Flight Software Branch

FSW Version Description Document

Core Flight Executive (cFE) Platform Specific Package (PSP)

Build: 1.2.0.0

10/1/2014

1.0 FSW Version Description

1.1 purpose and summary

The purpose of this build is to continue to refine and enhance the core Flight Executive (cFE) Platform Support Package (PSP) library. This build provides a minor bug fix to the pc-linux link-rules, as well as, enhancements to the pc-linux library. In addition this build provides a new library package for the SPARC LEON3 processor. This document serves to formally release cFE\_PSP Build 1.2.0.0.

This version of the cFE\_PSP works only with the OS Abstraction Layer (OSAL) versions 3.1 or later and the cFE versions 6.1.0 or later. It is highly recommended to use this version of the cFE\_PSP with the latest versions of the OSAL and cFE.

There are some outstanding issues being investigated. Resolutions to these issues will require a new release. The project CCB and community inputs will determine which FSW DCRs to include in the next release.

1.2 new/Changed 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 | High Level Description of Functionality |
| --- | --- | --- | --- |
| 1 | 22765 | N/A | Add ut699 SPARC LEON3 PSP as delivered by JSC |

Table 1.2-2 identifies changes to FSW functionality from a previously delivered FSW version and the DCRs associated with these changes.

**Table 1.2-2 – Changes to Previously Delivered Functionality**

| No. | FSB DCR # (or N/A ) | Requirements | Functionality or Change Description |
| --- | --- | --- | --- |
| 1 | 14621 | N/A | Remove the "-fvolatile" compiler option from the PowerPC Makefiles for MCP750 (ARC wish list) |
| 2 | 14622 | N/A | Remove the "-fvolatile" compiler option from the PowerPC RAD750 Makefiles (ARC wish list) |
| 3 | 22608 | N/A | Enhancements that have been developed for the pc-linux PSP:  1. Updated volume table to allow the cFE to run from a local directory, rather than being copied into the /tmp directory. This allows more than one user to run the cFE on a single system.  2. Updated make rules to allow cFE to compile on a 64 bit linux system ( it still compiles as a 32 bit application )  3. Updated PSP startup code to properly set the priority of the startup code. This was necessary after the OSAL priority management was fixed on linux. |
| 4 | 22740 | N/A | Removed the "-lstdc++" option from the /psp/fsw/pc-linux/make/link-rules.mak.  This library is not a standard gcc library and creates a link error when building on linux platforms using the gcc compiler. |

1.3 MISSING Planned FEATURES AND KNOWN PROBLEMS

Table 1.3-1 identifies functions that were originally planned for this release, but are absent. Any workarounds that may apply are identified.

Information on currently open DCRs is available at <http://tlserver.gsfc.nasa.gov:7001/index.html>. Note that this is a restricted website that requires a server account.

Refer to the Delivery Letter for any additional DCRs submitted after preparation of this VDD.

**Table 1.3-1 – Functions absent from this Release**

| No. | FSB  DCR # | Description | Reason for Absence | Affected Requirement or Component | Workaround | Planned Delivery |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 9861 | RAD750 PSP calls same functions as MCP750. | Insufficient time/resources to complete | RAD750 | None Identified | Not Determined |
| 2 | 13297 | Implement a new CFE PSP timer API library for all currently supported platforms | Insufficient time/resources to complete | N/A | N/A | Not Determined |
| 3 | 13298 | Update cFE\_PSP\_EepromWriteEnable to accept an address (MMS request) | Insufficient time/resources to complete | N/A | N/A | Not Determined |
| 4 | 13420 | Add utility to return EEPROM write enable/disable status | Insufficient time/resources to complete | N/A | N/A | Not Determined |
| 5 | 13543 | Implement Platform Dependent timers in the PSP | Insufficient time/resources to complete | N/A | N/A | Not Determined |
| 6 | 13845 | The spacecraft ID has different lengths depending upon what you care about. (MMS Request) | Insufficient time/resources to complete | cFE | None Identified | Not Determined |
| 7 | 14261 | Submit MMS ETU/Flight Coldfire/RTEMS PSP | Insufficient time/resources to complete | N/A | N/A | Not Determined |
| 8 | 14952 | CFE\_PSP\_GetTime loses resolution in conversion to microseconds | Insufficient time/resources to complete | cFE | None Identified | Not Determined |
| 9 | 14953 | Report exception in cFE Reset Sub-Type | Insufficient time/resources to complete | N/A | N/A | Not Determined |
| 10 | 18535 | Preserve cFE Exception and Reset Logs on Soft Poweron Reset | Insufficient time/resources to complete | N/A | N/A | Not Determined |
| 11 | 18574 | Consider adding the vxWorks RTP/Memory protected PSP | Insufficient time/resources to complete | N/A | N/A | Not Determined |
| 12 | 18615 | PSP - Add User Configurable Memory Types to Memory Table | Insufficient time/resources to complete | N/A | N/A | Not Determined |
| 13 | 21074 | Add CFE\_PSP\_GetLocalMET and CFE\_PSP\_SetLocalMET | Insufficient time/resources to complete | cFE | None Identified | Not Determined |
| 14 | 21561 | PSP: Add multi-core support to pc-linux PSP | Insufficient time/resources to complete | N/A | N/A | Not Determined |
| 15 | 21562 | PSP: Add multi-core support to vxWorks ( and other ) PSPs | Insufficient time/resources to complete | N/A | N/A | Not Determined |
| 16 | 22017 | PSP: Add support for C++ in the PSP header files | Insufficient time/resources to complete | N/A | N/A | Not Determined |
| 17 | 22110 | PSP 32-bit Memory Accesses Must Be 32-bit Aligned | Insufficient time/resources to complete | N/A | N/A | Not Determined |
| 18 | 22700 | Integrate JSC Unit Tests | Insufficient time/resources to complete | N/A | N/A | Not Determined |
| 19 | 22624 | Feature Request: Add PSP function to return startup path of cFE | Insufficient time/resources to complete | N/A | N/A | 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 | VxWorks, and pc-linux | VxWorks 6.4  CentOS 7  Red Hat 5.10 |
| Compiler | GNU (ccppc) | 3.3.2 |
| Ground System | ASIST | 20.2 |

