File-based Processing and Migration System

System Requirements Specification

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FPMS System Requirements Specification

Prepared By:

_____

Jay Cable
Sustaining Engineer

_____

J. Patrick O'Neill
Principal Systems Engineer

Reviewed By:

_____

Scott Arko
Engineering Development Lead

Approved By:

_____

Dr. Nettie Labelle-Hamer
ASF Science Center Manager

_____

Carel Lane
ASF Operations Center Manager

_____

Jamie Marschner
ASF Engineering Center Manager

_____

Dr. Roger Smith
ASF Director (Acting)

Document: FPMS System Requirements Specification

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Table of Contents

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1.0 Introduction

1.1 Identification of Document

This is the System Requirements Specification (SRS) for the File-based Processing and Migration System (FPMS).

1.2 Scope

This specification presents the functional, performance, and interface requirements for the hardware and software comprising the FPMS. The File-based Processing and Migration System encompasses the functionality to: migrate data presently on *SONY ID-1* and *DCRSi* data tapes to "capture" files into the *StorageTek Powderhorn 9310 Tape Library*, perform basic data quality checks on captured data files, and allow Level Zero (L0) and Level One (L1) products to be produced from migrated data.

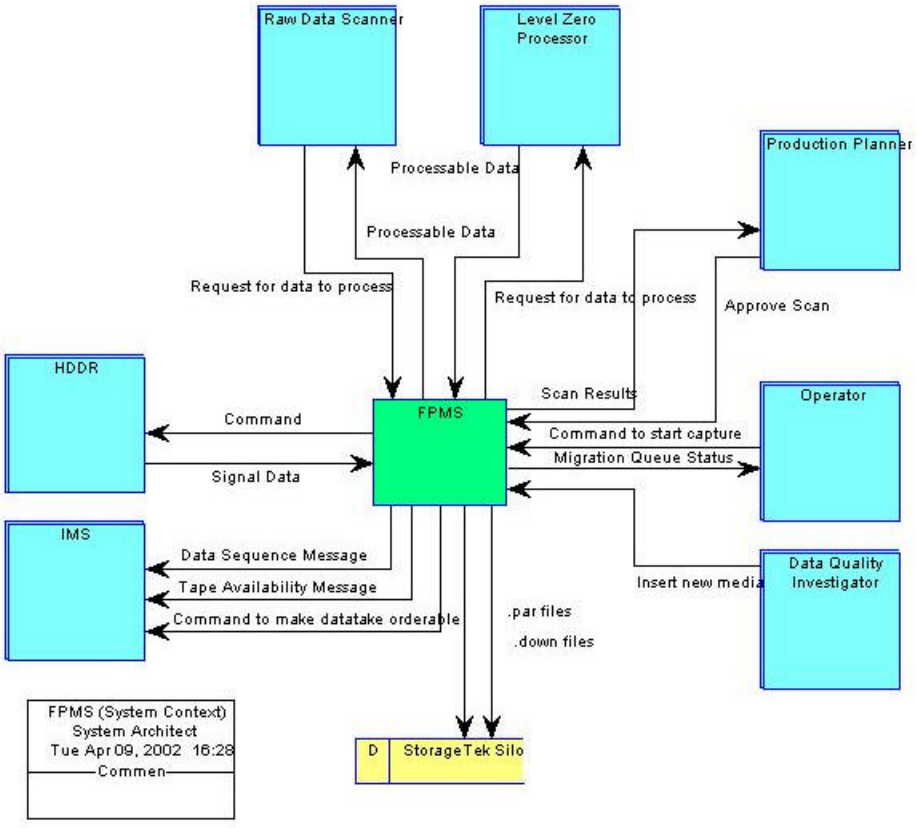

Figure 1: FPMS Context Diagram

1.3 Purpose

The purpose of this SRS is to formally document the consolidated requirements of all hardware and software items associated with the File-based Processing and Migration System. This document is a Level 2 specification, which identifies in detail what functions the system must perform, and the extent to which it must perform those functions.

The requirements comprise the assessed needs of the Alaska Synthetic Aperture Radar (SAR) Facility (ASF) as they relate to ASF's role as a Distributed Active Archive Center (DAAC) and data provider. Specifically, the requirements translate the needs of ASF to safely store and simultaneously process data presently stored within the ASF archive.

