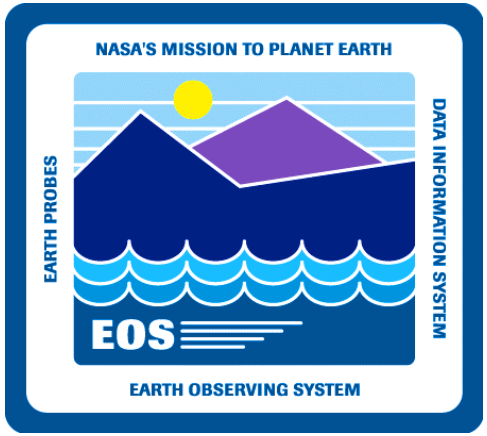
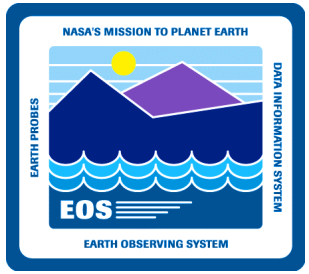


SSI&T/Earth Science Data Types (ESDTs) Part 2 of 2

ECS Version 2 Training Updated for Release 6A

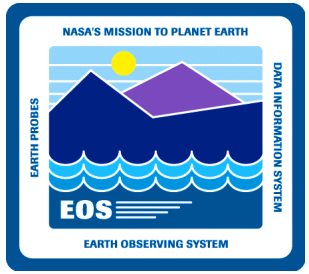
625-CD-616-001

Topics



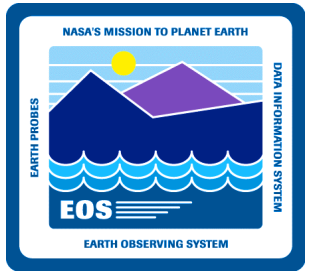
- What are Metadata?
- Overview: Role of ESDTs
- Descriptor File
- Descriptor File Components
- Object Description Language
- Collection Metadata Groups
- Granule-Level Metadata
- Multiple Values: Containers and Arrays
- Product Specific Attributes

Topics (Cont.)



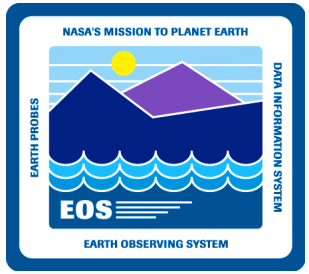
- Group = SERVICES
- Group = STRUCTURE
- Group = EVENT
- An Example Descriptor File
- Metadata Configuration File
- An Example MCF
- Metadata File
- An Example .met File
- Tools for Descriptor Development
- Summary

What are Metadata?



- **Metadata are descriptive information about the data, employing a common set of terms and definitions**
- **An Earth Science Data Type (ESDT) is the interface between the science data and the ECS system**

How are Metadata Used in ECS?



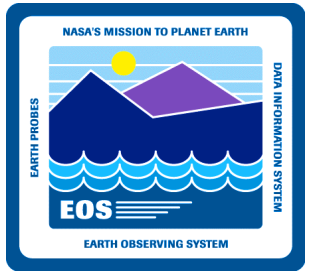
Search and access of data

- Inventory searches submitted by users via the ECS Client
- Collection discovery via the Advertising Service

Other uses

- Subscriptions based on metadata
- Staging of input files based on metadata for Data Processing (e.g., time, location, version)

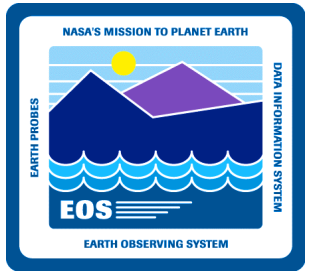
Overview: Role of ESDTs



Representation of data products from the Earth Scientist's perspective

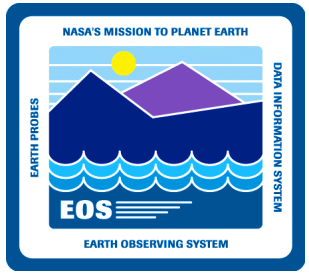
- **Earth Science Data Types (ESDTs) embody the core science data knowledge for data products contained in the EOS Data and Information System (EOSDIS)**
- **Mechanism used to inform the Science Data Server about**
  - **Core and product-specific metadata attribute values for each collection and data granule**
  - **EOSDIS Core System (ECS) Data Server services (e.g., Insert, Search, Acquire) which can be invoked for the collection**

Overview: Role of ESDTs (Cont.)



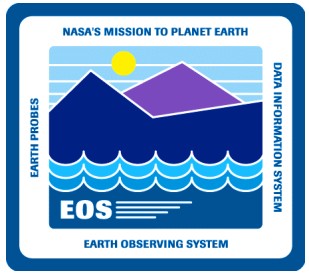
- One ESDT per collection
- Before a new collection can be added to ECS
  - An ESDT must be created and submitted to Science Data Server (SDSRV), a component of the Data Server Subsystem (DSS)

Overview: Role of ESDTs (Cont.)



- An ESDT, added to the SDSRV, defines to the ECS subsystems
  - Collection level metadata attributes and values
  - Granule metadata attributes, source of attribute values and attribute valid values
  - Product-Specific attributes and their valid values and ranges
  - Subscribable events
  - Services

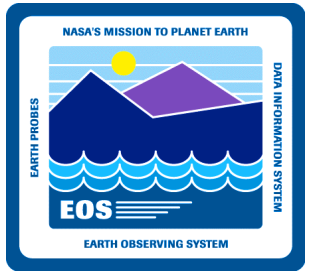
Overview: Role of ESDTs (Cont.)



Each ESDT consists of two components

- **Descriptor file**
  - **ASCII file in Object Description Language (ODL) format describing metadata and services**
    - » **ODL is an object-based language with "keyword = value" (keyword/value) statements that allows the class and attributes of an entity to be specified**
    - » **ODL is used to convey relations between attributes and their characteristics within the descriptor files**
- **Dynamic Link Library (DLL)**
  - **Shared object file coded in C++**
  - **Handles the implementation of the specified services on each collection described in the Descriptor file**

Descriptor File

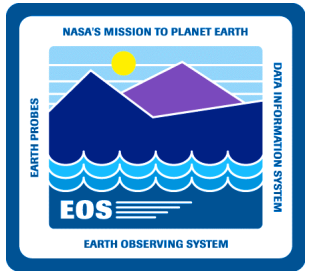


Most collection-level attributes are known ahead of time so their values can be specified in the descriptor file

The ESDT descriptor has six basic sections:

- **Collection level metadata information**
- **Granule/Inventory level metadata information**
- **Unparsed/Archive metadata information**
- **Structure information which holds the CSDT (Computer Science Data Type) mapping - (the actual physical file organization and storage implementation)**
- **ESDT service descriptions**
- **ESDT supported event handlers**

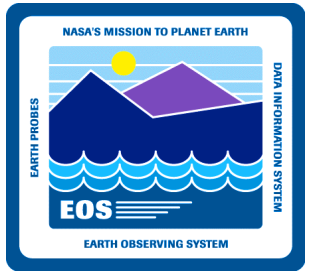
File Naming Convention



For ESDTs

- **Descriptor Files**
  - Have a prefix of “DsESDT”, followed by instrument abbreviation and then collection Short Name and 3 digit Version ID
  - MUST end in ".desc"
  - Examples -- DsESDTMoMOD10_L2.001.desc, DsESDTOmOMI_L1b.001.desc

File Naming Convention (Cont.)



For ESDTs

- DLL Files
  - Have a prefix of “libDsESDT”, followed by instrument abbreviation, and collection Short Name and 3 digit Version ID
  - MUST end in "Sh.so"
  - Examples -- libDsESDTLsL70R.001Sh.so, libDsESDTSyBASIC.001Sh.so, libDsESDTSyLgPoly.001Sh.so

Descriptor File Components

Group = METADATA

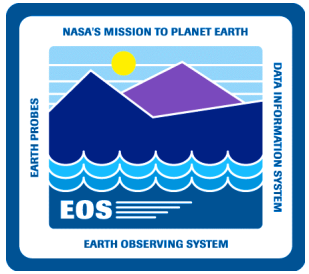
Specifies the attributes for the ESDT forming the COLLECTIONMETADATA and INVENTORYMETADATA groups.

