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Transition Plan
4PX to 4PY, 4PY to 5A, and 5A to 5B for the ECS Project

Technical Paper

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RESPONSIBLE AUTHOR

Earl Engelhard /s/ 5/11/00

Earl Engelhard, Systems Engineer Date
EOSDIS Core System Project

RESPONSIBLE OFFICE

Mark McBride /s/ 5/11/00

Mark McBride, Director, Systems Engineering, Date
EOSDIS Core System Project

Raytheon Systems Company
Upper Marlboro, Maryland

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Preface

This document revision consists of updates to the 5B transition plans (Section 4). Transition for 4PY (Section 2) and 5A (Section 3) have not changed.

Release 5B (Section 4)

The 5B plans contained herein are applicable to all four existing DAACs (EDC, GSFC, LaRC, and NSIDC). These plans are based on the 5A transition plans, with the major difference being additional enhancements to ECS Assistant. This is a deviation from the previous concept, which included a strategy known as mode switching. Upon further analysis of the 4PY transition at EDC, it became apparent that mode switching, as currently understood, would not result in a significant savings.

At the time of initial publication, the following issues are still outstanding. As these are worked-off, updates will be incorporated as required.

The from (5A) and to (5B) patch levels will be established one month prior to the start of transition checkout in the VATC. Due to the time period needed to transition all four DAACs the "from" and "to" baselines could change. NCR and CCR updates to the transition baselines will be monitored for changes that impact the transition process. The transition process will be updated to accommodate changes as required.

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Abstract

The objective of this plan is to provide a roadmap for the shift from the Release 4PX baseline to future releases of ECS. Specifically, this document provides plans for transitioning between the following SDPS software releases:

1. 4PX-to-4PY
2. 4PY-to-5A
3. 5A-to-5B

The document establishes the processes that will be used to evolve ECS from one version to the next and provides common understanding of the transition approach, both internally and at the DAACs. Sections related to past transitions are retained for historical purposes.

Key Words: transition, Release 4PY, Release 5A, Release 5B, ECS Assistant, Update ESDT

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1. Introduction

1.1 Objective

The objective of this transition plan is to provide a roadmap for the progression from the Release 4PX baseline to 4PY, 5A, and 5B. It is intended to establish the processes and steps that will be used to evolve ECS from one version to the next and should satisfy the need for a common understanding of the ECS Custom Software transition approach both internally and at the DAACs.

Transition as used in the context of this document is between major custom software releases. The distinguishing factors are the change in format or organization of persistent data (databases, configuration parameters, etc.), the addition of new functionality, and the need to quiesce the system and perform an ECS Coldstart. COTS upgrades and Custom Software patch releases are not covered by transition planning when there is no change to the persistent data, and the ECS system can be Warmstarted. A COTS upgrade and/or patch release will need to be examined to determine if it qualifies to be included in a Custom Software transition. In general, these upgrades are covered in detail in the DID/335 COTS Deployment Plan.

1.2 Purpose

There are three goals that drive our transition approach:

- Avoid any data loss or data corruption
- Minimize the amount of operational downtime
- Reduce the staff required to perform transitions (ECS and DAAC personnel)

This can be summarized by the need to install the upgrade or release with the greatest possible speed while ensuring that the existing data are not affected.

1.3 Transition Process Status and Long-term Plan

Prior to 4PY, the installation of new ECS custom software release required:

- System shutdown
- Custom software installation
- Persistent data file installation/conversion
- Coldstart of ECS

With the launch of LANDSAT-7, a different approach must be taken to reduce operational impact. Over the successive releases, the ECS Program plans to improve the installation and transition process incrementally. The following are the incremental improvements that are planned:

- Development of special database patch and verification scripts
- Development of save/restore scripts to expedite falling back to a previous release
- Building configuration files based on the existing configuration parameters
- Additional automation of the installation process
- Development of the Update ESDT capability prior to its formal release

1.4 Schedule

Transition activities are scheduled around major software releases and on-going operations at the affected DAAC(s). The transition schedules for each release are maintained as a part of the Science Data Processing System (SDPS) Master Schedule in Primavera.

Transition preparation begins with the design, development, integration, and check-out of the procedures and software (e.g. scripts) required to perform the operational transition of a major software release. These activities are the responsibility of Development and are performed initially in the EDF. Once integrated in the EDF, a second integration and check-out phase begins in the VATC. The period in the VATC is also used to train the installation team, including DAAC personnel. Transition at the DAAC(s) is initiated upon completion of the VATC checkout and the Pre-Shipment Review (PSR). The baseline schedule at each DAAC spans a 2 - 3 week period. During the first week, the TS2 mode is transitioned to the new release. The goals during this period include refinement of the transition procedures and additional training for the installation team. The second week includes the transition of TS1 mode. This transition is used as a dry run of the Ops transition, confirming the ability to perform transition to the target time line. Time is allotted to repeat this process if required. Once the transition procedures have been demonstrated in TS1, the Ops mode transition is performed. It should be noted that the detailed schedule for the transition is dependent on the DAAC operational schedules. For the 5A to 5B transition, the DAACs have requested an extra week for the test modes, except the LaRC DAAC which requested 2 additional weeks.

1.5 Roles and Responsibilities

Each transition will be performed by an installation team composed of DAAC personnel, ECS Development, and Test personnel. The installation team will begin by integrating and testing the installation software and processes in the EDF. This is followed by transition training for the DAAC in the VATC. After completion of training in the VATC transitions are executed each mode at the DAACs. Transition training for selected DAACs will continue at the DAAC sites. During the DAAC transitions, access to other ECS personnel is provided through the Help Desk. M&O will coordinate with the DAAC liaisons to determine the best time to schedule the

transition at each DAAC. Each ECS DAAC organization is responsible for scheduling and completing the transition at their site. Therefore, they assume control of the transition team at their respective sites.

1.6 White Paper Organization

This document is organized as follows:

- Section 2 - 4PX to 4PY (EDC only)
- Section 3 - 4PY to 5A (EDC only)
- Section 4 - 5A to 5B

Questions regarding technical information contained within this Paper should be addressed to the following ECS contacts:

- Rino Ciardo, System Engineer, (301) 925-0606 sciardo@eos.hitc.com
- Earl Engelhard, System Engineer, (301) 925-0611 eengelha@eos.hitc.com

Questions concerning distribution or control of this document should be addressed to:

Data Management Office
The ECS Project Office
Raytheon Systems Company
1616 McCormick Drive
Upper Marlboro, MD 20774-5301

1.7 Reference Documentation

Additional information is contained in:

- Installation Instructions for each release)Delivered with updates following VATC Transition Training)
- Transition Checkout Procedures for each release (A subset of test procedures intended only to verify that the custom software is properly configured following transition)
- COTS Deployment Plan DID 335/DV2
- Science System Release Plan DID 334/DV1

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2. 4PX to 4PY Transition At EDC

2.1 4PX to 4PY Transition Overview

The goal of the 4PX to 4PY transition is to complete the process with EDC OPS mode in 48 hours or less.

Preparation for transitioning 4PX to 4PY involves:

1. Baselining the specific version of 4PX (custom code, databases, and configuration)
2. Baselining the specific version of 4PY (custom code, databases, and configuration)
3. Developing scripts to convert persistent data for a given mode from one specific baseline to the other
4. Developing procedures and scripts to verify that the persistent data has been appropriately converted
5. Developing procedures and scripts to minimize the amount of time spent with configuration and checkout issues.

2.1.1 EDC Transition Assumptions

1. LPS has a data storage capacity to handle 72 hours of L7 data, so that if ECS is "off-line" for 48 hours no data would be lost and the LPS could forward the stored data as soon as ECS is back "on-line" and processing data. The interface protocol would remain the same.
2. The transition will be from a single baseline. That is, if the Custom Software for a given mode is not starting from 4PX.30 then the appropriate patches will be applied to bring the release to that level before the transition is started
3. The transition approach is from 4PX.30 to 4PY.05 (Elmira) (Patches beyond the baseline will be dealt with on a case by case basis.)
4. Prior to shutdown the system will be quiesced (work queues allowed to run until they are empty)
5. The 48 hour clock starts when system inputs are disabled, and completes when the system is receiving operational data again.
6. Once operations are restored, use of the other modes will be kept to a minimum to allow backlogged processing to catch-up.

7. The shared mode common will be updated prior to the start of transition
8. COTS software versions match required baseline versions
9. Full system backup and any associated incrementals are complete and available.

2.1.2 Time Line

Figure 2.1-1 Shows the high-level installation timeline in four steps covering 2 to 3 weeks[1]. The highlighted modes reflect Operational Data processing. Step one shows the initial install conditions with 4PX.30 in all three modes. Step two shows 4PY.04 (Dryden) installed in TS2 mode for checkout and functionality testing. The database is not converted since the 4PY.04 release does not contain the transition scripts.