The document structure and functional breakdown contained here should not be construed as physical architecture or a pre-conceived component allocation. The formatting serves only as a logical compartmentalization of functionality for organizational purposes although the order of sections 4.0 and 5.0 nominally follow the chronological order of processes.

1.4 Document Status and Schedule

Version 1.0 of this document is scheduled for release on 1 May 2002. Interim draft releases will be numbered 0.1, 0.2, 0.3 etc.

1.5 Documentation Organization

1. *Introduction*

This section identifies the physical document itself in terms of its purpose and scope. It goes on to provide its present status, schedule, and physical organization.

2. *Related Documentation*

The purpose of this section is to provide the references for this document.

3. *Requirements Approach*

This section will describe the overall approach in gathering, analyzing, and synthesizing requirements. It will explain the tradeoff process used to analyze conflicting requirements and arrive at the actual specifications for those requirements. Requirements trades and analysis information (such as a prototyping effort report), especially those that must be reevaluated or considered when changes are proposed during development or maintenance, should be included in an appendix or explicitly referenced.

4. *External Interface Requirements*

This section contains the specification of requirements for interfaces between this system and its external environment, including users.

5. Requirements Specification

This section contains the specification of requirements for function, performance, quality, safety, and security of the system, as well as for the structure, source, and output of the data handled by the system. Furthermore, this section goes on to identify constraints on the design and design goals.

6. Acronyms

The "Acronyms" section contains an alphabetized list of the acronyms used in this document.

7. Glossary

The "Glossary" contains an alphabetized list of definitions for special terms used in this document. Special terms are those used in a sense that differs from or is more specific than the common usage for such terms.

8. Notes

This section presents information that aids in understanding the information provided in previous sections, and which is not contractually binding.

9. Appendices

The appendices contain material that is too bulky, detailed, or sensitive to be placed in the main body of text. Refer to each appendix in the main body of the text where the information applies. Appendices may be bound separately, but are considered part of the document and shall be placed under configuration control as such.

2.0 Related Documentation

2.1 Parent Documents

Parent Documents are those volumes from which this document's scope and content are derived. Whether this document expands the scope of the FPMS demarcated in the parent documents or reduces it, its specifications will supersede those documents.

Doc. Number	Rev. and Date	Title
	Version 1.6, April 9, 2002	FPMS Operational Concept
GI-02-13	September 2001	Continuation Proposal To National Aeronautics And Space Administration (Contract #NAS5-98129), FY02 Operations and Management of the Alaska Synthetic Aperture Radar (SAR) Facility

2.2 Applicable Documents

Applicable Documents (ADs) are those specifications, standards, criteria, etc. used to define the requirements of this specification. The following sections list documents applicable to this specification. Unless specific versions and/or issue dates are cited, the most recent version of documents shall apply. Applicable documents shall be considered binding on the system.

2.2.1 Precedence Statement

In the event of a conflict between an AD and this specification, this specification shall take precedence. Should a conflict occur among ADs, the Engineering Center Manager will be consulted for resolution.

Doc. Number	Rev. and Date	Title
	October 2001	Information Technology (IT) Security And Contingency Plan For The Alaska SAR Facility
	Version R2.1, Issue 1.1, May 20, 1997	Dub Station/IMS Interface Control Document
ER-IS_EPO_GU-0107-1.5 Issue 1	Revision 5, March 6, 1995	ESRIN ERS Central Facility to National and Foreign Ground Stations Interface Specification
NASDA HE-89033	Revision 4, April 15, 1993	JERS-1 Operational Interface Specification
815650	Revision A	RADARSAT X-Band ICD

2.3 Information Documents

Information documents are those documents included for information purposes; they provide insight into the operation, characteristics, and interfaces associated with FPMS, as well as relevant background information

Doc. Number	Rev. and Date	Title
	August 26, 1999	NASA Procedures and Guidelines 2810, NASA Information Technology Security Guidelines
VX-INC-001	July 12, 2000	Vexcel 3dSAR SAR Processing System: Installation and Configuration Manual
		Agreement Between the European Space Agency and the United States Aeronautics and Space Administration Concerning the Direct Reception of ERS-2 SAR Data
		Agreement Between the National Space Development Agency of Japan and University of Alaska Fairbanks for Cooperation on Earth Observation Research
		Memorandum of Understanding Between Canadian Space Agency of Canada and National Aeronautics and Space Administration and National Oceanic and Atmospheric Administration of the Department of Commerce of the United States of America Concerning the RADARSAT Project
MT3034 E	January 2002	*StorageTek* T9940 Tape Drive Specifications
	March 28, 2002	*StorageTek* Powderhorn 9310 Tape Library Specifications, http://www.storagetek.com/prodserv/products/tape/9310/9310_sp.htm
603009 Rev A	June 2000	AMASS Overview, AMASS Version 4.13