The UNPARSEDMETADATA group specifies the non-inventory attributes to be set by a PGE. The correct format (ODL— described later) must be used, however.

Group = SERVICE

The purpose of this group is to hold the list of services which will be available for this ESDT

Descriptor File Components (Cont.)



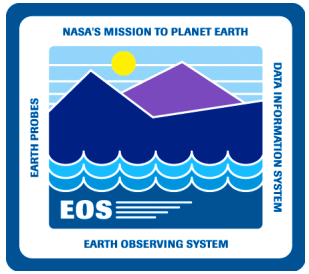
Group = STRUCTURE

The STRUCTURE group contains objects which indicate the granule file structure, or CSDT of the ESDT.

Group = EVENT

The EVENT group specifies which services, when invoked, signal to other ECS subsystems that an event has occurred. The event signature includes the attributes whose values are to be included in the event message.

Object Description Language (ODL)



- **ECS software to read and write ODL-encoded metadata descriptions uses a public domain license ODL Library obtained from the JPL Planetary Data Systems group.**

  [available via anonymous ftp site starhawk.jpl.nasa.gov under the tools/toolbox_v4r1 directory]

- **Example ODL:**

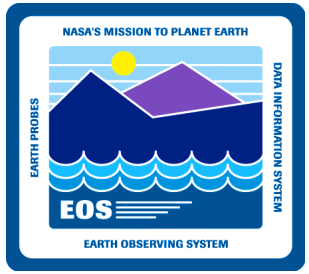
```
GROUP = ECSDataGranule
   OBJECT = ProductionDateTime
      Data_Location = "TK"
      Mandatory = "TRUE"
      TYPE = "DATETIME"
      NUM_VAL = 1
   END_OBJECT = ProductionDateTime
END_GROUP = ECSDataGranule
```

- **The ODL Specification is found at**

  http://pds.jpl.nasa.gov/stdref/chap12.htm

  [i.e., “StdRef Chapter 12: Object Description Language (ODL) Specification and Usage”]

Description Elements



The order* of the description elements for each Object in a Descriptor File is as follows:

Data_Location = Required for all, but set to Metadata Configuration File(MCF) for all Collection-level Attributes

Mandatory = Required for all. Used by SDP Toolkit :
= TRUE, error message is issued if the value is not set
=FALSE, no error message is issued if the value is not set

Class = Only used for Container Objects

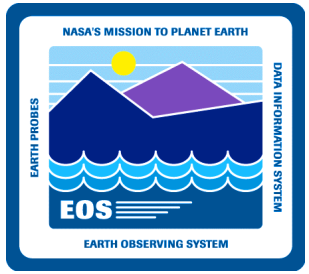
TYPE = Used only for Granule-level attributes to put into the MCF File for use by the SDP Toolkit

NUM_VAL = The maximum number of values to be set for the attribute

Value = Used only when Data_Location = MCF

* The actual order of elements in an object description is not important, except for visual consistency.

Description Elements:
Data_Location settings



- **The Location indicates the source of the metadata value:**
  - **MCF- the descriptor file, or metadata configuration file**
  - **PGE - Science Software program**
  - **TK - SDP Toolkit**
  - **DSS - set after processing by the Data Server**
  - **DAAC - set after processing by the DAAC**
  - **DP - set after processing by the Data Provider**

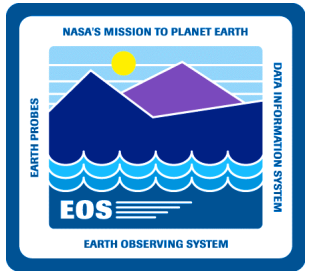
B.0 Science Data Model Used in ECS

Collection-Level Metadata

Described in 420-TP-021-001, “Release 5B Implementation Earth Science Data Model for the ECS Project”, dated September 1999.

The applicable valid values for each attribute are also given there.

Spectrum of Metadata Coverage in ESDTs



- Minimal - number of attributes needed by the system to insert a granule (e.g., non-science or system collections)
- Limited - includes the Minimal attributes plus other attributes needed to identify the science content of the collection to the Global Change Master Directory (GCMD)
    - Data Providers may supply metadata above and beyond this level as desired or as necessary to uniquely identify data granules
- Intermediate - for products generated outside of EOSDIS but used within or distributed by EOSDIS (e.g., ancillary, Level 0, Landsat-7, SAGE III)
- Full - for Standard Products generated within EOSDIS

Optionality of Collection Metadata Groups

Attribute	Cardinality	Minimal	Limited	Intermediate	Full
CollectionDescriptionClass	1	R	R	R	R
ECSCollection	1	R	R	R	R
SingleTypeCollection	0-1	O	O	R	R
Spatial	0-1	O	O	R	R
SpatialCoverageType	[1	R	R	R	R] †
SpatialDomainContainer	[1	R	R	R	R] †
VerticalCoordinateSystemContainer	[0-n	O	O	O	O] †
HorizontalCoordinateSystemContainer	[1	R	R	R	R] †
Temporal	0-1	O	O	R	R
RegularPeriodic or MultipleDateTimePeriod or SingleDateTime orRangeDateTime	1	O	O	R	R
Contact	0-1	O	R	R	R
ContactPerson	[0-n	R	R	R	R] †
ContactOrganization	[1-n	R	R	R	R] †
DisciplineTopicParameters	0-n	O	R	R	R
TemporalKeywordClass	0-n	O	O	O	O
SpatialKeywordClass	0-n	O	O	O	O
ProcessingLevel	0-1	O	O	O	R
Locality	0-1	O	O	O	O

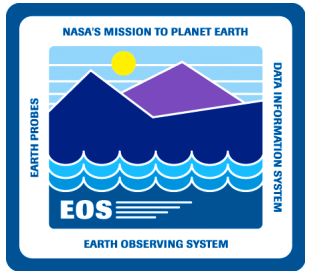
† optionality applicable only if parent group is used (R = required, O = optional)

Optionality of Collection Metadata Groups (Cont.)

Attribute	Cardinality	Minimal	Limited	Intermediate	Full
Platform	0-n	O	O	O	O
PlatformCharacteristic	[0-n	O	O	O	O] †
Instrument	[0-n	O	O	O	O] †
OperationModeClass	[0-n	O	O	O	O] †
InstrumentCharacteristic	[0-n	O	O	O	O] †
Sensor	[0-n	O	O	O	O] †
SensorCharacteristic	[0-n	O	O	O	O] †
AnalysisSource	0-n	O	O	O	O
Campaign	0-n	O	O	O	O
CollectionAssociation	0-n	O	O	O	O
Review	0-n	O	O	O	O
CSDTDescription	0-1	O	O	O	O
AdditionalAttributes	0-n	O	O	O	O
PhysicalParameterDetails	[0-1	O	O	O	O] †
InformationContent	[0-1	O	O	O	O] †
StorageMediumClass	0-n	O	O	O	O
type	0-1	O	O	O	O
DLL Name	1	R	R	R	R
SpatialSearchType	0-1	O	O	O	O

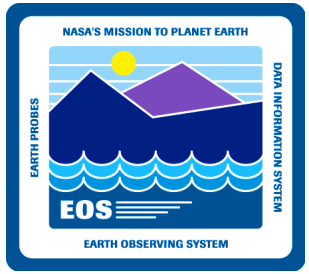
† optionality applicable only if parent group is used (R = required, O = optional)

Absent From Descriptor File



- The Document Module has not been included since Documents are handled by the Document Data Server which has not been currently implemented
- The Delivered Algorithm Package attributes (if applicable) are populated separately following successful Science Software Integration and Test (SSI&T)
- All pointer attributes have been excluded; viz.., Browse, QualityTextComment, ValidationDocument, and UserCommentDocument
  - These values are not known at the ESDT installation time

For the Slides which follow:



- **The Type values for the attributes are abbreviated:**

  VA - variable length string

  A - fixed length string (Defined in the Data Base this way for attributes with small string lengths, but are actually VA for population purposes)

  I - integer (32 bit)

  SI - Short Integer (8 bit)

  F - float

  LF - long float, or double

  D - date

  T - time

  DT - datetime

- **All Collection-level Attributes have Data_Location set to MCF, since all Collection-level metadata values must be set in the Descriptor File**

  ("MCF" here is a legacy. The Descriptor file was originally referred to by Data Server developers as a metadata control file, but this name was too easily confused with the SDP Toolkit Metadata Configuration File, however.)

