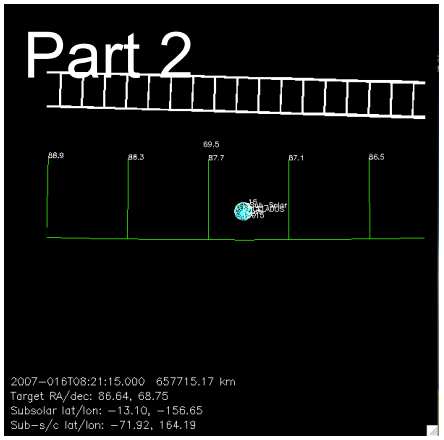
Longitude= 194°W

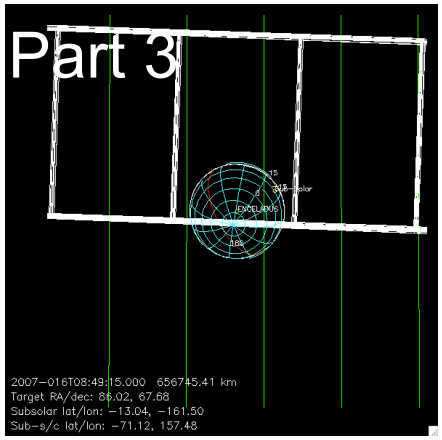
Latitude=72°S

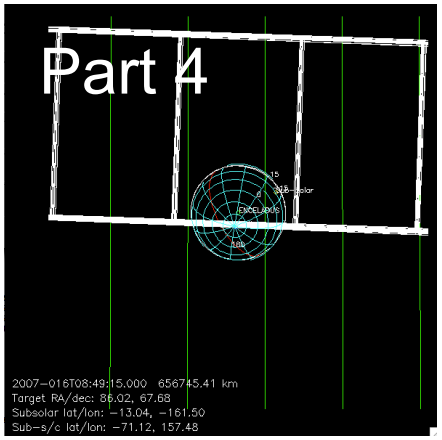
Phase= 63.8°











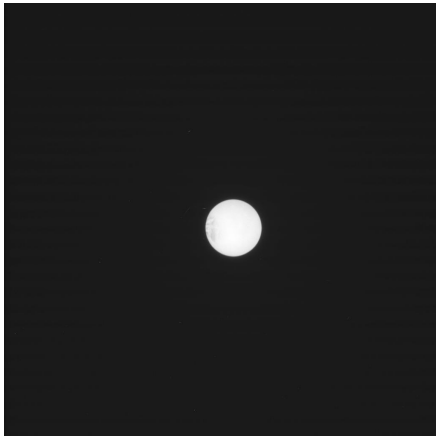
HSP
profile

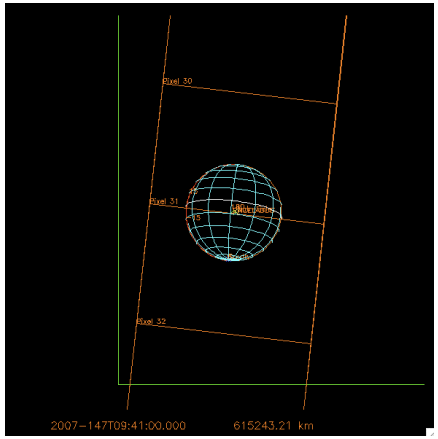
UVIS_038EN_ICYOCC011_PRIME
2007-031T21:38
Ingress lat/lon:
Egress lat/lon:
Star: 45 eps Per

Star missed Enceladus

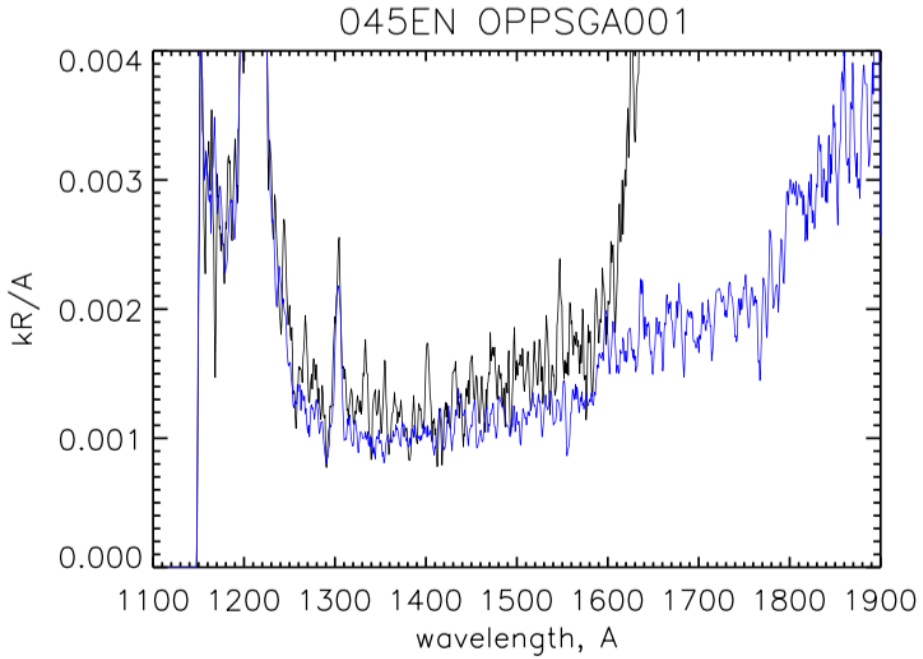
Spectra of I, I_0 (counts per integration period vs wavelength)

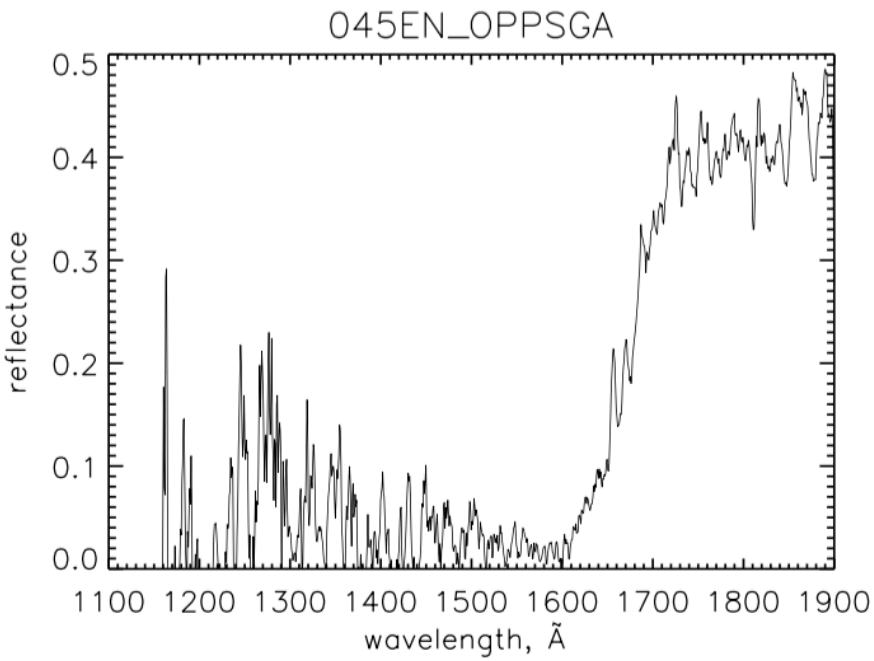
Spectrum of I/I_0



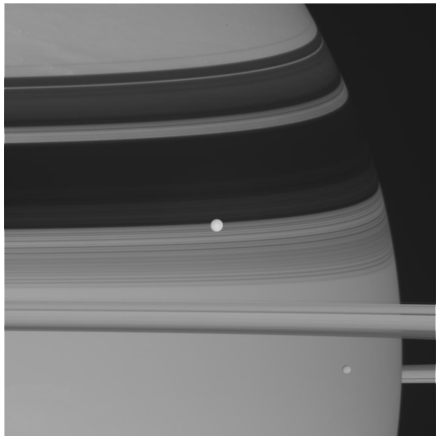


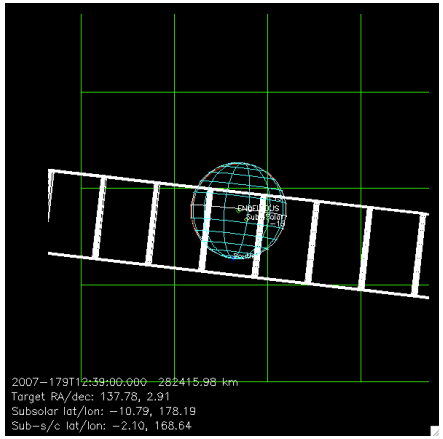
045EN_OPPSGA001_ISS
2007-147T09:41
Alt= 624,620 km
Longitude= 27°W
Latitude=12°S
Phase= 1.9°

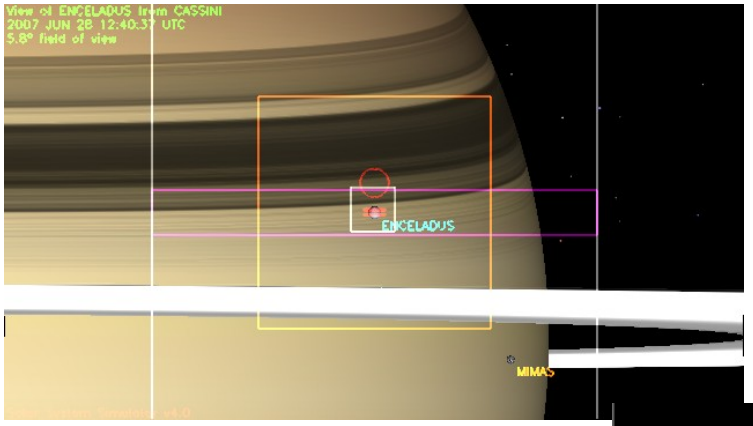


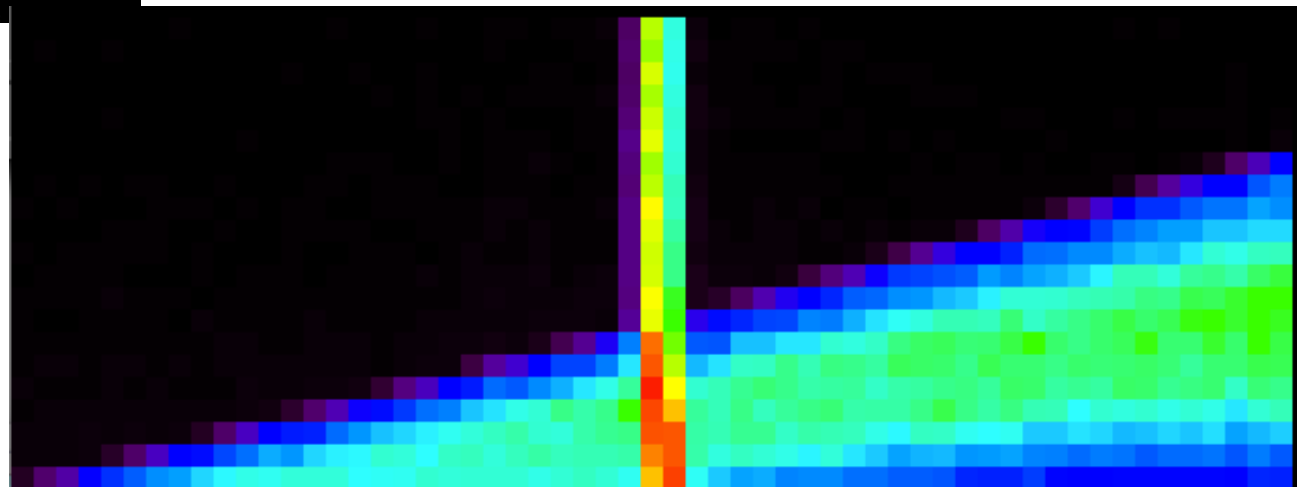


047EN_ICYLON001_ISS
2007-179T12:40
Alt= 295,401 km
Longitude= 196°W
Latitude=2°S
Phase=14.9°

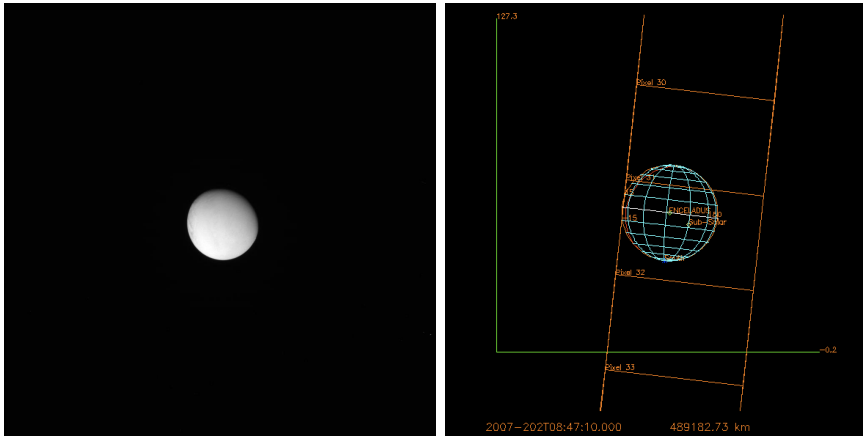






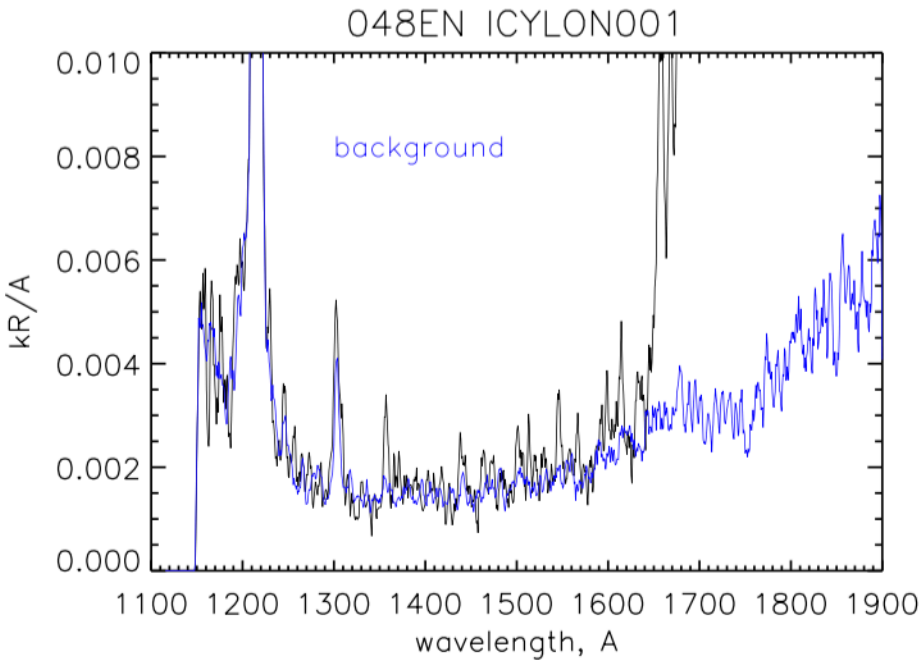


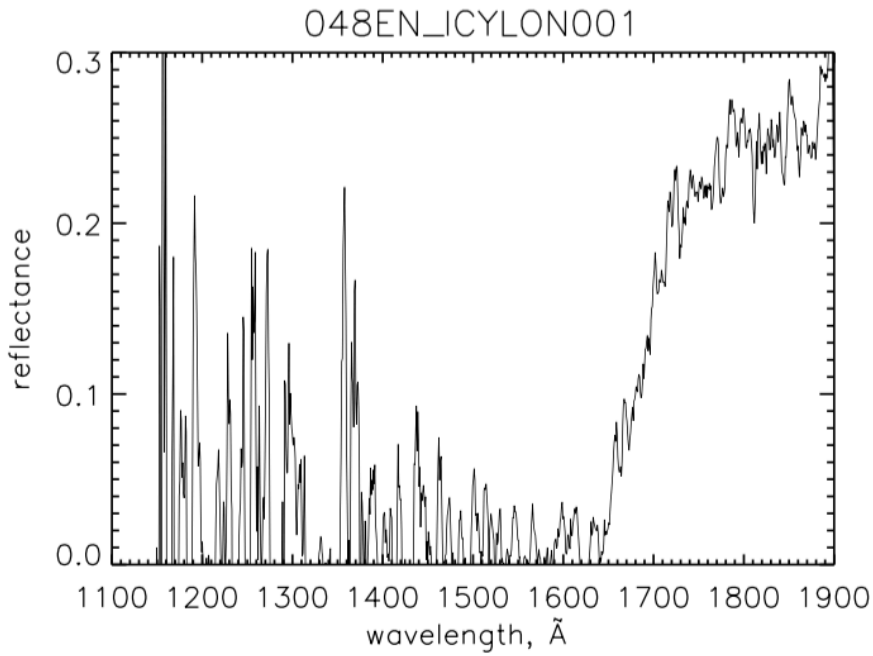
ISS_048EN_GLOCOLA101_PRIME



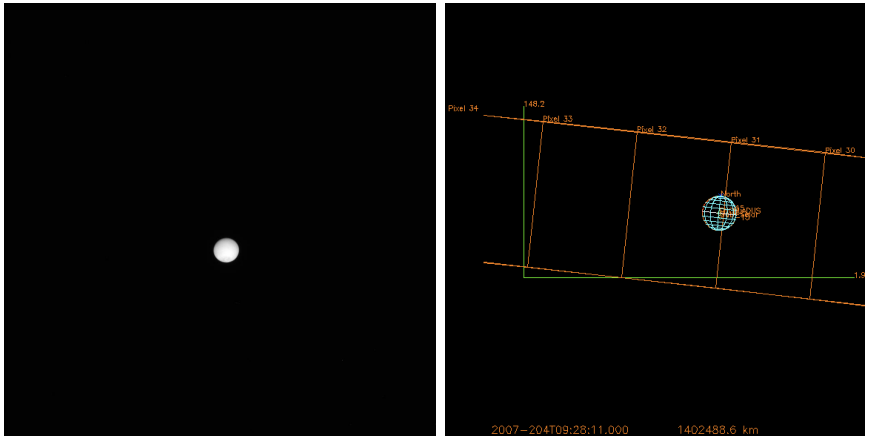
048EN_ICYLON001_ISS

2007-202T08:48
Alt= 487,226 km
Longitude= 87°W
Latitude=0.3°S
Phase=26°

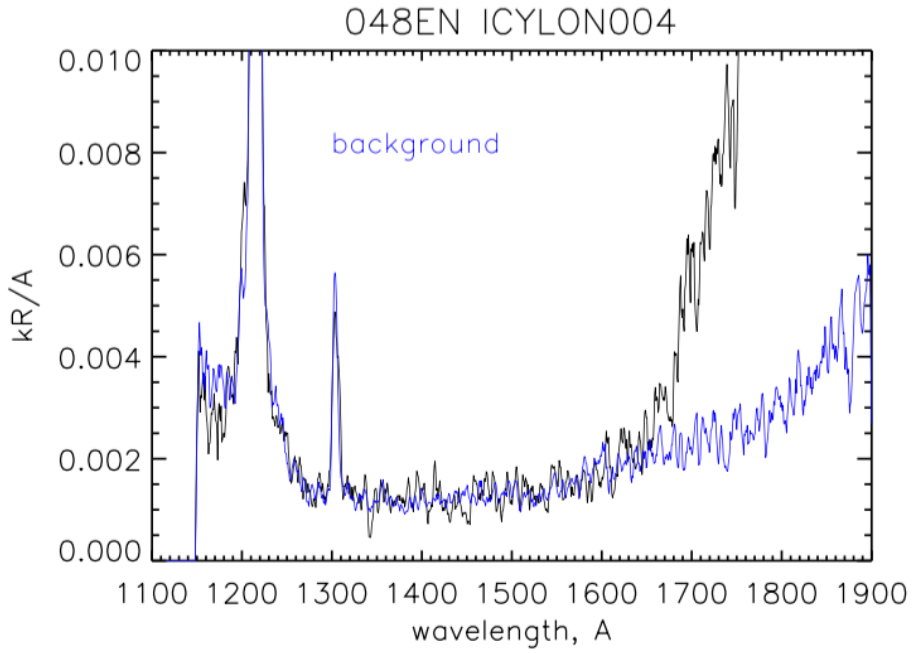


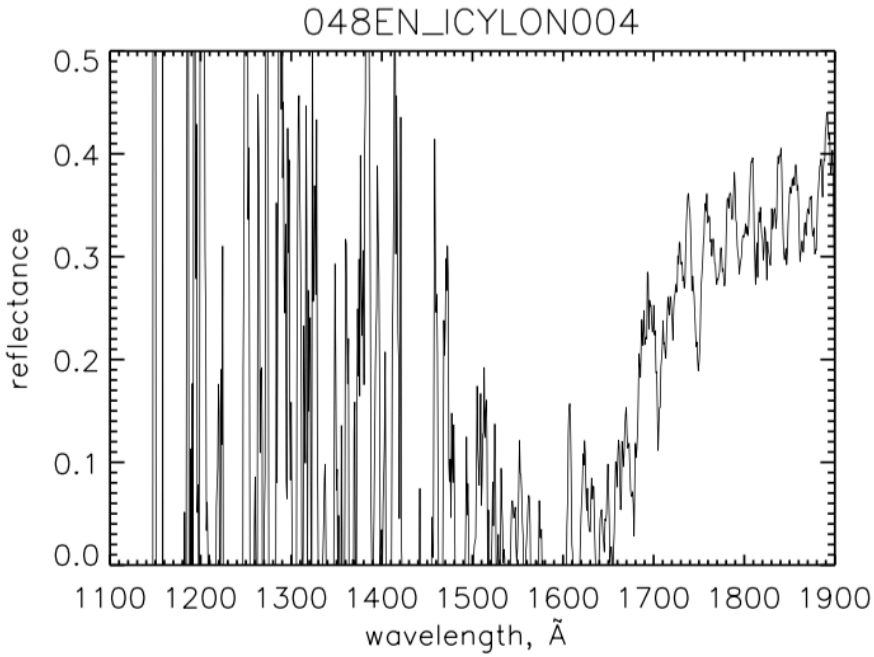


ISS_048EN_238W012PH001_PRIME

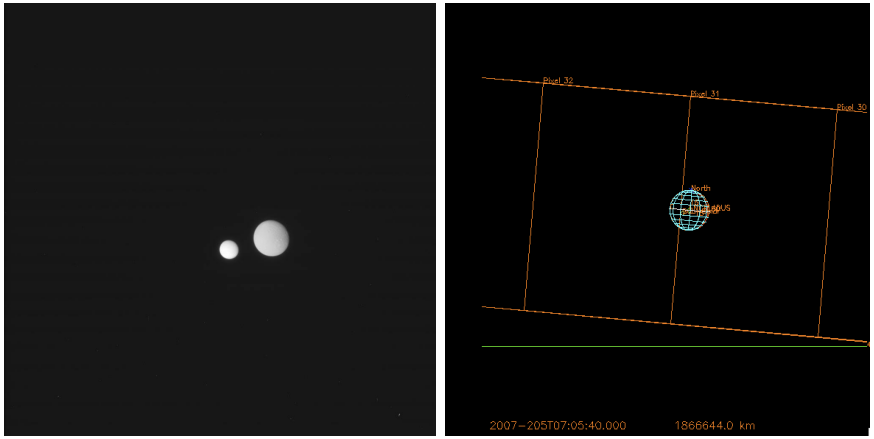


048EN_ICYLON004_ISS
2007-204T09:29
Alt=1,422,227 km
Longitude= 240°W
Latitude=0°
Phase=12°



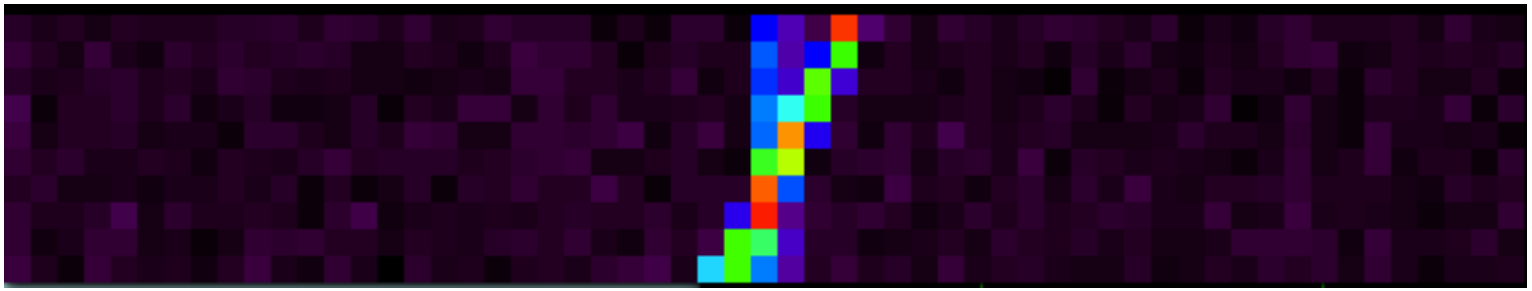


ISS_048EN_094W022PH001_PRIME



Dione (larger) passes behind EN

048EN_ICYLON005_ISS
2007-205T07:06
Alt= 1,861,965 km
Lon= 95°W
Latitude=0.05°N
Phase=21.8°



050EN_PLUMES002_ISS

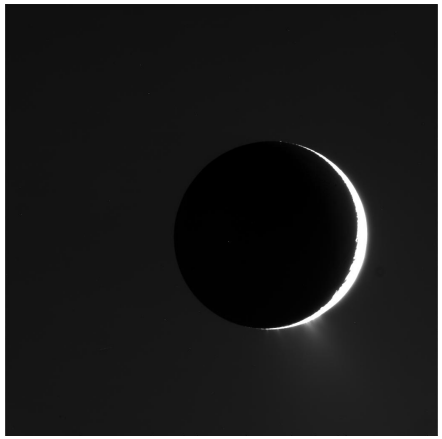
2007-273T05:11

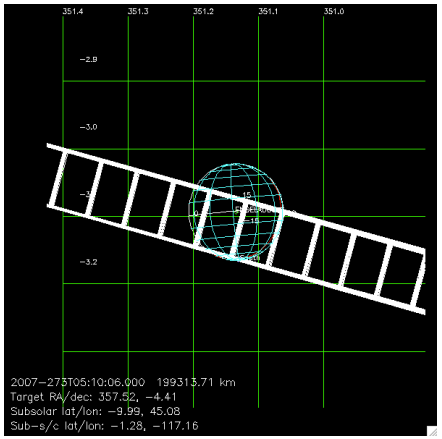
Alt= 186,966 km

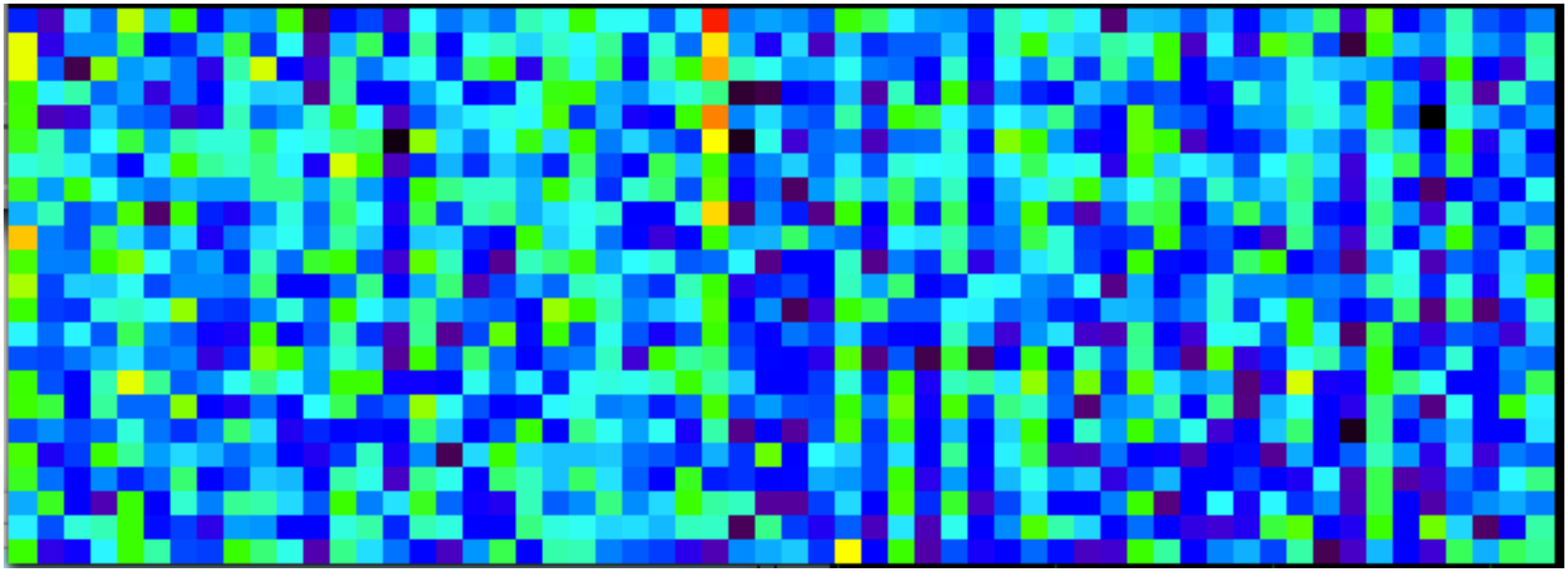
Longitude= 118°W

Latitude=0.8°S

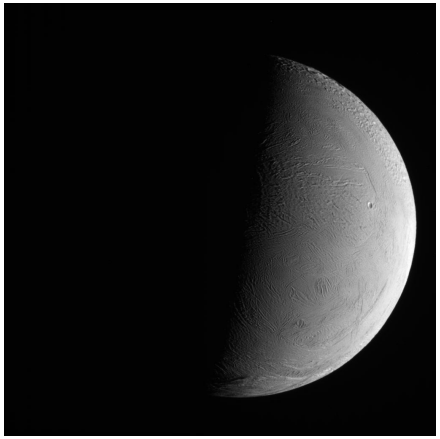
Phase=156.5°

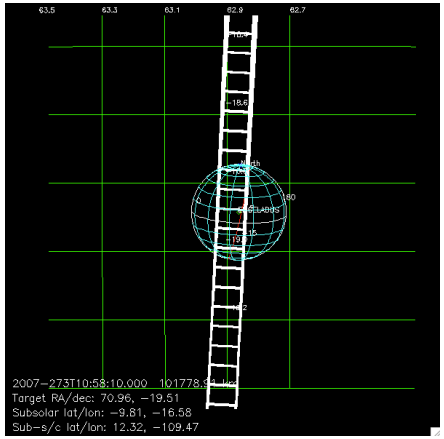






050EN_COLORF001





050EN_ICYLON001_ISS

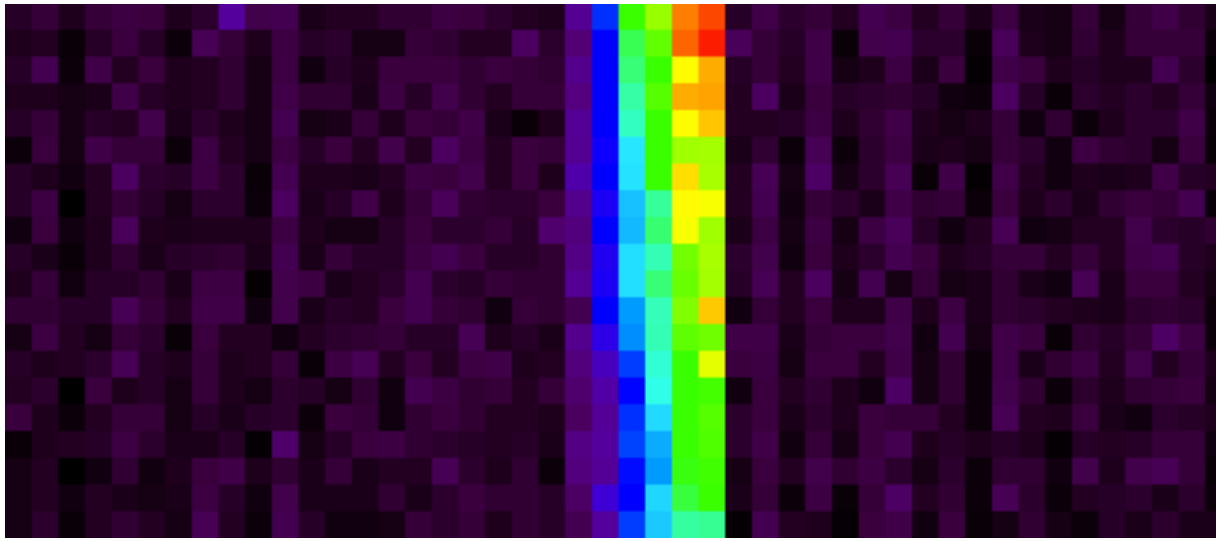
2007-273T10:59

Alt= 101,932 km

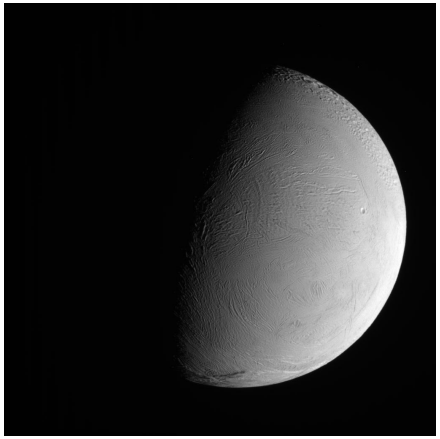
Longitude= 109°W

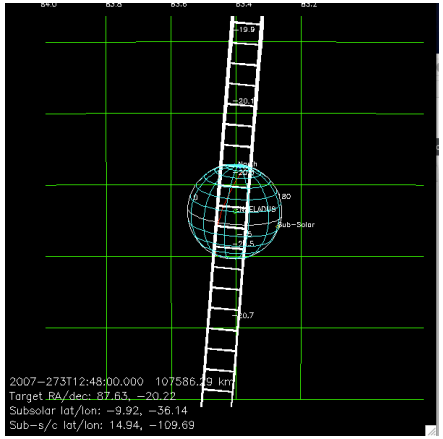
Latitude=13°N

Phase=90°



050EN_PHOTOM002





050EN_ICYLON002_ISS

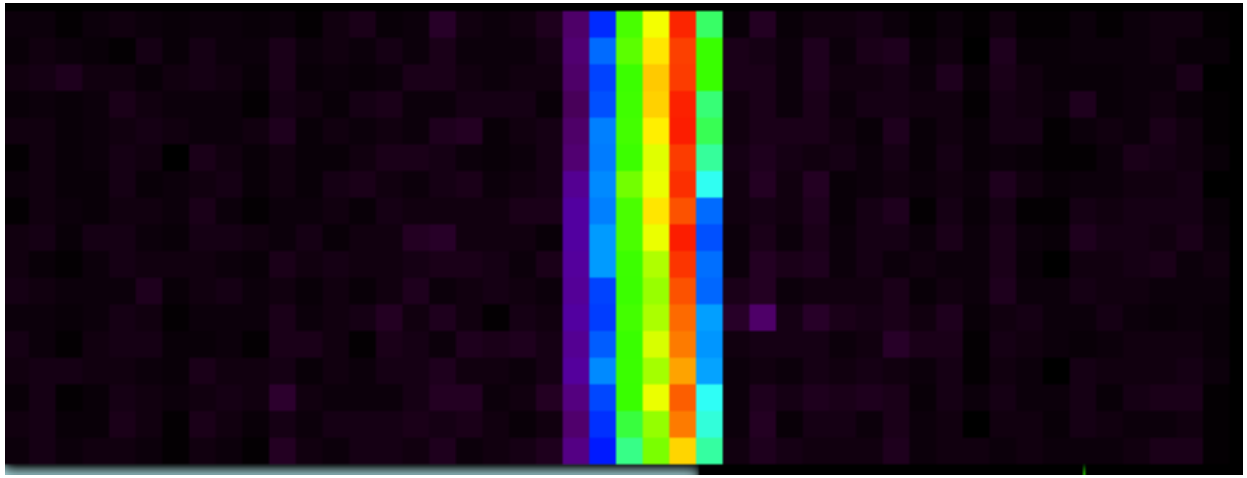
2007-273T12:49

Alt= 108,711 km

Longitude= 111°W

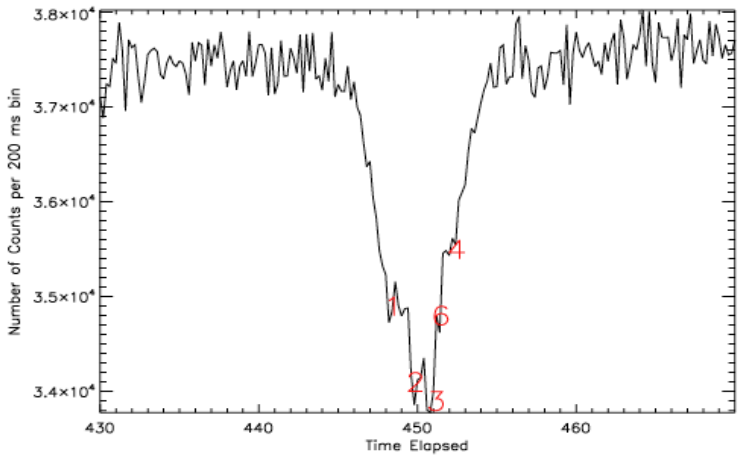
Latitude=15°N

Phase=73.6°



HSP profile

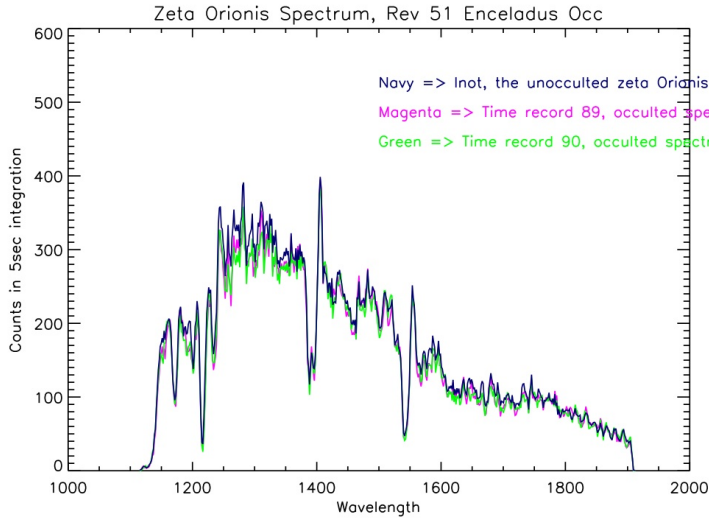
Numbers indicate statistically significant enhancements in absorption



UVIS_051EN_ICYEXO002_PRIME
2007-297T16:59
Ingress lat/lon: n/a
Egress lat/lon: n/a
Star: zeta Orionis

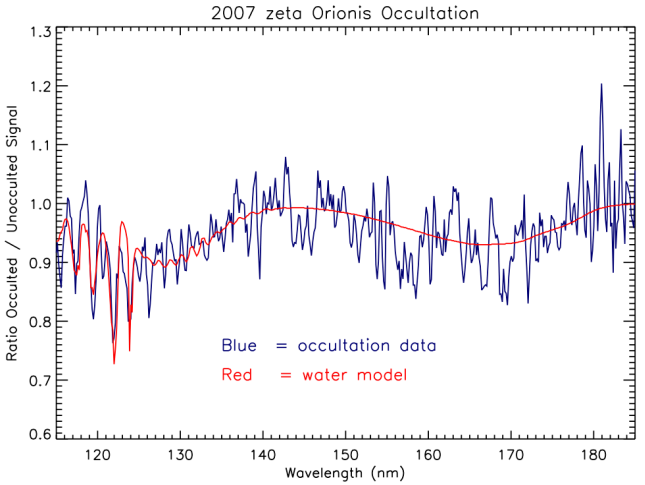
Horizontal cut through plume

Spectra of I, I_0 (counts per integration period vs wavelength)

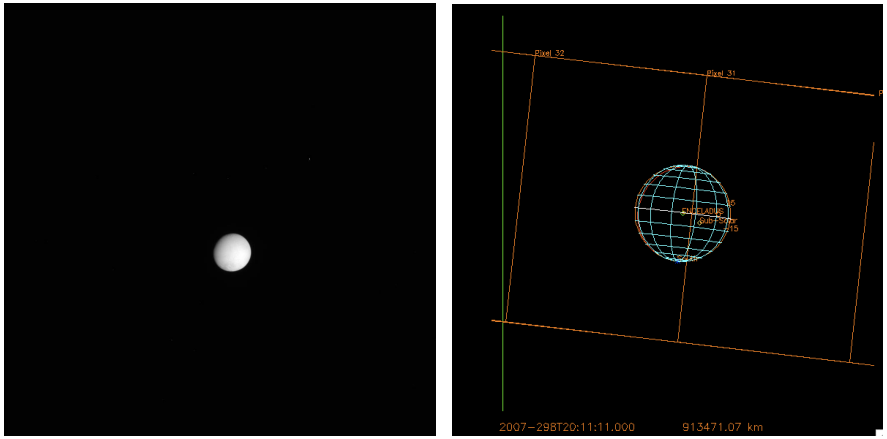


Spectrum of I/I_0 in plume

Ingress (blue) compared to water with column density 1.4 x 10^{16} cm^{-2}

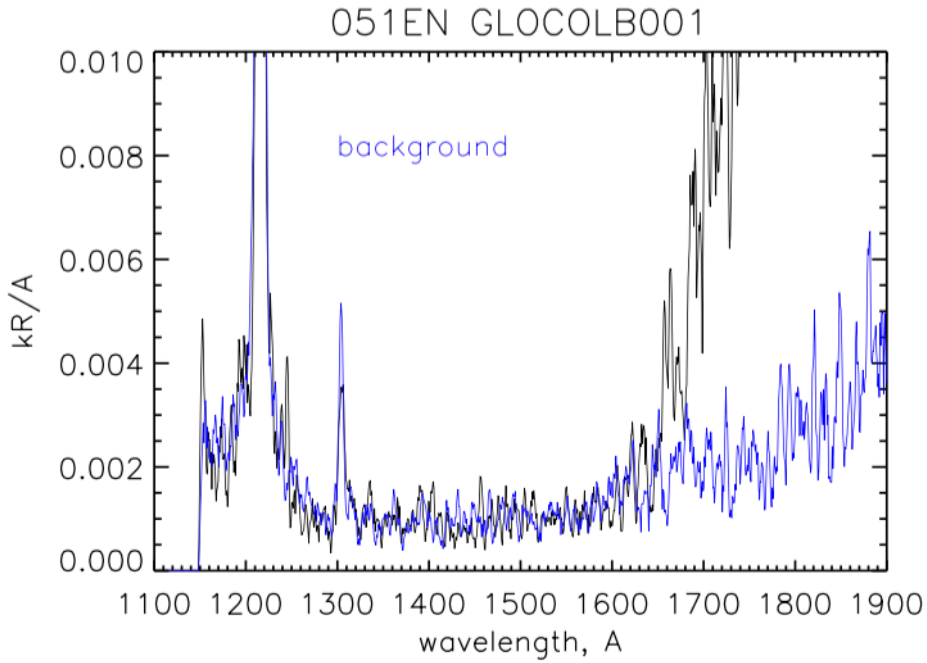


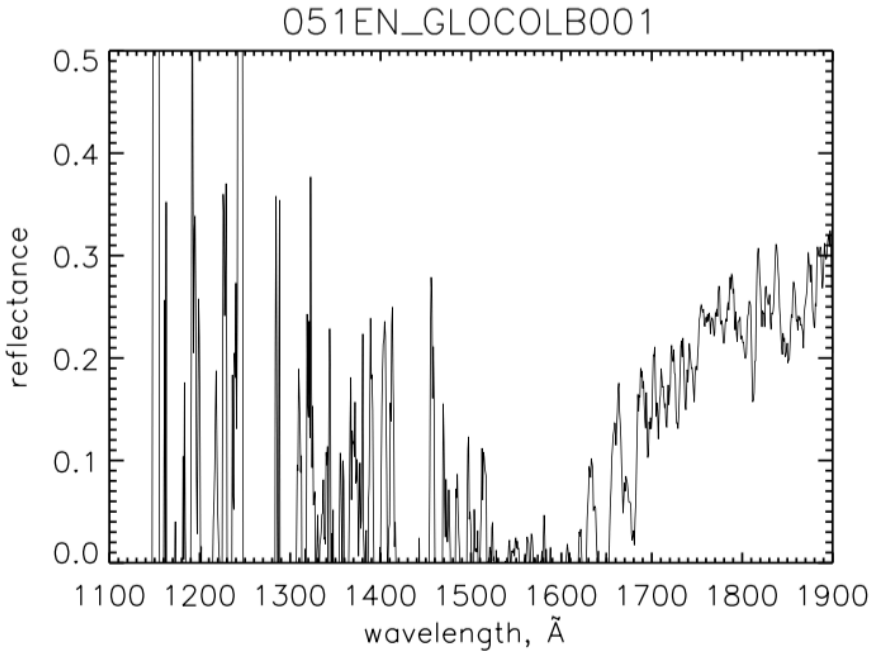
051EN_GLOCOLB101



051EN_GLOCOLB001_ISS

2007-298T20:12
Alt= 919,990 km
Longitude= 226°W
Latitude=0.8°S
Phase=22.5°





051EN_238W023PH001_ISS

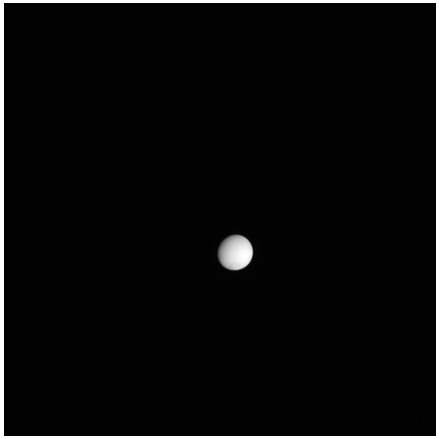
2007-298T21:11

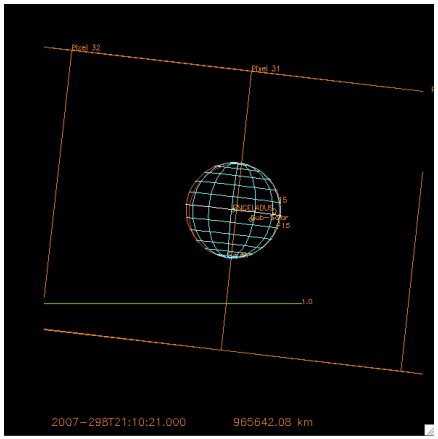
Alt= 976,577 km

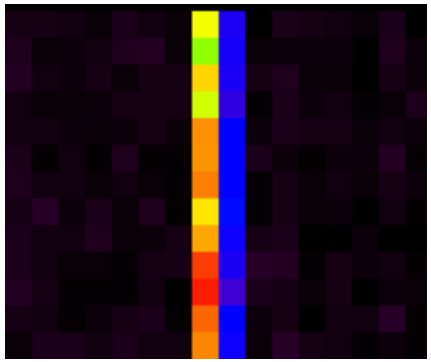
Longitude= 238°W

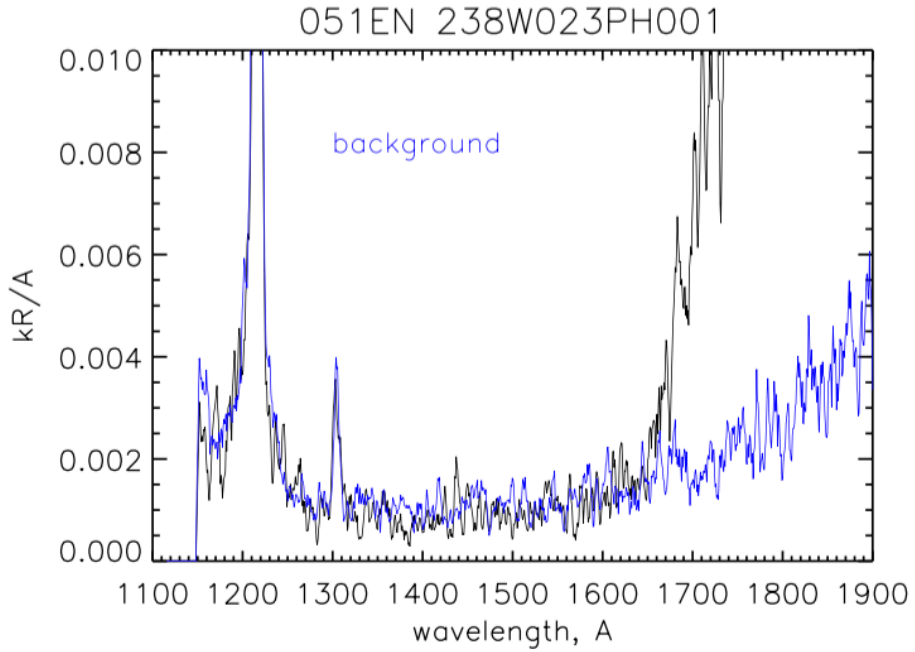
Latitude=0.7°S

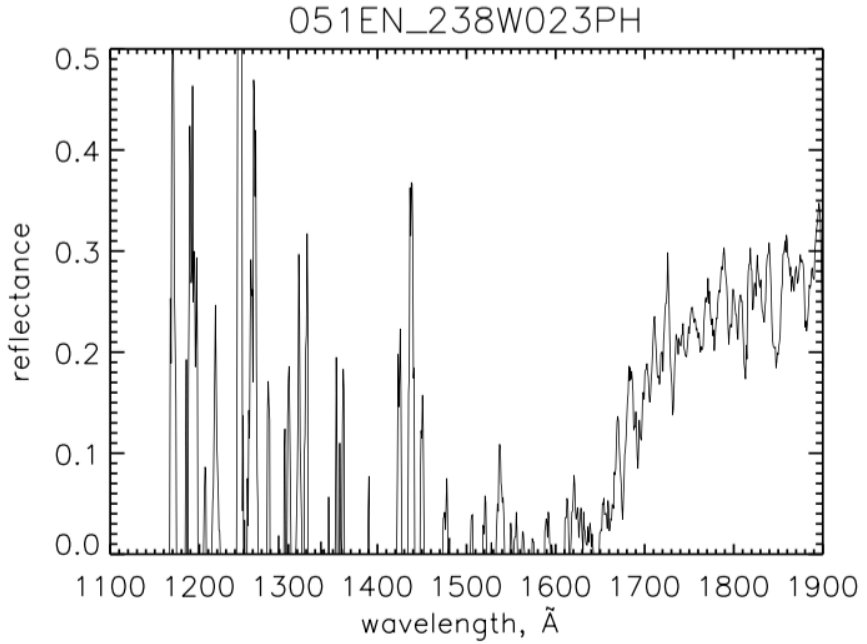
Phase=23°

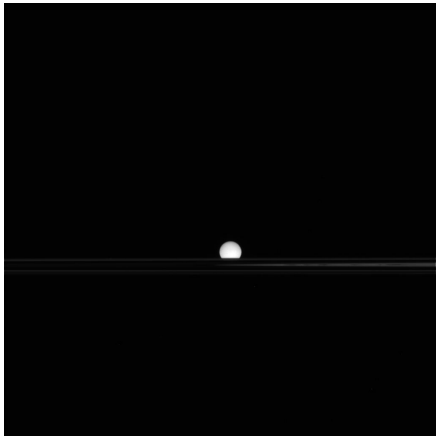


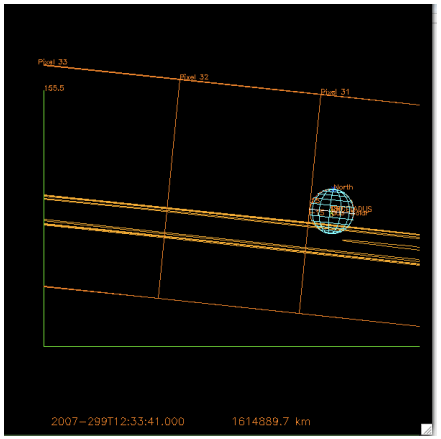








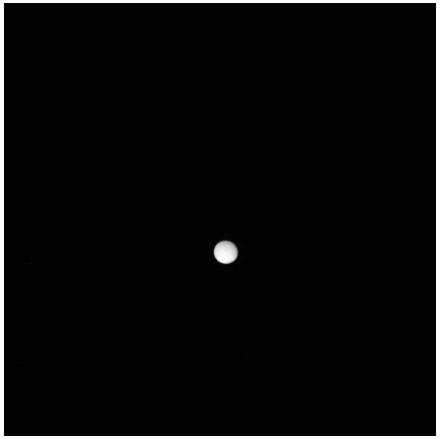


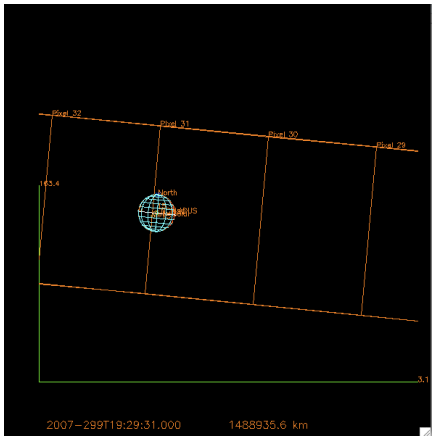


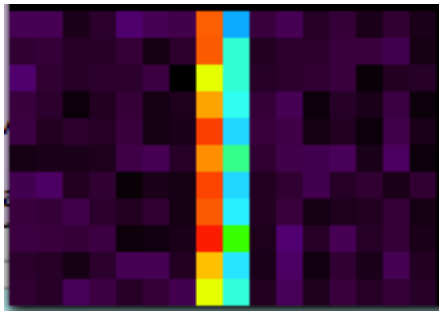
051EN_022W010PH001_ISS
2007-299T12:34
Alt= 1,614,614 km
Longitude= 23°W
Latitude=0.06°N
Phase=10.2°

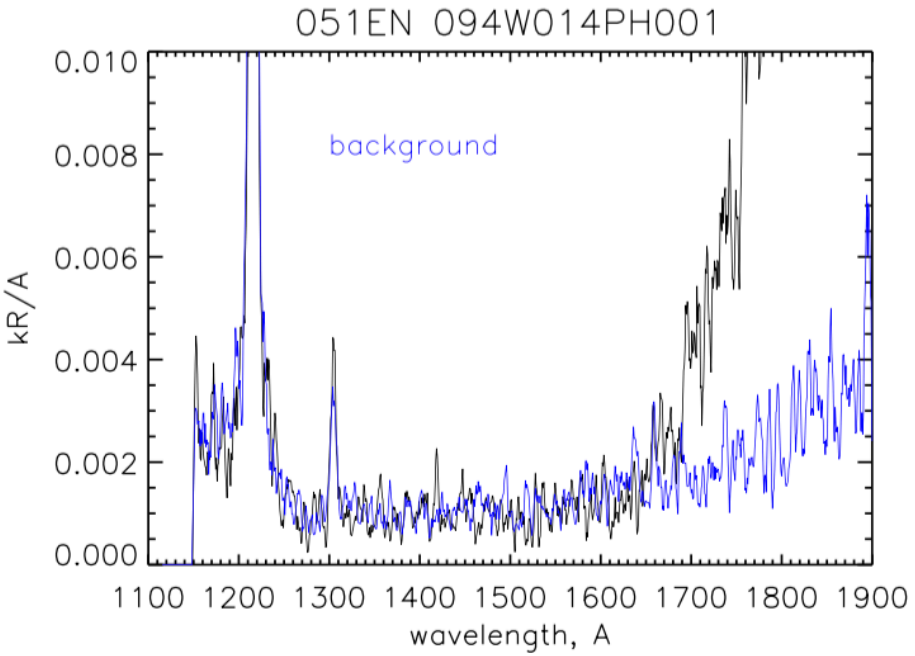
Rings in slit too

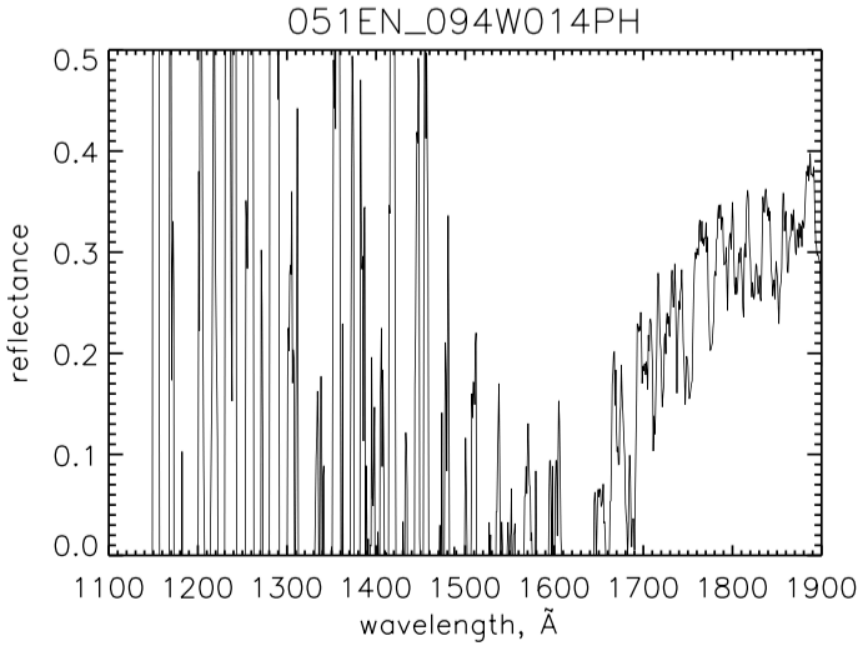
051EN_094W014PH001_ISS
2007-299T19:30
Alt= 1,483,960 km
Longitude= 94°W
Latitude=0.32°N
Phase=13.7°











2-part 051EN_166W011PH001_ISS

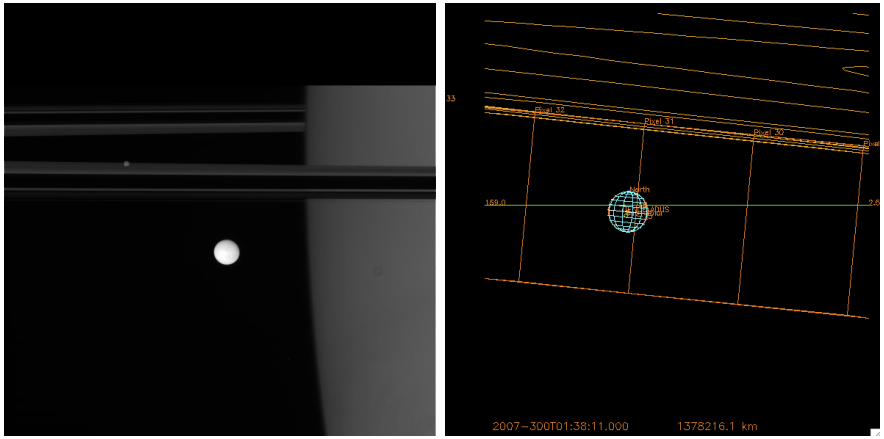
2007-300T01:39

Alt= 1,378,028 km

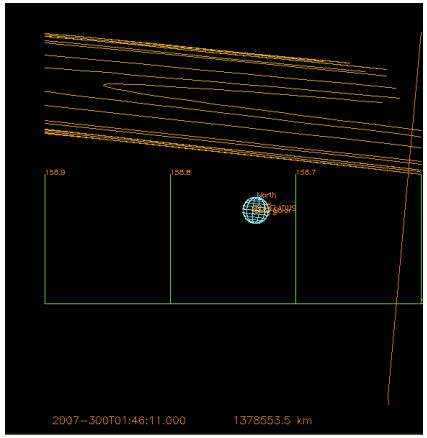
Lon= 164°W

Latitude

Phase=11.5°



Epimetheus

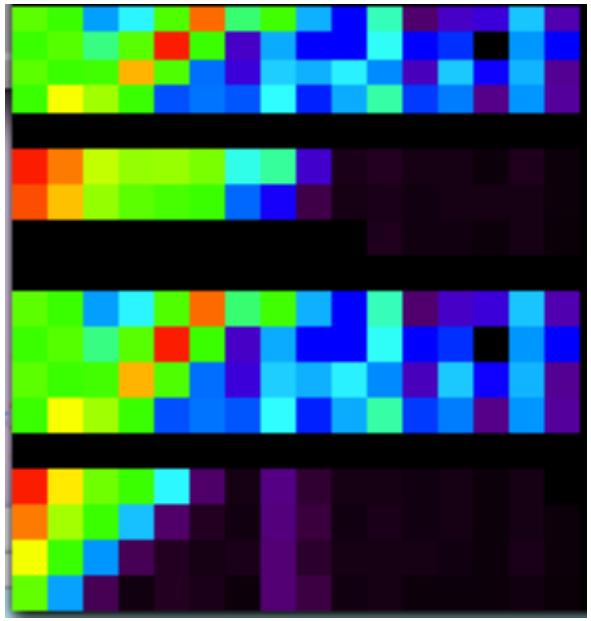


Part 2 Ly-a

Part 2 long waves

Part 1 Ly-a

Part 1 long waves



051EN_310W011PH001_ISS

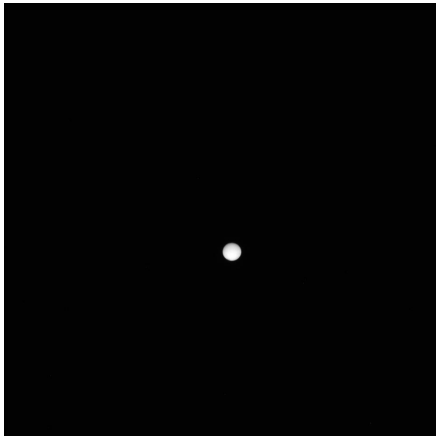
2007-300T14:11

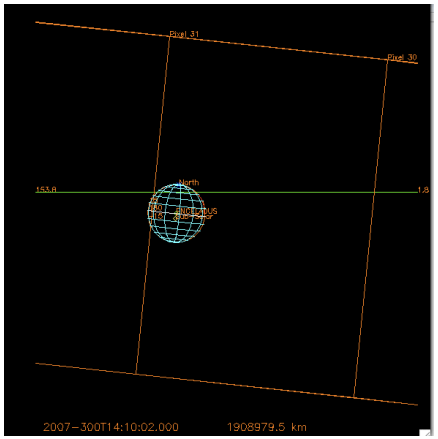
Alt= 1,916,125 km

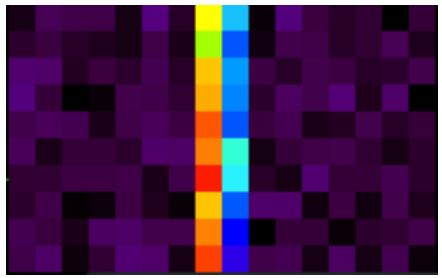
Longitude= 309°W

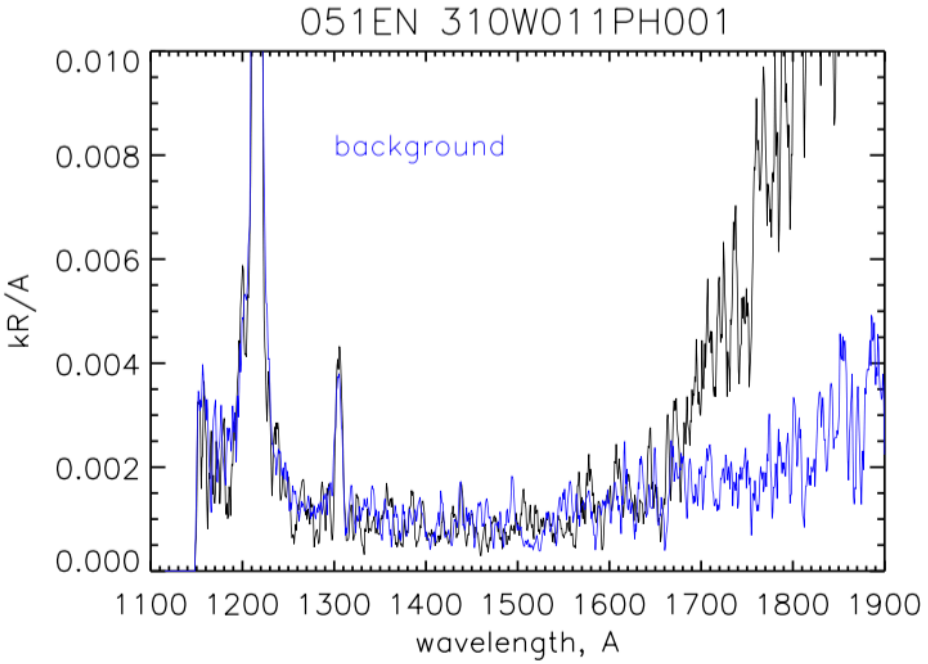
Latitude=0.72°N

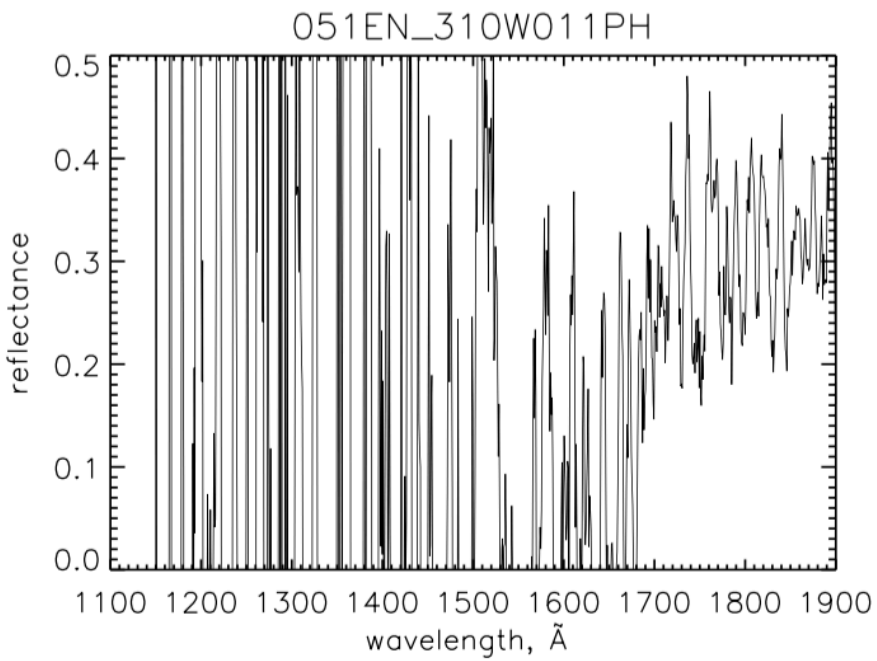
Phase=10.8°











051EN_022W015PH001_ISS

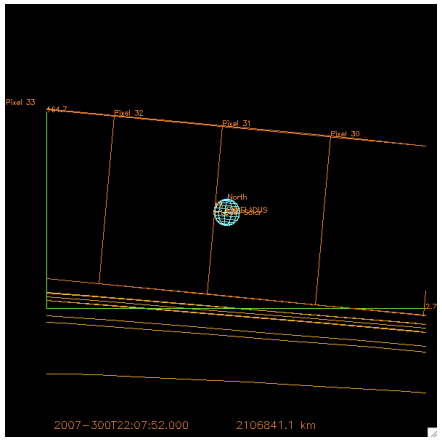
2007-300T22:08

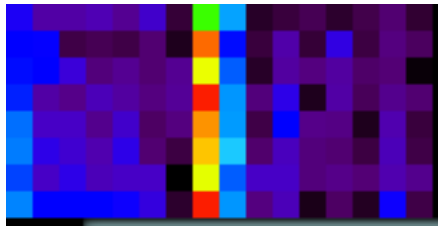
Alt= 2,106,076 km

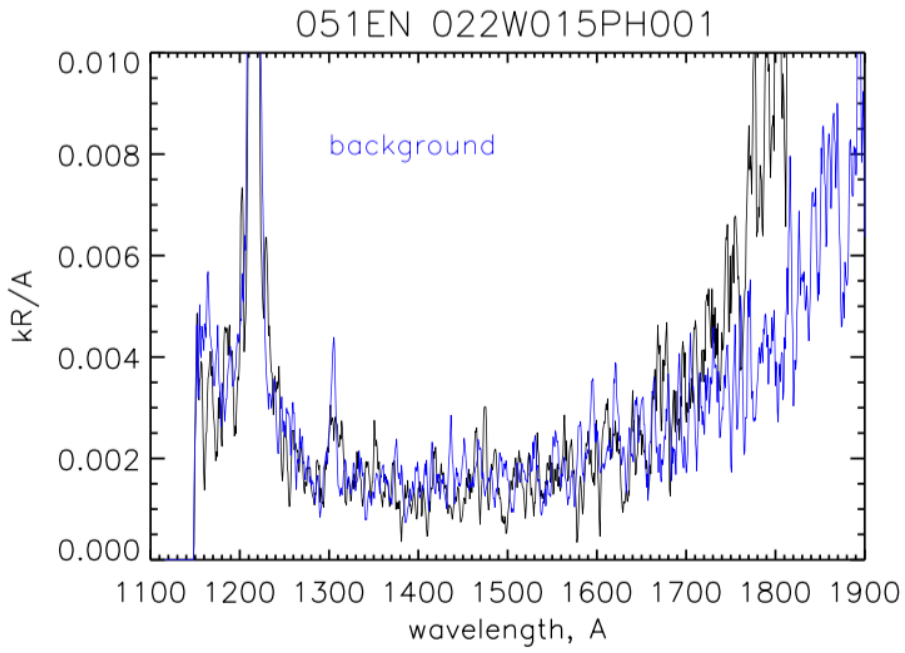
Longitude= 22°W

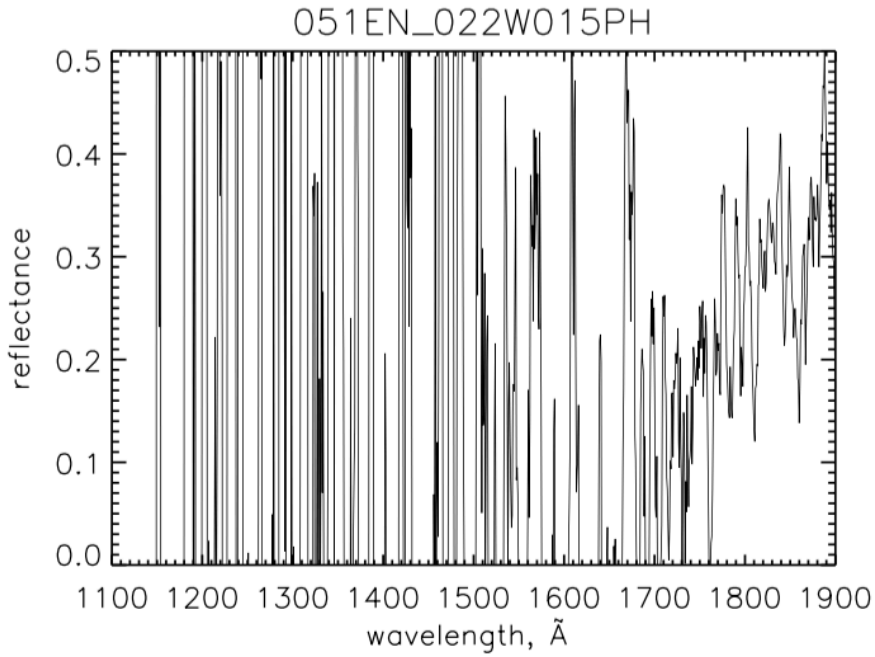
Latitude=0.8°N

Phase=14.9°

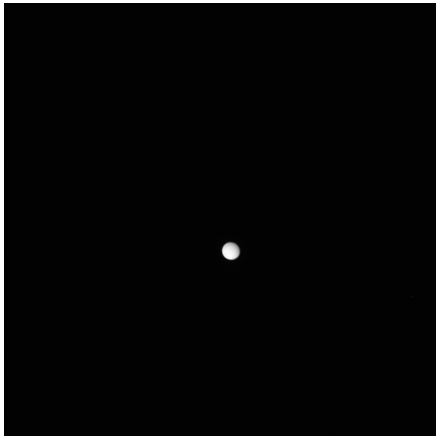


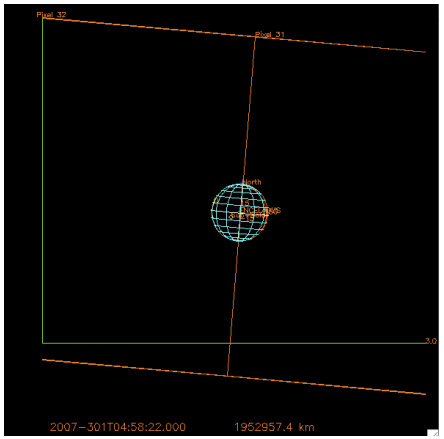


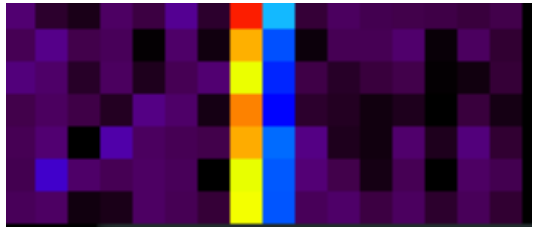


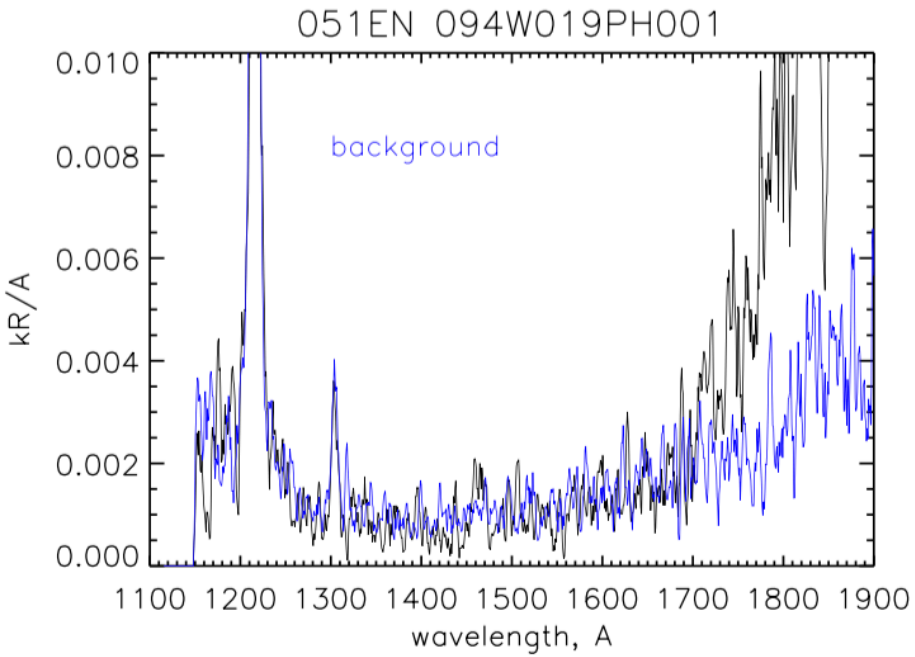


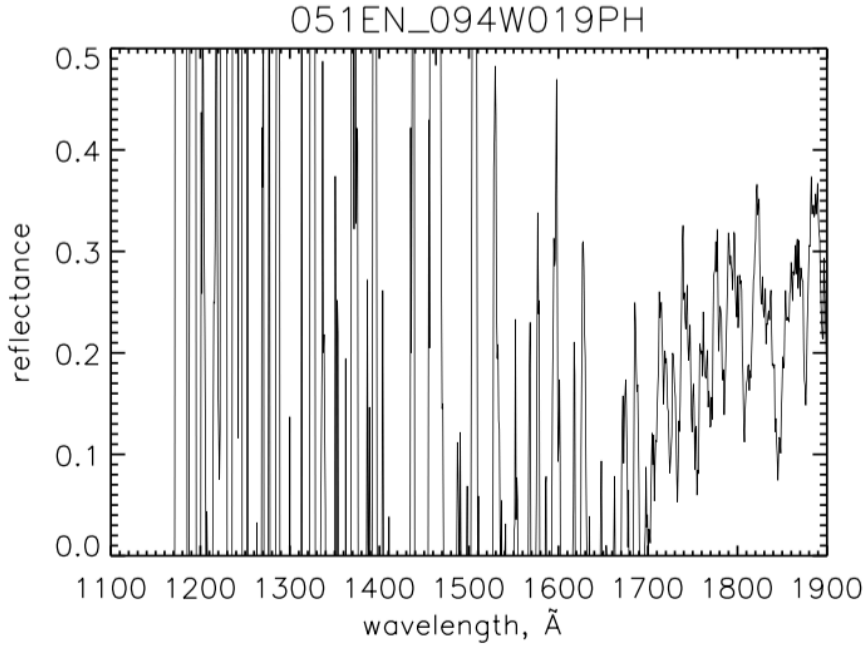
051EN_094W019PH001_ISS
2007-301T04:59
Alt= 1,949,414 km
Longitude= 92°W
Latitude=1°N
Phase=19.4°



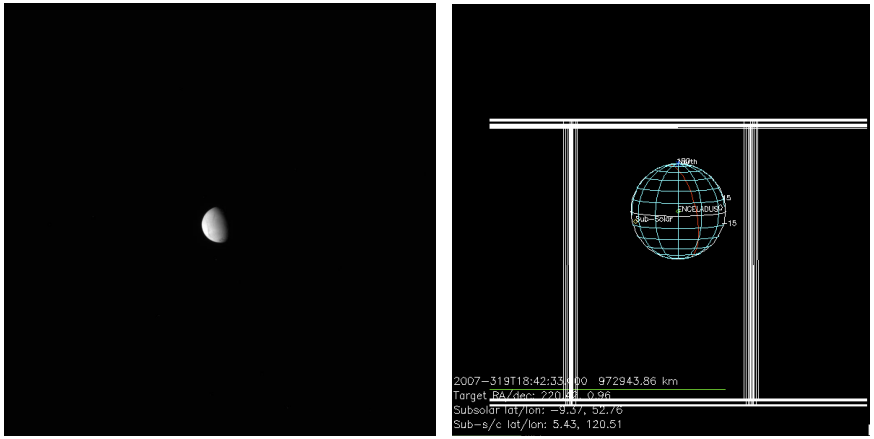




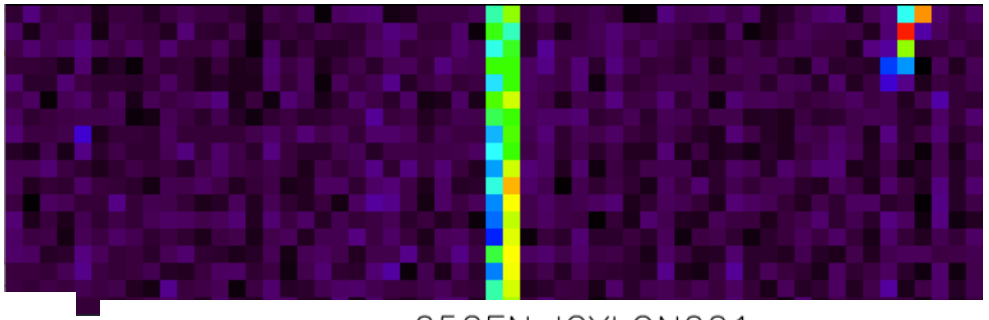


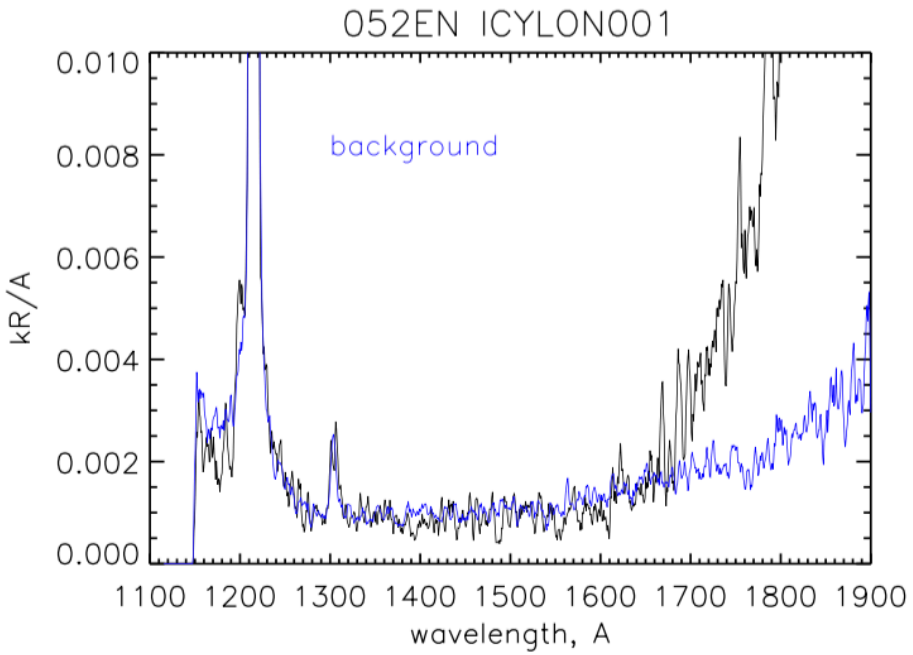


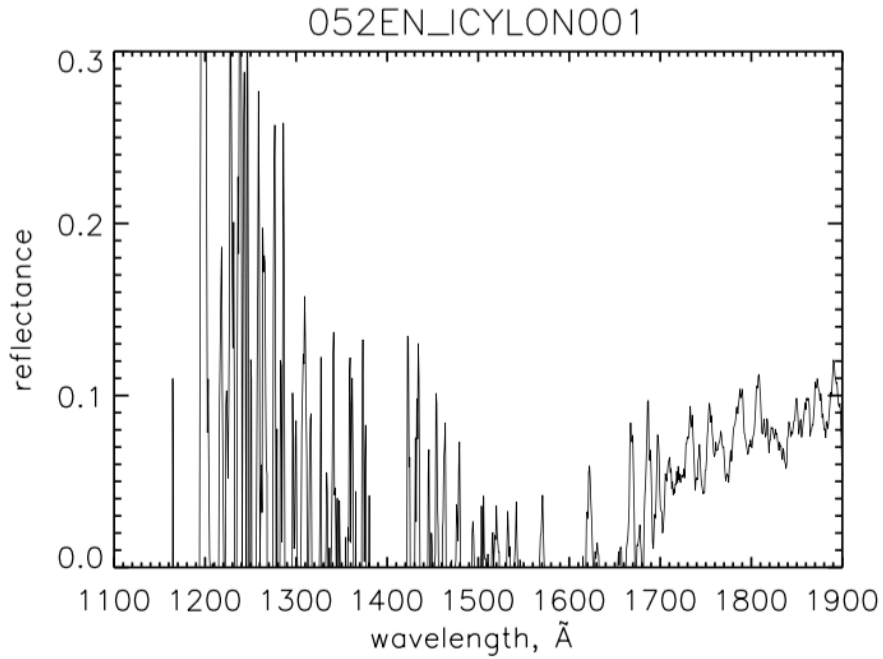
ISS_052EN_PHOTOM001



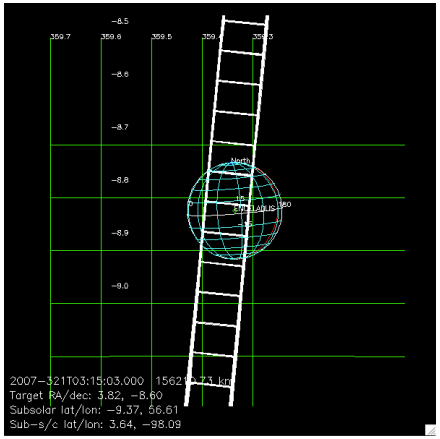
052EN_ICYLON001_ISS
2007-319T18:43
Alt= 977,647 km
Longitude= 243°W
Latitude=5.4°N
Phase=65.9°





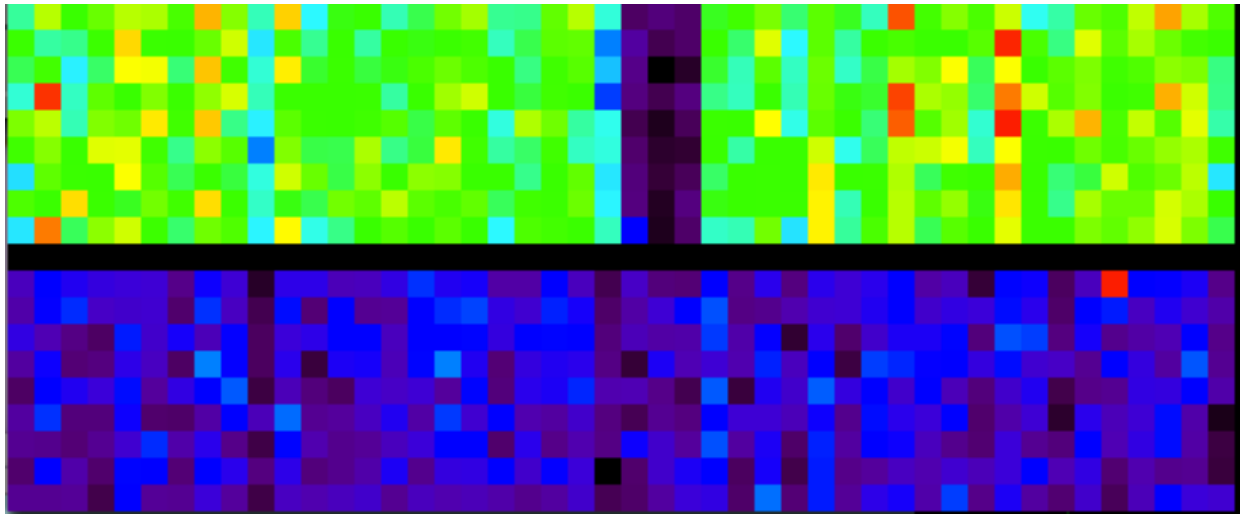


052EN_ICYLON002_ISS
2007-321T03:16
Alt= 153,088km
Longitude=97°W
Latitude=3.5°N
Phase=153°

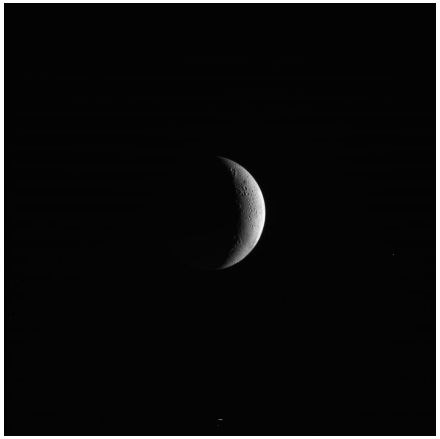


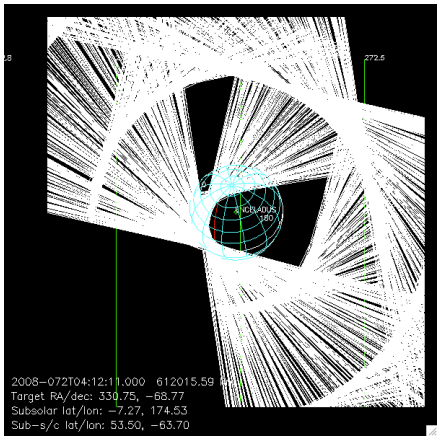
Ly-a

Long waves

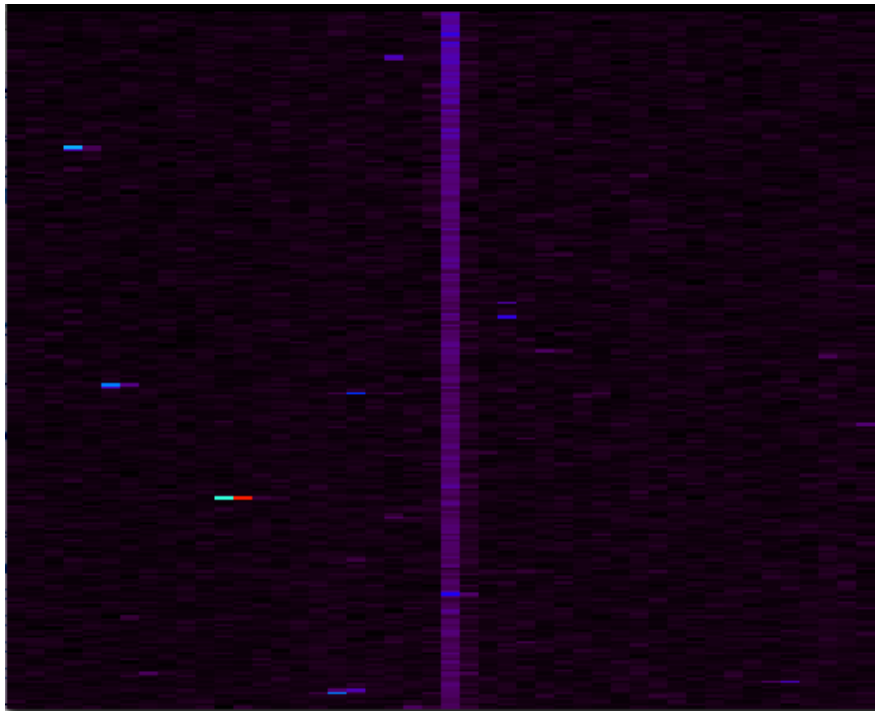


VIMS_061EN_ENCELADUS001_PRIME

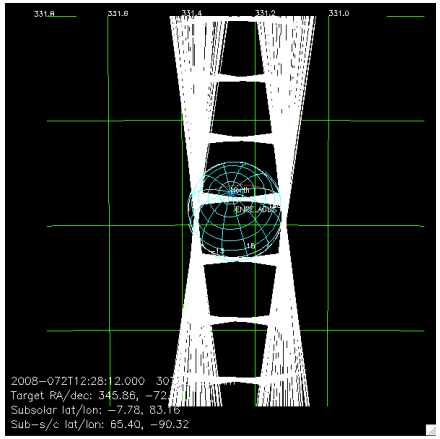


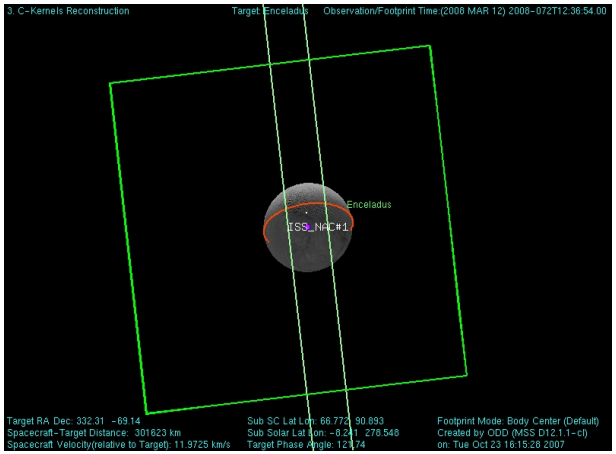


061EN_ICYLON001_VIMS
2008-072T04:13
Alt= 461,923 km
Longitude= 77°W
Latitude=60°N
Phase= 121.4°



