

RBS

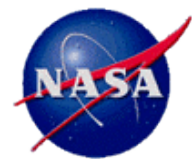
Radiation Belt Storm Probes

RBS Science Working Group **Commissioning Discussion**

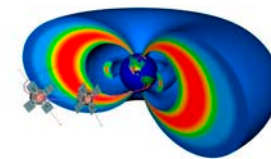


Karen Kirby
August 20, 2012

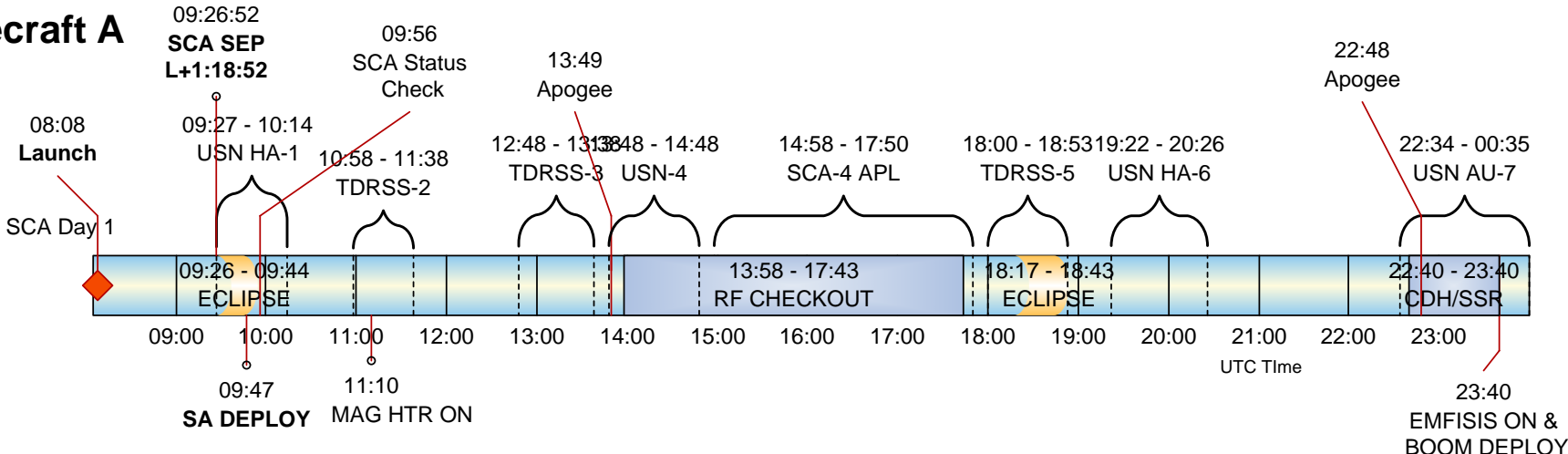




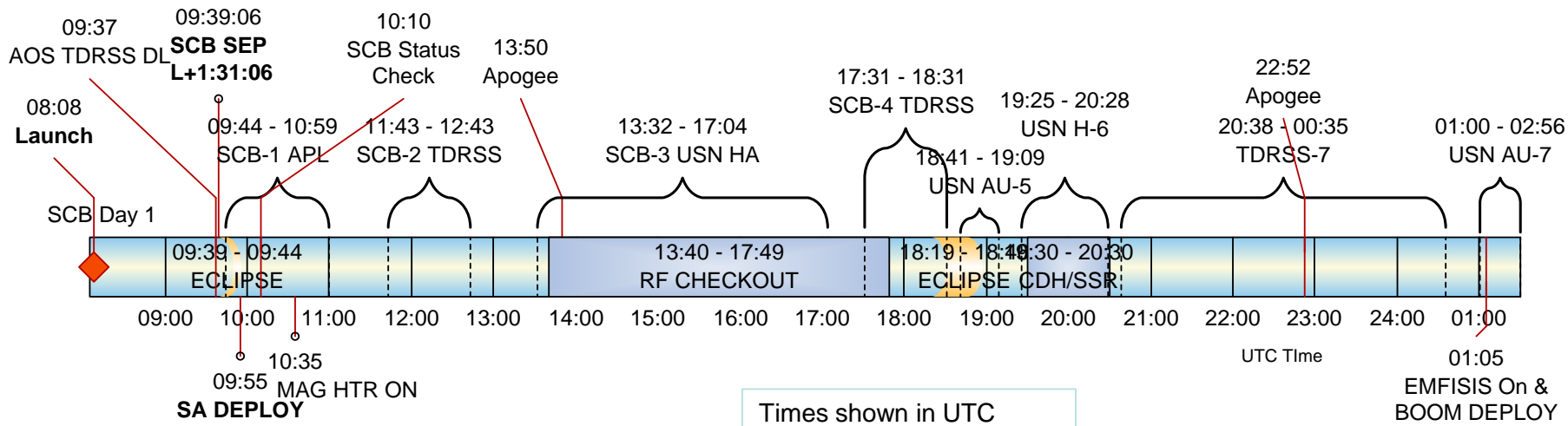
Spacecraft First Day Timeline



Spacecraft A



Spacecraft B

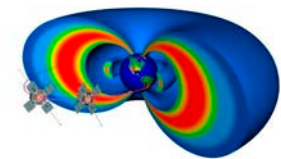


Times shown in UTC
Scale with launch time





SCA Post Launch Initial Activities

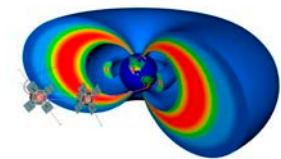


L Time (h:mm)	Aug 23 Nominal Clock Time (EDT)	DOY xx UTC Time	SCA RBSP Activity
L + 1:18:52	5:27 AM	9:27	SCA Separation
L+ 1:18:55	5:27AM	9:27	SCA AOS with USN; Uplink Sweep
	5:44 AM	9:44	SCA Exit Eclipse (09:26 – 09:44 UTC)
L + 1:38:03	5:47 AM	9:47	SCA Solar Array Deployment
L+1:48	5:56 AM	9:56	SCA Telemetry Status Check
L+1:54	6:02 AM	10:02	SCA Status Poll of SC Team (Nominal, report or standby)
			SCA Change Software Command Loss Timer for early-ops (from launch setting); Tickle HWCLT, SWCLT
			SCA Turn on Mag heater
	6:14 AM	10:14	LOS with USN
	6:58 AM	10:58	AOS with TDRSS E
			SCA Clear XCVR Reset Source; Configure SSR for Post Launch
