



## RBSP EFW SOC Requirements Document

### RBSP\_EFW\_SYS\_010\_SOC\_Requirements

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History:

rev A: DWC, UCBSL.  
(1) Initial version.  
(2) Submitted to RBSP Project.

rev B: JWB, UCBSL, 7 August 2008.  
(1) Deleted "ODA" tab.  
(2) Renamed "SCI" tab "SDC" to match PDMP nomenclature.  
(3) Initial version of SDC requirements based on GSE, CTG, and SDC data flow diagrams.  
(4) Initial version of CTG requirements, and all requirements lined backwards and forwards.

rev B (cont): DWC, UCBSL, 7 October 2008.  
(1) Updated source requirements per APL STARD rev - and updated links  
(2) Note change - quick look MAG data replaced by raw MAG telemetry as input to SOC.SDC-401 per EFW-529, EFW-547; we need MAG calibration coefficients from MOC and conversion routine

rev C: JWB, MB, WR, Dec 2009 - Jan 2010.  
(1) Updated SIGNATURE block (SysEng, DWC->MML; added MB as SDC Lead).  
(2) Complete re-structuring of SDC requirements to match new CSCI organization of SDC; validation of same.  
(3) Validation of CTG requirements.  
(2) Note change - quick look MAG data replaced by raw MAG telemetry as input to SOC.SDC-401 per EFW-529, EFW-547; we need MAG calibration coefficients from MOC and conversion routine

rev D: Formatted for release.