- **A value of "R" for attributes within optional Groups means that "if any attribute within that group are to be set, then the attribute(s) indicated with R must also be set"**

The CollectionDescriptionClass Group

CollectionDescription Group

Attributes	Type/Size	Location	Required
ShortName	A8	MCF	R
LongName	VA80	MCF	R
CollectionDescription	VA255	MCF	R
VersionID	I	MCF	R

ShortName and VersionID uniquely identify the collection.

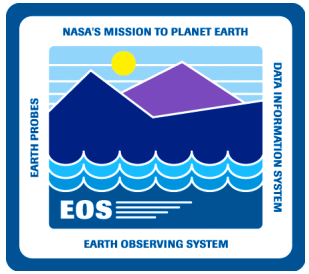
An attribute VersionDescription has been added to provide an explanation of how the version is different from other versions.

The ECSCollection Group

ECSCollection Group

Attributes	Type/Size	Location	Required	
RevisionDate	D	MCF	R	**Date of Descriptor File Revision**
SuggestedUsage	VA500	MCF	O	
ProcessingCenter	VA20	MCF	O	
ArchiveCenter	VA20	MCF	R	
VersionDescription	VA255	MCF	R	

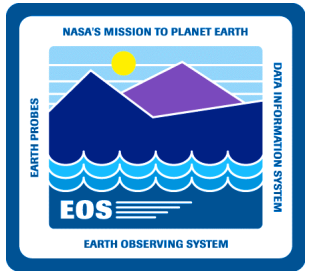
The SingleTypeCollection Group



SingleTypeCollection Group

Attributes	Type/Size	Location	Required
AccessConstraints	VA255	MCF	O
CitationforExternalPublication	VA255	MCF	O
CollectionState	A10	MCF	R
MaintenanceandUpdateFrequency	VA80	MCF	R

The Spatial Groups (1 of 5)



Spatial Group

Attributes	Type/Size	Location	Required
SpatialCoverageType	A10	MCF	R

The spatial extent of a collection is indicated by setting only 1 of GPolygon, BoundingRectangle, Point or Circle

HorizontalSpatialDomainContainer Group

Attributes	Type/Size	Location	Required
ZoneIdentifier	VA64	MCF	O

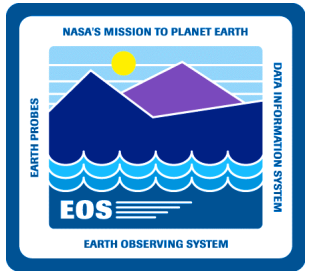
GPolygonContainer

Attributes	Type/Size	Location	Required
ExclusionGRingFlag	A1	MCF	R
GRingPointLatitude	LF	MCF	R
GRingPointLongitude	LF	MCF	R
GRingPointSequenceNo	I	MCF	R

A GPolygon must have at least 3 unique points clockwise order with the interior to the right in going from one point to the next.

Multiple GRings may be specified using multiple containers.

The Spatial Groups (2 of 5)



or

BoundingRectangle Group

Attributes	Type/Size	Location	Required
WestBoundingCoordinate	LF	MCF	R
NorthBoundingCoordinate	LF	MCF	R
EastBoundingCoordinate	LF	MCF	R
SouthBoundingCoordinate	LF	MCF	R

or

Point Group

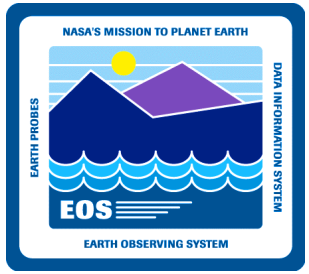
Attributes	Type/Size	Location	Required
PointLongitude	LF	MCF	R
PointLatitude	LF	MCF	R

or

Circle Group

Attributes	Type/Size	Location	Required
CenterLatitude	LF	MCF	R
CenterLongitude	LF	MCF	R
RadiusValue	LF	MCF	R
RadiusUnits	LF	MCF	R

The Spatial Groups (3 of 5)



AltitudeSystemDefinition Group

Attributes	Type/Size	Location	Required
AltitudeDatumName	VA40	MCF	R
AltitudeDistanceUnits	VA20	MCF	R
AltitudeEncodingMethod	VA255	MCF	R
AltitudeResolution	F	MCF	R

The AltitudeSystemDefinition Group is optional, with cardinality of 0-1.

Only one value can be set, use finest resolution.

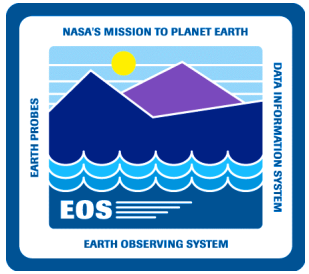
DepthSystemDefinition Group

Attributes	Type/Size	Location	Required
DepthDatumName	VA80	MCF	R
DepthDistanceUnits	VA20	MCF	R
DepthEncodingMethod	VA255	MCF	R
DepthResolution	F	MCF	R

The DepthSystemDefinition Group is optional, with cardinality of 0-1.

Only one value can be set, use finest resolution.

The Spatial Groups (4 of 5)



GeodeticModel Group

Attributes	Type/Size	Location	Required
EllipsoidName	VA255	MCF	R
SemiMajorAxis	F	MCF	R
DenominatorofFlatteningRatio	F	MCF	R
HorizontalDatumName	VA30	MCF	O

The GeodeticModel Group is optional, with cardinality of 0-1.

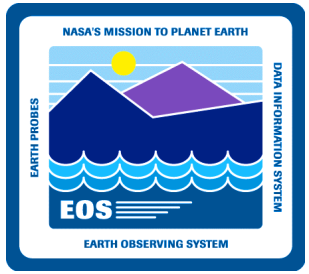
GeographicCoordinateSystem Group

Attributes	Type/Size	Location	Required
LatitudeResolution	F	MCF	R
LongitudeResolution	F	MCF	R
GeographicCoordinateUnits	A80	MCF	R

If the HorizontalCoordinateSystemContainer group is used, then one of GeographicCoordinateSystem, PlanarCoordinateSystemContainer or LocalCoordinateSystemContainer must be used.

The GeographicCoordinateSystem is used with most Level 3 products on a regular Latitude-Longitude grid.

The Spatial Groups (5 of 5)



PlanarCoordinateSystemContainer Group

Attributes	Type/Size	Location	Required
[Details skipped because of group complexity, see 420-TP-015-002]			

LocalCoordinateSystemContainer Group

Attributes	Type/Size	Location	Required
LocalCoordinateSystemDescription	VA255	MCF	R
LocalGeoreferenceInformation	VA255	MCF	R

VerticalSpatialDomain Group

Attributes	Type/Size	Location	Required
VerticalSpatialDomainType	VA20	MCF	R
VerticalSpatialDomainValue	VA20	MCF	R

If the HorizontalCoordinateSystemContainer group is used, then one of GeographicCoordinateSystem, PlanarCoordinateSystemContainer or LocalCoordinateSystemContainer must be used.

A "roll-your-own" coordinate system.

Multiple VerticalSpatialDomains are declared using containers

The Time Groups (1 of 3)

Temporal Group

Attributes	Type/Size	Location	Required
TimeType	A10	MCF	R
DateType	A10	MCF	R
TemporalRangeType	VA30	MCF	R
PrecisionofSeconds	I	MCF	R
EndsatPresentFlag	A1	MCF	R

The EndsatPresentFlag is used to indicate if the collection is open (i.e., granules are still being added) or closed.

