



CORE FLIGHT SOFTWARE SYSTEM (CFS)

SCHEDULER (SCH) APPLICATION

BUILD: 2.2.1.0

FSW VERSION DESCRIPTION DOCUMENT

RELEASE DATE: 7/5/2017



SIGNATURES

Approved by:

X

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1.0 FSW VERSION DESCRIPTION

1.1 PURPOSE AND SUMMARY

The purpose of this build is to continue to refine the cFS Scheduler (SCH) application product. This build provides the following revisions:

- Minor clean up to remove old history logs
- Minor clean up to the custom source code file to remove local definitions of PSP functions
- Fixes comment errors in the platform configuration file
- Fixes the table primary header to be CCSDS compliant
- Fixes CFE_EVS_SendEvent format warnings
- Adds new assert based unit tests.

This document serves as the notification of the Build 2.2.1.0 release of the cFS SCH application.

Checksum (SCH) version 2.2.1.0 is compatible with cFE builds 6.5.0 and above and OSAL builds 4.2.0 and above.

1.2 NEW FUNCTIONALITY IN THIS VERSION

Table 1.2-1 identifies new FSW functionality that has been implemented and is integrated into this FSW version. Requirement references are included.

Table 1.2-1 – New Functionality in this Version

No.	FSB DCR # (or N/A)	Requirements	Functionality or Change Description
-	-	N/A	None

Table 1.2-2 identifies changes to FSW functionality from a previously delivered FSW version and the DCRs and Trac Ticket numbers associated with these changes. See attachment 1 for a full listing of the DCRs and Trac Tickets included in this release.

Table 1.2-2 – Changes to Previously Delivered Functionality



No.	FSB DCR # (or N/A)	Requirements	High Level Description of Functionality
-	-	N/A	None

1.3 MISSING PLANNED FEATURES AND KNOWN PROBLEMS

Table 1.3-1 identifies the functions and known discrepancies that are absent from SCH Build 2.2.1.0. Any workarounds that may apply are identified.

Information on currently open DCRs is available at:

<http://gs580v-fsbmks10.ndc.nasa.gov:7001/index.html>.

Information on currently open Trac tickets is available at:

https://babelfish.arc.nasa.gov/trac/cfs_apps/report/1.

Note that these are restricted websites that requires a server account. Additional DCRs and/or Trac Tickets may have been submitted after preparation of this VDD. A cFS SCH DCR report containing a listing of open DCRs and Trac tickets is available on request for customers who do not have access to the restricted servers. Please contact Susanne Strege, susie.strege@nasa.gov.

Table 1.3-1 – Functions absent from this Release

Trac ticket references are proceeded with a ‘#’ character.

No.	FSB DCR or Trac #	Description	Reason for Absence	Affected Requirement or Component	Workaround	Planned Delivery
1	#21	SCH cmake table integration. The cFE 6.5 release adds better support for building table objects from CMakeLists files. This ticket contains an update to the SCH app to use this feature to build its table files in addition to the normal SCH build.	Implementation is dependent on resource/staff availability	SCH Tables	N/A	Not Determined
2	#35	SCH occasionally hangs when CFS is stopped. When the CFS process receives a SIGINT (ctrl-c), the SCH_MinorFrameCall back is called by the pthread_cancel. Often this will cause that callback to hang on a lock.	Implementation is dependent on resource/staff availability	SCH App	None	Not Determined



3	#45	SCH: Remove dependencies on cfe_platform_cfg.	Implementation is dependent on CCB consensus	SCH App	None	Not Determined
4	#47	Inaccuracies in Scheduler Minor Frame Slot Timing/Processing.	Implementation is dependent on resource/staff availability	SCH App	None	Not Determined
5	#84	SCH Does Not Protect Scheduler Table Slots from Being Commanded. SCH currently allows any slot within the Scheduler Table to be commanded to an enable/disable state.	Implementation is dependent on customer needs. Community input is needed.	SCH App	None	Not Determined
6	#85	SCH Minor Frame Interrupt Processed Before Receipt of Startup Sync. The default custom.c file includes the create timer function in the early initialization function. On NICER this caused the minor frame interrupt to be processed before the SCH application has received the startup sync.	Implementation is dependent on resource/staff availability	SCH App	None	Not Determined
7	#86	Consider Moving Group Macro Definitions to a Header File. Moving these macro definitions to a header file would allow ground system command definitions to include the actual group definitions vs. redefining them which can be error prone.	Implementation is dependent on resource/staff availability	SCH App	None	Not Determined
8	#87	Should the Scheduler Table's Types be Configurable? MMS Made the SCH table critical. The current CFS SCH options do not allow the Scheduler's table's types to be configurable.	Implementation is dependent on CCB consensus	SCH App	Update calls to CFE_TBL_Register() function to replace CFE_TBL_OPTION_DEFAULT with desired table options.	Not Determined