3.0 Requirements Approach

3.1 Function

The concept for the FPMS arose from a need to address the problem of aging DCRSi media in the ASF working and archive signal libraries. The integrity of SAR signal data transcribed to these tapes is in danger of being compromised by deterioration of the media; therefore, the data must be migrated to new media in the near term. ASF is required by existing Memorandums of Understanding (MOU) to maintain its data archive for a period of time that extends past the End of Mission (EOM) of many of the supported platforms. FPMS requirements were derived from the *intentions* stated in the Continuation Proposal to National Aeronautics and Space Administration (Contract #NAS5-98129 for fiscal year 2002:

> **Priority 1 - Migrate and Preserve Data Archive.**
> ASF will manage the archive migration process to ensure that it meets the required performance goals and quality metrics. A plan will be issued prior to the start of the migration process, which will dictate how the process is to execute (concurrent with normal DAAC operations). This activity supports the ASF Contract Statement of Work (SOW) items: 3.2 and 5.2.
> FY02 Goals:
> - Migrate DCRSi tapes to Sony tapes for data preservation;
> - Create and implement a detailed L0 migration schedule.
>
> **Priority 9 - L0 Migration**
> ASF is migrating the entire archive of raw signal data to Level 0 format and storing it in a mass storage device for the purpose of preserving the archive as well as ensuring efficient Level 0 processing. ASF is working with external contractors to develop and test software subsystems needed to interface with the Level Zero Processor, Level 0 Archive Manager and Level 0 Controller. ASF will complete a data migration plan for archive migration priorities. This activity supports the ASF Contract Statement of Work (SOW) items: 3.2, 4.1, 4.3, 4.4, and 5.2.
> FY02 Goals:
> - Complete data migration plan for archive migration priorities;
> - Complete development and testing of L0 migration capabilities including archival in mass storage device;
> - Create and implement a detailed L0 migration schedule.

The objectives of the FPMS and specifications thereof are commensurate with the aim of these two priorities.

ASF has already procured a *StorageTek Powderhorn 9310 Tape Library* and 9940 media for this purpose, constraining the design to include the silo as the data store for migrated files.

ASF's function as a DAAC implies additional requirements that ASF be able to process and distribute higher-level data products from its archive, on demand, to any registered customer. The User Services Office (USO) in the ASF Science Center has stipulated that users not be prevented from ordering any data during or after the migration.

The requirements for managing migration were largely taken from the existing functionality of the ASF Level Zero Processing queue. Data capture is a subset of Level Zero processing and as such will require many of the same bookkeeping functions. Additional functional requirements were added to the FPMS in consultation with the intended users.

The Science Center added significant input to the QC Investigator functions for reviewing and approving scans. Furthermore, the System Administration group gave input related to safety and security requirements.

3.2 Performance

Performance specifications for the migration and subsequent file-based processing were established from prototyping, analysis of the present production metrics (L0 and L1), and a polling of the Operations staff.

4.0 External Interface Requirements

The FPMS has three intended users, Control Room Operators, a Quality Control (QC) Investigator, and Production Planners. The Operators will be responsible for the day-to-day operations of migration and file-based processing. The QC Investigator will troubleshoot and render disposition on any failures the Operators may encounter during capture and scan processes. The Production Planner will be responsible for ensuring continuity of job flow within the current system in light of the FPMS's interaction with it.

In the course of fulfilling their respective responsibilities, both users will need to interact with the FPMS. The following sections specify the requirements for the user interfaces in terms of functions to be performed by the users.

4.1 Operator Interface

4.1.1 The FPMS shall allow the Operator to view a list of all the tape segments that are in the migration queue.

4.1.2 The FPMS shall allow the Operator to restrict their view to only a list of the tape segments that are "ready to be captured" in the migration queue.

4.1.3 The FPMS shall allow the Operator to view a unique identifier associated with each tape segment in the migration queue.

