



CORE FLIGHT SOFTWARE SYSTEM (CFS)

FILE MANAGER (FM) APPLICATION

BUILD: 2.5.2.0

FSW VERSION DESCRIPTION DOCUMENT

RELEASE DATE: 1/30/2017



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 File Manager (FM) application product. This build provides various bug fixes and enhancements, minor requirement updates, and new assert based unit tests. The enhancements include:

- A new command to set/change the permissions/mode of a file.
- A new command parameter for the directory listing commands to allow users to specify whether or not to update the file stat information (date/time/permissions) with the directory listing.
- New configuration parameters to specify a configurable delay between a configurable number of files when obtaining file stat information (date/time/permissions) when processing directory listing commands to help prevent CPU hogging.

This document serves as the notification of the Build 2.5.2.0 release of the cFS FM application. The FM Build 2.5.2 release contains the changes associated with Builds 2.5.0.0, 2.5.1.0, and 2.5.2.0. The 2.5.1.0 and 2.5.2.0 are revisions that include bug fixes found during FM Builds 2.5.0.0 and 2.5.1.0 Build Verification Testing. Build 2.5.2.0 is the final release of the cFS FM application following BVT of Builds 2.5.0.0 and 2.5.1.0 of the cFS FM application. For more details on the issues encountered during testing, please refer to attachment 1 for a full listing of the DCRs and Trac Tickets included in this release and the FM 2.5.2.0 Test Report located in the /test_and_ground/results folder.

File Manager (FM) version 2.5.2.0 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
1	8529	N/A	Implement UT-Assert based unit tests for the FM application.
2	145875 145983	FM2011 FM2013 FM3002 FM3003	Add command requirements to Set/Change File Permissions. Add file permissions/mode information to the file information packet, directory listing packet, and directory listing file.

No.	FSB DCR # (or N/A)	Requirements	Functionality or Change Description
3	4178	N/A	Added a conditional check in FM_ChildInit on return from OS_MutSemCreate for variable FM_GlobalData.ChildQueueCountSem. Sends additional error event message on Result != CFE_SUCCESS.

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
1	4014	N/A	Removed unnecessary checks from verify.h. Removed check on FM_APP_PIPE_DEPTH. Changed check on FM_CHILD_TASK_PRIORITY to be a valid range rather than arbitrary values.
2	7558	FM3002.3 FM3003.1	High CPU seen when using the directory listing to file command GC_FM_DIRLISTFILE. Added command parameter (GetSizeTimeMode flag) to the directory listing commands to allow users to specify whether or not to update the file stat information (size, time, mode/permissions) in the directory listing. Added configuration parameters to specify a configurable delay between a configurable number of files when obtaining file stat information (size, time, and mode/permissions) when processing the directory listing commands with the command-specified GetSizeTimeMode flag set to TRUE.



1.3 MISSING PLANNED FEATURES AND KNOWN PROBLEMS

Table 1.3-1 identifies the functions and known discrepancies that are absent from FM Build 2.5.2.0. 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 FM 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

No.	FSB DCR or Trac #	Description	Reason for Absence	Affected Requirement or Component	Workaround	Planned Delivery
1	4114	FM - Add Trick Simulation Support (JSC Request)	Implementation is dependent on customer needs. Community input is needed.	N/A	None	Not Determined
2	4136	The child task command processing in the FM application is hard coded. During the Flight Software Systems Branch Internal CDR of the CFS FM application questions came up as to whether or not child task command processing should be configurable, if all FM commands should be processed by the child, or if the decision should be made in real time (RFA #4).	Implementation is dependent on customer needs. Community input is needed.	FM App	None	Not Determined
3	4108	FM CRC Tool Displays Output in Hexidecimal Only	Lower priority than other 2.5 issues	FM CRC Tool	None	Not Determined

4	4064	The FM application currently will only provide file system disk free space information via command. Disk space is often monitored by applications such as LC for appropriate action to be taken if a file system/disk free space falls below a certain amount. For future FM releases consider adding platform configuration option for having free space sent in telemetry (or not).	Implementation is dependent on customer needs.	FM4001	None	Not Determined
5	4009	On GPM, when given a directory argument "/", the FM_DirListTlm command lists the files in the /ram directory, but without file size and timestamp information (as is done when the command argument is "/ram"). The FM_DirListFile command should also be checked.	Implementation is dependent on customer needs.	FM3003 FM3002	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	2.5.2.0	Not application. 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	2.5.2.0	gs580v-fsbmks10.ndc.nasa.gov. MKS label FM-ALL-Build2.5.2.0_JAN30-2017 babelfish.arc.nasa.gov (in git system fm_app_master branch) and http://sourceforge.net/projects/cfs-fm
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	Yes	2.5.2.0	gs580v-fsbmks10.ndc.nasa.gov. MKS label FM-ALL-Build2.5.2.0_JAN30-2017 babelfish.arc.nasa.gov (in git system fm_app_master branch) and http://sourceforge.net/projects/cfs-fm



