Process for Submission of Large Data Sets to NSSDC
DRAFT
2008-08-11

I   Introduction

This document describes a standard process for the delivery of data from the Planetary Data System (PDS) to the National Space Science Data Center (NSSDC). The process addresses the need to transfer the contents of PDS volume content that exceeds the capacity of the archive media currently in use at NSSDC (300 GB) but can be applied to the transfer of data from smaller volumes as well.

II   Establish a Producer Archive Project (PAP)

A Producer-Archive Project is a set of activities and the means used by a data provider and the NSSDC to ingest a given set of information. To establish a PAP the information supporting the ingest process must be collected. Some of this information is supplied by the data provider; some is supplied by NSSDC personnel. This information is required for NSSDC to identify incoming data and perform appropriate ingest and archiving activities. NSSDC also uses PAP information for planning purposes.

For PDS, Volume IDs will be used to identify PAPs. The submitting PDS node sends an email message to the NSSDC scientist responsible for PDS data acquisition. The email lists the specific PDS volumes to be included in a new PAP.

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The NSSDC scientist starts the process of registering the new PAP and obtains an identifier for the PAP. NSSDC updates the configuration file used by the *xman* SIP manifest generator to include the new volumes and the PAP ID and delivers it to the requesting node via email. The PDS node must install the updated configuration file in the appropriate directory. The PDS node can then generate SIP manifests for volumes belonging to the new PAP.

NSSDC must complete the PAP registration and approval process and update its ingest database before it can ingest SIPs from the new PAP. In the course of this approval process, NSSDC may contact the supplying PDS node to obtain additional PAP information items.

Requests to add volumes to existing PAPs will be reviewed at NSSDC.

The initial interface for submitting PAP information and disseminating *xman* configuration files is email. A future NSSDC-provided web service to perform this function is anticipated.

III   Preparing Data Deliveries

Data are delivered to NSSDC on individual 2-terabyte sized USB disks (data bricks). Disk space permitting, multiple PDS volumes may be delivered on a single disk. A prepared delivery disk will contain:
•   Directory structure(s) for one or more PDS volumes
•   XML SIP manifest(s) for each of the PDS volumes
•   A single XML delivery manifest the delivery disk

NSSDC provides software to the PDS data nodes to be used in creation of manifests of Submission Information Packages (SIPs). This *xman* software creates an XML manifest document that lists the contents of the SIP with information required to identify the data and verify successful transfer of the data. *Xman* is available for Windows machines as executable binary in a standard installation kit. For Linux and Macintosh operating systems a distribution kit is provided with a document describing how to build the utility. Basic operating instructions are contained in the supplied Man pages. Additional information is supplied in the <u>Xman Operations Guide.</u>

Data deliveries are prepared in several steps:
1.   Create a SIP manifest for each PDS volume to be delivered. The SIP manifest, created by the *xman* software, describes the PDS volume directory structure and provides fixity information for each file. Appendix A provides the SIP manifest schema. All completed SIP manifests are located in the top level directory on the delivery disk: */SIP_Manifest*.

2. Copy each PDS volume to the delivery media. The top directory of each delivered PDS volume should be a directory of the top directory of the delivery disk, e.g. - */ODTH_0001.*

3. Validate each manifest against the PDS data volume located on the delivery disk.

4. Create a delivery manifest. The delivery manifest (currently created by hand) is an XML file containing supporting information for the overall delivery. Appendix B describes the delivery manifest content. Each delivery is has a unique identifier in the form *CuratingNodeId_SubNodeId_yy-mm-dd*T*hhmmss* - e.g. IMAGING_USGS_2008-06-23T120000. The XML delivery manifest file name is the delivery manifest file name with extension *xml*, as in

    IMAGING_USGS_2008-06-23T120000.xml. The delivery manifest should be in the top
    level directory of the disk.

