Chapter 2 - Orbit Overview

Contents

Introduction to Chapter 2

This chapter gives an overview of the NIMS observations in the I27 Orbit.

The text on page 3 summarizes the NIMS science objectives for I27. The NIMS calibrations are discussed on page 3. Early data return and I27 playback are also discussed on page 3.

The I27 Integrated Io Observation Plan is presented on pages 4 and 5.

The table on page 6 is a time-ordered listing of the NIMS Oapels for I27.

The plot on page 7 shows the geometry of the NIMS I27 observations using a north trajectory pole view projection. The plot on page 8 shows the geometry of the NIMS I27 observations during the Io Flyby using a north trajectory pole view projection. The plot on page 9 shows the geometry of the NIMS I27 calibrations.

The spreadsheet on page 10 summarizes the various inputs for the NIMS I27 Observations. The spreadsheet on pages 11 and 12 summarizes the resource usage for the NIMS I27 observations.

The table on page 13 lists various NIMS I27 observing parameters: target latitude/longitude, range, cone angle, incidence angle light), emission angle view) and phase angle.

The timeline on pages 14 through 18 shows the placement of the I27 observations for all intruments during the I27 Encounter Period.

The tapemap on page 19 shows the placement of the I27 observations on the spacecraft’s tape recorder.

The timeline on pages 20 through 29 shows the preliminary I27 playback schedule.

The NIMS I27 mosaic designs are summarized on page 30 in time-order.

NIMS I27 SCIENCE OVERVIEW

Io Science

The I27 Io sequence design is different from that used in I24 and I25 in response to the loss of spectral capability due to the stuck grating. The NIMS observations are mostly mapping instead of sit-and-stare spectrum building observations. NIMS and SSI did collaborate on some targets, and some ride-along behind SSI will be returned.

27INHRPELE01 - high resolution nightside obs. of Pele.
27INICHAAC01 - dayside jail-bar obs over 'golf course' in Chaac region.
27INMOSAIC01 - dayside two-swath map of Chaac region.
27INPROMTH01 - dayside map across Prometheus region.
27INCAMAXT01 - dayside map across Camaxtl hot spot.
27INAMRANI01 - dayside three-swath map across Amiarani region.
27INTVASHT01 - dayside map across Tvashtar caldera region.
27INREGION01 - dayside three-swath regional map containing Prometheus.
27INGLOBAL01 - dayside three-swath global map

Calibration

There are three NIMS calibration observations planned for I27: one PCT cal, one RCT cal and one OPCAL.

Early Data Return

There are three realtime observations in I27: One PCT calibration, one RCT calibration and one OPCAL.

I27 Playback

I27 playback is split into two passes through the tape. Some I27 data will not be recorded over in G28 and will be played back during G28 cruise.

I27 Joint Observation Plan

Track 2:

day/hr:mn	Min from Io C/A	Target	Target Lat/Lon	S/C Lat/Lon	Range (km)	Notes
053/07:00 to 08:10	-406 to -336	Global	00, 322	+3, 78	161578	PPR nightside dark map
053/11:22 to 12:19	-144 to -87	Loki	00, 285	+3, 114	66504	PPR nightside
053/12:26 to 13:03	-80 to - 43	Daedalus	27, 272	+3, 123	32730	PPR nightside

Track 3:

day/hr:mn	Min from Io C/A	Target	Target Lat/Lon	S/C Lat/Lon	Range (km)	Notes
053/13:07 to 13:24	-39 to - 22	Loki	+13, 318	+3, 128	15153	PPR nightside
053/13:26 to 13:33	-20 to -13	Loki	+11, 328	+3, 131	6898	PPR nightside
053/13:34	-12	Pele	-19, 256	+3, 132	3674	NIMS 1 swath, 7 minutes, nightside
053/13:39	-7	Pele	-18, 255	+3, 133	1445	SSI 1x4 IM8 clear filter, nightside, 17m/pixel
053/13:40	-6	Mulungu	+17, 218	+3, 133	830	PPR dayside
053/13:44	-2	Sapping	+32, 193	+3, 134	374	SSI 1x4 IM4 clear filter, 5.5m/pixel
053/13:48	+2	Chaac	+13, 158	+3, 134	374	SSI 1x7 IM4 + 1 IM4/480, clear fitler, 7-8m/pixel
053/13:50	+4	Prometheus	-1, 156	+3, 134	828	SSI 1x8 IM8 clear filter, 11-13 m/pixel
053/13:51	+5	Chaac	+13, 160	+3, 134	1000	NIMS jail-bar, 4 minutes
053/13:57	+11	Chaac Mosaic	+13, 156	+3, 135	2899	NIMS 2 swaths, 15 minutes

I27 Joint Observation Plan

Track 4:

day/hr:mn	Min from Io C/A	Target	Target Lat/Lon	S/C Lat/Lon	Range (km)	Notes
053/14:16	+30	Prometheus	-2, 159	+3, 138	11029	NIMS 1 swath, 10 minutes
053/14:26	+40	Tohil	-26, 163	+3, 139	15180	SSI 2x2 IM8 clear filter, 165 m/pixel
053/14:28	+42	Prometheus	-2, 156	+3, 140	16011	SSI 1x2 IM8 clear filter, 170 m/pixel
053/14:31	+45	Camaxtli	+16, 158	+3, 140	16843	SSI 2x6 IM4 clear filter, 180-185 m/pixel
053/14:36	+50	Camaxtli Region	+14, 137	+3, 141	19338	NIMS 1 swath, 2 minutes
053/14:39	+53	Amirani	+29, 114	+3, 141	20170	SSI 1x3 IM4 green filter, 1 IM4 756, 1 IM4 violet, 210 m/pixel
053/14:43	+56	Amirani	+30, 119	+3, 142	22666	NIMS 3 swath 18 minutes

Track 1:

day/hr:mn	Min from Io C/A	Target	Target Lat/Lon	S/C Lat/Lon	Range (km)	Notes
053/15:01	+74	Tvashtar	+61, 120	+3, 144	30151	SSI 5 IM8 violet, 756, 889, 968, clear filters, 315 m/pixel
053/15:05	+78	Zal, Term	+56, 182	+3, 145	30982	SSI 1x6 IM4 clear filter, 335 m/pixel
053/15:09	+82	Shamshu	+11, 167	+3, 145	32645	SSI 1x4 IM8 clear filter, 340-345 m/pixel
053/15:11	+84	S. Pole	-52, 118	+3, 146	33477	SSI 1x4 IM4 clear filter, 350-355 m/pixel
053/15:13	+86	Tvashtar	+57, 112	+3, 146	34308	NIMS 1 swath, 4 minutes
053/15:17	+90	Region	+19, 163	+3, 147	35971	NIMS 3 swaths, 52 minutes

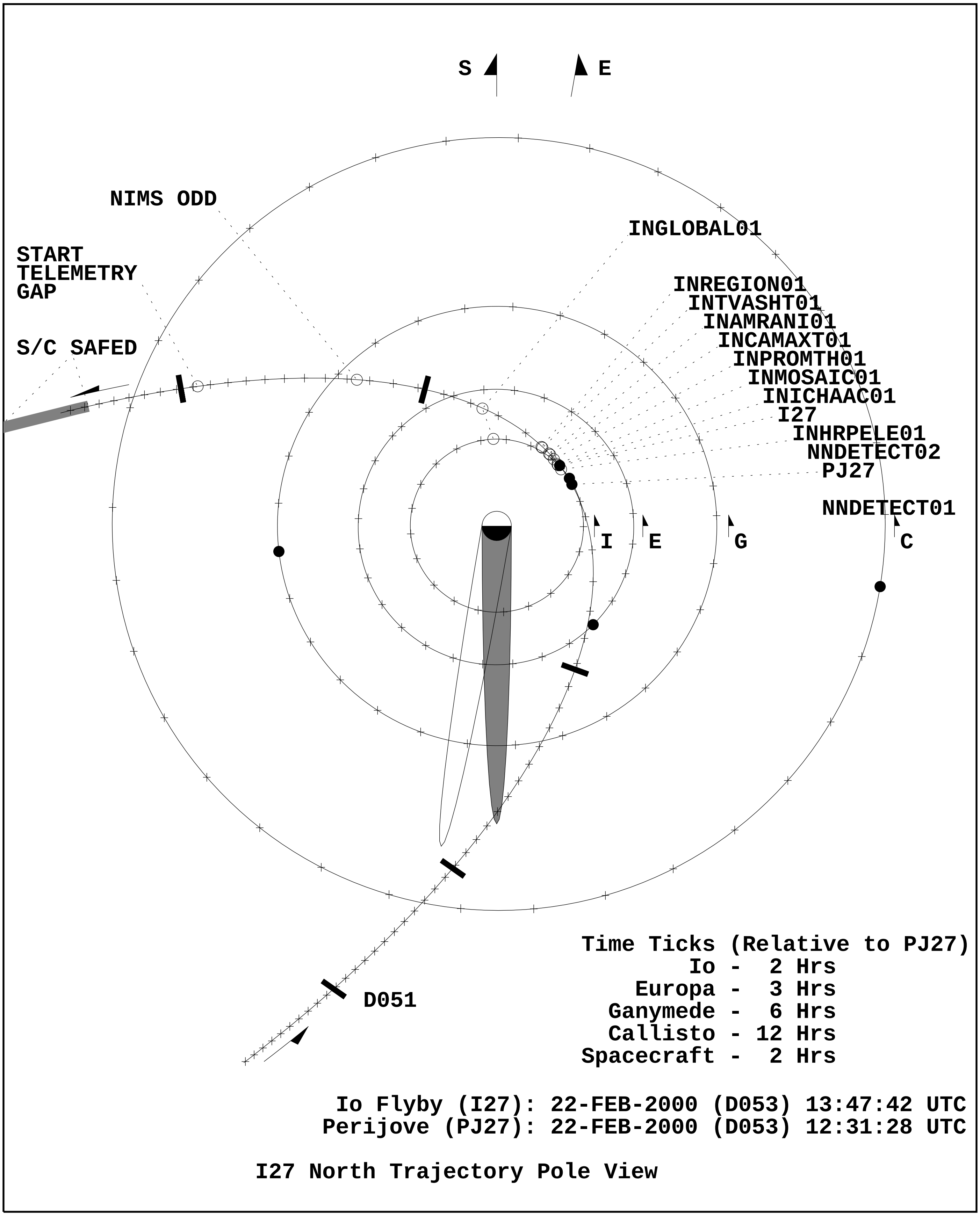
Track 2:

day/hr:mn	Min from Io C/A	Target	Target Lat/Lon	S/C Lat/Lon	Range (km)	Notes
053/16:12	+145	Bosphorus Regio	0, 155	+3, 155	61592	PPR SO2 Frost Sample
053/17:21	+145	Global	0, 165	+3, 165	90826	PPR Dayside Thermal Map
053/19:40	+350	Global	0, 170	+3, 183	155130	NIMS 3 swaths, 40 minutes
053/23:12	+562	Global	0, 200	+3, 214	301743	SSI 2x2 IM4 756, green and violet filters, 3.1 km/pixel
054/16:20	+1590	Eclipse	0, 000	+3, 000	1640K	SSI IM4/400 OCM clear and 1 micron filters, 17 km/pixel

