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Project Title: UFTR DIGITAL CONTROL SYSTEM UPGRADE
UFTR-QA1-109, Software Library and Control

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1. Applicability

This procedure is applicable to University of Florida Training Reactor (UFTR).

2. Purpose

To establish a method for controlling and maintaining software items per UFTR-QA1-02, "Software Configuration Management Plan (SCMP)," 3, which implements the guidance of IEEE 828-1990, /5/, as indorsed by, Regulatory Guide 1.169-1997, /6/.

3. References

3.1 UFTR Documents

- /1/ UFTR QA1-QAPP, "Quality Assurance Project Plan (QAPP)"
- /2/ UFTR-QA1-01, "Software Quality Assurance Plan (SQAP)"
- /3/ UFTR-QA1-02, "Software Configuration Management Plan (SCMP)"
- /4/ UFTR-QA1-105, "Cyber-Security"

3.2 Industry Standards

- /5/ IEEE Std 828-1990, "Standard for Software Configuration Management Plans"

3.3 NRC Documents

- /6/ Regulatory Guide 1.169, "Configuration Management Plans for Digital Computer Software Used in Safety Systems of Nuclear Power Plants", September 1997

4. Attachments

Attachment 1 Software Library Transaction Form

5. Responsibilities

The organization, complete with roles and responsibilities, is identified in UFTR QA1-QAPP, "Quality Assurance Project Plan (QAPP)," /1/.

User:

- Requesting a software item to be checked in or checked out via the Software Library Transaction Form (Attachment 1).
- Obtain Software Library Transaction Form (Attachment 1) approvals.
- Returning checked out software items to the Software Librarian.

Software Librarian

- Is responsible for accessing the safety-related software that is stored in the software library. For more details see section 9.3 of this procedure.

6. Abbreviation/Acronyms

CD	Compact Disk
FTP	File Transfer Protocol
ISO	International Organization for Standardization

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7. Effectivity

This procedure applies to all software used in UFTR, products developed within UFTR or by vendors after the date of issue of this instruction. Note: Software created before the original issue of this procedure and vendor software may not adhere to section 9.1.

8. Definitions

Absolute Code: The final product of the software development cycle. This code includes Executable Code, data files, resource files, etc.

Baseline: A specification or product that has been formally reviewed and agreed upon, that thereafter serves as the basis for further development, and that can be changed only through formal change control procedures. Formal review and agreement means that responsible management has reviewed and approved a baseline. Baselines are subject to change control.

End Use: Use of software for its intended purpose.

Executable Code: Code that can be executed by a processor without further processing.

File Transfer Protocol (FTP): A network protocol used to transfer data from one computer to another through a network, such as the Internet.

ISO image: is an archive file (a.k.a. disk image) of an optical disc using a conventional ISO format that is supported by many software vendors. ISO image files typically have a file extension of .ISO.

Release Date: The date that the Executable Code was created.

Software Library: The official storage location for released software used in development of or developed as an UFTR product. The Software Library is administered by the Software Librarian. Note: There may be multiple Software Libraries based on location and therefore multiple Software Librarians.

Software Librarian: Person responsible for maintaining the Software Library.

Software License Dongle: Piece of equipment that contains the license for the System Software and is physically plugged into the USB port of the computer attempting to run the System Software.

System Software: A package(s) of software utilized to create application specific software functions.

9. Instructions

As controlled by UFTR SCMP, /3/, the configuration management process consists of establishing baseline configuration items and tracking their status during software development, providing change control of the software, providing secure storage of the developed software, and ensuring that the correct software or firmware is delivered. The

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process for providing secure storage of developed and procured software and for controlling the access to that software is described below.

9.1 Software Item Identification

9.1.1 Software items created internally by UFTR shall be assigned a three-digit (e.g. X.Y.Z) version number (or software version). See Figure 1 for a representation of the version number. For new software items the version number shall be 1.0.0.

Note: Interim software releases are indicated by a fourth alphabetic digit (or interim software release). This digit will be incremented by one (A,B,C,...) for sequential interim release. In accordance with UFTR SCMP, /3/, the fourth digit will be removed from the version number and the appropriate digit incremented by one (1) before it is released as a new software version.

9.1.2 The first digit of the version number shall be incremented by one (1) when the Application Software is migrated to a newer version of System Software.

9.1.3 The second digit of the version number shall be incremented by one (1) when the proposed changes make significant modifications to the existing functionality of the software or adds new functions to the software.

9.1.4 The third digit of the version number shall be incremented by one (1) when the proposed changes make minor modifications to the existing functionality of the software, i.e., bug fixes, input/output format changes, etc.

Note: When a digit of the version number is incremented, the digits following the incremented number shall be reset to zero (0). For example, if the current version number is 1.2.6 and new functions are added to the software, the new version number would be 1.3.0.

9.1.5 The interim modification digit is for internal use only and is intended to be used during field tests of the software. The interim modification letter will be incremented by one for each field change modification.

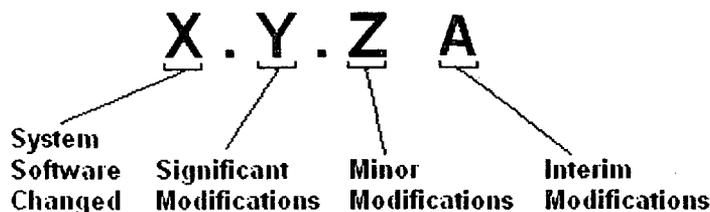


Figure 1: Internally Developed Software Identification

9.1.6 The internally developed software shall also have a Release Date assigned to it. The Release Date shall be the date in which the Executable Code is created and shall be in the format of YYYY-MM-DD.

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9.2 Software Development

- 9.2.1 Software items to be revised shall be checked out for revision from the Software Library using a Software Library Transaction Form (Attachment 1).
- 9.2.2 For safety-related software, software tools such as compilers, linkers, etc. used in creation of the Absolute or Executable Code shall be obtained from the Software Library when needed. The same version of these tools that were used to generate the previous revision of the software shall be used to generate the subsequent revision (unless the project is migrated to a newer version of System Software).
- 9.2.3 A copy of the software to be tested shall be obtained from the Software Library using a Software Library Transaction Form (Attachment 1). Software not obtained in this manner shall not be considered valid.

9.3 Software Librarian Functions

- 9.3.1 Check in of Items to the Software Library:
- 9.3.1.1 The Software Librarian shall verify that all items checked in to the library are accompanied by a completed Software Library Transaction Form (Attachment 1) and software item(s) are marked with the following information as a minimum:
- System Software (e.g. TELEPERM XS)
 - Supplier Name (i.e. vendor name or UFTR if developed internally).
 - Program Name, Version, and Release Date, as applicable.
 - All applicable signatures.
- 9.3.1.2 Prior to accepting software into the library, the Software Librarian shall check the software for viruses using the latest version and revision of UF standard virus checking software in accordance with UFTR-QA1-105, "Cyber-Security," /4/. The Software Librarian will indicate on the Software Library Transaction Form that the virus scan has been conducted.
- 9.3.1.3 Prior to accepting software into the library, the Software Librarian shall check the referenced document(s) are released to ensure that the software was officially generated in accordance with UFTR SCMP, /3/.
- 9.3.1.4 Prior to accepting software into the library, the Software Librarian shall check the software content of Software against configuration documents (i.e. supplier summary of data packages, file structures detailed in applicable code configuration documents, etc).
- 9.3.1.5 If software items that have been checked out need to be returned to the Software Library (e.g. Software License Dongle), the Software

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Librarian shall verify the identity of those software items before returning them to the Software Library. Software item copies shall be destroyed by the Software Librarian. Also when the copies are returned for software items that were checked out, the Software Configuration Management Tracking Report (see section 9.4) shall be updated to indicate that the particular item is no longer checked out. The Software Librarian will indicate on the Software Library Transaction Form when the copied software item is returned and destroyed.

9.3.2 Check Out of Items from the Software Library:

9.3.2.1 The Software Librarian shall process Software Library Transaction Form (Attachment 1) requests for check out for revision from the Software Library.

9.3.2.2 Upon receipt of a software check out request, the Software Librarian shall perform the following steps to retrieve the item:

9.3.2.2.1 Review the status of the item and inform the individual requesting the item if the same item is already checked out.

- Multiple copies of a software item shall not be checked out for revision.
- All individuals using a copy of a software item shall be informed that the item is being checked out for revision.
- The individual creating a revision to a software item shall be informed that the item is being checked out for internal use.
- If applicable, the referenced document(s) shall be released to ensure that the software was officially generated in accordance with UFTR SCMP, /3/.

9.3.2.2.2 Retrieve the media from storage.

9.3.2.2.3 Copy the media containing the item requested to a CD, or as an ISO image for transfer via FTP site or other electronic tools used to store and deliver the media. The Software Librarian must contact the end user and determine which ISO file format to use when creating the image.

9.3.2.2.4 Check the copied software's content against the source.

9.3.2.2.5 The CD or electronic file will be labeled with the same name, version and release date as found on the source (or library copy) CD. The CD will be physically marked (labeled) using either permanent marker or printed CD label.

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9.3.2.2.6 Provide the copy to the person requesting the item. For copies located on an FTP site: after the file has been downloaded to a CD, the recipient will delete the file from the FTP site.

9.3.2.2.7 Return the library copy of the media to storage.

9.3.2.2.8 After the software item copy is no longer needed, it shall be returned to the Software Librarian or delegate for destruction. The Software Librarian will indicate on the transaction form that the copy was returned and destroyed.

Note: An exception to this procedure is the Software License Dongle that cannot be copied. The dongle shall be delivered to the person requesting the item and tracked through the Software Configuration Management Tracking Report. After the Software License Dongle is no longer needed, it shall be returned to the Software Librarian for return to the Software Library.

9.3.2.3 The Software Librarian shall generate a semi-annual Software Configuration Management Tracking Report on June 30th (+- a month) and December 31st (+- a month). The content of this report is described in Section 9.4. The Software Librarian shall enter the report including all Software Library Transaction Forms (Attachment 1) received during the period, with copies to the Project Coordinator, Software Development Lead, and others upon request.

9.3.2.4 To facilitate retrieval of the previous Software Configuration Management Tracking Reports, the Software Librarian shall retain the most current report. Additionally, the Software Librarian shall maintain a copy of the Software Configuration Management Tracking Reports in electronic format (for example, in PDF format) in a suitable network file storage location where they are stored in sub-directories organized by year. Each file shall have the date (in the format YYYY-MM-DD) in the name of the file.

9.4 Tracking Report and Transaction Record

9.4.1 The Software Configuration Management Tracking Report shall contain the status (i.e., Name, Version, Release Date, and an indication if software is presently checked out for revision, testing, use, or released to customer) and the safety classification for each software item.

9.4.2 Software items are added to the Software Configuration Management Tracking Report via a Software Library Transaction Form (Attachment 1). For each software item, the Name, Version, and Release Date, as applicable, shall

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be recorded in the report. These items may be added any time after the software is released (i.e., checked in to the Software Library).

9.4.3. A Transaction Record shall be maintained that keeps a year to date record of all of the transactions in and out of the Software Library (the record shall contain all information contained in the first section of the Software Library Transaction Form Attachment 1). Each transaction shall be assigned an ID number (sequential starting at one) that shall also be recorded on a Software Library Transaction Form (Attachment 1). This record shall be maintained in a suitable network file storage location.

9.4.4. Note: Software Item documentation shall be controlled and maintained in accordance with UFTR SCMP, /3/.

9.5 Software Item Check In Options

UFTR or vendor software may be checked into the library only after the requirements of UFTR-QA1-02, "Software Quality Assurance Plan (SQAP)," /2/, have been met.

9.5.1 For software items that are to be checked into the Software Library as listed in Section 9.3.1, the User shall complete a Software Library Transaction Form (Attachment 1).

9.5.2 The transaction type shall be indicated as Check In on the Software Library Transaction Form (Attachment 1).

9.5.3 The Software Library Transaction Form (Attachment 1) shall be prepared by a User, approved by the Software Development Lead and issued to the Software Librarian.

9.5.4 The notes section shall be completed by the user to provide sufficient details about the revision, including any reference document numbers.

9.5.5 The Software Configuration Management Tracking Report shall be updated to indicate which items have been checked in.

9.6 Software Item Check Out Options

9.6.1 Check out for Revision

9.6.1.1 Software items that are to be revised, shall be checked out of the Software Library as listed in Section 9.3.2, the user shall complete a Software Library Transaction Form (Attachment 1).

9.6.1.2 Only one copy of a software item shall be checked out for revision at a time.

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- 9.6.1.3 The Software Library Transaction Form shall be prepared by a User, approved by the Software Development Lead and issued to the Software Librarian.
- 9.6.1.4 The transaction type shall be indicated as Check out for Revision on the Software Library Transaction Form (Attachment 1).
- 9.6.1.5 The notes section shall be completed by the User to provide sufficient details about the revision, including reference document numbers and general purpose for the revision.
- 9.6.1.6 The Software Configuration Management Tracking Report shall be updated to indicate which items have been checked out for revision.
- 9.6.1.7 The user shall be responsible for any requested software items from the Software Library. These software items shall not be loaned to other individuals.

9.6.2 Check out for Internal Use

- 9.6.2.1 Software items that are to be used internally (i.e., by UFTR Engineering) shall be checked out of the Software Library as listed in Section 9.3.2, the User shall complete a Software Library Transaction Form (Attachment 1).
- 9.6.2.2 The Software Library Transaction Form shall be prepared by a User, approved by the Software Development Lead and issued to the Software Librarian.
- 9.6.2.3 The transaction type shall be indicated as Check out for Internal Use on the Software Library Transaction Form (Attachment 1).
- 9.6.2.4 The notes section shall be completed by the User to provide sufficient details about the revision, including any reference document numbers and nature of the intended use (i.e., testing, verification, training...).
- 9.6.2.5 The Software Configuration Management Tracking Report shall be updated to indicate which items have been utilized internally.
- 9.6.2.6 The User shall be responsible for any requested software items for the Software Library. These software items shall not be loaned to other individuals.

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9.7 Storage Methods

- 9.7.1 Software items (developed and procured) shall be stored in the Software Library. These items include, but are not limited to:
- Application Software
 - System Software
 - Software tools (e.g. libraries, compilers, etc.)
 - Software licenses (e.g. dongles)
 - Test data, scripts, etc...
- 9.7.2 All software shall be stored in the Software Library which is a locked safe. Access to this software shall be limited to the Software Librarian and his/her backup as designated by the Software Development Lead.
- 9.7.3 All software in the Software Library (with the exception of software license dongles) shall have a backup copy located at the Project Manager office and has to meet the requirements as listed in Section 9.7.2. As a minimum, the Software Librarian shall back up all software within a month after release. These items shall be clearly marked per Section 9.3.2. Each software item shall have an indication whether or not a backup has been created listed in the Software Configuration Management Tracking Report.

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Attachment 1

SOFTWARE LIBRARY TRANSACTION FORM (SLTF)

SLTF ID: _____

Software Item: _____

Version: _____ Release date: _____

Project: _____ Contract: _____

Software Transfer Type: Check In: Check Out: for Revision
 for UFTR Use

Notes:

Software Checked In / Out By: _____ Date: _____
 User

Approved By: _____ Date: _____
 Software Development Lead

Accepted / Released By: _____ Date: _____
 Software Librarian

Virus scan conducted By¹ /
 Copy received and destroyed By²: _____ Date: _____
 Software Librarian

¹Required for Check in

²Required after a copy is returned