The following illustrates the delivery disk structure.

```
/
    delivery_manifest_IMAGING_USGS_2008-06-23T120000.xml
    ODTH_0001
    SIP_Manifest

/ODTH_0001
    aareadme.htm
    aareadme.lbl
    aareadme.txt
    browse
    calib
    catalog
    data
    document
    errata.txt
    geometry
    index
    software
    voldesc.cat
    voldesc.cat_save

/SIP_Manifest
    ODTH_0001_SIP_Manifest.log
    ODTH_0001_SIP_Manifest.xml
```

IV   Submit Delivery Package

The delivering PDS node informs NSSDC that a delivery has been initiated and sends the disk to NSSDC:

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V   Receive Delivery

Upon receipt of the a delivery, NSSDC shall:
- Acknowledge receiving the data bricks.
- Validate the overall delivery packaged
- Validate individual SIPs
- Register SIPs and transfer objects (PDS volumes) in SIP registry (to be created)
- Create validated copies of SIPs
- Return data bricks to PDS

PDS shall acknowledges receipt of the returned data brick.

VI   Archive the Delivery

PDS PAPs are collections of PDS Volume IDs. NSSDC data collections are collections of PDS datasets, not known to NSSDC until the SIPs have been delivered. The formal modeling and assignment to NSSDC collections of transfer objects contained in PDS SIPs does not occur until the datasets contained in each delivered SIP have been identified following delivery to NSSDC. After the modeling process has been completed, NSSDC can package the transfer object (i.e. PDS volume) into an AIP and update the SIP registry accordingly.

NSSDC's intent is to store AIPs on magnetic tape. It will modify its archival storage system so that it can store and track large AIPs on multiple tapes. Until such system modifications are complete, NSSDC will store multiple copies of large AIPs on separate data bricks.

VII   Report to PDS

NSSDC reports ingest status (success or failure) to the originating PDS. NSSDC ingest is not complete until the SIP transfer objects have been assigned to NSSDC collections, packaged into AIPs, and archived to long-term storage media. Thus, there can be a considerable delay between NSSDC receipt of data and notification of ingest status. If the ingest process is successful, NSSDC sends the SIP manifests to the Engineering Node.

VIII   Data Retrieval

The providing PDS node contacts the NSSDC acquisition scientist or NSSDC Coordinated Request and User Support Office (CRUSO). PDS volumes to be retrieved are identified by their transfer object IDs. For PDS, where each SIP contains only one transfer object, supplying the SIP ID will provide sufficient information for NSSDC to retrieve the data.

Appendix A: Glossary

Submission Information Package (SIP)
A digital information package delivered to the NSSDC. Each PDS SIP contains a single transfer object to be packaged into an AIP for long-term preservation.

Transfer Object
A digital information object within a SIP to be preserved in an AIP. Transfer objects are the basic unit archiving unit. Each transfer object will be preserved in a single AIP and any data replacements will occur as replacements complete transfer objects. A PDS transfer object contains the directory structure and all files from a single PDS volume.

SIP Manifest
A manifest of a Submission Information Package in XML format included in data submissions to NSSDC.

Delivery Manifest
A manifest providing information about single PDS delivery to NSSDC. One or more SIPs may be included in the delivery.