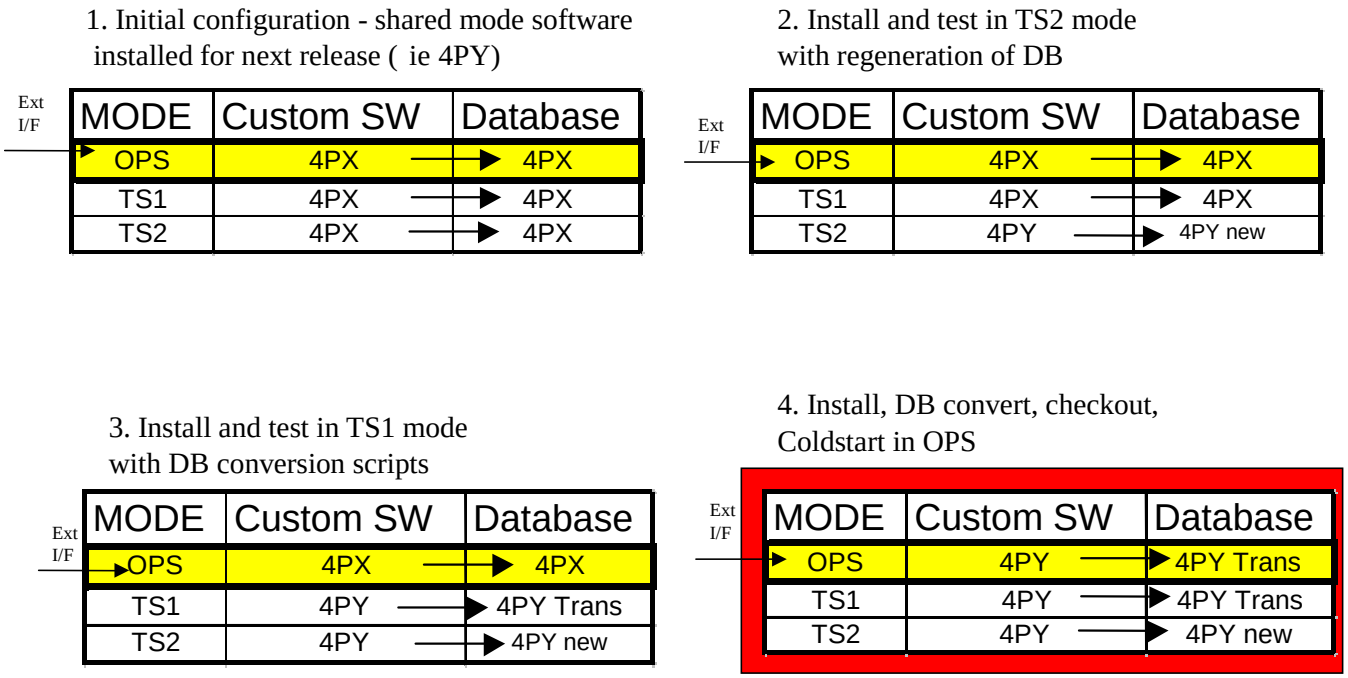

Figure 2.1-1. EDC Transition 4PX to 4PY

The goal of this approach is to allow overlap between testing of the 4PY.04 software and development of the transition scripts, thereby reducing the negative schedule impact, and simplifying problem detection and isolation. Release 4PY.05 (Elmira) is a patch release containing only the transition scripts. Step three shows installation and transition in TS1 mode using the 4PY.05 release. It is expected that transitioning testing would occur at least once in the

[1] The actual duration is determined by the EDC; the timeline is based on the suggested approach.

TS1 mode. Multiple transitions would require, at a minimum, the unloading and reloading of the 4PX databases. Step 4 represents the final transition in OPS mode. OPS mode transition is scheduled to occur in 48 hours or less.

2.2 4PX to 4PY Transition Contingencies

Risks:

- Data loss/corruption

  Contingencies: Perform special backup of databases prior to transition in each mode. There is also a secondary backup consisting of the routine full-system backup plus the daily incremental backups.

- Problems encountered preventing 48 hour install in OPS mode

  Contingencies: Restore ECS system from backup. Perform real-time assessment of problem to determine if the installation/transition can be re-performed or other action taken to correct the problem, possibly extending beyond the 48-hour period.

- Problems restoring system from backup

  Contingency: Use full-system backup and daily incrementals to restore the system.

2.3 4PX to 4PY Transition Approach

Past installation problems have primarily been caused by changes to the configuration files. Configuration files were recreated with each major delivery without regard to the previously specified configuration. As a result errors in the configuration were not detected until system checkout.

The 4PX-to-4PY transition will achieve reduced installation and checkout times by controlling changes to the established configuration parameters. Controlling the changes to the configuration parameters and utilizing the configuration information already established by the site will allow the transition to be completed within the allocated 48 hours.

Table 2.3-1 identifies the sequence of steps to transition the OPS mode.

Table 2.3-1. 48-Hour Sequence of Events (1 of 2)

Event	Estimated Time	Cumulative Time	See Section
1. Quiesce the System	6 hours	6 hours	2.3.1
2. Shutdown/Backup	12 hours	18 hours	2.3.2
3. Install/Configure	6 hours	24 hours	2.3.3

Table 2.3-1. 48-Hour Sequence of Events (2 of 2)

Event	Estimated Time	Cumulative Time	See Section
4. Convert System Databases	5 Hours (in parallel with install)	24 hours	2.3.4
5. ECS Application Coldstart	1 hour	25 hours	2.3.5
6. Checkout Installation and Databases	20 hours	45 hours	2.3.6
7. Re-enable Operational Data Inputs	1 hour	46 hours	2.3.7

The following sequence is specifically intended for transition in the OPS mode and is reflected in the unified installation/transition instructions for 4PY.05 (Elmira).

2.3.1 Quiesce the System

System external inputs are suspended. This includes user requests as well as LANDSAT data from the LPS. Request LPS to suspend sending of data to ECS until further notice. At the end of the OPS mode transition LPS will be requested to re-enable the transmission of data.

Assumptions:

- The LANDSAT 7 Data Handling Facility can hold up to 72 hours of data backlog.
- The LPS can withhold sending data on verbal request.
- Queues can be monitored to determine when they are inactive.

2.3.2 Shutdown/Backup

The system shut is performed stopping all of the ECS processes after the system has been quiesced. The backup performed at this stage will be complete and consistent across all ECS databases since there is no database update activity occurring.

Assumptions:

- EDC has procedures to backup and restore the system.

2.3.3 Install/Configure

ECS Assist and various scripts are used to perform the installation and transition.

Assumptions:

- All COTS products are up to baseline requirements
- EDC has deleted all ESDTs which will not be transitioned
- EDC has updated all ESDTs to point to the correct volume groups

2.3.4 Convert System Databases

The 4PX.05 (Elmira) release contains the database transition scripts. These scripts are executed by the transition team at the proper time during the install process. The scripts migrate the data from the previous version of the database to the new version. Table 2.3-2 shows the databases to be converted in the migration from 4PX to 4PY.

Table 2.3-2. Database Transition Scripts Between 4PX.30 and 4PY.05

Database	Transition 4PX.30 to 4PY.05	Notes
CLS Database	N/A	CLS does not have a database
DM Database	Transition and verify	
INGEST Database	Transition	
IOS Database	Transition and verify	
MSS Database	Transition and verify	
PDPS Database	Transition and verify	
SDSRV Database	Transition and verify	
STMGT Database	Transition	
SBSRV Database	Transition	
Toolkit Database	N/A	Toolkit does not have a database

2.3.5 Coldstart the System

Based on the extent of changes between major releases, a Coldstart is required.

2.3.6 Checkout of the Installation and Databases

2.3.6.1 Goals of Checkout

There are two principal goals of the post-transition checkout activities:

- Confirm the integrity of data holdings that existed prior to the transition, and
- Ensure that basic Landsat Mission services (defined below) are still operational.

Procedures and activities related to testing new functionality are NOT discussed here, but rather in the release installation and test procedures.

2.3.6.2 Checkout Approach

By the time software transition occurs, there will exist in the EDC archive several weeks of Landsat 7 mission data. Therefore, an approach needs to be adopted that first verifies the integrity of data acquired before transition, before moving onto verifying capability under the new release. In addition, data storage services integrity must take priority over data access services. Some of the activities identified in the sequence below imply pre-transition data collection.

Assumptions:

- Activity in other modes is restricted.

2.3.6.3 Checkout Sequence

The System checkout is divided into primary and secondary activities. Primary activities must occur within the 48-hour window. Secondary activities are desirable, but are not mandatory. These activities will be performed as time allows. The checkout procedures are only intended to verify that the custom software is installed and configured. Specific functionality and NCR fixes have been tested in the VATC and EDC TS2 and TS1 modes.

