
European Space Agency

Directorate of Technical and Operational Support
Mission Operations Department

ROSETTA

Mission Calendar

RO-ESC-PL-5026

Issue 1

May 2005



ESOC *European Space Operations Centre*





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CHANGE RECORD SHEET

Date	Issue No.	Rev. No.	Pages Affected	Description/Authority	CR No.
13-May-05	Issue 1	---	All	New document based on Mission Calendar RO-ESC-TN-5026 Issue 3. Implements the following calendar post-commissioning updates: <ul style="list-style-type: none">- Adjusted Payload Checkout Windows as per consolidated timeline- Adjusted NSHM windows- Introduced close monitoring during first solar conjunction in first quarter of 2006- Introduced Deep Impact campaign in July 2005- Introduced Deep Space Hibernation commissioning in first quarter of 2010- Adjusted ground station support profile as agreed at mission handover to SCI-S- Kourou MRTs removed – included in the Kourou support around Earth swing-bys	

Revisions are indicated by a vertical bar at the outside border.

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LIST OF ACRONYMS

Acronyms	Description
ACM	Active Cruise Mode
APM	Antenna Pointing Mechanism
CR	Cruise
CVP	Commissioning and Verification Phase
D/L	Downlink
DSM	Deep Space Manoeuvre
DSN	Deep Space Network
GMI	Global Mapping Insertion Point
IMP	Inertial Measurement Package
LEOP	Launch and Early Orbit Phase
LGA	Low Gain Antenna
MGA	Medium Gain Antenna
MRT	Mission Readiness Test
NNO	New Norcia
NSHM	Near Sun Hibernation Mode
P/L	Payload
RVM	Rendezvous Manoeuvre
S/C	Spacecraft
SADM	Solar Array Drive Mechanism
SIM	Simulation
SKM	Sun Keeping Mode
SSCE	Sun Spacecraft Earth angle
SSMM	Solid State Mass Memory
STR	Star Tracker
TBC	To be confirmed
TBD	To be defined
U/L	Uplink

1. INTRODUCTION

The purpose of this document is to detail the key dates of the ROSETTA mission. It reflects the mission phases and support schedule according to the Mission Implementation Plan [AD-1] and provides the formal overall mission timeline on which the Flight Operations Plan [RD-1] is based. For all phases where payload science activities are foreseen in the Mission Implementation Plan [AD-1], this document identifies the allocated window and provides the basis for the phase-specific Mission Science Plans.

This document reflects the contents of a Microsoft Project electronic file, under the form of report and Gantt charts printouts. This file is kept under configuration control in the Flight Operations Plan production environment. It contains additional detailed operational information and will therefore be the prime reference for high-level planning of the mission phases.

For each mission phase of the ROSETTA mission, the document gives start and end dates/conditions and key events foreseen during this phase. Environmental events (solar conjunctions and oppositions) are also listed. A description of the main platform and payload activities foreseen during this phase can be found in [RD-1].

1.1 Applicable Documents

AD-1 Rosetta Mission Implementation Plan, RO-ESC-PL-5100 (Issue 3 – February 2005)

1.2 Reference Documents

RD-1 ROSETTA Flight Operations Plan; RO-ESC-PL-5000 (Issue 5.0 - December 2004)



Cruise 3	29/05/2007	12/09/2007	107	1 month after DSM3	1.32	1.58	0.43	1.51	35.7	41.6	
Earth Swing-by 2	13/09/2007	13/12/2007	92	2 months before Earth Swing-by 2	0.91	1.32	0	0.42	6.3	147.8	Close to Sun conditions (min Sun distance of 0.91AU)
Earth	13/11/2007										
Cruise 4-1	14/12/2007	04/07/2008	204	1 month after Earth Swing-by 2	0.91	1.92	0.16	1.47	8.0	111.7	Close to Sun conditions (min Sun distance of 0.91AU)
Steins Flyby	05/07/2008	05/11/2008	124	2 months before Steins Flyby	1.93	2.24	1.49	3.05	12.5	31.4	
Steins	05/09/2008										
Cruise 4-2	06/11/2008	12/09/2009	311	2 months after Steins Flyby	1.36	2.26	0.42	3.24	1.7	34.5	Solar conjunction of 39 days
DSM4	18/03/2009										
Earth Swing-by 3	13/09/2009	13/12/2009	92	2 months before Earth Swing-by 3	0.98	1.35	0	0.41	22.5	109.0	
Earth	13/11/2009										
Cruise 5	14/12/2009	09/05/2010	147	1 month after Earth Swing-by3	1.03	2.23	0.16	1.79	8.8	70.9	
Lutetia Flyby	10/05/2010	10/09/2010	124	2 months before Lutetia Flyby	2.23	3.14	1.81	4.04	7.4	26.3	
Lutetia	10/07/2010										
Rendez-vous Manoeuver 1	11/09/2010	13/07/2011	306	2 months after Lutetia Flyby	3.15	4.58	3.29	4.45	0.2	14.4	Solar conjunction of 50 days Solar opposition of 37 days
RVM1	23/01/2011										Start of RVM1 burn
Cruise 6 (DSHM)	14/07/2011	22/01/2014	917	Sun distance of 4.6AU	4.49	5.29	4.06	6.26	0.1	12.7	



Rendez-vous Manoeuver 2 and Comet Approach	23/01/2014	21/08/2014	211	Sun distance below 4.6AU and Sun-spacecraft-Earth angle above 4 degrees	3.51	4.49	2.69	5.36			Solar occultation (28 days) Near Comet Drift (start with first RVM2 burn): 30d Far Approach: 30d Close Approach: 6d Transition to Global Mapping: 15d Operational Margin: 11d
RVM2	22/05/2014										Start of RVM2 burn
Global Mapping and Close Observation	22/08/2014	19/10/2014	59	Comet insertion point (92 days after start of RVM2)	3.150	3.507	2.771	3.241			<u>Global Mapping:</u> - 7d dedicated to data collection - 28d for data analysis and selection of 5 potential landing sites <u>Close Observation:</u> - 13d dedicated to data collection (2 days for each landing site + 1 day orbit phasing + 2days to downlink data of last site) - 10d for landing site selection
Lander Delivery	20/10/2014	15/11/2014	27	22 days before Lander Delivery	2.970	3.150	3.241	3.426			Lander Delivery Dress Rehearsal: 11d Lander Delivery Preparation: 11d



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Lander Delivery	10/11/2014										Sun distance = 3AU
Comet Escort	16/11/2014	31/12/2015	411	Lander Delivery + 5d	1.243	2.970	1.774	3.524			

2.2 Sun Occultations (Sun-Spacecraft-Earth angle below 5 degrees)

Note: date format is dd/mm/yyyy.

