

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:



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. |
| 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](mailto: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> |
| 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> |
| 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\_DirPlusEntryTooLong and FM\_ChildDirListFileLoop\_Test\_DirectoryAndNameTooLong must be updated so that the messages they expect are truncated. | defect | | major | Test Complete | 07/06/2016 | 2.5.0.0 |
| 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 |