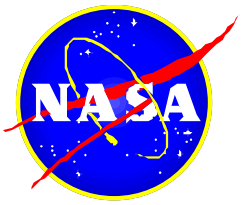

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058

January 2001

Software Configuration Management Plan and Procedure for the Human Research Facility

CCB CONTROLLED

LS-71020-1A

PROJECT DOCUMENT APPROVAL SHEET

DOCUMENT NUMBER	DATE	NO. OF PAGES
LS-71020-1A	1/11/01	33

TITLE:

Software Configuration Management Plan and Procedure for the Human Research Facility

APPROVED:	NT3/GFE Assurance Branch	Original Signature on File	12/22/00
APPROVED:	SF4/C. Haven Configuration Control Manager	Original Signature on File	1/5/01
APPROVED:	SF2/D. Grounds HRF Program Manager	Original Signature on File	1/11/01

DATE	PREPARED BY	CHANGE APPROVALS	CHANGE NUMBER
6/22/01	M. Klee	Ref. CCBD: HLP1-D020&20-1-0001	A-1

Report Number	LS-71020-1A	**Date**	12/12/00

Software Configuration Management Plan and Procedure for the Human Research Facility

Prepared by: Original Signature on File 11/22/00
Margaret Klee — Date
HRF Project Manager

Approved: Original Signature on File 12/1/00
Mark Scott — Date
HRF Software Quality Assurance

Approved: Original Signature on File 12/12/00
Gloria Salinas — Date
Technical Work Plan Manager

Prepared by:

Lockheed Martin Space Operations
Houston, Texas
For
National Aeronautics and Space Administration
Johnson Space Center

REVISION/CHANGE APPROVALS

Date	Revision Letter	Change Number	Prepared by	Approved by:		
				Unit Manager	SR&QA Manager	Projects Manager

DOCUMENT NUMBER LS-71020-1	**DOCUMENT CHANGE/ REVISION LOG**	PAGE 1 OF 1

CHANGE/ REVISION	DATE	DESCRIPTION OF CHANGE	PAGES AFFECTED
Basic	12/17/97	Baseline Issue	
1	5/29/98	Configuration Control Board Directive HJP1-D020-0013 was prepared to officially baseline this document	Cover
2	12/13/99	Updated Section 1.4 and Section 2.0. Revised Appendix A Reference CCBD: HJ00-D020-0001	Contents, 2, A-2 through A-5
A	1/11/01	Updated per CCBD: HJ00-D020-0003	All
A-1	6/28/01	Updated per CCBD: HLP1-D020 & 020-1-0001	Contents, A2-A3, and A5-A-6

Altered pages must be typed and distributed for insertion.

CONTENTS

ACRONYMS AND ABBREVIATIONS

CBT	Computer Based Training
CCB	Configuration Control Board
CFRI	Common Flight Rack Interface
CSCI	Computer Software Configuration Item
GASMAP	Gas Analyzer System for Metabolic Analysis of Physiology
HRF	Human Research Facility
HTML	Hypertext Markup Language
LMSO	Lockheed Martin Space Operation
ISS	International Space Station
OS	Operating System
PC	Portable Computer
PDF	Portable Document Format
SCM	Software Configuration Management
SCR	Software Change Request
SDR	Software Discrepancy Report
SW	Software
TBD	To Be Determined

1.0 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

The purpose of this document is to establish and maintain the integrity of the software products for the Human Research Facility (HRF). Software Configuration Management (SCM) involves:

a) Identifying and cataloging the components and configurations of the HRF software (SW)

b) Systematically controlling changes to the HRF SW configuration

c) Maintaining the integrity and traceability of the HRF SW configuration(s)

d) Auditing the HRF SW configuration

e) Documenting and periodically reviewing the HRF SCM procedures

The HRF SW placed under SCM includes all HRF SW delivered to the customer as well as applications software and related systems software, compilers, and firmware. SCM will be maintained throughout the HRF life-cycle.

1.2 RELATIONSHIP OF SOFTWARE CONFIGURATION MANAGEMENT (SCM) TO HUMAN RESEARCH FACILITY (HRF) HARDWARE AND OTHER HUMAN RESEARCH FACILITY CM ACTIVITIES

The activities for SCM are delegated under the authority of the HRF Configuration Control Board (CCB), as specified in the Configuration Management Plan for the HRF. Configuration management practices of HRF software shall comply with overall HRF configuration management policies and procedures of the above-named document.

1.3 OVERVIEW OF HUMAN RESEARCH FACILITY SOFTWARE

The HRF on the International Space Station provides a basic research capability to address fundamental science questions regarding human physiology in the space environment. As such, the HRF includes a variety of medically-related hardware elements and associated software. The HRF will be initially configured upon GFE-supplied racks in the United States module of the International Space Station. Software loaded into HRF hardware originates from a variety of sources, including custom built software, modified commercial off the shelf software, modified government furnished software, and data and configuration files. HRF software is assembled into an aggregate, termed a software build, within the HRF software development environment which consists of hardware, software compilers, SCM and documentation tools for test, integration, and verification of developed software.

Software builds will be periodically sent up to the orbiting space station and released to ground facilities.

1.4 IDENTIFICATION OF CONFIGURATION ITEMS UNDER SOFTWARE CONFIGURATION MANAGEMENT

All HRF software released for customer use is subject to configuration control. The HRF software is divided into four general categories:

a) Software loaded within the orbiting HRF, termed HRF flight software

b) Software loaded on HRF ground systems that interface to flight software, termed HRF ground support software

c) Software loaded in ground facilities used to test and/or verify HRF flight software, termed HRF Test and Simulation software

d) Computer based training (CBT) software that will be used on-orbit, termed CBT

Each item included in an HRF releasable configuration is uniquely identified as a computer software configuration item (CSCI). It should be noted that the HRF configuration-controlled CSCIs also include the following software:

a) Operating systems-compilers

b) Configuration management tools

c) Documentation tools

d) Anti-virus tools

e) Other tools

Appendix A lists the configuration-controlled HRF CSCIs. If any CSCI is modified, that modification is subject to the HRF change process.

2.0 REFERENCED AND APPLICABLE DOCUMENTS

2.1 REFERENCE DOCUMENTS

Document No.	Rev.	Document Title
LS-71005	Baseline	Configuration Management Plan for the Human Research Facility
LS-71020	B	Software Development Plan for the Human Research Facility

2.2 APPLICABLE DOCUMENTS

This section lists the documen

[redacted]

3.0 HUMAN RESEARCH FACILITY SOFTWARE CONFIGURATION MANAGEMENT

3.1 HUMAN RESEARCH FACILITY SOFTWARE CONFIGURATION MANAGEMENT ORGANIZATION

The HRF CCB is responsible for maintaining configuration control of the HRF. The HRF software configuration manager is responsible for the released HRF software configuration and is accountable to the Chair of the HRF CCB.