The primary activities of the checkout period is to ensure:

1. Verify inventory integrity of the existing L7 data holdings - Run an SQL analysis against the updated inventory, and verify contents against the pre-transition analysis – New Procedure
2. Verify archive integrity of the existing L7 data (archive check)-Analyze data pointers into the archive. Confirm inventory points to the correct files. – New Procedure
3. Verify integrity of primary L7 services on existing data (Search, order, subsetting & distribution)–Existing Procedure

4. Verify LPS Ingest of new, simulated L7 data (ingest and archive)-Existing Procedure
5. Verify integrity of primary L7 services on new, simulated data (subsetting & distribution)-Existing Procedure (see #3)

The secondary activities are:

6. Verify L7 secondary services (Billing and MOC interfaces) – Existing Procedure
7. Verify ASTER D3 ingest capability– Existing Procedure
8. Verify On-demand production. – Existing Procedure
9. Verify tape distribution services (ASTER & Landsat) – Existing Procedure

The first two primary items are performed as a part of the installation procedures. Table 2.3-3 presents a mapping from test activity to test case. These checkout tests are documented in the Transition Checkout Procedures for 4PY.05 (Elmira), which is an adjunct to the installation instructions. In the table, primary and secondary activities have been italicized. Also, an asterisk indicates which procedures required transition specific updates to satisfy a particular criteria.

Table 2.3-3. Mapping: Activity to Checkout Procedure (1 of 2)

ACTIVITY	TEST CASE
DSS CHECKOUT	
Add/View ESDTS (L7,ASTER,system)	DSS Checkout
Insert	DSS Checkout
FTPPush	DSS Checkout
FTPPull	DSS Checkout
Verify primary L7 services on existing and new data (P) (subsetting,distribution)	DSS Checkout
Verify secondary L7 services on existing and new data (S) (MOC Interface)	DSS Checkout*
Verify tape distribution services	DSS Checkout*
INGEST CHECKOUT	
Ingest Attitude Polling wo/DR	Ingest Checkout (FDD polling)
Ingest DAP	Ingest Checkout (DAP)
Ingest AST_L1B (D3 Tape)	Ingest Checkout (D3 media)
Ingest L7CPF	Ingest Checkout (SCF polling)
Ingest L7 LPS	Ingest Checkout (auto)
PDPS CHECKOUT	
Register PGEs (ACT,ETS)	PDPS Checkout
Run PGEs (ACT,ETS) *On-demand production workaround for 4PY*	PDPS Checkout
Acquire DAP	PDPS Checkout
QA Monitor	PDPS Checkout

Table 2.3-3 Mapping: Activity to Checkout Procedure (2 of 2)

ACTIVITY	TEST CASE
DMS/IOS CHECKOUT	
Search for ASTER	DMS Checkout*
Search for L7 data *Verify primary L7 services on existing and new data (P)* *(search,order*	DMS Checkout*
Acquire L7 scenes	DMS Checkout*
**Verify secondary L7 services on existing and new data (S)* *(Billing Interface)*	DMS Checkout*
DMS/MSS Order Tracking	DMS Checkout*
CLS CHECKOUT	
Register End Client User w/MSS	CLS Checkout
MSS CHECKOUT	
MSS Startup Servers	MSS Checkout
Register End Client User w/MSS	MSS Checkout
DMS/MSS Order Tracking	MSS Checkout
CSS CHECKOUT	
Enter subscription on DAP	CSS Checkout
Enter subscription on AST_08 for FTPPush	CSS Checkout
Distribution for Subscription	CSS Checkout

2.3.7 Re-enable Operational Data Inputs

At this point, the 4PY system has been verified using the standard checkout procedures, which have been augmented for transition as discussed above. All major system functions, most critically the capability to ingest and merge Landsat data, were verified sequentially in all three modes. In addition, site personnel have performed additional verification functions after transition in the TS1 mode.

Re-enabling processing consists of restarting gateways/servers blocking external interfaces (as required) and requesting LPS to resume sending data. Initially, a single granule of each Landsat data format is ingested. The transition team is present while DAAC operations personnel verify that the granules are properly archived and merged. At this point, the system is fully restored to operations. In case of breakage, the transition team, along with DAAC management, decides whether to retain 4PY or fall back to 4PX. Since these procedures have been practiced and verified several times, the risk at this point is minimal. However, the ability to quickly restore the 4PX system was demonstrated as a part of the transition in TS2 mode.

3. 4PY to 5A Transition at EDC

3.1 4PY to 5A Transition Overview

The 4PY-to-5A transition follows the same general process as the 4PX-to-4PY transition described in Section 2. To improve the reliability and timeliness of the transition, the transition plan incorporates the following key features:

1) Enhanced automation
   a) Additional enhancements to ECS Assistant to automate the installations
   b) Update ESDT capabilities to allow the transition of existing ESDTs (required to preserve the existing archives)
   c) Special backup and restore procedures to recover the existing release, including all site-specific configurations
   d) Numerous database update and verification scripts
2) Integrated transition teams consisting of development, test, and site personnel. These teams provide both development expertise as well as detailed knowledge of the site-unique configurations and issues.
3) A multi-phased verification process which includes the following steps prior to a transition in OPS mode:
   a) Initially, the transition procedures are thoroughly verified in the VATC. Although the VATC configuration varies significantly from the operation sites, a large portion of the functionality provided by the installation tools can be verified. During this phase, site personnel participate in practice installations.
   b) On-site practice installations in the TS2 mode, to identify any issues that are unique to the site configuration. This phase includes practicing the restoration of the previous build.
   c) A 'dress-rehearsal' in the TS2 mode. This will allow the procedures to be practiced on the 48-hour time line. This step is repeated as required.
   d) Prior to operational transition, the site is provided the opportunity to perform additional testing, at their discretion.

Note the system changes identified above will be delivered as a patch, or patches to the 5A release. These items are required in order to transition from 4PY to 5A.

The long-term goal is to significantly reduce the time required to complete the installation and verification in the OPS mode. Although the maximum transition duration is 48 hours, the goal of the 4PY-to-5A transition is 32 hours (duration based on an EDC-only transition, prior to the receipt of operational Terra data).

3.1.1 Transition Assumptions

GENERAL

1. The transition is from a single baseline. That is, if the Custom Software for a given mode is not starting from 4PY.12 then the appropriate patches will be applied to bring the release to that level before the transition is started.
2. The transition approach is from 4PY.12 to 5A.02**,** which includes the transition patches. Patches beyond this baseline will be dealt with on a case by case basis.
3. The shared mode common is updated and tested prior to the start of transition
4. COTS software versions match required baseline versions
5. Full system backup and any associated incremental backup are complete and available prior to the start of transition.
6. All volume groups conform to the baselined naming conventions.
7. The DAAC will delete all unused/test data form the archive prior to transition.
8. All producers of higher-level data products (L1 and higher) are capable of holding/buffering products that could not be ingested during the transition period.
9. Prior to shutdown the system is quiesced (work queues are allowed to run until they are empty)
10. The 24-hour clock starts when system inputs are disabled, and completes when the system is again receiving operational data.
11. Once operations are restored, the use of the other modes is kept to a minimum to allow backlogged processing to catch-up.

EDC SPECIFIC

1. LPS has the data storage capacity to handle 72 hours of L7 data, so that if ECS is "off-line" for 48 hours, no data would be lost and the LPS could forward the stored data as soon as ECS is back "on-line" and processing data. The interface protocol would remain the same.
2. EDC will perform a clean install of 5A in the TS1 mode prior to transition.

3.1.2 Time Line

This section describes the transition time line at a given site. The sequence in which the sites are transitioned is established based on site availability (operations workload), personnel availability, and the detailed contents of Release 5A. The overall schedule for the transition process is maintained as a part of the SDPS Master Schedule.

Figure 3.1-1 shows the high-level installation time line in four steps covering 2 to 3 weeks[2]. The highlighted mode reflects operational data processing. Step 1 shows the initial install conditions with 4PY.12 in the TS2 and Ops modes. Note that 5A has been installed clean in TS1 prior to the start of transition. Step 2 provides for the checkout of both the transition procedures as well as the 5A software. Step 3 is essentially a dry run of the actual OPS transition, including the verification of the projected duration. Finally, Step 4 represents the final transition to operations.

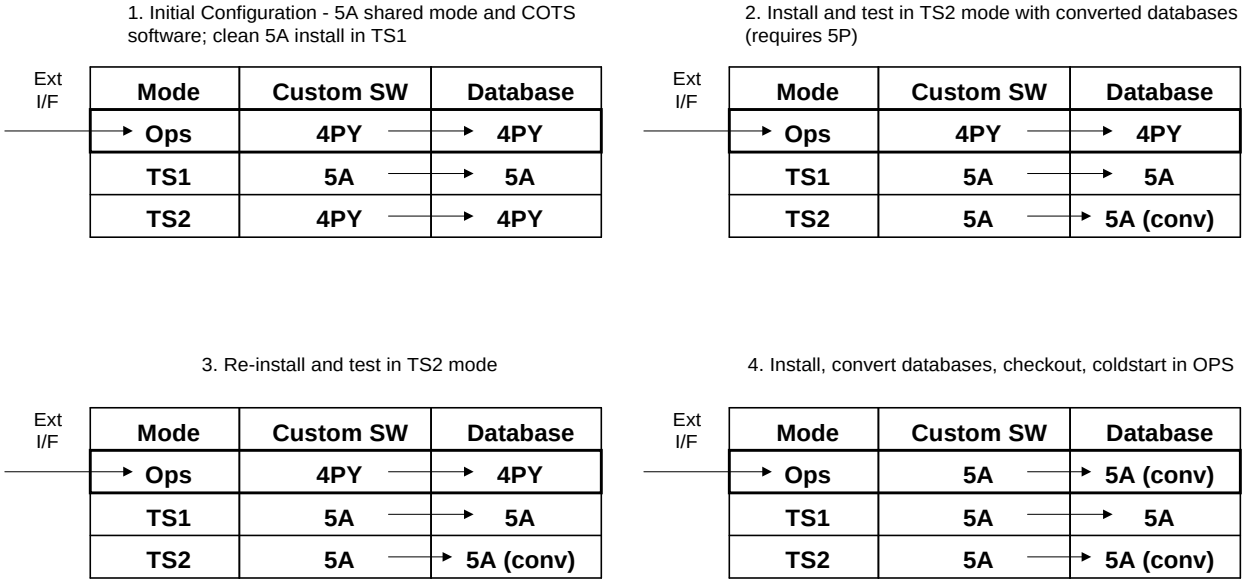

Figure 3.1-1. High Level 5A installation Time Line

[2] The actual duration is determined by each DAAC; the timeline is based on the suggested approach.