RegularPeriodic Group

Attributes	Type/Size	Location	Required
PeriodName	VA30	MCF	R
Period1stDate	D	MCF	R
Period1stTime	T	MCF	R
PeriodCycleDurationUnit	VA15	MCF	R
PeriodCycleDurationValue	F	MCF	R
PeriodDurationUnit	VA15	MCF	R
PeriodDurationValue	F	MCF	R

The RegularPeriodic group is optional, with cardinality of 0-n; multiples are defined using containers.

The Time Groups (2 of 3)

or

MultipleDateTimePeriod Group

Attributes	Type/Size	Location	Required
MultipleDateTimeName	VA30	MCF	R

or

SingleDateTime Group

Attributes	Type/Size	Location	Required
TimeofDay	T	MCF	R
CalendarDate	D	MCF	R

or

The MultipleDateTimePeriod group is optional, with cardinality of 0-n. The MultipleDateTimePeriod requires 2 or more SingleDateTime groups associated with it.

Only 1 DateTime Group can be set.

Dates and Times are set separately:

Date Format:

YYYY-MM-DD

or **YYYY-DOY**

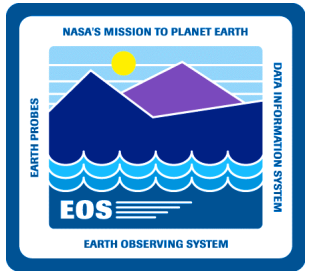
Time Format:

HH:MM:SS.ddddddZ

where Z indicates UTC.

Decimal places d are not required, but the SDP Toolkit limits to 6 decimal places

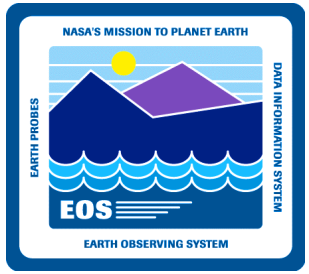
The Time Groups (3 of 3)



RangeDateTime Group

Attributes	Type/Size	Location	Required
RangeBeginningTime	T	MCF	R
RangeEndingTime	T	MCF	R
RangeBeginningDate	D	MCF	R
RangeEndingDate	D	MCF	R

The Contact Groups (1 of 4)



ContactPerson Group

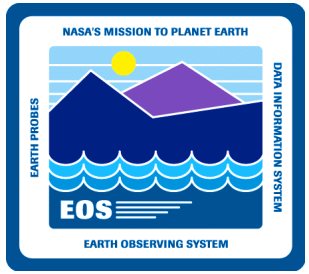
Attributes	Type/Size	Location	Required
Role	VA20	MCF	R
HoursofService	VA255	MCF	O
ContactInstructions	VA255	MCF	O
ContactJobPosition	VA255	MCF	O
ContactFirstName	VA255	MCF	R
ContactMiddleName	VA255	MCF	O
ContactLastName	VA255	MCF	R

ContactPersonAddress Group

Attributes	Type/Size	Location	Required
StreetAddress	VA80	MCF	R
City	VA30	MCF	R
StateProvince	VA30	MCF	R
PostalCode	VA20	MCF	R
Country	VA10	MCF	R

ContactPersonAddress is optional, with multiples expressed as container objects.

The Contact Groups (2 of 4)



Telephone Group

Attributes	Type/Size	Location	Required
TelephoneNumber	VA23	MCF	R
TelephoneNumberType	A10	MCF	O

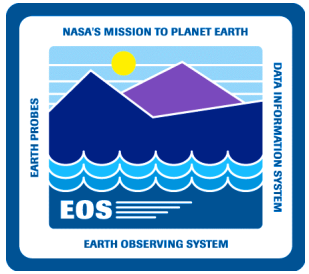
Telephone is optional, with multiples expressed as container objects.

Email Group

Attributes	Type/Size	Location	Required
ElectronicMailAddress	VA255	MCF	R

Email is optional, with cardinality of 0-1.

The Contact Groups (3 of 4)



ContactOrganization Group

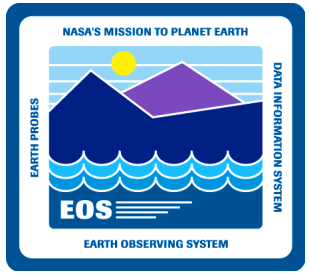
Attributes	Type/Size	Location	Required
Role	VA20	MCF	R
HoursofService	VA255	MCF	O
ContactInstructions	VA255	MCF	O
ContactOrganizationName	VA255	MCF	R

ContactOrganizationAddress Group

Attributes	Type/Size	Location	Required
StreetAddress	VA80	MCF	R
City	VA30	MCF	R
StateProvince	VA30	MCF	R
PostalCode	VA20	MCF	R
Country	VA10	MCF	R

ContactOrganizationAddress is optional, with multiples expressed as container objects

The Contact Groups (4 of 4)



OrganizationTelephone Group

Attributes	Type/Size	Location	Required
TelephoneNumber	VA23	MCF	R
TelephoneNumberType	A10	MCF	O

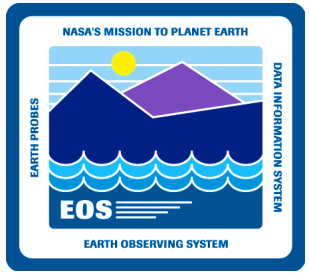
OrganizationTelephone is optional, with multiples expressed as container objects.

OrganizationEmail Group

Attributes	Type/Size	Location	Required
ElectronicMailAddress	VA255	MCF	R

OrganizationEmail is optional, with cardinality of 0-1.

The Keyword Groups



DisciplineTopicParameters Group

Attributes	Type/Size	Location	Required
ECSDisciplineKeyword	VA24	MCF	R
ECSTopicKeyword	VA32	MCF	R
ECSTermKeyword	VA50	MCF	R
ECSVariableKeyword	VA80	MCF	R
ECSParameterKeyword	VA80	MCF	O

The DisciplineTopicParametersgroup may have multiple sets of keywords, conforming to the GCMD keywords; multiples are expressed as container objects.

ECSParameterKeyword has a cardinality of 0-n

TemporalKeywordClass Group

Attributes	Type/Size	Location	Required
TemporalKeyword	VA40	MCF	R

TemporalKeywordClass is optional, with cardinality of 0-n.

SpatialKeywordClass Group

Attributes	Type/Size	Location	Required
SpatialKeyword	VA40	MCF	R

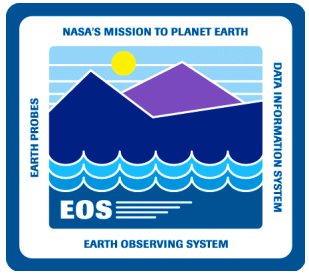
SpatialKeywordClass is optional, with cardinality of 0-n.

The ProcessingLevel Group

ProcessingLevel Group

Attributes	Type/Size	Location	Required
ProcessingLevelDescription	VA80	MCF	R
ProcessingLevelID	A6	MCF	R

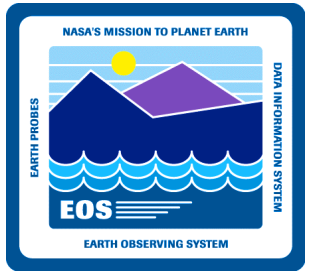
The Platform, Instrument and Sensor Groups (1 of 3)



Platform Group

Attributes	Type/Size	Location	Required	
PlatformShortName	VA20	MCF	R	**Multiple Platforms are specified using containers.**
PlatformLongName	VA80	MCF	R	
PlatformType	VA20	MCF	R	
PlatformCharacteristicName	VA40	MCF	R	**PlatformCharacteristics have a cardinality of 0-n.**
PlatformCharacteristicDescription	VA80	MCF	R	**Multiple PlatformCharacteristics are specified using containers.**
PlatformCharacteristicDataType	A8	MCF	R	
PlatformCharacteristicUnit	VA20	MCF	O	
PlatformCharacteristicValue	VA20	MCF	R	

The Platform, Instrument and Sensor Groups (2 of 3)



Instrument Group

Attributes	Type/Size	Location	Required
InstrumentShortName	VA20	MCF	R
InstrumentLongName	VA80	MCF	O
InstrumentTechnique	VA80	MCF	O
NumberofSensors	I	MCF	O
OperationMode	VA20	MCF	O
InstrumentCharacteristicName	VA40	MCF	R
InstrumentCharacteristicDescription	VA80	MCF	R
InstrumentCharacteristicUnit	VA20	MCF	O
InstrumentCharacteristicDataType	A8	MCF	R
InstrumentCharacteristicValue	VA15	MCF	R

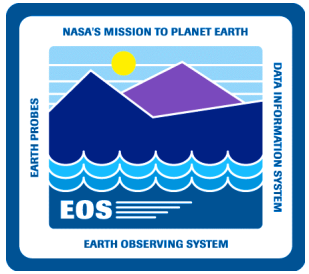
Multiple Instruments are specified using containers.