Software Element	Changed with this Version?	New Version or Date	Location
Ground System Scripts developed by FSB	Yes	2.5.2.0	gs580v-fsbmks10.ndc.nasa.gov. MKS label FM-ALL-Build2.5.2.0_JAN30-2017 babelfish.arc.nasa.gov (in git system fm_app_master branch) and http://sourceforge.net/projects/cfs-fm
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	2.5.2.0	gs580v-fsbmks10.ndc.nasa.gov. MKS label FM-ALL-Build2.5.2.0_JAN30-2017 babelfish.arc.nasa.gov (in git system fm_app_master branch) and http://sourceforge.net/projects/cfs-fm
Unit Test Data	Yes	2.5.2.0	gs580v-fsbmks10.ndc.nasa.gov. MKS label FM-ALL-Build2.5.2.0_JAN30-2017 babelfish.arc.nasa.gov (in git system fm_app_master branch) and http://sourceforge.net/projects/cfs-fm
Unit Test Results	Yes	2016/10/28	gs580v-fsbmks10.ndc.nasa.gov. MKS label FM-ALL-Build2.5.2.0_JAN30-2017 babelfish.arc.nasa.gov (in git system fm_app_master branch) and http://sourceforge.net/projects/cfs-fm

Software Element	Changed with this Version?	New Version or Date	Location
FSW Make Files	No	2.5.2.0	gs580v-fsbmks10.ndc.nasa.gov. MKS label FM-ALL-Build2.5.2.0_JAN30-2017 babelfish.arc.nasa.gov (in git system fm_app_master branch) and http://sourceforge.net/projects/cfs-fm
Linker & Compiler Configuration Files	No	2.5.2.0	gs580v-fsbmks10.ndc.nasa.gov. MKS label FM-ALL-Build2.5.2.0_JAN30-2017 babelfish.arc.nasa.gov (in git system fm_app_master branch) and http://sourceforge.net/projects/cfs-fm
Requirements version (from MKS)	Yes	1.5	MKS label – version 1.5

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

FM Build 2.5.2.0 can be found on gs580v-fsbmks10.ndc.nasa.gov, sourceforge: <http://sourceforge.net/projects/cfs-fm>, and babelfish.arc.nasa.gov (in git system fm_app_master branch). Verification of the version can be done by sending an FM 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
FM.....	File Manager
FSB.....	Flight Software Branch
FSW	Flight Software
I&T	Integration & Test
OSAL.....	Operating System Abstraction Layer
RTOS	Real-Time Operating System
T&C.....	Telemetry and Command
URL.....	Universal Resource Locator
VDD	Version Description Document