3.2 4PY to 5A Contingencies

Risks:

- Data loss/corruption

  Contingencies: Perform a special backup of system configuration files and databases prior to transition in each mode. The ability to restore the system from these backups and the current software baseline is demonstrated. There is also a secondary backup consisting of the routine full-system backup plus the daily incremental backups.

- Problems encountered preventing a 48 hour transition in OPS mode

  Contingencies: Restore ECS system from the contingency backup. Perform real-time assessment of problem to determine if the installation/transition can be re-performed or other action taken to correct the problem, possibly extending beyond the 48-hour period.

- Problems restoring system from backup

  Contingency: Use full-system backup and daily incremental backups to restore the system.

3.3 4PY to 5A Transition Approach

The 4PY-to-5A transition achieves improved reliability and reduced installation and checkout times through enhanced automation. Controlling the changes to the existing configuration parameters, utilizing the configuration information already established by the sites, and automating the installation and test processes allows the transition to be completed within the allocated time period.

Table 3.3-1 identifies the sequence of steps to transition the OPS mode.

Table 3.3-1. High-Level Sequence of Events (1 of 2)

Event	Estimated Time	Cumulative time	See Section
1. Pre-transition Preparation	N/A	0 hours	3.3.1
2. Quiesce the System	6 hours	6 hours	3.3.2
3. Shutdown/Backup	7 hours	13 hours	3.3.3
4. Install/Configure	2 hours	15 hours	3.3.4
5. Convert System Databases	7 Hours	22 hours	3.3.5

Table 3.3-1. High-Level Sequence of Events (2 of 2)

Event	Estimated Time	Cumulative time	See Section
6. Restart the System	1 hour	23 hours	3.3.6
7. Update Existing ESDTs	1 hour	24 hours	3.3.7
8. Checkout Installation and Databases	7 hours	31 hours	3.3.8
9. Re-enable Operational Data Inputs	1 hour	32 hours	3.3.9

The following paragraphs describe the major transition activities for the OPS mode. Subsets of these procedures are used in the TS1 and TS2 modes. These paragraphs describe the general sequence of events. The exact sequence is documented in the detailed installation/transition instructions provided with the release.

3.3.1 Pre-Transition Preparation

Based on experience with the 4PX-to-4PY transition, the following activities should be performed prior to the start of transition. This list is organized by the responsible organization and does not necessarily reflect the actual sequence of events:

1) CM/Construction Office

   a) Baseline the specific version of 4PY (custom code, databases and configuration)

   b) Baseline the specific version of 5A (custom code, databases and configuration)

   c) Interrogate the site's *.cfg, *.acfg, and *.pcfg files and incorporate differences into the *.cfgpatch file used by ESC Assist

   d) Update the *.cfgparms, *.extparms, and mkcfg files and compare the results with item c. The changes to the site's configuration are reviewed with site personnel.

   e) Verify that there is adequate disk space

2) Site Engineering Personnel

   a) Remove all non-operational ESDTs from the system

   b) Install the prerequisite shared mode and COTS upgrades prior to transition

   c) Receive and unpack drop 5A

3) Site Operations

   a) Perform full and/or regularly scheduled incremental backups

   b) Start and stop the system

4) Site Management (with support from transition team)

   a) Conduct pre-install reviews

   b) Conduct site-level CCB meetings, as required

   c) Conduct a pre-transition kick-off briefing.

3.3.2 Quiesce the System

System external inputs are suspended. These inputs include user requests as well as ingest operations. For example, EDC personnel coordinate the suspension of Landsat data from the LPS.

Assumptions:

- Site operations personnel are responsible for coordinating the details of how external inputs are suspended/disabled and will schedule the transition with local operations.
- Queues can be monitored to determine when they are inactive.

3.3.3 Shutdown/Backup

The system shut down is performed (stopping all of the ECS processes) after the system has been quiesced. Special backups of the system configuration files and databases are made. The backup of system configuration parameters and databases performed at this stage are complete and consistent across all ECS databases since there is no database update activity occurring. Scripts are provided to perform the following functions:

- Verify the contents of the archive vs. the inventory
- Capture the pre-transition inventory
- Produce a list of orphaned granules

3.3.4 Install/Configure

Prior to installation, a clean-out script is executed to delete all elements of the mode that are not to be transitioned. A detailed list of these items is included in the installation/transition instructions.

ECS Assist and various transition scripts are used to perform the installation and transition of ECS.

Assumptions:

- All COTS products are up to baseline requirements

3.3.5 Convert System Databases

Release 5A database transition scripts perform the following functions:

- Dump scripts to capture the database prior to transition
- Load scripts to restore the database to an earlier, dumped version
- Description scripts to view the structure of the database - used to perform comparisons to a transitioned test/checkout database from the VATC
- Checksum scripts to quantitatively compare the database before and after transition
- Patch scripts to update the database schema
- Verify scripts to list the logical key data values for each table within a database - used to qualitatively compare the database before and after the transition.

These scripts are executed by transition team at the proper time during the install process. Table 3.3-2 shows the databases to be converted in the migration from 4PY to 5A.

Table 3.3-2. Database Transition Scripts between 4PY and 5A (1 of 2)

Database	Transition 4PY.12 to 5A.02	Notes
DM Database	Transition and verify using custom scripts and checksums	
INGEST Database	Transition and verify using checksums only	
IOS Database	Transition and verify using custom scripts and checksums	
MSS Database	Transition and verify using custom scripts and checksums	
PDPS Database	Transition and verify using custom scripts and checksums	

Table 3.3-2. Database Transition Scripts between 4PY and 5A (2 of 2)

Database	Transition 4PY.12 to 5A.02	Notes
SDSRV Database	Transition and verify using custom scripts and checksums	Includes: 1) transition of existing event files into the SDSRV database
STMGT Database	Transition and verify using checksums only	
SBSRV Database	Transition and verify using checksums only	

3.3.6 Restart the System

Based on the extent of changes between major releases, a coldstart is required.

3.3.7 Update Existing ESDTs

A new service, delete from archive, was added to all ESDTs in Release 5A. Therefore, all operational ESDTs will have to be transitioned using the new Update ESDT capability. Update ESDT is executed with the SDSRV in the maintenance mode (new) to ensure that there are no requests to access this information. Prior to starting Update ESDT, the old descriptors are backed-up to ensure that they can be recovered in the event that the update is unsuccessful and requires manual intervention.

3.3.8 Checkout the Installation and Databases

3.3.8.1 Goals of Checkout

There are two principal goals of the post-transition checkout activities:

- Confirm the integrity of data holdings that existed prior to the transition, and
- Ensure that basic mission services (defined below) are operational.

3.3.8.2 Checkout Approach

By the time software transitions occurs, each site's archives will contain mission data. Therefore, integrity of data acquired before transition must be verified. In addition, data storage services integrity must take priority over data access services.

Assumptions:

- Activity in other modes is restricted during transition checkout in the OPS mode.

3.3.8.3 Checkout Sequence

System checkout begins with the verification of the databases. This verification includes the following major activities:

1) Verify inventory integrity of the existing data holdings - Run an SQL analysis against the updated inventory, and verify contents against the pre-transition analysis.

2) Verify archive integrity of existing data (archive check) - Analyze data pointers into the archive. Confirm inventory points to the correct files.

3) Perform pre- and post-transition comparisons.

The system checkout continues with the execution of the standard checkout procedures, augmented for the 5A transition. In case the transition is at risk of exceeding the allocated time, the functional checkout is divided into primary and secondary activities. Primary activities must occur within the transition window. Secondary activities are desirable, but are not mandatory. These activities will be performed as time allows. The primary checkout procedures are only intended to verify that the custom software is installed and configured. Specific functionality and NCR fixes have been tested in the VATC and on-site in TS2 and TS1 modes.