Appendix B: SIP Manifest XML Schema

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2005 rel. 3 U (http://www.altova.com) by John Garrett (NASA Goddard
Space Flight Center) -->
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns="urn:us:gov:nasa:nssdc:schema:sipmanifest:v0.13"
targetNamespace="urn:us:gov:nasa:nssdc:schema:sipmanifest:v0.13"
elementFormDefault="unqualified" attributeFormDefault="unqualified">
    <xs:complexType name="ParameterRangeType">
        <xs:annotation>
            <xs:documentation>This type is used to expess the range of parameter values
covered for this object.  This may be used for access to the data.</xs:documentation>
        </xs:annotation>
        <xs:sequence>
            <xs:element name="TimeRange" minOccurs="0">
                <xs:annotation>
                    <xs:documentation>Range of the event time (in UTC) in this object.  Since
these values are used for searching and since we want a common format for that searching, we
will use the full XML dateTime format for the type.  For times that are not accurate to the
second, beginTime and EndTime would be set to included the entire range that could be covered
by the less precise time range.  For example, if range is from 2007-07-04 UTC to 2007-11-27
UTC, beginTime = "2007-07-04T00:00:00 UTC" and endTime = "2007-11-27T23:59:59 UTC" </
xs:documentation>
                </xs:annotation>
                <xs:complexType>
                    <xs:sequence>
                        <xs:element name="BeginTime" type="xs:dateTime"/>
                        <xs:element name="EndTime" type="xs:dateTime" minOccurs="0"/>
                    </xs:sequence>
```

```xml
                </xs:complexType>
            </xs:element>
            <xs:element name="OrbitRange" minOccurs="0">
                <xs:annotation>
                    <xs:documentation>Span of orbits in this object</xs:documentation>
                </xs:annotation>
                <xs:complexType>
                    <xs:sequence>
                        <xs:element name="BeginOrbit" type="xs:nonNegativeInteger">
                            <xs:annotation>
                                <xs:documentation>First orbit included in this object. (Note:
Number of the very first orbit for this spacecraft (0 or 1) follows the converntion used for
the spacecraft.</xs:documentation>
                            </xs:annotation>
                        </xs:element>
                        <xs:element name="EndOrbit" type="xs:positiveInteger" minOccurs="0"/>
                    </xs:sequence>
                </xs:complexType>
            </xs:element>
            <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="ChecksumType">
        <xs:annotation>
            <xs:documentation>Overall checksum for all content at this level for this SIP
instance.  (Note: Producer and Archive need to coordinate on the meaning of  (i.e., how to
calculate) this checksum if directories or more than one file are involved. </
xs:documentation>
        </xs:annotation>
        <xs:sequence>
            <xs:element name="ChecksumMethod">
                <xs:annotation>
                    <xs:documentation>Name or ID of the checksum algorithm used (i.e., not the
actual algorithm). </xs:documentation>
                </xs:annotation>
                <xs:simpleType>
                    <xs:restriction base="xs:string">
                        <xs:enumeration value="CRC32"/>