3.2 HUMAN RESEARCH FACILITY SOFTWARE DEVELOPMENT CONFIGURATION MANAGER

The HRF software development configuration manager (Software Development Plan, Table 3.5-1) is responsible for the integrity of released HRF software configurations. The HRF software configuration manager shall:

a) Work with the HRF CCB to establish the HRF SW baseline configurations and review and approve changes to the SW baselines

b) Affected hardware or software development managers shall appoint mandatory evaluators to review the proposed software changes

c) Maintain traceability of requirements into released HRF software configurations

d) Maintain copies and archives of released HRF software configurations and associated records

e) Arrange for and document periodic audits of released HRF software configurations and report audit findings to the HRF CCB

f) Conduct and document periodic reviews and updates of HRF configuration procedures

3.3 HUMAN RESEARCH FACILITY SOFTWARE CONFIGURATION MANAGEMENT ACTIVITIES

The tool selected to aid in the management of the software configuration is “Razor,” a UNIX-based automated release management, file version control, and problem tracking system. Subsequent discussion of configuration identification and requirements/ software traceability capitalizes on the automated capabilities afforded through the use of Razor.

Within the “Razor” system, software development files are characterized into various "states". The state designations indicate the development or operational status of the CSCI. Software development personnel are classified into types of users, called "roles". The Razor system accommodates the assignment of specific permissions to personnel with a particular type of Software Development Role (refer to the HRF

Software Development Plan, Table 3.5-1, for definition of HRF software development roles). The various types of software development personnel are assigned specific permissions to change the state status of a CSCI file. This is further detailed in Appendix B, which:

a) Lists and defines the various state statuses which can be assigned to a CSCI

b) Identifies the permissions granted to the various software development roles

Thus, the Razor system allows only pre-authorized personnel the ability to designate a CSCI as in a particular state, for example, the design state, test state, or review state. Similarly, the Razor system monitors changes in state status and reports CSCI state changes automatically to identified software development personnel.

Critical to the HRF SW Configuration baseline and subsequent changes to the baseline is identification and capture of specific versions of CSCI along with associated technical records. The Razor system captures CSCI in the "released" state as files to include in a software build. The system also captures associated system file documentation that contains traceability to HRF requirements.

The HRF Software Development Configuration Administrator maintains the HRF software configuration and associated tools, such as Razor. The administrator assigns the specific permissions to change the state status of CSCIs to the various types of HRF software development personnel. The administrator operates in the Razor role of “CFG” (see Appendix B.2). The assignment of permissions allows the designated personnel the ability to make the identified type of change only, with all other permissions being specifically denied. This feature, along with the reporting of all state status changes prevents unauthorized promotion of CSCIs during any stage of development and release.

3.3.1 Software Configuration Identification

Each CSCI is assigned a configuration number by the HRF Software Configuration Manager. Specific version identification of individual CSCIs is assigned by the Razor configuration management system. Upon development of a software build (or "thread", as termed by the Razor system), the Razor system shall track CSCI configuration numbers to specific version numbers and relate the version number to a specific approved HRF requirement.

3.3.2 Human Research Facility Software Configuration Baseline

3.3.2.1 Procedures to Establish the Initial Baseline

The initial HRF baseline configurations for the HRF flight software, the HRF ground support software, the HRF CBT software, and the HRF test and simulation software shall be reviewed and dispositioned (i.e., approved or disapproved) by the HRF CCB.

The HRF SW baselines shall be directly traceable to approved higher level HRF requirements.

3.3.2.2 Procedures to Change the SW Baseline

Proposed changes to the software baselines shall be identified to the HRF CCB for review/approval via the HRF configuration change process. Review and/or impact analysis of the proposed changes may be coordinated by the CCB.

3.3.3 Human Research Facility Software Configuration Control - Change Process

The HRF CCB is responsible for maintaining overall configuration control of released HRF software.

SW Configuration Change Request - Software change requests shall be presented to the HRF SW configuration manager for initial review and dispositioning.

SW change evaluation/impact analysis - Depending on the extent of a proposed software change, the HRF SW configuration manager may request evaluation and/or impact analysis of the proposed change by various agencies. The results of the evaluation and impact analysis shall be documented using the HRF CM process described in the Configuration Management Plan for the HRF.

SW change approval process - The change approval process for HRF software configuration control is illustrated in Figure 3.3.3-1. Refer to the Configuration Management Plan for the HRF for the HRF change flow process.

SW change status - The HRF software configuration manager shall provide a current status of proposed HRF software changes. The software change status shall be periodically reviewed to ensure the proper integration of all proposed software changes within an HRF build.

SW configuration management of Nonconforming Items - In the event a software build is released which contains a subsequently identified CSCI software deficiency (i.e., "nonconforming item"), the impact of the deficiency shall be determined by the software development organization.

Deficiencies which bear operational impact on functionality or operability shall be remediated through the release of emergency instructions to field users by the HRF software configuration manager. Emergency instructions shall be designed to segregate the affected CSCI from the rest of the HRF software build and provide a back-up capability to the user until a recovery build is released.

Deficiencies which bear no operational impact shall be scheduled for remediation in subsequent system releases. No field notification is required.

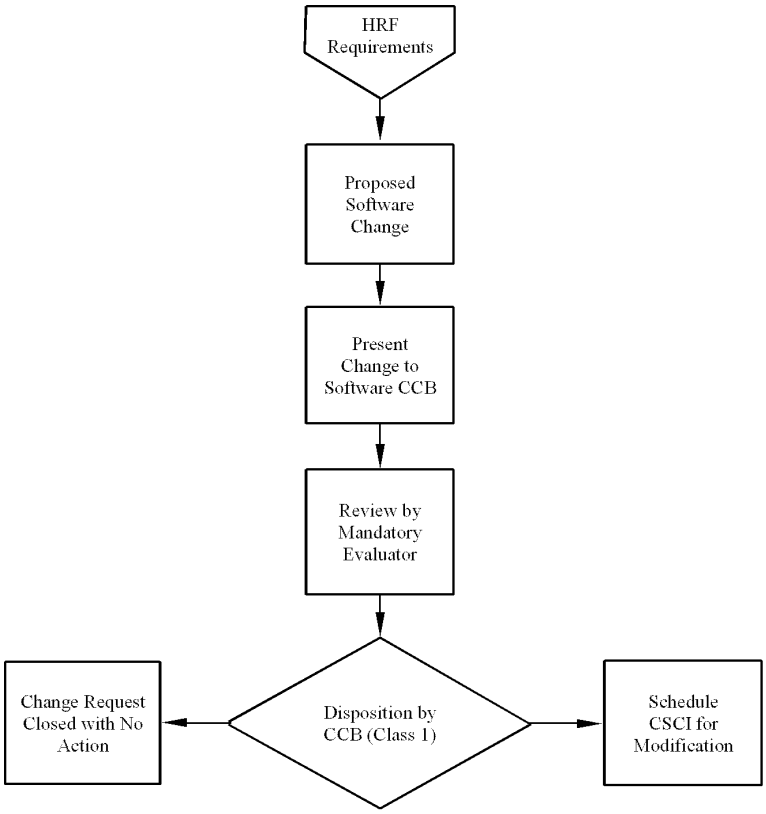

Figure 3.3.3-1. HRF Software Change Approval Process

Once the impact of the deficiency has been determined, the affected item shall be checked out of the HRF configuration management system and a note describing the version, deficiency and corrective action to date shall be added to the Description Field on the check-out menu. This Description Field stays with the CSCI. A CSCI shall not be used in a new "Release" software build if a deficiency has been noted, but a corrected version has not been released.

