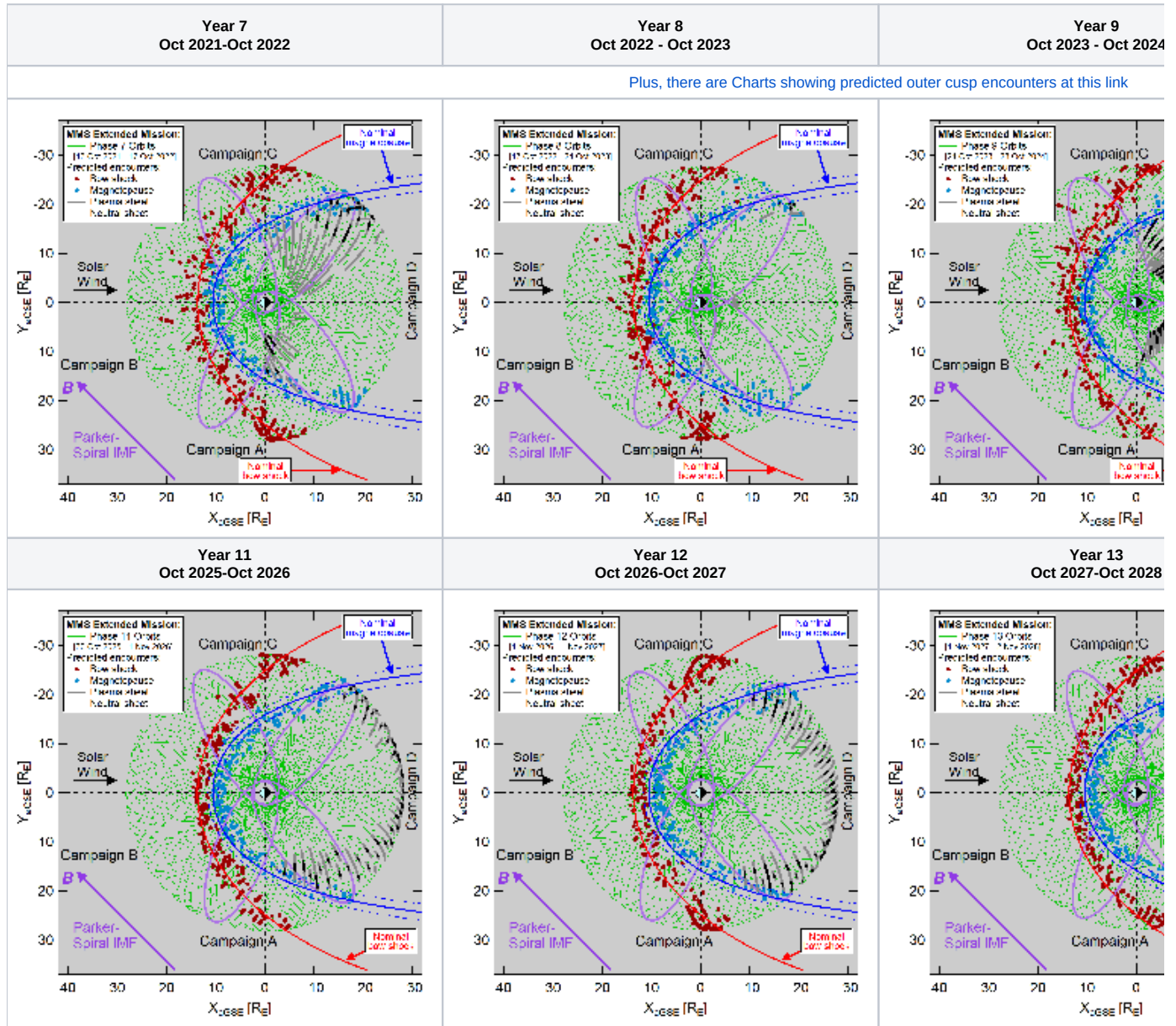
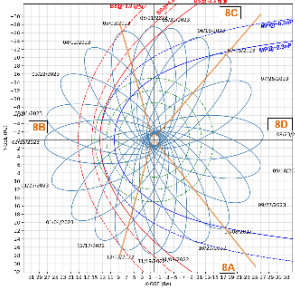
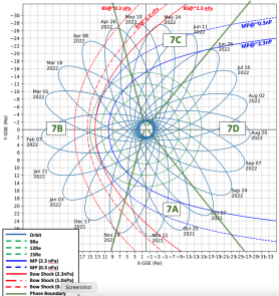
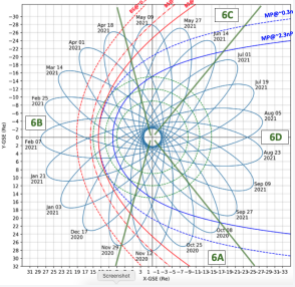