ISS_061EN_PHOTPOL001_PRIME





061EN_ICYLON002_ISS

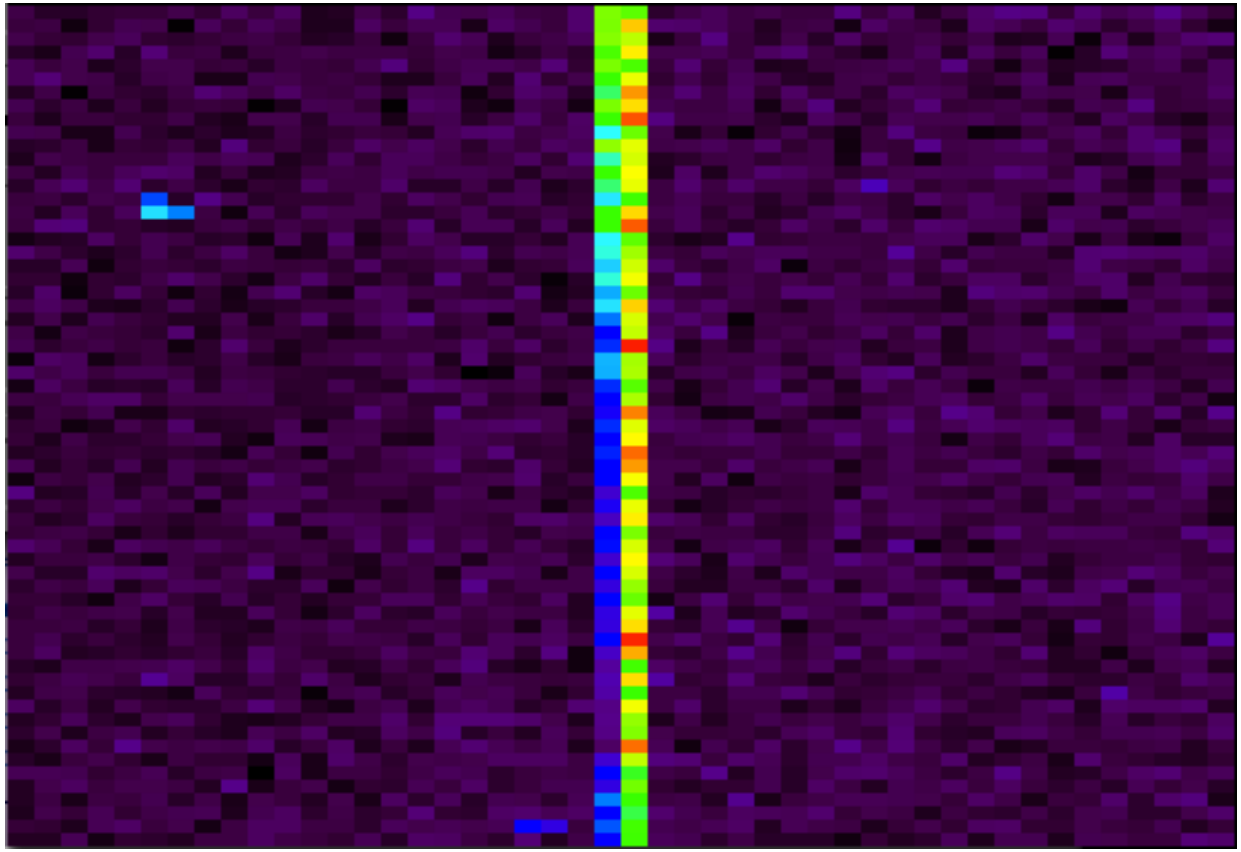
2008-072T12:26

Alt= 265,002 km

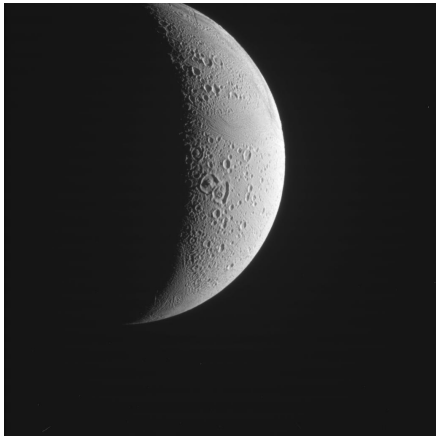
Longitude=95°W

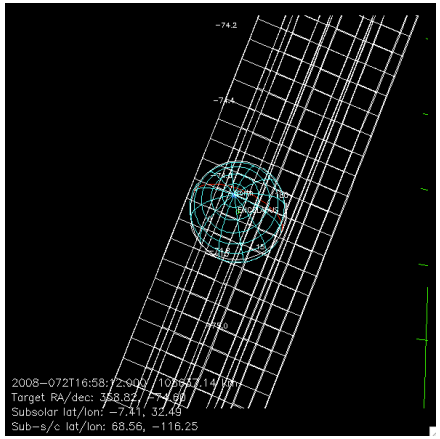
Latitude=66.3°N

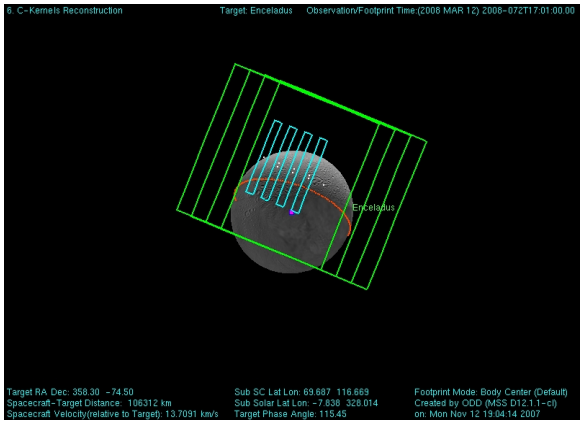
Phase=120.4°



CIRS_061EN_FP34MAP001_PRIME



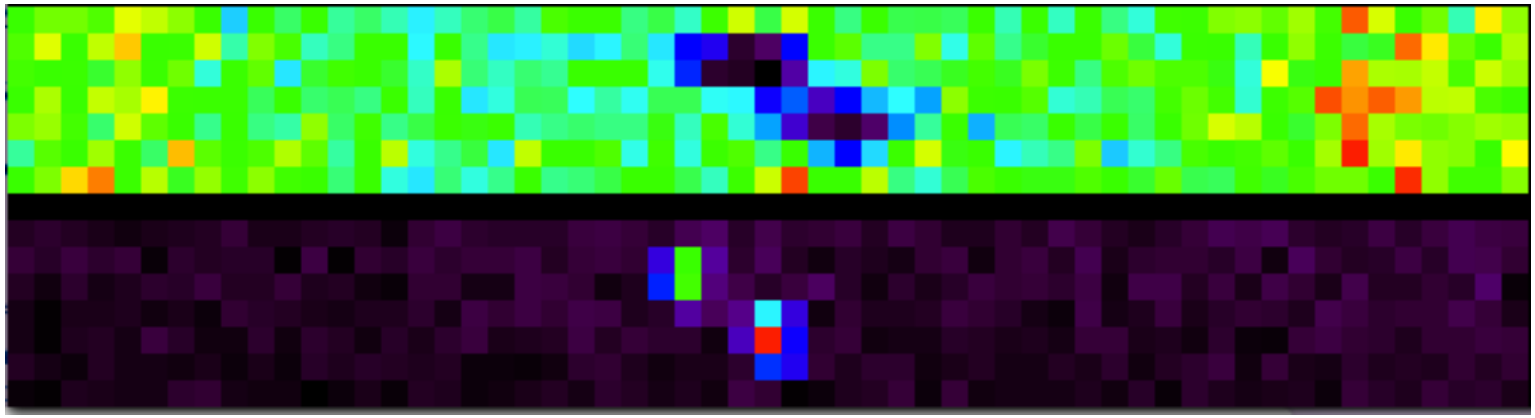




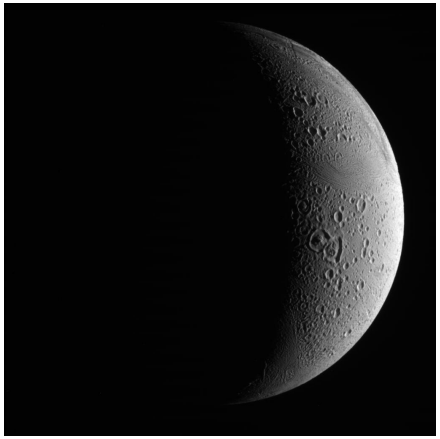
061EN_ICYLON003_CIRS
2008-072T16:36
Alt= 103,455 km
Longitude=117°W
Latitude=68.6°N
Phase=115.4°

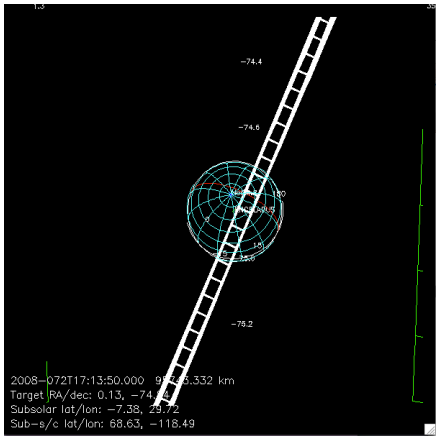
Ly-a

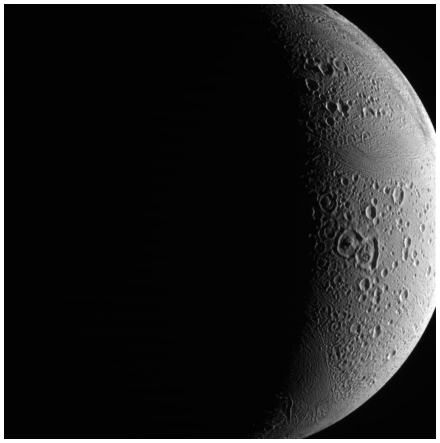
Long waves



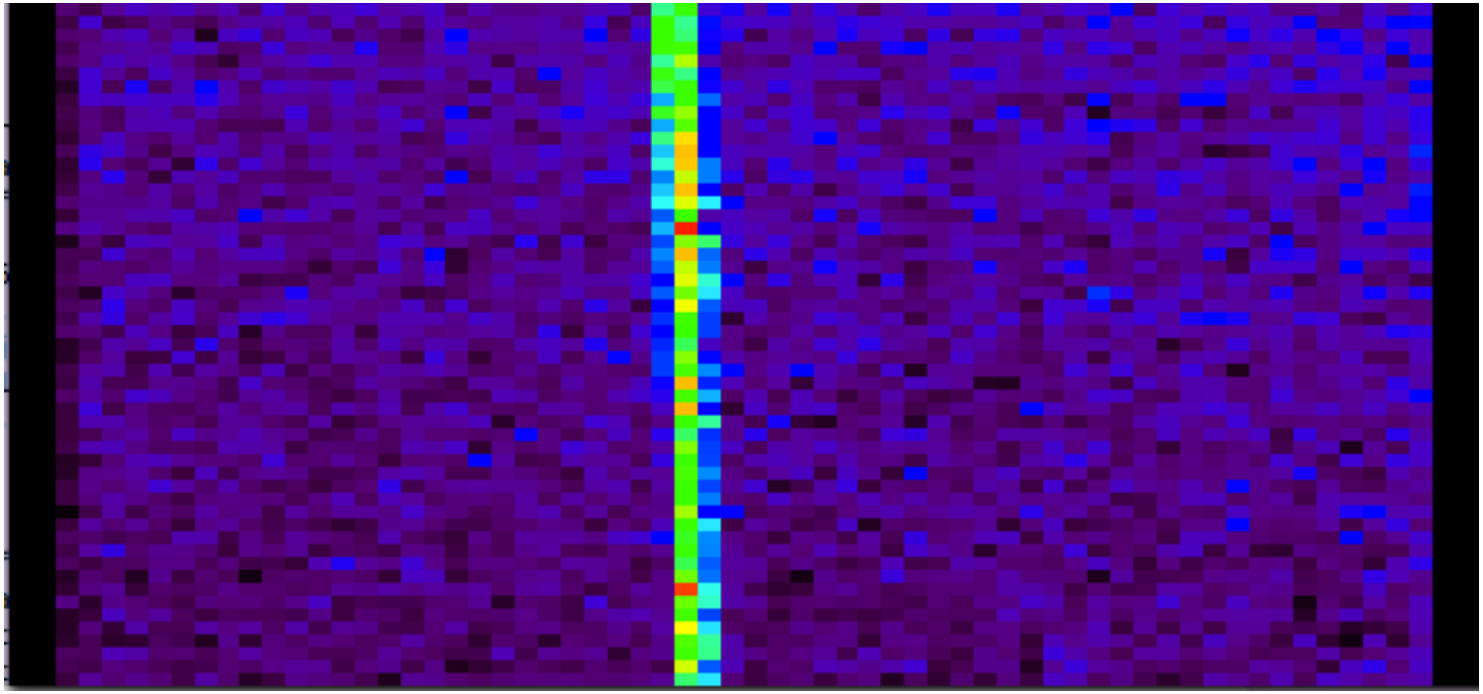
VIMS_061EN_ENCELADUS002_PRIME



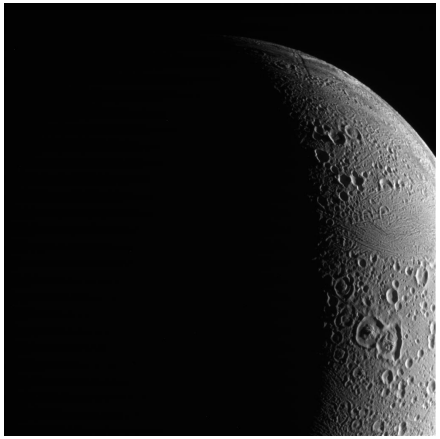


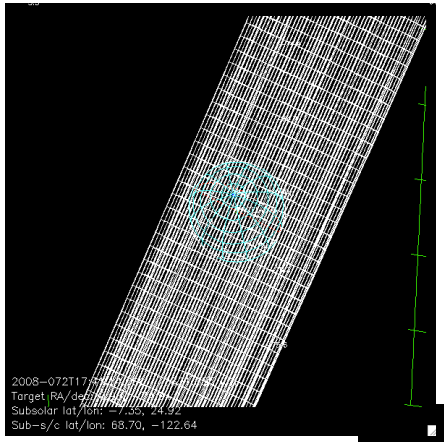


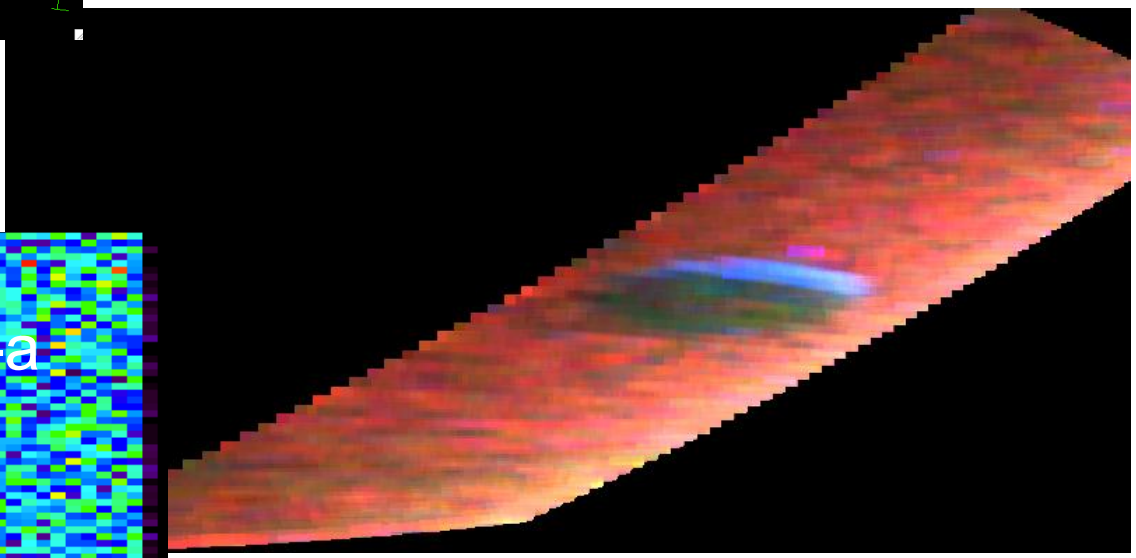
061EN_ICYMAP001_VIMS
2008-072T17:13
Alt= 84,660 km
Longitude=120°W
Latitude=69°N
Phase=115°

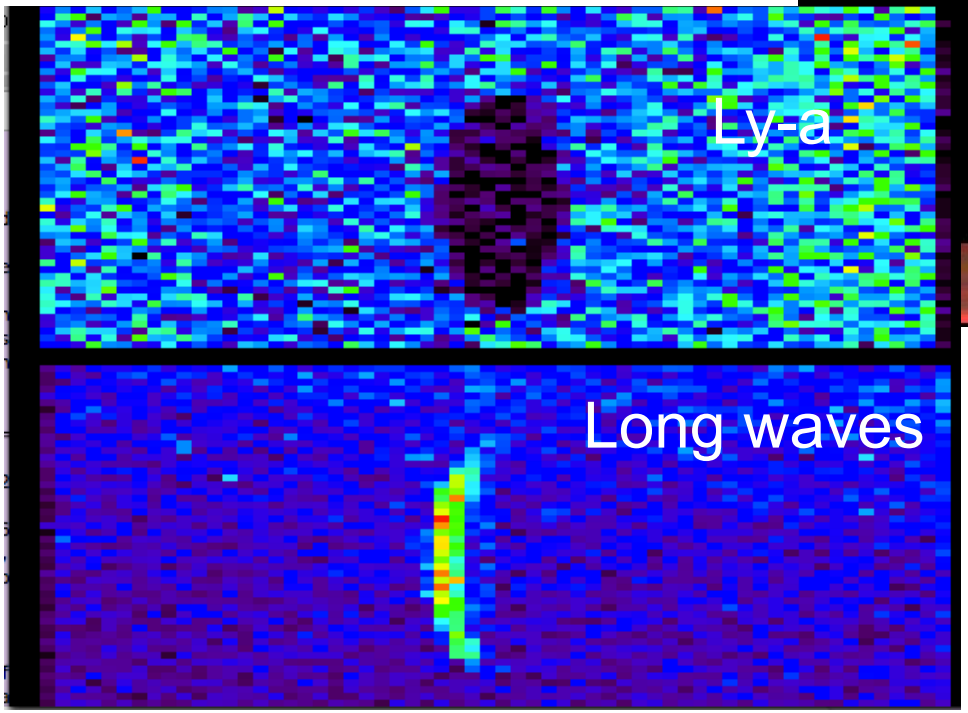


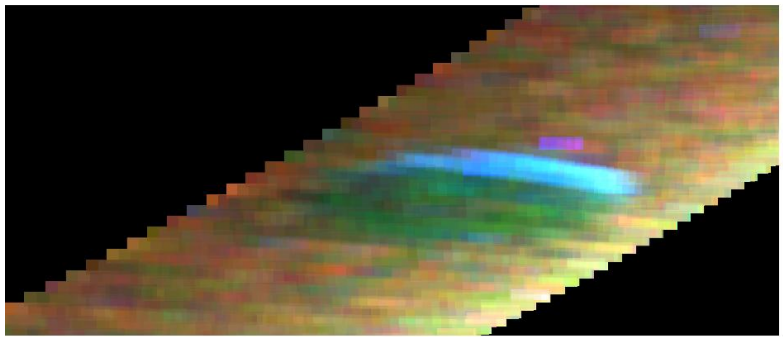
061EN_ICYMAP002_PRIME
2008-072T17:40
Alt= 62,217 km
Longitude=125°W
Latitude=69°N
Phase=114.9°





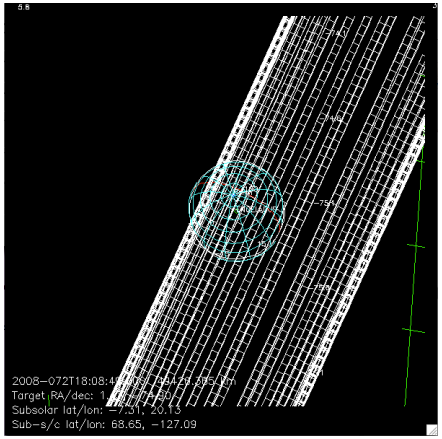


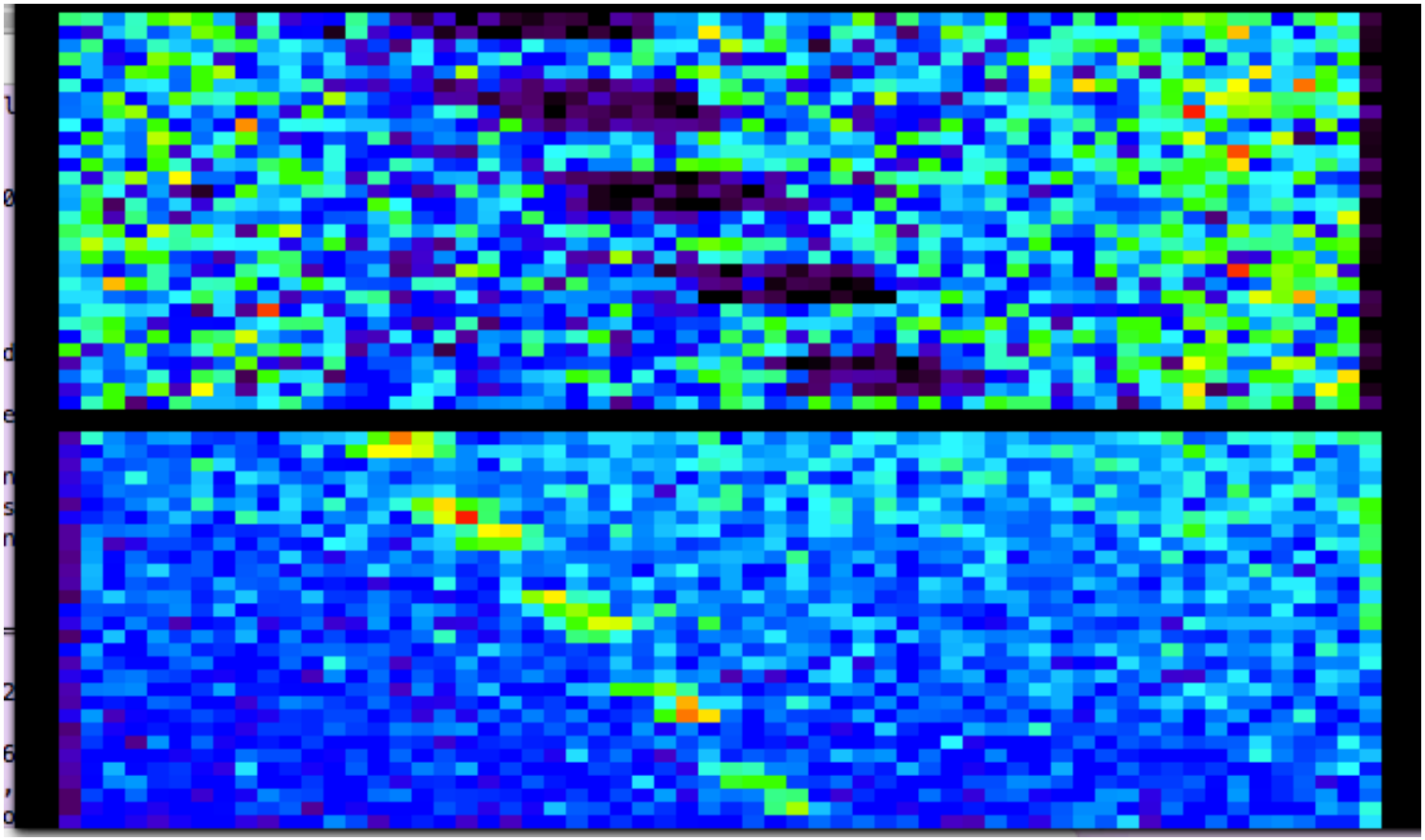




CIRS_061EN_FP1INMAP001_PRIME

061EN_ICYMAP003_CIRS
2008-072T18:07
Alt= 42,972 km
Longitude=128°W
Latitude=69°N
Phase=114.7°





ISS_061EN_REGMAP002_PRIME

061EN_ICYMAP004_ISS

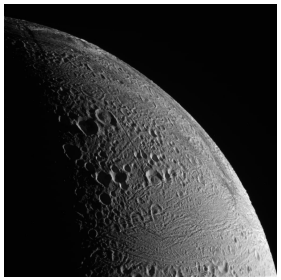
2008-072T18:25

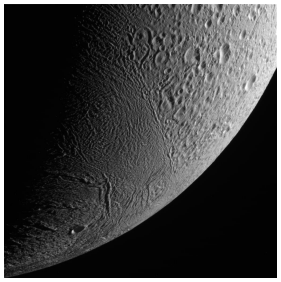
Alt= 33,379 km

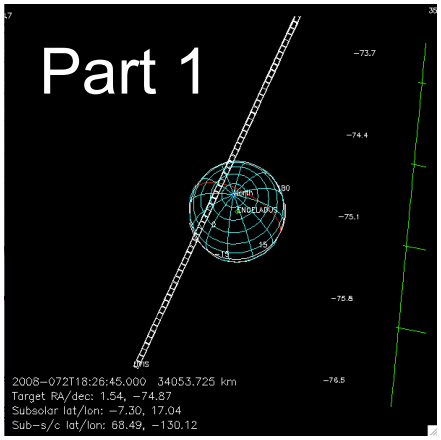
Longitude=130°W

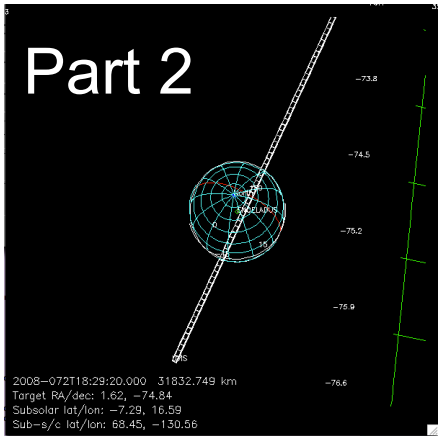
Latitude=69°N

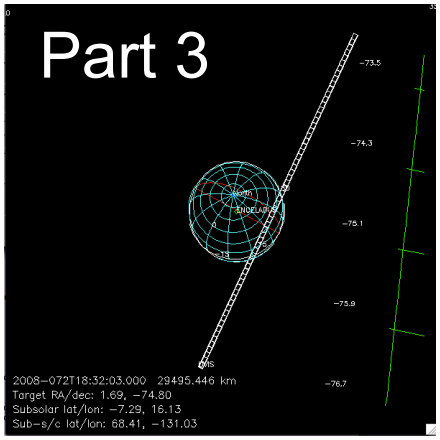
Phase= 114.8°

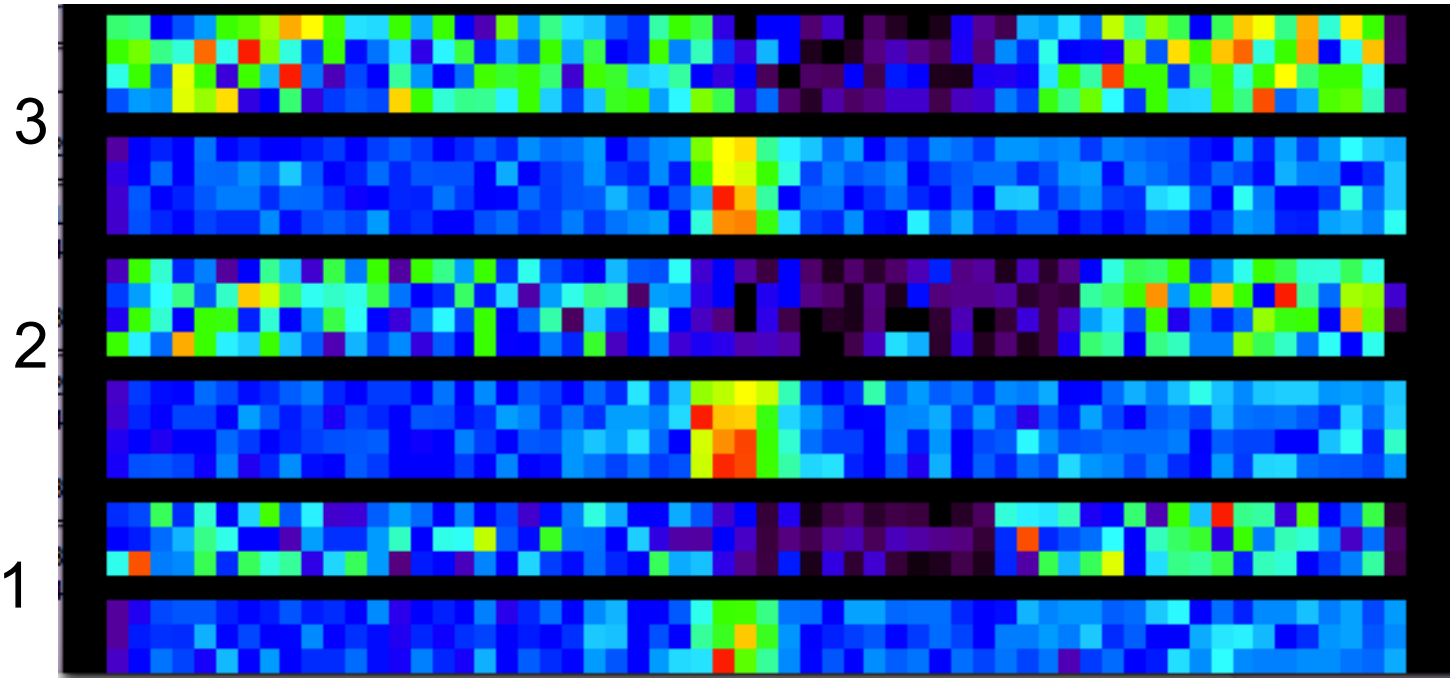












Ly-a

Long waves

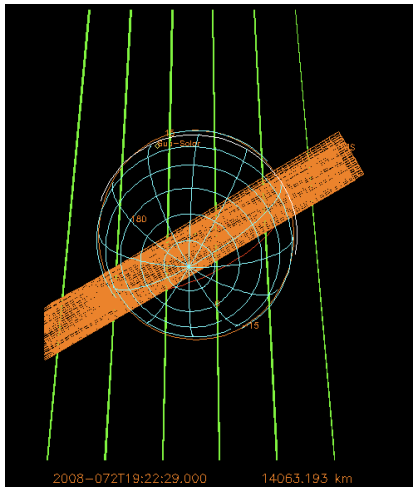
CAPS_061EN_ENCLDSPTG001

061EN_ICYMAP005_CAPS
2008-072T18:44
Alt= 18,204 km
Longitude=131°W
Latitude
Phase=115.0°

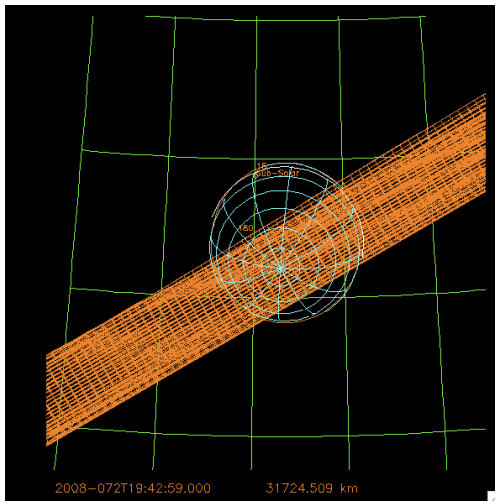
Weird pointing on this observation…

CIRS_061EN_FP3HOTSPT001_PRIME

5-part



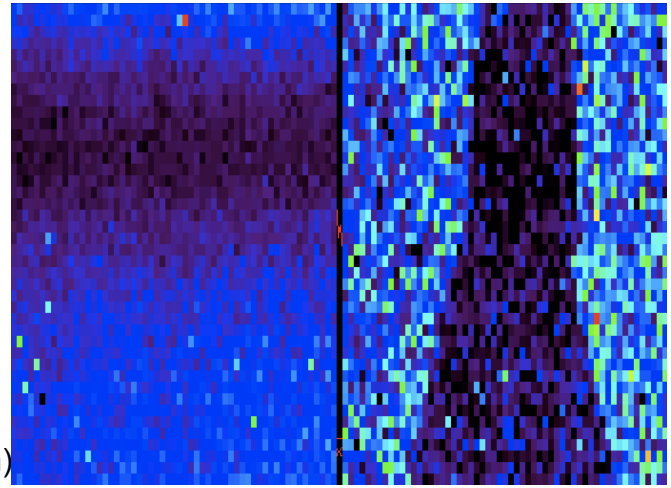
Part 1 start



Part 1 end

061EN_ICYMAP006_CIRS
2008-072T19:11
Alt= 4649 km
Longitude=316°W
Phase=68.6°

Enceladus in Eclipse
19:09:06- 21:18:07



Long-λ

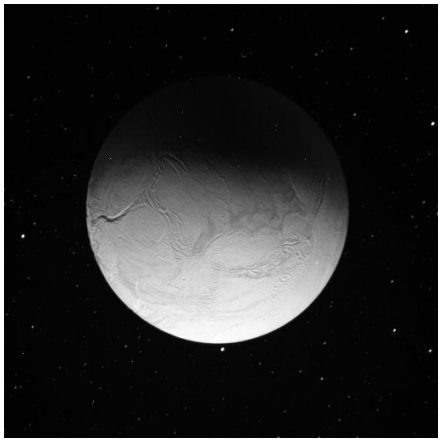
Ly-α

19:11:12, +00:05:00	Begin turn from MAPS C/A attitude
19:21:37, +00:15:25	Complete turn, with FP3 at 330 W, 70 S
19:22:12, +00:16:00	Begin FP3 tiger stripe map (range 13,831 km, FP3 resn. 4.1 km)
19:43:25, +00:37:13	End FP3 tiger stripe map (range 32,110, FP3 resn. 9.6 km)
19:44:10, +00:37:58	Begin FP3 stare at plume source “VI”, hot spot “C” (87 S, 236 W). (range 32,754 km, FP3 resn. 9.8 km)
19:50:26, +00:44:14	Offset FP1, FP3, to sky for calibration
19:55:36, +00:49:24	Begin FP1 stare at south pole, for long-wavelength heat flow
20:02:32, +00:56:20	Begin FP1 stare at 44 S, 285 W, for passive subtraction
20:09:08, +01:02:56	End observation

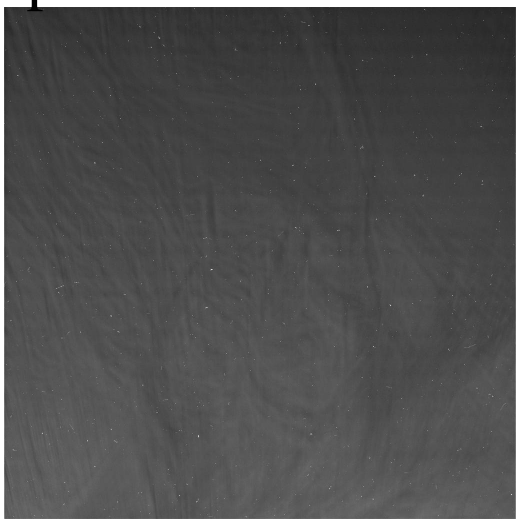
CIRS_061EN_FP3HOTSPT001_PRIME

061EN_ICYMAP006_CIRS
2008-072T19:11

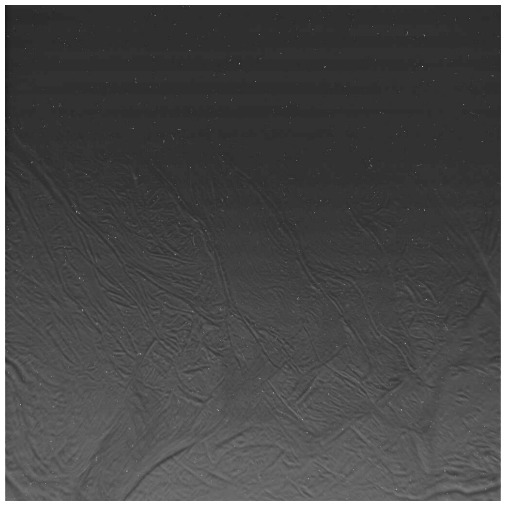
Eclipse 19:09:06- 21:18:07



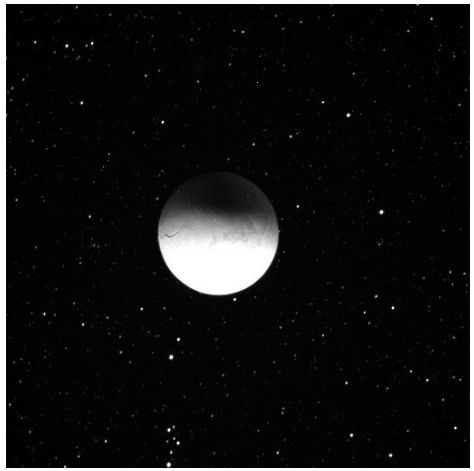
WAC at 19:21:53



NAC at 19:24:53



NAC at 19:49:57



WAC at 19:42

CIRS_061EN_FP3HOTSPT001_PRIME

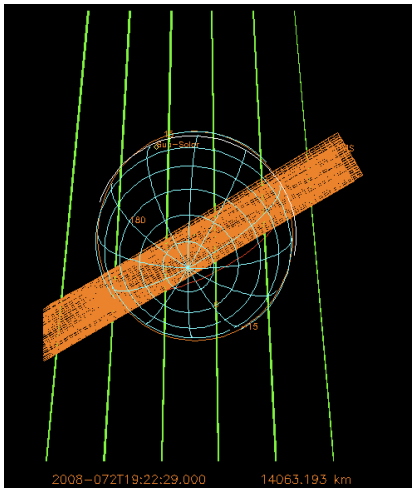
061EN_ICYMAP006_CIRS
2008-072T19:11

Eclipse 19:09:06- 21:18:07

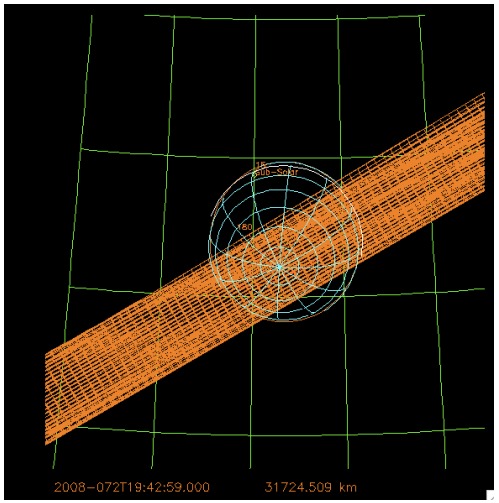
•FIRST PART:

•19:22:12, +00:16:00 Begin FP3 tiger stripe map (range 13,831 km, FP3 resn. 4.1 km)

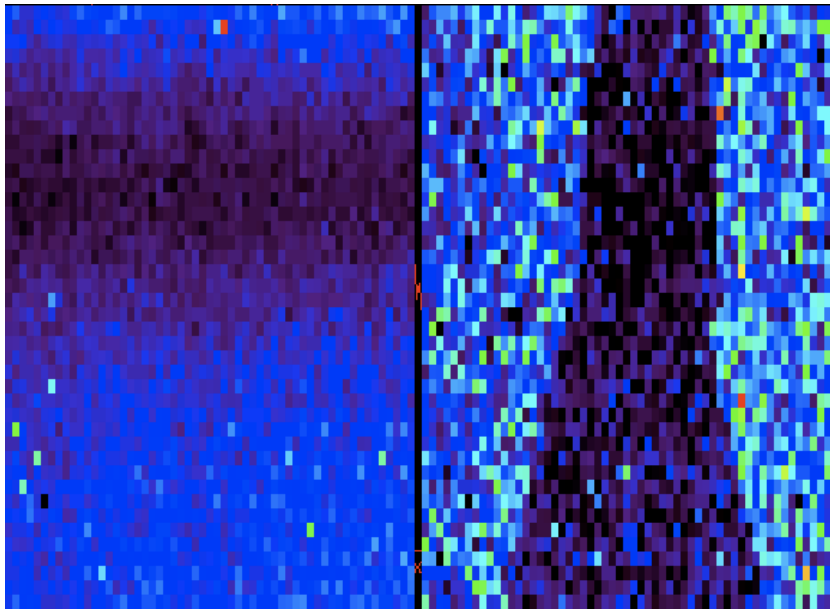
•19:43:25, +00:37:13 End FP3 tiger stripe map (range 32,110, FP3 resn. 9.6 km)



start



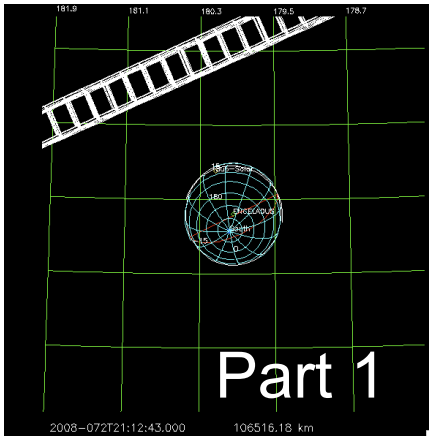
end

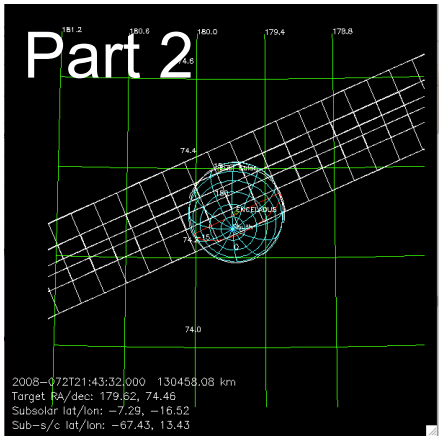


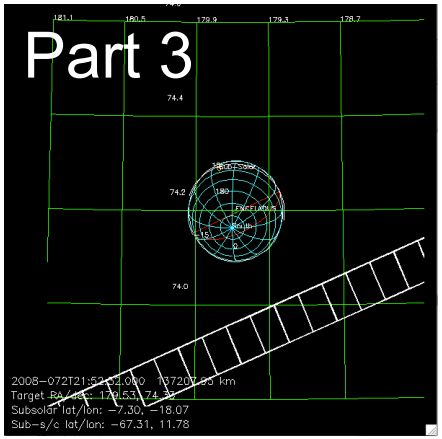
Long-λ Ly-α

- This is a back-and-forth scan, so it's surprising that the first half is so different from the 2nd half.
- First half: E-ring grains illuminated & scattering in all rows?
- 2nd half: E-ring grain no long illuminated, in eclipse
- Very end: ??

CIRS_061EN_FP1SECLX001_PRIME







061EN_ICYLON005_CIRS

2008-072T21:13

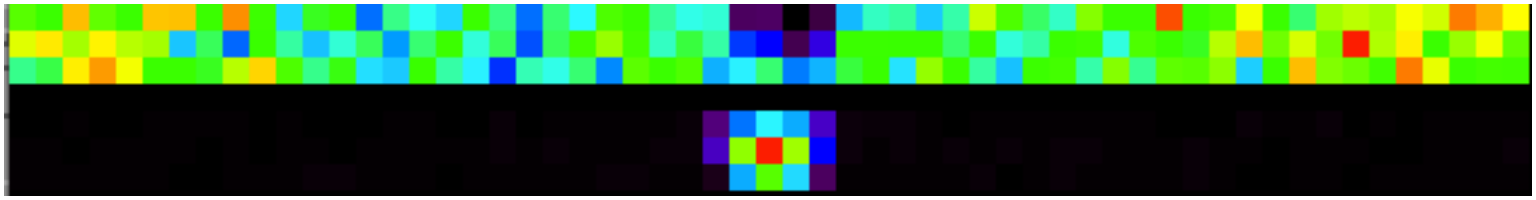
Altitude= 131,720 km

Longitude=347°W

Latitude=67°W

Phase=65°

Enceladus in Eclipse 19:09:06-21:18:07



061EN_ICYLON006_PRIME

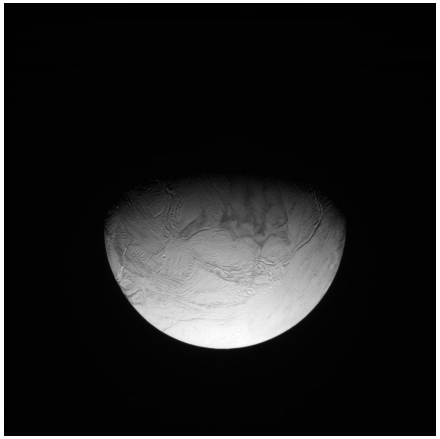
2008-072T22:01

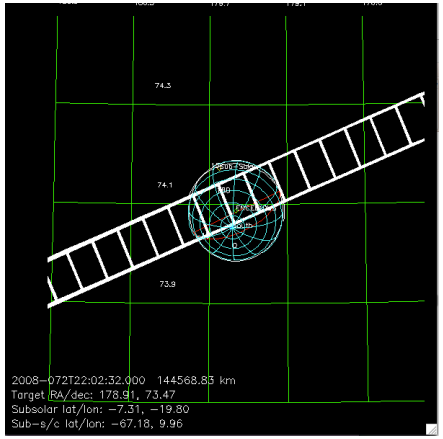
Alt= 180,955 km

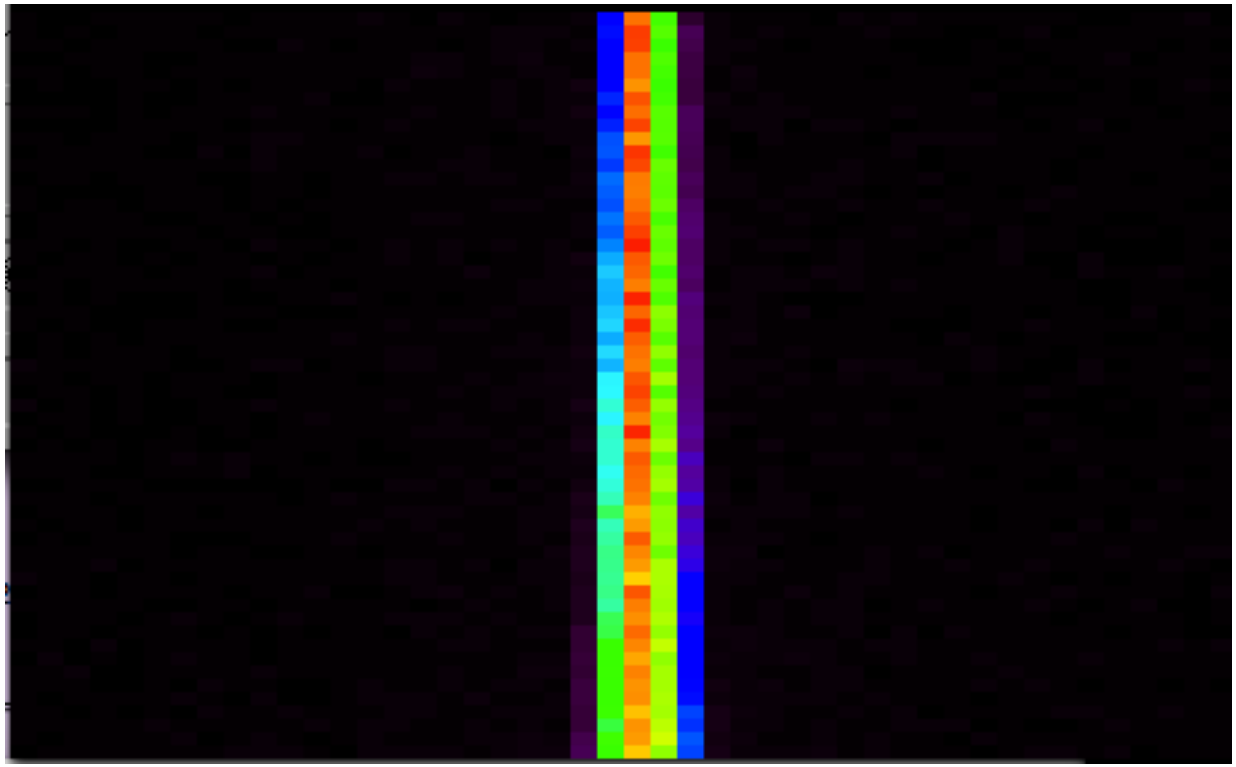
Longitude=180°W

Latitude-67°S

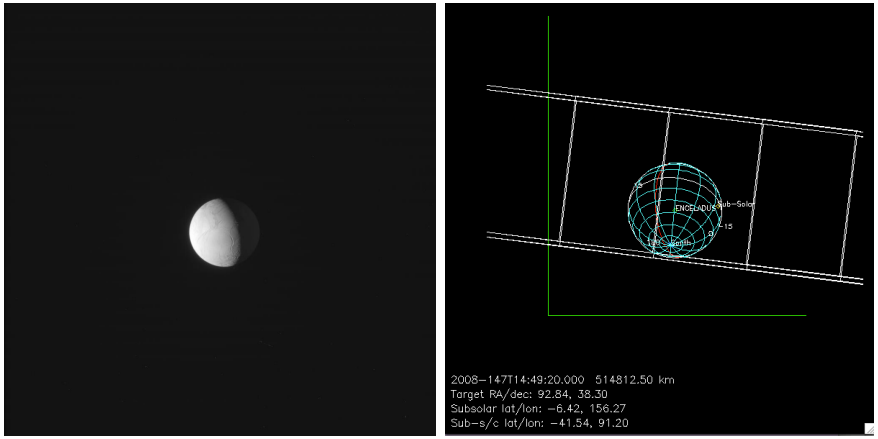
Phase=64°







ISS_069EN_LIMTOP001_PRIME



069EN_ICYLON001_ISS

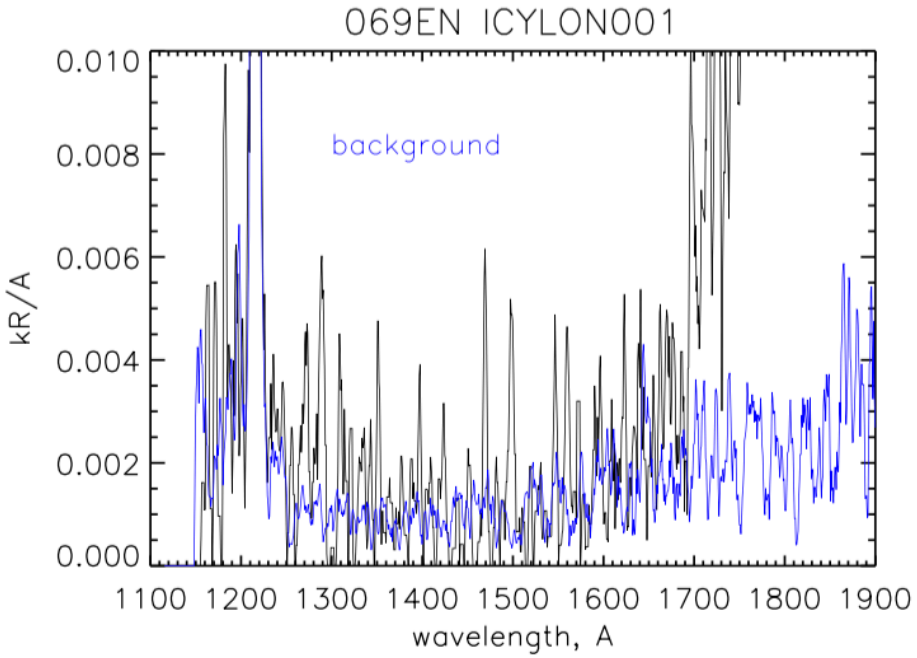
2008-147T14:50

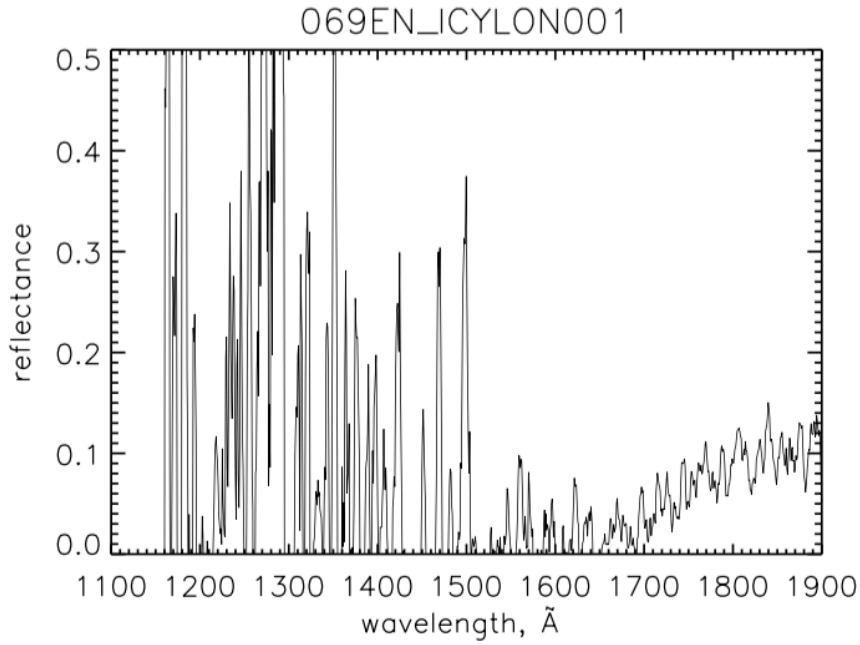
Alt= 515,370 km

Longitude= 269°W

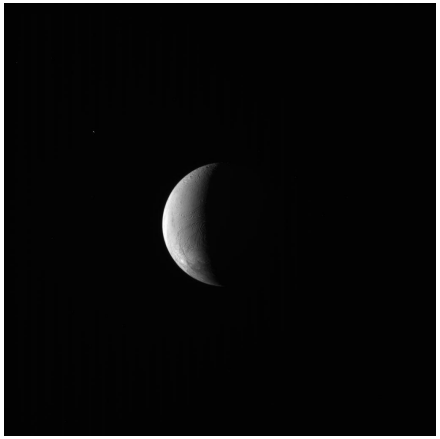
Latitude=41.5°S

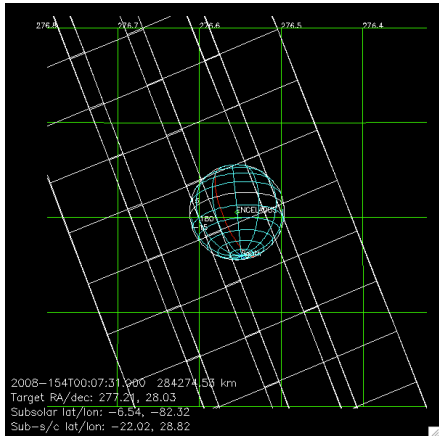
Phase= 66.4°





CIRS_070EN_ENCELADUS001_PRIME





070EN_ENCEL001_CIRS

2008-154T00:08

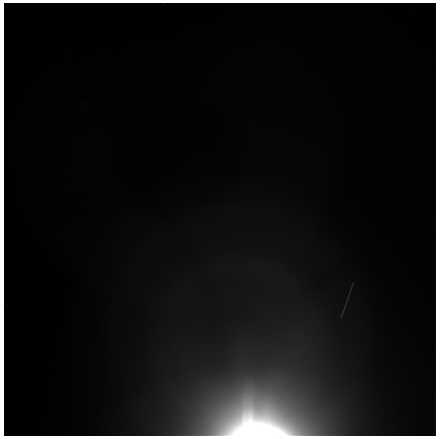
Alt= 284,715 km

Longitude= 331°W

Latitude=23°S

Phase= 107.7°

ISS_071EN_PLMLP001_PRIME



6-part

071EN_ICYLON001_ISS
2008-162T12:38
Alt= 284,071 km
Longitude= 330°W
Phase= 107.6°

Pointing off-body the whole time

ISS_073EN_GLOCOL001_PRIME

073EN_ICYLON001_ISS

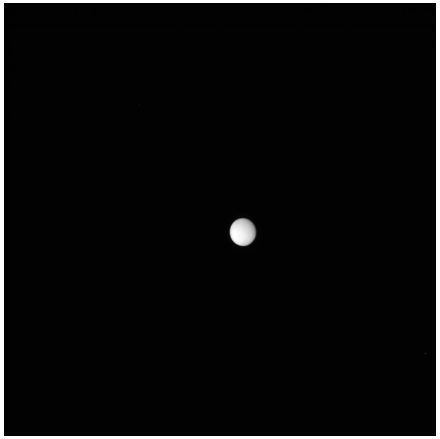
2008-178T15:07

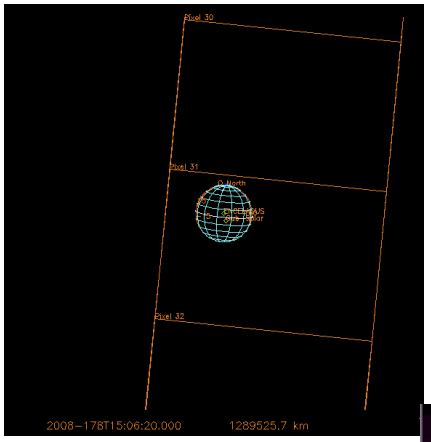
Alt= 1,283,650 km

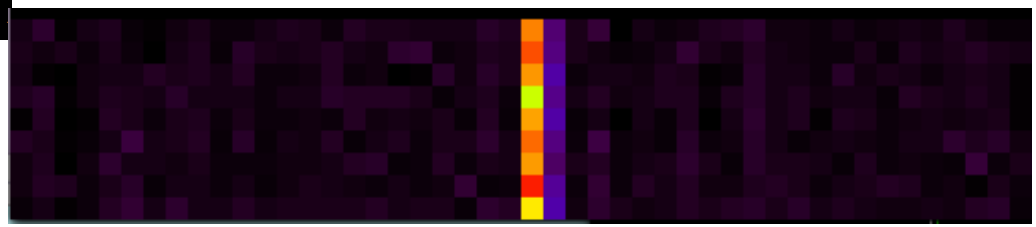
Longitude= 76°W

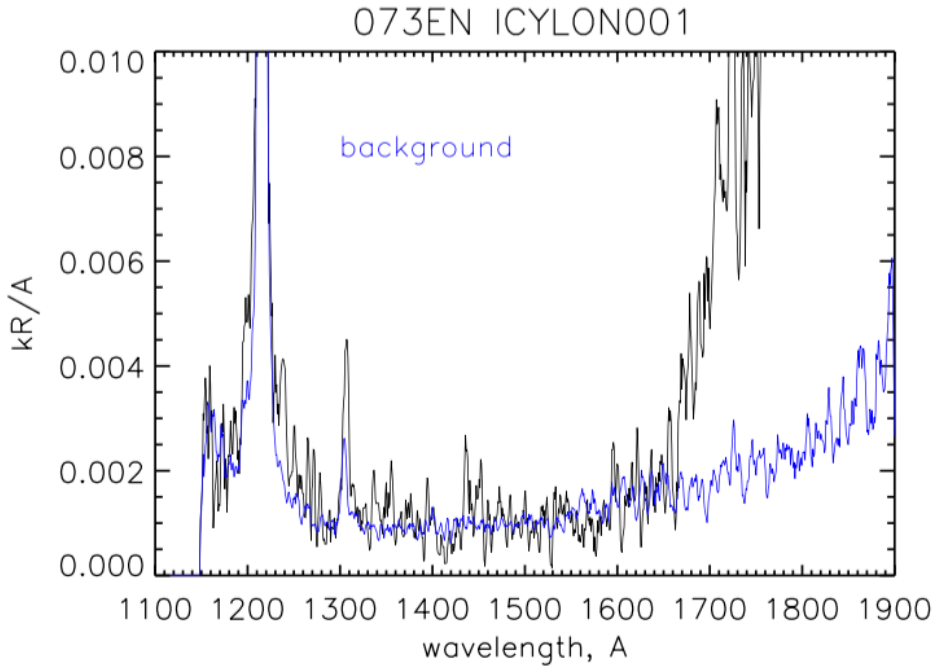
Latitude=7°N

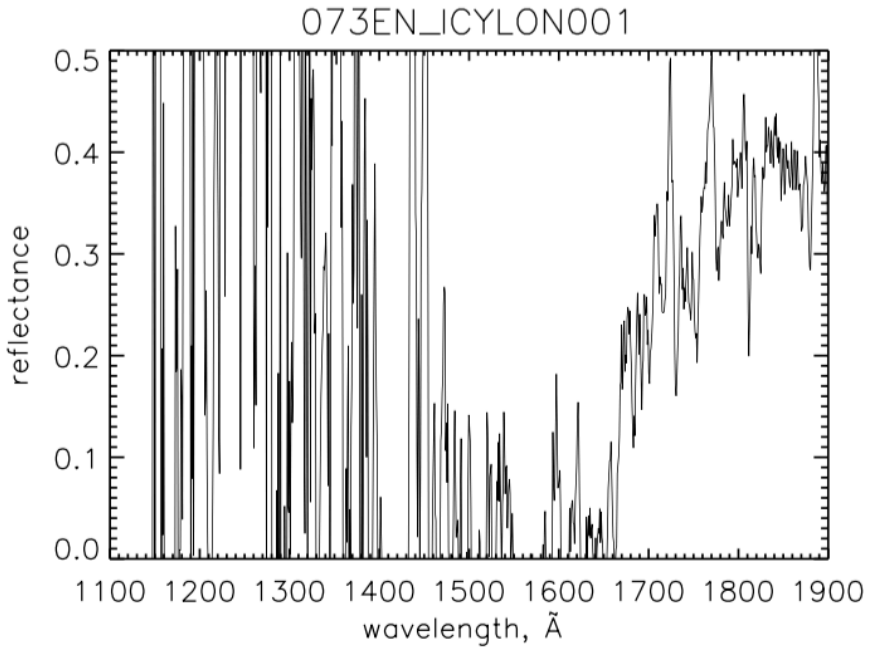
Phase= 14.6°







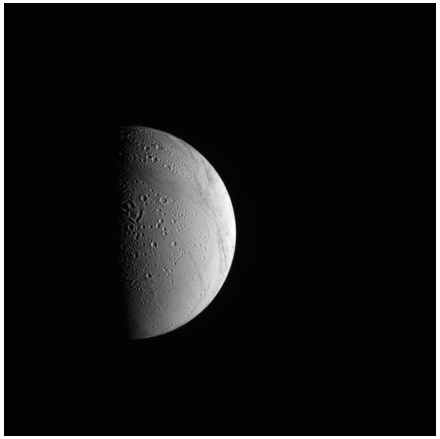


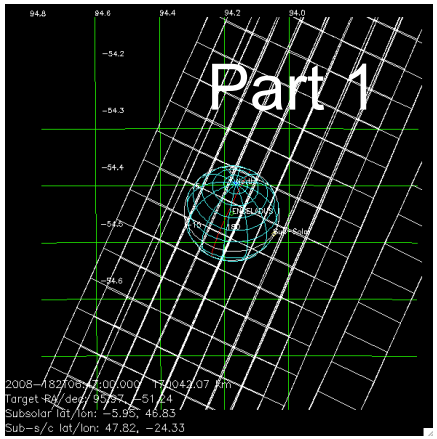


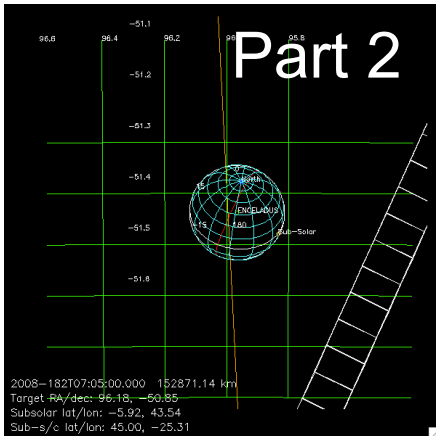
CIRS_074EN_ENCELADUS001_PRIME

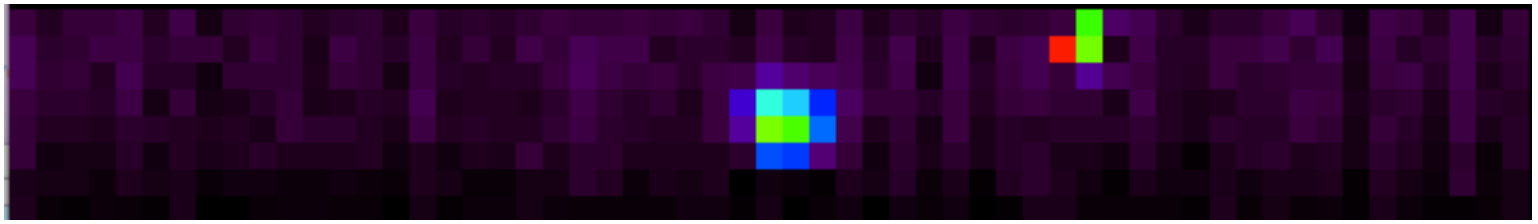
2-part

074EN_ENCEL002_CIRS
2008-182T06:48
Alt= 163,123 km
Longitude= 25°W
Latitude=47°N
Phase= 84.4°





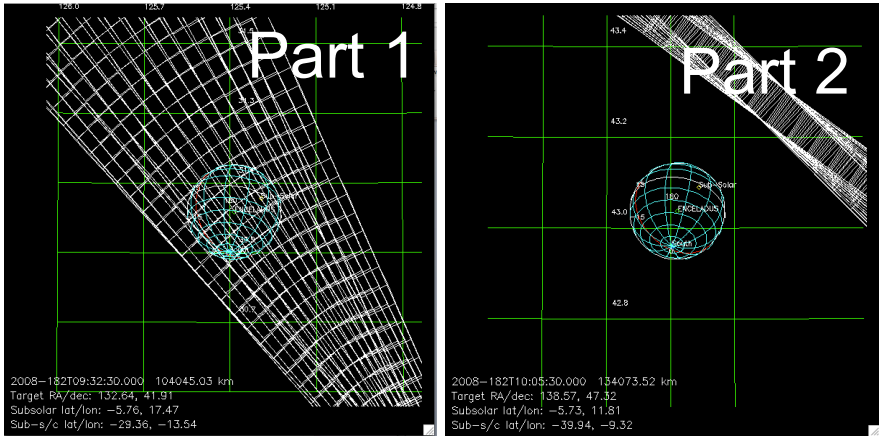


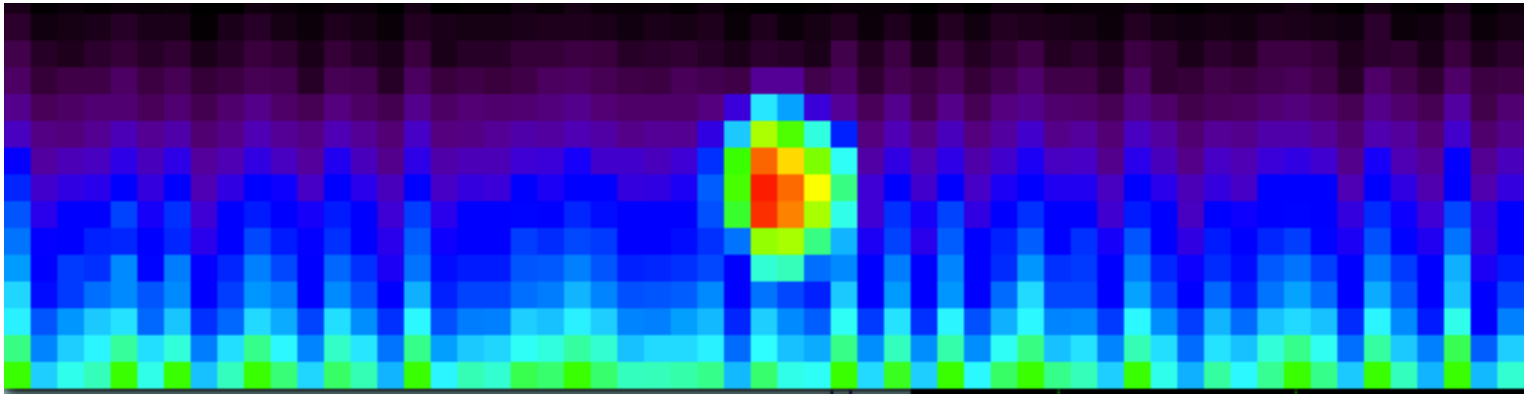


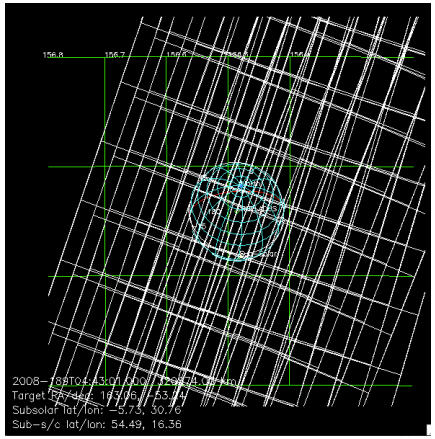
CIRS_074EN_FP1SECLN002_PRIME

2-part

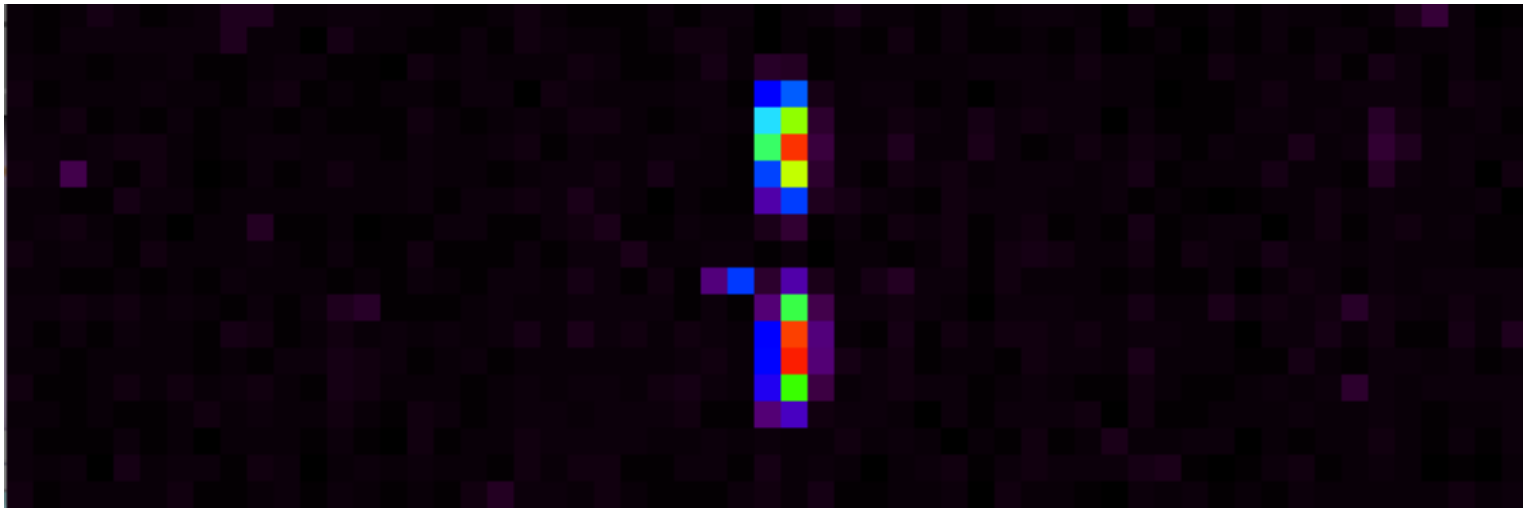
074EN_ENCEL001_CIRS
2008-182T09:33
Range= 115,919 km
Longitude= 12°W
Latitude=35°S
Phase= 40.5°





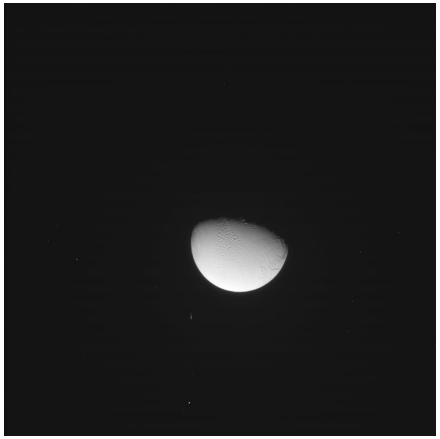


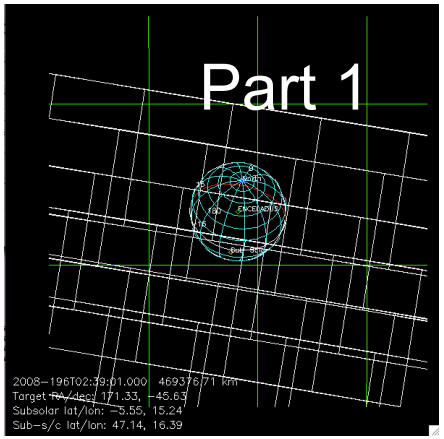
075EN_ICYLON001_CIRS
2008-189T04:44
Range= 307,112 km
Lon= 343°W
Latitude=54°N
Phase= 64°

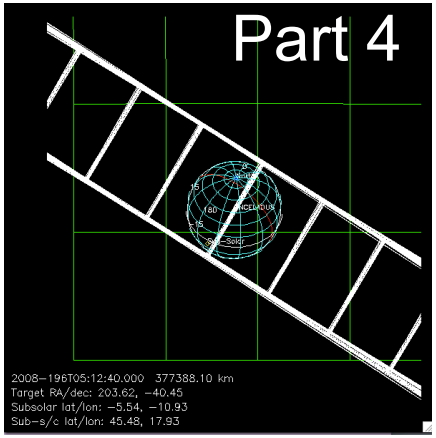


4-part

076EN_ICYLON001_CIRS
2008-196T02:40
Alt= 466,356 km
Longitude= 344°W
Latitude=47°N
Phase= 55.7°

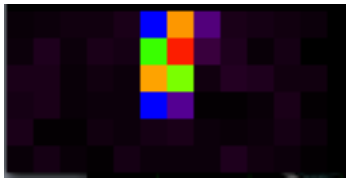




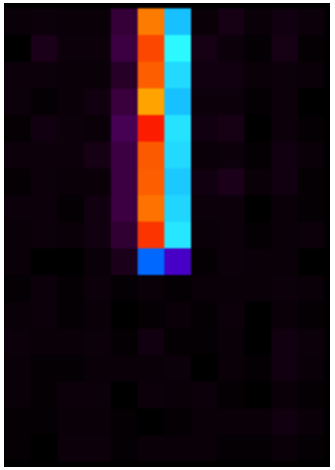


Enceladus not in UVIS slit
for other parts

Part 1



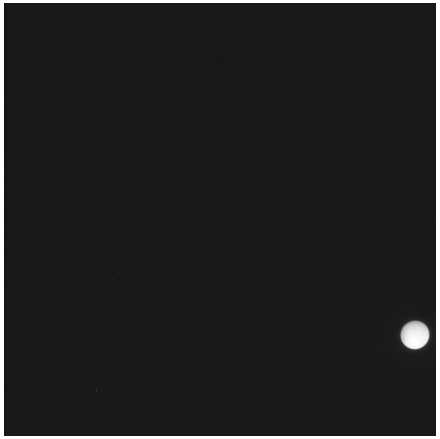
Part 4

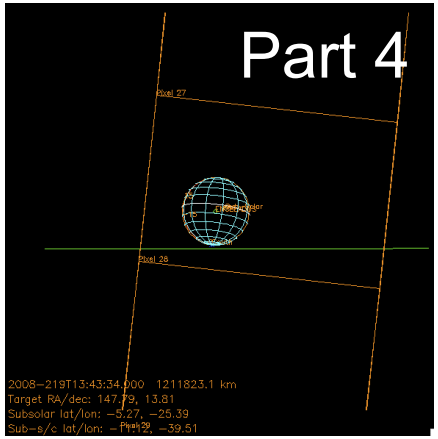


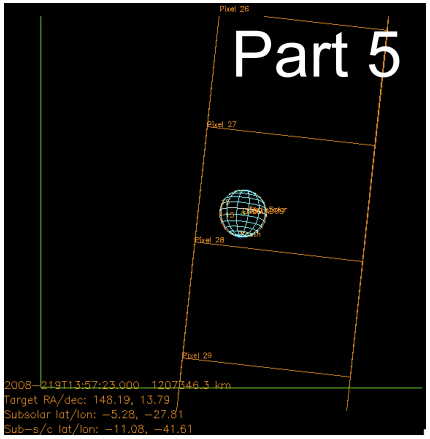
ISS_079EN_PLMLP001_PRIME

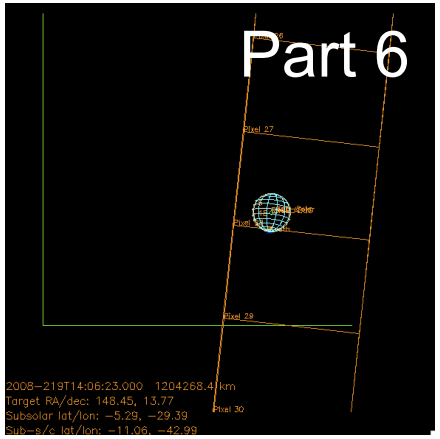
9-part

079EN_ICYLON001_ISS
2008-219T13:15
Alt= 1,209,923 km
Longitude= 40°W
Latitude=11°S
Phase= 15.4°

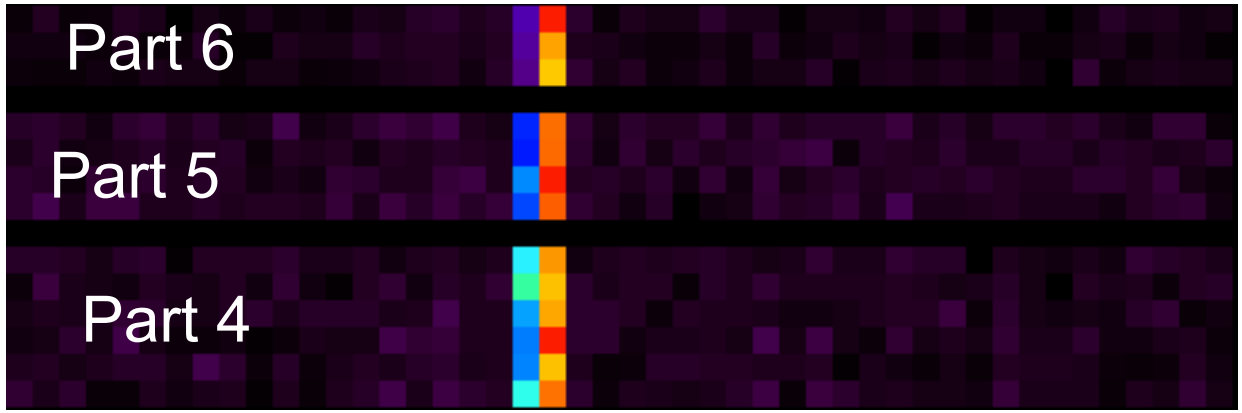








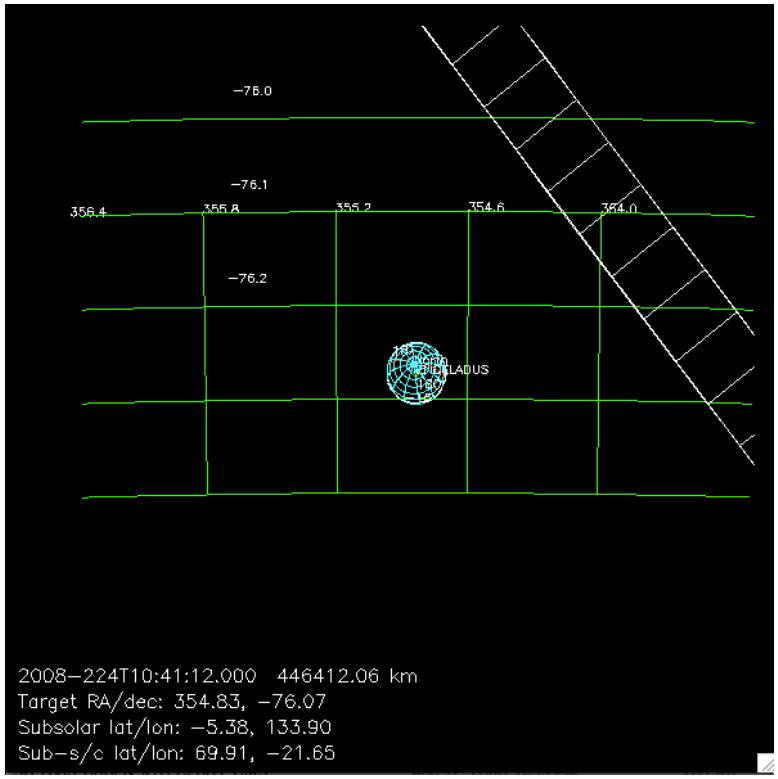
Enceladus not in UVIS slit for other parts



ISS_080EN_PLMHINCL001_PRIME

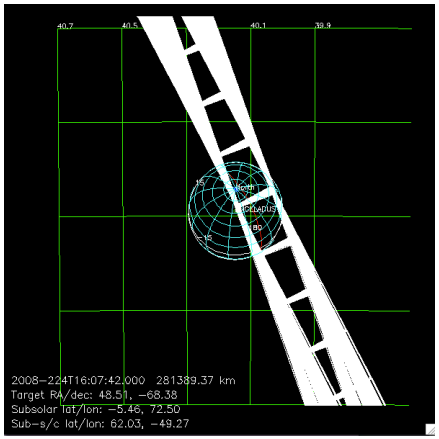
080EN_ICYPLU001_ISS
2008-224T06:08
Alt= 520,106 km
Longitude= 54°W
Latitude=77°N
Phase= 102.9°

38-part



Strange pointing… never on body?