3.3.4 Build, Release, Packaging, Handling, Storage and Archival Procedures

HRF software builds and releases may be of four separate types:

a) HRF flight software

b) HRF ground support software

c) HRF test and simulation software

d) HRF CBT software

After a proposed software change has been approved, the software development to implement the change proceeds. Upon completion of the software changes, the

modified software is "marked" (using the features in the Razor system) by the SW developing agency as ready for inclusion into the HRF software baseline.

Specifications for the build, release, handling, storage and archival of HRF software are listed in the HRF Software Development Plan.

The HRF SW Configuration Manager shall:

a) Maintain a library of released software builds for the period of time as specified by the customer. Deletion of previous software builds requires HRF CCB action.

b) Include in the released baselined version documentation the source code and the executable code.

c) Maintain this code as separate from the software development and test environment.

d) Control access to create and access baselined versions.

e) Preserve HRF released software such that field versions may be readily duplicated in the development environment.

Released versions shall be duplicated and stored in dual access controlled locations to prevent loss in the event of catastrophic events. For Flight and CBT software, one of the two locations shall be bonded storage.

3.3.5 Software Item/Configuration Traceability

Software configurations shall be tracked using version numbers associated with the individual CSCIs. Baseline configurations and changes to the baselines shall be traceable to approved HRF requirements.

3.3.6 Audit Procedures

The HRF Software Configuration Manager shall arrange for formal audits on a periodic basis of the HRF SW configurations as compared to approved software baselines and approved changes. The auditing agency shall be named by the HRF CCB chair. Findings of the configuration audit shall be reported to the HRF Software Configuration Manager and the HRF CCB.

4.0 HUMAN RESEARCH FACILITY SOFTWARE CONFIGURATION MANAGEMENT SCHEDULES

Per the HRF Software Development Plan, HRF SCM build and release schedules are directly related to the hardware capability development schedules. The software schedules are reflected in the HRF Level 3 schedules, if Level 3 schedules are required.

Schedules for initial baselines (i.e., threads) for the four types of HRF software and changes to those baselines may be detailed in HRF Level 4 schedules.

5.0 HUMAN RESEARCH FACILITY SOFTWARE CONFIGURATION MANAGEMENT RESOURCES

The HRF SCM function requires the HRF software development configuration manager to be designated and have access to the Razor system available on HRF software developers' workstations.

The HRF software development configuration manager shall provide training to HRF software developers on the use of the Razor tool.

6.0 HUMAN RESEARCH FACILITY SOFTWARE CONFIGURATION MANAGEMENT PLAN/PROCEDURES MAINTENANCE

The HRF SW Configuration Manager is responsible for regular review and update of this document. Changes to this document shall be submitted for approval to the HRF CCB as configuration changes. Approved changes shall be published and listed as change notices on JSC Form 604 in the revised document.

APPENDICES

APPENDIX

CONTENTS

APPENDIX A

A. HRF COMPUTER SOFTWARE CONFIGURATION ITEMS

A.1. COMPUTER SOFTWARE CONFIGURATION ITEM (CSCI) IDENTIFICATION

The following guidelines shall be used by the Human Research Facility (HRF) Configuration Manager when generating a CSCI identification number:

HRF-xxxxxxyyz

Where:

HRF The identifier for the Human Research Facility
xxxxxxxx The identifier for primary requirements source. See Table A.1-1.
yy A sequence count of CSCIs associated with x above
z The major software category -
U for HRF unique software
or
N for Non-developmental software

A.1-1 REQUIREMENTS SOURCE IDENTIFIER

CSCI Requirements Sources	Identifier
Hardware Requirements Document (HRD)for the Activity Monitor	ACTMON
HRD for the Ambulatory Data Acquisition System (ADAS)	ADAS
HRD for the Space Linear Acceleration Mass Measurement Device (SLAMMD)	SLAMMD
HRD for the Refrigerated Centrifuge	CENTRF
HRD for the Continuous Blood Pressure Device	CBPD
HRF for the Foot Ground Interface	FGI
HRD for the GASMAP	GASMAP
HRD for the Hand Grip Dynamometer	HGDYN
HRD for the HRF Computer Workstation	WKSTA
HRD for the HRF Portable Computer	HPCS
HRD for the Holter Monitor	HOLMON
HRD for the Lower Body Negative Pressure Device	LBNP
HRD for the Physiological Signal Conditioner	PSCOND
HRD for the Pinch Force Dynamometer	PFDYN
HRD for the HRF Pulse Oximeter	PULSOX
HRD for the Range of Motion System (Goniometer)	ROMS
HRD for the Strength Measurement Device	MARES
HRD for the Ultrasound System	ULTRSD
HRD for the Sample Collection Kits	SCKITS
Software Requirements Specification for the HRF Common Software	COMSW
HRD for the Ground Development Facility	GDF
HRD for the High Fidelity Mockup	HFM
HRD for the Launch Package Integration Facility	LIF
HRF Requirements for the Johnson Space Center (JSC) Telescience Support Center (TSC)	TSC

