Chapter 2 - Orbit Overview

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Introduction to Chapter 2

This chapter gives an overview of the NIMS observations in the E15 Orbit.

The text on page 3 summarizes the NIMS science objectives for E15. The NIMS calibrations are discussed on page 3. Early data return and E15 playback are also discussed on page 3.

The table on page 4 is a time-ordered listing of the NIMS Oapels for E15.

The plot on page 5 shows the geometry of the NIMS E15 observations using a north trajectory pole view projection. The plot on page 6 shows the NIMS Europa regional observations along the trajectory of the E15 Europa flyby. The plot on page 7 shows the geometry of the NIMS E15 calibrations.

The table on page 8 lists various NIMS E15 observing parameters: target latitude/longitude, range, cone angle, incidence angle (light), emission angle (view) and phase angle.

The spreadsheet on page 9 summarizes the various inputs for the NIMS E15 Observations. The spreadsheet on pages 10 and 11 summarizes the resource usage for the NIMS E15 observations.

The timeline on page 12 shows the placement of the E15 observations for all intruments during the E15 Encounter Period.

The tapemap on page 13 shows the placement of the E15 observations on the spacecraft’s tape recorder.

The timeline on pages 14 through 20 shows the preliminary E15 playback schedule.

The NIMS E15 mosaic designs are summarized on page 21 and 22 in time-order.

NIMS E15 SCIENCE OVERVIEW

Jupiter Science

There are six Jupiter observations in E15. All observations look at the nightside North Equatorial Belt region at about 7 degrees North latitude in gain state 4. Three are realtime and three are recorded. The three realtime observations look at different longitudes. JUPRTS01 returns 10 Rims of 408 wavelengths, JUPRTS02 returns 20 Rims of 408 wavelengths and JUPRTS03 returns 10 Rims of 408 wavelengths. JNJPDARK01, 02 and 03 all look at the same nightside region, +7 latitude, 155 to 170 W. longitude with different viewing geometries.

Io Science

There are two INHRSPEC high spatial and spectral resolution Io observations in E15. INHRSPEC01, centered at 155 W. longitude, consists of four identical scans across the daylit disk, three in Long Map mode and the last in Long Spectrometer mode. INHRSPEC02, centered at 195 W. longitude, consists of three scans across the daylit disk, the first across the northern hemispehere, the second across the southern hemisphere and the third across the equatorial region.

Europa Science

There are eight Europa observations planned for E15: Four regional observations, one half-disk global observation and three distant global observations. ENREGION01 is a two swath observation centered at +7 latitude, 185 W. longitude. ENSUCOMP01 is a Long Spectrometer west-east scan (107 - 120 W. longitude) at about +7 latitude over the Cilix dark linea terrain. ENSUCOMP02 is a two swath observation centered at +30 latitude, 105 W. longitude on rough terrain. ENSUCOMP03 is an equatorial scan from 90 to 120 W. longitude. ENGLOBAL01 is a 4 scan map of the 1/3 lit disk in gain states 3 and 4. ENEUR16H01, ENEUR20H01 and ENEUR22H01 are distant single scan maps of the 1/3 daylit disk. Each has two identical swaths: the first in gain state 4, MPW 408 wavelengths, the second in gain state 3, LPU 228 wavelengths.

Ganymede and Callisto Science

Ganymede and Callisto were not observed in E15.

Calibration

There are two NIMS calibration observations planned for E15: one RCT cal and one OPCAL.

Early Data Return

There are five realtime observations in E15: Three 408 wavelength Jupiter observations (JUPRTS), one RCT calibration and one OPCAL.

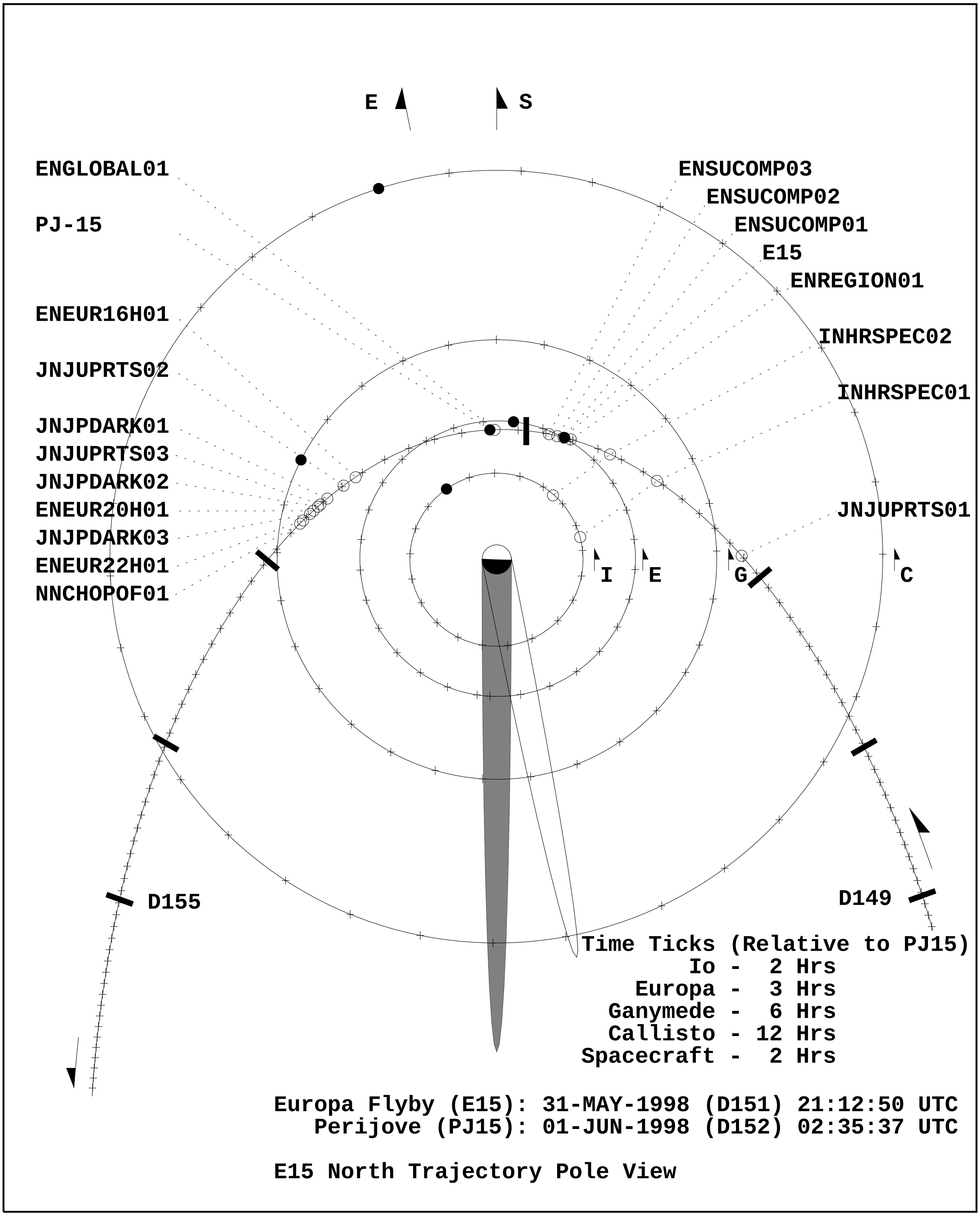
E15 Playback

E15 playback is split into two passes through the tape.

E15 Time-Ordered Listing

OAPEL	Start (UTC)	End (UTC)	Duration
15NNJUPRTS01-	98-151/02:43:51	98-151/02:53:58	000/00:10:06
15JNJUPRTS01*	98-151/02:53:58	98-151/03:09:08	000/00:15:10
15NNHRSPEC01-	98-151/13:04:40	98-151/13:14:47	000/00:10:06
15INHRSPEC01-	98-151/13:14:47	98-151/13:41:04	000/00:26:17
15NNHRSPEC02-	98-151/17:23:31	98-151/17:33:37	000/00:10:06
15INHRSPEC02-	98-151/17:33:37	98-151/17:59:55	000/00:26:17
15NNREGION01-	98-151/20:33:22	98-151/20:43:29	000/00:10:06
15ENREGION01-	98-151/20:43:29	98-151/21:04:43	000/00:21:14
15NNSUCOMP01-	98-151/21:13:49	98-151/21:16:51	000/00:03:02
15ENSUCOMP01-	98-151/21:17:51	98-151/21:42:07	000/00:24:16
15NNSUCOMP02-	98-151/21:42:07	98-151/21:46:10	000/00:04:02
15ENSUCOMP02-	98-151/21:46:10	98-151/22:11:27	000/00:25:16
15NNSUCOMP03-	98-151/22:11:27	98-151/22:16:30	000/00:05:03
15ENSUCOMP03-	98-151/22:16:30	98-151/22:33:41	000/00:17:11
15NNGLOBAL01-	98-152/02:07:02	98-152/02:17:09	000/00:10:06
15ENGLOBAL01-	98-152/02:17:09	98-152/02:51:31	000/00:34:22
15NNEUR16H01-	98-152/13:04:15	98-152/13:14:22	000/00:10:06
15ENEUR16H01-	98-152/13:15:23	98-152/13:35:36	000/00:20:13
15NNJUPRTS02-	98-152/14:22:21	98-152/14:26:24	000/00:04:02
15JNJUPRTS02*	98-152/14:26:24	98-152/14:50:40	000/00:24:16
15NNJPDARK01-	98-152/16:37:51	98-152/16:40:53	000/00:03:02
15JNJPDARK01-	98-152/16:40:53	98-152/16:56:03	000/00:15:10
15JNJUPRTS03*	98-152/16:56:03	98-152/17:10:12	000/00:14:09
15NNJPDARK02-	98-152/17:10:12	98-152/17:14:15	000/00:04:02
15JNJPDARK02-	98-152/17:14:15	98-152/17:33:27	000/00:19:12
15NNEUR20H01-	98-152/17:34:13	98-152/17:39:17	000/00:05:03
15ENEUR20H01-	98-152/17:39:17	98-152/18:01:31	000/00:22:14
15NNJPDARK03-	98-152/18:03:47	98-152/18:06:49	000/00:03:02
15JNJPDARK03-	98-152/18:06:49	98-152/18:23:00	000/00:16:10
15NNEUR22H01-	98-152/18:49:03	98-152/18:54:06	000/00:05:03
15ENEUR22H01-	98-152/18:54:06	98-152/19:20:23	000/00:26:17
15NNCHOPOF01-	98-152/19:24:26	98-152/19:34:33	000/00:10:06
15NNRCTRLT01-	98-180/08:00:05	98-180/21:15:50	000/13:15:44