**RBSP EFW SOC Requirements**

ID	Req. Title	Subject	Priority	Requirement Body or Section Heading	Description / Clarification	Source Type	Rationale	Impacts / Effects	Verification Method	Verification Planning Notes	Working Comments
Unique Identifier #	Summary of Req.	(The) Instrument (blank if heading)	shall or should	Includes requirements that are either: "inherited" (verbatim) from Level 2; can be shown to be somehow traceable back to Level 2; or, are derived at Level 3.	Supplemental info to make requirement clearer or easier to understand (as needed).	"Inherited" or "Derived"	Where does this req. come from? Why is it here? Why needed?	Anticipated / expected consequences of the requirement (optional).	either "T", "A", "I", "D", or combo.	Additional thoughts or comments on how to verify requirement.	Used to capture author / editor / reviewer notes, etc.
<b>3.5.1 Common SOC Requirements</b>											
<b>3.5.1.1 Operational Requirements</b>											
SOC - 180	SOC Post-Launch Design Life	Each SOC	shall	be designed to support mission science activities		Derived	MIS - 20 (2.2.0-15) Mission	EFW-501			
SOC - 197	SOC Accommodation of	Each SOC	shall	be capable of operating at times when the Mission		Derived	GSYS - 75 (2.1.0-9) Unstaffed	EFW-502			
SOC - 349	SOC Mission Lifecycle Support	Each SOC	shall	shall support instrument hardware checkout, flight		Derived	Typical mission support provisions	EFW-503			
SOC - 558	Observatory Naming Convention	Each SOC	shall	use an observatory naming convention, as follows:		Inherited	MIS - 342 (2.2.0-2) Observatory	EFW-504			
<b>3.5.1.2 SOC Safety, Security &amp; Fault Protection</b>											
SOC - 318	Operations Security	Each SOC	shall	comply with SOC-specific requirements imposed by	Disaster Recovery provisions	Inherited	MIS - 90 (2.9.0-2) Space Asset	EFW-505			
SOC - 319	Information Technology	Each SOC	shall	ensure that its operational components comply with		Inherited	MIS - 334 (2.9.0-4) JHU/APL	EFW-506			Added TBD document
SOC - 210	SOC Returned Science Data	Each SOC	shall	sample selected science telemetry returned from each of		Derived	MIS - 89 (2.3.0-12) Returned	EFW-507			
SOC - 320	Remote SOC Notifications of	Each SOC	shall	be capable of receiving and responding to a remote	A critical fault is defined as an	Derived	MIS - 69 (2.8.0-4) Recovery from	EFW-508			
SOC - 364	SOC Monitoring of Instrument	Each SOC	shall	be capable of monitoring and evaluating housekeeping		Derived	MIS - 109 (2.8.0-5) Provision of	EFW-509			
<b>3.5.1.3 SOC Planning and Commanding</b>											
SOC - 332	SOC Generation of Instrument	Each SOC	shall	provide the capability to plan scientific operations for the		Derived	GSYS - 76 (2.1.0-8) Decoupled	EFW-510			
SOC - 331	SOC Retrieval of MOC Products	Each SOC	shall	be capable of obtaining planning data products from the		Derived	SOC - 332 (3.1.3.0-1) SOC	EFW-511			
SOC - 321	SOC Delivery of Instrument	Each SOC	shall	deliver instrument commands to the MOC for uplink to the		Derived	GSYS - 76 (2.1.0-8) Decoupled	EFW-512			
SOC - 217	CCSDS Command Protocols	Each SOC	shall	deliver instrument commands to the MOC that are pre-		Derived	GSYS - 155 (2.5.2.0-1)	EFW-513			
SOC - 322	SOC Use of MET for	Each SOC	shall	ensure that all command sequences sent to the MOC are		Derived	GSYS - 76 (2.1.0-8) Decoupled	EFW-514			
SOC - 335	MET-UTC Conversion for	Each SOC	shall	provide a means by which the SOC operators can specify	The only onboard	Derived	MIS - 76 (2.4.0-8) Observatory	EFW-515			
SOC - 222	SOC Instrument Command	Each SOC	shall	be solely responsible for the definition and packaging of		Derived	GSYS - 76 (2.1.0-8) Decoupled	EFW-516			
SOC - 241	SOC Instrument Command	Each SOC	shall	shall include an identifier with each instrument command	Specific methods for	Derived	GSYS - 107 (2.5.2.0-4) Ground	EFW-517			
SOC - 255	SOC Instrument Command	Each SOC	shall	be solely responsible for the validation of each formulated	The MOC does not validate	Derived	GSYS - 76 (2.1.0-8) Decoupled	EFW-518			
SOC - 256	Verification of Executed	Each SOC	shall	be capable of confirming the execution of relevant		Derived	Typical operational capability	EFW-519			
SOC - 291	SOC Command History	Each SOC	shall	maintain a history of all commands it sends to the MOC		Derived	Typical operational capability	EFW-520			
SOC - 317	SOC Command Repository	Each SOC	shall	maintain a repository containing the definitions of all		Derived	Typical operational capability	EFW-521			
SOC - 165	SOC Real-Time Commanding	Each SOC	shall	be capable of issuing real-time commands for its respective	This capability is expected to	Derived	MIS - 257 (2.6.1.0-2) Real-Time	EFW-522			
SOC - 351	SOC Parameter Upload or	Each SOC	shall	be capable of formulating and commanding the upload of		Derived	GSYS - 76 (2.1.0-8) Decoupled	EFW-523			
<b>3.5.1.4 SOC Telemetry Handling and Data</b>											
SOC - 324	SOC Retrieval of Instrument	Each SOC	shall	instrument telemetry from the MOC in accordance with the	This includes science data	Derived	GSYS - 193 (2.6.3.0-1) Provision	EFW-524			
SOC - 325	SOC Retrieval of Instrument	Each SOC	shall	receive real-time telemetry from the MOC in accordance	This capability is expected to	Derived	GSYS - 198 (2.6.3.0-2) Real-Time	EFW-525			
SOC - 326	SOC Receipt of Playback	Each SOC	shall	shall be capable of obtaining playback telemetry from the		Derived	Standard operational capability.	EFW-526			
SOC - 328	CCSDS Telemetry Protocols	Each SOC	shall	be capable of receiving telemetry packets from the MOC in		Derived	GSYS - 169 (2.6.1.0-1) CCSDS	EFW-527			
SOC - 329	SOC Retrieval of Ancillary Data	Each SOC	shall	be capable of obtaining from the MOC ancillary engineering		Derived	GSYS - 195 (2.6.3.0-4) Provision	EFW-528			
SOC - 330	SOC Retrieval of Calibrated	Each SOC	shall	be capable of obtaining from the EMFISIS SOC calibrated		Derived	MIS - 251 (2.6.3.0-2) Distribution	EFW-530			
SOC - 336	MET-UTC Conversion for	Each SOC	shall	provide a means by which the SOC operators can interpret	The only onboard	Derived	MIS - 76 (2.4.0-8) Observatory	EFW-531			
SOC - 533	SOC Use of Current SCLK	Each SOC	shall	ensure that the latest-available SCLK kernel is used in		Derived	SOC - 336 (3.1.4.0-7) MET-UTC	EFW-532			
SOC - 534	SOC Time Conversion	Each SOC	shall	be responsible for verifying the accuracy of time		Derived	Required for the accurate	EFW-533			
SOC - 337	SOC Utilization of MOC Time	Each SOC	shall	be capable of accessing and utilizing, on a per-request	Note: This Ground System	Derived	MIS - 76 (2.4.0-8) Observatory	EFW-534			
SOC - 338	Formatted for release.	Each SOC	shall	be capable of generating a quick-look processed version of		Budgeted	MIS - 250 (2.6.3.0-1) Delivery of	EFW-535			
SOC - 339	SOC Delivery of Processed,	Each SOC	shall	be capable of providing electronic data obtained as part of	Assumes that all final,	Budgeted	MIS - 236 (2.6.3.0-4) Delivery of	EFW-536			
<b>3.5.1.5 SOC Data Archiving</b>											
SOC - 342	SOC Maintenance of Science	Each SOC	shall	maintain a safe repository for the data archive of its		Inherited	MIS - 253 (2.6.3.0-7) Maintain	EFW-537			
SOC - 334	SOC Management of High-Level	Each SOC	shall	receive, track, store, and archive high-level data products		Derived	SOC - 342 (3.1.5.0-1) SOC	EFW-538			
SOC - 340	SOC Management of Derived	Each SOC	shall	receive, track, store, and archive all derived data products		Derived	SOC - 342 (3.1.5.0-1) SOC	EFW-539			
SOC - 341	SOC Data Ingestion Capability	Each SOC	shall	provide the capability to receive, store, and archive data		Derived	SOC - 342 (3.1.5.0-1) SOC	EFW-540			
SOC - 347	SOC Archive Layout Definition	Each SOC	shall	be responsible for specifying and implementing the structure		Derived	SOC - 342 (3.1.5.0-1) SOC	EFW-541			
SOC - 348	SOC Archive Format Validation	Each SOC	shall	be responsible for verifying and validating that its mission		Derived	SOC - 343 (3.1.5.0-7) SOC	EFW-542			
SOC - 343	SOC Delivery of Mission Data	Each SOC	shall	complete delivery of its mission data archive to a NASA-		Inherited	MIS - 237 (2.6.3.0-8) Delivery of	EFW-543			
SOC - 346	SOC Packaging of Data Products	Each SOC	shall	physically format and package its deliveries to the mission-	Deliveries to the archive may	Derived	MIS - 237 (2.6.3.0-8) Delivery of	EFW-544			
SOC - 344	Science Data Management Plan	Each SOC	shall	comply with the RBSP Science Data Management Plan		Inherited	MIS - 254 (2.6.3.0-9) Mission	EFW-545			New document Number
<b>3.5.3 EFW-Specific SOC Requirements</b>											
SOC - 353	EFW SOC Science Data Product	The EFW SOC	shall	generate data products derived from the following	Refer to MRD Section 3.1.3 for	Allocated	IPLD - 38 (2.3.1.1.0-1) Measure	EFW-546			
SOC-566	EFW SOC Retrieval of	The EFW SOC	shall	be capable of obtaining from the MOC unprocessed	Refer to the RBSP Science		GSYS - 539 (2.6.3.0-5) Provision	EFW-529			NEW - replaces SOC-
SOC-571	EFW SOC Use of MAG Calibration Data for Quick-Look Processing	The EFW SOC	shall	be capable of obtaining the latest available version of the Magnetometer Calibration Report from the MOC for purposes of producing quick-look data products only	The Magnetometer Calibration Report will be supplied to the MOC by the EMFISIS SOC on a periodic basis, but not more than once per month		SOC - 540 (3.4.0-3) Provision of Magnetometer Calibration Report SOC - 338 (3.1.4.0-11) SOC Generation of Quick-Look Science Data Products	EFW-547			NEW
<b>EFW SOC Level 3 Requirements</b>											
<b>3.5.1.1 Operational Requirements</b>											
EFW-501	SOC Post-Launch Design Life	The EFW SOC	shall	be designed to support mission science activities throughout the commissioning and operational phases of the mission, plus one additional year after the close of observatory operations, for a total duration of 3 years plus 60 days		Inherited	SOC - 180	SOC.SDC-204, SOC.SDC-205			
EFW-502	SOC Accommodation of Unattended MOC Operations	The EFW SOC	shall	be capable of operating at times when the Mission Operations Center (MOC) is unstaffed by the Mission Operations Team (MOT).		Inherited	SOC - 197	SOC.SDC-103, SOC.SDC-204, SOC.SDC-302, SOC.SDC-303, SOC.SDC-304, SOC.SDC-313, SOC.SDC-325, SOC.SDC-402, SOC.SDC-403, SOC.SDC-502, SOC.SDC-503, SOC.SDC-504,			