Sun Occultations			
Conjunction 1	48d	21/03/2006	07/05/2006
Conjunction 2	39d	08/12/2008	15/01/2009
Conjunction 3	50d	22/09/2010	10/11/2010
Opposition 1	37d	13/04/2011	19/05/2011
Conjunction 4	64d	15/10/2011	17/12/2011
Opposition 2	47d	30/04/2012	15/06/2012
Conjunction 5	67d	31/10/2012	05/01/2013
Opposition 3	46d	20/05/2013	04/07/2013
Conjunction 6	60d	24/11/2013	22/01/2014
Opposition 4	28d	25/06/2014	22/07/2014

2.3 Payload Checkouts

Note: date format is dd/mm/yyyy.

Payload Checkouts			
P/L Checkout 0	5d	28/03/2005	01/04/2005
P/L Checkout 1	5d	30/09/2005	04/10/2005
P/L Checkout 2	5d	03/03/2006	07/03/2006
P/L Checkout 3	5d	25/08/2006	29/08/2006
P/L Checkout 4	25d	27/11/2006	21/12/2006
P/L Checkout 5	5d	18/05/2007	22/05/2007
P/L Checkout 6	15d	17/09/2007	01/10/2007
P/L Checkout 7	5d	04/01/2008	08/01/2008
P/L Checkout 8	25d	07/07/2008	31/07/2008
P/L Checkout 9	5d	30/01/2009	03/02/2009
P/L Checkout 10	15d	21/09/2009	05/10/2009
P/L Checkout 11	5d	04/12/2009	08/12/2009
P/L Checkout 12	25d	10/05/2010	03/06/2010
P/L Checkout 13	5d	03/12/2010	07/12/2010

2.4 AOCS Checkouts

Periodic AOCS activities on Reaction Wheels, IMP and solar-array mounted SAS are to be carried out every six months. Duration of this activity is of the order of two days.

Note: date format is dd/mm/yyyy.

AOCS Checkouts	
AOCS C/O 1	10/06/2004
AOCS C/O 2	16/09/2004
AOCS C/O 3	17/03/2005
AOCS C/O 4	29/09/2005
AOCS C/O 5	02/03/2006
AOCS C/O 6	03/08/2006
AOCS C/O 7	01/02/2007
AOCS C/O 8	24/05/2007
AOCS C/O 9	17/09/2007
AOCS C/O 10	07/01/2008
AOCS C/O 11	07/07/2008
AOCS C/O 12	22/01/2009
AOCS C/O 13	21/09/2009
AOCS C/O 14	13/05/2010
AOCS C/O 15	13/09/2010
AOCS C/O 16	07/03/2011

2.5 NSHM Phases

Note: date format is dd/mm/yyyy.

NSHM Phases			
NSHM Test	5d	11/04/2005	15/04/2005
NSHM Commissioning	18d	25/04/2005	12/05/2005
NSHM1	58d	26/07/2005	21/09/2005
NSHM2	128d	18/10/2005	22/02/2006
NSHM3	65d	23/05/2006	26/07/2006
NSHM4	107d	29/05/2007	12/09/2007
NSHM5	170d	15/01/2008	02/07/2008
NSHM6	142d	21/04/2009	09/09/2009
NSHM7	65d	02/03/2010	05/05/2010

2.6 Ground Stations Usage

2.6.1 New Norcia

Note: date format is dd/mm/yyyy.

Appendix 1 presents the deviations between the current New Norcia support profile and the previous baseline.

New Norcia			
NNO Daily	129d	26/02/04	03/07/04
NNO Weekly	64d	04/07/04	05/09/04
NNO Daily	56d	06/09/04	31/10/04
NNO Weekly	61d	01/11/04	31/12/04
NNO Weekly	30d	01/01/05	30/01/05
NNO Daily	116d	31/01/05	26/05/05
NNO Daily	52d	27/05/05	17/07/05
NNO Weekly	63d	18/07/05	18/09/05
NNO Daily	7d	19/09/05	25/09/05
NNO Weekly	21d	26/09/05	16/10/05
NNO Daily	7d	17/10/05	23/10/05
NNO Weekly	28d	24/10/05	20/11/05
NNO Monthly	41d	21/11/05	31/12/05
NNO Monthly	50d	01/01/06	19/02/06
NNO Daily	16d	20/02/06	07/03/06
NNO Weekly	13d	08/03/06	20/03/06
NNO Daily	48d	21/03/06	07/05/06
NNO Weekly	14d	08/05/06	21/05/06
NNO Daily	3d	22/05/06	24/05/06
NNO Weekly	28d	25/05/06	21/06/06
NNO Monthly	32d	22/06/06	23/07/06
NNO Weekly	35d	24/07/06	27/08/06
NNO Daily	63d	28/08/06	29/10/06
NNO Weekly	28d	30/10/06	26/11/06
NNO Daily	28d	27/11/06	24/12/06
NNO Weekly	7d	25/12/06	31/12/06
NNO Weekly	31d	01/01/07	31/01/07
NNO Daily	122d	01/02/07	02/06/07
NNO Weekly	28d	03/06/07	30/06/07
NNO Monthly	71d	01/07/07	09/09/07
NNO Weekly	21d	10/09/07	30/09/07
NNO Daily	74d	01/10/07	13/12/07
NNO Weekly	18d	14/12/07	31/12/07