A.2 FLIGHT HARDWARE CSCIs

Flight Hardware Component	CSCI Identification
Activity Monitor	TBD
Ambulatory Data Acquisition System	N/A
Instrument Configuration and Control CSCI (Columbus)	HRF-ADAS01N
Recorder Firmware CSCI	HRF-ADAS02N
Checkout Utility CSCI	HRF-ADAS03U
EDF File Viewer CSCI	HRF-ADAS04N
Collection Kits	N/A
Space Acceleration Mass Measurement Device	N/A
Display CSCI	HRF-SLAMMD01U
Data Collection CSCI	HRF-SLAMMD02U
Centrifuge	HRF-CENTRF01U
Continuous Blood Pressure Device	TBD
Foot-Ground Interface	TBD
GASMAP	N/A
Flight Software	HRF-GASMAP01N
Test Software	HRF-GASMAP02N
Download Software	HRF-GASMAP03N
Hand Grip Dynamometer	TBD
Holter Monitor	TBD
HRF Computer Workstation	N/A
Flight Operating System	HRF-WKSTA01N
Workstation Test Software	HRF-WKSTA02U
Workstation Ethernet Test Software	HRF-WKSTA03U
Workstation Time Utility	HRF-WKSTA04U
HRF Portable Computer	N/A
PC Flight Operating System	HRF-HPCS01N
EXPRESS Application	HRF-HPCS02N
Lower Body Negative Pressure Device	TBD
Physiological Signal Conditioner	TBD
Pinch Force Dynamometer	TBD
Pulse Oximeter	HRF-PULSOX01U
Strength Mass Measurement Device	TBD
Ultrasound System	N/A
Ultrasound Graphical User Interface	HRF-ULTRSD01U
Ultrasound Image Collector	HRF-ULTRSD02N
Ultrasound Diagnostic	HRF-ULTRSD03N
HRF Common Software	N/A
Common Flight Rack Interface CSCI	HRF-COMSW01U
Common Flight User Interface CSCI	HRF-COMSW02U
Common Flight Office Software CSCI	HRF-COMSW03N
Common Flight Lab Software CSCI	HRF-COMSW04N
Common Flight Anti-Virus CSCI	HRF-COMSW05N
Common Flight File Manager CSCI	HRF-COMSW06U

A.2 FLIGHT HARDWARE CSCIs (Cont'd)

Flight Hardware Component	CSCI Identification
Common Flight File Transfer CSCI	HRF-COMSW07N
Common Flight Browser Software CSCI	HRF-COMSW08N HRF-COMSW09N
Common Flight Keyboard Mapper CSCI	HRF-COMSW10N
Common Flight Portable Document Format (PDF) Viewer	HRF-COMSW11N
Common Flight Video Viewer CSCI	HRF-COMSW12N
Common Flight Portable Document Format (PDF) Viewer	HRF-COMSW11N
Common Flight Video Viewer CSCI	HRF-COMSW12N
Common Software Dynamic Linked Library (DLL)	HRF-COMSW13U
Common Software Test Client	HRF-COMSW14U
Common Software User Interface Test Software	HRF-COMSW15U
Common Software File Manager Test Software	HRF-COMSW16U
Common Software User Interface Simulator for Rack Interface	HRF-COMSW17U
Common Software File Manager Simulator for Rack Interface	HRF-COMSW18U
Common Software Test RIC	HRF-COMSW19U

A.3 GROUND FACILITY CSCIs

Ground Facility	CSCI Identification
Ground Development Facility	N/A
Simulated Rack Interface Controller (SRIC) Executive CSCI	HRF-GDF01U
SRIC Operating System CSCI	HRF-GDF02N
Operator Control Station (OCS) Executive CSCI	HRF-GDF03U
OCS Operating System CSCI	HRF-GDF04N
Test Support System Laptop Executive (TSSLE) CSCI	HRF-GDF05U
TSSLE Operating System CSCI	HRF-GDF06N
High Fidelity Mock-Up	
Simulated Power Control Module (SPCM) CSCI	HRF-HFM01U
SPCM Operating System CSCI	HRF-HFM02N
Rack Monitor Station (RMS) CSCI	HRF-HFM03N
RMS Operating System CSCI	HRF-HFM04N
Launch Package Integration Facility	
HRF Components of the JSC Telescience Support Center (TSC)	
Training Software	

A.4 SOFTWARE TOOLS

Software Type or Tool Name	Version
Operating Systems	----------
Mac OS	Version Controlled by Computer Support Personnel
MS-DOS	6.22
Solaris	2.5.1 2.6
Solaris X86	2.5
Tornado	1.0
VxWorks	3.5
Windows	Windows 95, Windows 98, Windows 2000 Version Controlled by Computer Support Personnel on Some Systems
Windows NT	4.0
Compilers	----------
GNU C/C++	TBD
InstallShield	5.5
Microsoft Visual Basic	5.0 6.0
Microsoft Visual C/C++	6.0
Microsoft J++	From Microsoft Visual 6.0
VxWorks Cross Compiler	Version is the same as the Operating System
Zeus for Windows 95, NT	2.70
VxWorks/Tornado Board Support Package	----------
Heuikon Nitro/60	1.1/0
Heuikon Baja 60	1.1/0
Synergy SV462	1.0/5
Aitech C-407	1.0/02d
Configuration Management Tools	----------
Tower Concepts Razor	4.1, 4.2
Documentation Tools	----------
Access	7.0 Version Controlled by Computer Support Personnel on Some Systems
Canvas	Version Controlled by Computer Support Personnel on Some Systems
Interleaf	Version Controlled by ISS Computer Support Personnel
TopDown Flowcharter	5.0, Not in use

A.4 SOFTWARE TOOLS (Cont'd)

Software Type or Tool Name	Version
Microsoft Excel	7.0 2000 Version Controlled by Computer Support Personnel on Some Systems
Microsoft PowerPoint	7.0 2000 Version Controlled by Computer Support Personnel on Some Systems
Microsoft Project	4.0 98 Version Controlled by Computer Support Personnel
Microsoft Word	7.0 2000 Version Controlled by Computer Support Personnel on Some Systems
Anti-Virus	----------
McAfee Anti-Virus	Used off-site, Version Controlled by Computer Support Personnel on Some Systems
Norton Anti-Virus	5.0
Other Tools	----------
National Instruments LabVIEW	5.0 5.1
Norton NT Tools	TBD
Sammi	4.1, Purchased, but not in use
Ghost	5.1c
Partition Magic	4.0, Not in use

APPENDIX B

B. RAZOR DEFINITION

The Razor configuration management tool is highly configurable. It consists of three integrated tools:

- Issues – Change and discrepancy tracking
- Versions – Version control
- Threads – CSCI configuration and release management

The customizations for Razor for the Human Research Facility (HRF) are in the form of Issue types, states, roles and assignment of role permissions to state transitions. These customizations are detailed in tabular form in this appendix. Additionally, development database areas have been established to test changes to the Razor configuration and new uses for the tool. These development databases are for test use only and are not defined in this document.