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 | 1.2.0.0 | N/A. Executables are not delivered for the cFE-PSP |
| Installation Procedures & Special Instructions | Yes | 3.0 | See CFS Deployment Guide. Tlserver.gsfc.nasa.gov (in MKS CM system) and open source at <http://sourceforge.net/projects/coreflightexec/> |
| Source Code of this FSW Build | Yes | 1.2.0.0 | Tlmserver.gsfc.nasa.gov in MKS CM system (PSP-All-Build1.2.0.0) and open source at <http://sourceforge.net/projects/coreflightexec/> |
| FSW Build Plan | N/A |  | None |
| Annotated S/W Detailed Design Docs | N/A | 5.4 | See cFE Application Developer’s Guide. Tlserver.gsfc.nasa.gov (in MKS CM system) and open source at <http://sourceforge.net/projects/coreflightexec/> |
| Ground System T&C Database | N/A | N/A | None |
| Ground System Scripts developed by FSB | N/A | N/A | None |
| Simulator and Test Data Generator Software | N/A | N/A | None |
| Executable - Ground Tools associated with FSW (tools to build stored command loads, etc.) | N/A | N/A | Tools are available in cm (desktop cmd and telemetry interface, Performance analysis tools, eft2tables) and open source at <http://sourceforge.net/projects/coreflightexec/> |
| Source Code - Ground Tools associated with FSW (tools to build stored command loads, etc.) | No | N/A | $WORK  Perl scripts to generate ground database and build verification procedures from templates |
| Unit Test Procedures | N/A | N/A | None. There are no existing unit test procedures. |
| Unit Test Data | N/A | N/A | None. See note above. |
| Unit Test Results | N/A | N/A | None. See note above. |
| FSW Make Files | Yes | Tagged in CM | Tlserver.gsfc.nasa.gov (in MKS CM system) and open source at <http://sourceforge.net/projects/coreflightexec/> |
| Linker & Compiler Configuration Files | Yes |  | Tlserver.gsfc.nasa.gov (in MKS CM system) and open source at <http://sourceforge.net/projects/coreflightexec/> |

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 |
| --- | --- | --- | --- |
| Procedure is generic for CPU1, CPU2 or CPU3 | CFS Deployment Guide | 3.0 | tlserver.gsfc.nasa.gov CFS\_MISSION-project docs/CFS Deployment Guide and open source at <http://sourceforge.net/projects/coreflightexec/> |

4.0 Configuration summary and version identification

cFE\_PSP Build 1.2.0.0 can be found on tlserver3.gsfc.nasa.gov and is provided as open source on sourceforge.net:

<http://sourceforge.net/projects/coreflightexec/>

Telemetry is available to indicates cFE Build 6.4.0 using OSAL Build 4.1.1 and cFE-PSP Build 1.2.0.0

5.0 Software CopyRight Notice

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Acronyms

API………………………………………...…………………………………………….Application Program Interface

cFE Core Flight Executive

C&DH Command and Data Handling

CFS…………………………………………………………………………………………Core Flight Softare System

CM Configuration Management

COTS Commercial Off-The-Shelf

DCR Discrepancy/Change Request

ES Executive Services

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

TBL……………………………………………………………………………………………………………..……Table

T&C Telemetry and Command

URL Universal Resource Locator

UTF…………………………………………………………………………………………….….Unit Test Framework

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