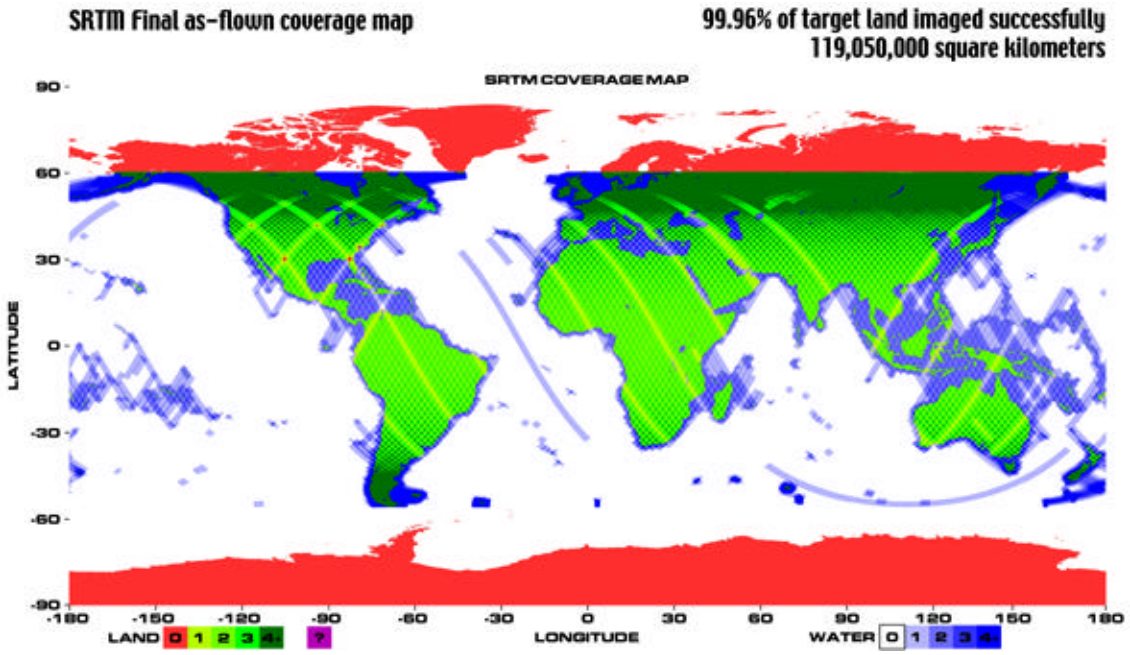
SRTM As-Flown Mission Timeline



16 May 2000

Issued by: D. Seal / F. Rogez

JPL NASA

1. Introduction

This document contains technical information relevant to Mission Planning for the Shuttle Radar Topography Mission (SRTM). It includes the as-flown events executed during the mission. This timeline serves to guide post-mission reconstruction and data processing is under control of the Mission Operations System.

The SRTM mission launched on February 11, 2000 at 12:44am EST (exact GMT was 17:43:39.961) aboard the space shuttle Endeavor (STS-99) for a mission duration of 11 days, 5 hours, and 38 minutes. The high-level timeline for the SRTM mission was as follows:

> Mapping began at MET 00/11:47, several hours earlier than expected after a nominal OOCO using plan A
>
> Mapping ended at MET 09/18:10, earlier than the required 10/07:30 to complete the repeat cycle, but enough to get 99.96% of the target land imaged at least once
>
> Mast stow ended at 09/22:07 on the fifth attempt
>
> Nominal de-orbit burn was at 11/04:48
>
> Nominal landing at KSC 11/05:38 (February 22, 2000 at 6:22pm EST)

This report, along with other as-flown resources, are available electronically at the Mission Planning document library at "http://samadhi.jpl.nasa.gov/srtm".

2. Orbit Characteristics

During the flight, the shuttle characteristics and orbital perturbations were modelled as follows:

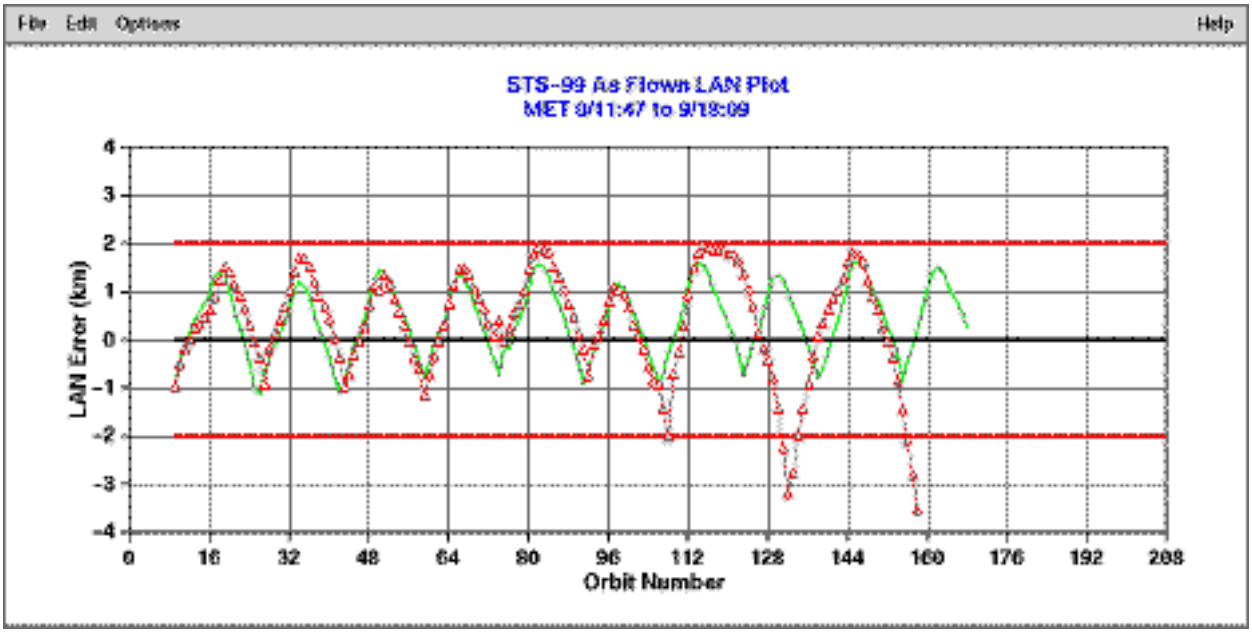
Orbiter coefficient of drag (Cd) = 2.0
Orbiter weight = 242200.0 pounds mass at launch, dropping smoothly to 234257 pounds mass at end of mapping
Area = 1577 square feet

90-day mean solar flux (f10.7) = 172.0
Geomagnetic planetary index (kp) = 2.38
Drag weighting factor for vernier firings, vent forces, etc. (kcon) = 1.35 at launch; 1.17-1.61 during the flight
Propagator alignment factor (to align JPL and JSC propagators): 0.865

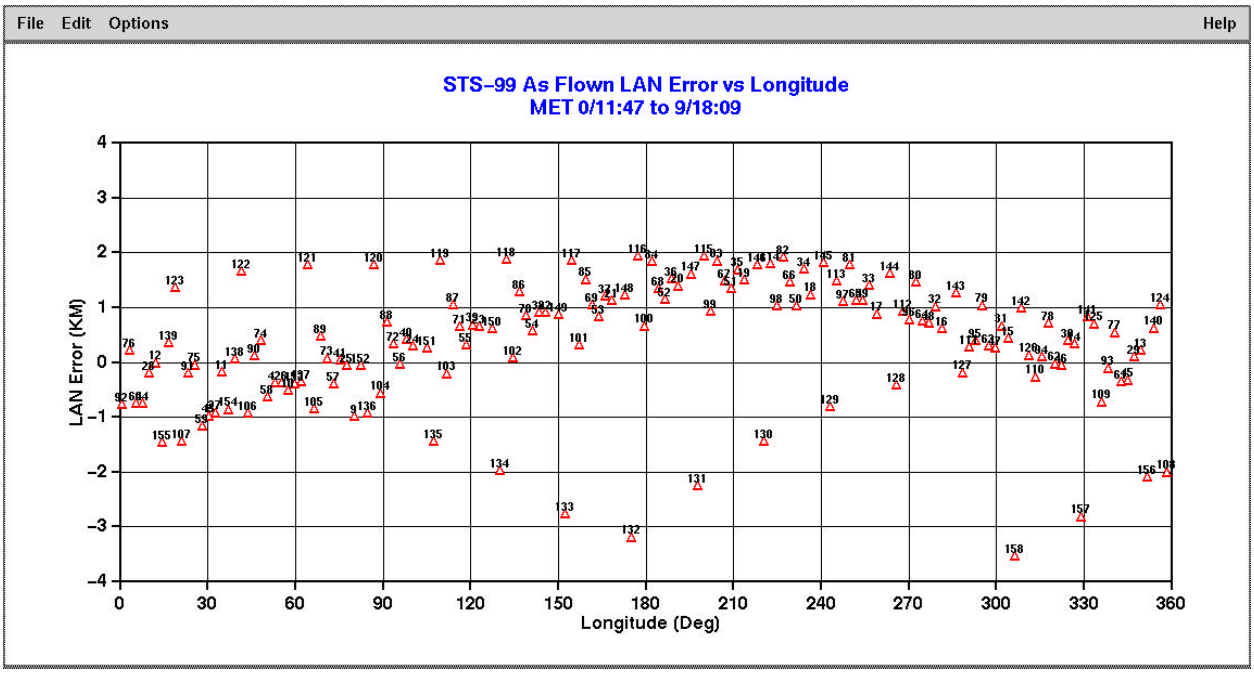
Trim burns were scheduled at a rate of about one per day to maintain the orbital repeat cycle. The orbital quantities of primary interest in maintaining the baseline orbit were the radius and ascending node crossing longitude (an ascending node crossing occurs when the orbiter passes through Earth's equatorial plane heading northward). In combination, these quantities were maintained to ensure that the C-RADAR swath covers all land with no gaps. In addition, trim burns were placed within JPL-defined "quiet periods" which minimize their impact on science data acquisition. Quiet periods were defined to contain no more than 3.0 minutes of science data per period. The trim maneuvers during the flight were as follows:.

Trims 8 and 9 were skipped to save propellant to make up for the failure of the gravity gradient-counteracting cold gas thruster at the end of the mast. To minimize the motion of the orbit with respect to the target profile, trim 6 was used to loft the orbit slightly, and trim 7 was delayed significantly and also lofted the orbit so that the average orbital period matched that of the premission baseline. As a result, the ascending nodes violated the node requirement only slightly (see figures) and adjacent nodes were no further from their targets than 5.0 km. Since the swath overlap at the equator was estimated at 10-20 km, it is expected that no swath gaps were caused by skipping trim burns.

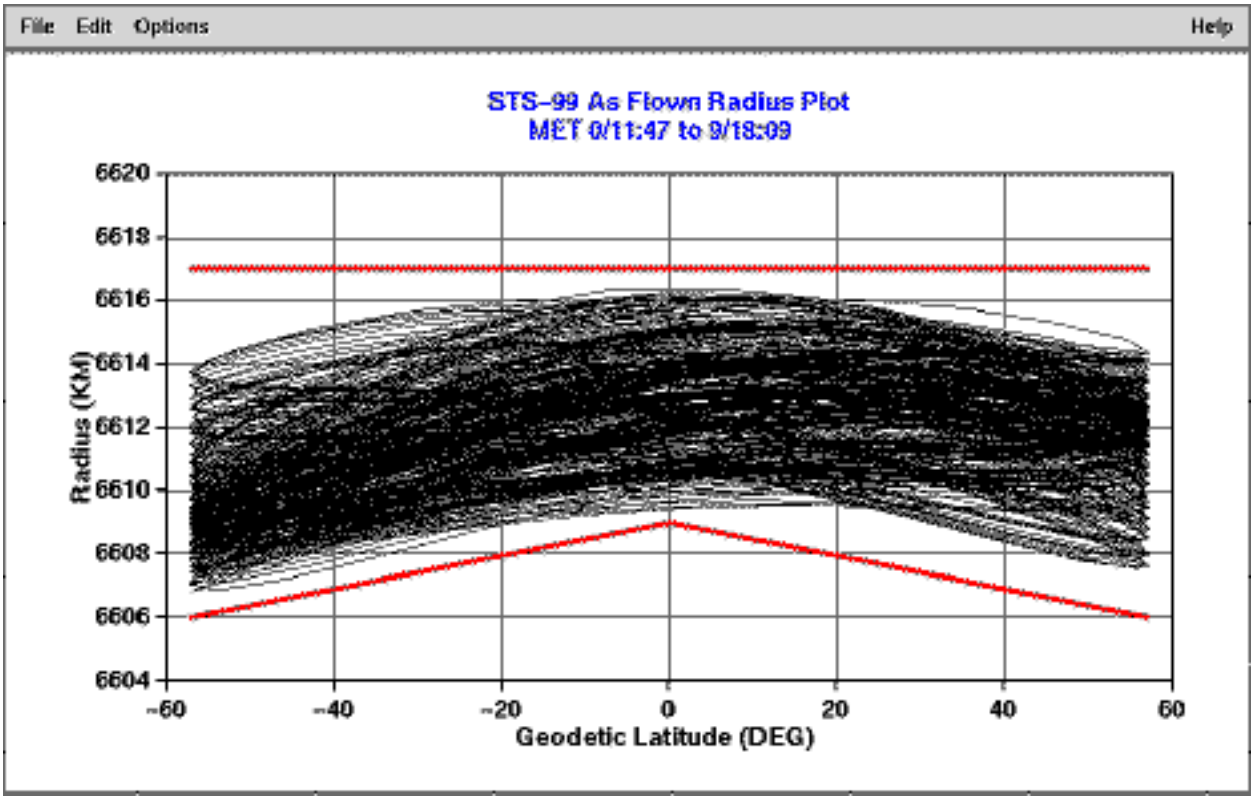
	PRE-FLIGHT		AS-FLOWN		
Maneuver	**TIG (MET)**	**ΔV (fps)**	**TIG (MET)**	**Executed ΔV (fps)**	**Targeted ΔV (fps)**
OMS-2	0/00:34:59	182.4	0/00:34:59	182.8	
OA-1	0/04:25:00	2.8	0/04:14:00	-1.9 (retro)	(statistical)
OA-2	not nominally planned		0/05:15:00	-1.5 (retro)	(statistical)
Low Impulse PRCS Test	0/12:00:00	-0.3	0/12:30:00	-0.3 (retro)	
High Impulse PRCS Test	1/00:50:00	1.2	1/00:42:00	1.2 (OOP)	
TRIM-1	1/12:33:00	3.5	1/14:00:00	3.72	3.60
TRIM-2	2/13:24:00	3.5	2/14:53:00	3.95	3.80
TRIM-3	3/13:39:00	3.4	3/13:39:00	3.83	3.70
TRIM-4	4/12:57:00	3.3	4/14:22:40	3.01	2.90
TRIM-5	5/13:12:00	3.4	5/14:26:00	3.11	3.00
TRIM-6	6/12:29:00	3.4	6/13:56:00	4.01	3.80
TRIM-7	7/12:47:00	3.3	8/02:53:00	5.13	5.10
TRIM-8	8/12:02:00	3.5	Not executed		
TRIM-9	9/12:21:00	3.4	Not executed		
		Total trim ΔV (fps)		**26.76**	**25.90**
		Avg trim ΔV error (fps)		**0.12 = 97% accurate**	



As-flown node placement with time vs. node target (zero line); requirement shown in thick lines at +/- 2 km



As-flown node placement around equator (swath-swath overlap reduction can be measured by the delta of two adjacent nodes) vs. node target (zero line)



As-flown radius with latitude; radius requirement is shown by thick lines at top and bottom

3. Planning Strategies

SRTM's charter was to image all land that can be imaged from the orbiter. With an orbital inclination of 57°, and very little land between 54-60° south latitude, a constant north-looking geometry was adopted to cover all land between ±60°. However, accomplishing this goal was somewhat more complicated than "on over land, off over ocean." Detailed descriptions of the data acquisition strategies are described below.

General strategies and input databases

The priority for event planning was as follows, from highest priority to lowest: trim burns (placed over ocean wherever possible), land-based data takes, playbacks, long ocean calibrations, BITEs, short ocean calibrations. The long oceans were given moderate priority because they were so infrequent, and because they otherwise would not have been planned (i.e. BITEs would likely have filled up all of the ocean passes that could be used for long calibrations).

Event planning used a set of high-level databases to tell the mission planning software where land is located, what priority it has with respect to other land, and what topography characteristics the land possesses (for swath tracking). The "land mask" defined where land is located, and was derived from the MISR (Multi-angle Imaging SpectroRadiometer) project and the WVS (World Vector Shoreline) plus data sets, which are nearly identical. This map had 12 pixels per degree in latitude and longitude (4320 x 2160, 10km at the equator) with the first (upper left) pixel at +90 degrees latitude (top of pixel) and 0 degrees longitude (left side of pixel). Longitude was eastward to the right. The CRC checksum of the land mask was 333dd9e7.

The topography database recorded the height above a reference ellipsoid of all land so that the swath could be tracked by the radar adequately. The planning topography map was derived from the USGS World Elevation data set and compared well with all other topography databases examined. The file was in the same format as the land mask and no bathymetry (sea floor depths) was included. The CRC checksum of the topography database was 7062f270.

The NIMA category map from July 1999 determined the relative priority of the land to be imaged. The NIMA map had three categories and one pixel per degree in latitude and longitude with the first (upper left) pixel at +90 degrees latitude (top of pixel) and 0 degrees longitude (left side of pixel). Longitude was also eastward to the right. The CRC checksum of the category map was 99e42634.

Trim planning

Trim burns were placed over water with minimal islands in the swath wherever possible. Some trim burns were placed over northern land masses which were fully recoverable with at least two imagings. The latitude limit above which these trims started was approximately 49.6 degrees. Trim burns were the only events which can limit or remove land-based data takes during mapping.

Data take planning

All NIMA categories of land were imaged if overflown. Only on one occasion was "nesting" activated to save power, where the radar turned off over land that had already been imaged several times.

Partially overlapped commands were those commands which either begin or end a chain of seamless overlapping commands, and had to be at least 16 seconds in duration. Fully overlapped commands which are in the middle of such a chain had to be at least 11 seconds. No command associated with a data take (i.e. not counting BITEs, playbacks, or regular commands) had a duration longer than 10 minutes.

The engineering data time added to each end of data takes was 6 seconds. This time period was not included in coverage mapping.

The pretake for all ScanSAR data takes was assumed to be 105 sec; the posttake was 10 sec. Neither of these included the engineering or the ocean calibration data.

Calibration data planning

The ocean calibration time added to each data take was 5-15 seconds on each end. The exact amount was equal to the duration of land that was covered (bounded by the above limits). Therefore, a 7 second island crossing had 7 seconds of ocean on either side.

Short (42 second) and long (20 minute) ocean calibrations were planned and required to be over water. They were not placed immediately before playbacks. Two long ocean calibrations were executed, and were spread out as much as can reasonably be arranged with the first one placed early in the mission (02/06:00 and 08/00:31). Thirty short ocean calibrations were executed.

Downlink / PHRR planning

The pretake for playbacks was assumed to be 105 seconds, the posttake 120 seconds. Program search followed the pretake and was assumed to be 90 seconds; however, most playbacks finished program search as part of the pretake and began rolling tape very close to the commanded MET time. Almost all playbacks were 120 seconds and rewound 7,000 – 14,000 TSIDs from the last data recorded.

Playbacks were scheduled whenever possible, but no more than two consecutively (i.e. one C and one X). Approximately 2 C playbacks were planned for every 1 X playbacks in rotation. 110 C playbacks and 49 X playbacks were executed.

KuSP downlink assignments rotated in the following order: DDHA1, DDHA2, DCE-1, DDHA3, DDHA4, DCE-2 (DDHA means C-Radar, DCE means X-SAR). If an event with KuSP downlink was a C-only or X-only event, and the opposite system was in line to receive the KuSP, the next assignment for the appropriate system was made and the rotation attempted to “catch up” in sequence on following events (e.g. DCE-1 was not assigned for a C-only data take, but was assigned for the next available event with X participation).

Read-after-write (RAW) was turned on for all PHRRs by default.

Built-in test (BITE) planning

The pretake for BITE data takes was assumed to be 105 seconds, the posttake 10 seconds. Only four types of BITEs were planned systematically; two each of HPA_T/R (20 sec) and LNA_T/R Auto (68 sec), the first of each with DDHA3 set for the KuSP and the second with DDHA4. All BITEs were placed when Ku TDRS was AOS, but no other constraints were levied (e.g. that they be over water or land). 65 BITEs (~16 of each type) were executed.

Sequence times

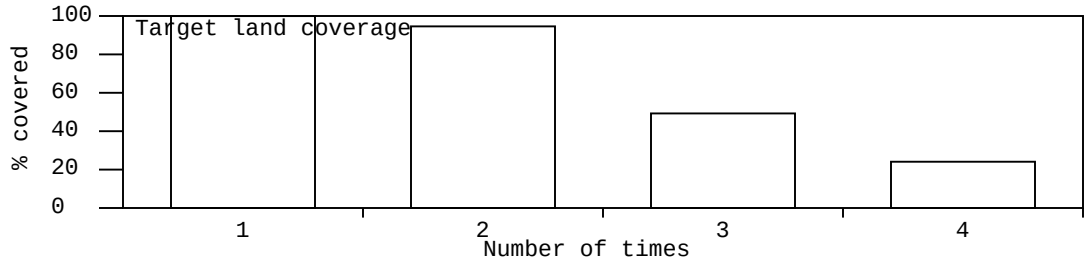
The mission was split into pieces of approximately 6 hours in length to facilitate planning in discrete cycles. Every twelve hours, the sequence boundaries were intended to line up with a crew shift handover so that the new shift began with a fresh timeline. These are marked in the timeline.

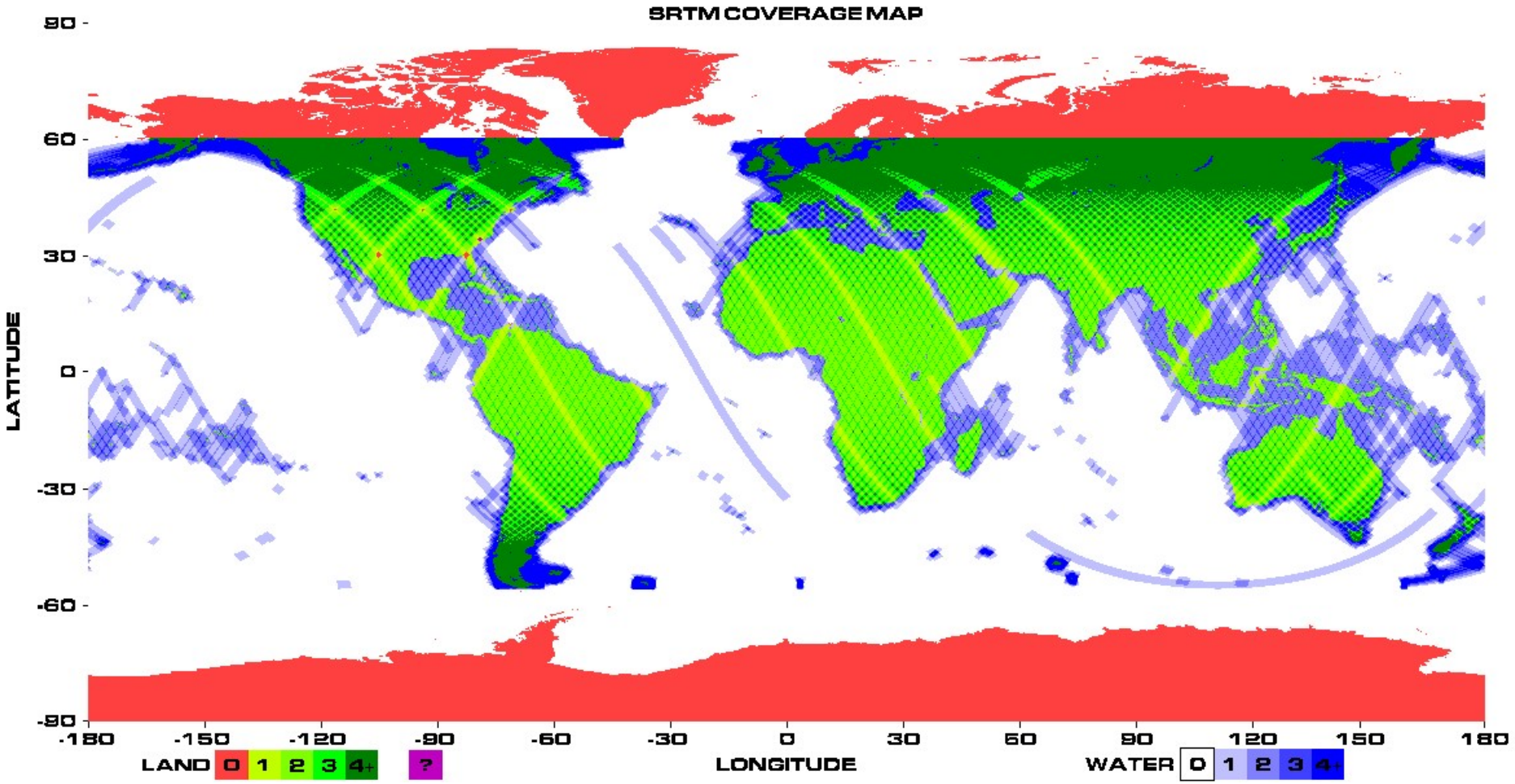
STS-99 Mission Summary (through sequence 38 / MET 09/18:10:00)

COVERAGE (CUMULATIVE)

Target land imaged at least one time: 99.958
Target land imaged at least two times: 94.594
Target land imaged at least three times: 49.253
Target land imaged at least four times: 24.096

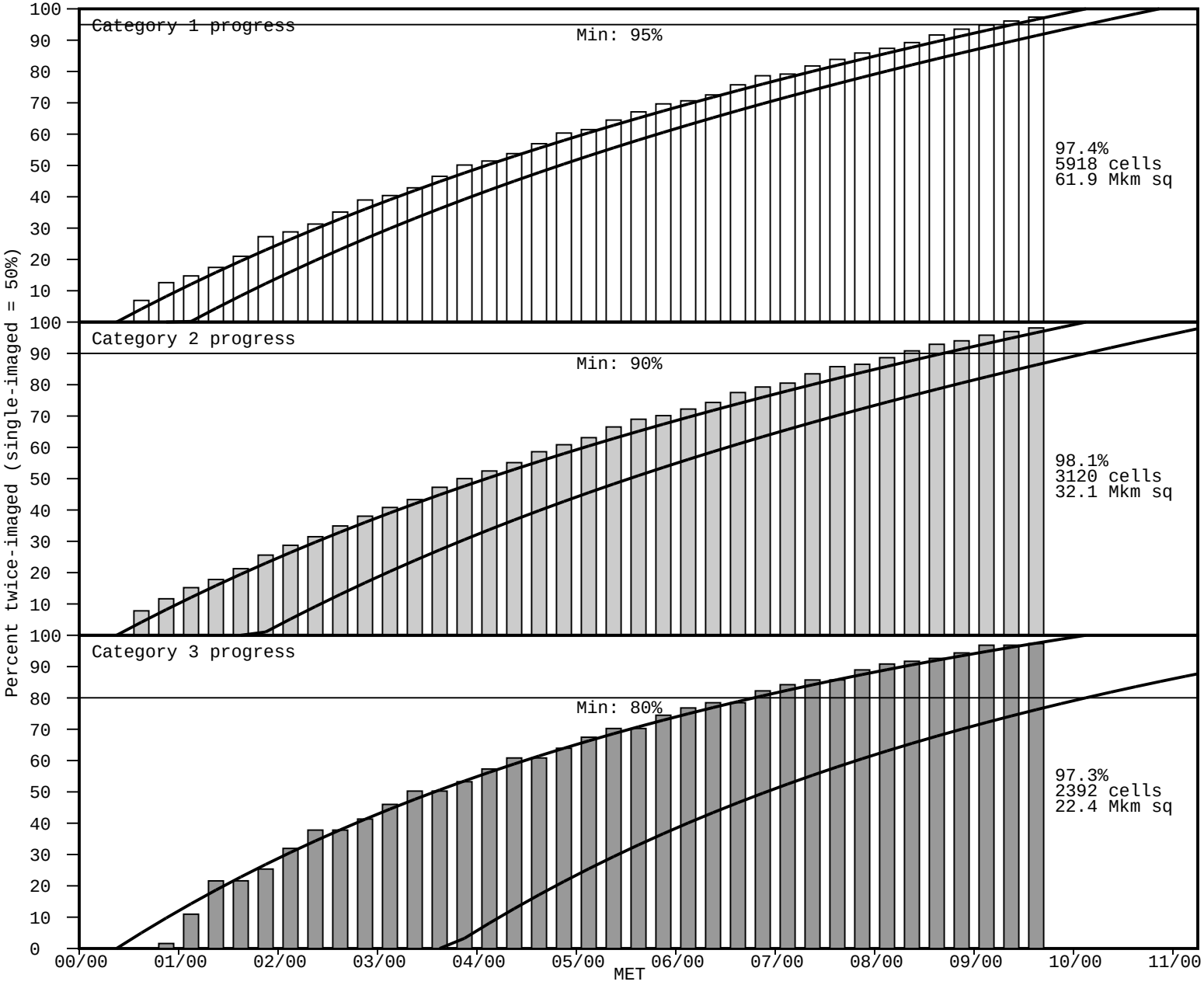
Percentage of time spent imaging land: 65.364%
Percentage of time spent imaging water: 34.636%





STS-99 Mission Summary (through sequence 38 / MET 09/18:10:00)

MISSION PROGRESS



CELL COVERAGE HISTORY

MET	CAT1	CAT2	CAT3
00/07	0	0	0
00/15	0	0	0
00/19	420	248	2
00/23	765	370	39
01/06	896	483	269
01/12	1060	566	530
01/18	1276	676	531
02/00	1658	814	623
02/06	1750	913	785
02/13	1902	1001	929
02/18	2135	1110	929
03/01	2369	1209	1016
03/06	2455	1297	1130
03/12	2605	1377	1235
03/18	2828	1502	1235
04/00	3047	1590	1308
04/06	3126	1668	1408
04/12	3269	1753	1495
04/18	3461	1863	1495
05/00	3668	1934	1571
05/06	3735	2006	1658
05/13	3920	2115	1726
05/18	4079	2193	1726
06/01	4234	2230	1830
06/06	4294	2296	1887
06/12	4408	2363	1928
06/18	4604	2464	1928
07/01	4780	2520	2021
07/06	4812	2560	2070
07/12	4970	2654	2107
07/18	5097	2727	2107
08/00	5221	2751	2186
08/07	5311	2818	2232
08/12	5424	2887	2253
08/19	5571	2954	2276
09/01	5684	2989	2319
09/08	5762	3046	2379
09/14	5842	3083	2379
09/18	5918	3120	2392

STS-99 Mission Summary (through sequence 38 / MET 09/18:10:00)

CONSUMABLES USAGE

Energy

Total energy used (kWh): 854.0
On track for (kWh): 902.8
Allocation (kWh): 911.0

By ownership

Checkout energy used (kWh):	26.9
C standby energy used (kWh):	279.0
X standby energy used (kWh):	70.2
CX operate energy used (kWh):	430.0
C operate energy used (kWh):	46.1
X operate energy used (kWh):	1.8

By type

Checkout energy used (kWh):	26.9
Standby energy used (kWh):	349.2
Land energy used (kWh):	462.5
BITE energy used (kWh):	3.3
Short ocean energy used (kWh):	2.7
Long ocean energy used (kWh):	2.9
Playback energy used (kWh):	4.9
Handover energy used (kWh):	2.0

On time by ownership

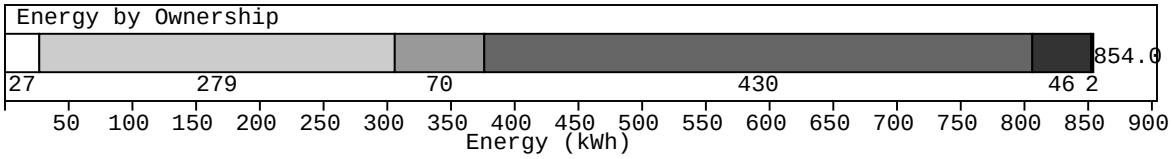
C ontime (hrs): 99.2
X ontime (hrs): 90.6

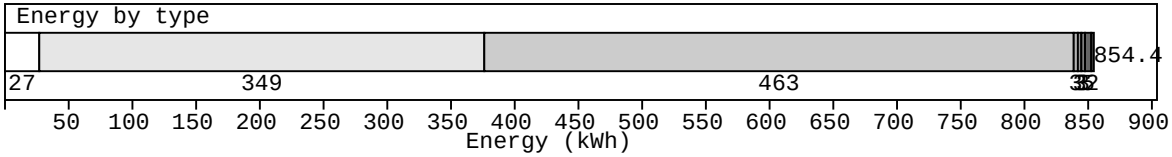
Tapes

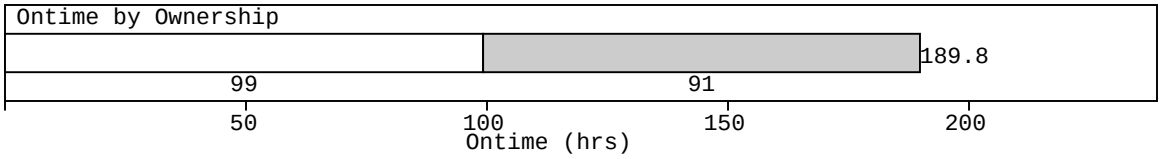
Total tapes used: 325.5
On track for: 344.7
Allocation: 350.0

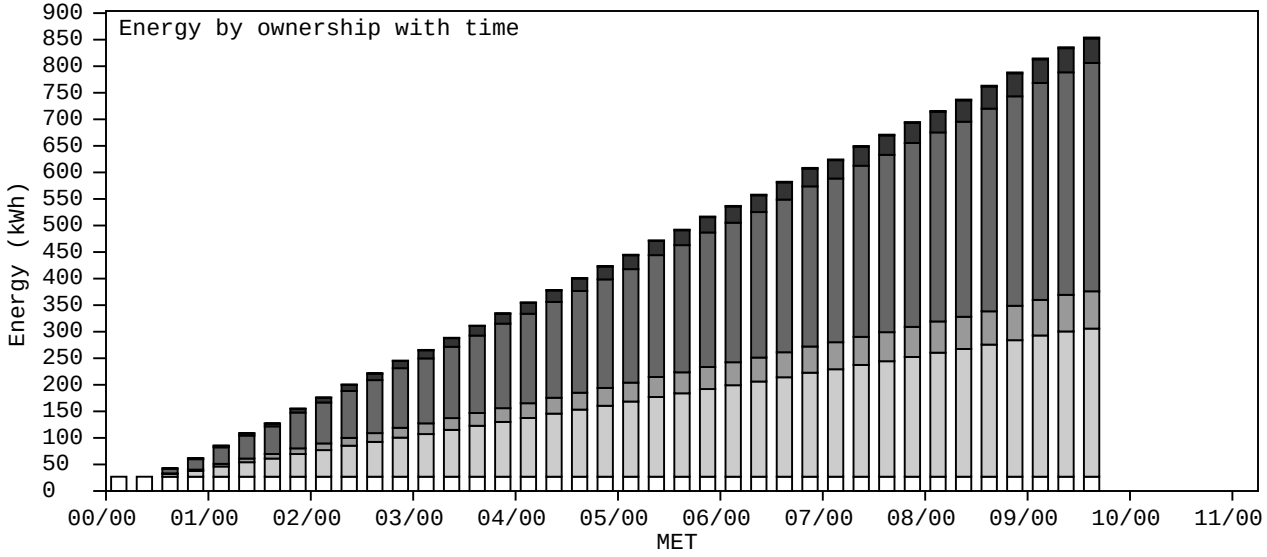
By ownership

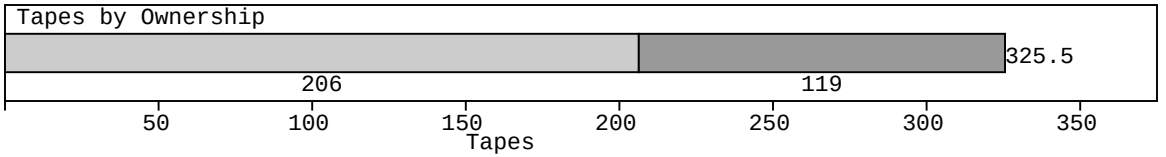
Checkout tapes used:	0.0
C tapes used:	206.3
X tapes used:	119.2











STS-99 Mission Summary (through sequence 38 / MET 09/18:10:00)

EVENT SUMMARY

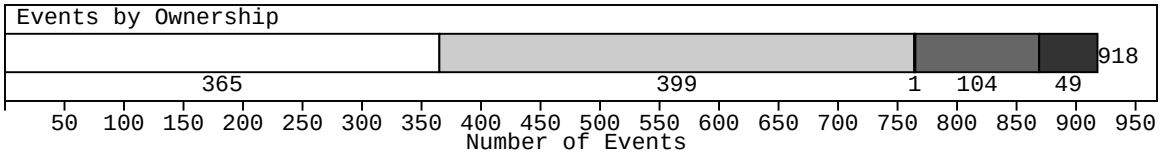
Total events (on-board): 918
Total datatakes: 765

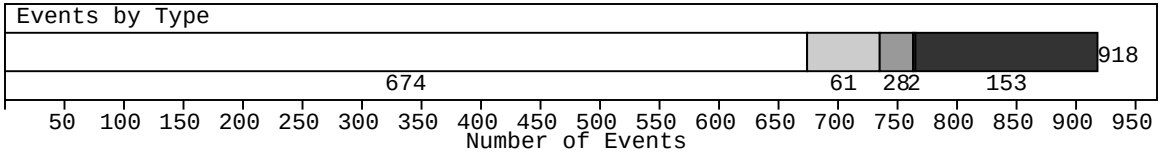
By ownership

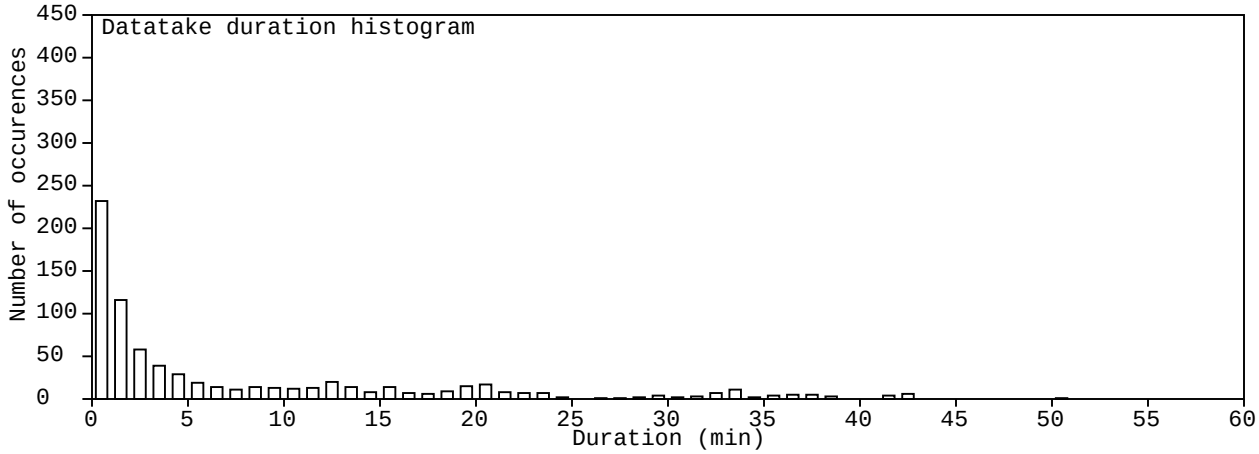
CX datatakes: 365
C datatakes: 399
X datatakes: 1
C Playbacks: 104
X Playbacks: 49

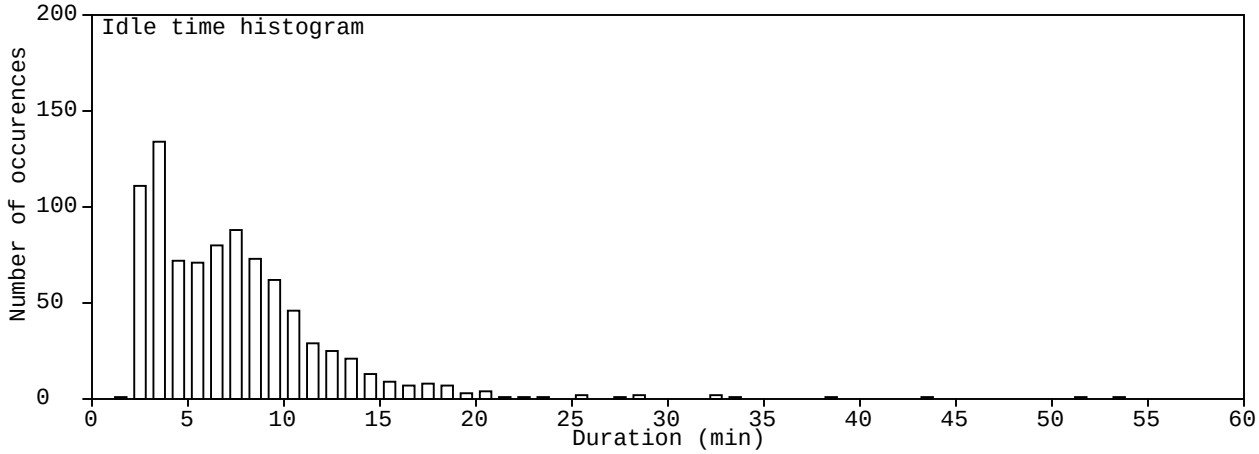
By type

Land datatakes: 674
BITE datatakes: 61
Short ocean datatakes: 28
Long ocean datatakes: 2
Playbacks: 153

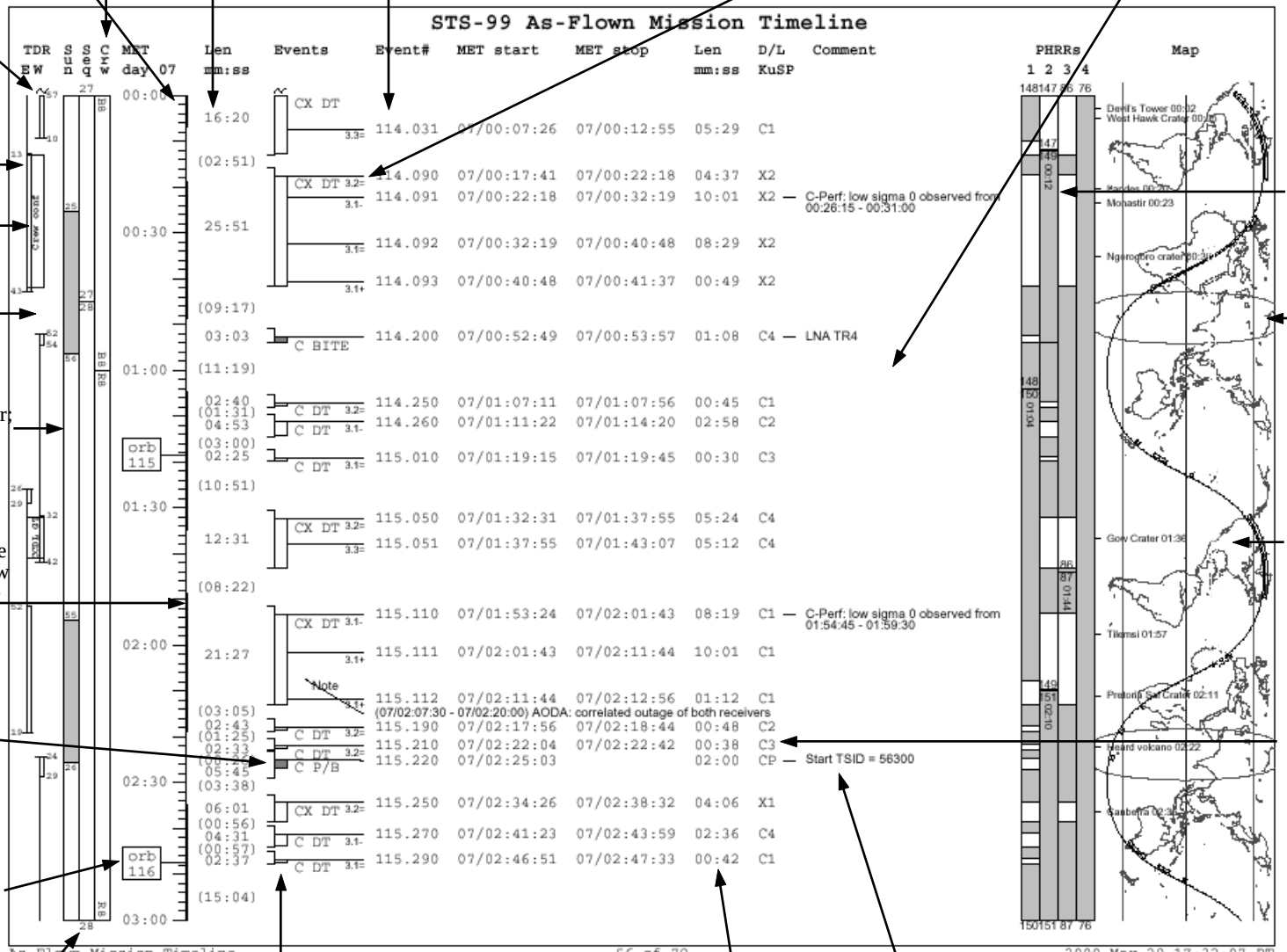








AS-FLOWN TIMELINE KEY



Crew shift and flight day

Length of full event in mm:ss, *including pre-take and post-take*; gaps between events are shown in parentheses

MET time scale with minor ticks every 2 minutes, major ones every 10; half-hour times in hh:mm are listed

Event number (orbit.event; must be unique; only seamless overlapping commands typically have non-zero units digit)

Radar configuration of datatake indicated by (file ID # . radar record #), and direction of DWP drift (= means no drift)

Expected command uplink times and purpose; critical uplinks are starred (*)

Squiggly lines mean event continues to next / previous page

TDRS coverage; line = S, box = Ku for E and W satellites; nearest minute noted

PAO, crew choice downlink, or family briefings which use Ku

Orbiter is in ZOE (no S coverage, no communication)

Day / night for orbiter; gray = nighttime

Thicker lines indicate when orbiter is below 49.6° latitude (where 4x coverage is not possible)

Events not critical to data acquisition are shown in grey

Change of orbit number; occurs when orbiter crosses equator heading north

Sequence number

Event illustration; box extends from start to stop time; horizontal lines after first indicate commands within an event; text indicates participation and event type (DT = data take, P / B = playback); "hooks" indicate length of pre-take and post-take

Page number

Duration of commanded sub-event within larger event

Comment field with details of event execution; for playbacks, start TSID of tape rolling, can include data quality comments, stats for trim burns, etc.