NIMS E15 OBSERVATIONS

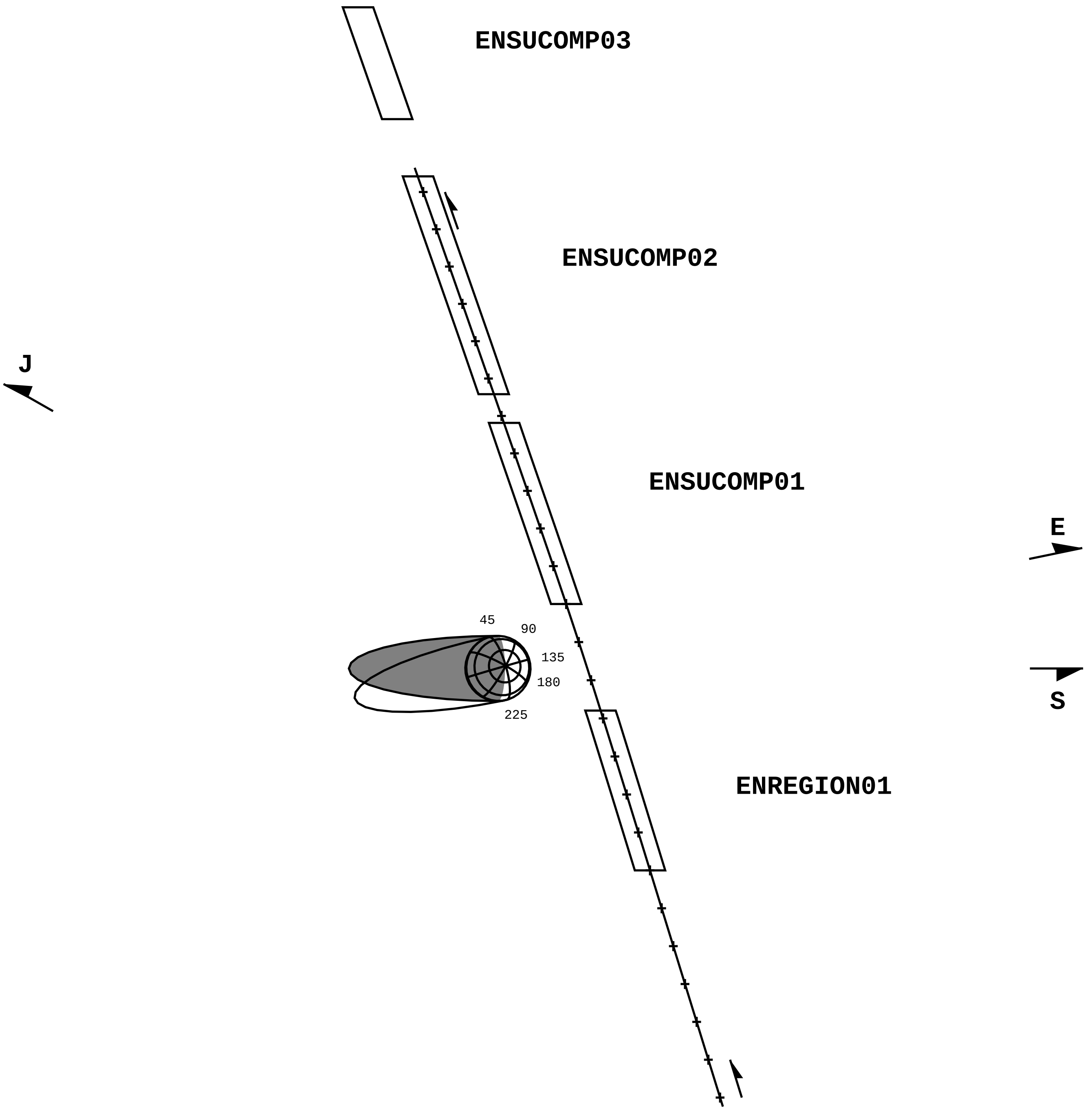


NIMS - FEL - 05/29/98

NIMS E15 EUROPA FLYBY OBSERVATIONS

Europa Flyby (E15): 31-MAY-1998 (D151) 21:12:50 UTC

Time Ticks (Relative to E15)
Spacecraft - 5 Minutes

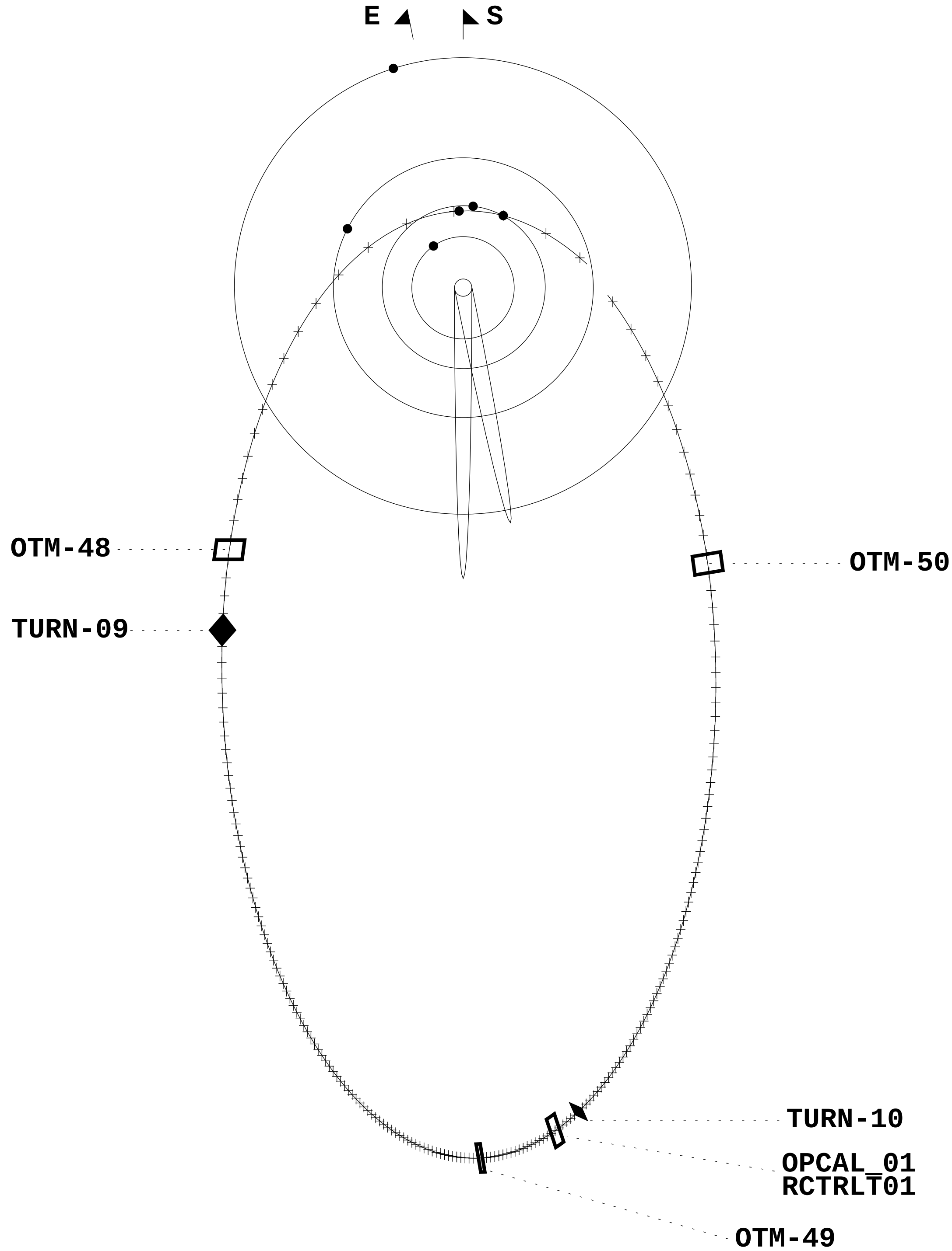


E15 North Trajectory Pole View, +/- 1 Hour

NIMS E15 CRUISE CALIBRATIONS

Europa Flyby (E15): 31-MAY-1998 (D151) 21:12:50 UTC
Perijove (PJ15): 01-JUN-1998 (D152) 02:35:37 UTC
Apojove (AJ15): 25-JUN-1998 (D176) 16:00:00 UTC