NNO Weekly	10d	01/01/08	10/01/08
NNO Daily	7d	11/01/08	17/01/08
NNO Weekly	28d	18/01/08	14/02/08
NNO Monthly	136d	15/02/08	29/06/08
NNO Daily	129d	30/06/08	05/11/08
NNO Weekly	56d	06/11/08	31/12/08
NNO Weekly	21d	01/01/09	21/01/09
NNO Weekly	28d	22/01/09	18/02/09
NNO Daily	65d	19/02/09	24/04/09
NNO Weekly	28d	25/04/09	22/05/09
NNO Monthly	105d	23/05/09	04/09/09
NNO Weekly	28d	05/09/09	02/10/09
NNO Daily	79d	01/10/09	18/12/09
NNO Weekly	13d	19/12/09	31/12/09
NNO Daily	63d	01/01/10	04/03/10
NNO Monthly	62d	05/03/10	05/05/10
NNO Daily	144d	06/05/10	26/09/10
NNO Weekly	42d	27/09/10	07/11/10
NNO Daily	54d	08/11/10	31/12/10
NNO Daily	102d	01/01/11	12/04/11
NNO Weekly	37d	13/04/11	19/05/11
NNO Daily	55d	20/05/11	13/07/11
NNO Daily	343d	23/01/14	31/12/14
NNO Daily	365d	01/01/15	31/12/15

2.6.2 Cebreros

Support of the ESA Cebreros ground station is scheduled for 90 days between the 18-Aug-2014 and the 15-Nov-2014 to support comet characterization and Lander delivery.

2.6.3 Kourou

Note: date format is dd/mm/yyyy.

The support around the Earth swing-by is limited to a few passes close to the swing-by and a few weekly passes prior to the swing-by to verify the compatibility between the ground station and the spacecraft.

Kourou			
Kourou 1	14d	26/02/2004	11/03/2004

Kourou 2	30d	04/02/2005	05/03/2005
Kourou 3	30d	22/10/2007	20/11/2007
Kourou 4	30d	22/10/2009	20/11/2009

2.6.4 DSN

Note: date format is dd/mm/yyyy.

NASA DSN			
DSN1	14d	26/02/04	10/03/04
DSN2	93d	26/02/04	29/05/04
DSN3	7d	03/06/04	09/06/04
DSN4	42d	06/09/04	17/10/04
DSN5	30d	17/02/05	18/03/05
DDOR Check	14d	07/08/06	20/08/06
DSN6	38d	01/09/06	08/10/06
DDOR1	14d	09/10/06	22/10/06
DSN7	155d	23/10/06	26/03/07
DSN8	30d	31/10/07	29/11/07
DSN9	40d	08/08/08	16/09/08
DSN10	30d	28/10/09	26/11/09
DSN11	40d	12/06/10	21/07/10
DSN12	115d	10/11/10	04/03/11
DSN13	30d	05/03/11	03/04/11
DSN14	153d	23/01/14	24/06/14
DSN15	34d	23/07/14	25/08/14
DSN16	28d	25/10/14	21/11/14

2.7 Ground Segment Activities

Note: date format is dd/mm/yyyy.

Ground Segment Activities			
Ground Segment Revalidation	60d	25/09/2013	24/11/2013
Mission Readiness Tests			
New Norcia MRT	60d	24/11/2013	23/01/2014
NASA/DSN MRTs			
NASA MRT1	60d	19/12/04	17/02/05
NASA MRT2	60d	08/06/06	06/08/06
NASA MRT3	60d	01/09/07	31/10/07
NASA MRT4	60d	09/06/08	07/08/08
NASA MRT5	60d	29/08/09	28/10/09
NASA MRT6	60d	13/04/10	11/06/10
NASA MRT7	30d	11/10/10	09/11/10
NASA MRT8	60d	24/11/13	23/01/14
NASA MRT9	30d	25/09/14	25/10/14
Simulations			
SIM1	60d	02/01/2005	03/03/2005
SIM2	60d	01/08/2006	29/09/2006
SIM3	60d	28/12/2006	25/02/2007
SIM4	60d	15/09/2007	13/11/2007
SIM-Ast1	60d	08/07/2008	05/09/2008
SIM5	60d	18/01/2009	18/03/2009
SIM6	60d	15/09/2009	13/11/2009
SIM-Ast2	60d	12/05/2010	10/07/2010
SIM7	90d	03/12/2010	02/03/2011
SIM8	90d	29/10/2013	27/01/2014
SIM9	180d	13/05/2014	09/11/2014

3. MISSION GANTT CHART

For ground station support, black bars indicate daily passes, dark gray bars indicate weekly passes and light gray bars indicate monthly passes. Dashed bars indicate periods where the station is required for a few passes per week, resulting in a share between weekly and daily passes profile.