Local time when timeline was generated

PHRR activity area; all tape changes and tape numbers are shown, tape activity shown as white blocks

ZOE (no S-band TDRS coverage)

Graphical illustration of ground track and swaths; site imagings, ZOE and latitude lines above which 4x coverage is possible are also shown

KuSP downlink routing to TDRS; indicates owner (C or X) and which channel is routed to KuSP (for C, 1 or 2 = outboard, 3 or 4 = inboard; for X, 1 = inboard, 2 = outboard; for playbacks, P = PHRR data routed)

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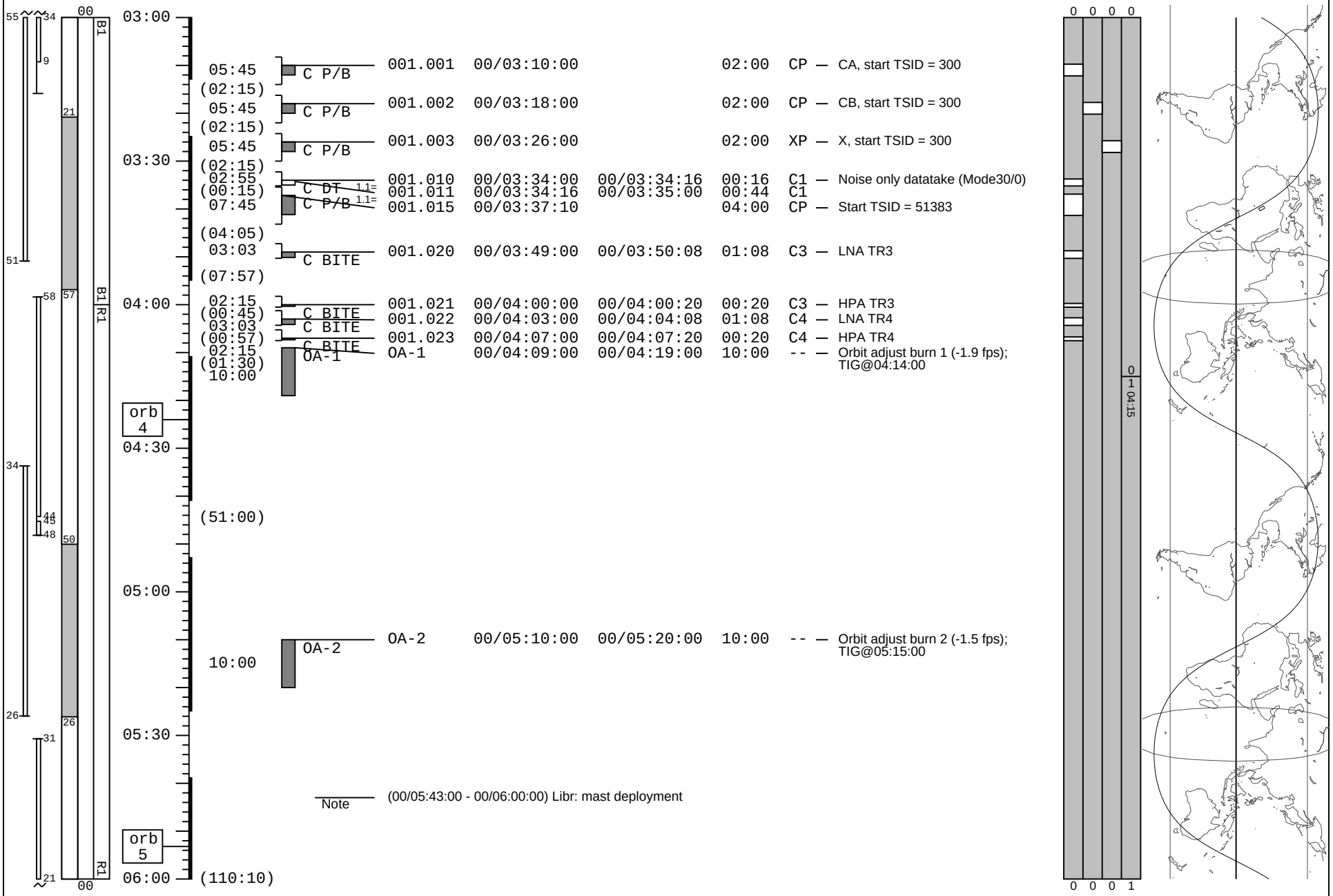

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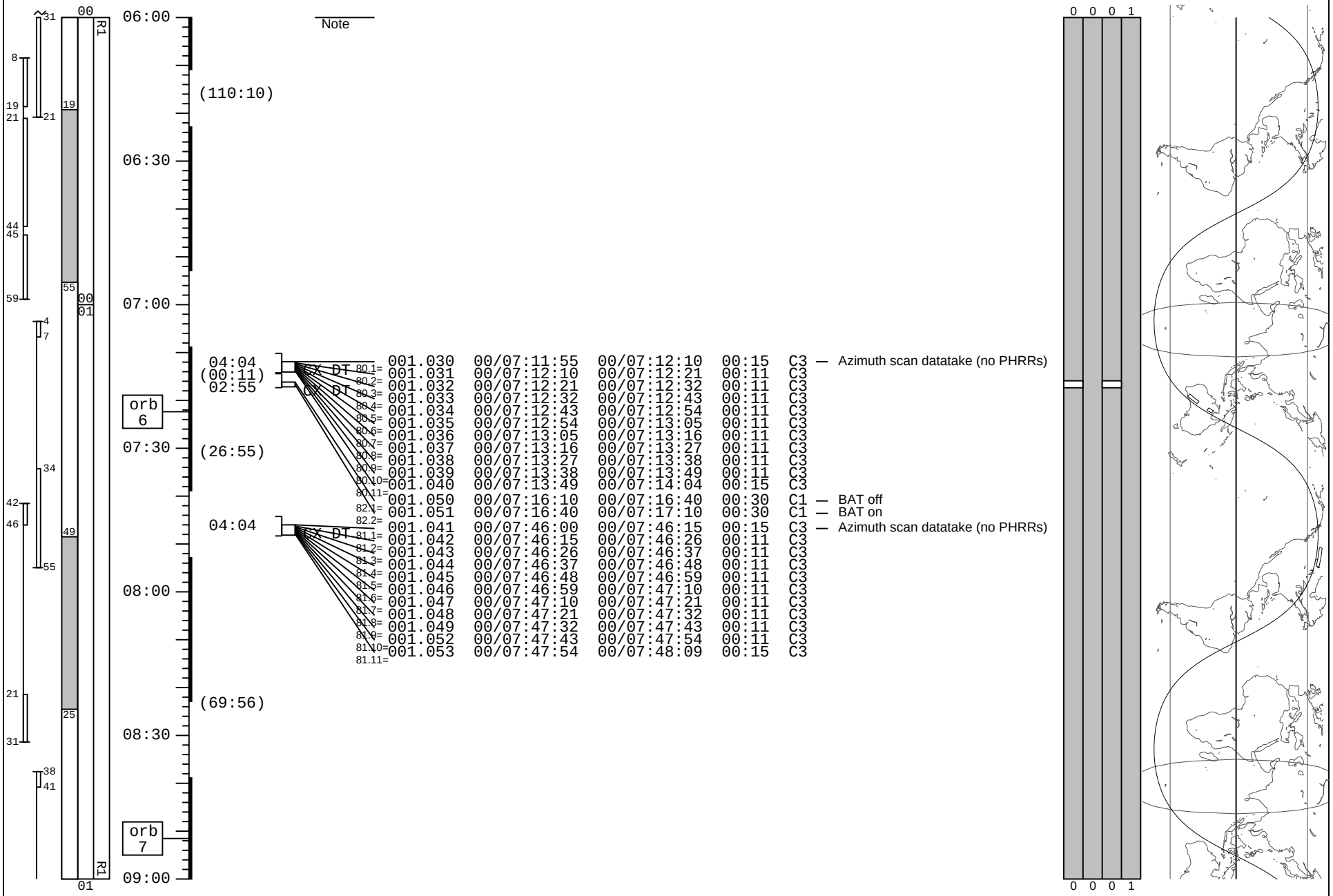

Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
(00/05:43:00 - 00/06:00:00) Libr: mast deployment					
001.030	00/07:11:55	00/07:12:10	00:15	C3	— Azimuth scan datatake (no PHRRs)
001.031	00/07:12:10	00/07:12:21	00:11	C3	
001.032	00/07:12:21	00/07:12:32	00:11	C3	
001.033	00/07:12:32	00/07:12:43	00:11	C3	
001.034	00/07:12:43	00/07:12:54	00:11	C3	
001.035	00/07:12:54	00/07:13:05	00:11	C3	
001.036	00/07:13:05	00/07:13:16	00:11	C3	
001.037	00/07:13:16	00/07:13:27	00:11	C3	
001.038	00/07:13:27	00/07:13:38	00:11	C3	
001.039	00/07:13:38	00/07:13:49	00:11	C3	
001.040	00/07:13:49	00/07:14:04	00:15	C3	
001.050	00/07:16:10	00/07:16:40	00:30	C1	— BAT off
001.051	00/07:16:40	00/07:17:10	00:30	C1	— BAT on
001.041	00/07:46:00	00/07:46:15	00:15	C3	— Azimuth scan datatake (no PHRRs)
001.042	00/07:46:15	00/07:46:26	00:11	C3	
001.043	00/07:46:26	00/07:46:37	00:11	C3	
001.044	00/07:46:37	00/07:46:48	00:11	C3	
001.045	00/07:46:48	00/07:46:59	00:11	C3	
001.046	00/07:46:59	00/07:47:10	00:11	C3	
001.047	00/07:47:10	00/07:47:21	00:11	C3	
001.048	00/07:47:21	00/07:47:32	00:11	C3	
001.049	00/07:47:32	00/07:47:43	00:11	C3	
001.052	00/07:47:43	00/07:47:54	00:11	C3	
001.053	00/07:47:54	00/07:48:09	00:15	C3	

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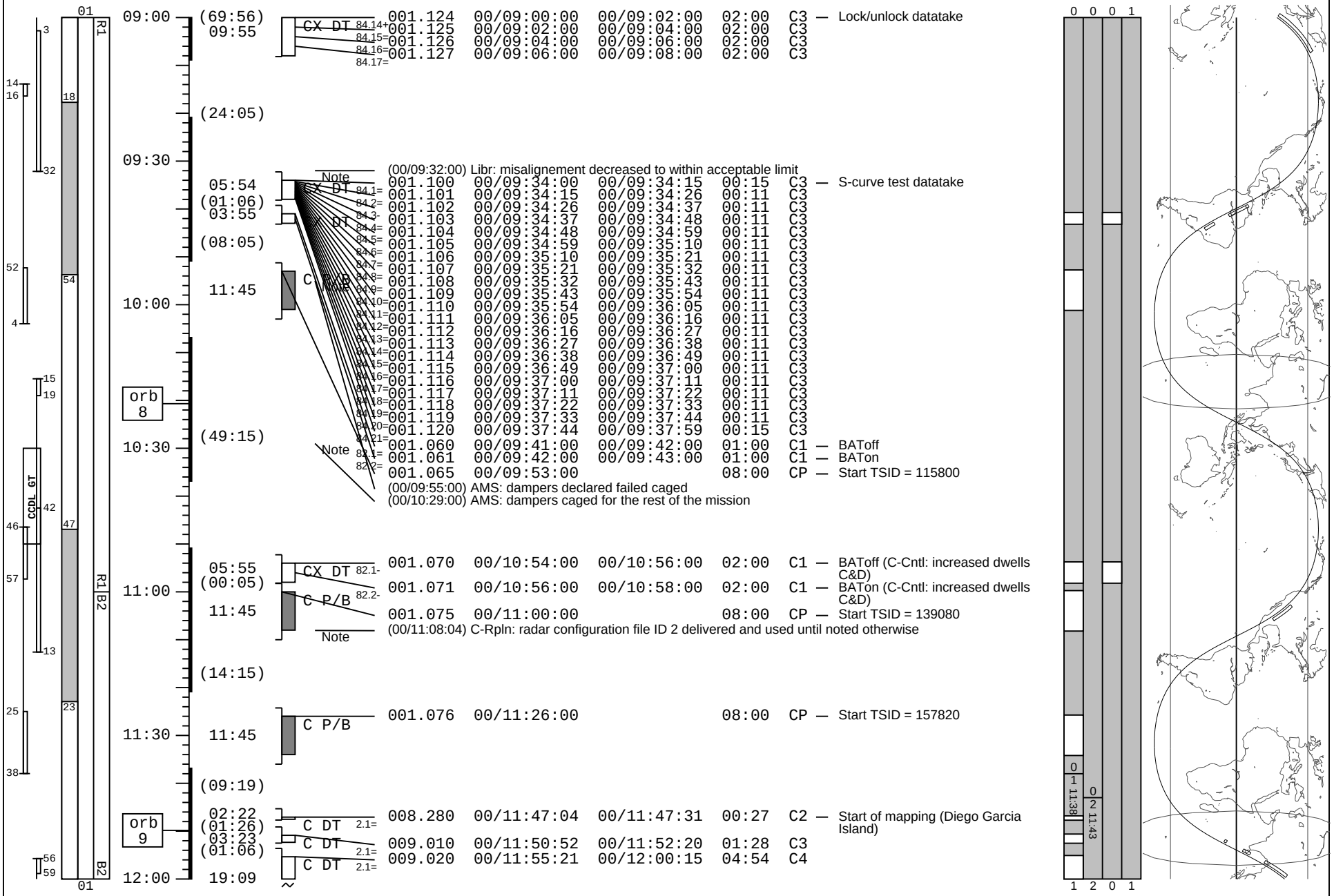
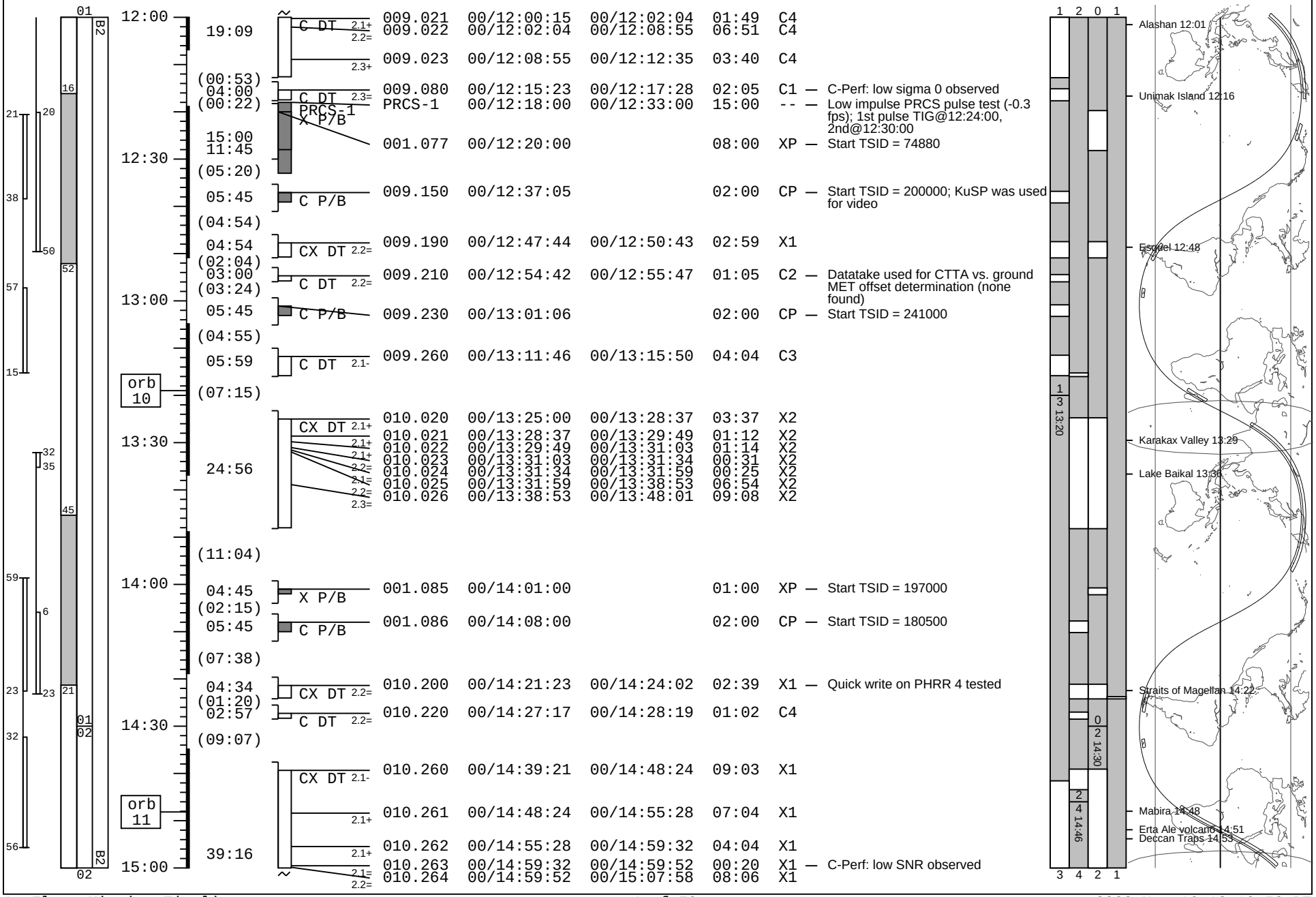
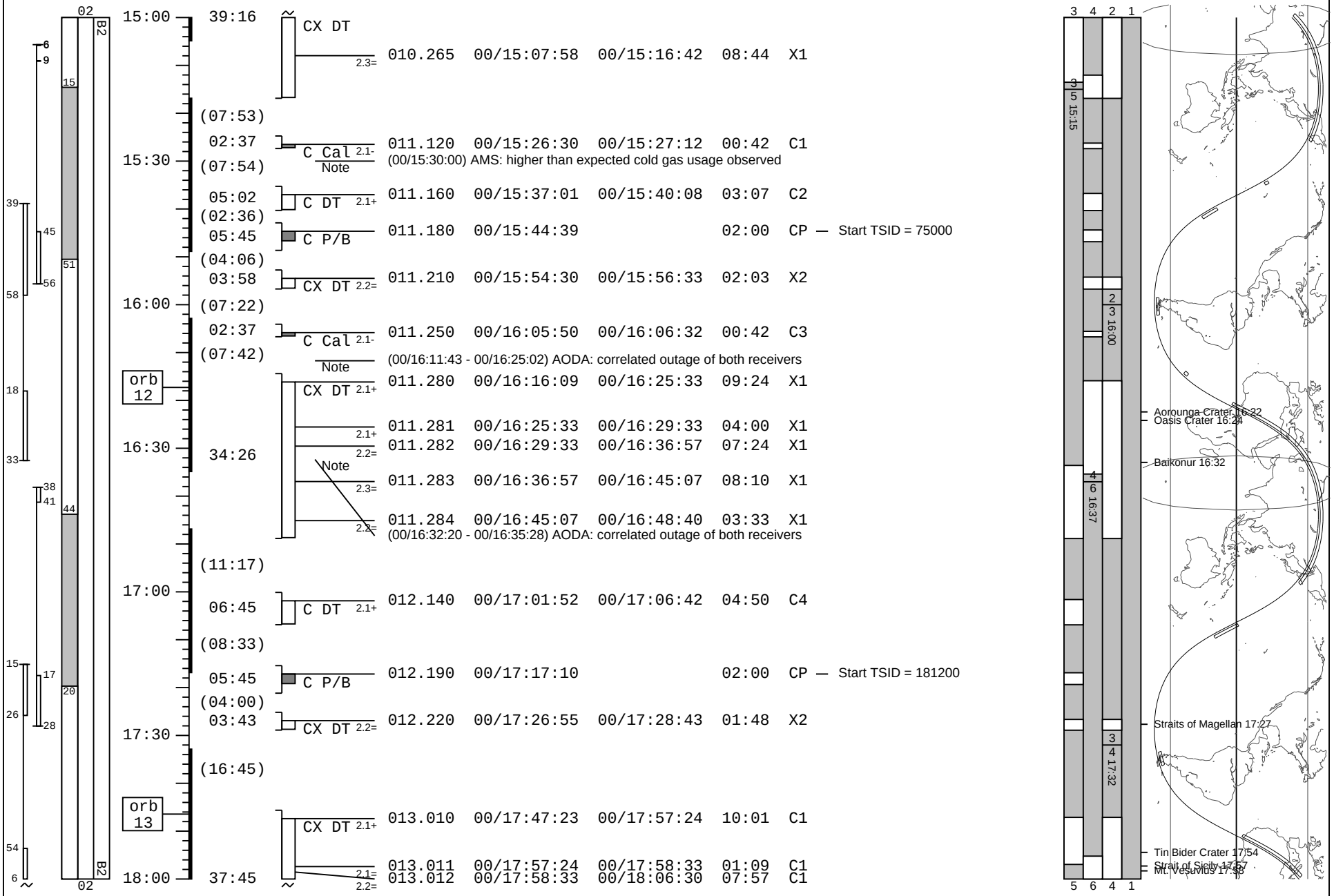


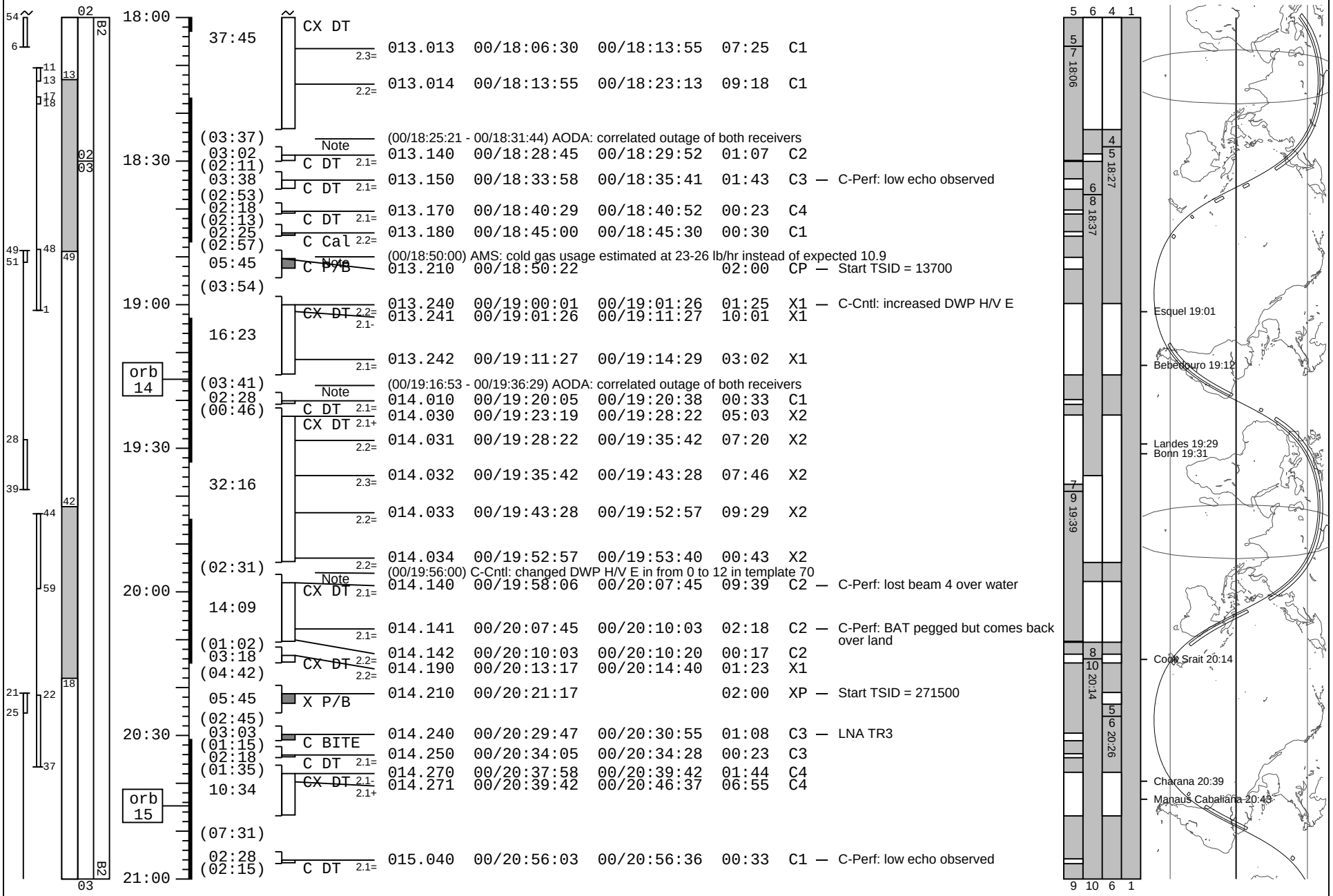
STS-99 As-Flown Mission Timeline



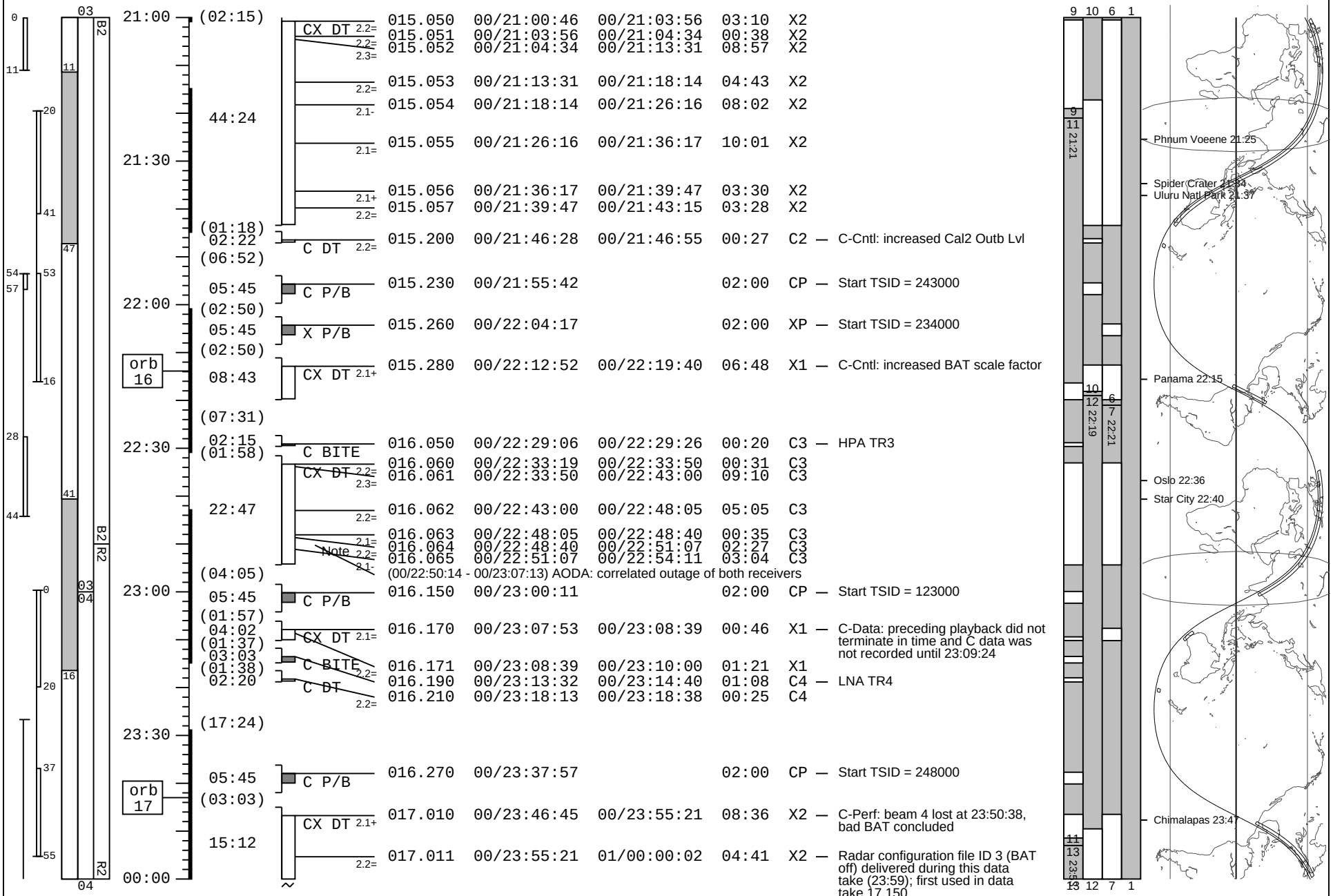
STS-99 As-Flown Mission Timeline



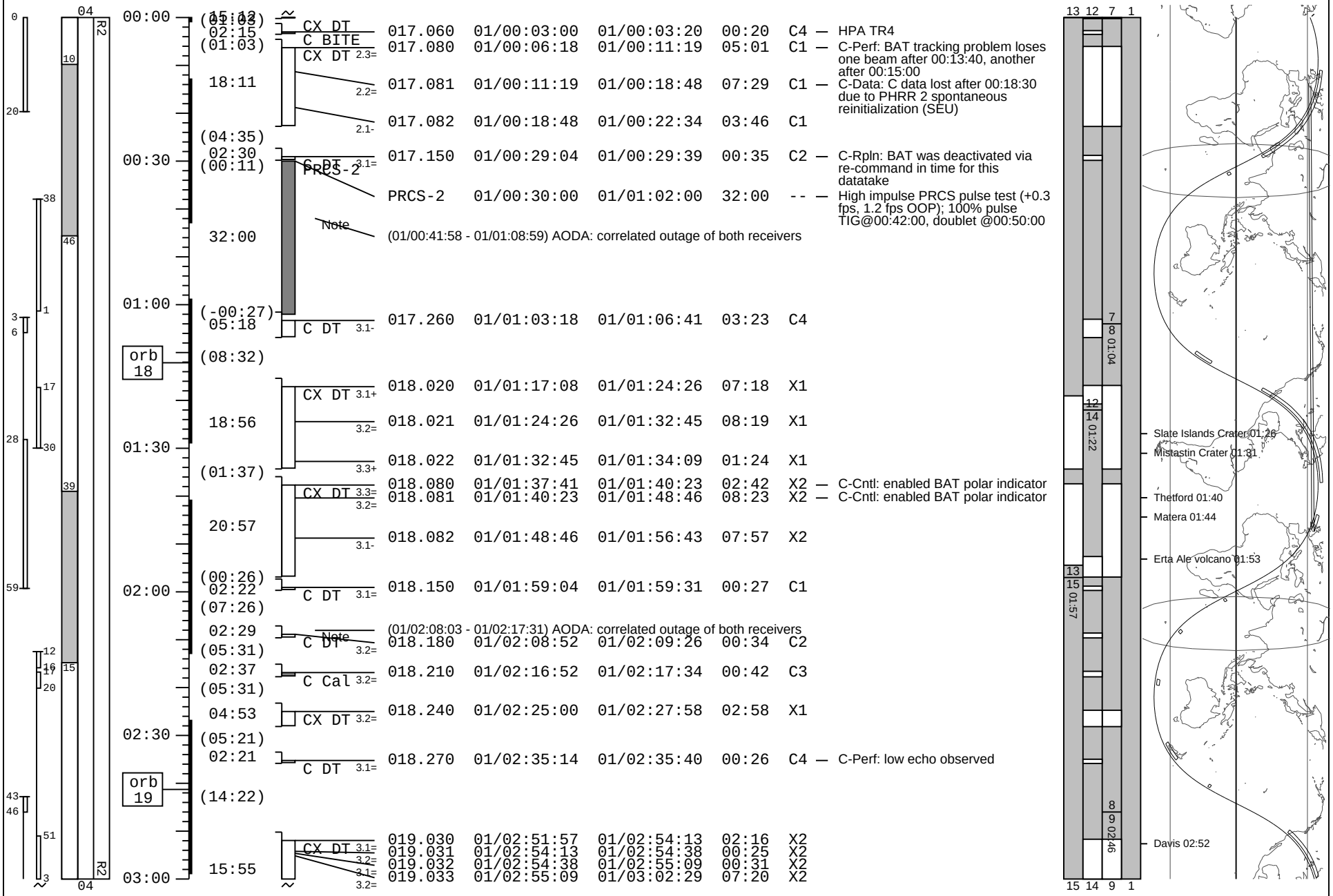
STS-99 As-Flown Mission Timeline



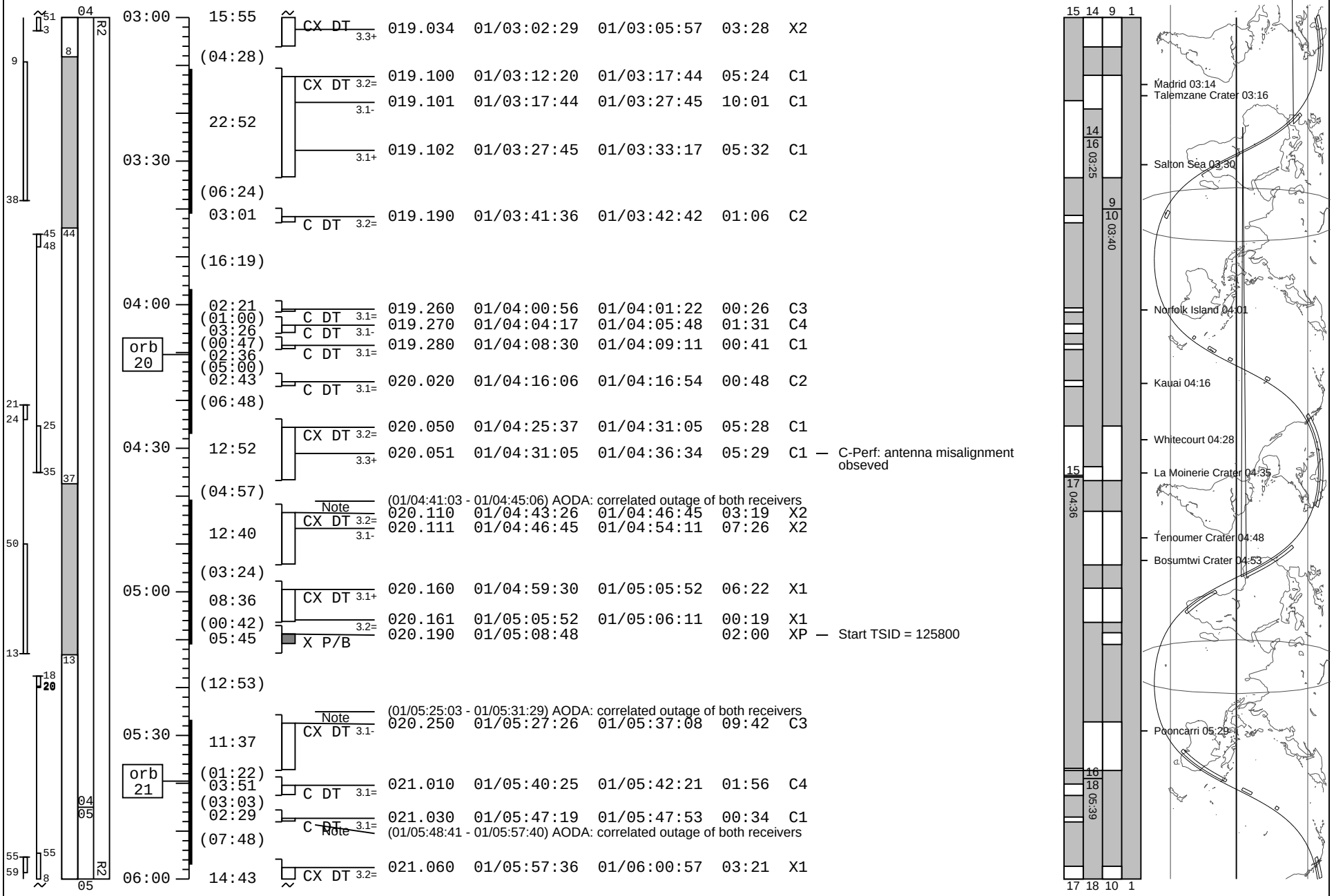
STS-99 As-Flown Mission Timeline



STS-99 As-Flown Mission Timeline



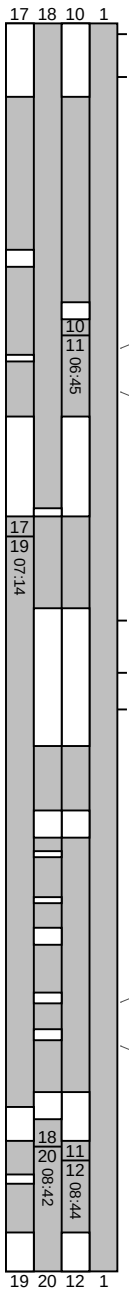
STS-99 As-Flown Mission Timeline



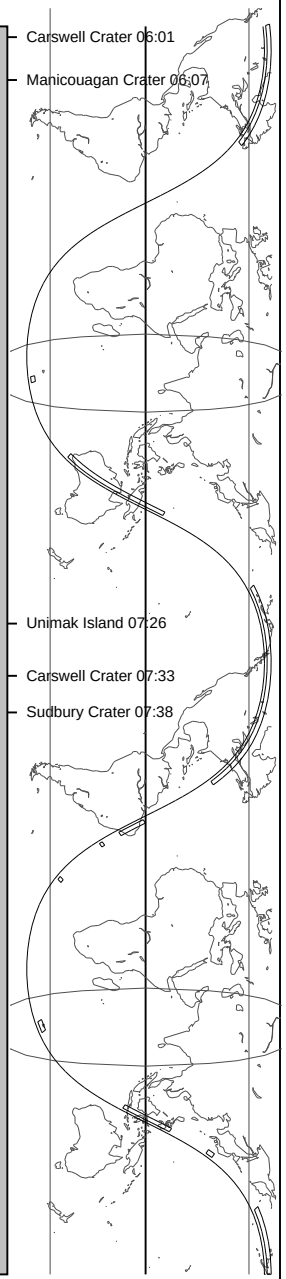
STS-99 As-Flown Mission Timeline

TDR E W	Sun	Seq	Crw	MET day 01	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
				06:00	14:43	CX DT 3.3=	021.061	01/06:00:57	01/06:07:21	06:24	X1	
						3.2=	021.062	01/06:07:21	01/06:10:24	03:03	X1	
						Note	(01/06:11:59) AMS: cold gas valves closed					
						Note	(01/06:14:42 - 01/06:21:31) AODA: correlated outage of both receivers					
					(20:36)							
				06:30	05:45	C P/B	021.170	01/06:32:55		02:00	CP	— Start TSID = 146480
					(01:49)							
					05:45	X P/B	021.200	01/06:40:29		02:00	XP	— Start TSID = 238100
					(01:50)							
					02:25	C DT 3.2=	021.220	01/06:48:04	01/06:48:34	00:30	C2	
					(06:29)							
				07:00	15:52	CX DT 3.1-	021.250	01/06:56:58	01/07:06:59	10:01	X2	
				orb 22		3.1+	021.251	01/07:06:59	01/07:10:55	03:56	X2	
					(11:47)							
				07:30	21:20	CX DT 3.2=	022.050	01/07:24:37	01/07:27:58	03:21	X1	
						3.2=	022.051	01/07:27:58	01/07:29:01	01:03	X1	
						3.3=	022.052	01/07:29:01	01/07:36:57	07:56	X1	
						3.2=	022.053	01/07:36:57	01/07:44:02	07:05	X1	
					(07:50)							
				08:00	05:23	CX DT 3.1=	022.150	01/07:53:47	01/07:57:15	03:28	C3	
					(00:29)							
					02:20	C DT 3.1=	022.160	01/07:59:39	01/08:00:04	00:25	C4	
					(04:18)							
					02:20	Note	(01/08:05:33) AMS: cold gas valves reopened					
					(02:05)	C DT 3.2=	022.190	01/08:06:17	01/08:06:42	00:25	C1	— C-Perf: low SNR observed
					05:45	C P/B	022.200	01/08:10:42		02:00	CP	— Start TSID = 236000
					(03:36)							
					03:01	C DT 3.2=	022.230	01/08:20:03	01/08:21:09	01:06	C2	
					(02:16)							
					03:03	C BITE	022.250	01/08:25:20	01/08:26:28	01:08	C3	— LNA TR3
				08:30	(06:01)							
				orb 23	08:30	CX DT 3.1-	022.280	01/08:34:24	01/08:40:59	06:35	X2	
					(03:23)							
					02:48	C DT 3.1+	023.030	01/08:46:17	01/08:47:10	00:53	C3	
					(05:34)							
				09:00	38:39	CX DT 3.2=	023.050	01/08:54:39	01/08:58:30	03:51	X1	
						3.2=	023.051	01/08:58:30	01/08:59:27	00:57	X1	
						3.3=	023.052	01/08:59:27	01/09:02:06	02:39	X1	

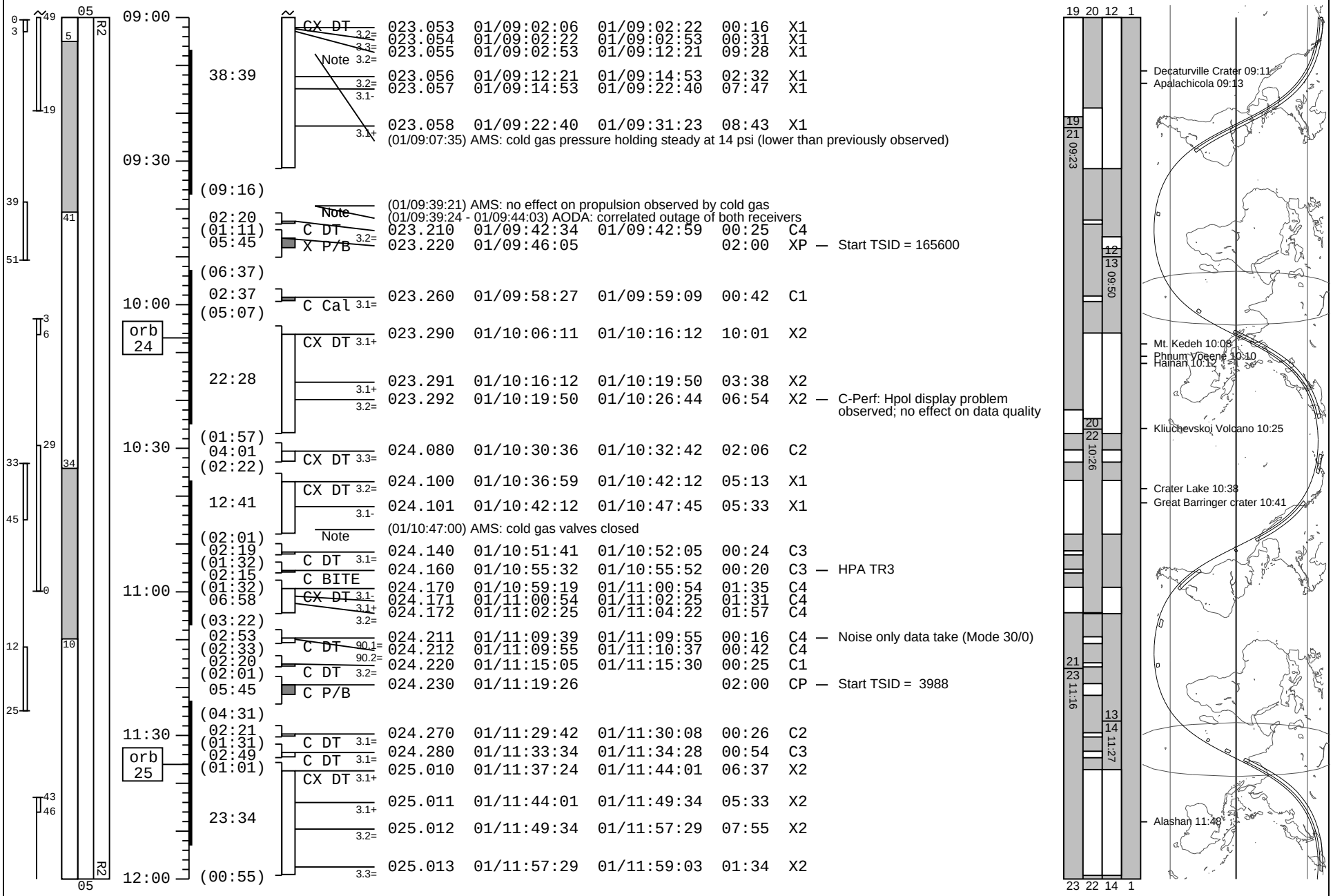
PHRRs 1 2 3 4



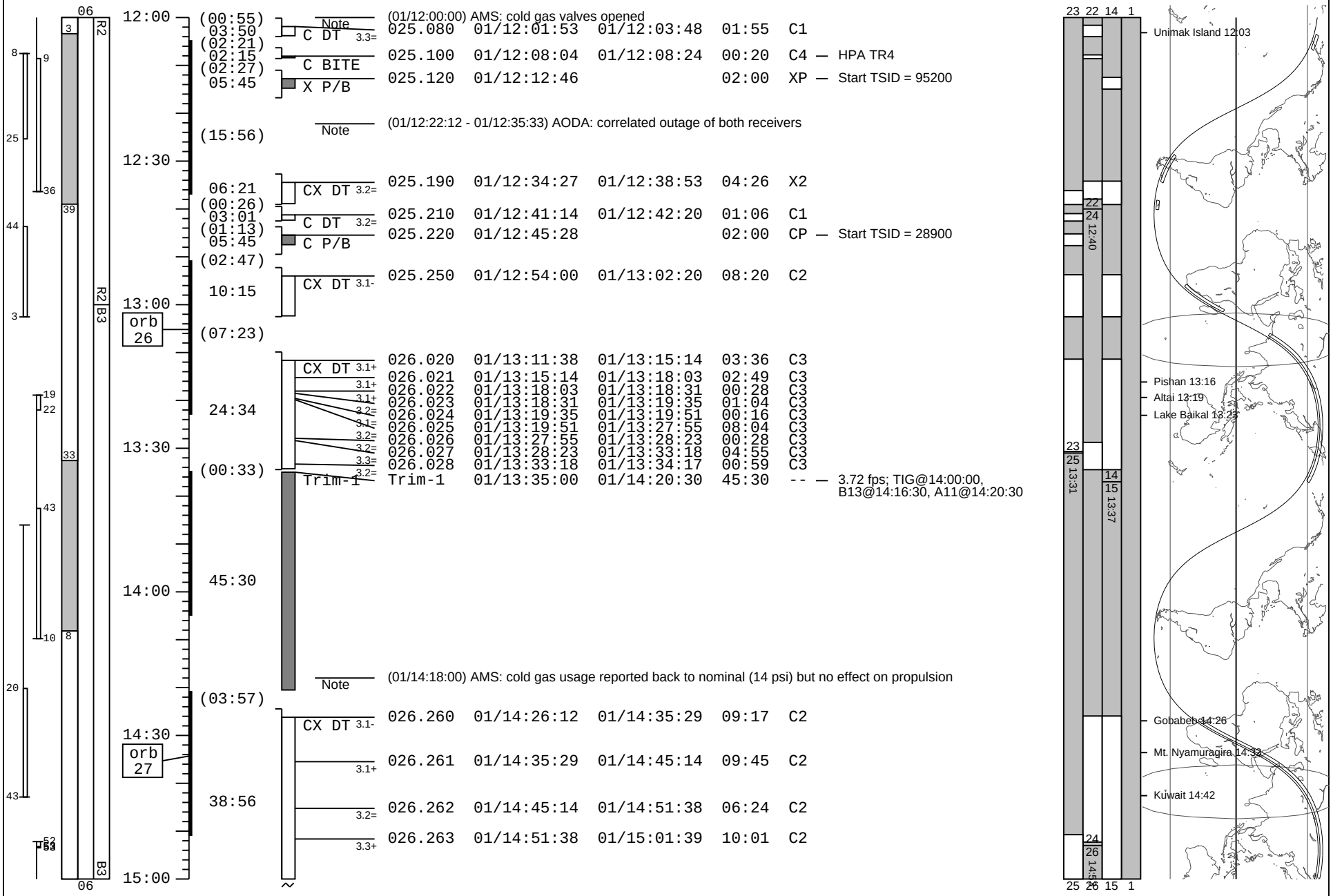
Map



STS-99 As-Flown Mission Timeline

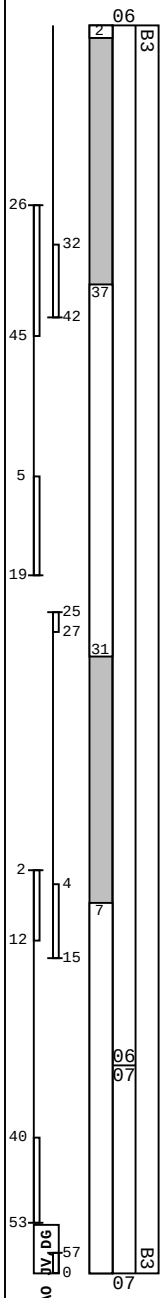


STS-99 As-Flown Mission Timeline

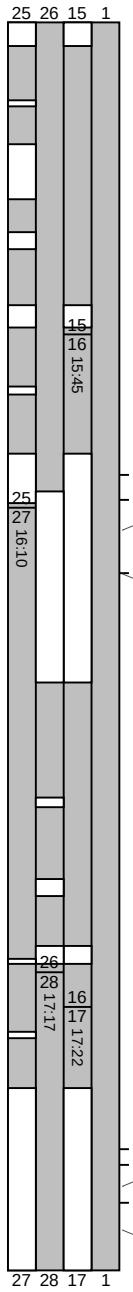


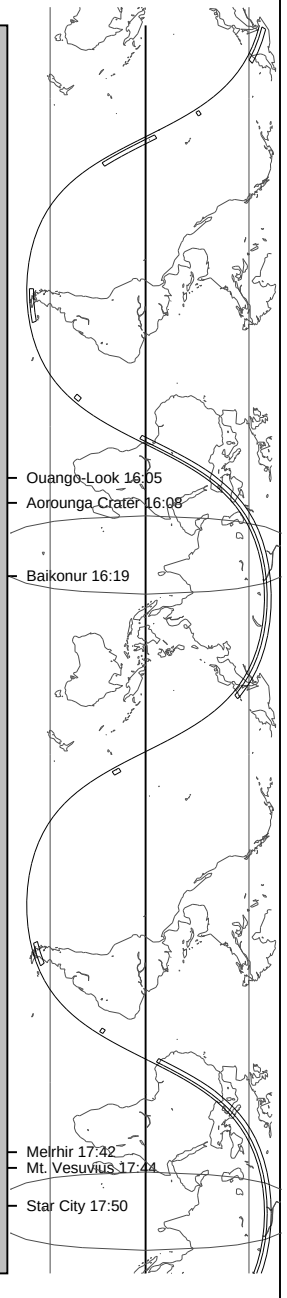
Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
Note						(01/12:00:00) AMS: cold gas valves opened
C DT 3.3=	025.080	01/12:01:53	01/12:03:48	01:55	C1	
C BITE	025.100	01/12:08:04	01/12:08:24	00:20	C4	— HPA TR4
X P/B	025.120	01/12:12:46		02:00	XP	— Start TSID = 95200
Note						(01/12:22:12 - 01/12:35:33) AODA: correlated outage of both receivers
CX DT 3.2=	025.190	01/12:34:27	01/12:38:53	04:26	X2	
C DT 3.2=	025.210	01/12:41:14	01/12:42:20	01:06	C1	
C P/B	025.220	01/12:45:28		02:00	CP	— Start TSID = 28900
CX DT 3.1-	025.250	01/12:54:00	01/13:02:20	08:20	C2	
CX DT 3.1+	026.020	01/13:11:38	01/13:15:14	03:36	C3	
3.1+	026.021	01/13:15:14	01/13:18:03	02:49	C3	
3.1+	026.022	01/13:18:03	01/13:18:31	00:28	C3	
3.2=	026.023	01/13:18:31	01/13:19:35	01:04	C3	
3.1-	026.024	01/13:19:35	01/13:19:51	00:16	C3	
3.2=	026.025	01/13:19:51	01/13:27:55	08:04	C3	
3.2=	026.026	01/13:27:55	01/13:28:23	00:28	C3	
3.3=	026.027	01/13:28:23	01/13:33:18	04:55	C3	
3.2=	026.028	01/13:33:18	01/13:34:17	00:59	C3	
Trim-1	Trim-1	01/13:35:00	01/14:20:30	45:30	--	— 3.72 fps; TIG@14:00:00, B13@14:16:30, A11@14:20:30
Note						(01/14:18:00) AMS: cold gas usage reported back to nominal (14 psi) but no effect on propulsion
CX DT 3.1-	026.260	01/14:26:12	01/14:35:29	09:17	C2	
3.1+	026.261	01/14:35:29	01/14:45:14	09:45	C2	
3.2=	026.262	01/14:45:14	01/14:51:38	06:24	C2	
3.3+	026.263	01/14:51:38	01/15:01:39	10:01	C2	