B.1 LIST AND DEFINITION OF RAZOR STATES

B.1.1. Razor Issues State Definitions

Two types of Issues have been defined for HRF:

- Change Request Issue (CRI)(default)
- Discrepancy Report Issue (DRI)

State (Status)	Issue Type	Definition
Submitted	All	An issue has been created and introduced into the HRF CM system (Razor). A CRI stays in this state until CCB approval, a move to the Hold State, or closure
Hold	All	The issue has been placed in an inactive state due to technical, scheduling, budget, or other problems
Active	All	The issue is being actively worked, but has not reached the first issue milestone. For CRIs, this state signifies CCB approval of the change request
Req_Complete	Default (CRI)	The requirements activity for the software associated with the CRI have been completed.
Prelim_Des_Complete	CRI	The preliminary design activities for the software associated with the CRI have been completed
Detail_Des_Complete	CRI	All design activities for the software associated with the CRI have been completed

B.1.1. Razor Issues State Definitions (Cont'd)

State (Status)	Issue Type	Definition
Impl_Unit_Test_Complete	CRI, DRI	All activities associated with implementation and unit test of the software associated with the issue have been completed.
Integ_Test_Complete	CRI, DRI	All activities associated with integration testing of the software associated with the issue have been completed.
Sys_Integ_Complete	CRI, DRI	All activities associated with system integration testing of the software associated with the issue have been completed.
Qual_Test_Complete	CRI, DRI	All activities associated with qualification testing of the software associated with the issue have been completed.
Released	CRI, DRI	Software is in Bond (Flight and CBT software only) and is ready for installation and/or use.
Closed	CRI, DRI	All activities associated with the issue have been completed.

B.1.2 Razor Versions State Definitions

State (Status)	Definition
Active	The software item is being actively worked, but has not reached the first milestone.
Impl_Unit_Test_Complete	All activities associated with implementation and unit test of the software have been completed.

B.1.3 Razor Threads State Definitions

State (Status)	Definition
Prototype	The software associated with the thread is in work but has not been formally tested.
Integ_Test_Complete	All activities associated with integration testing of the software associated with the thread have been completed.
Sys_Integ_Complete	All activities associated with system integration testing of the software associated with the thread have been completed.
Qual_Test_Complete	All activities associated with qualification testing of the software associated with the thread have been completed. This step applies only to flight and CBT software.
Released	Software is ready for use.

B.2 RAZOR ROLE DEFINITIONS

Software Development Role	**Razor Role**
Technical Work Package Manager	TOM
Project Manager	STOM
Responsible Engineer	RE
Software Developer	SD
Software Tester	SD
Usability Tester	SD
SW Configuration Manager	CFG
Software Quality Assurance	QA
All users	*

B.3 IDENTIFICATION OF THE PERMISSIONS GRANTED TO THE HRF SOFTWARE DEVELOPMENT ROLES BY SOFTWARE TYPE

The state transitions identified in the following sections represent the nominal state transitions associated with Issues, Version and Threads. The roles identified are the "preferred" role associated with a state transition. In Section B.4, the full set of role authorizations are identified. Should it be necessary for a state transition to be performed by a "different" role a note explaining why the "preferred" role did not perform the promotion shall be put in the action text or in the Software Development File.

B.3.1 Razor Issue Nominal State Transitions – Software Change Requests

From	**To**	**Role**	
		Flight and Ground	**Test, Sim and Training**
Submitted	Submitted	*	*
Submitted	Hold	%STOM	%STOM
Submitted	Active	%STOM	%STOM
Submitted	Closed	%STOM	%STOM
Hold	Any State	%CFG	%CFG
Active	Hold	%STOM	%STOM
Active	Req_Complete	%RE	%RE
Active	Closed	%CFG	%CFG
Req_Complete	Hold	%STOM	%STOM
Req_Complete	Prelim_Des_Complete	%RE	N/A
Req_Complete	Detail_Des_Complete	N/A	%RE
Req_Complete	Closed	%CFG	%CFG
Prelim_Des_Complete	Hold	%STOM	%STOM
Prelim_Des_Complete	Detail_Des_Complete	%RE	N/A
Prelim_Des_Complete	Closed	%CFG	%CFG
Detail_Des_Complete	Hold	%STOM	%STOM
Detail_Des_Complete	Impl_Unit_Test_Complete	%SD	%SD
Detail_Des_Complete	Closed	%CFG	%CFG
Impl_Unit_Test_Complete	Hold	%STOM	%STOM
Impl_Unit_Test_Complete	Integ_Test_Complete	%SD	%SD
Impl_Unit_Test_Complete	Closed	%CFG	%CFG

B.3.1 Razor Issue Nominal State Transitions – Software Change Requests (Cont'd)

From	To	Role	
		Flight and Ground	Test, Sim and Training
Integ_Test_Complete	Hold	%TOM	%STOM
Integ_Test_Complete	Sys_Integ_Complete	N/A	%RE
Integ_Test_Complete	Closed	%CFG	%CFG
Sys_Integ_Complete	Hold	%STOM	%STOM
Sys_Integ_Complete	Qual Test_Complete	%QA	N/A
Sys_Integ_Complete	Released	N/A	%RE
Sys_Integ_Complete	Closed	%CFG	%CFG
Qual_Test_Complete	Hold	%TOM	N/A
Qual_Test_Complete	Released	%RE	N/A
Qual_Test_Complete	Closed	%CFG	N/A
Released	Hold	%CFG	%CFG
Released	Closed	%STOM	%STOM

B.3.2. Razor Issue Nominal State Transitions - Software Discrepancy Reports

From	To	Role	
		Flight and Ground	Test, Sim and Training
Submitted	Submitted	*	*
Submitted	Hold	%STOM	%STOM
Submitted	Active	%STOM	%STOM
Submitted	Closed	%STOM	%STOM
Hold	Any State	%CFG	%CFG
Active	Hold	%STOM	%STOM
Active	Imp_Unit_Test_Complete	%SD	%SD
Active	Closed	%CFG	%CFG
Impl_Unit_Test_Complete	Hold	%STOM	%STOM
Impl_Unit_Test_Complete	Integ_Test_Complete	%SD	%SD
Impl_Unit_Test_Complete	Closed	%CFG	%CFG
Integ_Test_Complete	Hold	%TOM	%STOM
Integ_Test_Complete	Sys_Integ_Complete	%RE	%RE
Integ_Test_Complete	Closed	%CFG	%CFG
Sys_Integ_Complete	Hold	%STOM	%STOM
Sys_Integ_Complete	Qual Test_Complete	%QA	N/A
Sys_Integ_Complete	Released	N/A	%RE
Sys_Integ_Complete	Closed	%CFG	%CFG
Qual_Test_Complete	Hold	%STOM	N/A
Qual_Test_Complete	Released	%RE	N/A
Qual_Test_Complete	Closed	%CFG	N/A
Released	Hold	%CFG	%CFG
Released	Closed	%STOM	%STOM

B.3.3 Razor Versions Nominal State Transitions

From	To	Role (All)
Active	Active	*
Active	Impl_Unit_Test_Complete	%SD

B.3.4 Razor Threads Nominal State Transitions

From	To	Role	
		Flight and Ground	Test, Sim and Training
Prototype	Prototype	*	*
Prototype	Integ_Test_Complete	%SD	%SD
Integ_Test_Complete	Sys_Integ_Complete	%RE	N/A
Sys_Integ_Complete	Qual_Test_Complete	%QA	N/A
Sys_Integ_Complete	Released	N/A	%STOM
Qual_Test_Complete	Released	%STOM	N/A

B.4 IDENTIFICATION OF ALL PERMISSIONS GRANTED TO THE HRF SOFTWARE DEVLEOPMENT ROLES

The following sections contain the full state transitions implemented in Razor for all issue, version and thread types.