                        <xs:enumeration value="MD5"/>
                    </xs:restriction>
                </xs:simpleType>
            </xs:element>
            <xs:element name="ChecksumValue" type="xs:string"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="GroupType">
        <xs:sequence>
            <xs:element name="GroupTypeID" type="xs:string">
                <xs:annotation>
                    <xs:documentation>An ID unique within the Producer-Archive Project which
identifies the type of this Group instance. This ID was defined during data modeling that is
part of the Submission Agreement. [PAIS WB0.8 ASM: transferObjectGroupID]</xs:documentation>
                </xs:annotation>
            </xs:element>
            <xs:element name="GroupID" type="xs:string">
                <xs:annotation>
                    <xs:documentation>An ID unique within the combined context of the parent
objects (any Transfer Object Group Types and the Transfer Object Type) containing this group
object, the Producer Site, and the Producer-Archive Project.  This identifies this Group
instance.  (Could be Directory name.) [PAIS WB0.8 ASM: transferObjectGroupInstanceName TBD?]
</xs:documentation>
                </xs:annotation>
            </xs:element>
            <xs:element name="ParameterRange" type="ParameterRangeType" minOccurs="0">
                <xs:annotation>
                    <xs:documentation>Values for attributes that could be used to discover the
data content included in this group (directory) instance. [PAIS WB0.8 ASM: ANY]</
xs:documentation>
                </xs:annotation>
            </xs:element>
            <xs:element name="NumberOfFilesIncluded" type="xs:positiveInteger" minOccurs="0">
                <xs:annotation>
                    <xs:documentation>Total of all actual files (i.e., directories are not
counted) in the payload of this Group instance. [PAIS WB0.8 ASM: ANY]</xs:documentation>
                </xs:annotation>
            </xs:element>
            <xs:element name="Group" type="GroupType" minOccurs="0" maxOccurs="unbounded">
                <xs:annotation>
                    <xs:documentation>Instances of individual groups (directories or directory
trees) that are part of this Group instance.  If 0 groups are included, the current Group
instance is the bottom group in the current group tree. [PAIS WB0.8 ASM: transferObjectGroup
(0..N)]</xs:documentation>
                </xs:annotation>
            </xs:element>
            <xs:element name="File" minOccurs="0" maxOccurs="unbounded">
                <xs:annotation>
                    <xs:documentation>Instances of individual files that are part of this Group
instance.  If 0 files (and 0 groups) are included, this indicates an existing but empty group
(directory). [PAIS WB0.8 ASM: dataObject (0..N)]</xs:documentation>
                </xs:annotation>
                <xs:complexType>
                    <xs:sequence>
                        <xs:element name="DataObjectTypeID" type="xs:string">
                            <xs:annotation>
                                <xs:documentation>An ID unique within the combined context of
the Transfer Object Group Type, the Transfer Object Type, the Producer Site, and the
Producer-Archive Project which identifies the type of the Data Object (File).        [PAIS
WB0.8 ASM: dataObjectTypeID (1..1)]    [NOTE: JGG added this new element since it was a
```