Time Ticks (Relative to E15)
Spacecraft - 6 Hours



E15 North Trajectory Pole View, Perijove to Perijove

NIMS E15 OBSERVING GEOMETRY

OAPEL	Latitude (deg)	Longitude (deg)	Range (km)	Cone (deg)	Light (deg)	View (deg)	Phase (deg)
15JNJUPRTS01	+6 to +8	81 to 100	1130K	82	113 to 137	27 to 51	87
15INHRSPEC01	-90 to +90	65 to 245	460K	118	3 to 141	2 to 90	51
15INHRSPEC02	-90 to +90	105 to 295	334K	114	3 to 141	1 to 90	54
15ENREGION01	+4 to +10	182 to 187	6K	113 to 154	31 to 38	5 to 23	17 to 56
15ENSUCOMP01	+7 to +7	107 to 121	6K	96 to 126	33 to 46	19 to 61	65 to 95
15ENSUCOMP02	+20 to +37	92 to 115	17K	91 to 94	46 to 67	44 to 63	97 to 100
15ENSUCOMP03	-5 to +7	90 to 121	27K	87 to 89	37 to 67	35 to 67	102 to 104
15ENGLOBAL01	-90 to +90	65 to 155	120K	82	23 to 107	15 to 90	109
15ENEUR16H01	-90 to +90	105 to 195	308K	76	25 to 115	0 to 90	115
15JNJUPRTS02	+6 to +8	42 to 80	800K	130	90 to 140	30 to 80	61
15JNJPDARK01	+3 to +11	155 to 168	832K	121	90 to 97	21 to 28	70
15JNJUPRTS03	+6 to +8	145 to 161	850K	121	106 to 116	37 to 47	70
15JNJPDARK02	+3 to +11	154 to 171	860K	120	107 to 118	37 to 49	70
15ENEUR20H01	-90 to +90	128 to 219	359K	80	21 to 111	0 to 90	111
15JNJPDARK03	+3 to +11	142 to 183	918K	118	126 to 160	54 to 90	72
15ENEUR22H01	-90 to +90	135 to 226	375K	82	19 to 110	0 to 90	109

E15 NIMS INPUTS

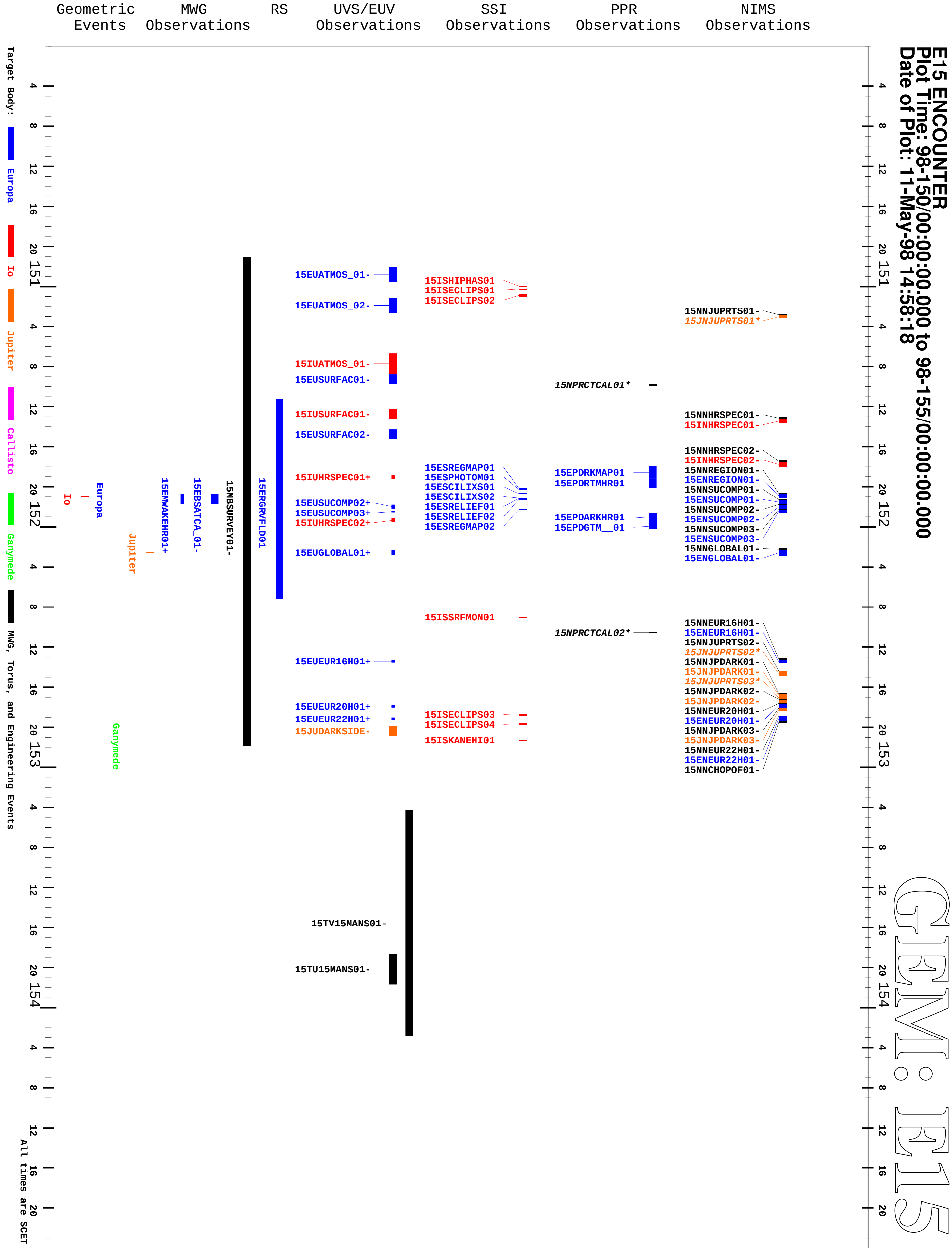
Activity ID	Observation Title	NIMS Edit Table	NIMS PB Table	Mode	Gain	Grating Start	Grating Offset	Record Format	PSID
15NNJUPRTS01-	NIMS Software Reload								
15JNJUPRTS01*	Jupiter Realtime Observation	E15JLM442/MB	R/T	LM	4	0	4	R/T	DA
15NNHRSPEC01-	NIMS Software Reload								
15INHRSPEC01-	Io Monitoring at High Spectral Resolutio	E15ILM442	E15B_ILM228C_1	LM,LS	2	0	4	MPW	DB
15NNHRSPEC02-	NIMS Software Reload								
15INHRSPEC02-	Io Monitoring at High Spectral Resolutio	E15ILM442	E15ILM360	LM	2	0	4	MPW	DD
15NNREGION01-	NIMS Software Reload								
15ENREGION01-	Europa Regional Observation	E15ELM442	E15ELM360	LM	3	0	4	MPW	DE
15NNSUCOMP01-	NIMS Software Reload								
15ENSUCOMP01-	Europa Surface Composition	E15ELM442	E15ELM360	LS	3	0	4	MPW	DF
15NNSUCOMP02-	NIMS Software Reload								
15ENSUCOMP02-	Europa Surface Composition	E15ELM442	E15ELM360	LM	3	0	4	MPW	DG
15NNSUCOMP03-	NIMS Software Reload								
15ENSUCOMP03-	Europa Surface Composition	E15ELM442	E15B_ELM228C_1	LM	4,3	0	4	MPW	DH
15NNGLOBAL01-	NIMS Software Reload								
15ENGLOBAL01-	Europa Global	E15ELM442	E15B_ELM228C_1	LM	4,3	0	4	MPW	DI
15NNEUR16H01-	NIMS Software Reload								
15ENEUR16H01-	Europa 16 Hour Map	E15ELM442	E15B_ELM240T	LM	4	0	4	MPW	DK
15ENEUR16H01-	Europa 16 Hour Map	E15B_ELM240V	E15B_ELM168V	LM	3	0	4	LPU	EK
15NNJUPRTS02-	NIMS Software Reload								
15JNJUPRTS02*	Jupiter Realtime Observation	E15JLM442/MB	R/T	LM	4	0	4	R/T	DC
15NNJPDARK01-	NIMS Software Reload								
15JNJPDARK01-	Jupiter Dark Observation	E15J5M253B	E15J5M80B	LM	4	0	4	LPU	DN
15JNJUPRTS03*	Jupiter Realtime Observation	E15JLM442/MB	R/T	LM	4	0	4	R/T	DJ
15NNJPDARK02-	NIMS Software Reload								
15JNJPDARK02-	Jupiter Dark Observation	E15J5M253B	E15J5M80B	LM	4	0	4	LPU	DO
15NNEUR20H01-	NIMS Software Reload								
15ENEUR20H01-	Europa 20 Hour Map	E15ELM442	E15B_ELM240T	LM	4	0	4	MPW	DL
15ENEUR20H01-	Europa 20 Hour Map	E15B_ELM240V	E15B_ELM168V	LM	3	0	4	LPU	EL
15NNJPDARK03-	NIMS Software Reload								
15JNJPDARK03-	Jupiter Dark Observation	E15J5M253B	E15J5M80B	LM	4	0	4	LPU	DP
15NNEUR22H01-	NIMS Software Reload								
15ENEUR22H01-	Europa 22 Hour Map	E15ELM442	E15B_ELM240T	LM	4	0	4	MPW	DM
15ENEUR22H01-	Europa 22 Hour Map	E15B_ELM240V	E15B_ELM168V	LM	3	0	4	LPU	EM
15NNCHOPOF01-	Chopper off								
15NNRCTRLT01-	NIMS RCT Real-Time Calibration	E14RCT252	R/T	LM	1	0	4	R/T	XE