I27 Time-Ordered Listing

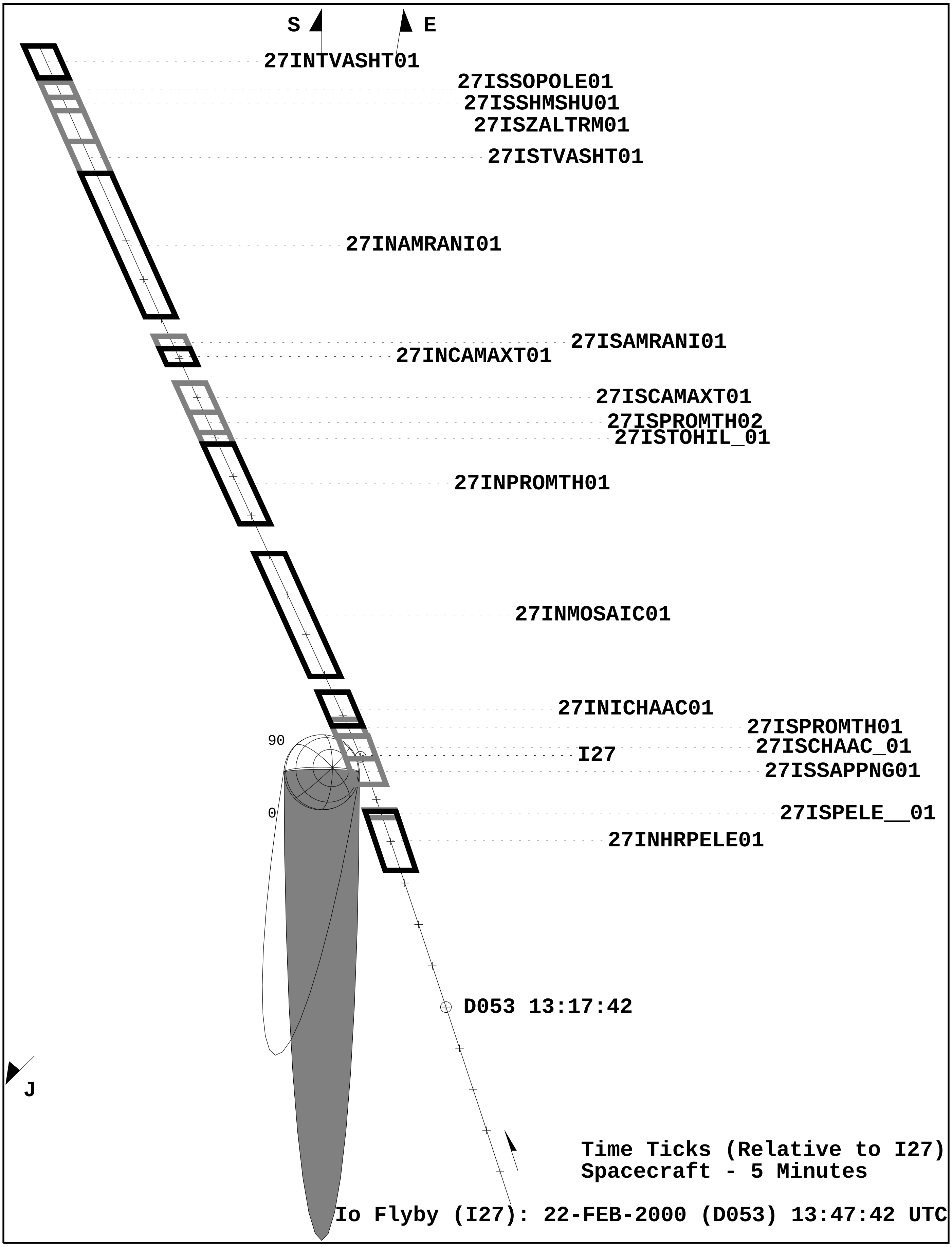
OAPEL	Start (UTC)	End (UTC)	Duration
27NNDETECT01	00-053/12:35:35	00-053/12:55:48	000/00:20:13
27NNHRPELE01	00-053/13:28:10	00-053/13:31:12	000/00:03:02
27INHRPELE01	00-053/13:34:14	00-053/13:41:18	000/00:07:04
27NNICHAAC01	00-053/13:47:22	00-053/13:50:24	000/00:03:02
27INICHAAC01	00-053/13:51:25	00-053/13:55:28	000/00:04:02
27NNMOSAIC01	00-053/13:55:28	00-053/13:57:29	000/00:02:01
27INMOSAIC01	00-053/13:57:29	00-053/14:12:39	000/00:15:10
27NNPROMTH01	00-053/14:13:40	00-053/14:16:42	000/00:03:02
27INPROMTH01	00-053/14:16:42	00-053/14:26:48	000/00:10:06
27NNCAMAXT01	00-053/14:28:50	00-053/14:31:52	000/00:03:02
27INCAMAXT01	00-053/14:36:55	00-053/14:38:56	000/00:02:01
27NNAMRANI01	00-053/14:39:57	00-053/14:42:59	000/00:03:02
27INAMRANI01	00-053/14:42:59	00-053/15:01:11	000/00:18:12
27NNTVASHT01	00-053/15:12:18	00-053/15:13:19	000/00:01:00
27INTVASHT01	00-053/15:13:19	00-053/15:17:22	000/00:04:02
27INREGION01	00-053/15:17:22	00-053/16:09:56	000/00:52:34
27NNGLOBAL01	00-053/19:35:12	00-053/19:38:14	000/00:03:02
27INGLOBAL01	00-053/19:40:15	00-053/20:20:42	000/00:40:26
27NNDETECT02	00-053/20:30:48	00-053/20:51:02	000/00:20:13
27NNRELOAD01	00-056/01:56:02	00-056/02:10:11	000/00:14:09
27NNPCTRLT01	00-071/02:00:25	00-071/09:50:35	000/07:50:10
27NNRCTRLT01	00-072/10:00:31	00-072/23:16:16	000/13:15:44

NIMS I27 OBSERVATIONS



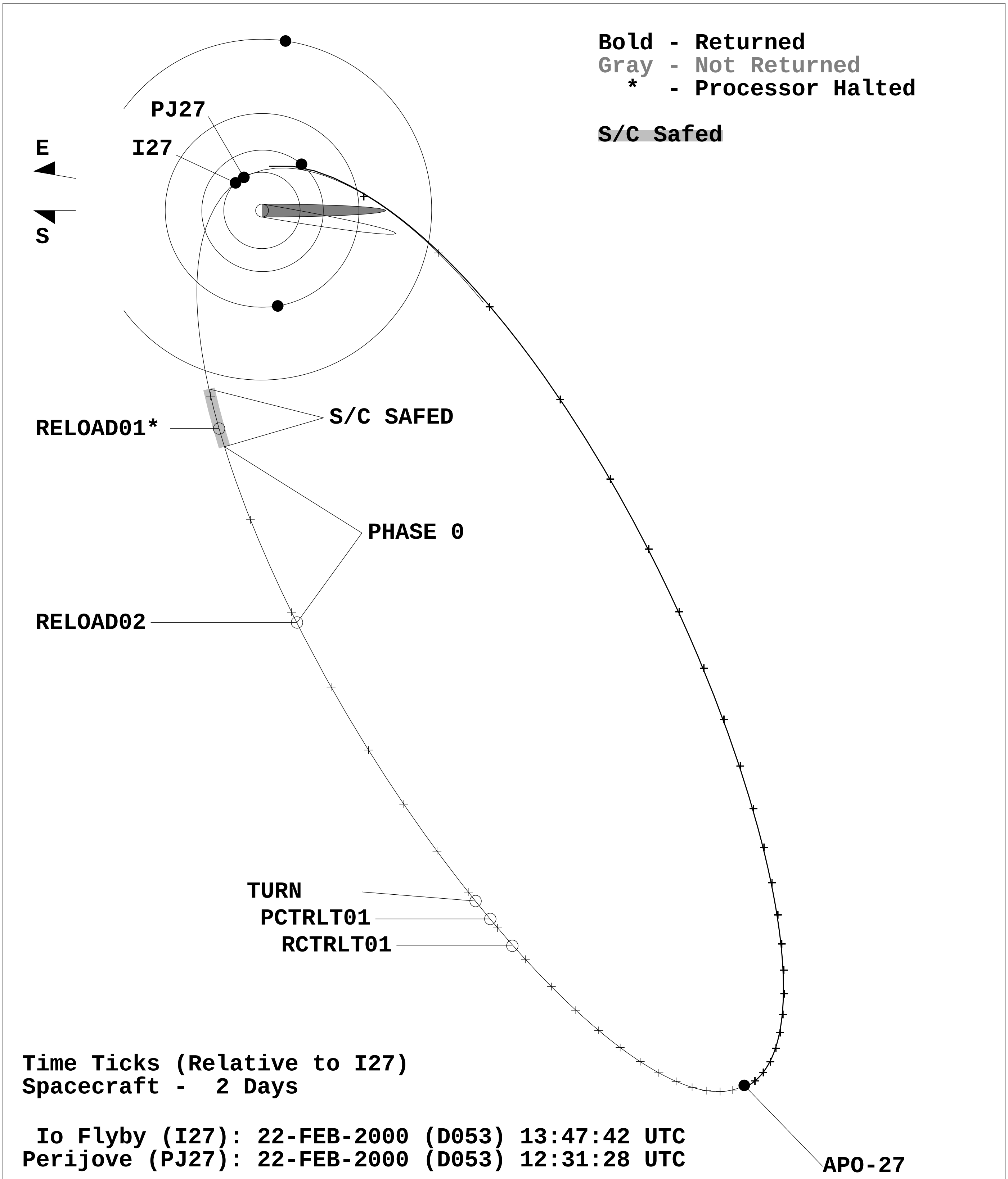
NIMS - FEL - 02/29/00

NIMS & SSI I27 IO FLYBY OBSERVATIONS



I27 North Trajectory Pole View, +2/-08 Hour NIMS - FEL - 01/27/00

NIMS I27 CALIBRATIONS



I27 North Trajectory Pole View

NIMS - FEL - 01/10/00

I27 NIMS INPUTS

Activity ID	Observation Title	NIMS Edit Table	NIMS PB Table	Mode	Gain	Grating Start	Grating Offset	Record Fromat	PSID
27NNDETECT01-	Grating Step Test Copy								
27NNHRPELE01-	NIMS Software Reload								
27INHRPELE01-	Io Pele Observation	I27ILM442	I27ILM144	LM	2	0	4	MPW	DA
27NNICHAAC01-	NIMS Software Reload								
27INICHAAC01-	Io Chaac Observation	I27ILM442	I27ILM144	LM	2	0	4	MPW	DD
27NNMOSAIC01-	NIMS Software Reload								
27INMOSAIC01-	Io Mosaic Obs	I27ILM442	I27ILM144	LM	2	0	4	MPW	DE
27NNPROMTH01-	NIMS Software Reload								
27INPROMTH01-	Io Prometheus Observation	I27ILM442	I27ILM144	LM	2	0	4	MPW	DF
27NNCAMAXT01-	NIMS Software Reload								
27INCAMAXT01-	Io Camaxtli Observation	I27ILM442	I27ILM144	LM	2	0	4	MPW	DG
27NNAMRANI01-	NIMS Software Reload								
27INAMRANI01-	Io Amirani Observation	I27ILM442	I27ILM144	LM	2	0	4	MPW	DH
27NNTVASHT01-	NIMS Software Reload								
27INTVASHT01-	Io Tvashtar Observation	I27ILM442	I27ILM144	LM	2	0	4	MPW	EJ
27NNREGION01-	NIMS Software Reload								
27INREGION01-	Io Regional Obs	I27ILM442	I27ILM144	LM	2	0	4	MPW	DI
27NNGLOBAL01-	NIMS Software Reload								
27INGLOBAL01-	Io Global Obs	I27ILM442	I27ILM144	LM	2	0	4	MPW	EI
27NNDETECT02-	Grating Step Test P2	I27ILM442	I27ILM144						
27NNRELOAD01-	NIMS Software Reload	I27ILM442	I27ILM144						
27NNCHOPOF01-	NIMS Chopper Off	I27ILM442	I27ILM144						
27NNPCTRLT01-	PCT Calibration	I27PCT252	R/T	LM	4	0	4	R/T	
27NNRCTRLT01-	RCT Calibration	I27RCT252	R/T	LM	1	0	4	R/T	
27NNROPCAL01	NIMS OPCAL	I27OPCAL48	R/T	LM	4	0	4	R/T	