4.1.4 The FPMS shall allow the Operator to view an integer value for each tape segment in the migration queue, starting with "1" for the first segment and ending with X for the last segment, in ascending order.

4.1.5 The FPMS shall allow the Operator to view the priority value associated with each tape segment in the migration queue.

4.1.6 The FPMS shall allow the Operator to view the media ID associated with each tape segment in the migration queue.

4.1.7 The FPMS shall allow the Operator to view the media dog tag associated with each tape segment in the migration queue.

4.1.8 The FPMS shall allow the Operator to view the media type associated with each tape segment in the migration queue.

4.1.9 The FPMS shall allow the Operator to view the tape start address associated with each tape segment in the migration queue.

4.1.10 The FPMS shall allow the Operator to view the tape stop address associated with each tape segment in the migration queue.

4.1.11 The FPMS shall allow the Operator to view the status of each tape segment in the migration queue.

4.1.12 The FPMS shall allow the Operator to view the tape segment status of each tape segment in the migration queue.

4.1.13 The FPMS shall allow the Operator to view all tape segment fields simultaneously.

4.1.14 The FPMS shall allow the Operator to view the scan status of each datatake in the migration queue.

4.1.15 The FPMS shall allow the Operator to sort a list of the tape segments and their associated fields by any viewable field.

4.1.16 The FPMS shall allow the Operator to perform a *layered* sort (up to 3).

4.1.17 The FPMS shall prompt the Operator to mount a tape for migration with a visual message that includes the media ID.

4.1.18 The FPMS shall require the Operator to initiate each capture.

4.1.19 The FPMS shall require the Operator to scan a tape's dog tag prior to mounting it for capture.

4.1.20 The FPMS shall allow the Operator to manually enter a tape's dog tag prior to mounting it for capture in lieu of scanning it.

4.1.21 The FPMS shall allow the Operator to select any single tape segment with a status of "ready for capture" for migration from the migration queue.

4.1.22 The FPMS shall allow an Operator to view the BER map in real time during a capture.

4.1.23 The FPMS shall allow the Operator to cancel a capture during the capture process.

4.1.24 The FPMS shall allow the Operator to ascertain the progress of a capture in terms of percentage complete.

4.1.25 The FPMS shall alert the Operator when a capture event is completed.

4.1.26 The FPMS shall graphically present the Operator with a Bit Error Rate map for each captured tape segment after the capture is completed.

4.1.27 The FPMS shall prompt the Operator to either *accept* or *reject* the capture result of each captured tape segment before Data Sequence Messages or Tape Availability Messages are issued to the IMS.

4.1.28 The FPMS shall allow the Operator to view the BER map for any tape segment captured as part of migration at any time after the capture.

4.1.29 The FPMS shall allow the Operator to view a text file listing of all the status changes and when they occurred (DD/MM/YYYY HH:MM:SS) for any tape segment in the migration queue.

4.1.30 The FPMS shall allow the Operator to input a text comment at the console of the machine hosting the migration queue corresponding to an individual tape segment, truncated to one thousand characters inclusive.

4.2 Quality Control Investigator Interface

The Quality Control Investigator interface shall have the same requirements as the Operator interface, plus the following additional requirements.

4.2.1 The FPMS shall allow the QC Investigator to add new tape segments to the migration queue by allowing him/her to select a tape queue file from a directory on the local machine and ingest it so that its entries populate the migration queue.

4.2.2 The FPMS shall allow the QC Investigator to add a single new tape segment to the migration queue by specifying a media id, tape start address, tape stop address, and a priority value.

4.2.3 The FPMS shall allow the QC Investigator to replace the source media, and start and stop addresses for any tape segment already existing in the migration queue.

4.2.4 The FPMS shall allow the QC Investigator to change the status of any tape segment in the migration queue.

4.2.5 The FPMS shall allow the QC Investigator to change the priority value of any tape segment in the migration queue.

4.2.6 The FPMS shall allow the QC Investigator to input an electronic text comment at the console of the machine hosting the migration queue corresponding to an individual tape segment, truncated to one thousand characters inclusive.

4.2.7 The FPMS shall allow the QC Investigator to query all media (returned as media ID, media dog tag, start address, and stop address) at ASF that contain a downlink (specified by platform, revolution and downlink sequence number).