E15 NIMS RESOURCES

Activity ID	Mode	Record Mode	Obs. Cost (tracks)	Obs. Cost (ticks)	Number Wavelengths Returned	Obs Record (sec.)	Obs Playback (sec.)	Selected Bits to Tape sBOT (MBITS)	Bits to Tape MBOT (Mbit)	Mode Cycle time (sec)
15JNJUPRTS01	LM	R/T			360					
15INHRSPEC01	LM	MPW	0.1905	1110	228	1260	335	3.86	14.52	8.667
15JNJUPRTS02	LM	R/T			360					
15INHRSPEC02	LM	MPW	0.1905	1110	360	1260	797.333	9.19	14.52	8.667
15ENREGION01	LM	MPW	0.1724	1004	360	1140	1140	13.13	13.13	8.667
15ENSUCOMP01	LM	MPW	0.1814	1057	360	1200	1150	13.25	13.82	8.667
15ENSUCOMP02	LM	MPW	0.1814	1057	360	1200	949	10.93	13.82	8.667
15ENSUCOMP03	LM	MPW	0.0909	530	228	600	530	6.11	6.91	8.667
15ENGLOBAL01	LM	MPW	0.2719	1585	228	1800	979	11.28	20.74	8.667
15ENEUR16H01	LM	MPW	0.0442	257	240	290	286	3.29	3.34	8.667
15ENEUR16H01	LM	LPU	0.0120	70	168	290	286	1.76	1.79	8.667
15JNJPDARK01	LM	LPU	0.0245	143	80	600	300	1.85	3.70	8.667
15JNJUPRTS03	LM	R/T			360					
15JNJPDARK02	LM	LPU	0.0245	143	80	600	300	1.85	3.70	8.667
15ENEUR20H01	LM	MPW	0.0406	236	240	266	251.333	2.90	3.06	8.667
15ENEUR20H01	LM	LPU	0.0110	64	168	266	251.33	1.55	1.64	8.667
15JNJPDARK03	LM	LPU	0.0245	143	80	600	300	1.85	3.70	8.667
15ENEUR22H01	LM	MPW	0.0374	218	240	245	234	2.70	2.82	8.667
15ENEUR22H01	LM	LPU	0.0102	59	168	245	234	1.44	1.51	8.667
15NNRCTRLT01	LM	R/T								
Total			1.5078	8786						
Alloc										

E15 NIMS RESOURCES

Activity ID	AACS Mbits c 2.5	Thold	Comp	RT BTG Mbits	Total MBTG (w/4% overhead)	Data Reduction Factor (sBOT/BTG)	Pass
15JNJUPRTS01				0.16			
15INHRSPEC01	0.02	2	1.50		1.2220	3.16	1,2
15JNJUPRTS02				0.16			
15INHRSPEC02	0.05	2	1.30		5.2990	1.73	1,2
15ENREGION01	0.07	0	1.30		7.5763	1.73	1,2
15ENSUCOMP01	0.07	0	1.30		7.6428	1.73	1,2
15ENSUCOMP02	0.05	0	1.30		6.3070	1.73	1,2
15ENSUCOMP03	0.03	0	1.30		2.2308	2.74	1,2
15ENGLOBAL01	0.06	0	1.40		3.8263	2.95	1,2
15ENEUR16H01	0.02	0	1.50		1.0982	3.00	1
15ENEUR16H01	0.02	0	1.50		0.7687	2.29	2
15JNJPDARK01	0.02	0	1.30		0.4431	4.18	1
15JNJUPRTS03				0.16			
15JNJPDARK02	0.02	0	1.40		0.4114	4.50	2
15ENEUR20H01	0.01	0	1.50		0.9651	3.00	2
15ENEUR20H01	0.01	0	1.50		0.6755	2.29	1
15JNJPDARK03	0.02	0	1.40		0.4114	4.50	2
15ENEUR22H01	0.01	0	1.50		0.8985	3.00	1
15ENEUR22H01	0.01	0	1.50		0.6290	2.29	2
15NNRCTRLT01					0.1400		
Total				**Total**	40.4052		
Alloc				**Alloc**	40.1830		
				Over/Un	0.2222		


E15 ENCOUNTER
Plot Time: 98-150/00:00:00.000 to 98-155/00:00:00.000
Date of Plot: 11-May-98 14:58:18
Geometric Events
MWG Observations
RS
UVS/EUV Observations
SSI Observations
PPR Observations
NIMS Observations
Target Body: Europa Io Jupiter Callisto Ganymede MWG, Torus, and Engineering Events
All times are SCET
151
152
153
154
Io
Europa
Jupiter
Ganymede
15EMWAKEHR01+
15EBSATCA_01-
15MBSURVEY01-
15ERGRVFLD01
15EUATMOS_01-
15EUATMOS_02-
15IUATMOS_01-
15EUSURFAC01-
15IUSURFAC01-
15EUSURFAC02-
15IUHRSPEC01+
15EUSUCOMP02+
15EUSUCOMP03+
15IUHRSPEC02+
15EUGLOBAL01+
15EUEUR16H01+
15EUEUR20H01+
15EUEUR22H01+
15JUDARKSIDE-
15TV15MANS01-
15TU15MANS01-
15ISHIPHAS01
15ISECLIPS01
15ISECLIPS02
15ESREGMAP01
15ESPHOTOM01
15ESCILIXS01
15ESCILIXS02
15ESRELIEF01
15ESRELIEF02
15ESREGMAP02
15ISSRFMON01
15ISECLIPS03
15ISECLIPS04
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15EPDRKMAP01
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15EPDARKHR01
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15JNJUPRTS01*
15NNHRSPEC01-
15INHRSPEC01-
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15INHRSPEC02-
15NNREGION01-
15ENREGION01-
15NNSUCOMP01-
15ENSUCOMP01-
15NNSUCOMP02-
15ENSUCOMP02-
15NNSUCOMP03-
15ENSUCOMP03-
15NNGLOBAL01-
15ENGLOBAL01-
15NNEUR16H01-
15ENEUR16H01-
15NNJUPRTS02-
15JNJUPRTS02*
15NNJPDARK01-
15JNJPDARK01-
15JNJUPRTS03*
15NNJPDARK02-
15JNJPDARK02-
15NNEUR20H01-
15ENEUR20H01-
15NNJPDARK03-
15JNJPDARK03-
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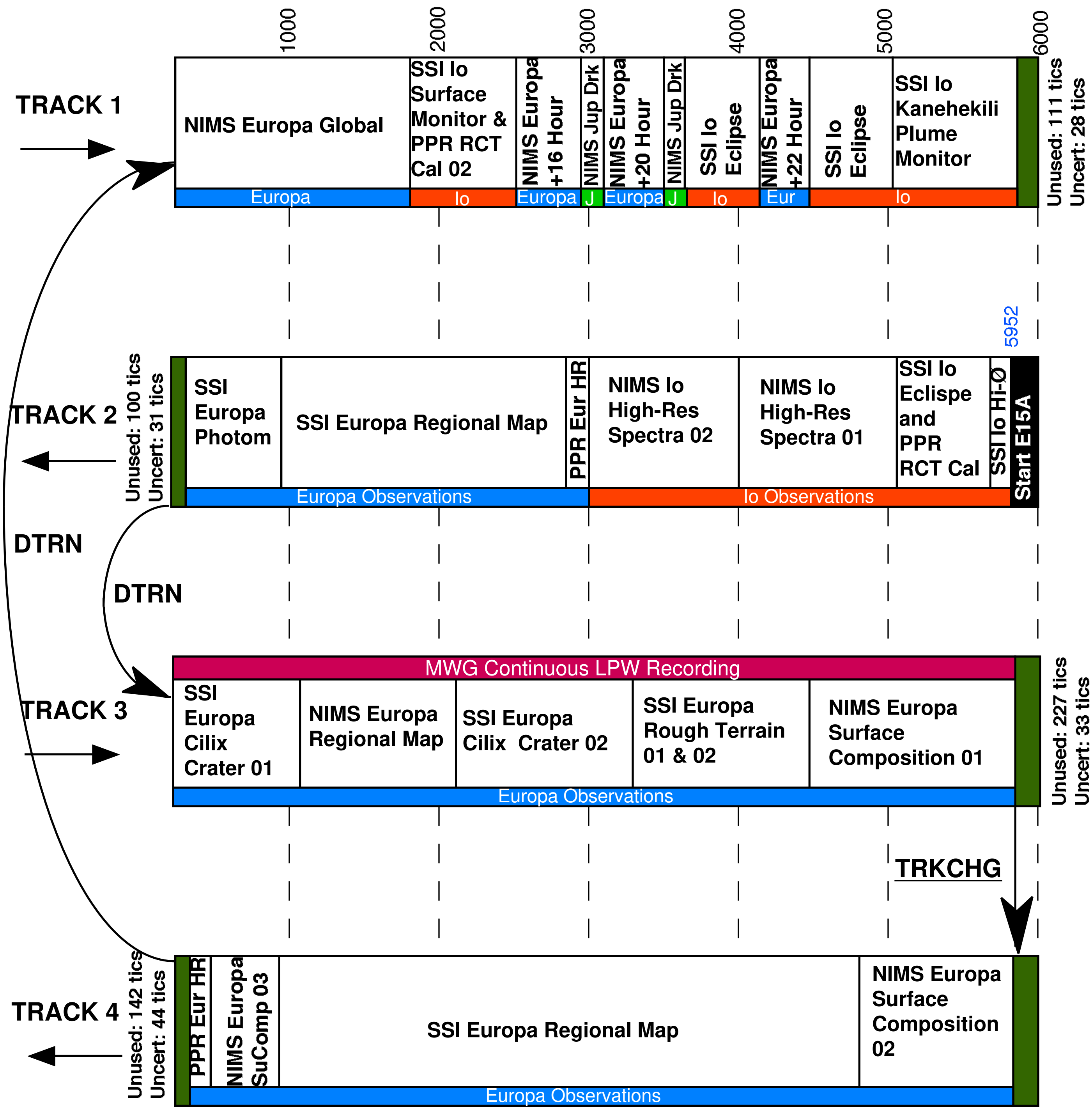
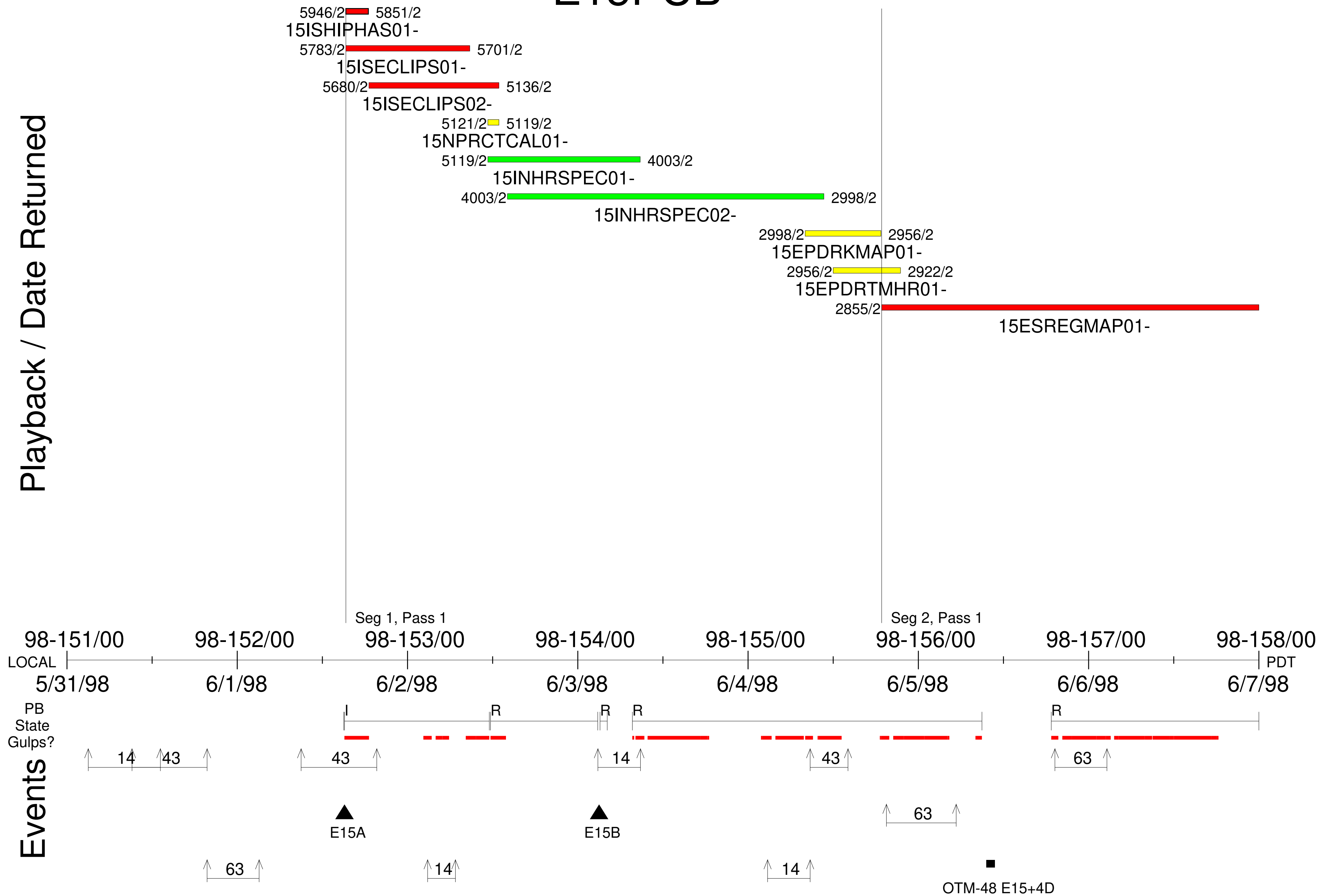
15ENEUR22H01-
15NNCHOPOF01-
GEM: E15