RBSP EFW SOC Requirements

ID	Req. Title	Subject	Priority	Requirement Body or Section Heading	Description / Clarification	Source Type	Rationale	Impacts / Effects	Verification Method	Verification Planning Notes	Working Comments
EFW-503	<b>SOC Mission Lifecycle Support</b>	The EFW SOC	shall	shall support instrument hardware checkout, flight instrument software development, integration and test (I&T), mission operations (MOPs), and simulator environments		Inherited	SOC - 349	SOC.CTG-02, SOC.CTG-15, SOC.CTG-16, SOC.CTG-17, SOC.SDC-102, SOC.SDC-104, SOC.SDC-204, SOC.SDC-212, SOC.SDC-213, SOC.SDC-705, SOC.SDC-706, SOC.SDC-707	*		
EFW-504	<b>Observatory Naming Convention</b>	The EFW SOC	shall	use an observatory naming convention, as follows: -- Observatory A is the top observatory in the stacked configuration for launch; -- Observatory B is the bottom observatory in the stacked configuration for launch.		Inherited	SOC - 558	SOC.SDC-312, SOC.SDC-322, SOC.SDC-332, SOC.SDC-514, SOC.SDC-527, SOC.SDC-533, SOC.SDC-543, SOC.SDC-559, SOC.SDC-565	*		
				<b>3.5.1.2 SOC Safety, Security &amp; Fault Protection</b>							
EFW-505	<b>Operations Security</b>	The EFW SOC	shall	comply with SOC-specific requirements imposed by [document ref. TBD], RBSP Space Asset Protection Plan (TBR)	Disaster Recovery provisions (e.g., backup MOC, backup power, etc.); Additional sub-requirements likely will flow down from the Space Asset Protection Plan when it is completed.	Inherited	SOC - 318	SOC.SDC-206	TBD		
EFW-506	<b>Information Technology Security</b>	The EFW SOC	shall	ensure that its operational components comply with JHU/APL IT security requirements, per [Document reference TBD].		Inherited	SOC - 319	SOC.CTG-07, SOC.SDC-207	*		Added TBD document
EFW-507	<b>SOC Returned Science Data Validity Checking</b>	The EFW SOC	shall	sample selected science telemetry returned from each of the flight instruments under its control at least once every 120 hours (TBR) during the operational phase of the mission, in order to verify that instruments are collecting measurements per specification.		Inherited	SOC - 210	SOC.SDC-602, SOC.SDC-608	*		
EFW-508	<b>Remote SOC Notifications of Critical Fault Condition</b>	The EFW SOC	shall	be capable of receiving and responding to a remote notification from the MOC indicating the detection of a critical fault.	A critical fault is defined as an event where the spacecraft has autonomously turned an instrument off due to a detected health and safety anomaly	Inherited	SOC - 320	SOC.CTG-08	*		
EFW-509	<b>SOC Monitoring of Instrument Housekeeping</b>	The EFW SOC	shall	be capable of monitoring and evaluating housekeeping telemetry from each of the flight instruments under its control for purposes of detecting and diagnosing correctable instrument faults.		Inherited	SOC - 364	SOC.CTG-09, SOC.SDC-101, SOC.SDC-531, SOC.SDC-532, SOC.SDC-534, SOC.SDC-535	*		
				<b>3.5.1.3 SOC Planning and Commanding</b>							
EFW-510	<b>SOC Generation of Instrument Planning Strategy</b>	The EFW SOC	shall	provide the capability to plan scientific operations for the instruments under their control.		Inherited	SOC - 332	SOC.SDC-701, SOC.SDC-708	*		
EFW-511	<b>SOC Retrieval of MOC Products for Command Planning</b>	The EFW SOC	shall	be capable of obtaining planning data products from the MOC in a manner consistent with the MOC-SOC ICD		Inherited	SOC - 331	SOC.SDC-312	*		
EFW-512	<b>SOC Delivery of Instrument Commands to MOC per ICD</b>	The EFW SOC	shall	deliver instrument commands to the MOC for uplink to the spacecraft in accordance with the MOC to SOC ICD.		Inherited	SOC - 321	SOC.CTG-01, SOC.CTG-04, SOC.CTG-05, SOC.SDC-709	*		
EFW-513	<b>CCSDS Command Protocols</b>	The EFW SOC	shall	deliver instrument commands to the MOC that are pre-formed and packaged as CCSDS Telecommand Packets		Inherited	SOC - 217	SOC.CTG-01	*		
EFW-514	<b>SOC Use of MET for Commanding</b>	The EFW SOC	shall	ensure that all command sequences sent to the MOC are referenced to mission elapsed time (MET).		Inherited	SOC - 322	SOC.CTG-05,	*		
EFW-515	<b>MET-UTC Conversion for Instrument Commands</b>	The EFW SOC	shall	provide a means by which the SOC operators can specify and interpret MET-based command time tags in terms of UTC	The only onboard representation of time on the RBSP spacecraft is MET; therefore, all time-tagged commands must have their execution times specified in terms of MET. Operators need the ability to understand the execution times in terms of an Earth-based time convention (UTC).	Inherited	SOC - 335	SOC.CTG-05, SOC.SDC-401, SOC.SDC-405, SOC.SDC-707	*		
EFW-516	<b>SOC Instrument Command Definition</b>	The EFW SOC	shall	be solely responsible for the definition and packaging of commands and command sequences for the instruments under its control		Inherited	SOC - 222	SOC.CTG-03	*		