VIMS_080EN_ENCEL001_PRIME



080EN_ICYMAP001_VIMS

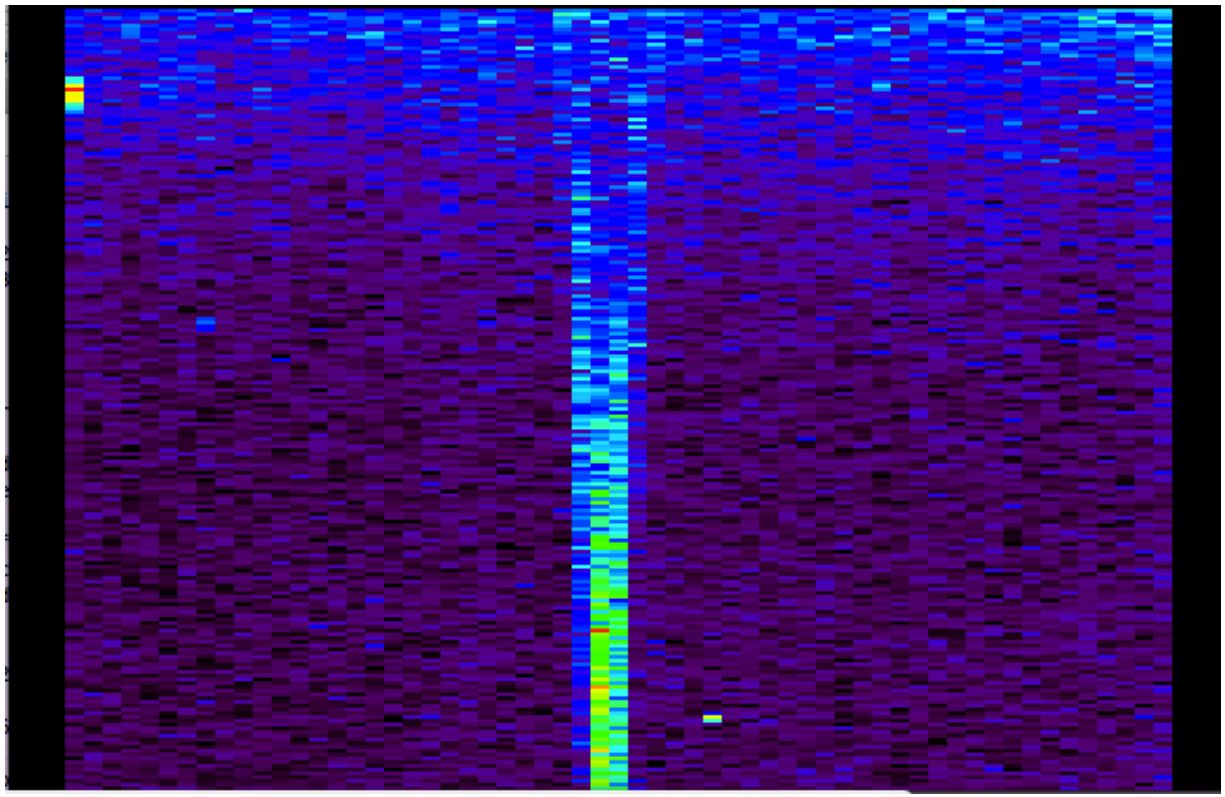
2008-224T16:08

Alt=193,437 km

Longitude=64°W

Latitude=61°N

Phase=108°



UVIS_080EN_ICYLIMB001_PRIME

080EN_ICYLIMB001_PRIME

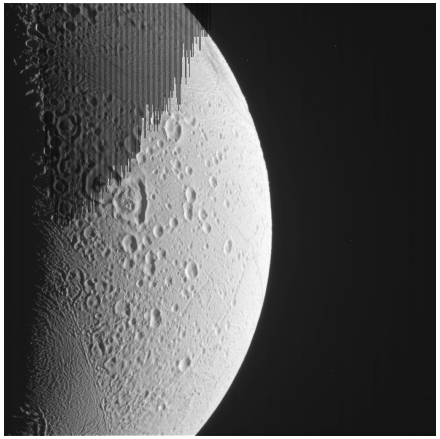
2008-224T19:38

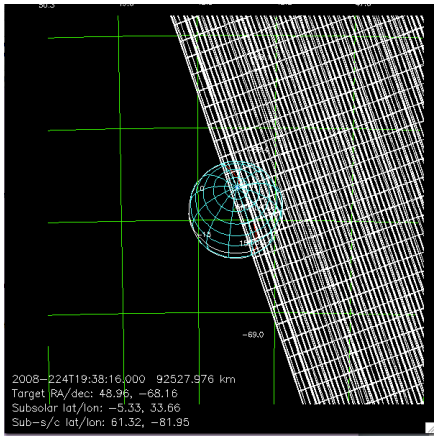
Alt=68,957 km

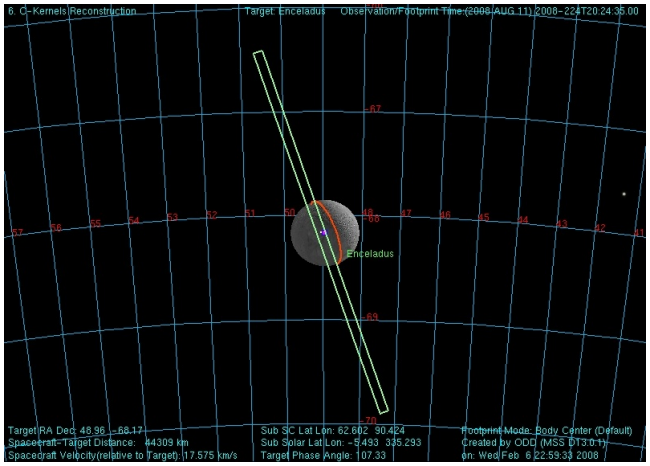
Longitude=86°W

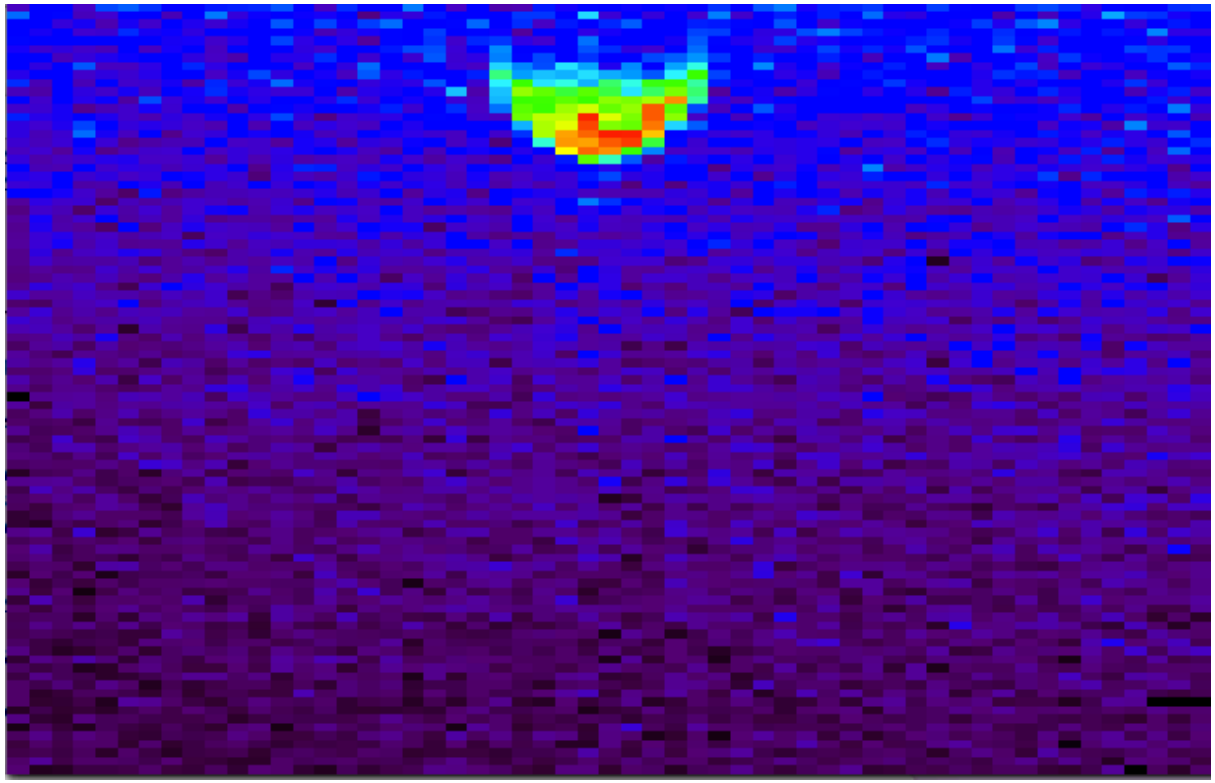
Latitude=61°N

Phase=107°

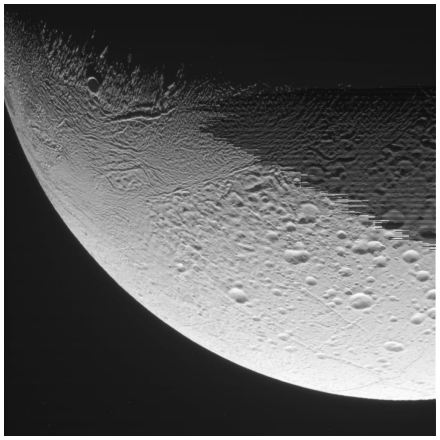




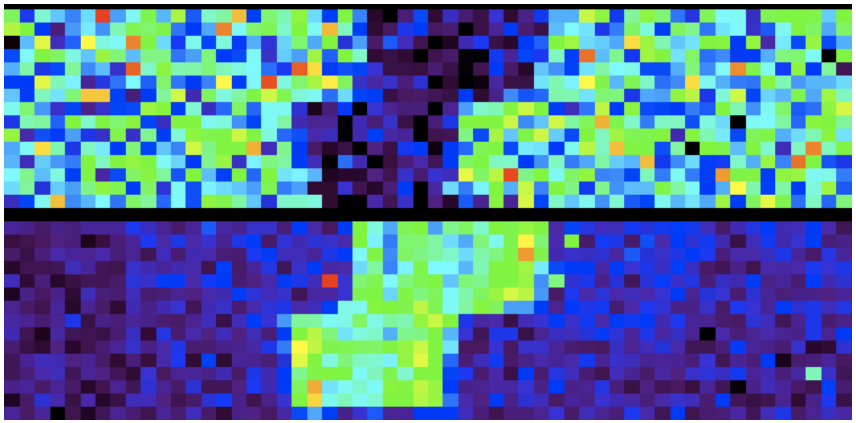




ISS_080EN_ENCELCA001_PRIM

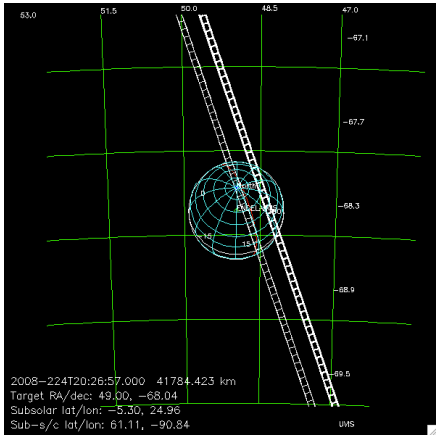


080EN_ICYMAP001_ISS
2008-224T20:27
Alt=37,837 km
Longitude=91.5°W
Latitude=61°N
Phase=107°

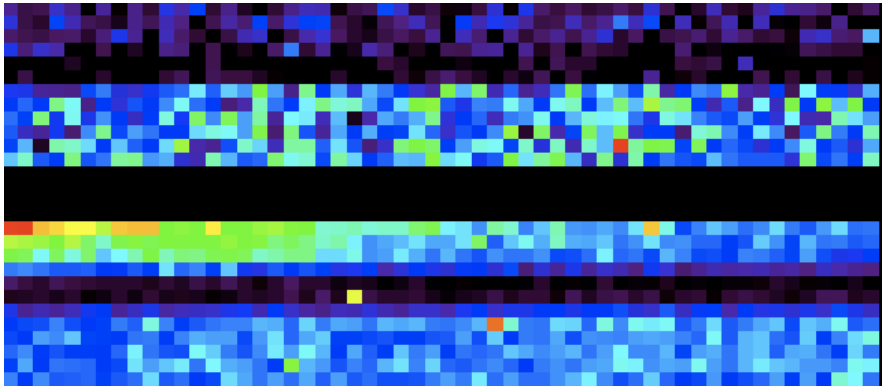


Ly-α

Long λ

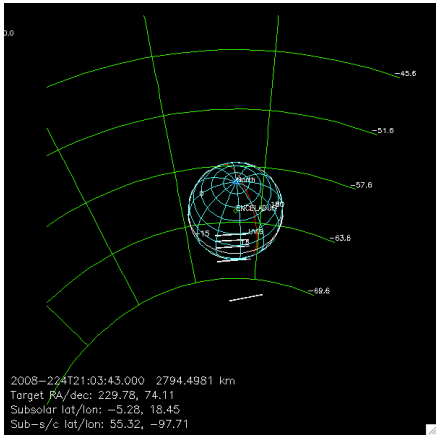


Part #1



Ly-α

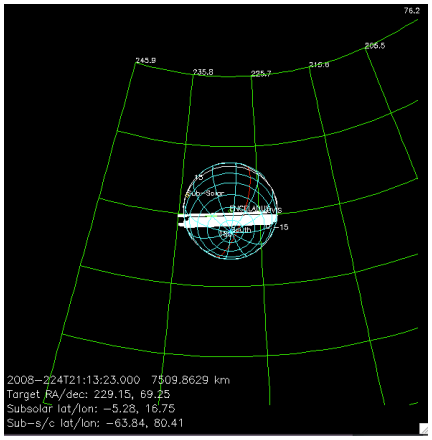
Long λ



Part #2

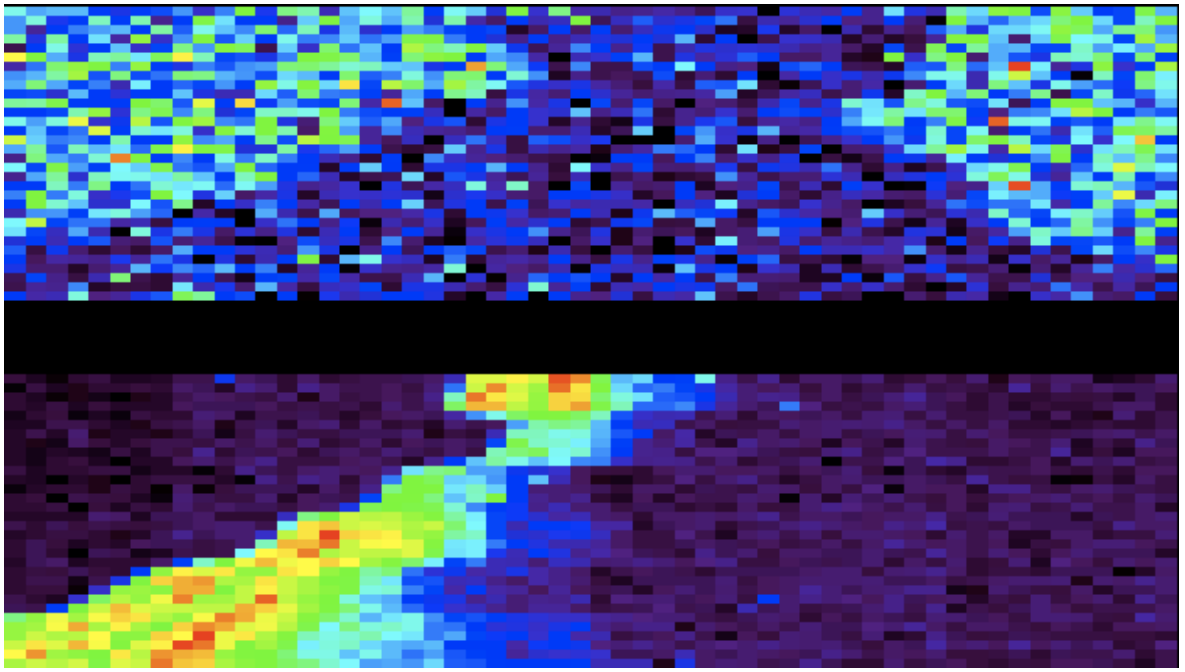
080EN_ICYMAP001_ISS
Cont'd

Part 3

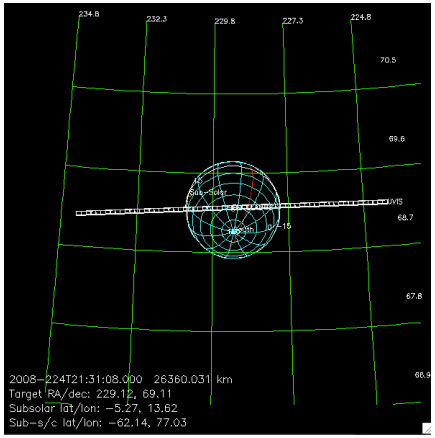


Ly-α

Long λ

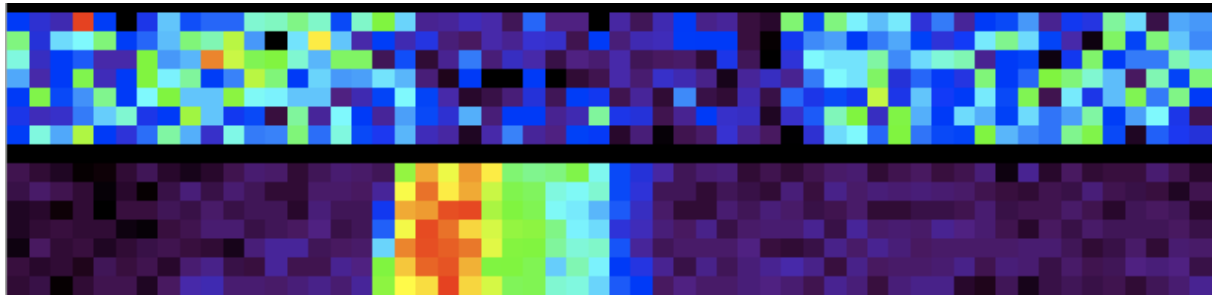


Part 4



Ly-α

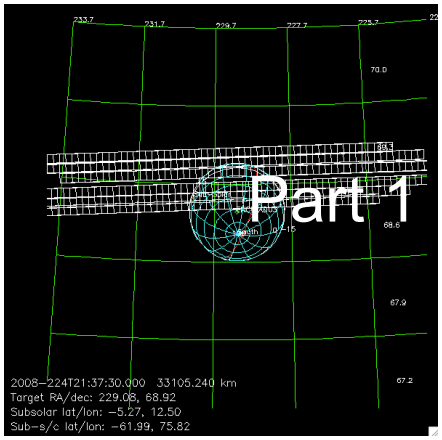
Long λ



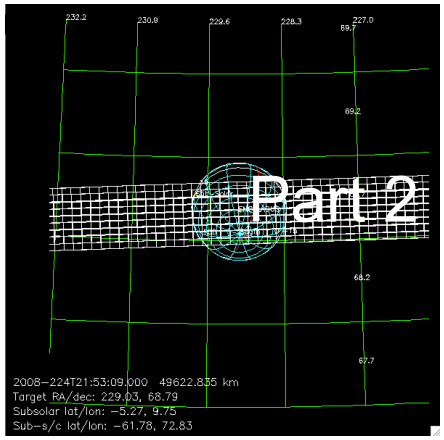
CIRS_080EN_FP1ECLSCN001_PRIME
(eclipse 224T21:41:21 - 225T00:07:29)

080EN_ICYECL001_CIRS

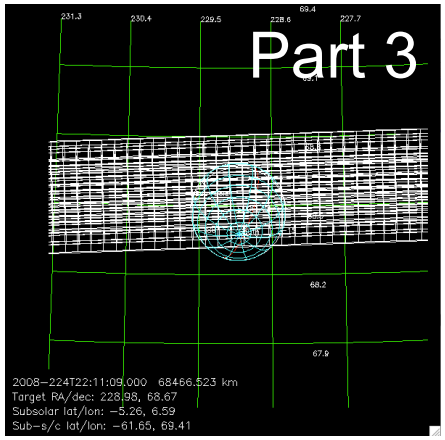
2008-224T21:38
Alt=38,142 km
Longitude=285°W
Latitude=62°S
Phase=73°



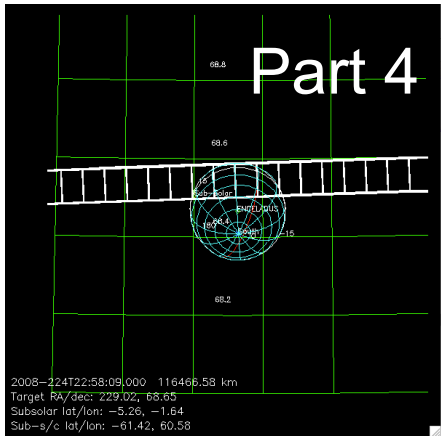
FP1 map at 420 urad/sec -- 14 min.,



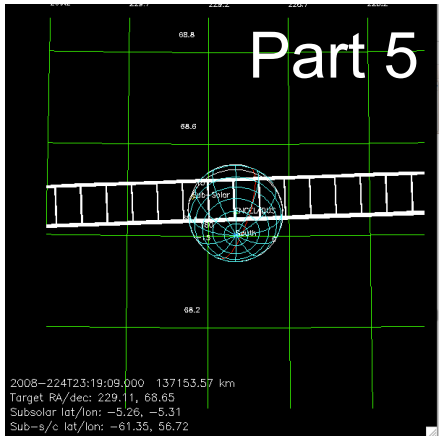
Single FP3 scan at 6 urad/sec -- 17 min.,



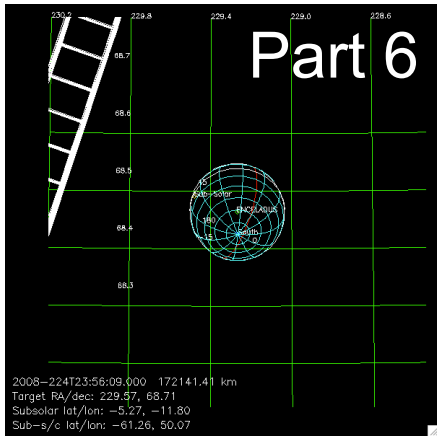
3-scan FP3 map at 8 urad/sec -- 46 min.,



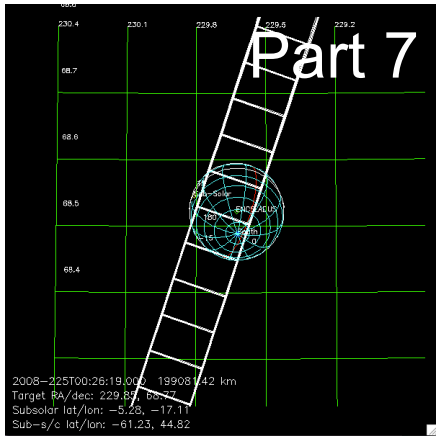
FP4 stare -- 20 min.,



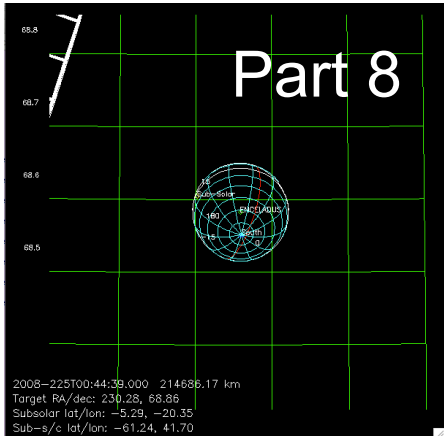
FP3 stare -- 20 min.,



FP1 stare -- 29 min.,

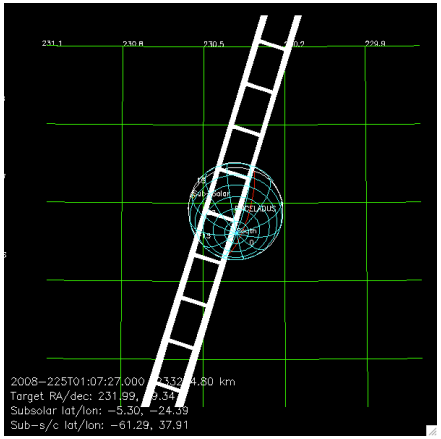


NAC stare -- 17 min. 10 sec.,



FP1 stare -- 21 min. 10 sec.

VIMS_080EN_ENCEL002_PRIME



080EN_ICYMAP002_VIMS

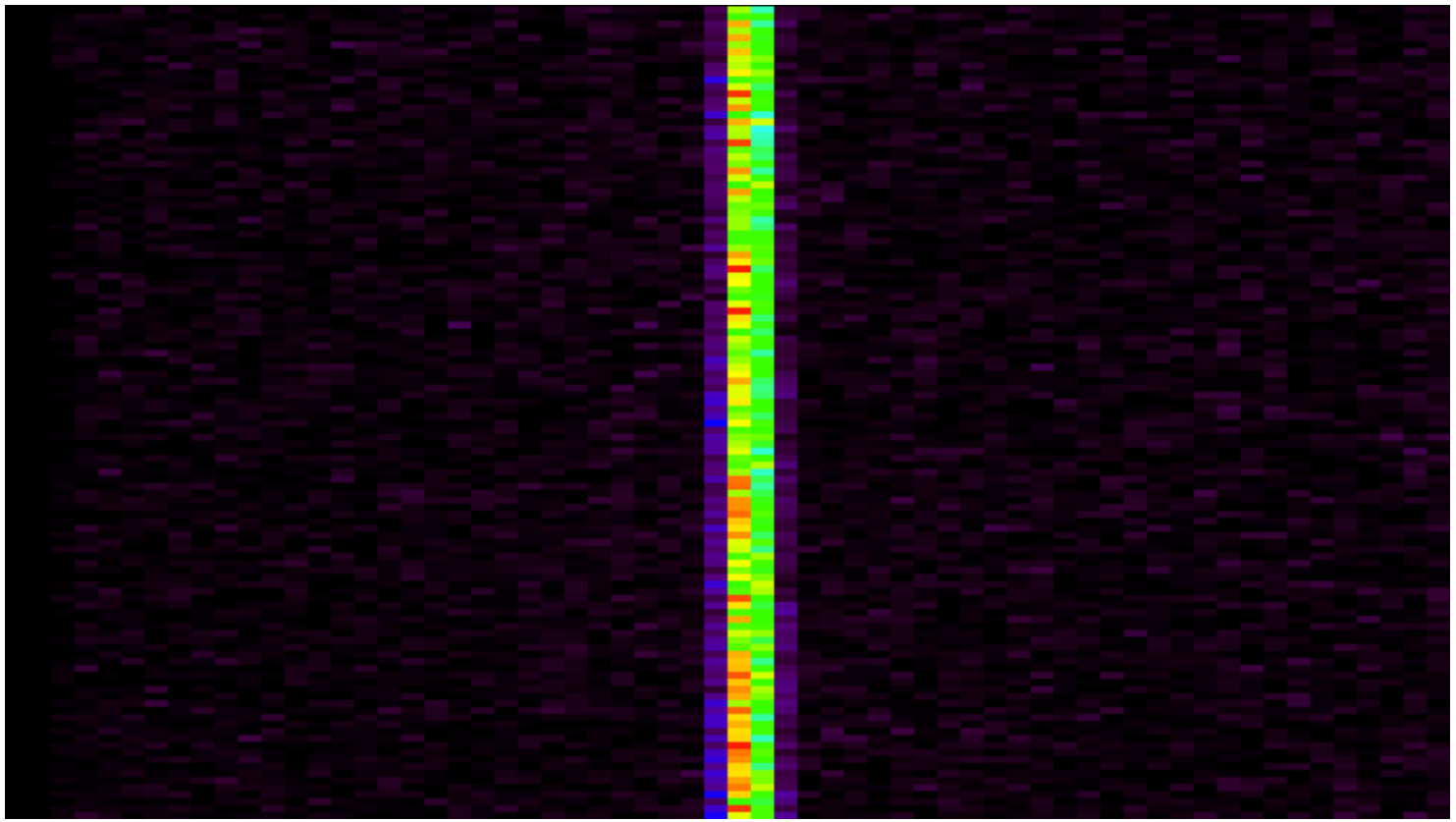
2008-225T01:07

Alt=142,037 km

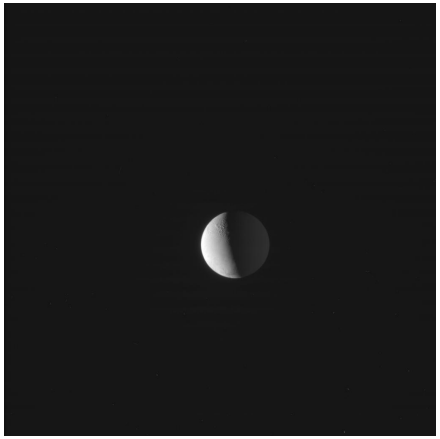
Longitude=182°W

Latitude=34°S

Phase=41°



ISS_088EN_PLMHINCL001_PRIME



15-part

088EN_ICYLON001_ISS
2008-283T02:15
Alt= 554,974 km
Longitude= 71°W
Latitude=72°N
Phase= 92.6°

Pointing is mainly not with UVIS slit on body

CIRS_088EN_ENCEL001_PRIME

10-part

088EN_ICYLON001_CIRS

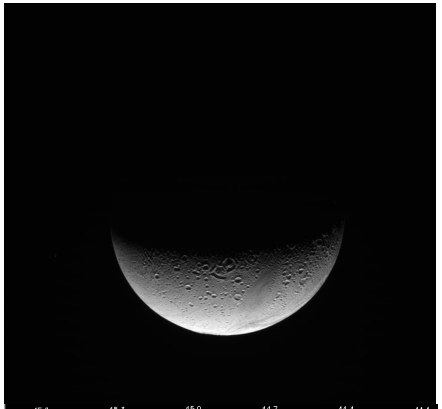
2008-283T14:09

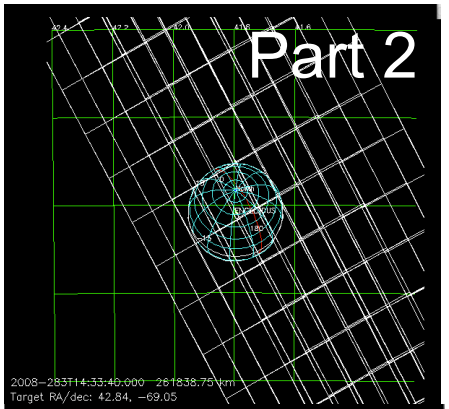
Alt=254,462 km

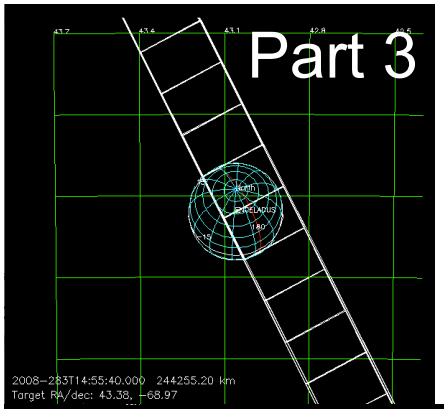
Longitude=53°W

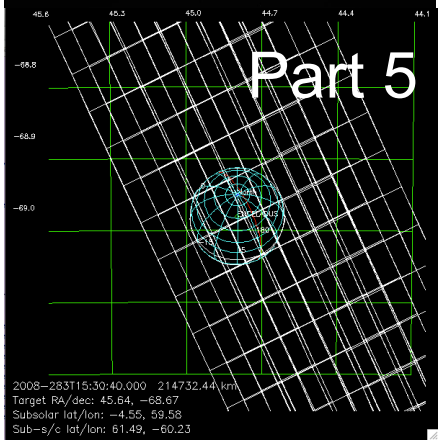
Latitude=62°N

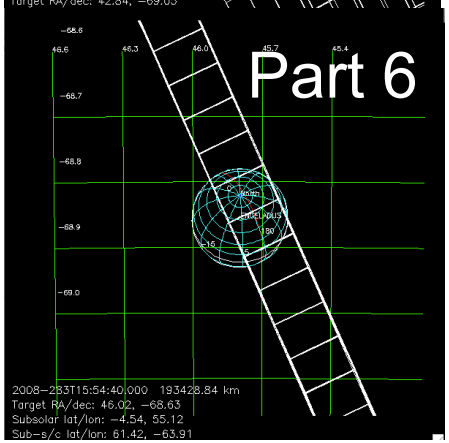
Phase=109°

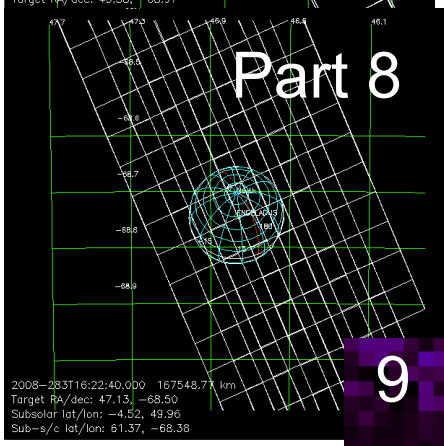


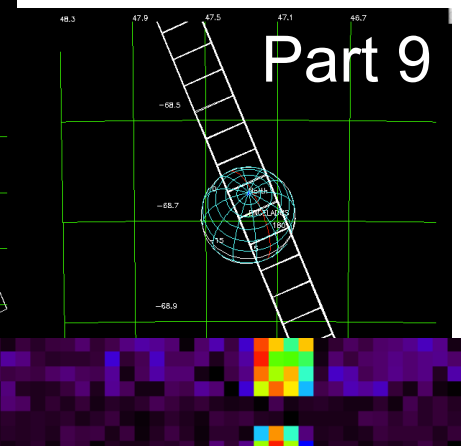


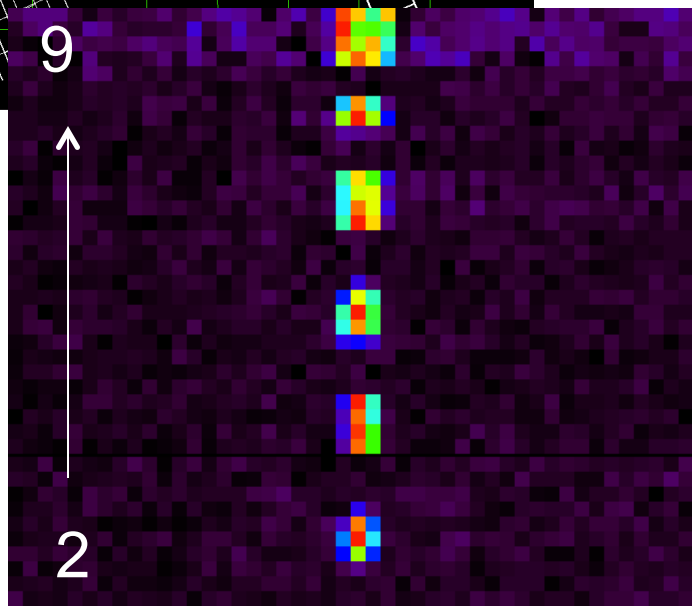






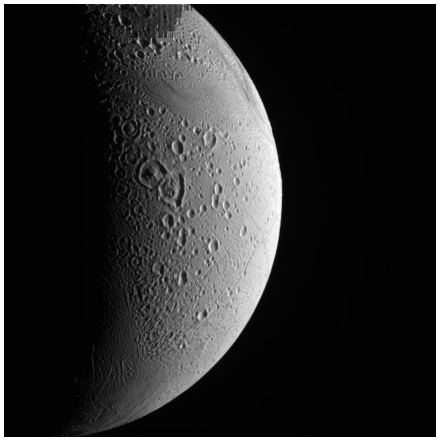


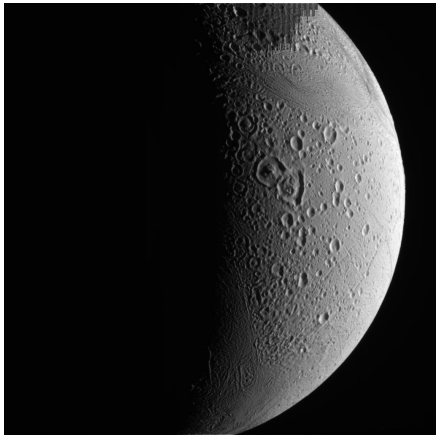




- Part 1 FP1 stare (duration 24 min.)
- Part 2 FP3/FUV scan at 4 urad/sec (duration 21 min.)
- Part 3 NAC stare (duration 10 min.)
- Part 4 FP1 stare (duration 23 min.)
- Part 5 FP3/FUV scan at 4 urad/sec (duration 23 min.)
- Part 6 NAC stare (duration 10 min.)
- Part 7 FP1 stare (duration 16 min.)
- Part 8 FP3/FUV scan at 8 urad/sec (duration 16 min.)
- Part 9 NAC stare (duration 10 min.)
- Part 10 FP1 stare (duration 16 min.)

UVIS_088EN_ICYLIMB001_PRIME

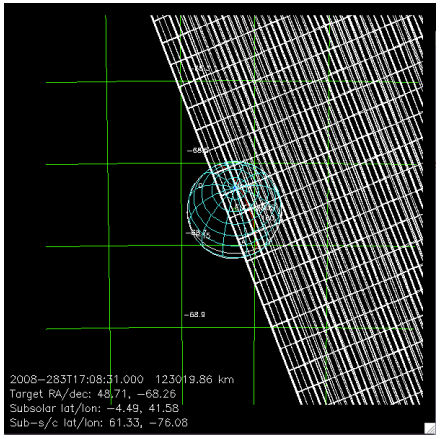


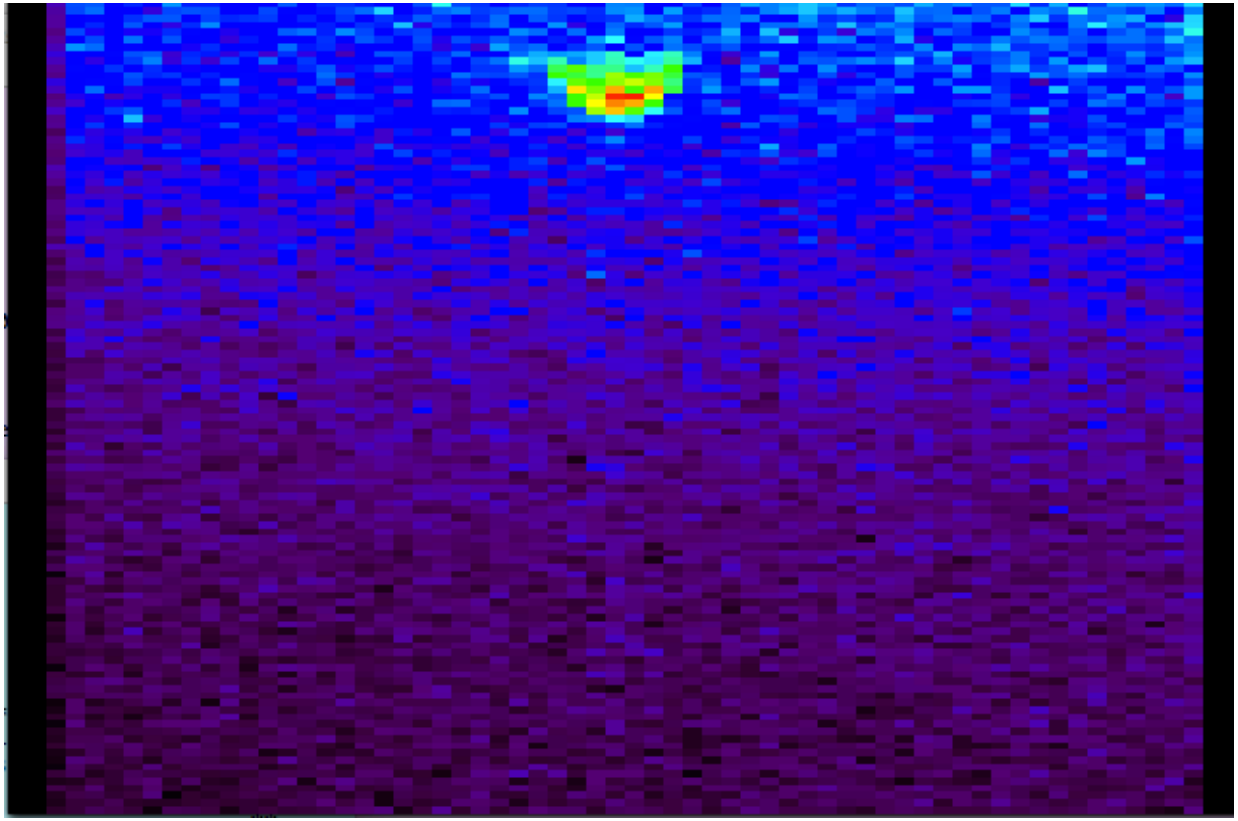


17:58:20

18:01:16

088EN_ICYLIMB001_PRIME
2008-283T17:08
Alt=94,090 km
Longitude=81°W
Latitude=61°N
Phase=108°





ISS_088EN_ENCELCA001_PRIME

8-part

088EN_ICYMAP001_ISS

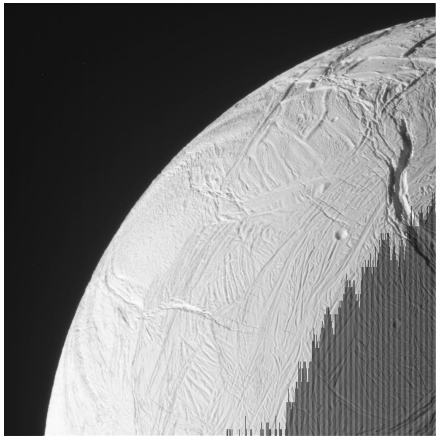
2008-283T19:29

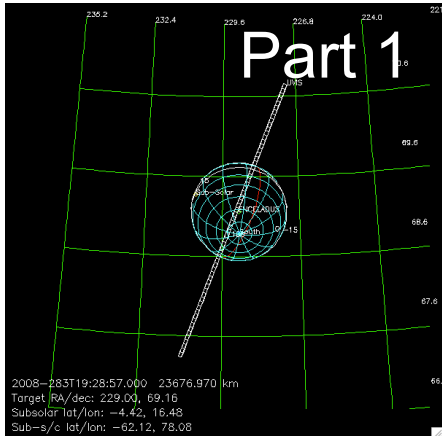
Alt=26,045 km

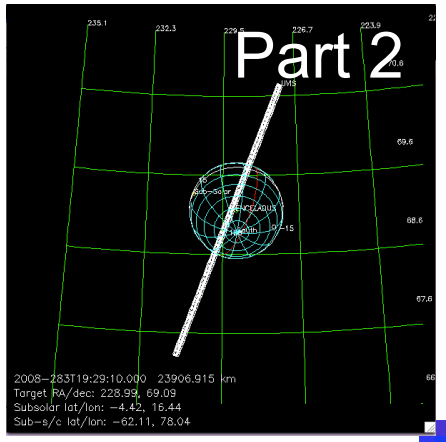
Longitude=282°W

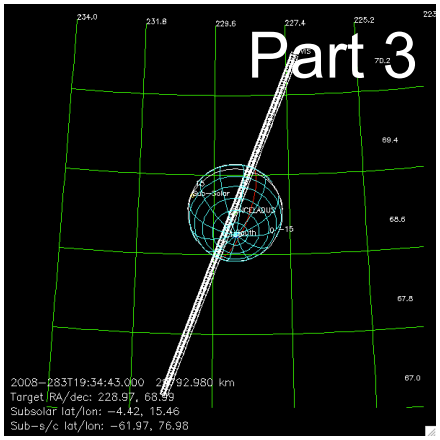
Latitude=62°S

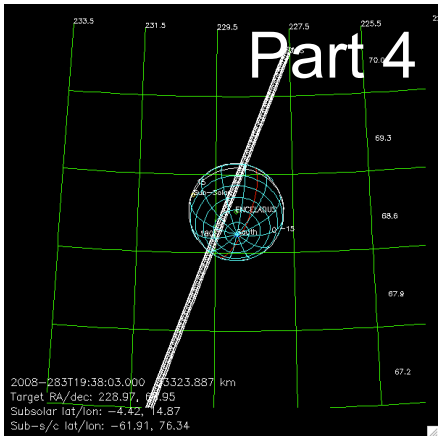
Phase=73°

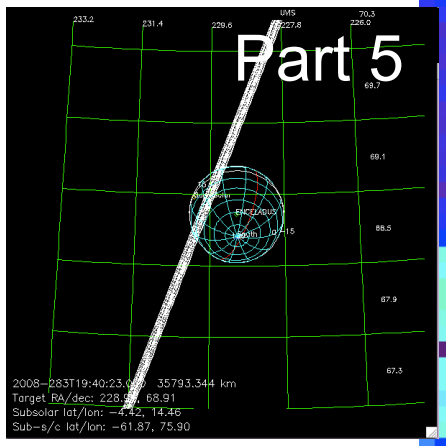


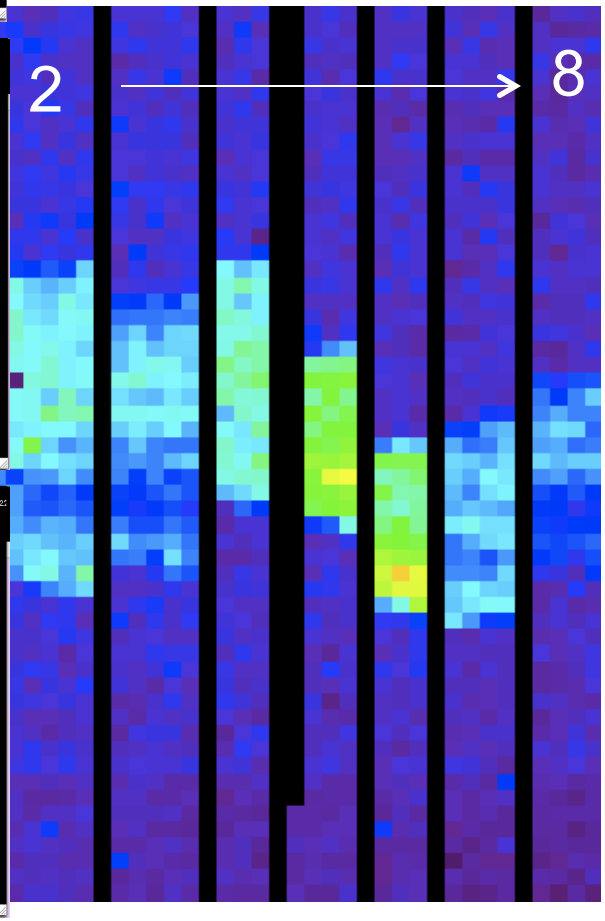


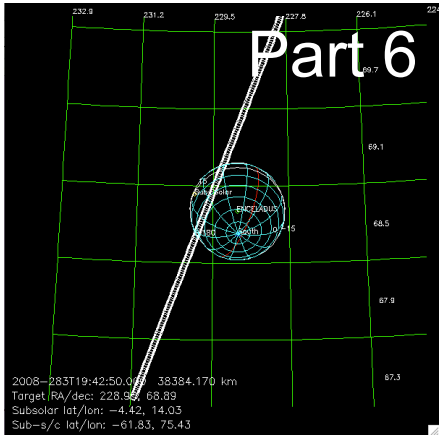


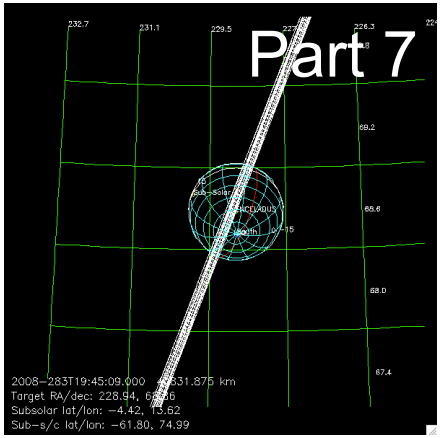


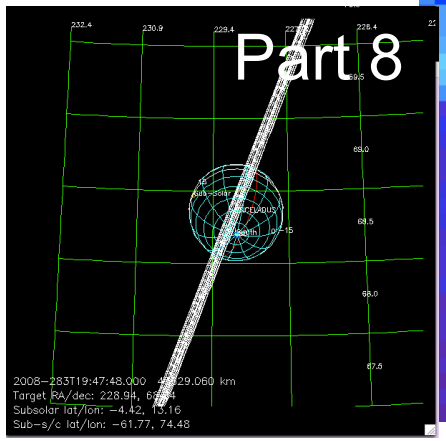








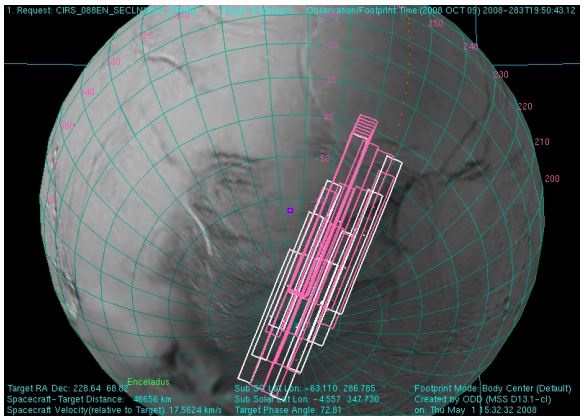


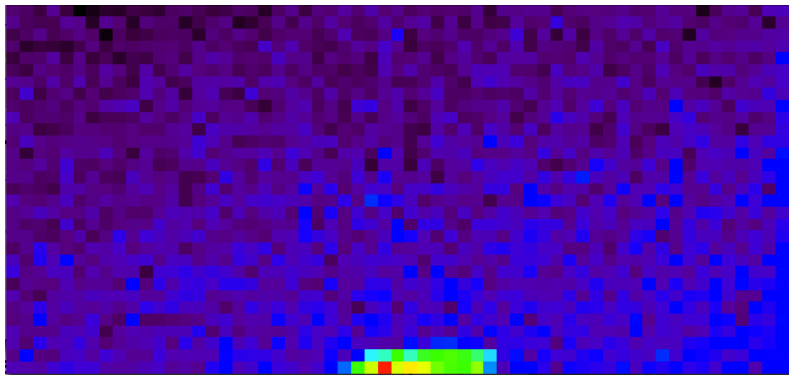


CIRS_088EN_SECLNX001_PRIME
Eclipse ~19:52:04 - 22:23:00

2-part

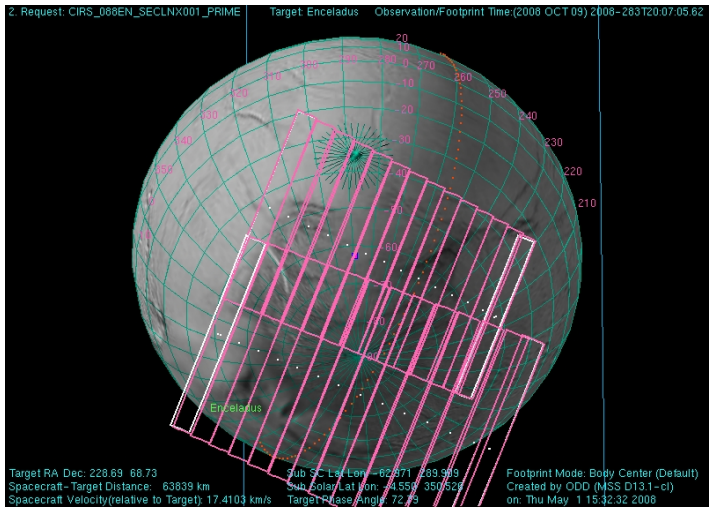
088EN_ICYMAP002_CIRS
2008-283T19:51
Alt=54,583 km
Longitude=288°W
Latitude=62°S
Phase=73°





Enceladus goes into eclipse shortly after the start of the observation

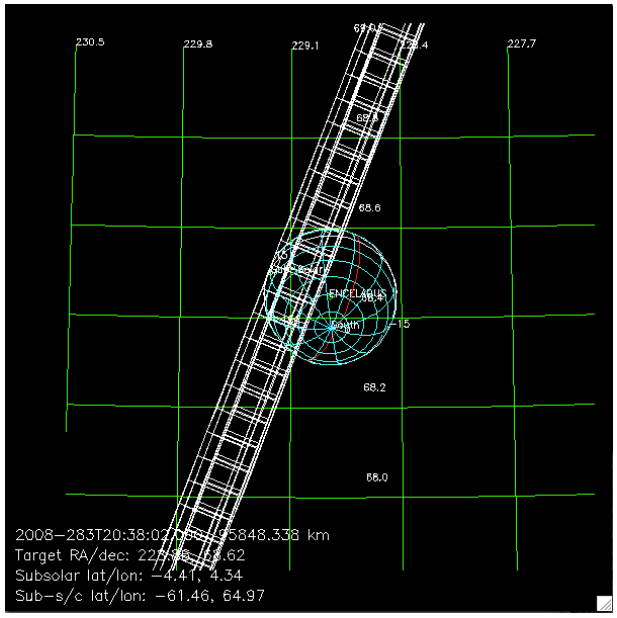
Part 1: 19:50 - 20:06: “Super-resolution” dither of Damascus and Baghdad



Part 2: 20:07- 20:31 2-swath scan of south pole at 6 µrad/sec (in eclipse)

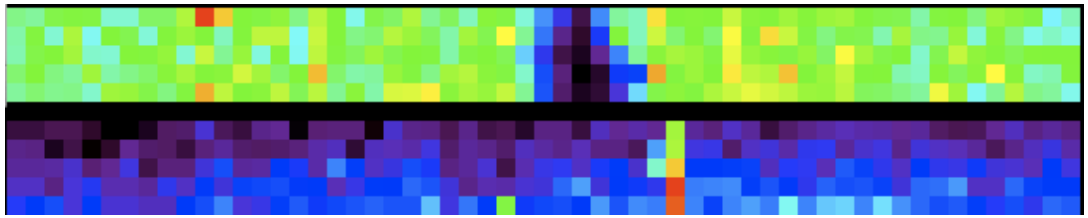
CIRS_088EN_SECLNX001_PRIME
Eclipse ~19:52:04 - 22:23:00

088EN_ICYECL001_ENGR
2008-283T20:40
Alt=103,709 km
Longitude=297°W
Latitude=61°S
Phase=73°



- 29-minute stare with FP4 at 88 S, 0 W

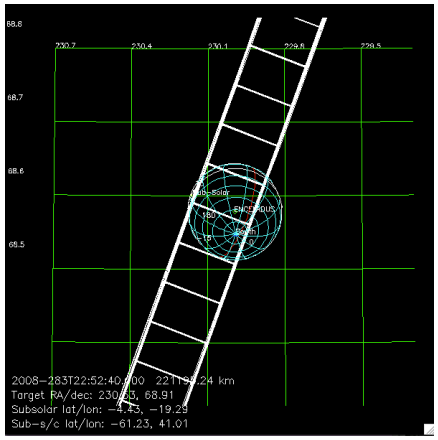
Enceladus in eclipse



CIRS_088EN_SECLNX001_PRIME
Eclipse ~19:52:04 - 22:23:00

6-part

088EN_ICYECL002_CIRS
2008-283T21:02
Alt=230,619 km
Longitude=321°W
Latitude=61°S
Phase=73°



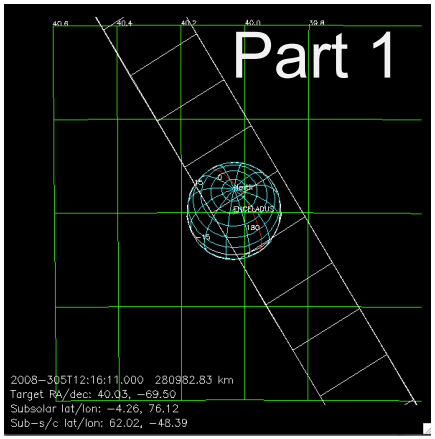
Part 5 … Enceladus out of eclipse

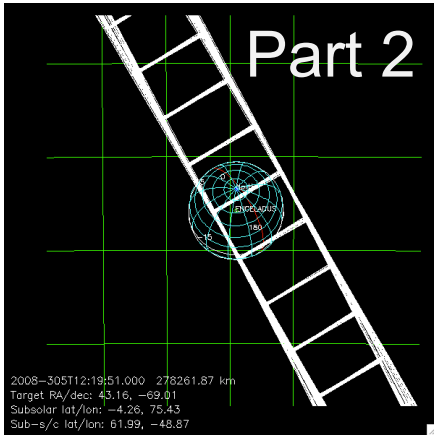
•21:59 - 22:40: FP1 stare centered on Enceladus, for eclipse reappearance (at 22:23)
•22:40 - 23:09: NAC to Enceladus for other ORS
•23:12 - 00:05; FP1 stare centered on Enceladus, for remaining eclipse warmu

VIMS_091EN_ENCEL001_PRIME

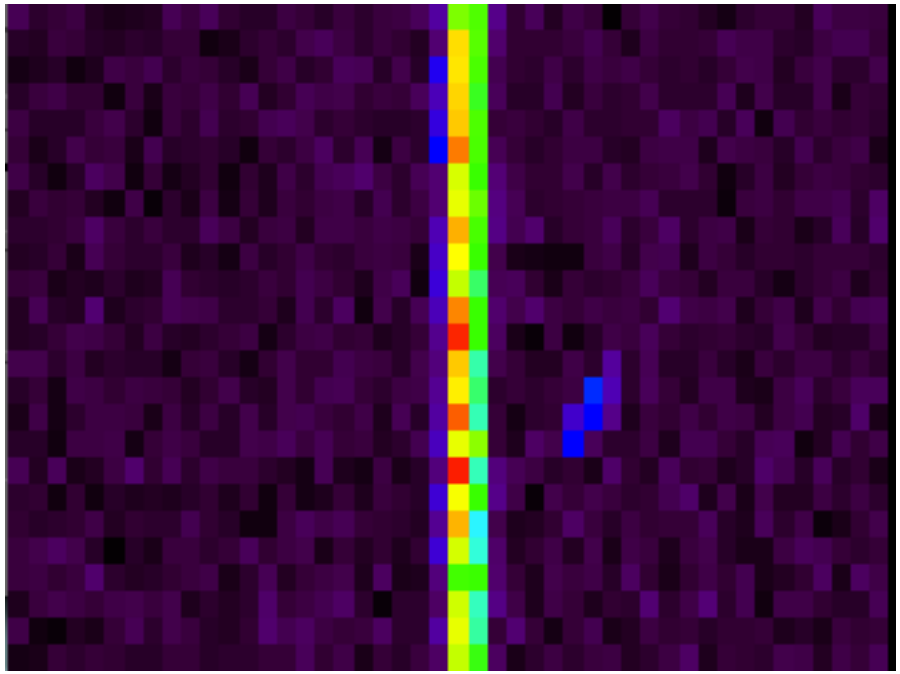
2-part

091EN_ICYLON001_VIMS
2008-305T12:17
Alt=259,505 km
Longitude=52°W
Latitude=62°N
Phase=109°





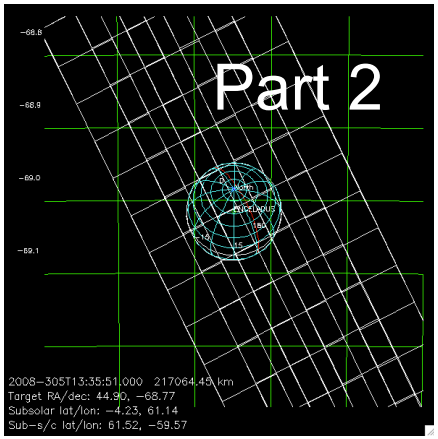
Part 2

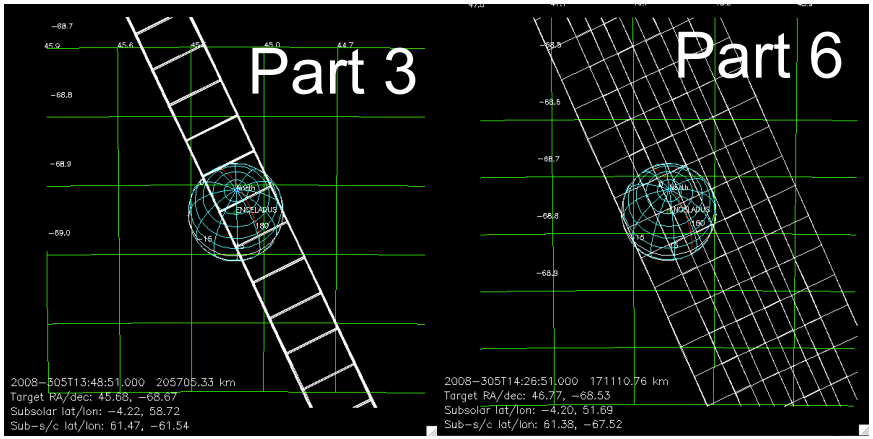


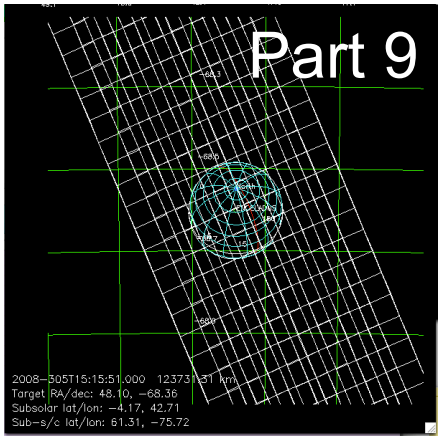
CIRS_091EN_FP3STARE001_PRIME

12-part

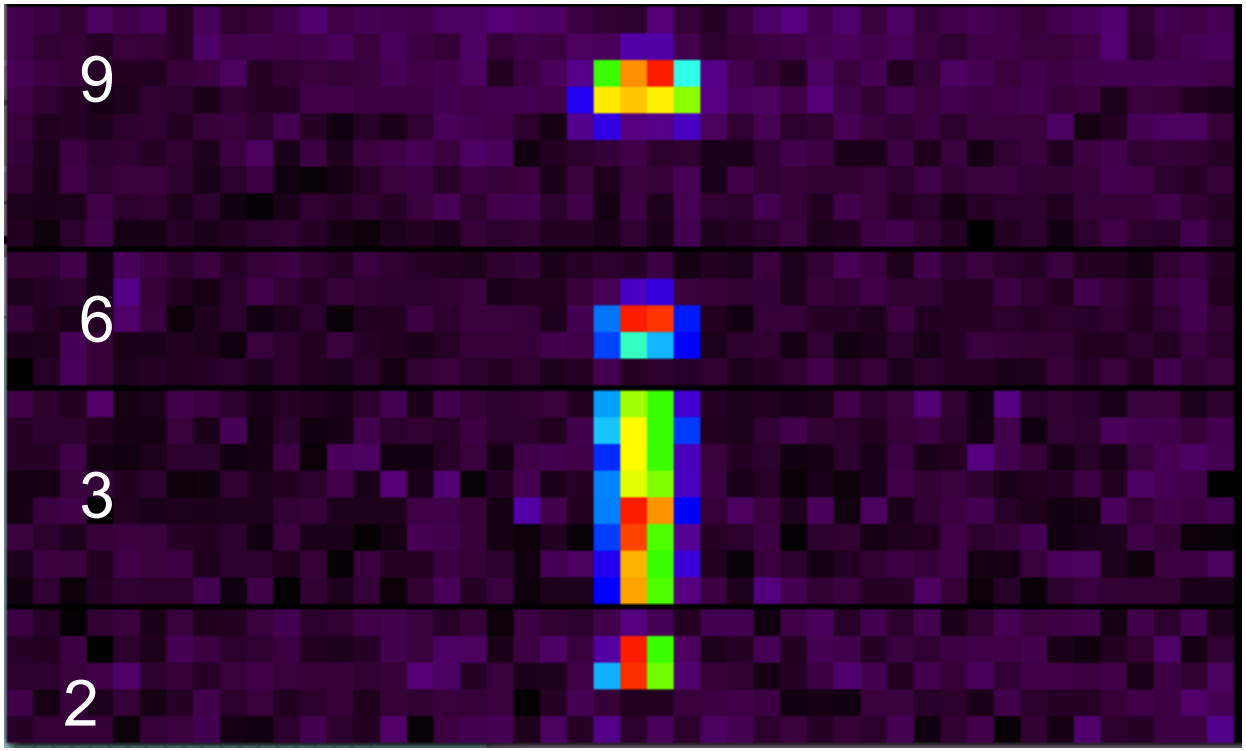
091EN_ICYLON002_CIRS
2008-305T13:17
Alt=213,341 km
Longitude=60°W
Latitude=62°N
Phase=109°







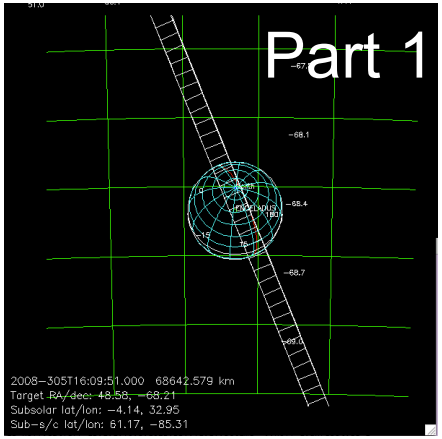
Series of FP1 stares, FP3 stares, FP3 scans, some of which don't have Enceladus in UVIS slit (or not fully in slit)

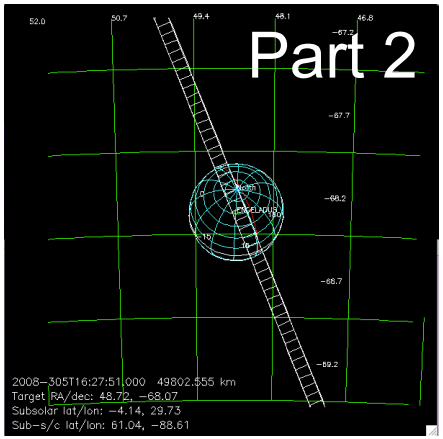


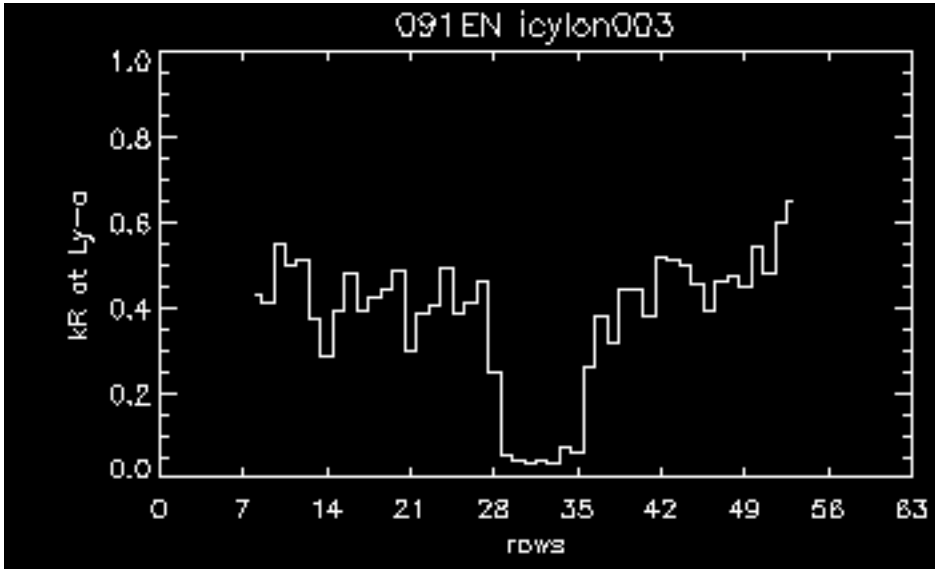
VIMS_091EN_ENCEL002_PRIME

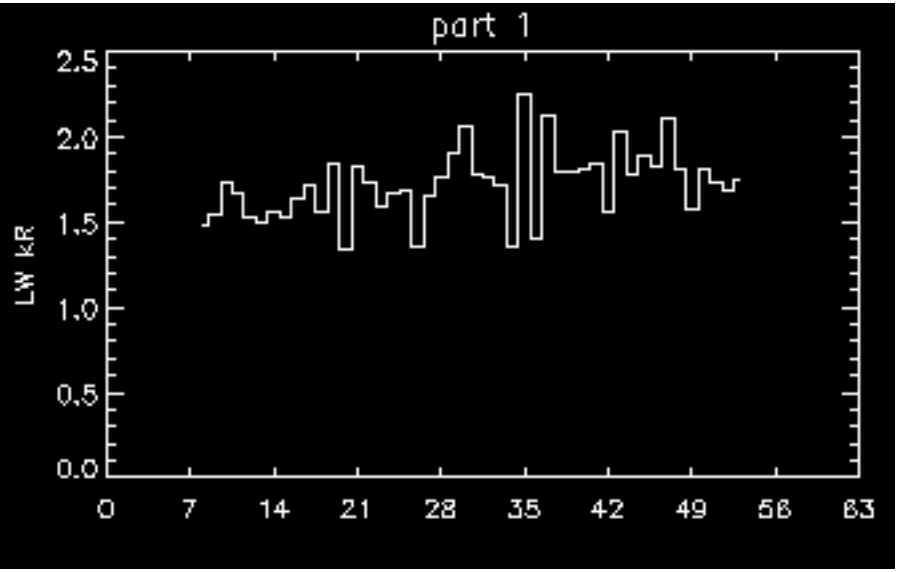
2-part

091EN_ICYLON003_VIMS
2008-305T16:10
Alt=68,394 km
Longitude=85°W
Latitude=61°N
Phase=107°





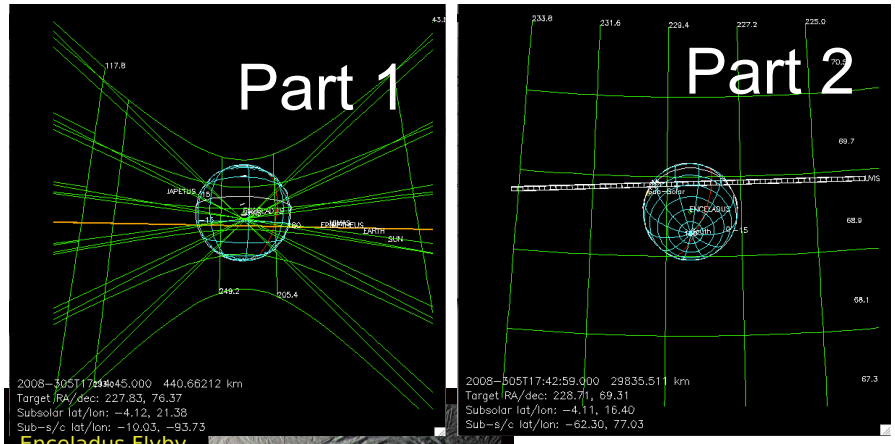


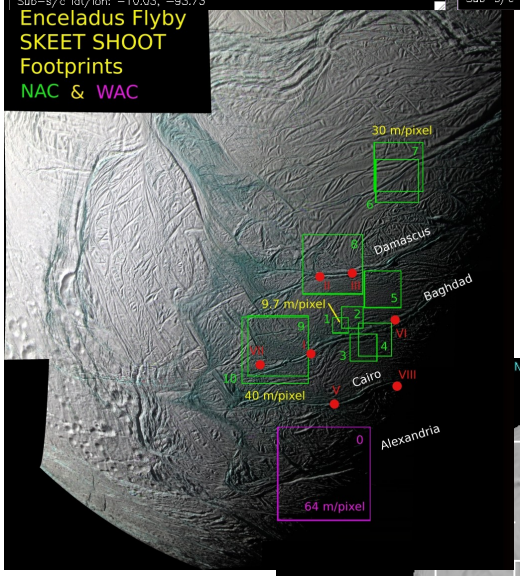


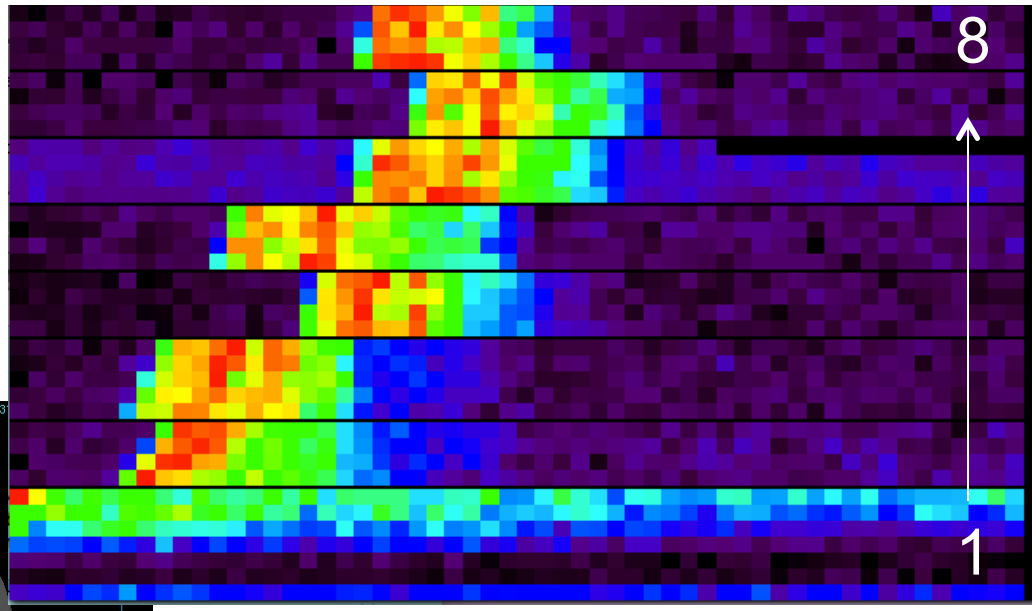
ISS_091EN_ENCELCA001_PRIME

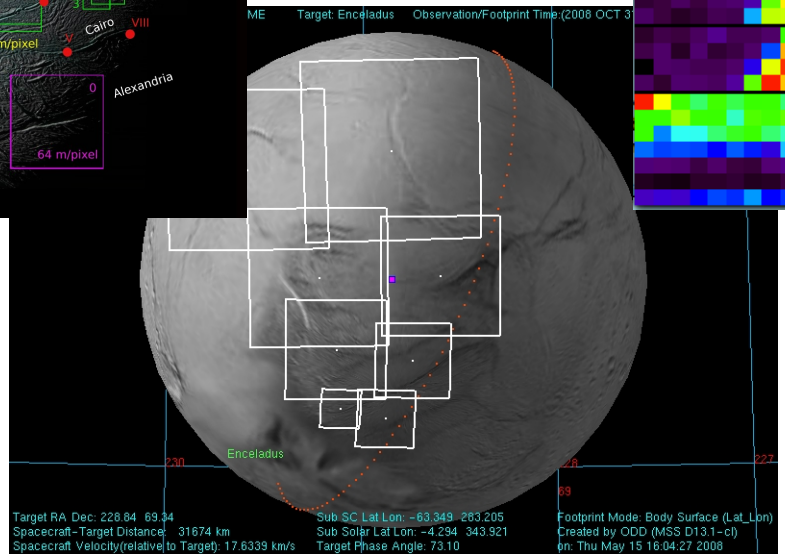
8-part

091EN_ICYMAP001_ISS
2008-305T17:15
Alt=1355.9 km
Longitude=229°W
Latitude=66°S
Phase=85°









2-part

091EN_ICYMAP002_PRIME

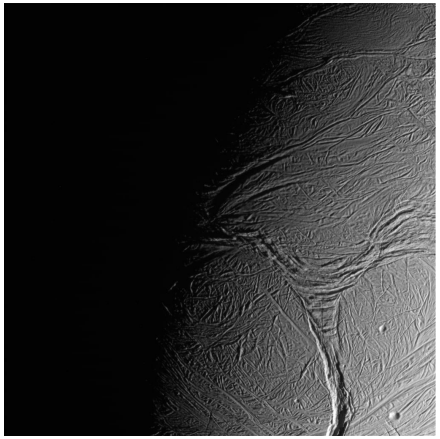
2008-305T17:46

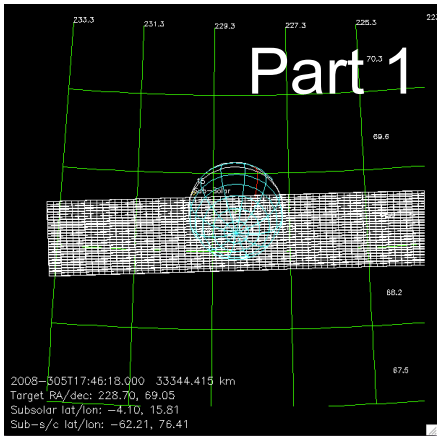
Alt=39,958 km

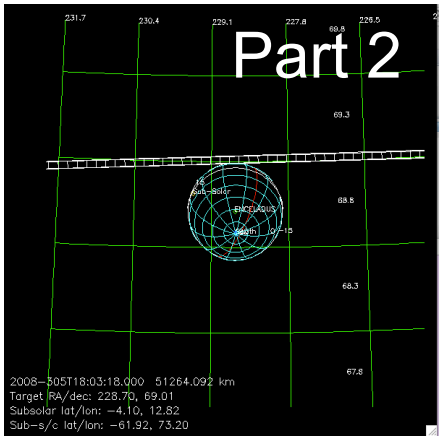
Longitude=285°W

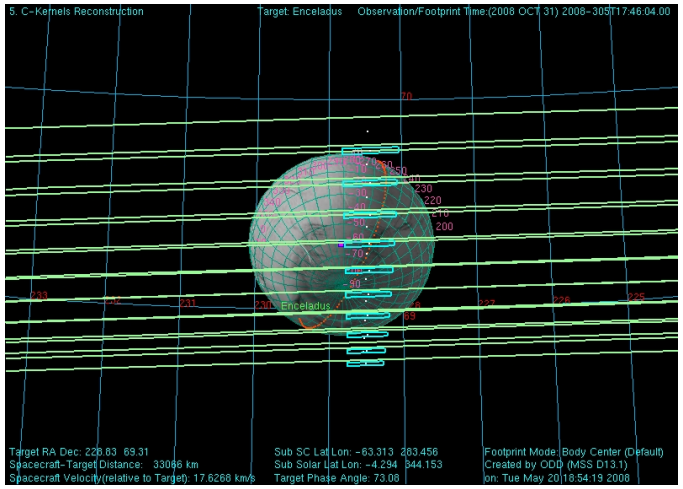
Latitude=62°S

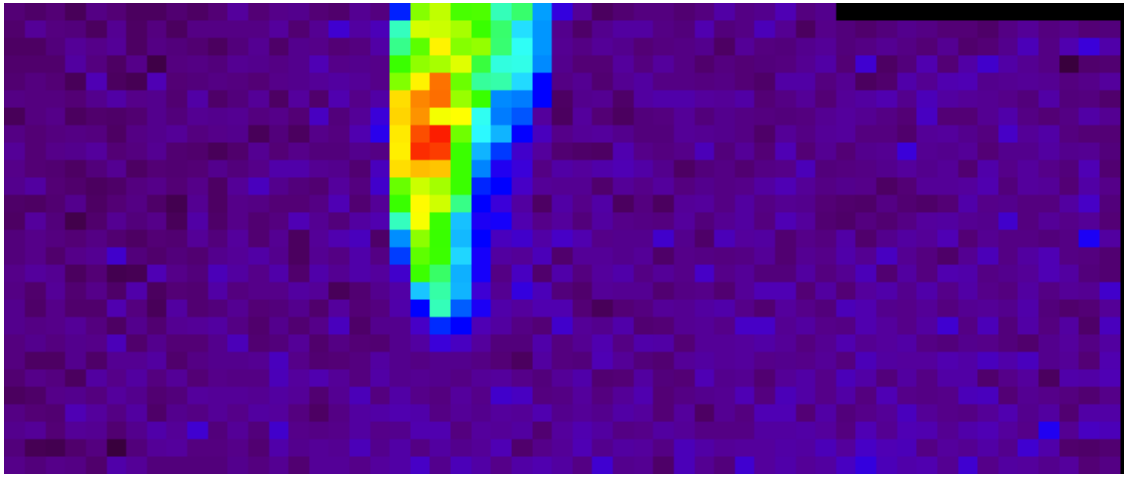
Phase=73°



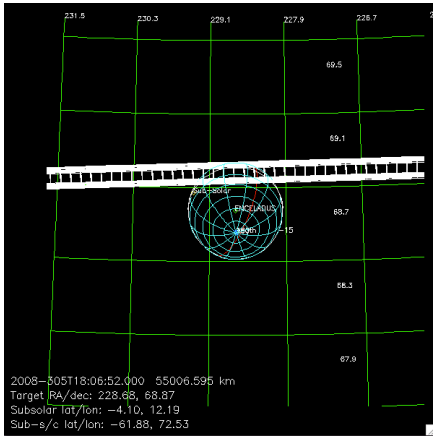


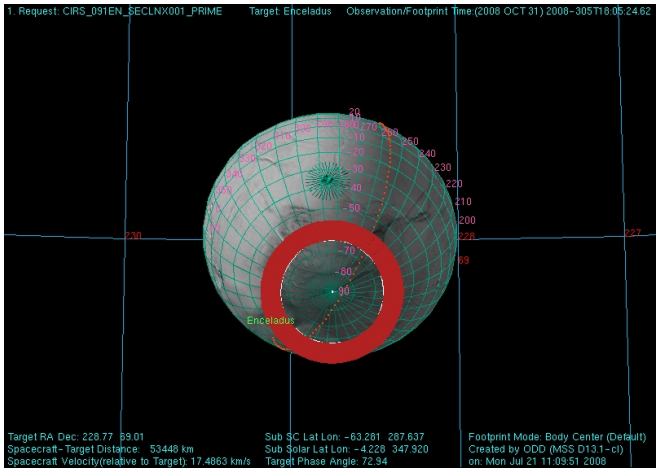






CIRS_091EN_SECLNX001_PRIME
Eclipse ~18:04:26-20:36:55





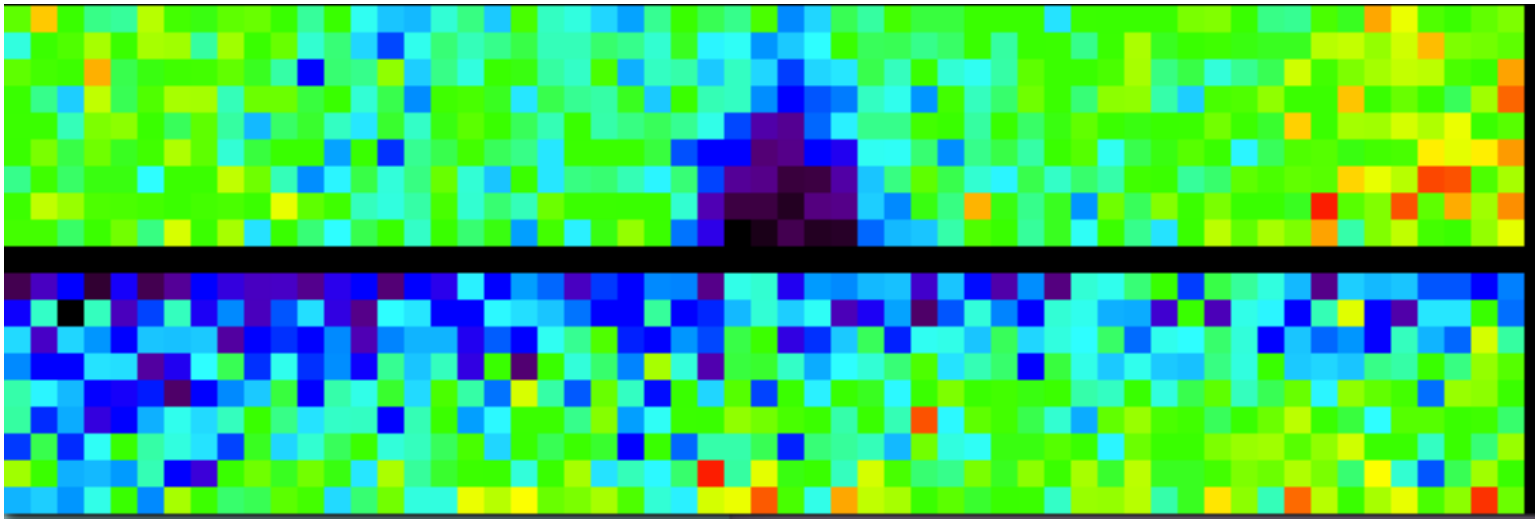
091EN_ICYECL001_CIRS
2008-305T18:07
Alt=63,117 km
Longitude=289°W
Latitude=62°S
Phase=73°

FP1 stare at south pole for total south polar heat flow

DURING ECLIPSE

Ly-a

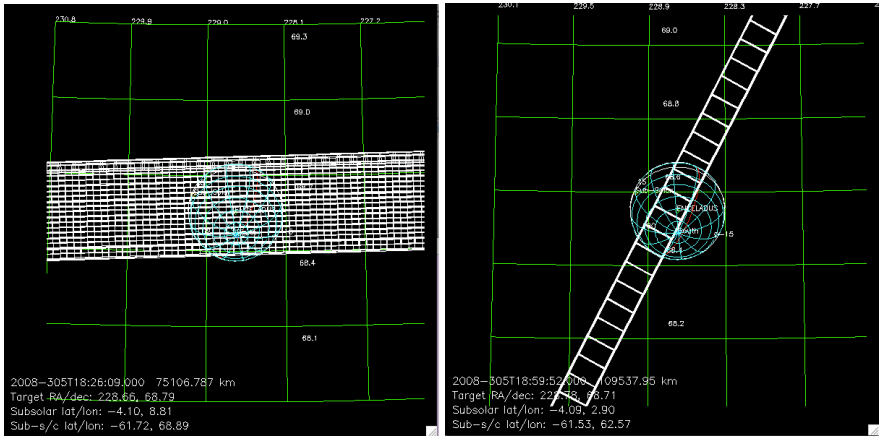
Long waves



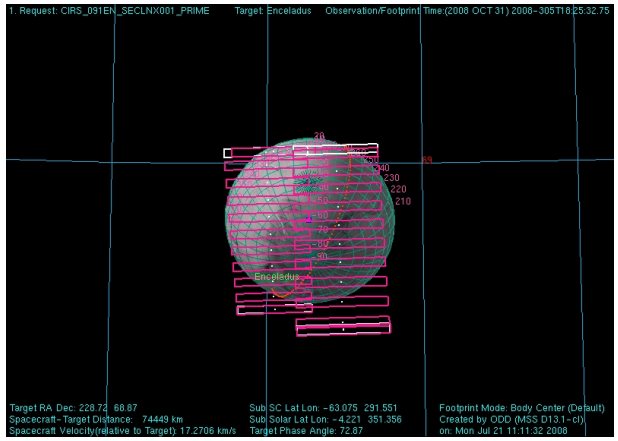
CIRS_091EN_SECLNX001_PRIME
Eclipse ~18:04:26-20:36:55

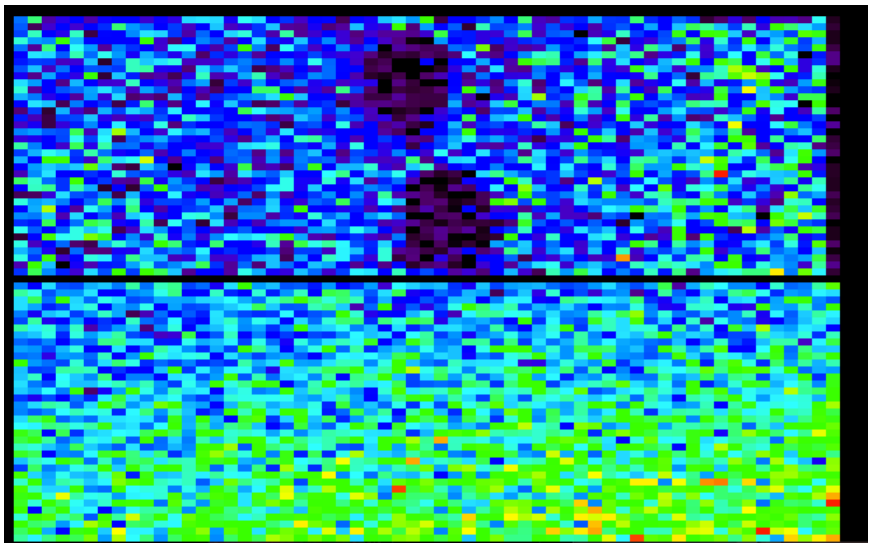
2-part

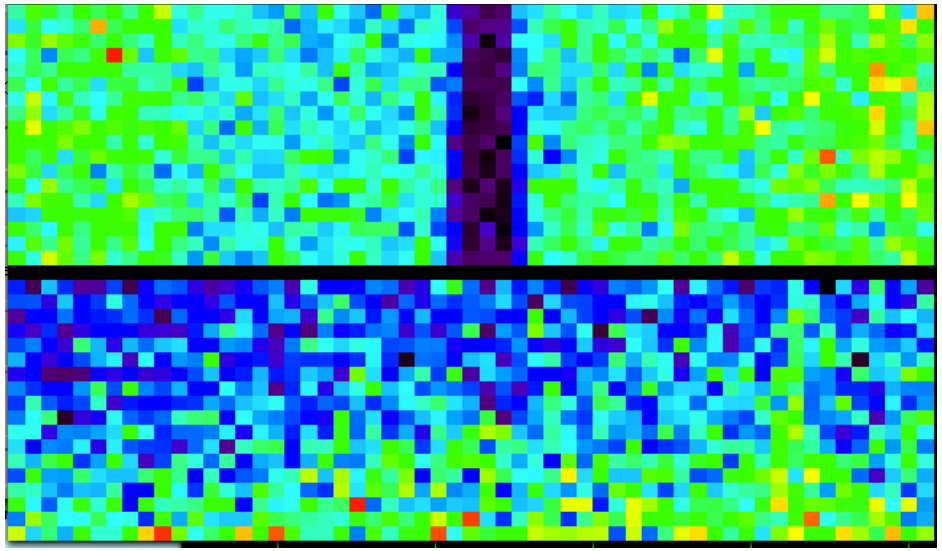
091EN_ICYMAP003_CIRS
2008-305T18:26
Alt=84,136 km
Longitude=293°W
Latitude=62°S
Phase=73°



FP3 global map, 12 µrad/sec
IN ECLIPSE



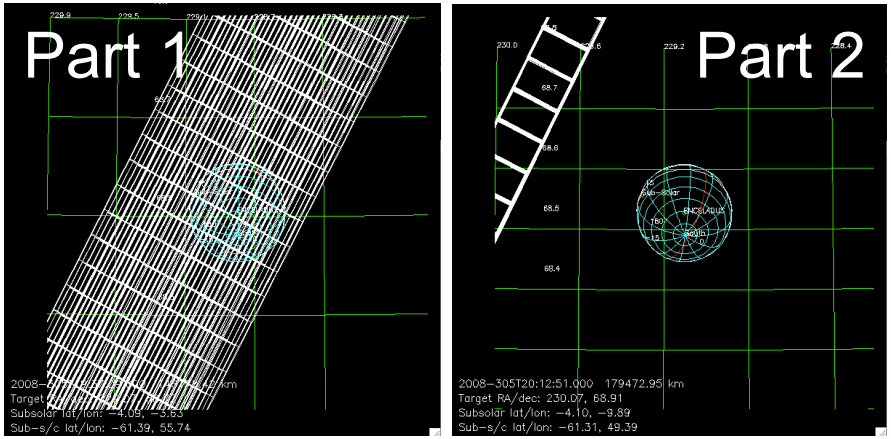




CIRS_091EN_SECLNX001_PRIME
Eclipse ~18:04:26-20:36:55

2-part

091EN_ICYECL002_CIRS
2008-305T19:37
Alt=161,485 km
Longitude=307°W
Latitude=61°S
Phase=73°



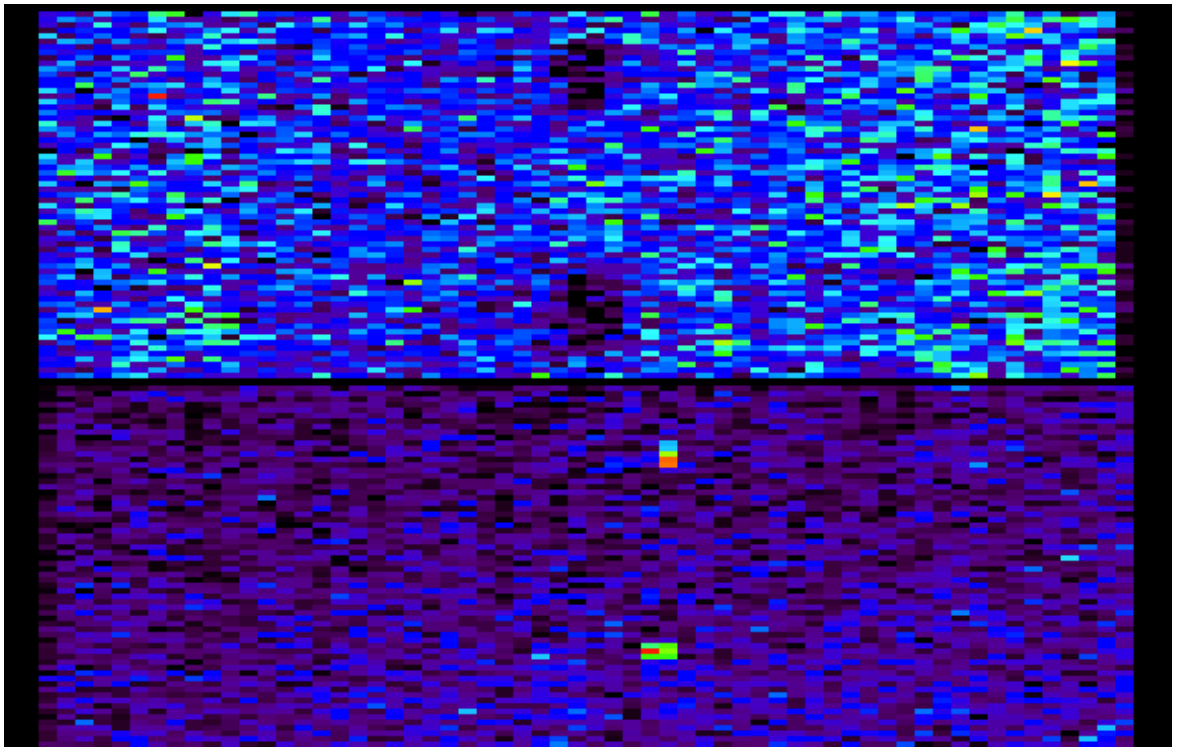
Part 1: Pair of global FP3/FP4 scans

Part 2: FP1 stare at disk center for eclipse reappearance (at 20:37)

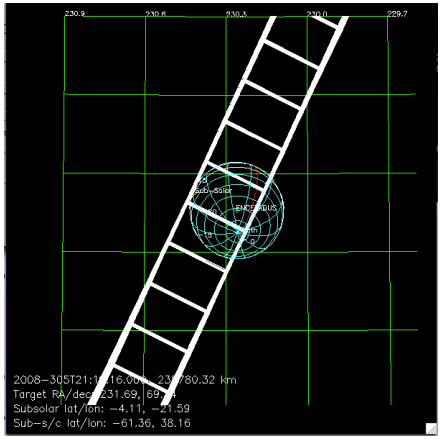
Part 1

Ly-a

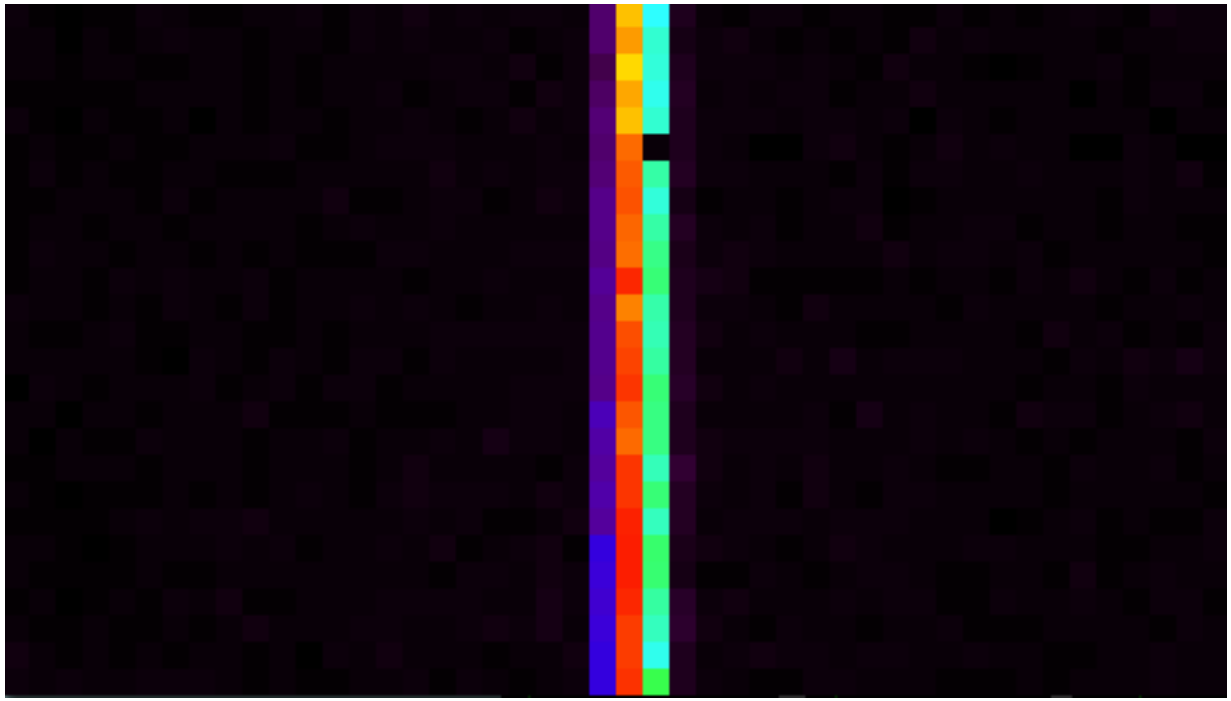
Long waves



VIMS_091EN_ENCEL003_PRIME

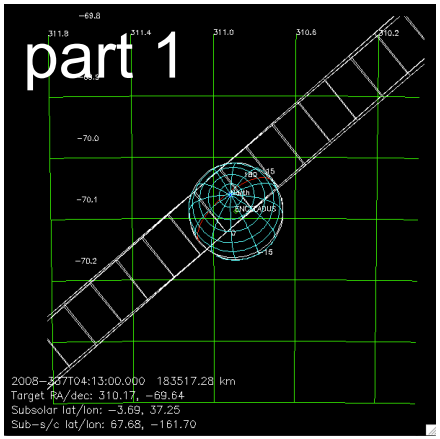


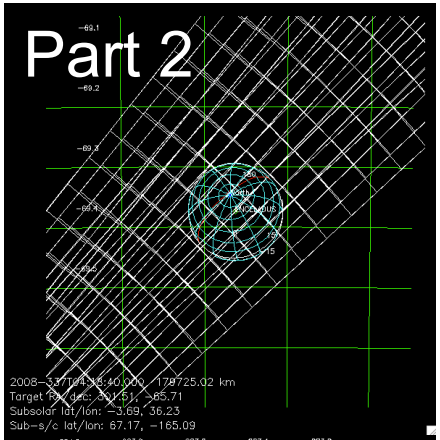
091EN_ICYLON004_VIMS
2008-305T21:20
Alt=254,403 km
Longitude=326°W
Latitude=61°S
Phase=74°