E15 HIGH-LEVEL TAPEMAP



J. Gross, 5/4/98

E15PCB



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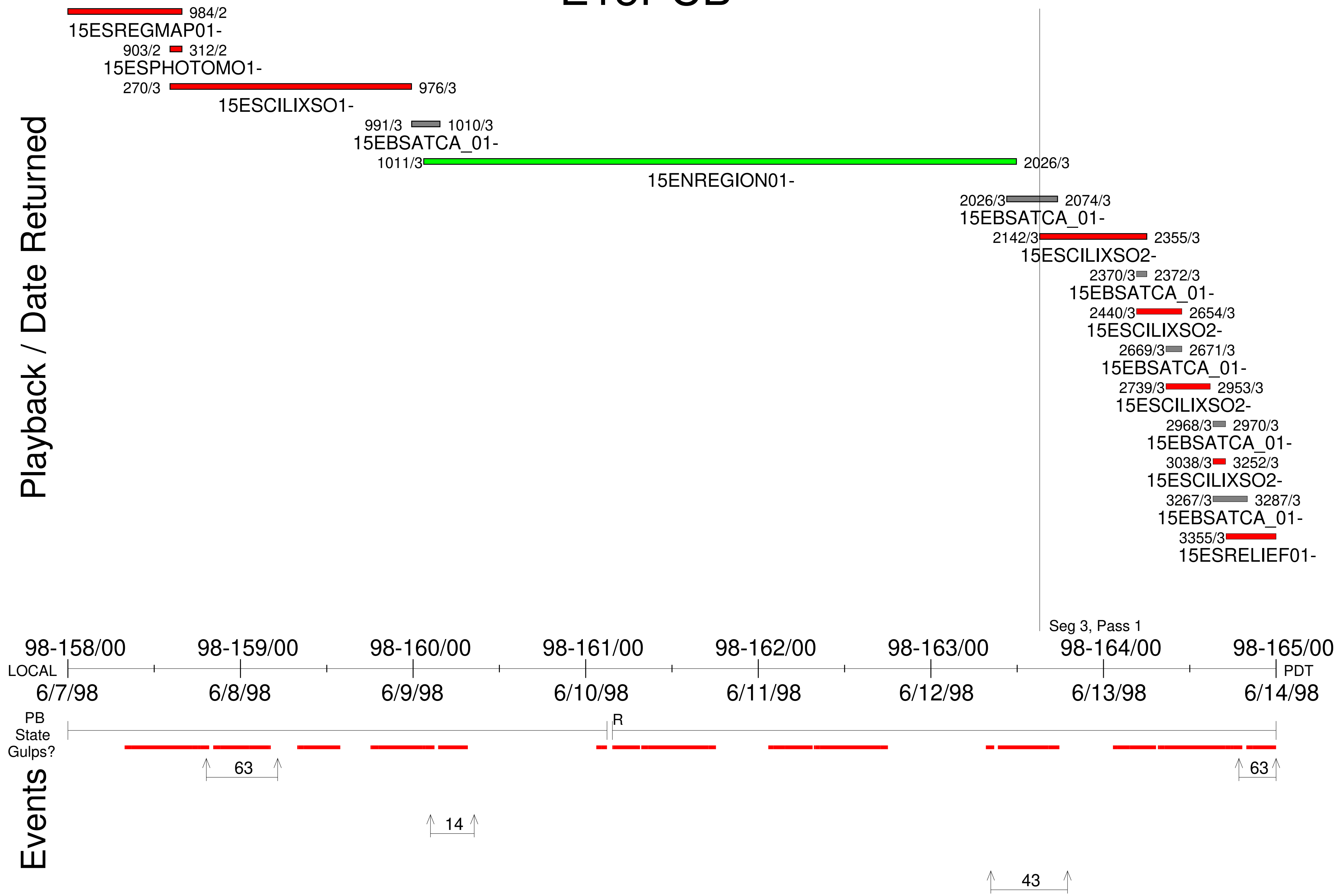
E15PCB