OperationMode has a cardinality of 0-n.

InstrumentCharacteristics have a cardinality of 0-n.

Multiple InstrumentCharacteristics are specified using containers.

The Platform, Instrument and Sensor Groups (3 of 3)



Sensor Group

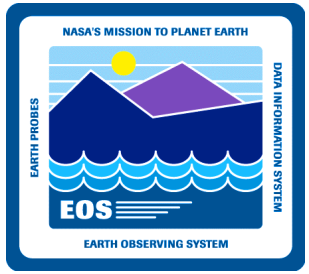
Attributes	Type/Size	Location	Required
SensorShortName	VA20	MCF	R
SensorLongName	VA80	MCF	O
SensorTechnique	VA80	MCF	O
SensorCharacteristicName	VA40	MCF	R
SensorCharacteristicDescription	VA80	MCF	R
SensorCharacteristicDataType	A8	MCF	R
SensorCharacteristicUnit	VA20	MCF	O
SensorCharacteristicValue	VA80	MCF	R

Multiple Sensors are specified using containers.

SensorCharacteristics have a cardinality of 0-n.

Multiple SensorCharacteristics are specified using containers.

Misc. Groups (1 of 4)



AnalysisSource Group

Attribute	Type/Size	Location	Required
AnalysisShortName	VA20	MCF	R
AnalysisLongName	VA80	MCF	O
AnalysisTechnique	VA80	MCF	O
AnalysisType	VA20	MCF	R

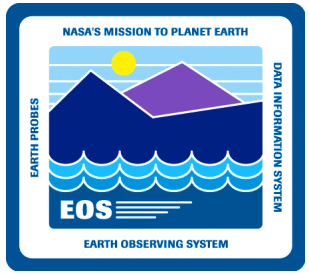
Multiple AnalysisSource groups are specified using containers.

Campaign Group

Attributes	Type/Size	Location	Required
CampaignShortName	VA20	MCF	R
CampaignLongName	VA80	MCF	O
CampaignStartDate	D	MCF	O
CampaignEndDate	D	MCF	O

Multiple Campaign groups are specified using containers.

Misc. Groups (2 of 4)



CollectionAssociation Group

Attributes	Type/Size	Location	Required
CollectionType	VA20	MCF	R
CollectionUse	VA500	MCF	R
ShortName	A8	MCF	R
VersionID	SI	MCF	R

Multiple AnalysisSource groups are specified using containers.

These are the ShortName and VersionID of the associated collection.

Review Group

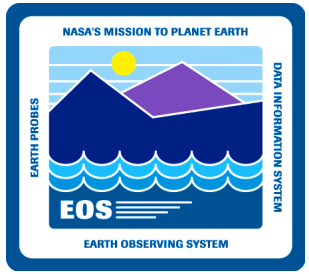
Attributes	Type/Size	Location	Required
ScienceReviewDate	D	MCF	R
ScienceReviewStatus	VA20	MCF	R
FutureReviewDate	D	MCF	O

Multiple Review groups are specified using containers.

CSDTDescription Group

Attributes	Type/Size	Location	Required
PrimaryCSDT	VA30	MCF	R
IndirectReference	VA100	MCF	O
Implementation	VA100	MCF	R
CSDTComments	VA255	MCF	O

Misc. Groups (3 of 4)



AdditionalAttributes Group

Attributes	Type/Size	Location	Required
AdditionalAttributeDatatype	A10	MCF	R
AdditionalAttributeDescription	VA255	MCF	R
AdditionalAttributeName	VA40	MCF	R
ParameterUnitsofMeasurement	VA20	MCF	O
ParameterRangeBegin	VA40	MCF	O
ParameterRangeEnd	VA40	MCF	O
ParameterValueAccuracy	VA30	MCF	O
ParameterValueAccuracyExplanation	VA255	MCF	O
ParameterMeasurementResolution	VA30	MCF	O
ParameterValue	VA255	MCF	O

Multiple AdditionalAttributess are specified using containers.

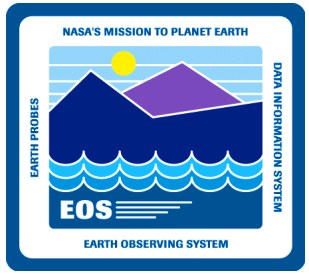
If a Parameter Range is to be specified, the both ParameterRangeBegin and ParameterRangeEnd must be provided.

StorageMedium has a cardinality of 0-n.

StorageMediumClass Group

Attributes	Type/Size	Location	Required
StorageMedium	VA30	MCF	R

Misc. Groups (4 of 4)

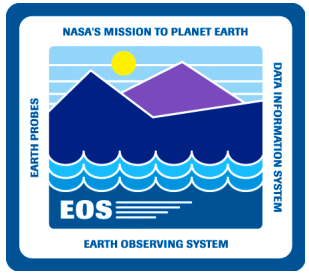


Locality Group

Attributes	Type/Size	Location	Required
LocalityType	VA20	MCF	R
LocalityDescription	VA255	MCF	R

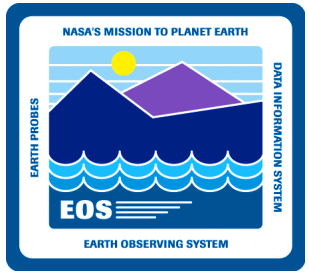
Attributes	Type/Size	Location	Required
type	VA20	MCF	O
DLLName	VA255	MCF	R
SpatialSearchType	VA40	MCF	O

Granule-Level Metadata



Described in 420-TP-021-001, "Release 5B Implementation Earth Science Data Model for the ECS Project", dated September 1999.
The applicable valid values for each attribute are also given there.

Pointers in Descriptor File



- **In the Inventory Metadata Group, only those pointer attributes that are set by the Science Software have been included**
  - **Viz. InputPointer, AncillaryInputPointer, and OrbitParametersPointer**
  - **Only these pointers are known at the time a data granule produced by a PGE is inserted in the Science Data Server**

note: ECS is discouraging the use of AncillaryInputPointer and OrbitParametersPointer.
InputPointer should be used instead.

