Version Description Document
for the
Core Flight System SP0-VxWorks6.9 Platform Support Package

Engineering Directorate
Software, Robotics and Simulation Division

Availability:

NASA & NASA contractor employees as required

June 2022
Release 1.5.1

Verify this is the correct version before use

Change Record

Revision	*Date*	*Originator*	*Description*
Rel 1.5.1	Jun 2022	Tam Ngo	Release 1.5.1 content

Table of Contents

Verify this is the correct version before use

Johnson Space Center Engineering Directorate	Title: Version Description Document for the Core Flight System SP0-VxWorks6.9 Platform Support Package	
	Doc. No. N/A	Release 1.5.1
	Date: June 2022	Page 4 of 14

List of Tables

Verify this is the correct version before use

1 INTRODUCTION

1.1 Purpose and Scope

The purpose of the Version Description Document (VDD) is to provide a precise description of a particular version of the software being released. It documents the "as-built" configurations for the software, the version of requirements applicable to this version, and an exact description of the software contents in this version. If applicable, this document also describes the hardware configurations on which the software is intended to operate.

The purpose of this VDD is to provide a precise list of controlled items for the Release 1.5.1 of the Core Flight System SP0-VxWorks6.9 Platform Support Package (PSP).

1.2 Responsibility and Change Authority

This document is prepared in accordance with EA-WI-025, "GFE Flight Project Software and Firmware Development". The responsibility for the development of this document lies with the Engineering Directorate Software, Robotics, & Simulation Division (SR&SD), Spacecraft Software Engineering Branch/ER6. Change authority is the Software, Robotics and Simulation Division of the Johnson Space Center.

2 APPLICABLE AND REFERENCE DOCUMENTS

2.1 Applicable Documents

The following documents, of the exact issue and revision shown, form a part of this VDD to the extent specified herein.

Table 2-1: Applicable Documents

Document Number	Document Title	Revision / Release Date
NPR 7150.2	NASA Software Engineering Procedural Requirements	Rev C / Aug 2019
EA-WI-025	GFE Flight Project Software and Firmware Development	Rev D / Sep 2013
GP-10021	cFS Certification Software Development Plan	Baseline / May 2020

2.2 Reference Documents

The following documents are reference documents utilized in the development of this VDD. These documents do not form a part of this VDD and are not controlled by their reference herein.

Table 2-2: Reference Documents

Document Number	Document Title	Revision / Release Date
None		

Verify this is the correct version before use

2.3 Order of Precedence

In the event of a conflict between the text of this specification and an applicable document cited herein, the text of this specification takes precedence.

3 PRODUCT DESCRIPTION

Release 1.5.1 of the Core Flight Software (cFS) SP0-VxWorks6.9 Platform Support Package (PSP) is the baseline version of the software.

4 INVENTORY AND PRODUCTS

4.1 Materials Released

4.1.1 Software Media Description

The software will be available for download or checkout on a server designated by the project or program that uses it. There will be a Git tag labeled "v1.5.1" to identify the Release 1.5.1 of the SP0-VxWorks6.9 PSP.

4.1.2 Software Documentation Description

Table 4-1 lists the main documents that are released with and form a part of this software release.

Table 4-1: Software Documentations

Document Number	Document Title	Document Name and Location	Revision / Release Date
N/A	Software Design Document (SDD)	Release Artifacts package: PSP_SP0-VXWORKS6.9_SDD.pdf	Baseline / May 2022
N/A	Software Test Plan and Procedures (STP)	Release Artifacts package: PSP_SP0-VXWORKS6.9_STP.pdf	Baseline / May 2022
N/A	Software User's Guide (SUG)	Release Artifacts package: PSP_SP0-VXWORKS6.9_SUG.pdf	Baseline / May 2022
N/A	Software Version Description Document (VDD)	Release Artifacts package: PSP_SP0-VXWORKS6.9_VDD.pdf	Rel 1.5.1 / Jun 2022

Table 4-2 lists the supporting documents that are either referenced or linked from the main documents listed in Table 4-1. They are also released with and form a part of this software release.

Table 4-2: Supporting Software Documentations

Document Description	Document Name and Location	Referenced/Linked By
APIs for Common Public Functions	Release Artifacts package: PSP_sp0-vxworks6.9_common.pdf	PSP_SP0-VXWORKS6.9_SDD.pdf PSP-SP0-VXWORKS6.9_SUG.pdf

Verify this is the correct version before use

Document Description	*Document Name and Location*	*Referenced/Linked By*
APIs for Startup Functions	Release Artifacts package: PSP_sp0-vxworks6.9_startup.pdf	PSP_SP0-VXWORKS6.9_SDD.pdf PSP-SP0-VXWORKS6.9_SUG.pdf
APIs for FLASH Functions	Release Artifacts package: PSP_sp0-vxworks6.9_flash.pdf	PSP_SP0-VXWORKS6.9_SDD.pdf PSP-SP0-VXWORKS6.9_SUG.pdf
APIs for Exception Storage	Release Artifacts package: PSP_sp0-vxworks6.9_exceptionstorage.pdf	PSP_SP0-VXWORKS6.9_SDD.pdf PSP-SP0-VXWORKS6.9_SUG.pdf
APIs for Memory	Release Artifacts package: PSP_sp0-vxworks6.9_memory.pdf	PSP_SP0-VXWORKS6.9_SDD.pdf PSP-SP0-VXWORKS6.9_SUG.pdf
APIs for Memory Scrubbing	Release Artifacts package: PSP_sp0-vxworks6.9_memoryscrub.pdf	PSP_SP0-VXWORKS6.9_SDD.pdf PSP-SP0-VXWORKS6.9_SUG.pdf
APIs for Module	Release Artifacts package: PSP_sp0-vxworks6.9_module.pdf	PSP_SP0-VXWORKS6.9_SDD.pdf PSP-SP0-VXWORKS6.9_SUG.pdf
APIs for SP0 Statistical Data	Release Artifacts package: PSP_sp0-vxworks6.9_sp0.pdf	PSP_SP0-VXWORKS6.9_SDD.pdf PSP-SP0-VXWORKS6.9_SUG.pdf
APIs for NTP Time Synchronization	Release Artifacts package: PSP_sp0-vxworks6.9_timesync.pdf	PSP_SP0-VXWORKS6.9_SDD.pdf PSP-SP0-VXWORKS6.9_SUG.pdf
Section 5 of the SDD	Release Artifacts package: PSP_sp0-vxworks6.9_sdd_s5.pdf	PSP_SP0-VXWORKS6.9_SDD.pdf
Test Rig Description	Release Artifacts package: cFS_Test_Rig.pdf	PSP_SP0-VXWORKS6.9_STP.pdf

4.2   Product Configuration Accounting

This section identifies the exact configuration of the products delivered in this version. A key function of the VDD is to provide the traceability between the end product (e.g., executable) and the original input products (e.g., source code).

4.2.1   Software Configuration Accounting

This section describes each source file and their version. These files are related to a Git commit hash, TBD. This unique Git commit hash identifies a specific version of each source file that is part of the Git tag labeled "v1.5.1" in the Gitlab repository at https://js-er-code.jsc.nasa.gov/gateway/cfs/gateway_msg. This repository is not accessible outside of NASA Gateway program.

Note: Git commit hashes are unique identifiers generated by Git when a code change is recorded. Every Git commit contains the unique commit hash, the time and date, the user who recorded the change, and the description of the change.

Table 4-3 lists the implementation source files.

Verify this is the correct version before use

Table 4-4 lists the unit test source files.

Table 4-5 lists the functional test source files.

Table 4-6 lists the test artifacts.

<div align="center">

Table 4-3: Source Files

</div>

File Name and Location
psp/fsw/inc/cfe_psp.h
psp/fsw/modules/eeprom_direct/cfe_psp_eeprom_direct.c
psp/fsw/modules/ntp_clock_vxworks/cfe_psp_ntp.c
psp/fsw/modules/port_direct/cfe_psp_port_direct.c
psp/fsw/modules/ram_direct/cfe_psp_ram_direct.c
psp/fsw/modules/timebase_vxworks/cfe_psp_timebase_vxworks.c
psp/shared/inc/cfe_psp_exceptionstorage_api.h
psp/shared/inc/cfe_psp_exceptionstorage_types.h
psp/shared/inc/cfe_psp_memory.h
psp/shared/inc/cfe_psp_module.h
psp/shared/src/cfe_psp_exceptionstorage.c
psp/shared/src/cfe_psp_memrange.c
psp/shared/src/cfe_psp_memutils.c
psp/shared/src/cfe_psp_module.c
psp/shared/src/cfe_psp_version.c
psp/fsw/sp0-vxworks6.9/inc/cfe_psp_config.h
psp/fsw/sp0-vxworks6.9/inc/psp_flash.h
psp/fsw/sp0-vxworks6.9/inc/psp_mem_scrub.h
psp/fsw/sp0-vxworks6.9/inc/psp_sp0_info.h
psp/fsw/sp0-vxworks6.9/inc/psp_start.h
psp/fsw/sp0-vxworks6.9/inc/psp_time_sync.h
psp/fsw/sp0-vxworks6.9/inc/psp_verify.h
psp/fsw/sp0-vxworks6.9/inc/psp_version.h
psp/fsw/sp0-vxworks6.9/src/cfe_psp_exception.c
psp/fsw/sp0-vxworks6.9/src/cfe_psp_mem_scrub.c
psp/fsw/sp0-vxworks6.9/src/cfe_psp_memory.c
psp/fsw/sp0-vxworks6.9/src/cfe_psp_flash.c
psp/fsw/sp0-vxworks6.9/src/cfe_psp_sp0_info.c
psp/fsw/sp0-vxworks6.9/src/cfe_psp_start.c
psp/fsw/sp0-vxworks6.9/src/cfe_psp_support.c
psp/fsw/sp0-vxworks6.9/src/cfe_psp_watchdog.c

<div align="center">

Table 4-4: Unit Test Source Files

Verify this is the correct version before use

</div>

File Name and Location
psp/fsw/sp0-vxworks6.9/unit_test/psp_exception_testcase.c
psp/fsw/sp0-vxworks6.9/unit_test/psp_exception_testcase.h
psp/fsw/sp0-vxworks6.9/unit_test/psp_memory_testcases.c
psp/fsw/sp0-vxworks6.9/unit_test/psp_memory_testcases.h
psp/fsw/sp0-vxworks6.9/unit_test/psp_flash_testcases.h
psp/fsw/sp0-vxworks6.9/unit_test/psp_flash_testcases.c
psp/fsw/sp0-vxworks6.9/unit_test/psp_mem_scrub_testcases.c
psp/fsw/sp0-vxworks6.9/unit_test/psp_mem_scrub_testcases.h
psp/fsw/sp0-vxworks6.9/unit_test/psp_ntp_testcases.c
psp/fsw/sp0-vxworks6.9/unit_test/psp_ntp_testcases.h
psp/fsw/sp0-vxworks6.9/unit_test/psp_sp0_info_testcases.c
psp/fsw/sp0-vxworks6.9/unit_test/psp_sp0_info_testcases.h
psp/fsw/sp0-vxworks6.9/unit_test/psp_start_testcases.c
psp/fsw/sp0-vxworks6.9/unit_test/psp_start_testcases.h
psp/fsw/sp0-vxworks6.9/unit_test/psp_support_testcases.c
psp/fsw/sp0-vxworks6.9/unit_test/psp_support_testcases.h
psp/fsw/sp0-vxworks6.9/unit_test/psp_watchdog_testcases.c
psp/fsw/sp0-vxworks6.9/unit_test/psp_watchdog_testcases.h
psp/fsw/sp0-vxworks6.9/unit_test/psp_testcases.c
psp/fsw/sp0-vxworks6.9/unit_test/psp_testcases.h

Table 4-5: Functional Test Source Files

File Name and Location
psp/fsw/sp0-vxworks6.9/functional_test/psp_ft.h
psp/fsw/sp0-vxworks6.9/functional_test/psp_ft.c

Table 4-6: Test Artifacts

File Name and Location
Release Artifacts package: psp_sp0-vxworks6.9_ut_results.log
Release Artifacts package: psp_sp0-vxworks6.9_ut_coverage.zip
Release Artifacts package: psp_sp0-vxworks6.9_ft_results.log

4.2.2   Software Build Tools Configuration Accounting

Table 4-7 lists the build files. They are also part of the Git tag labeled "v1.5.1".

Verify this is the correct version before use

Table 4-8 lists the software tools, and their versions, that are used to build the SP0-VxWorks6.9 PSP Release 1.5.1.

Table 4-7: Build Files

File Name and Location
psp/CMakeLists.txt
psp/fsw/modules/eeprom_direct/CMakeLists.txt
psp/fsw/modules/ntp_clock_vxworks/CMakeLists.txt
psp/fsw/modules/port_direct/CMakeLists.txt
psp/fsw/modules/ram_direct/CMakeLists.txt
psp/fsw/modules/timebase_vxworks/CMakeLists.txt
psp/fsw/shared/CMakeLists.txt
psp/fsw/sp0-vxworks6.9/CMakeLists.txt
psp/fsw/sp0-vxworks6.9/unit_test/CMakeLists.txt

Table 4-8: Software Build Tools and Their Versions

Software Build Tool	Version
gcc	gcc (GCC) 4.8.5 20150623 (Red Hat 4.8.5-44)
ccppc	(Wind River VxWorks G++ 4.3-386) 4.3.3
Linux (CentOS/RedHat)	7.9.2009
cmake	3.17.5
Git	1.8.3.1
Understand (static analysis)	5.1
Cppcheck (static analysis)	2.5

4.2.3   Software Build Process

The software build process is documented in the SP0-VxWorks6.9 PSP Software User's Guide.

4.3   Non-Released Software or Equipment

None.

5   CONFIGURATION AND CHANGE STATUS

5.1   Installed Changes

Release 1.5.1 of the SP0-VxWorks6.9 PSP is the baseline for the software. Its capabilities are described in its Application Programming Interfaces (APIs). This section will contain capabilities newly installed in future releases.

Verify this is the correct version before use

5.2 Waivers

None.

5.3 Known Problems

All known issues related to the SP0-VxWorks6.9 PSP are being tracked in the project's Jira system at https://bender.jsc.nasa.gov/jira/secure/RapidBoard.jspa?rapidView=133&projectKey=GWCFS. This Jira system is not accessible outside of the cFS development team.

Release 1.5.1

1. None.

5.4 Planned Changes

All planned changes related to GW_MSG are being tracked in the project's Jira system at https://bender.jsc.nasa.gov/jira/secure/RapidBoard.jspa?rapidView=133&projectKey=GWCFS. This Jira system is not accessible outside of the cFS development team.

Release 1.5.1

1. None.

Verify this is the correct version before use

6   APPENDICES

6.1   Abbreviations and Acronyms

Term	*Definition*
API	Application Programming Interface
CBCS	Computer Based Control System
cFE	Core Flight Executive
cFS	Core Flight System
ES	cFE Executive Services
EVS	cFE Event Services
GFE	Government Furnished Equipment
GSFC	Goddard Space Flight Center
ICD	Interface Control Document
ISR	Interrupt Service Routine
JSC	Johnson Space Center
LRO	Lunar Reconnaissance Orbiter
MDT	Message Definition Table (for SCH_TT cFS Application)
Msg	Message
NASA	National Aeronautics and Space Administration
PMP	Project Management Plan
PSP	cFE Platform Support Package
SB	cFE Software Bus
SBNG	Software Bus Network for Gateway cFS Application
TTE_LIB	Time-Triggered Ethernet Scheduler cFS Library
SDD	Software Design Document
SDG	Software Developer's Guide
SDP	Software Development Plan
SDT	Schedule Definition Table (for SCH_TT cFS application)
SRS	Software Requirements Specification
SR&SD	JSC Engineering Directorate Software, Robotics & Simulation Division
SSET	JSC Spacecraft Software Engineering Team
SUG	Software User's Guide
TTE	Time-Triggered Ethernet
TTE_LIB	Time-Triggered Ethernet cFS Library
TTE_MGR	Time-Triggered Ethernet Manager cFS library
VDD	Version Description Document

6.2   Definition of Terms

Term	*Definition*
Configuration Item	An entity whose configuration is tracked as a single entity. Note that a configuration item may be comprised of other configuration items.
Conversion	The process of transforming one item into a different item (e.g. a compiler converts source code into object code, a linker converts object code into load modules, etc.).
Intermediate Products	Items that are conversions of input products or other intermediate products but require more conversion to become output products (see "input products" and "output products").
Output Products	The items that are the result of the build process converting input products (and possibly intermediate products) and are directly loadable or usable by the target system, e.g. the executable load module or binary data file (see "input products" and "intermediate products").
Release	A combination of configuration items that are designed to work together and released as a single entity.
Source Products	See "intermediate products" and "output products"
Version	A unique identifier for a configuration item.

Verify this is the correct version before use

7 NOTES

None.