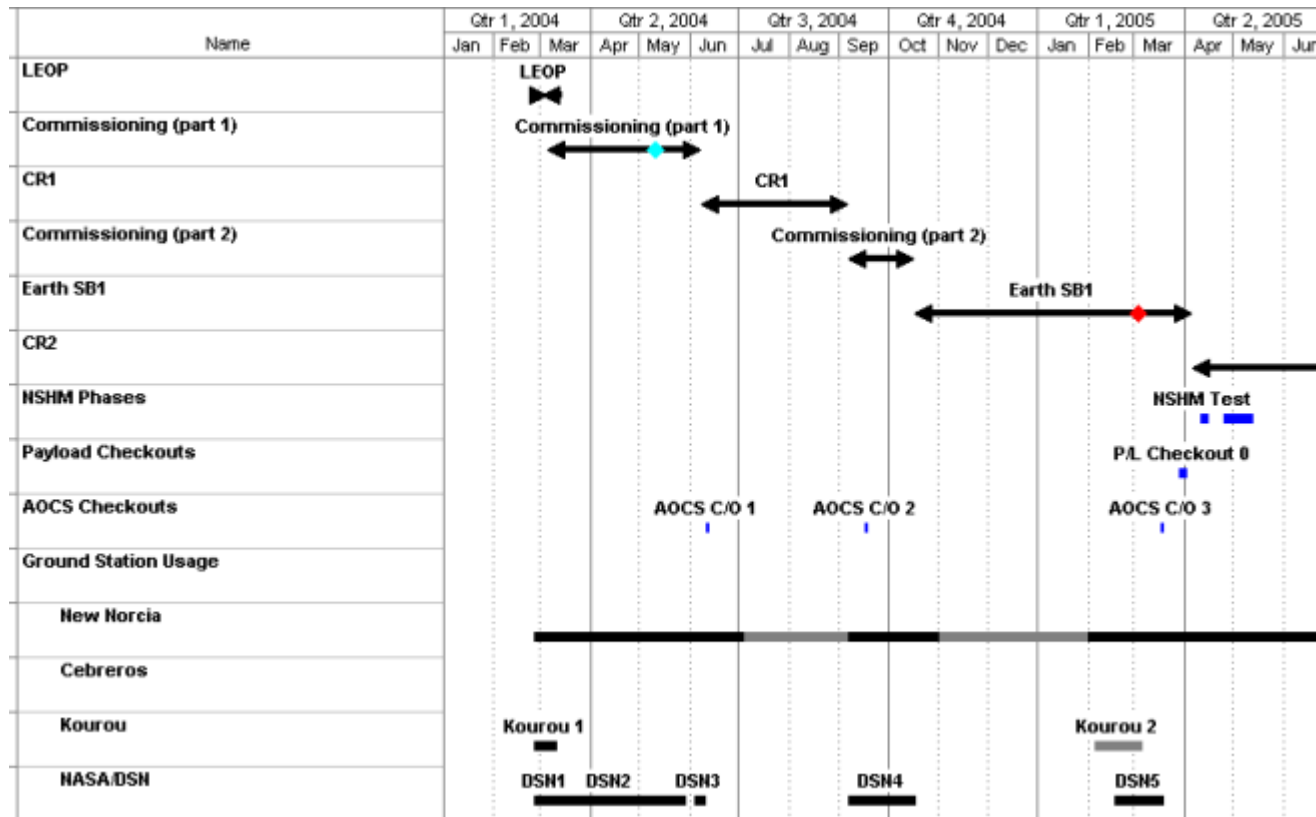


Figure 4.1: Launch to Earth Swing-by 1

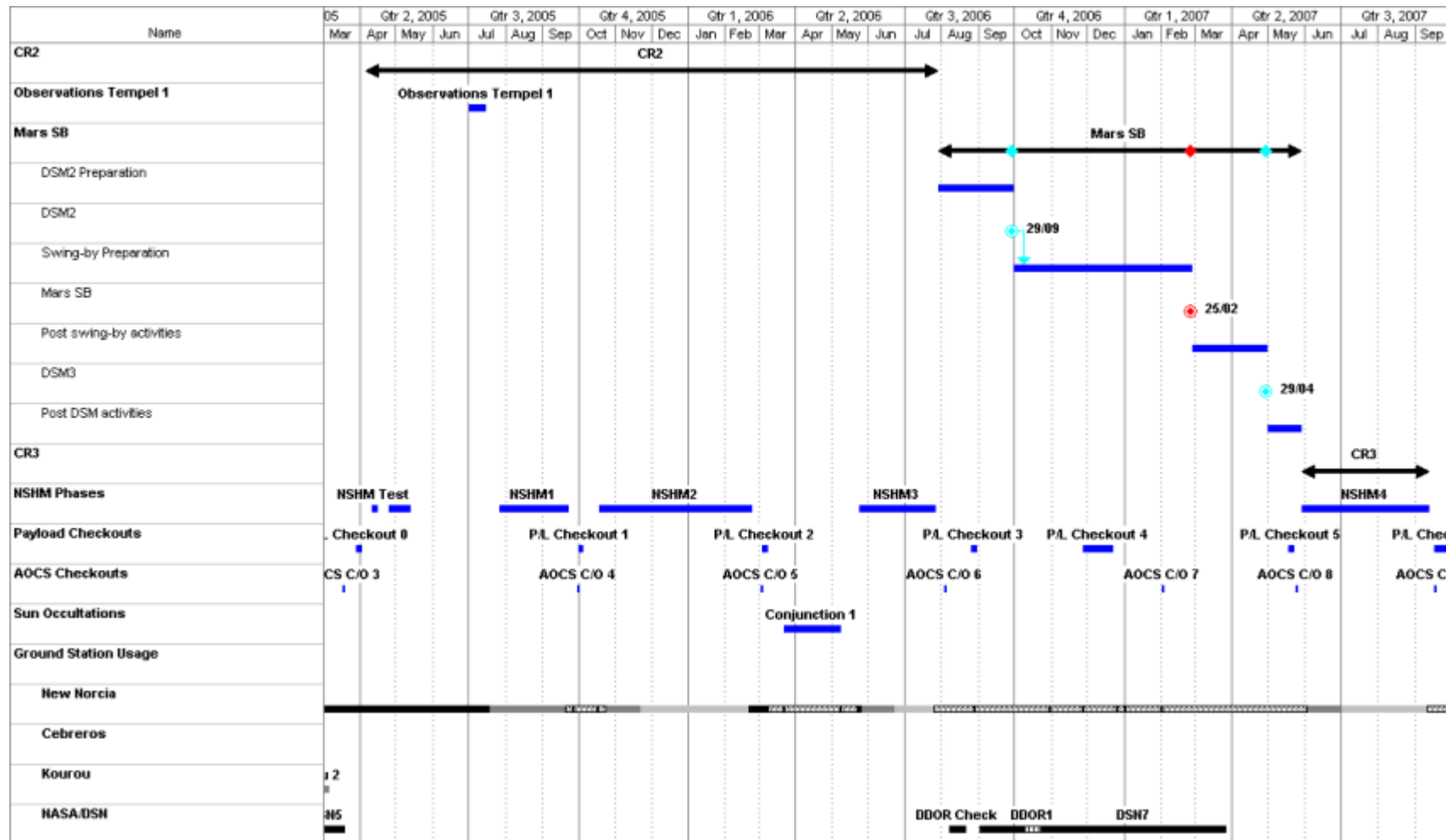


Figure 4.2: Cruise 2 to Cruise 3