Optionality of Inventory Metadata Groups (1 of 2)

Attribute	Cardinality	Minimal	Limited	Intermediate	Full
CollectionDescriptionClass	1	R	R	R	R
ECSDataGranule	0-1	O	O	R	R
MeasuredParameter	0-n	O	O	O	O
QAFlags	1	[R	R	R	R]†
QAStats	0-1	[O	O	O	O]†
OrbitCalculatedSpatialDomain}	0-n	O	O	O	O
InputGranule	0-n	O	O	O	O
SpatialDomainContainer	0-1	O	O	O	O
GranuleLocality	0-1	[O	O	O	O]†
ZoneIdentifierClass	0-1	[O	O	O	O]†
VerticalSpatialDomain	0-n	[O	O	O	O]†
HorizontalSpatialDomainContainer	1	[R	R	R	R]†

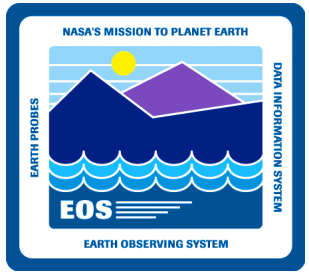
† optionality applicable only if parent group is used (R = required, O = optional)

Optionality of Inventory Metadata Groups (2 of 2)

Attribute	Cardinality	Minimal	Limited	Intermediate	Full
RangeDataTime or SingleDateTime	0-1	O	O	O	O
PGEVersionClass	0-1	O	O	O	O
AncillaryInputGranule	0-n	O	O	O	O
Review	0-n	O	O	O	O
ProcessingQA	0-n	O	O	O	O
OrbitParametersGranule	0-n	O	O	O	O
StorageMediumClass	0-n	O	O	O	O
AnalysisSource	0-n	O	O	O	O
Campaign	0-n	O	O	O	O
SensorCharacteristic	0-n	O	O	O	O
AssociatedPlatformInstrumentSensor	0-n	O	O	O	O
ProductSpecificMetadata	0-n	O	O	O	O

† optionality applicable only if parent group is used (R = required, O = optional)

For the Slides which follow:



- **The Type values for the attributes are abbreviated:**

  VA - variable length string
  A - fixed length string
  I - integer (32 Bit)
  SI - Short Integer (8 Bit)
  F - float
  LF - long float, or double
  D - date
  T - time
  DT - datetime

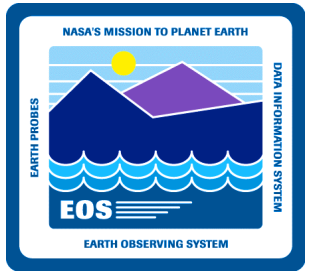
The CollectionDescriptionClass Group (Granule-level)

CollectionDescription Group

Attributes	Type/Size	Location	Required
ShortName	**A8**	**MCF**	**R**
VersionID	**SI**	**MCF**	**R**

These attributes uniquely identify the collection to which the granule belongs. The values in the MCF file are supplied by the Data Server, and must not be overwritten by the PGE.

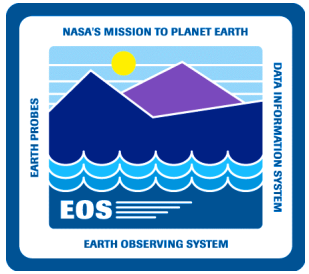
The ECSDataGranule Group



ECSDataGranule Group

Attributes	Type/Size	Location	Required	
SizeMBECSDataGranule	F10	DSS	R	**Size as Archived**
ReprocessingPlanned	VA20	PGE	O	
ReprocessingActual	VA45	PGE	O	**These attributes are included in Descriptor Files only at the request of the Data Provider**
LocalGranuleID	VA80	PGE	O	**The File Name of the granule supplied by the Data Provider**
DayNightFlag	A5	PGE	O	**Scene illumination condition**
ProductionDateTime	DT	TK	R	**Time when Inventory metadata is written using PGS_MET_WRITE**
LocalVersionID	VA60	PGE	O	**Granule Version number designated by Data Provider**

The MeasuredParameter Group



MeasuredParameter Group

Attributes	Type/Size	Location	Required
ParameterName	VA40	PGE	R

QAFlags Group

Attributes	Type/Size	Location	Required
AutomaticQualityFlag	VA64	PGE	R
... Explanation	VA255	PGE	R
OperationalQualityFlag	VA20	PGE	O
... Explanation	VA255	PGE	O
ScienceQualityFlag	VA20	DP	O
... Explanation	VA255	DP	O

QAStats Group

Attributes	Type/Size	Location	Required
QAPercentInterpolatedData	I	PGE	O
QAPercentMissingData	I	PGE	R
QAPercentOutofBoundsData	I	PGE	O
QAPercentCloudCover	I	PGE	O

Multiple MeasuredParameters declared using containers

Parameter Name identifies the set of QAFlags and QAStats. If subsetting by parameter is to be allowed, then the value of ParameterName must be identical to the name of the parameter as it appears in the structural metadata for the HDF-EOS granule.

The QAStats group is optional

The OrbitCalculatedSpatialDomain

OrbitCalculatedSpatialDomain Group

Attributes	Type/Size	Location	Required
OrbitalModelName	VA80	PGE	O
OrbitNumber	I	PGE	O
StartOrbitNumber	I	PGE	O
StopOrbitNumber	I	PGE	O
EquatorCrossingLongitude	LF	PGE	R
EquatorCrossingTime	T	PGE	R
EquatorCrossingDate	D	PGE	R

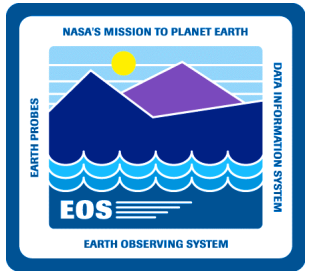
Multiple OrbitalCalculatedSpatialDomains are declared using containers.

OrbitalModelName might be dropped from the data model.

Only set either OrbitNumber or

StartOrbitNumber/StopOrbitNumber

The Input Pointers



InputGranule Group

Attributes	Type/Size	Location	Required
InputPointer	VA255	PGE	R

Multiple InputPointers are set using an array. All inputs (except for one special type described below) are set using InputPointer. These are URs or file names transferred from the Process Control File(PCF).

AncillaryInputGranule Group

Attributes	Type/Size	Location	Required
AncillaryInputType	VA20	PGE	R
AncillaryInputPointer	VA255	PGE	R

Multiple AncillaryInputPointers are set using a container. These attributes are used only to specify inputs files that are necessary in order to interpret the data in the product granule. For example, if the geolocation is in a separate file, then the AncillaryInputType is set to "Geolocation". The pointer is a UR transferred from the PCF.

OrbitParametersGranule Group

Attributes	Type/Size	Location	Required
OrbitParametersPointer	VA255	PGE	R

Multiple OrbitParametersPointers are set using an array. This pointer is to the orbital ephemeris file used in the geolocation of the Level 1 products. The pointer is a UR transferred from the PCF.

The SpatialDomainContainer Group

ZoneIdentifierClass

Attributes	Type/Size	Location	Required
ZoneIdentifier	VA64	PGE	O

If present, only one value

GPolygonContainer

Attributes	Type/Size	Location	Required
ExclusionGRingFlag	A1	PGE	R
GRingPointLatitude	LF	PGE	R
GRingPointLongitude	LF	PGE	R
GRingPointSequenceNo	I	PGE	R

The spatial extent of a granule is indicated by setting only 1 of GPolygon, BoundingRectangle, Point or Circle.

A GPolygon must have at least 3 unique points clockwise order with the interior to the right in going from one point to the next.

Multiple GRings may be specified using multiple containers.

or

BoundingRectangle Group

Attributes	Type/Size	Location	Required
WestBoundingCoordinate	LF	PGE	R
NorthBoundingCoordinate	LF	PGE	R
EastBoundingCoordinate	LF	PGE	R
SouthBoundingCoordinate	LF	PGE	R

The SpatialDomainContainer Group (Cont.)

or

Point Group

Attributes	Type/Size	Location	Required
PointLongitude	LF	PGE	R
PointLatitude	LF	PGE	R

or

Circle Group

Attributes	Type/Size	Location	Required	
CenterLatitude	LF	PGE	R	
CenterLongitude	LF	PGE	R	
RadiusValue	LF	PGE	R	At present, the Radius must only be expressed in meters
RadiusUnits	LF	PGE	R	

The VerticalSpatialDomain Group

Granule Locality Group

Attributes	Type/Size	Location	Required
LocalityValue	VA80	PGE	R

VerticalSpatialDomain Group

Attributes	Type/Size	Location	Required
VerticalSpatialDomainType	VA20	PGE	R
VerticalSpatialDomainValue	VA20	PGE	R

Multiple VerticalSpatialDomains are declared using containers

The vertical extent of data in a granule is indicated by designating one container with a VerticalSpatialDomainType of “Minimum Altitude” and corresponding value, and another container with a VerticalSpatialDomainType of “Maximum Altitude” and corresponding value.