1.3 Mission Phases and Science Regions of Interest

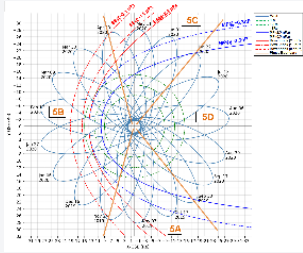


Year 9	Phase	Region	Timeline Files from S. Petronec These are planning files, not actuals	Spacecraft Separations Additional Notes
Extended Mission 3 - Year 1 	Phase 9a	29 R _E Dusk Flank	MMS_orbit_Phase9A_and_conjunctions_v1a.pptx	
	Phase 9b	29 R _E Dayside	MMS_orbit_Phase9B_and_conjunctions_v1a.pptx	fast_mode_times_agse1_2023307-000000_2024176-000000_V007_v2a.txt
	Phase 9c	29 R _E Dawn Flank	MMS_orbit_Phase9C_and_conjunctions_v2.pptx	fast_mode_times_agse1_2024062-000000_2024301-000000_V005_v1_MMS1.txt fast_mode_times_agse1_2024062-000000_2024301-000000_V005_v1_MMS2.txt fast_mode_times_agse1_2024062-000000_2024301-000000_V005_v1_MMS3.txt fast_mode_times_agse1_2024062-000000_2024301-000000_V005_v1_MMS4.txt
	Phase 9d	29 R _E Nightside		

Year 8 Extended Mission 2 - Year 3 				
	Phase	Region	Timeline Files from S. Petrinec These are planning files, not actuals	Spacecraft Separations Additional Notes
	Phase 8a:	29 R _E Dusk Flank	MMS_orbit_Phase8A_and_conjunctions_v1.pptx	
	Phase 8b:	29 R _E Dayside	MMS_orbit_Phase8B_and_conjunctions_v1.pptx	
	Phase 8c:	29 R _E Dawn Flank	MMS_orbit_Phase8C_and_conjunctions_v1.pptx	
	Phase 8d:	29 R _E Nightside	MMS_orbit_Phase8D_and_conjunctions_v2.pptx	fast_mode_times_agse1_2023125-000000_2024002-000000_V005_v3.dat
Year 7 Extended Mission 2 - Year 2 	Phase 7a:	29 R _E Dusk Flank	MMS_Ph7_ConOps_20210809c.pptx MMS_Ph7A_ConOps_20210914.pptx	fast_mode_times_agse1_2021240-000000_2022114-000000_V004_v1.txt
	Phase 7b:	29 R _E Dayside	MMS_orbit_Phase7B_and_conjunctions.pptx	fast_mode_times_agse1_2021296-000000_2022171-000000_V004_v1.dat
	Phase 7c:	29 R _E Dawn Flank	MMS_orbit_Phase7C_and_conjunctions.pptx	
	Phase 7d:	29 R _E Nightside	MMS_orbit_Phase7D_and_conjunctions_v3.pptx MMS_orbit_Phase8B_and_conjunctions_v1.pptx (adjustments due to Artemis-1 Launch attempts)	fast_mode_times_agse1_2022107-000000_2022343-000000_V004_v3.dat LongShadows_update19July2022.pptx
Year 6 Extended Mission 2 - Year 1  MMS_Year6_Orbits&Phases.png	Phase 6a:	29 R _E Dusk Flank	MMS_Ph6A_ConOps_20200908[1].pptx	fast_mode_times_agse1_2020200-000000_2021075-000000_V005_v1.dat
	Phase 6b:	29 R _E Dayside	MMS_Ph6B_ConOps_20201118.pptx	Cluster_conjunctions_fast_mode_times_agse1_2020200-000000_2021075-000000_V005_v1.dat fast_mode_times_agse1_2020291-000000_2021159-000000_V004_v3.dat
	Phase 6c:	29 R _E Dawn Flank	MMS_Ph6C_ConOps_20210319.pptx	fast_mode_times_agse1_2021030-000000_2021268-000000_V005_v2.dat
	Phase 6d:	29 R _E Nightside	MMS_Ph6D_ConOps_20210518.pptx	fast_mode_times_agse1_2021121-000000_2021360-000000_V005_v2.dat