I27 RESOURCES

Activity ID	Mode	Record Format	Obs. Cost (tracks)	Obs. Cost (ticks)	Number Wavelengths Returned	Obs Record (sec.)	Obs PB (sec.)	Selected Bits to Tape sBOT (MBITS)	Bits to Tape BOT (Mbit)	Mode Cycle time (sec)
27INHRPELE01	LM	MPW	0.0461	269	144	303.00	303.00	3.49	3.49	8.667
27INICHAAC01	LM	MPW	0.0188	110	144	122.00	122.00	1.41	1.41	8.667
27INMOSAIC01	LM	MPW	0.1274	743	144	842.00	842.00	9.70	9.70	8.667
27INPROMTH01	LM	MPW	0.0869	506	144	573.00	573.00	6.60	6.60	8.667
27INCAMAXT01A	LM	MPW	0.0185	108	144	120.00	120.00	1.38	1.38	8.667
27INCAMAXT01B	LM	MPW	0.0185	108	144	120.00	99.33	1.14	1.38	8.667
27INAMRANI01	LM	MPW	0.1694	987	144	1,120.00	1120.00	12.90	12.90	8.667
27INTVASHT01	LM	MPW	0.0336	196	144	220.00	220.00	2.53	2.53	8.667
27INREGION01	LM	MPW	0.4089	2383	144	2,708.00	970.00	11.17	31.20	8.667
27INGLOBAL01	LM	MPW	0.1783	1039	144	1,179.00	0.00	0.00	13.58	8.667
Resource Totals			**1.1064**	**6447**						

I27 RESOURCES

Activity ID	AACS Mbits c 2.5	Comp	Thold	RT	Total BTG Mbits (w/4% ohead)	Data Reduction Factor (sBOT/BTG)	Pass
27INHRPELE01	0.02	1.20			0.8726	4.00	1
27INICHAAC01	0.01	1.20			0.3513	4.00	1
27INMOSAIC01	0.05	1.20			2.4249	4.00	1,2
27INPROMTH01	0.03	1.20			1.6502	4.00	1,2
27INCAMAXT01A	0.01	1.20			0.3456	4.00	1
27INCAMAXT01B	0.01	1.20			0.2861	4.00	1
27INAMRANI01	0.06	1.20			3.2255	4.00	1,2
27INTVASHT01	0.01	1.20			0.6336	4.00	1
27INREGION01	0.06	1.20			2.7935	4.00	1,2
27INGLOBAL01	0.00	1.20			0.0000		1,2
Resource Totals					**12.5832**		

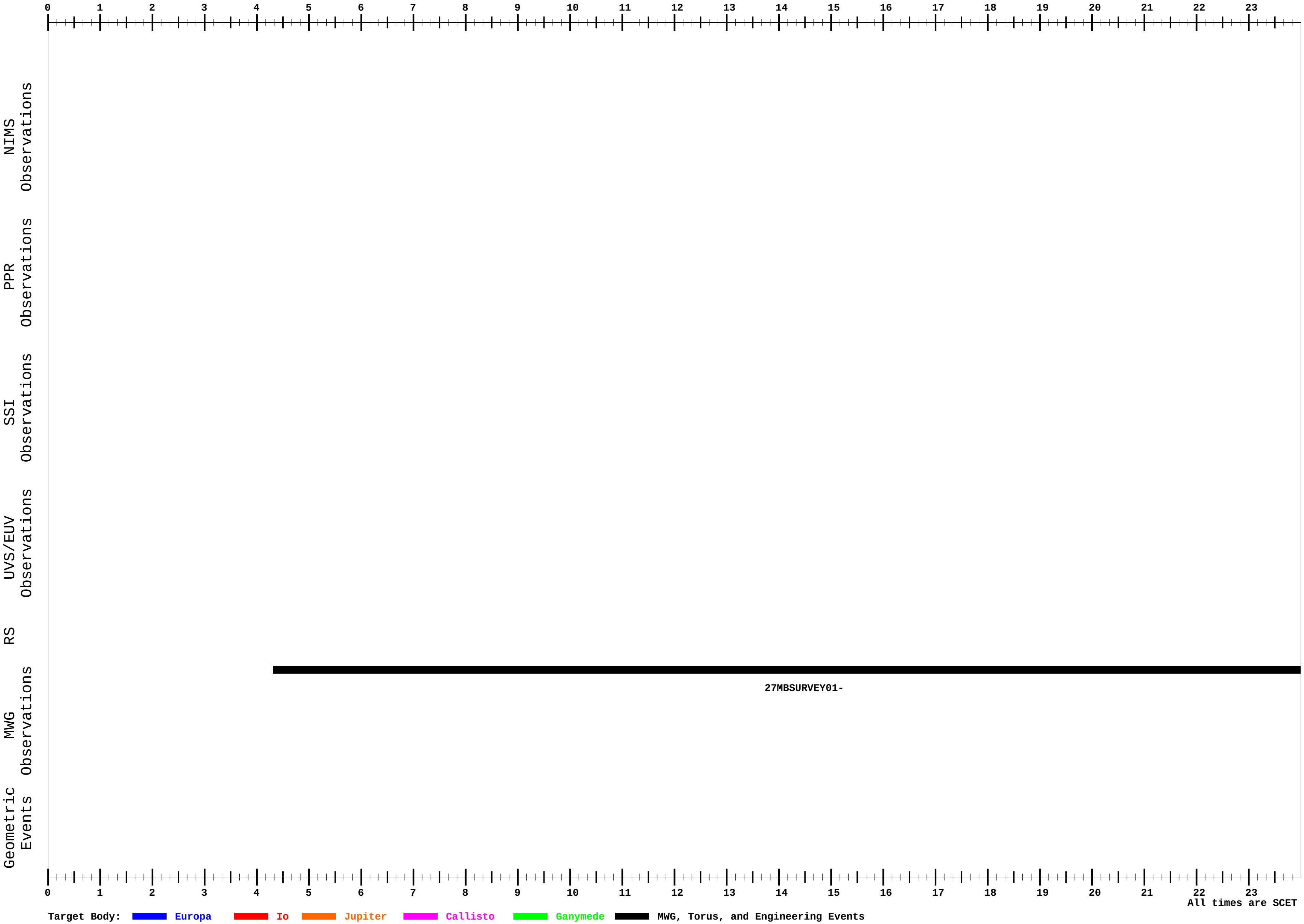
NIMS I27 OBSERVING GEOMETRY

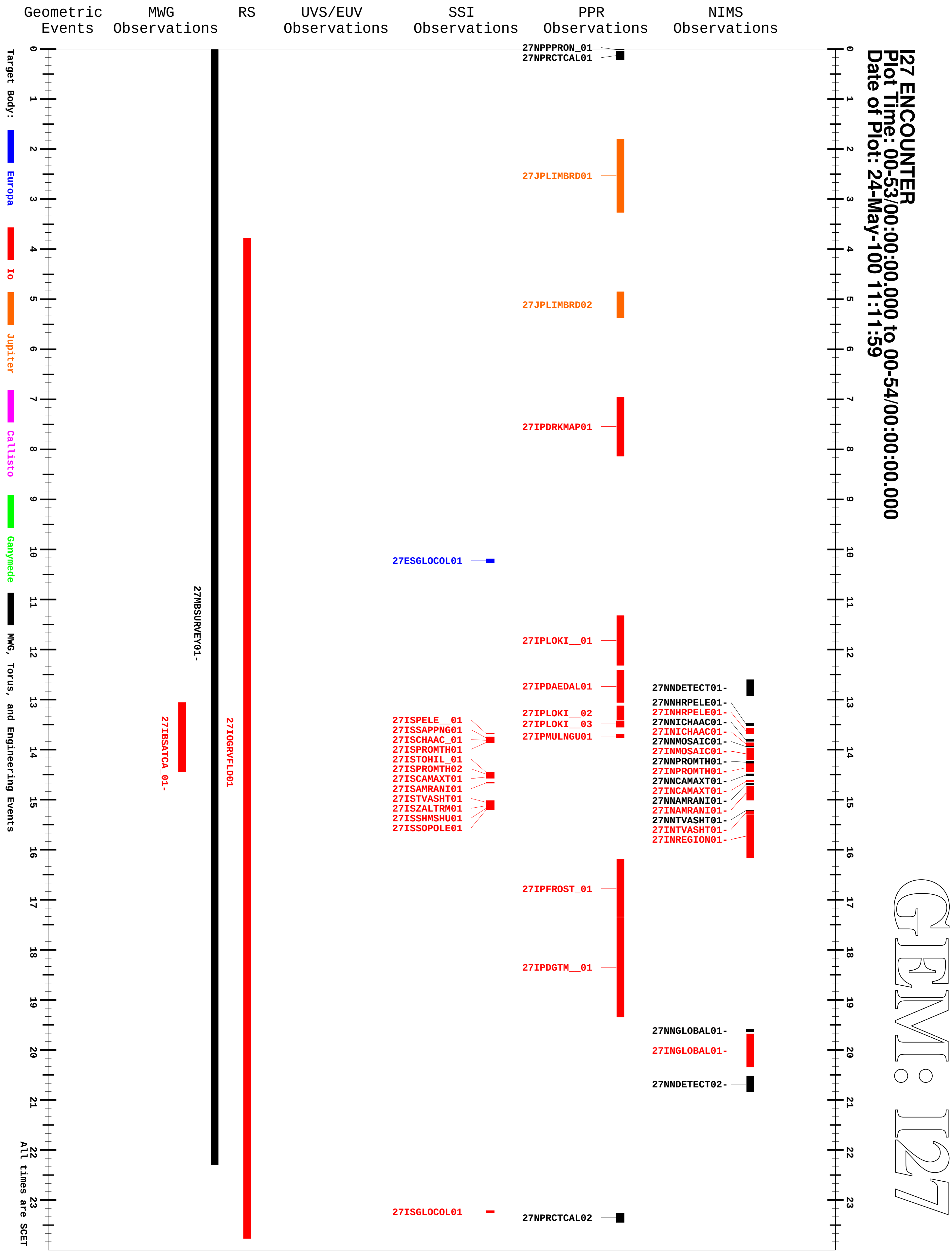
OAPEL	Latitude (deg)	Longitude (deg)	Range (km)	Cone (deg)	Light (deg)	View (deg)	Phase (deg)
27INHRPELE01	-19 to -17	255 to 256	2.0 to 3.8K	48 to 70	121 to 123	41 to 53	118 to 141
27INPELE__01+	-19 to -17	255 to 256	1.7 to 1.8K	76 to 82	121 to 122	57 to 62	105 to 112
27INPROMTH01+B	-2 to -1	154 to 156	1.1 to 1.4K	141 to 151	19 to 21	33 to 41	30 to 43
27INICHAAC01	+10 to +12	157 to 160	1.8 to 2.7K	158 to 163	23 to 26	27 to 33	6 to 10
27INMOSAIC01	+10 to +15	154 to 160	3.4 to 10.5K	147 to 156	19 to 25	34 to 44	12 to 21
27INPROMTH01	-5 to +0	151 to 159	12 to 15K	147	12 to 21	32 to 42	22
27INTOHIL_01+	-34 to -23	157 to 165	16K	147	33 to 41	48 to 58	22
27INPROMTH02+	-4 to +1	151 to 156	17K	147	12 to 17	33 to 39	22
27INCAMAXT01-	+8 to +18	133 to 158	18 to 20K	147	10 to 21	17 to 42	22
27INAMRANI01	+13 to +34	109 to 121	21 to 30K	149	26 to 42	18 to 33	20
27INTVASHT01+B	+52 to +75	119 to 120	31K	148	61	63	22
27INZALTRM01+	+20 to +50	62 to 81	33K	149	70 to 82	58 to 66	20
27INTVASHT01	+48 to +90	57 to 63	37K	147	60 to 62	59 to 65	22
27INREGION01	-20 to +25	114 to 163	40 to 59K	147	4 to 43	4 to 42	22
27INGLOBAL01	-90 to +90	80 to 260	161 to 175K	153	3 to 106	4 to 90	16