RBSP EFW SOC Requirements

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EFW-517	<b>SOC Instrument Command Destination Identifier</b>	The EFW SOC	shall	shall include an identifier with each instrument command that informs the ground system as to which observatory the command is to be sent, in accordance with the MOC-SOC ICD	Specific methods for accomplishing this should be indicated in the MOC-SOC ICD.	Inherited	SOC - 241	SOC.CTG-01, SOC.CTG-10	*		
EFW-518	<b>SOC Instrument Command Validation</b>	The EFW SOC	shall	be solely responsible for the validation of each formulated instrument CCSDS telecommand packet prior to its being transmitted to the MOC for uplink	The MOC does not validate instrument commands	Inherited	SOC - 255	SOC.CTG-14	*		
EFW-519	<b>Verification of Executed Commands</b>	The EFW SOC	shall	be capable of confirming the execution of relevant instrument commands via returned instrument telemetry		Inherited	SOC - 256	SOC.CTG-12	*		
EFW-520	<b>SOC Command History</b>	The EFW SOC	shall	maintain a history of all commands it sends to the MOC		Inherited	SOC - 291	SOC.CTG-06	*		
EFW-521	<b>SOC Command Repository</b>	The EFW SOC	shall	maintain a repository containing the definitions of all commands applicable to the instruments under its control		Inherited	SOC - 317	SOC.CTG-03			
EFW-522	<b>SOC Real-Time Commanding Capability</b>	The EFW SOC	shall	be capable of issuing real-time commands for its respective instruments aboard the two observatories.	This capability is expected to be used primarily during the commissioning period, and not during typical science operations.	Inherited	SOC - 165	SOC.CTG-03, SOC.CTG-04	*		
EFW-523	<b>SOC Parameter Upload or Software Change Capability</b>	The EFW SOC	shall	be capable of formulating and commanding the upload of any changes to flight instrument software or parameter loads		Inherited	SOC - 351	SOC.CTG-13	*		
<b>3.5.1.4 SOC Telemetry Handling and Data Processing</b>											
EFW-524	<b>SOC Retrieval of Instrument Telemetry from MOC</b>	The EFW SOC	shall	instrument telemetry from the MOC in accordance with the MOC to SOC ICD.	This includes science data packets as well as instrument housekeeping telemetry.	Inherited	SOC - 324	SOC.CTG-01, SOC.SDC-312	*		
EFW-525	<b>SOC Retrieval of Instrument Real-Time Telemetry from the</b>	The EFW SOC	shall	receive real-time telemetry from the MOC in accordance with the MOC to SOC ICD	This capability is expected to be used primarily during the commissioning period, and not during typical science operations.	Inherited	SOC - 325	SOC.CTG-01,	*		
EFW-526	<b>SOC Receipt of Playback Instrument Telemetry from MOC</b>	The EFW SOC	shall	shall be capable of obtaining playback telemetry from the MOC in accordance with the MOC to SOC ICD		Inherited	SOC - 326	SOC.CTG-01,	*		
EFW-527	<b>CCSDS Telemetry Protocols</b>	The EFW SOC	shall	be capable of receiving telemetry packets from the MOC in a CCSDS-compliant packet format.		Inherited	SOC - 328	SOC.CTG-01,	*		
EFW-528	<b>SOC Retrieval of Ancillary Data Products from MOC</b>	The EFW SOC	shall	be capable of obtaining from the MOC ancillary engineering data products (time, orbit, attitude) for use in completing quick-look and calibrated science measurement data sets, in accordance with the MOC-SOC ICD		Inherited	SOC - 329	SOC.SDC-351, SOC.SDC-352, SOC.SDC-361, SOC.SDC-362	*		
EFW-530	<b>SOC Retrieval of Calibrated EMFISIS Magnetometer Data</b>	The EFW SOC	shall	be capable of obtaining from the EMFISIS SOC calibrated magnetometer data for use in completing calibrated science measurement data sets		Inherited	SOC - 330	SOC.SDC-322	*		
EFW-531	<b>MET-UTC Conversion for Instrument Telemetry</b>	The EFW SOC	shall	provide a means by which the SOC operators can interpret MET-based telemetry time tags in terms of UTC.	The only onboard representation of time on the RBSP spacecraft is MET; therefore, all telemetry time tags are specified in terms of MET. Operators and scientists need the ability to understand telemetry time tags in terms of an Earth-based time convention (UTC).	Inherited	SOC - 336	SOC.SDC-312, SOC.SDC-322, SOC.SDC-332, SOC.SDC-405, SOC.SDC-513, SOC.SDC-514, SOC.SDC-527, SOC.SDC-533, SOC.SDC-543, SOC.SDC-559, SOC.SDC-565	*		
EFW-532	<b>SOC Use of Current SCLK Kernel</b>	The EFW SOC	shall	ensure that the latest-available SCLK kernel is used in performing MET-UTC and UTC-MET time conversions		Inherited	SOC - 533	SOC.SDC-341, SOC.SDC-342, SOC.SDC-404	*		
EFW-533	<b>SOC Time Conversion Verification</b>	The EFW SOC	shall	be responsible for verifying the accuracy of time conversions performed within the SOC.		Inherited	SOC - 534	SOC.SDC-406	*		
EFW-534	<b>SOC Utilization of MOC Time Conversion Test Facility</b>	The EFW SOC	shall	be capable of accessing and utilizing, on a per-request basis, a MOC-hosted time conversion test utility for purposes of validating the performance of SOC time correlations.	Note: This Ground System utility is intended only for periodic checking of SOC performance in correctly performing MET-UTC and UTC-MET time conversions. It is not intended for routine use by SOCs in support of normal operations. Details will be provided in the	Inherited	SOC - 337	SOC.SDC-406	*		

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EFW-535	Formatted for release.	The EFW SOC	shall	be capable of generating a quick-look processed version of its mission-specified science data parameter set, as follows: -- within 15 days (TBR) from the time that the prerequisite quick-look ancillary and magnetometer data are made available for SOC processing, during the first three months of the operational phase of the mission; -- within 8 days from the time that the prerequisite quick-look ancillary and magnetometer data are made available for SOC processing, after the first three months of the operational phase of the mission;		Inherited	SOC - 338	SOC.SDC-561, SOC.SDC-565, SOC.SDC-609, SOC.SDC-802, SOC.SDC-804	*		
EFW-536	SOC Delivery of Processed, Calibrated Final Data to Public	The EFW SOC	shall	be capable of providing electronic data obtained as part of the RBSP mission to the public, as follows: -- within 70 days (TBR) that the ancillary and magnetometer data are made available for SOC processing, during the first three months of the operational phase of the mission; -- within 40 days that the ancillary and magnetometer data are made available for SOC processing, after the first three months of the operational phase of the mission.	Assumes that all final, calibrated ancillary data (time, orbit, attitude) and fully calibrated magnetometer data from EMFISIS SOC is available for processing within 20 days of the onboard observation time.	Inherited	SOC - 339	SOC.SDC-223, SOC.SDC-558, SOC.SDC-559, SOC.SDC-610, SOC.SDC-802, SOC.SDC-804	*		
				3.5.1.5 SOC Data Archiving							
EFW-537	SOC Maintenance of Science Data Archive	The EFW SOC	shall	maintain a safe repository for the data archive of its instrument science, documentation, software, and science data products for the life of the mission.		Inherited	SOC - 342	SOC.SDC-201, SOC.SDC-204	*		
EFW-538	SOC Management of High-Level Science Data	The EFW SOC	shall	receive, track, store, and archive high-level data products created by the science team		Inherited	SOC - 334	SOC.SDC-203, SOC.SDC-204, SOC.SDC-221, SOC.SDC-222, SOC.SDC-223, SOC.SDC-603, SOC.SDC-611, SOC.SDC-803	*		
EFW-539	SOC Management of Derived Data Products	The EFW SOC	shall	receive, track, store, and archive all derived data products that are internally generated by the SOCs.		Inherited	SOC - 340	SOC.SDC-103, SOC.SDC-203, SOC.SDC-204, SOC.SDC-211, SOC.SDC-212, SOC.SDC-214, SOC.SDC-305, SOC.SDC-504, SOC.SDC-506, SOC.SDC-505, SOC.SDC-605, SOC.SDC-704	*		
EFW-540	SOC Data Ingestion Capability	The EFW SOC	shall	provide the capability to receive, store, and archive data from multiple sources, such as, but not limited to, the MOC and the science investigation team		Inherited	SOC - 341	SOC.SDC-212, SOC.SDC-301, SOC.SDC-305, SOC.SDC-404, SOC.SDC-506, SOC.SDC-611	*		
EFW-541	SOC Archive Layout Definition	The EFW SOC	shall	be responsible for specifying and implementing the structure and format of its mission archive.		Inherited	SOC - 347	SOC.SDC-202	*		
EFW-542	SOC Archive Format Validation	The EFW SOC	shall	be responsible for verifying and validating that its mission data archive is in a format that is compatible with ingestion into the selected NASA Resident Archive (TBR).		Inherited	SOC - 348	SOC.SDC-210	*		
EFW-543	SOC Delivery of Mission Data Archive to NASA Resident Archive	The EFW SOC	shall	complete delivery of its mission data archive to a NASA-designated location for a Resident Archive no later than one year after the completion of the operational phase of the mission.		Inherited	SOC - 343	SOC.SDC-205, SOC.SDC-210	*		
EFW-544	SOC Packaging of Data Products for Resident Archive	The EFW SOC	shall	physically format and package its deliveries to the mission-designated NASA Resident Archive (TBR) in accordance with the requirements (TBD) specified by the selected archive	Deliveries to the archive may take the form of a dataset collection or individual archive sets. The SOCs will need to coordinate with the designated Resident Archive to identify the media on which the dataset volumes are to be delivered	Inherited	SOC - 346	SOC.SDC-210	*		
EFW-545	Science Data Management Plan Compliance	The EFW SOC	shall	comply with the RBSP Science Data Management Plan (SDMP), APL document no. 7419-9129		Inherited	SOC - 344	SOC.SDC-208, SOC.SDC-601, SOC.SDC-602, SOC.SDC-604, SOC.SDC-802, SOC.SDC-804	*		New document Number
				3.5.3 EFW-Specific SOC Requirements							