Year 5

Extended Mission 1 - Year 3



MMS_Year5_Orbits&Phases.png

Phase 5a:

~09/30/2019 - 11/24/2019

29 R_E Dusk Flank

MMS_EM5A_orbits_20190821.pptx
timelines_orbs1046_1061.pdf
fast_mode_times_agse1_EM5A.dat
offsets submitted

3 SROI

Phase 5b:
~11/24/2019 - 04/23/2020

29 R_E Dayside

MMS_Ph5B_ConOps_20191029.pptx

3 SROI

Parker Solar Probe perihelion alignment

11/28-11/30 - formation resize to <20km>

11/26 (DOY 330) - 34% moon shadow

12/27 (DOY 361) - 73% moon shadow - [timeline](#)

Solar Wind SROI: FPI electrons: 4eV-940eV / FPI ions: 197eV-9222eV

Phase 5c:
~04/23/2020 - 06/19/2020

29 R_E Dawn Flank

MMS_Ph5C_ConOps_20200227.pptx

Formation resize to 40km: planned for 4/14-16/2020

Phase 5d:
~06/22/2020 - 10/02/2020

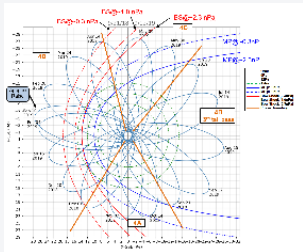
29 R_E Nightside

MMS_Ph5D_ConOps_20200519.pptx

Long Eclipses (~5.124 hr): 8/13/2020 and 8/17/2020

Year 4

Extended Mission 1 - Year 2



MMS_Year4_Orbits&Phases.png

MMS_2019Orbits_GSE.tiff

SROI PROPOSAL FOR APOGEE RAISE, TURBULENCE CAMPAIGN, AND REMAINDER OF PHASE 4B									
Day	Time	Phase	Altitude	Speed	Angle	Angle	Angle	Angle	Angle
101	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
102	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
103	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
104	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
105	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
106	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
107	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
108	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
109	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
110	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
111	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
112	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
113	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
114	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
115	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
116	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
117	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
118	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
119	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
120	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
121	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
122	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
123	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
124	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
125	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
126	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
127	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
128	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
129	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
130	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
131	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
132	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
133	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
134	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
135	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
136	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
137	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
138	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
139	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
140	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
141	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
142	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
143	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
144	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
145	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
146	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
147	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
148	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
149	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
150	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
151	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
152	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
153	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
154	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
155	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
156	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
157	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
158	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
159	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
160	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
161	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
162	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
163	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
164	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
165	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
166	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
167	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
168	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
169	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
170	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
171	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
172	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
173	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
174	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
175	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
176	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
177	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
178	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
179	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
180	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
181	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
182	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
183	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
184	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
185	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
186	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
187	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
188	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
189	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
190	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
191	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
192	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
193	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
194	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
195	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
196	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
197	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
198	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
199	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0
200	09:17:13.29495	4b	29.0	1.0	10.0	10.0	10.0	10.0	10.0

SWCampaign_timeline.jpeg

Phase 4a:

September 28, 2018

25R_E Dusk Flank
(Dwell time outside BS (0.3 nPa < 10 hrs)

MMS_4A_SROIs_v2.pptx

3 SROI

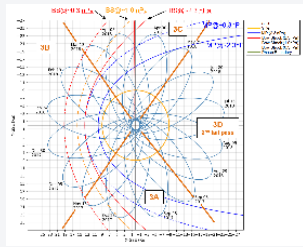
20 km Oct 18

Phase 4b:

November 29, 2018

25R_E Dayside
(Dwell time outside BS (0.3 nPa) > 10 hrs)

before apogee raise: MMS_half4 B_SROIs_v2.pptx



MMS_Year3_Orbits&Phases.png

Phase 3d:
May 25, 2018

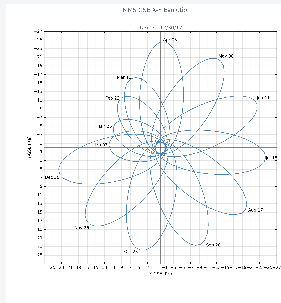
2nd 25R_E
Nightside

[MMS_3d_SROIs_886_930_mtail_timelines.pdf](#)

3 SROI

Year 2

Prime Mission - Year 2



MMS_2017Orbits_GSE.png

Phase 2a:
January 31, 2017

Apogee raise,
Dawn

No science ROIs planned in
Phase 2A

No FPI ops
60 km Feb 1
Apogee Raise Feb 9
160 km Apr 26

Phase 2b:
May 1, 2017

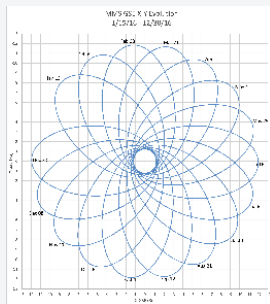
1st 25R_E
Nightside
Completion of
Prime Mission

[MMS_2b_SROIs_748-793_mtail_timelines.pdf](#)

1 SROI
60 km May 18
30 km Jun 1
20 km Jun 29

Year 1

Prime Mission - Year 1



MMS_2016Orbits_GSE.jpg

Phase 1a:
September 1,
2015

1st 12R_E
Dayside

[Petricin_UPDATE_Sliding_ROI_timelines_ph1a.pdf](#)

60 km DOY 259/260 (Sept 16/17)
25 km DOY 273/274 (Sept 30/Oct 1)
10 km DOY 287/288 (Oct 14/15)
40 km Dec 16
10 km Jan 13

Phase 1x:
March 8, 2016

12R_E Dawn,
Nightside, Dusk

No science ROIs planned in
Phase 1x

No FPI Ops
40 km Mar 24
10 km Sep 1

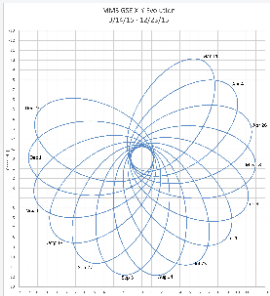
Phase 1b:
Sept 12, 2016

2nd 12R_E
Dayside

[MMS_ph1b_avg13.5hr_pref1_v2.pdf](#)

7 km Sep 15

Commissioning:



MMS_2015Orbits_GSE.jpg

March 15, 2015

Nightside -->
Dusk Flank

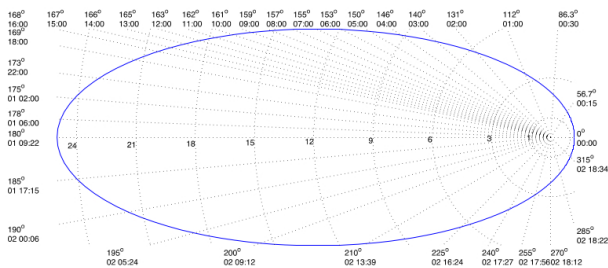
160 km DOY 188/190 (July 7/9)

Selected datasets only
BBF campaign

12R_E Orbit

similar graphic needs to be created

25R_E Orbit



MMS_25RE_Orbit.jpg

29R_E Orbit

similar graphic needs to be created