STS-99 As-Flown Mission Timeline

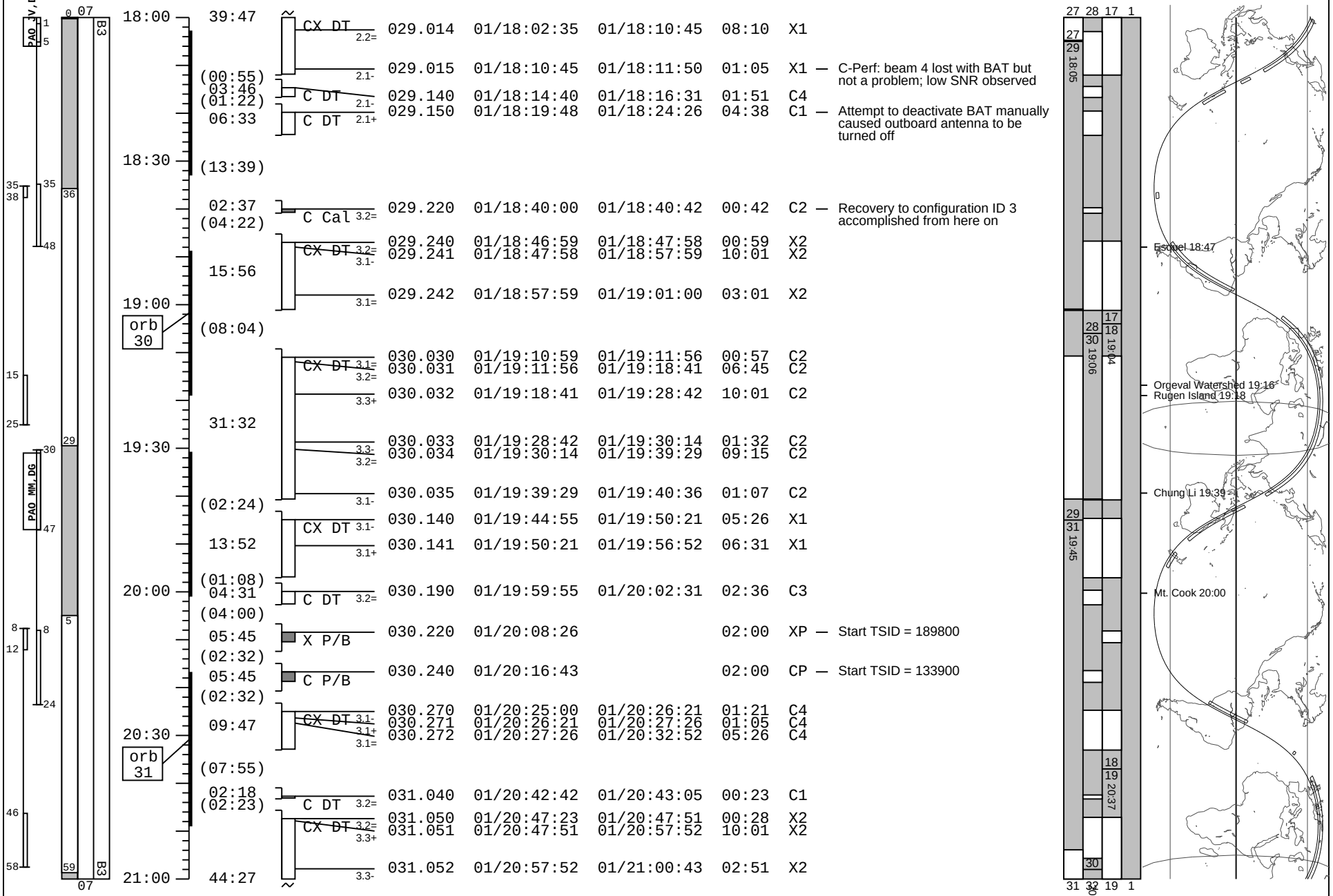


MET day 01	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
15:00	38:56	CX DT 3.3-	026.264	01/15:01:39	01/15:03:13	01:34	C2	
	(06:22)							
	02:20	C DT 3.2=	027.120	01/15:11:30	01/15:11:55	00:25	C3	
	(04:00)							
	09:24	C DT 3.1+	027.140	01/15:17:50	01/15:25:19	07:29	C4	
	(03:17)							
15:30	05:45	C P/B	027.180	01/15:30:31		02:00	CP	— Start TSID = 189300
	(04:47)							
	04:41	CX DT 3.2=	027.220	01/15:41:03	01/15:43:49	02:46	X1	
	(07:03)							
	02:37	C Cal 3.1=	027.250	01/15:52:47	01/15:53:29	00:42	C1	
	(07:04)							
16:00 orb 28	34:28	CX DT 3.1+	027.280	01/16:02:28	01/16:11:43	09:15	X2	
		3.1+	027.281	01/16:11:43	01/16:14:03	02:20	X2	
		3.2=	027.282	01/16:14:03	01/16:14:16	00:13	X2	
		3.1=	027.283	01/16:14:16	01/16:15:03	00:47	X2	
		3.2=	027.284	01/16:15:03	01/16:21:04	06:01	X2	
		3.3+	027.285	01/16:21:04	01/16:31:05	10:01	X2	
16:30		3.3-	027.286	01/16:31:05	01/16:34:31	03:26	X2	
		3.2=	027.287	01/16:34:31	01/16:35:01	00:30	X2	
	(15:08)							
	02:51	C DT 3.1=	028.160	01/16:52:04	01/16:53:00	00:56	C2	
	(08:54)							
17:00	05:45	C P/B	028.190	01/17:03:49		02:00	CP	— Start TSID = 261000
	(03:54)							
	04:03	CX DT 3.2=	028.230	01/17:13:28	01/17:15:36	02:08	X1	
	(08:20)							
	02:23	C DT 3.1=	028.270	01/17:25:51	01/17:26:19	00:28	C3	
	(05:44)							
17:30 orb 29	39:47	CX DT 2.1+	029.010	01/17:33:58	01/17:43:12	09:14	X1	— Next several data takes used radar configuration ID 2 (BAT on) by mistake
		2.2=	029.011	01/17:43:12	01/17:49:43	06:31	X1	
		2.3+	029.012	01/17:49:43	01/17:59:44	10:01	X1	
18:00		2.3-	029.013	01/17:59:44	01/18:02:35	02:51	X1	

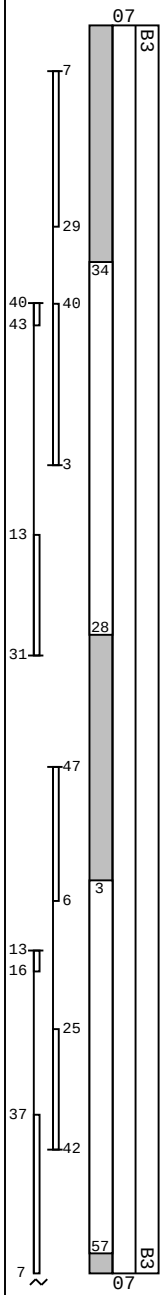




STS-99 As-Flown Mission Timeline

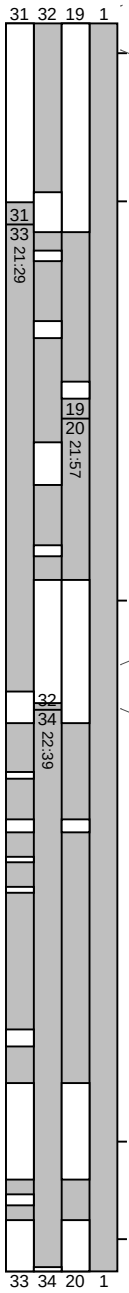


STS-99 As-Flown Mission Timeline

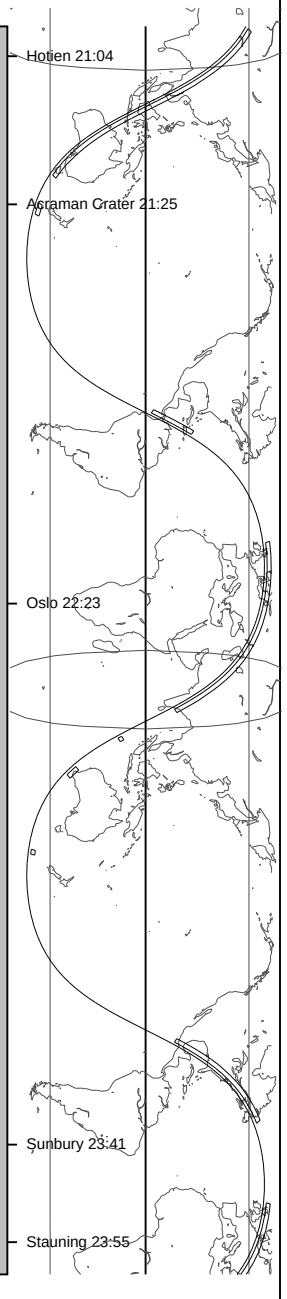


MET day 01	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
21:00		CX DT 3.2=	031.053	01/21:00:43	01/21:04:35	03:52	X2	
		3.1-	031.054	01/21:04:35	01/21:07:31	02:56	X2	
	44:27	3.1-	031.055	01/21:07:31	01/21:17:32	10:01	X2	
		3.1+	031.056	01/21:17:32	01/21:27:33	10:01	X2	
		3.1=	031.057	01/21:27:33	01/21:27:51	00:18	X2	
21:30	(01:12)	3.2=	031.058	01/21:27:51	01/21:29:55	02:04	X2	
	02:59	Note	(01/21:28:43 - 01/21:33:02) AODA: correlated outage of both receivers					
	(07:11)	C DT 3.2=	031.200	01/21:33:02	01/21:34:06	01:04	C2	
	05:45	C P/B	031.230	01/21:43:12		02:00	CP	— Start TSID = 58300
	(02:59)							
	05:45	X P/B	031.260	01/21:51:56		02:00	XP	— Start TSID = 193000
	(03:00)							
22:00								
orb 32	07:37	C DT 3.1+	032.010	01/22:00:41	01/22:06:23	05:42	C3	
	(07:14)							
	03:03	C BITE	032.050	01/22:15:32	01/22:16:40	01:08	C3	— LNA TR3
	(01:57)	CX DT 3.3-	032.070	01/22:20:32	01/22:30:33	10:01	X1	
22:30	22:07	3.3=	032.071	01/22:30:33	01/22:30:46	00:13	X1	
		3.2=	032.072	01/22:30:46	01/22:34:29	03:43	X1	
		3.1=	032.073	01/22:34:29	01/22:35:24	00:55	X1	
		3.2=	032.074	01/22:35:24	01/22:37:19	01:55	X1	
		3.1-	032.075	01/22:37:19	01/22:40:44	03:25	X1	
	(05:35)							
	02:26	C DT 3.1=	032.160	01/22:48:14	01/22:48:45	00:31	C4	— C-Perf: low echo observed
	(04:24)							
	03:20	CX DT 3.1=	032.180	01/22:55:04	01/22:56:29	01:25	X2	
	(02:04)							
23:00	02:15	C BITE	032.200	01/23:00:28	01/23:00:48	00:20	C3	— HPA TR3
	(02:05)							
	02:19	C DT 3.2=	032.210	01/23:04:48	01/23:05:12	00:24	C1	
	(18:15)							
orb 33								
	05:45	C P/B	032.280	01/23:25:22		02:00	CP	— Start TSID = 71500
23:30	(01:59)							
		CX DT 3.1+	033.010	01/23:33:06	01/23:40:04	06:58	C2	
	15:23	3.2=	033.011	01/23:40:04	01/23:46:34	06:30	C2	
	(00:40)							
	03:03	C BITE	033.060	01/23:49:09	01/23:50:17	01:08	C4	— LNA TR4
	(00:40)	CX DT 3.3-	033.080	01/23:52:52	01/23:59:11	06:19	X1	
00:00	18:12	3.2=	033.081	01/23:59:11	02/00:06:36	07:25	X1	

PHRRs



Map



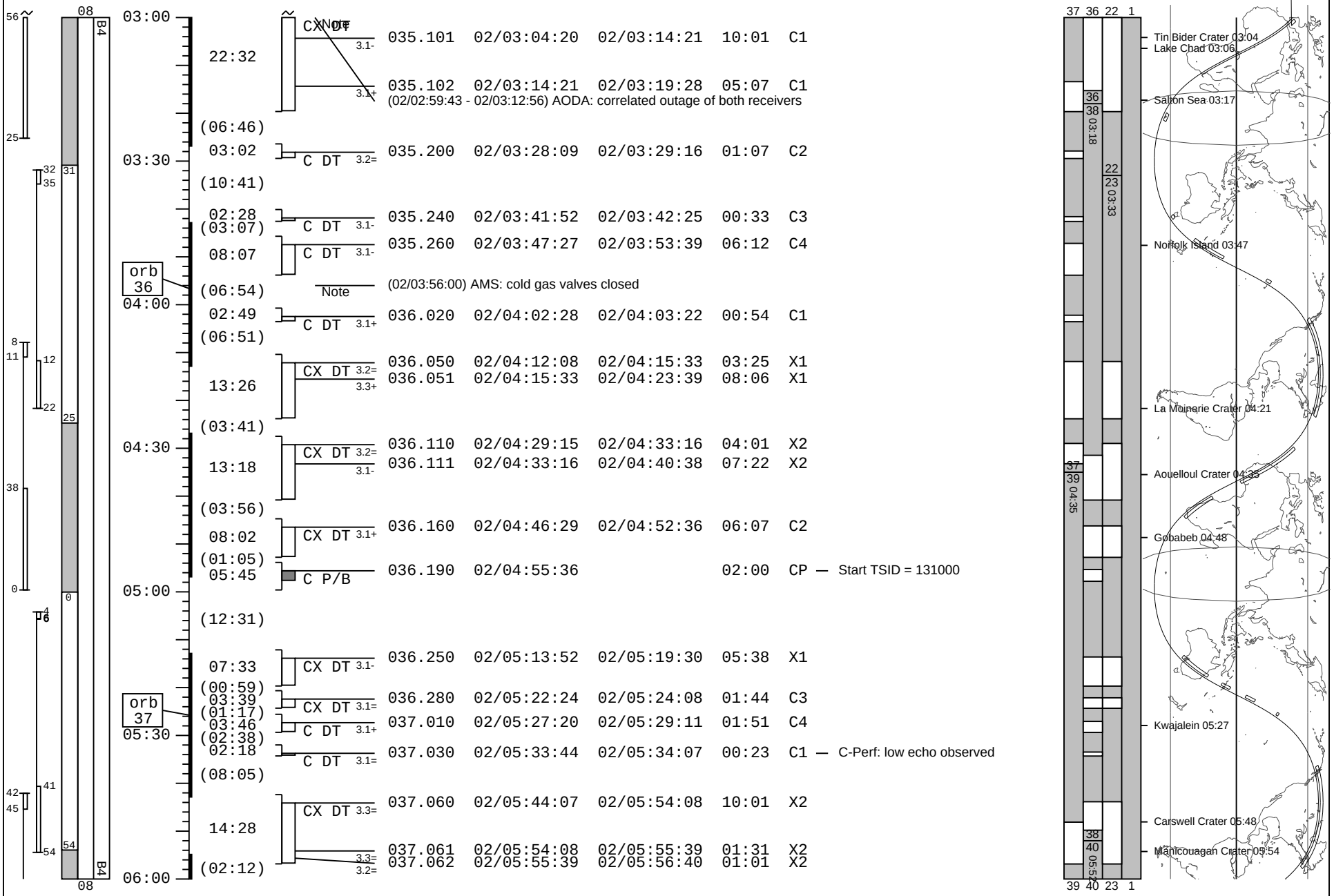
STS-99 As-Flown Mission Timeline

TDR E	TDR W	Sun	Seq	Crw	MET day 02	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
					00:00	18:12	CX DT 3.1-	033.082	02/00:06:36	02/00:09:09	02:33	X1	
						(04:30)							
						02:55	C DT 3.1=	033.150	02/00:15:34	02/00:16:34	01:00	C1	
						(18:47)							
					00:30								
						05:44	C DT 3.2=	033.220	02/00:37:16	02/00:41:05	03:49	C2	
						(09:00)							
					orb 34	03:35	C DT 3.1-	033.270	02/00:52:00	02/00:53:40	01:40	C3	
					01:00	(09:35)							
							CX DT 3.1+	034.020	02/01:05:10	02/01:10:01	04:51	C4	
						17:25	3.2=	034.021	02/01:10:01	02/01:16:47	06:46	C4	— C-Cntl: enabled BAT polar indicator
							3.3+	034.022	02/01:16:47	02/01:20:40	03:53	C4	— C-Cntl: enabled BAT polar indicator
						(02:17)							
							CX DT 3.3-	034.090	02/01:24:52	02/01:28:03	03:11	X2	
					01:30		3.2=	034.091	02/01:28:03	02/01:35:32	07:29	X2	
						20:20	3.1-	034.092	02/01:35:32	02/01:42:31	06:59	X2	
						(00:38)	3.1=	034.093	02/01:42:31	02/01:43:17	00:46	X2	
						05:44	C DT 3.1+	034.150	02/01:45:50	02/01:49:39	03:49	C1	— C-Perf: low echo observed (ocean)
						(08:42)							
							Note	(02/01:55:42 - 02/02:06:58) AODA: correlated outage of both receivers					
					02:00	02:37	C Cal 3.2=	034.200	02/02:00:16	02/02:00:58	00:42	C2	
						(08:43)							
							CX DT 3.2=	034.240	02/02:11:36	02/02:12:31	00:55	X1	
						05:52	3.1-	034.241	02/02:12:31	02/02:15:33	03:02	X1	
						(04:00)							
						02:20	C DT 3.1=	034.270	02/02:21:28	02/02:21:53	00:25	C3	
					orb 35	(00:18)	C DT 3.1=	034.280	02/02:24:06	02/02:26:02	01:56	C4	
						03:51							
					02:30	(03:59)							
						02:15	C BITE	035.010	02/02:31:56	02/02:32:16	00:20	C4	— HPA TR4
						(04:26)							
							CX DT 3.2=	035.040	02/02:38:37	02/02:45:40	07:03	X2	
						13:41	3.3+	035.041	02/02:45:40	02/02:50:23	04:43	X2	
						(06:33)							
					03:00	22:32	CX DT 3.2=	035.100	02/02:58:51	02/03:04:20	05:29	C1	
							Note	(02/02:59:43 - 02/03:12:56) AODA: correlated outage of both receivers					

PHRRs 1 2 3 4

Map

STS-99 As-Flown Mission Timeline



TDR E W	Sun	Seq	Crw	MET day 02	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
				03:00								
					22:32	CX DT 3.1-	035.101	02/03:04:20	02/03:14:21	10:01	C1	
						CX DT 3.1+	035.102	02/03:14:21	02/03:19:28	05:07	C1	
							(02/02:59:43 - 02/03:12:56) AODA: correlated outage of both receivers					
					(06:46)							
				03:02		C DT 3.2=	035.200	02/03:28:09	02/03:29:16	01:07	C2	
				03:30	(10:41)							
					02:28	C DT 3.1-	035.240	02/03:41:52	02/03:42:25	00:33	C3	
					(03:07)							
					08:07	C DT 3.1-	035.260	02/03:47:27	02/03:53:39	06:12	C4	
				orb 36	(06:54)	Note	(02/03:56:00) AMS: cold gas valves closed					
				04:00	02:49	C DT 3.1+	036.020	02/04:02:28	02/04:03:22	00:54	C1	
					(06:51)							
					13:26	CX DT 3.2=	036.050	02/04:12:08	02/04:15:33	03:25	X1	
						CX DT 3.3+	036.051	02/04:15:33	02/04:23:39	08:06	X1	
					(03:41)							
				04:30	13:18	CX DT 3.2=	036.110	02/04:29:15	02/04:33:16	04:01	X2	
						CX DT 3.1-	036.111	02/04:33:16	02/04:40:38	07:22	X2	
					(03:56)							
					08:02	CX DT 3.1+	036.160	02/04:46:29	02/04:52:36	06:07	C2	
					(01:05)							
					05:45	C P/B	036.190	02/04:55:36		02:00	CP	— Start TSID = 131000
				05:00	(12:31)							
					07:33	CX DT 3.1-	036.250	02/05:13:52	02/05:19:30	05:38	X1	
					(00:59)							
					03:39	CX DT 3.1=	036.280	02/05:22:24	02/05:24:08	01:44	C3	
				orb 37	(01:17)							
					03:46	C DT 3.1+	037.010	02/05:27:20	02/05:29:11	01:51	C4	
				05:30	(02:38)							
					02:18	C DT 3.1=	037.030	02/05:33:44	02/05:34:07	00:23	C1	— C-Perf: low echo observed
					(08:05)							
					14:28	CX DT 3.3=	037.060	02/05:44:07	02/05:54:08	10:01	X2	
						3.3=	037.061	02/05:54:08	02/05:55:39	01:31	X2	
						3.2=	037.062	02/05:55:39	02/05:56:40	01:01	X2	
				06:00	(02:12)							

PHRRs 1 2 3 4

Map

Tin Bider Crater 03:04
Lake Chad 03:06
Salton Sea 03:17
Norfolk Island 03:47
La Moinerie Crater 04:21
Aouelloul Crater 04:35
Gobabeb 04:48
Kwajalein 05:27
Carswell Crater 05:48
Manicouagan Crater 05:54

STS-99 As-Flown Mission Timeline

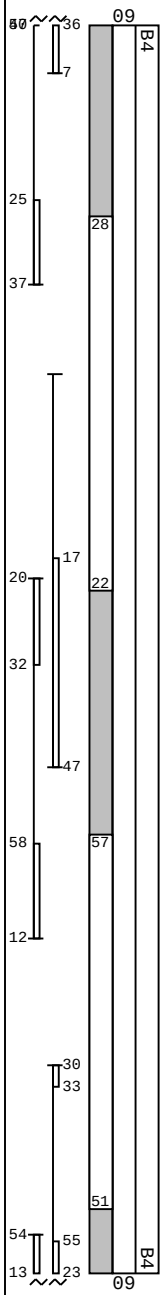
TDR E	TDR W	Sun	Seq	Crw	MET day 02	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
					06:00	(02:12)							
							C Cal 3.2=	037.110	02/06:00:47	02/06:02:26	01:39	C1	
							3.1-	037.111	02/06:02:26	02/06:12:27	10:01	C1	
						21:55							
							3.1+	037.112	02/06:12:27	02/06:20:47	08:20	C1	
						(01:02)							
						05:45	X P/B	037.190	02/06:23:44		02:00	XP	— Start TSID = 223800
					06:30	(05:03)							
						02:30	C DT 3.2=	037.220	02/06:34:32	02/06:35:07	00:35	C2	
						(06:25)							
							Note	(02/06:40:12) Libr: all future playbacks (except special ones) to be rewound 14,000 TSIDs instead of 7,000					
							CX DT 3.1-	037.250	02/06:43:27	02/06:53:28	10:01	C3	
						15:50							
					orb 38		3.1+	037.251	02/06:53:28	02/06:57:22	03:54	C3	
						(02:04)							
					07:00	02:18	C DT 3.1=	038.020	02/07:01:21	02/07:01:44	00:23	C4	
						(06:50)							
								038.050	02/07:10:29	02/07:13:33	03:04	C1	
							CX DT 3.2=	038.051	02/07:13:33	02/07:23:33	10:00	C1	
						21:59							
							3.2=	038.052	02/07:23:33	02/07:30:33	07:00	C1	
					07:30								
						(07:06)							
						06:16	CX DT 3.1=	038.140	02/07:39:34	02/07:43:55	04:21	C2	
						(11:14)							
						05:45	C P/B	038.200	02/07:57:04		02:00	CP	— Start TSID = 80700
					08:00	(03:47)							
						03:01	C DT 3.2=	038.230	02/08:06:36	02/08:07:42	01:06	C3	
						(11:05)							
							CX DT 3.1+	038.280	02/08:20:42	02/08:27:43	07:01	X1	
					orb 39	08:56							
					08:30	(03:32)							
						03:26	C DT 3.1+	039.030	02/08:33:10	02/08:34:41	01:31	C4	— C-Perf: saturation on beam 4 observed
						(08:22)							
							CX DT 3.3-	039.070	02/08:44:58	02/08:51:02	06:04	X2	
							3.2=	039.071	02/08:51:02	02/09:00:25	09:23	X2	
					09:00	34:58							

PHRRs 1 2 3 4

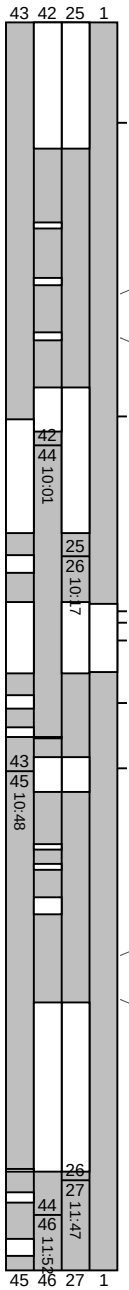
Map

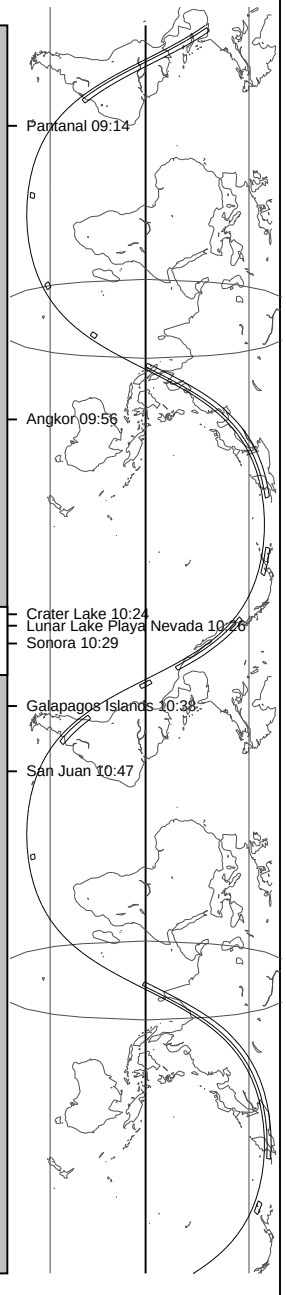
Heard volcano 06:34
Connolly Basin Crater 06:47
Wolfe Creek Crater 06:48
Darwin 06:50
Unimak Island 07:12
Gow Crater 07:21
Slate Islands Crater 07:24
Bebedouro 07:42
Izuoshima Island 08:33
Konza 08:56

STS-99 As-Flown Mission Timeline

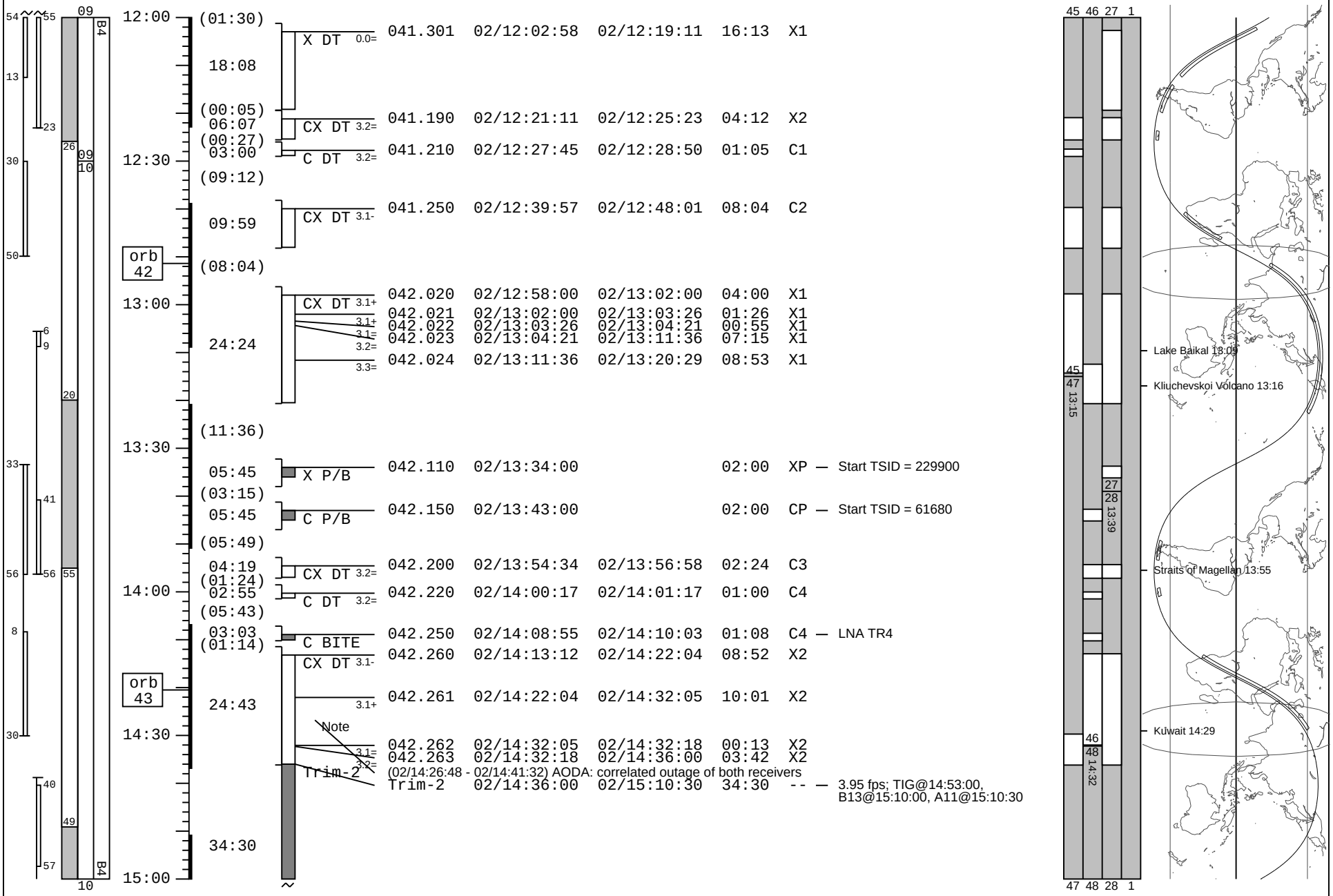


MET day 02	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
09:00	34:58	CX DT 3.1-	039.072	02/09:00:25	02/09:10:00	09:35	X2	
		3.1+	039.073	02/09:10:00	02/09:18:01	08:01	X2	
		Note	(02/09:14:40 - 02/09:24:56) AODA: correlated outage of both receivers					
	(09:11)							
09:30	02:20	C DT 3.2=	039.210	02/09:29:07	02/09:29:32	00:25	C1	
	(05:40)							
	02:31	C DT 3.2=	039.240	02/09:37:07	02/09:37:43	00:36	C2	
	(05:20)							
	02:37	C Cal 3.1=	039.260	02/09:44:58	02/09:45:40	00:42	C3	
	(05:20)							
orb 40		CX DT 3.1+	039.290	02/09:52:55	02/10:02:56	10:01	X1	
10:00	22:28	3.1=	039.291	02/10:02:56	02/10:04:36	01:40	X1	
		3.2=	039.292	02/10:04:36	02/10:12:41	08:05	X1	
		3.3+	039.293	02/10:12:41	02/10:13:28	00:47	X1	
	(01:43)							
	04:01	C DT 3.3=	040.080	02/10:17:06	02/10:19:12	02:06	C4	
	(02:45)	Note	(02/10:20:06 - 02/10:29:29) AODA: correlated outage of both receivers					
		CX DT 3.2=	040.100	02/10:23:52	02/10:28:31	04:39	C3	— Libr: X data may be lost due to PHRR3 unavailable; MAR quickwrite
10:30	11:45	3.1-	040.101	02/10:28:31	02/10:33:42	05:11	C3	
	(01:41)							
	03:24	C DT 3.1=	040.140	02/10:37:18	02/10:38:47	01:29	C1	
	(01:14)							
	03:03	C BITE	040.160	02/10:41:56	02/10:43:04	01:08	C3	— LNA TR3
	(01:15)							
	06:29	CX DT 3.1-	040.170	02/10:46:14	02/10:47:54	01:40	C2	
		3.1+	040.171	02/10:47:54	02/10:50:48	02:54	C2	
	(06:04)	Note	(02/10:52:14) Libr: MAR recorder powered down (after quickwrite on 40.100)					
	02:15		040.210	02/10:58:47	02/10:59:07	00:20	C3	— HPA TR3
11:00	(00:36)	C BITE	040.220	02/11:01:38	02/11:02:02	00:24	C3	
	02:19	C DT 3.2=						
	(02:30)		040.240	02/11:06:27		02:00	CP	— Start TSID = 45940
	05:45	C P/B						
	(09:25)							
orb 41		CX DT 3.1+	040.290	02/11:21:37	02/11:30:09	08:32	X1	
11:30		3.1+	040.291	02/11:30:09	02/11:34:45	04:36	X1	
	25:52	3.2=	040.292	02/11:34:45	02/11:42:02	07:17	X1	
		3.3+	040.293	02/11:42:02	02/11:45:34	03:32	X1	
	(01:31)							
	02:57	C DT 3.3=	041.090	02/11:49:00	02/11:50:02	01:02	C4	
	(03:46)							
	05:45	C P/B	041.110	02/11:55:43		02:00	CP	— Start TSID = 300
12:00	(01:30)							

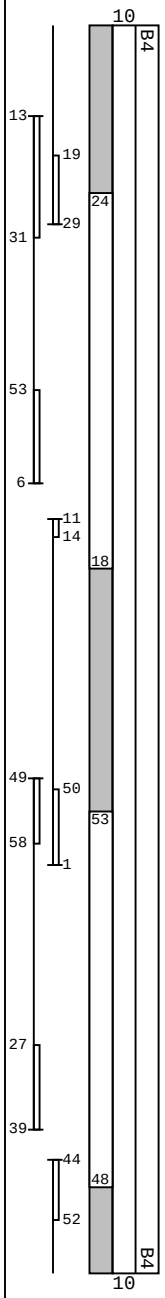




STS-99 As-Flown Mission Timeline

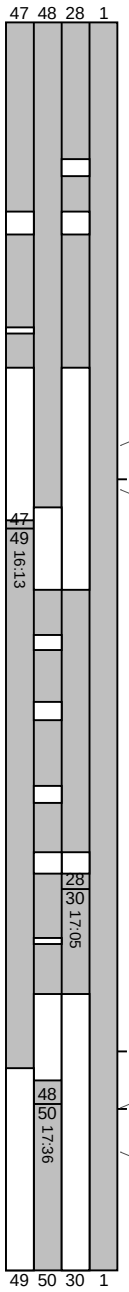


STS-99 As-Flown Mission Timeline

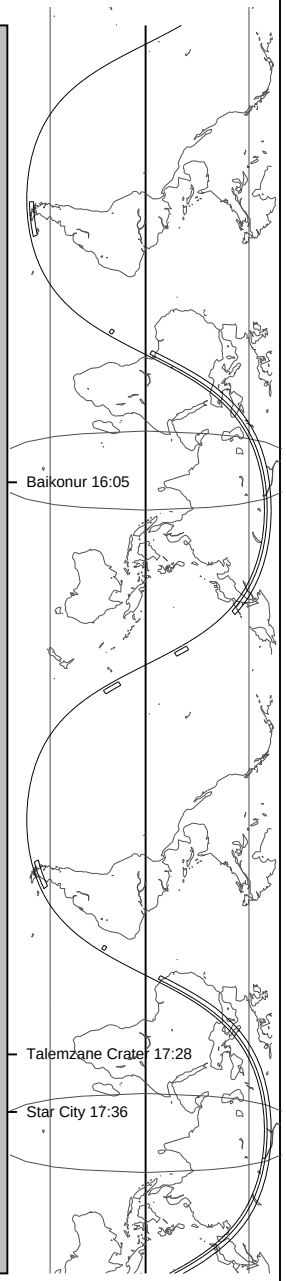


MET day 02	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
15:00	34:30	Trim-2						
	(07:44)							
	05:45	X P/B	043.180	02/15:19:59		02:00	XP	— Start TSID = 106300
	(01:49)							
15:30	04:46	CX DT 3.2=	043.220	02/15:27:33	02/15:30:24	02:51	X1	
		Note	(02/15:31:00) AMS: cold gas valves opened					
	(11:56)							
	02:21	C DT 3.1=	043.270	02/15:44:15	02/15:44:41	00:26	C4	
	(03:28)	Note	(02/15:46:00) AMS: cold gas valves closed (no joy)					
orb 44		CX DT 3.1+	044.010	02/15:50:04	02/15:58:45	08:41	C4	
16:00		3.2=	044.011	02/15:58:45	02/16:07:17	08:32	C4	
	33:30	3.3=	044.012	02/16:07:17	02/16:17:18	10:01	C4	
		3.3=	044.013	02/16:17:18	02/16:17:53	00:35	C4	
		3.2=	044.014	02/16:17:53	02/16:21:39	03:46	C4	
	(05:03)							
16:30	03:38	C DT 3.1-	044.130	02/16:28:37	02/16:30:20	01:43	C1	
	(06:01)							
	04:06	C DT 3.1+	044.160	02/16:38:16	02/16:40:27	02:11	C2	
	(08:01)							
	05:45	C P/B	044.200	02/16:50:23		02:00	CP	— Start TSID = 137900
	(03:49)							
17:00	04:33	CX DT 3.2=	044.230	02/16:59:57	02/17:02:35	02:38	X1	
	(07:49)							
	02:20	C DT 3.1=	044.270	02/17:12:19	02/17:12:44	00:25	C3	
	(05:45)							
orb 45		CX DT 3.1+	045.010	02/17:20:24	02/17:28:31	08:07	X1	— Longest datatake of the mission
17:30		3.2=	045.011	02/17:28:31	02/17:36:12	07:41	X1	
		3.3=	045.012	02/17:36:12	02/17:46:13	10:01	X1	
	52:18	3.3=	045.013	02/17:46:13	02/17:46:29	00:16	X1	
		3.2=	045.014	02/17:46:29	02/17:54:34	08:05	X1	
		3.1-	045.015	02/17:54:34	02/18:04:35	10:01	X1	
18:00								