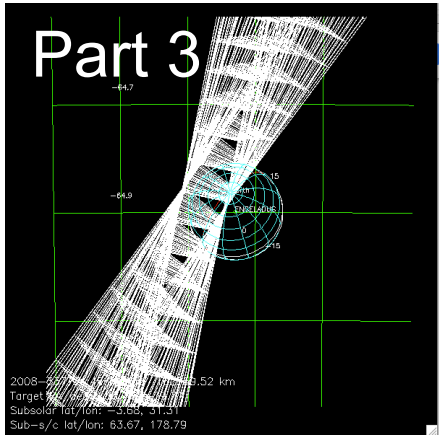


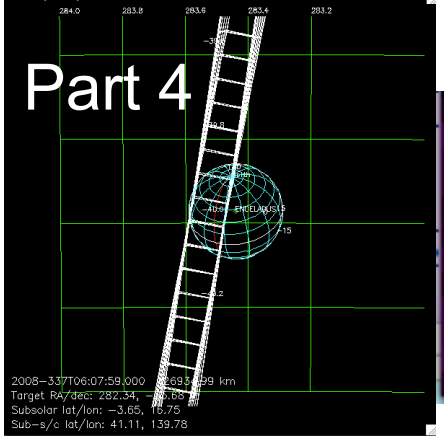
4-part

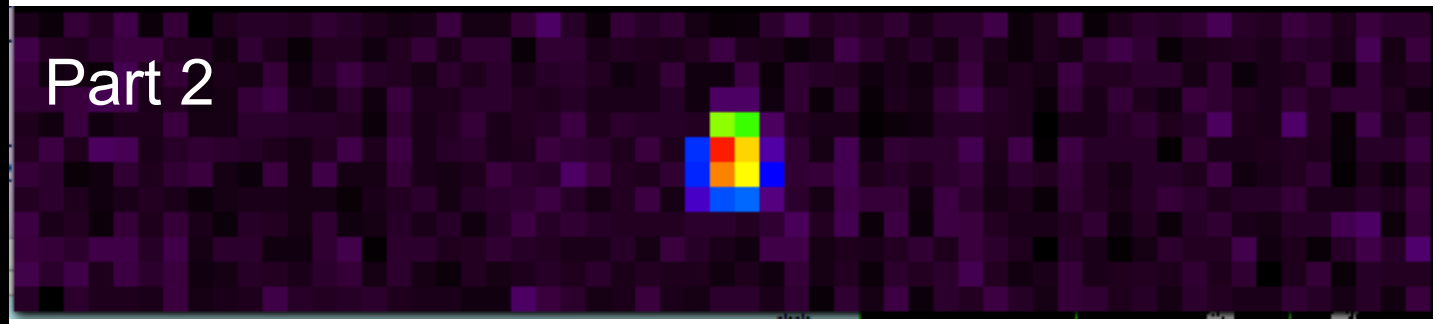
095EN_ICYLON001_ISS
2008-337T04:14
Alt= 182,596 km
Longitude= 162°W
Latitude=68°N
Phase= 113.7°





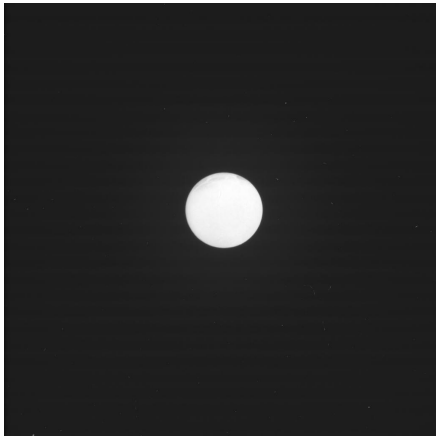


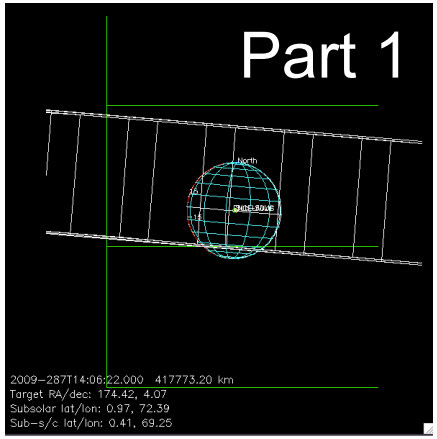


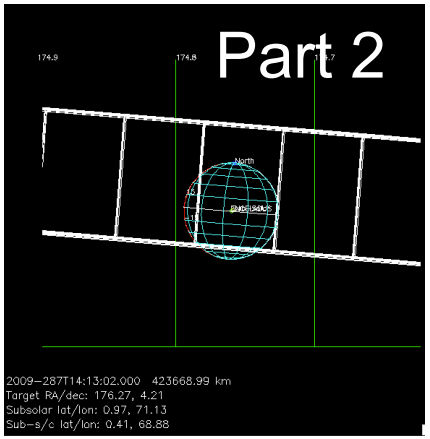


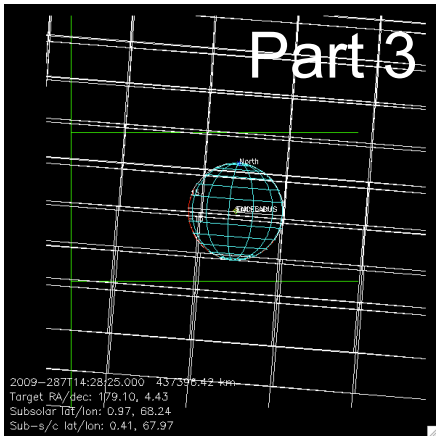
5-part

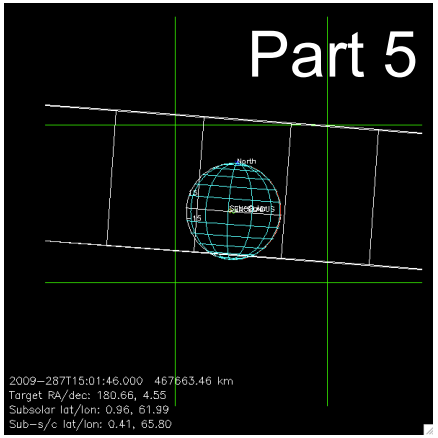
119EN_ICYLON001_ISS
2009-287T14:07
Alt= 419,287 km
Longitude= 291°W
Latitude=0.4°N
Phase= 2.8°



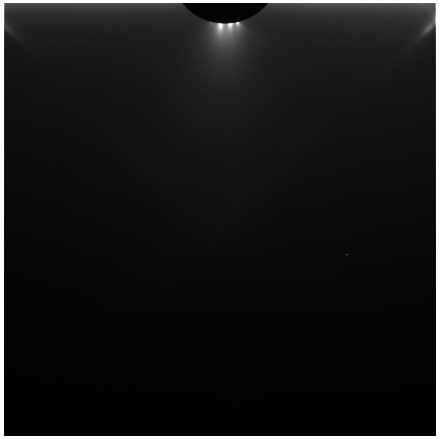


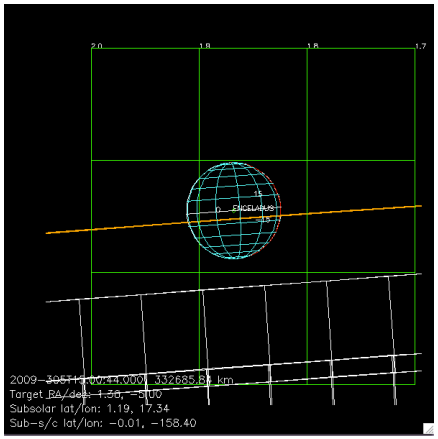






ISS_120EN_PLMSCECL001





UVIS_120EN_ICYPLU001_ISS
2009-305T15:03
Alt= 328,276 km
Longitude= 160°W
Latitude=0°N
Phase= 176°

UVIS slit not on Enceladus

CIRS_120EN_FP13DKMAP

UVIS_120EN_ICYLON001_CIRS

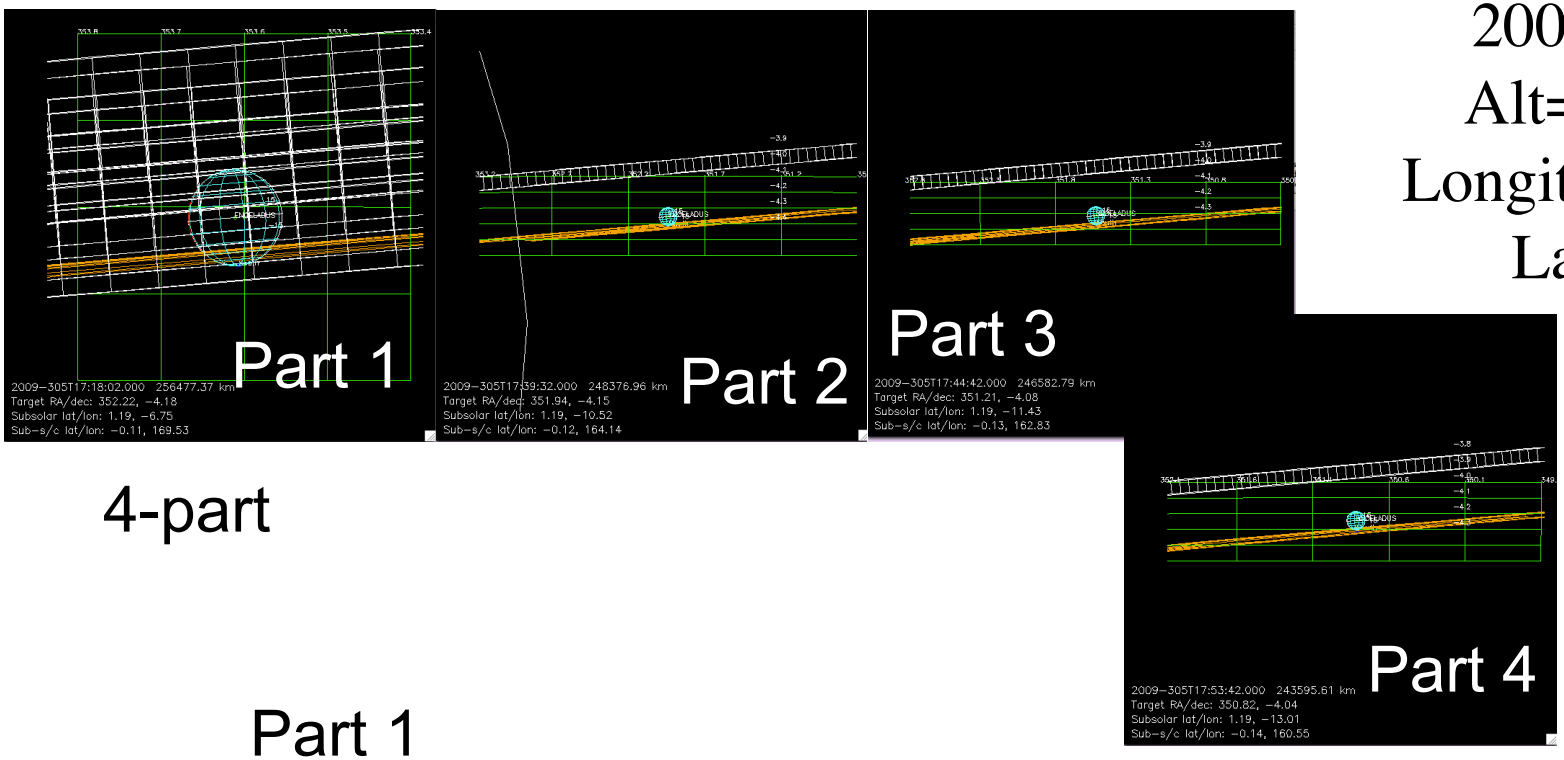
2009-305T17:19

Alt= 252,741 km

Longitude= 193°W

Latitude=0.1°S

Phase= 175°

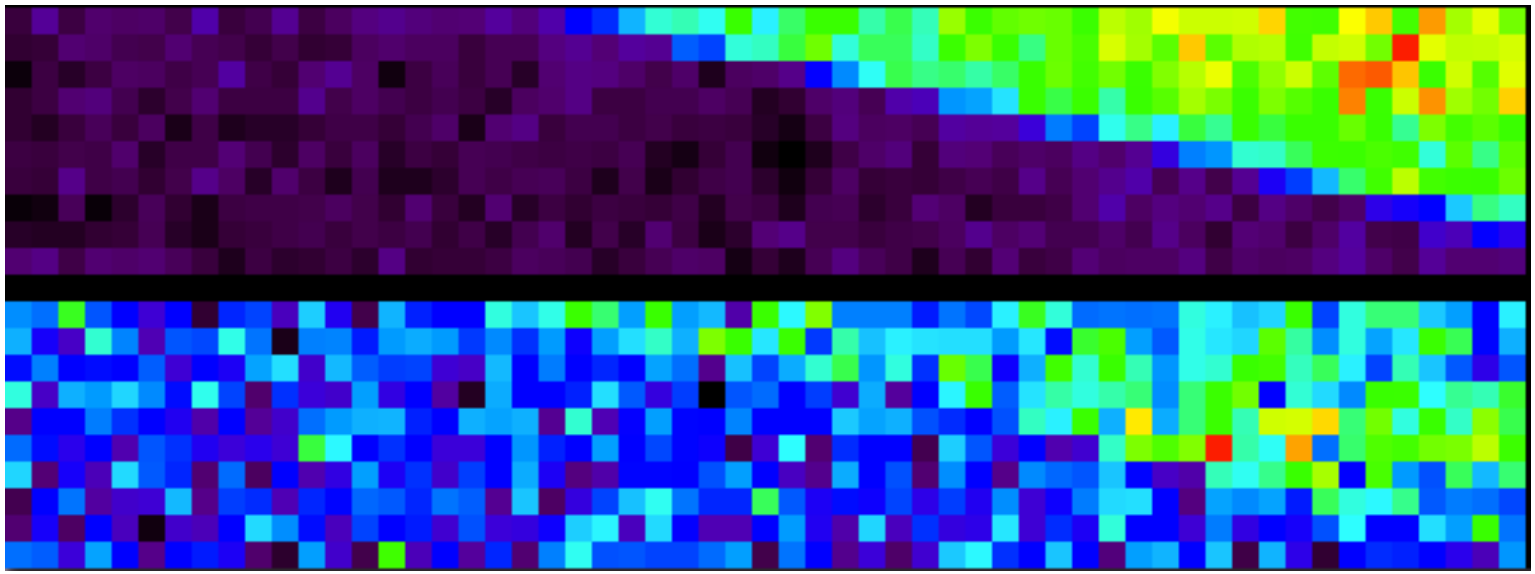


4-part

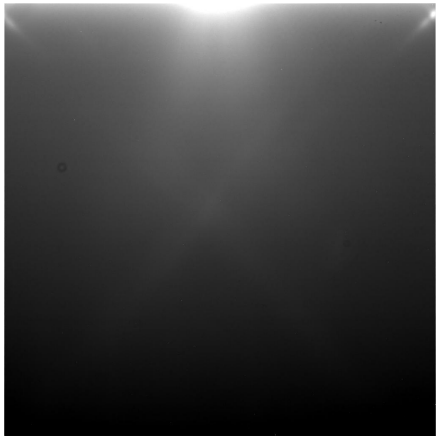
Part 1

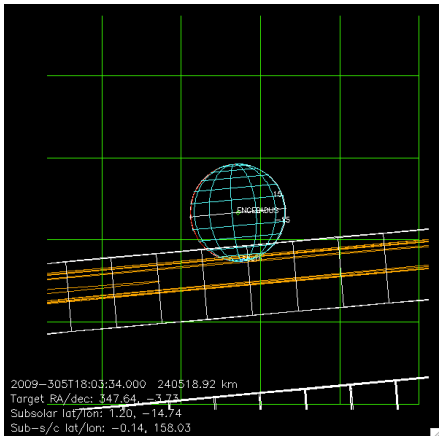
Ly-a

Long waves



ISS_120EN_PLMSCECL002

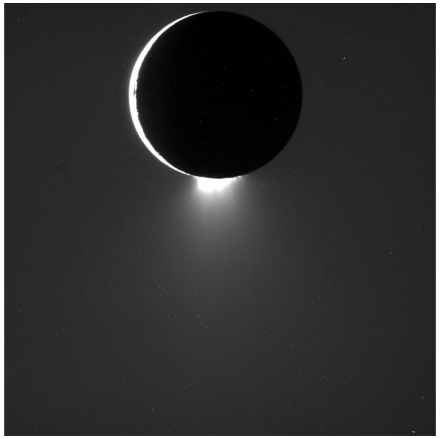


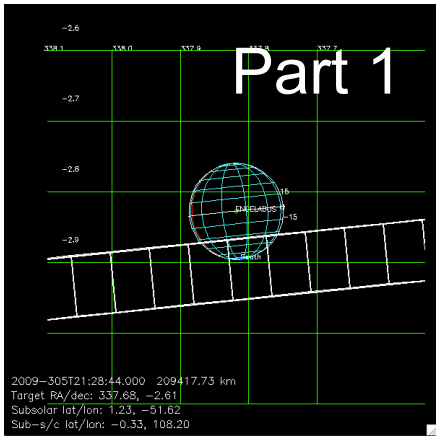


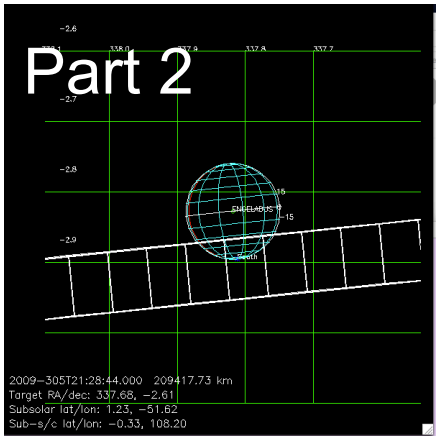
UVIS_120EN_ICYPLU002_ISS
2009-305T18:06
Alt= 236,075 km
Longitude= 206°W
Latitude=0.2°S
Phase= 171°

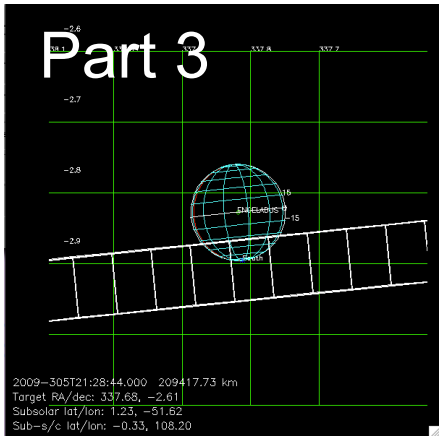
UVIS slit not on Enceladus

ISS_120EN_PLMHRHP001 3-part UVIS_120EN_ICYPLU003_ISS

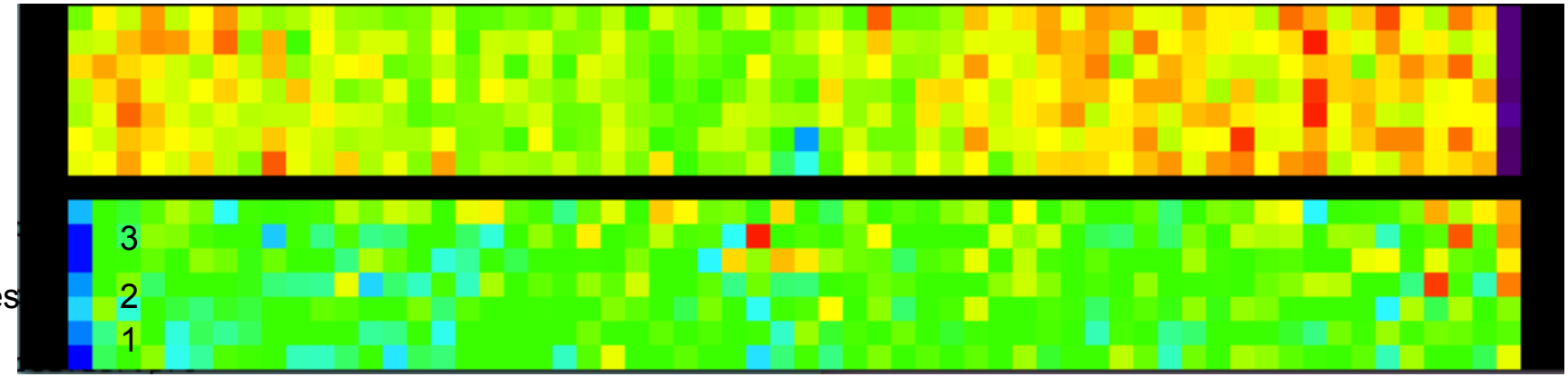




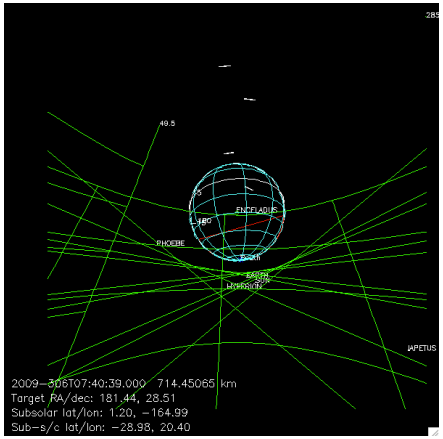




2009-305T21:31
Alt= 208,933 km
Longitude= 252°W
Latitude=0.3°S
Phase= 160°



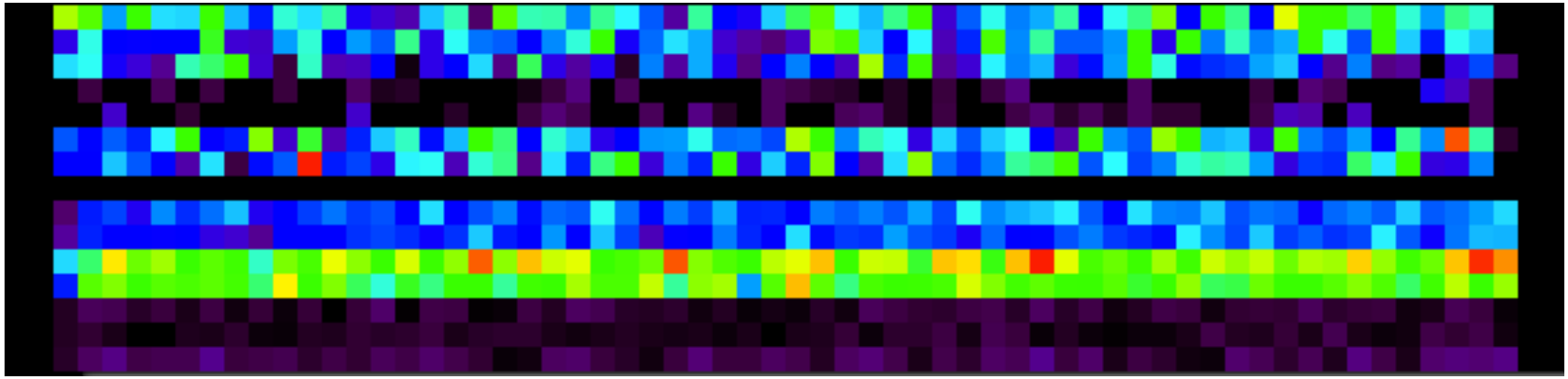
UVIS_120EN_ICYMAP001_INMS
2009-306T07:40
Alt= 308 km
Longitude= 237°W
Latitude=45°S
Phase= 85°



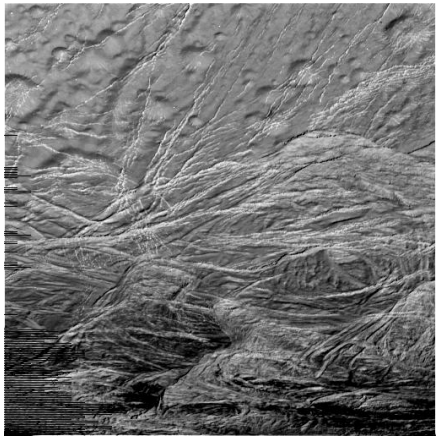
Enceladus passed through slit on central records

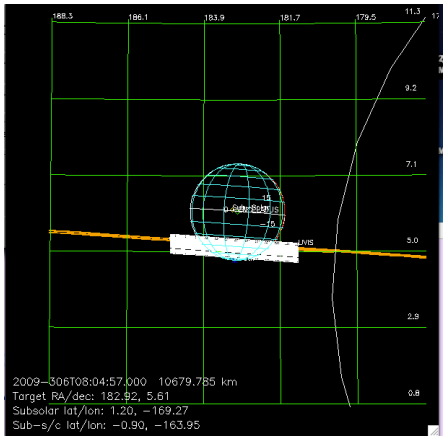
Ly-a

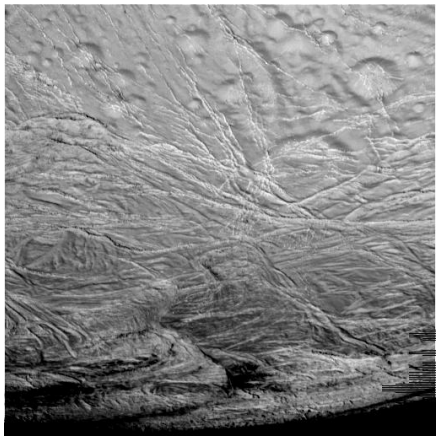
Long-waves



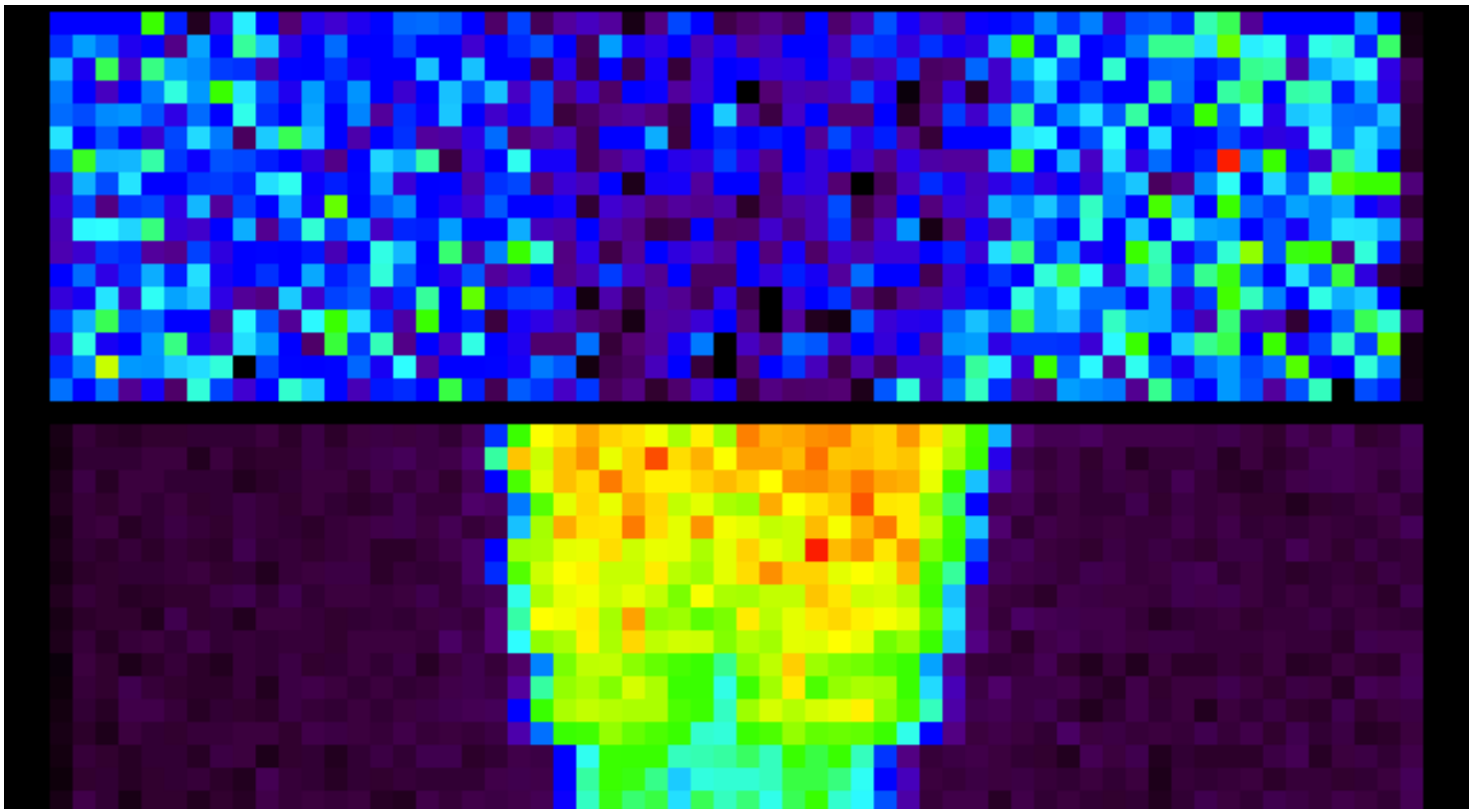
CIRS_120EN_FP3SPMAP001





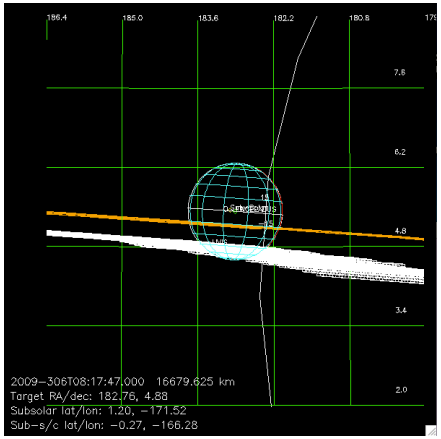


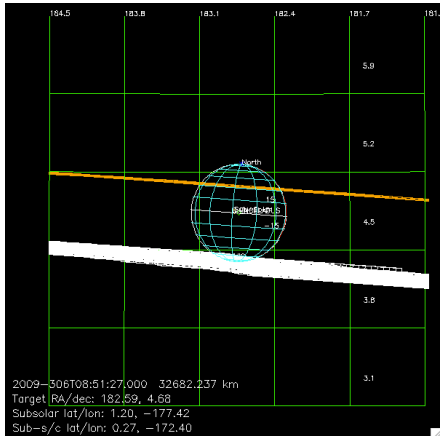
UVIS_120EN_ICYMAP002_CIRS
2009-306T08:05
Alt=12,290 km
Longitude=165°W
Latitude=0.7°S
Phase=5.8°

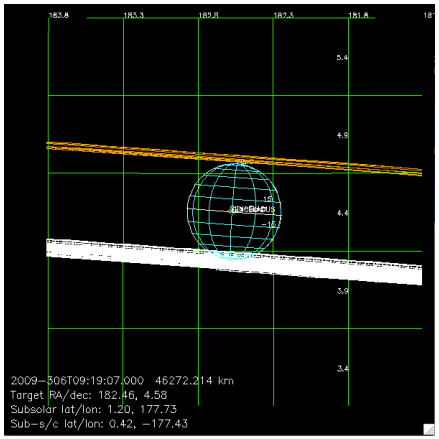


3-part

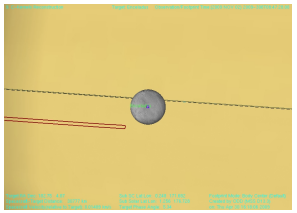
UVIS_120EN_ICYMAP003
2009-306T08:18
Alt= 23,2374 km
Longitude= 169°W
Latitude=0°N
Phase= 5.5°

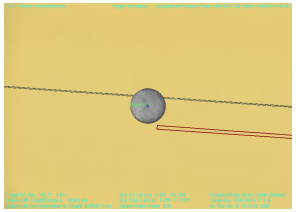


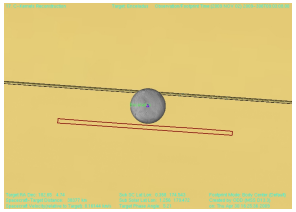


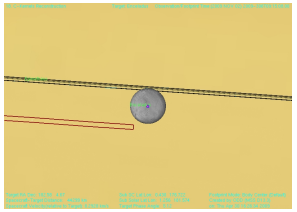


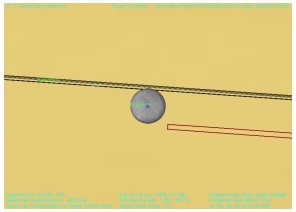
Observations mostly catch Jupiter in reflectance

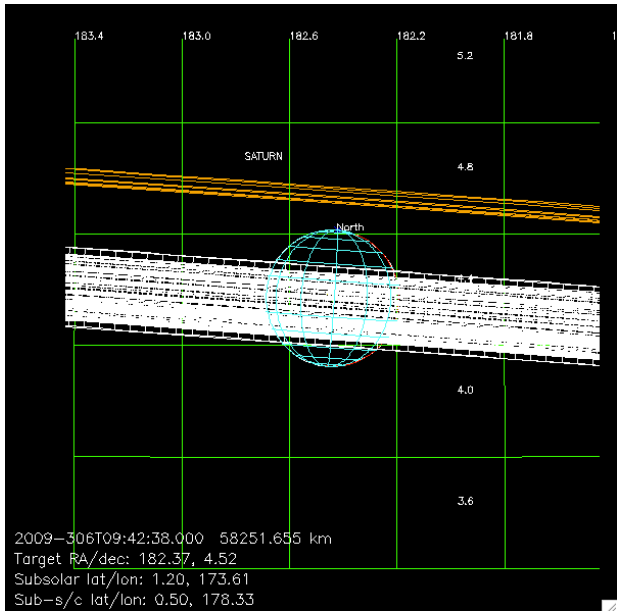








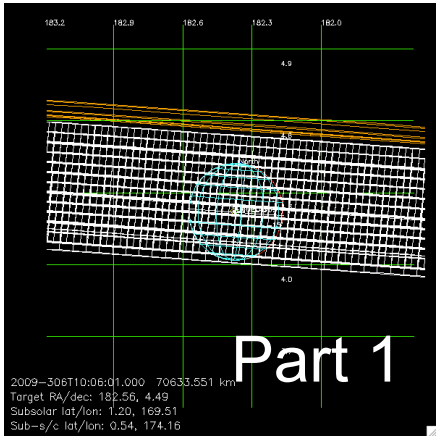


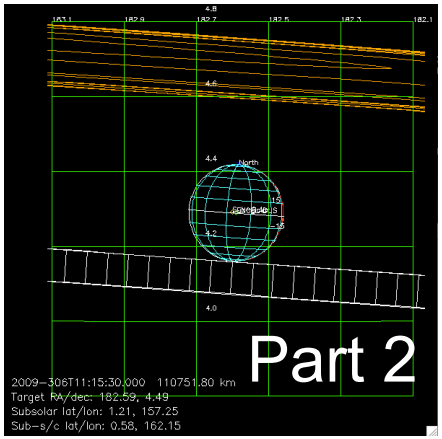


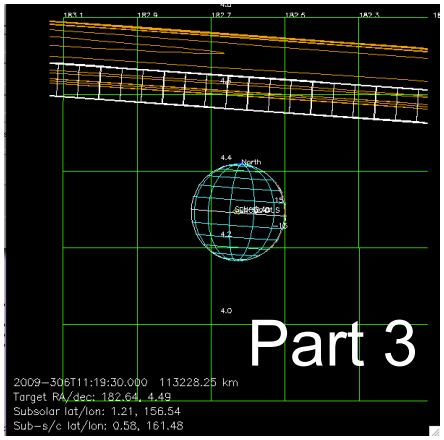
UVIS_120EN_ICYMAP004_ENGR
2009-306T09:42
Alt= 63,510 km
Longitude= 183°W
Latitude=0.5°N
Phase= 4.9°

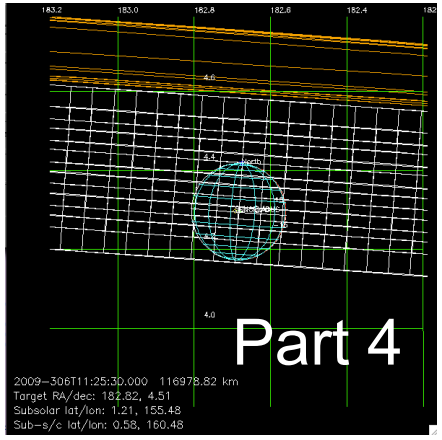
In front of Saturn…
Observations mostly catch Saturn in reflectance

CIRS_120EN_FP3DAYMAP001





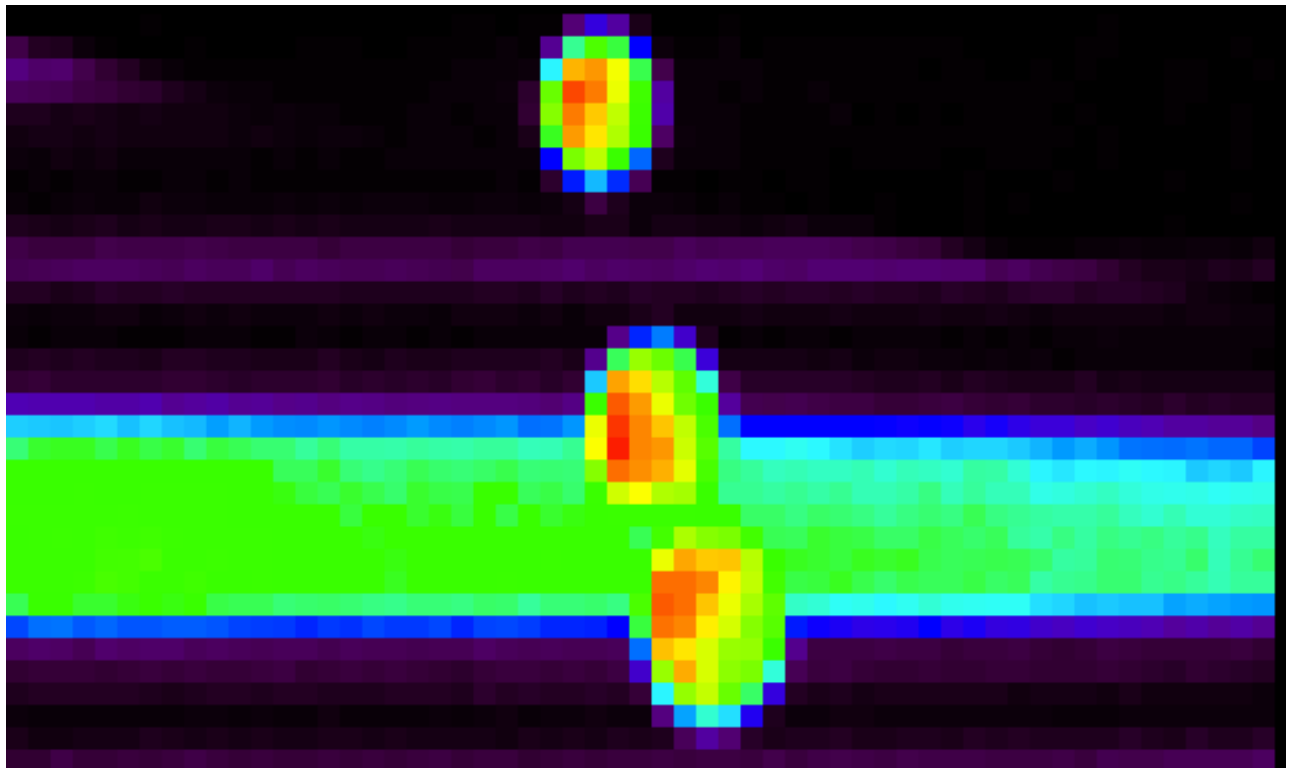




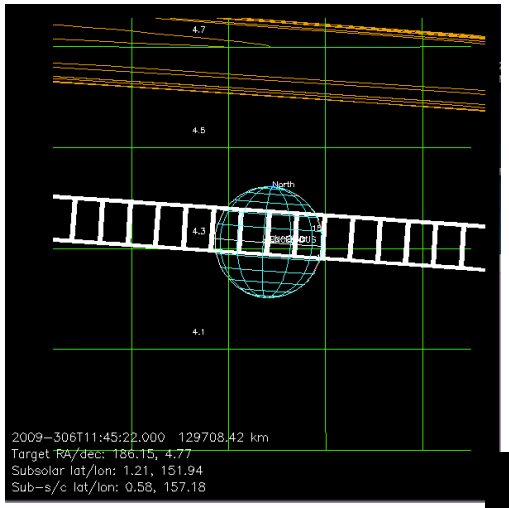
4-part

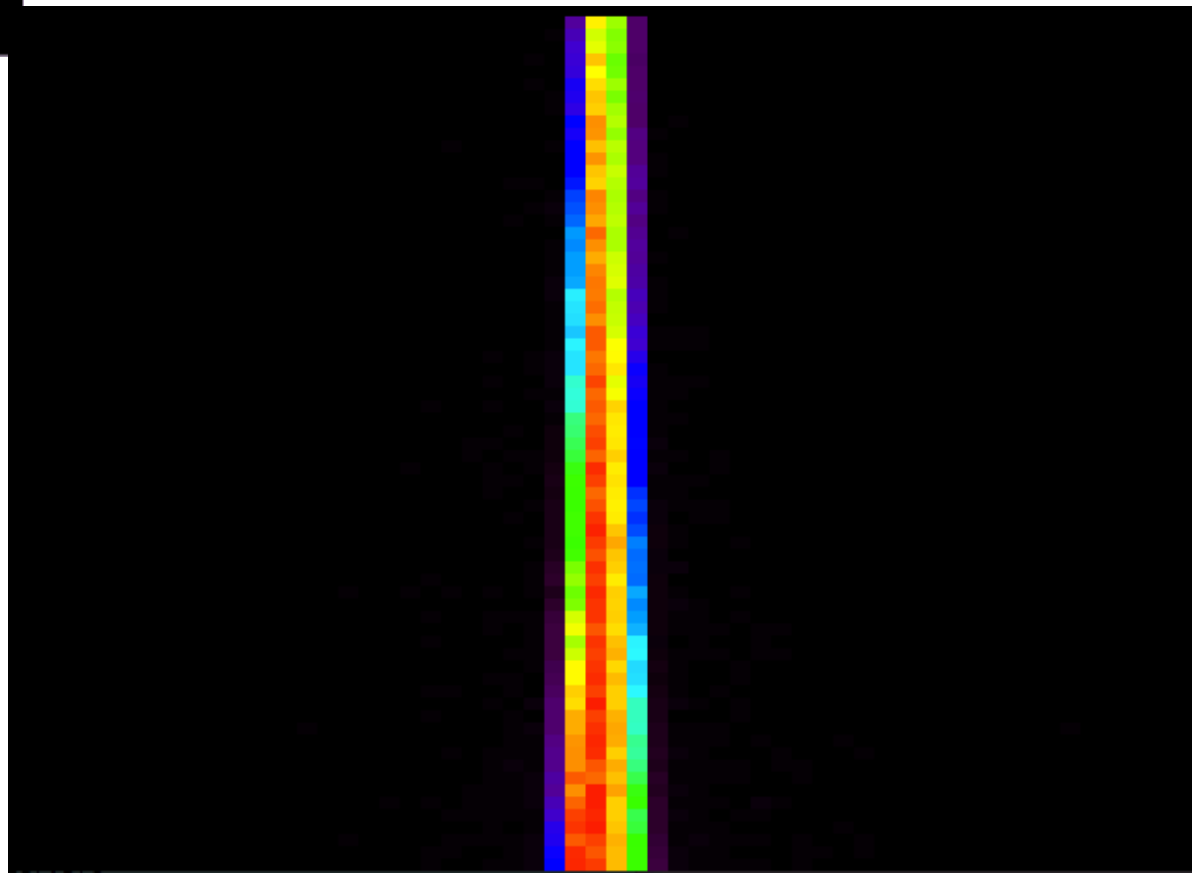
UVIS_120EN_ICYLON002_CIRS
2009-306T10:03
Alt= 88,980 km
Longitude= 192°W
Latitude=0.6°N
Phase= 5°

Part 1:



UVIS_120EN_ICYLON003_VIMS
2009-306T11:46
Alt=177,677 km
Longitude=246°W
Latitude=0.7°N
Phase=7°





ISS_121EN_PLMHRHP001

9-part

121EN_ICYPLU001_ISS

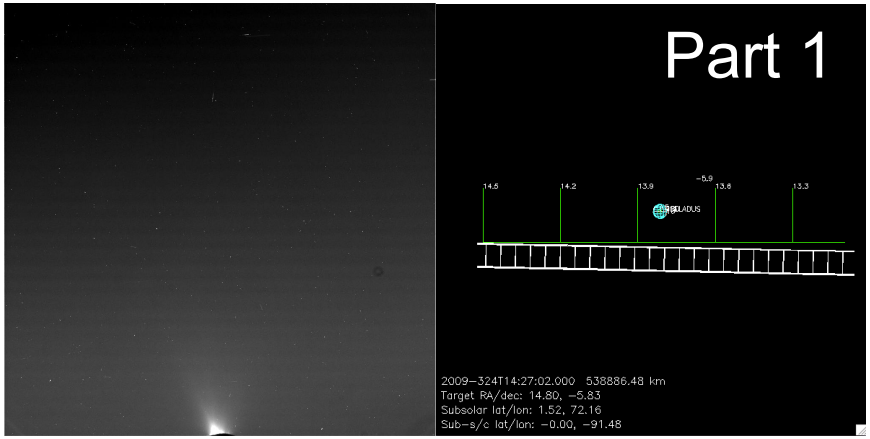
2009-324T14:30:02

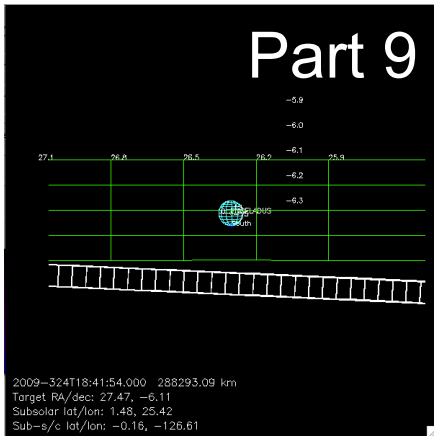
Alt= 529,255 km

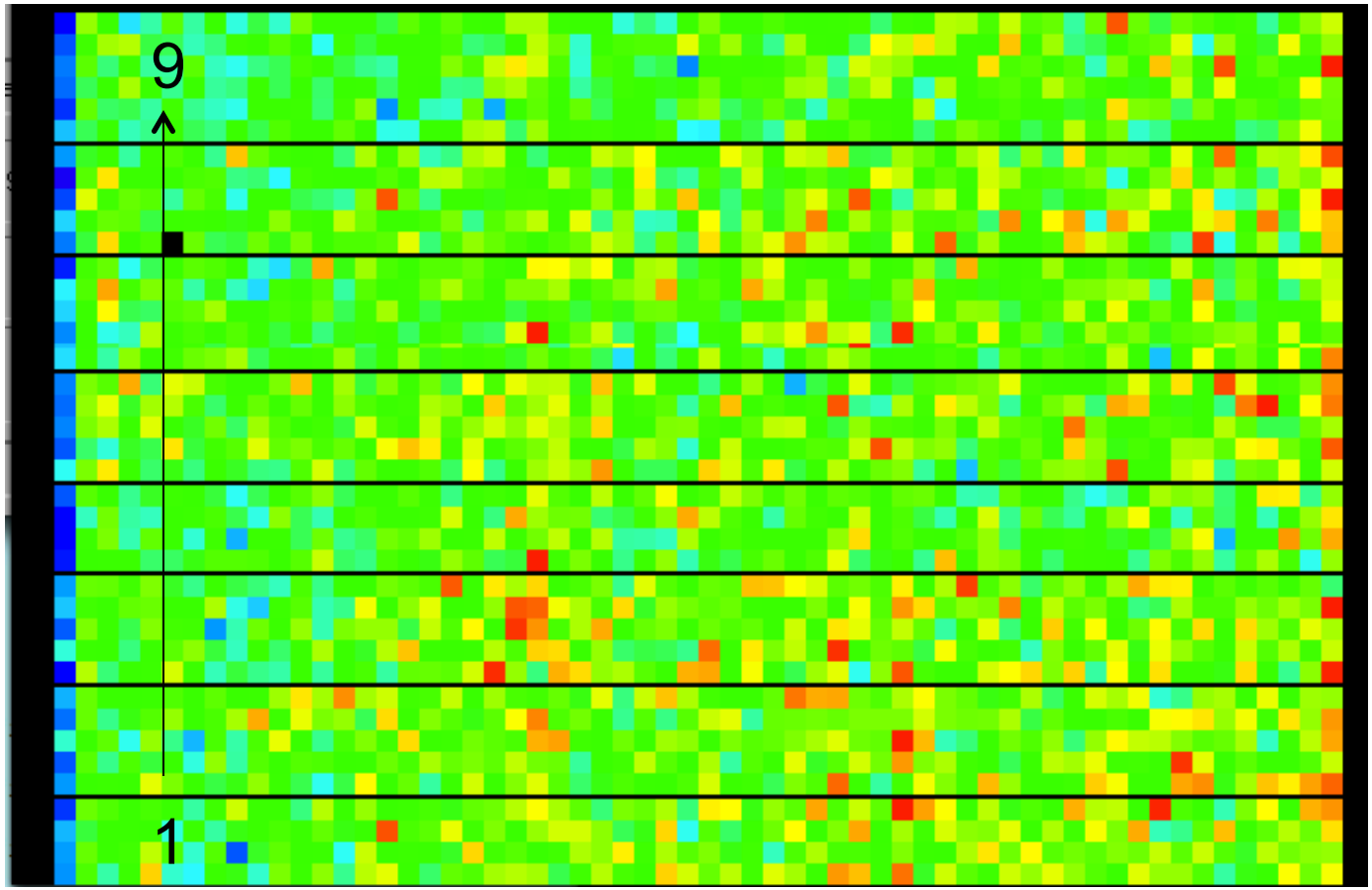
Longitude= 93°W

Latitude=0°N

Phase= 164°







VIMS_121EN_ENCEL001 2-part 121EN_ICYLON001_VIMS

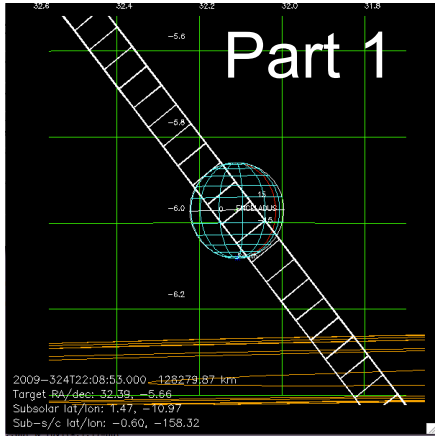
2009-324T22:10:53

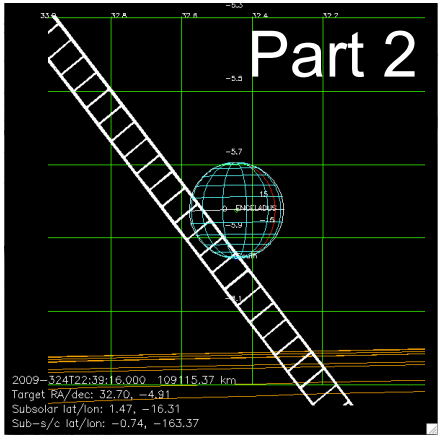
Alt= 120,361 km

Lon= 160°W

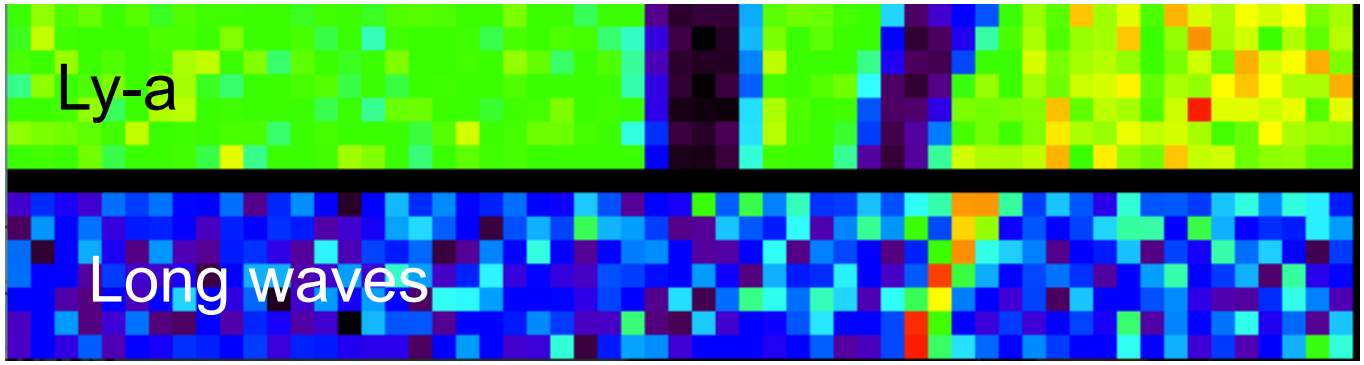
Latitude=0.7°S

Phase= 146°

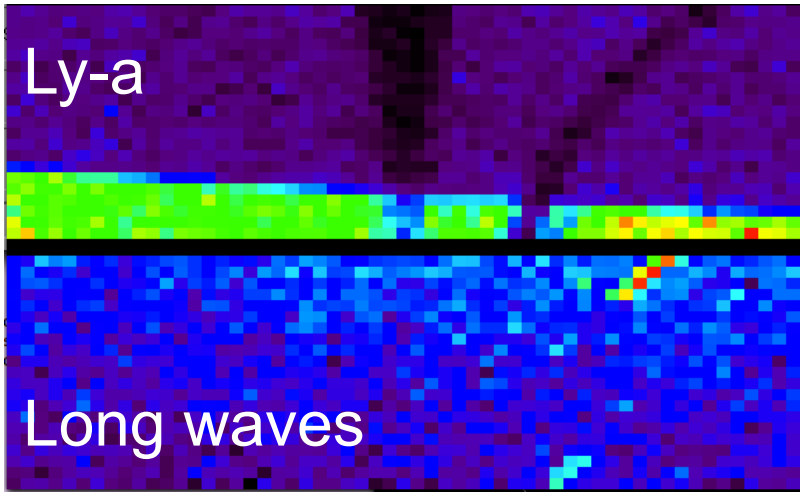




Part 1



Part 2: Enceladus moves in front of Saturn's night side



CIRS_121EN_FP1DRKMAP001

3-part

121EN_ICYLON002_CIRS

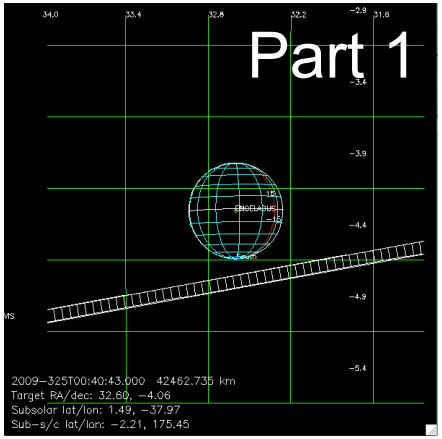
2009-325T00:42:43

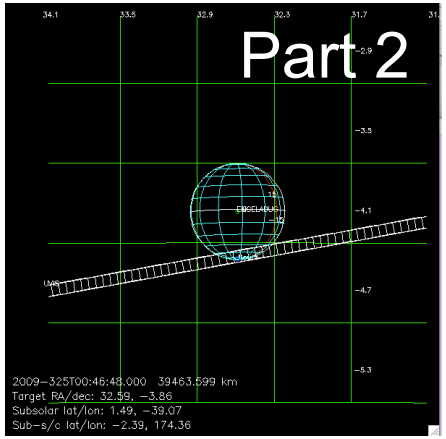
Alt= 42,206 km

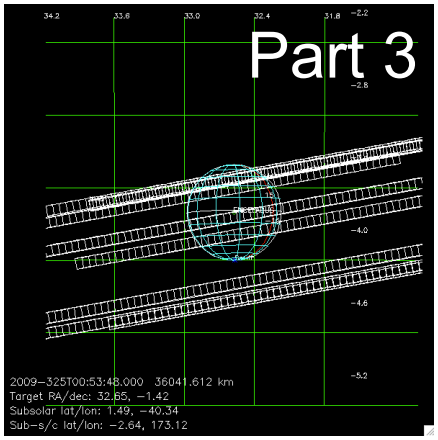
Longitude= 185°W

Latitude=2°S

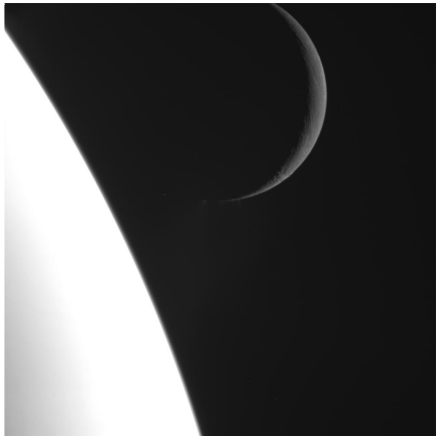
Phase= 146°

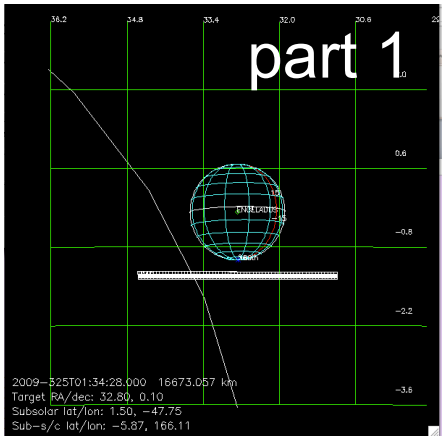


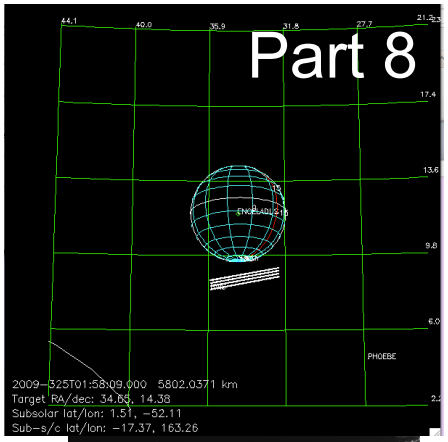




ISS_121EN_PLMHR001 8-part 121EN_ICYMAP001_ISS

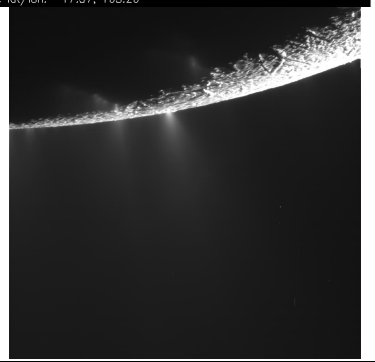




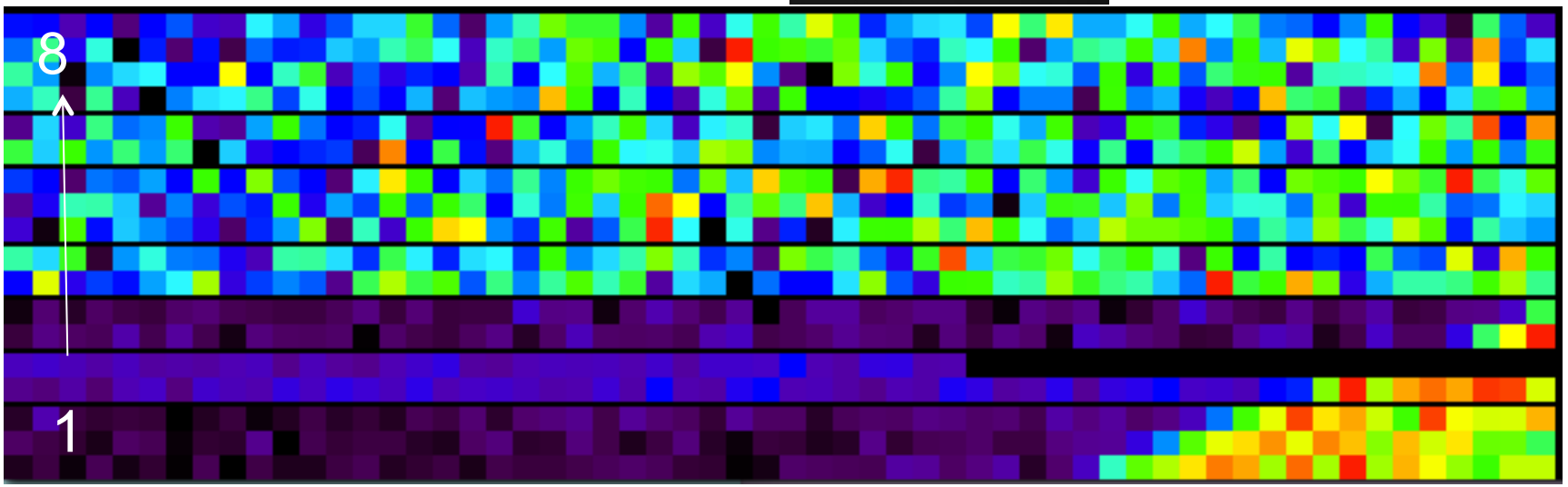


2009-325T01:34:43
Alt= 16,183 km
Longitude= 194°W
Latitude=6°S
Phase= 145°

WAC image

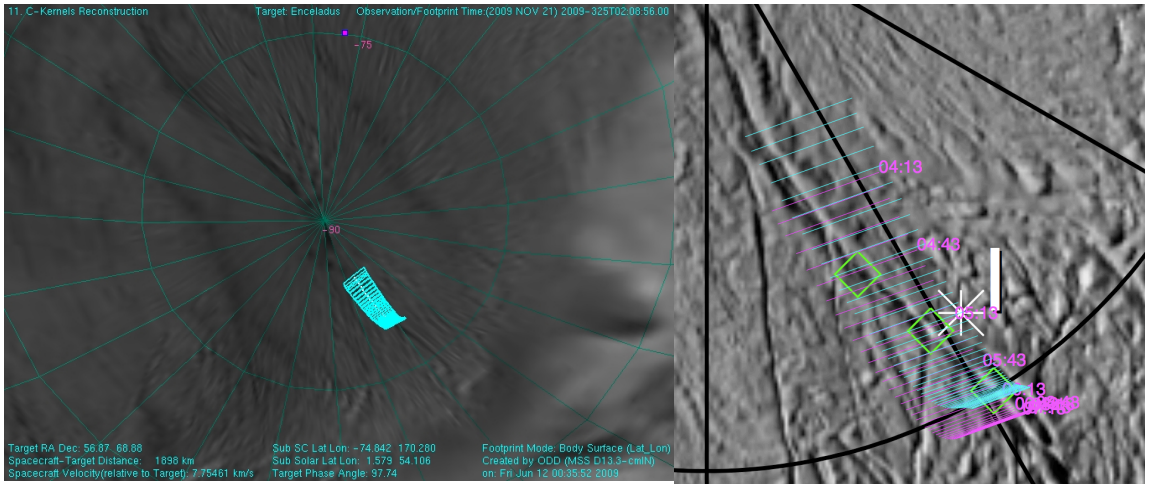


NAC image



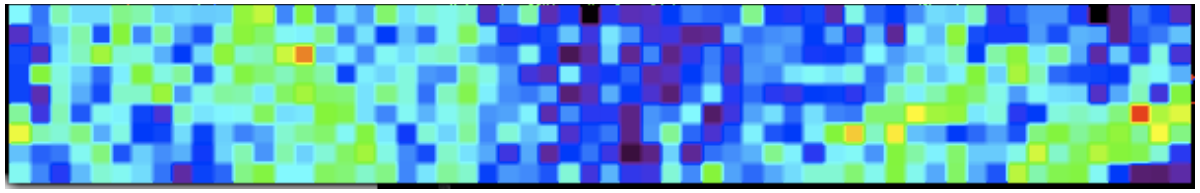
CIRS_121EN_FP3HIRES001

32-part

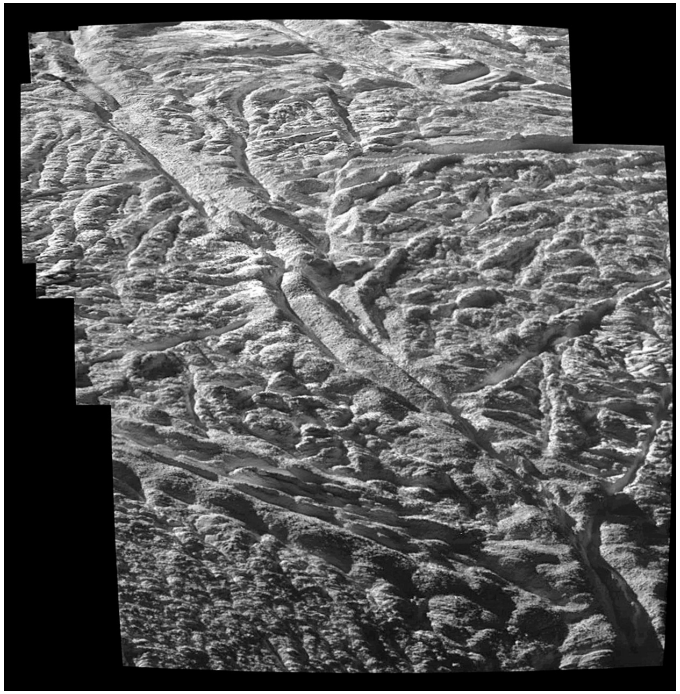


121EN_ICYMAP002_CIRS
2009-325T02:04:48
Alt=2229 km
Longitude=192°W
Latitude=48.8°S
Phase=120°

1. 02:04 – 02:09: V. high res scan of Baghdad Sulcus near plume 1 source

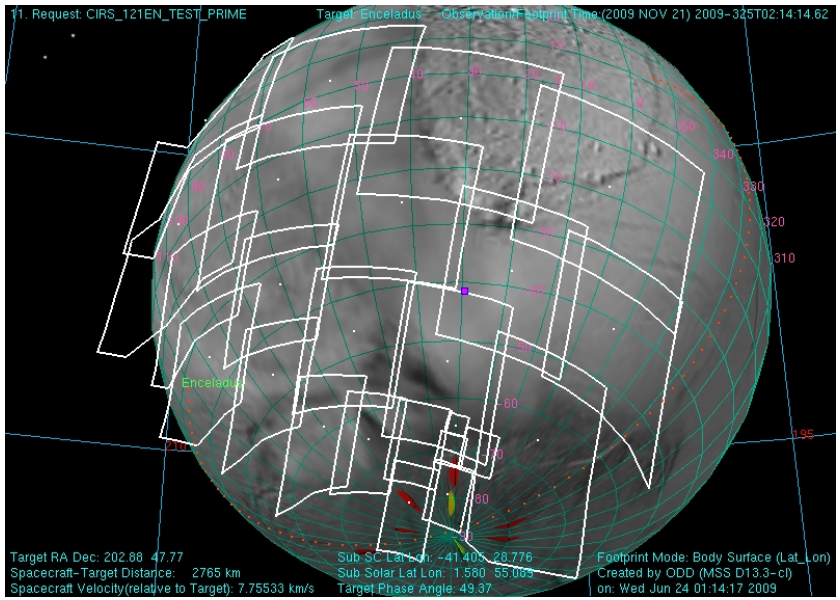


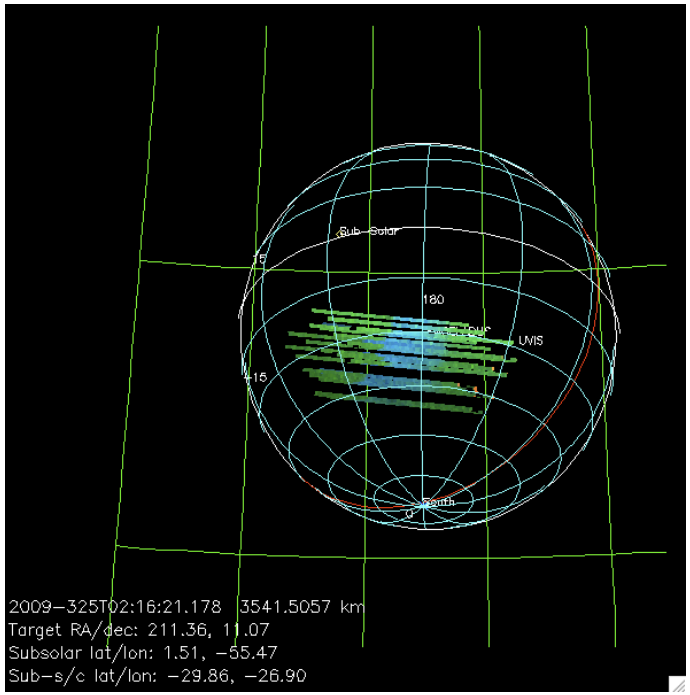
Long wavelengths



121EN_ICYMAP002_CIRS
2009-325T02:15:49++ (23 obs)

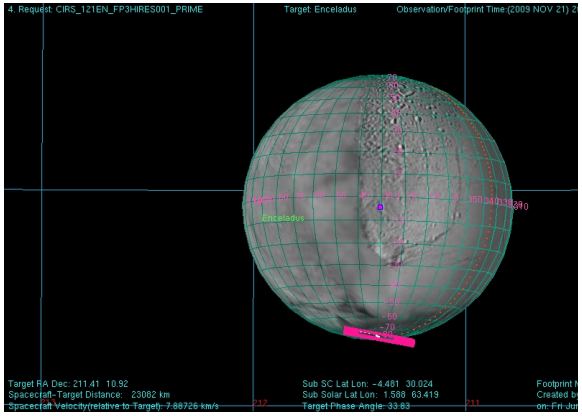
2. 02:14 – 02:57, ISS mosaic

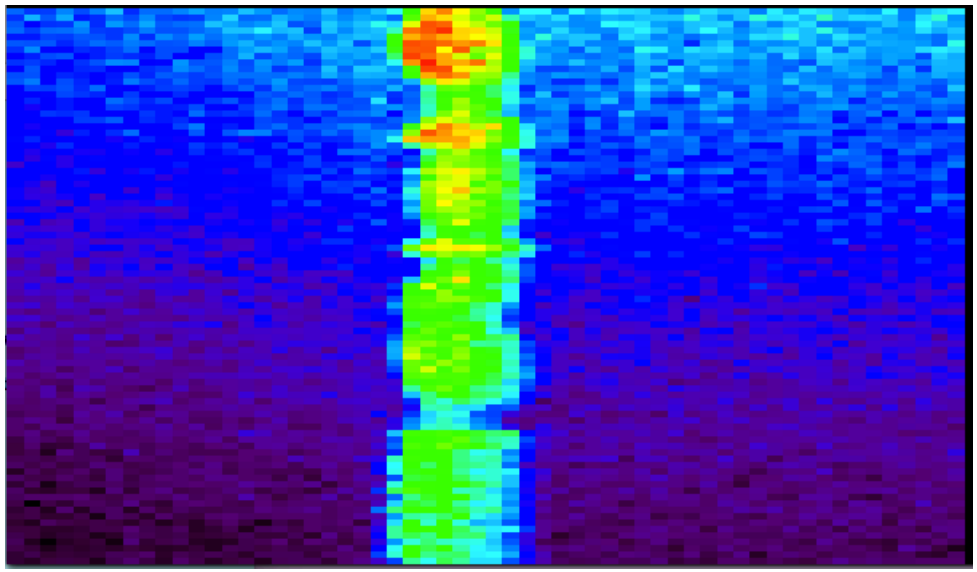




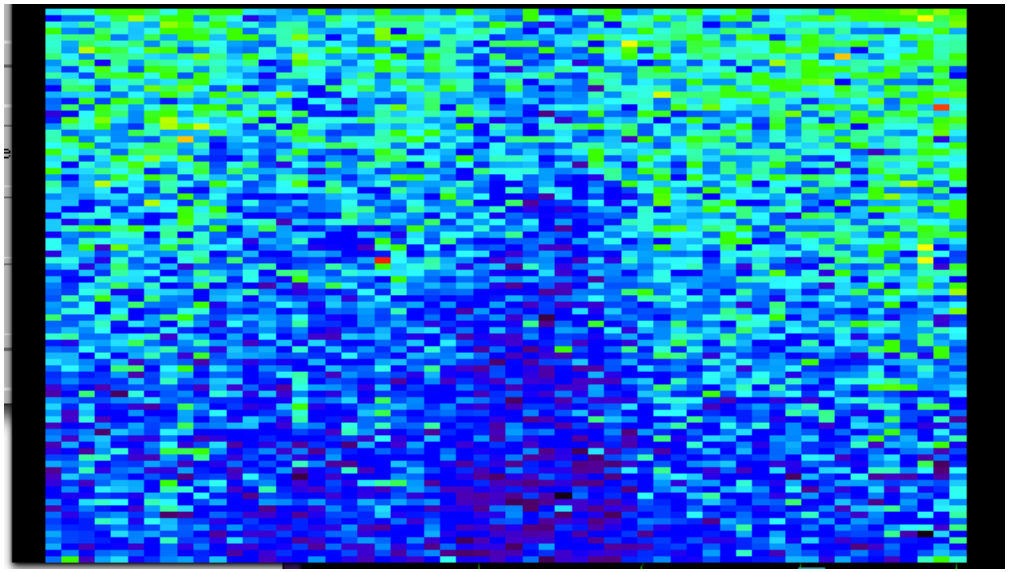
121EN_ICYMAP002_CIRS
2009-325T02:58:06++ (2 obs)

3. 02:58 – 03:44 Sit and stare for VIMS

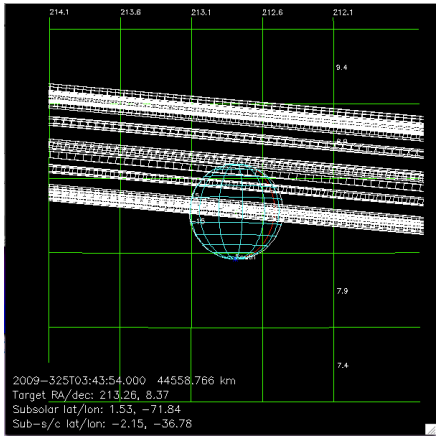




Long waves

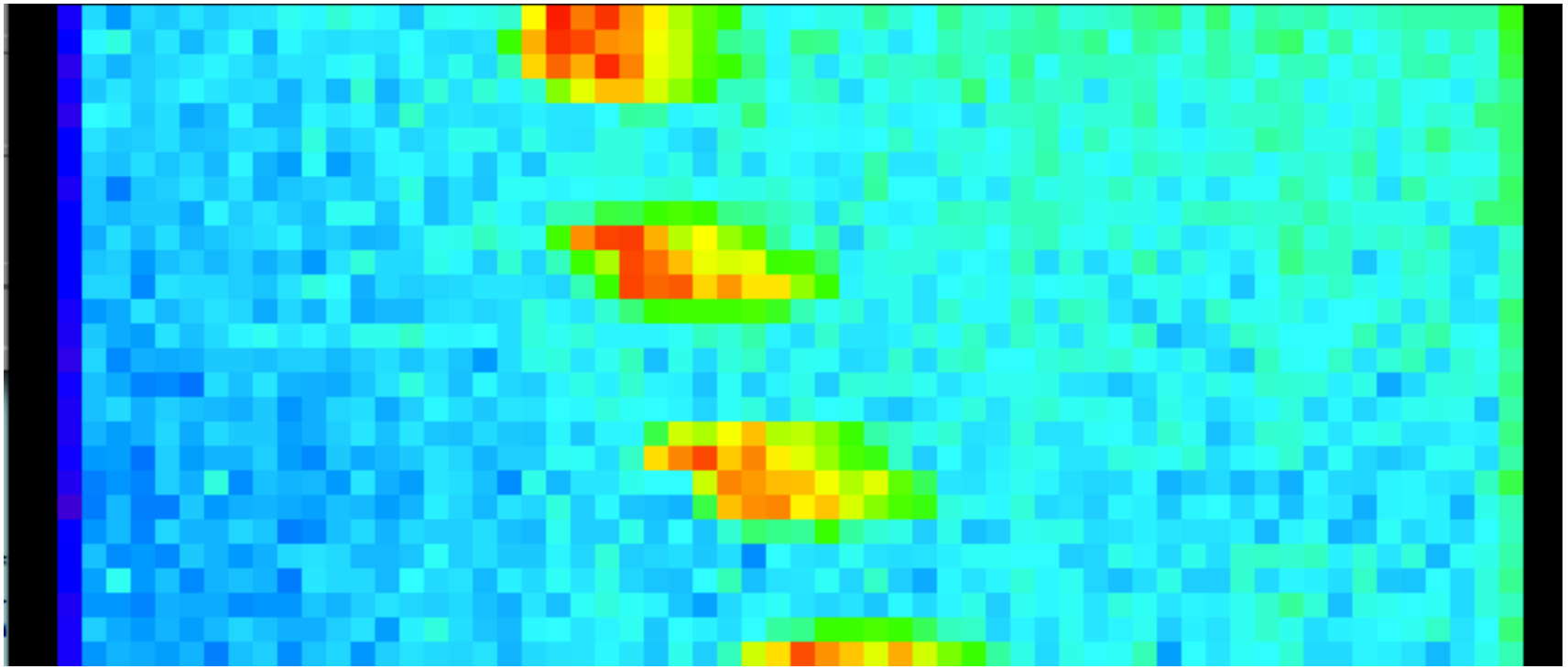


Ly-a



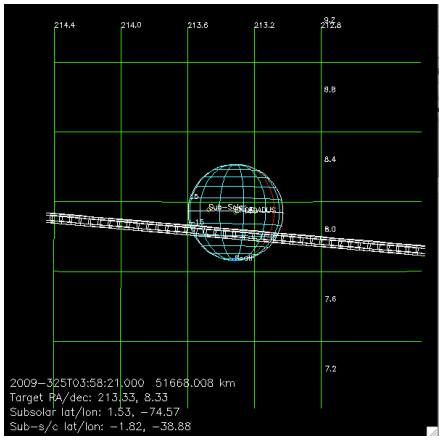
121EN_ICYMAP002_CIRS
2009-325T03:44:09
Alt=47,495 km
Longitude=38°W
Latitude=2°S
Phase=35°

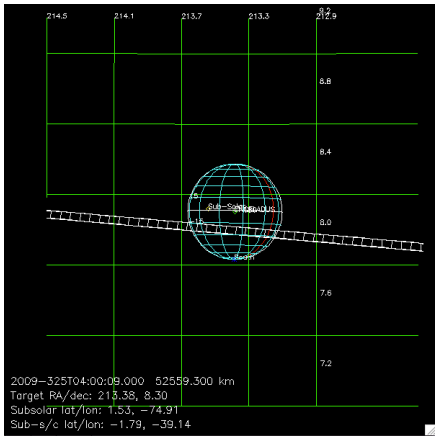
4. ~ 03:44 – 03:55 FP1 raster scan

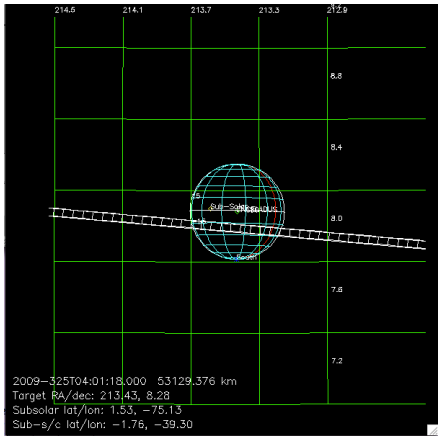


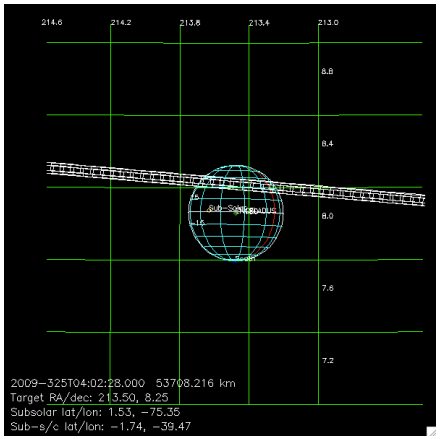
121EN_ICYMAP002_CIRS
2009-325T03:58:36++ (4 obs)
Alt=51,537 km
Longitude=39°W
Latitude=1.8°S
Phase=35°

5. ~03:58 – 04:10 Quick ISS 2x2 mosaic



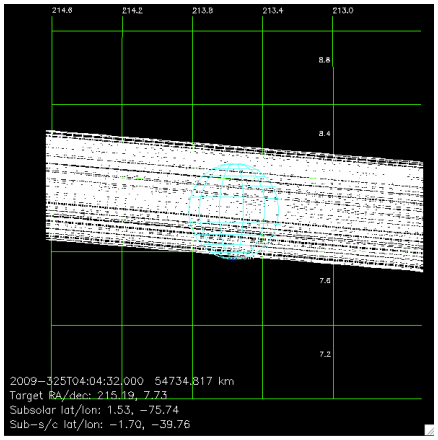


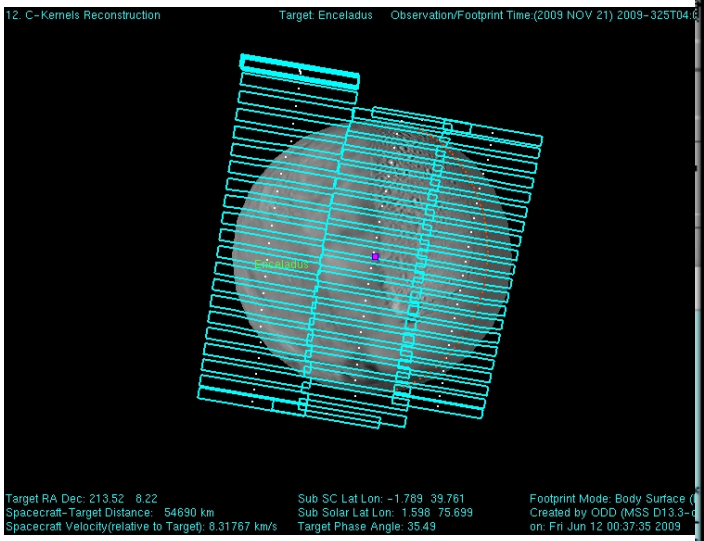


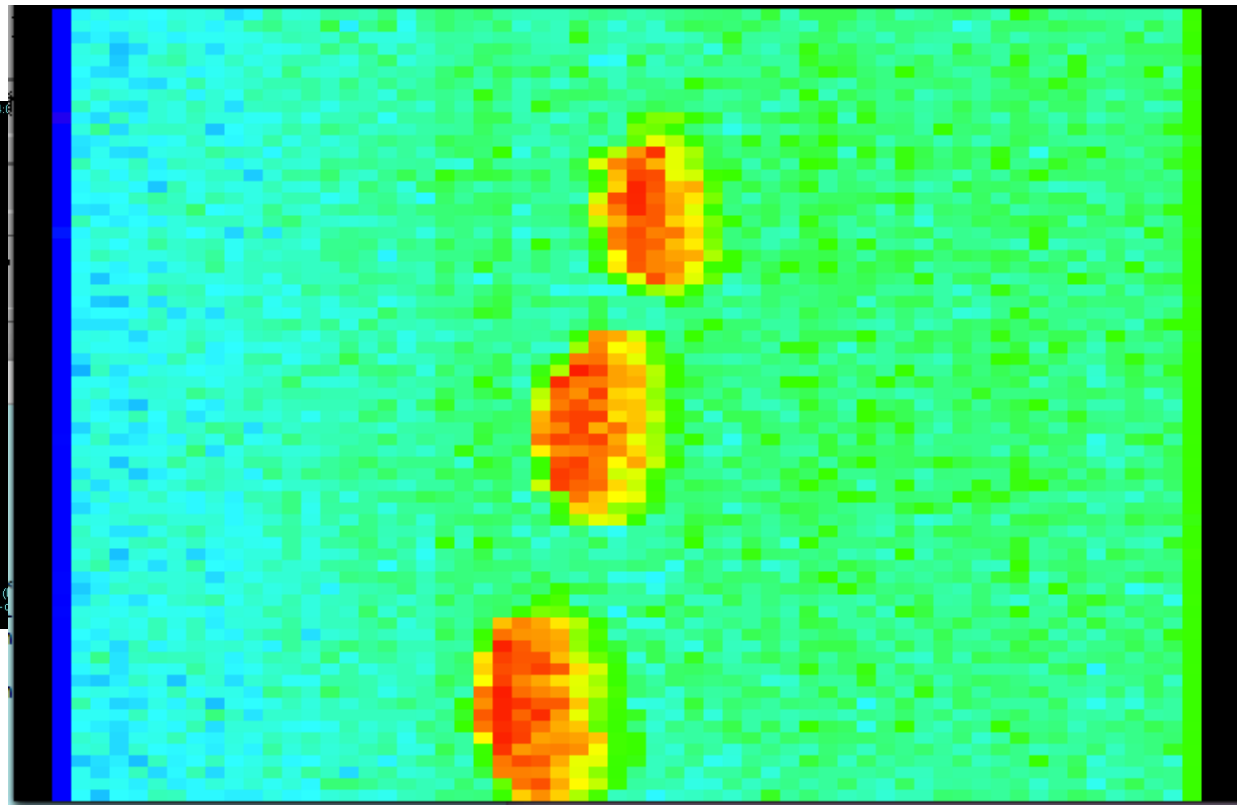


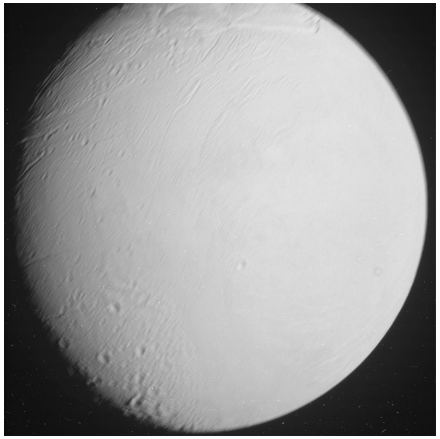
6. ~04:15 – 04:40 FP3 global map

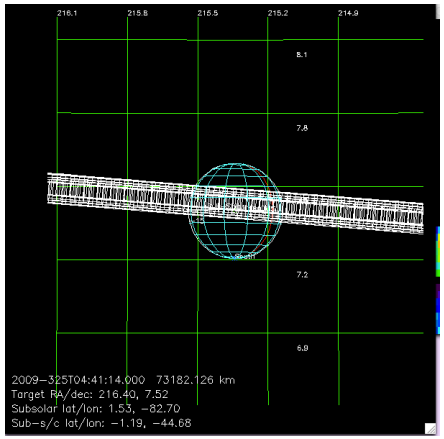
121EN_ICYMAP002_CIRS
2009-325T04:04:47
Alt=62,994 km
Longitude=42°W
Latitude=1.4°S
Phase=36°



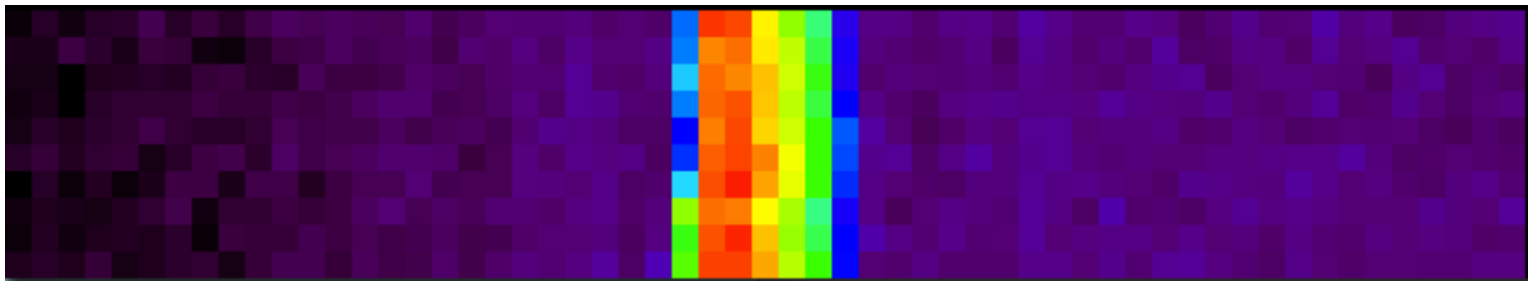




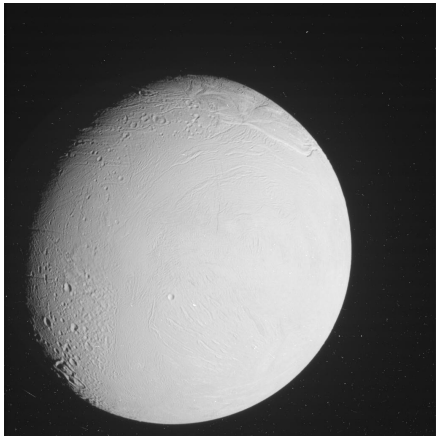


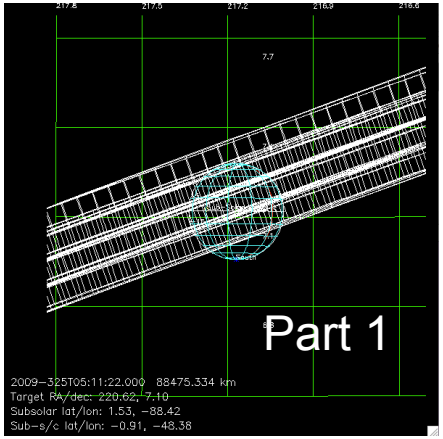


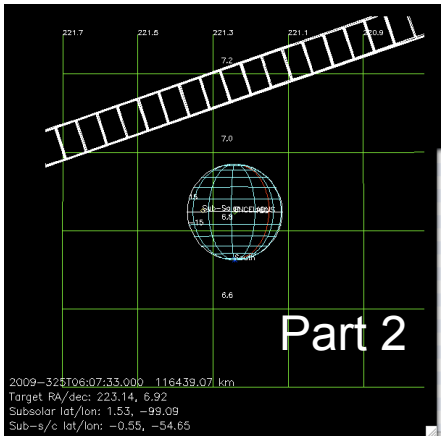
121EN_ICYLON004_CIRS
2009-325T04:42:14
Alt= 77,495 km
Longitude= 46°W
Latitude=1°S
Phase= 38°



