

# Version Description Document for the **Core Flight System SP0-VxWorks6.9 Platform Support Package – Version 1.5.1.0**

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Engineering Directorate  
Software, Robotics and Simulation Division

## Availability:

NASA & NASA contractor employees as required

October 2021  
Draft



National Aeronautics and  
Space Administration  
**Lyndon B. Johnson Space Center**  
Houston, Texas

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Version Description Document  
for the  
**Core Flight System SP0-VxWorks6.9 Platform Support Package  
Version 1.5.1.0**

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**National Aeronautics and Space Administration  
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## Change Record

| <i>Revision</i> | <i>Date</i> | <i>Originator</i> | <i>Description</i> |
|-----------------|-------------|-------------------|--------------------|
| N/A             | Oct 2021    | Tam Ngo           | Initial draft      |
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## 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 description of Version 1.5.1.0 of the Core Flight System Sp0-VxWorks6.9 Platform Support Package. This VDD describes the “certifiable” release of the SP0-VxWorks6.9 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**

| <i>Document Number</i> | <i>Document Title</i>                                | <i>Revision / Release Date</i> |
|------------------------|--|--------------------------------|
| 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**

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| Johnson Space Center<br>Engineering Directorate | Title: Version Description Document for the Core Flight System SP0-VxWorks6.9 Platform Support Package – Version 1.5.1.0 |              |
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| <i>Document Number</i> | <i>Document Title</i>                       | <i>Revision / Release Date</i> |
|------------------------|---|--------------------------------|
| TBD                    | SP0-VxWorks6.9 PSP Software Design Document | TBD                            |
| TBD                    | SP0-VxWorks6.9 PSP Software Test Procedures | TBD                            |

## 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.

All specifications, standards, exhibits, drawings or other documents that are invoked as “applicable” in this specification are incorporated as cited. All documents that are referred to by an applicable document are considered to be for guidance and information only, with the exception of ICDs which will have their applicable documents considered to be incorporated as cited.

## 3 PRODUCT DESCRIPTION

The Version 1.5.1.0 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 from a git repository on a server designated by the project or program that uses it. There will be a Git tag labeled “v1.5.1.0” to identify the SP0-VxWorks6.9 PSP Version 1.5.1.0 Release. Specific delivery requirements are documented in the project’s Software Development Plan (SDP).

#### 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**

| <i>Document Number</i> | <i>Document Title</i>            | <i>Document Name and Location</i>   | <i>Revision / Release Date</i> |
|------------------------|----------------------------------|-------------------------------------|--------------------------------|
| TBD                    | Software Design Document (SDD)   | psp/docs/PSP_SP0-VXWORKS6.9_SDD.pdf | TBD                            |
| TBD                    | Software Developer's Guide (SDG) | psp/docs/PSP_SP0-VXWORKS6.9_SDG.pdf | TBD                            |
| TBD                    | Software Test Procedures (STP)   | psp/docs/PSP_SP0-VXWORKS6.9_STP.pdf | TBD                            |

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| <i>Document Number</i> | <i>Document Title</i>                       | <i>Document Name and Location</i>   | <i>Revision / Release Date</i> |
|------------------------|---|-------------------------------------|--------------------------------|
| TBD                    | Software Version Description Document (VDD) | psp/docs/PSP_SP0-VXWORKS6.9_VDD.pdf | TBD                            |

Table 4.2 lists the supporting documents that are either referenced or linked from the main documents. They are also released with and form a part of this software release.

**Table 4-2: Supporting Software Documentations**

| <i>Document Description</i>      | <i>Document Name and Location</i>                | <i>Referenced/Linked By</i>  |
|----------------------------------|--|--|
| APIs for Common Public Functions | psp/docs/PSP_sp0-vxworks6.9_common.pdf           | psp/docs/PSP_SP0-VXWORKS6.9_SDD.pdf<br>psp/docs/PSP-SP0-VXWORKS6.9_SDG.pdf |
| APIs for Startup Functions       | psp/docs/PSP_sp0-vxworks6.9_startup.pdf          | psp/docs/PSP_SP0-VXWORKS6.9_SDD.pdf<br>psp/docs/PSP-SP0-VXWORKS6.9_SDG.pdf |
| APIs for CDS-in-FLASH Functions  | psp/docs/PSP_sp0-vxworks6.9_cdsflash.pdf         | psp/docs/PSP_SP0-VXWORKS6.9_SDD.pdf<br>psp/docs/PSP-SP0-VXWORKS6.9_SDG.pdf |
| APIs for Exception Storage       | psp/docs/PSP_sp0-vxworks6.9_exceptionstorage.pdf | psp/docs/PSP_SP0-VXWORKS6.9_SDD.pdf<br>psp/docs/PSP-SP0-VXWORKS6.9_SDG.pdf |
| APIs for Memory                  | psp/docs/PSP_sp0-vxworks6.9_memory.pdf           | psp/docs/PSP_SP0-VXWORKS6.9_SDD.pdf<br>psp/docs/PSP-SP0-VXWORKS6.9_SDG.pdf |
| APIs for Memory Scrubbing        | psp/docs/PSP_sp0-vxworks6.9_memoryscrub.pdf      | psp/docs/PSP_SP0-VXWORKS6.9_SDD.pdf<br>psp/docs/PSP-SP0-VXWORKS6.9_SDG.pdf |
| APIs for Module                  | psp/docs/PSP_sp0-vxworks6.9_module.pdf           | psp/docs/PSP_SP0-VXWORKS6.9_SDD.pdf<br>psp/docs/PSP-SP0-VXWORKS6.9_SDG.pdf |
| APIs for SP0 Statistical Data    | psp/docs/PSP_sp0-vxworks6.9_sp0.pdf              | psp/docs/PSP_SP0-VXWORKS6.9_SDD.pdf<br>psp/docs/PSP-SP0-VXWORKS6.9_SDG.pdf |

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| <i>Document Description</i>       | <i>Document Name and Location</i>           | <i>Referenced/Linked By</i>  |
|-----------------------------------|---|--|
| APIs for NTP Time Synchronization | psp/docs/PSP_sp0-vxworks6.9_timesync.pdf    | psp/docs/PSP_SP0-VXWORKS6.9_SDD.pdf<br>psp/docs/PSP-SP0-VXWORKS6.9_SDG.pdf |
| Section 5 of the SDD              | psp/docs/PSP_sp0-vxworks6.9_sdd_s5.pdf      | psp/docs/PSP_SP0-VXWORKS6.9_SDD.pdf  |
| Test Rig Description              | psp/docs/PSP_sp0-vxworks6.9_STP_testrig.pdf | psp/docs/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. Table 4.3 lists the source files.

These files correspond to Git commit hash **TBD**. The corresponding unique Git commit hash that identifies the version of each source file that is part of the git tag labeled “v1.5.1.0”.

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: Source Files**

| <i>File Name and Location</i>                               |
|---|
| psp/fsw/inc/cfe_psp.h                                       |
| psp/fsw/modules/eeeprom_direct/cfe_psp_eeeprom_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                           |

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|  |
|--|
| 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_cds_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_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  |

Table 4.4 lists the unit test source files.

These files correspond to Git commit hash **TBD**. The corresponding Git commit hash that identifies the version of each source file that is part of the Git tag labeled “v1.5.1.0”.

**Table 4-4: Unit Test Source Files**

| <i>File Name and Location</i>                              |
|--|
| 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_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  |

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| <i>File Name and Location</i>                    |
|--|
| psp/fsw/sp0-vxworks6.9/unit_test/psp_testcases.c |
| psp/fsw/sp0-vxworks6.9/unit_test/psp_testcases.h |

Table 4.5 lists the functional test source files.

These files correspond to Git commit hash TBD. The corresponding Git commit hash that identifies the version of each source file that is part of the Git tag labeled “v1.5.1.0”.

**Table 4-5: Functional Test Source Files**

| <i>File Name and Location</i> |
|-------------------------------|
| TBD                           |

Table 4.6 lists the test artifacts.

These files correspond to Git commit hash TBD. The corresponding Git commit hash that identifies the version of each source file that is part of the Git tag labeled “v1.5.1.0”.

**Table 4-6: Test Artifacts**

| <i>File Name and Location</i>                                 |
|---|
| psp/fsw/sp0-vxworks6.9/unit_test/psp_ut_results_expected.log  |
| psp/fsw/sp0-vxworks6.9/unit_test/psp_ut_coverage_expected.zip |

#### 4.2.2 Software Build Tools Configuration Accounting

This section describes the configuration information necessary to build the products from the sources described in section 4.2.1.

Table 4.6 lists the build files.

These files correspond to Git commit hash TBD. The corresponding Git commit hash that identifies the version of each source file that is part of the Git tag labeled “v1.5.1.0”.

**Table 4-7: Build Files**

| <i>File Name and Location</i>                    |
|--|
| psp/CMakeLists.txt                               |
| psp/fsw/modules/eeeprom_direct/CMakeLists.txt    |
| psp/fsw/modules/ntp_clock_vxworks/CMakeLists.txt |
| psp/fsw/modules/port_direct/CMakeLists.txt       |

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|   |
|---|
| 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 4.7 lists the software tools, and their versions, that are used to build this v1.5.1.0 of the SP0-VxWorks6.9 PSP.

**Table 4-8: Software Build Tools and Their Versions**

| <i>Software Build Tool</i> | <i>Version</i> |
|----------------------------|----------------|
| TBD                        | TBD            |
| TBD                        | TBD            |

#### 4.2.3 Software Build Process

The software build process is documented in the SP0-VxWorks6.9 PSP Software Developer's Guide. See Table 4-1.

### 4.3 Non-Released Software or Equipment

None.

## 5 CONFIGURATION AND CHANGE STATUS

### 5.1 Installed Changes

Version 1.5.1.0 of the SP0-VxWorks6.9 PSP is the baseline for the software. Its capabilities are described in its Software Design document. This section will contain capabilities newly installed for future releases.

### 5.2 Waivers

None.

### 5.3 Known Problems

Version 1.5.1.0 of the SP0-VxWorks6.9 PSP has the following changes being tracked in the project's Jira system at <https://bender.jsc.nasa.gov/jira/secure/RapidBoard.jspa?rapidView=133&projectKey=GWCF5>.

TBD

### 5.4 Planned Changes

TBD

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## 6 ABBREVIATIONS AND ACRONYMS

| <i>Term</i> | <i>Definition</i>  |
|-------------|--|
| 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  |
| 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   |

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|   |  |               |
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## 7 DEFINITION OF TERMS

| <i>Term</i>           | <i>Definition</i>   |
|-----------------------|---|
| 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.   |

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## 8 NOTES

None.

## 9 APPENDICES

None.

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