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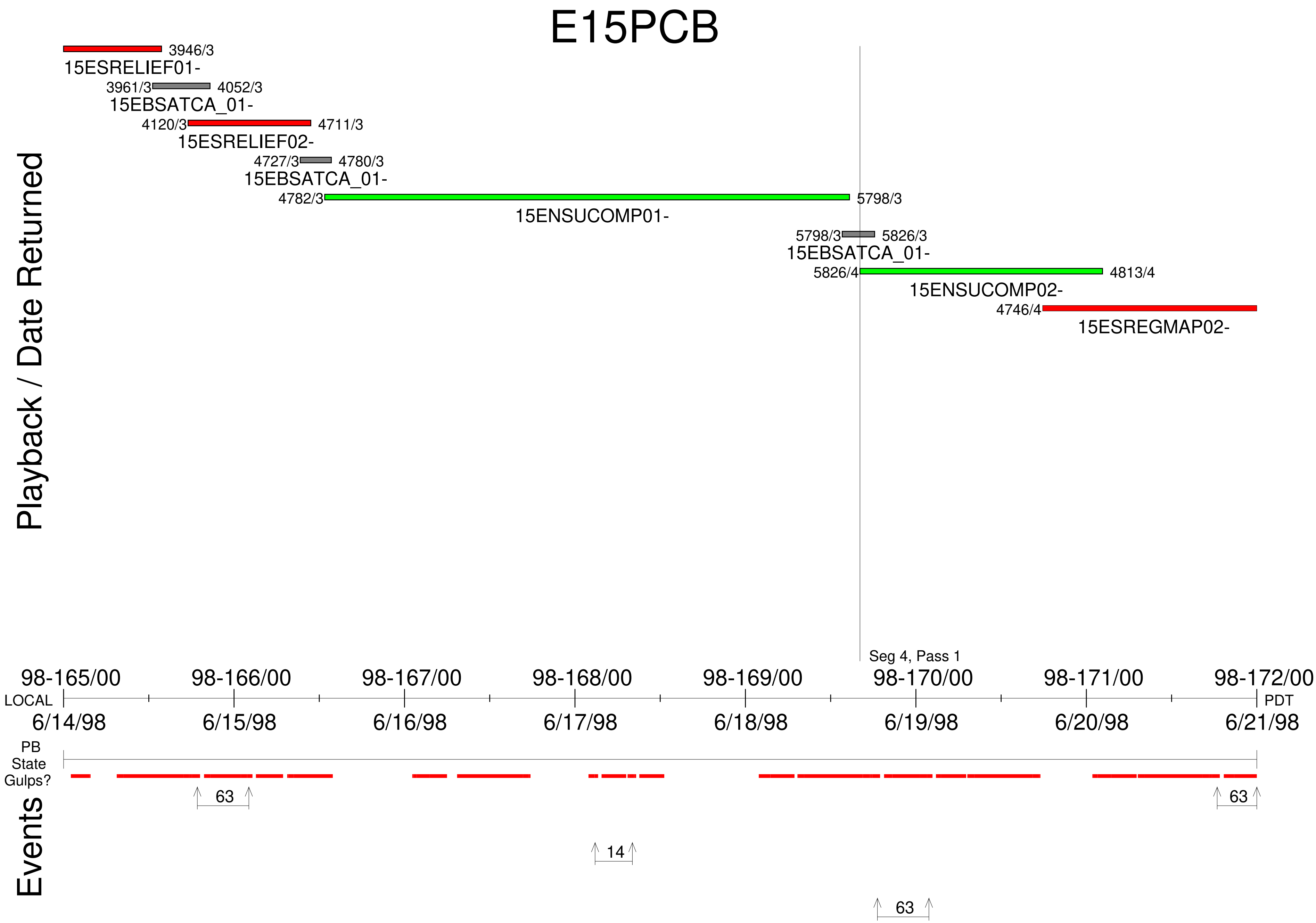

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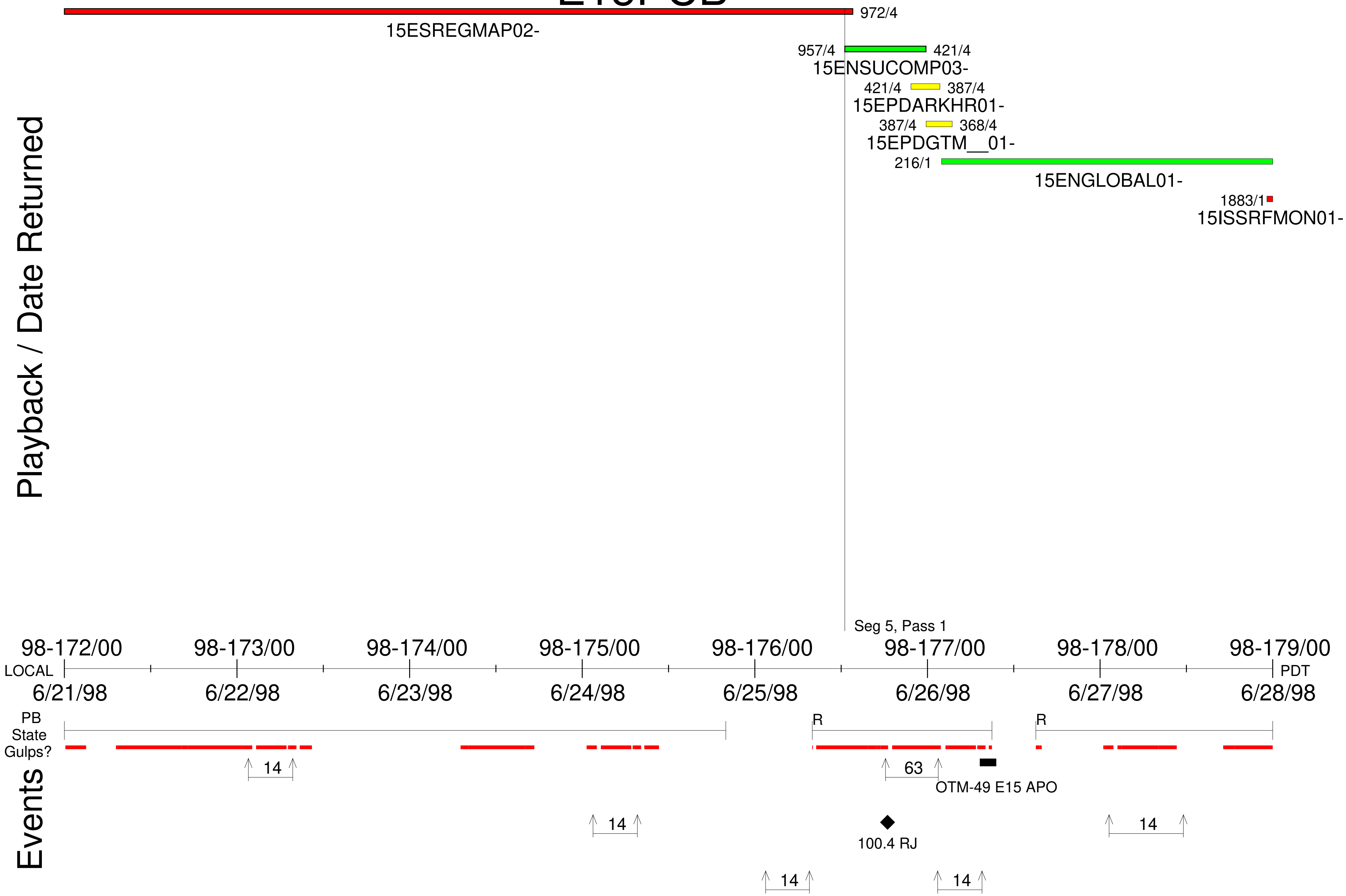
E15PCB



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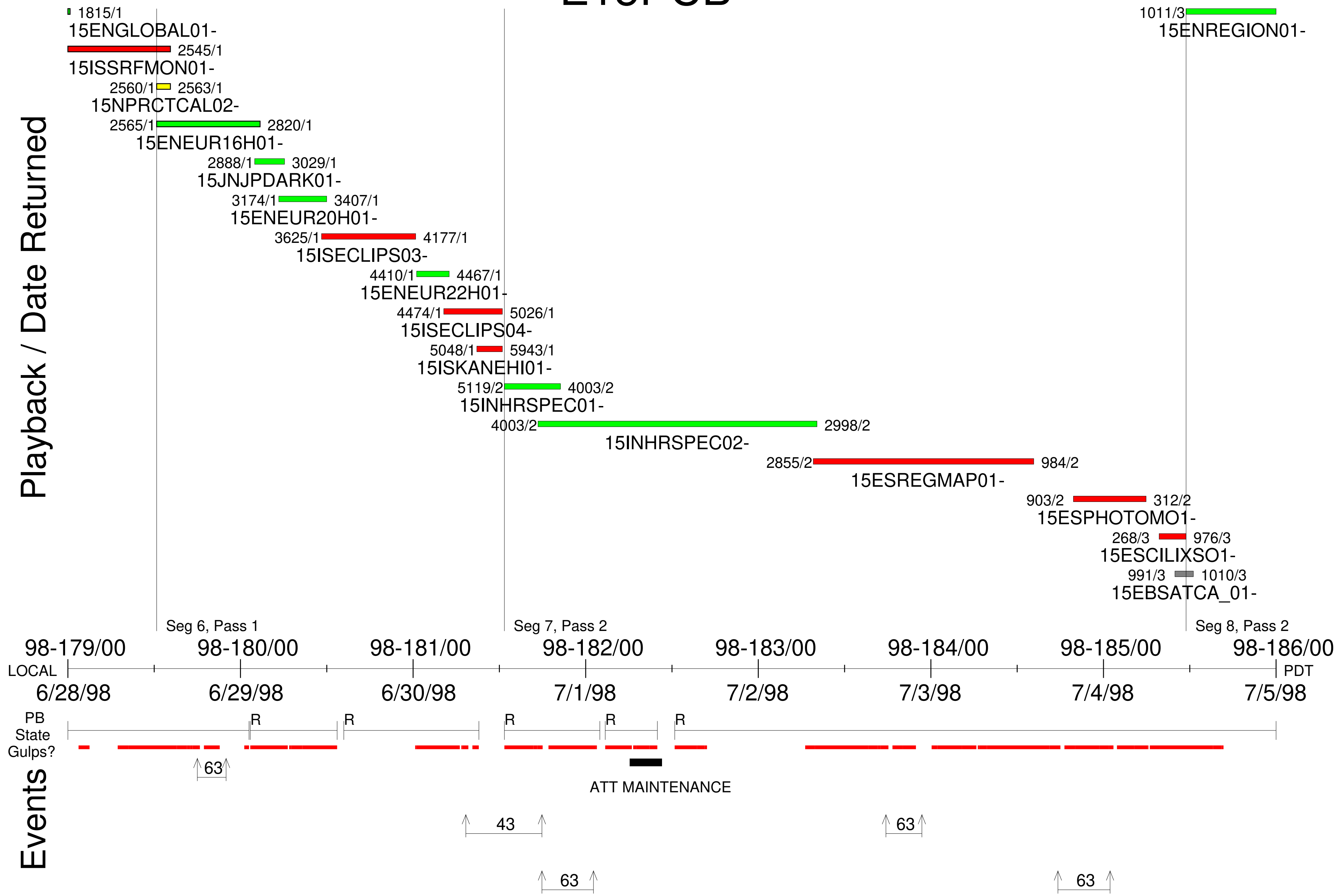
E15PCB