CIRS_121EN_FP3DAYMAP002



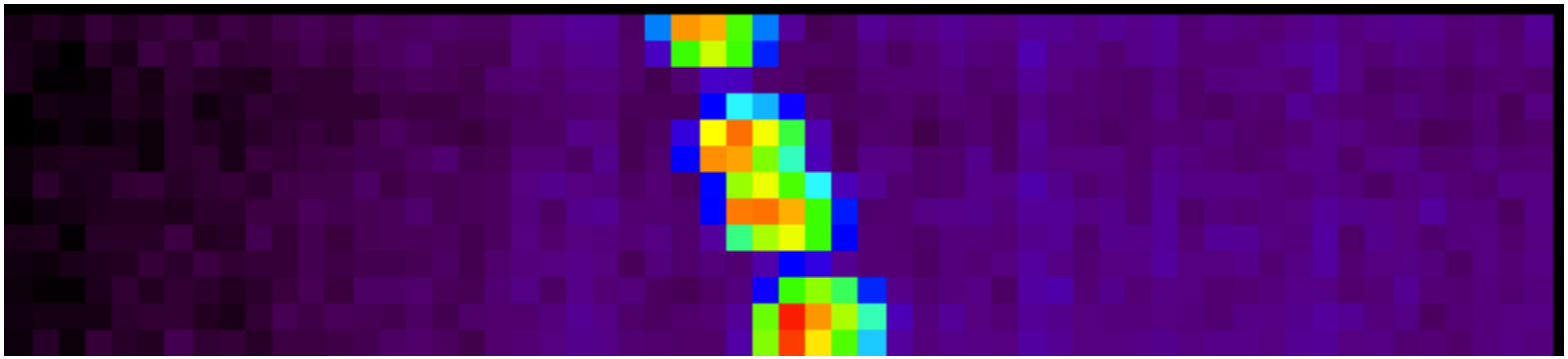




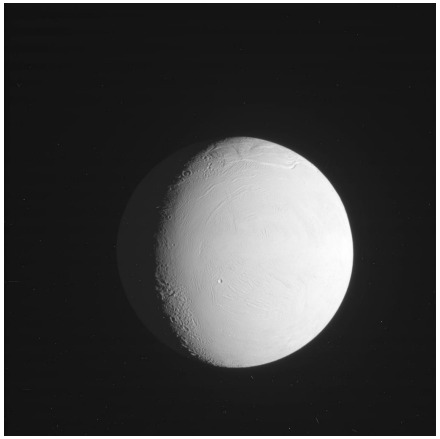
121EN_ICYLON005_CIRS
2009-325T05:13:22
Alt=100,264 km
Longitude=51°W
Latitude=0.7°S
Phase=41°

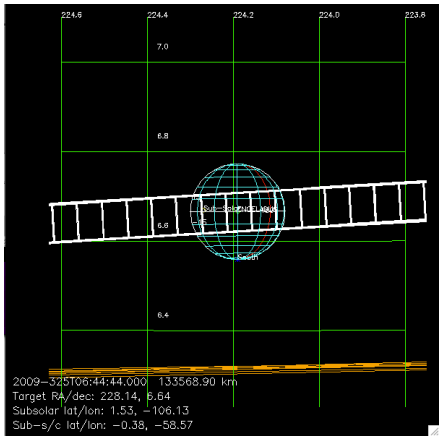
2-part

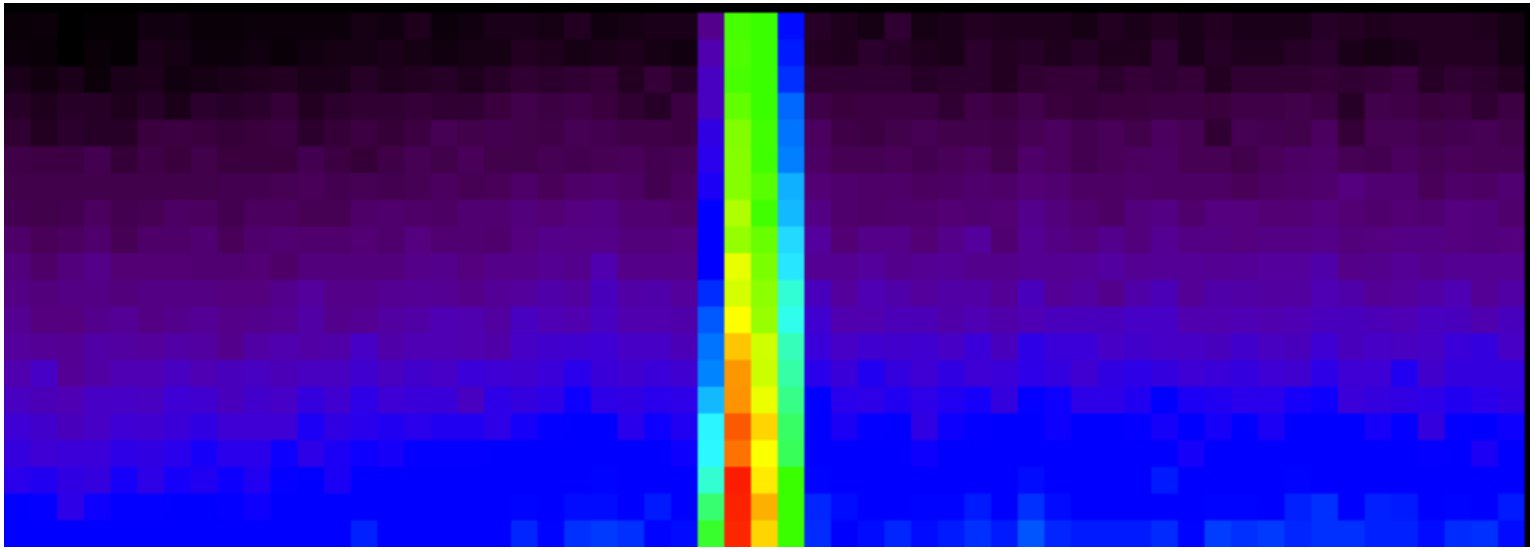
First part: FP3 scans

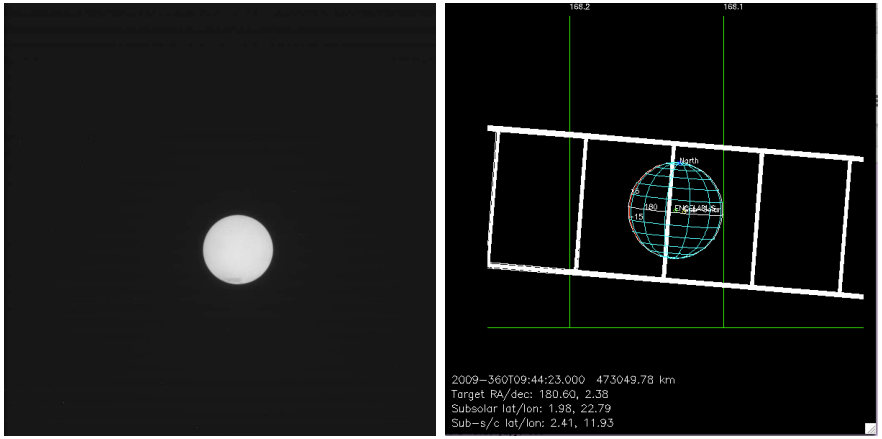


121EN_ICYSTARE002_PRIME
2009-325T06:46:04
Alt= 144,012 km
Lon= 61°W
Latitude=0.3°S
Phase= 48°

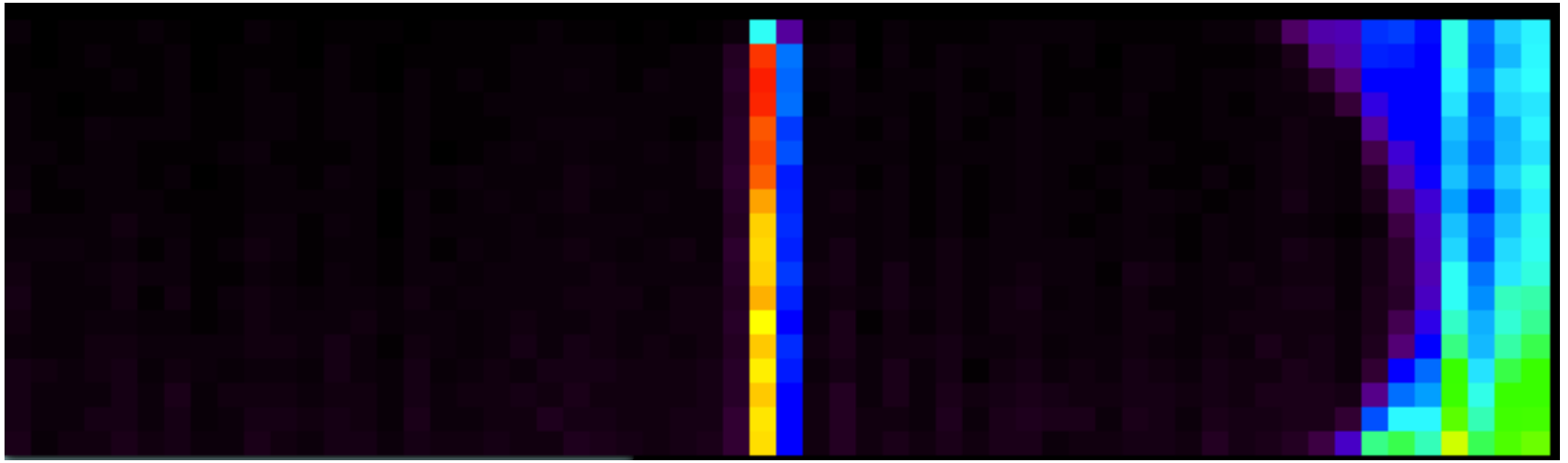








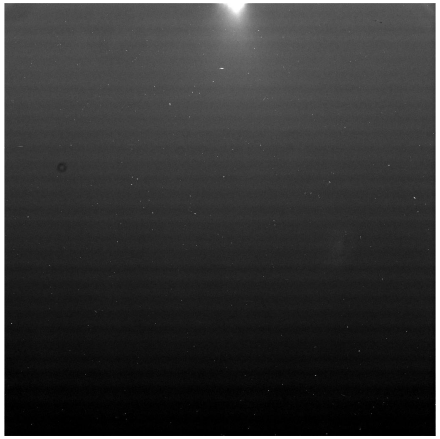
123EN_ICYLON001_VIMS
2009-360T09:46:23
Alt= 493,230 km
Longitude= 344°W
Latitude=2.4°N
Phase= 5.1°

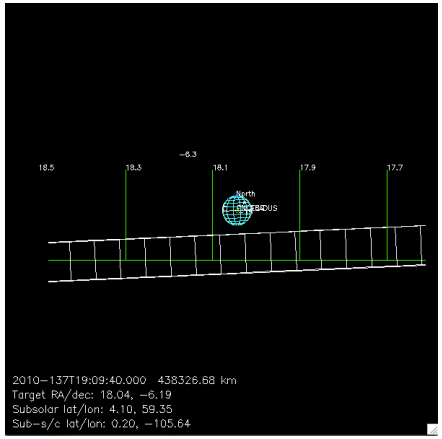


SS_131EN_PLMHRHP001_PRIME

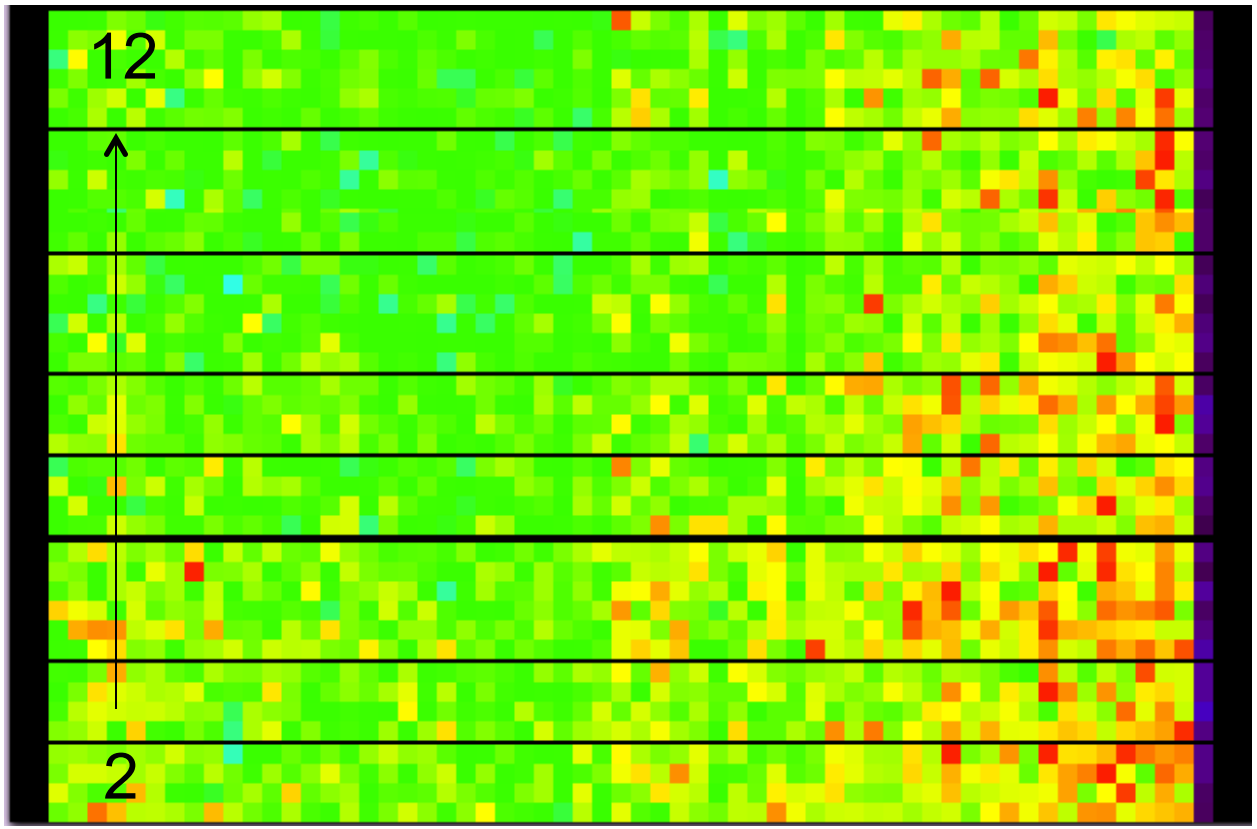
16-part

131EN_ICYPLU002_ISS
2010-137T19:11
Alt= 438,075 km
Longitude= 106°W
Latitude=0.2°N
Phase= 164.8°



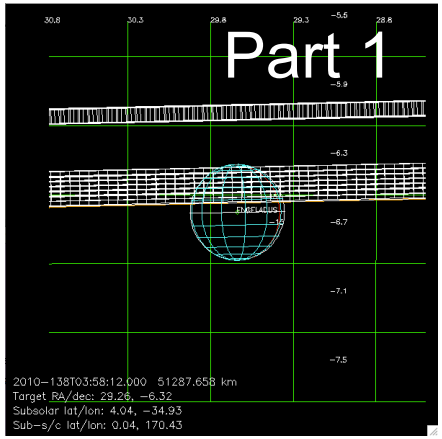


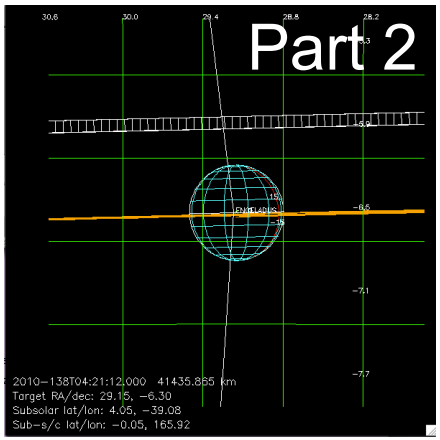
Ly-a



CIRS_131EN_FP1DRKMAP001_PRIME

2-part 131EN_ICYLON001_CIRS
2010-138T03:59
Alt= 47,144 km
Longitude= 191°W
Latitude=0°N
Phase= 154°

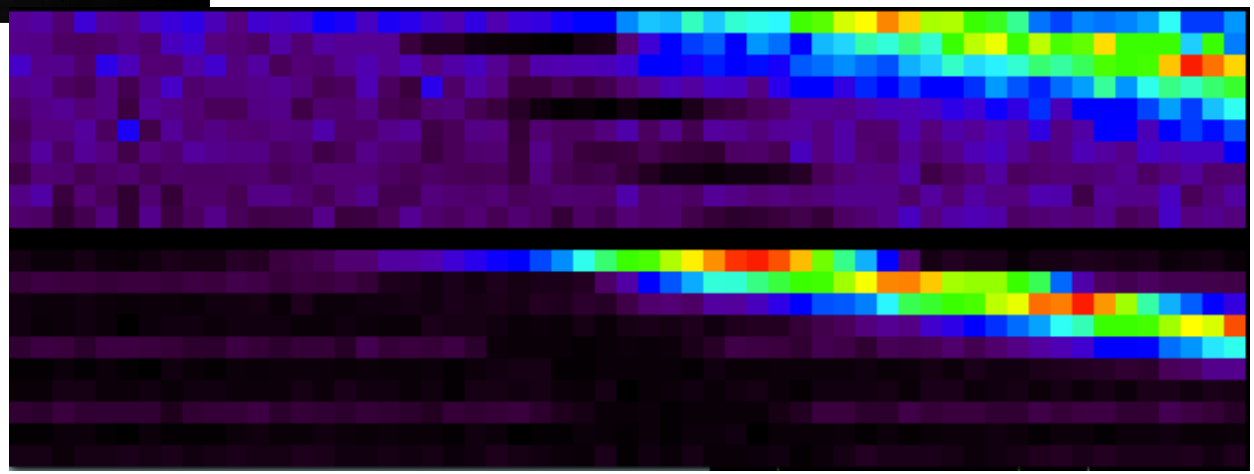




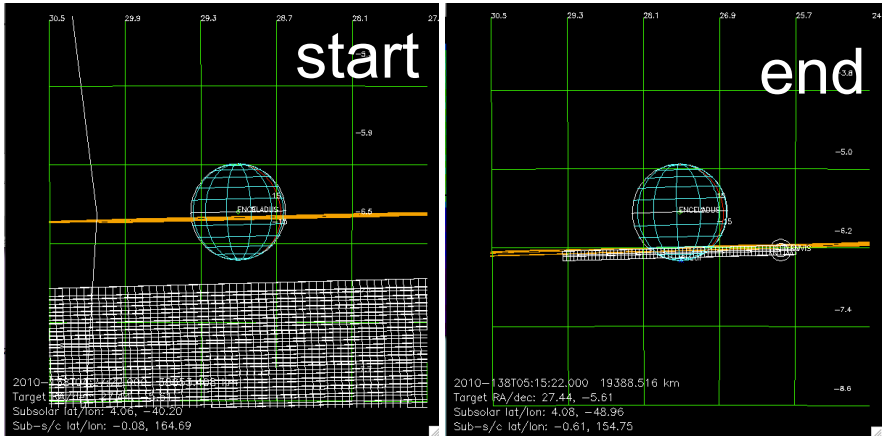
In front of Saturn
Enceladus is darker at long waves, Ly-a than Saturn limb

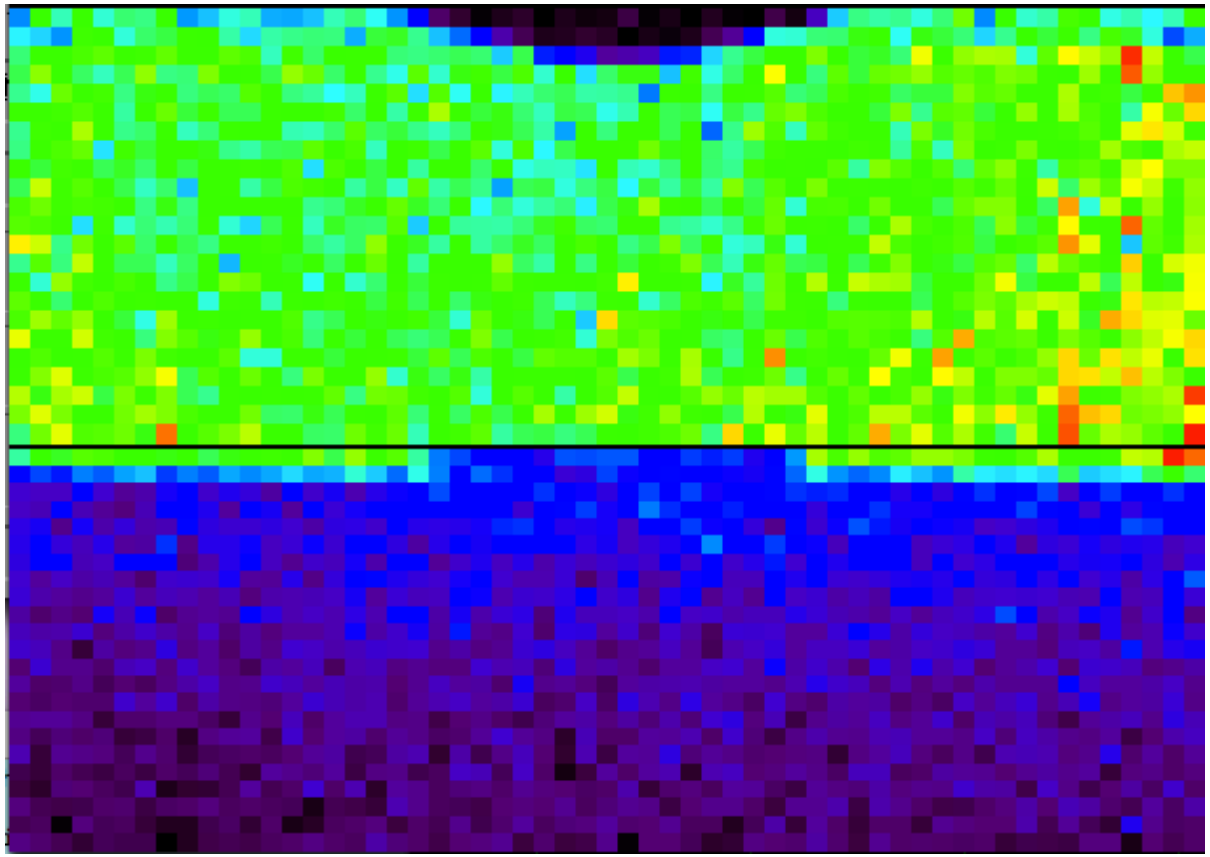
Ly-a

Long waves



131EN_ICYLIMB001_PRIME
2010-138T04:28
Alt= 28,385 km
Longitude= 200°W
Latitude=0.3°S
Phase= 155°

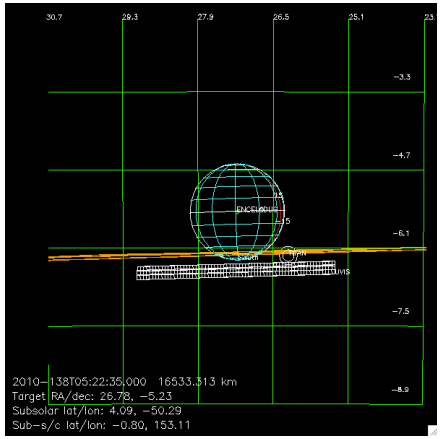




Ly-a

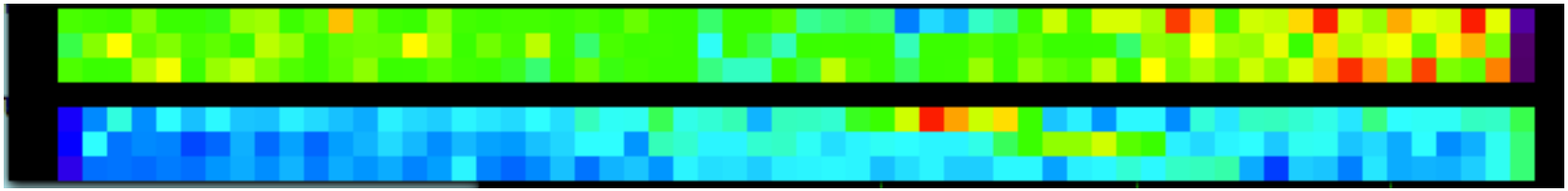
Long waves

ISS_131EN_PLMHR001_PRIME



131EN_ICYPLU001_ISS
2010-138T05:24
Alt= 15,095 km
Longitude= 208°W
Latitude=0.9°S
Phase= 156°

Titan snapped by ISS at end of obs

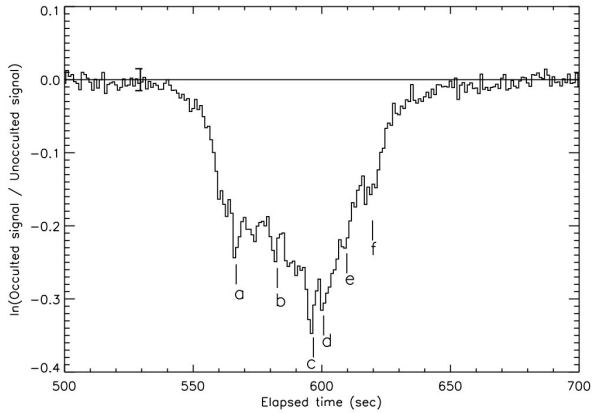


Ly-a

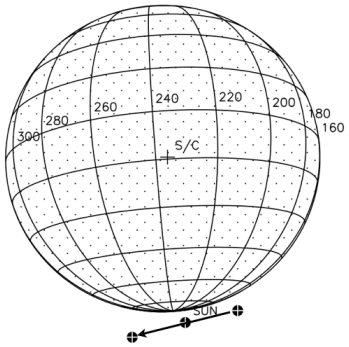
Long waves

EUV profile

Summed over wavelength; Letters show enhanced absorption due to collimated gas jets

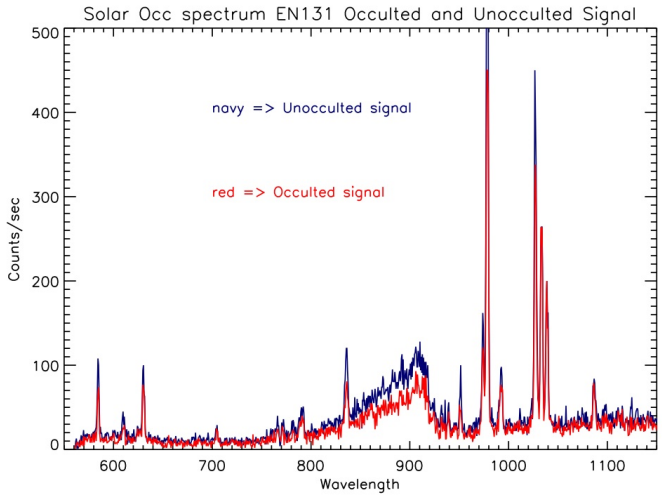


UVIS_131SU_ICYSUNOCC001_PRIME
2010-138T05:52
Ingress lat/lon: n/a
Egress lat/lon: n/a
Star: Sun

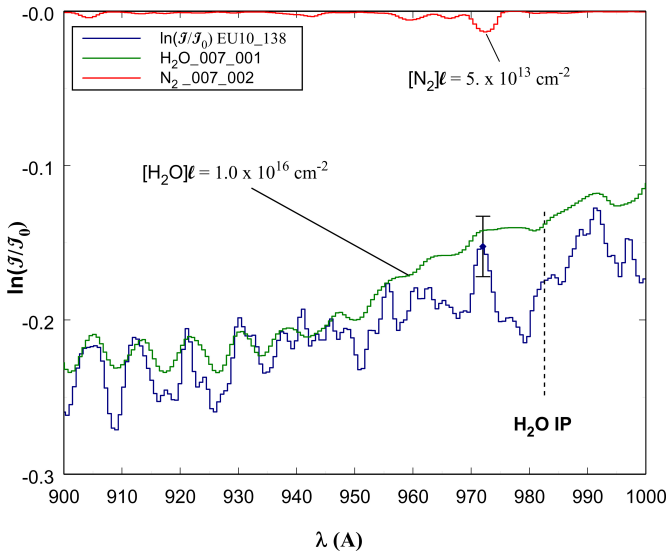


Horizontal cut through plume

Spectra of I, I_0 (counts per integration period vs wavelength)



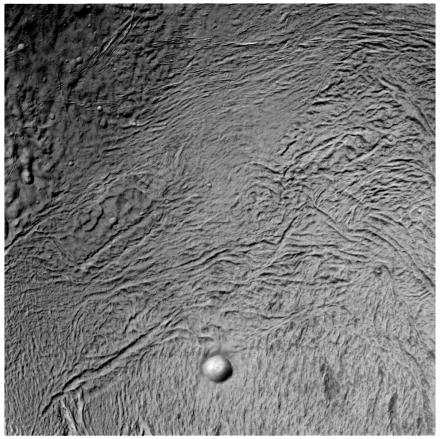
Spectrum of I/ I_0

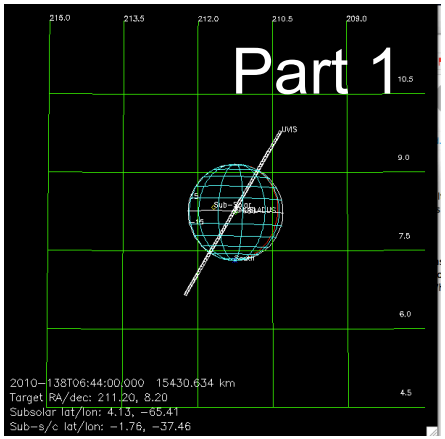


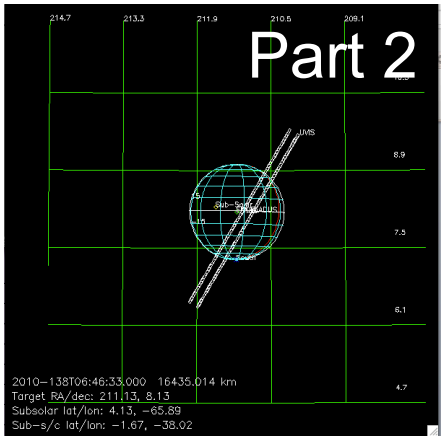
ISS_131EN_ENCEL001_PRIME

9-part

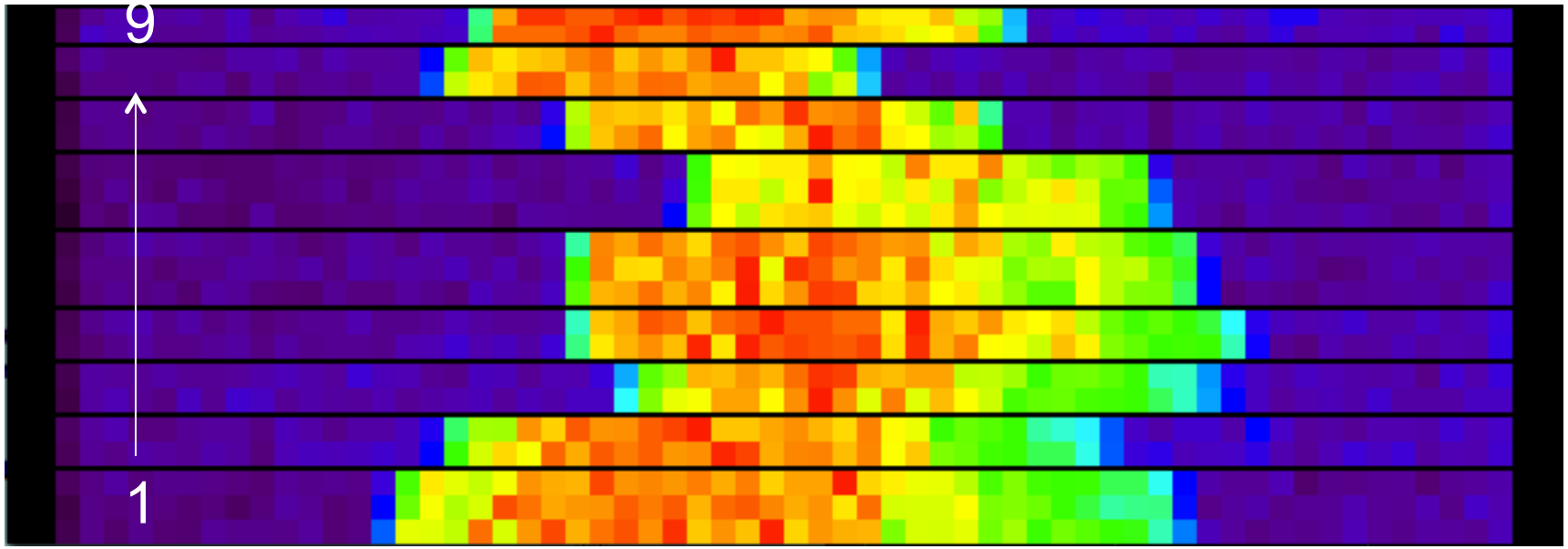
131EN_ICYMAP001_ISS



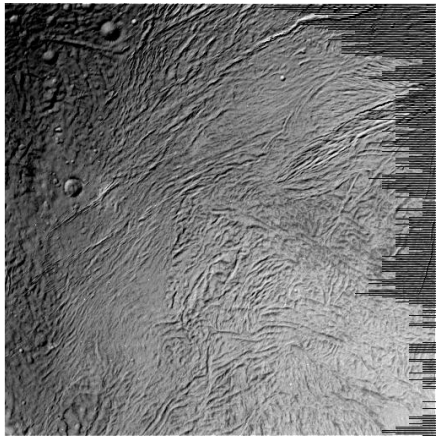


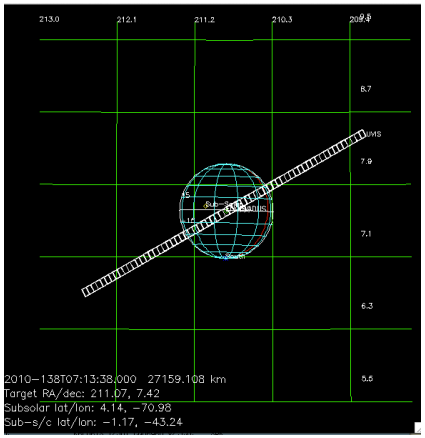


2010-138T06:44
Alt= 46,119 km
Longitude= 38°W
Latitude=1.7°S
Phase= 28°



VIMS_131EN_ENCEL001_PRIME





131EN_ICYLON003_VIMS

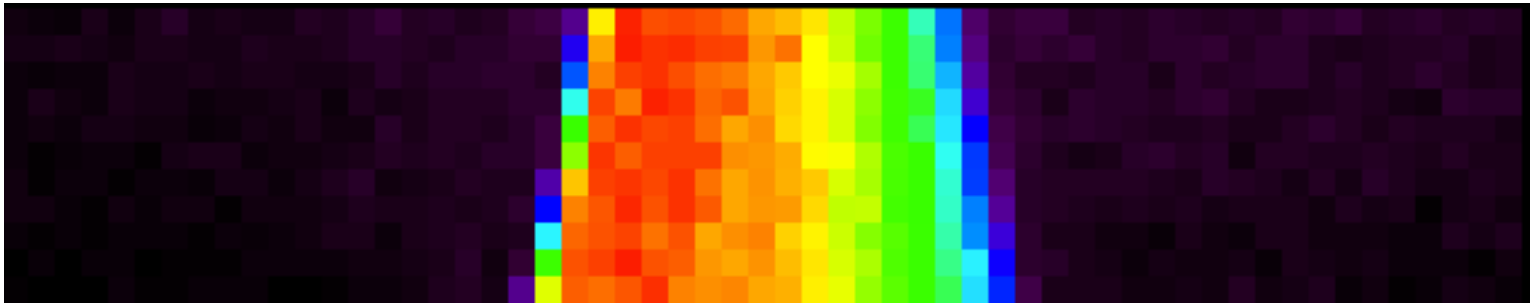
2010-138T07:14

Alt= 30,891 km

Longitude= 45°W

Latitude=1°S

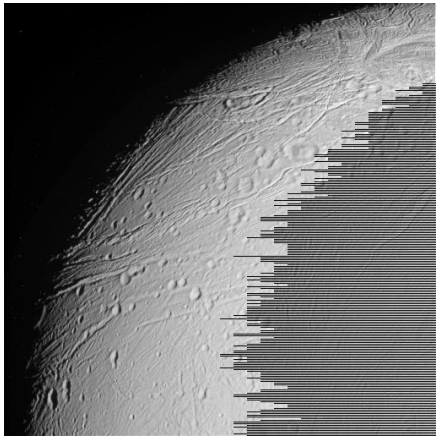
Phase= 28°

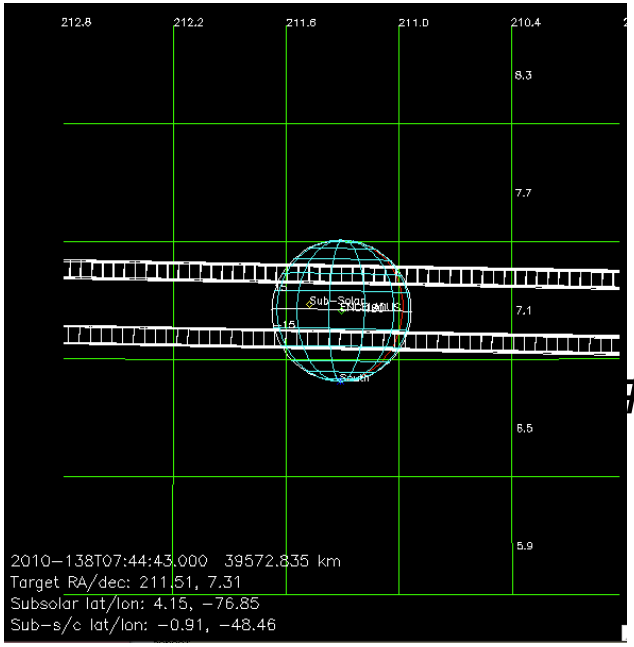


ISS_131EN_ENCEL002_PRIME

4 parts

131EN_ICYLON003_ISS
2010-138T07:45
Alt= 39,319 km
Longitude= 49°W
Latitude=0.9°W
Phase= 28°





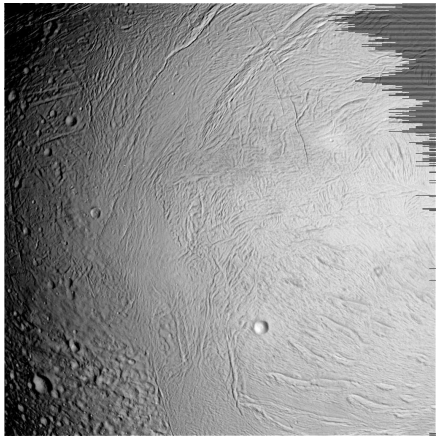
#2,3 in N.

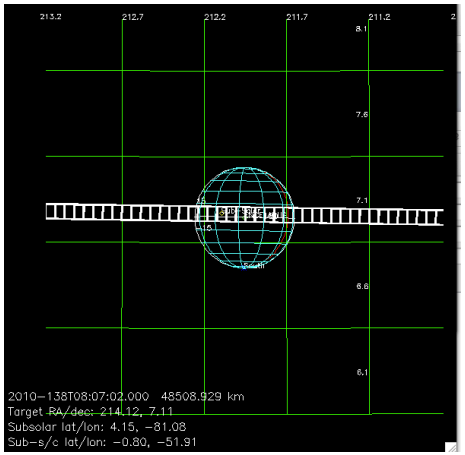
#1,4 in S.

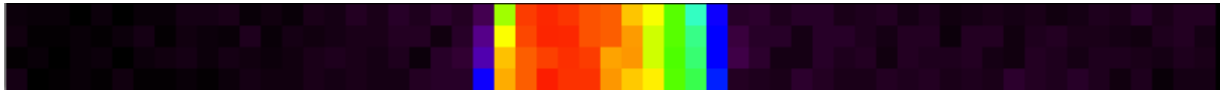
VIMS_131EN_ENCEL002_PRIME

2-part

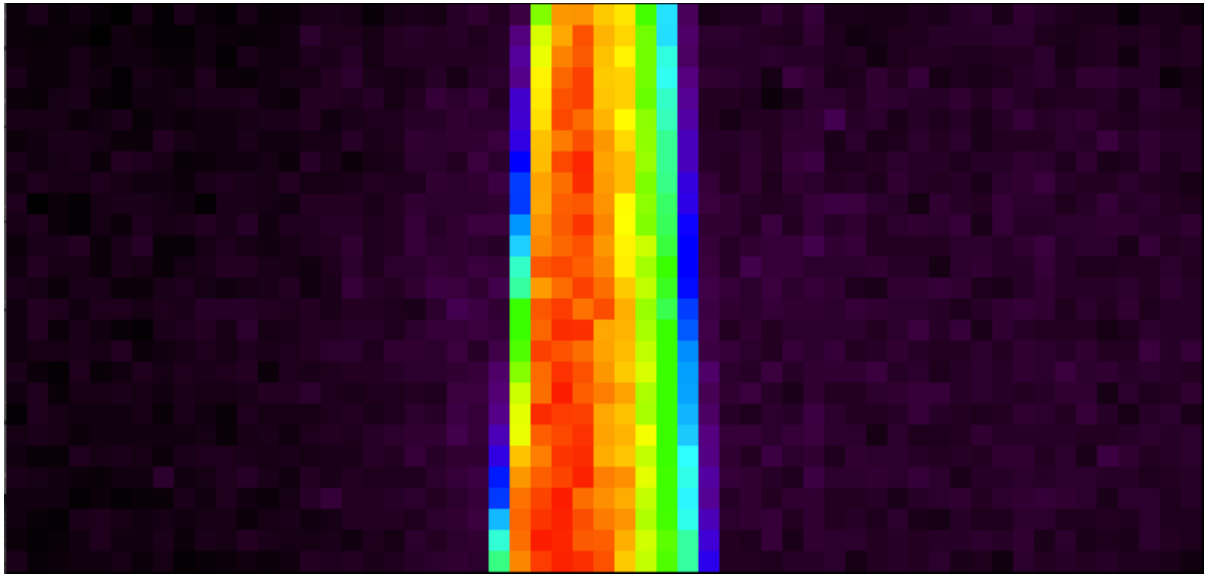
131EN_ICYLON004_VIMS
2010-138T07:58
Alt= 45,588 km
Longitude= 51°W
Latitude=0.8°S
Phase= 28.6°







Part 1

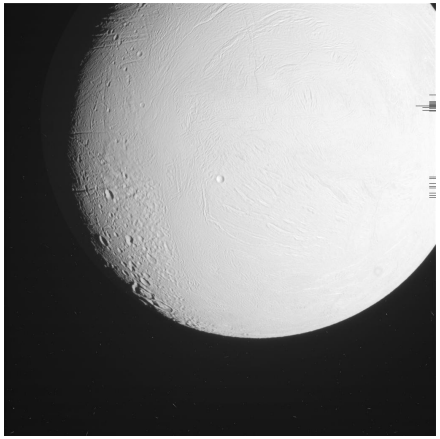


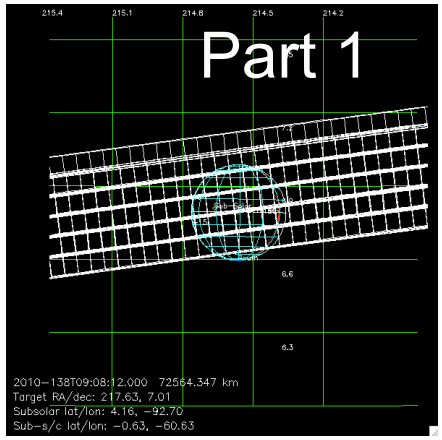
Part 2

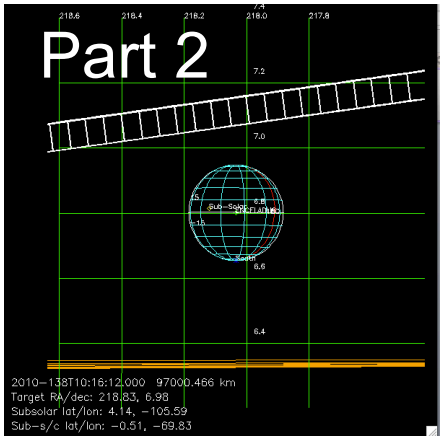
CIRS_131EN_FP3DAYMAP001_PRIME

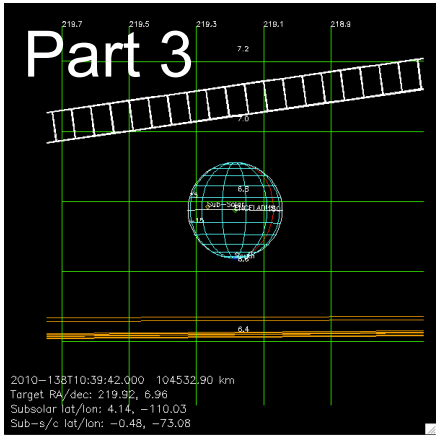
3-part

131EN_ICYLON002_CIRS
2010-138T09:10
Alt= 83,390 km
Longitude= 65°W
Latitude=0.6°S
Phase= 33°



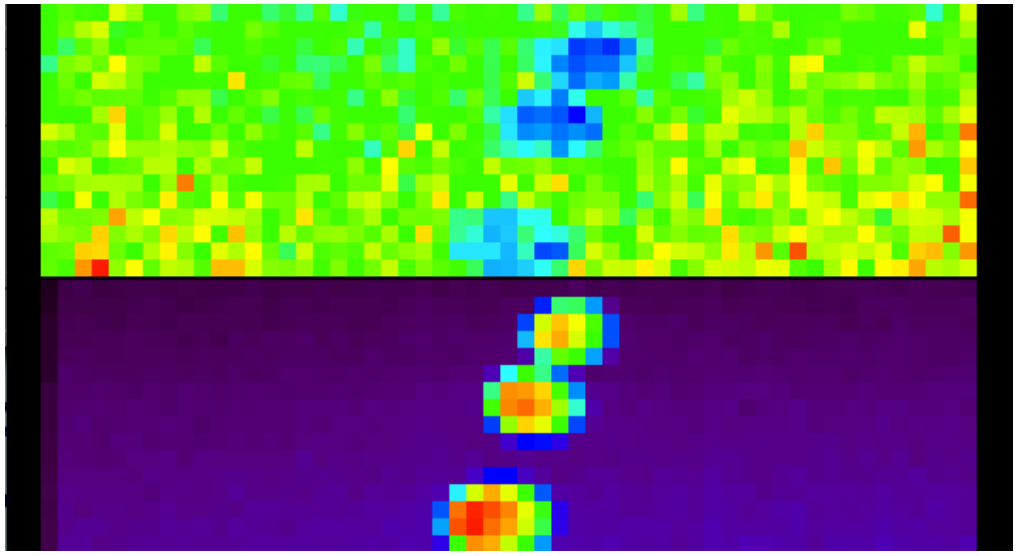






Part 1

Ly-a

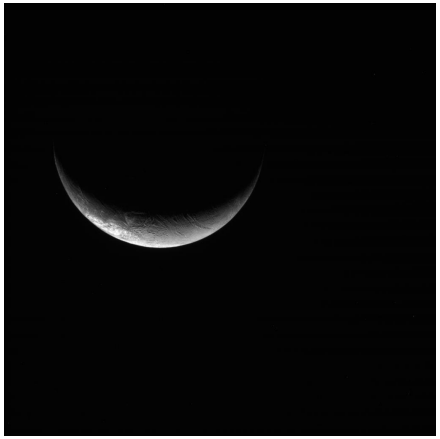


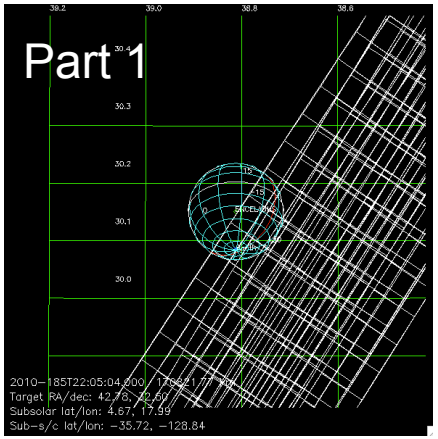
Long waves

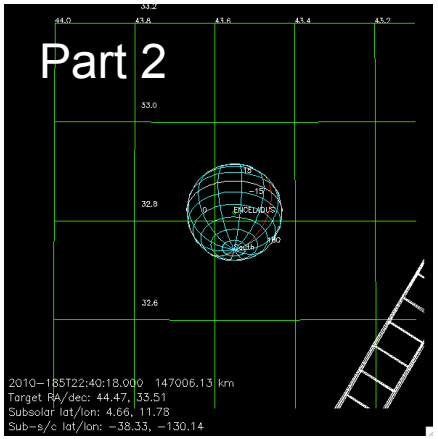
6-part

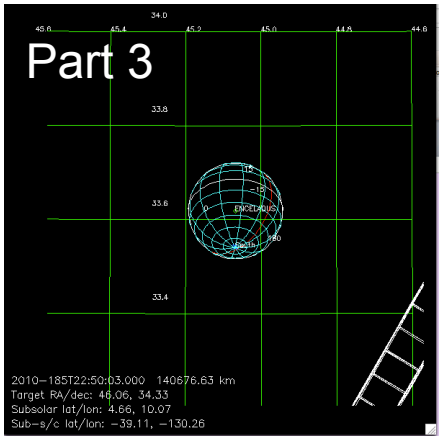
134EN_ICYLON002_CIRS

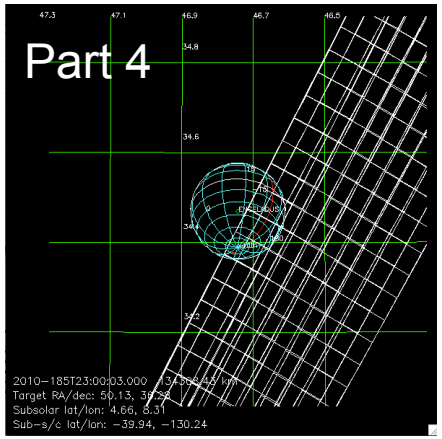
2010-185T22:06
Alt= 160,304 km
Longitude= 130°W
Latitude=37°S
Phase= 134°

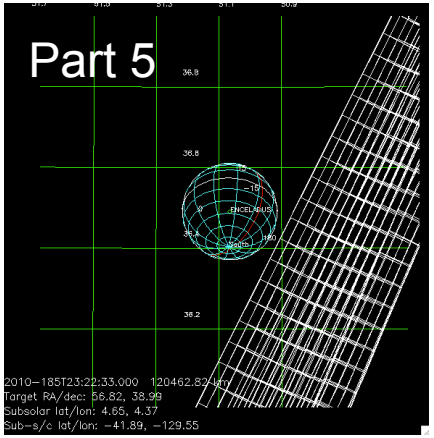


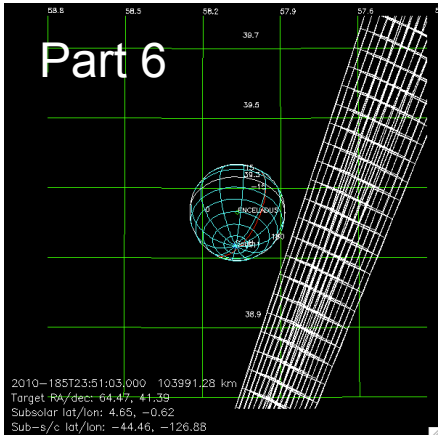




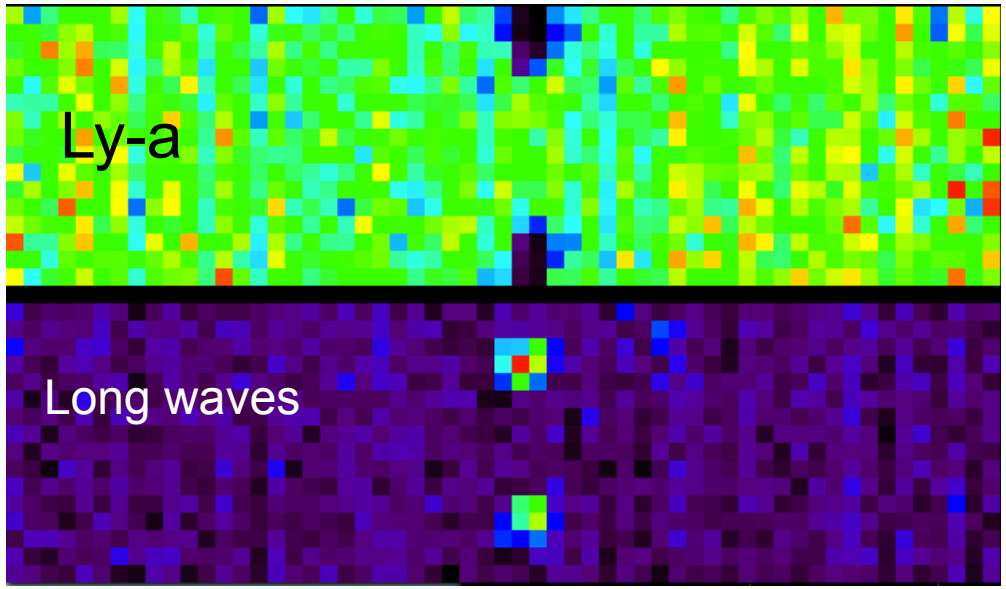








Part 1



ISS_136EN_PLMLRHP001_PRIME

3-part 136EN_ICYPLU001_ISS

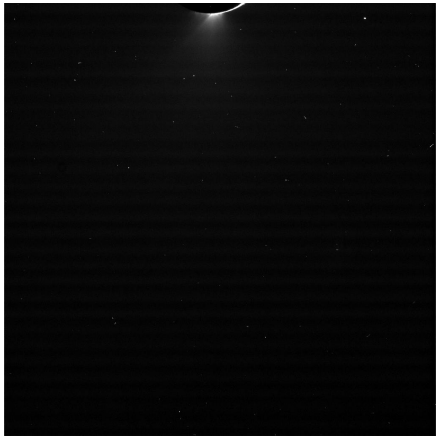
2010-225T13:23

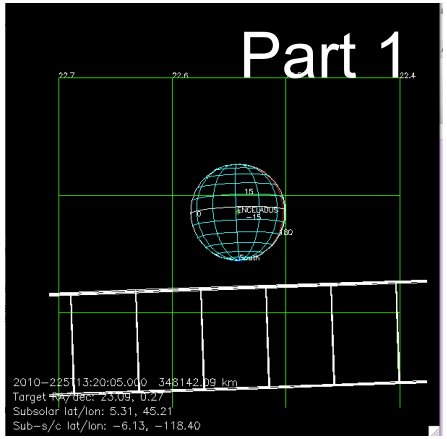
Alt= 342,365 km

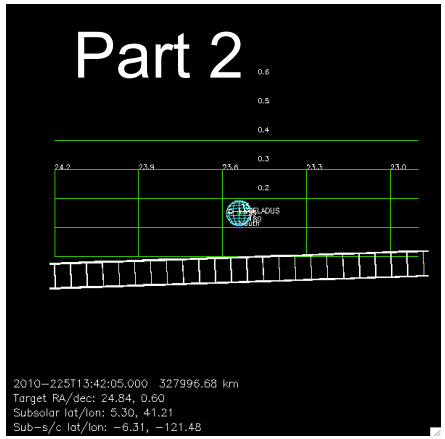
Longitude= 119°W

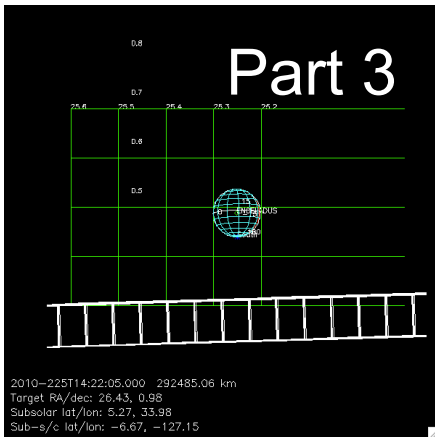
Latitude=6°S

Phase= 163.6°

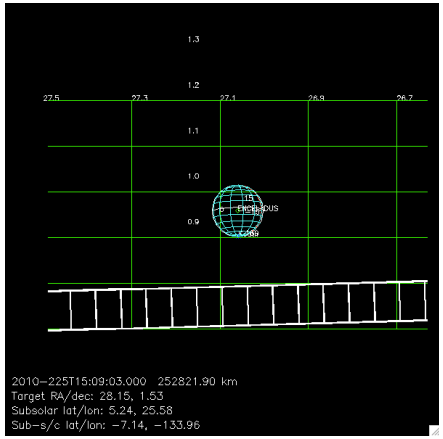






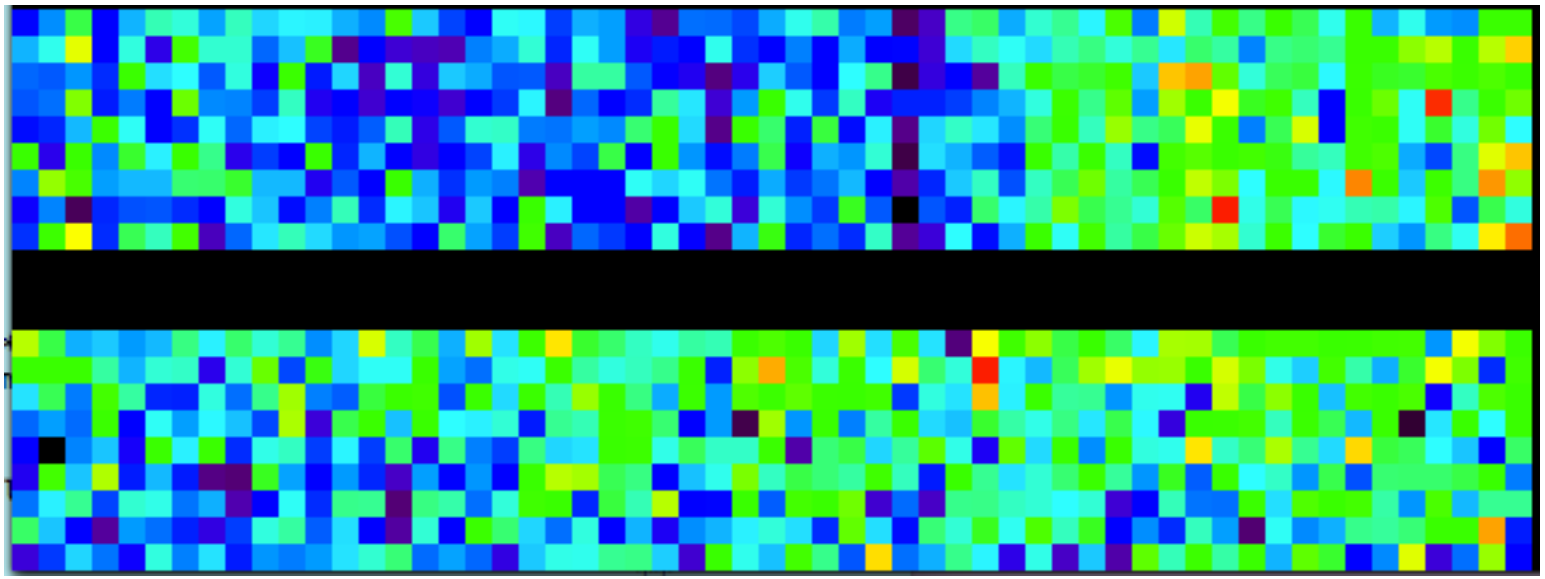


ISS_136EN_PLMSCECL001_PRIME



136EN_ICYECL001_ISS
2010-225T15:11
alt= 239,659 km
Longitude= 136°W
Latitude=7.3°S
Phase= 159°

s/c is in eclipse, not Encel



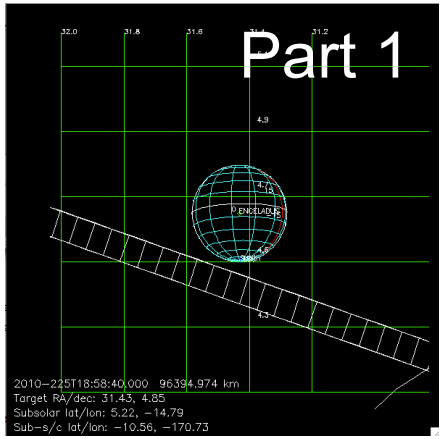
Ly-a

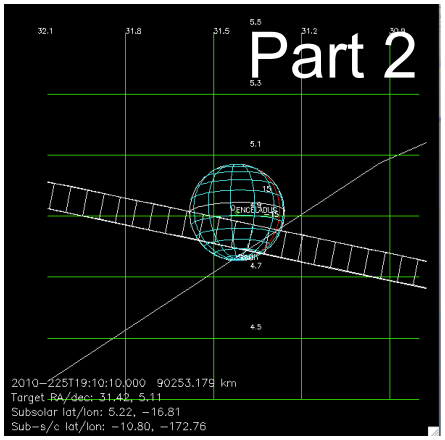
Long waves

CIRS_136EN_DRKPLUME001_PRIME

2-part

136EN_ICYPLU002_CIRS
2010-225T19:01
Alt= 96,139 km
Longitude= 171°W
Latitude=11°S
Phase= 154.6°





Saturn limb

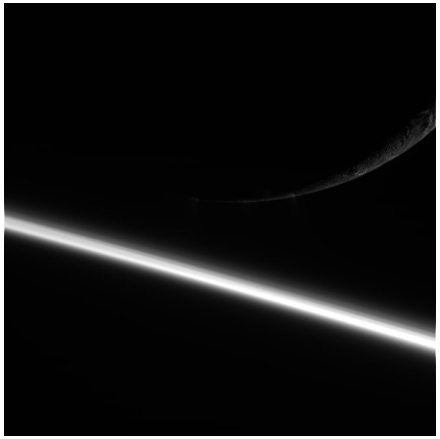
Ly-a

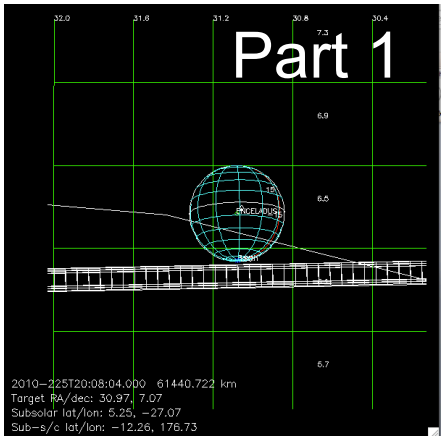
Long waves

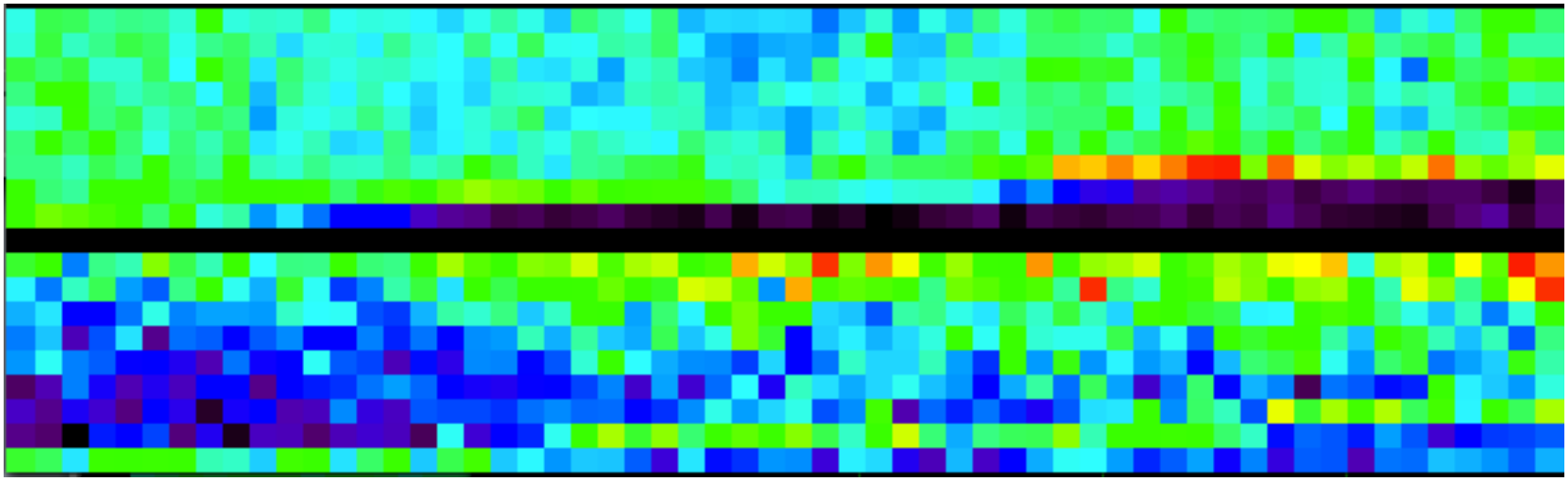
ISS_136EN_PLMHRHP002_PRIME

7-part

136EN_ICYPLU002_ISS
2010-225T20:11
Alt= 59,700 km
Lon= 184°W
Phase= 154.6°







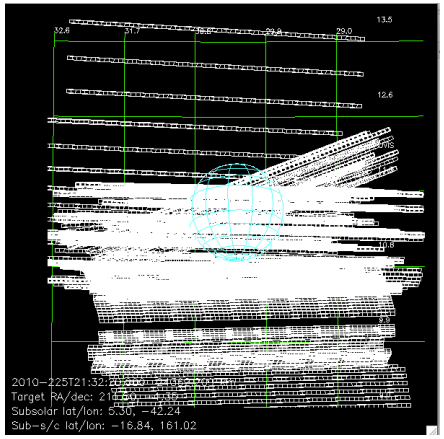
Ly-a

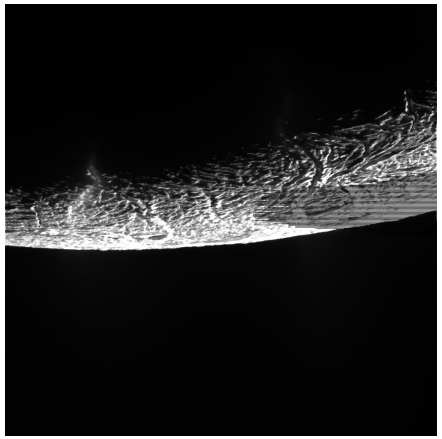
Long waves

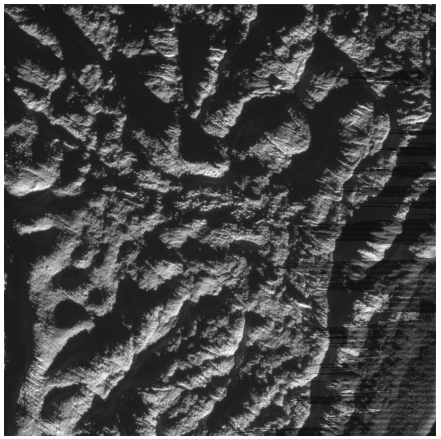
CIRS_136EN_HIRES001_PRIME

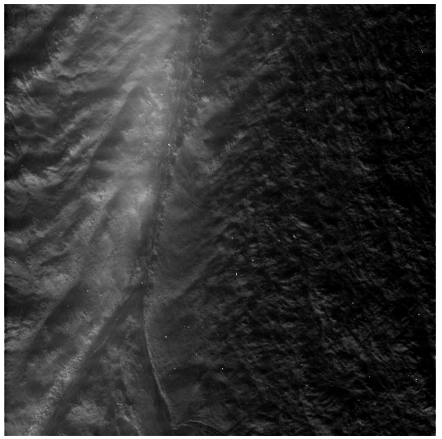
45-part

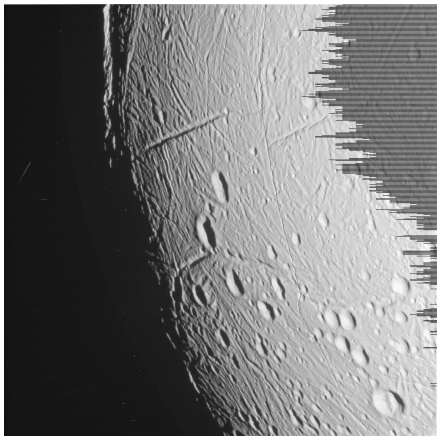
136EN_ICYMAP001_CIRS
2010-225T21:31
Alt= 24,357 km
Longitude= 200°W
Phase= 154°



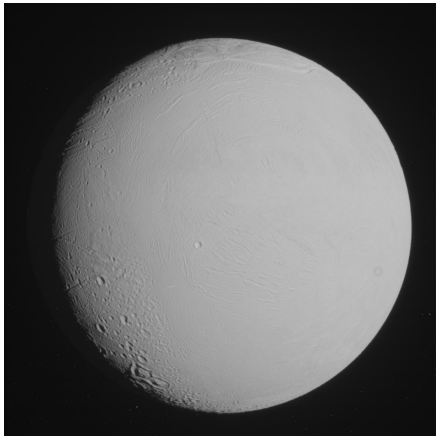


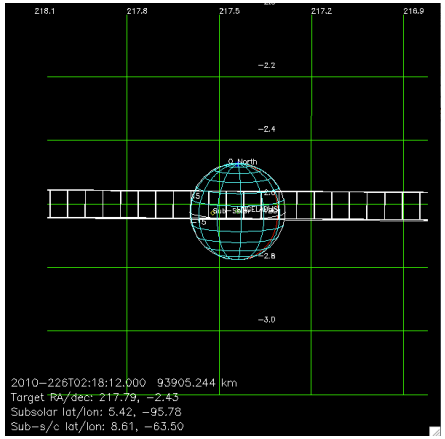




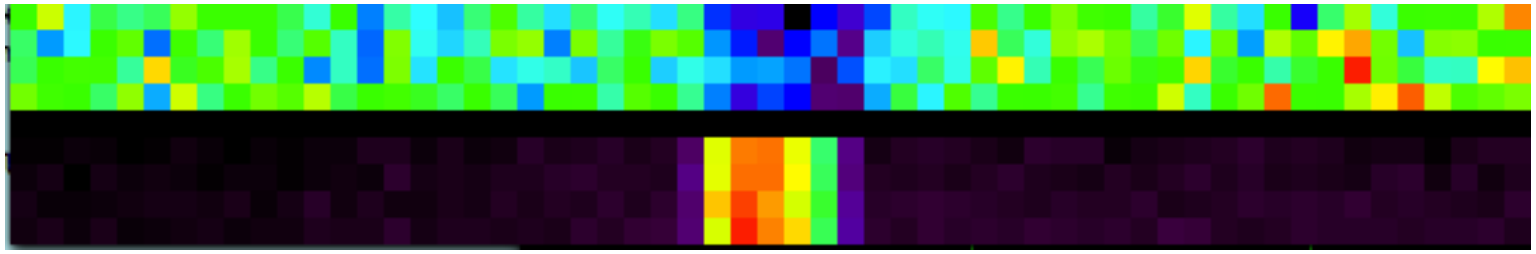


VIMS_136EN_ENCEL001_PRIME





136EN_ICYLON001_VIMS
2010-226T02:19
Alt= 94,781 km
Longitude= 64°W
Latitude=8.6°N
Phase= 31°



Ly-a

Long waves

ISS_141EN_PLMHPHR001_PIE

4-part

141EN_ICYPLU001_ISS

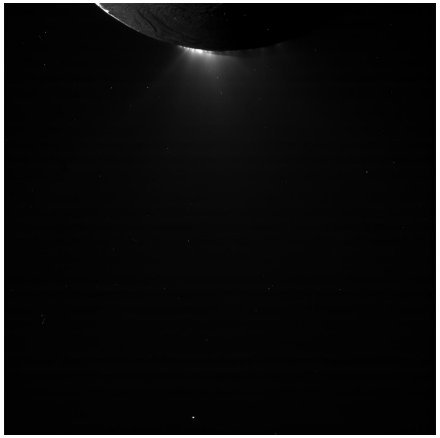
2010-334T07:29

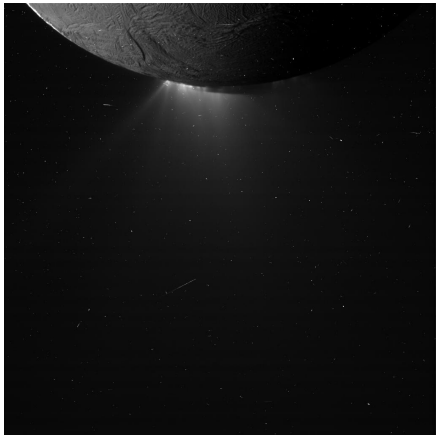
Alt= 95,964 km

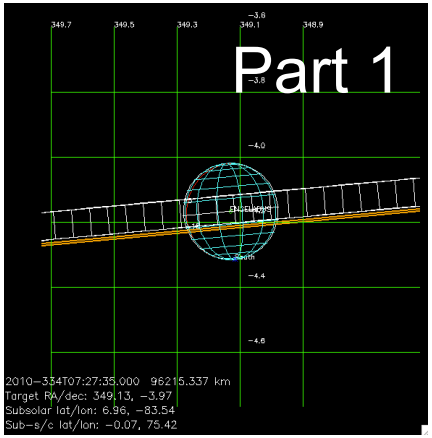
Longitude= 284°W

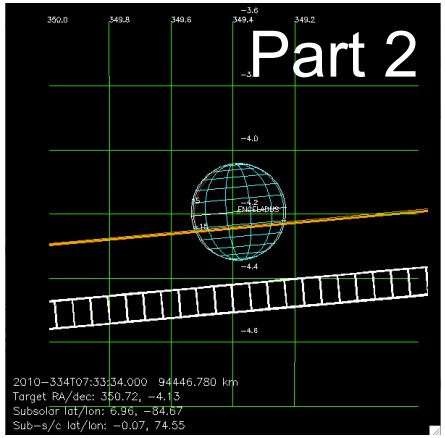
Latitude=0°N

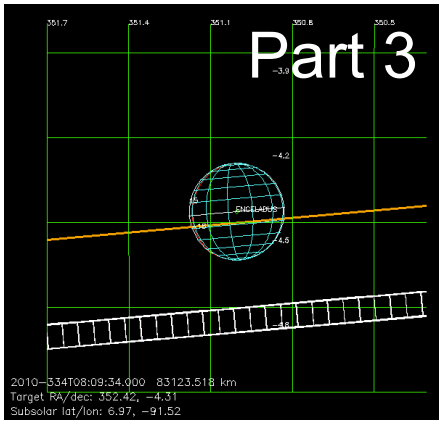
Phase= 158.6°

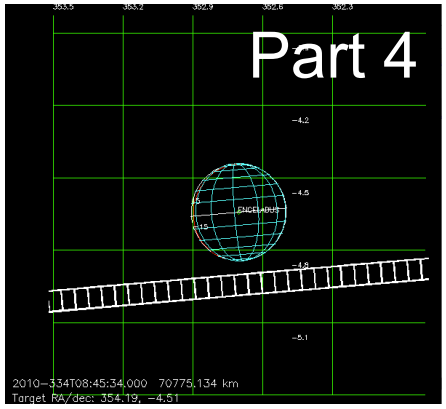




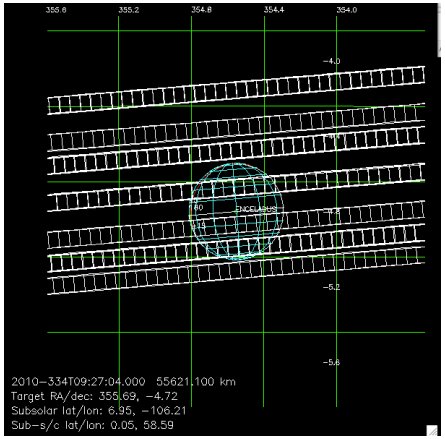




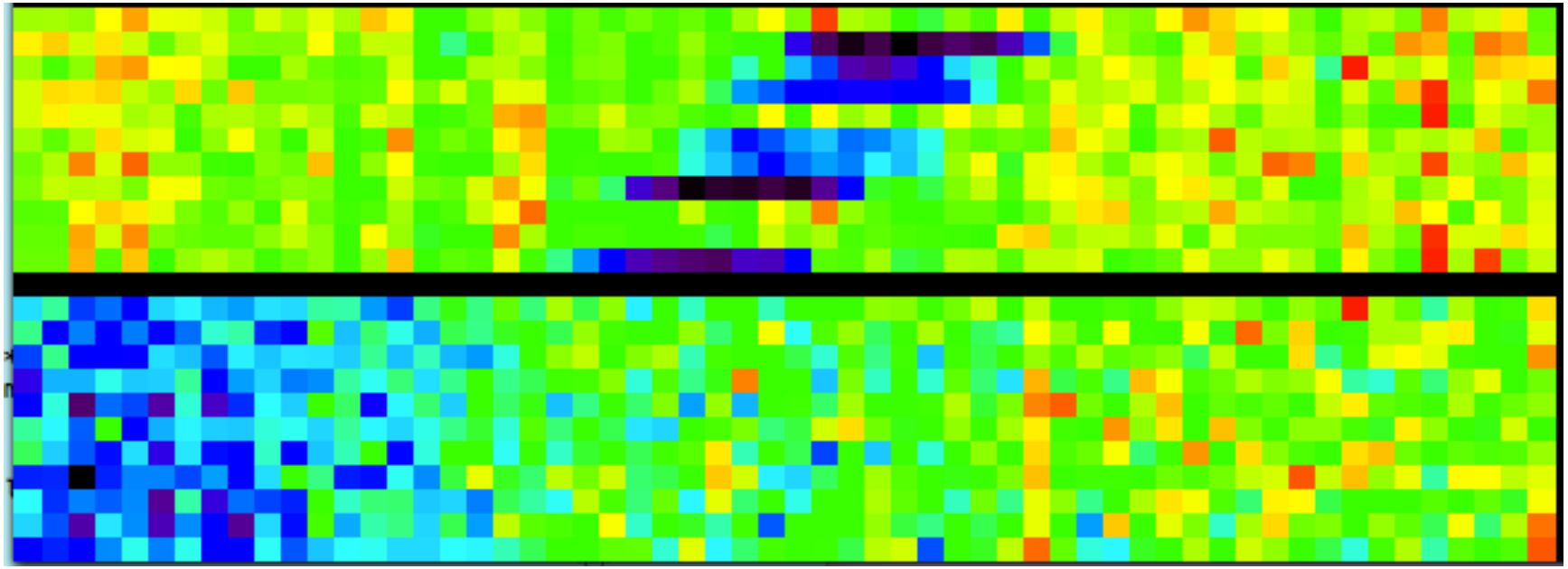




CIRS_141EN_DRKMAP001_PRIME



141EN_ICYPLU001_CIRS
2010-334T09:28
Alt=49,726 km
Longitude=304°W
Latitude=0.1°N
Phase=164°



Ly-a

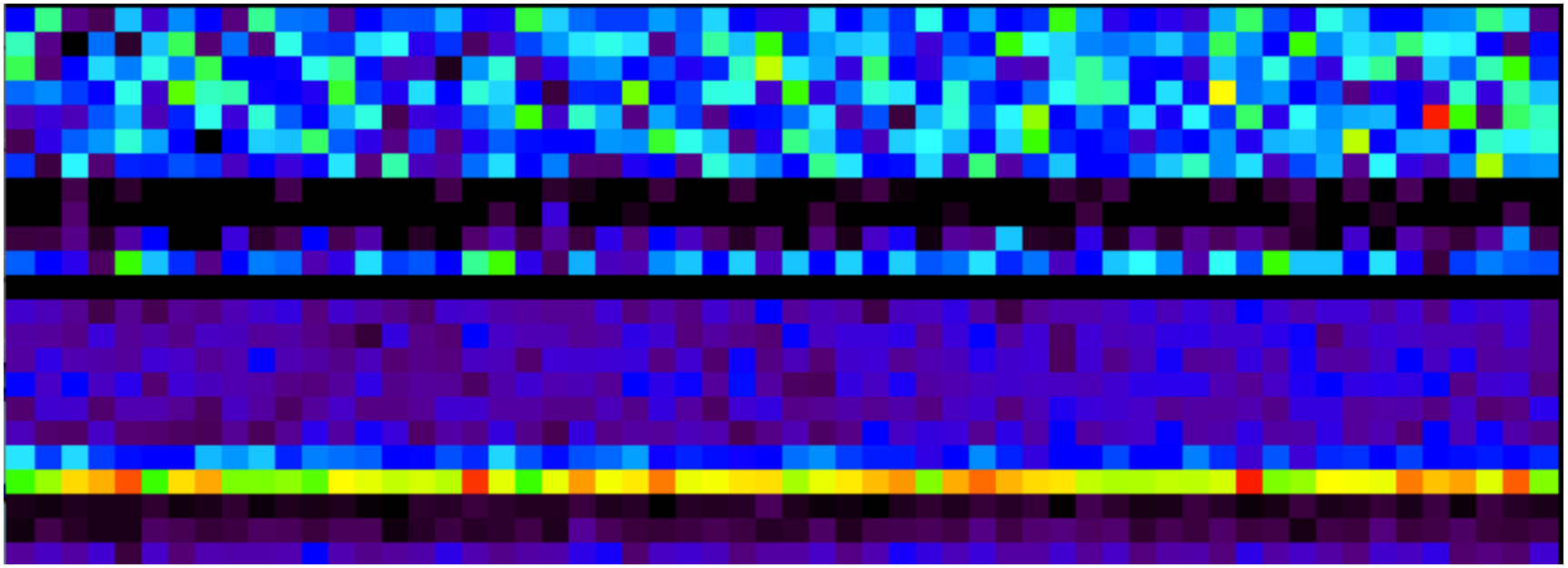
Long waves

RSS_141EN_GRAVITY002_PIE

141EN_ICYMAP001_RSS
2010-334T11:52
Alt= 454 km km
Longitude= 155°W
Latitude=29°N
Phase= 49°

WAC images

Enceladus quickly passes through UVIS slit



Ly-a

Long waves

CIRS_141EN_DAYMAP001_PRIME

5-part

141EN_ICYMAP001_CIRS

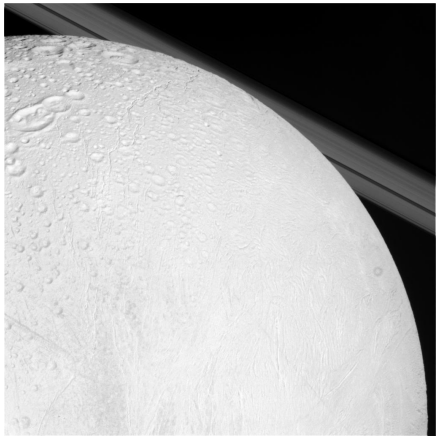
2010-334T13:51

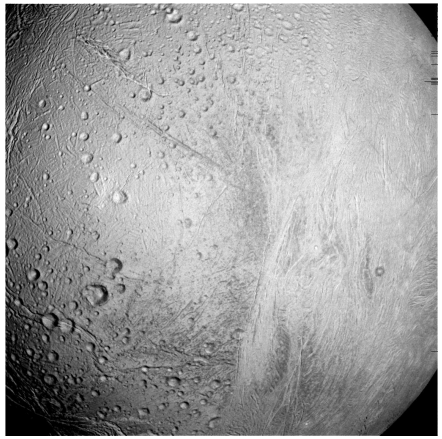
Alt= 45,441 km

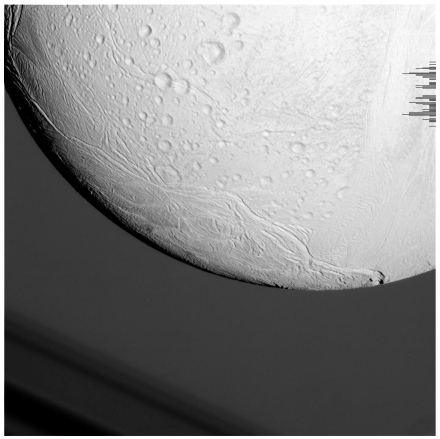
Longitude= 167°W

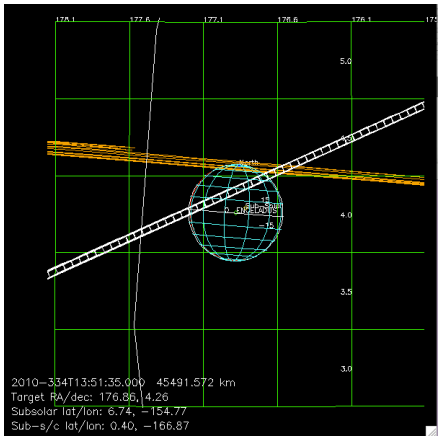
Latitude=0.4°N

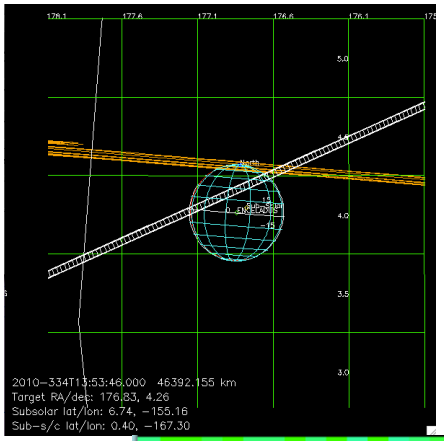
Phase = 14°

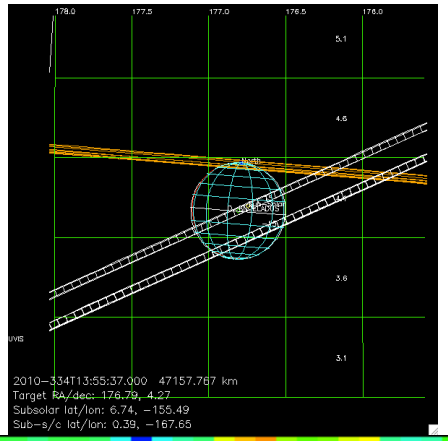


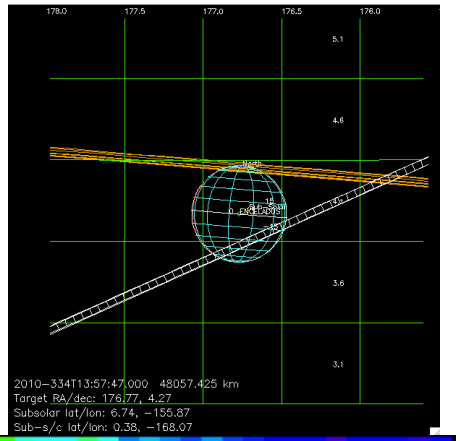


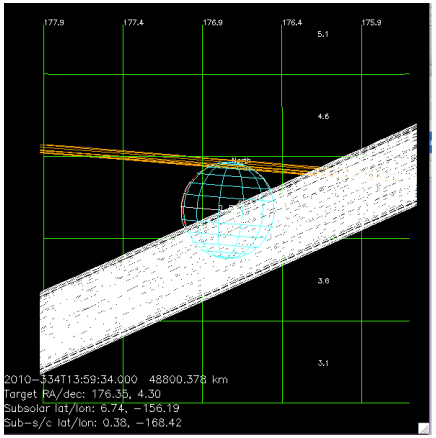


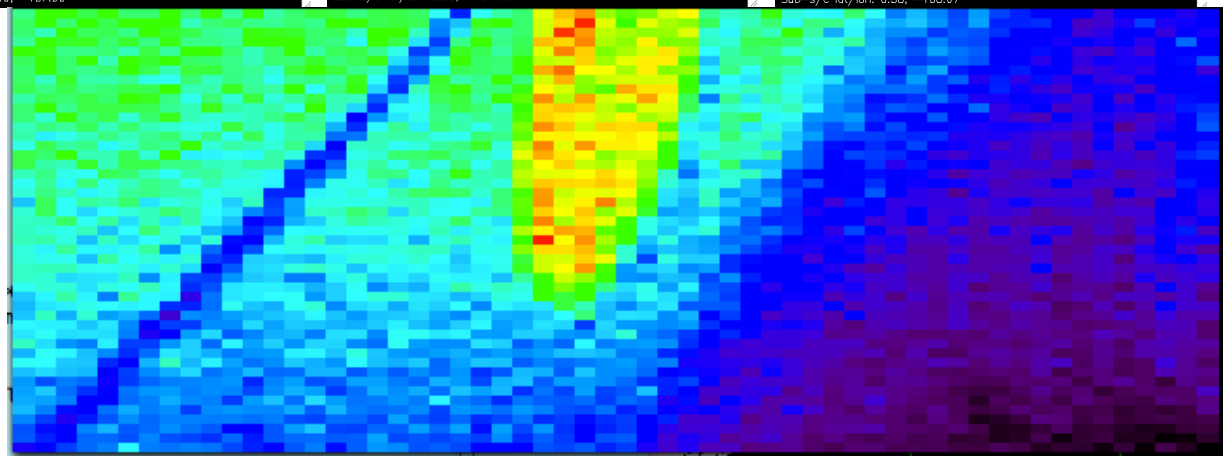




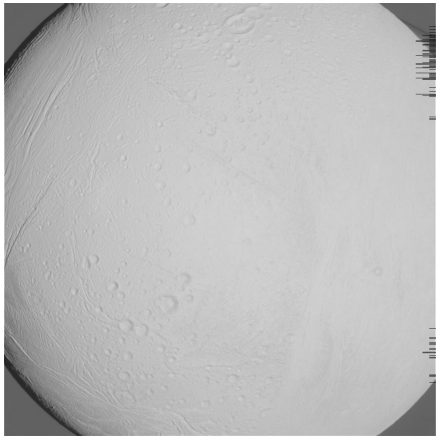


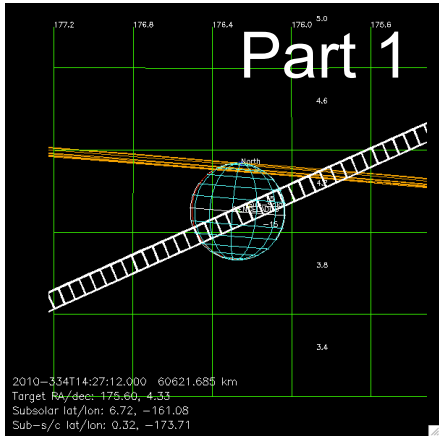


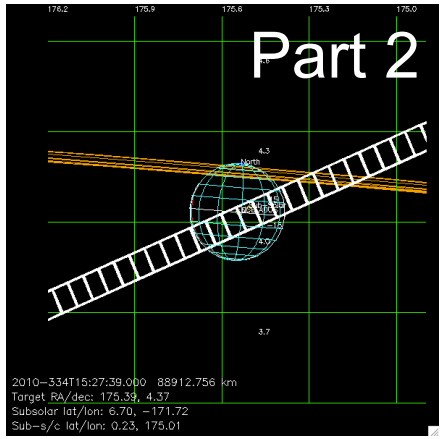




2-part 141EN_ICYLON001_VIMS

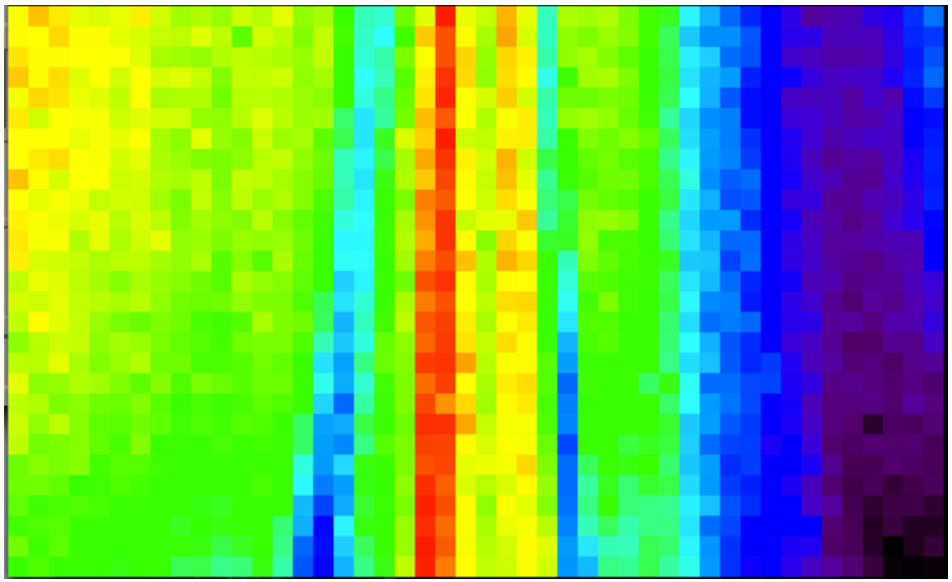






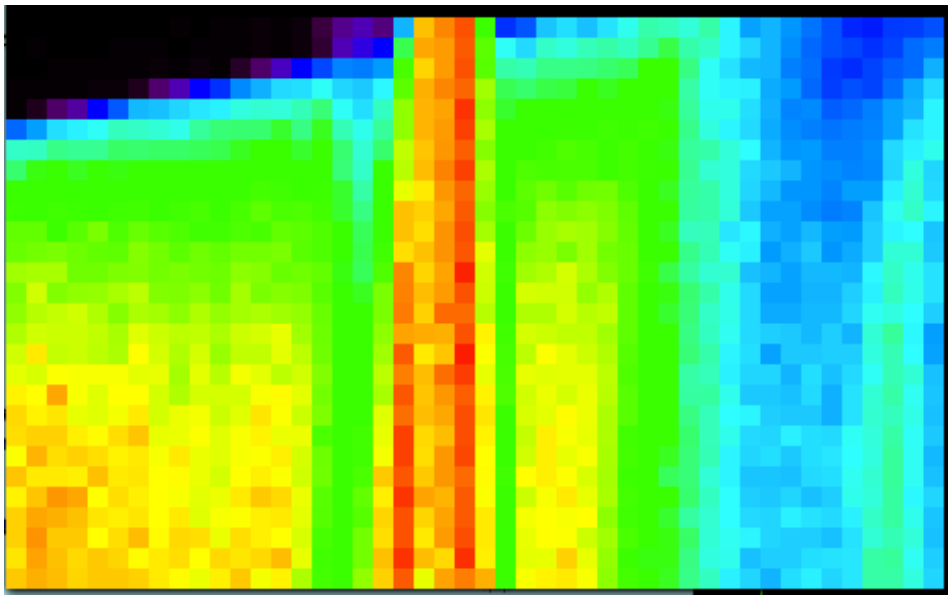
2010-334T14:28
Alt= 72,680 km
Longitude= 179°W
Latitude=0.3°N
Phase= 15°