B.4.1 Razor Issue State Transitions - Software Change Requests

From	To	Role
Submitted	Submitted	*
Submitted	Hold	%TOM, %STOM, %RE, %CFG
Submitted	Active	%TOM, %STOM, %CFG
Submitted	Req_Complete	%CFG
Submitted	Prelim_Des_Complete	%CFG
Submitted	Detail_Des_Complete	%CFG
Submitted	Impl_Unit_Test_Complete	%CFG
Submitted	Integ_Test_Complete	%CFG
Submitted	Sys_Integ_Complete	%CFG
Submitted	Qual_Test_Complete	%CFG
Submitted	Released	%CFG
Submitted	Closed	%TOM, %STOM, %RE, %CFG
Hold	Submitted	%TOM, %STOM, %CFG
Hold	Hold	%TOM, %STOM, %CFG
Hold	Active	%TOM, %STOM, %CFG
Hold	Req_Complete	%TOM, %STOM, %CFG
Hold	Prelim_Des_Complete	%TOM, %STOM, %CFG
Hold	Detail_Des_Complete	%TOM, %STOM, %CFG
Hold	Impl_Unit_Test_Complete	%TOM, %STOM, %CFG
Hold	Integ_Test_Complete	%TOM, %STOM, %CFG
Hold	Sys_Integ_Complete	%TOM, %STOM, %CFG
Hold	Qual_Test_Complete	%TOM, %CFG
Hold	Released	%TOM, %STOM, %CFG
Hold	Closed	%TOM, %STOM, %CFG
Active	Submitted	%CFG
Active	Hold	%TOM, %STOM, %RE, %CFG
Active	Active	*
Active	Req_Complete	%STOM, %RE, %CFG
Active	Prelim_Des_Complete	%STOM, %RE, %CFG
Active	Detail_Des_Complete	%STOM, %RE, %CFG
Active	Impl_Unit_Test_Complete	%STOM, %CFG

B.4.1 Razor Issue State Transitions - Software Change Requests (Cont'd)

From	To	Role
Active	Integ_Test_Complete	%CFG
Active	Sys_Integ_Complete	%CFG
Active	Qual_Test_Complete	%CFG
Active	Released	%CFG
Active	Closed	%CFG
Req_Complete	Submitted	%CFG
Req_Complete	Hold	%TOM, %STOM, %RE, %CFG
Req_Complete	Active	%TOM, %STOM, %RE, %CFG
Req_Complete	Req_Complete	%CFG
Req_Complete	Prelim_Des_Complete	%STOM, %RE, %CFG
Req_Complete	Detail_Des_Complete	%STOM, %RE, %CFG
Req_Complete	Impl_Unit_Test_Complete	%CFG
Req_Complete	Integ_Test_Complete	%CFG
Req_Complete	Sys_Integ_Complete	%CFG
Req_Complete	Qual_Test_Complete	%CFG
Req_Complete	Released	%CFG
Req_Complete	Closed	%CFG
Prelim_Des_Complete	Submitted	%CFG
Prelim_Des_Complete	Hold	%TOM, %STOM, %RE, %CFG
Prelim_Des_Complete	Active	%TOM, %STOM, %RE, %CFG
Prelim_Des_Complete	Req_Complete	%TOM, %STOM, %RE, %CFG
Prelim_Des_Complete	Prelim_Des_Complete	%CFG
Prelim_Des_Complete	Detail_Des_Complete	%STOM, %RE, %CFG
Prelim_Des_Complete	Impl_Unit_Test_Complete	%CFG
Prelim_Des_Complete	Integ_Test_Complete	%CFG
Prelim_Des_Complete	Sys_Integ_Complete	%CFG
Prelim_Des_Complete	Qual_Test_Complete	%CFG
Prelim_Des_Complete	Released	%CFG
Prelim_Des_Complete	Closed	%CFG
Detail_Des_Complete	Submitted	%CFG
Detail_Des_Complete	Hold	%TOM, %STOM, %RE, %CFG
Detail_Des_Complete	Active	%TOM, %STOM, %RE, %CFG
Detail_Des_Complete	Req_Complete	%TOM, %STOM, %RE, %CFG
Detail_Des_Complete	Prelim_Des_Complete	%TOM, %STOM, %CFG
Detail_Des_Complete	Detail_Des_Complete	%STOM, %RE, %SD, %CFG
Detail_Des_Complete	Impl_Unit_Test_Complete	%CFG
Detail_Des_Complete	Integ_Test_Complete	%CFG
Detail_Des_Complete	Sys_Integ_Complete	%CFG

B.4.1 Razor Issue State Transitions - Software Change Requests (Cont'd)

From	To	Role
Detail_Des_Complete	Qual_Test_Complete	%CFG
Detail_Des_Complete	Released	%CFG
Detail_Des_Complete	Closed	%CFG
Impl_Unit_Test_Complete	Submitted	%CFG
Impl_Unit_Test_Complete	Hold	%TOM, %STOM, %RE, %CFG
Impl_Unit_Test_Complete	Active	%TOM, %STOM, %RE, %CFG
Impl_Unit_Test_Complete	Req_Complete	%TOM, %STOM, %RE, %CFG
Impl_Unit_Test_Complete	Prelim_Des_Complete	%TOM, %STOM, %RE, %CFG
Impl_Unit_Test_Complete	Detail_Des_Complete	%TOM, %STOM, %RE, %CFG
Impl_Unit_Test_Complete	Impl_Unit_Test_Complete	%CFG
Impl_Unit_Test_Complete	Integ_Test_Complete	%TOM, %STOM, %RE, %SD, %CFG
Impl_Unit_Test_Complete	Sys_Integ_Complete	%CFG
Impl_Unit_Test_Complete	Qual_Test_Complete	%CFG
Impl_Unit_Test_Complete	Released	%CFG
Impl_Unit_Test_Complete	Closed	%CFG
Integ_Test_Complete	Submitted	%CFG
Integ_Test_Complete	Hold	%TOM, %STOM, %RE, %CFG
Integ_Test_Complete	Active	%TOM, %STOM, %RE, %CFG
Integ_Test_Complete	Req_Complete	%TOM, %STOM, %RE, %CFG
Integ_Test_Complete	Prelim_Des_Complete	%TOM, %STOM, %RE, %CFG
Integ_Test_Complete	Detail_Des_Complete	%TOM, %STOM, %RE, %CFG
Integ_Test_Complete	Impl_Unit_Test_Complete	%TOM, %STOM, %RE, %CFG
Integ_Test_Complete	Integ_Test_Complete	%CFG
Integ_Test_Complete	Sys_Integ_Complete	%STOM, %RE, %CFG
Integ_Test_Complete	Qual_Test_Complete	%CFG
Integ_Test_Complete	Released	%CFG
Integ_Test_Complete	Closed	%CFG
Sys_Integ_Complete	Submitted	%CFG
Sys_Integ_Complete	Hold	%TOM, %STOM, %RE, %CFG
Sys_Integ_Complete	Active	%TOM, %STOM, %RE, %CFG
Sys_Integ_Complete	Req_Complete	%TOM, %STOM, %RE, %CFG
Sys_Integ_Complete	Prelim_Des_Complete	%TOM, %STOM, %RE, %CFG
Sys_Integ_Complete	Detail_Des_Complete	%TOM, %STOM, %RE, %CFG
Sys_Integ_Complete	Impl_Unit_Test_Complete	%TOM, %STOM, %RE, %CFG
Sys_Integ_Complete	Integ_Test_Complete	%TOM, %STOM, %RE, %CFG
Sys_Integ_Complete	Sys_Integ_Complete	%CFG
Sys_Integ_Complete	Qual_Test_Complete	%TOM, %QA, %CFG