RBSP EFW SOC Requirements

ID	Req. Title	Subject	Priority	Requirement Body or Section Heading	Description / Clarification	Source Type	Rationale	Impacts / Effects	Verification Method	Verification Planning Notes	Working Comments
EFW-546	<b>EFW SOC Science Data Product Parameters</b>	The EFW SOC	shall	generate data products derived from the following concurrent, multipoint science measurements, as collected from the EFW instrument aboard each RBSP observatory: -- Spin Plane DC Electric Field (Survey); -- Spin Plane DC Electric Field (Burst); -- Spin Axis DC Electric Field (Survey); -- Spin Axis DC Electric Field (Burst); -- Cold Plasma Density; -- Density Perturbation (Burst); -- Interferometric Timing (Burst); -- Low-Frequency AC Electric Field Cross Spectra; -- 3D Low-Frequency AC Magnetic Field Cross Spectra (Burst); -- AC Magnetic Field (Burst).	Refer to MRD Section 3.1.13 for specifics of EFW Measurement Requirements	Inherited	SOC - 353	SOC.SDC-311, SOC.SDC-321, SOC.SDC-331, SOC.SDC-371, SOC.SDC-372, SOC.SDC-501, SOC.SDC-511, SOC.SDC-512, SOC.SDC-514, SOC.SDC-521, SOC.SDC-522, SOC.SDC-523, SOC.SDC-524, SOC.SDC-525, SOC.SDC-526, SOC.SDC-527, SOC.SDC-541, SOC.SDC-542, SOC.SDC-543, SOC.SDC-551, SOC.SDC-552, SOC.SDC-553, SOC.SDC-554, SOC.SDC-555, SOC.SDC-556, SOC.SDC-557, SOC.SDC-559, SOC.SDC-562, SOC.SDC-565, SOC.SDC-606, SOC.SDC-607, SOC.SDC-801, SOC.SDC-802, SOC.SDC-804	*		
EFW-529	<b>EFW SOC Retrieval of Unprocessed Magnetometer Data</b>	The EFW SOC	shall	be capable of obtaining from the MOC unprocessed magnetometer data extracted from EMFISIS MAG instrument telemetry, for the sole purpose of processing quicklook science measurement data sets, in accordance with the MOC-SOC ICID	Refer to the RBSP Science Data Management Plan (SDMP) APL Document no. 7419-9129, for specific rules regarding the authorized use of unprocessed magnetometer data.	Inherited	SOC-566	SOC.SDC-563	*		Modified
EFW-547	<b>EFW SOC Use of MAG Calibration Data for Quick-Look Processing</b>	The EFW SOC	shall	be capable of obtaining the latest available version of the Magnetometer Calibration Report from the MOC for purposes of producing quick-look data products only	The Magnetometer Calibration Report will be supplied to the MOC by the EMFISIS SOC on a periodic basis, but not more than once per month	Inherited	SOC-571	SOC.SDC-324, SOC.SDC-564	*		NEW
									* - see lower level verification		

Command and Telemetry GSE Requirements

Supports real time operations, commanding, and housekeeping telemetry monitoring

Requirement	Description	Verification	Parent
SOC.CTG-01	Shall interface to the MOC per the MOC/SOC ICD for commanding and real time telemetry per the MOC/SOC ICD	T	EFW-512, EFW-513, EFW-517, EFW-524
SOC.CTG-02	Shall interface to the S/C Emulator for commanding and real time telemetry during bench tests	T	EFW-503
SOC.CTG-03	Shall be capable of encoding mnemonic commands using command format database. Command mnemonics may be typed in by the user, selected from a menu, or embedded in a command script file.	T	#REF!
SOC.CTG-04	Shall be capable of generating real-time or time-tagged commands.	T	EFW-512
SOC.CTG-05	Shall convert commanding time tags from operator-entered UTC to MET, and back again, using the SDC capability (see SOC.SDC-501)	T	EFW-512, EFW-514, EFW-515
SOC.CTG-06	Shall maintain a log file of all commands sent, including their mnemonics, time sent, time tag (if used), and ARR status. The same log file shall record limit violations and other significant events	T	EFW-520
SOC.CTG-07	Shall comply with IT security per the EFW Compliance Matrix	I	EFW-506
SOC.CTG-08	Shall be capable of receiving and responding to a remote notification from the MOC indicating the detection of a critical fault by paging an operator	T	EFW-508
SOC.CTG-09	Shall be capable of converting, displaying, and limit checking EFW housekeeping telemetry for purposes of detecting and diagnosing correctable instrument faults, and notify an operator by pager of such a fault. Telemetry conversion coefficients and limits shall be maintained in a database (separate for each observatory)	T	EFW-509

SOC.CTG-10	Shall operate on a separate dedicated workstation, one per observatory. The workstation shall be readily identifiable as to which observatory it is connected to (e.g. screen background color), and shall only command and receive telemetry from that observatory	D	EFW-517
SOC.CTG-11	Shall log real-time telemetry data into binary telemetry files in the 'Payload Telemetry Packet' format described in the MOC/SOC ICD, which can be ingested by the SDC programs in near real time for science data display	T	#REF!
SOC.CTG-12	Shall verify command reception at the instrument by means of housekeeping telemetry and shall report any discrepancy	T	EFW-519
SOC.CTG-13	Shall include a utility for converting flight software binary images into command loads	T	EFW-523
SOC.CTG-14	Shall have a facility for identifying hazardous commands (based on the command database) and shall request authorization from the operator before transmitting (Note that in addition all non-trivial commanding shall be verified on the ETU instrument before being sent to the flight unit)	T	EFW-518
SOC.CTG-15	Shall have ability for conditional operations in command script based on telemetry housekeeping values; such as if/then constructs based on comparing telemetry values to some limit.	T	EFW-503
SOC.CTG-16	Shall have a data trending capability for instrument housekeeping telemetry (plotting).	T	EFW-503
SOC.CTG-17	Shall have the capability of controlling and monitoring bench test equipment (power supplies, etc)	T	EFW-503