			SCA Reinforce PSE SAJB relay ; Enable Battery Overtemp rules
			SCA Change Mission Phase from LAUNCH to ORBIT
	7:38 AM	11:38	LOS TDRSS E

Note: Greyed items are tied to launch time, others are fixed in time for the launch window



SCB Post Launch Initial Activities



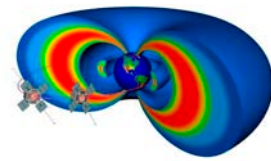
L Time (h:mm)	Aug 23 Nominal Clock Time (EDT)	DOY xx UTC	SCB RBSP Activity
L+1:31:06	5:39 AM	9:39	SCB Separation
L+ 1:31:09	5:39 AM	9:39	SCB AOS with TDRSS
	5:44 AM	9:44	SCB Exit Eclipse (09:26 – 09:44 UTC)
	5:44 AM	9:44	AOS with SCF
L + 1:45:59	5:55AM	9:55	SCB Solar Array Deployment
			SCB Uplink Sweep and acquire 2-way
L+1:56	6:04 AM	10:04	SCB telemetry status Check
L+2:02	6:10 AM	10:10	SCA Status Poll of SC Team (Nominal, report or standby)
			SCB Change Software Command Loss Timer for early-ops (from launch setting); reset HWCLT
			SCB Turn on Mag heater
			SCA Clear XCVR Reset Source; Configure SSR for Post Launch
			SCB Change Mission Phase from LAUNCH to ORBIT
	6:59 AM	10:59	LOS with APL SCF
	7:43 AM	11:43	AOS with TDRSS E
			SCB Reinforce PSE SAJB relay ; Enable Battery Overtemp rules
	8:43 AM	12:43	LOS with TDRSS E