9	#88	SCH Timer Configuration Issues. The SCH "Minor Frame MET Sync logic" is very dependent on the accuracy of the timer being used. There currently is no way for user's to configure the "Minor Frame MET Sync logic" to work with a variety of different timers.	Implementation is dependent on resource/staff availability	SCH App	None	Not Determined
10	4121	SCH - Add Trick Simulation Support (JSC Request)	Implementation is dependent on customer needs. Community input is needed.	Trick	None	Not Determined

1.4 DEVELOPMENT TOOL VERSIONS ASSOCIATED WITH THIS FSW VERSION

Table 1.4-1 identifies the versions of development tools used to generate this FSW version:

Table 1.4-1 – Development Tool Versions Associated with this FSW Version

Tool Type.	Tool Name	Version Used
RTOS	BVTed with VxWorks 6.9, however, OSAL provides ability to use multiple OSes	6.9
Compiler	GNU	3.3.2
cFE	Core Flight Executive	6.5.0.0
OSAL	Operating System Abstraction Layer	4.2.0.0

2.0 DELIVERED PRODUCTS

Table 2-1 identifies the locations of FSW products relevant to this FSW Build. The version or date of the Build and where the product can be located are provided. Changes from a previous VDD are identified.

Table 2-1 – Delivered Products and their Locations

Software Element	Changed with this Version?	New Version or Date	Location
Executable for this build	Yes	2.2.1.0	Not applicable. Executables must be created for the specific mission/platform
Installation Procedures & Special Instructions (See Section 3.0)	No	3.1	See cFS Deployment Guide babelfish.arc.nasa.gov (in git system TOOLS master branch) and http://sourceforge.net/projects/coreflightexec
Source Code of this FSW Build	Yes	2.2.1.0	gs580v-fsbmks10.ndc.nasa.gov. MKS label SCH-ALL-Build2.2.1.0_JUL5-2017 babelfish.arc.nasa.gov (in git system sch_app_master branch) and http://sourceforge.net/projects/cfs-sch
FSW Build Plan	N/A	N/A	None
Annotated S/W Detailed Design Docs	No	N/A	fsb.gsfc.nasa.gov/cFS
Ground System T&C Database	No	N/A	gs580v-fsbmks10.ndc.nasa.gov. MKS label SCH-ALL-Build2.2.1.0_JUL5-2017 babelfish.arc.nasa.gov (in git system sch_app_master branch) and http://sourceforge.net/projects/cfs-sch



Software Element	Changed with this Version?	New Version or Date	Location
Ground System Scripts developed by FSB	Yes	2.2.1.0	gs580v-fsbmks10.ndc.nasa.gov. MKS label SCH-ALL-Build2.2.1.0_JUL5-2017 babelfish.arc.nasa.gov (in git system sch_app_master branch) and http://sourceforge.net/projects/cfs-sch
Simulator and Test Data Generator Software	No	N/A	None
Executable - Ground Tools associated with FSW (tools to build stored command loads, etc.)	No	N/A	None
Source Code - Ground Tools associated with FSW (tools to build stored command loads, etc.)	No	N/A	Perl scripts to generate ground database and build verification procedures from templates (see cFS Deployment Guide)
Unit Test Procedures	Yes	2.2.1.0	gs580v-fsbmks10.ndc.nasa.gov. MKS label SCH-ALL-Build2.2.1.0_JUL5-2017 babelfish.arc.nasa.gov (in git system sch_app_master branch) and http://sourceforge.net/projects/cfs-sch
Unit Test Data	Yes	2.2.1.0	gs580v-fsbmks10.ndc.nasa.gov. MKS label SCH-ALL-Build2.2.1.0_JUL5-2017 babelfish.arc.nasa.gov (in git system sch_app_master branch) and http://sourceforge.net/projects/cfs-sch
Unit Test Results	Yes	2017/06/21	gs580v-fsbmks10.ndc.nasa.gov. MKS label SCH-ALL-Build2.2.1.0_JUL5-2017 babelfish.arc.nasa.gov (in git system sch_app_master branch) and http://sourceforge.net/projects/cfs-sch