The primary checkout activities include:

1) Verify integrity of primary services on existing data (Search, order, subsetting & distribution) - Existing checkout procedure

2) Verify ingest of new data (ingest and archive) - Existing checkout procedure

3) Verify integrity of primary services on new data (subsetting & distribution) - Existing checkout procedure

4) Verify key functionality added in 5A as specified in Table 3.3-3. These are not full acceptance tests, but rather a cursory check to verify that the installation was correct.– New checkout procedure(s)

The secondary test activities are run at the discretion of the DAAC. These secondary activities include:

1) Verify secondary services (Billing and MOC interfaces) – Existing checkout procedure

2) Verify ASTER D3 ingest capability - Existing checkout procedure

3) Verify On-demand production - Existing checkout procedure

4) Verify tape distribution services - Existing checkout procedure

5) Verify secondary functionality added in 5A, as specified in Table 3.4-4. This table represents a candidate list and will be adjusted base on time availability. These are not full acceptance tests, but rather a cursory check to verify that the installation was correct - New checkout procedure

Table 3.3-3. Primary 5A Functionality

Criteria Key	FG Source	Criteria Statement
1085	SM08	3. Send short or long, successful or error PAN
1093	SM15	3. Perform an ingest of several granules via the INGST SIPS interface capability. The test needs to exercise ingest operations that meet the following criteria: 3.1 The granules must contain Input Pointers using both LGID and UR references.
1247	SM07	5. Demonstrate the ability to correctly ingest ASTER data and to interpret the associated granule level spatial metadata (corner points) as a Gpolygon spatial object.
1248	SM15	3. Perform an ingest of several granules via the INGST SIPS interface capability. The test needs to exercise ingest operations that meet the following criteria: 3.2 At least one ingest request must include a production history granule
1249	SM15	3. Perform an ingest of several granules via the INGST SIPS interface capability. The test needs to exercise ingest operations that meet the following criteria: 3.3 At least one ingest request must include a browse granule
1250	SM15	3. Perform an ingest of several granules via the INGST SIPS interface capability. The test needs to exercise ingest operations that meet the following criteria: 3.4 At least one ingest request must include browse and production history granules
1251	SM15	5. Perform an ingest of a production history granule referencing a previously ingested science granule.
1252	SM15	6. Perform an ingest of a browse granule referencing a previously ingested science granule
1253	SM15	7. Perform an ingest of a QA granule referencing a previously ingested science granule

Table 3.3-4. Secondary 5A Functionality (1 of 2)

Criteria Key	FG Source	Criteria Statement
1229	RM04	7. Import a forwarded ticket at the SMC. Show that the forwarded ticket can be included in searches and that its contents can be displayed
1246	RM12	15. [PRODUCTION HISTORY ORDER]. Perform a V0 search on a Level 2 or higher product that is produced by ECS. Select several granules for ordering and fill in order processing options to order their production history.

Table 3.3-4. Secondary 5A Functionality (2 of 2)

Criteria Key	FG Source	Criteria Statement
1264	RM03	8. Using HP OpenView, make sure the following multi-platform applications are up and running. Then shut them down and restart them from HP OpenView. Verify that all servers belonging to the applications are indeed stopped and then restarted. The Applications to be included in the test are: Science Data Server (Application ID 4000000), including the Science Data Server and the HDF EOS Servers; Storage Management (Application ID 4600000, including all Storage management Servers)"
1266	RM03	10. Start all Sybase instances in the test environment that are part of the 5A ECS delivery and show their status (instance summary).
1267	RM03	11. Verify that the stop and restart of all Sybase instances are correctly monitored.
1268	RM03	12. Initiate activity on the PDPS Sybase instance and perform the following monitoring activities: (a) cache statistics
1269	RM03	12. Initiate activity on the PDPS Sybase instance and perform the following monitoring activities: (b) CPU statistics
1270	RM03	13. Repeat the above step for the SDSRV Sybase instance.
1335	SM18	2. Perform cross mode transfer local to one DAAC. Demonstrate the ability of Ingest (into one mode at a specific DAAC) to properly identify the arrival of email distribution messages, to interpret these messages generated by DDIST (from another mode in the same DAAC) during distribution, to locate (host and path), retrieve and ingest granules identified in the email distribution messages.

Table 3.3-5 presents a sample mapping from test activity to test case. The final mapping is included in the Transition Checkout Procedures for 5A.02, which is an adjunct to the installation instructions. In the table, primary and secondary activities have been italicized.

Table 3.3-5. Mapping: Activity to Checkout Procedure (1 of 2)

ACTIVITY	TEST CASE
DSS CHECKOUT	
Add/View ESDTS (L7,ASTER,system)	DSS Checkout
Insert	DSS Checkout
FTPPush	DSS Checkout
FTPPull	DSS Checkout
Verify primary L7 services on existing and new data (P) (subsetting,distribution)	DSS Checkout
Verify secondary L7 services on existing and new data (S) (MOC Interface)	DSS Checkout
Verify tape distribution services	DSS Checkout

Table 3.3-5 Mapping: Activity to Checkout Procedure (2 of 2)

ACTIVITY	TEST CASE
INGEST CHECKOUT	
Ingest Attitude Polling wo/DR	Ingest Checkout (FDD polling)
Ingest DAP	Ingest Checkout (DAP)
Ingest AST_L1B (D3 Tape)	Ingest Checkout (D3 media)
Ingest L7CPF	Ingest Checkout (SCF polling)
Ingest L7 LPS	Ingest Checkout (auto)
PDPS CHECKOUT	
Register PGEs (ACT,ETS)	PDPS Checkout
Run PGEs (ACT,ETS) *On-demand production workaround for 4PY*	PDPS Checkout
Acquire DAP	PDPS Checkout
QA Monitor	PDPS Checkout
DMS/IOS CHECKOUT	
Search for ASTER	DMS Checkout
Search for L7 data *Verify primary L7 services on existing and new data (P)* *(search,order*	DMS Checkout
Acquire L7 scenes	DMS Checkout
**Verify secondary L7 services on existing and new data (S)* *(Billing Interface)*	DMS Checkout
DMS/MSS Order Tracking	DMS Checkout
CLS CHECKOUT	
Register End Client User w/MSS	CLS Checkout
MSS CHECKOUT	
MSS Startup Servers	MSS Checkout
Register End Client User w/MSS	MSS Checkout
DMS/MSS Order Tracking	MSS Checkout
CSS CHECKOUT	
Enter subscription on DAP	CSS Checkout
Enter subscription on AST_08 for FTPPush	CSS Checkout
Distribution for Subscription	CSS Checkout

3.3.9 Re-enable Operational Data Inputs

At this point, the 5A system has been verified using the standard checkout procedures, which have been augmented for transition as discussed above. All major system functions, most critically the capability to ingest and merge level-0 data, were verified sequentially in all three modes. In addition, site personnel have performed additional verification functions after transition in the TS1 mode.

Re-enabling processing consists of restarting gateways/servers blocking external interfaces (as required) and requesting data providers to resume sending data. Initially, a single granule of each data type is ingested. The transition team is present while DAAC operations personnel verify that the granules are properly archived. At this point, the system is fully restored to operations. In case of breakage, DAAC management decides whether to retain 5A or fall back to 4PY. Since these procedures have been practiced and verified several times, the risk at this point is minimal. However, the ability to quickly restore the 4PY system was demonstrated as a part of the transition in TS2 mode.

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4. 5A to 5B Transition at EDC, GSFC, LaRC, NSIDC

4.1 5A to 5B Transition Overview

The 5A-to-5B transition follows the same general approach as the 4PY-to-5A transition described in Section 3.1. The main difference is the addition of an increased level of automation of ECS Assistant and the improved level of management of the configuration parameters.

The increased level of automation, provided by the ECS Assistant, allows for the entire installation process to be controlled from a single user terminal; automatically running configuration save and database dump scripts; and an enhanced error handling (in conjunction with database and mkcfg scripts).

Historically, the majority of the errors encountered in installations and transitions have involved configuration parameters. To improve the management of configuration parameters a registry database, implemented in Sybase, has been introduced in the 5B Release. During the "make configuration" phase, the ECS Assistant writes the content of configuration (.CFG) files into the Registry Database. "Make Configuration" processing is then switched off and future updates to configuration parameters are made via the Registry GUI. Activation of the registry database is to be activated following transition for additional time savings and risk reduction.

The long-term goal is to significantly reduce the risk and time required to complete the installation and verification in the OPS mode. The goal of the 5A-to-5B transition remains 48 hours or less. This goal will be updated once the dry runs are performed in Landover.

The general sequence of events for 5B transition, from May through the retirement of Release 5A, will be:

- Complete the development of the transition scripts
- Integrate and test the transition procedures in the EDF
- Dry-run transition in the VATC
- Train EDC and GSFC in the VATC on transition procedures
- Provide training support for NSIDC and LaRC during the transitions at EDC and GSFC
- NSIDC and LaRC will receive transition support from EDC and GSFC

- Enable Configuration Registry and Database Replication following the transition to 5B

4.1.1 Transition Assumptions

GENERAL

1. The transition is from a single baseline. That is, if the Custom Software for a given mode is not starting from 5A.***05*** then the appropriate patches will be applied to bring the release to that level before the transition is started.

2. The transition approach is from 5A.***05*** to 5B.***03*****.** Patches beyond this baseline will be dealt with on a case by case basis.

3. COTS software versions match required baseline versions (including Sybase version 11.5.1)

4. Full System backup and any assoicated incremental backup are complete and available prior to the start of the transition.