Note: Greyed items are tied to launch time, others are fixed in time for the launch window



Commissioning Phase Overview

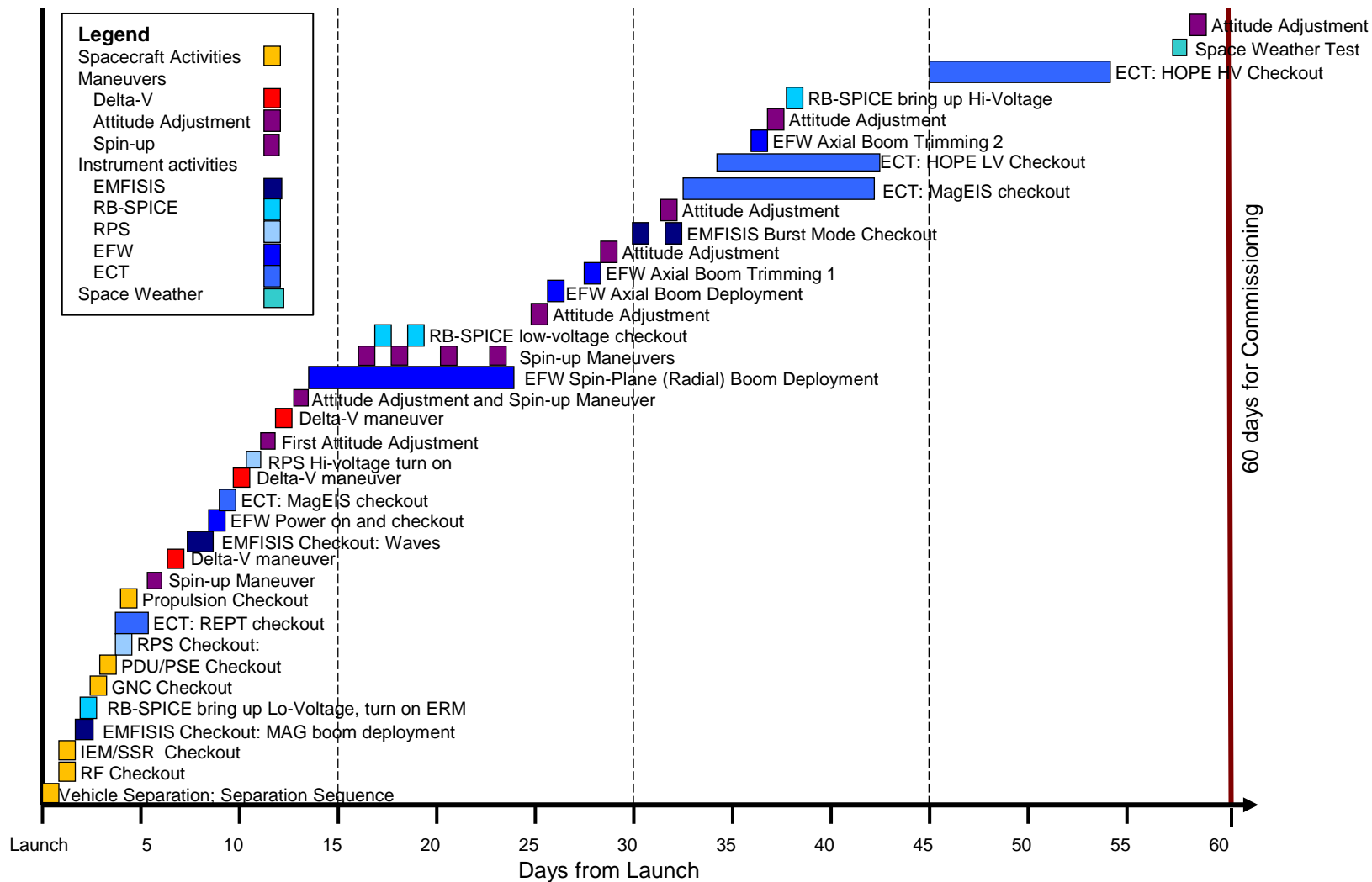
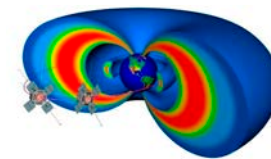
Days 2-60