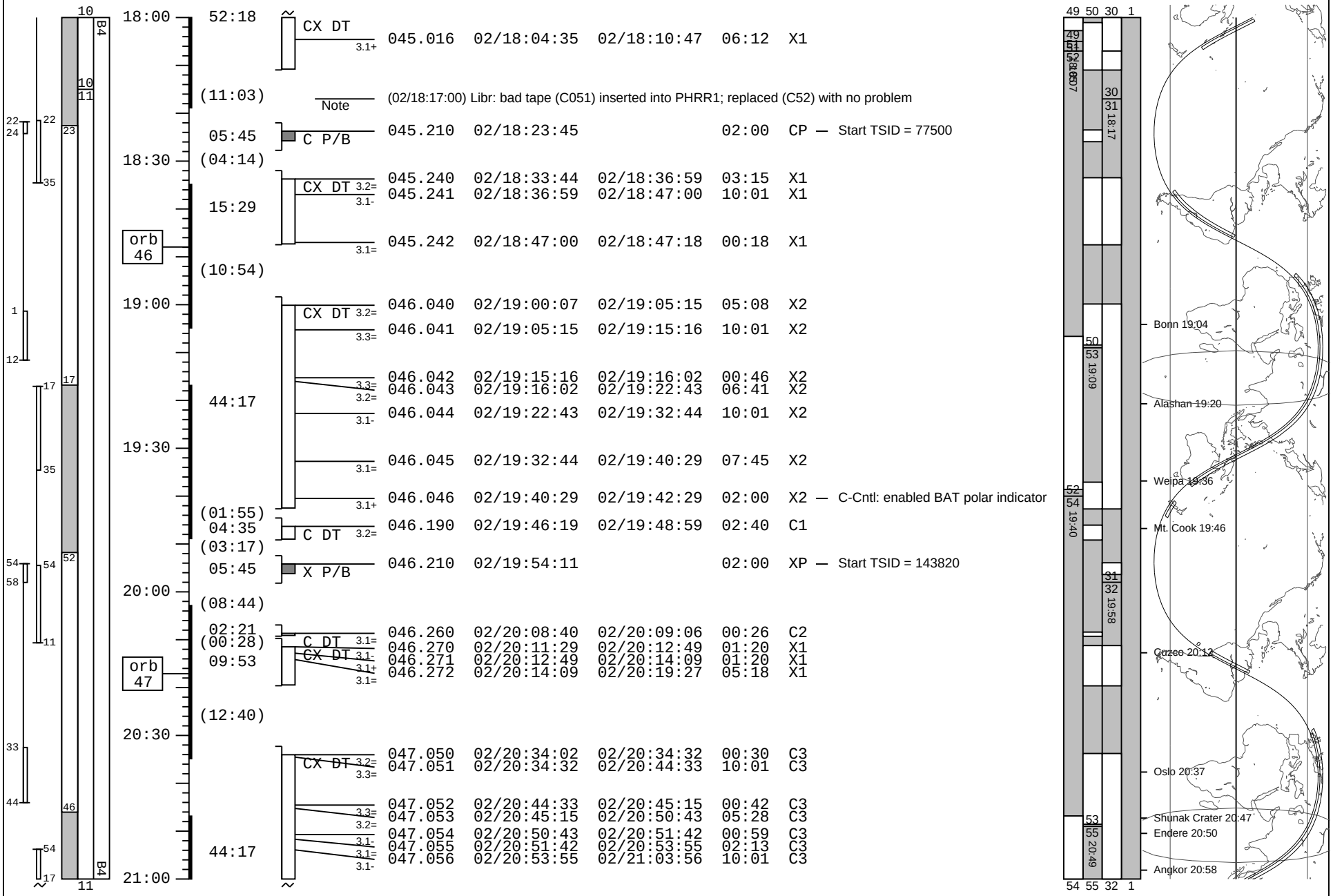
PHRRs



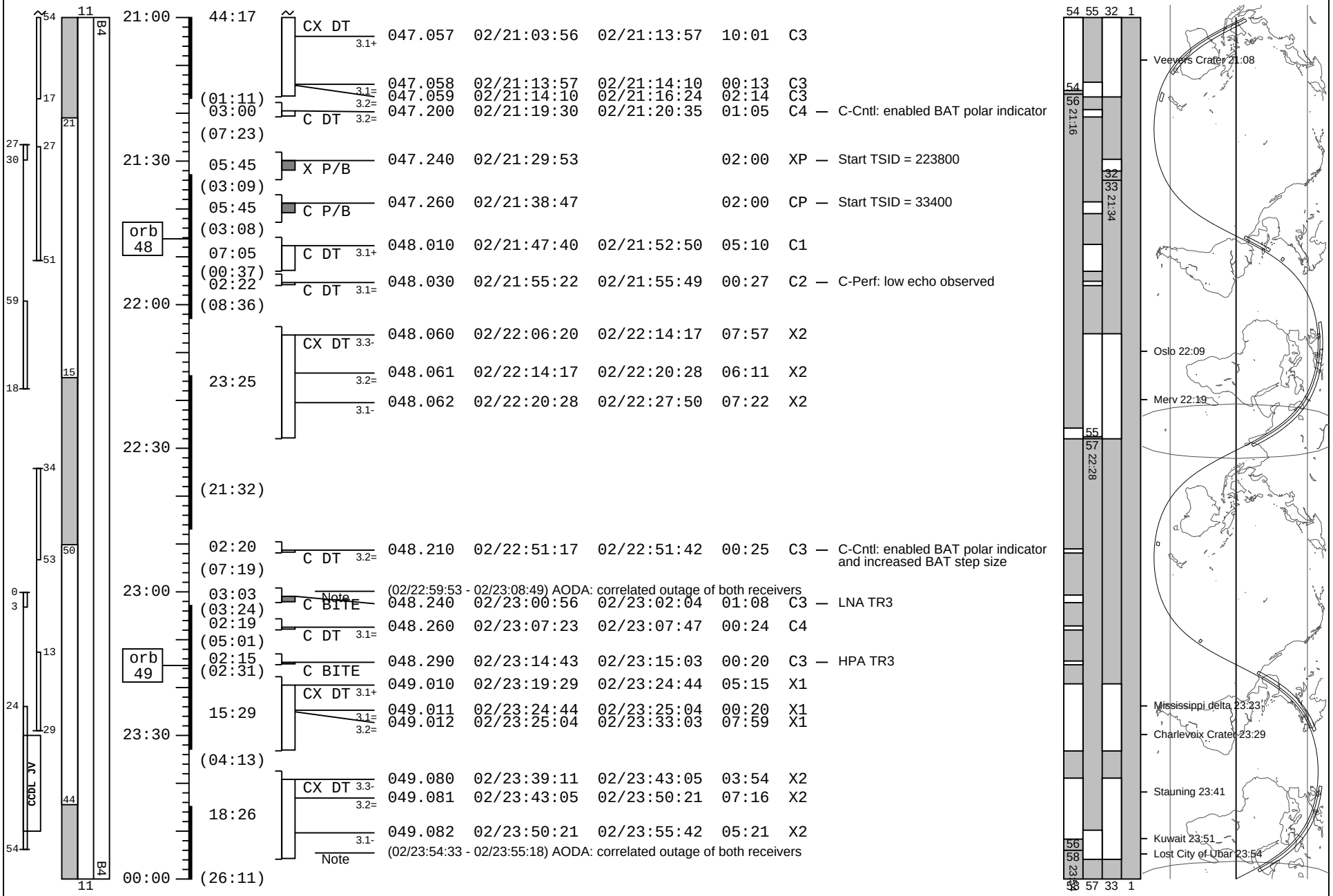
Map



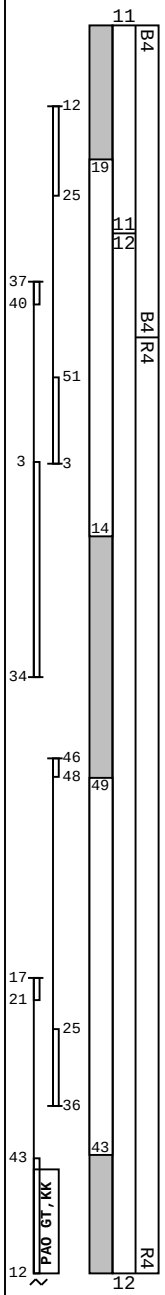
STS-99 As-Flown Mission Timeline



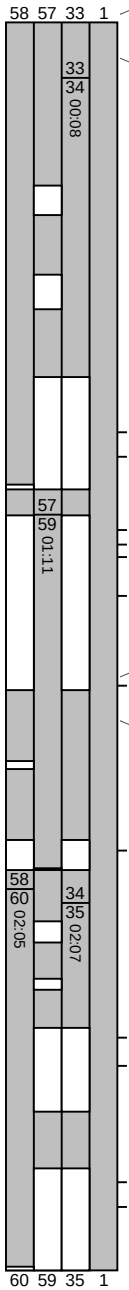
STS-99 As-Flown Mission Timeline

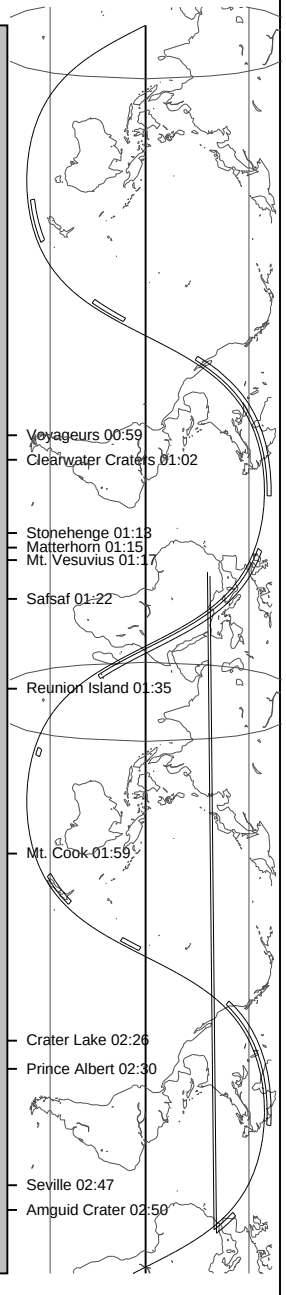


STS-99 As-Flown Mission Timeline

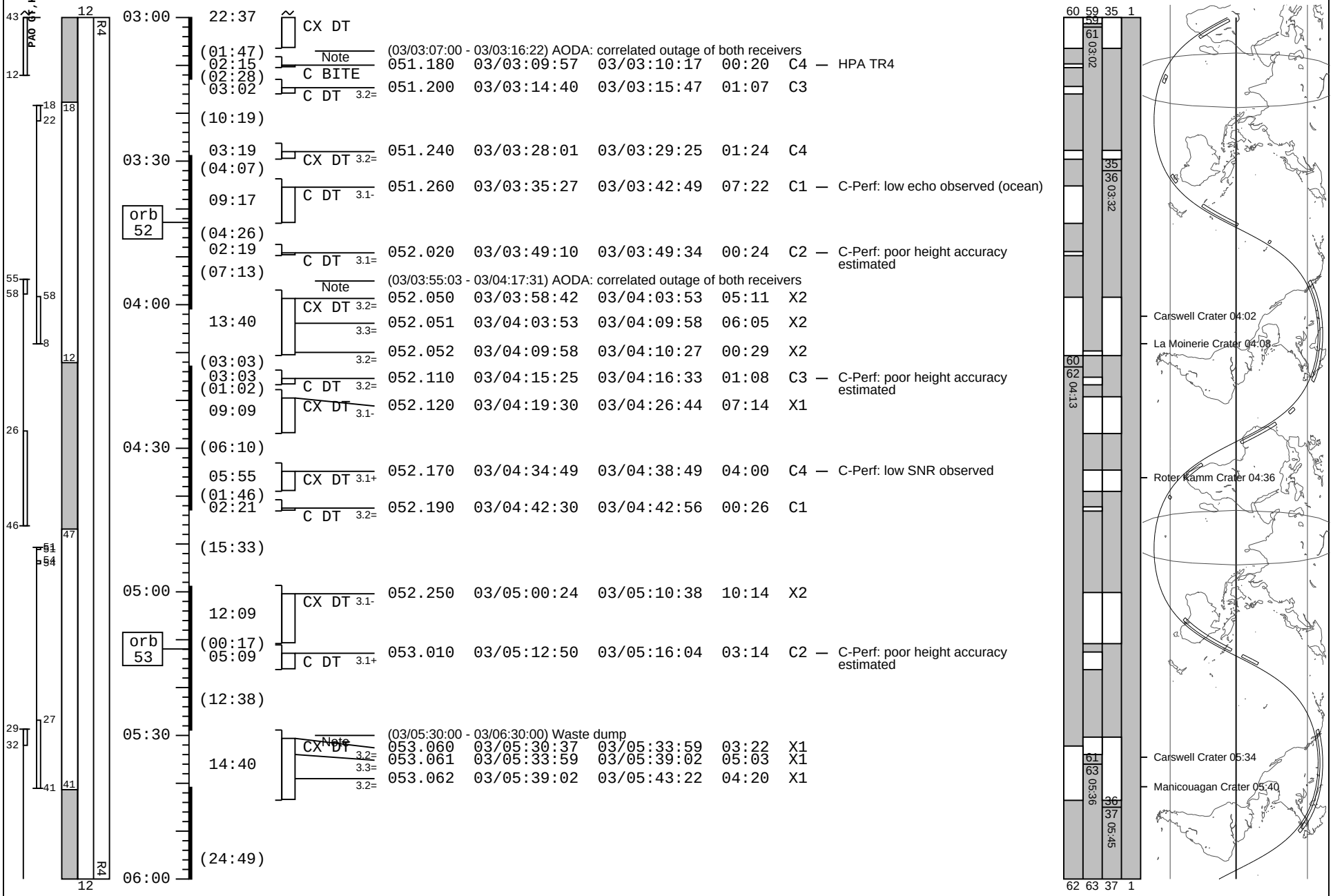


MET day 03	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
00:00		Note	(03/00:00:59 - 03/00:05:22) AODA: correlated outage of both receivers					
	(26:11)							
	05:43	C DT 3.2=	049.220	03/00:23:48	03/00:27:36	03:48	C1	— C-Cntl: enabled BAT polar indicator and increased BAT step size
00:30	(07:08)							
	06:27	C DT 3.1-	049.260	03/00:36:39	03/00:41:11	04:32	C2	
orb 50	(08:19)							
	17:40	CX DT 3.1+	050.020	03/00:51:25	03/00:56:20	04:55	X1	
01:00		3.2=	050.021	03/00:56:20	03/01:04:22	08:02	X1	
		3.3+	050.022	03/01:04:22	03/01:07:10	02:48	X1	
	(02:17)							
	26:40	CX DT 3.2=	050.090	03/01:11:22	03/01:14:29	03:07	C3	
		3.2=	050.091	03/01:14:29	03/01:19:36	05:07	C3	
		3.1-	050.092	03/01:19:36	03/01:28:58	09:22	C3	
01:30		3.1+	050.093	03/01:28:58	03/01:36:07	07:09	C3	
	(08:46)							
	02:37	C Cal 3.2=	050.200	03/01:46:48	03/01:47:30	00:42	C4	
	(08:46)							
02:00	05:48	CX DT 3.2=	050.240	03/01:58:11	03/02:02:04	03:53	X2	
	(05:56)							
	04:31	C DT 3.1=	050.280	03/02:09:55	03/02:12:31	02:36	C1	
orb 51	(03:46)							
	03:03	C BITE	051.010	03/02:18:12	03/02:19:20	01:08	C4	— LNA TR4
	(04:02)							
	13:33	CX DT 3.2=	051.040	03/02:25:17	03/02:33:13	07:56	C2	
02:30		3.3+	051.041	03/02:33:13	03/02:36:55	03:42	C2	
	(06:43)							
	22:37	CX DT 3.2=	051.100	03/02:45:33	03/02:47:59	02:26	X1	
		3.1-	051.101	03/02:47:59	03/02:58:00	10:01	X1	— C-Perf: echo display problem observed again; no effect on data quality
03:00		3.1+	051.102	03/02:58:00	03/03:06:15	08:15	X1	

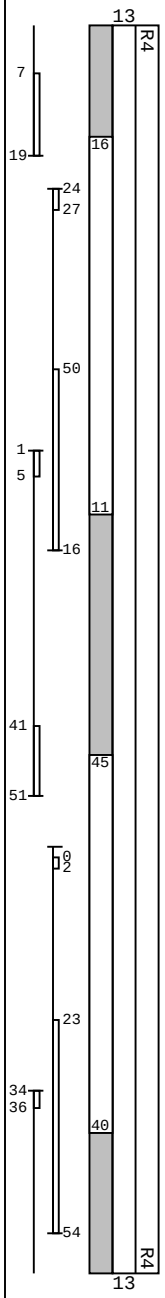




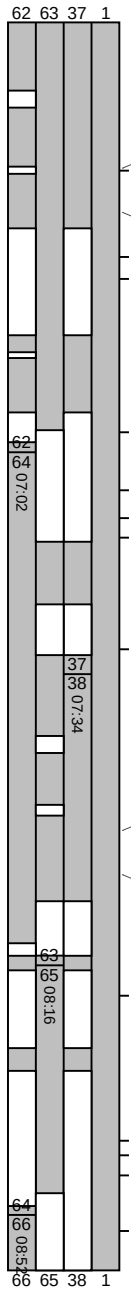
STS-99 As-Flown Mission Timeline

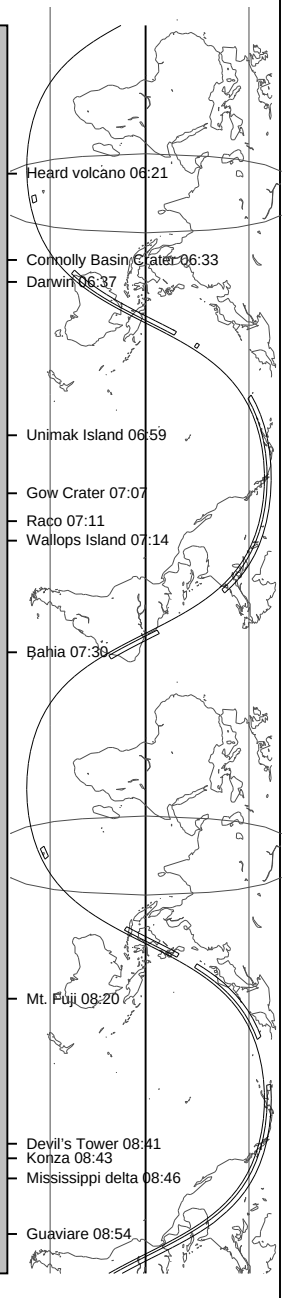


STS-99 As-Flown Mission Timeline

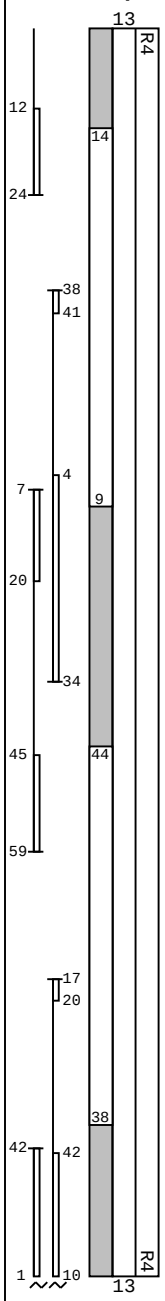


MET day 03	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
			(03/05:30:00 - 03/06:30:00) Waste dump					
06:00	(24:49)	Note						
	05:45	C P/B	053.190	03/06:10:06		02:00	CP	— Start TSID = 94760
	(05:13)							
	02:30	C DT 3.2=	053.220	03/06:21:04	03/06:21:39	00:35	C1	
	(06:24)							
06:30		CX DT 3.1-	053.250	03/06:29:58	03/06:39:59	10:01	C2	
	16:53							
orb 54		3.1+	053.251	03/06:39:59	03/06:44:56	04:57	C2	— C-Perf: poor height accuracy estimated
	(00:59)							
	02:18	C DT 3.1=	054.020	03/06:47:50	03/06:48:13	00:23	C3	— C-Perf: poor height accuracy estimated
	(06:23)							
		CX DT 3.2=	054.050	03/06:56:31	03/07:00:44	04:13	C4	
07:00		3.2=	054.051	03/07:00:44	03/07:10:15	09:31	C4	
	20:07							
		3.2=	054.052	03/07:10:15	03/07:14:43	04:28	C4	— C-Perf: bad after 07:14:30; main antenna panels turned off
	(07:34)							
	08:47	CX DT 3.1=	054.140	03/07:24:12	03/07:31:04	06:52	X2	
07:30								
	(10:12)							
	05:45	C P/B	054.200	03/07:43:11		02:00	CP	— Start TSID = 206160
	(04:11)							
	03:01	C DT 3.2=	054.230	03/07:53:07	03/07:54:13	01:06	C1	
08:00	(10:53)							
		CX DT 3.1=	054.280	03/08:07:01	03/08:14:26	07:25	C2	
orb 55	09:20							
	(00:38)	CX DT 3.1+	055.020	03/08:16:59	03/08:21:41	04:42	X1	— C-Perf: poor height accuracy estimated for beam 3
	12:41	3.2=	055.021	03/08:21:41	03/08:27:45	06:04	X1	— C-Perf: poor height accuracy estimated for beam 3
	(01:49)							
08:30		CX DT 3.2=	055.070	03/08:31:29	03/08:37:24	05:55	C3	
		3.2=	055.071	03/08:37:24	03/08:44:25	07:01	C3	
	35:08	3.1-	055.072	03/08:44:25	03/08:54:26	10:01	C3	
		Note 3.1+	055.073	03/08:54:26	03/09:04:42	10:16	C3	
			(03/08:52:32) Libr: go for 0.2 degree deadband					
09:00		Note	(03/08:59:00 - 03/09:11:52) AODA: correlated outage of both receivers					

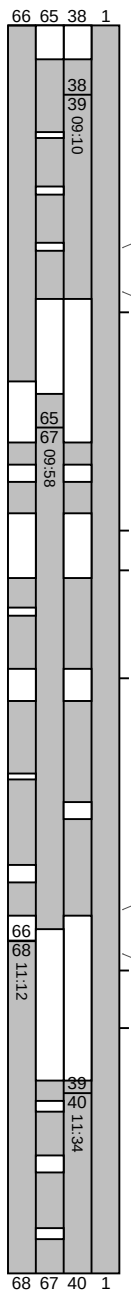


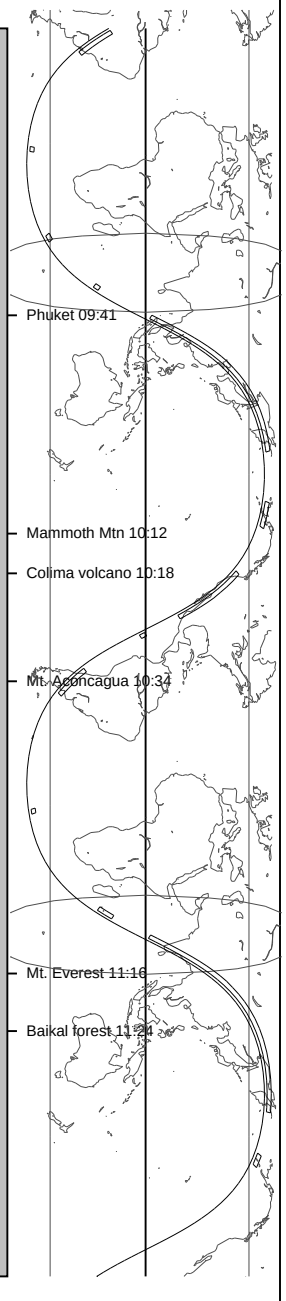


STS-99 As-Flown Mission Timeline

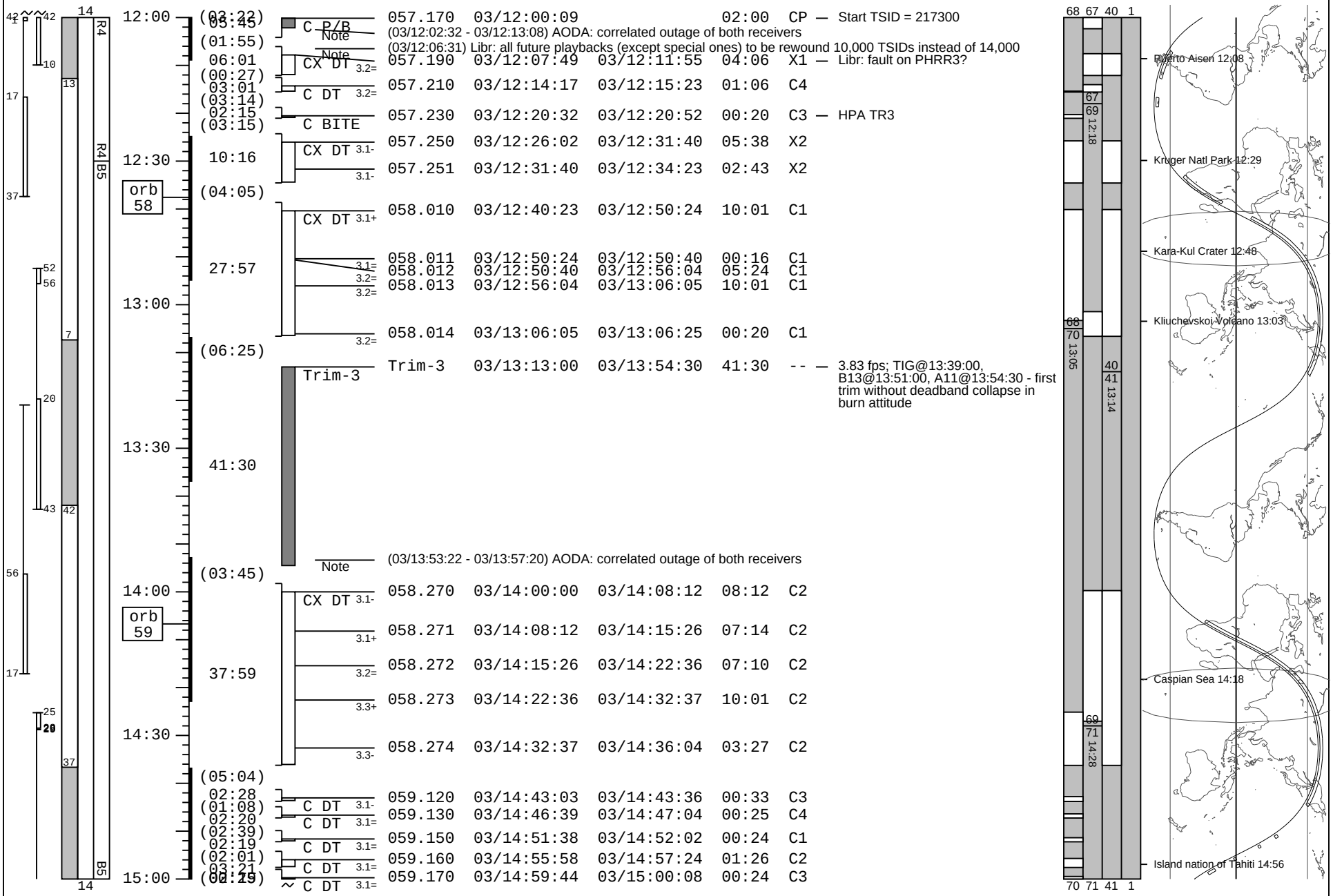


MET day 03	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
09:00	35:08	CX DT		(03/08:59:00 - 03/09:11:52) AODA: correlated outage of both receivers				
	(09:02)							
	02:19	C DT 3.2=	055.210	03/09:15:39	03/09:16:03	00:24	C4	— C-Perf: poor height accuracy estimated for beam 4
	(05:32)			(03/09:14:26) AMS: cold gas valves opened (no effect observed; considered dead)				
	02:38	C DT 3.2=	055.240	03/09:23:30	03/09:24:13	00:43	C1	
	(05:29)							
09:30	02:37	C Cal 3.1=	055.260	03/09:31:37	03/09:32:19	00:42	C2	
	(05:29)							
orb 56	22:10	CX DT 3.1+	056.010	03/09:39:43	03/09:49:44	10:01	X2	
		3.1=	056.011	03/09:49:44	03/09:50:52	01:08	X2	
		3.2=	056.012	03/09:50:52	03/09:59:58	09:06	X2	
				(03/09:41:01) AMS: cold gas valves closed				
				(03/09:42:01 - 03/09:50:13) AODA: correlated outage of both receivers				
10:00	(01:44)							
	03:57	CX DT 3.2=	056.080	03/10:03:37	03/10:05:39	02:02	X1	— C-Perf: poor height accuracy estimated for beam 1
	(03:04)							
	10:48	CX DT 3.2=	056.100	03/10:10:38	03/10:12:26	01:48	C4	
		3.1-	056.101	03/10:12:26	03/10:19:31	07:05	C4	
	(02:48)							
	02:38	C DT 3.1=	056.150	03/10:24:14	03/10:24:57	00:43	C4	— C-Perf: poor height accuracy estimated
	(06:12)							
10:30	06:06	CX DT 3.1=	056.170	03/10:33:04	03/10:35:32	02:28	X2	
		3.1=	056.171	03/10:35:32	03/10:36:27	00:55	X2	
		3.2=	056.172	03/10:36:27	03/10:37:15	00:48	X2	
	(09:00)							
	02:19	C DT 3.2=	056.220	03/10:48:10	03/10:48:34	00:24	C1	
	(01:48)							
	05:45	X P/B	056.240	03/10:52:17		02:00	XP	— Start TSID = 161300
	(03:19)							
11:00	03:59	C DT 3.1-	056.270	03/11:01:21	03/11:03:25	02:04	C2	
	(03:20)							
orb 57	25:15	CX DT 3.1+	057.010	03/11:08:40	03/11:16:21	07:41	X1	
		3.1+	057.011	03/11:16:21	03/11:20:10	03:49	X1	
		3.1=	057.012	03/11:20:10	03/11:21:38	01:28	X1	— C-Perf: low sigma 0 observed from 11:21 - 11:25
		3.2=	057.013	03/11:21:38	03/11:27:23	05:45	X1	
		3.2=	057.014	03/11:27:23	03/11:32:00	04:37	X1	
11:30	(01:28)							
	03:01	C DT 3.2=	057.090	03/11:35:23	03/11:36:29	01:06	C3	
	(04:51)							
	05:45	C P/B	057.110	03/11:43:15		02:00	CP	— Start TSID = 205800
	(04:44)							
	03:03	C BITE	057.150	03/11:53:44	03/11:54:52	01:08	C3	— LNA TR3
12:00	(03:22)							

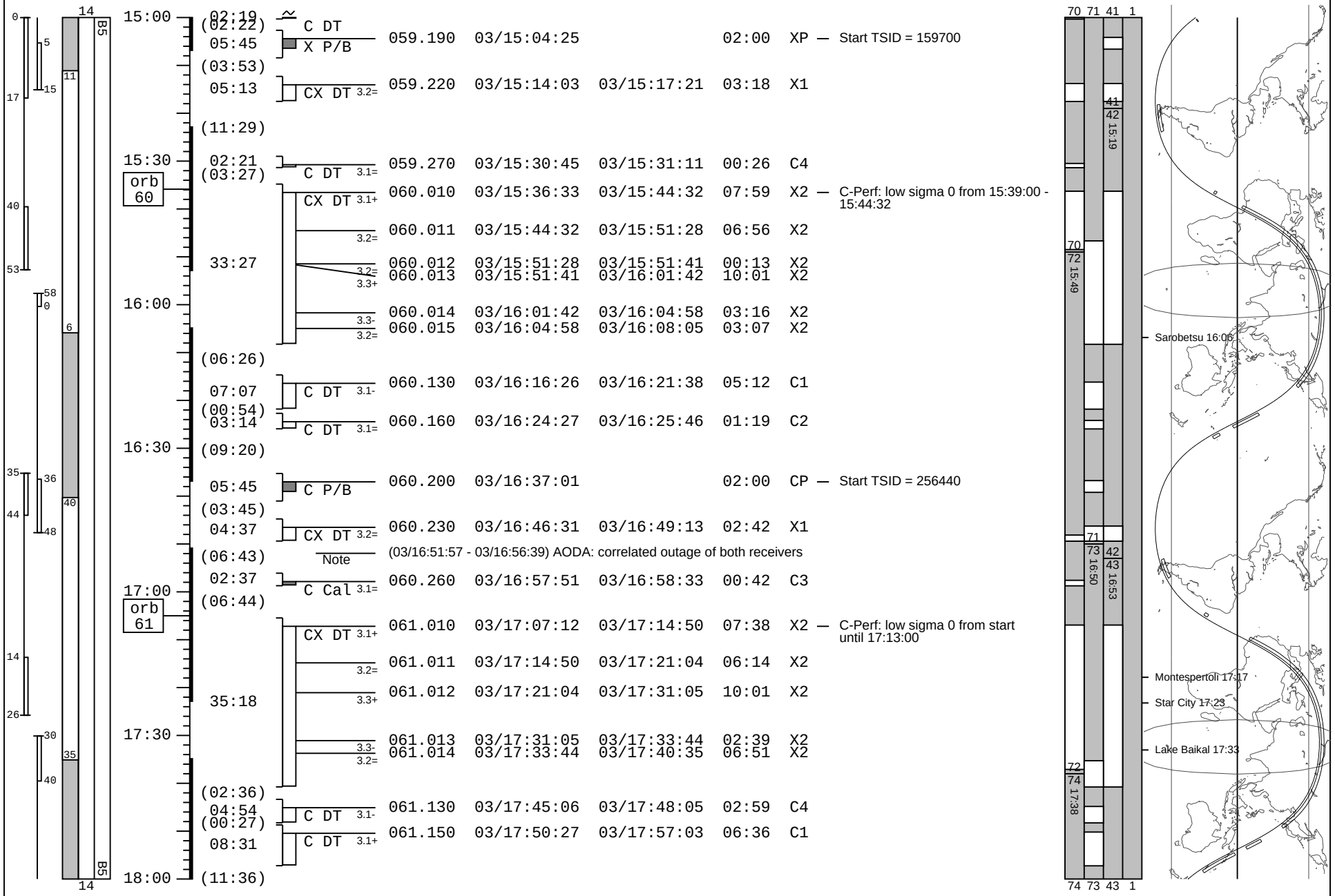




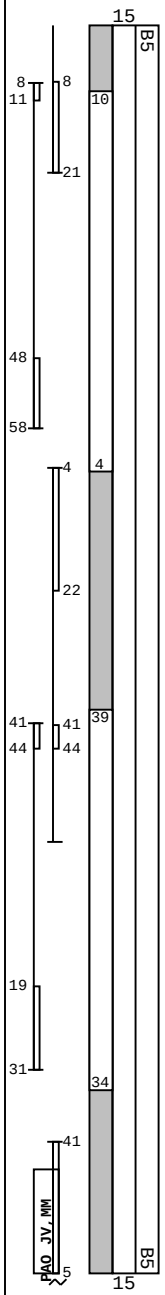
STS-99 As-Flown Mission Timeline



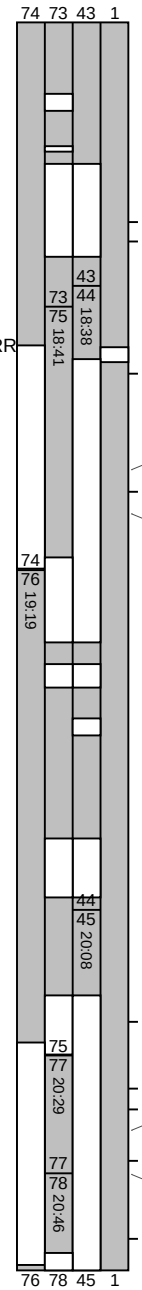
STS-99 As-Flown Mission Timeline

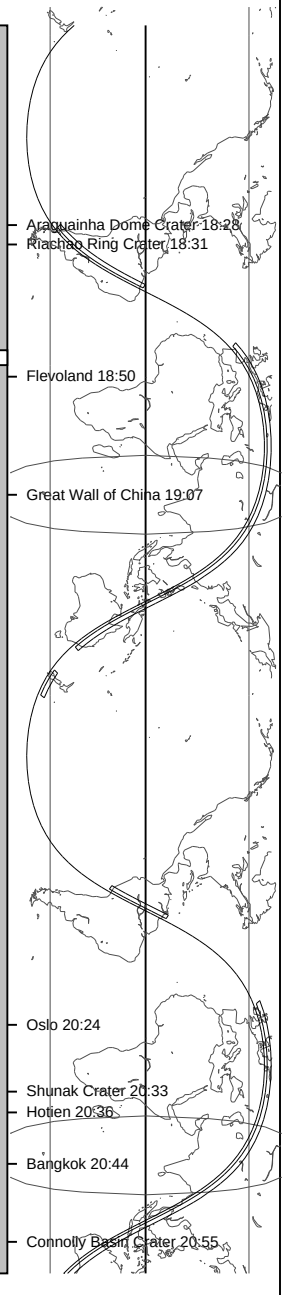


STS-99 As-Flown Mission Timeline

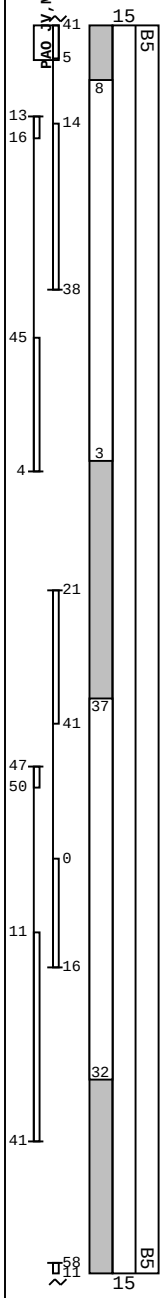


Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
061.210	03/18:10:34		02:00	CP —	Start TSID = 135200
061.240	03/18:18:07	03/18:18:27	00:20	C4 —	HPA TR4
061.250	03/18:20:40	03/18:21:37	00:57	C2	
061.251	03/18:21:37	03/18:31:38	10:01	C2	
061.252	03/18:31:38	03/18:33:37	01:59	C2	
062.040	03/18:46:51	03/18:49:28	02:37	X1 —	C-Data: X data not recorded on PHRR 3 from 18:46:51 - 18:48:34
062.041	03/18:49:28	03/18:49:52	00:24	X1	
062.042	03/18:49:52	03/18:59:53	10:01	X1	
062.043	03/18:59:53	03/19:02:47	02:54	X1	
062.044	03/19:02:47	03/19:10:39	07:52	X1	
062.045	03/19:10:39	03/19:20:40	10:01	X1	
062.046	03/19:20:40	03/19:29:14	08:34	X1	
	(03/18:49:00) Libr: MAR powered down after 62.040				
062.190	03/19:32:49	03/19:35:45	02:56	C3	
062.240	03/19:40:39		02:00	XP —	Start TSID = 195000
062.270	03/19:57:58	03/19:59:08	01:10	C4	
062.271	03/19:59:08	03/20:06:01	06:53	C4	
063.060	03/20:20:36	03/20:30:37	10:01	X2	
063.061	03/20:30:37	03/20:32:44	02:07	X2	
063.062	03/20:32:44	03/20:37:08	04:24	X2	
063.063	03/20:37:08	03/20:38:37	01:29	X2	
063.064	03/20:38:37	03/20:40:15	01:38	X2	
063.065	03/20:40:15	03/20:50:16	10:01	X2	
063.066	03/20:50:16	03/21:00:17	10:01	X2	
	(03/20:45:00) Libr: crew observed problem with PHRR 2 BIT and changed tapes again				

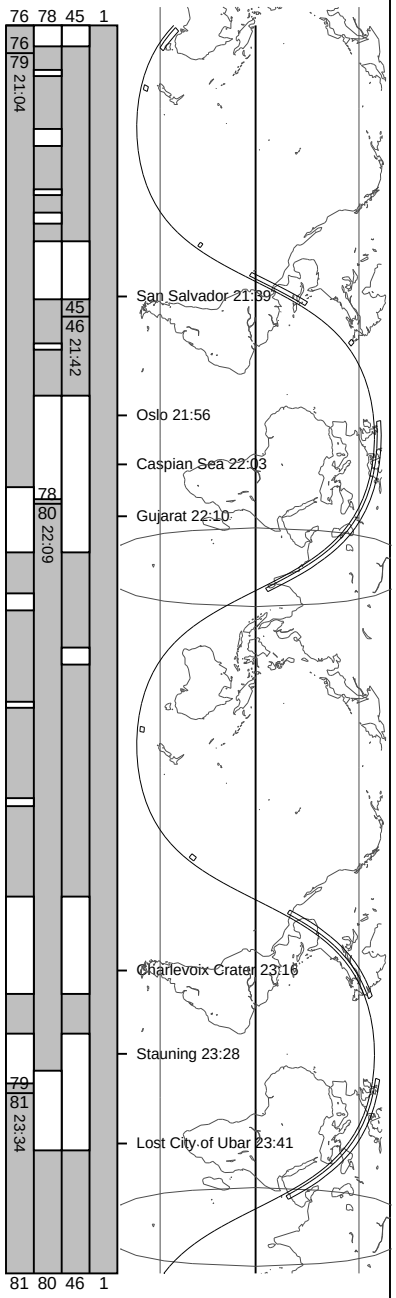




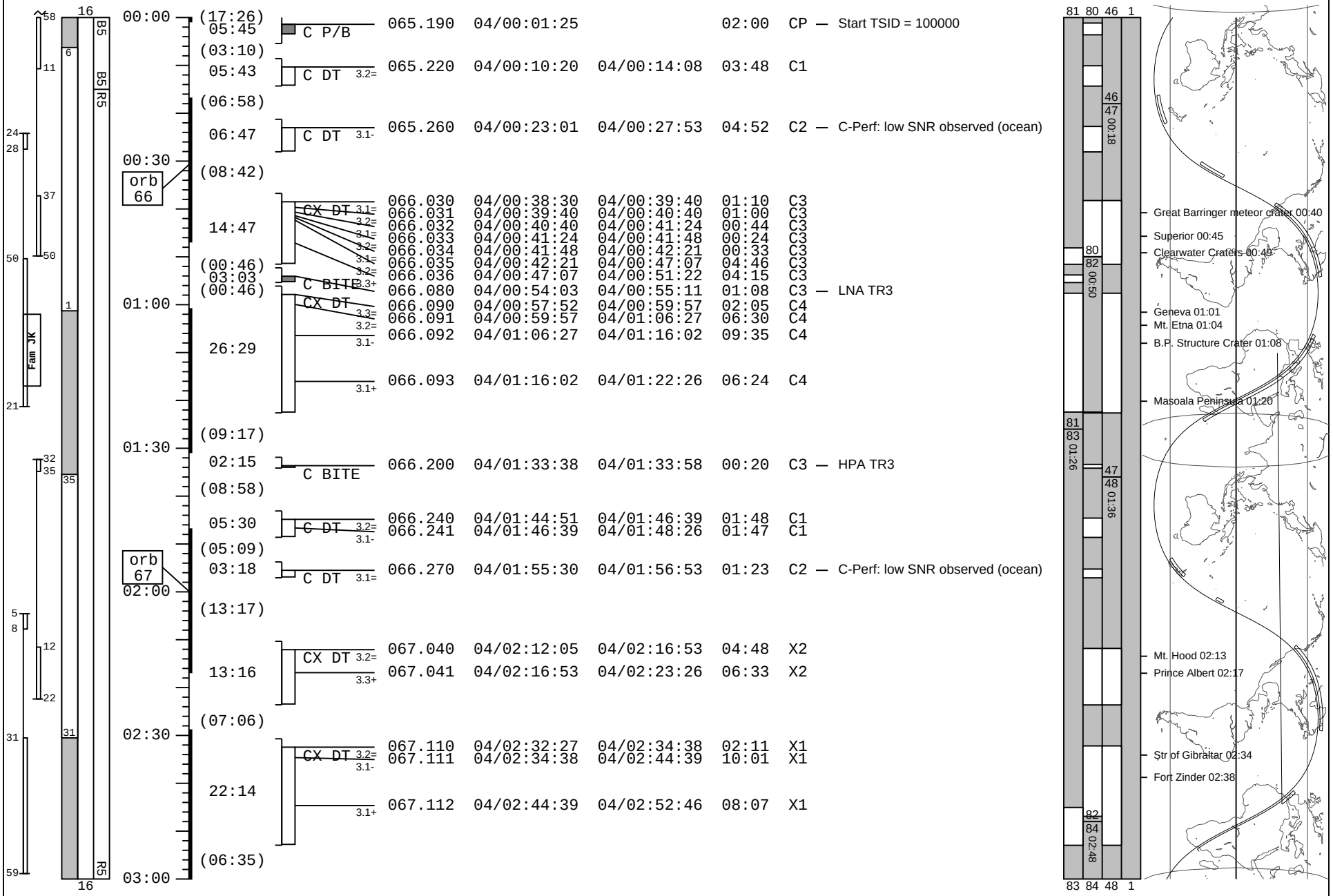
STS-99 As-Flown Mission Timeline



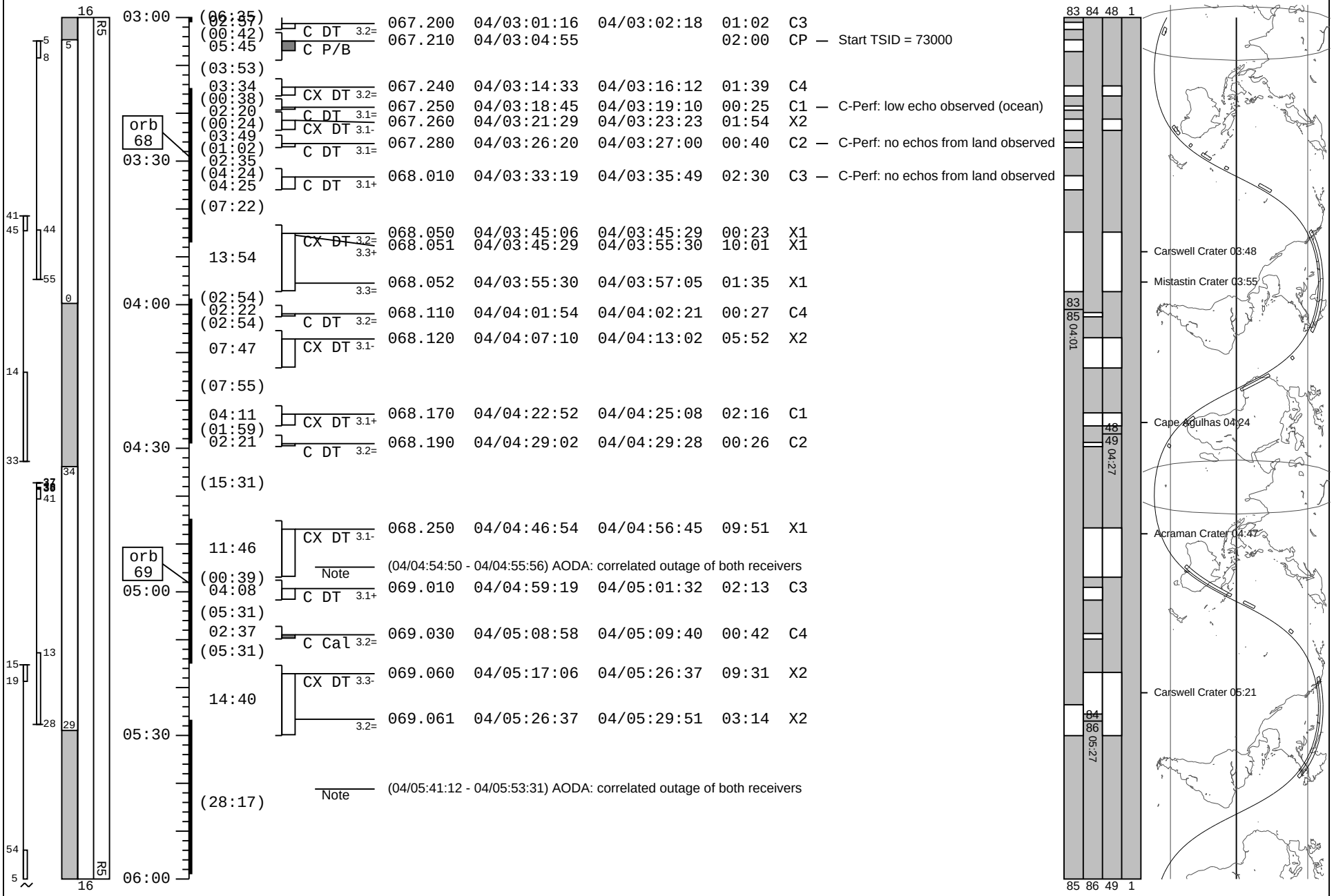
MET day 03	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
21:00	44:09	CX DT 3.1=	063.067	03/21:00:17	03/21:01:27	01:10	X2	— C-Perf: low echo observed (ocean)
	(01:56)	3.2=	063.068	03/21:01:27	03/21:02:50	01:23	X2	
	02:21	C DT 3.2=	063.200	03/21:06:41	03/21:07:07	00:26	C1	— C-Perf: low echo observed (ocean)
	(06:10)							
	05:45	C P/B	063.230	03/21:15:12		02:00	CP	— Start TSID = 47200
	(02:57)							
	02:18		063.260	03/21:23:54	03/21:24:17	00:23	C2	— C-Perf: low echo observed
	(01:04)	C DT 3.1=	063.270	03/21:27:16	03/21:28:24	01:08	C4	— LNA TR4
	03:03	C BITE						
21:30	(01:05)	CX DT 3.1+	063.280	03/21:31:24	03/21:38:19	06:55	X1	
orb 64	09:50	3.1=	063.281	03/21:38:19	03/21:39:19	01:00	X1	
	(04:54)							
	02:22	C DT 3.2=	064.040	03/21:46:08	03/21:46:35	00:27	C3	
	(05:10)							
		CX DT 3.3-	064.070	03/21:53:40	03/22:02:11	08:31	C4	
22:00		3.2=	064.071	03/22:02:11	03/22:07:04	04:53	C4	
	24:04	3.1-	064.072	03/22:07:04	03/22:15:49	08:45	C4	
		Note	(03/22:14:10 - 03/22:21:11) AODA: correlated outage of both receivers					
	(04:27)							
	05:45	C P/B	064.160	03/22:22:11		02:00	CP	— Start TSID = 68000
	(02:04)							
22:30	05:45	X P/B	064.190	03/22:30:00		02:00	XP	— Start TSID = 94500
	(02:04)							
	02:20	C DT 3.2=	064.210	03/22:37:49	03/22:38:14	00:25	C1	
	(11:34)							
	02:37	C Cal 3.1=	064.260	03/22:51:43	03/22:52:25	00:42	C2	
	(11:35)							
23:00			065.010	03/23:05:55	03/23:07:56	02:01	X2	
orb 65		CX DT 3.1=	065.011	03/23:07:56	03/23:10:27	02:31	X2	
	15:30	3.1+	065.012	03/23:10:27	03/23:18:08	07:41	X2	
		3.2=						
		3.3+	065.013	03/23:18:08	03/23:19:30	01:22	X2	
	(04:16)							
		CX DT 3.3-	065.080	03/23:25:41	03/23:30:34	04:53	X1	
23:30		3.2=	065.081	03/23:30:34	03/23:37:16	06:42	X1	
	18:18	3.1-	065.082	03/23:37:16	03/23:42:04	04:48	X1	
	(17:26)							
00:00								