5. Prior to shutdown the system is quiesced (work queues are allowed to run until they are empty).

6. The 48-hour clock starts when system inputs are disabled, and completes when the system is again receiving operational data.

7. Once operations are restpred, the use of the other modes is kept to a minimum to allow backlogged processing to catch-up.

8. Holding/buffering capability of L0 and higher products is accomplished by either ECS or the Data Providers as discussed in Section 4.1.1.1.

9. DAACs will coordinate with other DAACs, Users (including LPGS), etc., to keep them informed of data outage plans and schedules.

10. The Shared mode to 5B does not need any special updates.

4.1.1.1 Holding/Buffering of Data during Transition

Data coming from the various data provider cannot be ingested during the transition. Hence, either the data is held by the data provider or ECS has to buffer the data in some designated storage area accessible during the downtime. ECS will begin working off the Ingest backlog as soon as it's brought back on line.

Table 4.1-1 provides a synoptic view of the daily data volumes that are ingested by each DAAC under nominal operational conditions by data provider. The table also includes a reference to the document that has been used as a basis for the values reported in the table. Updates to the source document should be reflected in the Transition Plan to verify that the conclusions derived at the end of this paragraph are still valid.

Table 4.1-1 Daily Volumes to be ingested at each DAAC

EDC

Provider	Type	Rate (GB/day)	Buffering	Reference Doc.
LPS	L70R F1,F2	140	72 hours' worth of data by LPS	*C
ASTER GDS	L1A, L1B	136	GSD D3 Tapes	*C
L7IAS	CPF	<1 MB/Mo	ECS	L7 ICD
L7IGS	Metadata & Browse	<2	ECS-SMC	L7 ICD
GSFC	Ancillary	.012	ECS	GSFC DAAC ICD
GSFC	ASTER L0Expedite	<2	ECS	2% Req + *C
MODAPS	MOD Land Products	151	ECS-PDR	*C
GSFC				
EDOS	MODIS L0	70	ECS	*C
EDOS	Ancillary	.012	ECS	S/C ICD
FDD	Ancillary	.012	ECS	FDD ICD
EDOS	ASTER L0Expedite	<2	ECS	2% Req + *C
NOAA	NOAA products	<2	2 weeks' worth of data by NOAA	NOAA ICD
DAS	DAO	2	ECS	DAO ICD
MODAPS	MOD Land Products	60	ECS-PDR	*C
LaRC				
DAS	DAO	<1	ECS	DAO ICD
EDOS	MISR L0	49	ECS	*C
EDOS	MOPITT L0	<1	ECS	*C
METEOR	SAGE III L0 & Higher	<1	ECS	*C
ACRIM	ACRIM L0and Higher	<1	ECS	*C
EDOS	Ancillary	.012	ECS	S/C ICD
FDD	Ancillary	.012	ECS	FDD ICD
NSIDC				
MODAPS	MOD Snow & Ice	16	ECS-PDR	*C

* F&PRS Appendix C (change 7 - 2/8/2000)

From Table 4.1-1 it appears that ECS is taking almost total responsibility for buffering data during the transition period, the most noticeable exception being the L0R F1 and F2 products that are hold by LPS during transition at EDC for as long as 3 days.

A comparison between the ECS storage capacity available at each DAAC versus the requirements derived from Table 4.1-1 is shown in Table 4.1-2. This Table provides details for the two most significant components of the daily volumes – the data that will be stored in the L0

buffers of the ICLHW CI and the MODAPS data that will be stored in the PDR server located at GSFC.

The following assumptions have been made for the comparison:

a) Worst-case transition scenario: 72 hours (48 hours nominal plus 24 of contingency)

b) The disk utilization is no more than 80% of the total disk capacity

c) The partition dedicated to the on-line storage of products generated by MODAPS on the PDR server is 1.0 TB as specified in 423-41-77-7, ICD between ECS and the SIPS.

d) The L0 buffer sizes are 275, 137, and 137 GB respectively at the GSFC, EDC, and LaRC DAAC as shown in the Hardware Diagrams (As-Built) 920-TDG-001 to 920-TDG-004 for, respectively, GSFC, EDC, LaRC, and NSIDC.

Data volumes are derived from Table 4.1-1.

Table 4.1-2. Comparison between Storage availability and storage required by a worst case 5A-to-5B Transition

EDOS+others

DAAC	GSFC	EDC	LaRC	NSIDC
Req. for a 3-day transition (GB)	216	18	159	N/A
80% of L0 Buffer Size (GB)	220	110	110	

MODAPS

DAAC	GSFC	EDC	NSIDC	LaRC	Total
PDR on-line storage (GB)	800				800
Req. for a worst case transition at GSFC (*)	90	151	16	N/A	257
REq. for a worst case transition at EDC	60	453	16		529
Req. for a worst case transition at NSIDC	60	151	48	N/A	259

(*) Assumes 1.5x daily Volume by MODAPS based on: 1) no input from GDAAC, no higher products from MODAPS. 2) Multi-day products could be completed during the transition period.

The table shows that the present size of the L0 buffers should guarantee that no data loss is to be expected during a worst case 3 day' transition at all of the DAACs except for LaRC. The temporary increment of the storage capacity at LaRC is being planned at this time.

The comparison for the MODAPS data accounts for three different transition scenarios, one for each DAAC involved with exchanging of MODAPS data.

During transition at GSFC, MODAPS will not be receiving input data from G-DAAC, thus it will not be producing higher level products. However, an assumption has been made that all the previous day production has to be buffered on the PDR server. An additional 50% of the total daily volume has been added to account for buffering of products covering more than one day that can be produced during the GSFC DAAC off-line period. Hence, the table shows a 1.5x daily volume for GSFC and a nominal daily volume for NSIDC and EDC – based on the fact that these two DAACs keep ingesting data at the nominal rate.

During transition at both NSIDC and EDC, the MODAPS data is produced at the nominal rate. Thus the PDR server needs to be able to buffer, in this case, the nominal daily volume for GSFC and the DAAC that is not undergoing transition plus three times the nominal daily volume for the DAAC that is undergoing transition.

4.1.2 Time Line

This section describes the transition time line, which is applicable to all sites. The sequence in which the sites are transitioned is established based on site availability (operations workload), personnel availability, and the detailed contents of Release 5B. The overall schedule for the transition process is maintained as a part of the Science Data Processing System Master Schedule.

Figure 4.1-1. shows the high-level installation time line in four steps covering 3 to 4 weeks. The highlighted modes reflect Operational Data processing. Step 1 shows the initial install conditions with 5A.***05*** in all three modes. The subsequent steps consisting of a systematic upgrade of each of the three modes. Step 2 provides for the checkout of both the transition procedures as well as the 5B software. Step 3 is essentially a dry run of the actual OPS transition, including the verification of the projected duration. Finally, Step 4 represents the final transition to operations.

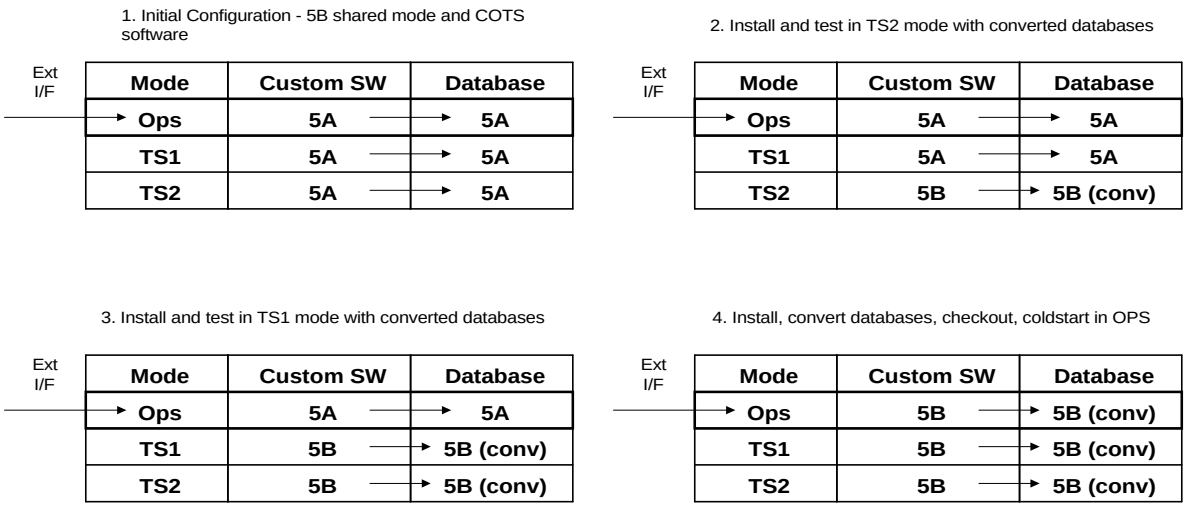

Figure 4.1-1. High Level 5B Installation Time Line

4.2 5A to 5B Transition Approach

The 5A-to-5B transition achieves improved reliability and reduced time requirements through enhanced automation and improved configuration management of configuration parameters.