Science Data Center (SDC) Requirements				
		Supports routine stored science data processing and distribution.		
Requirement	Subject	Description	Verification	Parent
		<b>Near-Real Time Data Acquisition, Processing, and Display Tool (NRT)</b>		
SOC.SDC-101	The EFW SOC	Shall include a module, NRT, that presents recently collected data to the user.	A	EFW-509,
SOC.SDC-102	The NRT module	Shall interface to the EFW SOC CTG for near-real time processing of science and SOH data.	T	EFW-503, SOC.CTG-11
SOC.SDC-103	The NRT module	Shall interface to the ARC-INT module for NRT analysis and display of EFW GSE RT/PB, EFW SOC L0 and EFW SOC L1 data.	T	EFW-503, EFW-539,
SOC.SDC-104	The NRT module	Shall provide software clients to display waveform, spectral, and ancillary (e.g. header-level) information.	T	EFW-503, SOC.CTG-11
		<b>Data Archives (ARC)</b>		
SOC.SDC-201	The EFW SOC	Shall include a module, ARC, which accepts and stores collected and generated data.	A	EFW-537,
SOC.SDC-202	The ARC module	Shall provide an archive with a directory format compatible with the THEMIS Data Analysis System (TDAS) and Science Data Tool (SDT).	T	EFW-541,
SOC.SDC-203	The ARC module	Shall provide a mechanism for accepting and tracking distinct versions of data products which represent the same information but are generated with different processes.	T	EFW-538, EFW-539,
SOC.SDC-204	The ARC module	Shall provide sufficient storage and backup capacity as to support both pre- and post-launch data volumes (TBD Gbytes).	T	EFW-501, EFW-503, EFW-537, EFW-538, EFW-539
SOC.SDC-205	The ARC module	Shall produce a log of its operation.	T	EFW-502,
SOC.SDC-206	The ARC module	Shall be capable of operation until at least one year after the completion of observatory operations.	T	EFW-501, EFW-543,
SOC.SDC-207	The ARC module	Shall comply with SOC-specific requirements imposed by the RBSP Space Asset Protection Plan.	T	EFW-505,
SOC.SDC-208	The ARC module	Shall comply with UCB EFW Performance Assurance matrix requirements.	T	EFW-506,
SOC.SDC-209	The ARC module	Shall comply with the RBSP Science Data Management Plan.	T	EFW-545,
SOC.SDC-210	The ARC module	Shall provide an image of the contained data to a NASA Resident Archive in an acceptable format [TBD] no later than 1 year following the completion of the operational phase of the mission.	T	EFW-542, EFW-543, EFW-544,
		<b>Internal Data Archive (ARC-INT)</b>		
SOC.SDC-211	The ARC module	Shall include a module, ARC-INT, that provides a protected archive for internal use.	A	EFW-539,
SOC.SDC-212	The ARC-INT module	Shall accept data from any SOC module.	T	EFW-503, EFW-539, EFW-540,
SOC.SDC-213	The ARC-INT module	Shall accept data from the EFW CTG, named EFW GSE RT/PB.	T	EFW-503,
SOC.SDC-214	The ARC-INT module	Shall restrict the distribution of archive contents to other SOC modules and internal users.	T	EFW-539,
		<b>Public Data Archive (ARC-PUB)</b>		
SOC.SDC-221	The ARC module	Shall include a module, ARC-PUB, that provides a universally-readable archive for public use.	A	EFW-538,
SOC.SDC-222	The ARC-PUB module	Shall accept only validated data which has been approved by an operator of the DVAL module.	T	EFW-538,
SOC.SDC-223	The ARC-PUB module	Shall permit the distribution of archive contents to any user, internal or external.	T	EFW-536, EFW-538,

		<b>Data Retrieval Services (RET)</b>		
SOC.SDC-301	The EFW SOC	Shall include a module, RET, that retrieves data from non-SOC sources.	A	EFW-540,
SOC.SDC-302	The RET module	Shall run periodically to ensure that EFW has the latest data.	T	EFW-502,
SOC.SDC-303	The RET module	Shall be capable of running in either a scripted or operator-commanded mode.	T	EFW-502,
SOC.SDC-304	The RET module	Shall produce a log of its operation.	T	EFW-502,
SOC.SDC-305	The RET module	Shall interface with the ARC-INT module to store the retrieved data.	T	EFW-539, EFW-540,
	Formatted for release.	<b>MOC Data Products Retrieval Service (RET-MDP)</b>		
SOC.SDC-311	The RET module	Shall include a module, RET-MDP, that retrieves the EFW instrument data from the MOC.	A	EFW-546,
SOC.SDC-312	The RET-MDP module	Shall interface with the MOC to retrieve observatory-separated (RB-A, RB-B, ETU, etc.), APID-separated, UTC-day-separated uncalibrated EFW instrument data files, named EFW SOC L0.	T	EFW-504, EFW-511, EFW-524, EFW-531,
SOC.SDC-313	The RET-MDP module	Shall be scripted such that latency of the retrieval of the data is less than 2 days during nominal operations.	T	EFW-502,
		<b>EMFISIS Magnetic Field Data Retrieval Service (RET-MAG)</b>		
SOC.SDC-321	The RET module	Shall include a module, RET-MAG, that retrieves the EMFISIS instrument data.	A	EFW-546,
SOC.SDC-322	The RET-MAG module	Shall interface with the EMFISIS SOC to retrieve observatory-separated (RB-A, RB-B, ETC, etc.), APID-separated, UTC-day separated calibrated EMFISIS-MAG instrument data files, named EMFISIS-MAG SOC L2.	T	EFW-504, EFW-530, EFW-531,
SOC.SDC-323	The RET-MAG module	Shall interface with the MOC to retrieve raw EMFISIS instrument data files, named MOC EMFISIS-MAG RAW.	T	EFW-529,
SOC.SDC-324	The RET-MAG module	Shall interface with the MOC to retrieve the EMFISIS-MAG instrument calibration report, named MOC EMFISIS-MAG CAL.	T	EFW-547,
SOC.SDC-325	The RET-MAG module	Shall be scripted such that latency of the retrieval of the data is less than 2 days for the MOC EMFISIS-MAG RAW and MOC EMFISIS-MAG CAL data, and 70/40 days for the EMFISIS-MAG SOC L2 data during nominal operations. (first value for Launch to Launch+30 days; second value thereafter).	T	EFW-502,
		<b>ECT Ion Velocity Data Retrieval Service (RET-ECT)</b>		
SOC.SDC-331	The RET module	Shall include a module, RET-ECT, that retrieves the ECT instrument ion velocity moment data.	A	EFW-546,
SOC.SDC-332	The RET-ECT module	Shall interface to the ECT SOC to retrieve observatory-separated, UTC-day separated uncalibrated ECT instrument ion velocity moment data files, named ECT SOC L2.	T	EFW-504, EFW-531,
		<b>MOC SCLK Kernel Retrieval Service (RET-SCLK)</b>		
SOC.SDC-341	The RET module	Shall include a module, RET-SCLK, that retrieves the SCLK kernel from the MOC.	A	EFW-532,
SOC.SDC-342	The RET-SCLK module	Shall interface with the MOC to retrieve updates to the SCLK kernel, named MOC SCLK.	T	EFW-532,
		<b>MOC Attitude And Ephemeris Data Retrieval Service (RET-STATE)</b>		
SOC.SDC-351	The RET module	Shall include a module, RET-STATE, that retrieves attitude and ephemeris data from the MOC.	A	EFW-528,
SOC.SDC-352	The RET-STATE module	Shall interface with the MOC to retrieve data files containing attitude and orbit information from the observatories, named MOC STATE.	T	EFW-528,