STS-99 As-Flown Mission Timeline

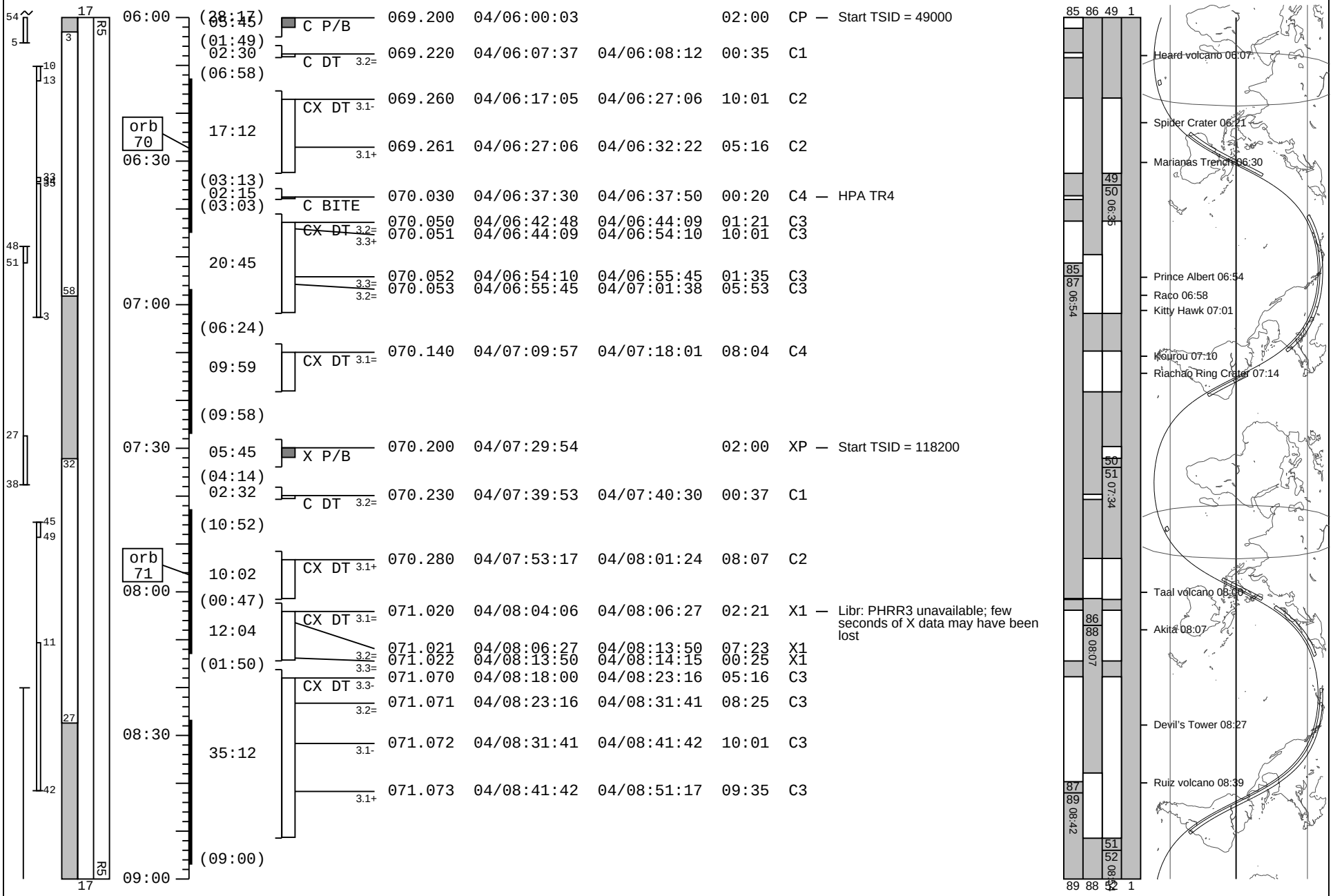


STS-99 As-Flown Mission Timeline

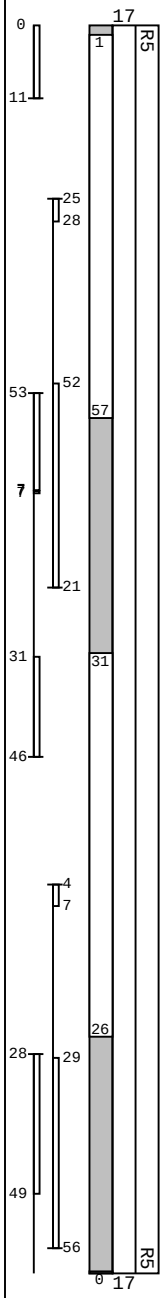


Event	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
C DT 3.2=	067.200	04/03:01:16	04/03:02:18	01:02	C3	
C P/B	067.210	04/03:04:55		02:00	CP	— Start TSID = 73000
CX DT 3.2=	067.240	04/03:14:33	04/03:16:12	01:39	C4	
C DT 3.1=	067.250	04/03:18:45	04/03:19:10	00:25	C1	— C-Perf: low echo observed (ocean)
CX DT 3.1-	067.260	04/03:21:29	04/03:23:23	01:54	X2	
C DT 3.1=	067.280	04/03:26:20	04/03:27:00	00:40	C2	— C-Perf: no echos from land observed
C DT 3.1+	068.010	04/03:33:19	04/03:35:49	02:30	C3	— C-Perf: no echos from land observed
CX DT 3.2=	068.050	04/03:45:06	04/03:45:29	00:23	X1	
CX DT 3.3+	068.051	04/03:45:29	04/03:55:30	10:01	X1	
3.3=	068.052	04/03:55:30	04/03:57:05	01:35	X1	
C DT 3.2=	068.110	04/04:01:54	04/04:02:21	00:27	C4	
CX DT 3.1-	068.120	04/04:07:10	04/04:13:02	05:52	X2	
CX DT 3.1+	068.170	04/04:22:52	04/04:25:08	02:16	C1	
C DT 3.2=	068.190	04/04:29:02	04/04:29:28	00:26	C2	
CX DT 3.1-	068.250	04/04:46:54	04/04:56:45	09:51	X1	
Note						(04/04:54:50 - 04/04:55:56) AODA: correlated outage of both receivers
C DT 3.1+	069.010	04/04:59:19	04/05:01:32	02:13	C3	
C Cal 3.2=	069.030	04/05:08:58	04/05:09:40	00:42	C4	
CX DT 3.3-	069.060	04/05:17:06	04/05:26:37	09:31	X2	
3.2=	069.061	04/05:26:37	04/05:29:51	03:14	X2	
Note						(04/05:41:12 - 04/05:53:31) AODA: correlated outage of both receivers

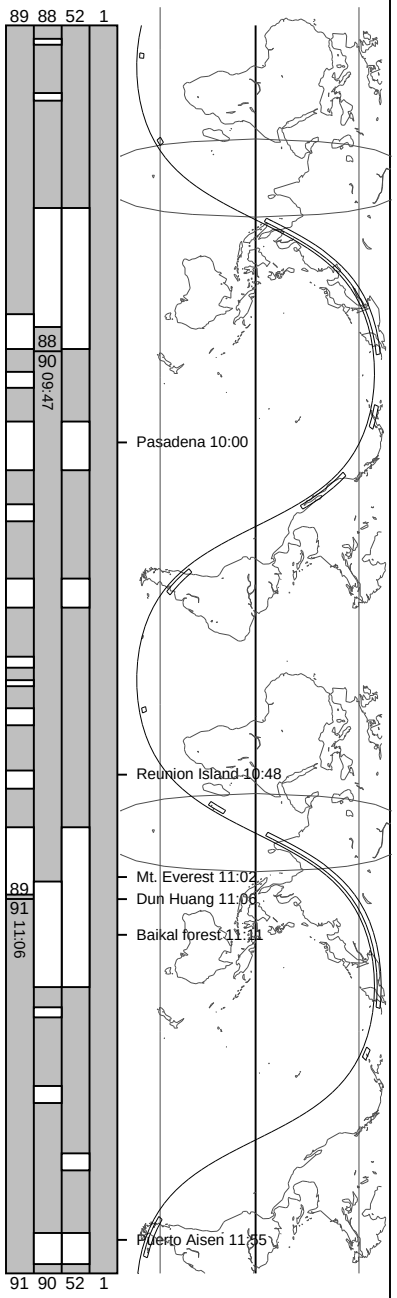
STS-99 As-Flown Mission Timeline



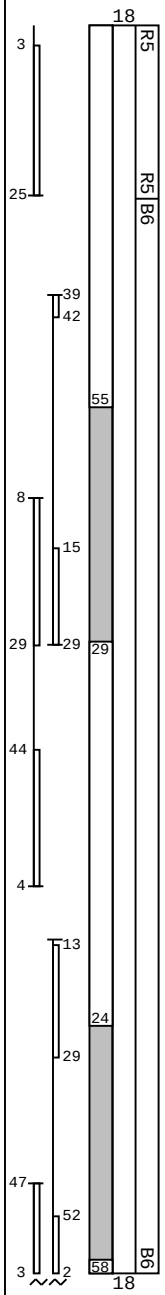
STS-99 As-Flown Mission Timeline



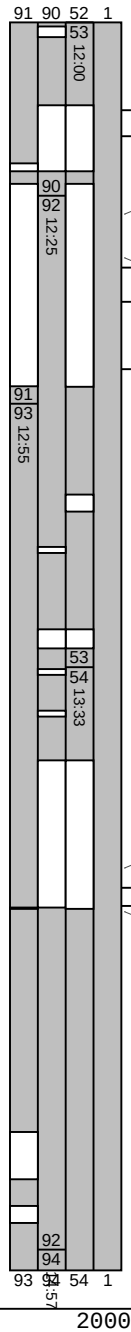
MET day 04	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
09:00	(09:00)							
	02:19	C DT 3.2=	071.210	04/09:02:12	04/09:02:36	00:24	C4	
	(05:30)							
	02:34	C DT 3.2=	071.240	04/09:10:01	04/09:10:40	00:39	C1	
	(14:01)							
orb 72								
09:30		CX DT 3.1+	072.010	04/09:26:36	04/09:35:34	08:58	X2	
	21:48	3.2=	072.011	04/09:35:34	04/09:43:01	07:27	X2	
		3.3+	072.012	04/09:43:01	04/09:46:29	03:28	X2	
	(01:50)							
	03:46	C DT 3.3=	072.080	04/09:50:14	04/09:52:05	01:51	C2	
	(03:24)							
		CX DT 3.2=	072.100	04/09:57:24	04/09:59:52	02:28	C3	
10:00	08:29	3.1-	072.101	04/09:59:52	04/10:03:58	04:06	C3	
	(03:27)							
	05:45	C P/B	072.140	04/10:09:20		02:00	CP	— Start TSID = 96500
	(04:58)							
	05:39	CX DT 3.1=	072.180	04/10:20:03	04/10:22:33	02:30	C3	
		3.1=	072.181	04/10:22:33	04/10:23:47	01:14	C3	
	(05:37)							
10:30	03:03	C BITE	072.210	04/10:31:19	04/10:32:27	01:08	C4	— LNA TR4
	(00:20)		072.220	04/10:34:42	04/10:35:07	00:25	C4	
	02:20	C DT 3.2=						
	(01:43)		072.240	04/10:38:45		02:00	CP	— Start TSID = 185000
	05:45	C P/B						
	(03:14)							
	04:05	C DT 3.1-	072.270	04/10:47:44	04/10:49:54	02:10	C1	
	(04:06)							
orb 73								
11:00		CX DT 3.1+	073.010	04/10:55:55	04/11:02:40	06:45	X2	
		3.1+	073.011	04/11:02:40	04/11:06:33	03:53	X2	
	24:31	3.2=	073.012	04/11:06:33	04/11:13:39	07:06	X2	
		3.3+	073.013	04/11:13:39	04/11:18:31	04:52	X2	
	(01:27)							
	02:55	C DT 3.2=	073.090	04/11:21:53	04/11:22:53	01:00	C2	
	(08:26)							
11:30								
	05:45	C P/B	073.120	04/11:33:14		02:00	CP	— Start TSID = 141900
	(03:58)							
		Note		(04/11:40:47 - 04/11:41:18) AODA: correlated outage of both receivers				
	05:45	X P/B	073.160	04/11:42:57		02:00	XP	— Start TSID = 242600
	(05:44)							
	05:57	CX DT 3.2=	073.190	04/11:54:26	04/11:58:28	04:02	X1	
12:00	(00:28)							

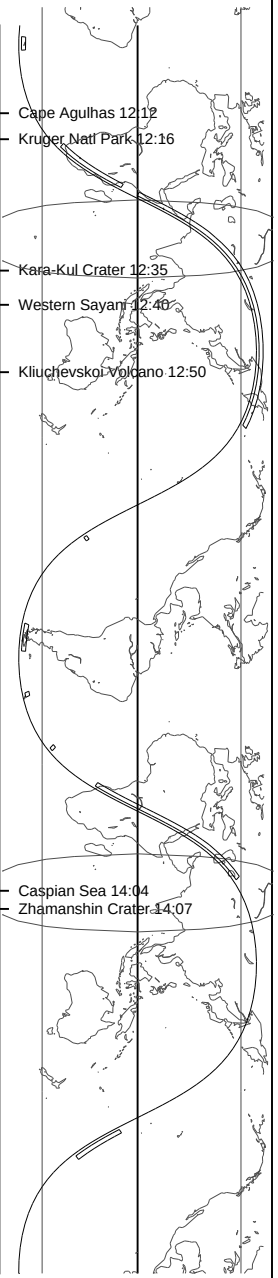


STS-99 As-Flown Mission Timeline

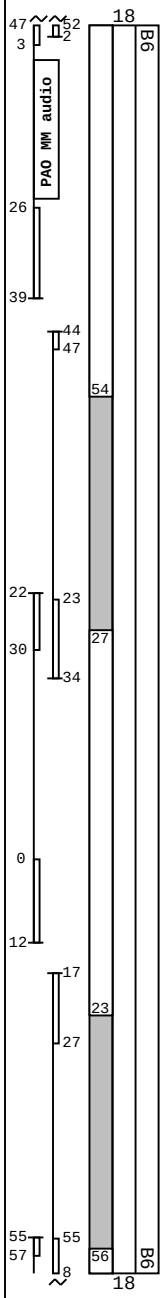


MET day 04	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
12:00	(00:28)							
	03:00	C DT 3.2=	073.210	04/12/00:00:51	04/12/01:00:56	01:05	C1	
	(08:22)							
	10:59	CX DT 3.1-	073.250	04/12/12:13	04/12/21:17	09:04	C2	
orb 74	(00:21)							
		CX DT 3.1+	073.290	04/12/23:33	04/12/33:34	10:01	C3	
12:30								
		3.1+	073.291	04/12/33:34	04/12/36:23	02:49	C3	
	30:44	3.2=	073.292	04/12/36:23	04/12/42:34	06:11	C3	
		3.3=	073.293	04/12/42:34	04/12/52:00	09:26	C3	
		3.2=	073.294	04/12/52:00	04/12/52:22	00:22	C3	
13:00	(14:05)							
	05:45	X P/B	074.140	04/13:08:22		02:00	XP	— Start TSID = 167900
	(01:48)							
	02:20	Note						(04/13:14:22 - 04/13:20:15) AODA: correlated outage of both receivers
	(09:33)	C DT 3.1=	074.170	04/13:15:55	04/13:16:20	00:25	C4	
	04:13	CX DT 3.2=	074.210	04/13:27:48	04/13:30:06	02:18	C4	
13:30	(01:31)							
	02:18	C DT 3.2=	074.230	04/13:33:32	04/13:33:55	00:23	C1	
	(03:42)							
	02:19	C DT 3.1-	074.240	04/13:39:32	04/13:39:56	00:24	C2	
	(04:51)							
		CX DT 3.1-	074.270	04/13:46:42	04/13:54:28	07:46	X2	
orb 75								
	22:53	3.1+	074.271	04/13:54:28	04/14:04:00	09:32	X2	
14:00								
		3.2=	074.272	04/14:04:00	04/14:07:40	03:40	X2	
		Trim-4	Trim-4	04/14:07:40	04/14:42:10	34:30	--	— 3.01 fps; TIG@14:22:40, B13@14:40:10, A11@14:42:10
	34:30							
14:30								
	08:17	C DT 3.1+	075.150	04/14:40:18	04/14:46:40	06:22	C4	— C-Perf: shuttle out of attitude at start (Motu One); good after 14:42:20
	(02:23)							
	05:45	C P/B	075.190	04/14:50:58		02:00	CP	— CB, start TSID = 203150
	(03:53)							
15:00								



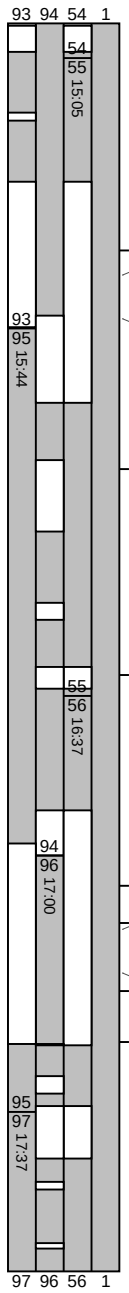


STS-99 As-Flown Mission Timeline

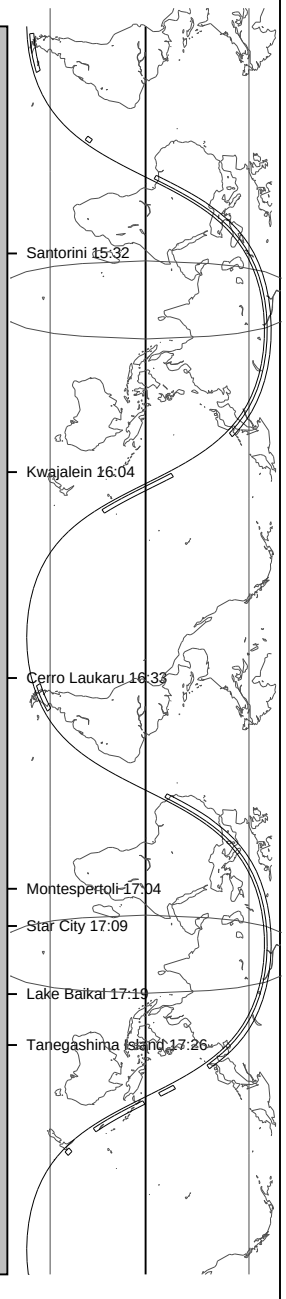


MET day 04	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
15:00	(03:53)							
	05:14	CX DT 3.2=	075.220	04/15:00:36	04/15:03:55	03:19	X1	
	(07:18)							
	02:37	C Cal 3.1-	075.260	04/15:13:08	04/15:13:50	00:42	C4 —	C-Perf: low sigma 0 observed
	(07:21)							
orb 76		CX DT 3.1+	076.010	04/15:23:06	04/15:30:31	07:25	X2 —	C-Perf: low sigma 0 observed from 15:26 - 15:28
15:30		3.2=	076.011	04/15:30:31	04/15:38:41	08:10	X2	
	33:21	3.3=	076.012	04/15:38:41	04/15:48:37	09:56	X2	
		Note 3.2=	076.013	04/15:48:37	04/15:54:32	05:55	X2	(04/15:43:40 - 04/15:49:58) AODA: correlated outage of both receivers
	(06:48)							
16:00		C DT 3.1=	076.130	04/16:03:15	04/16:13:06	09:51	C1	
	11:46							
	(08:49)							
	05:45	C P/B	076.200	04/16:23:50		02:00	CP —	Start TSID = 202300
	(03:30)							
16:30	04:36	CX DT 3.2=	076.230	04/16:33:05	04/16:35:46	02:41	C2	
	(16:05)							
orb 77		CX DT 3.1+	077.010	04/16:53:46	04/17:00:53	07:07	X1 —	C-Perf: low sigma 0 observed from 16:56:30 - 16:59:40
17:00		3.2=	077.011	04/17:00:53	04/17:08:08	07:15	X1	
	35:21	3.3=	077.012	04/17:08:08	04/17:18:06	09:58	X1	
		3.2=	077.013	04/17:18:06	04/17:26:12	08:06	X1	
		3.1-	077.014	04/17:26:12	04/17:27:12	01:00	X1	
	(02:59)							
17:30	03:59	Note						(04/17:32:00 - 04/18:11:00) AMS: cold gas cycling conducted; JV observes particle exiting payload bay
	(00:20)	C Note 3.1-	077.130	04/17:32:06	04/17:34:10	02:04	C3	
	09:02	CX DT 3.1+	077.150	04/17:36:25	04/17:43:32	07:07	C4	(04/17:33:43 - 04/17:40:58) AODA: correlated outage of both receivers
	(01:54)							
	02:34	C DT 3.1=	077.180	04/17:47:21	04/17:48:00	00:39	C1	
	(06:16)							
	02:15	C BITE	077.210	04/17:56:11	04/17:56:31	00:20	C3 —	HPA TR3
18:00	(09:15)							

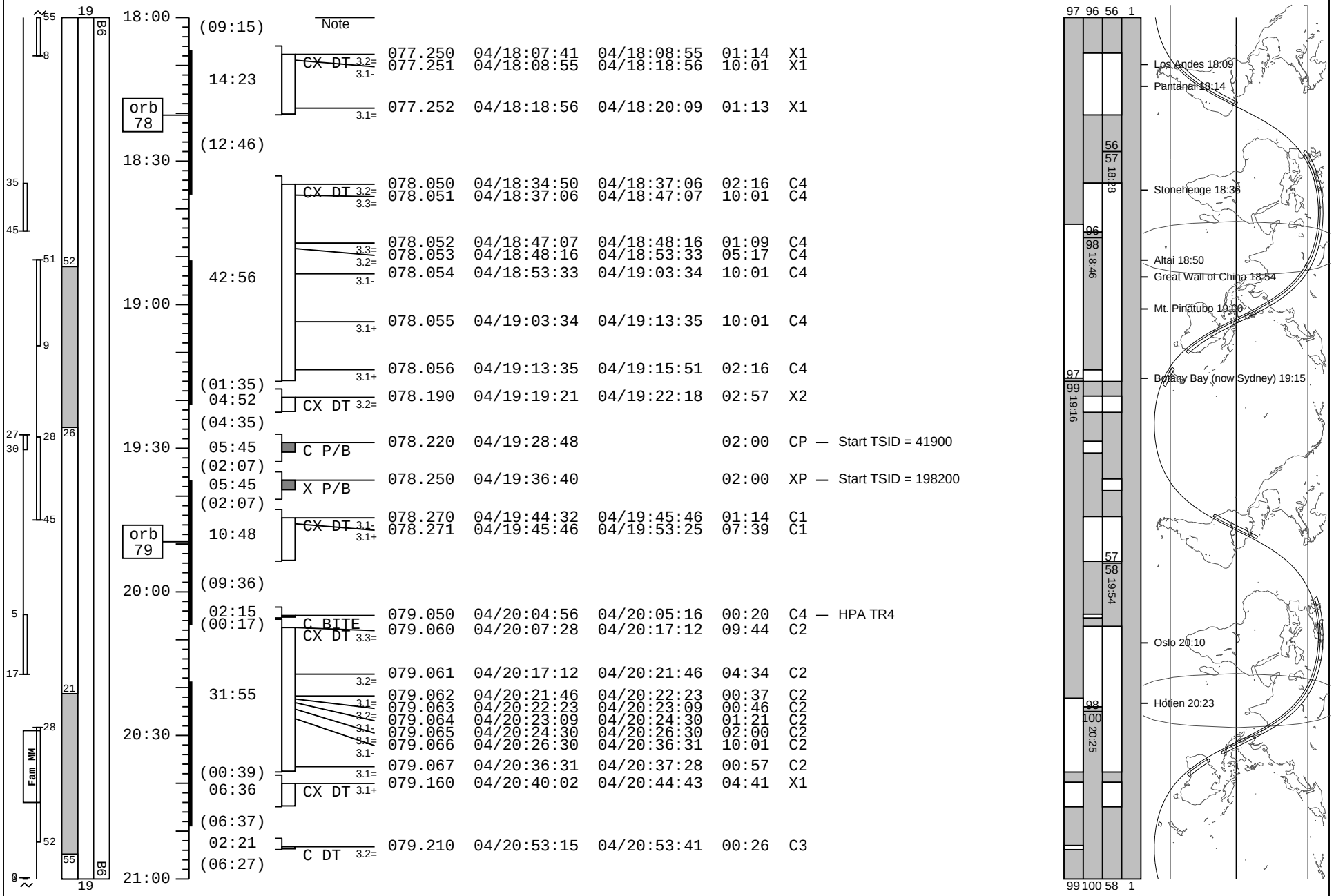
PHRRs 1 2 3 4



Map



STS-99 As-Flown Mission Timeline



STS-99 As-Flown Mission Timeline

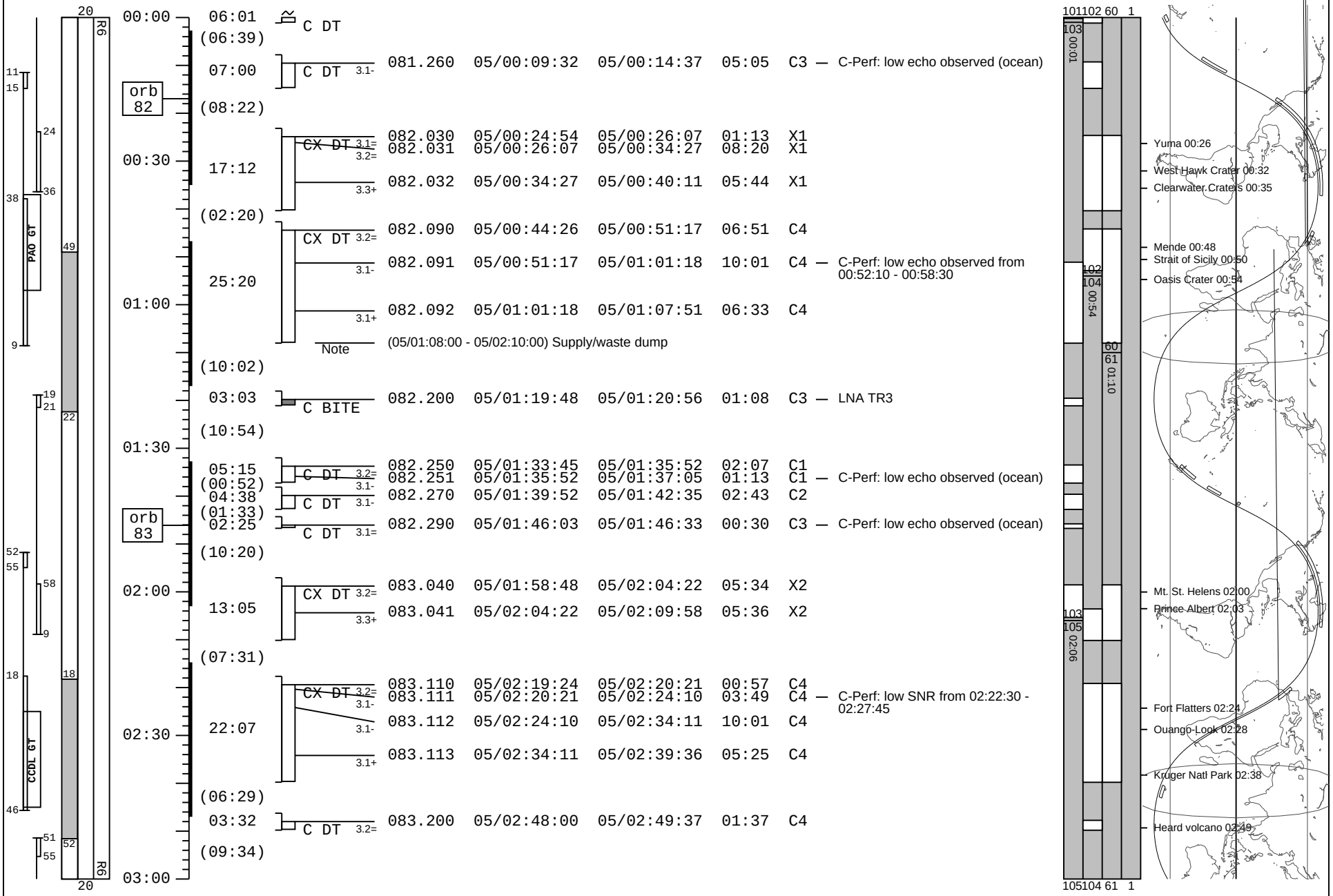
TDR E	TDR W	Sun	Seq	Crw	MET day 04	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
					21:00	(06:27)							
						05:45	C P/B	079.230	04/21:02:03		02:00	CP	— Start TSID = 185400
						(01:57)							
						02:22	C DT 3.1-	079.260	04/21:09:45	04/21:10:12	00:27	C4	
						(05:30)							
					orb 80		CX DT 3.1+	079.280	04/21:17:37	04/21:26:01	08:24	X2	
						10:19							
						(04:28)							
					21:30	03:03	C DT 3.2=	080.040	04/21:32:24	04/21:33:32	01:08	C1	
						(04:53)							
							CX DT 3.3-	080.070	04/21:40:20	04/21:46:09	05:49	C2	
							3.2=	080.071	04/21:46:09	04/21:52:15	06:06	C2	
						23:54	3.1-	080.072	04/21:52:15	04/22:02:19	10:04	C2	
					22:00								
						(12:35)							
						05:45	X P/B	080.190	04/22:16:49		02:00	XP	— Start TSID = 93800
						(01:48)							
						02:20	C DT 3.2=	080.210	04/22:24:22	04/22:24:47	00:25	C3	
					22:30	(08:11)							
						03:03	C BITE	080.250	04/22:34:53	04/22:36:01	01:08	C4	— LNA TR4
						(01:41)							
						02:43	C DT 3.1-	080.260	04/22:39:37	04/22:40:25	00:48	C4	— C-Perf: low echo observed (ocean)
						(10:01)							
					orb 81								
							CX DT 3.1+	081.010	04/22:52:21	04/22:55:39	03:18	X1	
							3.1=	081.011	04/22:55:39	04/22:56:34	00:55	X1	
					23:00	15:37	3.2=	081.012	04/22:56:34	04/23:05:25	08:51	X1	
							3.3+	081.013	04/23:05:25	04/23:06:03	00:38	X1	
						(04:17)							
							CX DT 3.3=	081.080	04/23:12:15	04/23:15:07	02:52	X2	
							3.2=	081.081	04/23:15:07	04/23:21:06	05:59	X2	
						19:10	3.1-	081.082	04/23:21:06	04/23:29:30	08:24	X2	— C-Perf: low sigma 0 observed
					23:30								
						(05:29)							
						02:37	C Cal 3.1=	081.160	04/23:36:54	04/23:37:36	00:42	C1	
							Note	(04/23:42:13 - 04/23:47:31) AODA: correlated outage of both receivers					
						(17:21)							
					00:00	06:01	C DT 3.2=	081.220	04/23:56:52	05/00:00:58	04:06	C2	— C-Perf: low echo observed (ocean)

PHRRs 1 2 3 4

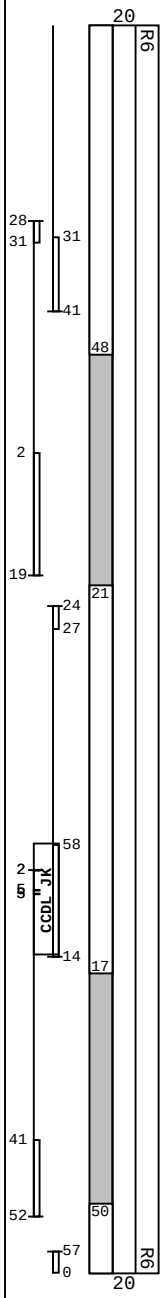
Map

Galapagos Islands 21:18
Oslo 21:42
Caspian Sea 21:49
Houston 22:56
New Madrid 22:58
Manicouagan Crater 23:03
Salzgitter 23:15
Palmyra 23:22

STS-99 As-Flown Mission Timeline

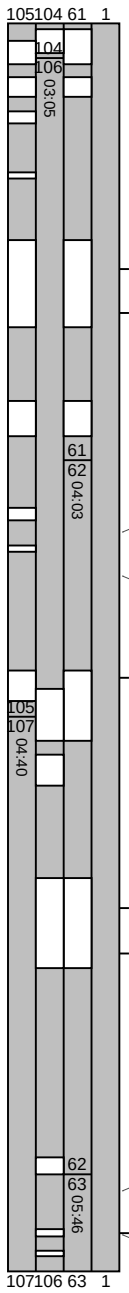


STS-99 As-Flown Mission Timeline

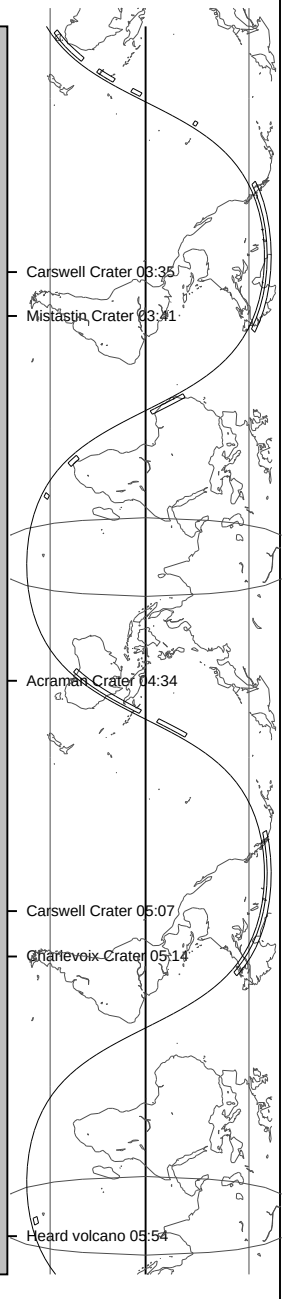


MET day 05	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
03:00	(09:34)							
	06:31	CX DT 3.2=	083.240	05/03:01:06	05/03:04:41	03:35	X2	
	(00:24)	3.1-	083.241	05/03:04:41	05/03:05:42	01:01	X2	— C-Perf: low echo observed (ocean)
	04:18	CX DT 3.1-	083.260	05/03:08:01	05/03:10:24	02:23	C1	
	(00:38)							
orb 84	03:12	C DT 3.1=	083.280	05/03:12:57	05/03:14:14	01:17	C2	
	(05:36)							
	02:21	C DT 3.1=	084.020	05/03:21:45	05/03:22:11	00:26	C3	— C-Perf: low echo observed (ocean)
	(07:25)							
03:30								
	14:02	CX DT 3.2=	084.050	05/03:31:31	05/03:34:23	02:52	X1	
		3.3=	084.051	05/03:34:23	05/03:41:28	07:05	X1	
		Note						
		3.2=	084.052	05/03:41:28	05/03:43:38	02:10	X1	
			(05/03:36:12 - 05/03:40:58) AODA: correlated outage of both receivers					
	(09:10)							
	06:33	CX DT 3.1-	084.130	05/03:54:43	05/03:59:21	04:38	C4	
04:00								
	(08:52)	Note	(05/04:04:40 - 05/04:27:44) AODA: correlated outage of both receivers					
	03:16	C DT 3.1+	084.180	05/04:10:08	05/04:11:29	01:21	C1	
	(02:10)							
	02:22	C DT 3.2=	084.190	05/04:15:34	05/04:16:01	00:27	C2	
	(15:40)							
04:30								
	11:36	CX DT 3.1-	084.250	05/04:33:36	05/04:43:17	09:41	X2	
orb 85	(00:32)							
	05:56	C DT 3.1+	085.010	05/04:45:44	05/04:49:45	04:01	C3	— C-Perf: low echo observed (ocean)
	(11:52)	Note	(05/04:55:00 - 05/05:40:00) Supply/waste dump					
05:00								
	14:27	CX DT 3.3=	085.060	05/05:03:32	05/05:11:16	07:44	X1	
		3.2=	085.061	05/05:11:16	05/05:16:04	04:48	X1	
	(25:50)							
05:30								
	05:45	C P/B	085.190	05/05:43:49		02:00	CP	— Start TSID = 219000
	(04:36)							
	02:31	C DT 3.2=	085.230	05/05:54:10	05/05:54:46	00:36	C4	
	(00:36)	C BITE	085.240	05/05:57:17	05/05:57:37	00:20	C3	— HPA TR3
	02:15							
06:00	(04:18)							

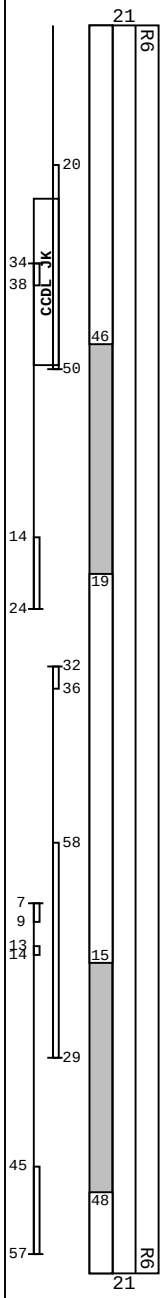
PHRRs 1 2 3 4



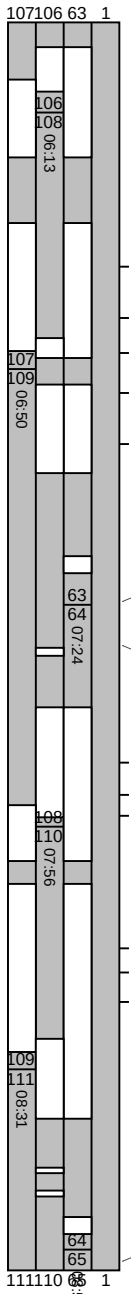
Map

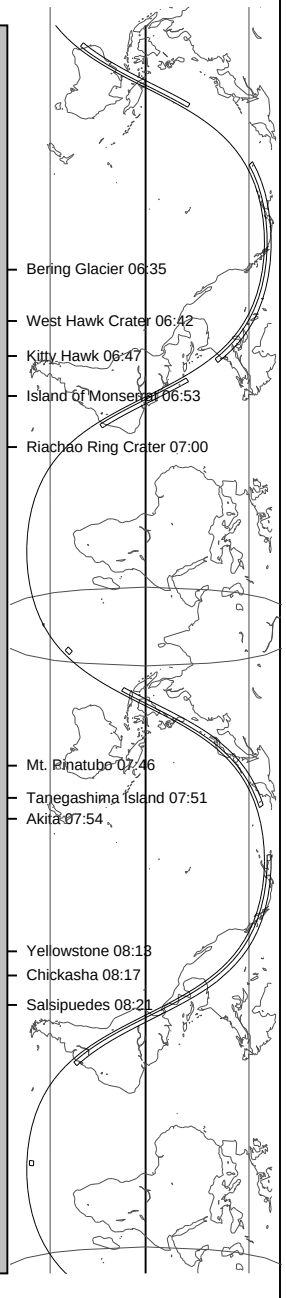


STS-99 As-Flown Mission Timeline

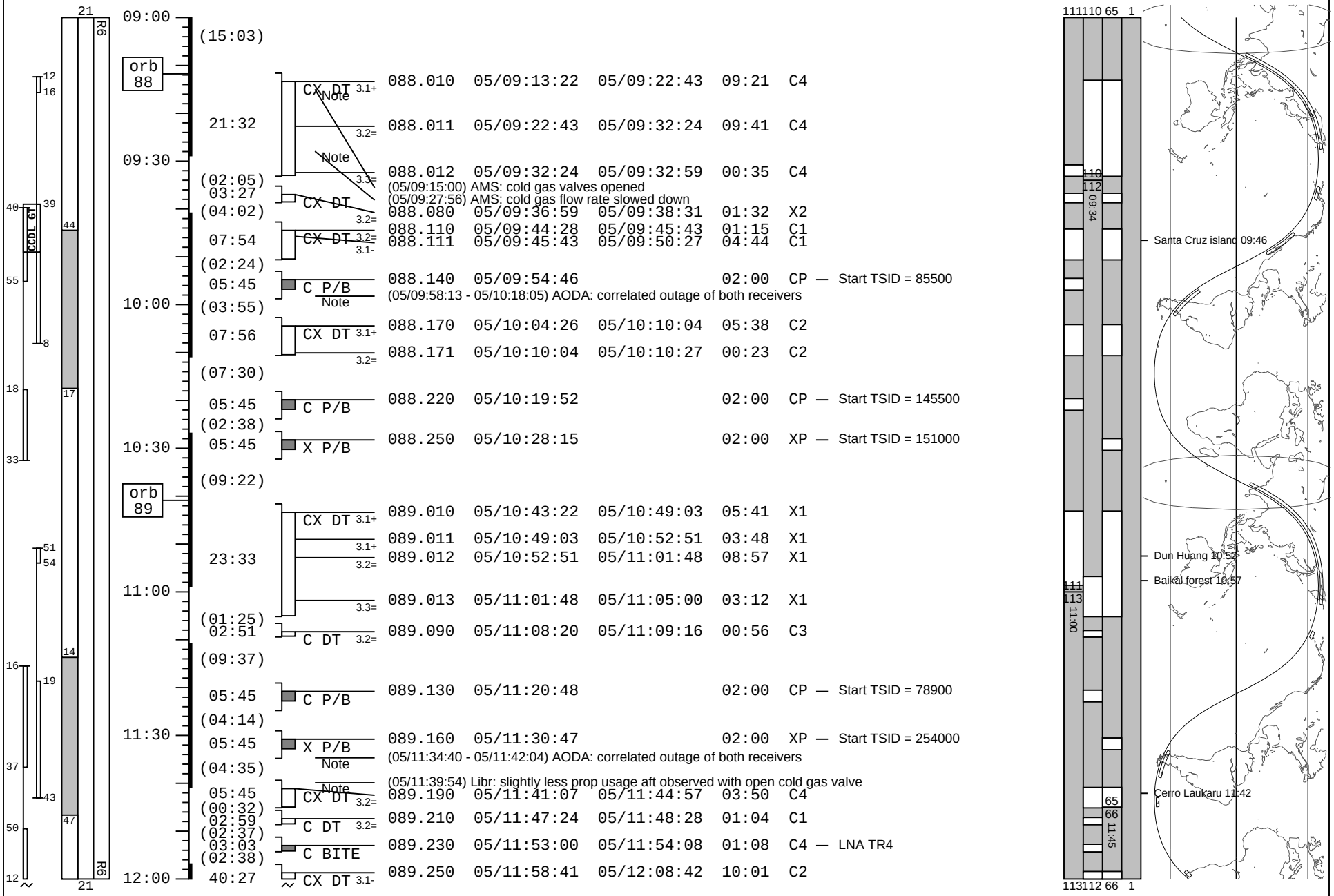


TDR E W	Sun	Seq	Crw	MET day 05	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
				06:00	(04:18)							
					17:22	CX DT 3.1-	085.260	05/06:03:50	05/06:13:51	10:01	X1	
				orb 86		3.1+	085.261	05/06:13:51	05/06:19:17	05:26	X1	
					(08:00)							
				06:30		CX DT 3.2=	086.050	05/06:29:12	05/06:32:28	03:16	C4	
						3.3=	086.051	05/06:32:28	05/06:37:27	04:59	C4	
					20:56	3.2=	086.052	05/06:37:27	05/06:45:48	08:21	C4	
						3.2=	086.053	05/06:45:48	05/06:48:13	02:25	C4	
					(02:22)							
					14:14	CX DT 3.1-	086.130	05/06:52:30	05/07:02:31	10:01	X2	
				07:00		Note 3.1+	086.131	05/07:02:31	05/07:04:49	02:18	X2	(05/07:00:32 - 05/07:08:06) AODA: correlated outage of both receivers
					(10:31)							
					05:45	X P/B	086.210	05/07:17:15		02:00	XP	— Start TSID = 212900
					(07:28)							
				07:30	02:37	C Cal 3.1-	086.250	05/07:30:28	05/07:31:10	00:42	C1	
					(05:58)							
				orb 87		CX DT 3.1+	086.280	05/07:39:03	05/07:49:04	10:01	C2	— C-Perf: saturation observed from 07:40:33 - 07:40:40
					23:38	3.1+	086.281	05/07:49:04	05/07:53:26	04:22	C2	— C-Perf: saturation observed from 07:52:34 - 07:53:03 and 07:55:23 - 07:55:33
						3.2=	086.282	05/07:53:26	05/08:00:46	07:20	C2	
				08:00	(01:50)							
						CX DT 3.3=	087.070	05/08:04:31	05/08:08:33	04:02	X1	
						3.2=	087.071	05/08:08:33	05/08:15:27	06:54	X1	
					35:20	3.1-	087.072	05/08:15:27	05/08:25:28	10:01	X1	
						3.1-	087.073	05/08:25:28	05/08:28:56	03:28	X1	— C-Perf: saturation observed from 08:25:58 - 08:26:18
				08:30		Note 3.1+	087.074	05/08:28:56	05/08:37:56	09:00	X1	(05/08:29:12 - 05/08:40:37) AODA: correlated outage of both receivers
					(05:36)							
					02:15		087.200	05/08:45:27	05/08:45:47	00:20	C4	— HPA TR4
					(01:03)	C BITE	087.210	05/08:48:45	05/08:49:09	00:24	C3	
					02:19	C DT 3.2=						
					(01:30)		087.230	05/08:52:34		02:00	XP	— Start TSID = 74342
					05:45	X P/B						
				09:00	(15:03)							