- **Mission Ops will setup daily coordination meetings (1pm) to discuss status, plans for next day and anomalies.**
 - SOC reps are expected to participate as needed
 - In person or via telecon
- **Planning timeline includes two opportunities for each activity (nominal and backup)**
 - Plans are target dates and will be updated as needed during commissioning phase
- **Commissioning activities are scheduled during daytime as much as possible**
 - First few days are an exception to this.
- **Test SOC at APL is available to all instrument teams for use throughout commissioning phase.**

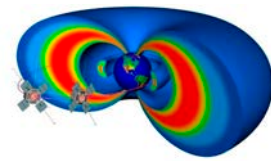


Commissioning Activities





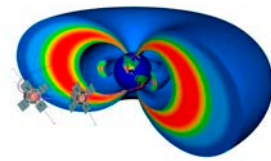
Commissioning Phase MOC-SOC ICD Information



- **The command queues will be routinely opened at the start of the contact for queued commands**
 - Only the instrument in commissioning will get real-time commanding. As such, stored commands are perfectly fine.
- **SSR playback will occur at each USN or APL ground station contact**
 - There is no requirement to return all the recorded SSR data each pass, it is expected that critical commissioning data will be returned in the real-time channel (VC7) which will be available immediately at SOC.
- **Level 0 files will be generated routinely.**
- **Command requests (via SCF) can be made during a pass**
- **Flush requests can be made verbally anytime and will be processed immediately.**
- **Software loads to be coordinated in advance after CCB approval.**



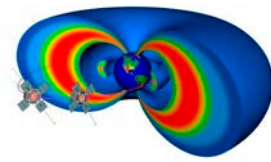
SCA Critical Event Coverage Target Dates



SCA Critical Event	DOY: Time (UTC)	Coverage
SCA Separation	L+1:18:52	USN
Solar Array Deploy	L + 1:38	USN
Increase data rate	D1:13:58	USN: T2,T6
EMF Boom Deploys	D1: 23:45	USN
Begin Delta V	D6:11:00	USN
Attitude Adjust	D10: 12:30	
RPS High Voltage	D12: 10:30	APL
EFW Boom Deploys	D15 - 39	USN, APL
RBSPICE Door	D18: 11:30	APL
RBSPICE Hi Volt	D41-43	USN, APL
HOPE Open Door	D36: 2:10	USN
HOPE Hi Voltage	D45 - 50	USN



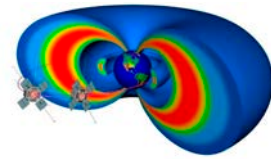
SCB Critical Event Coverage Target Dates