4.2.8 The FPMS shall allow the QC Investigator to query all downlinks (returned as platform, revolution and downlink sequence number) residing on a particular medium (specified by media ID, media dog tag, start address, and stop address).

4.2.9 The FPMS shall allow the QC Investigator to list the datatakes (SAT/REV/DTK SEQ) associated with any tape segment in the migration queue in the order that they were received in the downlink.

4.2.10 The FPMS shall allow the QC Investigator to view a list of the tape segments that have not been scanned and accepted.

4.2.11 The FPMS shall allow the QC Investigator to view all tape segments within the migration queue that have been scanned but that have not been accepted by the QC Investigator.

4.2.12 The FPMS shall allow the QC Investigator to view the date that a particular media was written.

4.2.13 The FPMS shall allow the QC Investigator to view the ASF IMS order number of any scanned datatake.

4.2.14 The FPMS shall allow the QC Investigator to view the ASF IMS item number of any scanned datatake.

4.2.15 The FPMS shall allow the QC Investigator to view the Station ID associated with any scanned datatake.

4.2.16 The FPMS shall allow the QC Investigator to view the beam mode associated with any scanned datatake.

4.2.17 The FPMS shall allow the QC Investigator to view the satellite, datatake revolution, datatake sequence of any scanned datatake.

4.2.18 The FPMS shall allow the QC Investigator to view the media ID of any scanned datatake.

4.2.19 The FPMS shall allow the QC Investigator to view the expected duration of any scanned datatake.

4.2.20 The FPMS shall allow the QC Investigator to view the actual duration of any scanned datatake.

4.2.21 The FPMS shall allow the QC Investigator to view the quotient of actual duration (dividend) and expected duration (divisor) of any scanned datatake.

4.2.22 The FPMS shall allow the QC Investigator to view the number of frames found in any scanned datatake.

4.2.23 The FPMS shall allow the QC Investigator to view the Bit Error Rate of any scanned datatake as reported by the ASF Raw Data Scanner.

4.2.24 The FPMS shall allow the QC Investigator to view the number of segments found in any scanned datatake.

4.2.25 The FPMS shall allow the QC Investigator to input an electronic text comment at the console of the machine hosting the migration queue corresponding to a datatake, truncated to one thousand characters inclusive.

4.2.26 The FPMS shall allow the QC Investigator to view the Scan Results File(s) for any datatake for which SRFs exist in the IMS database.

4.2.27 The FPMS shall allow the QC Investigator to view the RDS log file for any datatake scanned as part of migration.

4.2.28 The FPMS shall allow the QC Investigator to *accept* the scan results from a segment that has been scanned.

5.0 Requirements Specification

5.1 Process and Data Requirements

5.1.1 The FPMS shall populate a migration queue from an electronic file containing at a minimum, a list of tape segments with corresponding start and stop addresses, and a priority value.

5.1.2 The FPMS shall assign a “Ready to be captured” status to each tape segment that is ingested into the migration queue.

5.1.3 The FPMS shall assign a “Ready to be captured” status to each tape segment in the migration queue that has not been captured.

5.1.4 The FPMS shall assign a “Capture in process” status to each tape segment in the migration queue that is being captured.

5.1.5 The FPMS shall assign a ”Captured, waiting to be scanned” status to each tape segment in the migration queue that has been captured but not scanned.

5.1.6 The FPMS shall assign a “Scan in process” status to each tape segment in the migration queue for which there is a datatake within that segment that is being scanned.

5.1.7 The FPMS shall assign a “Failed capture” status to each tape segment in the migration queue whose capture was rejected.

5.1.8 The FPMS shall assign a “Failed capture” status to each tape segment in the migration queue whose capture is cancelled by the Operator.

5.1.9 The FPMS shall assign a “Waiting for Scan QC” status to each tape segment in the migration queue that has been scanned.

5.1.10 The FPMS shall assign a “Migrated and catalogued” status to each tape segment in the migration queue that has been captured, scanned, and accepted by the QC Investigator.

5.1.11 The FPMS shall assign a “Failed scan QC” status to each tape segment in the migration queue that has been captured, scanned, and rejected by the QC Investigator.