Symbol	Meaning
+	Ride-along
-	NIMS plus ride-along

I27 ENCOUNTER
Plot Time: 00-052/00:00:00.000 to 00-53/00:00:00.000
Date of Plot: 24-May-100 11:11:58

GEM: I27

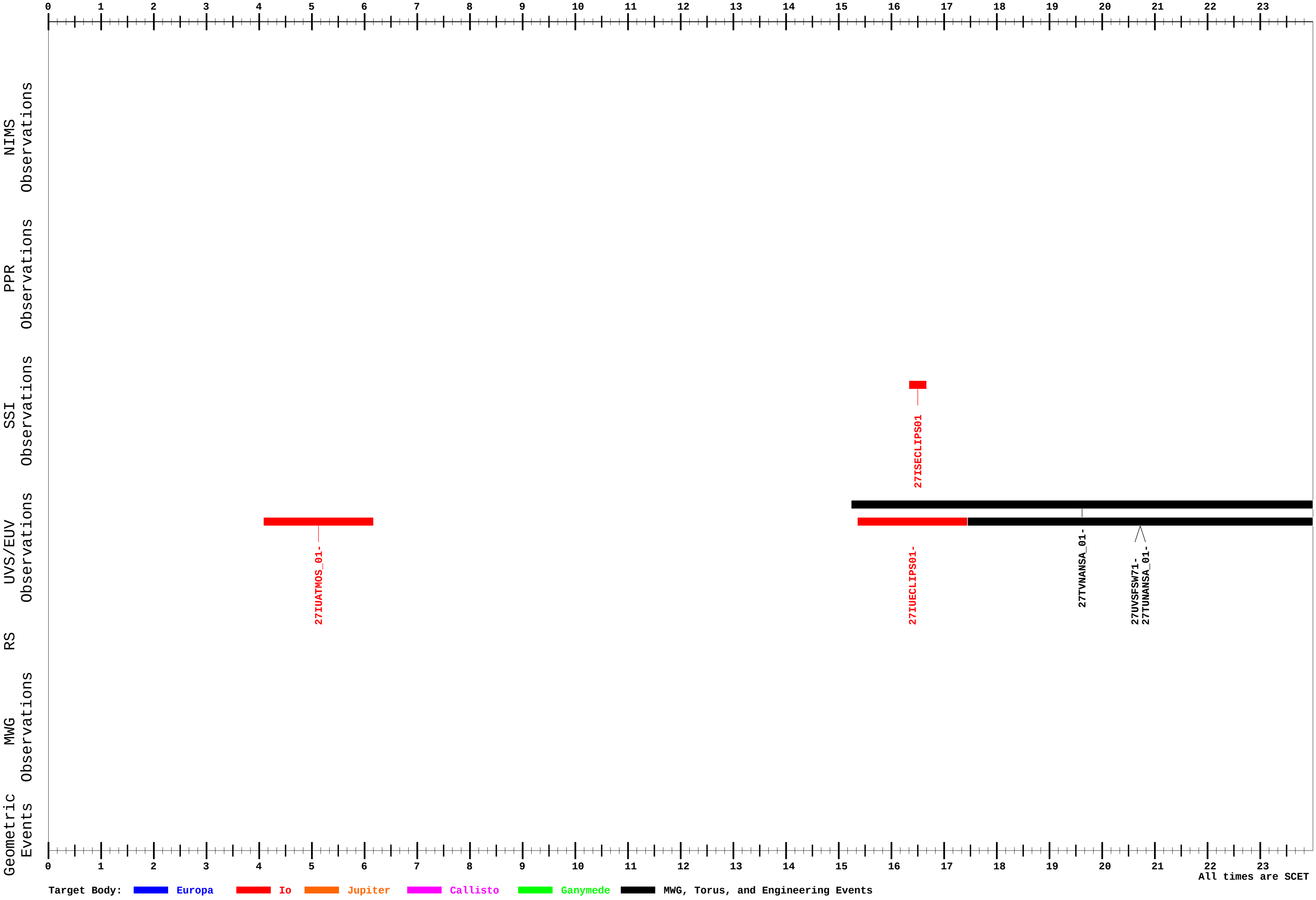




Geometric Events
MWG Observations
RS
UVS/EUV Observations
SSI Observations
PPR Observations
NIMS Observations
I27 ENCOUNTER
Plot Time: 00-53/00:00:00.000 to 00-54/00:00:00.000
Date of Plot: 24-May-100 11:11:59
GEM: I27
Target Body:
Europa
Io
Jupiter
Callisto
Ganymede
MWG, Torus, and Engineering Events
All times are SCET
27MBSURVEY01-
27IBSATCA_01-
27IOGRVFLD01
27ESGLOCOL01
27ISPELE__01
27ISSAPPNG01
27ISCHAAC_01
27ISPROMTH01
27ISTOHIL_01
27ISPROMTH02
27ISCAMAXT01
27ISAMRANI01
27ISTVASHT01
27ISZALTRM01
27ISSHMSHU01
27ISSOPOLE01
27ISGLOCOL01
27NPPPRON_01
27NPRCTCAL01
27JPLIMBRD01
27JPLIMBRD02
27IPDRKMAP01
27IPLOKI__01
27IPDAEDAL01
27IPLOKI__02
27IPLOKI__03
27IPMULNGU01
27IPFROST_01
27IPDGTM__01
27NPRCTCAL02
27NNDETECT01-
27NNHRPELE01-
27INHRPELE01-
27NNICHAAC01-
27INICHAAC01-
27NNMOSAIC01-
27INMOSAIC01-
27NNPROMTH01-
27INPROMTH01-
27NNCAMAXT01-
27INCAMAXT01-
27NNAMRANI01-
27INAMRANI01-
27NNTVASHT01-
27INTVASHT01-
27INREGION01-
27NNGLOBAL01-
27INGLOBAL01-
27NNDETECT02-

GEM: I27

I27 ENCOUNTER
Plot Time: 00-54/00:00:00.000 to 00-55/00:00:00.000
Date of Plot: 24-May-100 11:11:59