In front of Saturn



Part 1

Part 2



2-part

UVIS_141EN_ICYLON001_PRIME

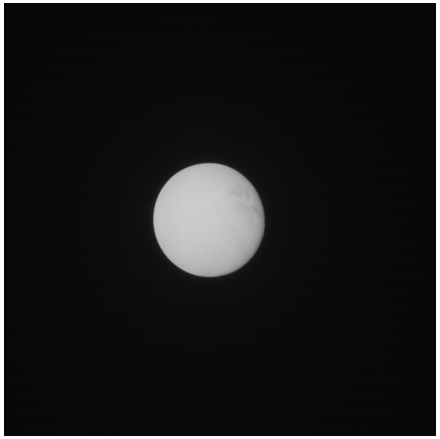
2010-334T20:27

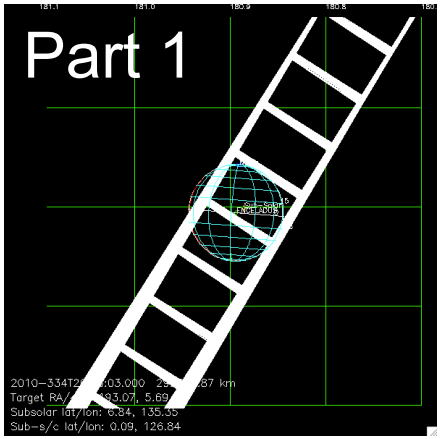
Alt= 408,900 km

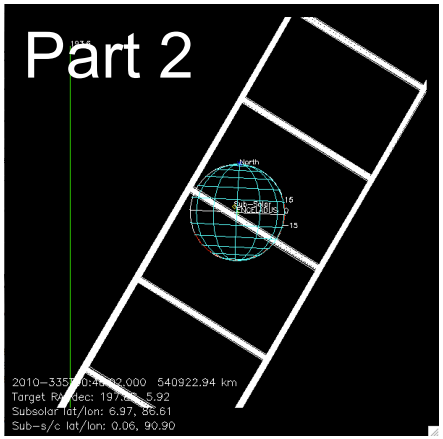
Longitude= 251°W

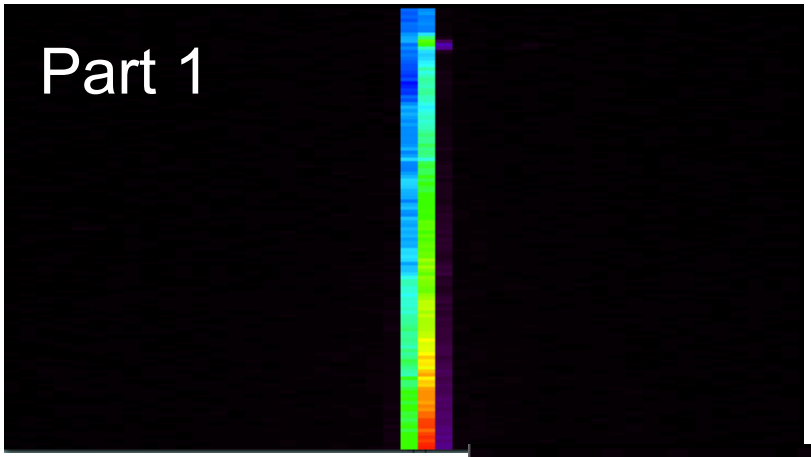
Latitude=0.1°N

Phase= 8.3°

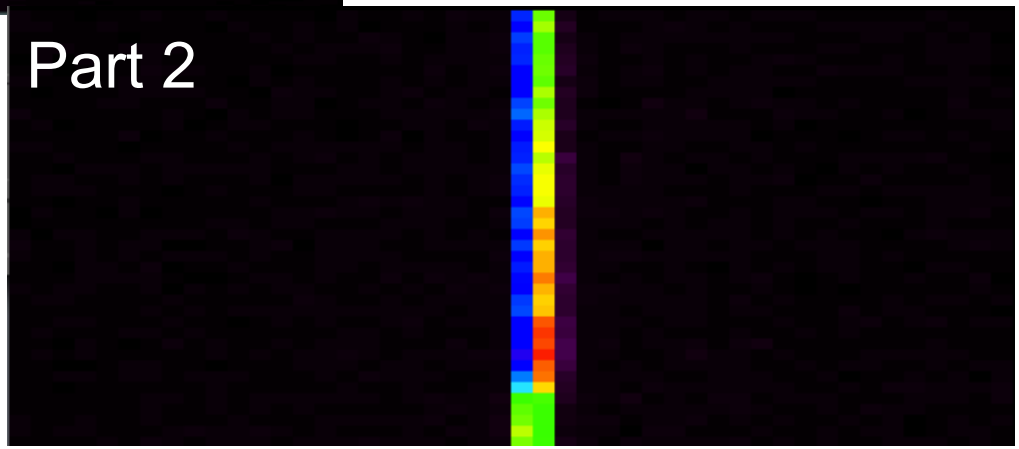








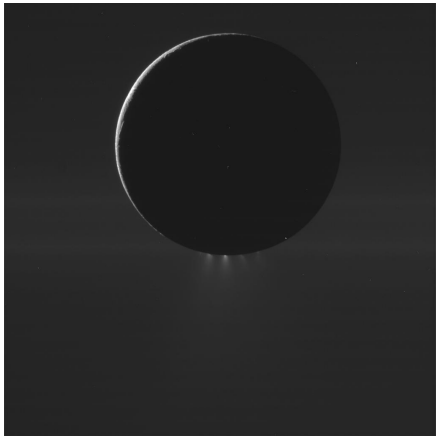
Dione passes thru slit

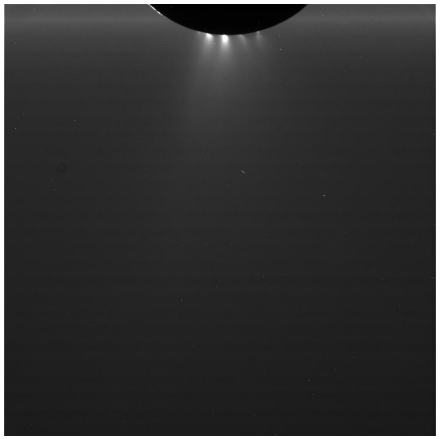


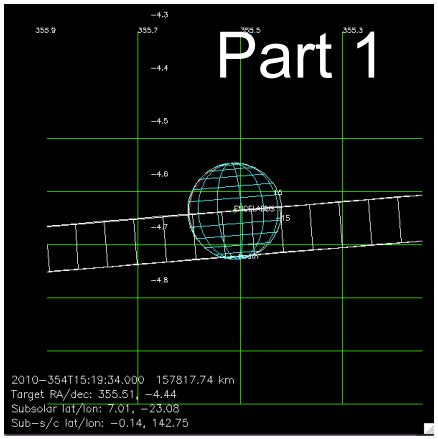
ISS_142EN_PLMHPHR001_PIE

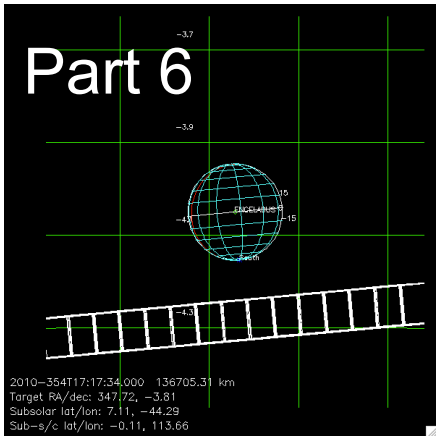
11-part

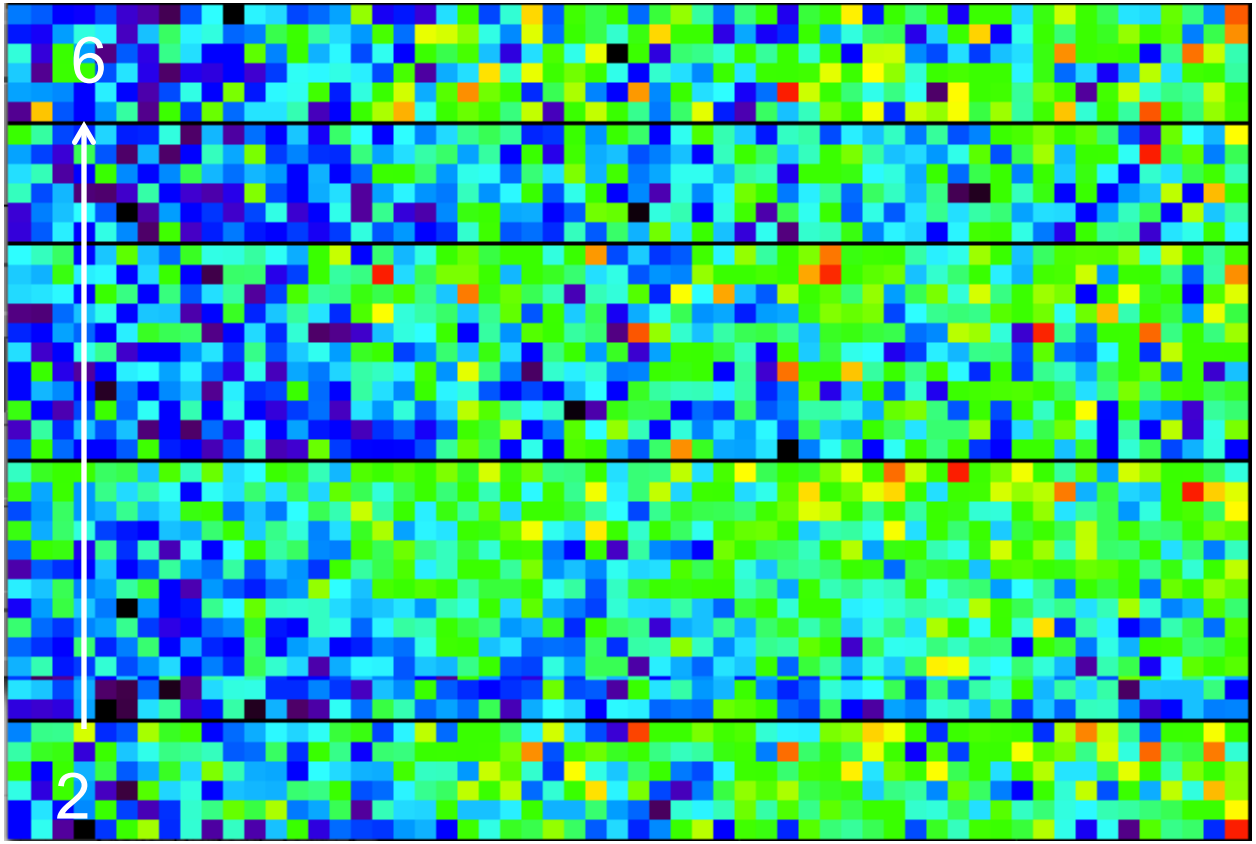
UVIS_142EN_ICYPLU001_ISS
2010-354T15:21
Alt= 157,563 km km
Longitude= 217°W
Latitude=0.14°S
Phase= 164°







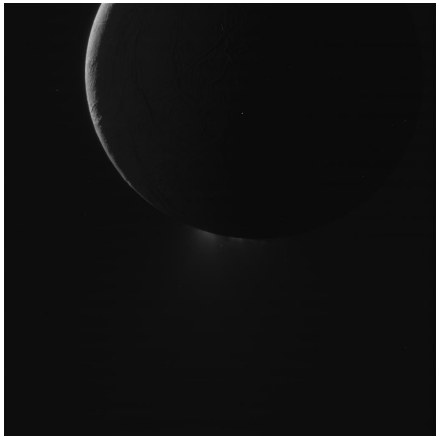


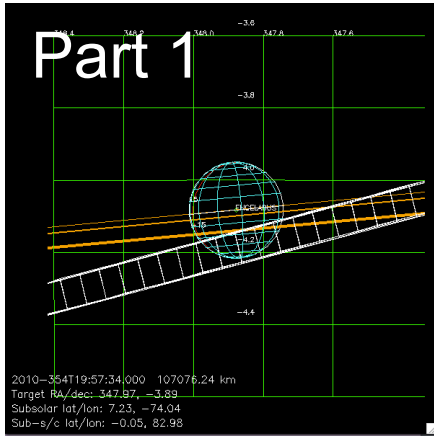


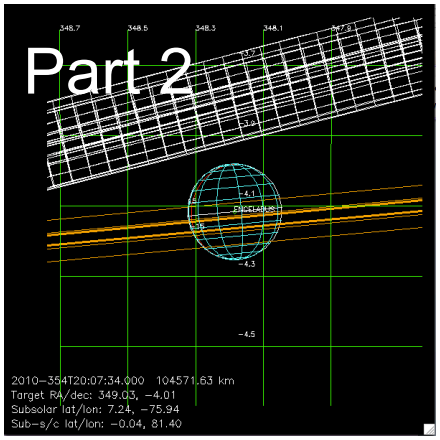
CIRS_142EN_NITEMAP001_PRIME

2-part

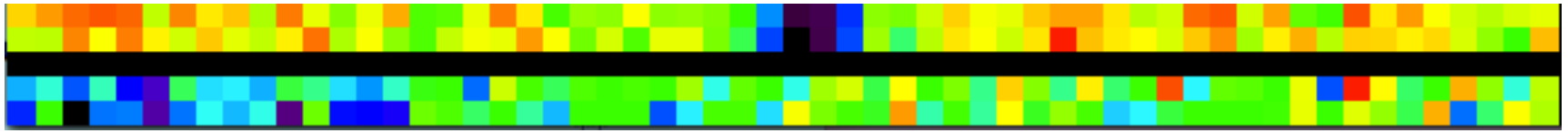
UVIS_142EN_ICYPLU002_CIRS
2010-354T19:59
Alt= 106,454 km
Longitude= 277°W
Latitude=0.05°S
Phase= 157°







Part 1



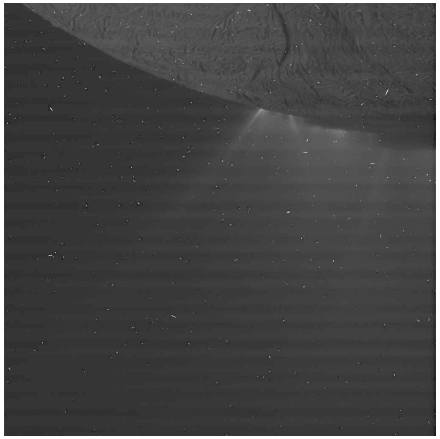
Ly-a

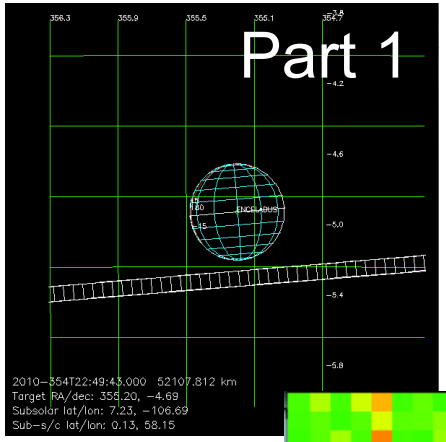
Long waves

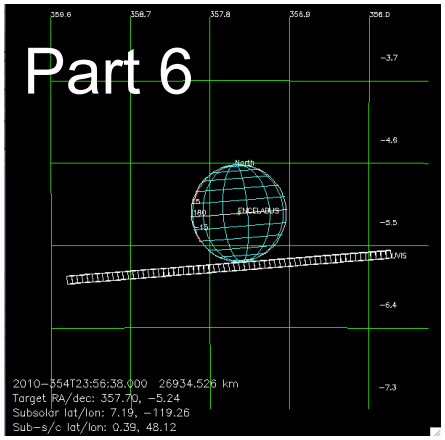
ISS_142EN_PLMHPHR002_PIE

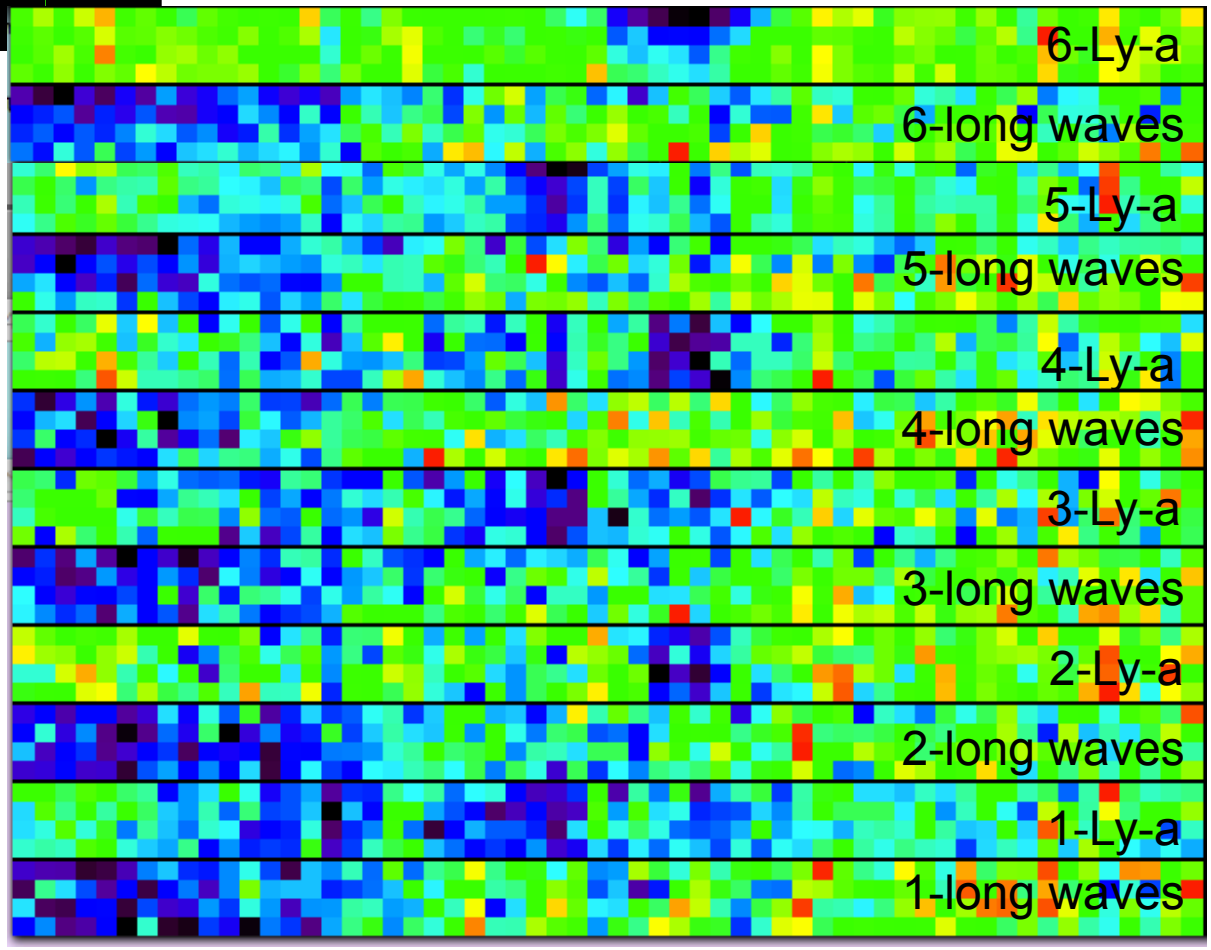
7-part

UVIS_142EN_ICYPLU003_ISS
2010-354T22:51
Alt= 50,179 km
Longitude= 303°W
Latitude=0.14°N
Phase= 164°









ISS_142EN_ORSCA001_PRIME

11-part

142EN_ICYMAP001_ISS

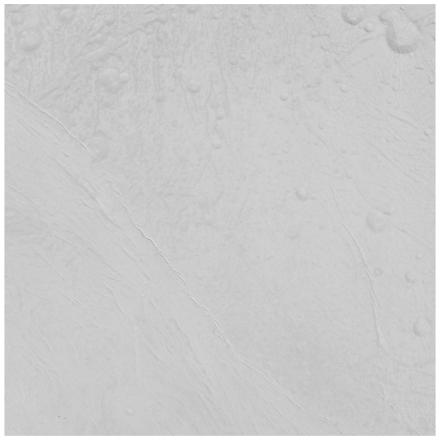
2010-355T02:14

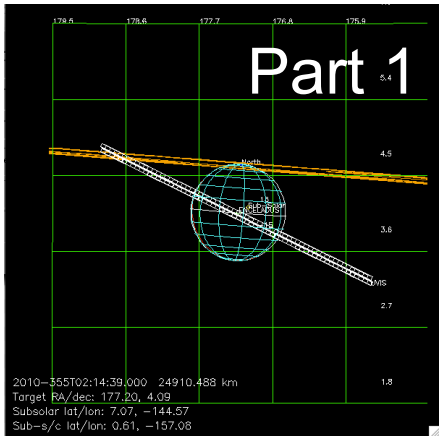
Alt= 25,134 km

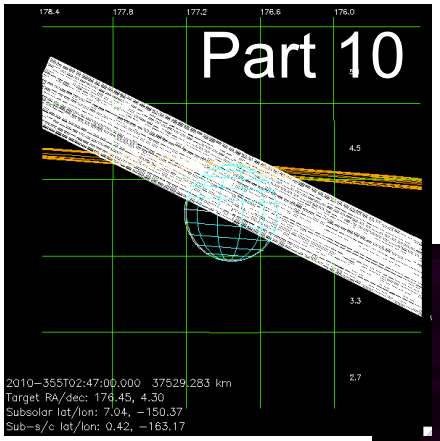
Longitude= 157°W

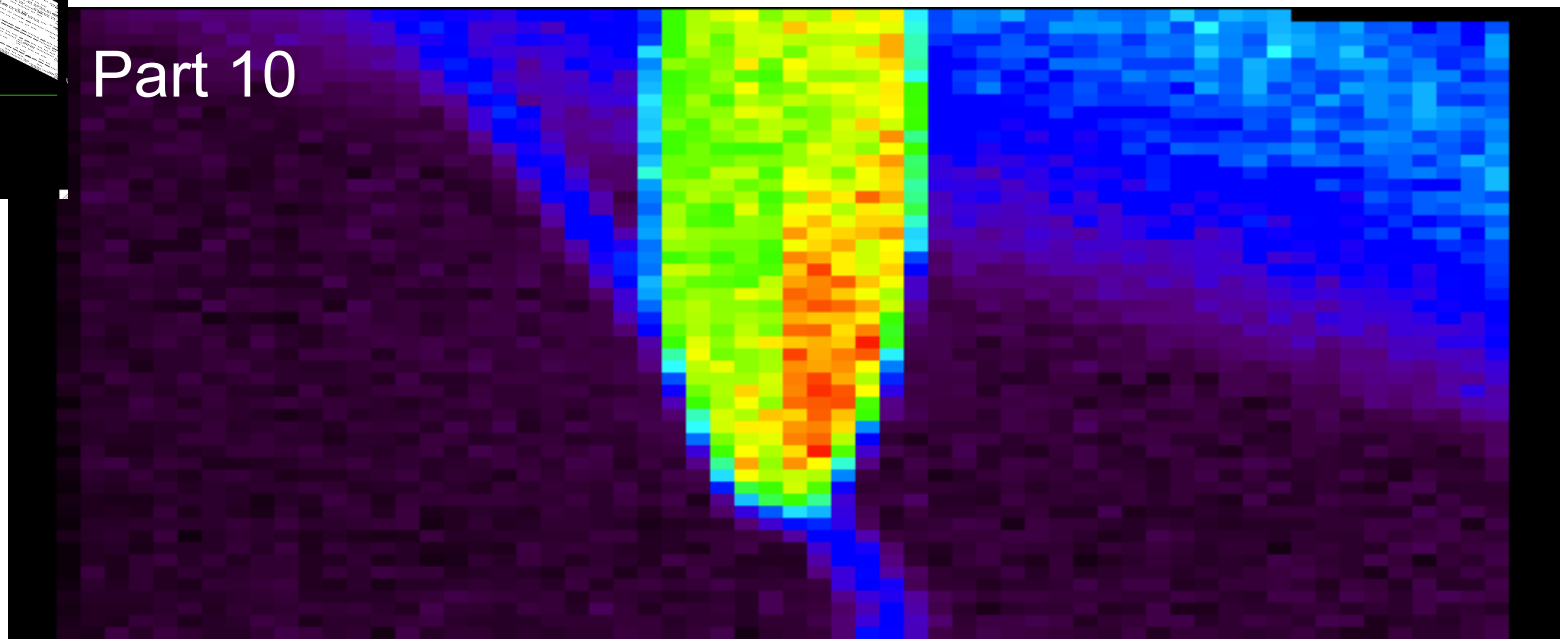
Latitude=0.6°N

Phase= 15°





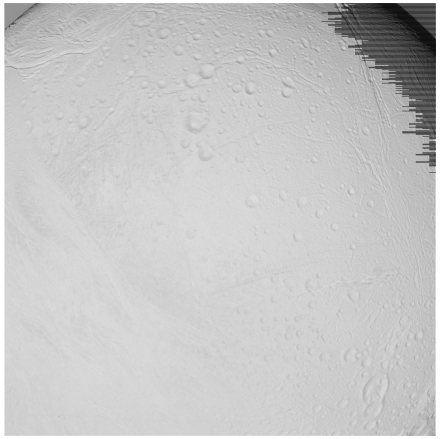


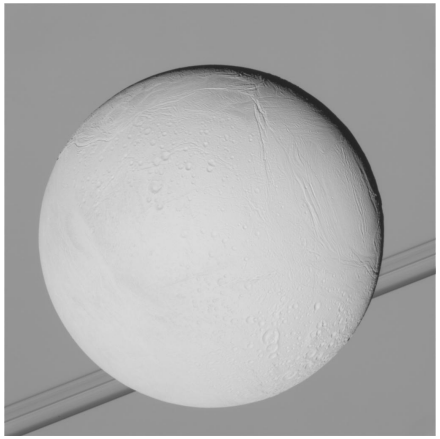


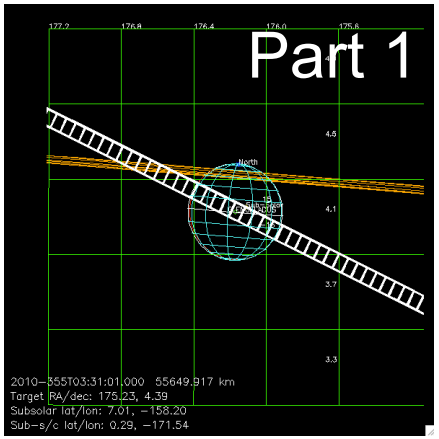
VIMS_142EN_ENCEL001_PIE

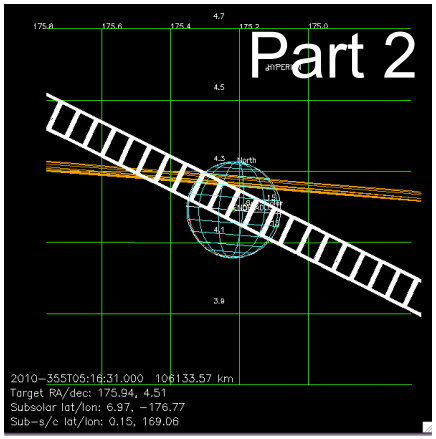
2-part

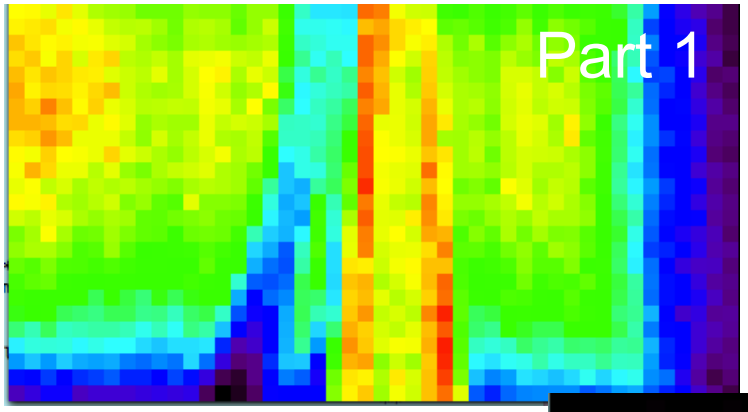
142EN_ICYLON001_VIMS
2010-355T03:33
Alt= 77,360 km
Longitude= 181°W
Latitude=0.2°N
Phase= 16°



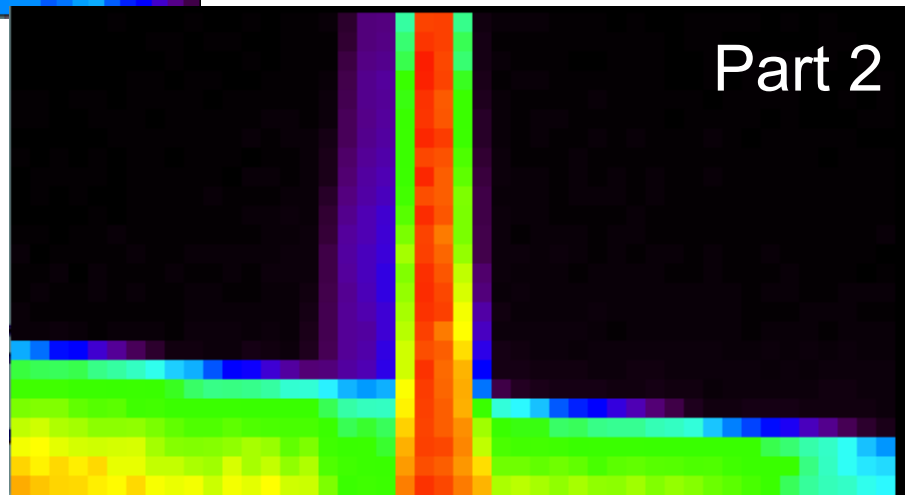






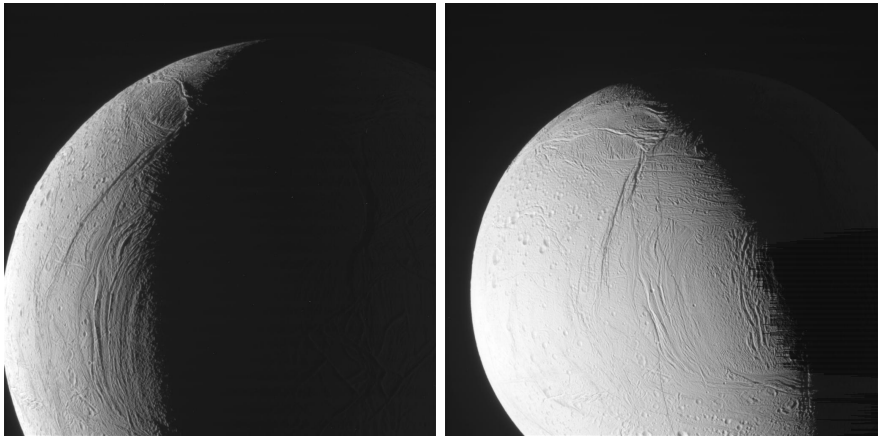


Enceladus in front of Saturn



11-part

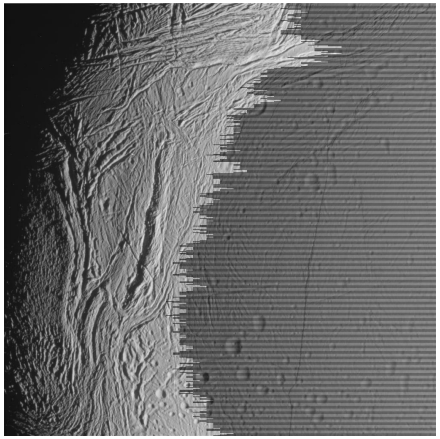
144EN_ICYLON001_ISS
2011-031T05:34
Alt= 60,743 km
Longitude= 271°W
Phase= 120°

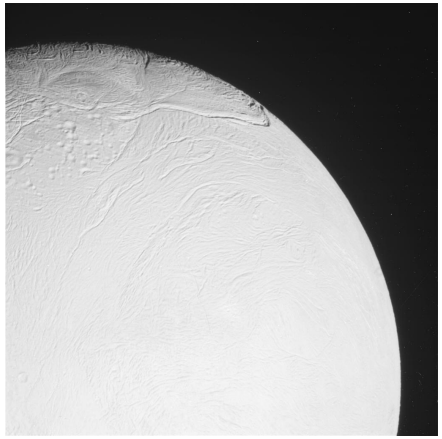


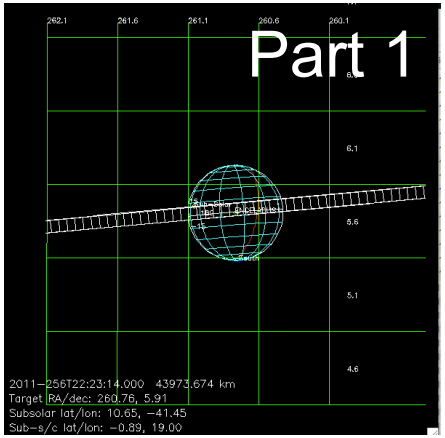
4-panel NAC mosaic, 2:30 dwells
Full disk FP1 scan at 40 µrad/sec
4-panel NAC mosaic, 2:30 dwells
FP1 scan, again at 40 µrad/sec
4-panel NAC mosaic, 1:00 dwells

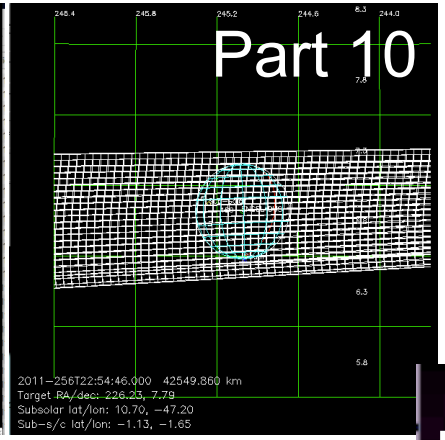
15-part

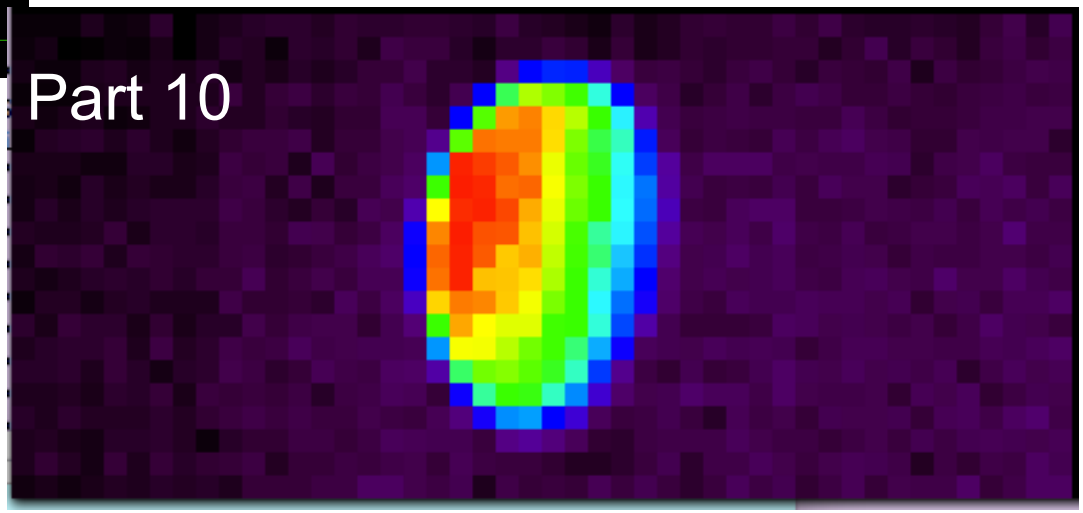
153EN_ICYLON001_ISS
2011-256T22:24
Alt= 43,718 km
Longitude= 341°W
Latitude=0.9°S
Phase= 63.1°





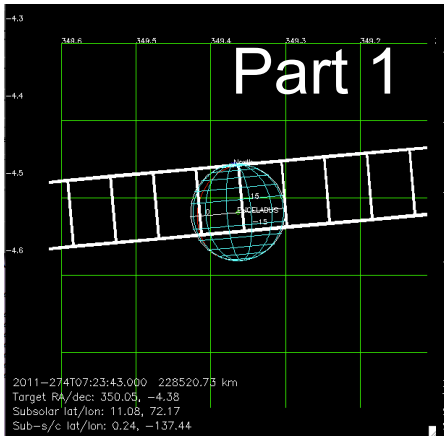


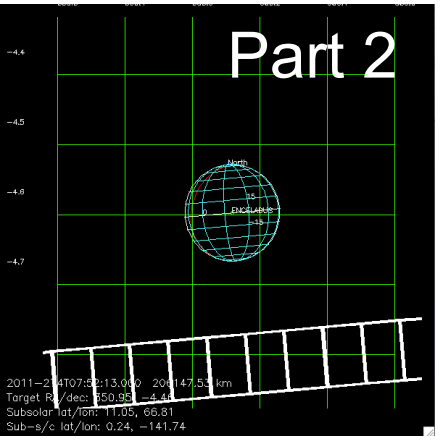


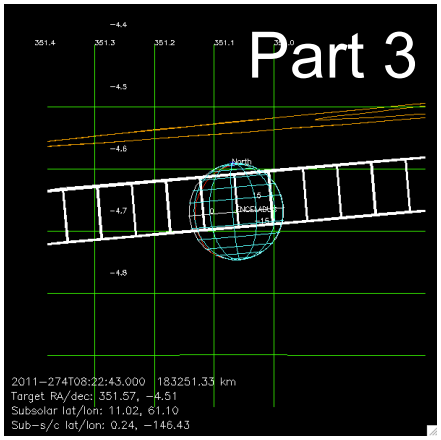


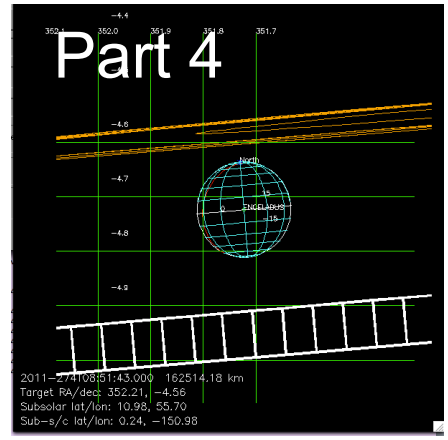
8-part

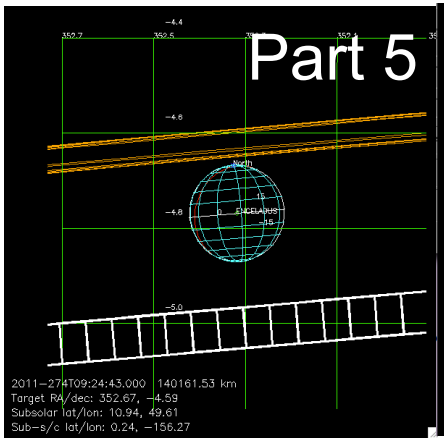
154EN_ICYLON001_ISS
2011-274T07:24
Alt= 219,548 km
Longitude= 139°W
Latitude=0.24°N
Phase= 149°

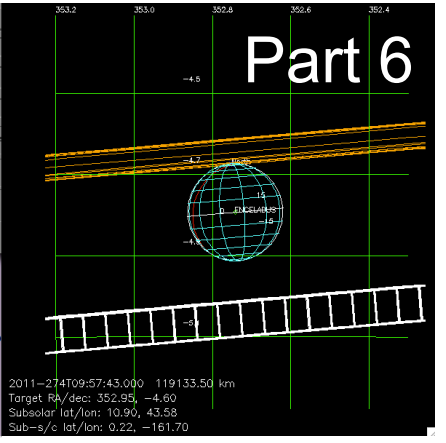


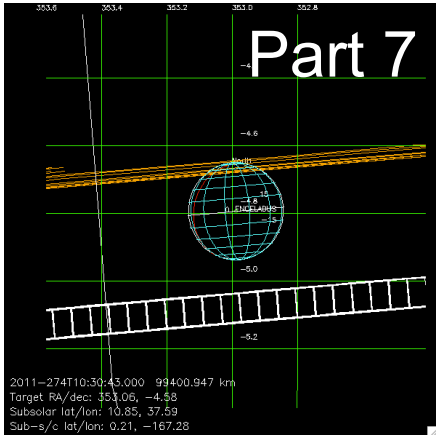


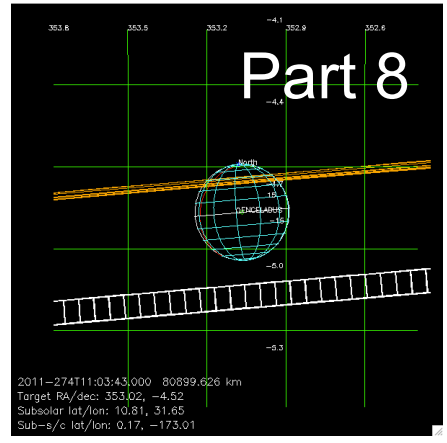






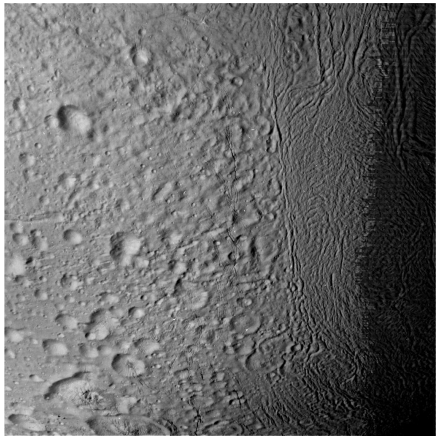


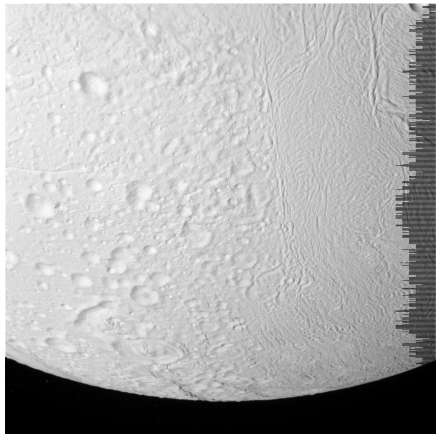


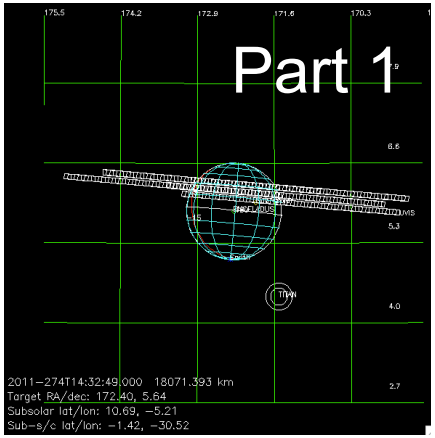


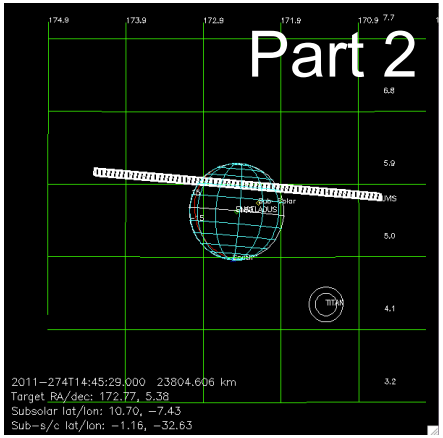
14-part

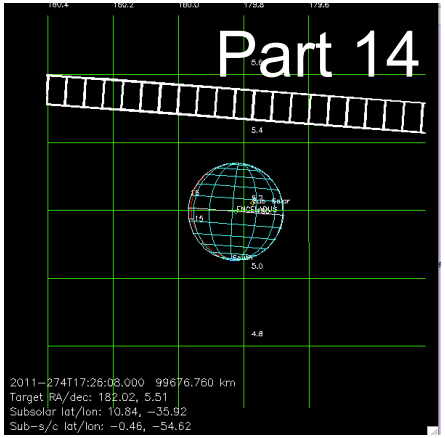
154EN_ICYLON002_CIRS
2011-274T14:33
Alt= 19,623 km
Longitude= 31°W
Latitude=1.3°S
Phase= 29°



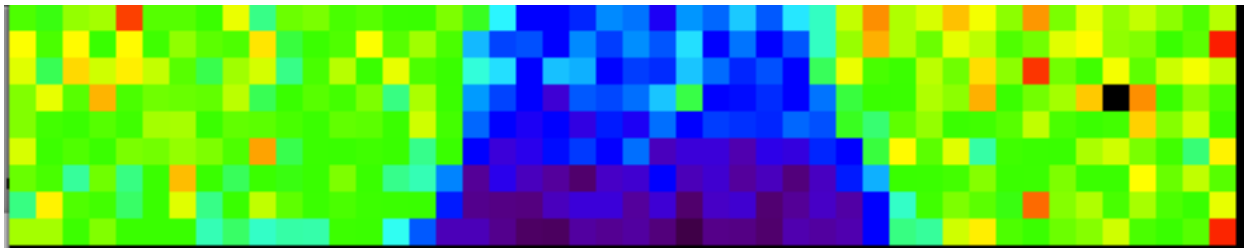






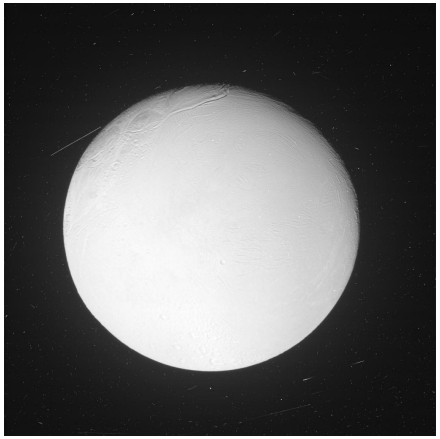


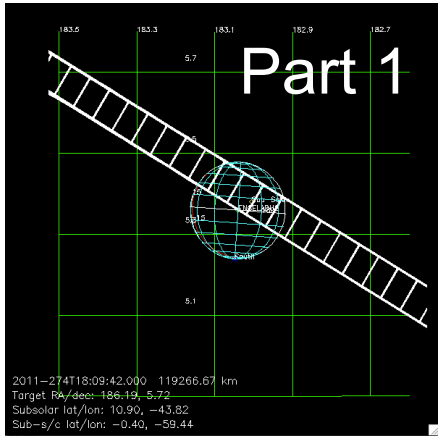
Part 2

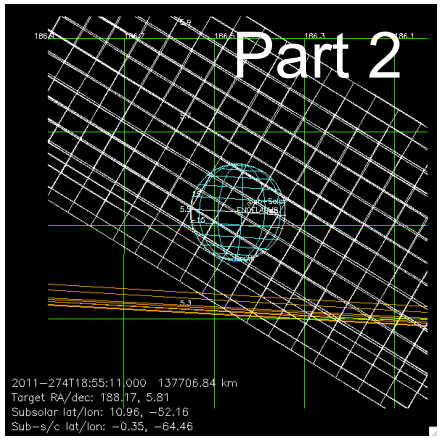


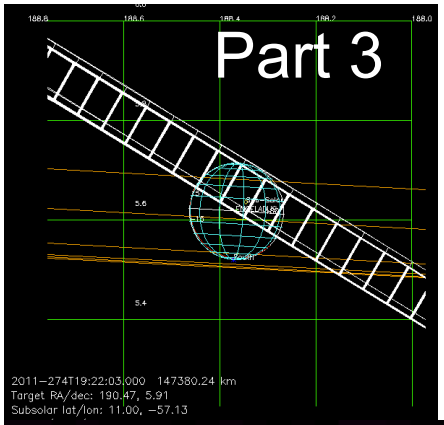
3-part

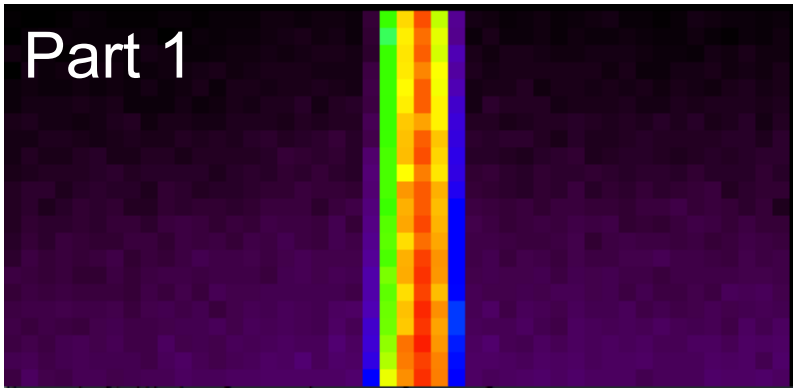
154EN_ICYLON003_ISS
2011-274T18:10
Alt= 127,734 km
Longitude= 62°W
Latitude=0.4°S
Phase= 18°

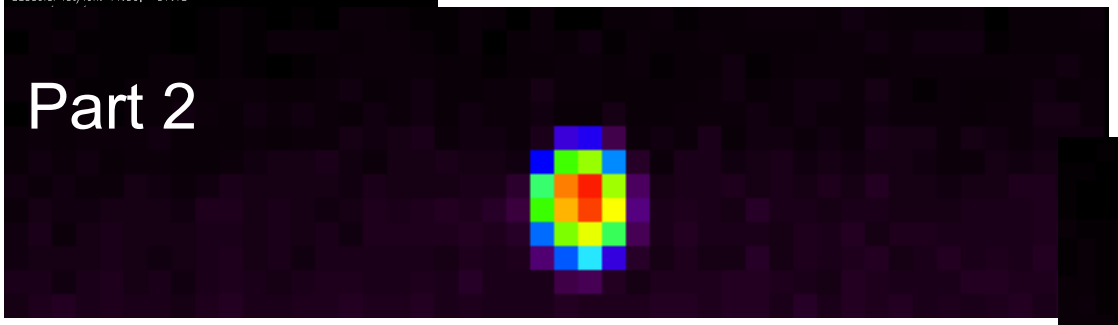


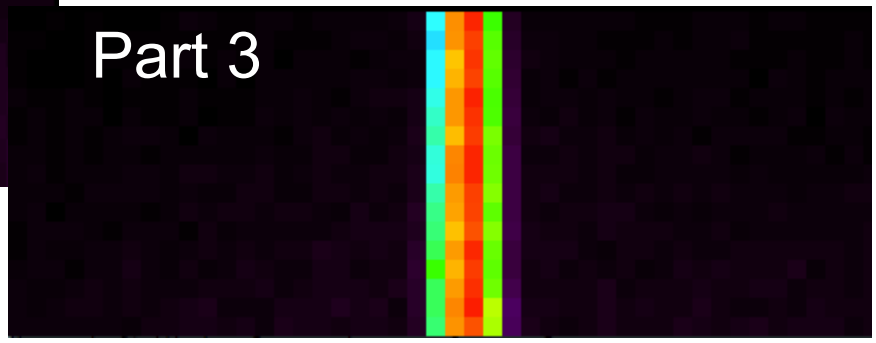






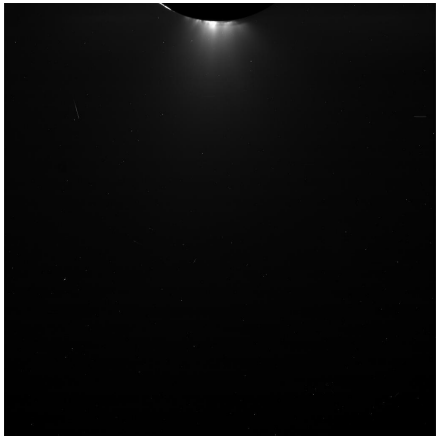


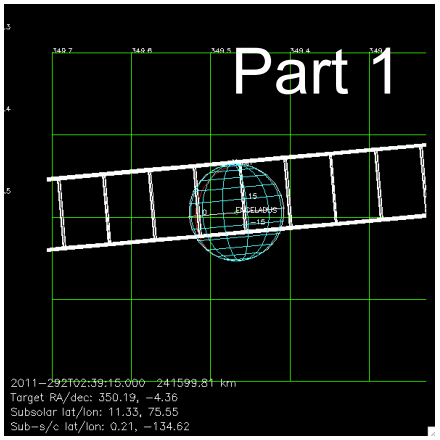


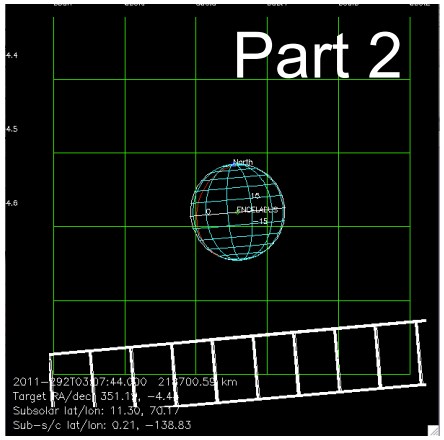


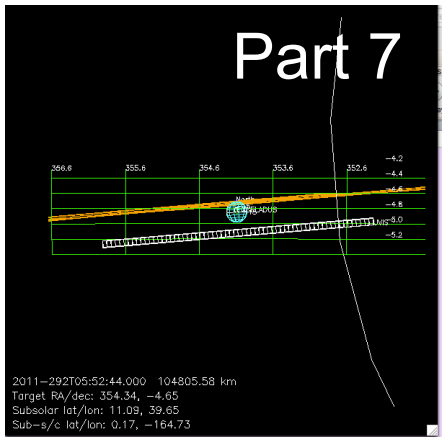
7-part

155EN_ICYPLU001_ISS
2011-292T02:40
Alt= 232,826 km
Longitude= 136°W
Latitude=0.2°N
Phase= 148.7°





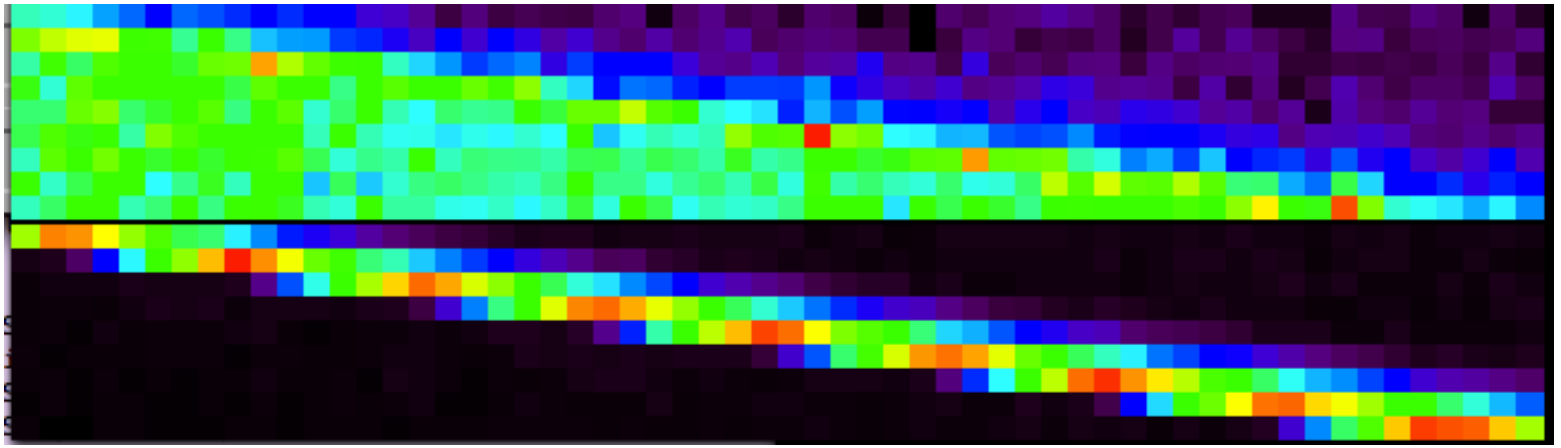




Part 7: bright limb of Saturn moves through slit

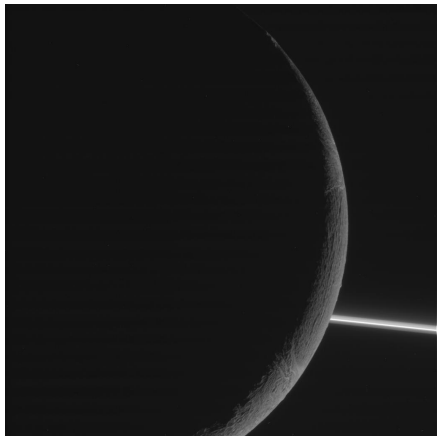
Ly-a

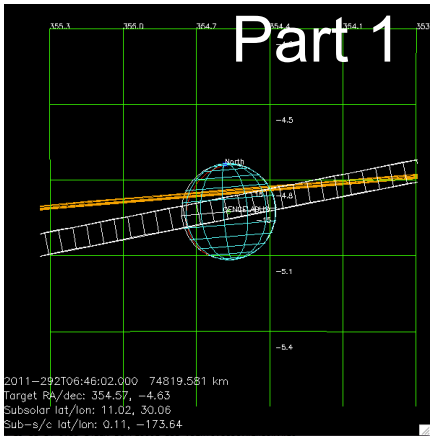
Long waves

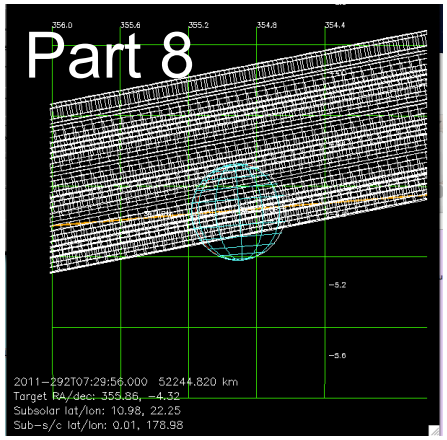


13-part

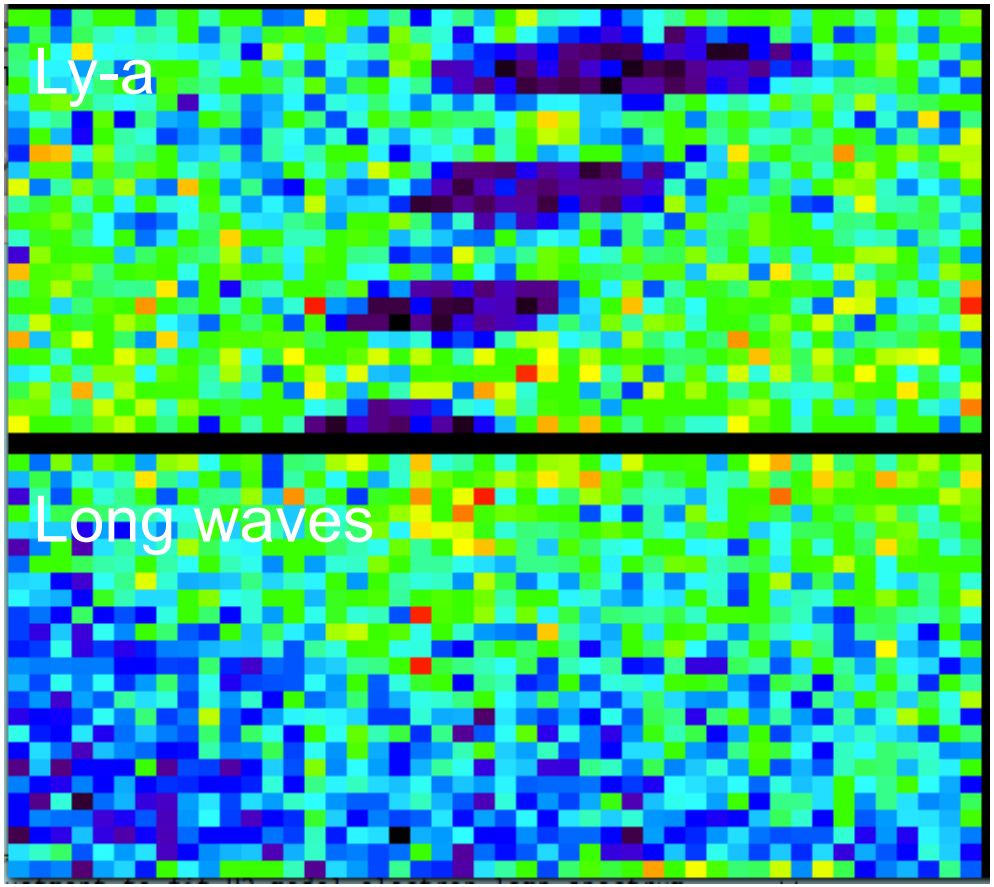
155EN_ICYLON001_ISS
2011-292T06:47
Alt= 74,563 km
Longitude= 174°W
Latitude=0.1°N
Phase= 153°





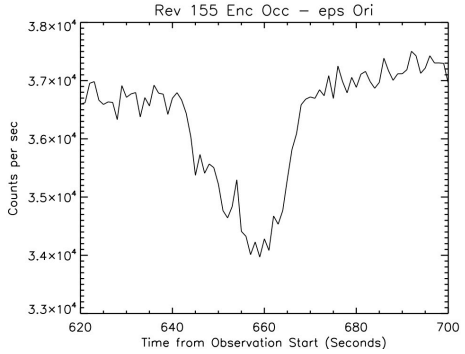


Part 8

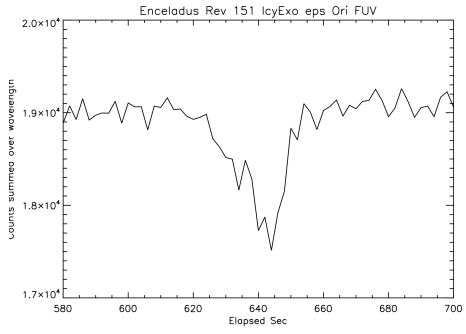


UVIS_155EN_ICYEXO001_PRIME_0
2011-292T09:11
Ingress lat/lon: n/a
Egress lat/lon: n/a
Star: eps Ori (dual occ)

HSP

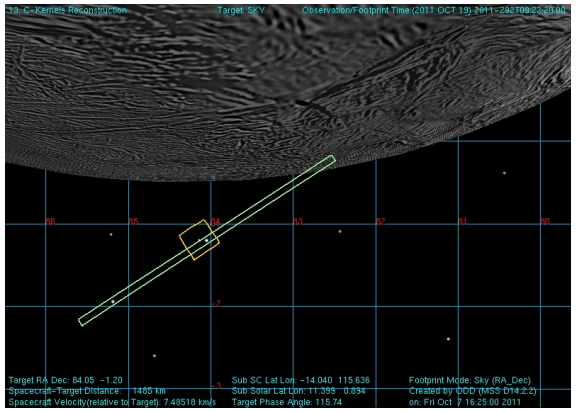


FUV

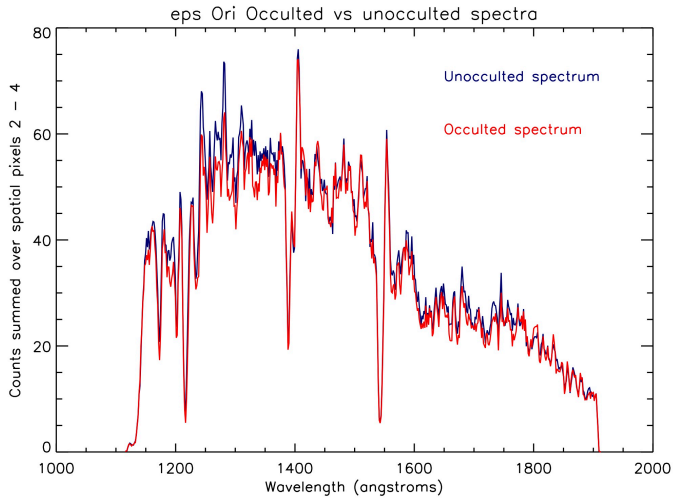


Summed over wavelength

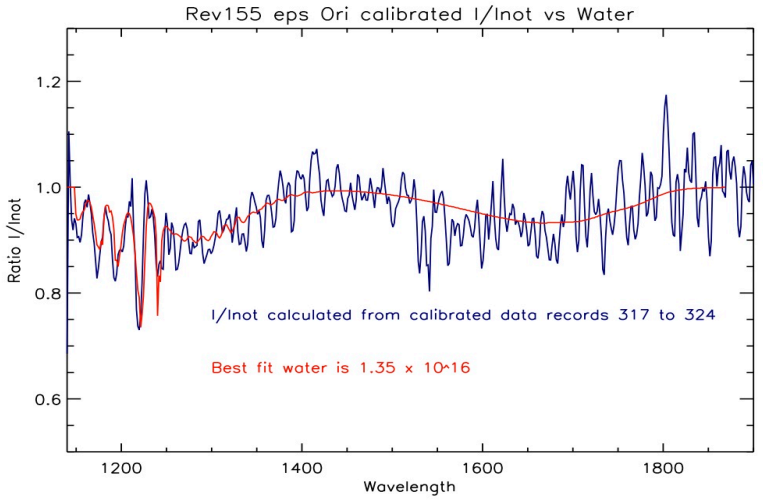
Horizontal cut; eps Ori closest to limb

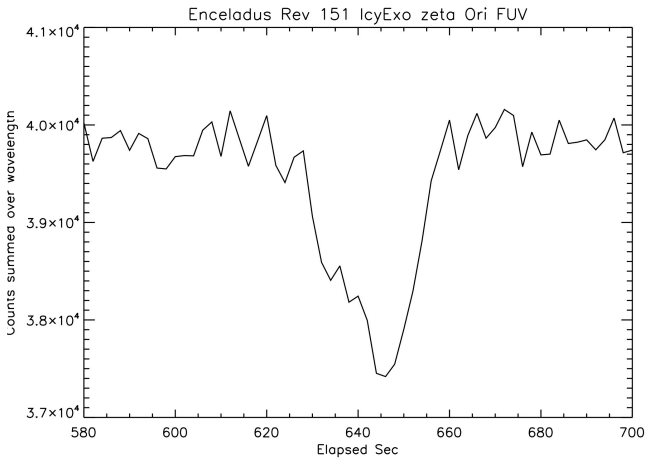


Spectra of I, I_0 (counts per integration period vs wavelength)



Spectrum of I/I_0 in plume



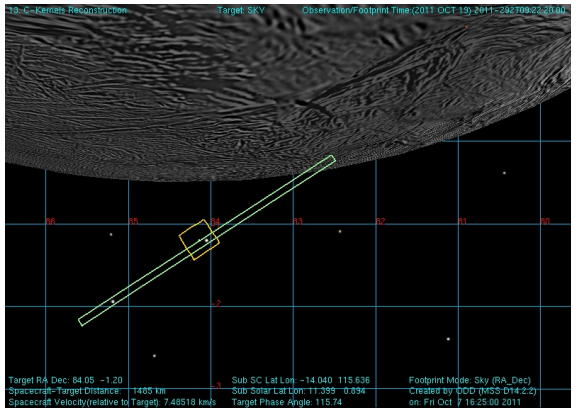


FUV profile

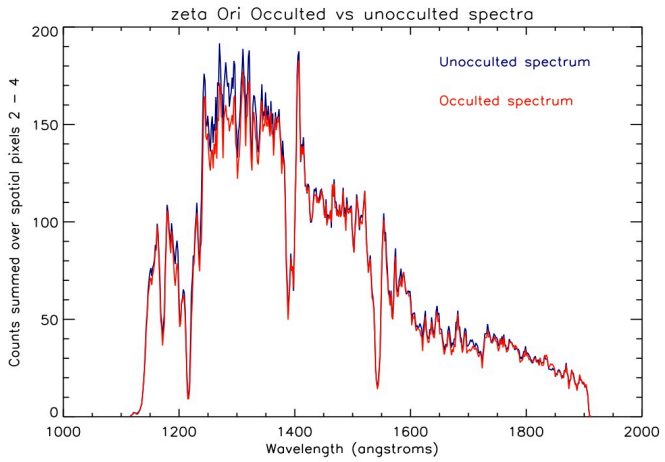
Summed over wavelength

UVIS_155EN_ICYEXO001_PRIME_1
2011-292T09:11
Ingress lat/lon: n/a
Egress lat/lon: n/a
Star: zeta Ori (dual occ)

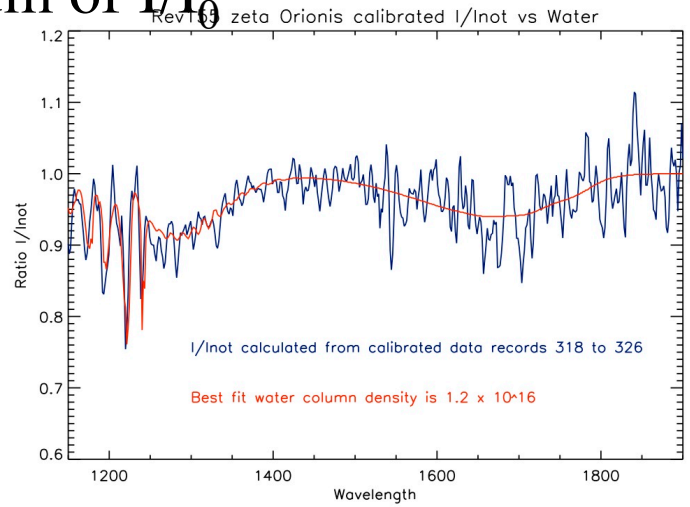
Horizontal cut; zeta Ori furthest from limb



Spectra of I, I_0 (counts per integration period vs wavelength)



Spectrum of I/I_0



6-part 155EN_ICYMAP001_CIRS

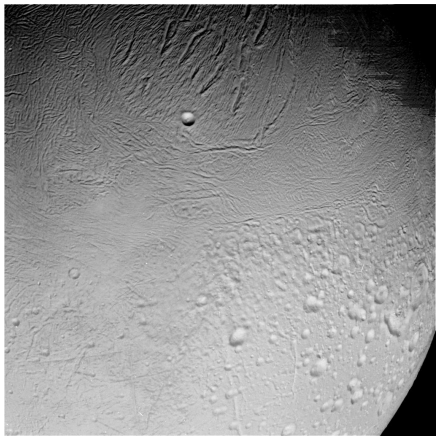
2011-292T09:43

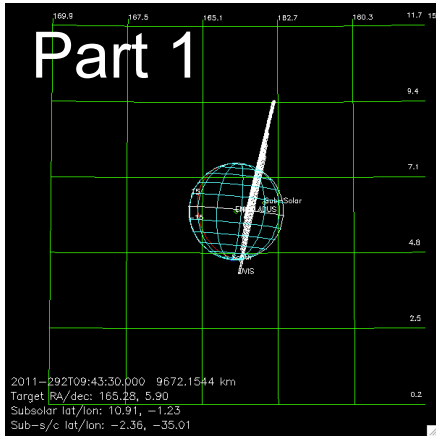
Alt= 9063 km

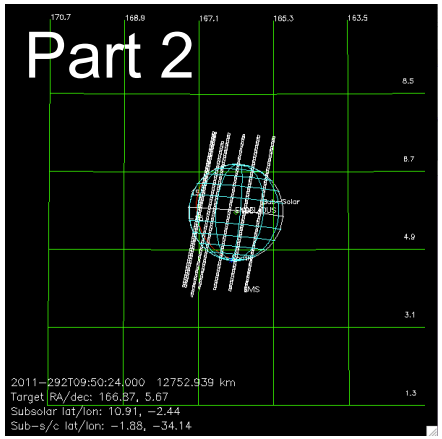
Longitude= 31°W

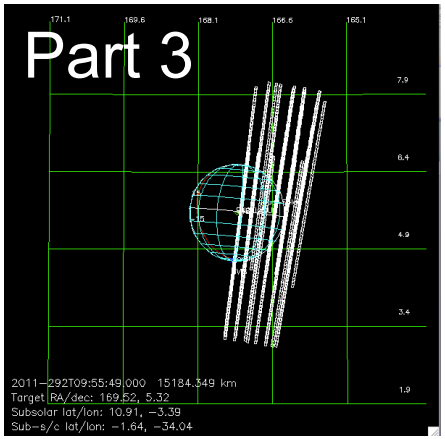
Latitude=2°S

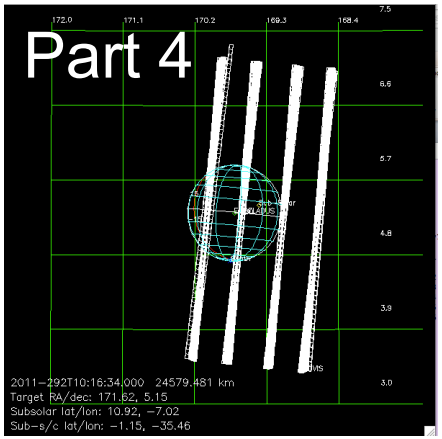
Phase= 33°

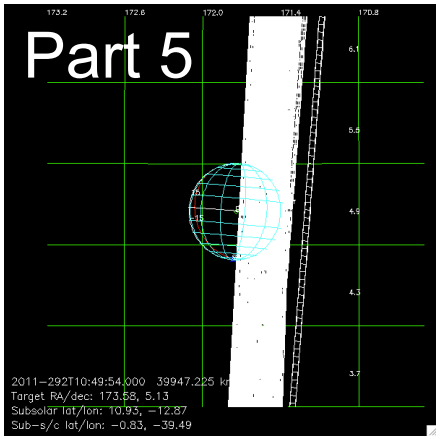


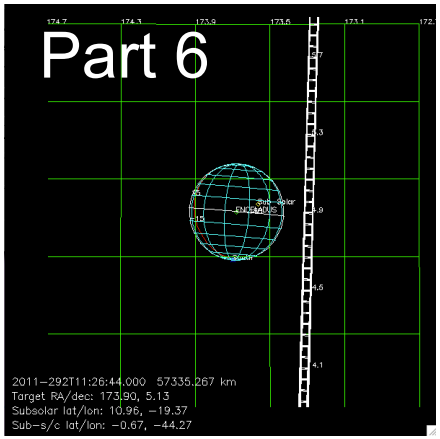




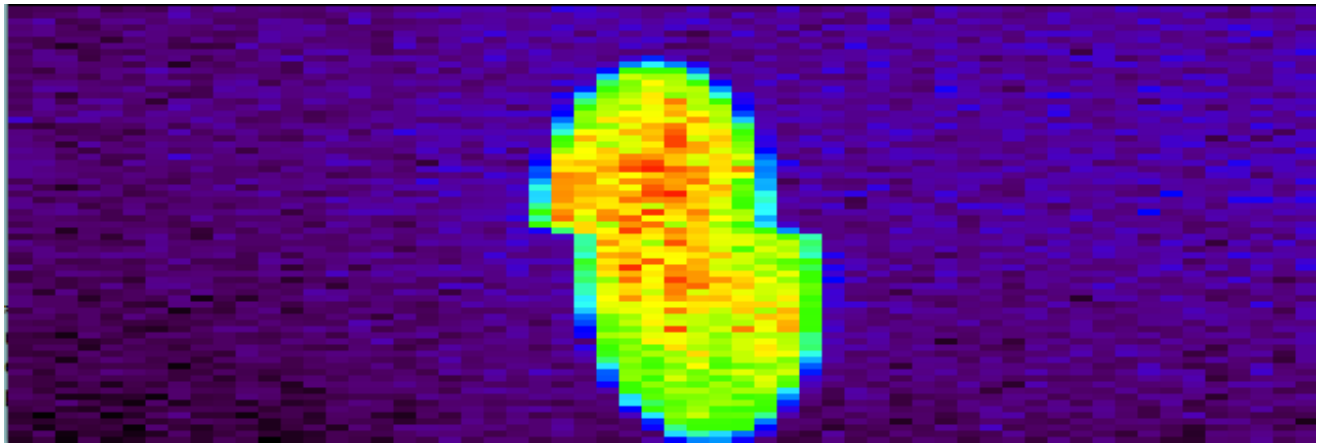








Part 5



3-part

156EN_ICYPLU001_ISS

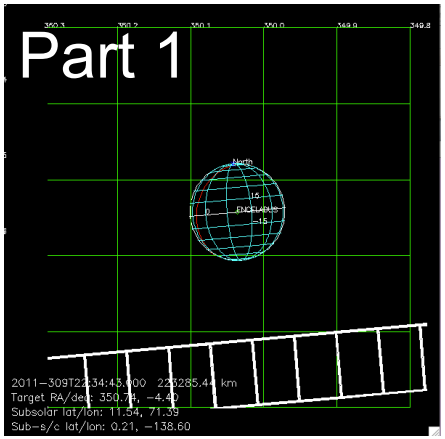
2011-309T22:36

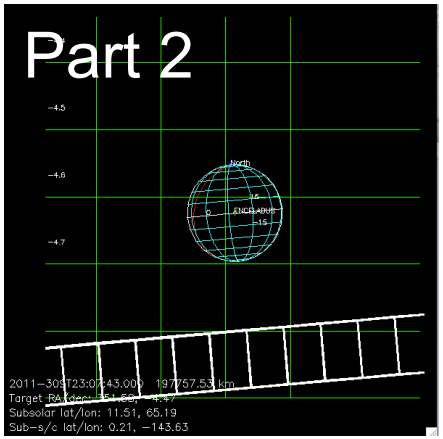
Alt= 213,637 km

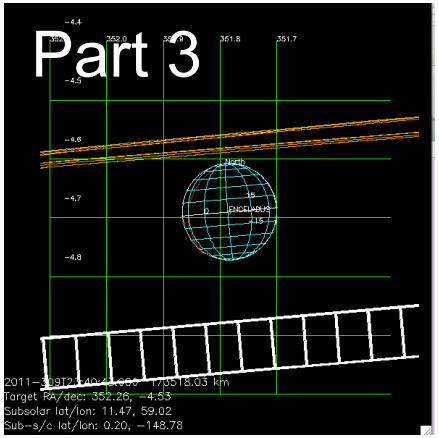
Longitude= 140°W

Latitude=0.2°N

Phase= 148.6°







5-part

156EN_ICYLON001_ISS

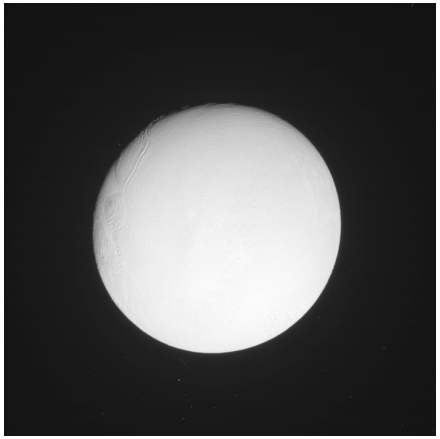
2011-310T07:50

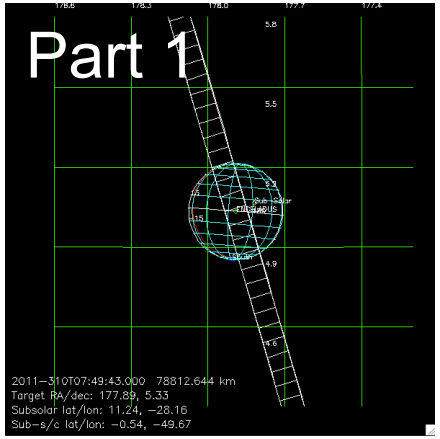
Alt= 78,559 km

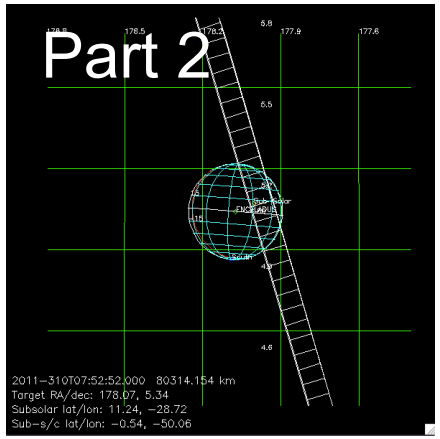
Longitude= 50°W

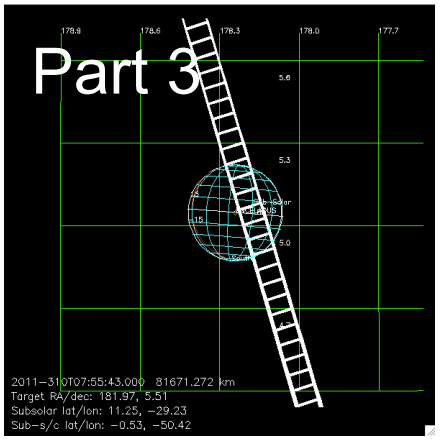
Latitude=0.55°S

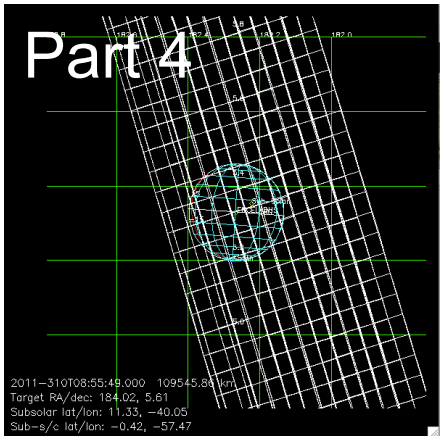
Phase= 24.9°

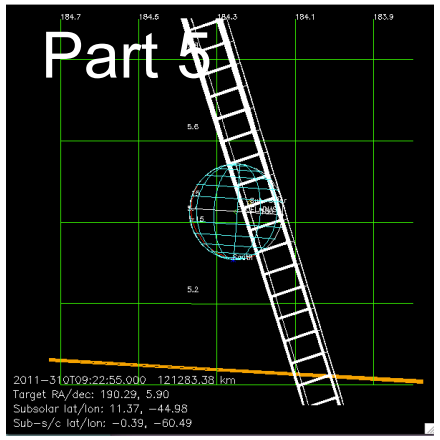


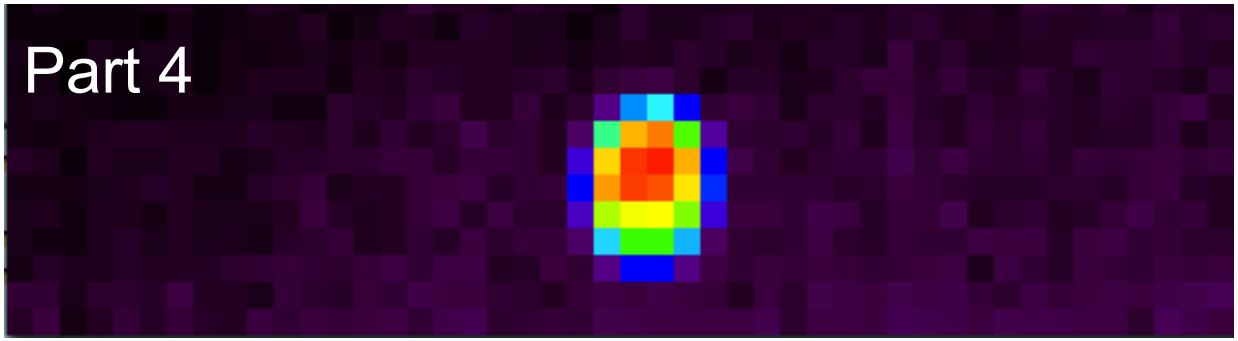




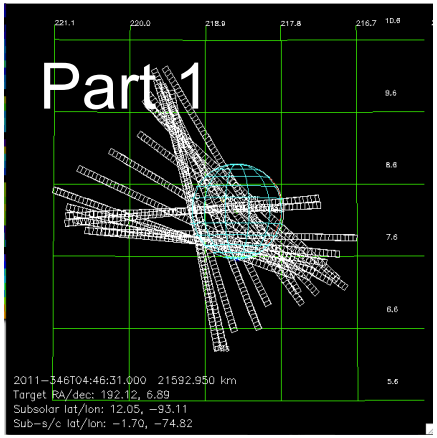


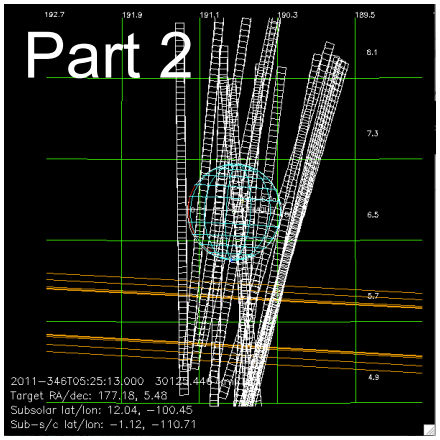






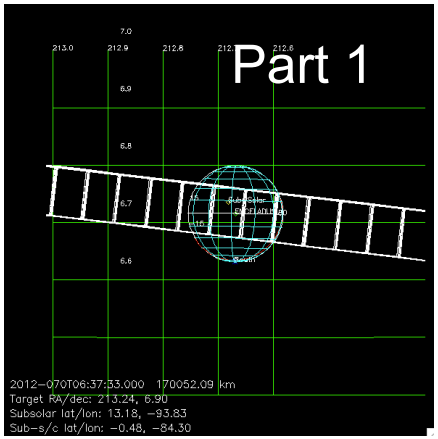
158DI_ICYLON001_ISS
2011-346T04:47
Alt= 21,511 km
Longitude= 77°W
Phase= 21.5°

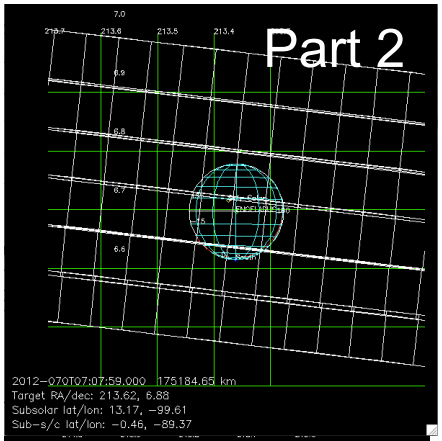


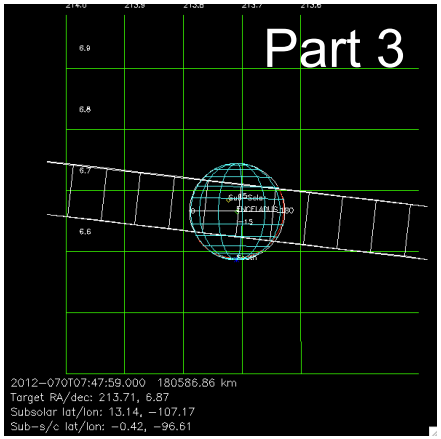


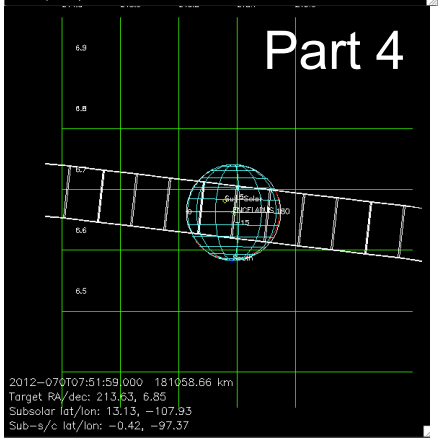
**this is really Enceladus, not Dione

4-part



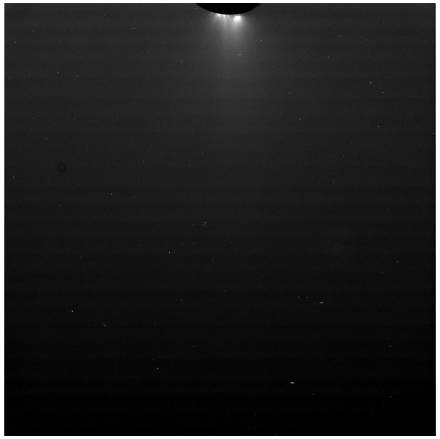


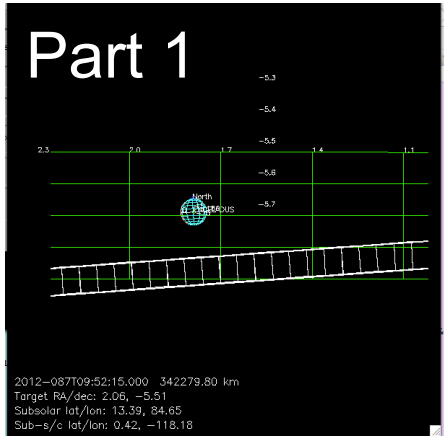


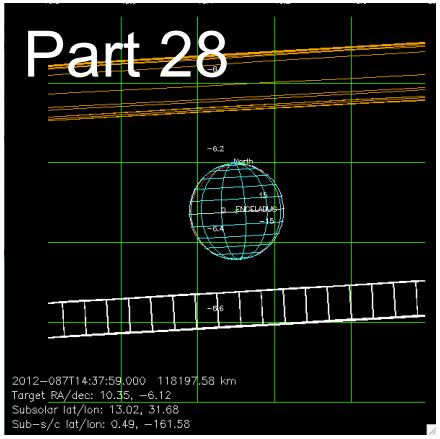


162EN_ICYLON001_ISS
2012-070T06:39
Alt= 171,909 km
Longitude= 86°W
Latitude=0.5°S
Phase= 16.8°