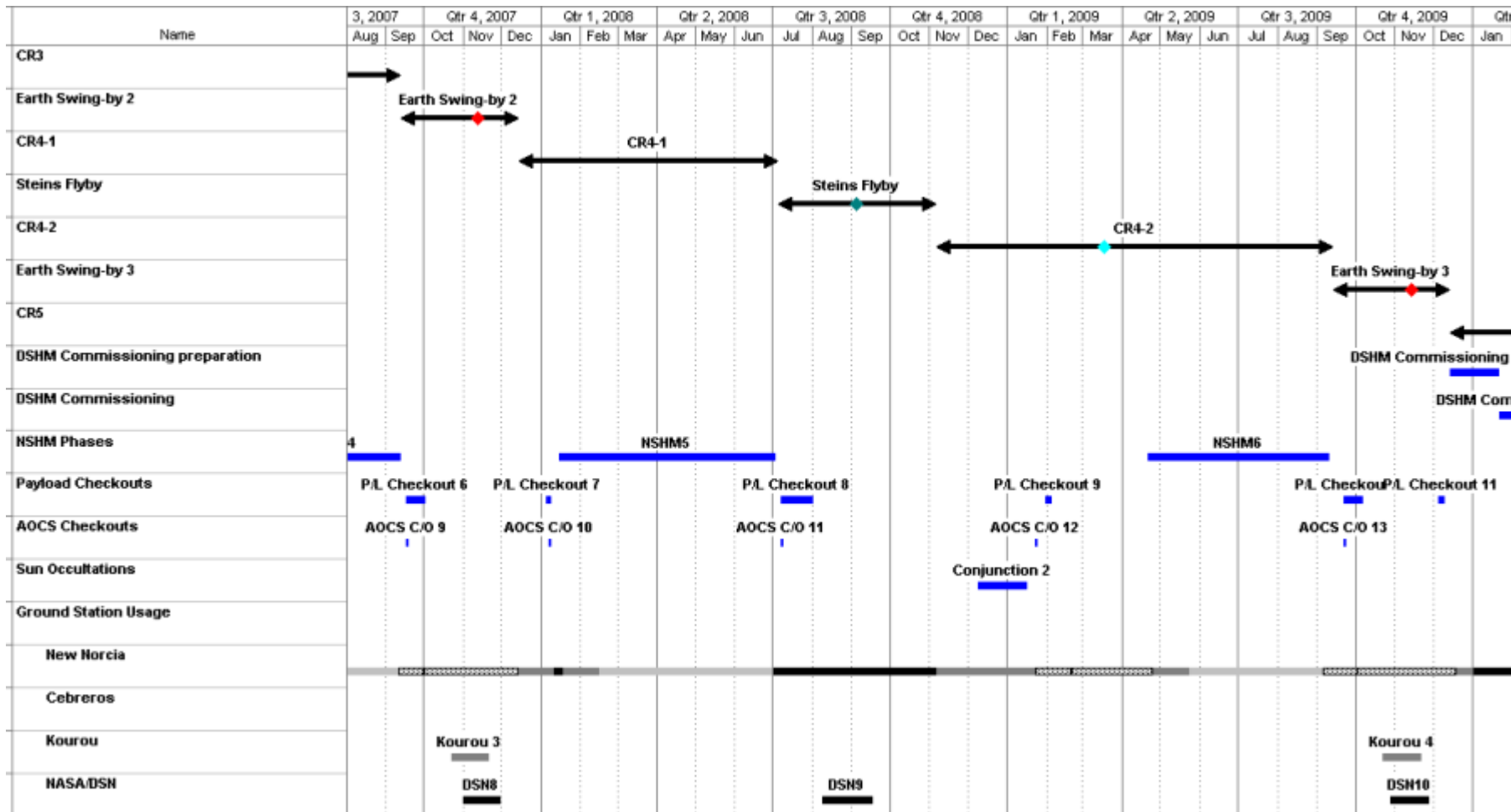


Figure 4.3: Earth Swing-by 2 to Cruise 5

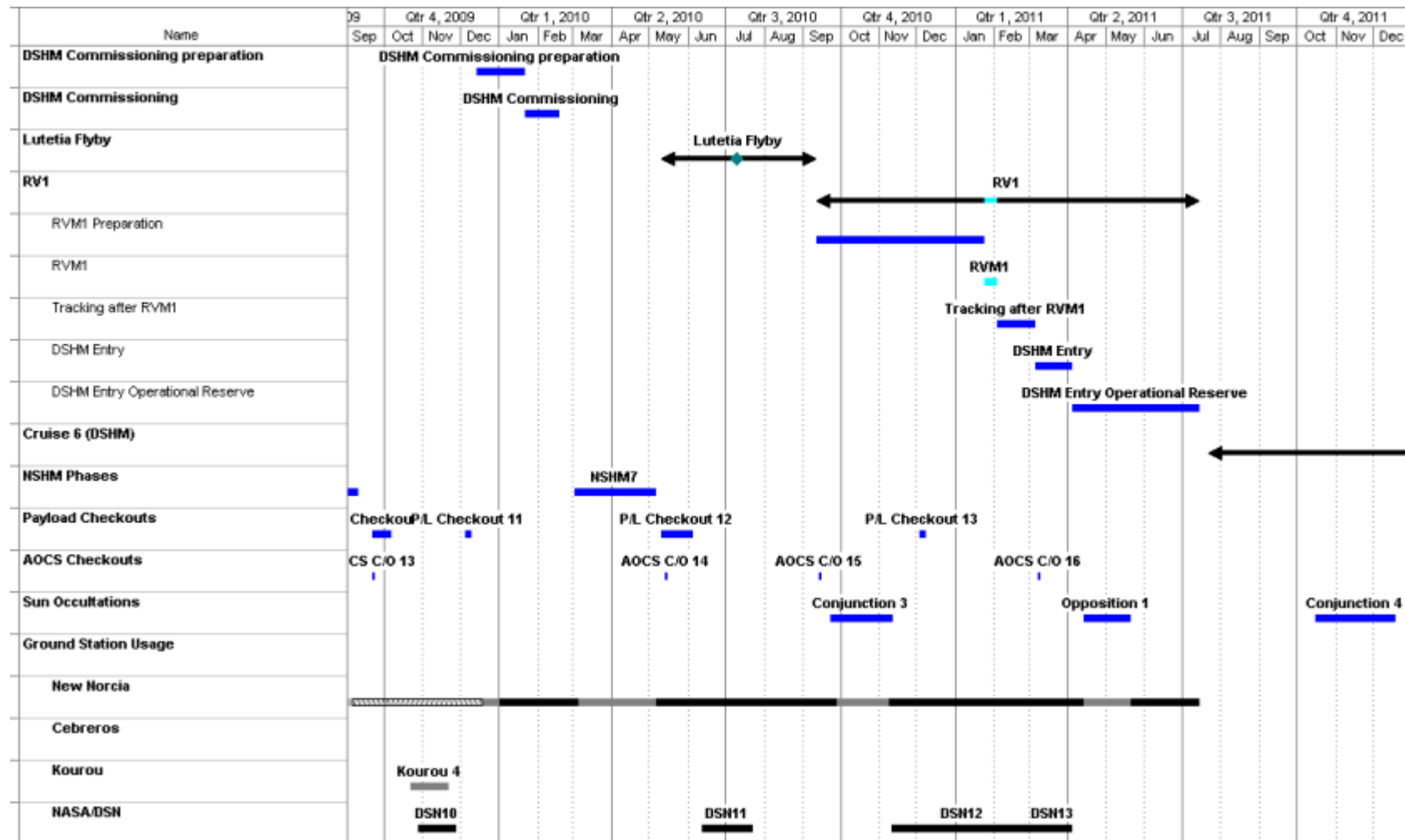


Figure 4.4: Cruise 5 to Cruise Phase 6 (DSHM)