5.1.12 The FPMS shall perform entire tape captures regardless of media.

5.1.13 The FPMS shall be capable of capturing data from any SONY ID-1 medium HDDT to a *.down* file.

5.1.14 The FPMS shall be capable of capturing data from any SONY ID-1 large HDDT to a *.down* files.

5.1.15 The FPMS shall be capable of capturing data from any DCRSi HDDT to a *.down* file.

5.1.16 The FPMS shall store all captured data as *.down* files (RADARSAT X-Band ICD, ESRIN ERS Ground Station Interface Specification, JERS-1 Operational Interface Specification).

5.1.17 The FPMS shall store the associated *.par* file along with each *.down* file (VEXCEL DOCUMENT).

5.1.18 The FPMS shall store the annotation track associated with each tape segment.

5.1.19 The FPMS shall store only *accepted* capture files (*.down*).

5.1.20 The FPMS shall issue a Data Sequence Message (DSM) to the IMS after a downlink's capture has been *accepted*.

5.1.21 The FPMS shall issue a Data Sequence Message (DSM) for each downlink in a *.down* file for which there is an entry in the Downlink to Datatake map (see Dub Station/IMS ICD).

5.1.22 The FPMS shall issue a Data Sequence Message (DSM) for only one copy of any downlink.

5.1.23 The FPMS shall issue a Tape Availability Message (TAM) for each *.down* file after it has been *accepted*.

5.1.24 The FPMS shall issue a Tape Availability Message (TAM) for each *.down* file that is created (Dub Station/IMS ICD).

5.1.25 The FPMS shall only issue a Tape Availability Message (TAM) for a single copy of any *.down* file.

5.1.26 The FPMS shall verify that the correct tape media ID is mounted for each capture attempt.

5.1.27 The FPMS shall store two copies of every *.down* file migrated on separate media.

5.1.28 The FPMS shall make the copies of each *.down* file distinguishable within the silo.

5.1.29 The FPMS shall electronically store the Scan Results Files for every scan performed as part of migration.

5.1.30 The FPMS shall automatically populate the IMS catalog with the SRF from any scan that is accepted by the QC Investigator.

5.1.31 The FPMS shall electronically store the portion of the RDS log file pertaining to a single scan event for every scan performed as part of migration.

5.1.32 The FPMS shall electronically store the Bit Error Rate map for every tape segment captured as part of migration.

5.1.33 The FPMS shall provide an ASF Raw Data Scanner with data from a *.down* file given a media identifier, start byte address and stop byte address.

5.1.34 The FPMS shall provide a Vexcel Level Zero Processor with data from a *.down* file given a media identifier, start byte address and stop byte address.

5.2 Performance and Quality Engineering Requirements

5.2.1 The FPMS shall be capable of capturing 1.2 TB of data recorded on HDDR media in a sixteen hour period.

5.2.2 The FPMS shall be capable of writing *two* copies of 1.2 TB of *.down* files into the *StorageTek Powderhorn 9310 Tape Library* in a twenty-four hour period, from the capture system.

5.2.3 The FPMS shall be capable of providing the RDS with 1.2 TB of *.down* files from the capture system in a twenty-four hour period.

5.2.4 The FPMS shall be capable of providing the Precision Processor and ScanSAR Processor resources with 300 GB of data (combined) in a 24 hour period; as *.down* files from the StorageTek silo.

5.2.5 The FPMS shall be capable of providing Level Zero Processor resources with 50GB of data in a 24 hour period; with *.down* files from the StorageTek silo.

5.3 Reliability Requirements

5.3.1 The FPMS shall tolerate the failure of any single hardware component to the extent that at most 1 day worth of migration data and/or migration status is unrecoverable.

5.3.2 The FPMS shall tolerate the failure of any single hardware component, except for silo related hardware, to the extent that at most the overall throughput is reduced to atmost 50% of the required throughput.

5.3.3 The FPMS shall automatically verify the integrity of the capture boards at daily intervals.

5.4 Security and Privacy Requirements

5.4.1 The FPMS must comply with the Information Technology (IT) Security and Contingency Plan for the Alaska SAR Facility.

5.4.2 The FPMS user interfaces shall only be accessible within the ASF Internal Network.

5.5 Implementation Constraints

5.5.1 The FPMS shall store one copy of all migrated *.down* and *.par* files in the silo.

5.5.2 The FPMS shall be capable of storing one copy of all migrated *.down* and *.par* files in a location that is not within the Elvey building.