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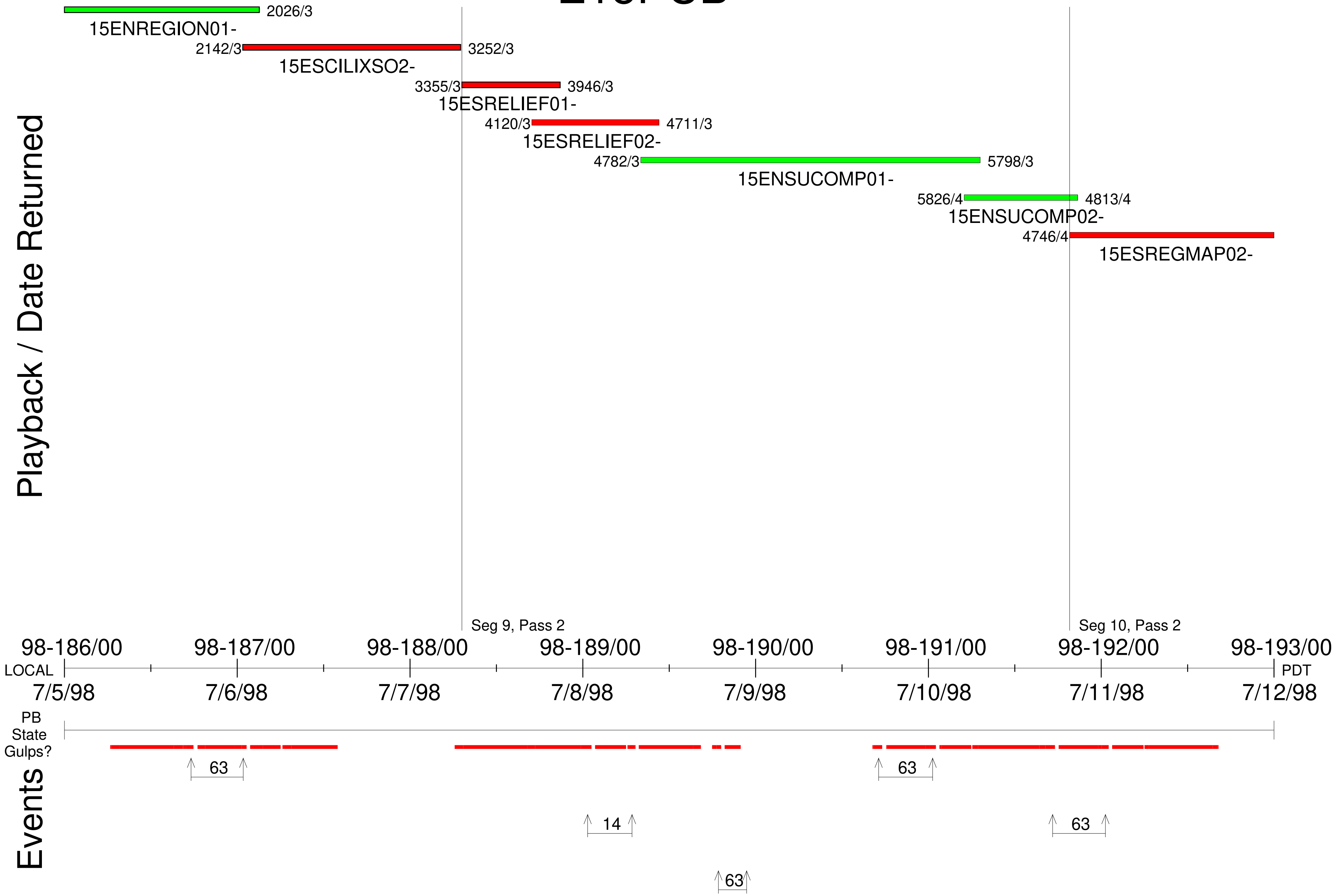
E15PCB



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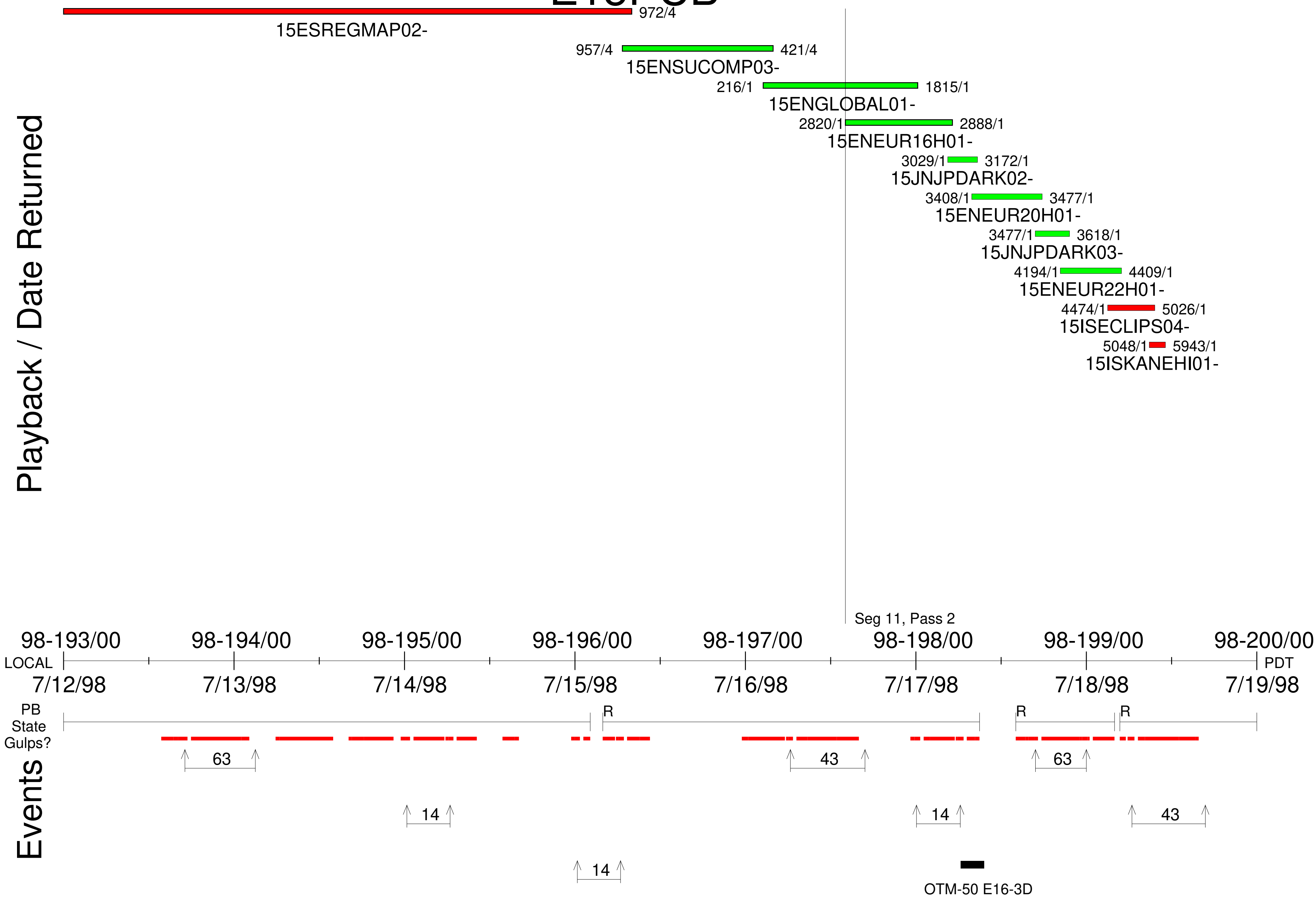
E15PCB



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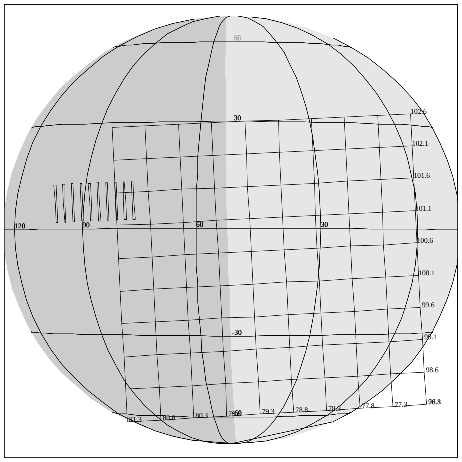
E15 NIMS A



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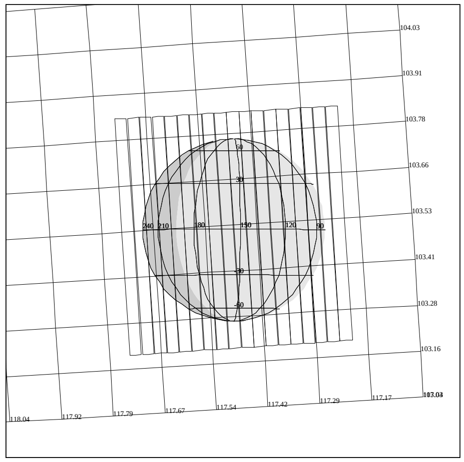

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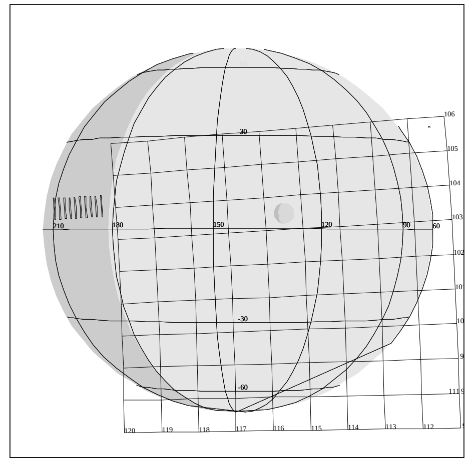