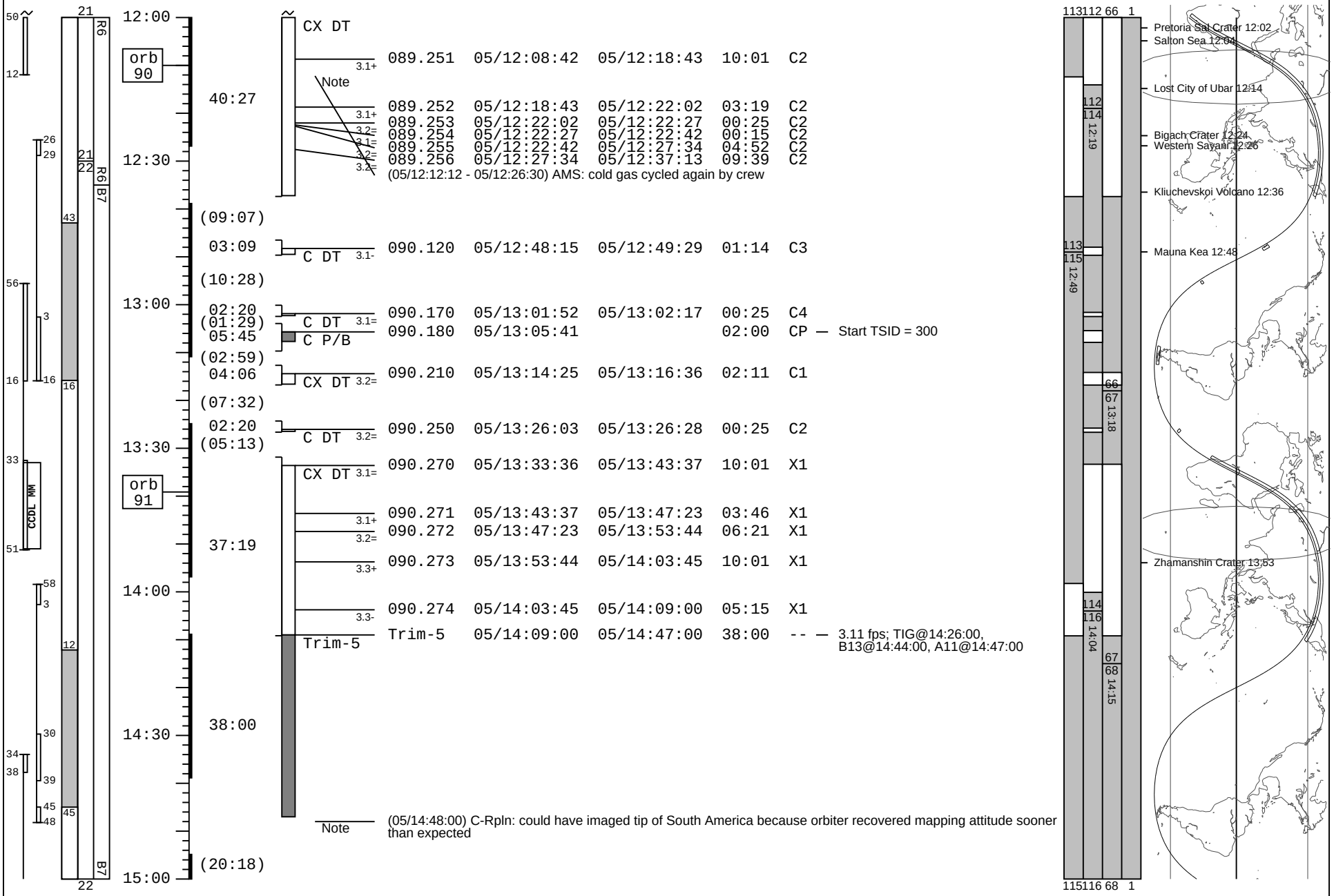




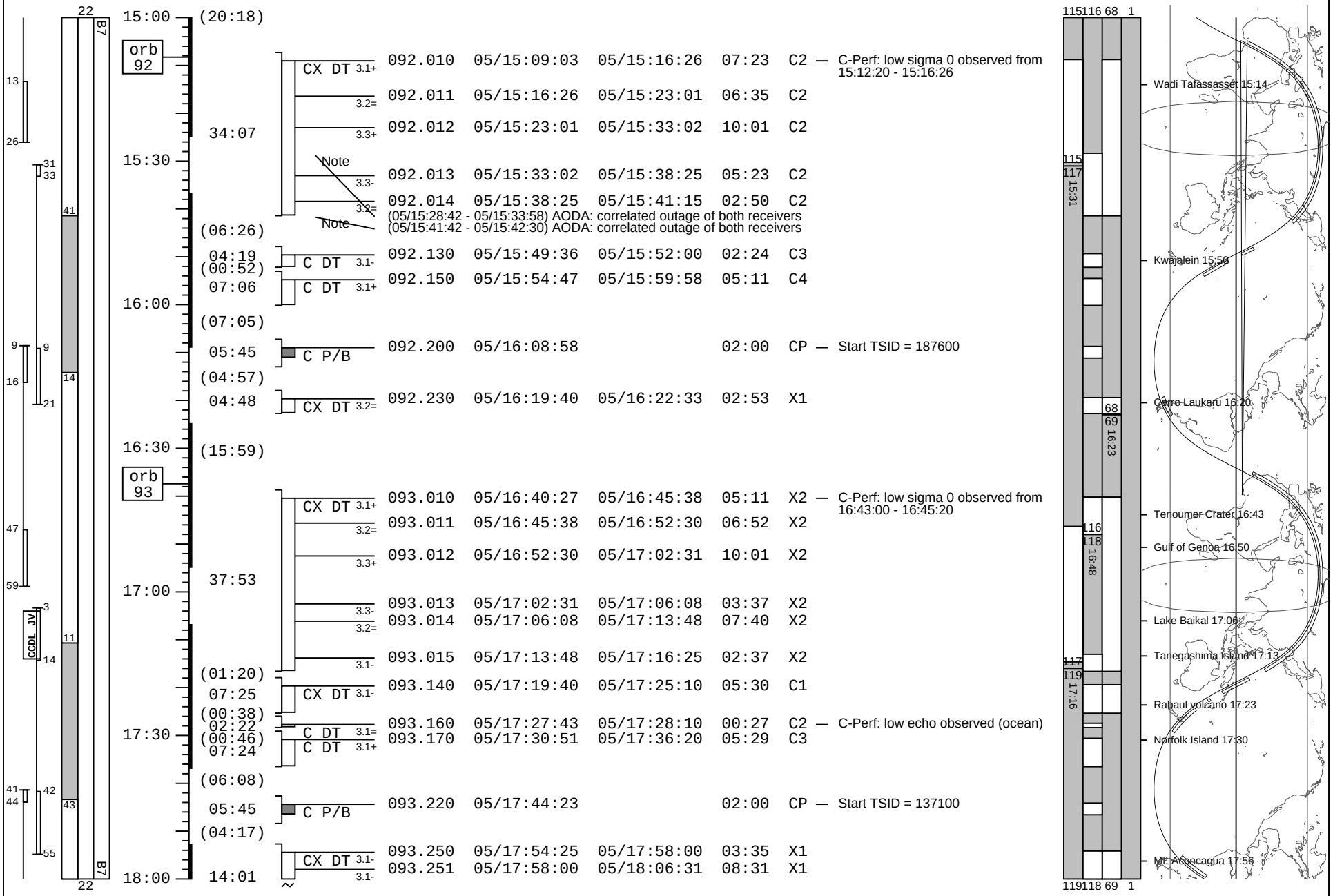
STS-99 As-Flown Mission Timeline



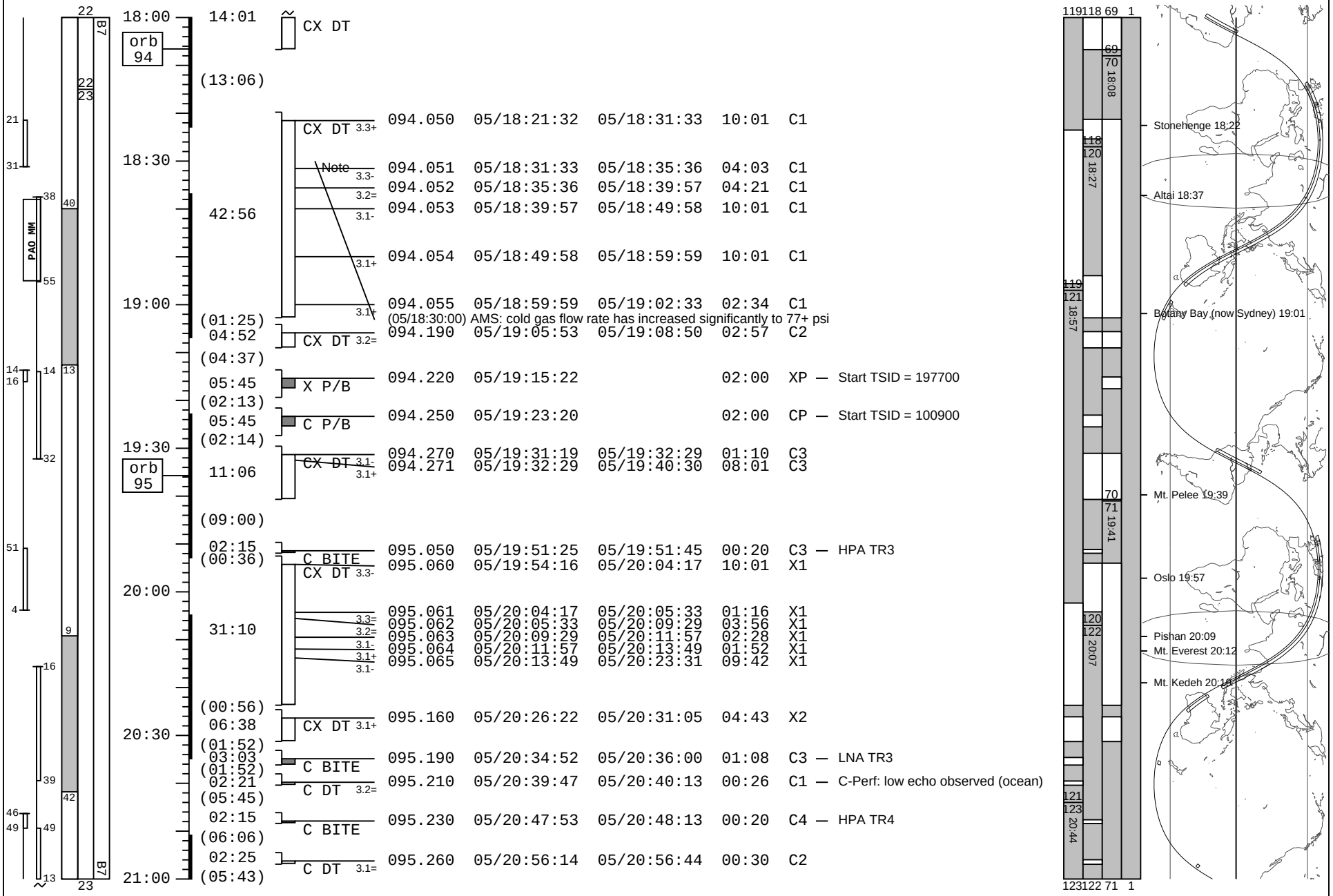
STS-99 As-Flown Mission Timeline



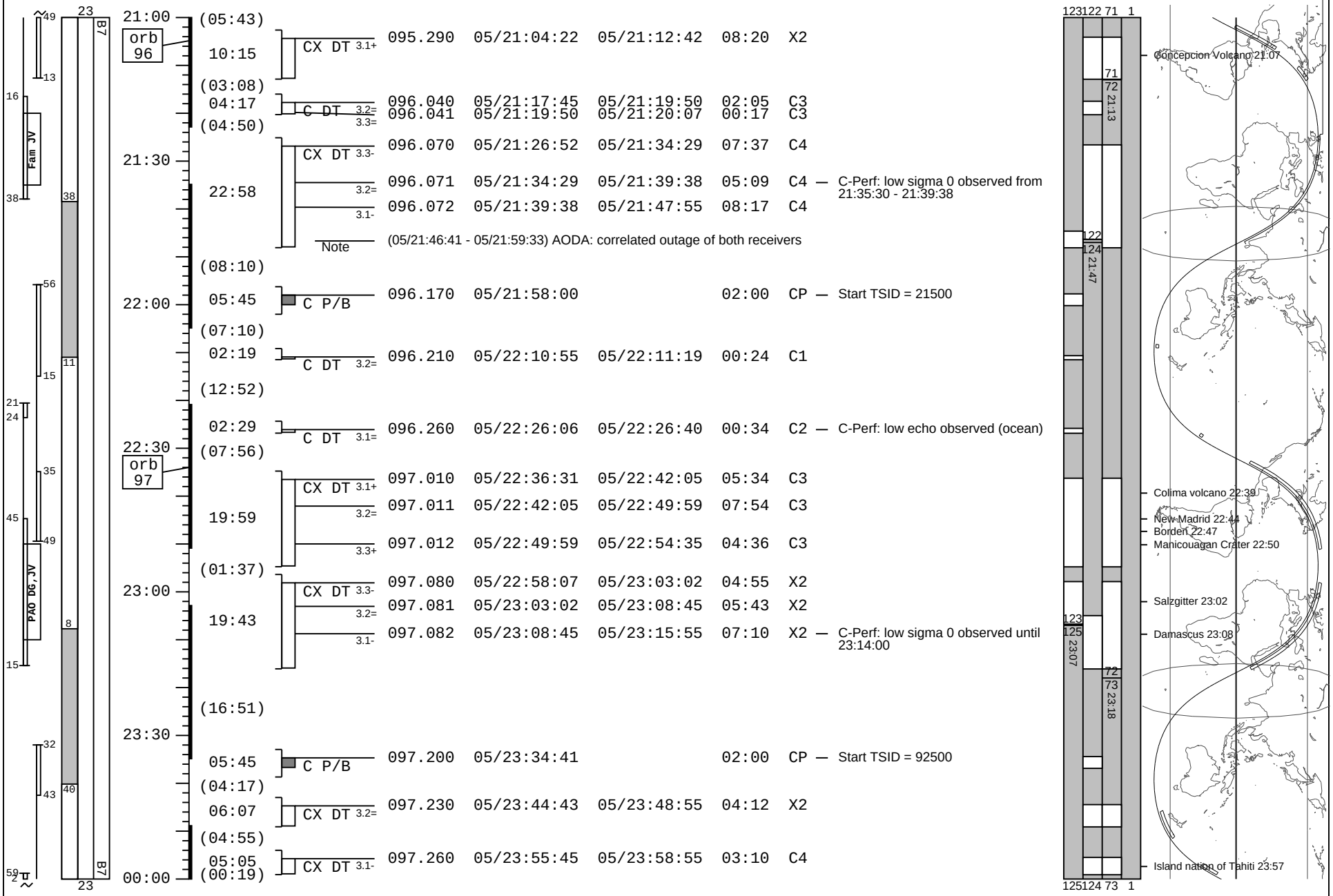
STS-99 As-Flown Mission Timeline



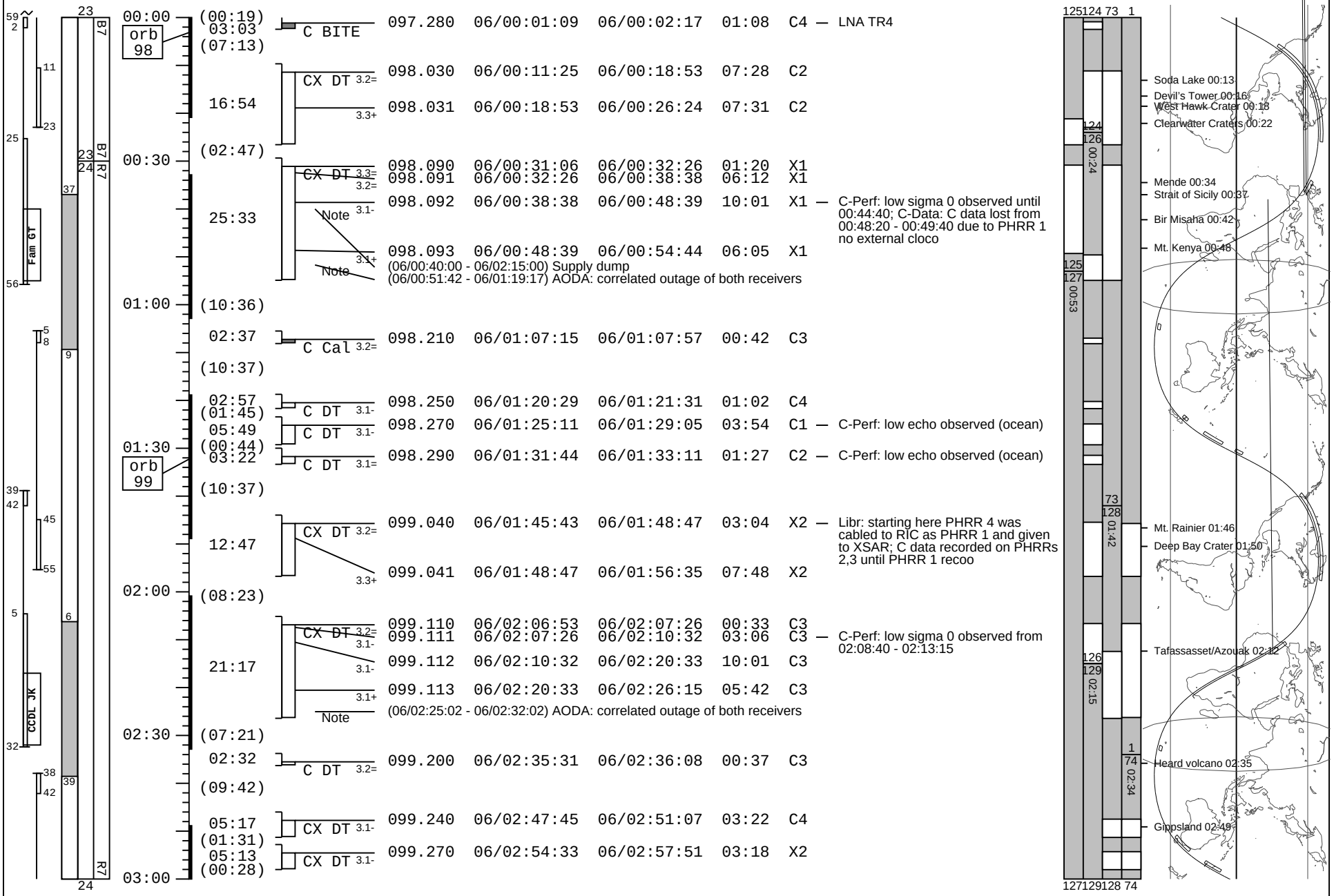
STS-99 As-Flown Mission Timeline



STS-99 As-Flown Mission Timeline

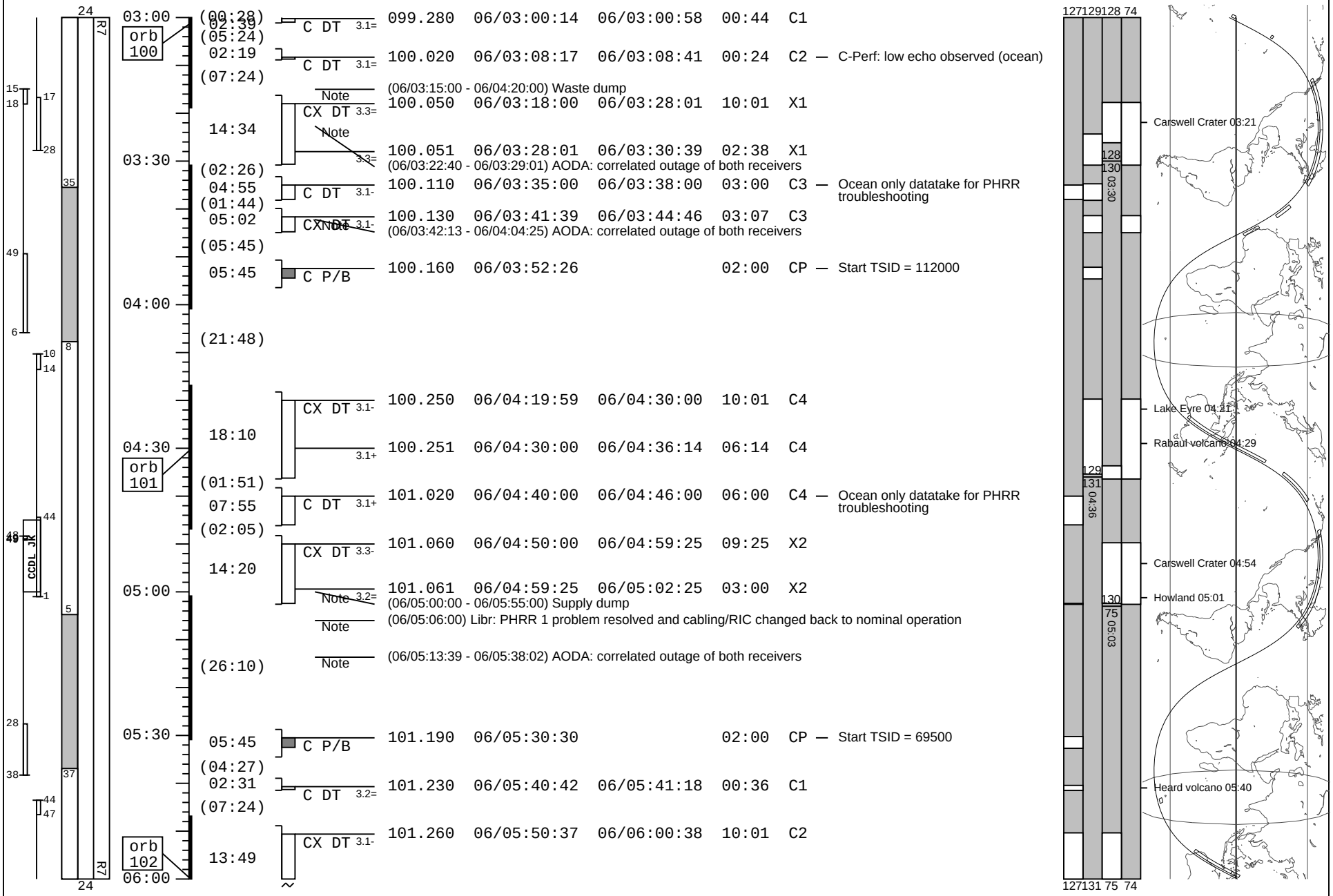


STS-99 As-Flown Mission Timeline

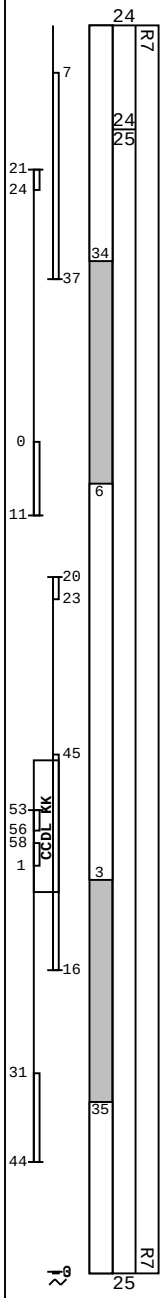


Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
097.280	06/00:01:09	06/00:02:17	01:08	C4	— LNA TR4
098.030	06/00:11:25	06/00:18:53	07:28	C2	
098.031	06/00:18:53	06/00:26:24	07:31	C2	
098.090	06/00:31:06	06/00:32:26	01:20	X1	
098.091	06/00:32:26	06/00:38:38	06:12	X1	
098.092	06/00:38:38	06/00:48:39	10:01	X1	— C-Perf: low sigma 0 observed until 00:44:40; C-Data: C data lost from 00:48:20 - 00:49:40 due to PHRR 1 no external cloco
098.093	06/00:48:39	06/00:54:44	06:05	X1	
					(06/00:40:00 - 06/02:15:00) Supply dump
					(06/00:51:42 - 06/01:19:17) AODA: correlated outage of both receivers
098.210	06/01:07:15	06/01:07:57	00:42	C3	
098.250	06/01:20:29	06/01:21:31	01:02	C4	
098.270	06/01:25:11	06/01:29:05	03:54	C1	— C-Perf: low echo observed (ocean)
098.290	06/01:31:44	06/01:33:11	01:27	C2	— C-Perf: low echo observed (ocean)
099.040	06/01:45:43	06/01:48:47	03:04	X2	— Libr: starting here PHRR 4 was cabled to RIC as PHRR 1 and given to XSAR; C data recorded on PHRRs 2,3 until PHRR 1 recoo
099.041	06/01:48:47	06/01:56:35	07:48	X2	
099.110	06/02:06:53	06/02:07:26	00:33	C3	
099.111	06/02:07:26	06/02:10:32	03:06	C3	— C-Perf: low sigma 0 observed from 02:08:40 - 02:13:15
099.112	06/02:10:32	06/02:20:33	10:01	C3	
099.113	06/02:20:33	06/02:26:15	05:42	C3	
					(06/02:25:02 - 06/02:32:02) AODA: correlated outage of both receivers
099.200	06/02:35:31	06/02:36:08	00:37	C3	
099.240	06/02:47:45	06/02:51:07	03:22	C4	
099.270	06/02:54:33	06/02:57:51	03:18	X2	

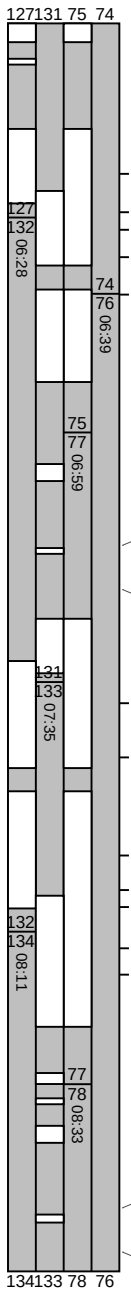
STS-99 As-Flown Mission Timeline

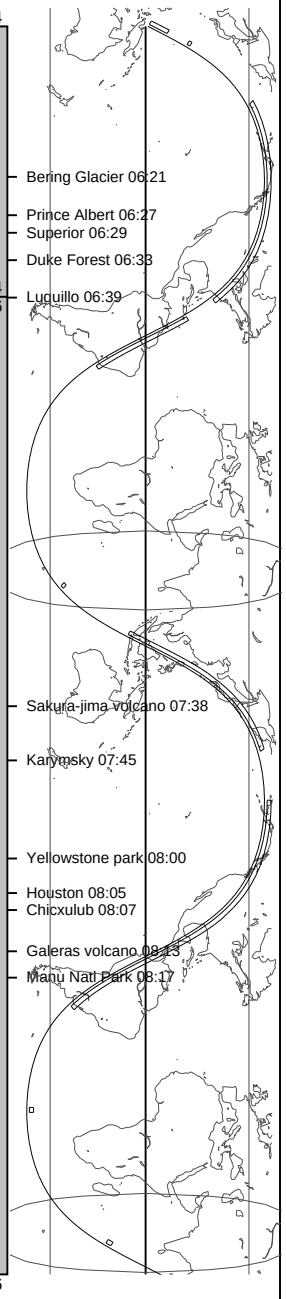


STS-99 As-Flown Mission Timeline

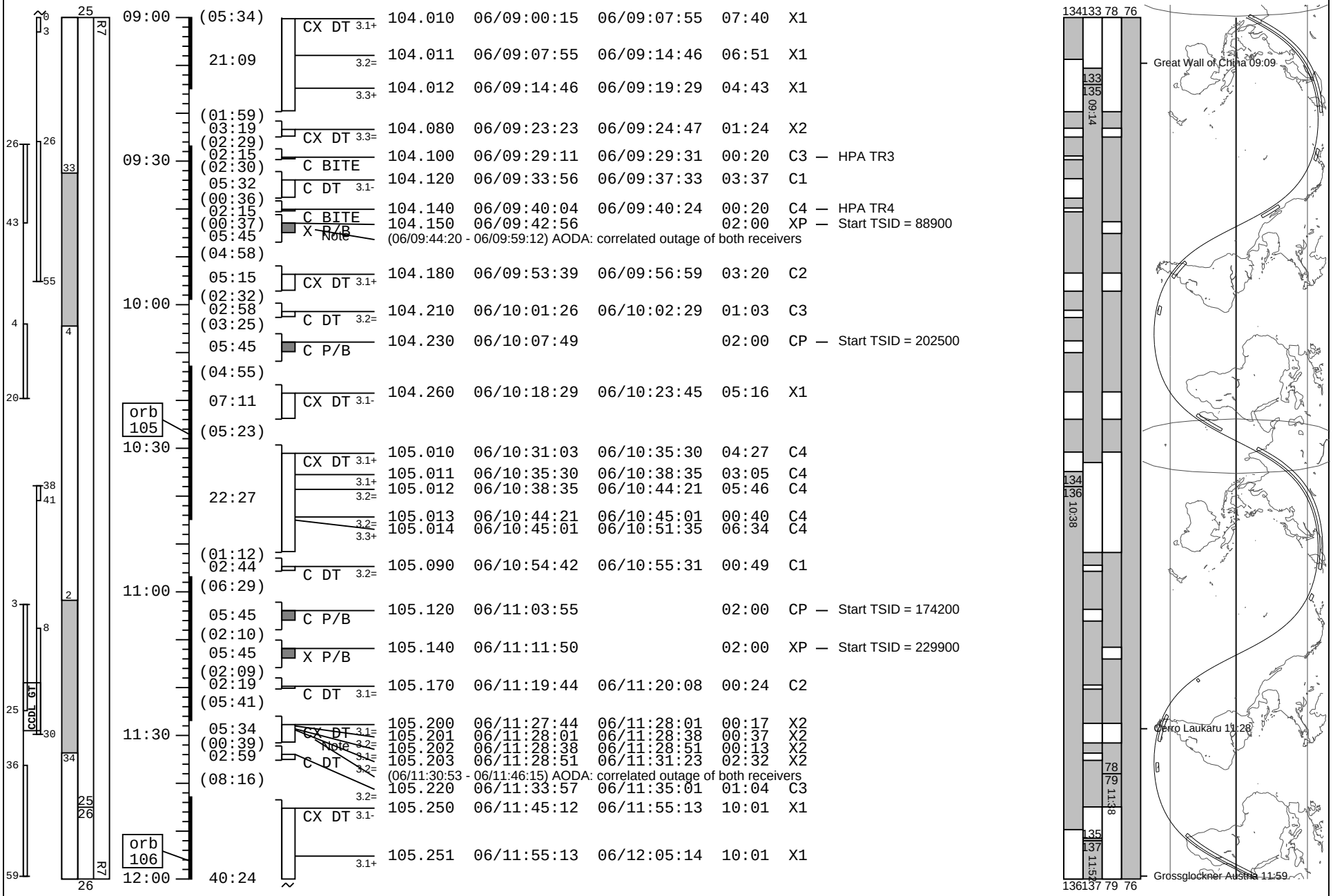


MET day 06	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
06:00	13:49	CX DT 3.1+	101.261	06/06:00:38	06/06:02:31	01:53	C2	
	(00:56)							
	02:18	C DT 3.1=	102.020	06/06:05:22	06/06:05:45	00:23	C3	— C-Perf: low echo observed (ocean)
	(07:49)							
		CX DT 3.2=	102.050	06/06:15:29	06/06:15:46	00:17	X1	— C-Perf: low echo observed (ocean)
		3.3+	102.051	06/06:15:46	06/06:25:47	10:01	X1	
	21:10							
		3.3=	102.052	06/06:25:47	06/06:28:16	02:29	X1	
06:30		3.2=	102.053	06/06:28:16	06/06:34:44	06:28	X1	
	(02:00)							
		CX DT 3.1-	102.130	06/06:38:39	06/06:48:40	10:01	C4	
	14:48							
		3.1+	102.131	06/06:48:40	06/06:51:32	02:52	C4	
	(10:22)							
07:00								
	05:45	C P/B	102.210	06/07:03:49		02:00	CP	— Start TSID = 212500
	(06:22)							
	02:18	C DT 3.1-	102.250	06/07:15:56	06/07:16:19	00:23	C1	
	(07:54)							
orb 103		CX DT 3.1+	102.280	06/07:26:08	06/07:36:09	10:01	X2	
07:30	23:00							
		3.1=	102.281	06/07:36:09	06/07:37:52	01:43	X2	
		3.2=	102.282	06/07:37:52	06/07:45:48	07:56	X2	— C-Perf: saturation observed between 07:38:28 - 07:39:08
		3.3+	102.283	06/07:45:48	06/07:47:13	01:25	X2	
	(01:53)							
		CX DT 3.3-	103.070	06/07:51:01	06/07:56:25	05:24	C2	
		3.2=	103.071	06/07:56:25	06/08:03:40	07:15	C2	
08:00		3.1-	103.072	06/08:03:40	06/08:13:41	10:01	C2	
	35:26							
		3.1=	103.073	06/08:13:41	06/08:20:16	06:35	C2	
		3.1+	103.074	06/08:20:16	06/08:24:32	04:16	C2	
	(05:12)							
08:30				(06/08:30:14) AMS: cold gas valves closed (at 100 psi / 15 lb left in tank)				
	03:03	Note						
	(00:36)	C BITE	103.200	06/08:31:39	06/08:32:47	01:08	C3	— LNA TR3
	02:19	C DT 3.2=	103.210	06/08:35:18	06/08:35:42	00:24	C3	— C-Perf: low echo observed (ocean)
	(01:39)	C P/B	103.230	06/08:39:16		02:00	CP	— Start TSID = 188000
	05:45							
	(07:03)							
	02:37	C Cal 3.1=	103.270	06/08:52:04	06/08:52:46	00:42	C4	
orb 104	(05:34)							
09:00								



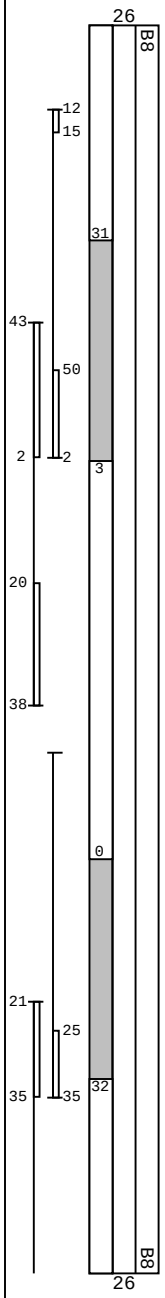


STS-99 As-Flown Mission Timeline



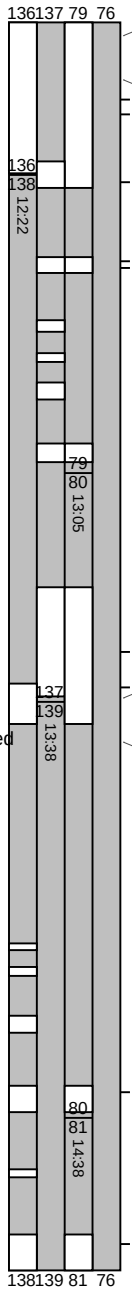
MET day 06	Len mm:ss	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
09:00	(05:34)	104.010	06/09/00:15	06/09/07:55	07:40	X1	
	21:09	104.011	06/09/07:55	06/09/14:46	06:51	X1	
		104.012	06/09/14:46	06/09/19:29	04:43	X1	
	(01:59)						
	03:19	104.080	06/09/23:23	06/09/24:47	01:24	X2	
	(02:29)						
09:30	02:15	104.100	06/09/29:11	06/09/29:31	00:20	C3	— HPA TR3
	(02:30)						
	05:32	104.120	06/09/33:56	06/09/37:33	03:37	C1	
	(00:36)						
	02:15	104.140	06/09/40:04	06/09/40:24	00:20	C4	— HPA TR4
	(00:37)	104.150	06/09/42:56		02:00	XP	— Start TSID = 88900
	05:45	(06/09:44:20 - 06/09:59:12) AODA: correlated outage of both receivers					
	(04:58)						
	05:15	104.180	06/09:53:39	06/09:56:59	03:20	C2	
	(02:32)						
10:00	02:58	104.210	06/10:01:26	06/10:02:29	01:03	C3	
	(03:25)						
	05:45	104.230	06/10:07:49		02:00	CP	— Start TSID = 202500
	(04:55)						
	07:11	104.260	06/10:18:29	06/10:23:45	05:16	X1	
orb 105	(05:23)						
10:30		105.010	06/10:31:03	06/10:35:30	04:27	C4	
		105.011	06/10:35:30	06/10:38:35	03:05	C4	
	22:27	105.012	06/10:38:35	06/10:44:21	05:46	C4	
		105.013	06/10:44:21	06/10:45:01	00:40	C4	
		105.014	06/10:45:01	06/10:51:35	06:34	C4	
	(01:12)						
	02:44	105.090	06/10:54:42	06/10:55:31	00:49	C1	
11:00	(06:29)						
	05:45	105.120	06/11:03:55		02:00	CP	— Start TSID = 174200
	(02:10)						
	05:45	105.140	06/11:11:50		02:00	XP	— Start TSID = 229900
	(02:09)						
	02:19	105.170	06/11:19:44	06/11:20:08	00:24	C2	
	(05:41)						
	05:34	105.200	06/11:27:44	06/11:28:01	00:17	X2	
11:30	(00:39)	105.201	06/11:28:01	06/11:28:38	00:37	X2	
	02:59	105.202	06/11:28:38	06/11:28:51	00:13	X2	
		105.203	06/11:28:51	06/11:31:23	02:32	X2	
	(08:16)	(06/11:30:53 - 06/11:46:15) AODA: correlated outage of both receivers					
		105.220	06/11:33:57	06/11:35:01	01:04	C3	
		105.250	06/11:45:12	06/11:55:13	10:01	X1	
orb 106		105.251	06/11:55:13	06/12:05:14	10:01	X1	
12:00	40:24						

STS-99 As-Flown Mission Timeline

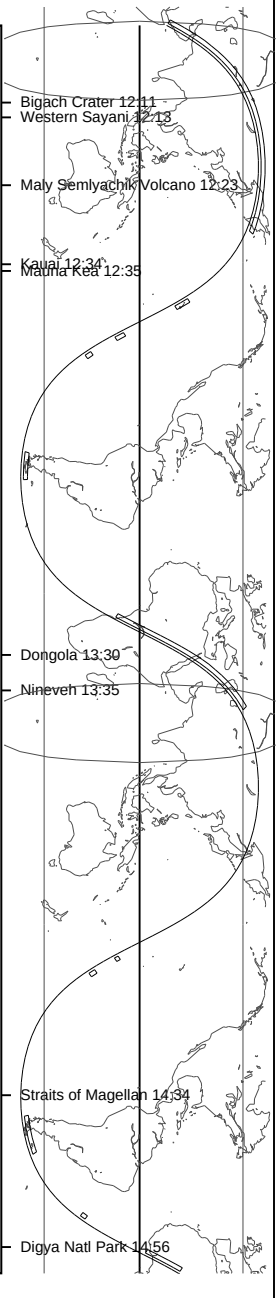


Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
40:24	CX DT						
	3.1=	105.252	06/12/05:14	06/12/06:47	01:33	X1	
	3.2=	105.253	06/12/06:47	06/12/12:49	06:02	X1	
	3.2=	105.254	06/12/12:49	06/12/17:08	04:19	X1	
	3.3=	105.255	06/12/17:08	06/12/22:28	05:20	X1	
	3.2=	105.256	06/12/22:28	06/12/23:41	01:13	X1	
(08:31)							
03:45	CX DT 3.1-	106.120	06/12/34:07	06/12/35:57	01:50	C3	
(05:21)							
03:08	C DT 3.1=	106.040	06/12/43:13	06/12/44:26	01:13	C4	
(01:37)							
02:44	C DT 3.1+	106.080	06/12/47:58	06/12/48:47	00:49	C1	— C-Perf: low sigma 0 observed
(01:30)							
05:45	C P/B	106.180	06/12/52:12		02:00	CP	— Start TSID = 42147
	Note	(06/12/55:39 - 06/13:10:08) AODA: correlated outage of both receivers					
(03:03)							
04:09	CX DT 3.2=	106.210	06/13/01:00	06/13/03:14	02:14	X2	
(16:35)							
	CX DT 3.1=	106.280	06/13/21:44	06/13/31:45	10:01	C2	
21:11							
	3.1=	106.281	06/13/31:45	06/13/32:45	01:00	C2	
	3.2=	106.282	06/13/32:45	06/13/41:00	08:15	C2	
	Trim-6	Trim-6	06/13/41:00	06/14:15:50	34:50	--	— 4.01 fps; TIG@13:56:00, B13@14:12:40, A11@14:15:50 - lofted to optimize for skipping trim 8
34:50							
02:26							
(00:58)	C DT 3.1=	107.150	06/14:13:06	06/14:13:37	00:31	C3	— Shuttle not back in attitude in time
02:45	C DT						
(04:17)	3.1+	107.170	06/14:16:30	06/14:17:20	00:50	C4	
05:45	C P/B	107.190	06/14:23:32		02:00	CP	— Start TSID = 61400
(04:21)							
05:16	CX DT 3.2=	107.220	06/14:33:38	06/14:36:59	03:21	X1	
(06:47)							
02:37	C Cal 3.2=	107.260	06/14:45:41	06/14:46:23	00:42	C1	
(06:47)							
	CX DT 3.1+	108.010	06/14:55:05	06/15:02:20	07:15	C2	— C-Perf: low sigma 0 observed from 14:58:00 - 15:02:20
34:50							

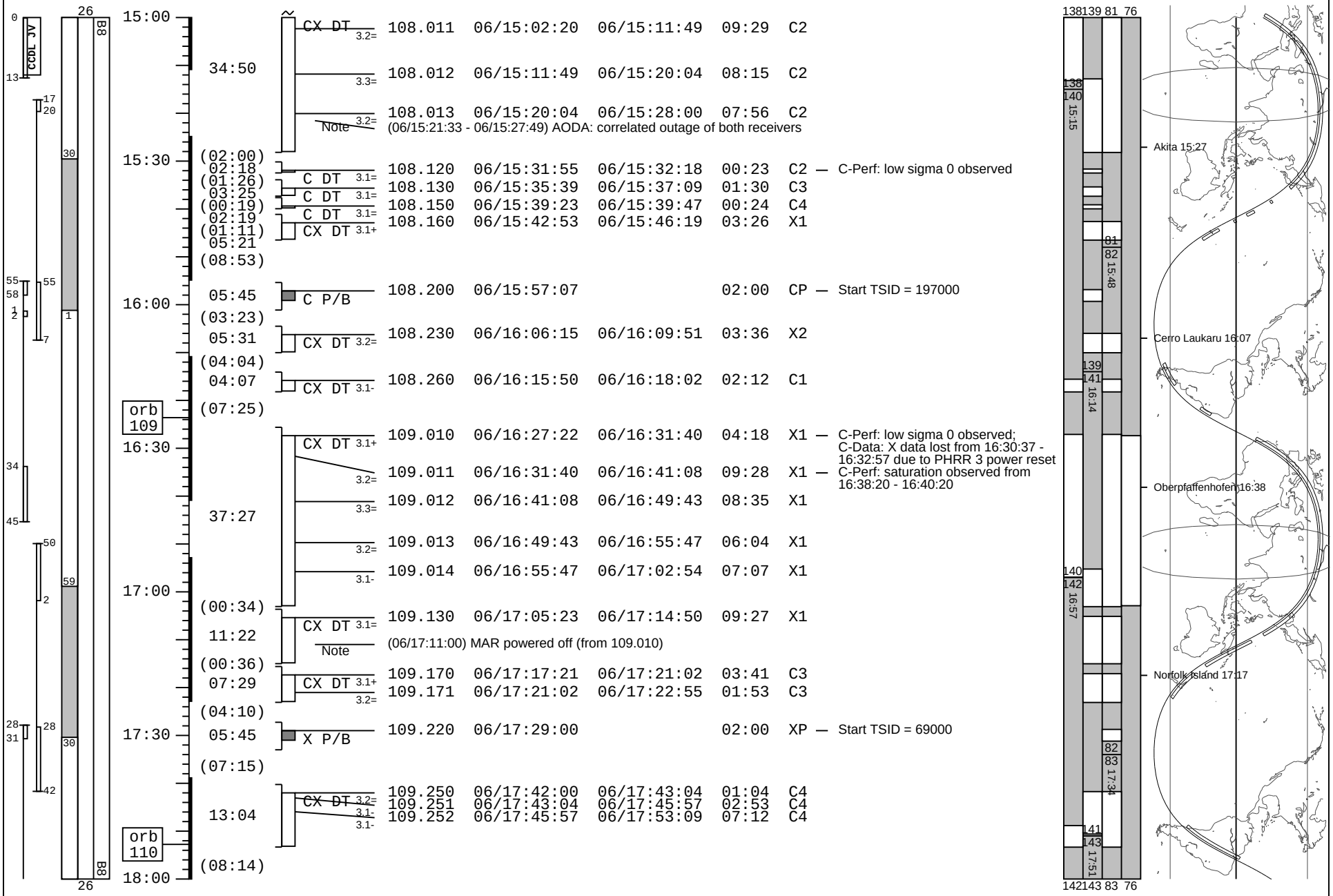
PHRRs 1 2 3 4



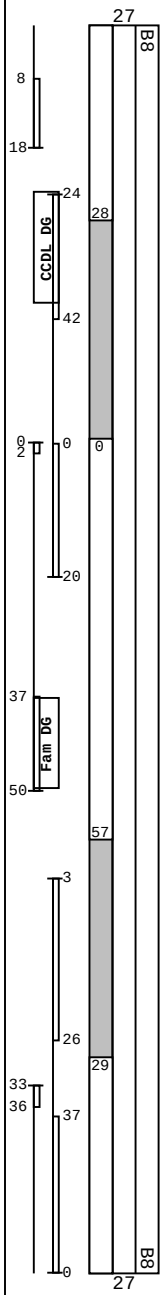
Map



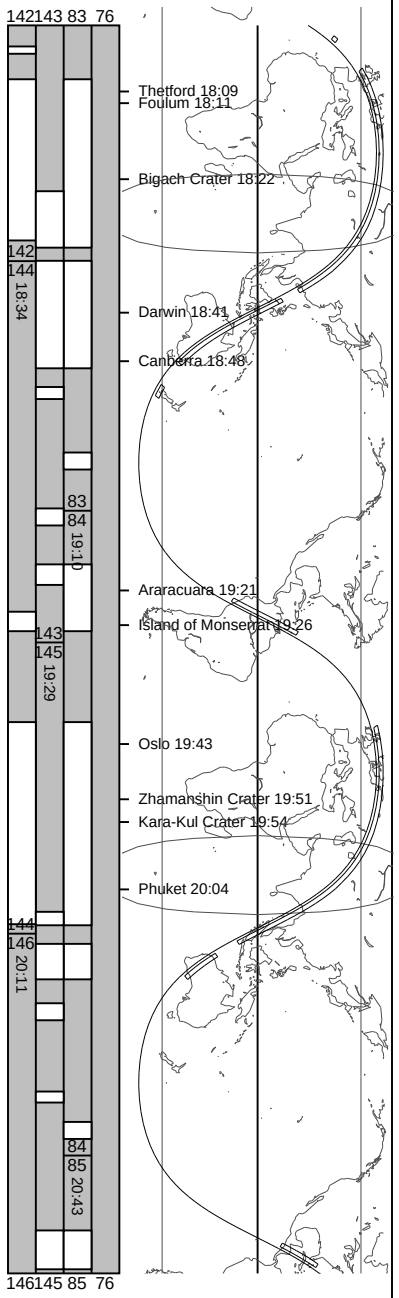
STS-99 As-Flown Mission Timeline



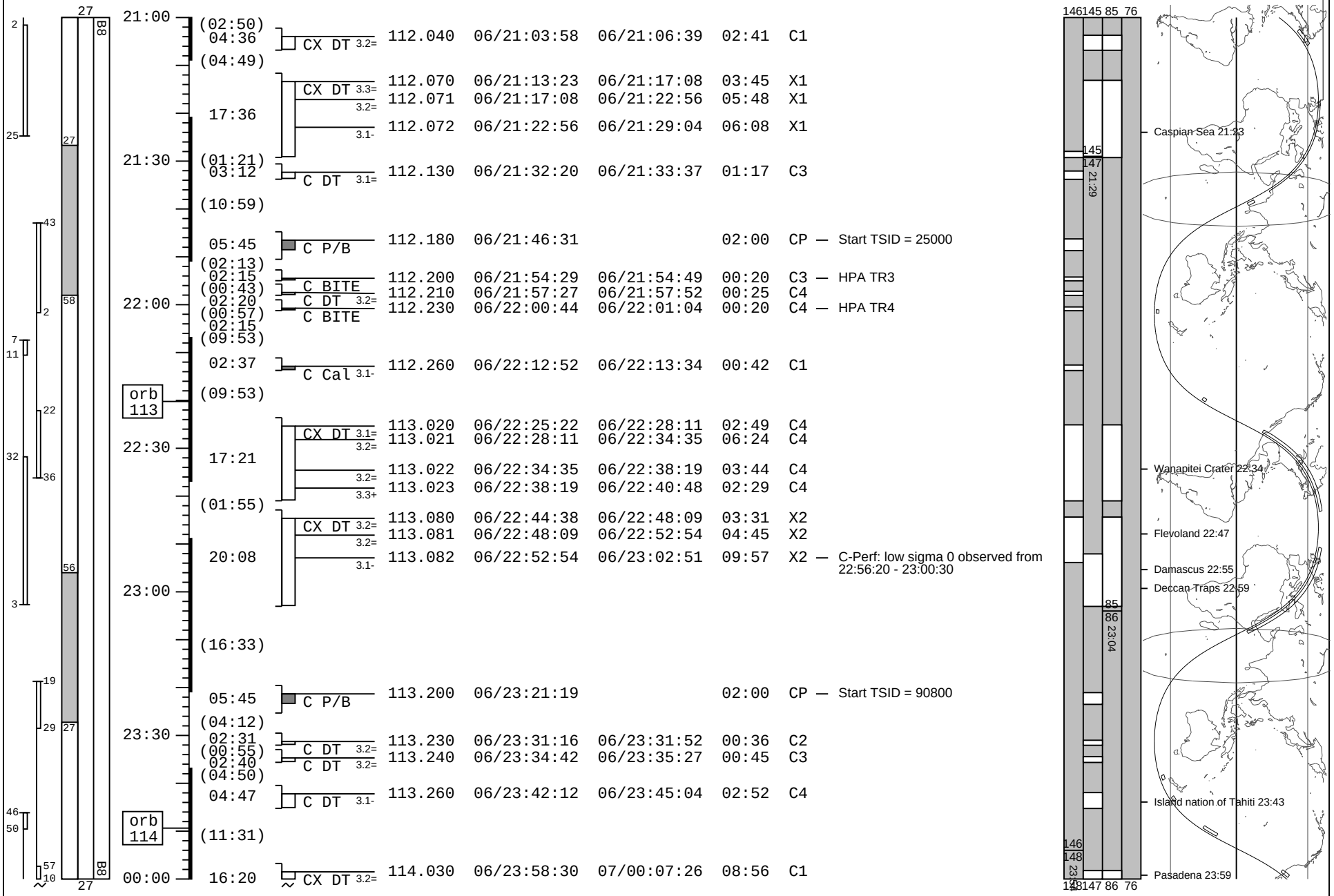
STS-99 As-Flown Mission Timeline



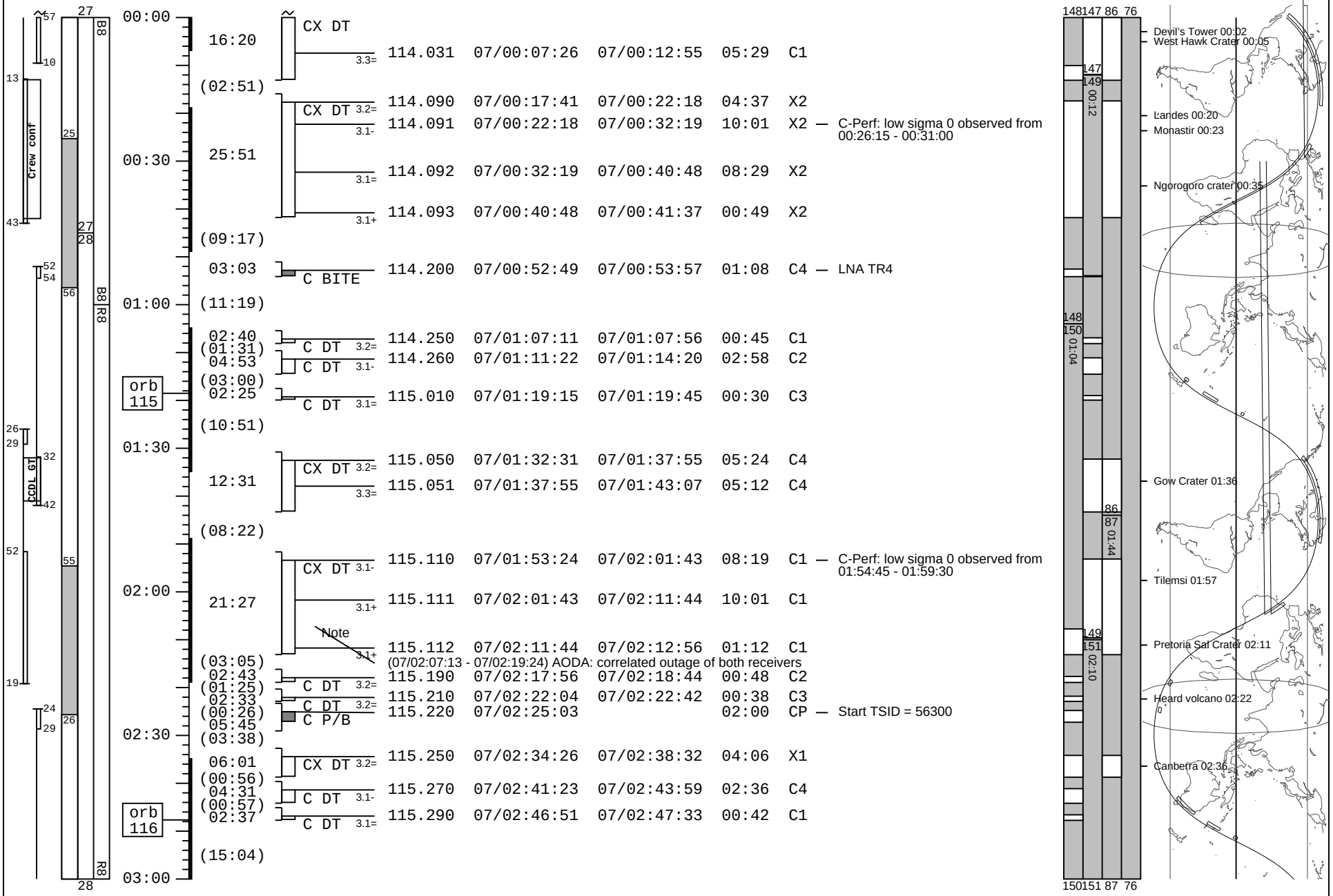
MET day 06	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
18:00	(08:14)							
	02:31	C DT 3.2=	110.030	06/18:03:18	06/18:03:54	00:36	C1	
	(02:13)							
		CX DT 3.2=	110.050	06/18:08:02	06/18:09:53	01:51	X1	
		3.3=	110.051	06/18:09:53	06/18:19:04	09:11	X1	
	25:45	3.2=	110.052	06/18:19:04	06/18:25:03	05:59	X1	
		3.1-	110.053	06/18:25:03	06/18:28:07	03:04	X1	
18:30		3.1+	110.054	06/18:28:07	06/18:29:32	01:25	X1	
		3.1-	110.055	06/18:29:32	06/18:31:52	02:20	X1	
	(00:26)	CX DT 3.1=	110.130	06/18:34:13	06/18:44:14	10:01	C2	
	16:58	3.1+	110.131	06/18:44:14	06/18:49:16	05:02	C2	
	(01:14)							
	03:12	C DT 3.2=	110.190	06/18:52:25	06/18:53:42	01:17	C2	
	(06:15)							
19:00	05:45	X P/B	110.220	06/19:01:52		02:00	XP	— Start TSID = 227600
	(02:19)							
	05:45	C P/B	110.250	06/19:09:56		02:00	CP	— Start TSID = 159000
	(02:19)							
		CX DT 3.1-	110.280	06/19:18:00	06/19:19:22	01:22	X1	
orb 111	11:06	3.1+	110.281	06/19:19:22	06/19:27:11	07:49	X1	
19:30	(11:39)							
		CX DT 3.3=	111.060	06/19:40:45	06/19:48:06	07:21	C3	
		3.2=	111.061	06/19:48:06	06/19:53:55	05:49	C3	
	30:46	3.1-	111.062	06/19:53:55	06/19:58:22	04:27	C3	
20:00		3.1+	111.063	06/19:58:22	06/20:00:04	01:42	C3	
		3.1-	111.064	06/20:00:04	06/20:09:36	09:32	C3	
	(01:13)							
	06:35	CX DT 3.1+	111.160	06/20:12:44	06/20:17:24	04:40	C4	
	(01:59)							
	05:45	C P/B	111.190	06/20:21:18		02:00	CP	— Start TSID = 52600
	(06:59)							
20:30	03:03	C BITE	111.230	06/20:34:02	06/20:35:10	01:08	C3	— LNA TR3
	(01:20)							
	05:45	X P/B	111.250	06/20:38:25		02:00	XP	— Start TSID = 125700
	(09:54)							
orb 112								
	07:04	CX DT 3.1+	112.010	06/20:54:04	06/20:58:40	04:36	X2	
21:00	(02:50)	3.2=	112.011	06/20:58:40	06/20:59:13	00:33	X2	