5.5.3 The FPMS shall use the LZP capture systems to create *.down* files.

5.6 Site Adaptation Requirements

5.6.1 The FPMS user interfaces shall be accessible outside the ASF Operations Center.

5.7 Design Goals

The following goals represent the intended properties and outcomes of an implemented FPMS. They are not requirements as such; they will be used to bring context to the specification statements.

These goals will be used at the completion of the project to measure project success.

1. The FPMS should ensure ASF's compliance with space agency MOUs by preserving the 95% of single, unique downlinks presently on HDDR media.

2. The use of the FPMS to provide operational processing resources (L0 and L1) with source data should not require *any* additional tasking to be performed by Production Planners, Operators, or customers.

3. The FPMS should use existing hardware and software at ASF where practicable.

4. The FPMS implementation should take no longer than 4 months – design review exit to first capture.

5. The FPMS should allow Operators and QC Investigators to easily ascertain anomalous conditions that occur during migration.

6. The FPMS should give Operators and QC Investigators flexibility with regards to controlling the order of migration.

7. The FPMS should create a catalog wholly representative of ASF's data holdings.

8. The FPMS should increase deliverable product by allowing the QC Investigator to selectively determine what scans populate the catalog.

9. The effects of FPMS operation on nominal ASF DAAC operations should not interfere with the ASF DAAC's ability to satisfy user demand for Level Zero and Level One products.

6.0 Acronyms

AD	Applicable Document
ASF	Alaska SAR Facility
BER	Bit Error Rate
DAAC	Distributed Active Archive Center
DCRSi	Digital Cassette Recording System - improved
DSM	Data Sequence Message
DTK	datatake
EOM	End of Mission
FPMS	File-based Processing and Migration System
FY02	Fiscal Year 2002
GB	Gigabyte
HDDR	High Density Data Recorder
HDDT	High Density Data Tape
IMS	Information Management System
IT	Information Technology
L0	Level Zero
L1	Level One
MB	Megabyte
Mbps	Megabits per second
MOU	Memorandum of Understanding
QC	Quality Control
RDS	Raw Data Scanner
REV	revolution
SAR	Synthetic Aperture RADAR
SAT	satellite
SEQ	sequence
SOW	ASF Contract Statement of Work
SRF	Scan Results File
SRS	System Requirements Specification
TAM	Tape Availability Message
TSR	Tape Scan Request
USO	User Services Office

7.0 Glossary

.down file	A file that contains the captured data from a HDDT created by the Vexcel Level Zero capture system. (*See RADARSAT X-Band ICD, ESRIN ERS Ground Station Interface Specification, JERS-1 Operational Interface Specification*).
.par file	"Parameter File". It is created by the LZP capture system and contains some metadata about the data capture and the capture process. (*See Appendix*)
9940	A drive type for the *StorageTek Powderhorn 9310 Tape Library*. This type writes 60 GB of data to each tape.
actual duration	
annotation track	
ASF Internal Network	The computing resources and network hardware within the Elvey building, directly controlled by ASF, and behind an ASF firewall.
Bit Error Rate	An estimation of the bits in error divided by the total number of bits.
Bit Error Rate map	A file or graphical display that indicates the Bit Error Rate of a captured file as a function of tape address within the file.
capture	The process of transcribing signal data resident on HDDR media to a *.down* file.
capture file	A *.down* file.
Data Sequence Message	A message sent from the ASF Host Controller or Dubstation that informs the IMS about the data taken from a particular downlink – specifically the datatakes from a downlink and their tape address range.
datatake	A set of data from a remote sensing platform, from a single sensor and mode corresponding to a discrete period of time when that sensor was "on" over a portion of the earth.
downlink	A single transmission of data to a ground station generally consisting of datatakes.
expected duration	Refers to the expected duration of a given datatake. It is computed by subtracting the scheduled start time from the scheduled stop time.
frames	fixed
item number	Identifier corresponding to the "Item ID" in the ASF IMS catalog.