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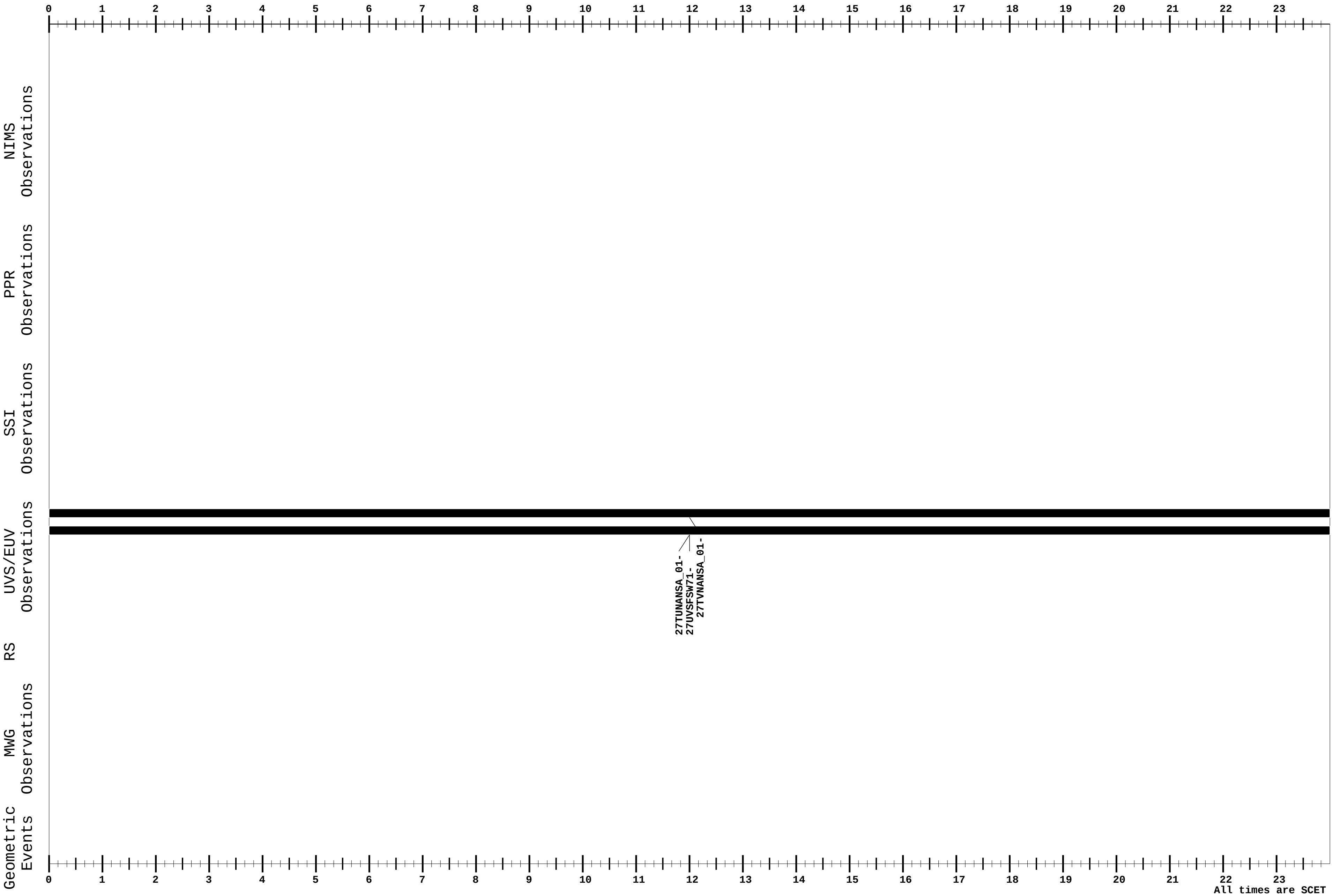
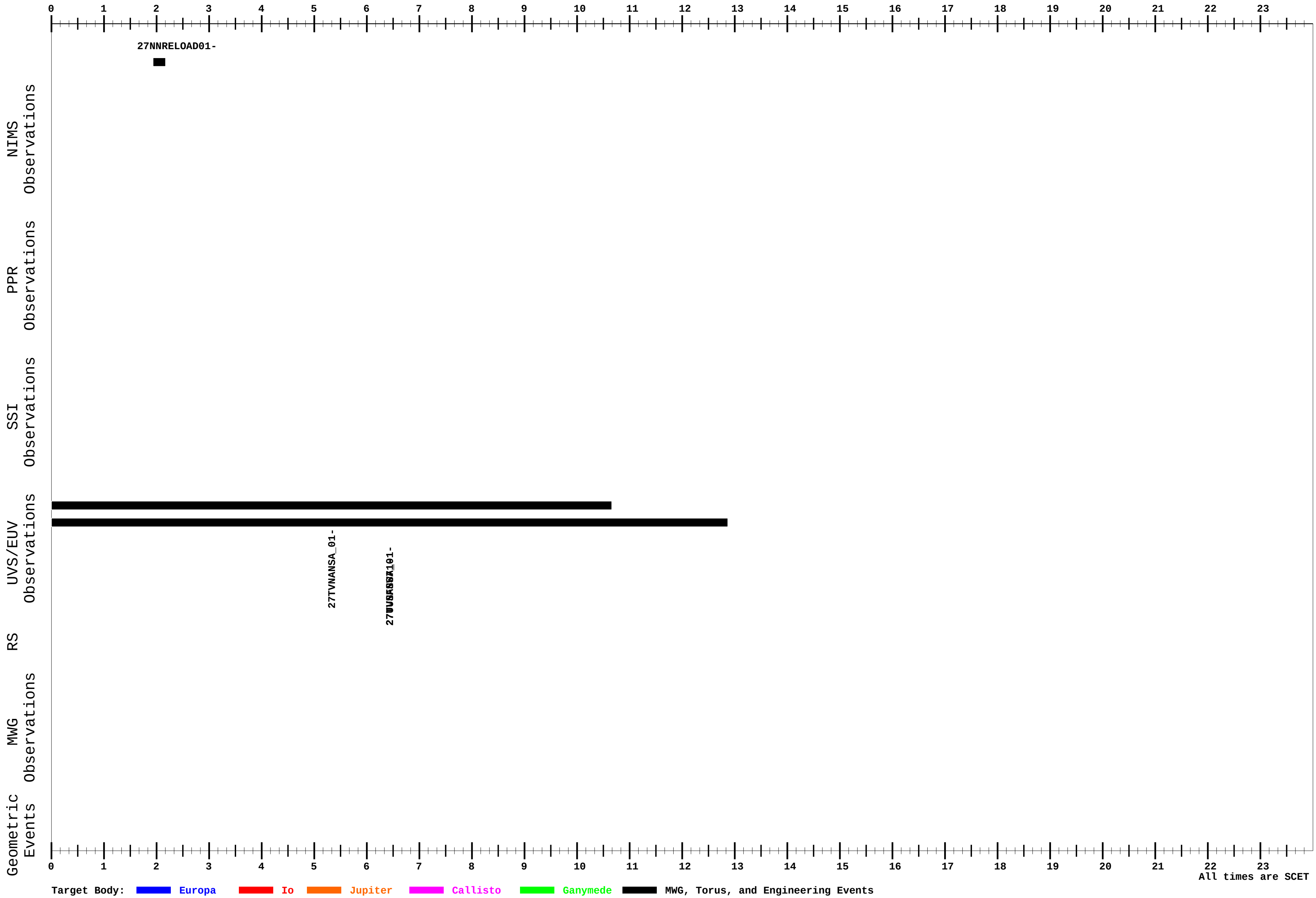
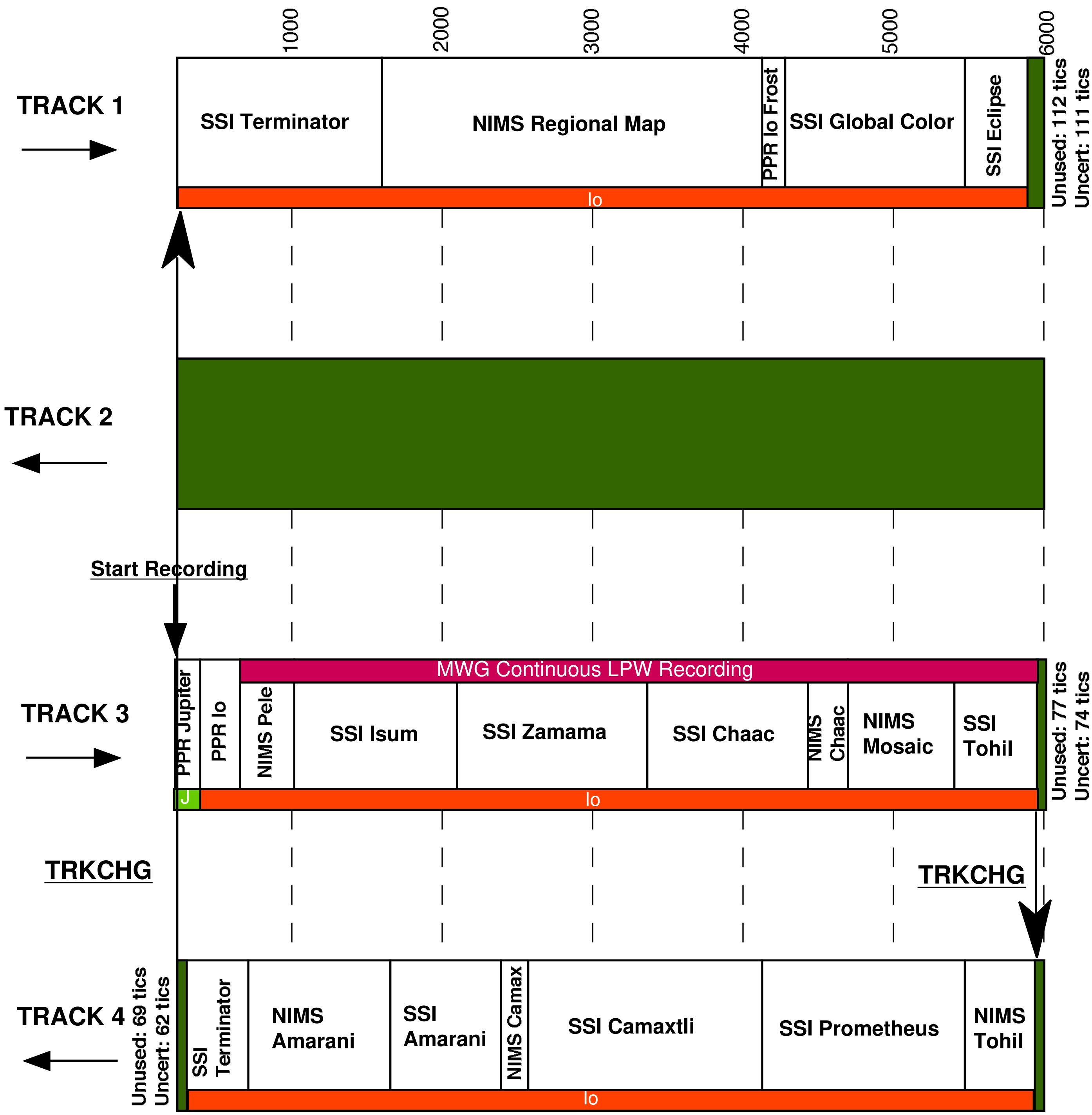


Target Body: Europa Io Jupiter Callisto Ganymede MWG, Torus, and Engineering Events

I27 ENCOUNTER
Plot Time: 00-56/00:00:00.000 to 00-57/00:00:00.000
Date of Plot: 24-May-100 11:11:59

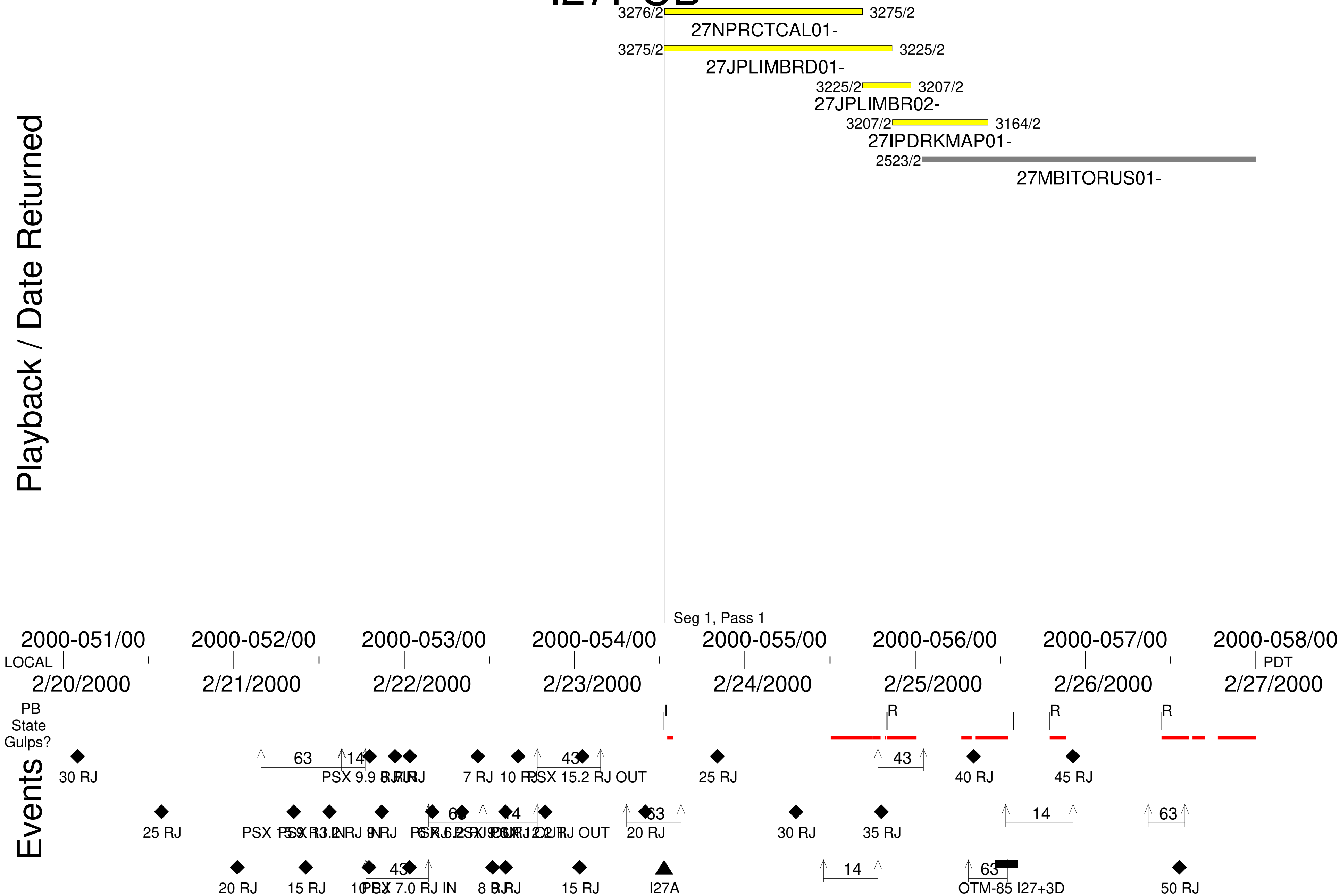


I27 ENCOUNTER HIGH-LEVEL TAPEMAP



J. Gross, 8/30/99

I27PCB

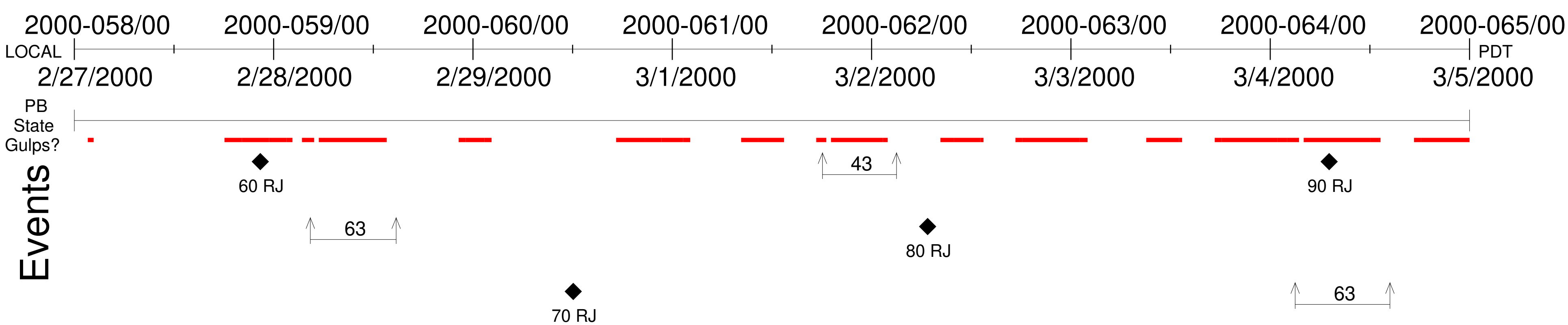


3276/2
3275/2
27NPRCTCAL01-
3275/2
3225/2
27JPLIMBRD01-
3225/2
3207/2
27JPLIMBR02-
3207/2
3164/2
27IPDRKMAP01-
2523/2
27MBITORUS01-
Playback / Date Returned
Seg 1, Pass 1
2000-051/00
2000-052/00
2000-053/00
2000-054/00
2000-055/00
2000-056/00
2000-057/00
2000-058/00
LOCAL
PDT
2/20/2000
2/21/2000
2/22/2000
2/23/2000
2/24/2000
2/25/2000
2/26/2000
2/27/2000
PB
State
Gulps?
Events
30 RJ
25 RJ
20 RJ
15 RJ
7 RJ
25 RJ
40 RJ
45 RJ
20 RJ
30 RJ
35 RJ
15 RJ
I27A
OTM-85 I27+3D
50 RJ
PSX 9.9
PSX 15.2 RJ OUT
PSX 7.0 RJ IN
63
14
43