SCB Critical Event	DOY: Time (UTC)	Coverage
SCB Separation	L+1:31:06	USN Hawaii
Solar Array Deploy	L + 1:46	USN Hawaii
Increase Data rate	D1:13:40	USN Hawaii
EMF Boom Deploys	D2: 01:10	USN Au
Begin Delta V	D6:13:00	APL
Attitude Adjust	D10: 15:03	
RPS High Voltage	D12: 13:50	APL
EFW Boom Deploys	D15 - 39	USN, APL
RBSPICE Door	D20: 10:30	APL
RBSPICE Hi Volt	D41-43	USN, APL
HOPE Open Door	D36: 16:36	USN
HOPE Hi Voltage	D46 - 50	USN



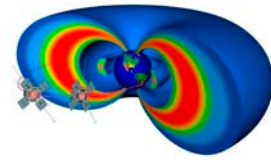
MOPS Staffing



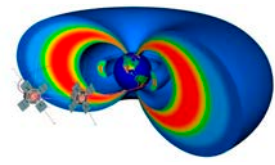
- **Commissioning (first 60 days)**
 - Mops Staff to support 24 hour coverage
 - Two Mops staff in MOC during all passes
 - Spacecraft subsystem team to support first week continuously and then on call.
 - Instrument team to support initial real time activities from Test SOC in MOC and then remotely.



Science Operations Phase



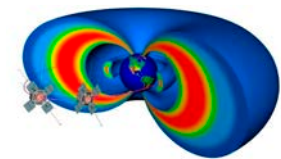
- **Mission Ops will cut back to weekly coordination meetings (1pm) to discuss status, plans for next day and anomalies.**
 - SOC reps are expected to participate as needed.
 - In person or via telecon
- **Anything special that requires real time commanding will need to be pre-scheduled.**
- **Unattended operations will start at Day 61 with mission ops team initially shadowing contacts.**



Backup



Launch Status and Poll Protocol



L Time (h:mm)	Clock Time (EDT)	RBSP Scripted Operation	Initiated By	Channel	Response
L-6:08	10:00 PM	On Console			
L-6:00	~10:00 PM	Power Up Spacecraft	TCA (Iain)/TCB (Hema)	RBSP-1/RBSP-2	
L-5:30	10:38 PM	Begin Aliveness Test	TCA/TCB	RBSP-1/RBSP-2	
L-3:30	~12:30 AM	Post-Aliveness Go/No-Go Poll (SC Subsystems and Instruments)	ITL (Elliot) at ASO	RBSP-1	"Go/No-Go"
L-3:00	1:08 AM	Voice Comm Check on RB1	RSE (Jim) in MOC	RBSP-1	"Copy"
L-2:45	1:23 AM	SC and Ops Readiness Poll	MSE	RBSP-1	"Ready/Stand By"
L-2:36	1:32 AM	Cryo Readiness Poll of RSE, RSMA, GSFC MM	SMD (Rick/Andy) at KSC	RBSP-1	"Ready/Stand By"
L-2:33	1:35 AM	Cryo Load Readiness Poll of SMD, GSFC, KSC	NLM (Tim Dunn/Dana Grieco) at KSC	NLM	"Ready/Stand By"
L-1:30	2:38 AM	SC and Ops Readiness Check	RSE	RBSP-1	"Ready/Stand By"
L-0:25	3:43 AM	SC and Ops Go/No Go Poll	RSE	RBSP-1	"Go/No-Go"
L-0:16	3:52 AM	Terminal Count Poll of RSE, RSMA, GSFC MM	SMD	RBSP-1	"Go/No-Go"
L-0:13	3:55 AM	Terminal Count Readiness Poll	NLM	NLM	"Go/No-Go"
L-0:09	3:59 AM	Indication SC is clear to go on Internal Power	NSC (Dan Baker) at KSC	RBSP-3	
L-0:06	4:02 AM	SC Switch to Internal Power	ITL	RBSP-1	
L-0:06-	4:02 AM	Confirmation SC are on Internal Power	ITL	RBSP-1	
L-0:05	4:03 AM	Informational Report that SC are on Internal Power	SMD	NLM	
L-0:00	4:08 AM	Launch	NLM	NLM	