Table 4.2-1 identifies the sequence of steps to transition the OPS mode.

Table 4.2-1. High-Level Sequence of Events

Event	Estimated Time	Cumulative time	See Section
1. Pre-transition Preparation	N/A	0 hours	4.3.1
2. Quiesce the System	12 hours	12 hours	4.3.2
3. Shutdown/Backup	8 hours	20 hours	4.3.3
4. Install/Configure	2 hours	22 hours	4.3.4
5. Convert System Databases	10 Hours	32 hours	4.3.5
6. Restart the System	1 hour	33 hours	4.3.6
7. Update Existing ESDTs	1 Hour (only 4 ESDT's needed as part of transition window))	34 hours	4.3.7
8. Checkout Installation and Databases	8 hours	42 hours	4.3.8
9. Re-enable Operational Data Inputs	1 hour	43 hours	4.3.9

The following paragraphs describe the major transition activities for the OPS mode. Subsets of these procedures are used in the TS1 and TS2 modes. These paragraphs describe the general sequence of events. The exact sequence is documented in the detailed installation/transition instructions provided with the release.

4.2.1 Pre-Transition Preparation

The following activities should be performed prior to the start of transition. This list is organized by the responsible organization and does not necessarily reflect the actual sequence of events:

1) CM/Construction Office
    a) Baseline the specific version of 5A (custom code, databases and configuration)
    b) Baseline the specific version of 5B (custom code, databases and configuration)
    c) Verify that there is adequate disk space
2) Site Engineering Personnel
    a) Remove all non-operational ESDTs from the system
    b) Install the prerequisite COTS upgrades prior to transition.
    c) Receive and unpack drop 5B
3) Site Operations
    a) Perform full and/or regularly scheduled incremental backups
    b) Start and stop the system
4) Site Management (with support from transition team)
    a) Conduct pre-install reviews
    b) Conduct site-level CCB meetings, as required
    c) Conduct a pre-transition kick-off briefing.

4.2.2 Quiesce the System

System external inputs are suspended. These inputs include user requests as well as ingest operations. For example, EDC personnel coordinate the suspension of Landsat data from the LPS.

Assumptions:

- Site operations personnel are responsible for coordinating the details of how external inputs are suspended/disabled and will schedule the transition with local operations.
- Queues can be monitored to determine when they are inactive.

4.2.3 Shutdown/Backup

The system shut down is performed (stopping all of the ECS processes) after the system has been quiesced. Special backups of the system configuration files and databases are made. The backup of system configuration parameters and databases performed at this stage are complete and

consistent across all ECS databases since there is no database update activity occurring. Scripts are provided to perform the following functions:

- Verify the contents of the archive vs. the inventory
- Capture the pre-transition inventory
- Produce a list of orphaned granules

4.2.4 Install/Configure

Prior to installation, a clean-out script is executed to delete all elements of the mode that are not to be transitioned. A detailed list of these items is included in the installation/transition instructions.

ECS Assist and various transition scripts are used to perform the installation and transition of ECS.

Assumptions:

- All COTS products are up to baseline requirements

4.2.5 Convert System Databases

The 5B release contains database transition scripts that perform the following functions:

- Dump scripts to capture the database prior to transition
- Load scripts to restore the database to an earlier, dumped version
- Description scripts to view the structure of the database - used to perform comparisons to a transitioned test/checkout database from the VATC
- Checksum scripts to quantitatively compare the database before and after transition
- Patch scripts to update the database schema
- Verify scripts to list the logical key data values for each table within a database - used to qualitatively compare the database before and after the transition.

These scripts are executed by transition team at the proper time during the install process. Table 4.2-2 shows the databases to be converted in the migration from 5A to 5B.

Table 4.2-2. Database Transition Scripts between 5A and 5B

Database	Transition 5A.*05* to 5B.*03*	Notes
DM Database	Transition and verify using custom scripts and checksums	
INGEST Database	Transition and verify using checksums only	
IOS Database	Transition and verify using custom scripts and checksums	
MSS Database	Transition and verify using custom scripts and checksums	
PDPS Database	Transition and verify using custom scripts and checksums	
SDSRV Database	Transition and verify using custom scripts and checksums	Update search indices for existing global granules
STMGT Database	Transition and verify using checksums only	
SBSRV Database	Transition and verify using checksums only	

4.2.6 Restart the System

Based on the extent of changes between major releases, a coldstart is required.

4.2.7 Update Existing ESDTs

In the 5B transition, a few operational ESDTs will have to be transitioned using the Update ESDT capability, which is delivered as a part of the release. Presently, 4 ESDTs are expected to be updated during the transition. Overall, the level of effort requested for the completion of this phase is supposed to be significantly less than the one needed during the 4PY-to-5A transition at EDC, where about 1300 ESDTs had to be updated.

4.2.8 Checkout the Installation and Databases

4.2.8.1 Goals of Checkout

There are two principal goals of the post-transition checkout activities:

- Confirm the integrity of data holdings that existed prior to the transition, and
- Ensure that basic mission services (defined below) are operational.

4.2.8.2 Checkout Approach

By the time software transitions occurs, each site's archives will contain mission data. Therefore, integrity of data acquired before transition must be verified. In addition, data storage services integrity must take priority over data access services.

Assumptions:

- Activity in other modes is restricted during transition checkout in the OPS mode.

4.2.8.3 Checkout Sequence

System checkout begins with the verification of the databases. This verification includes the following major activities:

1) Verify inventory integrity of the existing data holdings - Run an SQL analysis against the updated inventory, and verify contents against the pre-transition analysis.
2) Verify archive integrity of existing data (archive check) - Analyze data pointers into the archive. Confirm inventory points to the correct files.
3) Perform pre- and post-transition comparisons.

The system checkout continues with the execution of the standard checkout procedures, augmented for the 5B transition. In case the transition is at risk of exceeding the allocated time, the functional checkout is divided into primary and secondary activities. Primary activities must occur within the transition window. Secondary activities are desirable, but are not mandatory. These activities will be performed as time allows. The primary checkout procedures are only intended to verify that the custom software is installed and configured. Specific functionality and NCR fixes have been tested in the VATC and on-site in TS2 and TS1 modes.

The primary checkout activities include:

1) Verify integrity of primary services on existing data (Search, order, subsetting & distribution) - Existing checkout procedure
2) Verify ingest of new data (ingest and archive) - Existing checkout procedure

3) Verify integrity of primary services on new data (subsetting & distribution) - Existing checkout procedure

4) Verify key functionality added in 5B. These are not full acceptance tests, but rather a cursory check to verify that the installation was correct.– New checkout procedure(s)

The secondary test activities are run at the discretion of the DAAC. These secondary activities include:

1) Verify secondary services (Billing and MOC interfaces) – Existing checkout procedure

2) Verify ASTER D3 ingest capability - Existing checkout procedure

3) Verify On-demand production - Existing checkout procedure

4) Verify tape distribution services - Existing checkout procedure

5) Verify secondary functionality added in 5B. These are not full acceptance tests, but rather a cursory check to verify that the installation was correct - New checkout procedure

4.2.9 Re-enable Operational Data Inputs

At this point, the 5B system has been verified using the standard checkout procedures, which have been augmented for transition as discussed above. All major system functions, most critically the capability to ingest and merge level-0 data, were verified sequentially in all three modes. In addition, site personnel have performed additional verification functions after transition in the TS1 mode.

Re-enabling processing consists of restarting gateways/servers blocking external interfaces (as required) and requesting data providers to resume sending data. Initially, a single granule of each data type is ingested. The transition team is present while DAAC operations personnel verify that the granules are properly archived. At this point, the system is fully restored to operations. In case of breakage, DAAC management decides whether to retain 5B or fall back to 5A. Since these procedures have been practiced and verified several times, the risk at this point is minimal. However, the ability to quickly restore the 5A system was demonstrated as a part of the transition in TS2 mode.

4.2.10 Actual Timings from EDC 4PY to 5A Transition

Note: This section is provided as a basis for the projected time required for the transition in Table 4.2-1 High-Level Sequence of Events. While the timing was for 5A transition at EDC it still provided a good basis of what to expect for 5B.