I27PCB

27MBITORUS01-

Playback / Date Returned



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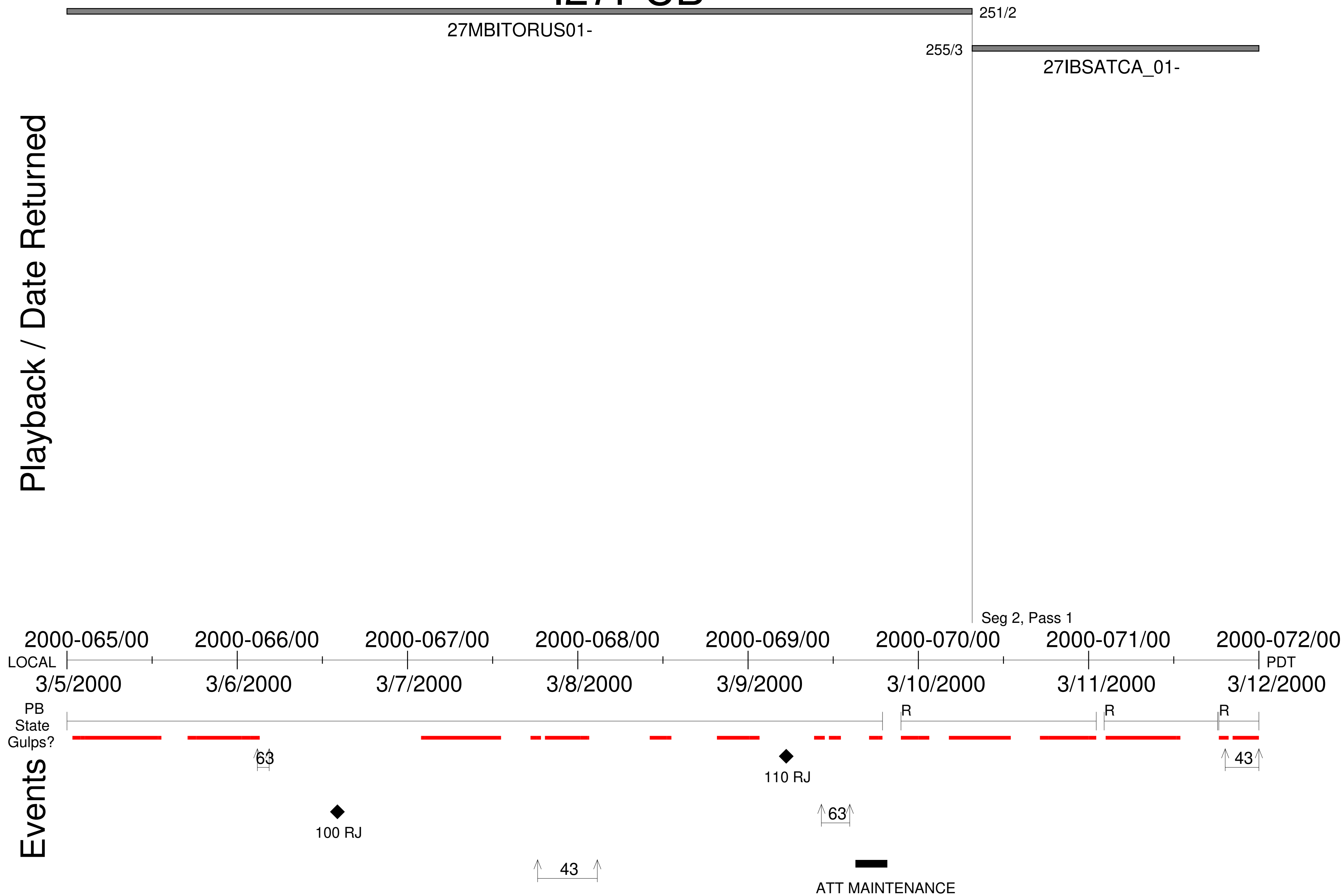

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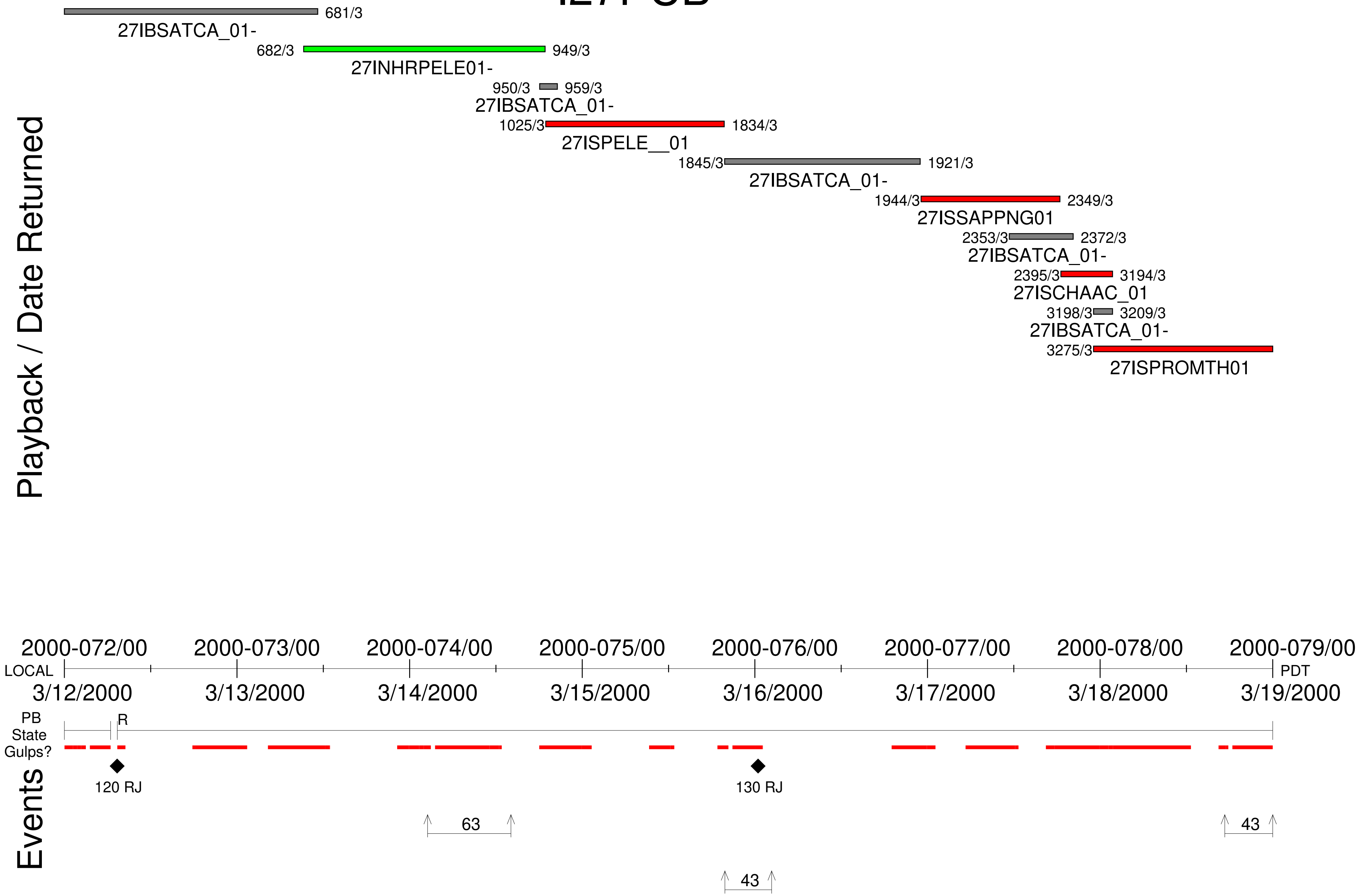
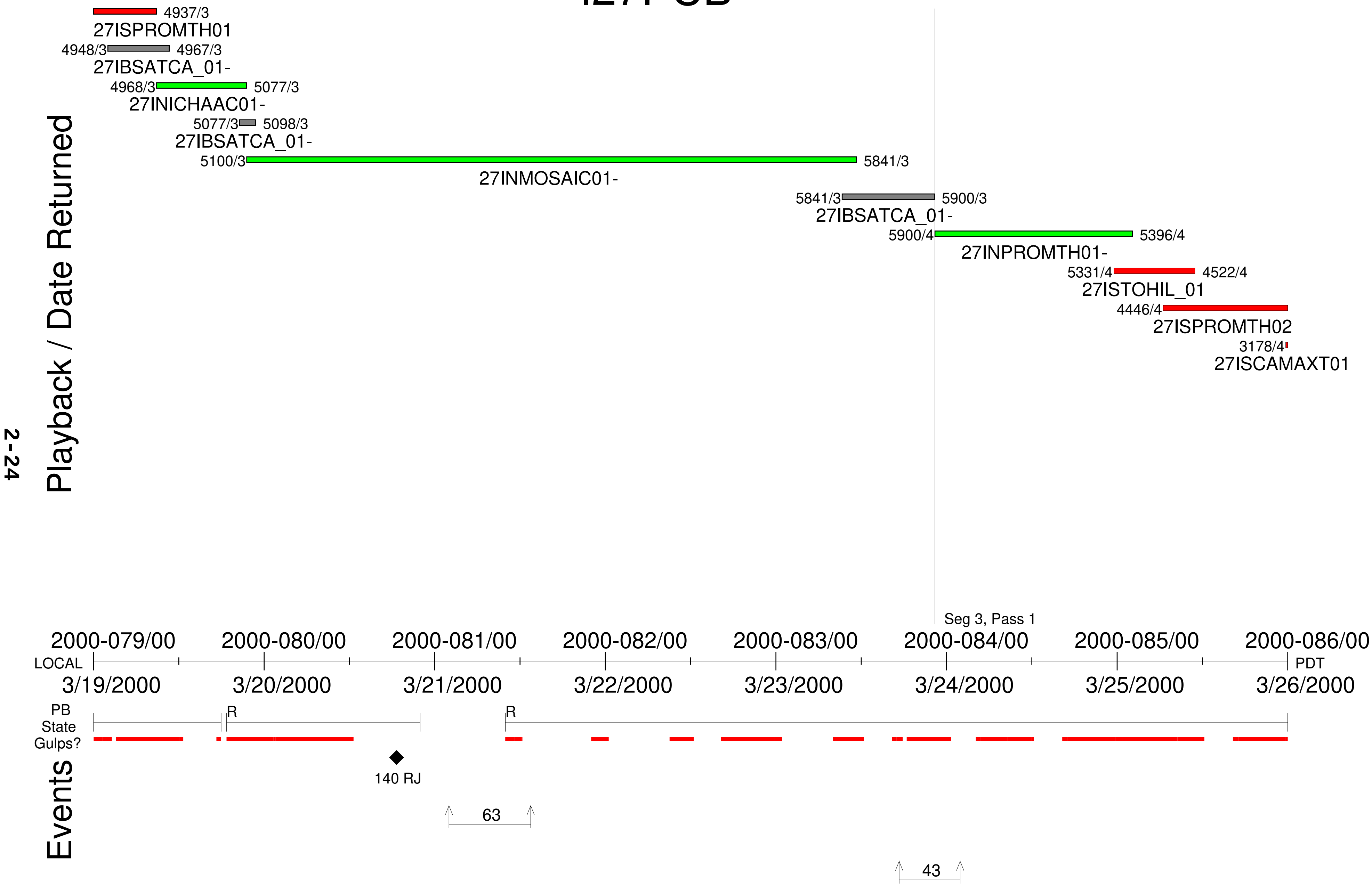