		<b>MOC Ancillary Data Retrieval Service (RET-ANC)</b>		
SOC.SDC-361	The RET module	Shall include a module, RET-ANC, that retrieves ancillary TBD data from the MOC.	A	EFW-528,
SOC.SDC-362	The RET-ANC module	Shall interface with the MOC to retrieve data files containing ancillary data, named MOC ANC.	T	EFW-528,
		<b>Other Geophysical Data Retrieval Service (RET-GEO)</b>		
SOC.SDC-371	The RET module	Shall include a module, RET-GEO, that retrieves other TBD geophysical data products from TBD sources.	A	EFW-546,
SOC.SDC-372	The RET-GEO module	Shall interface with TBD sources to retrieve TBD data files containing other geophysical data determined relevant to instrument operations or scientific analysis.	T	EFW-546,
		<b>MET&lt;-&gt;UTC Conversion Tool (MET&lt;-&gt;UTC)</b>		
SOC.SDC-401	The EFW SOC	Shall include a module, MET<->UTC Conversion, that is responsible for transforming MET into UTC and vice versa upon request.	A	EFW-515,
SOC.SDC-402	The MET<->UTC module	Shall be capable of running in either a scripted or operator-commanded mode.	T	EFW-502,
SOC.SDC-403	The MET<->UTC module	Shall produce a log of its operation.	T	EFW-502,
SOC.SDC-404	The MET<->UTC module	Shall interface with the ARC-INT module to read the latest SLCK kernel.	T	EFW-532, EFW-540,
SOC.SDC-405	The MET<->UTC module	Shall provide software clients a mechanism to effect transformations from MET to UTC and vice versa as needed by SOC modules.	T	EFW-515, EFW-531,
SOC.SDC-406	The MET<->UTC module	Shall provide a mechanism for checking the validity of the current MET<->UTC conversion at will against the definitive conversion data located at the RBSP MOC during nominal operations.	T	EFW-533, EFW-534,
		<b>Processed Data Products Production And Validation Service (PDP)</b>		
SOC.SDC-501	The EFW SOC	Shall include a module, PDP, that generates new data products by combining or reformatting existing data products.	A	EFW-546,
SOC.SDC-502	The PDP module	Shall run periodically to ensure that EFW produces the latest data.	T	EFW-502,
SOC.SDC-503	The PDP module	Shall be capable of running in either a scripted or operator-commanded mode.	T	EFW-502,
SOC.SDC-504	The PDP module	Shall produce a log of its operation.	T	EFW-502, EFW-539,
SOC.SDC-505	The PDP module	Shall interface with the ARC-INT module to read the input data.	T	EFW-539,
SOC.SDC-506	The PDP module	Shall interface with the ARC-INT module to store the generated data.	T	EFW-539, EFW-540,
		<b>L0 -&gt; L1 Processing Service (PDP-L0-&gt;L1)</b>		
SOC.SDC-511	The PDP module	Shall include a module, PDP-L0->L1, that generates L files.	A	EFW-546,
SOC.SDC-512	The PDP-L0->L1 module	Shall accept EFW SOC L0 data files.	T	EFW-546,
SOC.SDC-513	The PDP-L0->L1 module	Shall interface with the MET<->UTC module to convert spacecraft MET times to ground UTC times.	T	EFW-531,
SOC.SDC-514	The PDP-L0->L1 module	Shall produce ISTP-compliant, sample-time-tagged, observatory-separated (RB-A, RB-B, ETU, etc.), UTC-day-separated uncalibrated data files, named EFW SOC L1.	T	EFW-504, EFW-531, EFW-546,
		<b>L1 -&gt; L2 Processing Service (PDP-L1-&gt;L2)</b>		
SOC.SDC-521	The PDP module	Shall include a module, PDP-L1->L2, that generates L files.	A	EFW-546,
SOC.SDC-522	The PDP-L1->L2 module	Shall accept EFW SOC L1 data files.	T	EFW-546,
SOC.SDC-523	The PDP-L1->L2 module	Shall accept EMFISIS-MAG SOC L2 data files.	T	EFW-546,