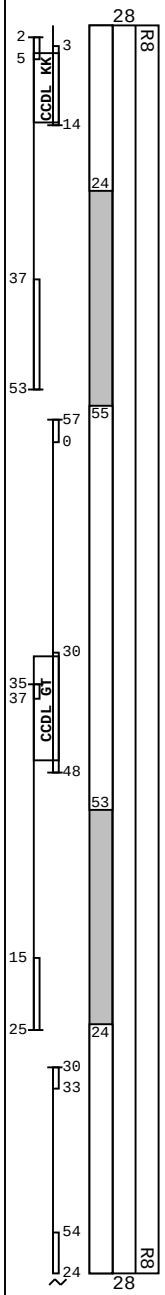
STS-99 As-Flown Mission Timeline



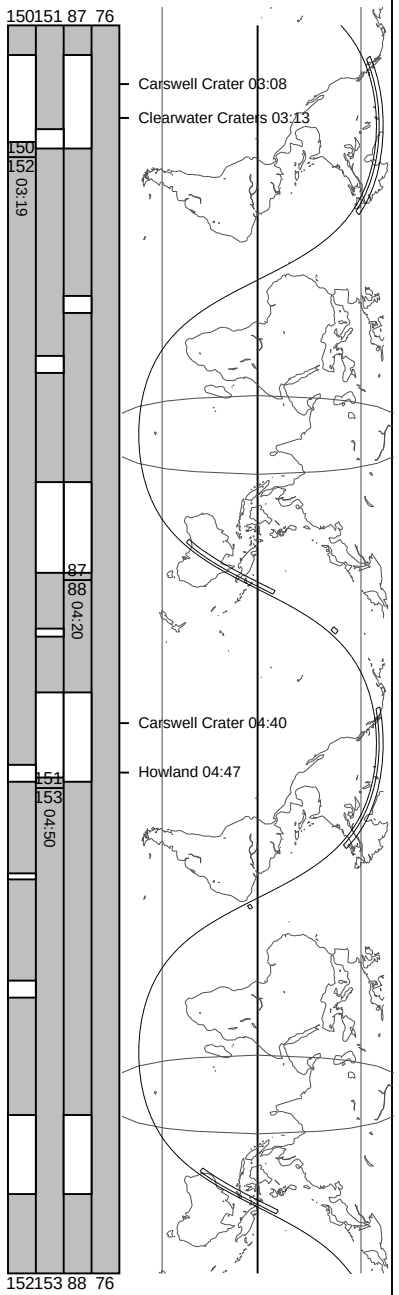
STS-99 As-Flown Mission Timeline



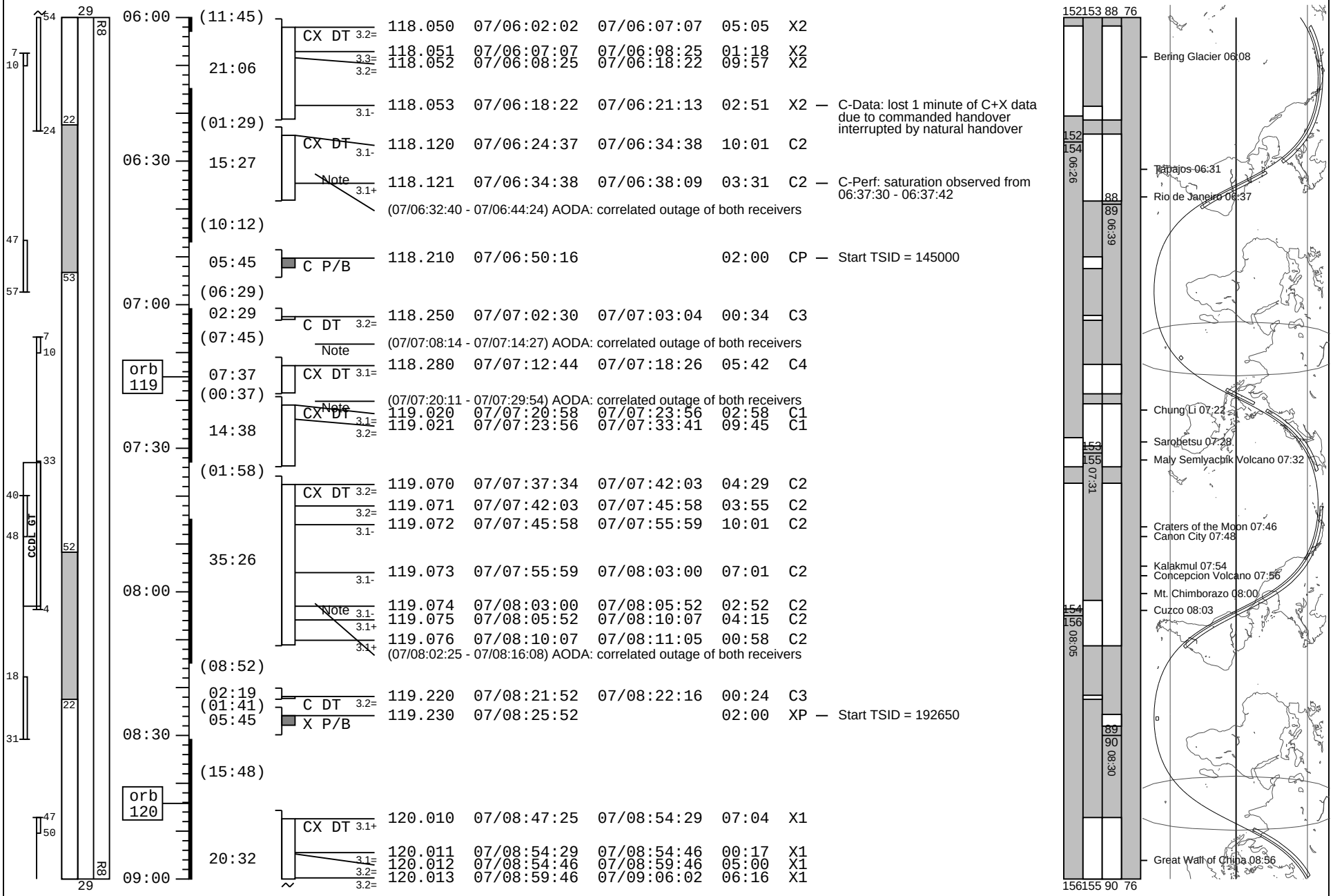
STS-99 As-Flown Mission Timeline



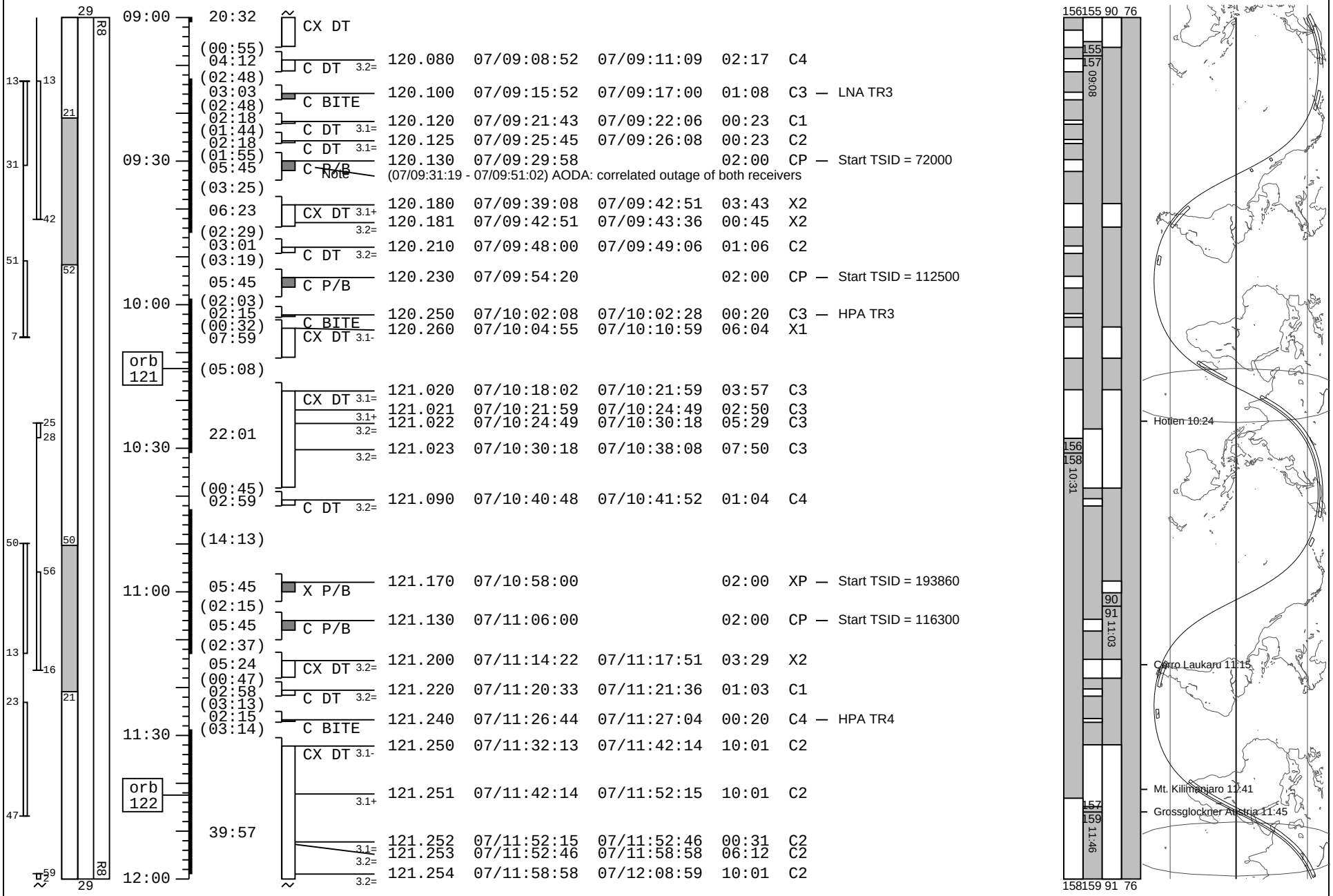
MET day 07	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
03:00	(15:04)							
	14:57	CX DT 3.2=	116.050	07/03:04:32	07/03:08:08	03:36	X2	
		CX DT 3.3=	116.051	07/03:08:08	07/03:12:50	04:42	X2	
		Note 3.2=	116.052	07/03:12:50	07/03:17:34	04:44	X2	
			(07/03:10:00 - 07/05:45:00) Supply dump					
03:30	(19:48)							
			(07/03:39:09 - 07/03:46:57) AODA: correlated outage of both receivers					
	05:45	X P/B	116.170	07/03:39:17		02:00	XP	— Start TSID = 165500
	(02:54)							
	05:45	C P/B	116.190	07/03:47:56		02:00	CP	— Start TSID = 14500
04:00	(12:27)							
	14:33	CX DT 3.2=	116.250	07/04:06:08	07/04:08:08	02:00	C2	
		CX DT 3.1-	116.251	07/04:08:08	07/04:18:09	10:01	C2	
orb 117		3.1=	116.252	07/04:18:09	07/04:18:46	00:37	C2	
	(06:35)							
	02:37	C Cal 3.2=	117.030	07/04:27:16	07/04:27:58	00:42	C3	
04:30	(06:35)							
	14:21	CX DT 3.3=	117.060	07/04:36:28	07/04:36:56	00:28	X1	
		3.2=	117.061	07/04:36:56	07/04:37:13	00:17	X1	
		3.3=	117.062	07/04:37:13	07/04:37:51	00:38	X1	
		3.2=	117.063	07/04:37:51	07/04:47:25	09:34	X1	
		3.2=	117.064	07/04:47:25	07/04:48:54	01:29	X1	
	(11:45)							
05:00	02:20	C DT 3.1=	117.150	07/05:02:34	07/05:02:59	00:25	C4	— C-Perf: low echo observed (ocean)
	(13:08)	Note	(07/05:09:08 - 07/05:13:33) AODA: correlated outage of both receivers					
	05:45	C P/B	117.200	07/05:18:02		02:00	CP	— Start TSID = 22900
05:30	(13:38)							
	12:52	CX DT 3.1-	117.260	07/05:37:25	07/05:47:26	10:01	X2	
orb 118		3.1=	117.261	07/05:47:26	07/05:48:22	00:56	X2	
	(11:45)							
06:00								



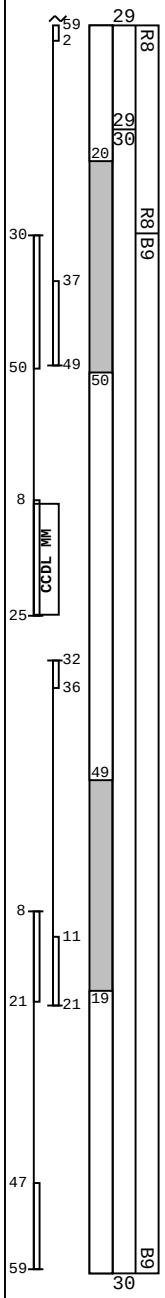
STS-99 As-Flown Mission Timeline



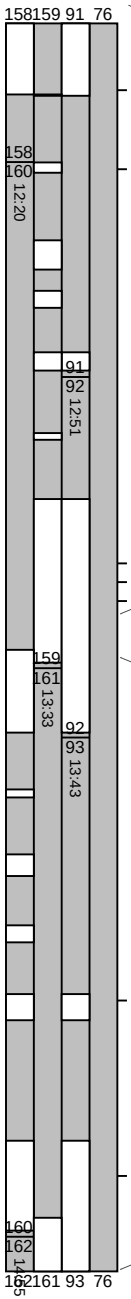
STS-99 As-Flown Mission Timeline

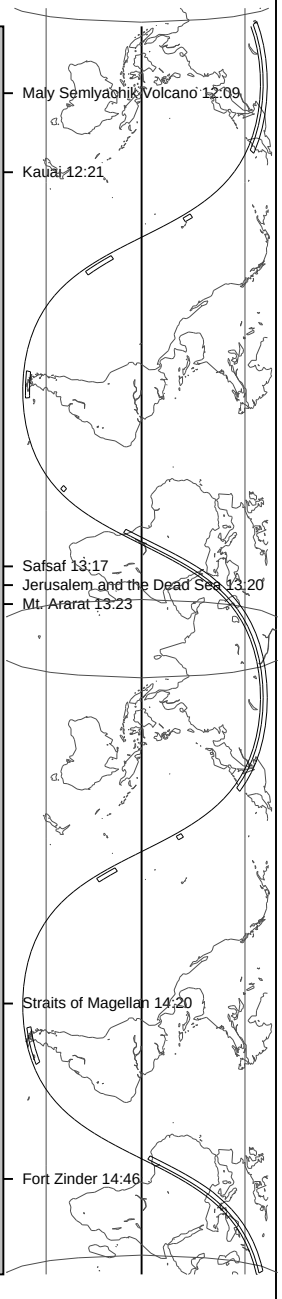


STS-99 As-Flown Mission Timeline

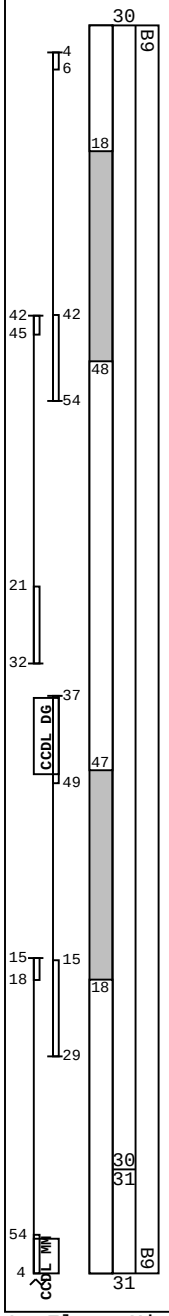


MET day 07	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
12:00	39:57	CX DT 3.2=	121.255	07/12:08:59	07/12:10:15	01:16	C2	
	(08:09)							
	02:57	C DT 3.1-	122.120	07/12:20:19	07/12:21:21	01:02	C3	
	(08:17)							
12:30	05:41	C DT 3.1+	122.160	07/12:31:33	07/12:35:19	03:46	C4	
	(01:36)							
	05:45	C P/B	122.180	07/12:38:50		02:00	CP	— Start TSID = 4701
	(03:07)							
	04:06	Note: (07/12:47:00) Trim: premission trim-7 opportunity (delayed to optimize for skipping trim 8) CX DT 3.2=	122.210	07/12:47:42	07/12:49:53	02:11	X1	
	(07:33)							
13:00	02:26	C DT 3.2=	122.250	07/12:59:21	07/12:59:52	00:31	C1	
	(07:05)							
orb 123	35:09	CX DT 3.1+	122.280	07/13:08:52	07/13:18:53	10:01	X2	— C-Perf: low sigma 0 observed from 13:15:50 - 13:18:40
		3.1=	122.281	07/13:18:53	07/13:21:42	02:49	X2	
		3.2=	122.282	07/13:21:42	07/13:27:50	06:08	X2	
13:30		3.2=	122.283	07/13:27:50	07/13:37:51	10:01	X2	
		3.2=	122.284	07/13:37:51	07/13:42:06	04:15	X2	
		Note: (07/13:40:00 - 07/14:30:00) Supply dump						
	(06:44)							
	02:37	C Cal 3.1=	123.130	07/13:50:45	07/13:51:27	00:42	C2	
	(06:45)							
14:00	04:35	C DT 3.1+	123.160	07/14:00:07	07/14:02:47	02:40	C3	
	(05:39)							
	05:45	C P/B	123.190	07/14:10:21		02:00	CP	— Start TSID = 137000
	(04:10)							
	05:14	CX DT 3.2=	123.220	07/14:20:16	07/14:23:35	03:19	X1	
14:30	(15:55)							
orb 124	35:15	CX DT 3.1+	124.010	07/14:41:25	07/14:50:21	08:56	C4	— C-Perf: low sigma 0 observed from 14:45:00 - 14:49:00
		3.2=	124.011	07/14:50:21	07/14:56:55	06:34	C4	
		3.2=	124.012	07/14:56:55	07/15:06:56	10:01	C4	
15:00								

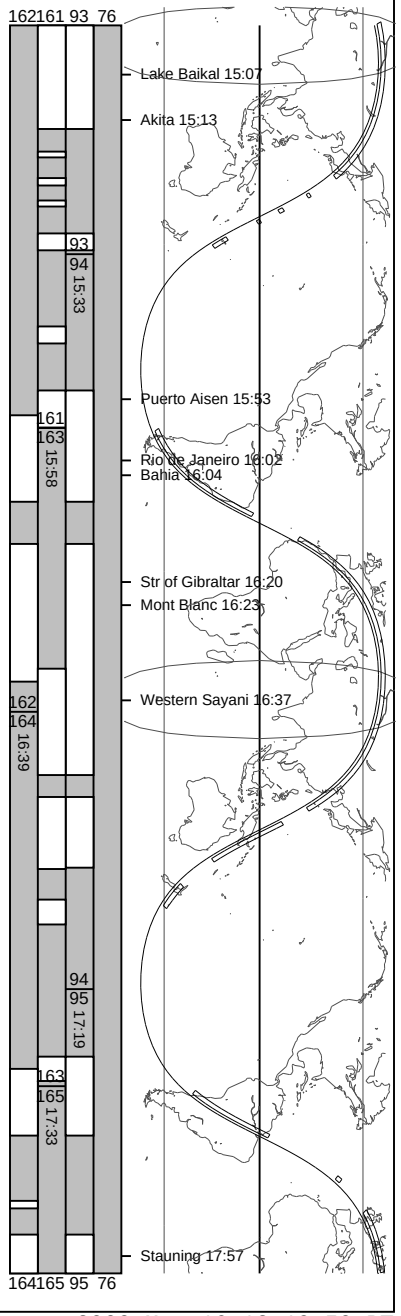




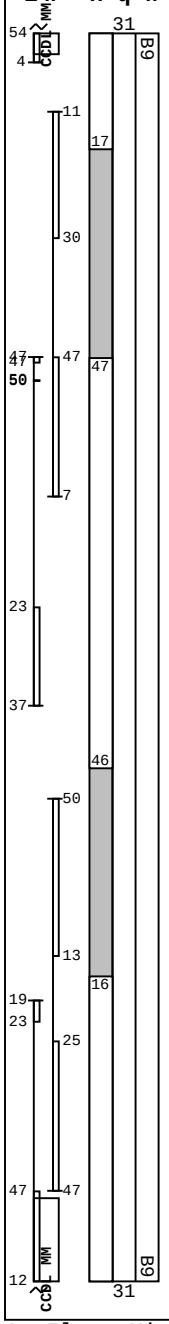
STS-99 As-Flown Mission Timeline



MET day 07	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
15:00	35:15	CX DT 3.2=	124.013	07/15:06:56	07/15:13:27	06:31	C4	
		3.1-	124.014	07/15:13:27	07/15:14:45	01:18	C4	
	(01:48)							
	02:18	C DT 3.1=	124.120	07/15:18:28	07/15:18:51	00:23	C1	— C-Perf: low sigma 0 observed
	(01:31)							
	02:32	C DT 3.1=	124.130	07/15:22:17	07/15:22:54	00:37	C2	
	(00:42)							
	02:20	C DT 3.1=	124.140	07/15:25:31	07/15:25:56	00:25	C3	— C-Perf: low sigma 0 observed
15:30	(02:25)							
	03:54	CX DT 3.1+	124.160	07/15:30:16	07/15:32:15	01:59	X2	
	(09:31)							
	05:45	C P/B	124.200	07/15:43:41		02:00	CP	— Start TSID = 234700
	(03:29)							
	17:31	CX DT 3.2=	124.230	07/15:52:55	07/16:00:17	07:22	X1	
16:00		3.1-	124.231	07/16:00:17	07/16:08:31	08:14	X1	
orb 125	(04:37)							
	34:48	CX DT 3.1+	125.020	07/16:15:03	07/16:19:52	04:49	X1	
		3.2=	125.021	07/16:19:52	07/16:26:04	06:12	X1	— C-Perf: saturation observed from 16:22:15 - 16:22:25
16:30		3.2=	125.022	07/16:26:04	07/16:36:05	10:01	X1	
		3.2=	125.023	07/16:36:05	07/16:41:22	05:17	X1	
		3.1-	125.024	07/16:41:22	07/16:47:56	06:34	X1	
	(01:42)							
	11:51	CX DT 3.1=	125.130	07/16:51:33	07/17:01:29	09:56	X2	
17:00	(02:57)							
	05:03	CX DT 3.1=	125.180	07/17:06:21	07/17:08:23	02:02	C1	— C-Data: X data recorded on PHRR4 only
	(04:36)	3.2=	125.181	07/17:08:23	07/17:09:29	01:06	C1	
	05:45	X P/B	125.220	07/17:16:00		02:00	XP	— Start TSID = 117940
	(07:15)							
17:30		CX DT 3.1-	125.260	07/17:29:00	07/17:32:23	03:23	C2	
	12:51	3.1+	125.261	07/17:32:23	07/17:39:56	07:33	C2	
orb 126	(07:57)							
	02:33	C DT 3.2=	126.030	07/17:49:48	07/17:50:26	00:38	C3	
	(02:19)							
		CX DT 3.2=	126.050	07/17:54:40	07/18:04:41	10:01	C2	
18:00	43:09							

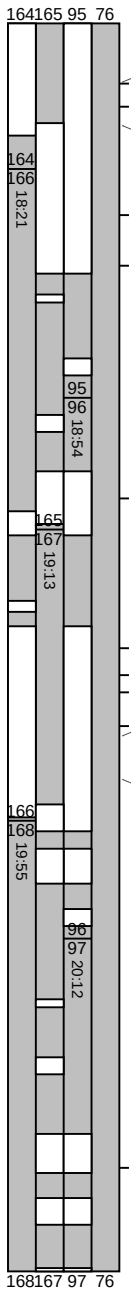


STS-99 As-Flown Mission Timeline

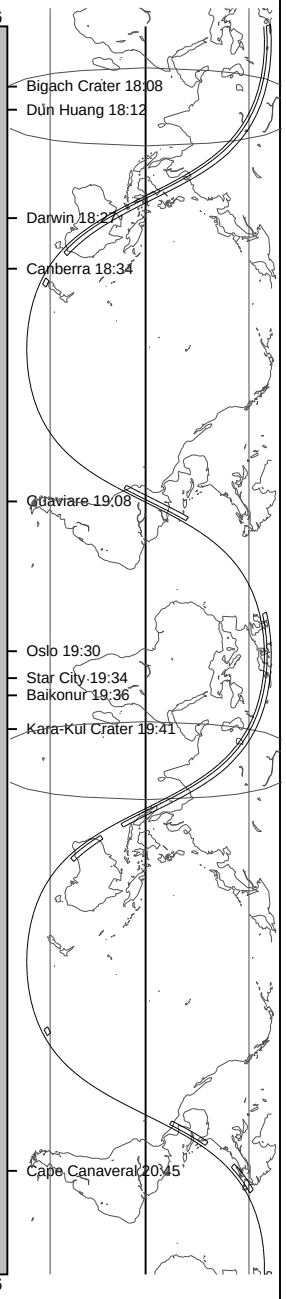


Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
126.051	07/18:04:41	07/18:10:19	05:38	C2	
126.052	07/18:10:19	07/18:14:52	04:33	C2	
126.053	07/18:14:52	07/18:24:53	10:01	C2	
126.054	07/18:24:53	07/18:34:54	10:01	C2	
126.055	07/18:34:54	07/18:35:54	01:00	C2	
126.200	07/18:39:22	07/18:40:04	00:42	C4	
126.220	07/18:48:35		02:00	XP	— Start TSID = 231600
126.250	07/18:56:44		02:00	CP	— Start TSID = 200700
126.280	07/19:04:52	07/19:06:20	01:28	X2	
126.281	07/19:06:20	07/19:13:39	07:19	X2	
127.050	07/19:23:33	07/19:24:41	01:08	C4	— LNA TR4
127.060	07/19:27:13	07/19:35:23	08:10	X1	
127.061	07/19:35:23	07/19:40:12	04:49	X1	
127.062	07/19:40:12	07/19:42:51	02:39	X1	
127.063	07/19:42:51	07/19:48:25	05:34	X1	
127.064	07/19:48:25	07/19:56:20	07:55	X1	
127.170	07/19:59:18	07/20:03:53	04:35	C2	
127.190	07/20:08:00		02:00	XP	— Start TSID = 192400
Note	(07/20:11:21 - 07/20:17:34) AODA: correlated outage of both receivers				
127.240	07/20:21:01	07/20:21:43	00:42	C3	
127.260	07/20:29:23		02:00	CP	— Start TSID = 80500
128.010	07/20:40:26	07/20:45:37	05:11	X1	
128.040	07/20:49:41	07/20:53:05	03:24	C4	
128.070	07/20:59:47	07/21:04:25	04:38	C1	

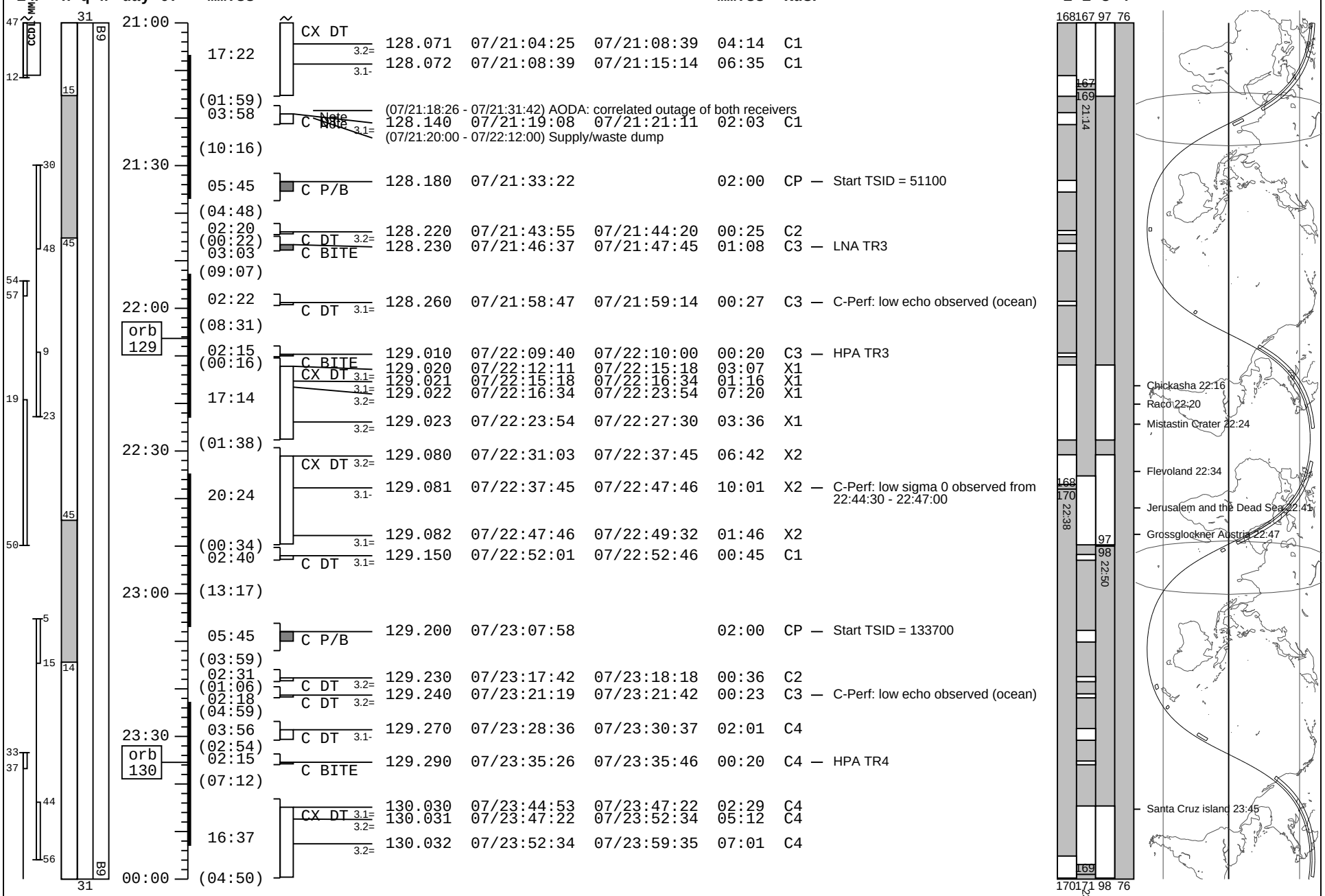
PHRRs 1 2 3 4



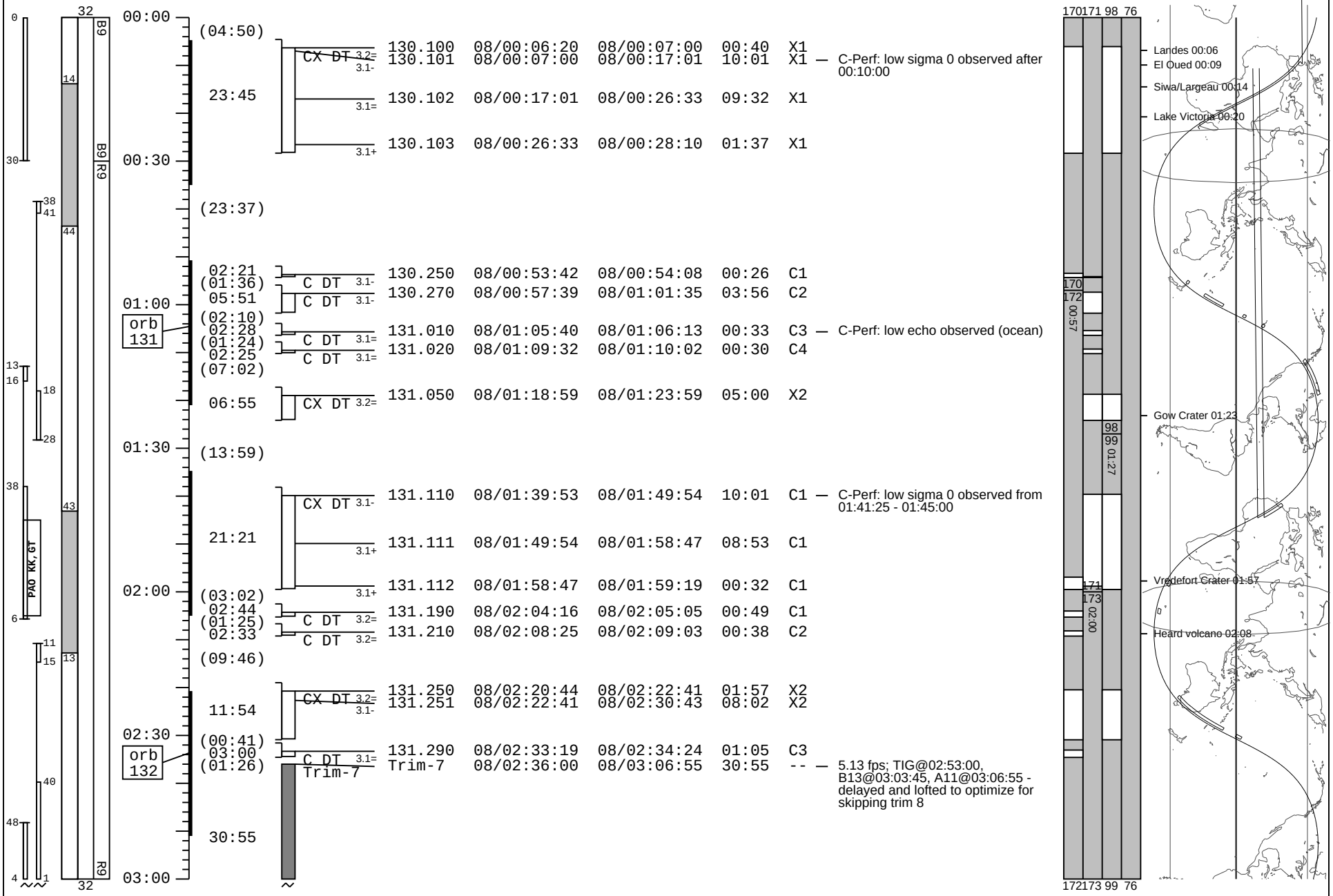
Map



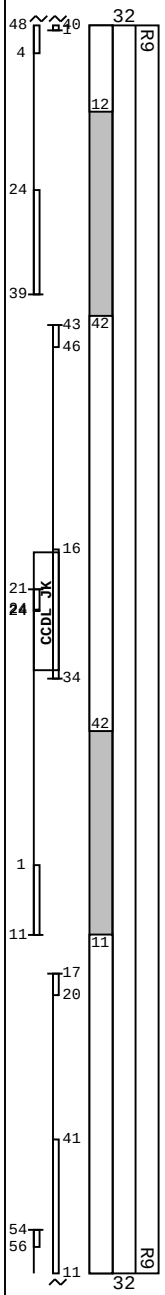
STS-99 As-Flown Mission Timeline



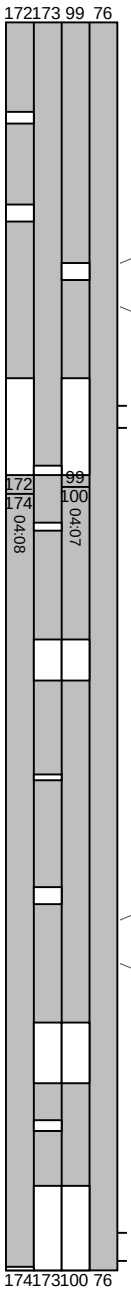
STS-99 As-Flown Mission Timeline

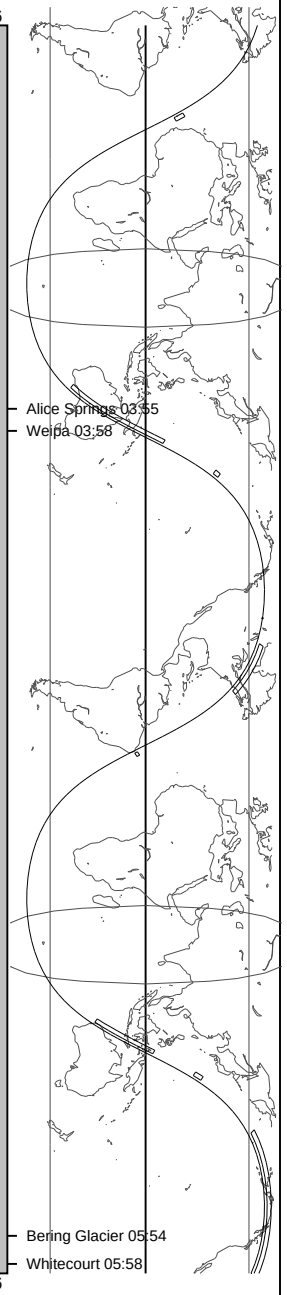


STS-99 As-Flown Mission Timeline

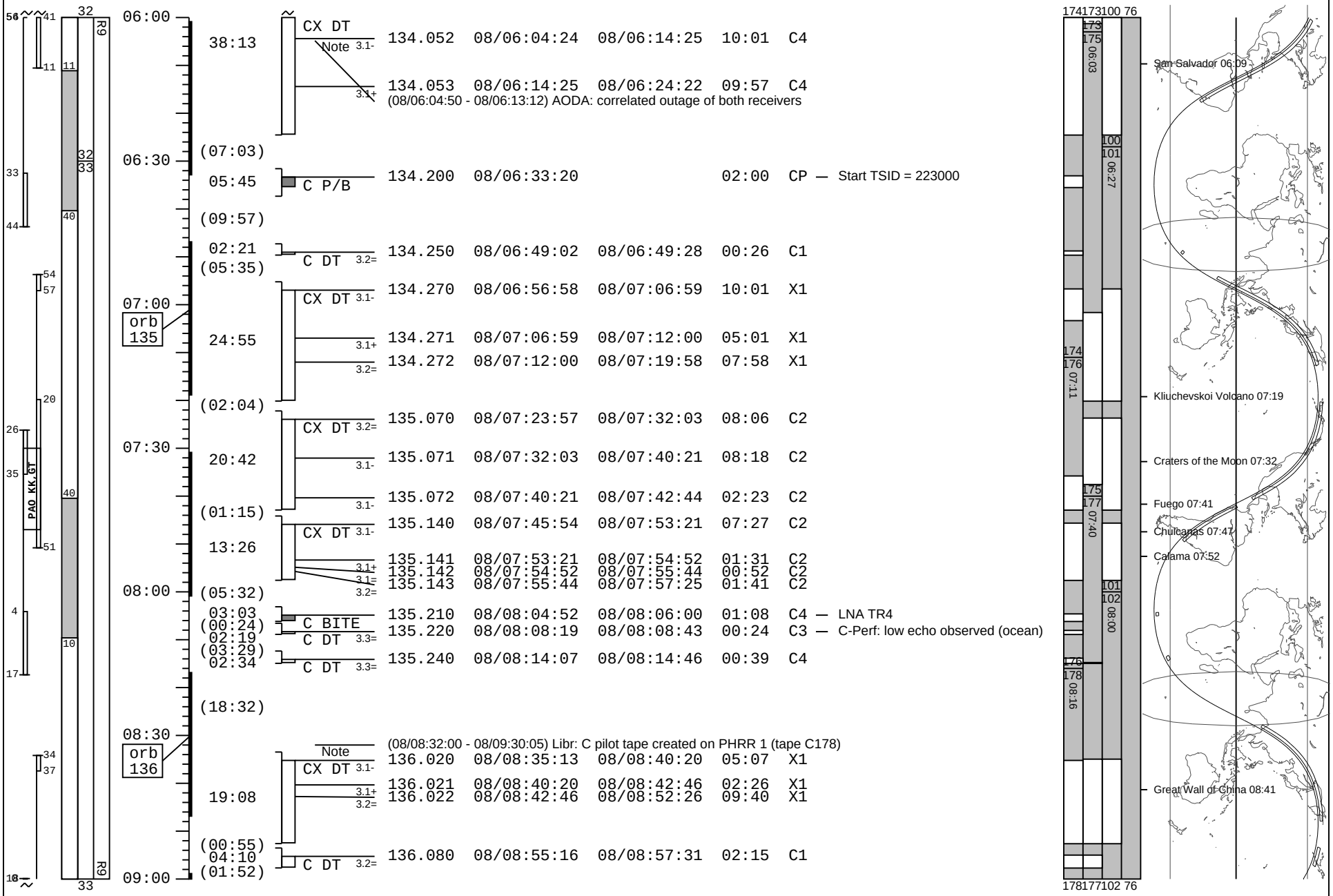


MET day 08	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
03:00	30:55	Trim-7						
	(04:30)							
	03:09	C DT 3.1=	132.130	08/03:13:10	08/03:14:24	01:14	C4	
	(10:13)							
	05:45	C P/B	132.170	08/03:26:32		02:00	CP	— Start TSID = 155000; WSGT was not configured properly
03:30	(02:41)							
	05:45	X P/B	132.200	08/03:34:58		02:00	XP	— Start TSID = 130000
	(10:52)							
		CX DT 3.2=	132.250	08/03:51:35	08/03:56:40	05:05	X1	
	15:26	3.1-	132.251	08/03:56:40	08/04:04:31	07:51	X1	
04:00		3.1=	132.252	08/04:04:31	08/04:05:06	00:35	X1	
orb 133	(05:24)							
	02:37	C Cal 3.1= 3.2=	133.030	08/04:12:25	08/04:12:42	00:17	C1	
			133.031	08/04:12:42	08/04:13:07	00:25	C1	
	(14:14)							
04:30	07:23	CX DT 3.2= Note	133.060	08/04:29:16	08/04:34:44	05:28	X2	— Data take nested to save energy; only such occurrence of nesting
		(08/04:30:09 - 08/04:36:42) AODA: correlated outage of both receivers						
	(12:05)							
	02:18	C DT 3.1= Note	133.150	08/04:48:44	08/04:49:07	00:23	C2	— C-Perf: low echo observed (ocean)
		(08/04:52:21 - 08/04:56:31) AODA: correlated outage of both receivers						
	(13:57)							
05:00	05:45	C P/B	133.200	08/05:04:59		02:00	CP	— Start TSID = 71500
	(13:47)							
		CX DT 3.2=	133.260	08/05:24:31	08/05:25:57	01:26	X1	
	10:13	3.1-	133.261	08/05:25:57	08/05:32:49	06:52	X1	
05:30	(03:52)							
orb 134	03:01	C DT Note 3.1=	134.020	08/05:38:36	08/05:39:42	01:06	C3	
		(08/05:38:21 - 08/05:45:58) AODA: correlated outage of both receivers						
	(06:27)							
		CX DT 3.2=	134.050	08/05:48:04	08/05:58:05	10:01	C4	
	38:13	3.2=	134.051	08/05:58:05	08/06:04:24	06:19	C4	
06:00								