Software Element	Changed with this Version?	New Version or Date	Location
FSW Make Files	No	2.2.1.0	gs580v-fsbmks10.ndc.nasa.gov. MKS label SCH-ALL-Build2.2.1.0_JUL5-2017 babelfish.arc.nasa.gov (in git system sch_app_master branch) and http://sourceforge.net/projects/cfs-sch
Linker & Compiler Configuration Files	No	2.2.1.0	gs580v-fsbmks10.ndc.nasa.gov. MKS label SCH-ALL-Build2.2.1.0_JUL5-2017 babelfish.arc.nasa.gov (in git system sch_app_master branch) and http://sourceforge.net/projects/cfs-sch
Requirements version (from MKS)	No	1.1	MKS label – version 1.1

3.0 INSTALLATION PROCEDURES

Table 3-1 identifies the nominal FSW Installation Procedure(s) for this FSW Build onto the intended target system (including the commercial applications used and the configuration settings). The procedure version identifier, the date of the procedure and where it can be located are also provided.

Table 3-1 FSW Installation Procedure(s)

Destination (Target System)	Filename	Version and Date	Location
N/A	See cFS Deployment Guide	Version 3.1	Available with cFE open source release: http://sourceforge.net/projects/coreflightexec/ babelfish.arc.nasa.gov (in git system TOOLS master branch) and on gs580v-fsbmks10.ndc.nasa.gov

4.0 CONFIGURATION SUMMARY AND VERSION IDENTIFICATION

SCH Build 2.2.1.0 can be found on gs580v-fsbmks10.ndc.nasa.gov, sourceforge: <http://sourceforge.net/projects/cfs-sch>, and babelfish.arc.nasa.gov (in git system sch_app_master branch). Verification of the version can be done by sending a SCH NOOP command which produces an event message containing the version information. In addition, the initialization event message generated during the application startup provides the version information.

5.0 SOFTWARE COPYRIGHT NOTICE

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ACRONYMS

ACS	Attitude Control System
C&DH.....	Command and Data Handling
cFE.....	core Flight Executive
cFS.....	core Flight Software System
CM	Configuration Management
COTS	Commercial Off-The-Shelf
DCR	Discrepancy/Change Request
ETU.....	Engineering Test Unit
FSB.....	Flight Software Branch
FSW	Flight Software
I&T	Integration & Test
OSAL.....	Operating System Abstraction Layer
RTOS	Real-Time Operating System
SCH	Scheduler Application
T&C.....	Telemetry and Command
URL.....	Universal Resource Locator
VDD	Version Description Document

**ATTACHMENT 1 – CFS SCHEDULER BUILD 2.2.1.0 DCRS/TRAC TICKETS**

Trac ticket references are proceeded with a '#' character.

No.	DCR/Trac Ticket #	Description	Type	Priority	State	Date Reported	Build Target
1	4157	Update commands in sch_platform_inc.h to fix comments. The comments for SCH_MDT_MIN_MSG_ID state maximum. The comments for SCH_MDT_MAX_MSG_ID state minimum.	defect	minor	Test Complete	05/15/2014	2.2.1.0
2	4174/#4	SCH tables have CCSDS primary packet header that must be Big Endian on Little Endian platforms	defect	moderate	Test Complete	11/23/2014	2.2.1.0
3	4248	SCH - Scheduler task source module sch_custom.c has local definitions of PSP functions. Remove the locally defined PSP timer functions.	cosmetic	minor	Test Complete	06/10/2015	2.2.1.0
4	145925	SCH - CFE_EVS_SentEvent Format Warnings	defect	minor	Test Complete	10/24/2016	2.2.1.0
5	145928	Implement UT-Assert Unit Tests for the SCH Application	enhancement	major	Test Complete	10/24/2016	2.2.1.0
6	146058	SCH: Move function prototypes from .c files to .h files. Unit tests need access to function definitions.	defect	minor	Test Complete	02/13/2017	2.2.1.0
7	146180	SCH - Remove MKS Logs and change copyright symbol to ASCII	cosmetic	minor	Test Complete	05/26/2017	2.2.1.0