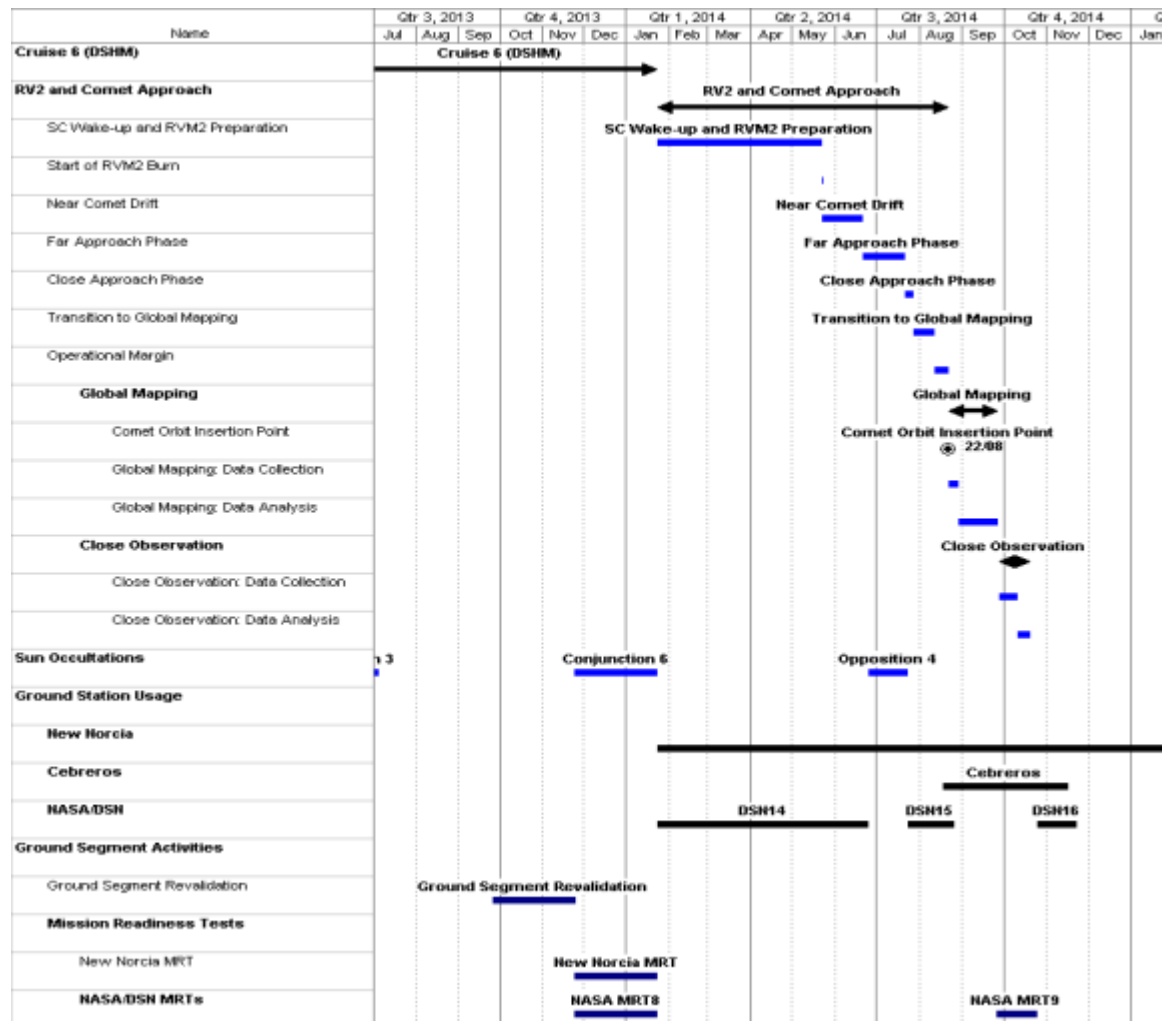


Figure 4.5: Cruise Phase 6 (DSHM) to Lander Delivery

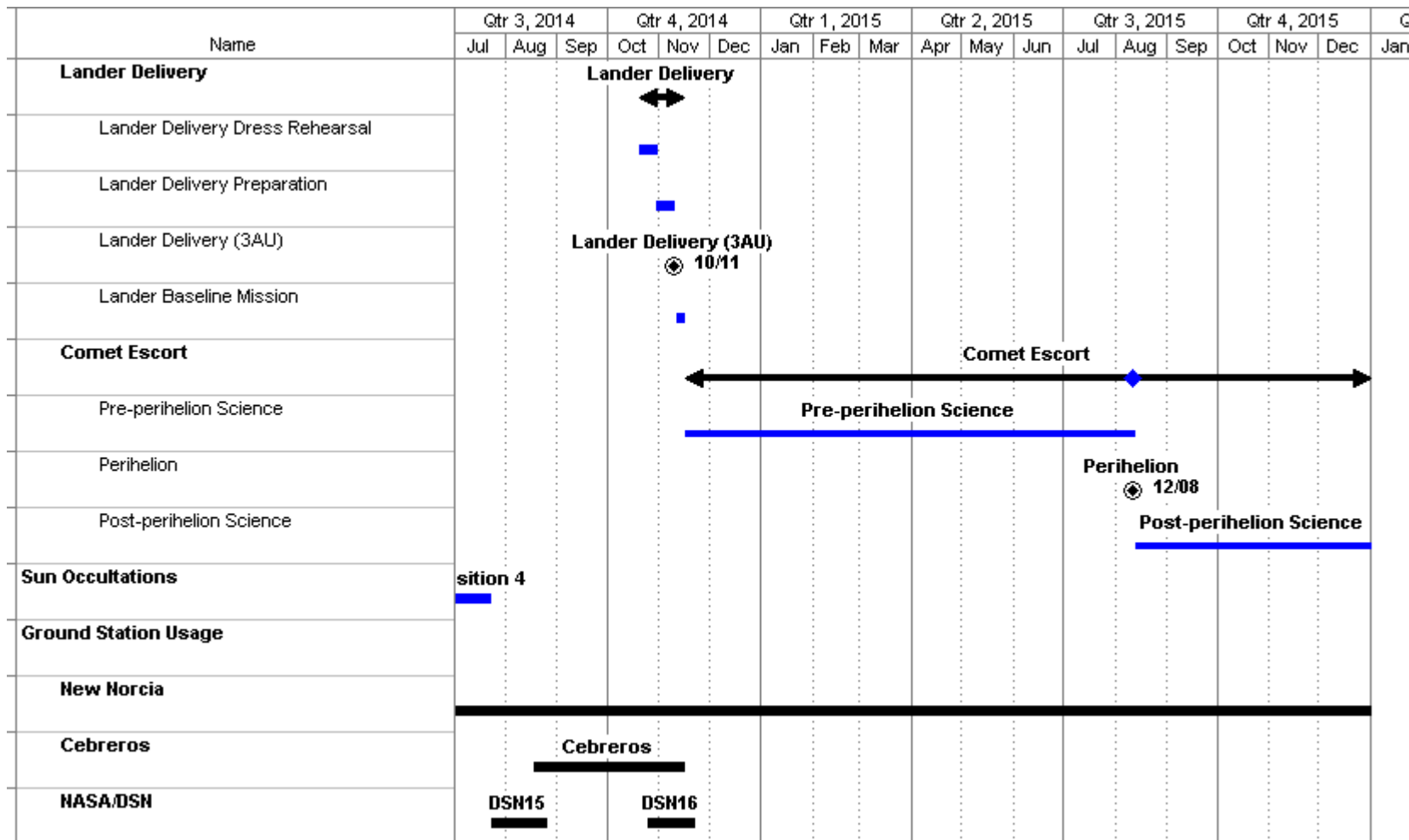


Figure 4.6: Comet Science Phases

4. APPENDIX 1 – NEW NORCIA STATION SCHEDULING – DEVIATIONS FROM PREVIOUS BASELINE

	type of NNO Pass	from	to	Oct-04		type of NNO Pass	from	to	May-05			
				days	passes				passes/year	days	passes	passes/year
leop cvp	daily	26-Feb-04	3-Jul-04	129	129	daily	26-Feb-04	03-Jul-04	129	129		
cruise	weekly	4-Jul-04	5-Sep-04	64	9	weekly	04-Jul-04	05-Sep-04	64	9		
cvp	daily	6-Sep-04	31-Oct-04	56	56	daily	06-Sep-04	31-Oct-04	56	56		
cruise	weekly	1-Nov-04	31-Dec-04	61	9	203	weekly	01-Nov-04	31-Dec-04	61	9	203
cruise	weekly	1-Jan-05	30-Jan-05	30	4	weekly	01-Jan-05	30-Jan-05	30	4		
earth	daily	31-Jan-05	26-May-05	116	116	daily	31-Jan-05	26-May-05	116	116		
deep impact	daily	27-May-05	23-Jul-05	58	58	daily	27-May-05	17-Jul-05	52	52		
cruise	monthly	24-Jul-05	24-Sep-05	63	2	weekly	18-Jul-05	18-Sep-05	63	9		
cruise	daily	25-Sep-05	1-Oct-05	7	7	daily	19-Sep-05	25-Sep-05	7	7		