Table 4.2-3. EDC 4PY to 5A Transition Timings (1 of 2)

Activity	Hours
Predecessor Activities	N/A
Sync 4PY.12. .cfgparms	
Full Legato backup	
Save DAAC unique extensions (MOC script,...)	
Quiesce System and Backup Activities	2.0
Quiesce System including TS2 and TS1	
Backup and Pre-Install Activities	10.7
Sybase Dumps	
Standard Legato Incremental backup	
Build SDSRV/STMGT "as was" list (after ingest/dist stops)	
Verify OPS environment	
Run 4PY Save Script	
ESDT and Data Clean up	
SME config file save	
Save off selected data/database	
Mode shutdown (all servers,GUIs, test bin.)) All modes	
Shutdown all Sybase Servers	
Compare db objects EDC to VATC to re-validate Landover test environment	
Restart all Sybase servers in single user mode	
Rename all Sybase error logs	
Sybase backups done (dump databases)	
Restart all Sybase servers in multi-mode	
Tar up files and save	
Clean up cds entries	
Run Incremental legato Backup for Sybase	
TS2 and TS1 can be brought back up	
Installation Activities	6.7
Run Delete Mode Script (custom code clean out)	
Run touch .cfgparms and .dbparms script	
Auto Install	
Run make config where indicated	
Regenerate archresconfig	
Make CDS entries	
Run Database Check Scripts for 4PY	
Install Code Patches	

Table 4.2-3. EDC 4PY to 5A Transition Timings (2 of 2)

Database Patch Activities	4.5
Run dbpatch upon DBA approval	
Database contingency time	
Verify dbpatch	
db patch review and mop-up	
Run Database Check Scripts for 5a	
Analysis of Db Check Scripts	
Re-apply any DAAC Unique extensions	
Review archive and inventory	
Sybase backups (dump databases)	
Databases brought back up	
Update ESDT	0.8
SDSRV to maintenance state for ESDT work	
Run Update ESDT	
Subsystems are brought up	
SDSRV boot to operational state	
Test	3.0
Add ESDTs	
Run checkout procedures	
Enable Ops	0.2
Turnover to OPS	

4.3 VATC Training and Transition Team

4.3.1 VATC Transition Training

Table 4.3-1. Plan for the Transition Training Week in the VATC (5A-to-5B) (1 of 2)

Day	Activities	Remarks
Mon.	• Schedule Presentation(Short and Long Term) • Team Assignments/Responsibilities • 5B description • Review of sitemap • Review of transition instructions and the cfgpatch • Review of test procedures	Kick-off Meeting
	• Assemble in VATC Lab • Install 5A test executables (*) • Regression test 5A (*) • QA audit of .cfgparms and dbparms (*)	VATC (*)1st time around only
	• Delete Mode for Transition • Install 5B + tests executables	1st transition cycle starts

Table 4.3-1 Plan for the Transition Training Week in the VATC (5A-to-5B) (2 of 2)

Day	Activities	Remarks
Tue.	• Configure subsystems • DBA runs pre-install DB checks • Subsystems run DB migrate scripts • DBA runs post-install DB checks • Start-up system and begin checkout tests	
Wed.	• Complete checkout tests • Run rollback to 5A + test executables • Start and complete rollback testing --- • Delete mode for transition	1st Transition cycle ends --- 2nd transition cycle starts
Thu.	• Install 5B + test executables • Configure subsystems • DBA runs pre-install DB checks • Subsystems run DB migrate scripts • DBA runs post-install DB checks • Start-up system	
Fri.	• Complete checkout tests • Run rollback to 5A + test executables • Start and complete rollback testing --- • Lessons Learned • NCR status review	2nd transition cycle ends --- Wrap-up meeting

4.3.2 Transition Team Capabilities:

The following is a description of the skill set needed for the 5A-5B transition team. More detail for the lead and alternate slots will be provided at a later date.

Lead: Senior Engineer responsible for:

- Running the transition integration lab
- Training of DAAC personnel in transition
- Quality of transition software, documentation and procedures

Alternate: Senior Engineer capable of filling in for the lead.

Subsystem expertise (one person each) in the following areas. Subsystem expertise means experience in the installation, configuration, operation and troubleshooting of the subsystem for which they are responsible. This involves details knowledge of the database operations associated with the subsystem, if applicable, as well as experience with running subsystem testing.

- Storage Management and Distribution
- Planning and Processing
- Science Data Server
- Ingest
- Infrastructure/Data Management/Advertising
- Management
- Client

Additionally, the team will require a separate full time Sybase person, responsible for monitoring all changes to system database to ensure database integrity through the transition.

4.4 5A to 5B Post Transition Activities

Following the 5A to 5B transition two items will still need to be completed at the DAACs. One is enabling database replication, the other is enabling the Configuration Registry. Instructions for accomplishing these tasks will be in the installation instructions for 5B.

4.4.1 Replication Using the SMC:

Starting with custom code 5B, functional capability using SMC will be modified to replicate a number of items across each DAAC making it possible that selective critical information will be the same from one DAAC to another. Some of this critical information is: (a) User Profile Information; (b) ASTER GDS Order Tracking.

- **User Profile Information:** Information that is provided during registration by new user, at any DAAC, is made available to the other DAACs. In addition, the SMC allows user profile information, that is inserted at one DAAC, to be replicated to the other DAACs. At a mutually agreed time between DAACS, this information is up-loaded from the SMC to all DAACs.
- **ASTER GDS Order Tracking:** SMC keeps track of ASTER Orders and routes them to the respective DAACs for processing. The status associated with each ASTER order is updated and archived at the SMC

4.4.2 Configuration Registry:

The configuration registry database replaces the configuration files (*.CFG) that have been difficult to manage in the past.

The mode where the registry is to be installed must be running ECS 5B or later. The registry should be brought online within one week of the 5B tranistion copletion. The configuration registry update should occur before the first patch to 5B, since Landover will in future maintain configuration parameters via registry database patches.

The following steps are used to transition to the registry:

1. Run the registry DbBuild script EcCsRgDbBuild to create an empty registry database on the ingest server.

2. On each machine, run the registry population tool (/tools/common/ea/EcCoPopulateRegistry) to copy the configuration parameters from the .CFG files into the registry database. This is a manual process. The tool allows either an individual file or all .CFG files in a directory to be specified.

3. In 5B, ECS servers will use .CFG files, if present in /usr/ecs/<mode>/CUSTOM/cfg when the server is started. Otherwise, ECS servers will use the registry. Therefore, after populating the registry, move the .CFG files to another directory, and servers will use the registry next time they restart. This allows the registry to be brought online (and taken offline) on a server-by-server basis.

Once the registry has been populated, maintenance of the parameters must be via the GUI or via database patches. Changes to the .CFG files or the .cfgparms files will not result in changes to the registry, unless the .CFG files are re-imported into the registry. The ability to create .CFG files during the "make config" phase of Ecs Assist processing can be switched off (via a configuration parameter, of course) after the initial population of the registry.

Java executables will not use the registry; they will continue to run “make config” and use configuration files. Generation of extension parameters (such as Storage Management's ArchResConfig) during the Ecs Assist "make config" phase will remain in use, in 5B.

The installation instructions for drop 5B will specify this process in detail.

4.5 5A to 5B Transition Contingencies

Risks:

- Data loss/corruption

  Contingencies: Perform a special backup of system configuration files and databases prior to transition in each mode. The ability to restore the system from these backups and the current software baseline is demonstrated. There is also a secondary backup consisting of the routine full-system backup plus the daily incremental backups.

- Problems encountered preventing a 48 hour transition in OPS mode

  Contingencies: Restore ECS system from the contingency backup. Perform real-time assessment of problem to determine if the installation/transition can be re-performed or other action taken to correct the problem, possibly extending beyond the 48-hour period. For GSFC and LaRC, procedures to move buffered data from the Ingest server to other storage are provided.

- Problems restoring system from backup

  Contingency: Use full-system backup and daily incremental backups to restore the system.

- Data loss/corruption in EDOS transfers while Ingest is shut down for transition

  Contingency: Provide procedures to manually load data from EDOS-supplied tape.

Appendix A

Lessons Learned From 4PX-to-4PY Transition at EDC

This appendix captures lessons learned from the 4PX-to-4PY transition at EDC. This appendix, along with Section 2, will be maintained for historical purposes.

Positives To Carry Forward

- Continuity of the team: the personnel in the VATC at the start, were at EDC at the end
- Iterative improvements (practice makes perfect)
- Priority: transition was given high priority relative to other activities
- Good support and involvement from the DAAC
- Good support from RTSC, Test, and Development
- Designed a game plan early on and stuck to it throughout

Problems and Proposed Solutions (1 of 2)

	Problem	***Proposed Solution***
1	Configuration parameter problems: a. .cfgparms out of sync with .cfg files b. emulation didn't get done c. no process for determining the delta from 4PX to 4PY	Improve the process for managing configuration parameters. Increase DAAC awareness of the importance of keeping .cfgparms synchronized with the .cfg files.
2	DAAC baseline was not as expected a. paths in .cshrc files b. archive IDs c. configuration parameter values	Audit the DAAC and fix discrepancies before transition

Problems and Proposed Solutions (2 of 2)

	Problem	***Proposed Solution***
3	Scripts (save, clean, restore) were coded during integration; errors required debugging at the DAAC	Integrate in the Functionality Lab, and spend an extra week in the VATC
4	Inconsistent database script instructions across the subsystems	DDM to standardize
5	Trouble tickets need to be written promptly	Appoint a trouble ticket point-of-contact during transition
6	Install made complicated by number of field fixes and fixes from Landover to be carried forward	Document what to install in Install Instructions
7	DAAC schedule (e.g. JDT demo) and gates for transition not known in advance	Work with DAAC management to create a plan and explicit gates, e.g. requirements for: a. demonstration of rollback b. dress rehearsal c. tests over and above the checkout procedures
8	Training and exposure to the new release needs to go across all modes/organizations	Make sure the DAAC's plan includes training and exposure for all organizations
9	Too much breakage in the VATC; no test plan going into the VATC	Integrate in the Functionality Lab; write a test plan.