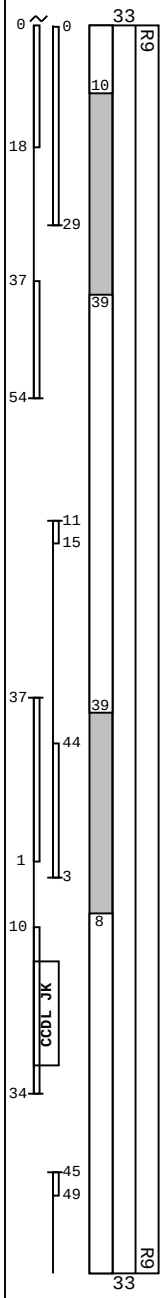




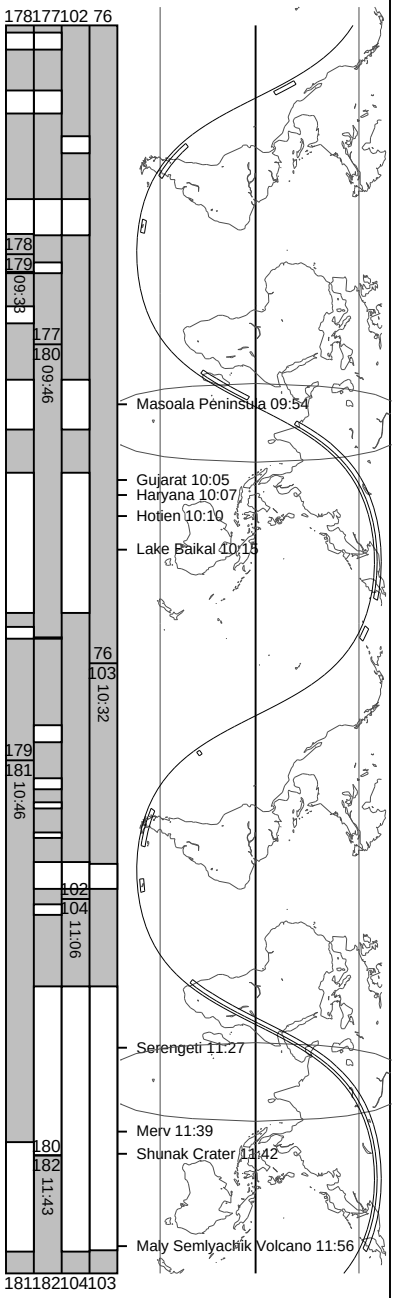
STS-99 As-Flown Mission Timeline



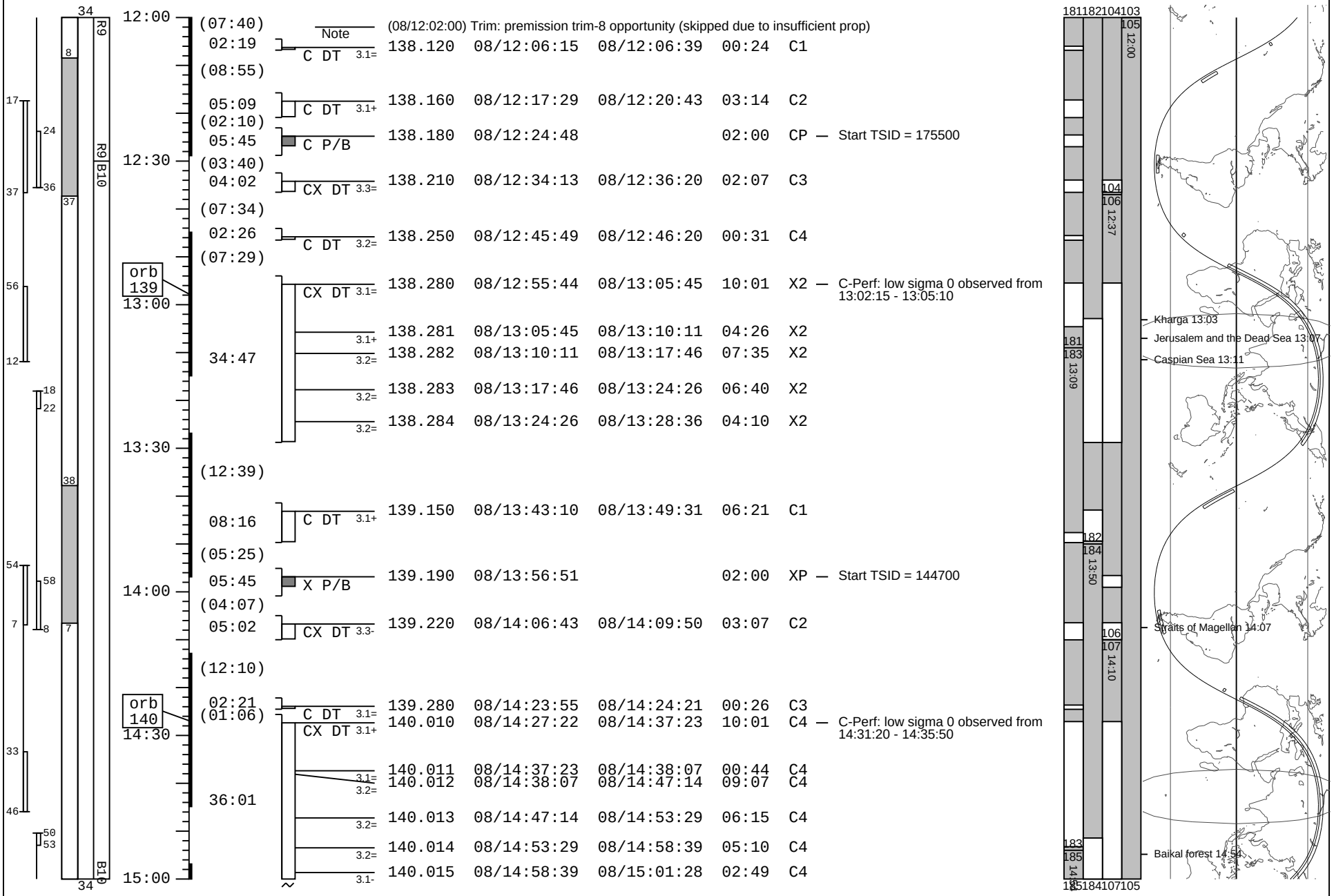
STS-99 As-Flown Mission Timeline



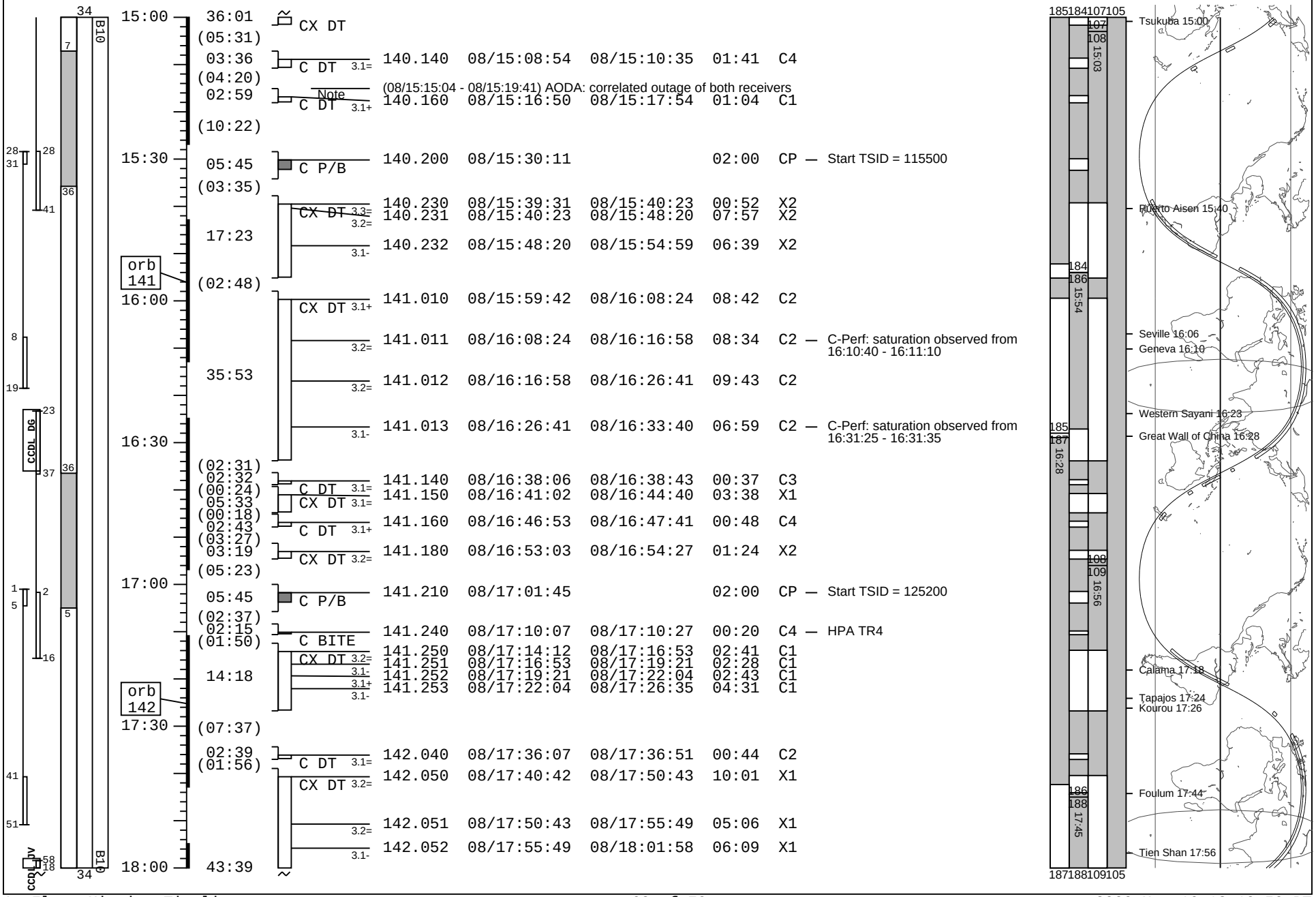
MET day 08	Len mm:ss	Events	Event#	MET start	MET stop	Len	D/L	Comment
			(08/08:32:00 - 08/09:30:05) Libr: C pilot tape created on PHRR 3 (tape C178)			PHRRs	KuSP	
09:00	(01:52)					1 2 3 4		
	05:45	Note C P/B	136.100	08/09:01:18		02:00	CP	— Start TSID = 172000
	(02:36)							
	04:47	C DT 3.1-	136.130	08/09:09:39	08/09:12:31	02:52	C2	
	(01:49)							
	05:45	X P/B	136.150	08/09:16:15		02:00	XP	— Start TSID = 71000
	(03:19)							
	06:41	CX DT 3.2=	136.180	08/09:25:19	08/09:30:05	04:46	X2	
09:30	(02:27)							
	03:01	C DT 3.3=	136.210	08/09:34:27	08/09:35:33	01:06	C3	
	(03:19)							
	05:45	C P/B	136.230	08/09:40:47		02:00	CP	— Start TSID = 264500
	(04:50)							
orb 137	08:39	CX DT 3.2= 3.1-	136.260 136.261	08/09:51:22 08/09:52:15	08/09:52:15 08/09:58:06	00:53 05:51	X1 X1	
10:00	(04:46)							
	21:41	CX DT 3.1= 3.1+ 3.1= 3.2= 3.2=	137.020 137.021 137.022 137.023 137.024	08/10:04:47 08/10:08:21 08/10:10:48 08/10:11:16 08/10:20:02	08/10:08:21 08/10:10:48 08/10:11:16 08/10:20:02 08/10:24:33	03:34 02:27 00:28 08:46 04:31	C4 C4 C4 C4 C4	
	(00:33)							
	03:10	C DT 3.2=	137.090	08/10:27:01	08/10:28:16	01:15	C1	
10:30	(11:01)							
	05:45	C P/B	137.130	08/10:41:12		02:00	CP	— Start TSID = 256500
	(01:54)							
	03:03	C BITE	137.160	08/10:48:51	08/10:49:59	01:08	C3	— LNA TR3
	(00:25)							
	02:21	C DT 3.1=	137.170	08/10:52:19	08/10:52:45	00:26	C2	
	(02:00)							
	02:15	C BITE Note	137.180	08/10:56:40	08/10:57:00	00:20	C3	— HPA TR3 (08/10:58:00 - 08/11:56:40) Libr: X pilot tape created on PHRR 4 (tape X103)
11:00	(02:01)							
	05:20	CX DT 3.2= 3.3+	137.200 137.201	08/11:00:56 08/11:01:13	08/11:01:13 08/11:04:21	00:17 03:08	X2 X2	
	(00:46)							
	02:59	C DT 3.3=	137.220	08/11:07:02	08/11:08:06	01:04	C3	
	(08:51)							
orb 138		CX DT 3.2= 3.1-	137.260 137.261	08/11:18:52 08/11:20:38	08/11:20:38 08/11:30:39	01:46 10:01	X1 X1	
11:30		3.1+	137.262	08/11:30:39	08/11:39:45	09:06	X1	— C-Perf: low sigma 0 observed from 11:32:40 - 11:36:00
	39:43							
		3.2=	137.263	08/11:39:45	08/11:43:52	04:07	X1	
		3.2=	137.264	08/11:43:52	08/11:50:24	06:32	X1	
		3.2=	137.265	08/11:50:24	08/11:56:40	06:16	X1	
12:00	(07:40)							



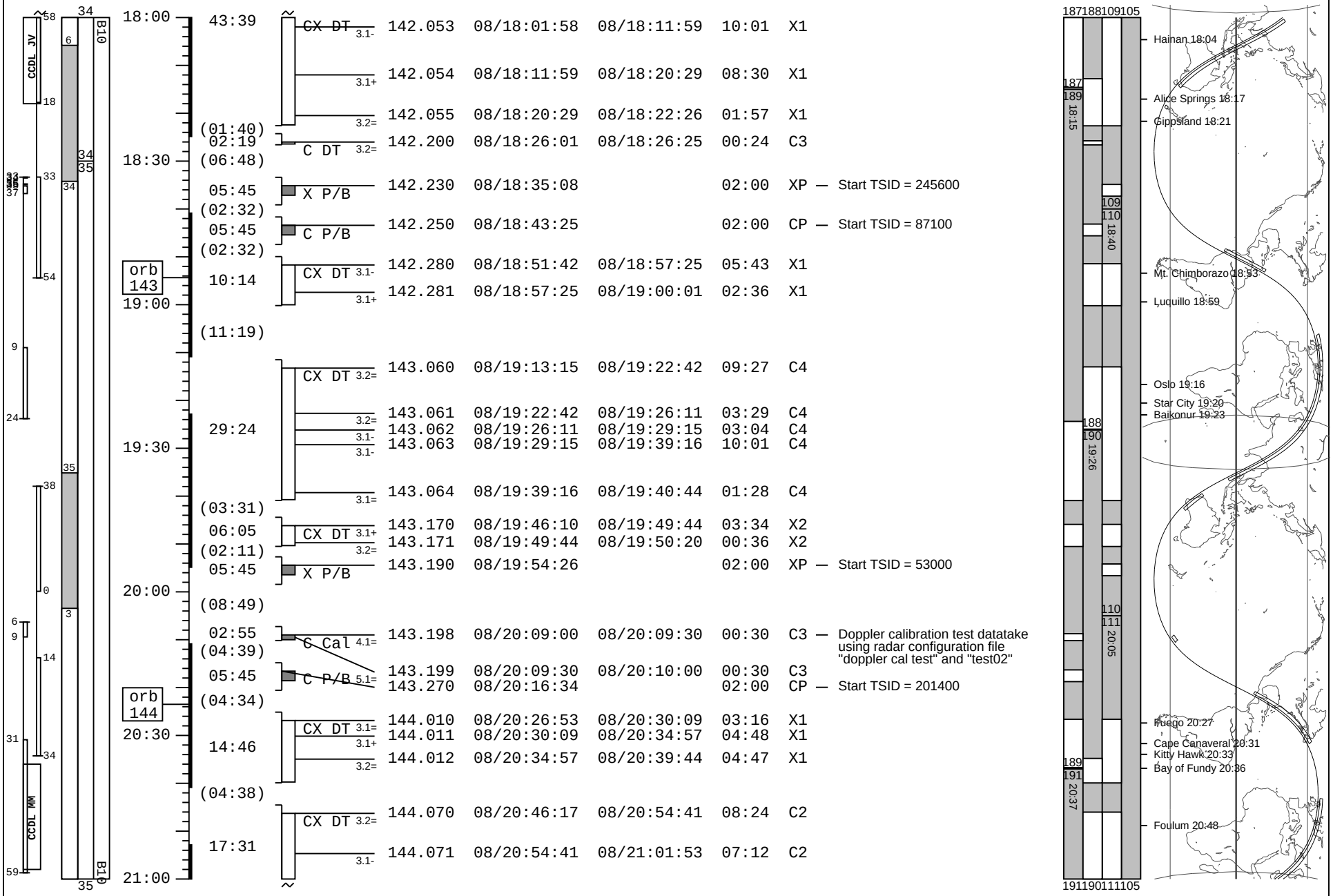
STS-99 As-Flown Mission Timeline



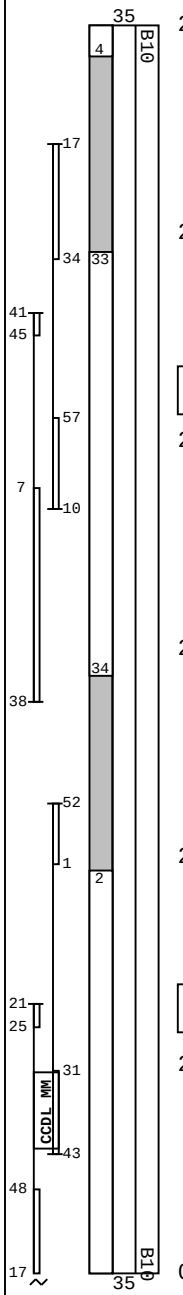
STS-99 As-Flown Mission Timeline



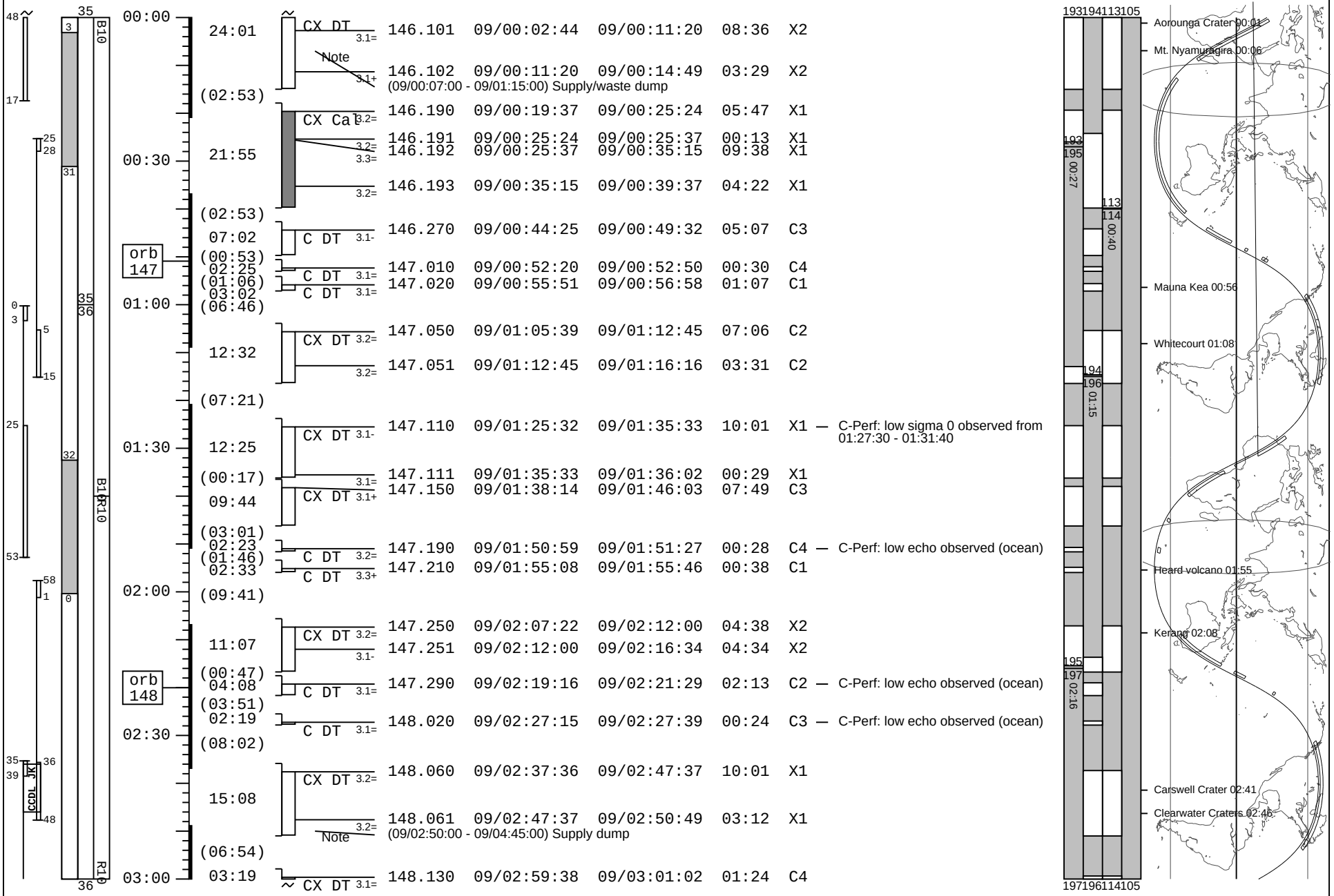
STS-99 As-Flown Mission Timeline



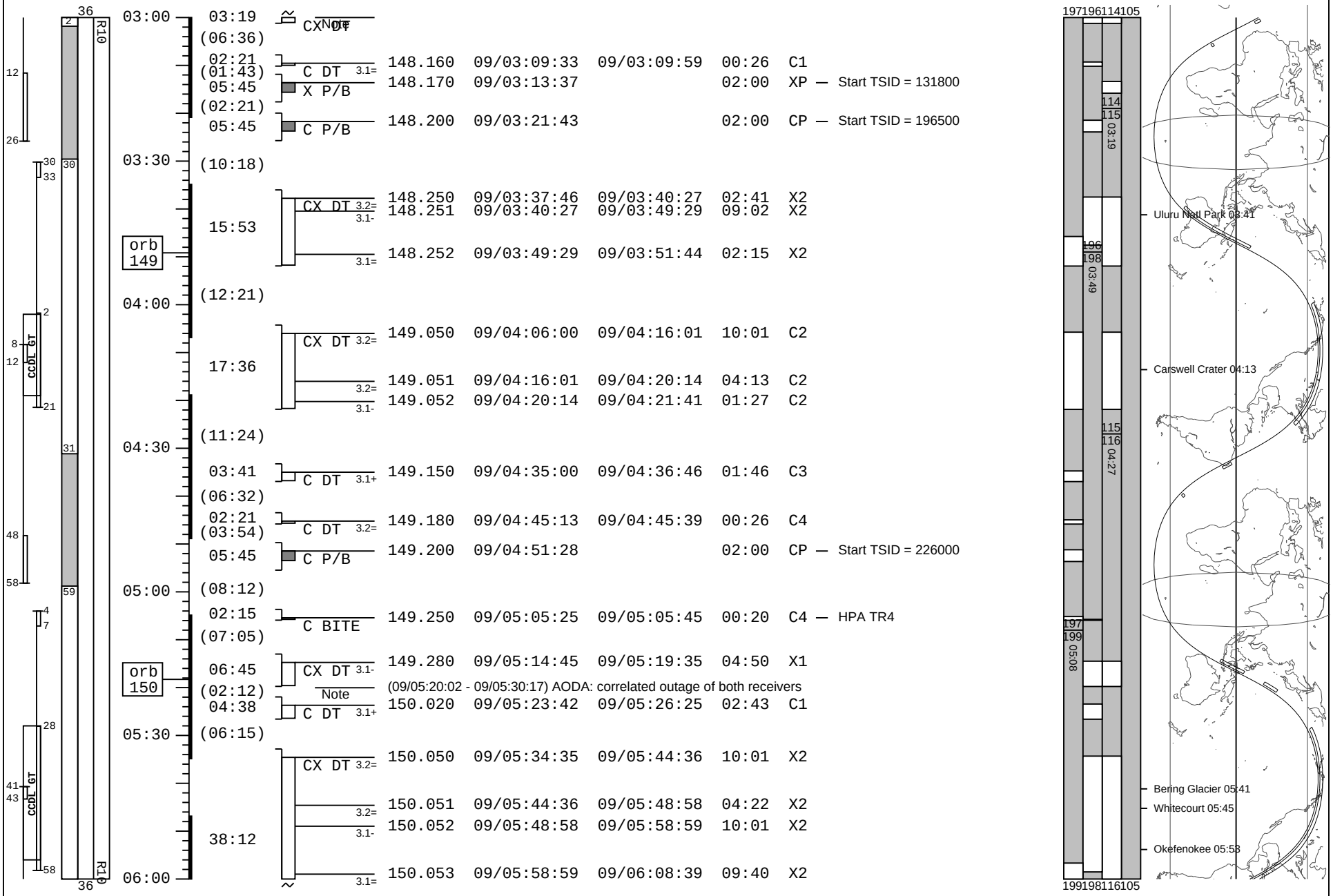
STS-99 As-Flown Mission Timeline



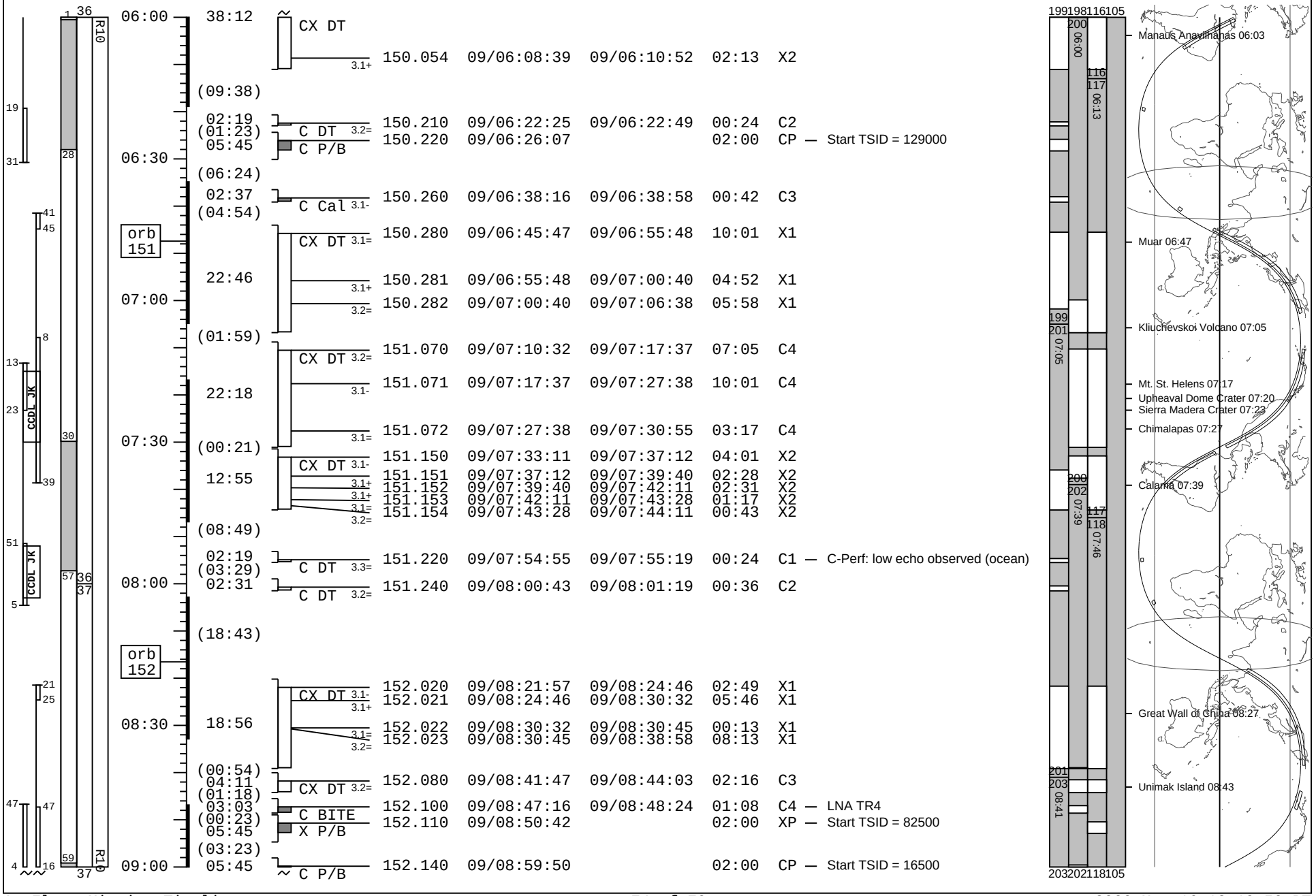
STS-99 As-Flown Mission Timeline



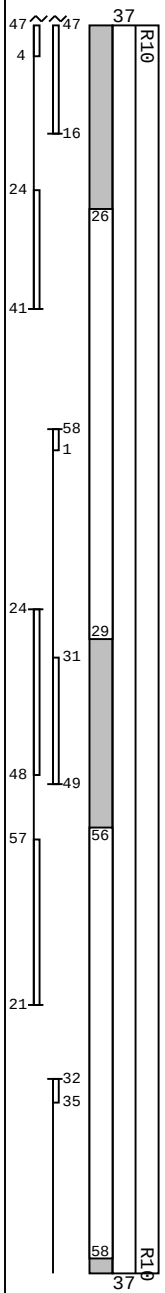
STS-99 As-Flown Mission Timeline



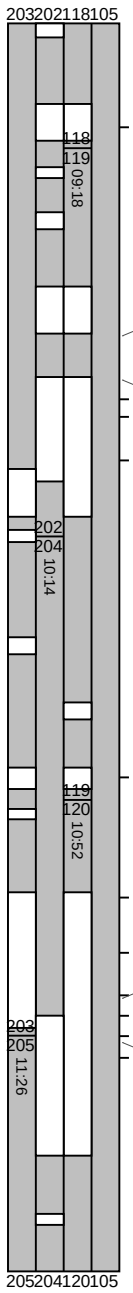
STS-99 As-Flown Mission Timeline

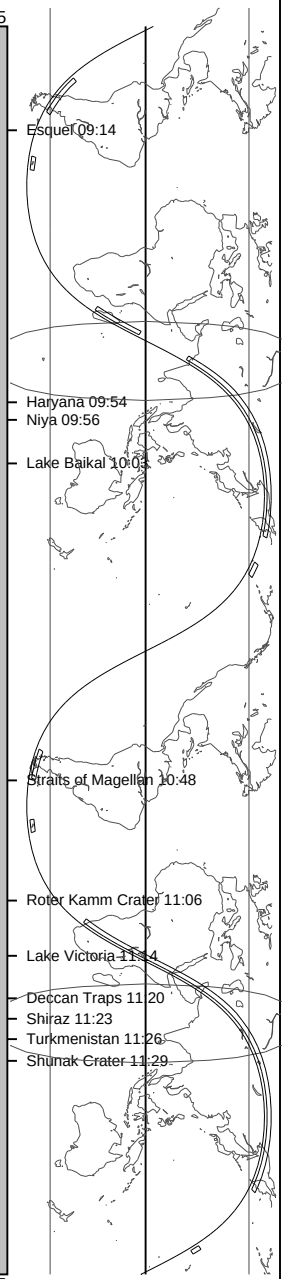


STS-99 As-Flown Mission Timeline

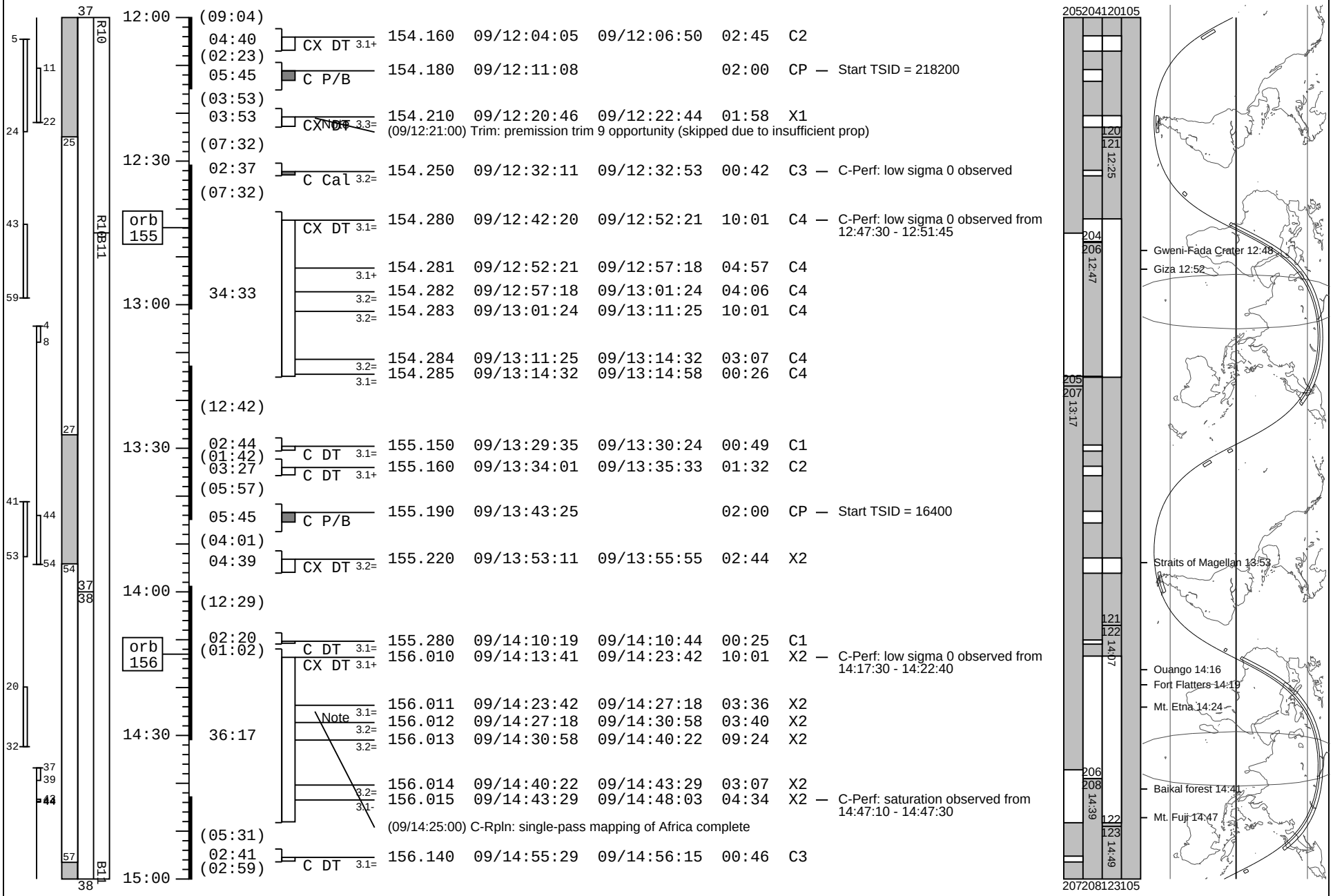


MET day 09	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
09:00	05:45	C P/B						
	(06:18)							
06:46		CX DT 3.1=	152.180	09/09:11:53	09/09:12:35	00:42	C4	
		3.2=	152.181	09/09:12:35	09/09:16:44	04:09	C4	
	(02:21)							
	03:02	C DT 4.1=	152.210	09/09:21:00	09/09:22:07	01:07	C1	— South Georgia test datatake using radar configuration file "SthGeorgia tst02"
	(03:28)							
09:30	05:45	C P/B	152.230	09/09:27:30		02:00	CP	— Start TSID = 88500
	(04:58)							
	08:15	CX DT 3.1-	152.260	09/09:38:13	09/09:44:33	06:20	X2	
orb 153	(04:48)							
	21:37	CX DT 3.1=	153.020	09/09:51:16	09/09:54:53	03:37	C2	
		3.1+	153.021	09/09:54:53	09/09:56:29	01:36	C2	
10:00		3.1+	153.022	09/09:56:29	09/10:01:20	04:51	C2	
		3.2=	153.023	09/10:01:20	09/10:10:58	09:38	C2	
	(00:26)							
	03:13	C DT 3.2=	153.090	09/10:13:19	09/10:14:37	01:18	C3	
	(12:16)	Note	(09/10:20:00 - 09/11:15:00) Supply dump					
10:30	05:45	C P/B	153.140	09/10:28:48		02:00	CP	— Start TSID = 68000
	(03:39)	Note	(09/10:33:30 - 09/10:46:30) Libr: loss of verniers					
	05:45	X P/B	153.170	09/10:38:12		02:00	XP	— Start TSID = 114400
	(03:39)							
	04:33	CX DT 3.2=	153.200	09/10:47:36	09/10:50:14	02:38	X1	
	(01:25)							
	02:57	C DT 3.3=	153.220	09/10:53:34	09/10:54:36	01:02	C4	
11:00	(09:04)							
	39:27	CX DT 3.1-	153.260	09/11:05:35	09/11:15:36	10:01	X2	
orb 154		3.1=	153.261	09/11:15:36	09/11:20:40	05:04	X2	— C-Perf: low sigma 0 observed from 11:20:00 - 11:22:00
		3.1+	153.262	09/11:20:40	09/11:28:15	07:35	X2	
11:30		3.2=	153.263	09/11:28:15	09/11:32:24	04:09	X2	
		3.2=	153.264	09/11:32:24	09/11:42:25	10:01	X2	
		3.2=	153.265	09/11:42:25	09/11:43:07	00:42	X2	
	(06:56)							
	03:03	C DT 3.1-	154.120	09/11:51:58	09/11:53:06	01:08	C1	
12:00	(09:04)							

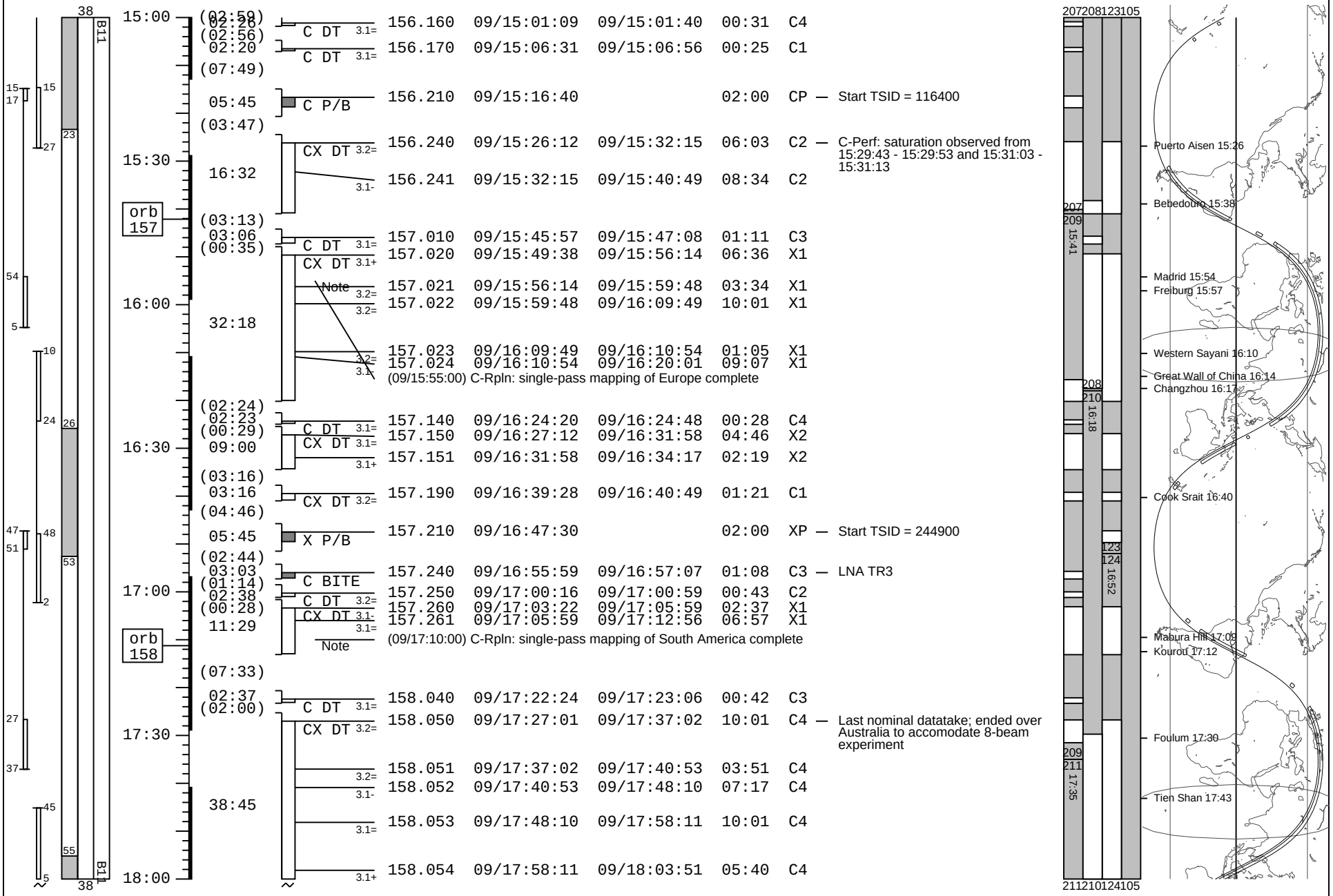




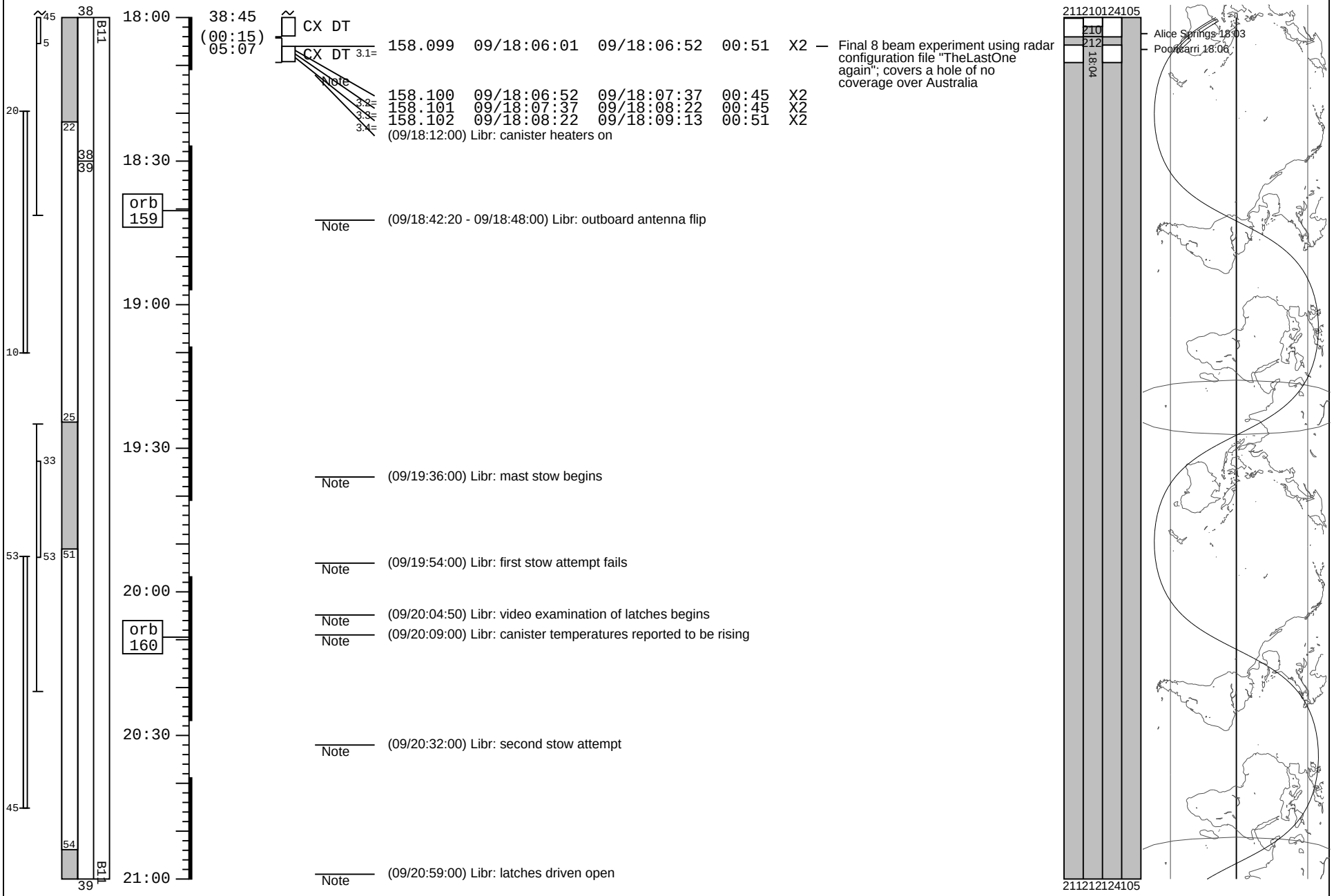
STS-99 As-Flown Mission Timeline



STS-99 As-Flown Mission Timeline



STS-99 As-Flown Mission Timeline



STS-99 As-Flown Mission Timeline

TDR E W	Sun Seq Crw	MET day 09	Len mm:ss	Events	Event#	MET start	MET stop	Len mm:ss	D/L KuSP	Comment
		21:00		Note						(09/21:01:20) Libr: third stow attempt
		21:30		Note						(09/21:22:00) Libr: fourth stow attempt (first at max torque)
		orb 161								
		22:00		Note						(09/22:07:00) Libr: fifth stow attempt (again at max torque): success! (TV/Ku was active)
		22:30								
		23:00								
		orb 162								
		23:30								
		00:00								

PHRRs 1 2 3 4

Map