```
required PAIS WB0.8 ASM element and was not included in this schema. TBD - Do we want to keep
this?]</xs:documentation>
                        </xs:annotation>
                    </xs:element>
                    <xs:element name="FileLocation" type="xs:anyURI">
                        <xs:annotation>
                            <xs:documentation>URI where this file can be found. NOTE: the
URI severs as a unique Data Object (File) Instance Identifier. [PAIS WB0.8 ASM:
dataObjectLocation 1..1)]</xs:documentation>
                        </xs:annotation>
                    </xs:element>
                    <xs:element name="ParameterRange" type="ParameterRangeType"
minOccurs="0">
                        <xs:annotation>
                            <xs:documentation>Values for attributes that could be used to
discover the data content included in this file instance. [PAIS WB0.8 ASM: ANY]</
xs:documentation>
                        </xs:annotation>
                    </xs:element>
                    <xs:element name="Checksum" type="ChecksumType" maxOccurs="unbounded">
                        <xs:annotation>
                            <xs:documentation>Checksum Value(s) and associated Checksum
Method (i.e., type of checksum) for this file [PAIS WB0.8 ASM: ANY]</xs:documentation>
                        </xs:annotation>
                    </xs:element>
                    <xs:element name="Format" minOccurs="0" maxOccurs="unbounded">
                        <xs:annotation>
                            <xs:documentation>Identification of the format of this file.
Multiple independently useable format identifications are allowed.  Each identification is
made by supplying the Authority or system in which the format registered and the ID for the
format within that system. [PAIS WB0.8 ASM: ANY]</xs:documentation>
                        </xs:annotation>
                        <xs:complexType>
                            <xs:sequence>
                                <xs:element name="Authority" type="xs:string">
                                    <xs:annotation>
                                        <xs:documentation>An identifier of a system of format
identifiers.  Examples: IETF MIME types or CCSDS Control Authority (i.e. ADID assignments)
[PAIS TransferObjectDescriptor (TOD) uses registrationAuthority]</xs:documentation>
                                    </xs:annotation>
                                </xs:element>
                                <xs:element name="FormatID" type="xs:string">
                                    <xs:annotation>
                                        <xs:documentation>The ID assigned to the data object
format with the system of format identifiers identified by Authority [PAIS TOD uses
registeredID]</xs:documentation>
                                    </xs:annotation>
                                </xs:element>
                            </xs:sequence>
                        </xs:complexType>
                    </xs:element>
                    <xs:element name="FileSize" type="xs:nonNegativeInteger" minOccurs="0">
                        <xs:annotation>
                            <xs:documentation>Size of the fille in bytes. (Zero size file
allowed.) [PAIS WB0.8 ASM: ANY]</xs:documentation>
                        </xs:annotation>
                    </xs:element>
                    <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
                </xs:sequence>
            </xs:complexType>
        </xs:element>
        <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="TransferObjectType">
    <xs:sequence>
        <xs:element name="TransferObjectReplacedID" type="xs:string" minOccurs="0">
            <xs:annotation>
                <xs:documentation>An ID that matches a previously submitted Transfer Object
ID.  The information contained within this current Transfer Object instance will replace
within the Archive the Transfer Object instance information identified by this ID. [PAIS
WB0.8 ASM: replacementTransferObjectID (0..1)]</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="TransferObjectTypeID" type="xs:string">
            <xs:annotation>
                <xs:documentation>An ID unique within the Producer-Archive Project which
identifies the type of this Transfer Object instance.  [PAIS WB0.8 ASM: descriptorID (1..1)]
(TBD) Any need to link to a particular version of descriptor?]</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="TransferObjectID" type="xs:string">
            <xs:annotation>
                <xs:documentation>An ID unique within the  Producer-Archive Project which
identifies this Transfer Object instance. [PAIS WB0.8 ASM: transferObjectID (1..1)  (For
PAIS, it is only unique within context of Transfer Object Type, the Producer Site, and
Producer-Archive Project,) ]</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="ParameterRange" type="ParameterRangeType" minOccurs="0">
            <xs:annotation>
                <xs:documentation>Values for attributes that could be used to discover the
data content included in this Transfer Object instance. [PAIS WB0.8 ASM: ANY]</
xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="NumberOfFilesIncluded" type="xs:positiveInteger" minOccurs="0">
            <xs:annotation>
```