**ATTACHMENT 1 – CFS FILE MANAGER BUILD 2.5.0.0 DCRS/TRAC TICKETS**

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

No.	DCR/Trac Ticket #	Description	Type	Priority	State	Date Reported	Build Target
1	#28	FM: Fix compiler errors using latest OSAL and strict settings	defect	minor	Test Complete	06/29/2015	2.5.0.0
2	#39	Allow C99 code in APPS	defect	minor	Test Complete	01/28/2016	2.5.0.0
3	4014	Remove unnecessary checks from verify.h.	enhancement	minor	Test Complete	05/18/2012	2.5.0.0
4	4023	GPM-IVV-1340 - FM requirements do not capture overwrite capability	defect	major	Test Complete	06/04/2012	2.5.0.0
5	4178	FM_GlobalData.ChildQueueCountSem is created and used without any checks that the create was successful. FM task will continue to run even when shared memory protection for ChildQueueCount is not available. Verify result from OS_MutSemCreate() before use of FM_GlobalData.ChildQueueCountSem and add new error event for reporting when semaphore creation fails.	defect	major	Test Complete	12/19/2014	2.5.0.0
6	7558	High CPU seen when using the directory listing to file command GC_FM_DIRLISTFILE	defect	major	Test Complete	08/27/2015	2.5.0.0
7	8529	Implement UT-Assert unit tests for the FM application	enhancement	major	Test Complete	09/08/2015	2.5.0.0
8	8531	Use Correct Symbol Name in fm_verify.h. In fm_verify.h, there's a preprocessor condition that looks at the value of "FM_FILE_SYS_ENTRIES". This constant does not exist, but based on the context of the code executed when the condition passes, the symbol should actually be "FM_TABLE_ENTRY_COUNT".	defect	minor	Test Complete	09/10/2015	2.5.0.0
9	141402	FM unit tests - add End-Of-File and End-Of-Function Comments Where Missing	enhancement	minor	Test Complete	01/29/2016	2.5.0.0
10	141406	FM - Add Baseline Output Log File from UT-Assert Run	enhancement	major	Test Complete	01/29/2016	2.5.0.0
11	141534	Delete unused common_types.h file from unit tests	defect	minor	Test Complete	02/04/2016	2.5.0.0
12	145436	Update unit tests to use Constants for Version Number Checks	enhancement	minor	Test Complete	05/03/2016	2.5.0.0
13	145677	FM Unit Tests: Add C Macro Definition to Makefile for New cFE. With the new version of cFE (6.5.0), changes were made that caused all previously-written application unit tests to generate warning messages when calling CFE_EVS_SendEvent and CFE_ES_WriteSysLog. It was determined that these messages were being generated because the constant OSAPI_NO_SPECIAL_ATTRIBS was not being defined. It was then determined that this definition would best be implemented in each unit test suite's makefile.	defect	major	Test Complete	06/22/2016	2.5.0.0
14	145691	FM: Update unit tests to check for truncated message. The UT-Assert library SendEvent stub function truncates messages longer than CFE_EVS_MAX_MESSAGE_LENGTH. The tests FM_ChildDirListPktCmd_Test_DirPlusEntryToo Long and FM_ChildDirListFileLoop_Test_DirectoryAndNa	defect	major	Test Complete	07/06/2016	2.5.0.0



		meTooLong must be updated so that the messages they expect are truncated.					
15	145694	FM Unit Tests: Fix expected event messages that depend on constants and data type lengths to use actual values	defect	minor	Test Complete	07/07/2016	2.5.0.0
16	145730	FM Unit Test Makefile: Replace hard-coded paths with environment variables set in setvars.sh	enhancement	minor	Test Complete	07/22/2016	2.5.0.0
17	145875	FM - Add Command to Set/Change File Permissions	enhancement	major	Test Complete	09/21/2016	2.5.0.0
18	145877	FM - UT-Assert Unit Tests - Code Walkthrough Updates	enhancement	moderate	Test Complete	09/22/2016	2.5.0.0
19	145918	FM - CFE_EVS_SendEvent Format Warnings	defect	minor	Test Complete	10/24/2016	2.5.0.0
20	145983	FM - Add requirement to Set/Change File Permissions	enhancement	major	Test Complete	01/09/2017	2.5.0.0
21	145986	FM - Update Requirements Based on DCR 7558 Updates	defect	major	Test Complete	01/10/2017	2.5.0.0
22	145999	Two issues found during 2.5.0.0 BVT: 1. Compiling "out of the box" there is one warning that was not fixed 2. The updated FM_GetDirFileCmd_t and FM_GetDirPktCmd_t packet types need to be aligned on a 32-bit boundary. Both structures need to be padded with an extra 3 bytes.	defect	minor	Test Complete	01/18/2017	2.5.1.0
23	146000	Fix Typo in FM Requirement FM2011. Requirement FM2011 needs to be updated for item d). It currently states "<MISSION_DEFINED> CR" when it should be "<MISSION_DEFINED> CRC".	defect	minor	Test Complete	01/18/2017	2.5.1.0
24	146006	Remove/Replace Copyright symbol from comment blocks with ASCII equivalent. Remove MKS log from comment blocks	defect	minor	Test Complete	01/19/2017	2.5.1.0
25	146008	Directory List to File command generates a file that contains incorrect information when Flag is set to FALSE	defect	moderate	Test Complete	01/23/2017	2.5.2.0
26	146011	The Set/Change File Permissions command does not increment the Child task error count on OSAL error	defect	minor	Test Complete	01/24/2017	2.5.2.0
27	146018	New File Permissions Requirements are Ambiguous. The new requirements for File Statistics (3002.3 and 3003.1) indicate that if the Flag is set to FALSE, these fields will not be updated. There are 2 interpretations of what this means. If the command is sent with the flag = TRUE, these fields are populated with the file's values. If the same command is sent with the flag = FALSE, these values are "cleared" or initialized to zero. One interpretation is that the "clearing" is considered to be an update and the requirement would fail. The other interpretation would be that these fields remain what they were prior to the FALSE flag command and the requirement would fail.	defect	moderate	Test Complete	01/25/2017	2.5.2.0