cruise	weekly	2-Oct-05	20-Oct-05	19	3	weekly	26-Sep-05	16-Oct-05	21	3		
cruise	daily	21-Oct-05	27-Oct-05	7	7	daily	17-Oct-05	23-Oct-05	7	7		
cruise	weekly	28-Oct-05	24-Nov-05	28	4	weekly	24-Oct-05	20-Nov-05	28	4		
cruise	monthly	25-Nov-05	31-Dec-05	37	1	202	monthly	21-Nov-05	31-Dec-05	41	1	203
cruise	monthly	1-Jan-06	24-Feb-06	55	2	monthly	01-Jan-06	19-Feb-06	50	2		
cruise	daily	25-Feb-06	7-Mar-06	11	11	daily	20-Feb-06	07-Mar-06	16	16		
cruise	weekly	8-Mar-06	20-Mar-06	13	2	weekly	08-Mar-06	20-Mar-06	13	2		
conj	daily	21-Mar-06	7-May-06	48	48	daily	21-Mar-06	07-May-06	48	48		
cruise	weekly	8-May-06	18-May-06	11	2	weekly	08-May-06	21-May-06	14	2		
cruise	daily	19-May-06	25-May-06	7	7	daily	22-May-06	24-May-06	3	3		
cruise	weekly	26-May-06	22-Jun-06	28	4	weekly	25-May-06	21-Jun-06	28	4		
cruise	monthly	23-Jun-06	24-Jul-06	32	1	monthly	22-Jun-06	23-Jul-06	32	1		
mars	weekly	25-Jul-06	27-Aug-06	34	5	weekly	24-Jul-06	27-Aug-06	35	5		
mars	daily	28-Aug-06	27-Oct-06	61	61	daily	28-Aug-06	29-Oct-06	63	63		