```xml
                        <xs:documentation>Total of all actual files (i.e., directories are not
counted) in the payload of this SIP instance. [PAIS WB0.8 ASM: ANY]</xs:documentation>
                    </xs:annotation>
                </xs:element>
                <xs:element name="Group" type="GroupType" maxOccurs="unbounded">
                    <xs:annotation>
                        <xs:documentation>A set of values applicable to this entire Group instance.
Directories are one type of Group.  (Can tar, (g)zip, arc, etc. be others?) Restrictions: 0
groups may occur within a TransferObject only when TransferObjectReplacedId is populated and
then the absence of any group indicates that the TransferObject identified by
TransferObjectReplacedID is to be deleted. [PAIS WB0.8 ASM: transferObjectGroup (1..N)]</
xs:documentation>
                    </xs:annotation>
                </xs:element>
                <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
        </xs:complexType>
        <xs:complexType name="TransferObjectDeleteType">
            <xs:sequence>
                <xs:element name="TransferObjectIDToDelete" type="xs:string">
                    <xs:annotation>
                        <xs:documentation>An ID that matches a previously submitted Transfer Object
ID.  The information contained within this Transfer Object instance within the Archive should
be deleted.r[PAIS WB0.8 ASM: proposed update]</xs:documentation>
                    </xs:annotation>
                </xs:element>
                <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
        </xs:complexType>
        <xs:element name="SIPManifest">
            <xs:annotation>
                <xs:documentation>Submission Information Package Manifest     [PAIS White Book (WB)
0.8 Abstract SIP Model (ASM)]</xs:documentation>
            </xs:annotation>
            <xs:complexType>
                <xs:sequence>
                    <xs:element name="SIPGlobal">
                        <xs:annotation>
                            <xs:documentation>A set of attributes providing values applicable to
this entire SIP instance. [PAIS WB0.8 ASM: SIPGlobalInformation (1..1); also has
SIPSequenceNumber (0..1)]</xs:documentation>
                        </xs:annotation>
                        <xs:complexType>
                            <xs:sequence>
                                <xs:element name="ProducerArchiveProjectID" type="xs:string">
                                    <xs:annotation>
                                        <xs:documentation>An ID unique within the Archive for the
Producer-Archive Project for which this SIP instance was generated. [PAIS WB0.8 ASM:
projectID (1..1)]</xs:documentation>
                                    </xs:annotation>
                                </xs:element>
                                <xs:element name="ProducerID" type="xs:string">
                                    <xs:annotation>
                                        <xs:documentation>An ID unique within the Producer-Archive
Project that indicates which Producer generated and sent this SIP instance. This can be used
to respond to the Producer. [PAIS WB0.8 ASM: producerID (1..1)]</xs:documentation>
                                    </xs:annotation>
                                </xs:element>
                                <xs:element name="SIPContentTypeID" type="xs:string">
                                    <xs:annotation>
                                        <xs:documentation>An ID unique within the Producer-Archive
Project for the SIP Content Type being used for this SIP instance. [PAIS WB0.8 ASM:
sipContentTypeID (1..1)]</xs:documentation>
                                    </xs:annotation>
                                </xs:element>
                                <xs:element name="SIPFormID">
                                    <xs:annotation>
                                        <xs:documentation>An ID unique within the (TBD)
ProducerArchiveProject | Producer | ProducerSite? for the SIP Form being used for this SIP
instance. [PAIS WB0.8 ASM: ANY]</xs:documentation>
                                    </xs:annotation>
                                    <xs:complexType>
                                        <xs:sequence>
                                            <xs:element name="SIPForm" type="xs:string">
                                                <xs:annotation>
                                                    <xs:documentation>A, B, C, or D from Don's
presentation.</xs:documentation>
                                                </xs:annotation>
                                            </xs:element>
                                            <xs:element name="SIPFormVersion" type="xs:string"/>
                                        </xs:sequence>
                                    </xs:complexType>
                                </xs:element>
                                <xs:element name="SIPID" type="xs:string">
                                    <xs:annotation>
                                        <xs:documentation>An ID unique within the Producer-Archive
Project Archive for this SIP instance. [PAIS WB0.8 ASM: SIPID(1..1)]</xs:documentation>
                                    </xs:annotation>
                                </xs:element>
                                <xs:element name="ParameterRange" type="ParameterRangeType"
minOccurs="0">
                                    <xs:annotation>
                                        <xs:documentation>Values for attributes that could be used to
discover the data content included in this SIP instance. [PAIS WB0.8 ASM: ANY]</
xs:documentation>
                                    </xs:annotation>
                                </xs:element>
                                <xs:element name="NumberOfFilesIncluded" type="xs:positiveInteger"
```