ORPROs Loaded: orpro.i27adc orpro.i27bdc

Fri Feb 18 18:05:03 2000, Page 4 of 10

I27PCB



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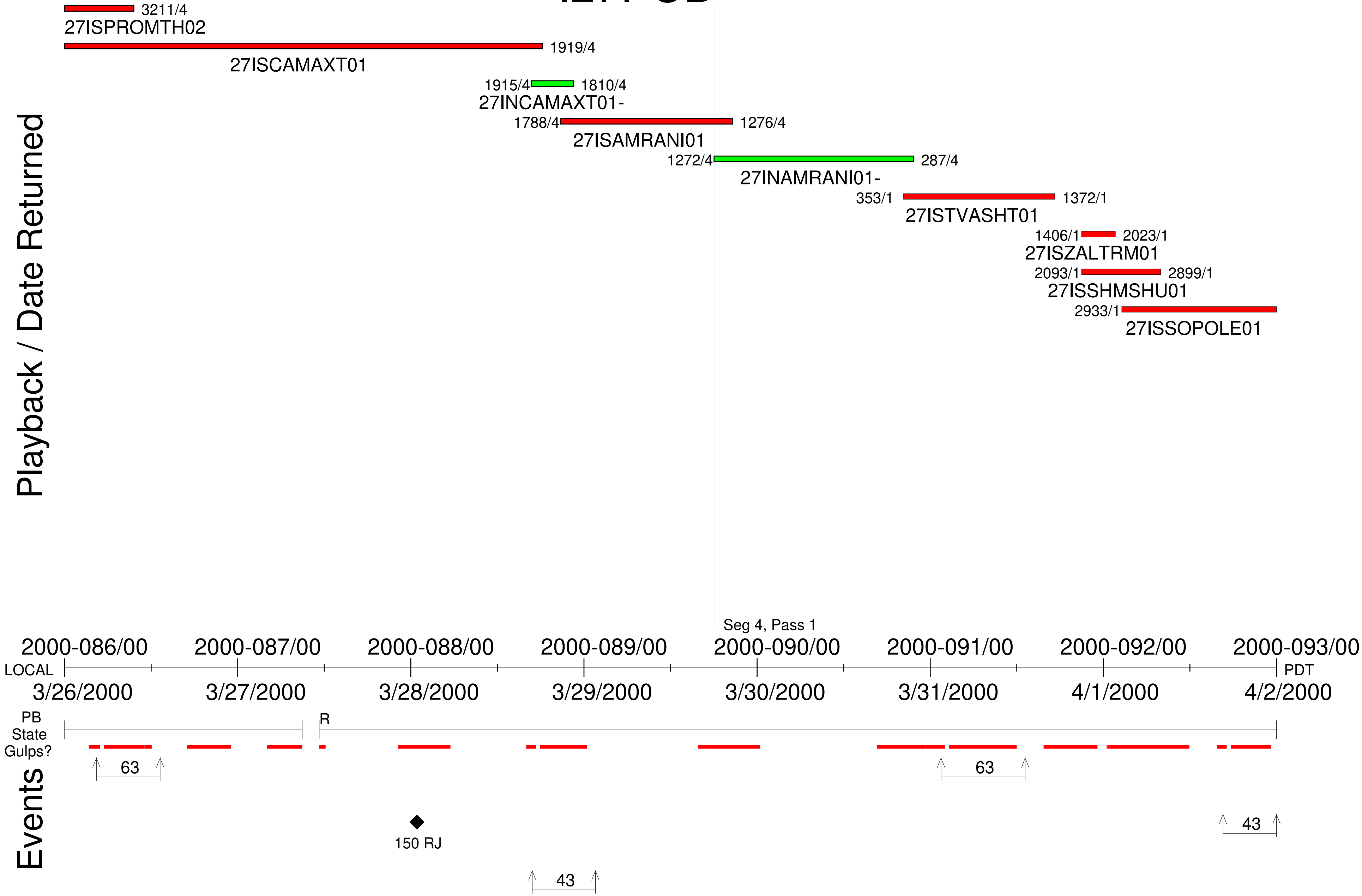

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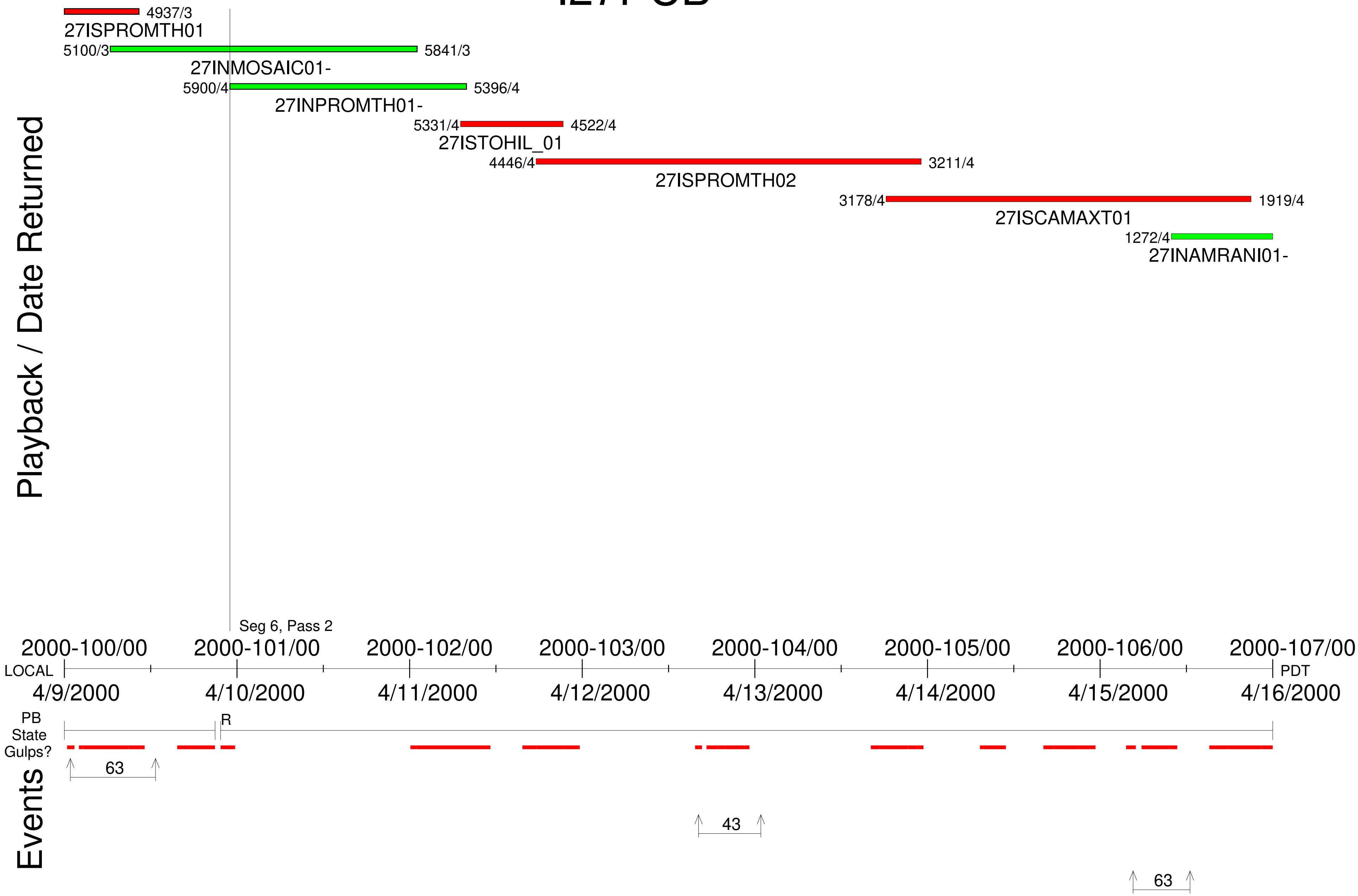

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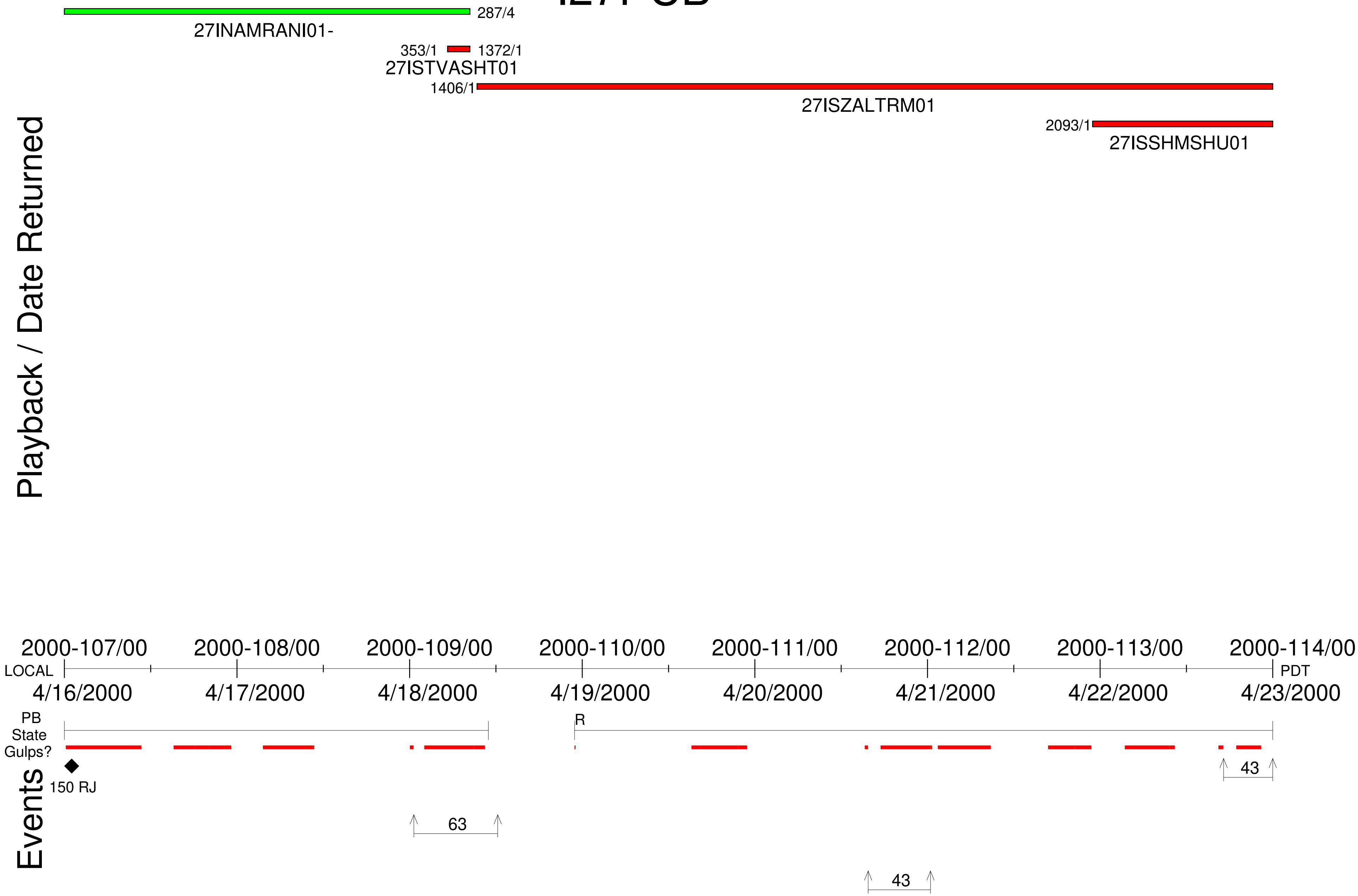