The Time Groups

SingleDateTime Group

Attributes	Type/Size	Location	Required
TimeofDay	T	PGE	R
CalendarDate	D	PGE	R

or

RangeDateTime Group

Attributes	Type/Size	Location	Required
RangeBeginningTime	T	PGE	R
RangeEndingTime	T	PGE	R
RangeBeginningDate	D	PGE	R
RangeEndingDate	D	PGE	R

Only 1 DateTime Group can be set.

Dates and Times are set separately:

Date Format:

YYYY-MM-DD

or YYYY-DOY

Time Format:

HH:MM:SS.ddddddZ

where Z indicates UTC.

Decimal places d are not required, but the SDP Toolkit limits to 6 decimal places

Miscellaneous Groups

PGEVersionClass

Attributes	Type/Size	Location	Required
PGEVersion	A10	PGE	R

Review Group

Attributes	Type/Size	Location	Required
ScienceReviewDate	D	PGE	R
ScienceReviewStatus	VA20	PGE	R
FutureReviewDate	D	PGE	O

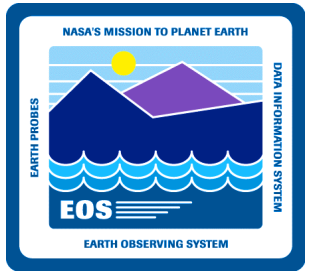
The Review Group is not being used at present, since this information is unknown at the time of PGE execution.

ProcessingQA Group

Attributes	Type/Size	Location	Required
ProcessingQADescription	VA255	PGE	R
ProcessingQAAttribute	VA80	PGE	R

Multiple ProcessingQA groups are declared using containers**. This group is intended to indicate the quality of the metadata values. It is not normally used at present.**

Miscellaneous Groups (Cont.)



StorageMediumClass Group

Attributes	Type/Size	Location	Required
StorageMedium	VA30	PGE	R

StorageMedium is not normally known by the PGEs, therefore not usually set. Multiple StorageMedium values are declared using arrays.

AnalysisSource Group

Attributes	Type/Size	Location	Required
AnalysisShortName	VA20	PGE	R

MultipleAnalysisShortNames are declared using arrays.

Campaign Group

Attributes	Type/Size	Location	Required
CampaignShortName	VA20	PGE	R

MultipleCampaignShortNames are declared using arrays.

Platform, Instrument, Sensor

SensorCharacteristic Group

Attributes	Type/Size	Location	Required
PlatformShortName	VA20	PGE	R
InstrumentShortName	VA20	PGE	R
SensorShortName	VA20	PGE	R
SensorCharacteristicName	VA40	PGE	R
SensorCharacteristicValue	VA80	PGE	R

AssociatedPlatformInstrumentSensor

Attributes	Type/Size	Location	Required
AssociatedPlatformShortName	VA20	PGE	R
AssociatedInstrumentShortName	VA20	PGE	R
AssociatedSensorShortName	VA20	PGE	R
OperationMode	VA20	PGE	O

The SensorCharacteristicGroup is used only when there is a SensorCharacteristicValue to be set for the granule.

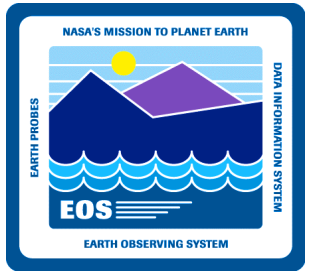
Multiple SensorCharacteristicGroups are declared using containers.

The SensorCharacteristicName must be identical with one indicated in the Collection Metadata.

The AssociatedPlatformInstrumentSensor is used where the granules may vary by Platform, Instrument, Sensor, or OperationMode.

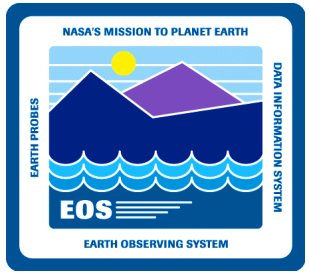
Multiple AssociatedPlatformInstrumentSensor groups are declared using containers.

For ECS to work: The Bare Bones



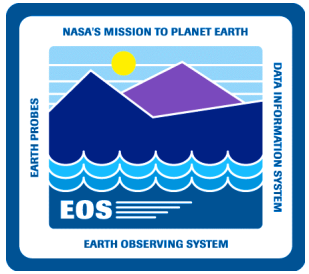
- **ShortName** and **VersionID** are used throughout the system as the unique identifiers for collections (2)
- **LongName** and **CollectionDescription** serve further to describe the collection. They are required so that someone besides the data producer can get some sense of what the collection is (2)
- **RevisionDate** to identify when the collection was established or modified (1)

For ECS to work: The Bare Bones (Cont.)



- **Contact name**, either a person or an organization, plus an attribute defining the role of this entity (2)
- **ArchiveCenter** to indicate where collection is held (1)
- **Discipline, Topic, Term** and Variable Keywords are descriptive information needed for GCMD compatibility (4)
- **Processing Level** and a description of the processing level (2)

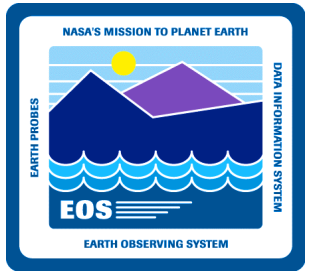
Why Do More?



Data can be inserted and retrieved with a minimum of metadata, so why bother with more?

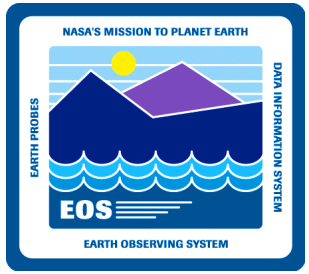
- **To make it easier to find**
  - **By the time of Aqua launch, ECS will have 40,000,000 granules in its archive.**
  - **ECS uses metadata to provide efficient searching of large, distributed archives**
  - **Metadata can also be used in production rules (locate and/or choose between input data)**
- **To allow users to quickly determine if a collection is suitable for their needs**
- **To point users to locations for further information**

B.0 ESDT Descriptor Template



- The B.0 Descriptor File Template represents an interface between:
  - Data Modeling
  - Science Data Server
  - SDP Toolkit
  - Descriptor File Creators
- Changes to the B.0 Descriptor File Template are made through the CCR/CCB Process
- The Template contains the ODL representation of every Group and Object that might appear within a Descriptor File. However, no single descriptor file can employ all of these groups and objects.

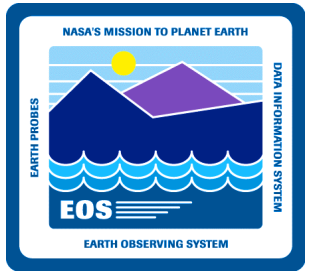
Expressing Multiple Values: Containers and Arrays



- **An array is used for individual attributes that are capable of having multiple values.**
- **In the descriptor, those individual attributes that have multiple values must have NUM_VAL set to the maximum possible number of values**
  - **Example: NUM_VAL = 3**

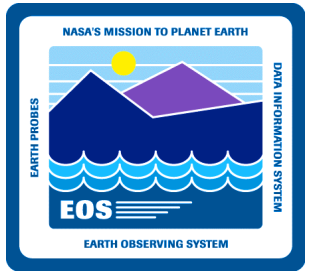
    Value = (“value_1”, “value_2”, “value_3”)
- **When a group containing two or more attributes is to be set multiple times, then a container object is used. Within each container object, an identifier <Class = > is declared for each attribute and set to the same number.**

Expressing Multiple Values: Containers and Arrays (Cont.)



- Different container objects must have different Class numbers
- In general, Container objects are not classes or attributes, but objects holding classes and attributes that are related to one another

Expressing Multiple Values: Containers and Arrays (Cont.)