SOC.SDC-524	The PDP-L1->L2 module	Shall accept EFW SOC SOH data files.	T	EFW-546,
SOC.SDC-525	The PDP-L1->L2 module	Shall accept EFW SOC CAL data files.	T	EFW-546,
SOC.SDC-526	The PDP-L1->L2 module	Shall accept EFW SOC STATE data files.	T	EFW-546,
SOC.SDC-527	The PDP-L1->L2 module	Shall produce ISTP-compliant, sample-time-tagged, observatory-separated (RB-A, RB-B, ETU, etc.), UTC-day-separated calibrated data files with quantities in geophysically-relevant coordinate systems, named EFW SOC L2.	T	EFW-504, EFW-531, EFW-546,
		<b>Instrument State-Of-Health Data Extraction Service (PDP-SOH)</b>		
SOC.SDC-531	The PDP module	Shall include a module, PDP-SOH.	A	EFW-509,
SOC.SDC-532	The PDP-SOH module	Shall accept EFW SOC L0 data files.	T	EFW-509,
SOC.SDC-533	The PDP-SOH module	Shall produce sample-time-tagged, observatory-separated, UTC-day-separated data files containing observatory and instrument data (TBD), named EFW SOC SOH.	T	EFW-504, EFW-531
SOC.SDC-534	The PDP-SOH module	Shall produce observatory-separated, UTC-day-separated plots of TBD state-of-health indicators from the EFW SOC SOH data files.	T	EFW-509,
SOC.SDC-535	The PDP-SOH module	Shall generate alerts to TBD engineering and science personnel if TBD state-of-health indicators exceed safety limits.	T	EFW-509,
		<b>Attitude And Ephemeris Data Processing Service (PDP-STATE)</b>		
SOC.SDC-541	The PDP module	Shall include a module, PDP-STATE.	A	EFW-546,
SOC.SDC-542	The PDP-STATE module	Shall accept MOC STATE data files.	T	EFW-546,
SOC.SDC-543	The PDP-STATE module	Shall produce TBD data files, named EFW SOC STATE.		EFW-504, EFW-531, EFW-546,
		<b>Calibration Parameter Production Service (PDP-CAL)</b>		
SOC.SDC-551	The PDP module	Shall include a module, PDP-CAL.	A	EFW-546,
SOC.SDC-552	The PDP-CAL module	Shall accept EFW SOC L1 data files.	T	EFW-546,
SOC.SDC-553	The PDP-CAL module	Shall accept EFW SOC L2 data files.	T	EFW-546,
SOC.SDC-554	The PDP-CAL module	Shall accept EFW SOC STATE data files.	T	EFW-546,
SOC.SDC-555	The PDP-CAL module	Shall accept EMFISIS-MAG SOC L2 data files.	T	EFW-546,
SOC.SDC-556	The PDP-CAL module	Shall accept ECT SOC L2 data files.	T	EFW-546,
SOC.SDC-557	The PDP-CAL module	Shall accept ECT SOC SOH data files.	T	EFW-546,
SOC.SDC-558	The PDP-CAL module	Shall estimate the values of calibration parameters for the DC and AC EFW data (waveform and spectral).	T	EFW-536,
SOC.SDC-559	The PDP-CAL module	Shall produce time-tagged, observatory-separated, UTC-day-separated data files containing EFW instrument calibration data (TBD), named EFW SOC CAL.	T	EFW-504, EFW-531, EFW-536, EFW-546,
		<b>QuickLook Data and Plot Production Service (PDP-QL)</b>		
SOC.SDC-561	The PDP module	Shall include a module, PDP-QL.	A	EFW-535,
SOC.SDC-562	The PDP-QL module	Shall accept EFW SOC L2 data files.	T	EFW-546,
SOC.SDC-563	The PDP-QL module	Shall accept MOC EMFISIS-MAG RAW data files.	T	EFW-529,
SOC.SDC-564	The PDP-QL module	Shall accept MOC EMFISIS-MAG CAL data files.	T	EFW-547,
SOC.SDC-565	The PDP-QL module	Shall produce ISTP-compliant, time-tagged, observatory-separated (RB-A, RB-B, ETU, etc.), UTC-day-separated summary data files and plots, named EFW SOC QL.	T	EFW-504, EFW-531, EFW-535, EFW-546,
		<b>L2 and QL Data Validation (DVAL)</b>		
SOC.SDC-601	The EFW SOC	Shall include a module, DVAL, that displays science data for manual verification before public release.	A	EFW-545,
SOC.SDC-602	The DVAL module	Shall provide software clients that allow the EFW SOC and SCI teams to validate the contents and data quality of EFW SOC L2 data files, and QL data files and summary plots.	T	EFW-507, EFW-545,
SOC.SDC-603	The DVAL module	Shall produce a log of its operation.	T	EFW-538,

SOC.SDC-604	The DVAL module	Shall run in an operator-commanded mode.	T	EFW-545,
SOC.SDC-605	The DVAL module	Shall interface with the ARC-INT module to read the input data.	T	EFW-539,
SOC.SDC-606	The DVAL module	Shall accept EFW SOC L2 data files.	T	EFW-546,
SOC.SDC-607	The DVAL module	Shall accept EFW SOC QL data files.	T	EFW-546,
SOC.SDC-608	The DVAL module	Shall prompt the EFW SOC and SCI teams so as to sample the QL data files and summary plots at least once every 120 hours during nominal operations.	T	EFW-507,
SOC.SDC-609	The DVAL module	Shall prompt the EFW SOC and SCI teams so as to maintain a latency of less than 15/8 days in the validation (and subsequent delivery) of QL data products for external access during nominal operations.	T	EFW-535,
SOC.SDC-610	The DVAL module	Shall prompt the EFW SOC and SCI teams so as to maintain a latency of less than 70/40 days in the validation (and subsequent delivery) of L2 data products for external access during nominal operations.	T	EFW-536,
SOC.SDC-611	The DVAL module	Shall interface with the ARC-PUB module to cause the validated data to be publicly accessible.	T	EFW-538, EFW-540,
		<b>Ground Selection of Burst Segments Tool (BSEL)</b>		
SOC.SDC-701	The EFW SOC	Shall include a module, BSEL, that displays the Survey waveform, spectral and housekeeping data to allow the EFW SOC and Science teams select particular B1 burst segments for playback.	A	EFW-510,
SOC.SDC-702	The BSEL module	Shall be capable of running in either a scripted or operator-commanded mode.	T	EFW-502,
SOC.SDC-703	The BSEL module	Shall produce a log of its operation.	T	EFW-502,
SOC.SDC-704	The BSEL module	Shall interface with the ARC-INT module to read the input data.	T	EFW-539,
SOC.SDC-705	The BSEL module	Shall accept EFW GSE RT/PB data files.	T	EFW-503,
SOC.SDC-706	The BSEL module	Shall accept EFW SOC L2 data files.	T	EFW-503,
SOC.SDC-707	The BSEL module	Shall accept EFW SOC QL data files.	T	EFW-503,
SOC.SDC-708	The BSEL module	Shall interface with the MET<->UTC module to provide information about the timestamps of the B1 buffers in UTC time.	T	EFW-515,
SOC.SDC-709	The BSEL module	Shall provide software clients to display information about the contents of the B1 buffers and allow selection for playback of segments thereof.	T	EFW-510,
SOC.SDC-710	The BSEL module	Shall interface with the EFW SOC-CTG to act upon the results of its operation.	T	EFW-512,
		<b>Science Data Analysis Tool (SDT)</b>		
SOC.SDC-801	The EFW SOC	Shall include a module, SDT, that may be used to perform scientific analysis of the data products.	A	EFW-546,
SOC.SDC-802	The SDT module	Shall provide software clients for display and analysis of waveform and spectral data types.	T	EFW-535, EFW-536, EFW-545, EFW-546,
SOC.SDC-803	The SDT module	Shall interface with the ARC-INT or ARC-PUB module to read the input data.	T	EFW-538,
SOC.SDC-804	The SDT module	Shall support the use of the relevant (E-field) portions of the THEMIS Data Analysis Software (TDAS) package for display and analysis of waveform and spectral data types.	T	EFW-535, EFW-536, EFW-545, EFW-546,
SOC.SDC-805	The SDT module	Shall support the use of the Science Data Tool (SDT) package for display and analysis of waveform and spectral data types.	T	EFW-535, EFW-536, EFW-545, EFW-546,