```
minOccurs="0">
                                <xs:annotation>
                                    <xs:documentation>Total of all actual files (i.e.,
directories are not counted) in the payload of this SIP instance. [PAIS WB0.8 ASM: ANY]</
xs:documentation>
                                </xs:annotation>
                            </xs:element>
                            <xs:element name="ProducerComment" type="xs:string" minOccurs="0">
                                <xs:annotation>
                                    <xs:documentation>Any type of comment from the producer
regarding this SIP instance. [PAIS WB0.8 ASM: ANY]</xs:documentation>
                                </xs:annotation>
                            </xs:element>
                            <xs:element name="CreationTime" type="xs:dateTime" minOccurs="0">
                                <xs:annotation>
                                    <xs:documentation>The time (in UTC) the producer created this
SIP instance. [PAIS WB0.8 ASM: ANY]</xs:documentation>
                                </xs:annotation>
                            </xs:element>
                            <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
                        </xs:sequence>
                    </xs:complexType>
                </xs:element>
                <xs:choice maxOccurs="unbounded">
                    <xs:element name="TransferObject" type="TransferObjectType">
                        <xs:annotation>
                            <xs:documentation>A set of values applicable to this entire Transfer
Object instance. [PAIS WB0.8 ASM: transferObjectIdentificationAndStatusInformation (1..N)]</
xs:documentation>
                        </xs:annotation>
                    </xs:element>
                    <xs:element name="DeleteTransferObject" type="TransferObjectDeleteType">
                        <xs:annotation>
                            <xs:documentation>A set of values applicable to this entire Transfer
Object instance. [PAIS WB0.8 ASM: ]</xs:documentation>
                        </xs:annotation>
                    </xs:element>
                    <xs:any namespace="##other" minOccurs="0" maxOccurs="unbounded"/>
                </xs:choice>
            </xs:sequence>
        </xs:complexType>
    </xs:element>
</xs:schema>
```

Appendix C:

NSSDC PDS Delivery Manifest

DRAFT

July 10, 2008

This document describes the NSSDC/PDS Delivery Manifest. A PDS/NSSDC Delivery Manifest provides information about a PDS delivery of one or more archive volumes to the NSSDC. One Delivery Manifest is created per delivery. It is written to each data brick in the delivery and is also forwarded via email to the NSSDC as the delivery is shipped to inform the NSSDC that the delivery has been sent.

A Delivery Manifest consists of a hierarchy of one delivery manifest header, a manifest entry for each Submission Information Package (SIP) in the delivery, and a data brick sequence entry for each data brick that the SIP was written to. The content of a SIP is equivalent to a PDS Archive Volume.

1.   Delivery_Manifest_Header – The delivery manifest header includes elements that provide general information for this delivery including its identifier, a text description, the total number of bricks in this delivery, the directory path to the data (i.e. volume) directories, the path to the directory that contains the individual SIP manifests, and the identifier of the data brick this copy of the delivery manifest is on.

a.   Brick_Identifier - Identification of THIS Data Brick – Best practice is to use the data brick serial number.

b.   Bricks – An integer value indicating the number of data bricks in this delivery.

c.   Data_Path - The relative path from the data brick mount point to the data directories. E.g. Data_Path = "./" indicates that the data directories are at the mount point of the disk brick.

d.   Delivery_Description – A text description of the delivery.

e.   Delivery_Identifier - The identifier for the delivery. Formation Rule: Curating_Node_Id + "_" + Subnode _Id + "_" + yy-mm-ddThhmmss - e.g. IMAGING_USGS_2008-06-23T120000.

f.   SIP_Manifest_Path - The relative path from the data brick mount point to and including the SIP manifest directory. E.g. SIP_Manifest_Path

= "./SIP_Manifest/" - indicates that the SIP_Manifest directory is at the mount point of the disk brick.

g.   Volumes - An integer value indicating the number of archive volumes in this delivery.

2.   Delivery_Manifest_Entry - There is one entry for each SIP in the Delivery. It includes elements that provide the SIP identifier, name of the SIP Data Directory and the SIP Manifest File.

a.   SIPID - SIP Identifier - Producer Archive Project ID (PAPID) in conjunction with a unique integer. PAPID is assigned by the NSSDC

b.   SIP_Data_Directory_Specification_Name - Relative path name to the data directory and indicates the directory being transferred in the SIP. E.g. SIP_Data_Directory_Specification_Name = <Volume_ID>

c.   SIP_Manifest_File_Specification_Name - Relative path name of the SIP manifest file in the SIP_Manifest directory. Formation Rule: <volume_id> + "_SIP_Manifest"

3.   Delivery_Brick_Sequence - A delivery brick sequence is one or more delivery bricks in a specific order.

a.   Brick_Identifier – The identifier of the data brick – Best practice is to use the data brick serial number.

b.   Brick_Number - An integer value indicating the sequence number of this brick. A SIP written to two bricks would use one (1) as the first brick number.

The XML structure in Figure 1 provides an example of a Delivery Manifest for one Submission Information Package (SIP) and written to one data brick.