B.4.1 Razor Issue State Transitions - Software Change Requests (Cont'd)

From	To	Role
Sys_Integ_Complete	Released	%TOM, %STOM, %CFG
Sys_Integ_Complete	Closed	%CFG
Qual_Test_Complete	Submitted	%CFG
Qual_Test_Complete	Hold	%CFG
Qual_Test_Complete	Active	%CFG
Qual_Test_Complete	Req_Complete	%CFG
Qual_Test_Complete	Prelim_Des_Complete	%CFG
Qual_Test_Complete	Detail_Des_Complete	%CFG
Qual_Test_Complete	Impl_Unit_Test_Complete	%CFG
Qual_Test_Complete	Integ_Test_Complete	%CFG
Qual_Test_Complete	Sys_Integ_Complete	%CFG
Qual_Test_Complete	Qual_Test_Complete	%CFG
Qual_Test_Complete	Released	%TOM, %STOM, %CFG
Qual_Test_Complete	Closed	%CFG
Released	Submitted	%CFG
Released	Hold	%CFG
Released	Active	%CFG
Released	Req_Complete	%CFG
Released	Prelim_Des_Complete	%CFG
Released	Detail_Des_Complete	%CFG
Released	Impl_Unit_Test_Complete	%CFG
Released	Integ_Test_Complete	%CFG
Released	Sys_Integ_Complete	%CFG
Released	Qual_Test_Complete	%CFG
Released	Released	%CFG
Released	Closed	%TOM, %STOM, %CFG
Sys_Integ_Complete	Submitted	%CFG
Sys_Integ_Complete	Hold	%TOM, %STOM, %RE, %CFG
Sys_Integ_Complete	Active	%TOM, %STOM, %RE, %CFG
Sys_Integ_Complete	Req_Complete	%TOM, %STOM, %RE, %CFG
Sys_Integ_Complete	Prelim_Des_Complete	%TOM, %STOM, %RE, %CFG
Sys_Integ_Complete	Detail_Des_Complete	%TOM, %STOM, %RE, %CFG
Sys_Integ_Complete	Impl_Unit_Test_Complete	%TOM, %STOM, %RE, %CFG
Sys_Integ_Complete	Integ_Test_Complete	%TOM, %STOM, %RE, %CFG
Sys_Integ_Complete	Sys_Integ_Complete	%CFG
Sys_Integ_Complete	Qual_Test_Complete	%TOM, %QA, %CFG
Sys_Integ_Complete	Released	%TOM, %STOM, %CFG
Sys_Integ_Complete	Closed	%CFG

B.4.1 Razor Issue State Transitions - Software Change Requests (Cont'd)

Qual_Test_Complete	Submitted	%CFG
Qual_Test_Complete	Hold	%CFG
Qual_Test_Complete	Active	%CFG
Qual_Test_Complete	Req_Complete	%CFG
Qual_Test_Complete	Prelim_Des_Complete	%CFG
Qual_Test_Complete	Detail_Des_Complete	%CFG
Qual_Test_Complete	Impl_Unit_Test_Complete	%CFG
Qual_Test_Complete	Integ_Test_Complete	%CFG
Qual_Test_Complete	Sys_Integ_Complete	%CFG
Qual_Test_Complete	Qual_Test_Complete	%CFG
Qual_Test_Complete	Released	%TOM, %STOM, %CFG
Qual_Test_Complete	Closed	%CFG
Released	Submitted	%CFG
Released	Hold	%CFG
Released	Active	%CFG
Released	Req_Complete	%CFG
Released	Prelim_Des_Complete	%CFG
Released	Detail_Des_Complete	%CFG
Released	Impl_Unit_Test_Complete	%CFG
Released	Integ_Test_Complete	%CFG
Released	Sys_Integ_Complete	%CFG
Released	Qual_Test_Complete	%CFG
Released	Released	%CFG
Released	Closed	%TOM, %STOM, %CFG
Closed	Submitted	%CFG
Closed	Hold	%CFG
Closed	Active	%CFG
Closed	Req_Complete	%CFG
Closed	Prelim_Des_Complete	%CFG
Closed	Detail_Des_Complete	%CFG
Closed	Impl_Unit_Test_Complete	%CFG
Closed	Integ_Test_Complete	%CFG
Closed	Sys_Integ_Complete	%CFG
Closed	Qual_Test_Complete	%CFG
Closed	Released	%CFG
Closed	Closed	%CFG

B.4.2 Razor Issue State Transitions - Software Discrepancy Reports

From	To	Role
Submitted	Submitted	*
Submitted	Hold	%TOM, %STOM, %RE, %CFG
Submitted	Active	%TOM, %STOM, %CFG
Submitted	Impl_Unit_Test_Complete	%CFG
Submitted	Integ_Test_Complete	%CFG
Submitted	Sys_Integ_Complete	%CFG
Submitted	Qual_Test_Complete	%CFG
Submitted	Released	%CFG
Submitted	Closed	%TOM, %STOM, %RE, %CFG
Hold	Submitted	%TOM, %STOM, %CFG
Hold	Hold	%TOM, %STOM, %CFG
Hold	Active	%TOM, %STOM, %CFG
Hold	Impl_Unit_Test_Complete	%TOM, %STOM, %CFG
Hold	Integ_Test_Complete	%TOM, %STOM, %CFG
Hold	Sys_Integ_Complete	%TOM, %STOM, %CFG
Hold	Qual_Test_Complete	%TOM, %STOM, %CFG
Hold	Released	%TOM, %STOM, %CFG
Hold	Closed	%TOM, %STOM, %CFG
Active	Submitted	%CFG
Active	Hold	%TOM, %STOM, %RE, %CFG
Active	Active	*
Active	Impl_Unit_Test_Complete	%TOM, %STOM, %RE, %SD, %CFG
Active	Integ_Test_Complete	%CFG
Active	Sys_Integ_Complete	%CFG
Active	Qual_Test_Complete	%CFG
Active	Released	%CFG
Active	Closed	%CFG
Impl_Unit_Test_Complete	Submitted	%CFG
Impl_Unit_Test_Complete	Hold	%TOM, %STOM, %RE, %CFG
Impl_Unit_Test_Complete	Active	%TOM, %STOM, %RE, %CFG
Impl_Unit_Test_Complete	Impl_Unit_Test_Complete	%CFG
Impl_Unit_Test_Complete	Integ_Test_Complete	%STOM, %RE, %SD, %CFG
Impl_Unit_Test_Complete	Sys_Integ_Complete	%CFG
Impl_Unit_Test_Complete	Qual_Test_Complete	%CFG
Impl_Unit_Test_Complete	Released	%CFG
Impl_Unit_Test_Complete	Closed	%CFG

B.4.2 Razor Issue State Transitions - Software Discrepancy Reports (Cont'd)

From	To	Role
Integ_Test_Complete	Submitted	%CFG
Integ_Test_Complete	Hold	%TOM, %STOM, %RE, %CFG
Integ_Test_Complete	Active	%TOM, %STOM, %RE, %CFG
Integ_Test_Complete	Impl_Unit_Test_Complete	%TOM, %STOM, %RE, %CFG
Integ_Test_Complete	Integ_Test_Complete	%CFG
Integ_Test_Complete	Sys_Integ_Complete	%STOM, %RE, %CFG
Integ_Test_Complete	Qual_Test_Complete	%CFG
Integ_Test_Complete	Released	%CFG
Integ_Test_Complete	Closed	%CFG
Sys_Integ_Complete	Submitted	%CFG
Sys_Integ_Complete	Hold	%TOM, %STOM, %CFG
Sys_Integ_Complete	Active	%TOM, %STOM, %CFG
Sys_Integ_Complete	Impl_Unit_Test_Complete	%TOM, %STOM, %CFG
Sys_Integ_Complete	Integ_Test_Complete	%TOM, %STOM, %CFG
Sys_Integ_Complete	Sys_Integ_Complete	%CFG
Sys_Integ_Complete	Qual_Test_Complete	%TOM, %QA, %CFG
Sys_Integ_Complete	Released	%TOM, %STOM, %CFG
Sys_Integ_Complete	Closed	%CFG
Qual_Test_Complete	Submitted	%CFG
Qual_Test_Complete	Hold	%CFG
Qual_Test_Complete	Active	%CFG
Qual_Test_Complete	Impl_Unit_Test_Complete	%CFG
Qual_Test_Complete	Integ_Test_Complete	%CFG
Qual_Test_Complete	Sys_Integ_Complete	%CFG
Qual_Test_Complete	Qual_Test_Complete	%CFG
Qual_Test_Complete	Released	%TOM, %STOM, %CFG
Qual_Test_Complete	Closed	%CFG
Released	Submitted	%CFG
Released	Hold	%CFG
Released	Active	%CFG
Released	Impl_Unit_Test_Complete	%CFG
Released	Integ_Test_Complete	%CFG
Released	Sys_Integ_Complete	%CFG
Released	Qual_Test_Complete	%CFG
Released	Released	%CFG
Released	Closed	%TOM, %STOM, %CFG

B.4.2 Razor Issue State Transitions - Software Discrepancy Reports (Cont'd)

From	To	Role
Closed	Submitted	%CFG
Closed	Hold	%CFG
Closed	Active	%CFG
Closed	Impl_Unit_Test_Complete	%CFG
Closed	Integ_Test_Complete	%CFG
Closed	Sys_Integ_Complete	%CFG
Closed	Qual_Test_Complete	%CFG
Closed	Released	%CFG
Closed	Closed	%CFG

B.4.3 Razor Versions State Transitions

From	To	Role
Active	Active	*
Active	Impl_Unit_Test_Complete	%STOM, %RE, %SD, %CFG
Impl_Unit_Test_Complete	Active	%CFG
Impl_Unit_Test_Complete	Impl_Unit_Test_Complete	%STOM, %RE, %SD, %CFG

B.4.4 Razor Threads State Transitions

From	To	Role
Prototype	Prototype	*
Prototype	Integ_Test_Complete	%TOM, %STOM, %RE, %SD, %CFG
Prototype	Sys_Integ_Complete	%CFG
Prototype	Qual_Test_Complete	%CFG
Prototype	Released	%CFG
Integ_Test_Complete	Prototype	%CFG
Integ_Test_Complete	Integ_Test_Complete	%CFG
Integ_Test_Complete	Sys_Integ_Complete	%TOM, %STOM, %SL, %RE, %CFG
Integ_Test_Complete	Qual_Test_Complete	%CFG
Integ_Test_Complete	Released	%CFG
Sys_Integ_Complete	Prototype	%CFG
Sys_Integ_Complete	Integ_Test_Complete	%CFG
Sys_Integ_Complete	Sys_Integ_Complete	%CFG
Sys_Integ_Complete	Qual_Test_Complete	%TOM, %QA, %CFG
Sys_Integ_Complete	Released	%TOM, %STOM, %CFG
Qual_Test_Complete	Prototype	%CFG
Qual_Test_Complete	Integ_Test_Complete	%CFG
Qual_Test_Complete	Sys_Integ_Complete	%CFG
Qual_Test_Complete	Qual_Test_Complete	%CFG
Qual_Test_Complete	Released	%TOM, %STOM, %CFG
Released	Prototype	%CFG
Released	Integ_Test_Complete	%CFG
Released	Sys_Integ_Complete	%CFG
Released	Qual_Test_Complete	%CFG
Released	Released	%CFG

DISTRIBUTION LIST
FOR
LS-71020-1A

NASA/JSC
STI Center Building 36 (6)

EA5/E. Bauer
A. Rodriguez
E. Strong

SF2/D. Grounds

SF4/C. Haven
D. Bauman
M. Kamman
S. McCollum

NT3/M. Iwasa
S. Nealon

NT52/F. Simmons

LOCKHEED MARTIN
A23/W. Tinch
B08/G. Moorman
C07C/M. Scott
C42/K. Kaufman
C25/F. Haas
S03/Science Payloads Library
S03/D. Babic
S03/W. Cohen
S03/M. Pickett
S03/C. Richard
S03/M. Romell
S18/M. Klee
S22/H. Ong
S22/S. Tarver
S22/E. Witt
S361/S. Landsdown
S361/J. McDonald
S362/H. Rahman
S362/M. Simpson
S363/S. Campana
S363/J. Fox
S363/C. Williamson