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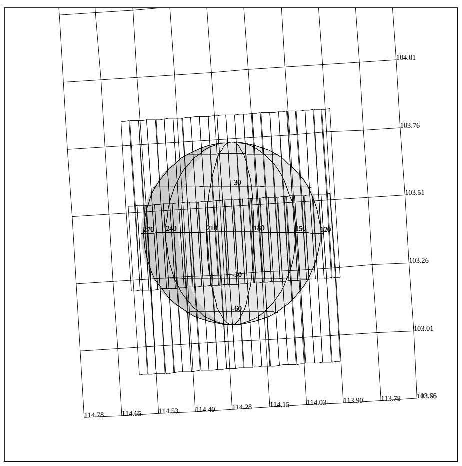

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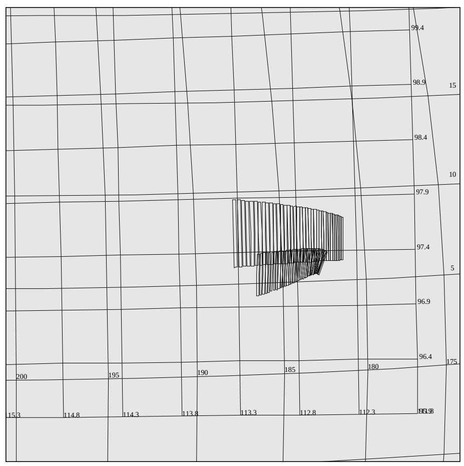

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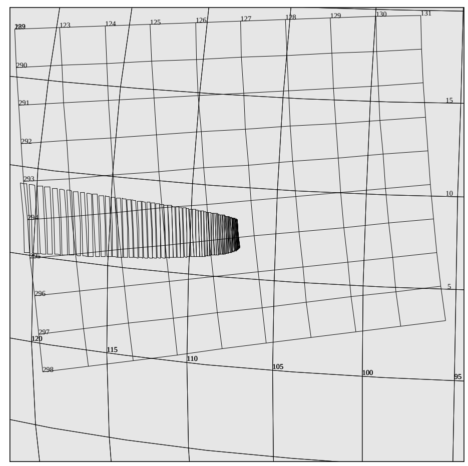

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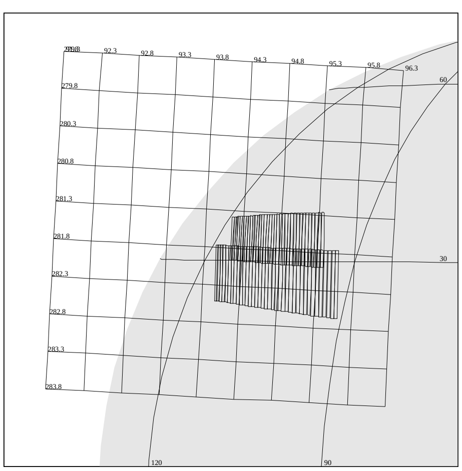

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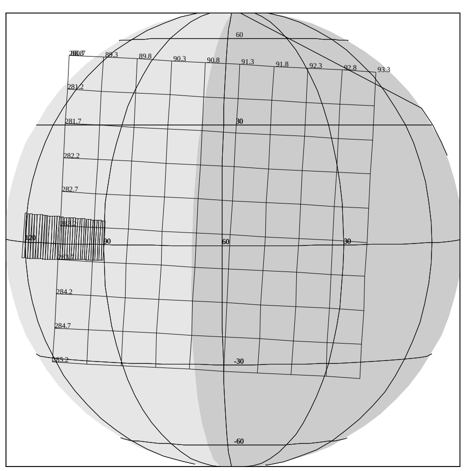

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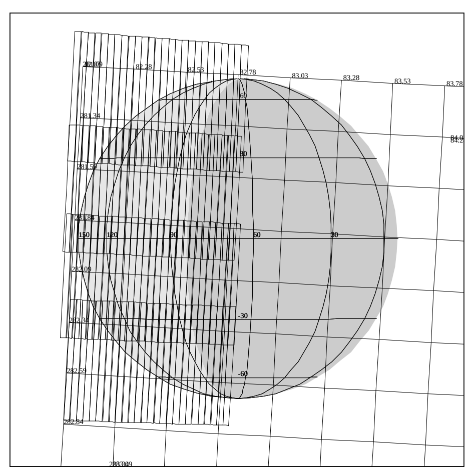

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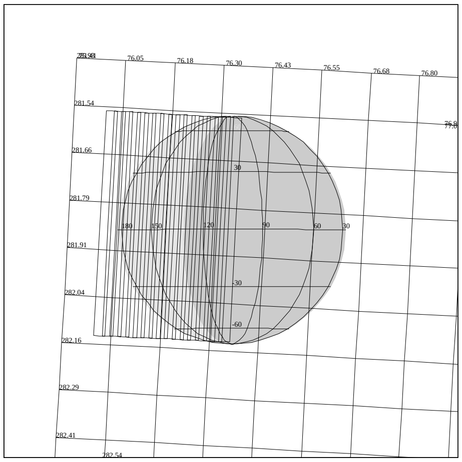
E15 NIMS B



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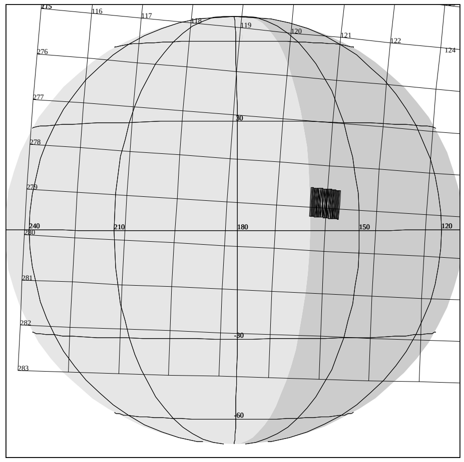

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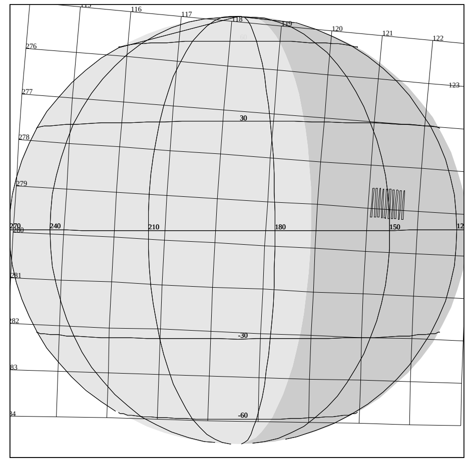

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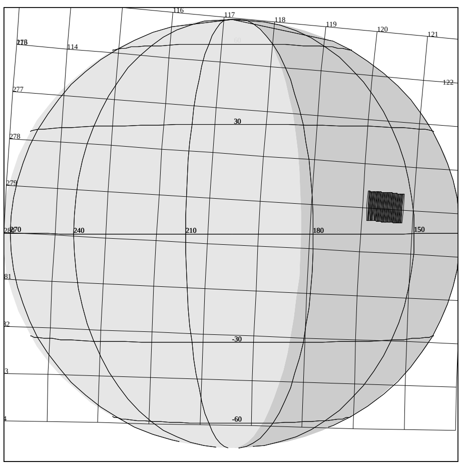

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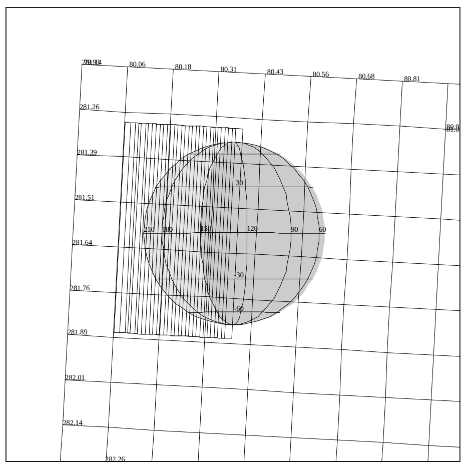

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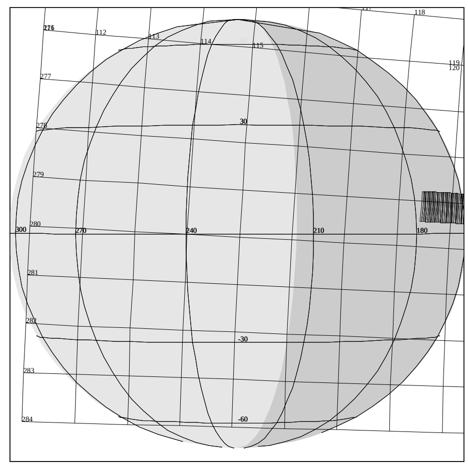

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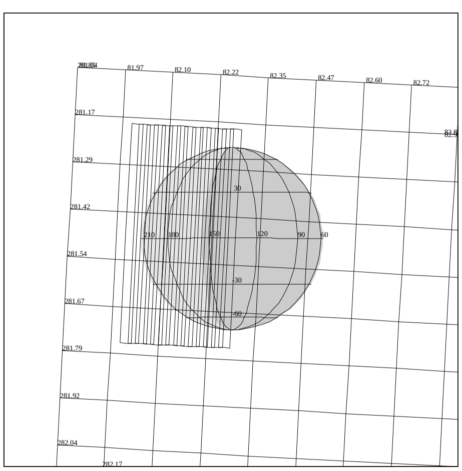

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