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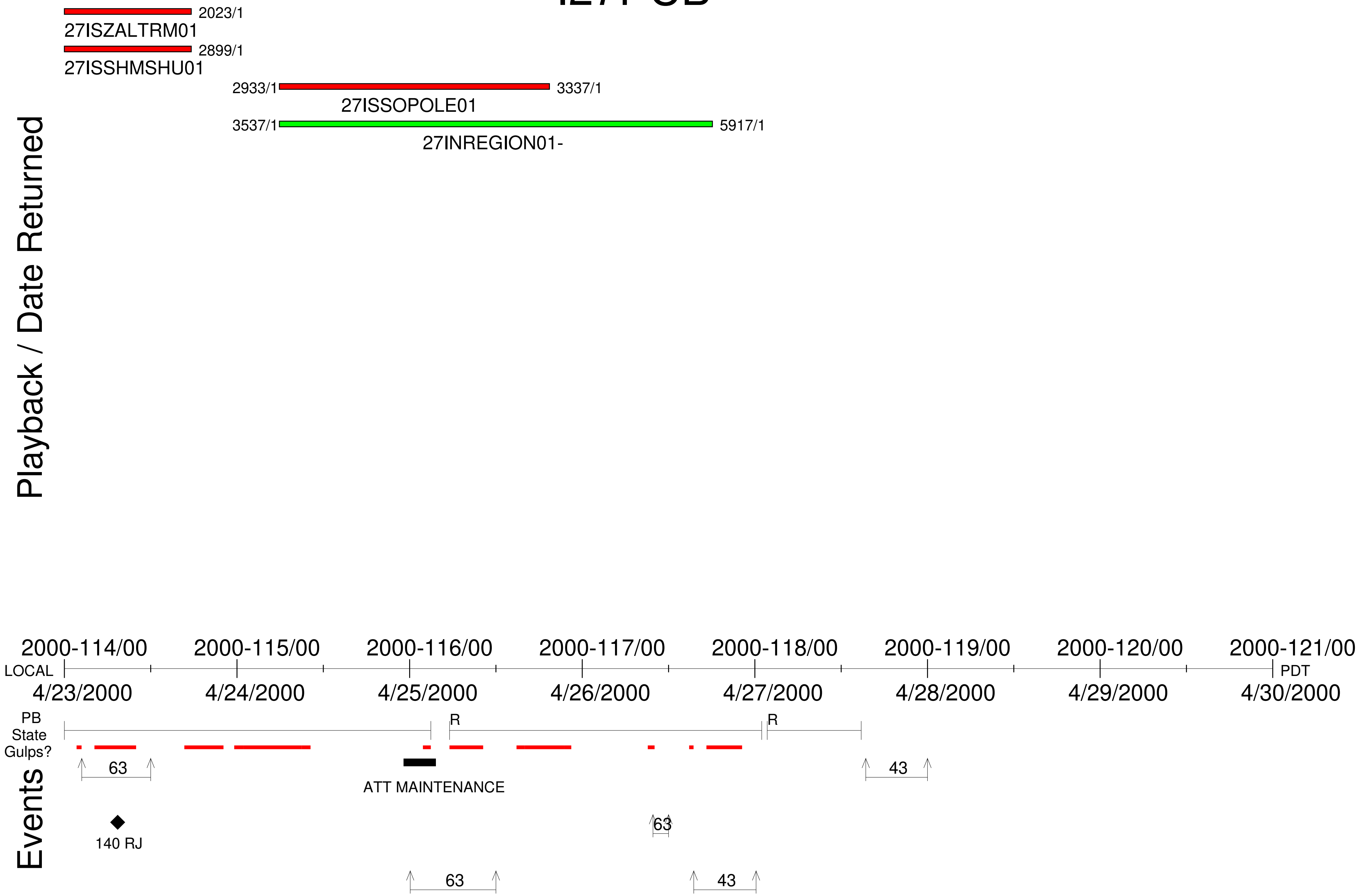

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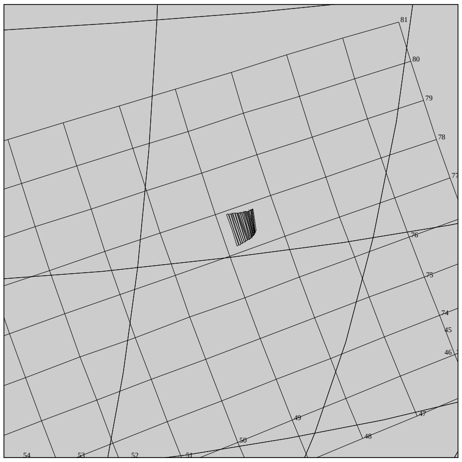

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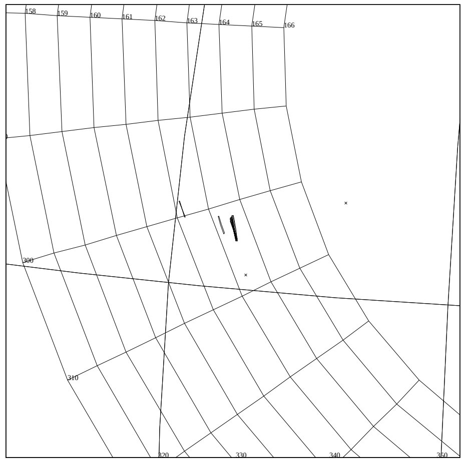

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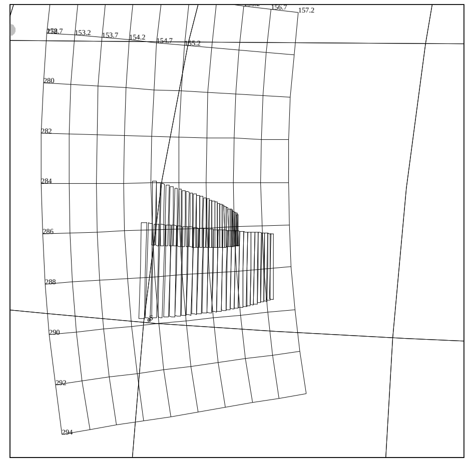

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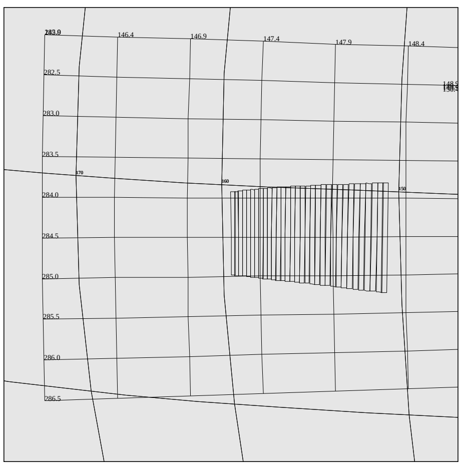

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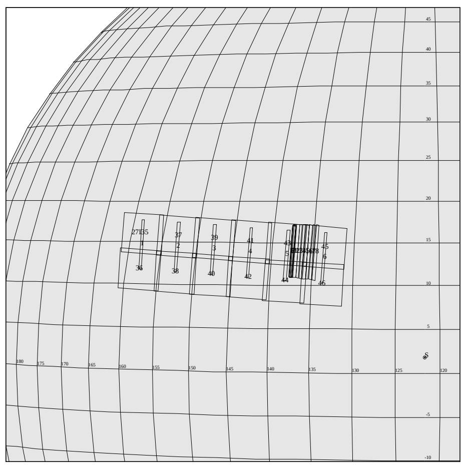

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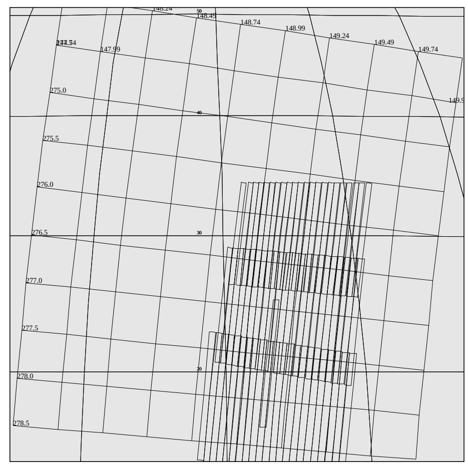

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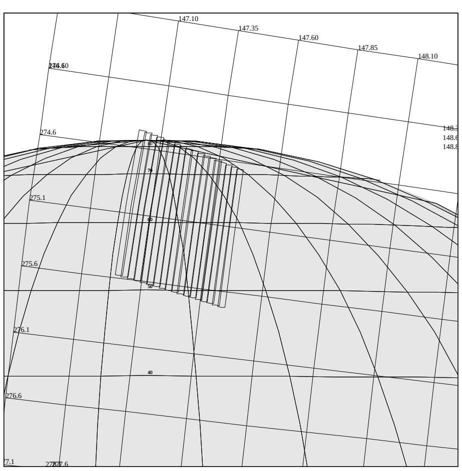

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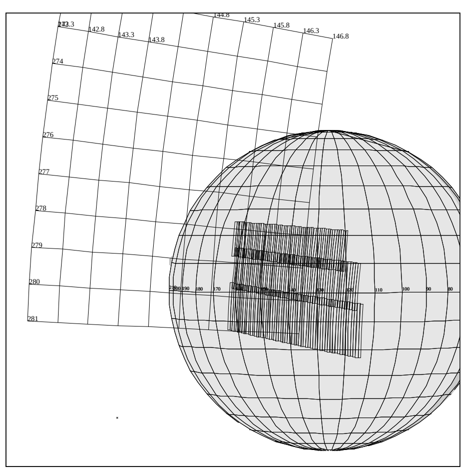

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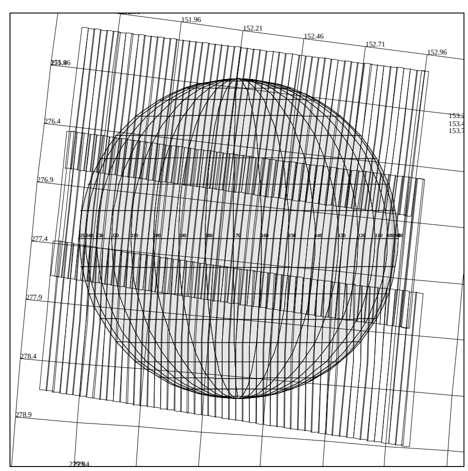

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