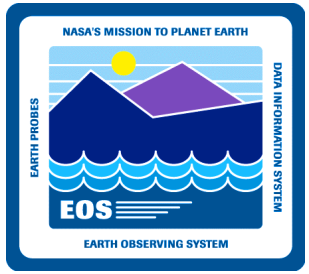


- Example:

```
GROUP = VerticalSpatialDomain
 OBJECT = VerticalSpatialDomainContainer
    Data_Location = "NONE"
    Mandatory = "TRUE"
    Class = ”1"
    OBJECT = VerticalSpatialDomainType
       Data_Location = "MCF"
       Mandatory = "TRUE"
       Class = ”1"
       NUM_VAL = 1
       Value = "Minimum Altitude"
    END_OBJECT = VerticalSpatialDomainType
    OBJECT = VerticalSpatialDomainValue
       Data_Location = "MCF"
       Mandatory = "TRUE"
       Class = ”1"
       NUM_VAL = 1
       Value = "SFC"
    END_OBJECT = VerticalSpatialDomainValue
 END_OBJECT = VerticalSpatialDomainContainer
```

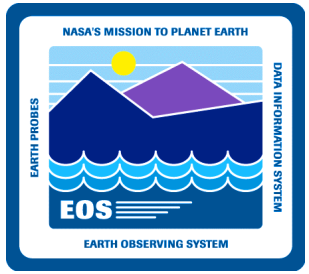
```
OBJECT = VerticalSpatialDomainContainer
       Data_Location = "NONE"
       Mandatory = "TRUE"
       Class = ”2"
       OBJECT = VerticalSpatialDomainType
          Data_Location = "MCF"
          Mandatory = "TRUE"
          Class = ”2"
          NUM_VAL = 1
          Value = "Maximum Altitude"
       END_OBJECT = VerticalSpatialDomainType
       OBJECT = VerticalSpatialDomainValue
          Data_Location = "MCF"
          Mandatory = "TRUE"
          Class = ”2"
          NUM_VAL = 1
          Value = "TOA"
       END_OBJECT = VerticalSpatialDomainValue
    END_OBJECT = VerticalSpatialDomainContainer
END_GROUP = VerticalSpatialDomain
```

Product Specific Attributes



- **Optional Additional Attributes or Characteristics which the data provider makes available to further describe the Collection or Granule, e.g.,**
  - **NodeType**
  - **ASTERMapProjection**
  - **GroundStationID**

Product Specific Attributes (Cont.)

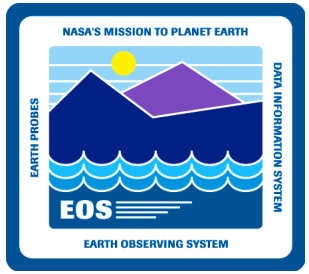


In the Descriptor File,

```
GROUP = ProductSpecificMetadata

   OBJECT = Example_String
      Data_Location = "PGE"
      Mandatory = "TRUE"
      TYPE = STRING
      LENGTH = "10"
      MAXOCCURRENCES = "1"
      VALIDRULE = "Match(valid_1, valid_2)"
   END_OBJECT = Example_String

OBJECT = Example_Float
      Data_Location = "PGE"
      Mandatory = "TRUE"
      TYPE = FLOAT
      MAXOCCURRENCES = "1"
      VALIDRULE = "Range(0.0, 100.0)"
   END_OBJECT = Example_Float
END_GROUP = ProductSpecificMetadata
```

Each AdditionalAttribute from the Collection-level must be defined at the Granule-level as well.

Product Specific Attributes (Cont.)



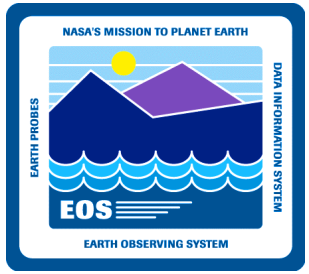
In the Metadata Configuration File (MCF) used by the PGE,

```
GROUP = AdditionalAttributes
  OBJECT = AdditionalAttributesContainer
    Data_Location = "NONE"
    Class = "M"
    Mandatory = "TRUE"
    OBJECT = AdditionalAttributeName
      Data_Location = "PGE"
      Mandatory = "TRUE"
      Class = "M"
      TYPE = "STRING"
      NUM_VAL = 1
    END_OBJECT = AdditionalAttributeName
    GROUP = InformationContent
      Class = "M"
      OBJECT = ParameterValue
        Data_Location = "PGE"
        Mandatory = "TRUE"
        TYPE = "STRING"
        NUM_VAL = 1
      END_OBJECT = ParameterValue
    END_GROUP = InformationContent
  END_OBJECT = AdditionalAttributesContainer
END_GROUP = AdditionalAttributes
```

This block of ODL is automatically constructed by the Science Data Server when an MCF is requested.

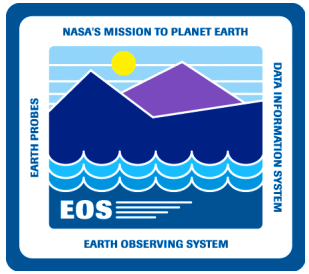
The SDP Toolkit uses the same block of ODL in setting each Product Specific Attribute (PSA). The data types for each PSA are defined in the Collection Metadata, and can be any of int, float, varchar, date, time or datetime. Since a single ODL block cannot have multiple data types for the ParameterValue, all PSAs must be set as STRING.

Group = SERVICES (1 of 3)



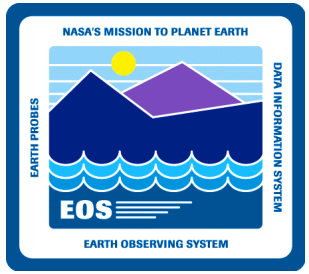
- The ACQUIRE object specifies the characteristics of the Acquire service
  - Acquire service allows users to retrieve data granules
- The INSERT object specifies the characteristics of the Insert service
  - The Insert service is used to store data granules in the archive
- The UPDATEMETADATA object allows changing of already inserted values with new values
- The BROWSE object allows access to browse images associated with a particular granule
- The GETQUERYABLEPARAMETERS object allows access to a list of collection and inventory attributes defined within the ESDT descriptor file

Group = SERVICES (2 of 3)



- The INSPECT object allows users to look at values from the Inventory metadata attributes
- The INSPECTCL object object allows users to look at values from the Collection metadata attributes
- The DELETE object allows the removal of granules from the archive as well as the metadata
- The DELETEFROMARCHIVE object allows the deletion of data granules from the archive but does not delete the associated metadata

Group = SERVICES (3 of 3)



- **Subsetting services are included as applicable for extracting information by:**
  - **Altitude (only)**
  - **Area (only) by bounding box**
  - **Area (only) by WRS Row, Path**
  - **Parameter (only)**
  - **Time (only)**
  - **Rows (Swath products only)**
  - **multiple means, area by WRS Row, Path**
  - **multiple means, area by Bounding Box**
  - **Apply Mask**
  - **Extract Narrow**

Group = Structure

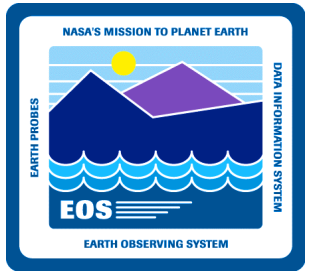
```
GROUP = STRUCTURE
  OBJECT = STRUCTURE
    CSDTType = "Projected Grid"
    CSDTInterfaceType = Conformant
    CSDTImplementation = “HDF-EOS”
  END_OBJECT = STRUCTURE
END_GROUP = STRUCTURE
```

CSDTType must be the same as the Collection-level attribute PrimaryCSDT

CSDTInterfaceType equals either Conformant or NonConformant

CSDT Implementation must agree with the Collection-level attribute Implementation. (HDF-EOS must be enclosed with in quotes, since a “-” is not allowed in an ODL identifier)

Group = Event

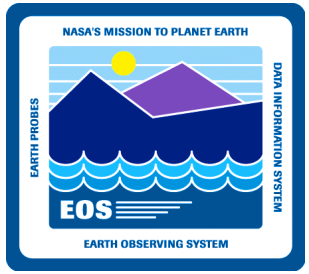


- Three events
  - Delete, Insert, UpdateMetadata
  - Triggered when corresponding services are executed
- