Department of the Interior
U.S. Geological Survey

LANDSAT GROUND SEGMENT CONFIGURATION CHANGE PROCESS (CCP)

Version 11.0

July 2008

Executive Summary

This document describes the Landsat Ground Segment Configuration Change Process (CCP) for the following types of changes: Configuration Change Requests (CCRs), Hardware Change Requests (HCRs), Test Discrepancy Reports (TDRs), and documentation changes. These processes apply to all types of changes.

Emergency and urgent changes move through the required steps in an expedited manner. However, personnel must still complete all steps to ensure that a proper audit trail exists for each change.

The following documents support the Configuration Management Processes: Landsat Configuration Control Board (LCCB) Charter (LS-CM-01), Landsat Configuration Control Board (LCCB) Configuration Management Plan (CMP) (LS-CM-02), Landsat Change Process (LS-CM-03), Landsat Document Plan (LS-DM-01), and Landsat Peer Review Process (LS-DM-02).

Document History

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CM-04	Version 0	August 1999	N/A
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CM-04	Version 5.0	July 2002	CCR 2034
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CM-04	Version 11.0	July 2008	CCR 5194, 5236, 5358

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1.1 Document Management

The Document Plan (LS-DM-01) and Peer Review Process (LS-DM-02) define the processes for change management, version management, and storage management for documentation and code.

Section 2 CCR Configuration Change Process

2.1 Configuration Change Management

This section describes the Landsat Project's Configuration Change Process (CCP) for Configuration Items (CIs). Personnel complete Configuration Change Requests (CCRs) to record all changes to the Landsat subsystems, including custom-designed code and Commercial Off-the-Shelf (COTS) software. Configuration Management (CM) personnel administer and control the CCP. Figure 2-1 shows the CCR process flow.

These processes apply to most projects subsystems, with a few exceptions. For example, the National Land Archive Production System (NLAPS) subsystem is mostly coded and delivered from MacDonald, Dettwiler and Associates Ltd. (MDA). In this instance, we cannot expect MDA staff to follow our process.

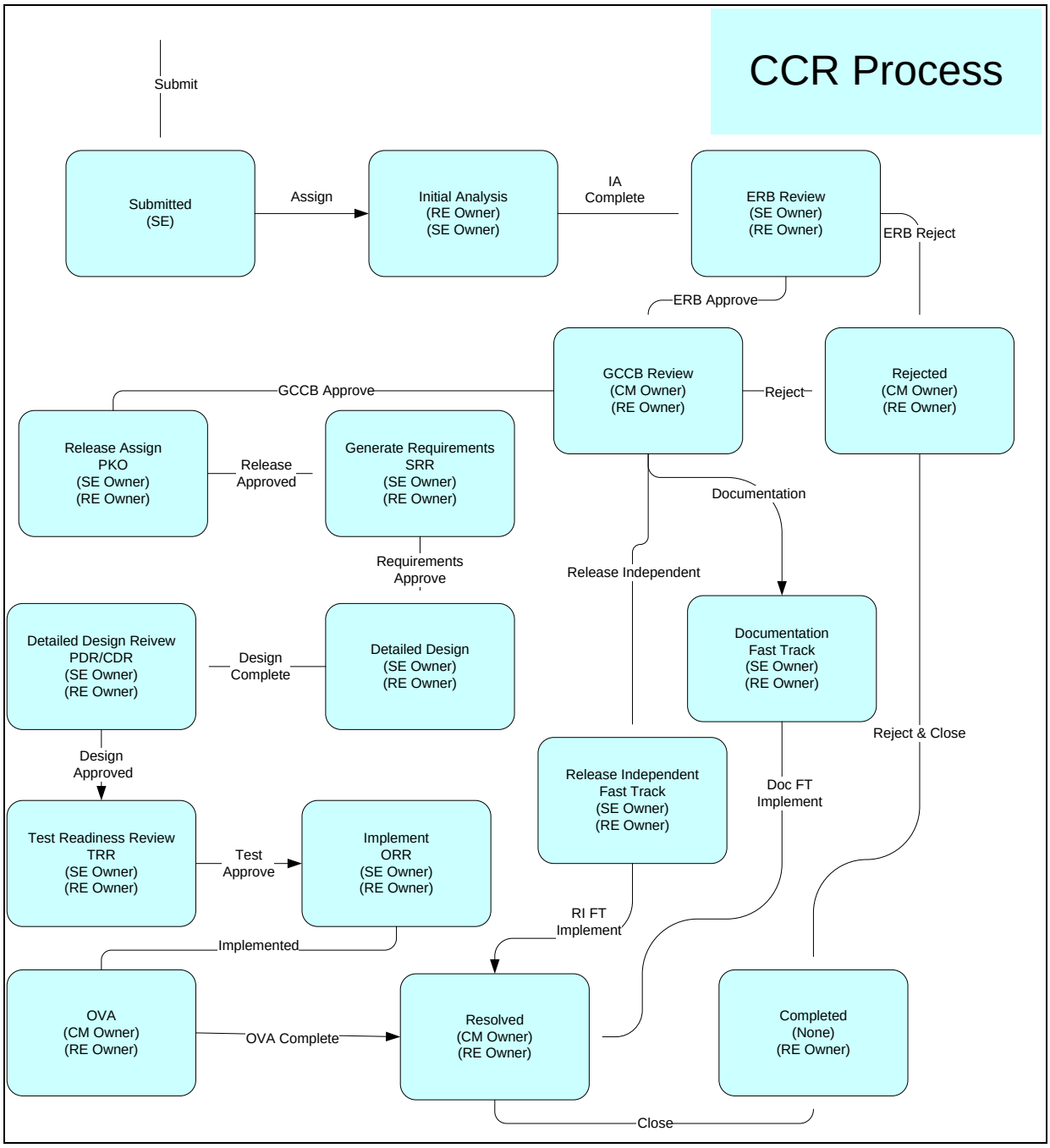

Figure 2-1. CCR Process Flow

2.2 Changes Identified and CCR Submitted

An individual who interfaces with configured subsystems within the Landsat Project completes a CCR to document or request a change. The user enters the information for a CCR into the change management system. The user must provide a detailed description of the change. A detailed description can result in more effective analysis and implementation of a change.

The priority of change requests is as follows:

- EMERGENCY: Operations are at a halt; no work-around solution is possible. Delivery of a fix is required immediately in order to resume operations.
- URGENT: Operations are hampered, but an acceptable work-around solution can be implemented. Delivery of a fix should occur at the direction of the Customer.
- ROUTINE: The proposed change is not mission-critical. These changes are usually corrective actions or enhancements.

2.3 Assign and Initial Analysis by RE

The Systems Engineer (SE) must check the change management system for newly opened CCRs regularly; they are marked as “Submitted” in the system. The SE assigns a Responsible Engineer (RE) to the CCR. The status is “Initial Analysis” in the system.

The RE writes an initial analysis of each assigned CCR. The initial analysis provides a more detailed description of the changes, presents a high-level explanation of how a change may occur, and lays the groundwork for detailed requirements generation later in the process. The initial analysis includes a Rough Order of Magnitude (ROM) estimation of the amount of time required to analyze, design, implement, integrate, test, document, and deliver a fix for the identified requested changes. The RE serves as the coordinator and consolidator of inputs from all organizations that contribute to the ultimate delivery of a fix.

The RE attaches the initial analysis to the CCR and marks the CCR as “IA Complete” in the system. The RE also attaches any supporting documentation to the CCR.

2.4 Engineering Review Board (ERB) Determination

A separate ERB exists for each Landsat subsystem and for the System Support and the Configuration Management areas. The ERB may recommend an update to the priority of the CCR before it is submitted to the Ground Segment Configuration Control Board (GCCB). Each ERB meets regularly to review the RE’s initial analysis of the CCRs. The ERB must determine the validity of a given CCR and verify whether the CCR warrants GCCB consideration.

- If the ERB deems the CCR valid and feasible based on the RE’s analysis, the panel forwards it to the SE, who ensures that all supporting documentation is attached to the CCR. At this time, the CCR is ready for presentation at the next regularly scheduled GCCB, and the SE “ERB Approves” the record. The SE tentatively assigns a CCR to a Software Release or flags the record as Independent at this time. In some cases, the change may require more time than what is available before the next scheduled release. In these cases, the change is assigned to a release far enough into the future to allow completion of all aspects of the change.

- If the ERB determines that the CCR is without merit, the SE “ERB Rejects” the record. The GCCB reviews the rejected CCR and notifies the originator of the closure.

The membership of the Landsat Ground Segment Subsystems ERBs includes, at the minimum, the following organizational representation:

- Systems Engineer, Co-Chair
- Task Lead, Co-Chair
- Operations Lead
- Software Project Lead (SPL)
- System Support Lead
- CM

The membership of the CM ERB includes, at the minimum, the following organizational representation:

- Designated Software CM Analyst, Chair
- CM Team Members
- System Support Lead
- Security
- Technical Writing
- Data Capture and Processing Facility (DCPF) Engineering
- Archive and Production (A&P) Engineering
- DCPF Operations
- A&P Operations
- Mission Systems Engineering (MSE) Lead

The membership of the System Support ERB includes, at a minimum, the following organizational representation:

- System Support Lead, Chair
- System Administrators (SAs)
- Database Administrators (DBAs)
- Security
- DCPF Engineering
- A&P Engineering
- DCPF Operations
- CM
- A&P Operations

2.5 GCCB and Class 1 or 2 Changes

The submitter must select a class during the CCR’s submission. The GCCB reviews the class assignment and determines if a change is necessary. The GCCB meets weekly

(or as directed by the GCCB Chair) to review new CCRs submitted for GCCB consideration. The Configuration Control Board Charter (CM-03) is the controlling document for establishing GCCB membership and responsibilities.

The CM staff uses one of the following methods to move CCRs forward in the process:

If the CCR is this:	CM does this to update the item:
Rejected by the ERB	Clicks the "Reject" button in the CCR solution.
Release Independent or for documentation items	Clicks the "Release Independent" or "Documentation" buttons in the CCR solution.
Needs release assignment	Clicks the "GCCB Approve" button in the CCR solution.
For a Class 1 item	Submits a Landsat Configuration Change Request (LCCR) into the LCCR solution, and then transitions the LCCR to the appropriate state in the LCCR solution (see Section 2.5.1).

2.5.1 Class 1 Changes

The GCCB forwards Class 1 CCRs to the Landsat Configuration Control Board (LCCB) for further action. The CCR then becomes an LCCR. A Class 1 CCR meets one or more of the following criteria:

- It affects the operational baseline in two or more operational segments.
- It affects any product that travels from one segment to another or to outside customers or partners.
- It affects any service provided by one segment to another or to outside users.
- It affects any intersegment interface, plan, specification, or requirement.
- It requires a revision of Landsat operational mission objectives and/or funding.
- It affects Project, system, or mission safety.
- It requires a modification of any agreement between the Project and an outside agency.

2.5.2 Class 2 Changes

Class 2 changes for the Landsat Ground Segment subsystems are handled in the ERBs and GCCB. A Class 2 CCR meets one or more of the following criteria:

- It affects the operational baseline of one or more operational subsystems in the same segment.
- It affects any products contained within one segment.
- It affects any service provided within one segment.
- It affects any subsystem's interface, plan, or requirement specifications.
- It does not require a revision of a Landsat operational mission objective and/or funding.

2.5.3 Fast Track

Changes to Release Independent CCRs and Documentation CCRs that were Approved for Implementation reside in the “Release Independent Fast Track” or “Documentation Fast Track” states, respectively, until the work is complete. To move completed Fast Track CCRs forward in the process and to update the CCR in the system, CM clicks the “RI FT Implement” or “Doc FT Implement” button. After implementation, the GCCB addresses the CCR.

2.5.4 Rejected

To move GCCB-rejected CCRs forward in the process and to update the CCR in the system, the CM staff clicks the “Reject” button. This triggered event moves the CCRs through the Rejected state and on to Completed.

2.6 Landsat Configuration Control Board

The following documents govern the LCCB: Landsat Configuration Control Board Charter (LS-CM-01), Landsat Configuration Control Board (LCCB) Configuration Management Plan (CMP) (LS-CM-02), Landsat Change Process (LS-CM-03), Landsat Document Plan (LS-DM-01), and Landsat Peer Review Process (LS-DM-02). The LCCB approves LCCRs with system-wide impacts that are external to the Landsat Project (Class 1 changes). The LCCB provides feedback to the GCCB. If the LCCB approves a request that the GCCB generated, the GCCB directs continued work on the change. If the LCCB rejects the CCR, the GCCB closes the CCR and notifies the submitter of the closure.

2.7 Release Approval

The SE for each activity functions as the “software release manager” for the software subsystems. Changes that affect similar functions in a subsystem are grouped together to form a Software Release. Once a sufficient number of proposed changes are assigned to a Release, the Task Lead holds a Project Kickoff (PKO) briefing. The Task Lead presents the PKO briefing to the Customer for formal approval of the Release activity. After the formal Customer approval, the SE clicks the “Release Approved” button to move the CCR forward in the system.

2.8 Requirements Generation and Approval

Requirements are generated based on the end user or Customer needs. Documented user needs are translated into requirements, which are stored in the Requirements Management tool and referenced in the CCRs to be used for implementation. Requirements generation is the most important step in the maintenance process because it represents the foundation upon which the ultimate change is built. Detailed requirements clearly and concisely identify the necessary functionality to address the associated change request adequately. Upon SRR approval, the SE or RE clicks the “Requirements Approve” button to move the CCR forward in the system. Detailed requirements are not meant to identify how functionality will be provided. Requirements generation and approval follows the Requirement Management Plan (RMP) process as laid out in the Requirements Management Plan document (RM-09).

2.9 Detailed Design

The detailed design phase of the system life cycle begins with the assigned developer scrutinizing the detailed requirements generated earlier in the process. The developer should work closely with the SE who generated the detailed requirements. In some cases, the developer requires further clarification, which may result in revisions to the detailed requirements. The detailed design must identify all subsystems that the proposed changes affect. Likewise, it must identify any required changes to documentation. The detailed design must map functional and quality requirements to the actual changes that implement those requirements. The detailed design should also identify the Software Configuration Items (SCIs) that the proposed changes affect. Finally, the detailed design provides refined estimates for all aspects of the change delivery process for the given CCR. The RE clicks the “Design Complete” button to move the CCRs to Detailed Design Review. As a further point of clarification, it is understood that prototyping is an accepted tool in developing a detailed design. The proposed fixes may have been implemented already in the development environment. However, the fixes should not be delivered to the Integration Test (IT) environment before Critical Design Review (CDR) approval of the detailed design.

2.10 Design Approval

The SE must ensure that the CCRs are set to Detailed Design Review for all CCRs involved in the CDR. If revisions to the original requirements are necessary, the changes are made and presented to the Customer at CDR. The Customer approves the detailed design at the Preliminary Design Review (PDR) and CDR at the discretion of the Task Lead for the system, as defined in the System Engineering Management Plan (SEMP) (LS-DIR-04). This approval ensures that the proposed design adequately addresses the approved detailed requirements. If the design of the CCR is not approved at the CDR, it returns to the assigned developer for further action before it is reviewed again for approval to implement. Approval to implement allows the developer to begin coding the design and performing the unit test of the developed product. Upon CDR approval, the SE or RE clicks the “Design Approved” button to move the CCRs forward in the system. Coding begins with the developer retrieving the necessary source code from the CM-controlled libraries. Next, the developer makes the necessary changes to the source code.

2.11 Delivery to the Archive

Following completion of the development and Unit Test (UT) of a change, the developer delivers the modified source code, along with all necessary documentation, to the archives, and then tags the source code appropriately. The developer may also check in intermediate versions of the source as needed, but should not tag it. The development group completes the UT, IT builds, and tests. The archives are comprised of software, hardware, and documentation.

2.12 Test Readiness Review

The Test Readiness Review (TRR) is a formal peer review of the final system design. A TRR must be held before the System Test (ST) can officially begin. The SE also

manages the testing during ST. The SE presents the TRR and obtains Customer approval to start ST. Upon TRR approval, the SE or RE clicks the “Test Approve” button to move the CCRs forward in the system.

For the TRR to occur, the following must take place:

- All UTs and ITs are successfully completed.
- All TDRs from UT and IT are satisfactorily resolved.
- The ST plans adequately test all system requirements (traceability).
- The ST schedule and resources are appropriate.
- Interfaces are all ready and agreed to by all parties.
- Each project subsystem’s build plan is complete and appropriate.

2.13 Implemented

CM Build for the System Test and System Test Phase occurs while CCRs are in the Implemented state.

The development group delivers all of the changes for a designated release to CM. The release is now considered a preliminary baseline, and changes to the code from this point on require a Test Discrepancy Report (TDR). CM conducts a Physical Configuration Audit (PCA) upon delivery to CM, and then builds and delivers the release to ST.

ST should conduct tests to verify that all new functionality exists as stipulated in the detailed requirements. Furthermore, ST should conduct regression test cases to ensure that existing functionality remains intact. The ST serves as the Functional Configuration Audit (FCA) defined in the Configuration Audit Guide (CM-07). The development group and RE must document all discrepancies identified during testing and present those findings to the Task Lead and Customer in the form of TDRs at the Operational Readiness Review (ORR) for review and acceptance.

2.14 Version Description Document (VDD)

The VDD identifies where the release resides, the contents of the release, any impacts to interfaces, any affected reference documents, and any possible anomalies, changes, or known errors associated with the release. The VDD is an integral part of every software release. It is important that the software development team finalizes this document and delivers it to CM to use during the ST build. Pending a successful ST, the VDD is delivered to operations.

2.15 Approval for Operations

Following completion of the ST and finalization of the VDD, the SE reviews all of the documentation related to the release and verifies that the associated documentation is correct and complete. Upon ORR completion, the U.S. Geological Survey (USGS) Customer approves the release for installation on the operational system. Upon ORR

approval, the SE or RE clicks the “Implemented” button to move the CCRs forward in the process.

2.16 Operational Verification Acceptance (OVA)

During the OVA state, the Delivery to Operations is completed, and the Operational Verification and Acceptance exit criteria must be met. Upon OVA completion, the SE clicks the “OVA Complete” button to transition the CCRs to the resolved state in the change management system. The Operations (OPS) staff provides the OVA signature pages to the Technical Writer, checks the soft copy of the document into DocuShare, and notifies CM of the OVA completion.

2.16.1 Software Source File Release to International Cooperators (ICs)

The release of software source code to ICs occurs as the released software is being delivered to operations as per the directives provided in the Landsat CM Program Directives document (CM-17). This release of the software source code is not a blanket release of all software systems that Landsat CM manages. The Landsat CM Program Directives document (CM-17) lists the affected systems. In an effort to simplify and standardize the distribution of the software source code for the affected software systems, the Project will follow these criteria:

The affected software systems shall not release any proprietary software, imbedded passwords, Internet Protocol (IP) addresses, etc. within the offsite distributions. The build procedures for each of the affected software systems create a distribution package that contains the software source code in a compressed tar file format. The file is named Offsite_SystemName_Release_Number.tar.gz (e.g., Offsite_LPS_R8.10.20.tar.gz). The files are placed in the home directory/Offsite/ of the userid that CM uses to build and install that system. Older software sources, Government Off The Shelf (GOTS) packages, and associated documentation remain online and available on the File Transfer Protocol (FTP) server under release- specific named folders. The CM staff is responsible for copying/moving the offsite distribution files to the appropriate FTP server and location once the software is delivered to Operations.

2.17 Resolved

After the OVA Completion, CM closes the CCRs in the Resolved state. To do this, CM clicks the “Close” button to move the CCRs to the “Completed” state in the CCR system. This occurs after meeting the project closure criteria described in this subsection.

2.17.1 Delivery to Operations

CM personnel prepare the release for delivery to operations. The SE coordinates the work with Operations, CM, Database Administrators, System Administrators, and Hardware Engineers as needed to install the release into Operations. In this manner, control of the baseline product can be ensured.

2.17.2 Operations Verification and Acceptance

Once installed on the operational machines, the release enters an OVA period. During this period, the system runs normal day-to-day operations using the new software release. Whenever possible, the last version of the software is maintained in a hot back-up configuration in case anomalies or changes with the new release are encountered. The OVAD for each release identifies the length of the Operations Verification (OV) period. The developer must also complete required changes to non-VDD documentation by the end of this phase. Following successful completion of the OV period, the system operators sign the OVA document to formally accept the release. The USGS Customer also signs the OVA as notification that the release is complete and to satisfy project closure criteria specified in the Landsat SEMP (LS-DIR-04). To do this, the group presents a signed OVAD to the release manager, who presents it to the GCCB.

2.17.3 Automated State Updated

An automated state update occurs when a change request transitions from “Resolved” to “Completed.” It is an automatic update of a related CCR in another solution that generated the originating CCR, or vice versa. No user interaction occurs. For example, when a Class 1 CCR becomes an LCCR, the CCR updates the LCCR to the proper associated state.

2.18 Request for Deviation and Waiver

Deviations and waivers not requiring LCCB action are Class 2 items. If presented at the ORR, the GCCB processes these deviations and waivers.

2.18.1 Deviation

The Project uses a deviation to obtain proper approval and contractual authority to deliver an item with a non-conformance. It is used when the Project plans to fix a problem later. A deviation is for a limited time and is approved before the non-conformance occurs. The Customer approves deviations.

2.18.2 Waiver

The Project uses a waiver to obtain proper approval and contractual authority to deliver an item with an error discovered after coding. The Customer approves all waivers.

2.19 CCR Closure and Originator Notification

Upon receiving the signed OVAD, the GCCB closes all CCRs associated with that release. The final step in the closure of a CCR is to notify the originator of the closure. This approach allows the originator one final opportunity to accept or appeal the decisions made by the various entities involved in the change process.

2.20 Releases

Routine releases are planned for delivery to Operations on a schedule-driven basis. All CCRs assigned to the release are completed in the time allotted for the release. The Ground Segment Task Lead identifies the contents of each release. The GCCB reviews CCRs assigned to the release. If a non-routine (emergency or urgent) priority CCR

occurs, the Ground Segment Task Lead redirects resources from routine releases to meet the operational needs of the users. This redirection may result in a slip in the routine release delivery schedule.

Section 3 HCR Configuration Change Process

3.1 Hardware Configuration Management

This section describes the CCP for the Landsat Ground Segment subsystems' Hardware Change Requests (HCRs). Project personnel write HCRs to record an anomaly or change in hardware. The MSE CM organization administers the hardware CCP. Figure 3-1 shows the HCR process flow.

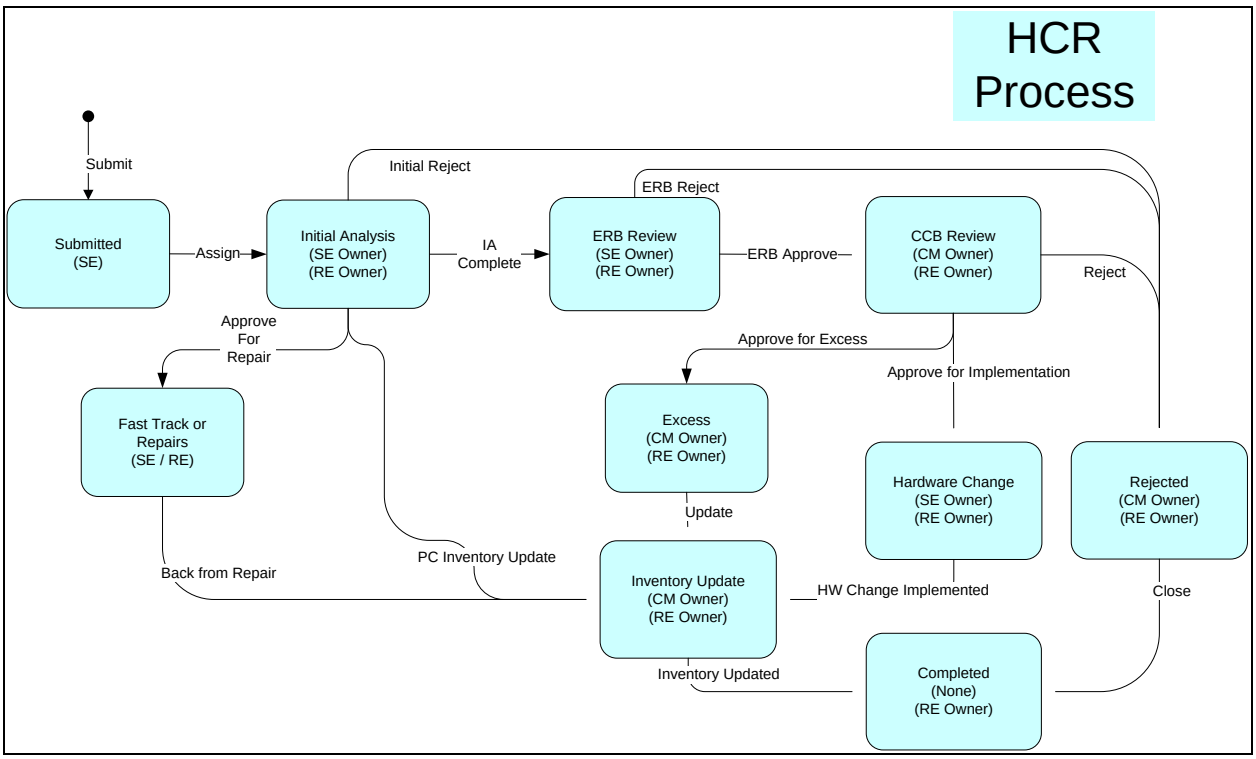

Figure 3-1. HCR Process Flow

3.2 Generic HCR Process

3.2.1 Changes Identified and HCR Submitted

An individual who interfaces with configured subsystems within the Landsat Ground Segment submits an HCR in the change management system to request a change or to document an anomaly.

The submitter must provide a detailed description of the anomaly or change. The greater the level of detail, the easier it is to repair or replace the faulty unit.

The submitter sets a priority for the HCR at submission. The ERB reviews and recommends changes to the priority of the HCRs it submits to the GCCB. The priority of change requests is as follows:

- EMERGENCY: Operations are at a halt. No work-around solution is possible. Delivery of a fix is required immediately in order to resume operations.
- URGENT: Operations are hampered, but an acceptable work-around solution can be implemented. Delivery of a fix should occur at the direction of the Customer.
- ROUTINE: The proposed change is not mission-critical. These changes may be corrective actions or enhancements. Delivery of the fixes for routine change requests is scheduled based on the Customer-determined priority.

3.2.2 RE Assigned and RE Analysis

The SE must check the change management system for newly opened HCRs regularly. The SE assigns an RE to the HCR.

The RE writes an initial analysis of each assigned HCR. The initial analysis provides a more detailed description of the anomaly or change and presents a high-level explanation of how to fix it. The initial analysis includes a ROM estimation of the amount of time required to analyze, implement, test, and fix the identified anomaly or change. The initial analysis is attached to the HCR and forwarded to the ERB for consideration at the next regularly scheduled meeting (unless the system affected is mission-critical, in which case the fix is implemented as soon as possible). The RE reviews the HCR to ensure that it is valid and feasible. The HCR is then submitted to the appropriate ERB.

3.2.3 Engineering Review Board (ERB) Determination

The ERB convenes regularly to review HCRs and the associated RE analysis. The ERB reviews the HCR and forwards it to an RE, who ensures that all supporting documentation is attached to the HCR. The ERB must determine the validity of a given HCR and determine whether it will approve the HCR for implementation or reject it.

- If the HCR is valid, the ERB approves it. The HCR is ready for presentation at the next GCCB. The RE makes the specified changes, updates the HCR accordingly, and adds any required notes.
    - If an HCR affects a production system, it is forwarded to the GCCB.
- If the HCR is without merit, the ERB rejects it and adds any required notes. The GCCB reviews the rejected HCR and notifies the originator of the pending closure action.

Each ERB includes, at a minimum, the following organizational representation:

- SE, Co-Chair
- Task Lead, Co-Chair
- CM
- Hardware Engineering Lead

- Operations Lead
- Software Project Lead

3.2.4 Inventory Changes Required

If the HCR requires inventory changes, the RE assigns the HCR to CM. Then, CM updates the Landsat Inventory System (LIS) database with the changes driven by the HCR, and updates the HCR accordingly.

3.2.5 HCR Closure

The GCCB Chair queries the Change Management System for HCRs that meet the closure criteria, and then adds the HCRs to the next GCCB meeting agenda for distribution. CM then closes the HCRs approved for closure. The final step in the closure of an HCR is to notify the originator of the closure. This approach allows the originator one final opportunity to accept or appeal the decisions made by the various entities involved in the change process.

3.3 HCR Repair Process

3.3.1 Hardware Configuration Item (HCI) Identified for Repair and CCR Written

An individual who interfaces with configured subsystems within the Landsat Ground Segment subsystem completes an HCR to request a change in an HCI or to document an anomaly.

The individual must provide a detailed description of the anomaly or change. The greater the detail, the easier it is to repair or replace the faulty unit.

3.3.2 RE Assigned and Analysis by RE

The SE must check the HCR system for newly opened HCRs regularly. The SE assigns an RE to the HCR.

The RE writes an initial analysis of each assigned HCR. The initial analysis provides a more detailed description of the anomaly or change and presents a high-level explanation of how to fix it.

3.3.3 Inventory Changes Required

The RE assigns the HCR to CM personnel so they can update the LIS. After updating the LIS with the information from the HCR, CM sets the progress to “Sent for Repair” and assigns the HCR to the RE. The piece of equipment identified in the HCR is shipped to the maintenance provider for repair.

When the repaired item returns from the maintenance provider, the RE updates the HCR to “Back from Repair.” The RE configures the piece of equipment, tests it, and then updates the HCR with the new inventory information. The RE assigns the HCR to CM to update the LIS with the new information listed in the HCR. CM updates the LIS

and the HCR with the new information and ensures that the HCR is in the proper state for GCCB approval for closure.

3.3.4 HCR Closure

The GCCB Chair queries the Change Management System for HCRs that meet the closure criteria, and then adds the HCRs to the next GCCB meeting agenda for distribution. CM closes the HCRs that the GCCB approves for closure. The final step in the closure of an HCR is to notify the originator of the closure. This approach allows the originator one final opportunity to accept or appeal the decisions made by the various entities involved in the change process.

3.4 HCR Excess Process

3.4.1 Hardware Configuration Item (HCI) Identified for Excess and CCR Written

An individual interfacing with a configured system within the Landsat Ground Segment completes an HCR after identifying candidate excess HCIs. The submitter then updates the HCR to include inventory information and determines if the identified item is salvageable.

3.4.2 RE Assigned

The SE must check the HCR system for newly opened HCRs regularly. When warranted, the SE assigns an RE to perform an initial analysis on the identified anomaly or requested change in the HCR.

3.4.3 ERB Approval

The HCR is brought before the GCCB for approval for excess. The RE assigns the HCR to CM personnel so they can update the LIS.

3.4.4 Inventory Changes Required

CM removes the item for excess from the LIS. After updating the LIS with the information from the HCR, CM contacts the Help Desk Point of Contact (POC) and the Property Manager with the list of items for excess. The Help Desk POC arranges for the excess items to be picked up. The Help Desk POC notifies CM when the item excess is complete.

3.4.5 HCR Closure

The GCCB Chair queries for HCRs that meet the closure criteria and adds the HCRs to the next GCCB meeting agenda for closure. CM closes these HCRs. The final step is to notify the originator of the closure. This approach allows the originator one final opportunity to accept or appeal the decisions made by the various entities involved in the change process.

Section 4 TDR Configuration Change Process

4.1 Test Discrepancy Report Management

This section describes the Landsat Ground Segment TDR CCP. Personnel complete a TDR to request a change or to document an anomaly during testing. CM administers and controls the TDR process. Figure 4-1 shows the TDR process flow.

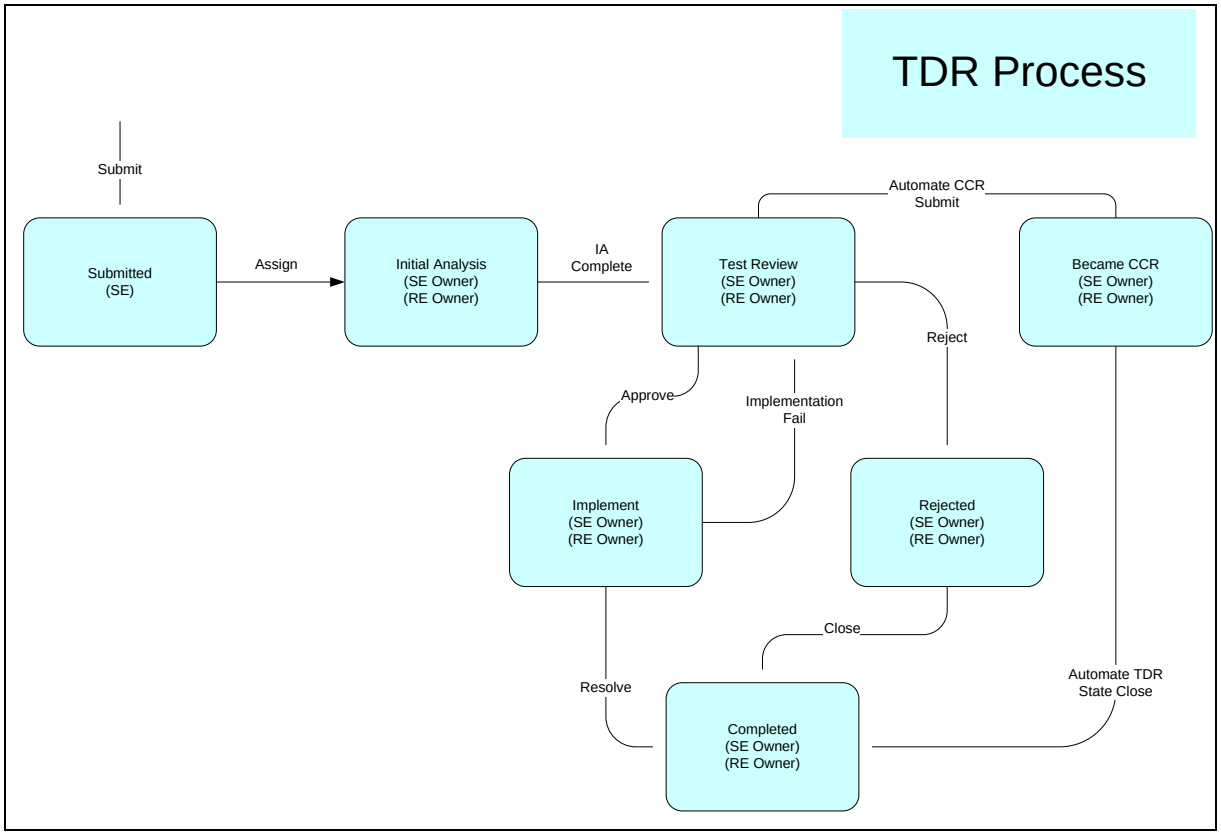

Figure 4-1. TDR Process Flow

4.2 Changes Identified and TDR Submitted

An individual who interfaces with configured subsystems within the Landsat Project completes a TDR to request a change or to document an anomaly during testing. The SPL for each software system directs the use of TDRs.

The individual must provide a detailed description of the anomaly or change. The greater the level of detail, the easier it is for engineering personnel to complete the reconstruction and analysis of the information. This results in more effective and efficient identification and implementation of a fix.

4.3 RE Assigned and RE Analysis

During testing, the SE must check the TDR system regularly for newly opened TDRs. The SE assigns an RE to each TDR.

The RE writes an initial analysis of each assigned TDR. The initial analysis provides a more detailed description of the anomaly or change and presents a high-level explanation of how a fix may occur. The initial analysis includes a ROM estimation of the amount of time required to analyze, design, implement, integrate, test, and deliver a fix for the identified anomaly or requested change. It is important to note that the RE serves as the coordinator and consolidator of inputs from all organizations that contribute to the ultimate delivery of a fix. The initial analysis is attached to the TDR and reviewed at the next TDR review meeting. The RE's analysis is a key factor in determining if the Project will implement the requested changes into the current development or move the issues to a CCR to be addressed later.

4.4 TDR Reviews

TDRs are reviewed at the discretion of the SE. The SE schedules the TDR review, which determines whether to implement the changes or move the TDR to a CCR to be addressed later.

Each TDR review includes, at a minimum, the following organizational representation:

- SE
- Operations Lead
- SPL
- CM Lead
- Task Lead

4.5 Implement as Designed and Deliver to the Archive

Some TDRs can be resolved without code changes, while others require code modifications before the TDR can be dispositioned successfully. Once the TDR review approves the design for a TDR, implementation of the fix may begin. Implementation includes two phases: coding/UT and IT. Coding begins with the developer retrieving the necessary source code from the CM-controlled libraries. Next, the developer makes the necessary changes to the source code. The developer must also identify required changes to documentation during this phase. After changing the source code, the developer builds the associated executables and proceeds with unit-level testing of the fixes.

After completing the development and unit test of a change, the developer delivers the modified source code, along with all necessary documentation, to the archives or other appropriate means. The development group performs the UT and IT builds and tests.

4.6 CM Build for System Test and System Test Phase

The development group delivers all of the changes for a designated release to CM, who conducts a PCA on the delivery and then builds and delivers the release to ST.

This level of testing is separate from UT and IT (performed on the product before delivery to CM). During ST, testers should conduct tests in such a manner as to verify that all new functionality exists as stipulated in the detailed requirements. Furthermore, testers should conduct regression test cases to ensure that existing functionality remains intact. ST serves as the FCA.

4.7 TDR Closure and Notifies Originator

Upon successful disposition and implementation of the TDRs, the SE closes the TDR. The final step in the closure of an HCR is to notify the originator of the closure. This approach allows the originator one final opportunity to accept or appeal the decisions made by the various entities involved in the change process.

References

Please see http://landsat.usgs.gov/tools_acronymns_ALL.php for a list of acronyms.

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