28-part



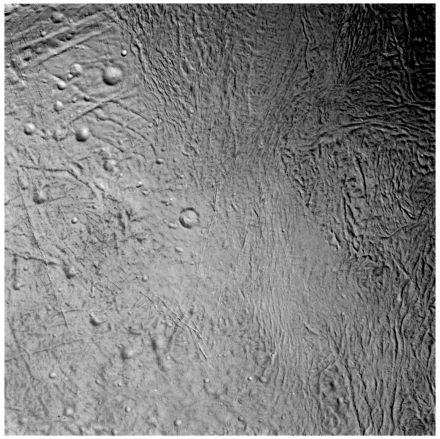


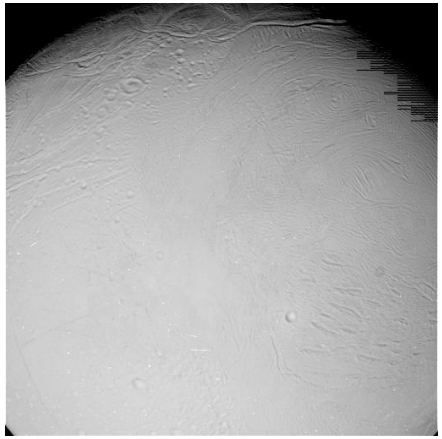


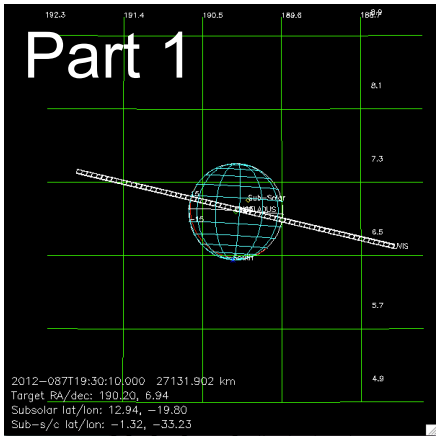
163EN_ICYPLU001_ISS
2012-087T09:53
Alt= 339,237 km
Longitude= 119°W
Latitude=0.4°N
Phase= 154°

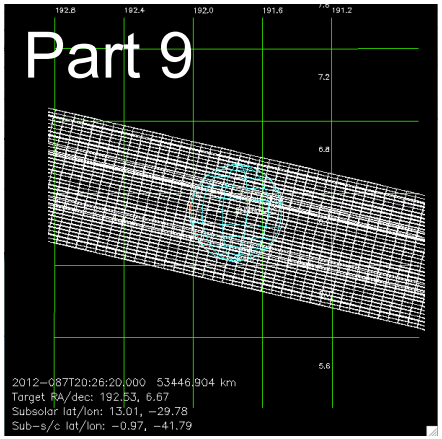
10-part

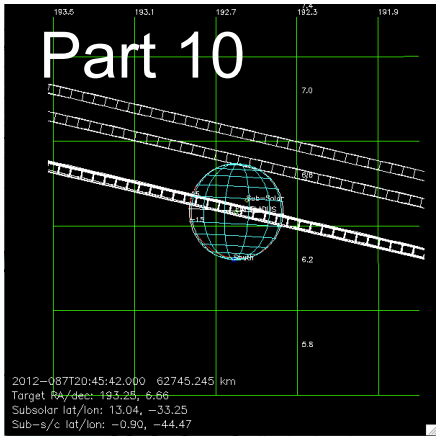
163EN_ICYMAP001_ISS
2012-087T19:30
Alt= 27,796 km
Longitude= 34°W
Latitude=1.3°S
Phase= 20°



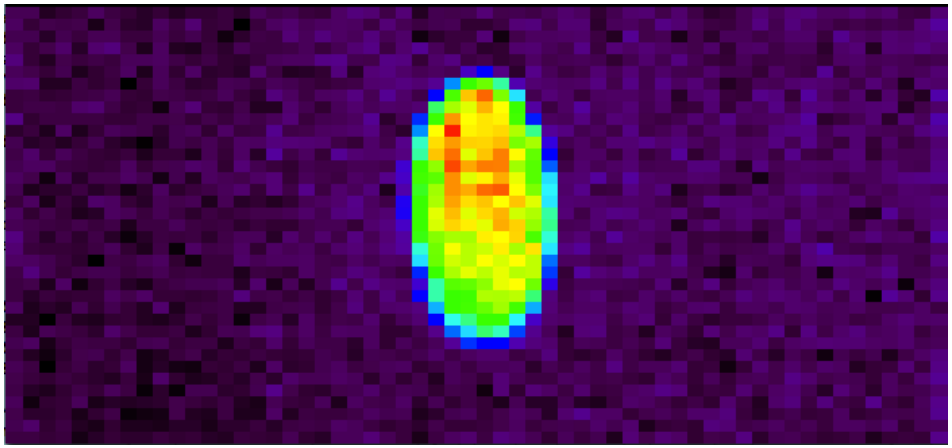






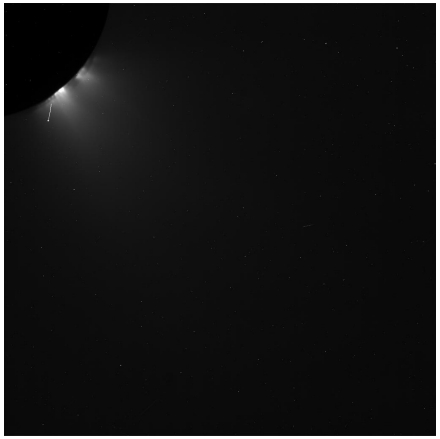


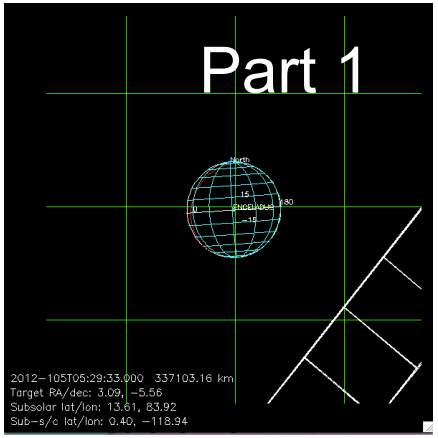
Part 9

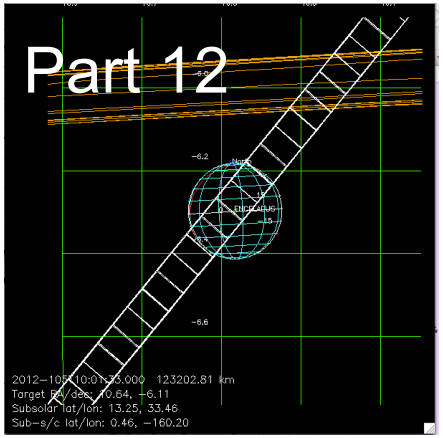


12-part

164EN_ICYPLU001_ISS
2012-105T05:32
Alt= 328,554 km
Longitude= 120°W
Latitude=0.4°N
Phase= 154°

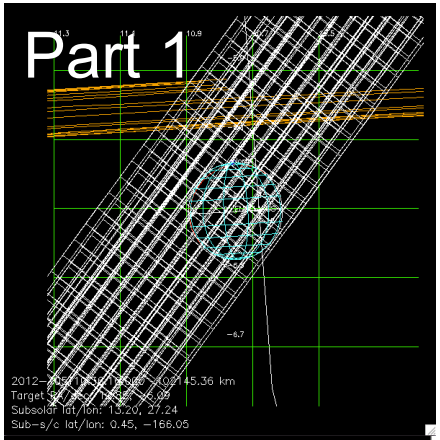


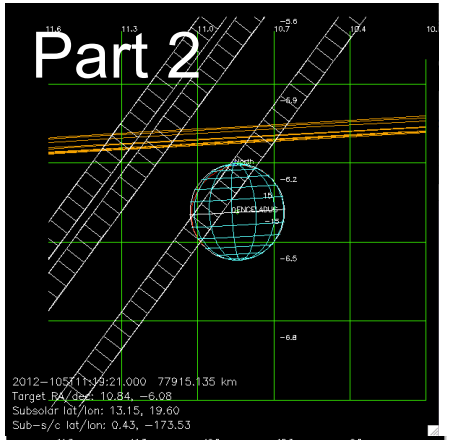


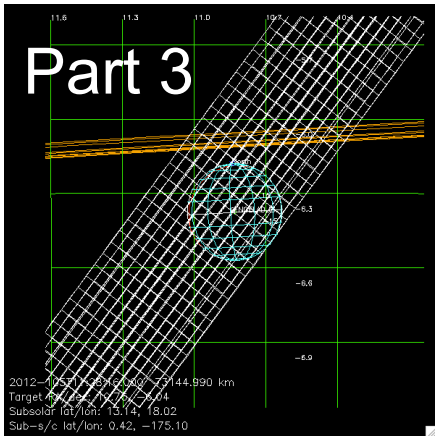


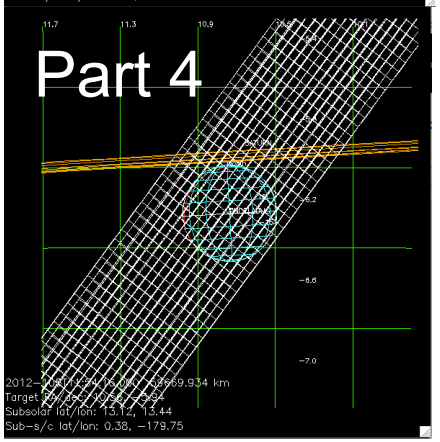
6-part

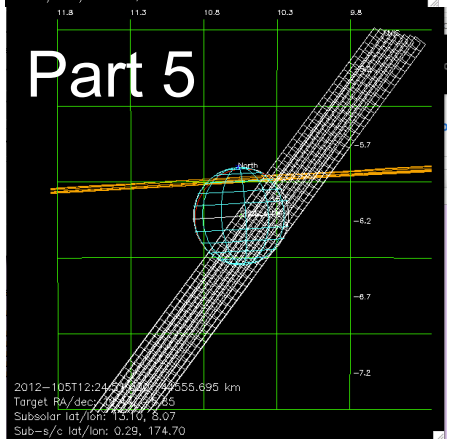
164EN_ICYLON001_CIRS
2012-105T10:37
Alt= 90,470 km
Lon= 170°W
Latitude=0.44°N
Phase= 160°

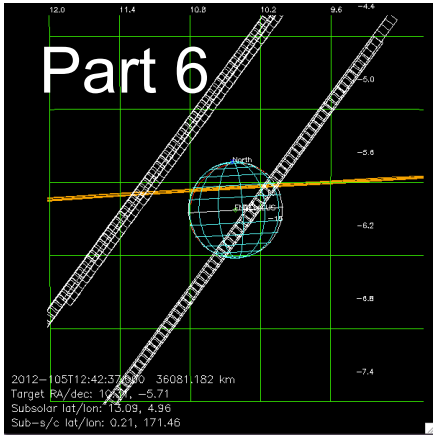




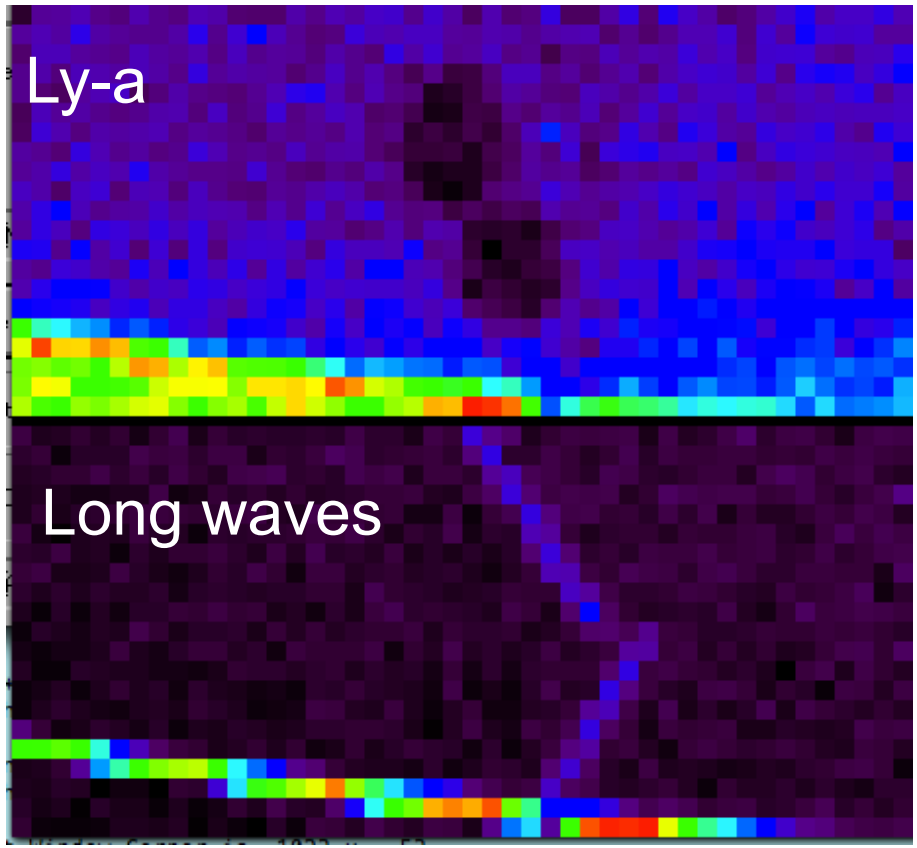




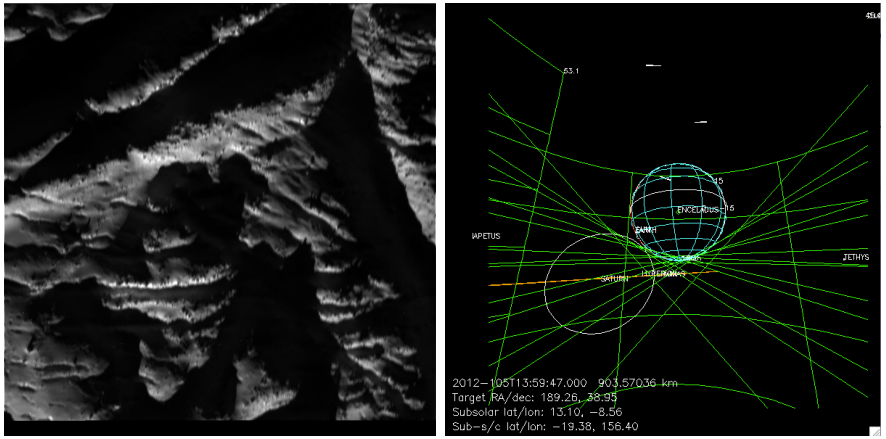




Part 1

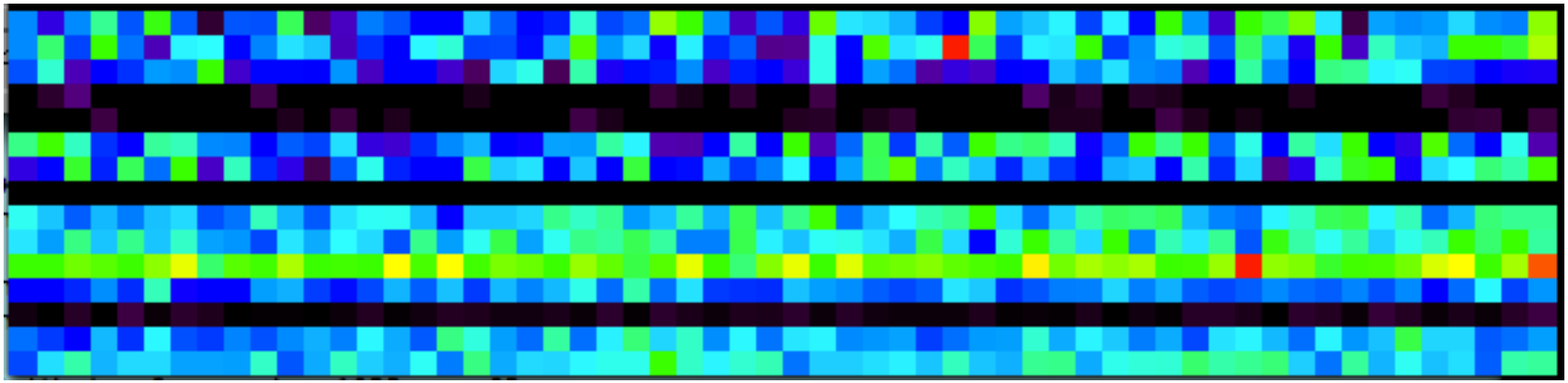


164EN_ICYMAP001_INMS
2012-105T14:00
Alt= 294 km
Longitude= 125°W
Latitude=43.7°S
Phase= 116.4°



WAC image

Enceladus quickly passes through UVIS slit



Ly-a

Long waves

5-part 164EN_ICYLON002_CIRS

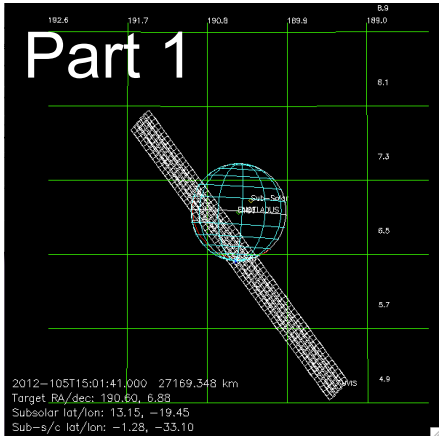
2012-105T15:02

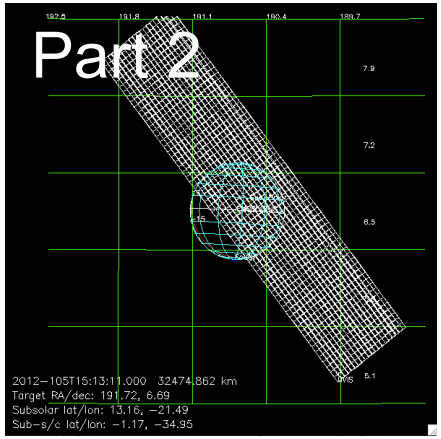
Alt= 28,756 km

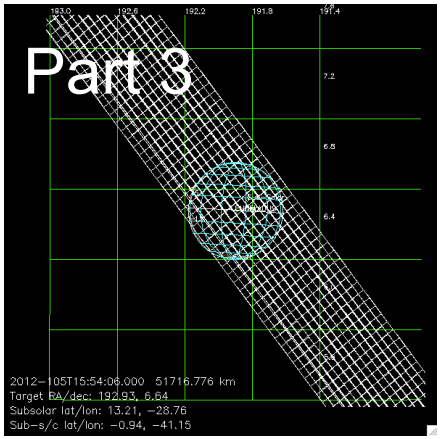
Longitude= 34°W

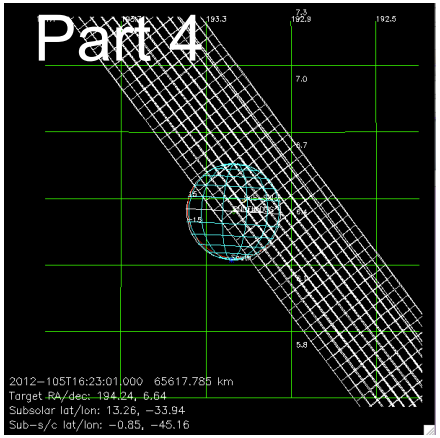
Latitude=1.2°S

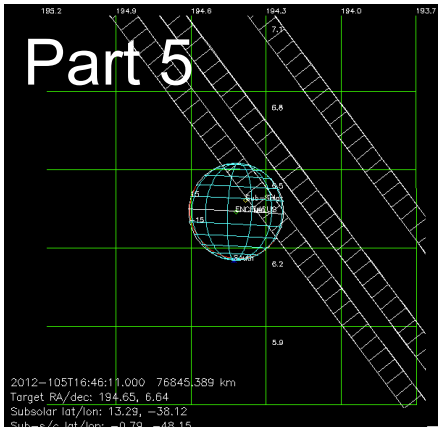
Phase=20.6°

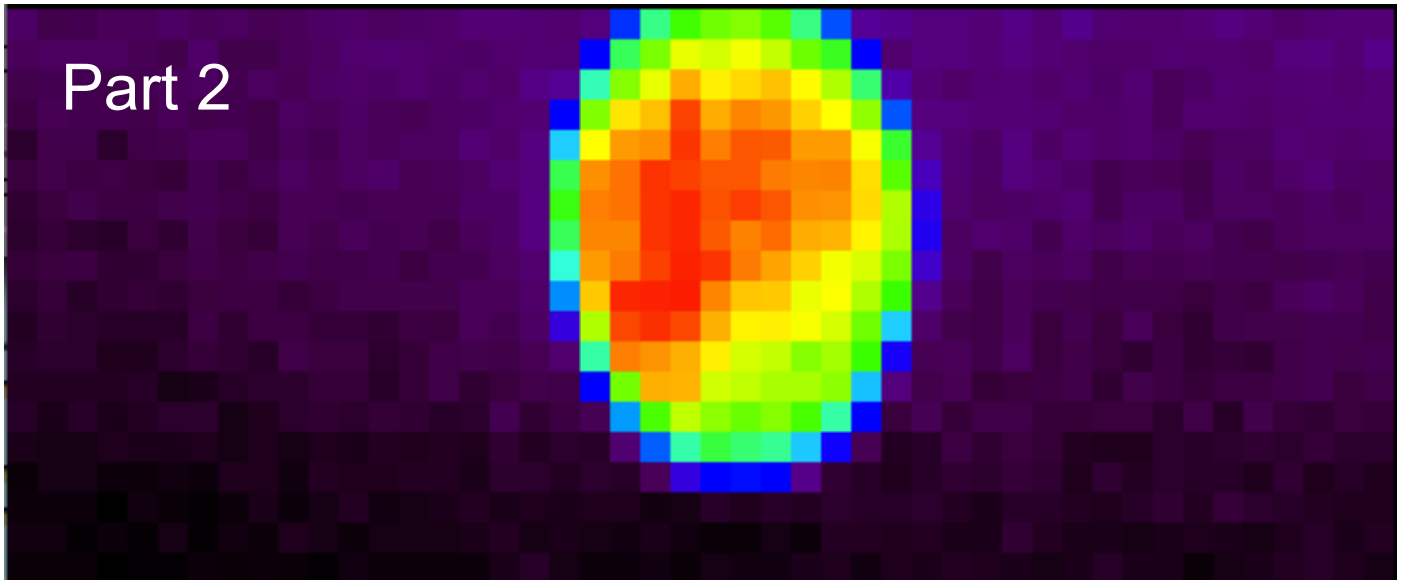






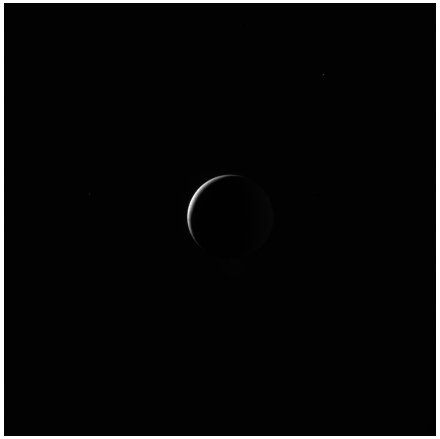


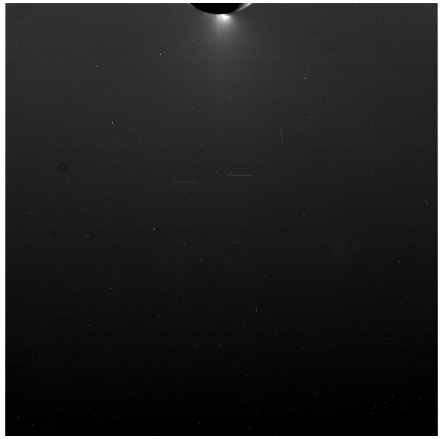


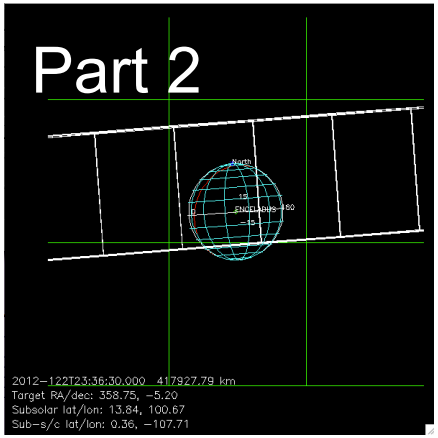


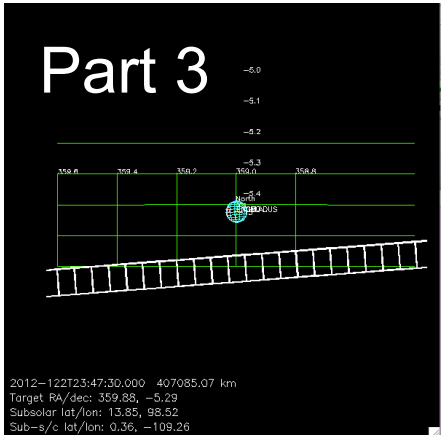
6-part

165EN_ICYPLU001_ISS
2012-122T23:08
Alt= 414,717 km
Longitude= 108°W
Latitude=0.4°N
Phase= 150°



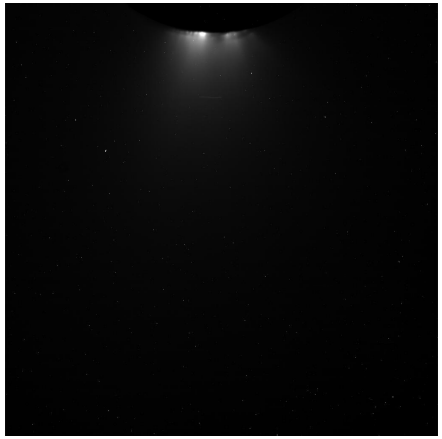


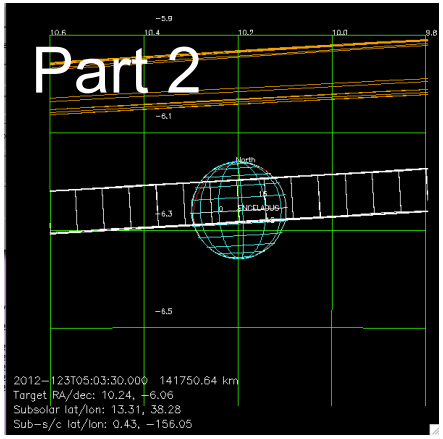


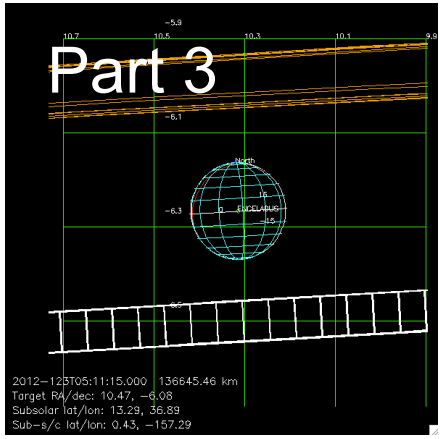


6-part

165EN_ICYPLU002_ISS
2012-123T04:38
Alt= 140,503 km
Longitude= 156°W
Latitude=0.4°N
Phase= 159°

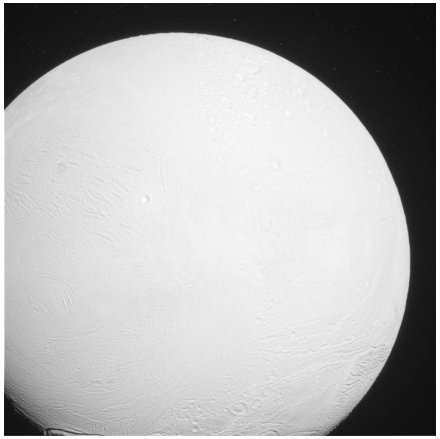


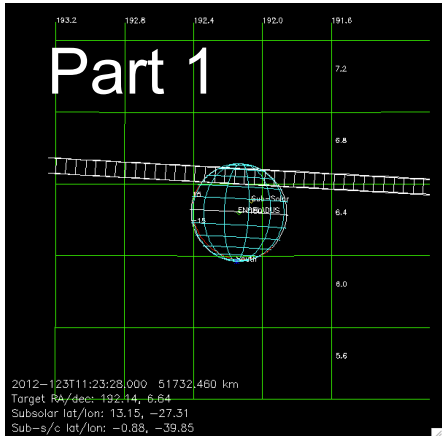


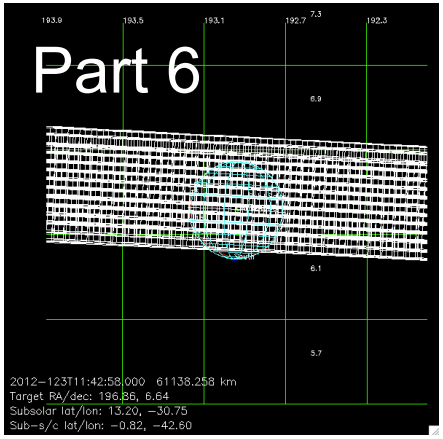


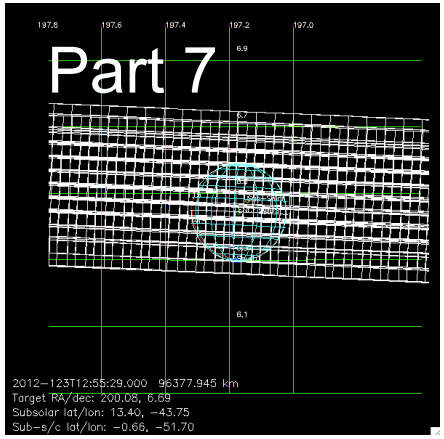
7-part

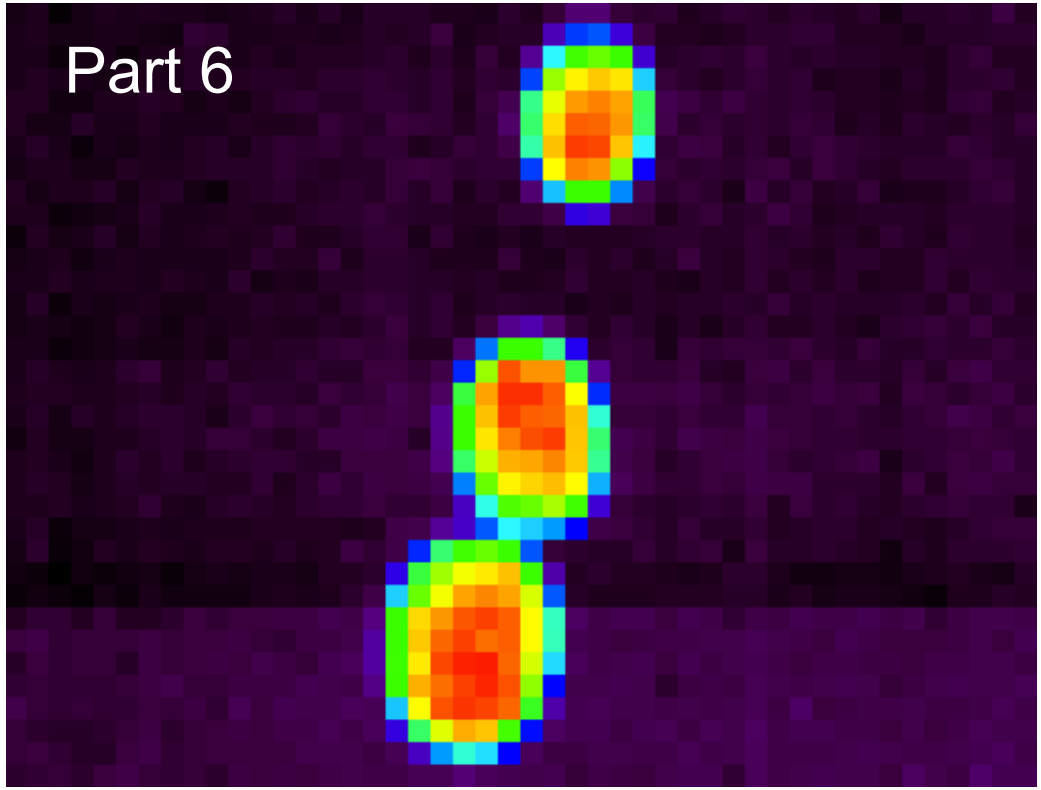
165EN_ICYLON001_CIRS
2012-123T11:24
Alt= 51,480 km
Longitude= 40°W
Latitude=0.9°S
Phase= 19.8°



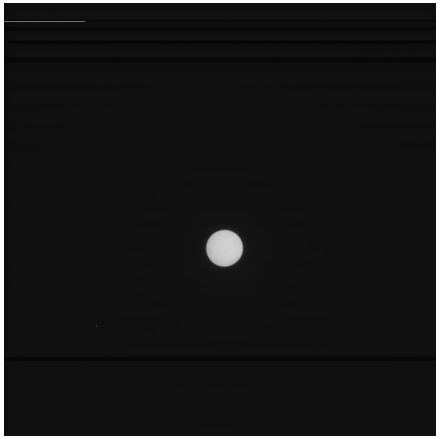


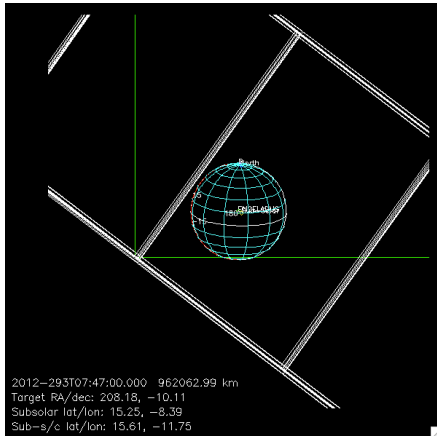




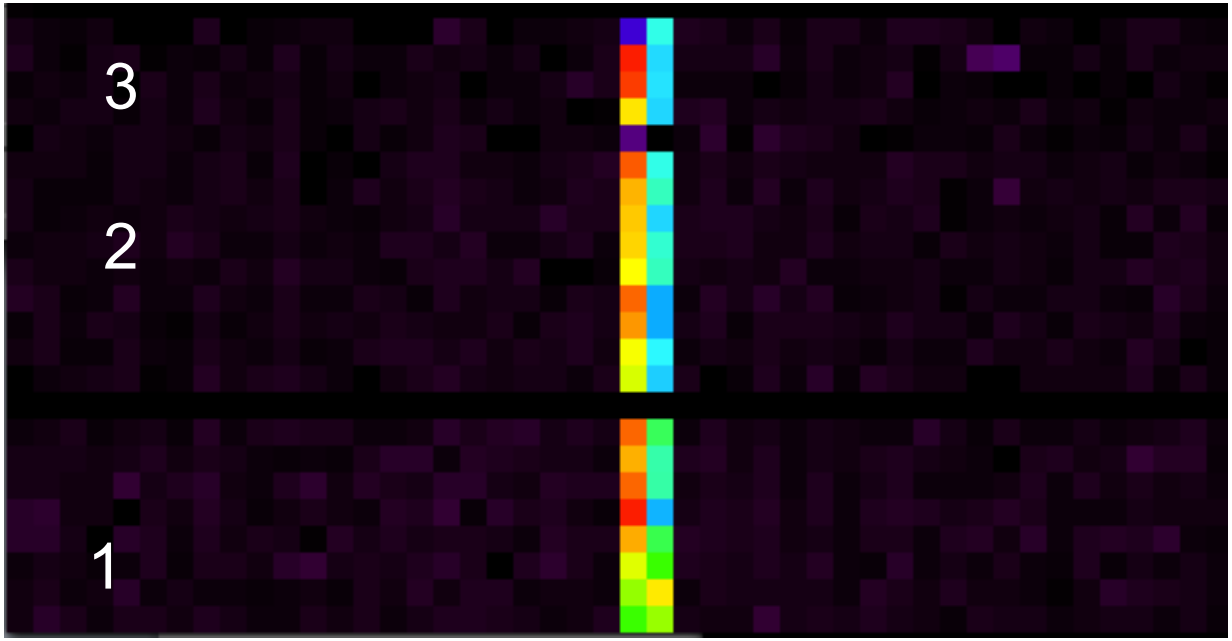


3-part





173EN_LOPHASE001_PIE
2012-293T07:48
Alt=963,028 km
Longitude=13°W
Latitude=15.5°N
Phase=2.9°



187EN_ICYLON001_PRIME

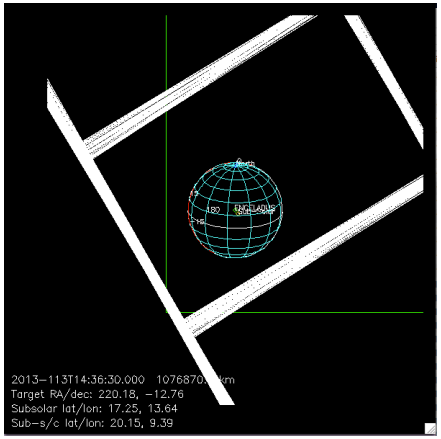
2013-113T14:37

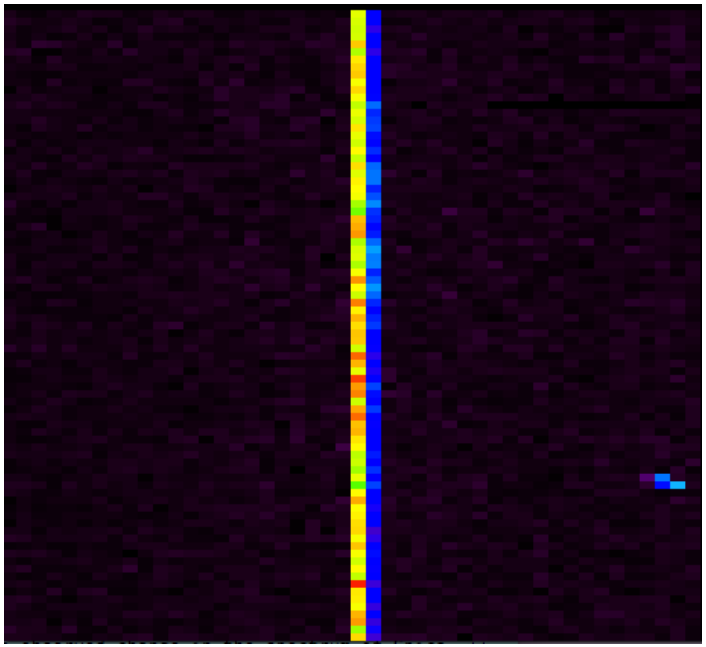
Alt= 1,099,476 km

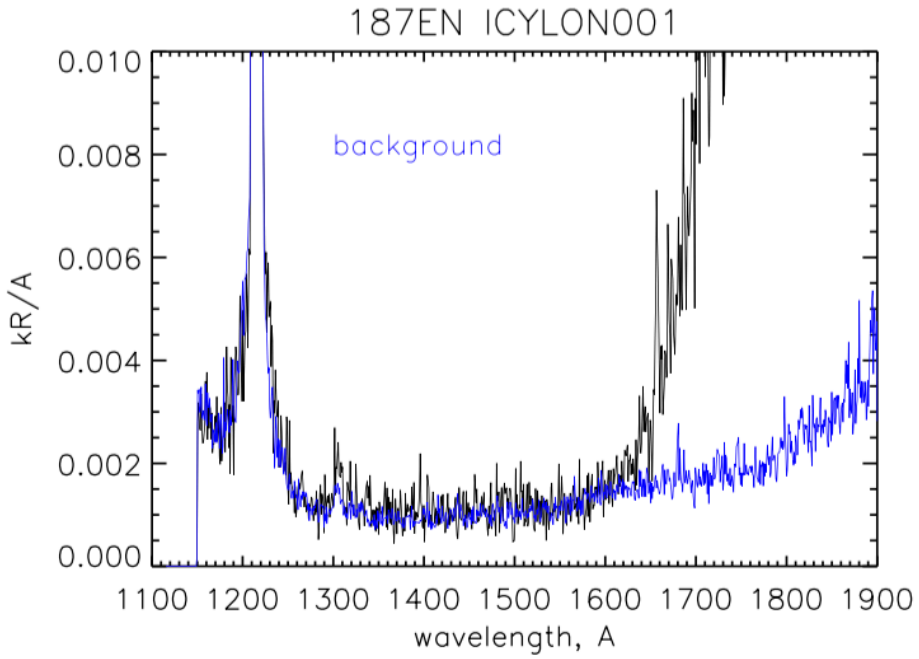
Longitude= 166°W

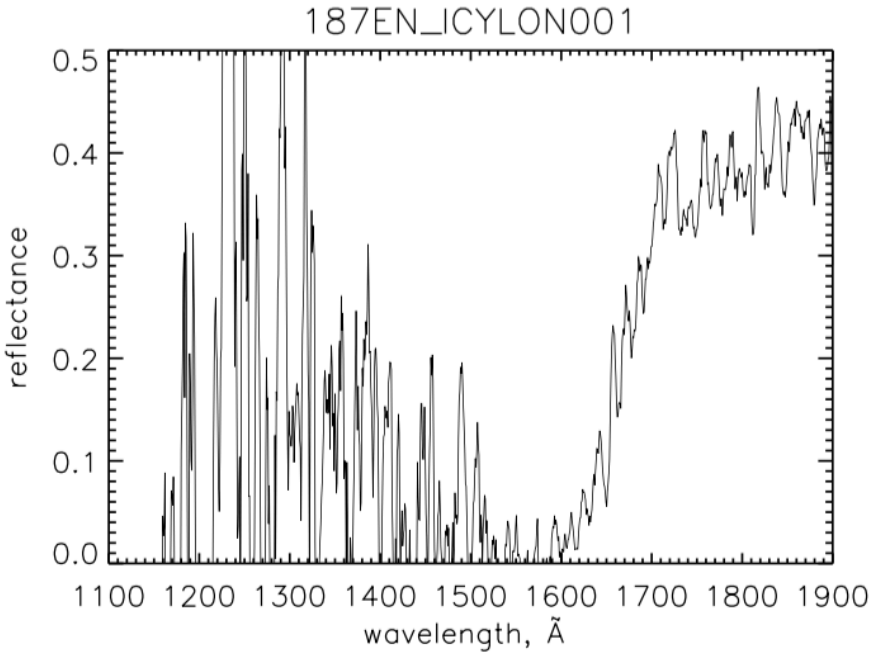
Latitude=19°N

Phase= 2.9°

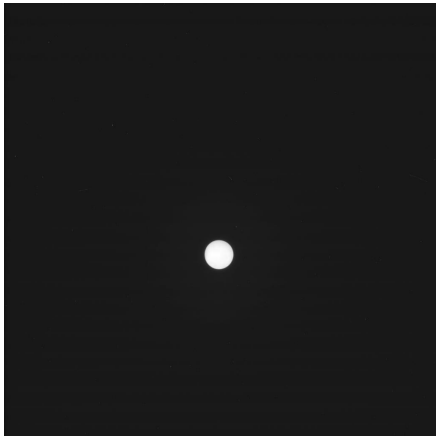


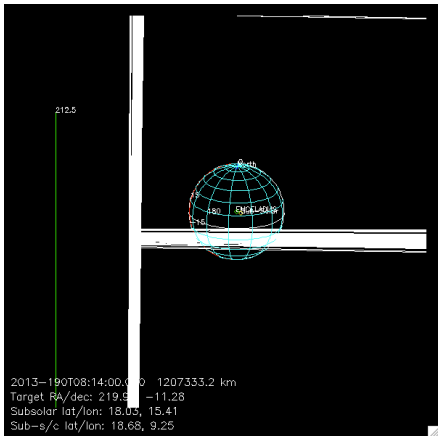


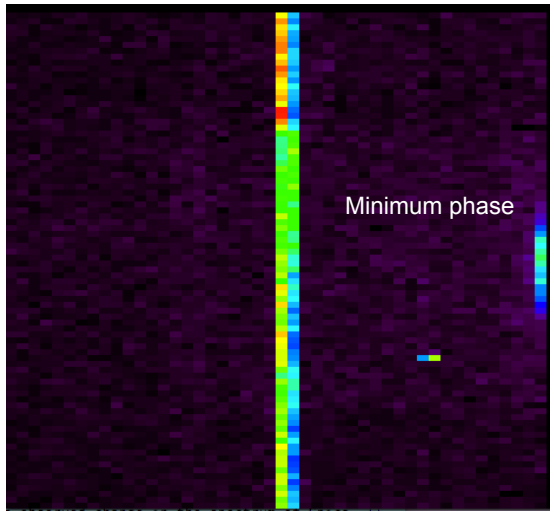


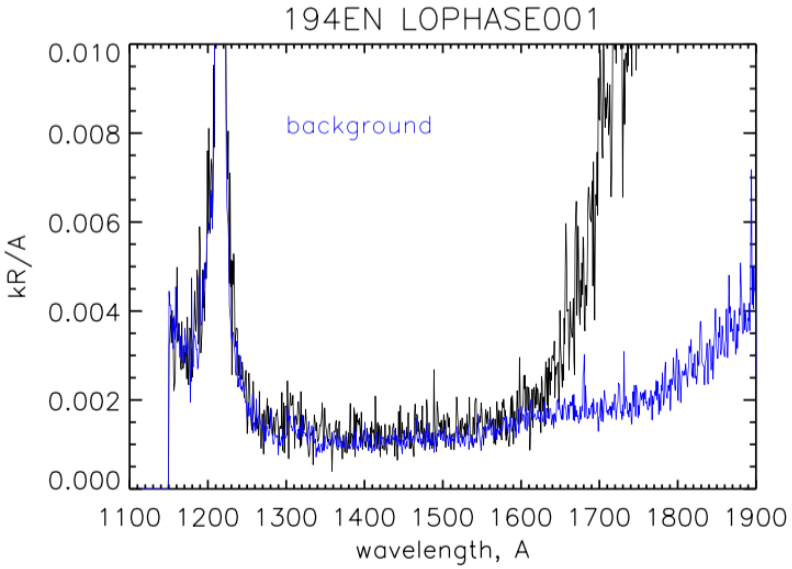


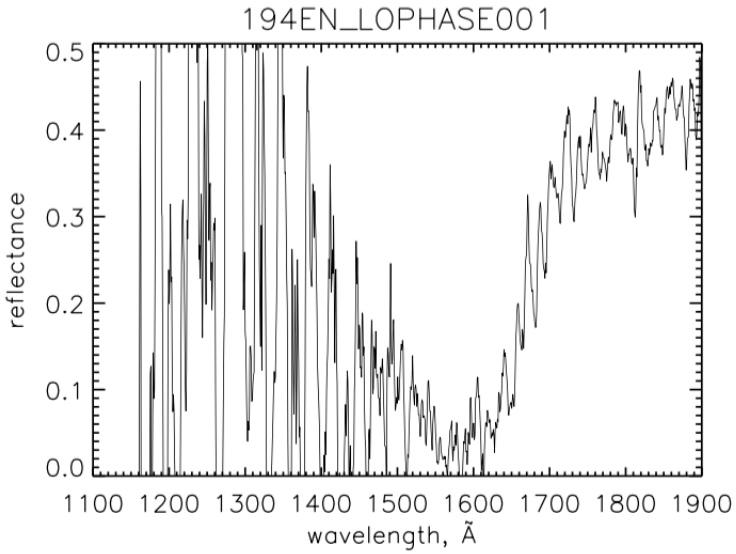
194EN_LOPHASE001_PIE
2013-190T08:15
Alt= 1,223,038 km
Longitude= 156°W
Latitude=18°N
Phase= 2.8°











204EN_ICYLON001_PRIME

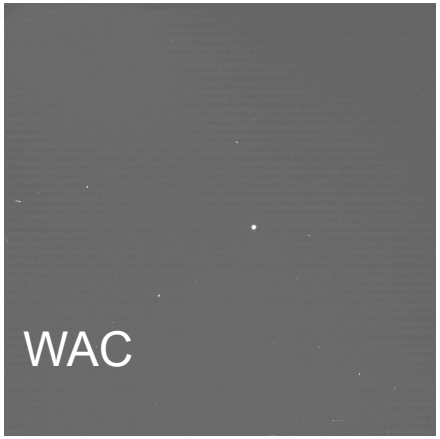
2014-131T21:48

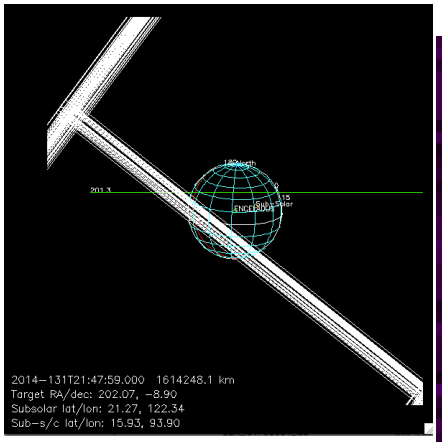
Alt=1,639,939 km

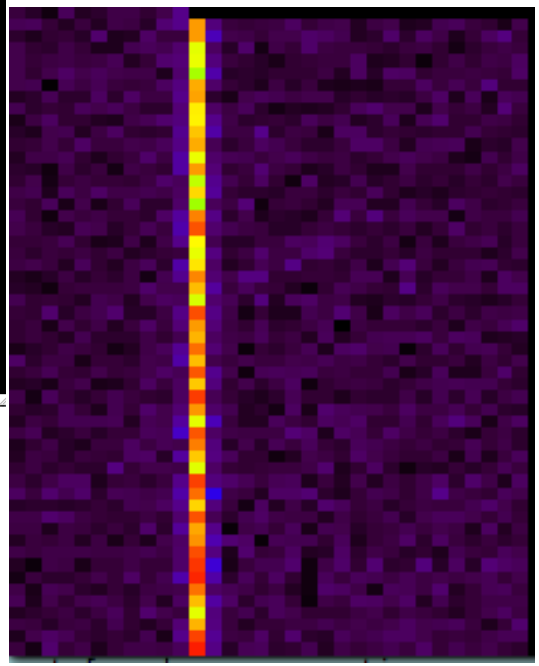
Lon= 276°W

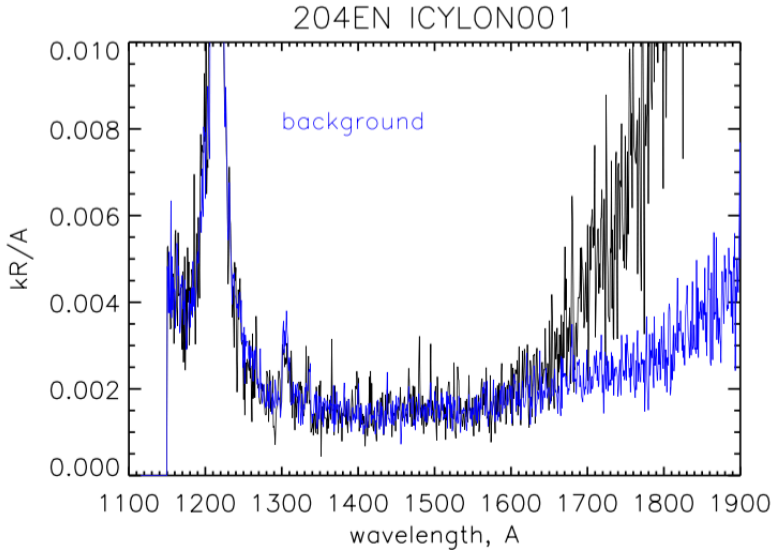
Latitude=15°N

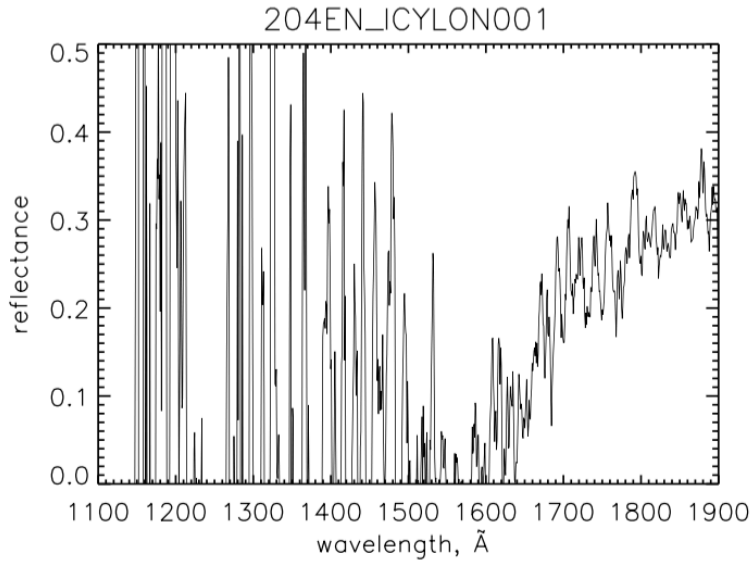
Phase= 26.5°

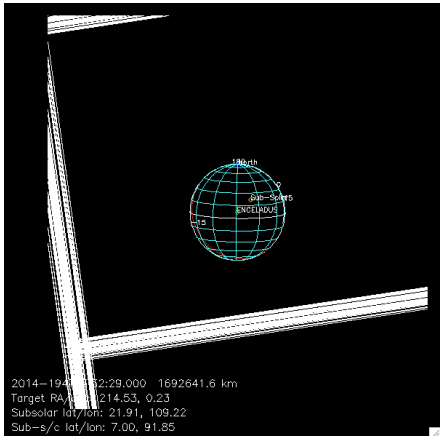


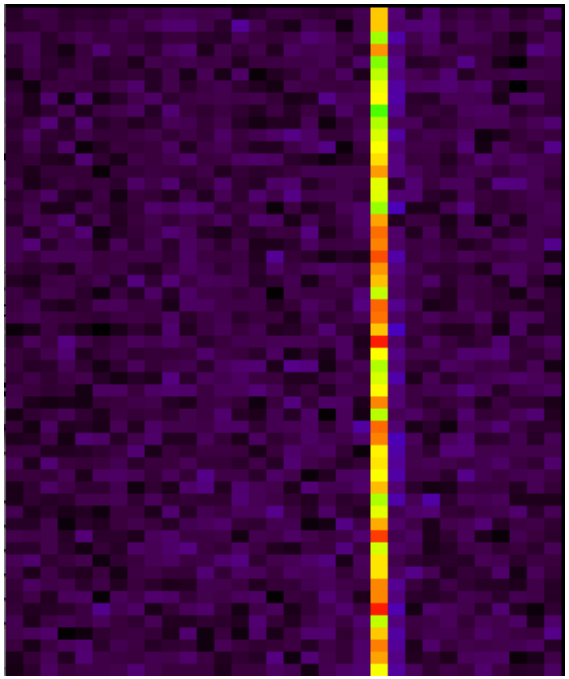




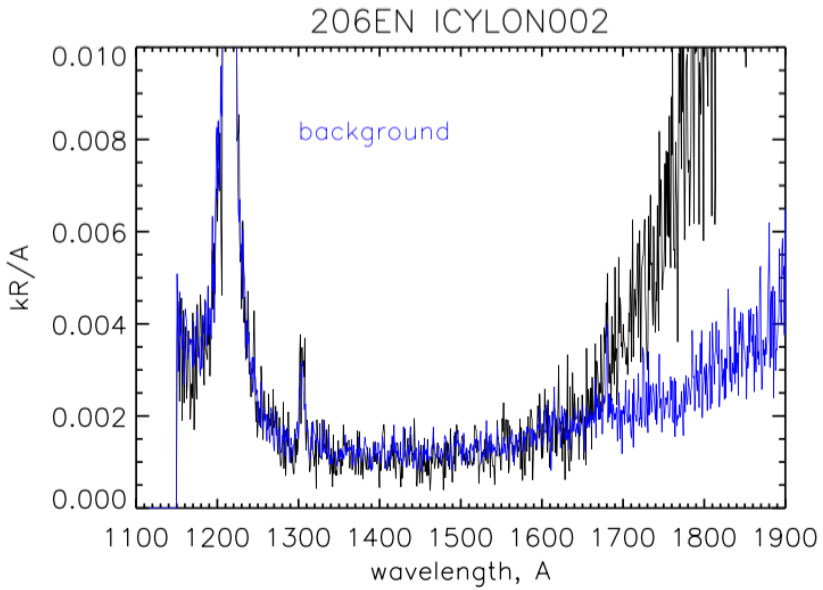


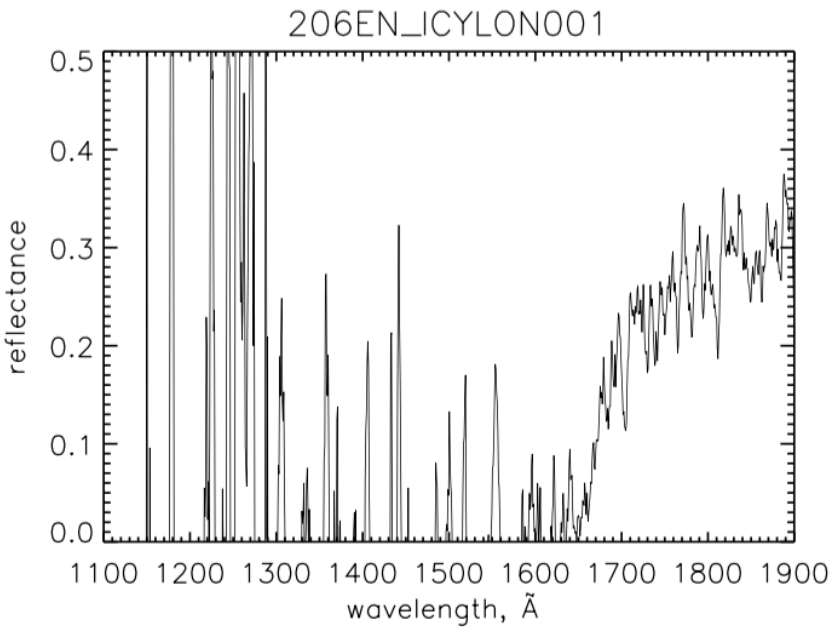






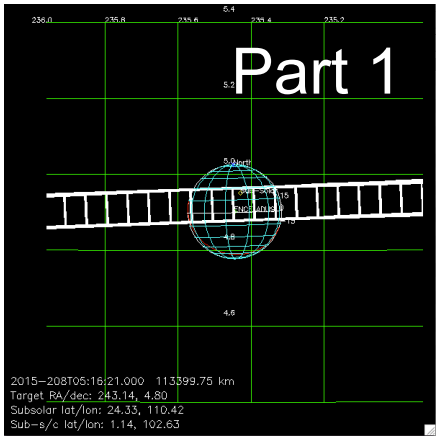
206EN_ICYLON002_PRIME
2014-194T23:53
Alt= 1,722,900 km
Longitude= 278°W
Latitude=6.5°N
Phase= 22°

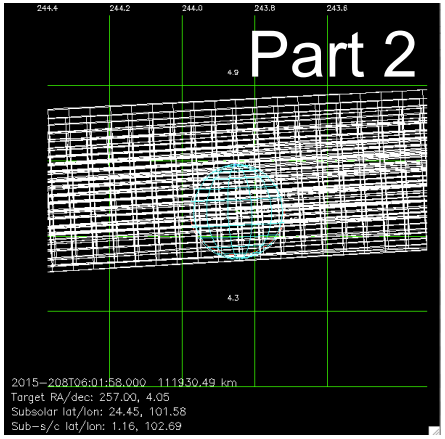


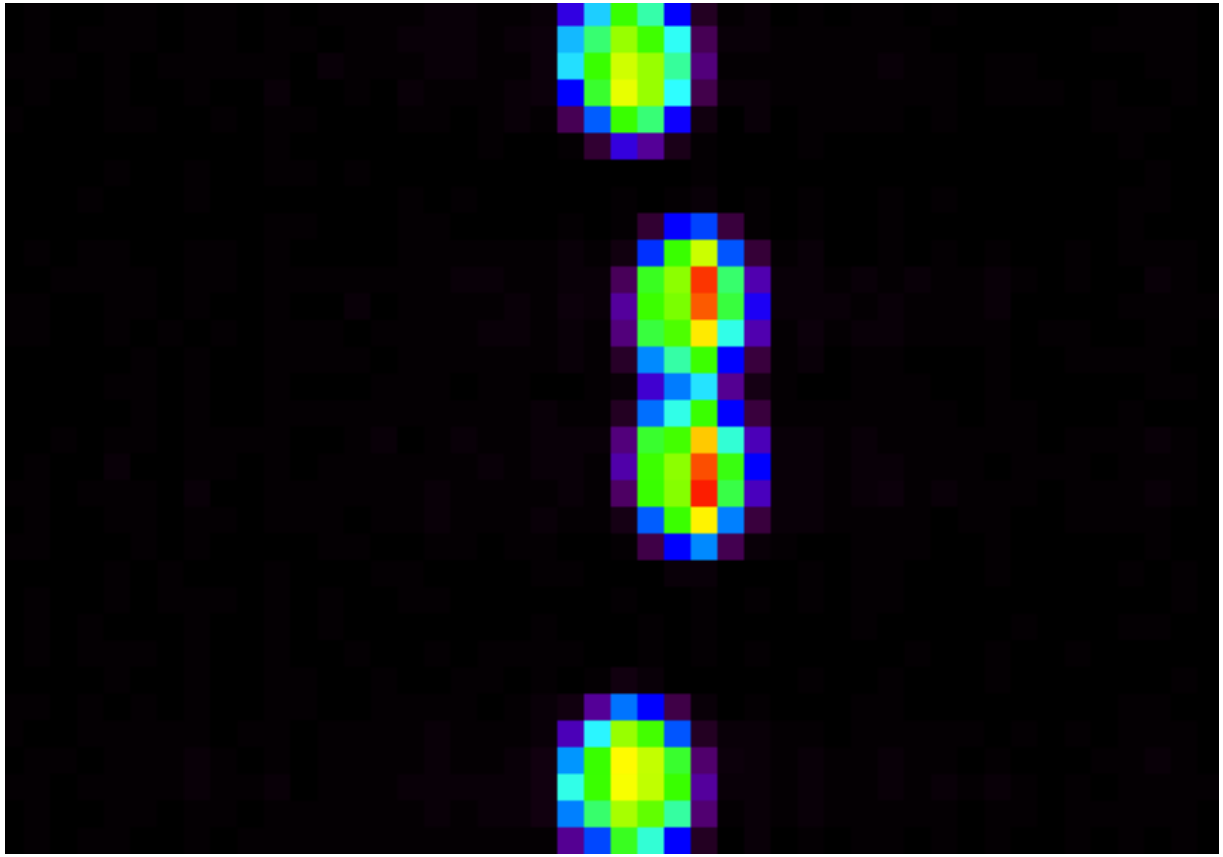


2-part

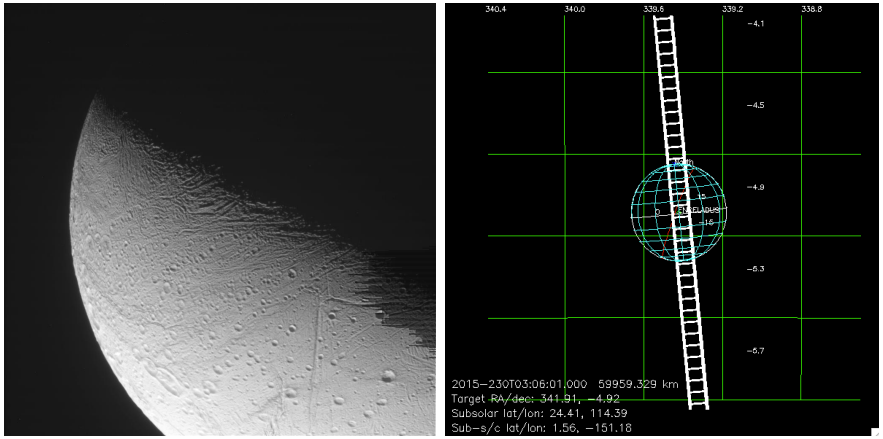
219EN_ICYLON001_ISS
2015-208T05:17
Alt= 112,352 km
Longitude= 257°W
Latitude=1°N
Phase= 24°

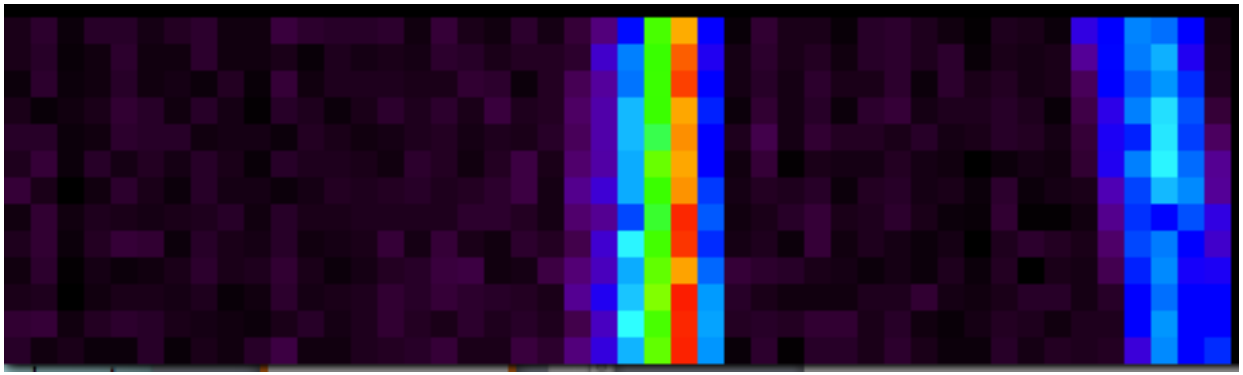




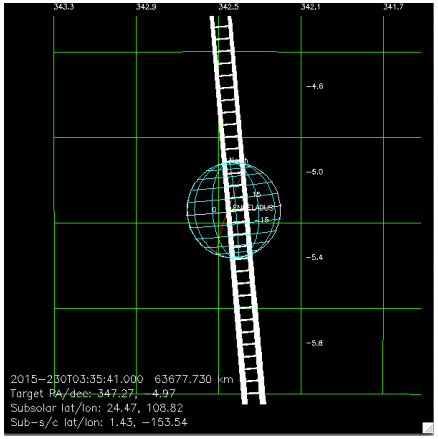


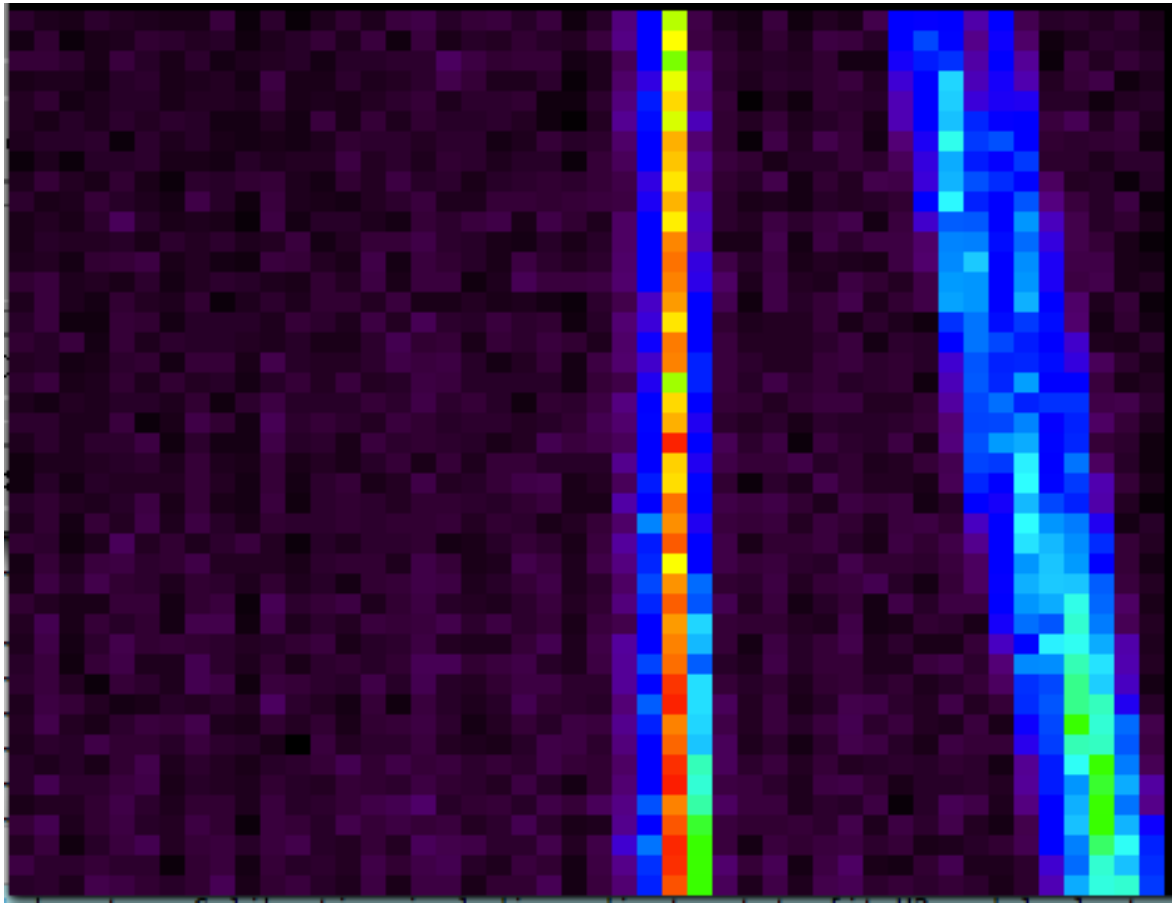
220EN_ICYLON001_ISS
2015-230T03:07
Alt= 61,142 km
Longitude= 152°W
Latitude=1°N
Phase= 96°





220EN_ICYLON001_PRIME
2015-230T03:36
Alt= 70,417 km
Longitude= 158°W
Latitude=1°N
Phase= 100°

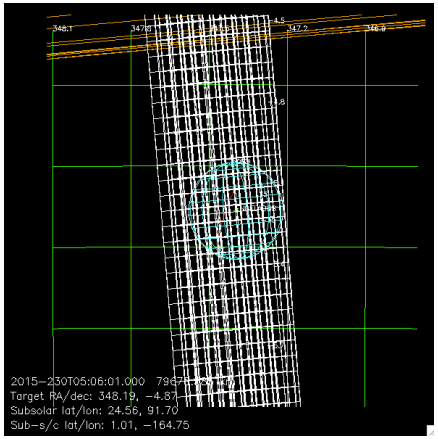


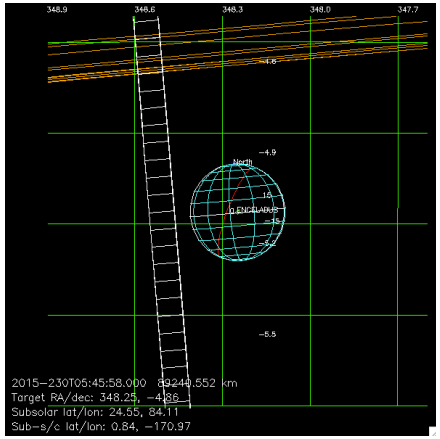


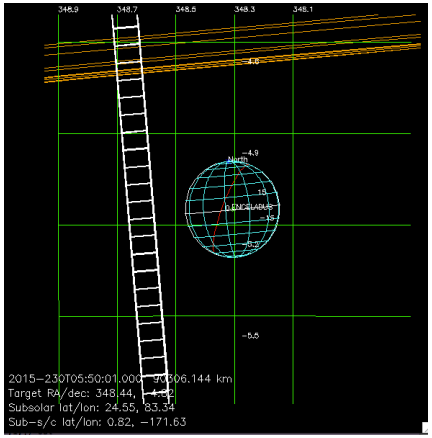
rings

3-part

220EN_ICYLON001_CIRS
2015-230T5:07
Alt= 83,584 km
Longitude= 168°W
Latitude=1°N
Phase= 103°

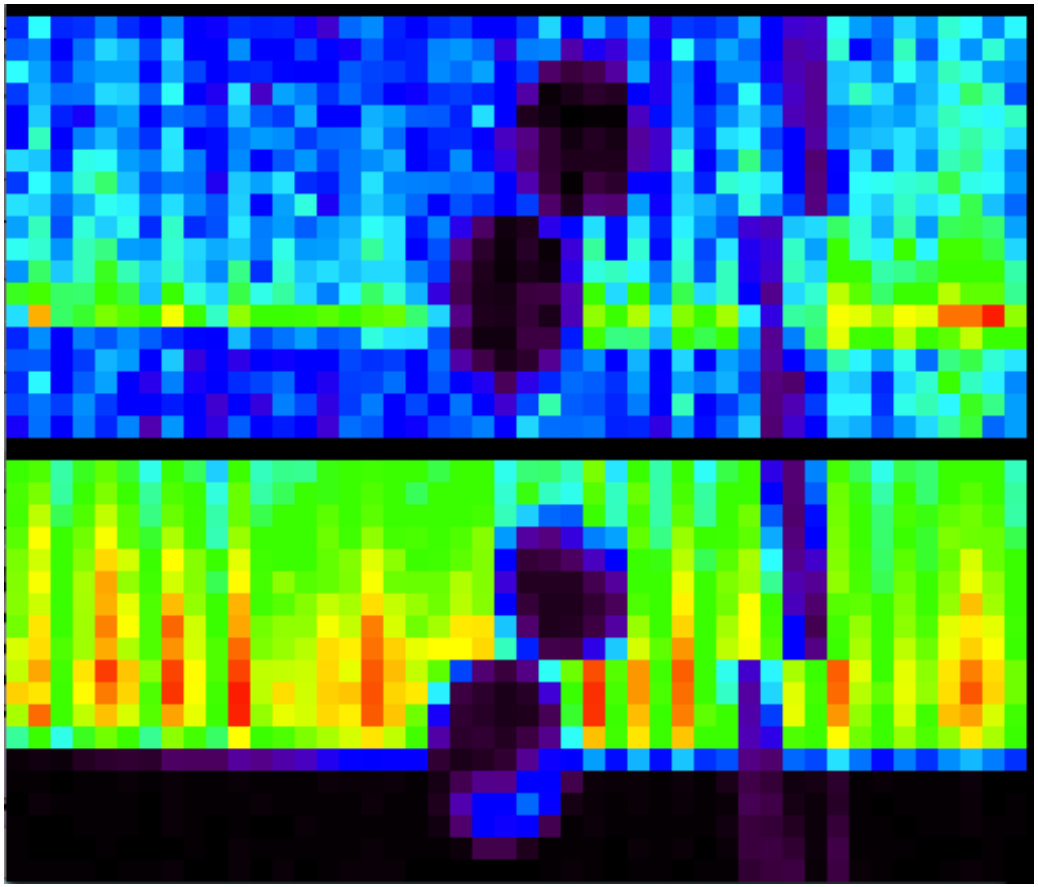






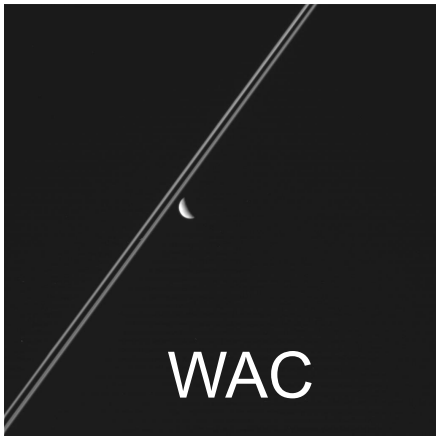
Ly-a

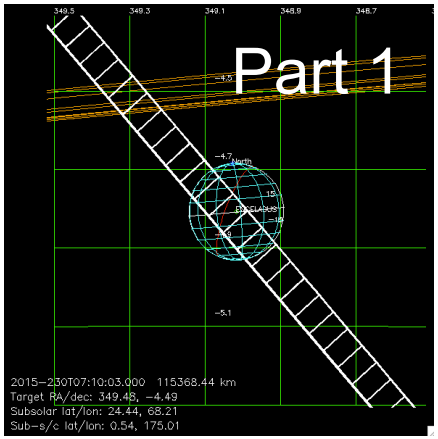
Long waves

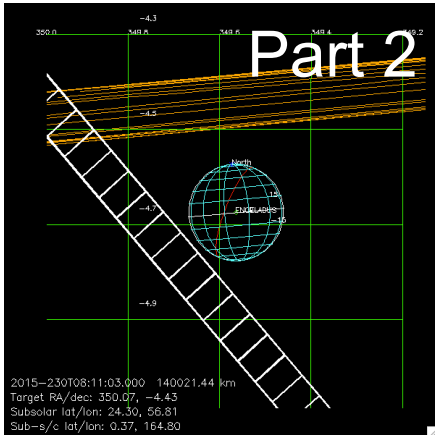


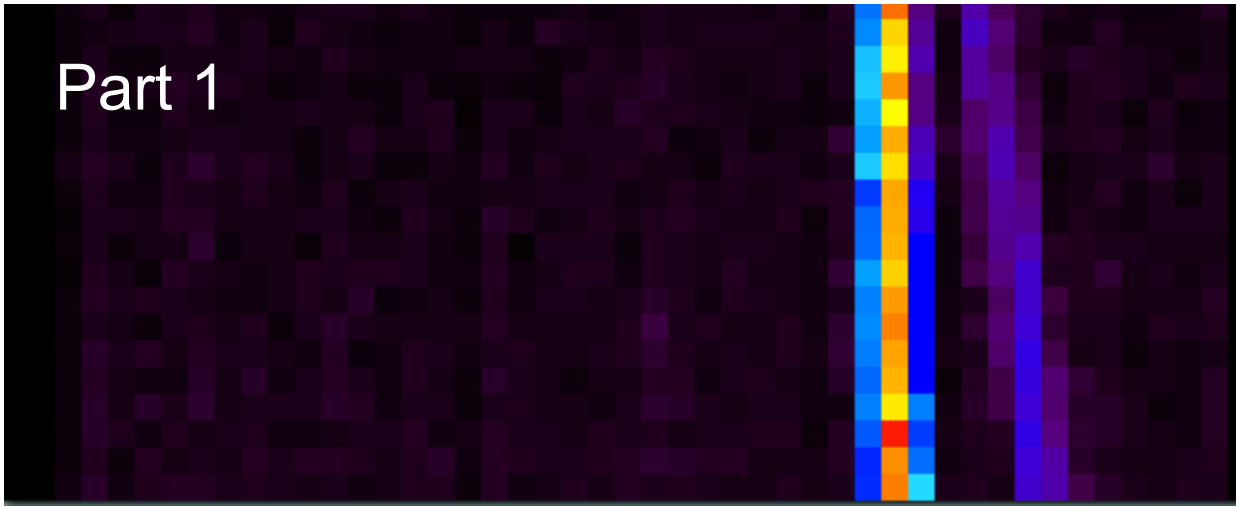
2-part

220EN_ICYPLU001_ISS
2015-230T07:11
Alt= 125,588 km
Longitude= 189°W
Latitude=0.5°N
Phase= 104°



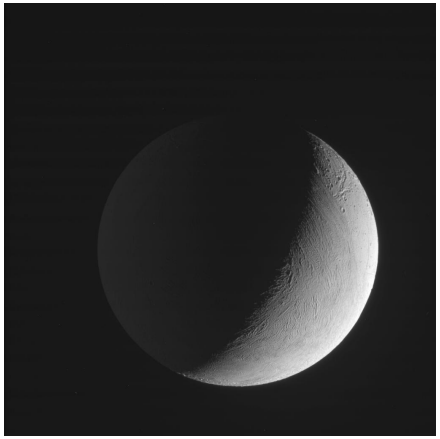


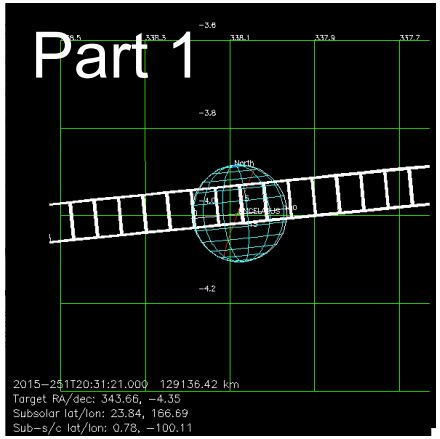


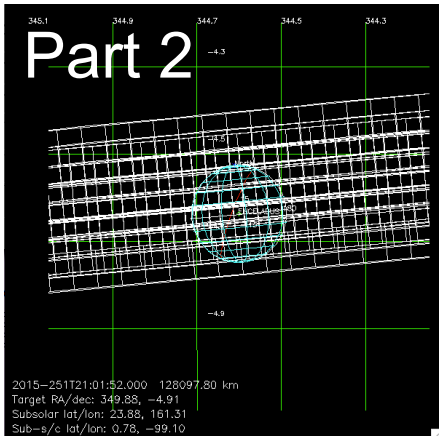


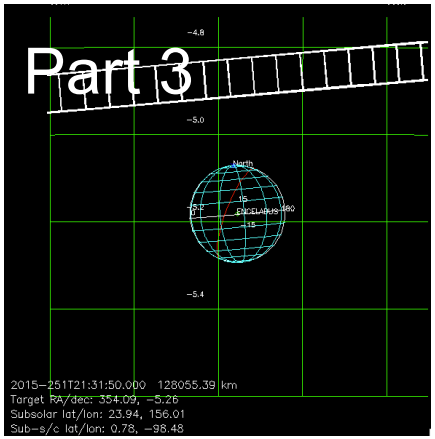
4-part

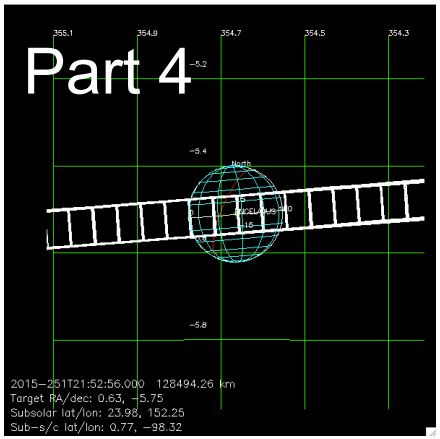
221EN_ICYLON001_ISS
2015-251T20:32
Alt= 128,345 km
Longitude= 100°W
Latitude=1°N
Phase= 96°

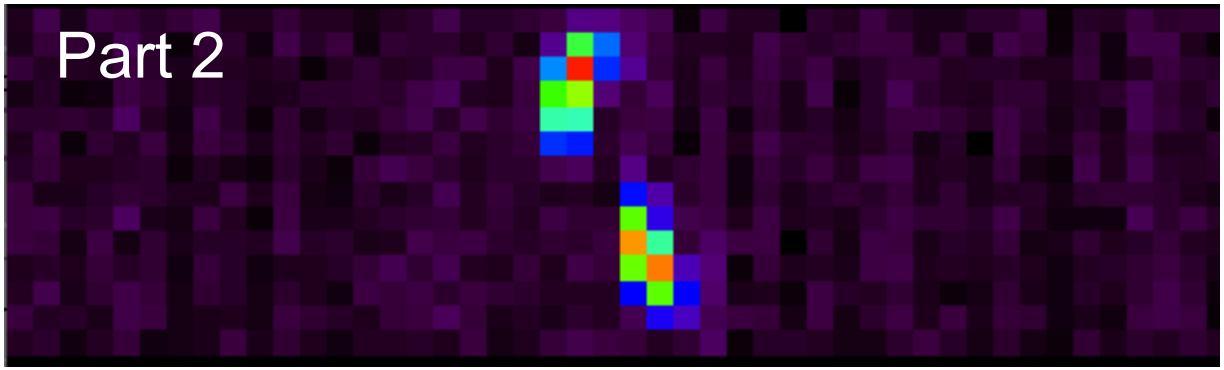






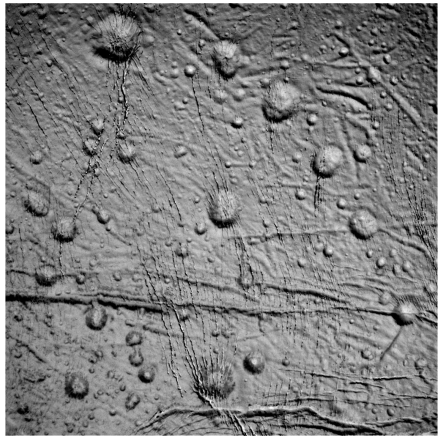


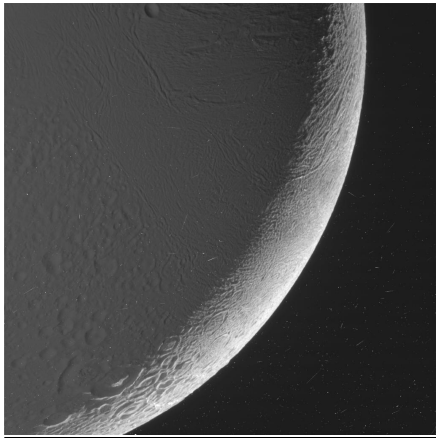


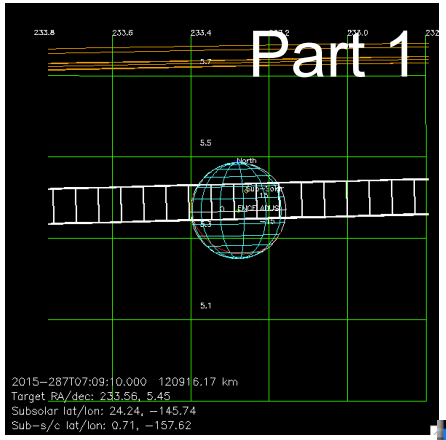


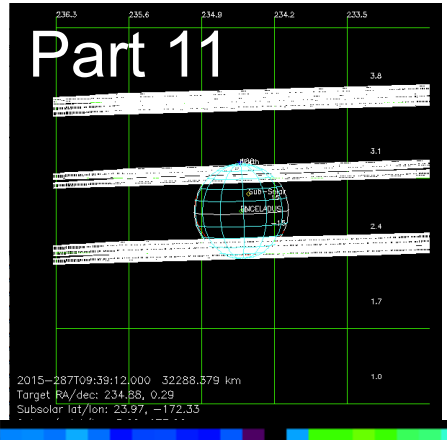
32-part

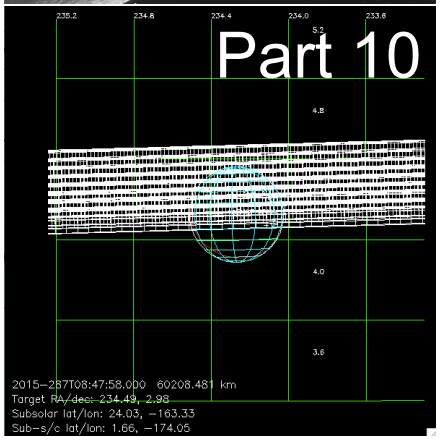
223EN_ICYMAP001_ISS
2015-287T07:10
Alt= 114,710 km
Longitude= 159.1°W
Latitude=0.8°N
Phase= 27°