mars	weekly	28-Oct-06	27-Nov-06	31	4		weekly	30-Oct-06	26-Nov-06	28	4	
mars	daily	28-Nov-06	31-Dec-06	34	34	181	daily	27-Nov-06	24-Dec-06	28	28	
							weekly	25-Dec-06	31-Dec-06	7	1	179
mars	weekly	1-Jan-07	31-Jan-07	31	4		weekly	01-Jan-07	31-Jan-07	31	4	
mars	daily	1-Feb-07	2-Jun-07	122	122		daily	01-Feb-07	02-Jun-07	122	122	
cruise	weekly	3-Jun-07	30-Jun-07	28	4		weekly	03-Jun-07	30-Jun-07	28	4	
cruise	monthly	1-Jul-07	8-Sep-07	70	2		monthly	01-Jul-07	09-Sep-07	71	2	
earth	weekly	9-Sep-07	30-Sep-07	22	3		weekly	10-Sep-07	30-Sep-07	21	3	
earth	daily	1-Oct-07	13-Dec-07	74	74		daily	01-Oct-07	13-Dec-07	74	74	
cruise	weekly	14-Dec-07	31-Dec-07	18	3	212	weekly	14-Dec-07	31-Dec-07	18	3	212
cruise	weekly	1-Jan-08	10-Jan-08	10	1		weekly	01-Jan-08	10-Jan-08	10	1	
cruise	daily	11-Jan-08	17-Jan-08	7	7		daily	11-Jan-08	17-Jan-08	7	7	
cruise	weekly	18-Jan-08	14-Feb-08	28	4		weekly	18-Jan-08	14-Feb-08	28	4	
cruise	monthly	15-Feb-08	30-Jun-08	137	5		monthly	15-Feb-08	29-Jun-08	136	5	
steins	daily	1-Jul-08	5-Nov-08	128	128		daily	30-Jun-08	05-Nov-08	129	129	
cruise	weekly	6-Nov-08	31-Dec-08	56	8	153	weekly	06-Nov-08	31-Dec-08	56	8	154
cruise	weekly	1-Jan-09	17-Jan-09	17	2		weekly	01-Jan-09	21-Jan-09	21	3	
cruise	weekly	18-Jan-09	15-Feb-09	29	4		weekly	22-Jan-09	18-Feb-09	28	4	
dsm	daily	16-Feb-09	24-Apr-09	68	68		daily	19-Feb-09	24-Apr-09	65	65	
cruise	weekly	25-Apr-09	22-May-09	28	4		weekly	25-Apr-09	22-May-09	28	4	
cruise	monthly	23-May-09	8-Sep-09	109	4		monthly	23-May-09	04-Sep-09	105	3	
earth	weekly	9-Sep-09	30-Sep-09	22	3		weekly	05-Sep-09	02-Oct-09	28	4	
earth	daily	1-Oct-09	18-Dec-09	79	79		daily	01-Oct-09	18-Dec-09	79	79	
cruise	weekly	19-Dec-09	31-Dec-09	13	2	166	weekly	19-Dec-09	31-Dec-09	13	2	164
dshm test	daily	1-Jan-10	4-Mar-10	63	63		daily	01-Jan-10	04-Mar-10	63	63	
cruise	monthly	5-Mar-10	5-May-10	62	2		monthly	05-Mar-10	05-May-10	62	2	
lutetia	daily	6-May-10	26-Sep-10	144	144		daily	06-May-10	26-Sep-10	144	144	
cruise	weekly	27-Sep-10	7-Nov-10	42	6		weekly	27-Sep-10	07-Nov-10	42	6	
rdv	daily	8-Nov-10	31-Dec-10	54	54	269	daily	08-Nov-10	31-Dec-10	54	54	269
rdv	daily	1-Jan-11	12-Apr-11	102	102		daily	01-Jan-11	12-Apr-11	102	102	



ROSETTA
Mission Calendar

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sun oppos	weekly	13-Apr-11	19-May-11	37	5		weekly	13-Apr-11	19-May-11	37	5	
rdv bckup	daily	20-May-11	13-Jul-11	55	55		daily	20-May-11	13-Jul-11	55	55	
hib	none	14-Jul-11	31-Dec-11	171	0	162	none	14-Jul-11	31-Dec-11	171	0	162
hib	none	1-Jan-12	31-Dec-12	366	0	0	none	01-Jan-12	31-Dec-12	366	0	0
hib	none	1-Jan-13	31-Dec-13	365	0	0	none	01-Jan-13	31-Dec-13	365	0	0
hib	none	1-Jan-14	22-Jan-14	22	0	0	none	01-Jan-14	22-Jan-14	22	0	0
rdv	daily	23-Jan-14	31-Dec-14	343	343	343	daily	23-Jan-14	31-Dec-14	343	343	343
comet	daily	1-Jan-15	31-Dec-15	365	365	365	daily	01-Jan-15	31-Dec-15	365	365	365
Total						2257						2254