Level One	In general, Level One refers to signal data processed to a viewable image. For the purposes of this document, it refers to products from the ASF Precision Processor and ScanSAR processor.
Level Zero	Level Zero refers to data processed to the extent that it is forward ordered in time, from a single sensor and mode, and with a single pulse repetition frequency.
media Dog Tag	A unique identifier given to each HDDT.
media ID	A unique identifier given to each HDDT.
media type	Refers to the type of HDDT. For the purposes of this document either SONY ID-1 (medium or large) or DCRSi.
migration queue	A logical list of a tape segments to be migrated, being migrated, and that have been migrated.
order number	Identifier corresponding to the "Order ID" in the ASF IMS catalog.
priority value	An arbitrary value assigned to each tape segment such that tape segments can be "prioritized" via a sort, for organizational purposes (e.g. High, Medium, or Low).
scan	A process by which the ASF Raw Data Scanner ascertains the "frames" of data present for a datatake. The RDS is commanded to search for a datatake by its platform, revolution, and sensor mode.
Scan Results File	A metadata file that reports the results of a data scan on the RDS. It lists all the frames of data found in any one specified datatake.
start address	Refers to the tape address on a HDDT, or "byte address" in file, where the data of interest begins.
stop address	Refers to the tape address on a HDDT, or "byte address" in file, where the data of interest ends.
Tape Availability Message	A message sent from the ASF Host Controller or Dubstation that informs the IMS about a new tape of data that is available to be scanned.
Tape Scan Request	A request by the IMS to have a media with a "new" datatake scanned by the RDS.
tape segment	A section of an HDDT defined by a start and stop tape address. It is at minimum one downlink and at maximum one entire HDDT.
sequence	

8.0 Notes

None.

9.0 Appendices

9.1 Vexcel LZP .par File (from capture only)

```
dcs_version: 3.03gamma
dcs_id: 3
dcs_file_creation_date: 20020202005121376
dcs_requested_start: 20020202005056983
dcs_valid_data_offset: 0
dcs_satellite: RSAT1
dcs_requested_stop: 20020202005121373
dcs_start: 20020202005057012
dcs_stop: 20020202005121376
dcs_stop_condition: stop_request
dcs_bit_error_rate: 0.000000E+00
dcs_bytes_captured: 310378496

datatake {
   satellite: UNKNOWN
   instrument: UNKNOWN
   tce_UTC: 19500101000000000
   tce_satellite: 0.000000
   tce_corr: 0.000000
   estimated_acq_start: 20200101000000000
   estimated_acq_time: 0.000000
   OrbitNr: 0
   clock_angle: 0.000000
   ellipsoid_name: UNKNOWN

   GHA {
      angle: 0.000000
      date: 19500101000000000
   }
}
js_version : 2.16.6
js_date : 20020202005054293
```

9.2 Data Sequence Message

OBJECT = DATA_SEQUENCE_MESSAGE &
common_header &
catalog_metadata &
detailed_metadata &
END_OBJECT = DATA_SEQUENCE_MESSAGE &
END

OBJECT = CATALOG_METADATA &
SYSTEM_ACTIVITY_ID &
SYSTEM_ACTIVITY_TYPE &
STATUS &
PLATFORM &
SENSOR &
REVOLUTION &
SEQUENCE &
MEDIA_ID_ALIAS &
MEDIA_ID &
MEDIA_ID_TYPE_NAME &
MEDIA_DOG_TAG &
GENERATION &
RECORDER_ID &
RECORDER_TYPE &
RECORDER_MEDIA_TYPE &
DATA_DIRECTION &
START _ADDRESS &
STOP_ADDRESS &
START_TIME &
END_TIME &
CHANNELIZATION &
BIT_RATE &
END_OBJECT = CATALOG_METADATA

OBJECT = DETAILED_METADATA &
COMMENT &
SWITCH_SETTING_ANALOG &
SWITCH_SETTING_DIGITAL &
END_OBJECT = DETAILED_METADATA

9.3 Tape Availability Message

OBJECT = TAPE_AVAILABILITY_MESSAGE &
common_header &
catalog_metadata &
detailed_metadata &
END_OBJECT = TAPE_AVAILABILITY_MESSAGE &
END

OBJECT = CATALOG_METADATA &
HC_ACTIVITY_ID &
SYSTEM_ACTIVITY_ID &
HC_ACTIVITY_TYPE &
SYSTEM_ACTIVITY_TYPE &
STATUS &
MEDIA_ID_ALIAS &
MEDIA_ID &
MEDIA_ID_TYPE_NAME &
MEDIA_DOG_TAG &
RECORDER_MEDIA_TYPE &
END_OBJECT = CATALOG_METADATA

OBJECT = DETAILED_METADATA &
null &
END_OBJECT = DETAILED_METADATA