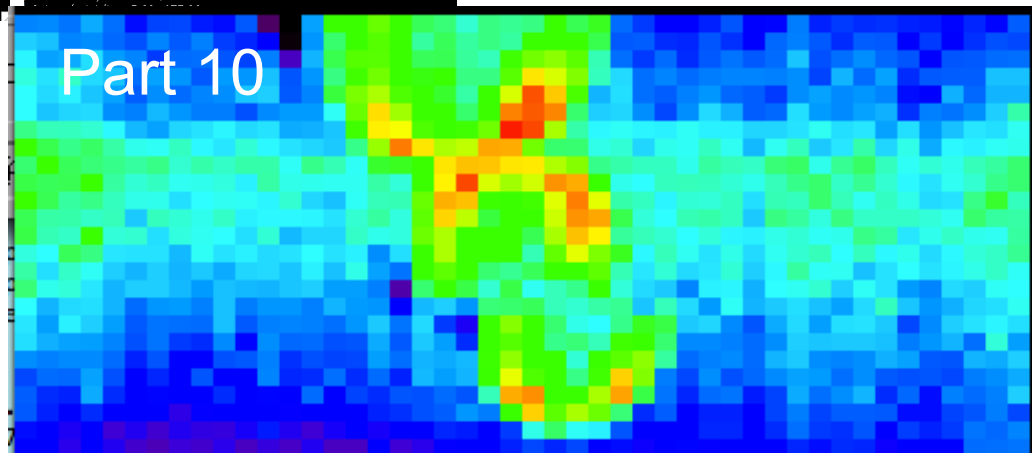




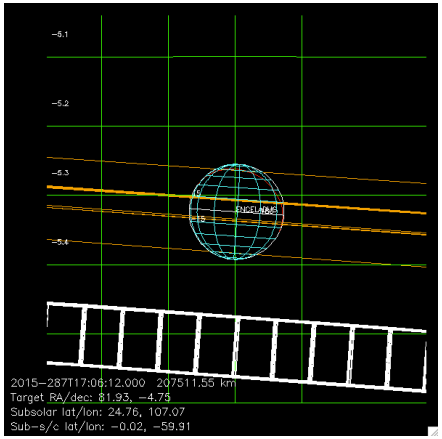


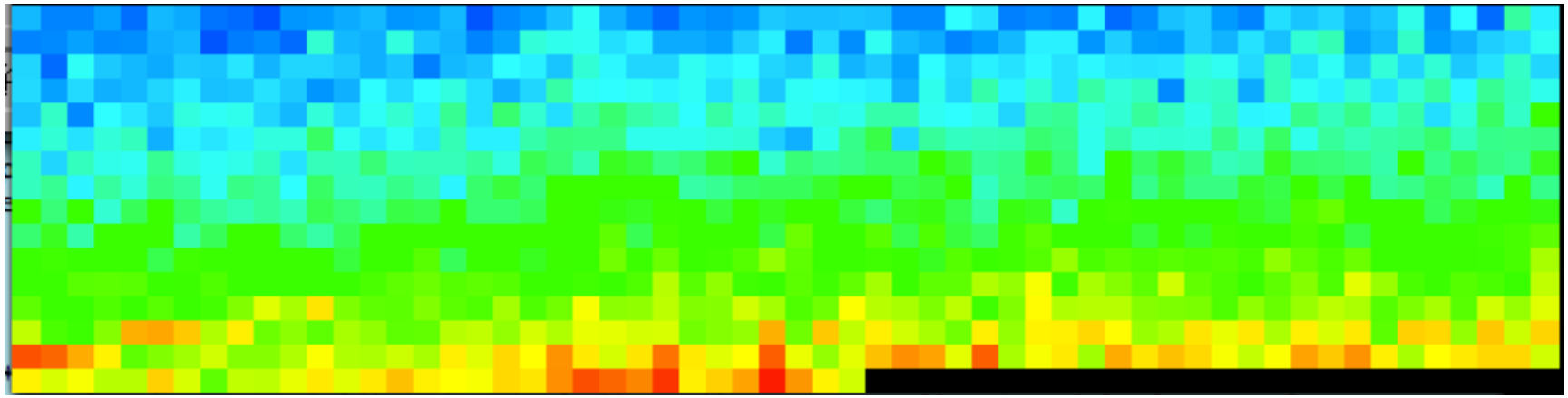


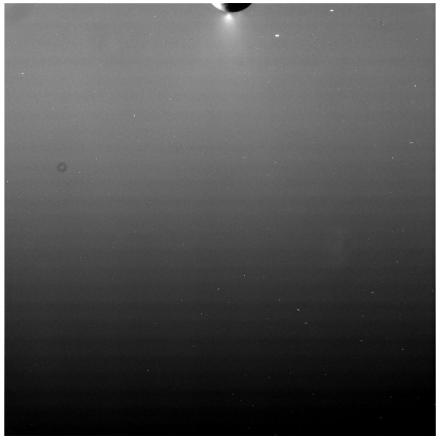


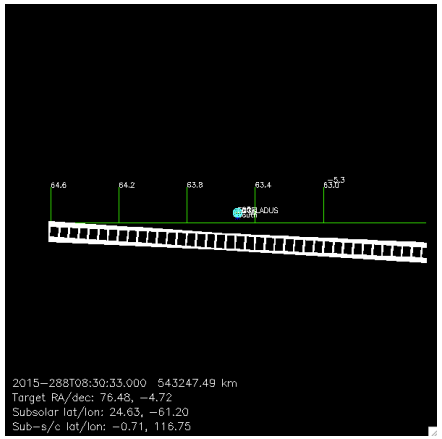


223EN_ICYPLU001_ISS
2015-287T17:07
Alt= 215,250 km
Longitude= 62°W
Latitude=0.1°S
Phase= 151°









223EN_ICYPLU002_ISS
2015-288T08:32
Alt= 751,037 km
Longitude= 276°W
Latitude=0.6°S
Phase= 155°

7-part 224EN_ICYLON001_ISS

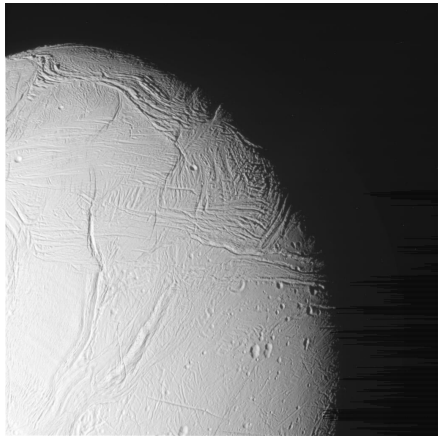
2015-301T11:12

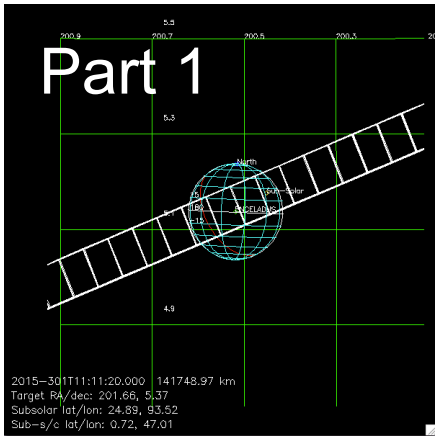
Alt= 137,967 km

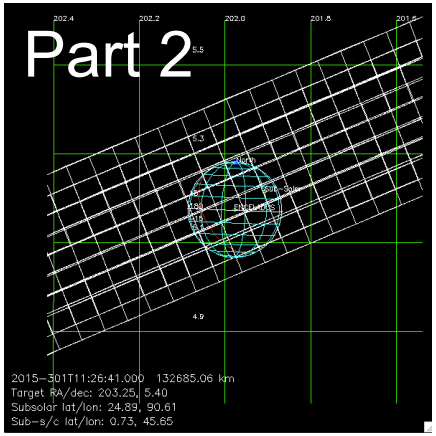
Longitude= 314°W

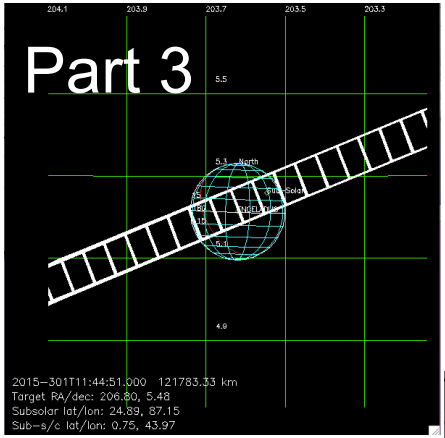
Latitude=0.7°N

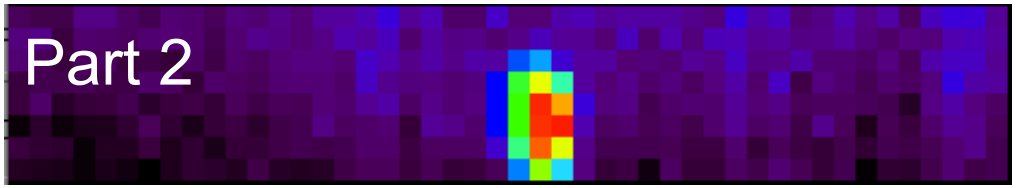
Phase= 50°

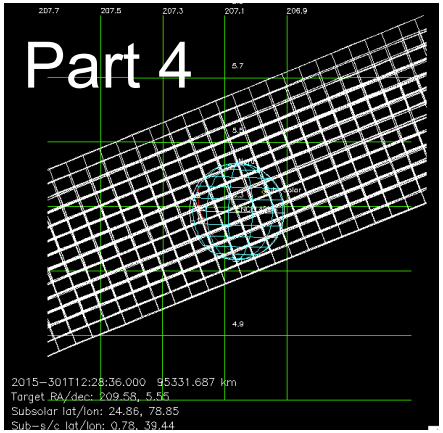


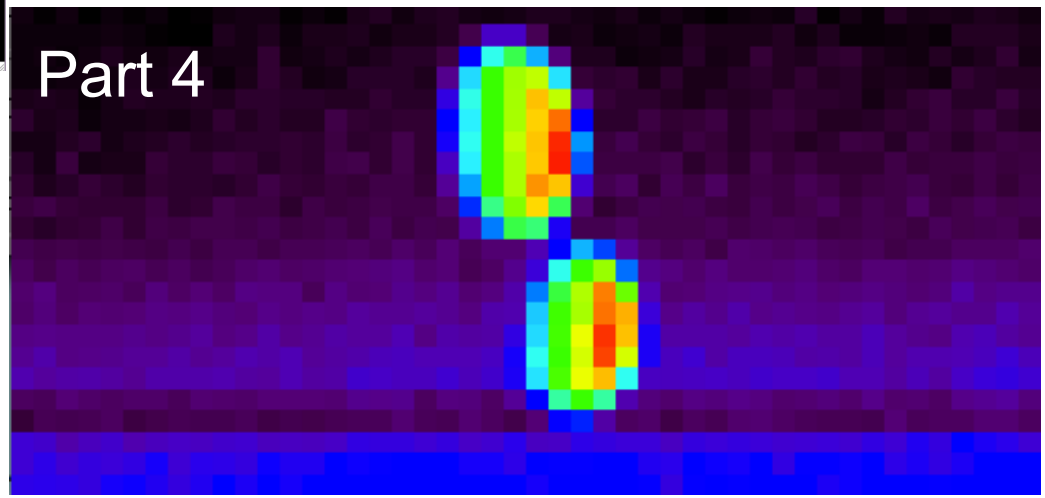




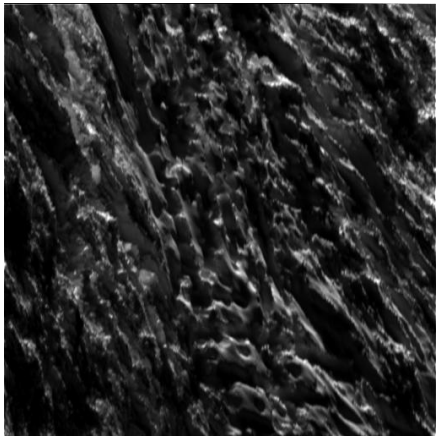


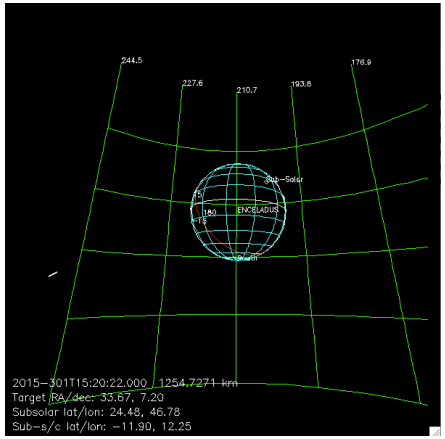




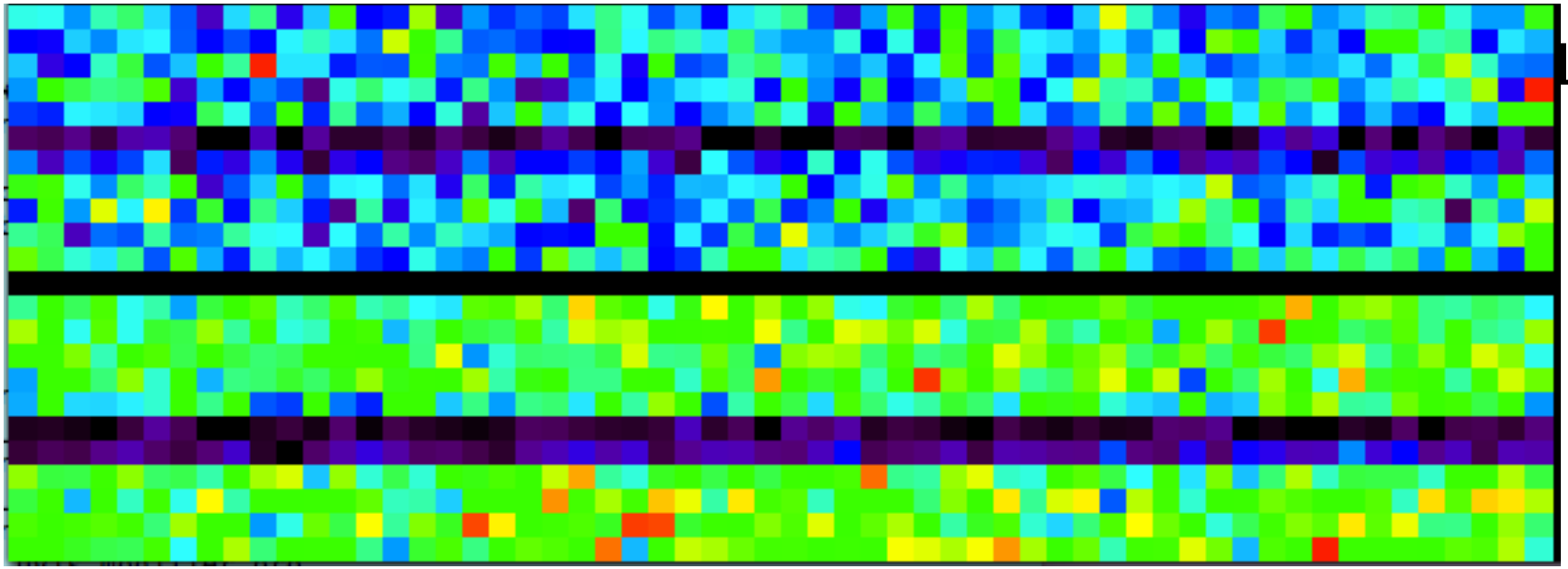


224EN_ICYMAP001_INMS
2015-301T15:20
Alt=532 km
Longitude= 245°W
Latitude=30°S
Phase= 109°



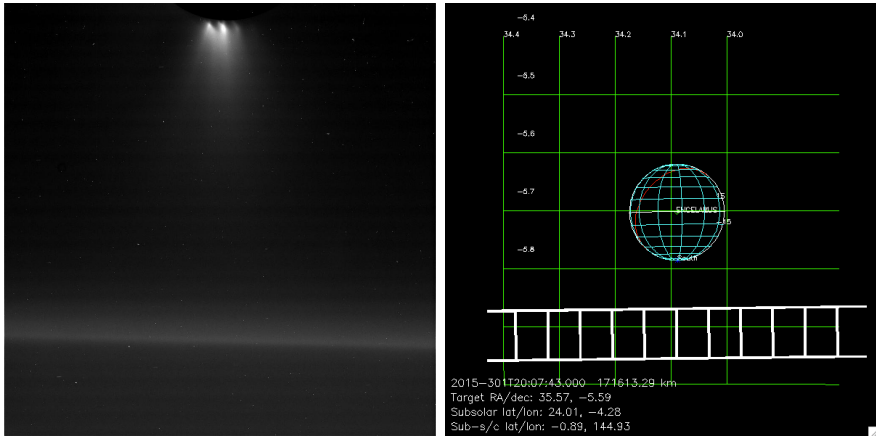


Enceladus quickly passes through UVIS slit



Ly-a

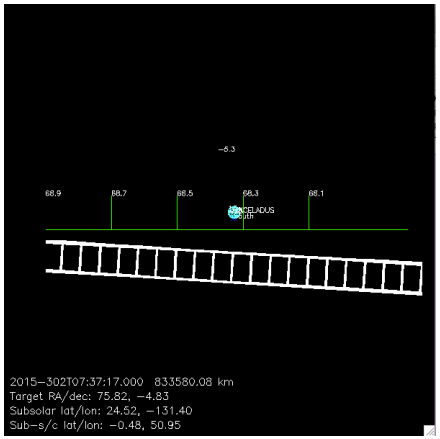
Long waves



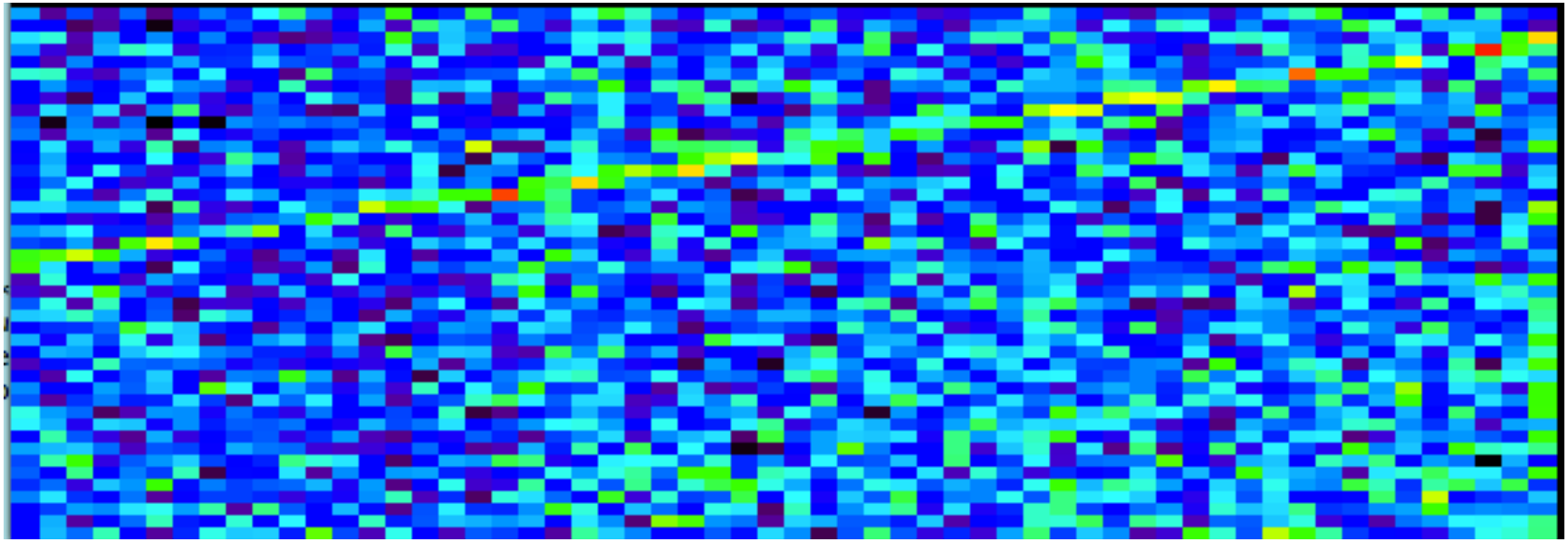
224EN_ICYPLU001_ISS
2015-301T20:09
Alt= 190,949 km
Longitude= 219°W
Latitude=0.9°S
Phase= 141°

2-part

224EN_ICYPLU002_ISS
2015-302T07:38
Alt= 890,700 km
Longitude= 317°W
Latitude=0.5°S
Phase= 154°

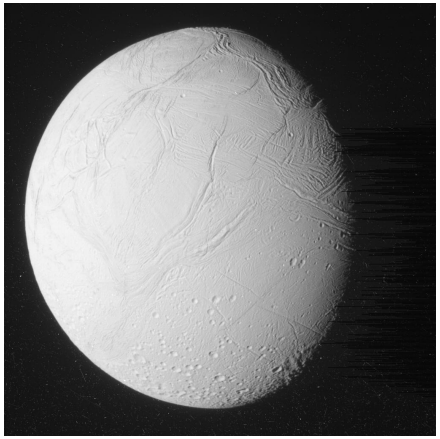


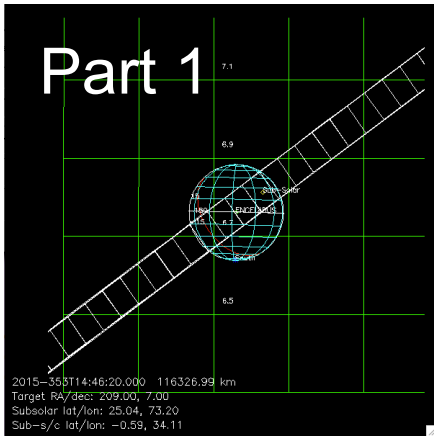
(something travels along the slit during this obs…)

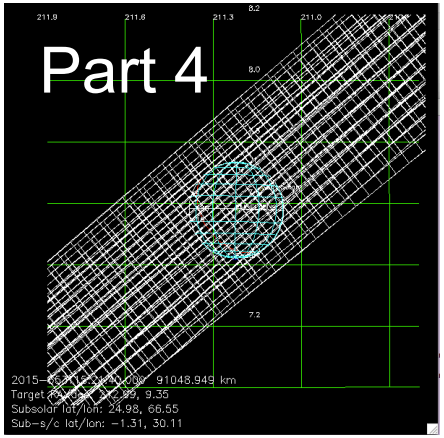


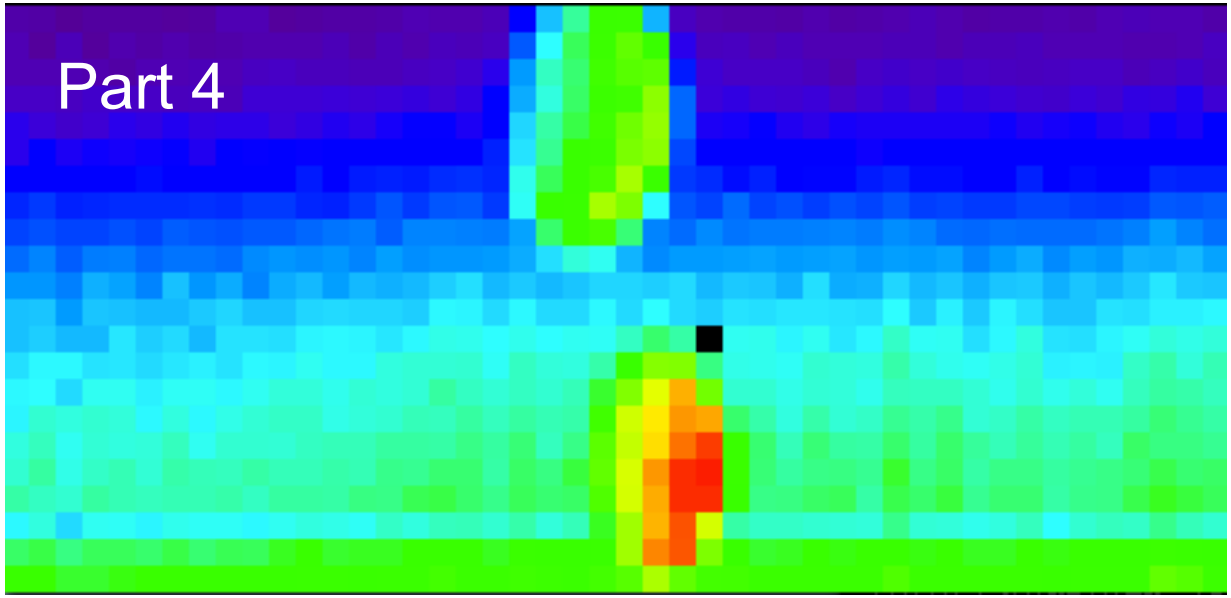
12-part

228EN_ICYLON001_CIRS
2015-353T14:47
Alt= 115,338 km
Longitude= 326°W
Latitude=0.6°S
Phase= 46°









HSP
profile

UVIS_228EN_ICYEXO001_CIRS
2015-353T17:12
Ingress lat/lon:
Egress lat/lon:
Star: Arcturus

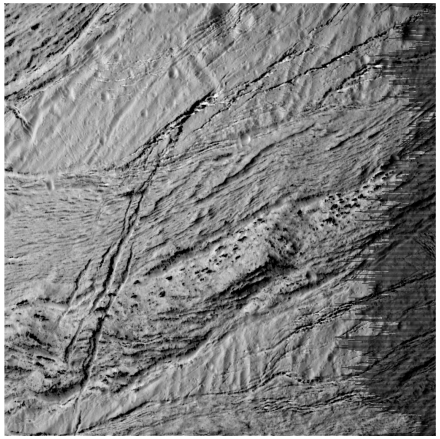
Star was too dim for
useful UVIS data analysis

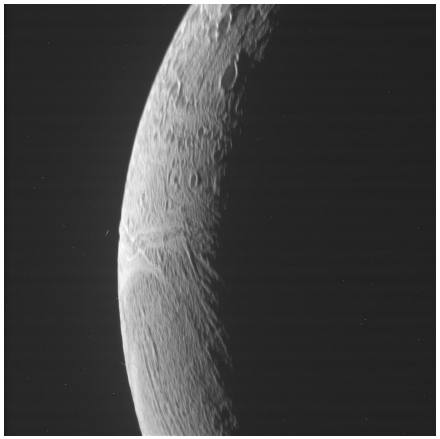
Spectra of I, I_0 (counts per integration period vs wavelength)

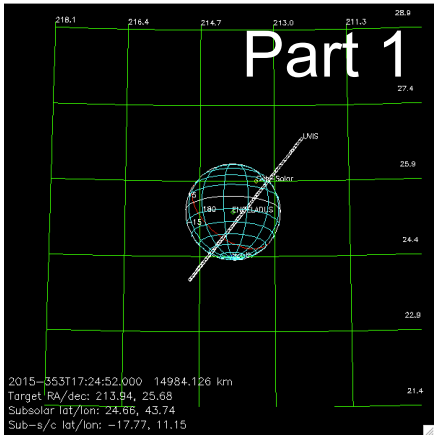
Spectrum of I/I_0

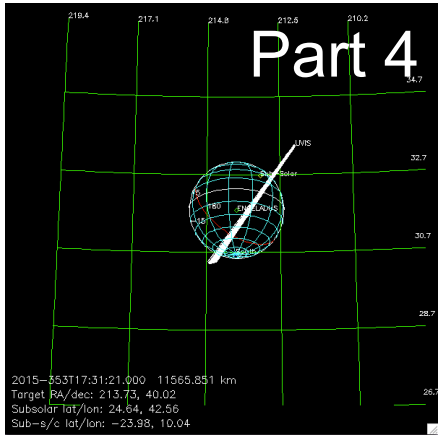
18-part

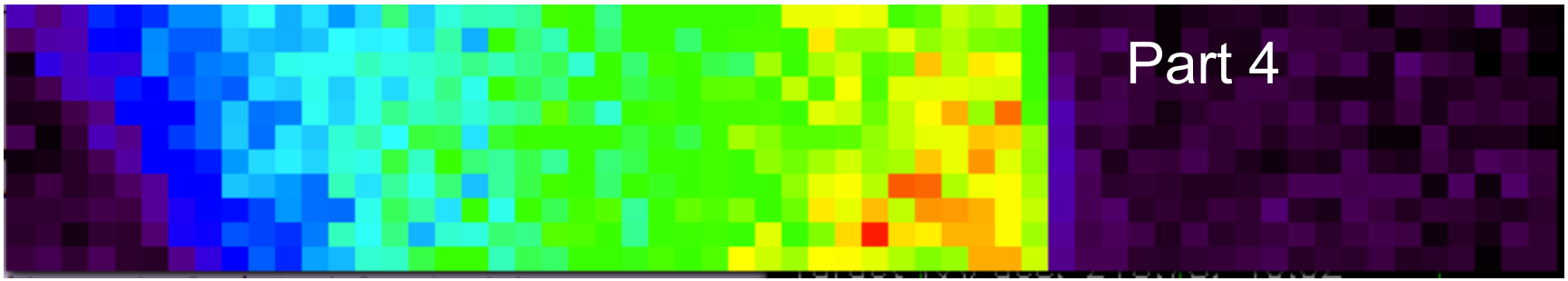
228EN_ICYMAP001_CIRS
2015-353T17:25
Alt= 14,594 km
Longitude= 349°W
Latitude=18°S
Phase= 55°

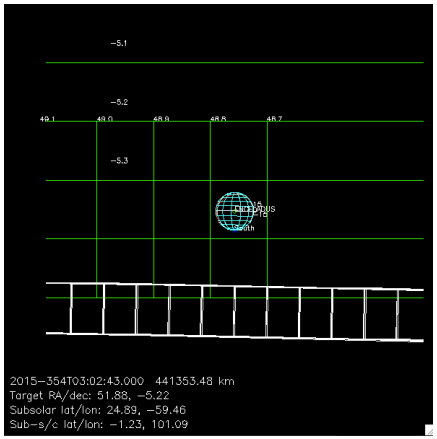








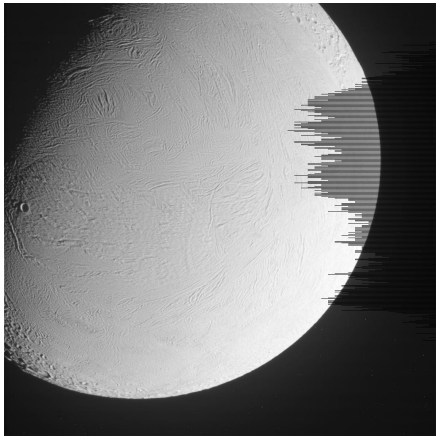


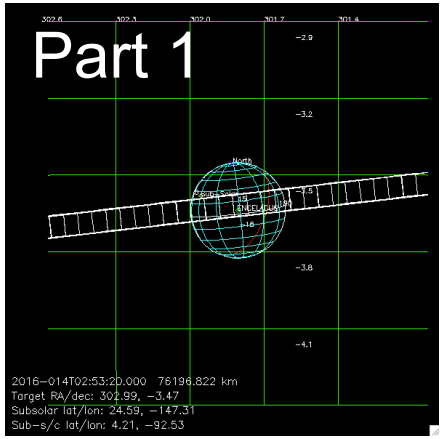


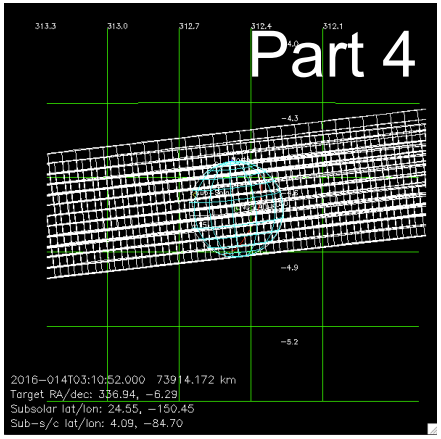
228EN_ICYPLU002_ISS
2015-354T03:17
Alt= 472,096 km
Longitude= 263°W
Latitude=1.2°S
Phase= 150°

5-part

230EN_ICYLON001_ISS
2016-014T02:54
Alt= 75,755 km
Longitude= 92°W
Latitude=4°N
Phase= 56°



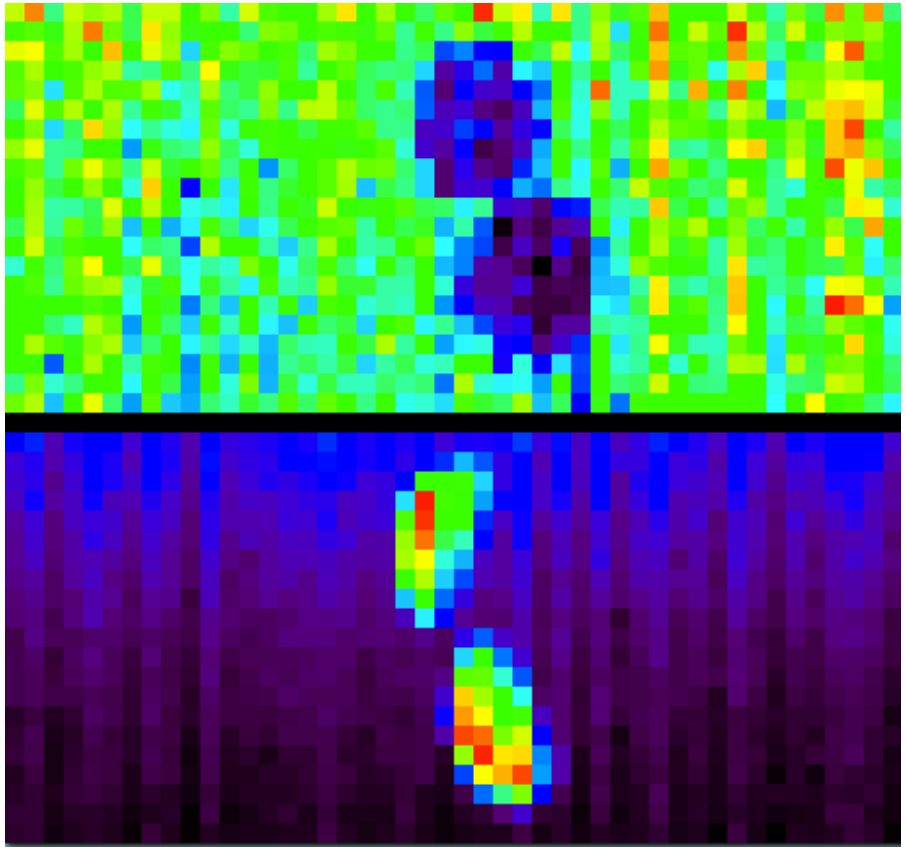




Part 4

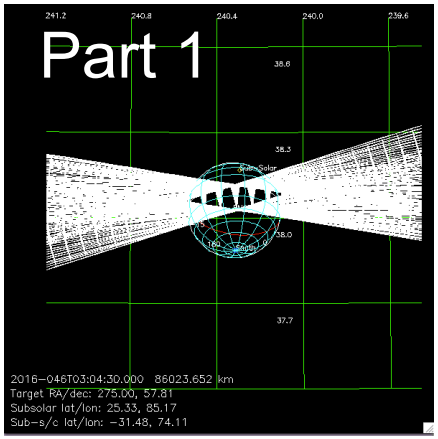
Ly-a

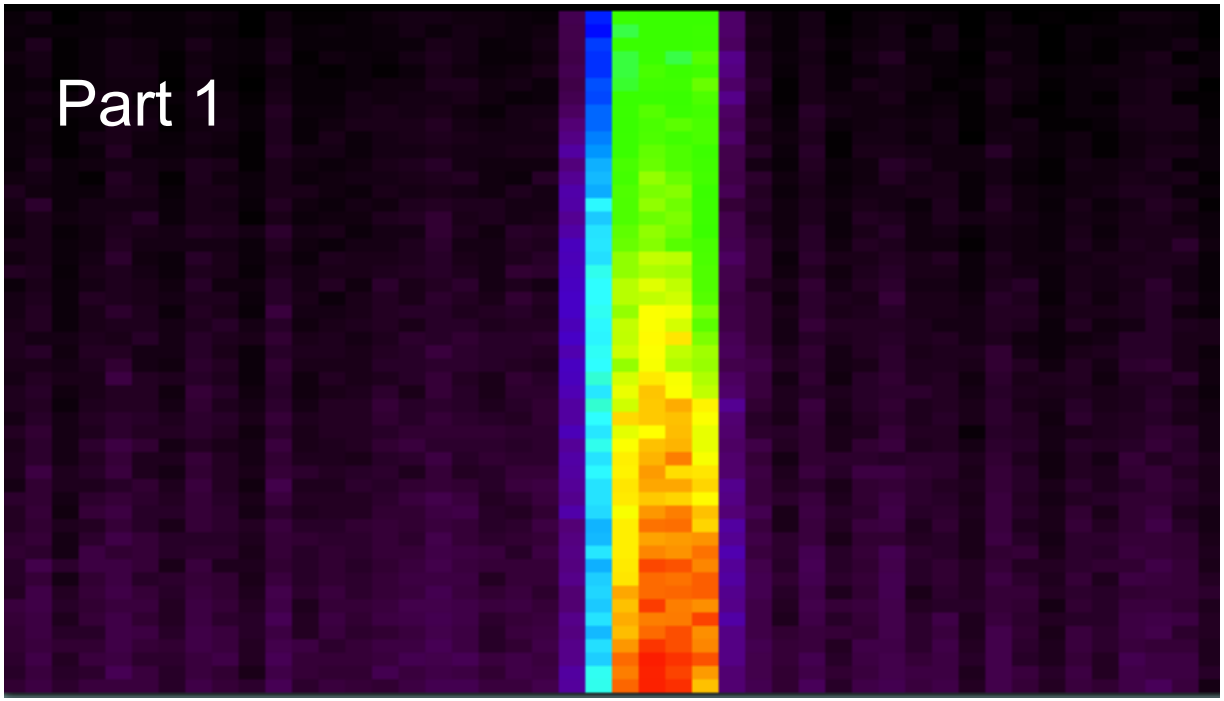
Long waves



4-part

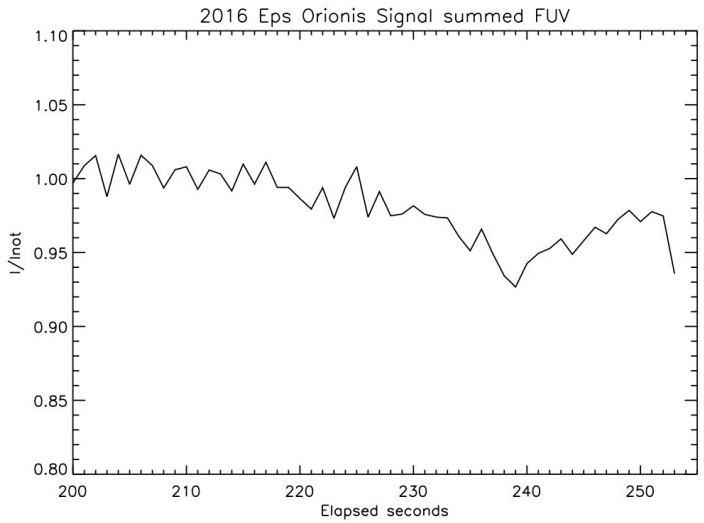
232EN_ICYLON001_VIMS
2016-046T03:05
Alt= 83,513 km
Longitude= 282°W
Latitude=43°S
Phase= 70°





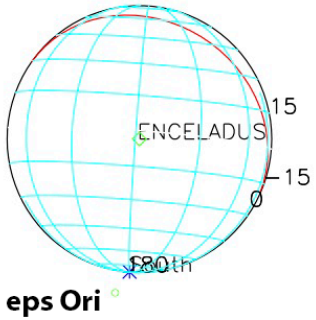
FUV profile

Summed over wavelength

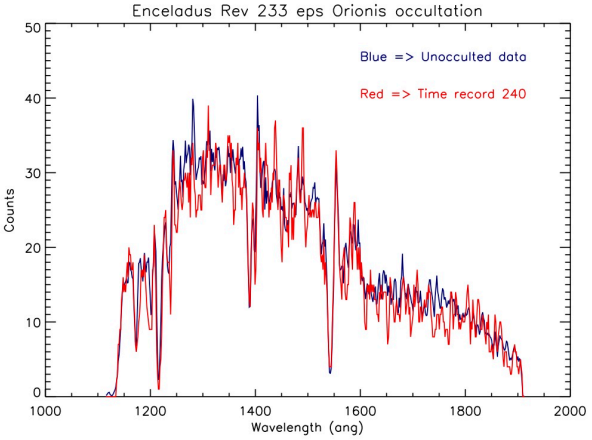


UVIS_233EN_ICYEXO001_PIE
2016-071T11:48
Ingress lat/lon: -78.5 / 160.1
Egress lat/lon: -36.5 / 175.6
Star: eps Ori

Ingress



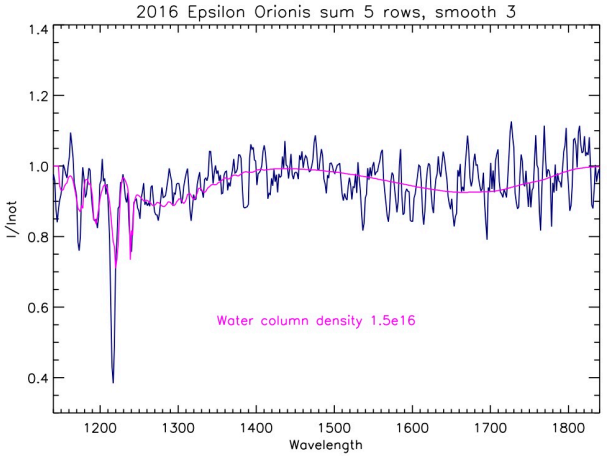
Spectra of I, I_0 (counts per integration period vs wavelength)



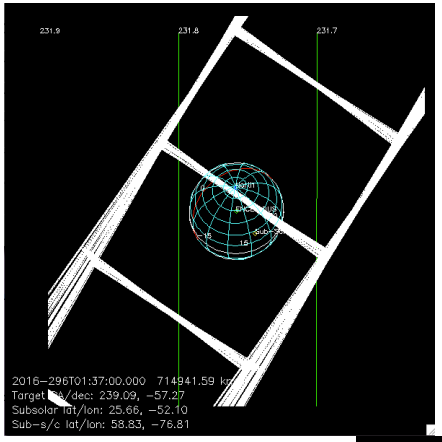
Ingress

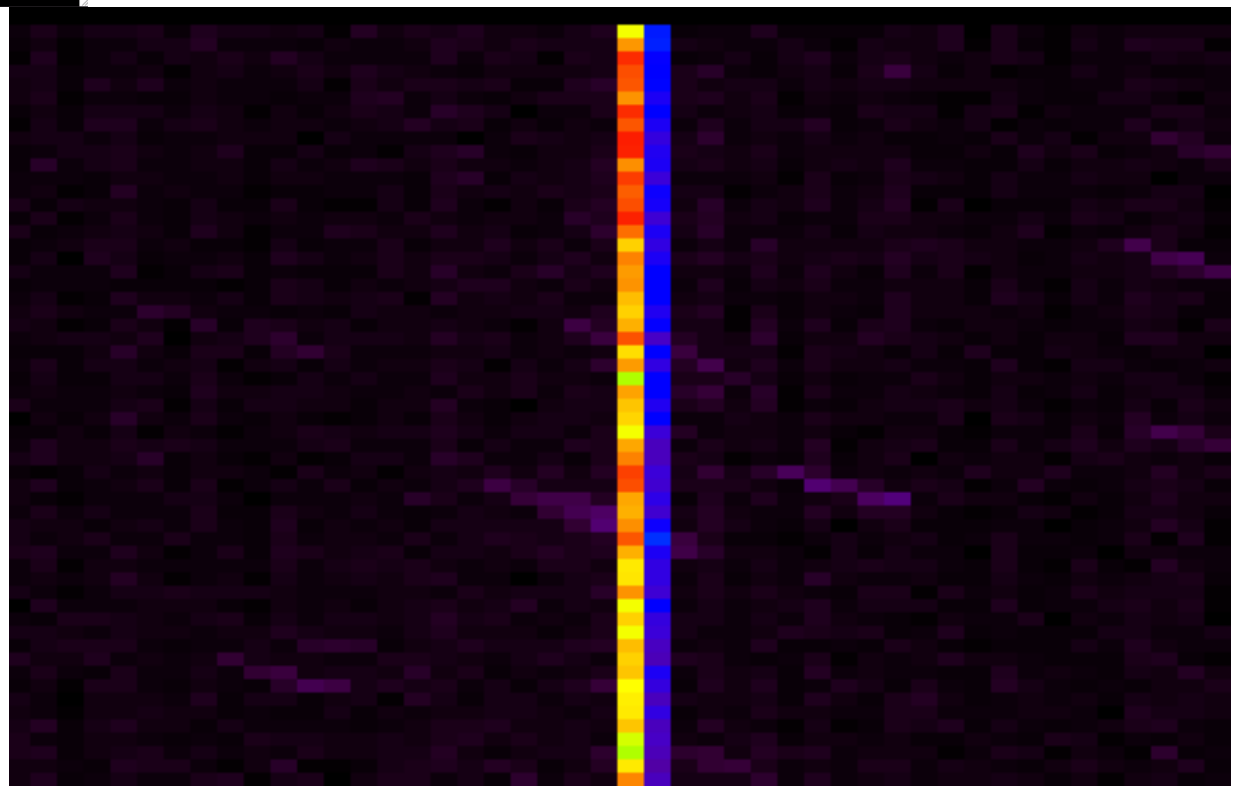
Spectrum of I/I_0

Ingress passed through plume



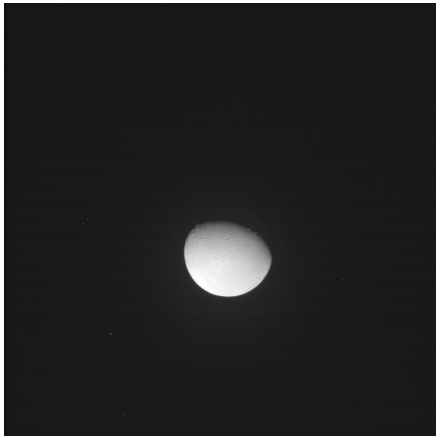
246EN_ICYLON001_PIE
2016-296T01:38
Alt= 685,599 km
Longitude= 82°W
Latitude=61°N
Phase= 37°

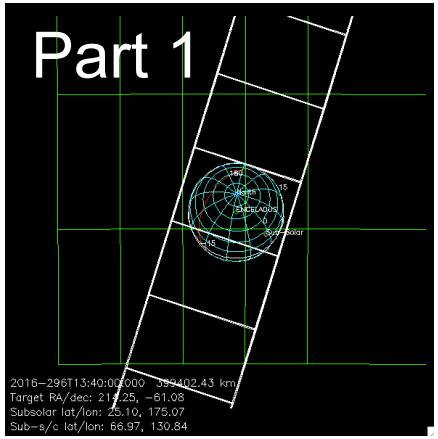


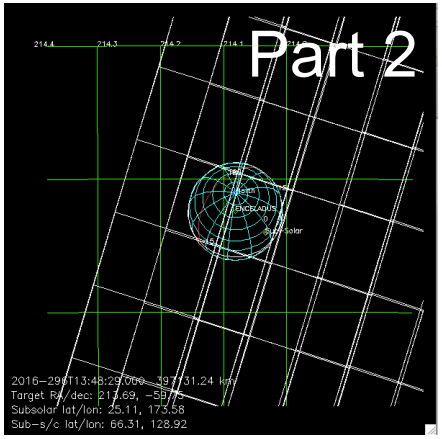


5-part

246EN_ICYLON002_ISS
2016-296T13:41
Alt= 395,323 km
Longitude= 232°W
Latitude=66°N
Phase= 49°



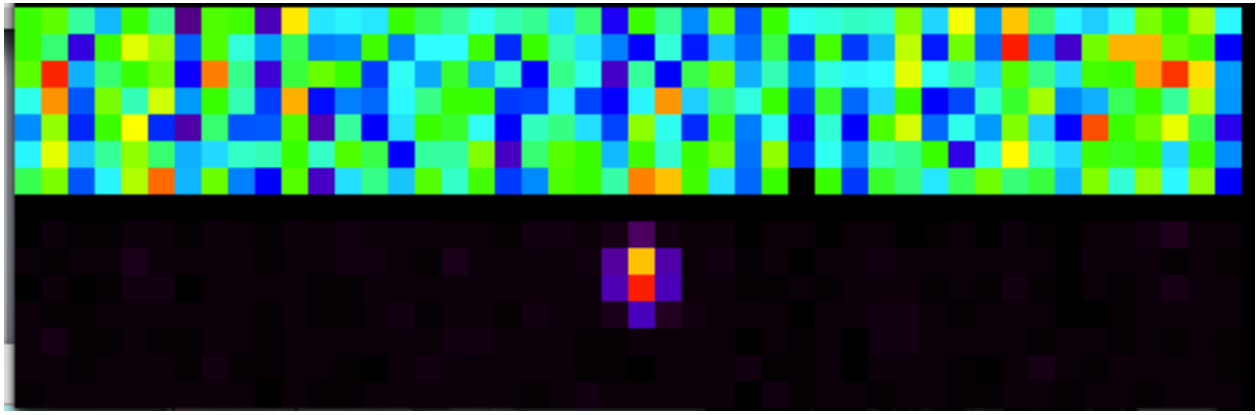




Part 2

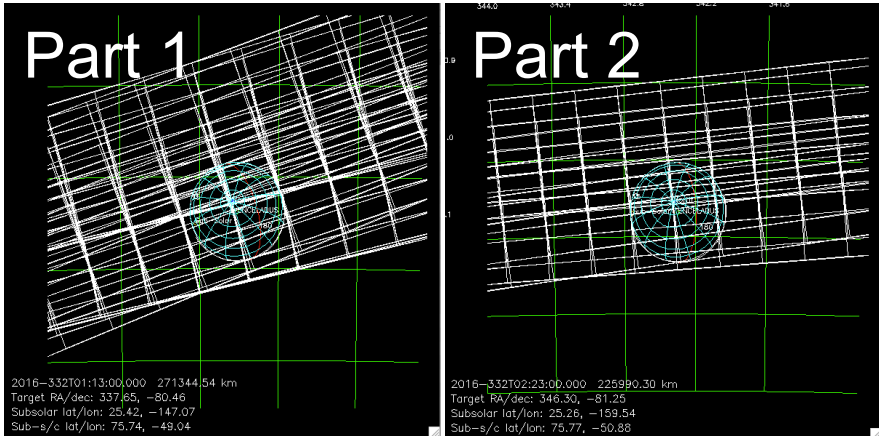
Ly-a

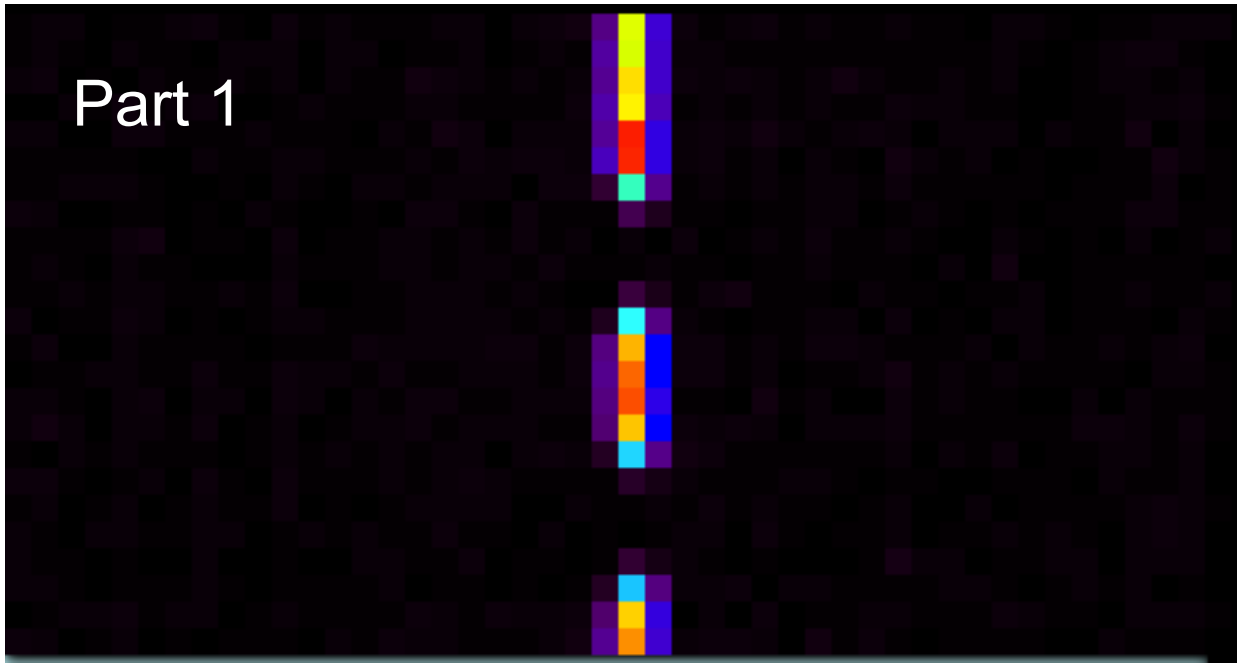
Long waves



2-part

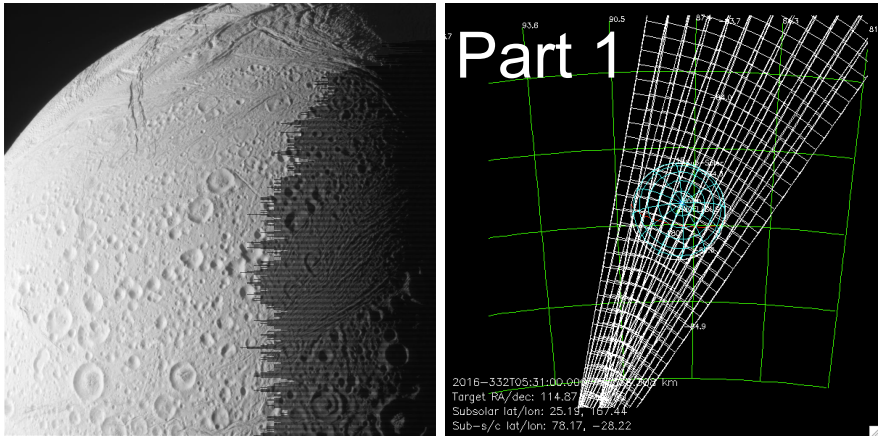
250EN_ICYLON001_CIRS
2016-332T01:14
Alt= 256,708 km
Longitude= 50°W
Latitude=76°N
Phase= 66°





8-part

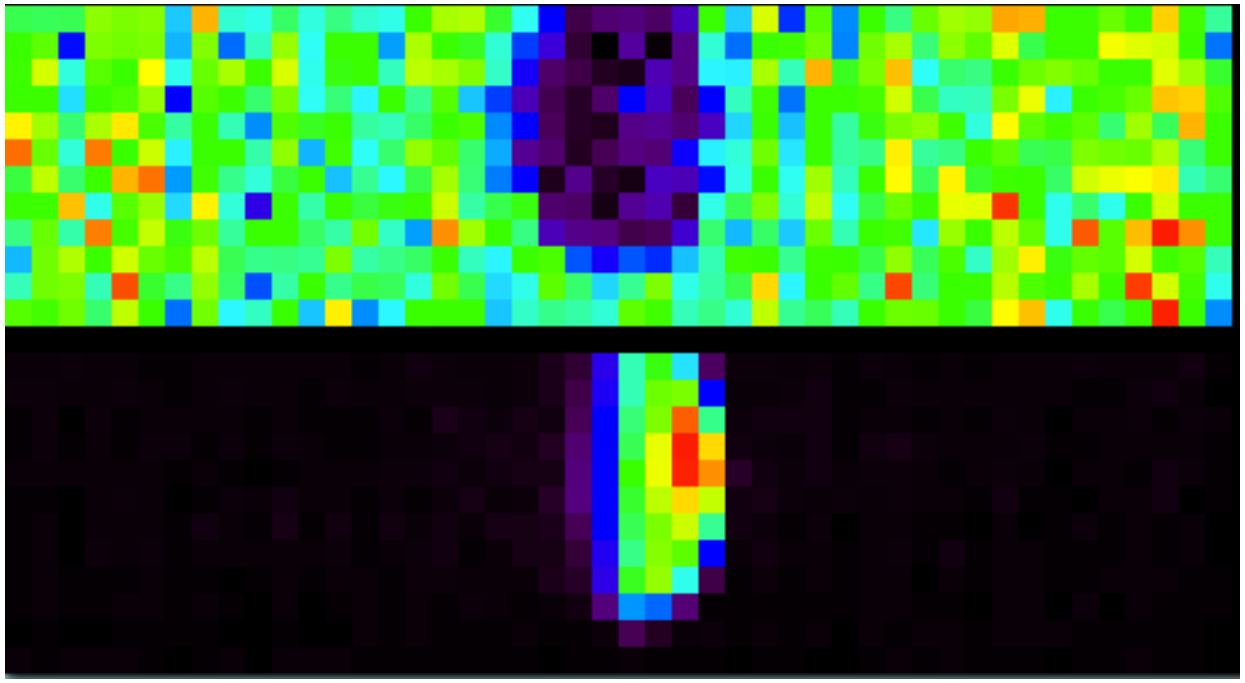
250EN_ICYLON001_ISS
2016-332T05:32
Alt= 67,070 km
Longitude= 19°W
Latitude=77°N
Phase= 75°



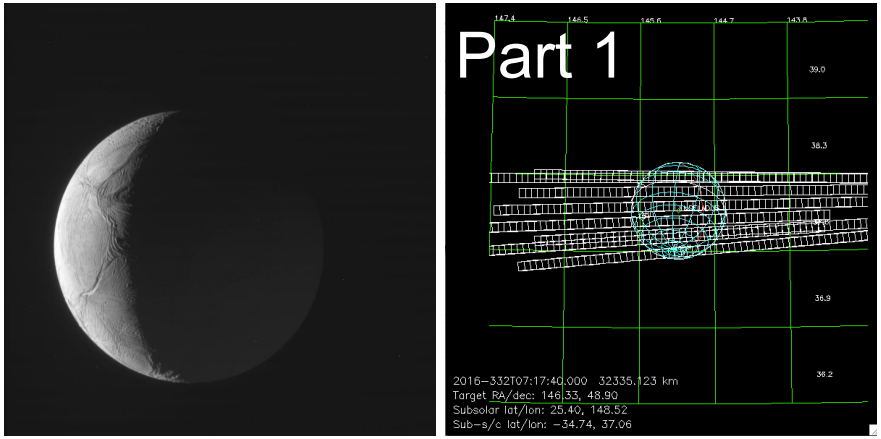
Part 1

Ly-a

Long waves



8-part

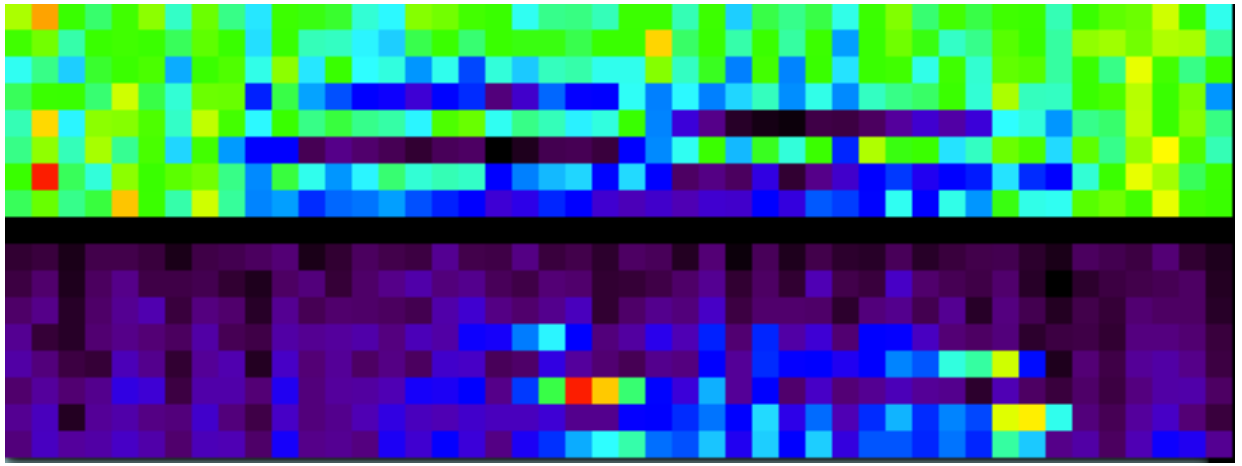


250EN_ICYLON002_CIRS
2016-332T07:18
Alt=37,447 km
Longitude= 323°W
Latitude=41°S
Phase= 120°

Part 1

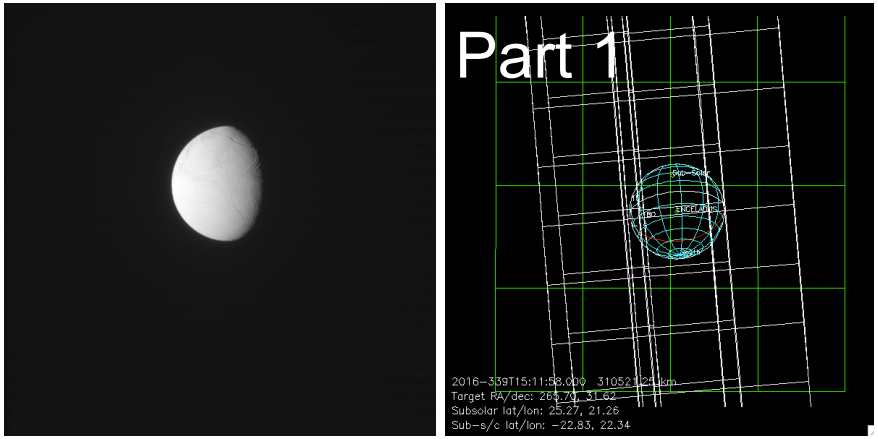
Ly-a

Long waves



3-part

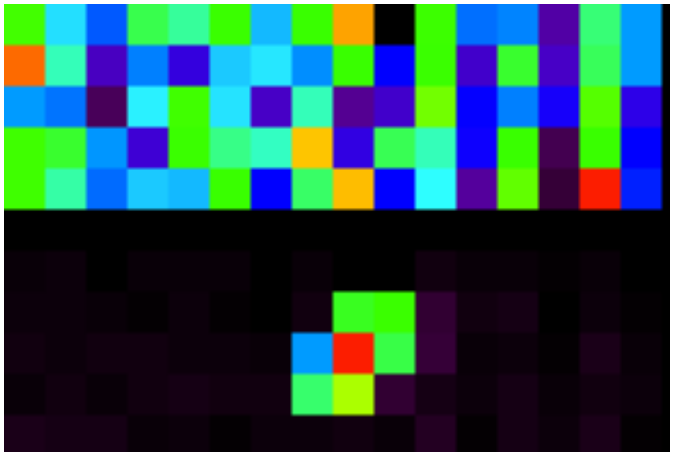
251EN_ICYSTARE001_CIRS
2016-339T15:13
Alt= 309,522 km
Longitude= 338°W
Latitude=24°S
Phase= 52°



Part 1

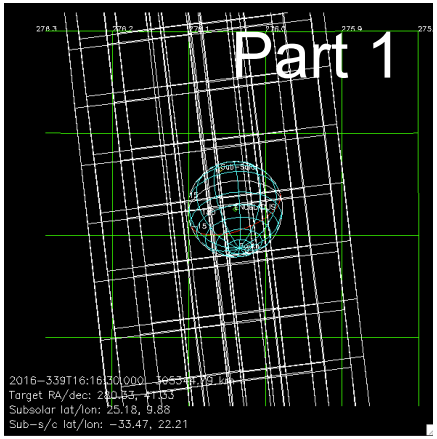
Ly-a

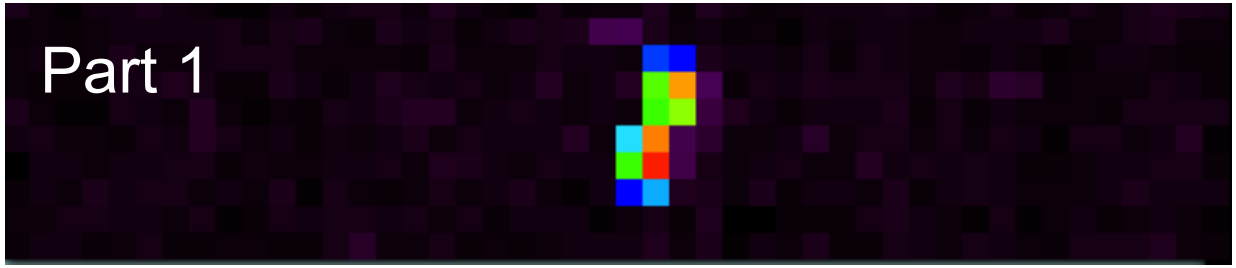
Long waves



7-part

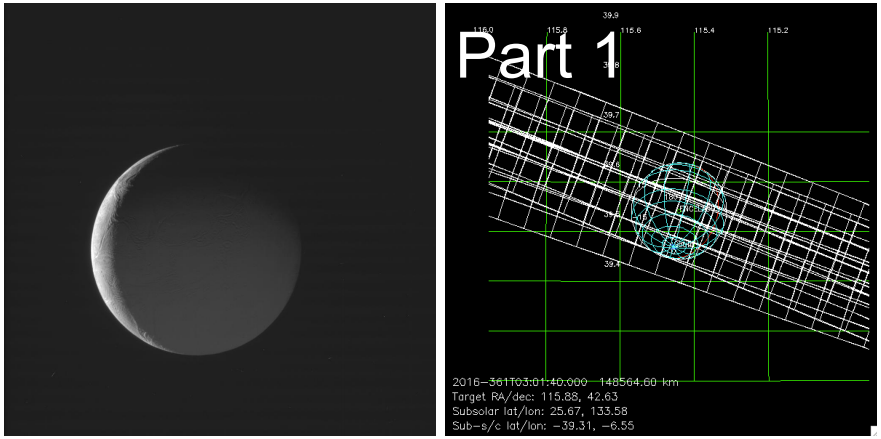
251EN_ICYLON001_CIRS
2016-339T16:17
Alt= 304,608 km
Longitude= 338°W
Latitude=35°S
Phase= 65°





15-part

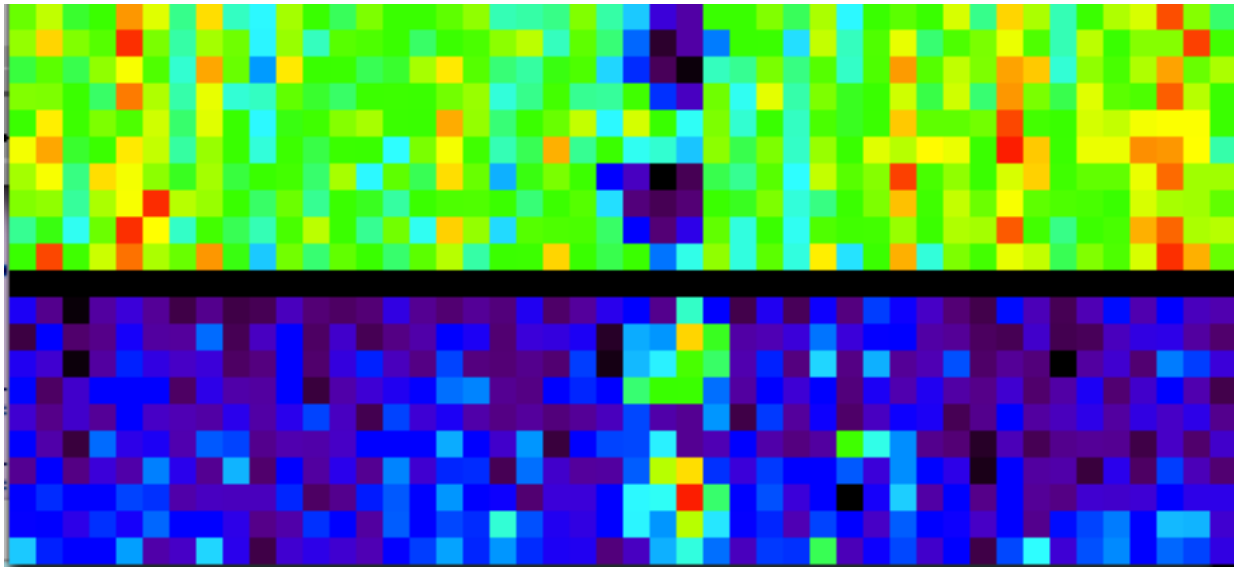
254EN_ICYLON001_CIRS
2016-361T03:02
Alt= 156,624 km
Longitude= 8°W
Latitude=41°S
Phase= 143°



Part 1

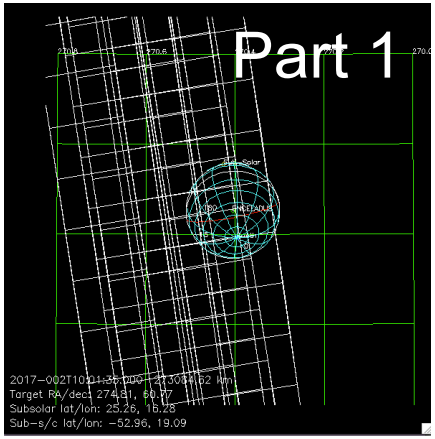
Ly-a

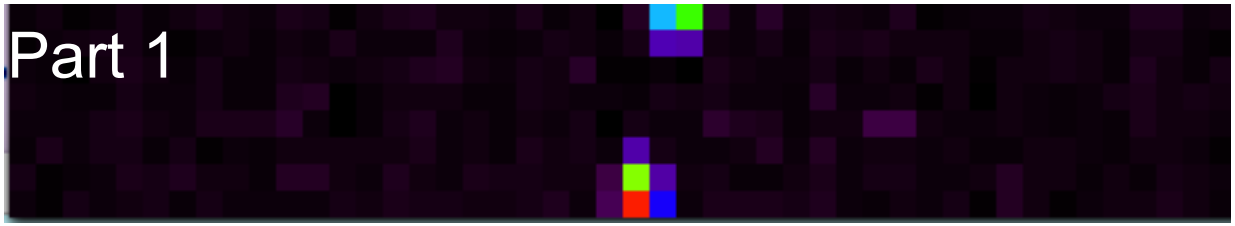
Long waves



7-part

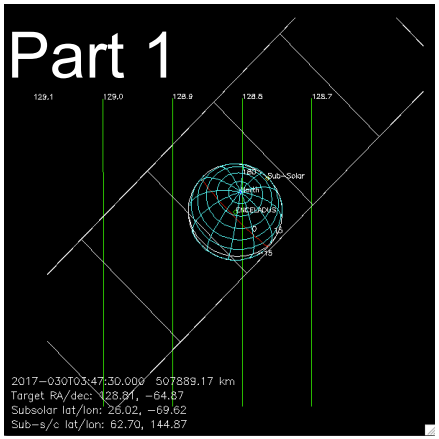
255EN_ICYLON001_CIRS
2017-002T10:02
Alt= 273,216 km
Longitude= 340°W
Latitude=54°S
Phase= 82°

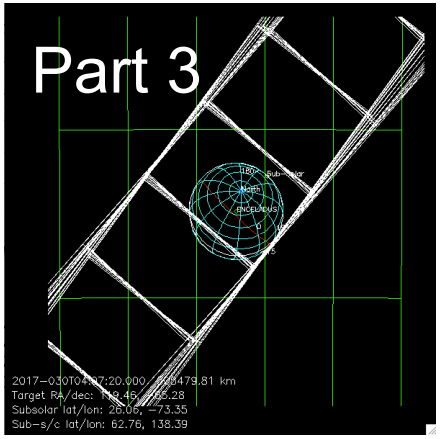


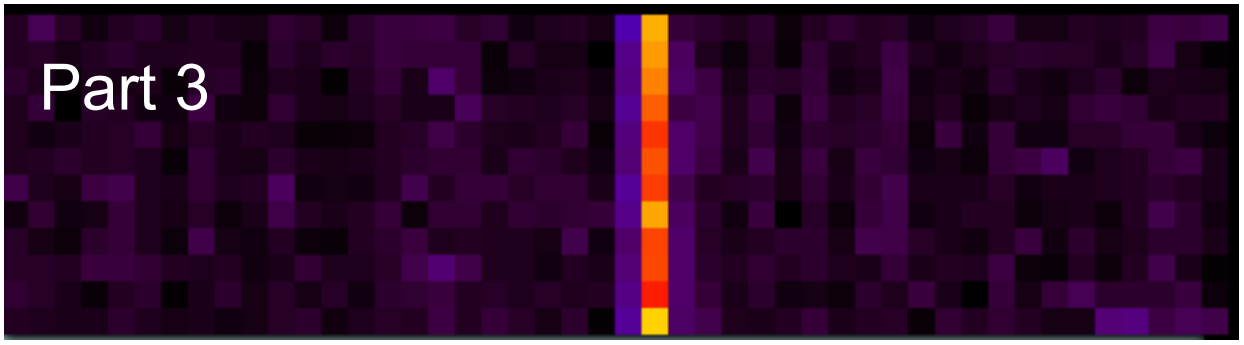


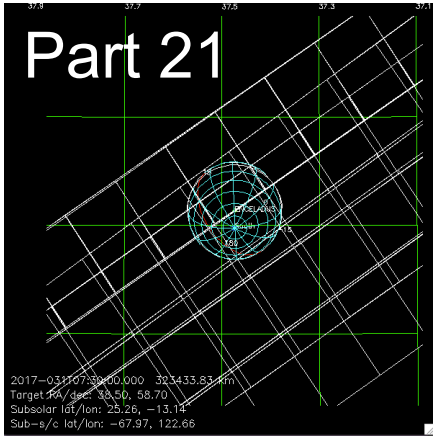
7-part

259EN_ICYLON001_ISS
2017-030T03:49
Alt=507,639 km
Longitude= 215°W
Latitude=63°N
Phase= 85°







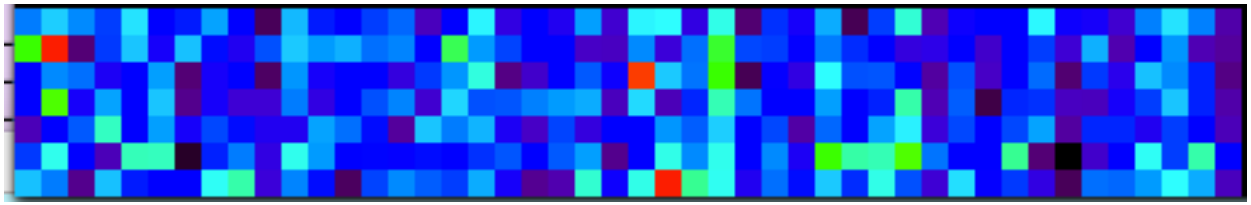


21-part

259EN_ICYLON001_CIRS
2017-030T23:39
Alt= 328,456 km
Longitude= 239°W
Latitude=66°S
Phase= 132°

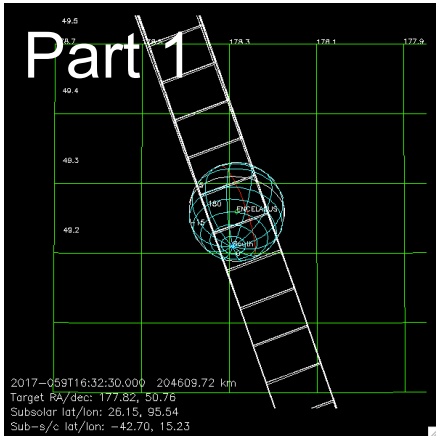
Low SNR

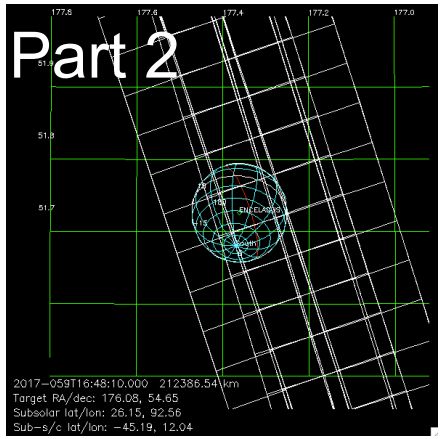
Part 21



30-part

263EN_ICYLON001_CIRS
2017-059T16:34
Alt= 216,910 km
Longitude= 350°W
Latitude=47°S
Phase= 104°

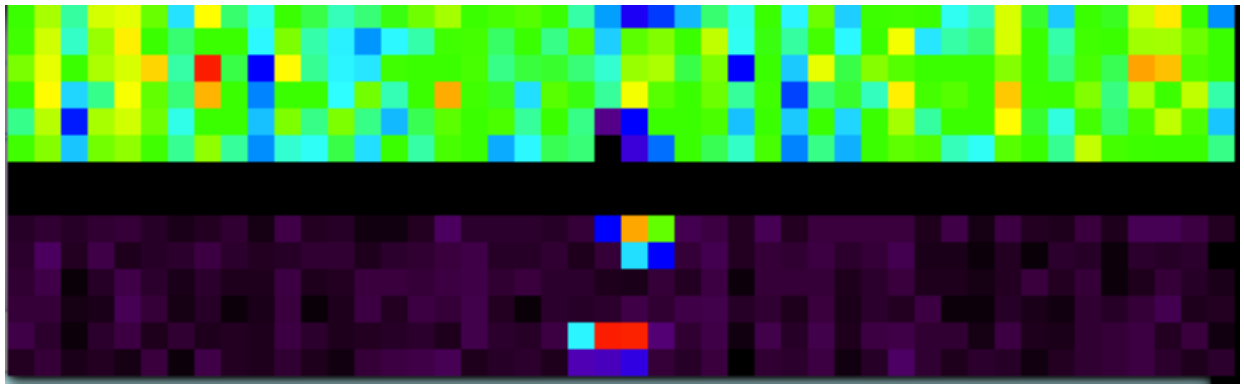


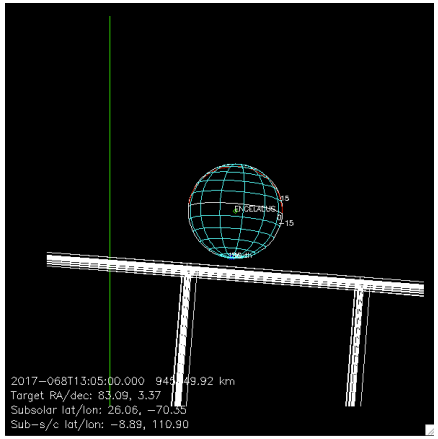


Part 2

Ly-a

Long waves



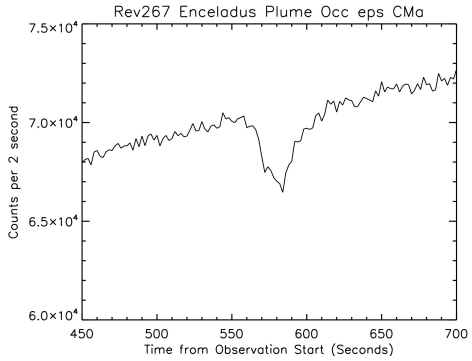


264EN_ICYLON001_ISS
2017-068T13:07
Alt= 973,860 km
Longitude= 255°W
Latitude=8°S
Phase= 162°

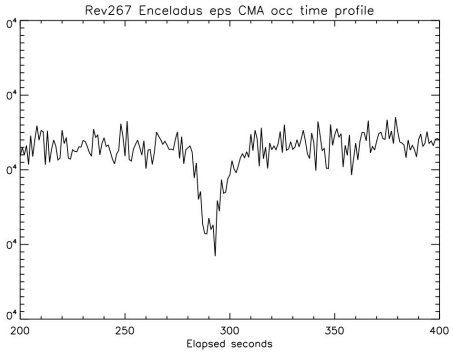
UVIS slit not on Enceladus

UVIS_267EN_ICYEXO001_PIE
2017-086T14:30
Ingress lat/lon: n/a
Egress lat/lon: n/a
Star: eps Canis Majoris

HSP

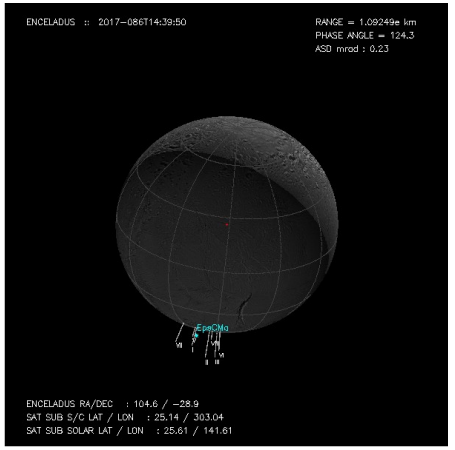


FUV

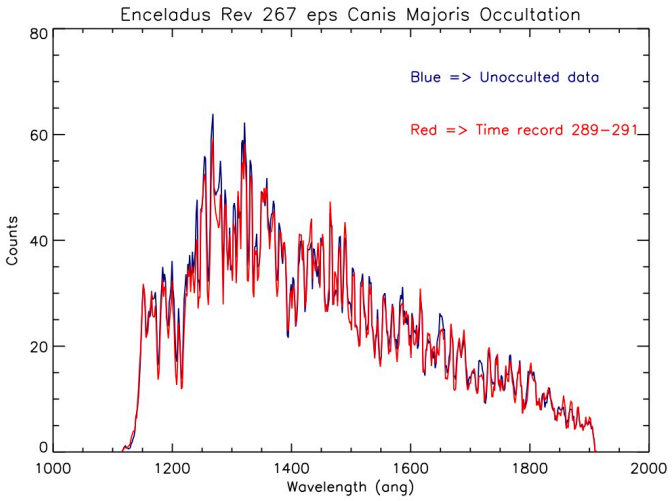


Summed over wavelength

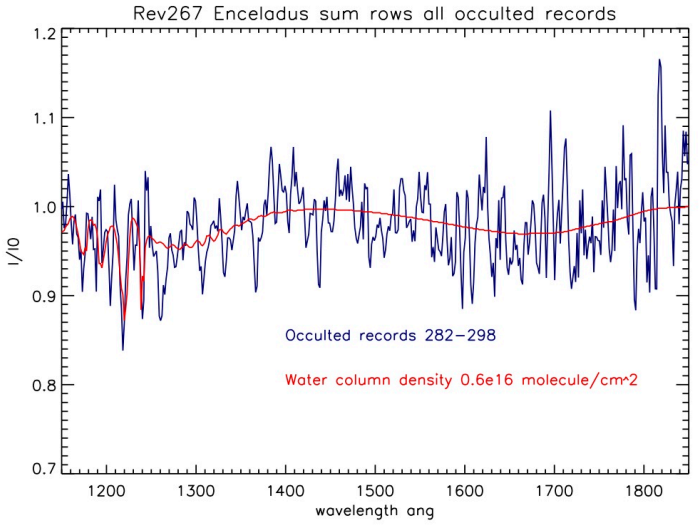
Horizontal cut through plume



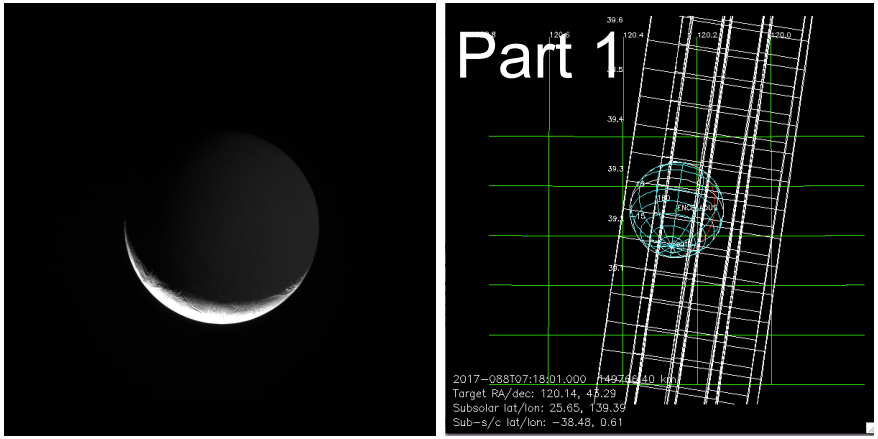
Spectra of I, I_0 (counts per integration period vs wavelength)



Spectrum of I/I_0



13-part

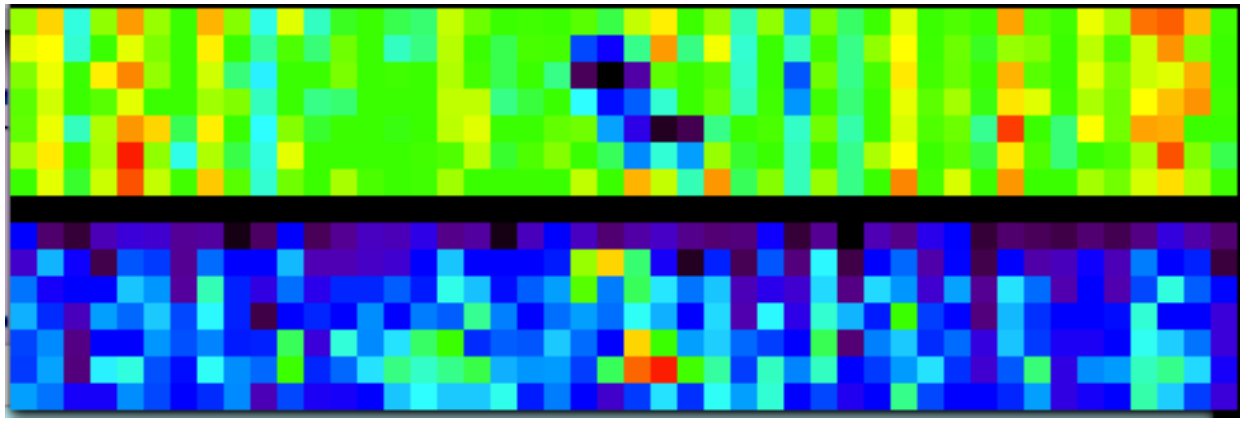


267EN_ICYLON001_CIRS
2017-088T07:20
Alt= 186,997 km
Longitude= 121°W
Latitude=47°S
Phase= 166°

Part 1

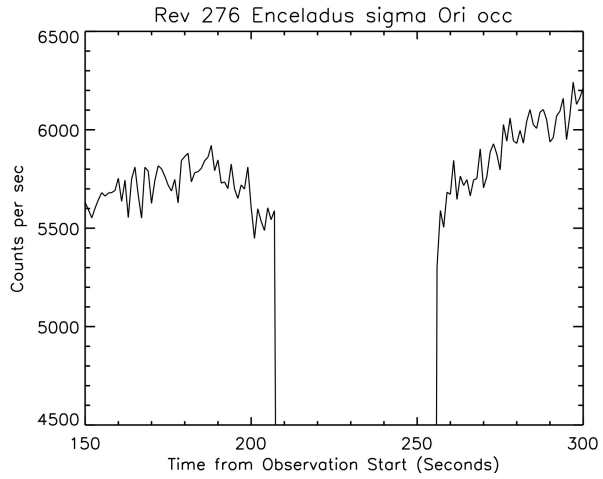
Ly-a

Long waves



UVIS_276EN_ICYEXO001_PIE
2017-150T15:20
Ingress lat/lon: 18.0 / 129.5
Egress lat/lon: 42.8 / 306.6
Star: sigma Orionis

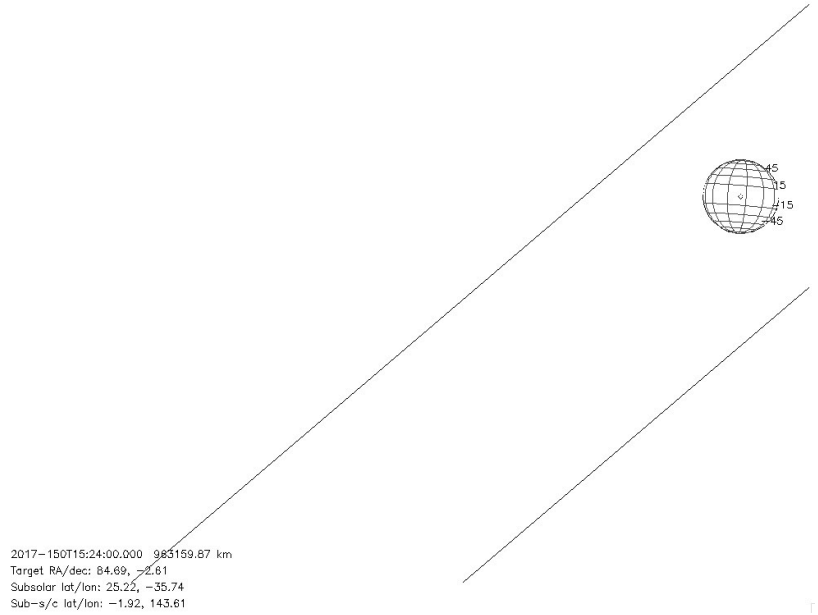
HSP



Sigma Ori is 3-star system, responsible for structure in profile

Spectra of I, I_0 (counts per integration period vs wavelength)

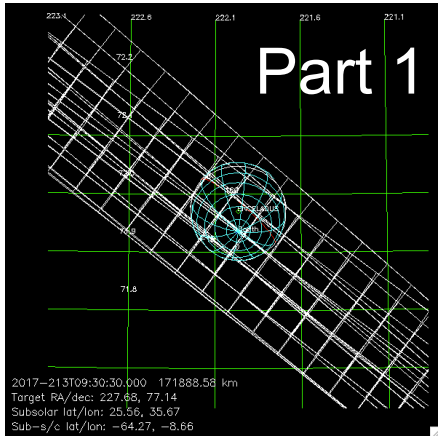
Sigma Ori is 3-star system, responsible for structure in profile, which renders the data too complicated to be useful for the science



Spectrum of I/I_0

10-part

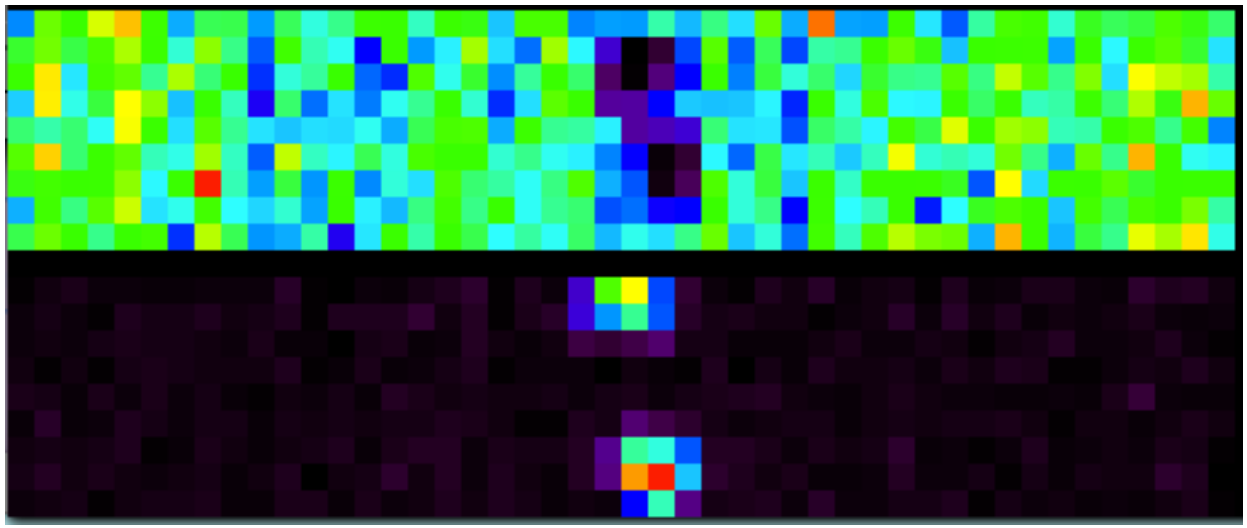
286EN_ICYLON001_CIRS
2017-213T09:31
Alt= 170,624 km
Longitude= 8°W
Latitude=67°S
Phase= 100°



Part 1

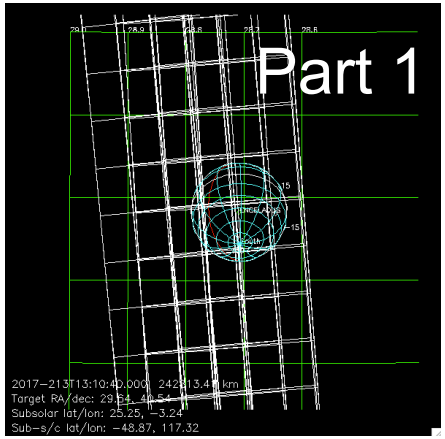
Ly-a

Long waves



9-part

286EN_ICYLON002_CIRS
2017-213T13:11
Alt= km
Longitude= °W
Latitude
Phase= °



Part 1

Ly-a

Long waves