



Form FM-SE-03



**Hardware Development Plan
*TEMPLATE***

TEMPLATE Version: 2.0

TEMPLATE Approval Date: July 23, 2024

Procedure for Using this Template to Create a Deliverable:

1. Enter your name, firm, and date in the Author Field Document control panel.
2. Replace [*bracketed text*] and empty sections with your project information and/or document content.

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4. Some sections also contain boilerplate text to use as a starting point. Review and modify the boilerplate content, if it exists, and add additional content as necessary to fulfill the requirement of each section. Use the Styles *H1 – H5* for section headers, *Figure Caption* for captions below figures, and *Table Caption* for captions above tables so that the Table of Contents, List of Figures, and List of Tables can be automatically updated.
5. Define acronyms at the first usage in parenthesis after the expanded term and add to the "List of Acronyms" section.
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17. Print the document to PDF and review it outside of the Microsoft Word application.
18. Submit the Word and PDF versions of the document as the final documents.

- Provide tables to display information, as needed:

- 📍 Table styles may use the following example format, or others as needed
- 📍 Placement of table captions above the table and left justified is recommended.

Table 1: Title

Header	Header

- Provide figures when need to convey information to augment written descriptions:

- 📍 Placement of figure captions below and center justified is recommended.

Figure 1: Title

Template Revision History

Version	Date	Name	Description
1.0	6/14/2018	Unknown	
2.0	5/28/2024	Steve Bahler	Update the template with guidance similar to other FDOT SE Templates and to address circumstances for use of an HDP.
2.0	06/26/2024	Amber Greene	Finalize edits and visual check.



Hardware Development Plan for: *insert project name*

Version: *insert version number*

Approval date: *insert approval date*

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List of Acronyms and Abbreviations

ConOps	Concept of Operations
CDMP	Configuration and Data Managements Plan
CI.....	Configuration Item
CM	Configuration Management
DevSpec	Developmental Specification
FDOT	Florida Department of Transportation
HDP.....	Hardware Development Plan
HWCI.....	Hardware Configuration Items
ITS.....	Intelligent Transportation Systems
MSP.....	Modified Special Provision
QA.....	Quality Assurance
PSEMP	Project Systems Engineering Management Plan
SIT.....	System Integration Testing
SSRBC	Standard Specifications for Road and Bridge Construction
TSP.....	Technical Special Provision

- *An HDP is recommended on a project where introduction of new/non-standard hardware or technology results in the determination that a project is “high risk” in accordance with the Florida Department of Transportation (FDOT) Systems Engineering and Intelligent Transportation Systems (ITS) Architecture Procedure (#750-040-003) and where the hardware or technology is not commercially available through use of a Technical Special Provision (TSP) or a Modified Special Provision (MSP). Typically, a risk mitigation plan will accompany a high-risk project. The HDP is listed in the risk mitigation plan, when applicable.*

1. Overview

- *Include this introduction and modify as appropriate.*

The Hardware Development Plan (HDP) establishes the hardware development approach, methodologies, tools, and procedures to be used during the analysis, design, development, testing, integration, and deployment of *[Name of new ITS hardware or technology]* which is not currently covered in the Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction (SSRBC) or in a Developmental Specification (DevSpec). This HDP is a dynamic document and shall be updated on a periodic basis to reflect organizational changes, lessons learned, new tools, and advances in methodologies.

1.1 Scope

The HDP provides the means to coordinate schedules, control resources, initiate actions, and monitor progress of the *[Name of new ITS hardware or technology]* development effort. The purpose of the document is to provide a detailed plan for the use of resources, methodologies, and techniques that assist in the development and acceptance of *[name of new ITS hardware or technology]* for use in the *[describe the project or organization where the hardware is planned for use]*.

1.2 Identification

This section contains a full identification of the *[Name of new ITS hardware or technology]* to which this document applies.

- *Include applicable identification information, such as:*

-  *Project description and identification numbers*

-  *Hardware description and identification numbers, including version and release numbers, if applicable*

1.3 System Overview

This section provides a brief description of the operational concepts and products that will be developed using this HDP.

- *Include system overview information, such as:*

- 📍 Describe the operational concept that incorporates the new hardware or technology (reference the ConOps, as appropriate)
- 📍 Describe configuration items (CI) and reference the CDMP, if applicable

1.4 Relationship to Other Plans

This section describes the relationship of the HDP to the other project management plans, including:

- *Provide references to applicable sections of other systems engineering documents prepared for the project, such as:*

- 📍 Concept of Operations (ConOps)
- 📍 Project Systems Engineering Management Plans (PSEMP)
- 📍 Requirements Traceability Verification Matrix (RTVM)
- 📍 Configuration and Data Management Plan (CDMP)

1.5 Reference Documents

- *This section lists the number, title, revision, and date of all documents referenced in this plan, such as:*

- 📍 FDOT documents
- 📍 Project systems engineering documents
- 📍 Project plans
- 📍 Operational procedures
- 📍 Engineering instructions

2. Overview of Hardware Development Planning

This section establishes the context for the planning described in later sections.

- *Include a subsection that provides an overview of the following items, as applicable:*

- 📍 Requirements and constraints on the system or software that the new technology with which the new hardware, including hardware configurable items (HWCI), will be integrated (this could reference the PSEMP or CDMP, if applicable)
- 📍 Document version and configuration control procedure
- 📍 Hardware acquisition plan and constraints (this could reference the PSEMP or the ConOps, if applicable)
- 📍 Project schedules and resources that apply to the HDP (this could reference with PSEMP, if applicable)
- 📍 Training required for designers, installers, integrators, users, and maintainers
- 📍 Other requirements and constraints, such as project security, privacy, methods, and standards, etc.

3. General Hardware Development Activities

3.1 Development Process

- *This section describes the hardware development process to be used. It also identifies planned hardware builds, their objectives, and the hardware development activities to be performed in each build.*

3.2 Development Methods

- *This section identifies the hardware development methods to be used, such as:*
 - 📍 *Modeling tools*
 - 📍 *Firmware*
 - 📍 *Programming tools*
 - 📍 *Special test equipment, etc.*
 - 📍 *Include descriptions of the manual, automated tools, and procedures to be used in support of these methods.*

3.3 Product Standards

- *This section provides reference to the standards to be followed for representing requirements, design, code, test cases, test procedures, and test results.*

3.4 Reusable Products

- *This section describes the approach to be followed for incorporating and developing reusable projects, including:*
 - 📍 *Identifying, evaluating, and incorporating reusable hardware products, including the scope of the search for such products and the criteria to be used for their evaluation*
 - 📍 *Identifying, evaluating, and reporting opportunities for developing reusable hardware products*

3.5 Critical Requirements

- *This section describes the approach to be followed for handling requirements designated critical. For example:*
 - 📍 *Safety assurance*
 - 📍 *Security assurance*
 - 📍 *Privacy assurance*
 - 📍 *Assurance of other critical requirements*

3.6 Computer Hardware Resource Utilization

- *This section describes the approach to be followed for allocating computer hardware resources and monitoring their utilization.*

4. Detailed Hardware Development Activities

- *This section provides the plans for performing detailed software development activities, including the approach (i.e., methods, procedures, and tools).*

4.1 Project Planning and Oversight

- *This section describes the approach to be followed for project planning and oversight.*

- 📍 *Hardware development planning*
- 📍 *Hardware configuration item test planning*
- 📍 *System test planning*
- 📍 *Hardware installation planning*
- 📍 *Hardware transition planning*

4.2 Establishing a Hardware Development Environment

- *This section describes the approach to be followed for establishing, controlling, and maintaining a hardware development environment.*

- 📍 *Hardware engineering environment*
- 📍 *Hardware test environment*
- 📍 *Hardware development library*
- 📍 *Hardware development folders*

4.3 System Requirements Analysis

- *This section describes the approach to be followed in system requirement analyses. System requirements analysis processes will be performed as described in the project PSEMP.*

- 📍 *Analysis of user input*
- 📍 *Operational concept*
- 📍 *System requirements*

4.4 System Design

- *This section describes the approach to be followed for participating in system design.*

- 📍 *System-wide design decisions*
- 📍 *System architectural design*

4.5 Hardware Requirements Analysis

- *This section describes the approach to be followed for hardware requirements analysis. It also defines the entrance and exit criteria for the hardware development process.*

4.6 Hardware Design

- *This section describes the approach to be followed for hardware design. It also defines the entrance and exit criteria for the hardware design process.*

- 📍 *Hardware architecture/preliminary design*
- 📍 *Hardware detailed design*

4.7 Prototype Development

- *This section describes the approach to be followed for hardware prototyping, including the prototype test plan. It also defines the entrance and exit criteria for the hardware prototype development process. The prototype development phase may begin when the hardware design has been reviewed and approved.*

4.8 Hardware Integration and Testing

- *This section describes the approach to be followed for hardware integration and testing.*

- 📍 *Preparing for HWCI integration and testing*
- 📍 *Performing HWCI integration and testing*

4.9 System Integration and Testing

- *This section describes the approach to be followed for participating in HWCI/HWCI integration and testing. System integration testing (SIT) will be conducted in accordance with the project PSEMP.*

- 📍 *Independence in SIT*
- 📍 *Testing on the target computer system*
- 📍 *Preparing for SIT*
- 📍 *Performing SIT dry runs*
- 📍 *Performing SIT*
- 📍 *Revision and retesting*
- 📍 *Analyzing and recording SIT results*

4.10 System Acceptance Test

- *This section describes the approach to be followed for participating in system qualification testing. System acceptance testing will be conducted in accordance with the project PSEMP.*

- 📍 *Independence in system acceptance testing*
- 📍 *Testing on the target computer system*
- 📍 *System acceptance test preparation*
- 📍 *Performing system acceptance test dry runs*
- 📍 *Performing system acceptance test*
- 📍 *Revision and retesting*
- 📍 *Analyzing and recording system acceptance test results*

4.11 Preparing for Site Deployment

- [This section describes the approach to be followed to prepare for hardware delivery and site use.](#)

- 📍 Preparing user manuals
- 📍 Installing at user sites

4.12 Hardware Configuration Management

- [This section describes the approach to be followed for hardware CM. The CM processes and procedures are described in the CDMP.](#)

- 📍 Configuration identification
- 📍 Configuration control
- 📍 Configuration status accounting
- 📍 Configuration audits
- 📍 Packaging, storage, handling, and delivery

4.13 Hardware Product Evaluation

- [This section describes the approach to be followed for hardware product evaluation. Hardware product evaluation will be accomplished according to the program schedules established for the project.](#)

- 📍 In-process and final hardware product evaluations
- 📍 Hardware product evaluation records, including item to be recorded
- 📍 Independence in hardware product evaluation

4.14 Hardware Quality Assurance

- [This section describes the approach to be followed for hardware quality assurance \(QA\).](#)

- 📍 Hardware QA process and product evaluations
- 📍 Hardware QA records, including items to be recorded
- 📍 Independence in hardware QA

4.15 Corrective Action

- [This section describes the approach to be followed for corrective actions \(i.e., problem/change reports, etc.\).](#)

4.16 Technical and Management Reviews

- [This section describes the approach to be followed for technical and management reviews.](#)

4.17 Other Hardware Development Activities

[*This section describes the approach to be followed for other hardware development activities.*](#)

- Risk management, including known risks and corresponding strategies
- Hardware management indicators, including indicators to be used (i.e., metrics)
- Security and privacy
- Subcontractor management
- Interface with hardware independent verification and validation (agents)
- Improvement of project processes

5. Schedules and Activity Network

[*This section presents the schedule information or refers to detailed hardware schedules published for the project, including:*](#)

- Schedule(s) identifying the activities in each build and showing initiation of each activity
- Availability of draft and final deliverables, and other milestones; and completion of each activity
- An activity network, depicting sequential relationships and dependencies among activities and identifying those activities that impose the greatest time restrictions on the project

6. Program Organization and Resources

[*This section describes the project organization and resources to be applied in each hardware build, increment, iteration, or prototype.*](#)

7. User Definitions

- [*Delete this section if not applicable*](#)
- [*The CDMP should define terms and processes that are unique to the CMP and/or DMP*](#)

Table 1: Title

Figure 1: Title

DOCUMENT REVISION HISTORY			
Version Number	Approved Date	Description of Change(s)	Created/ Modified By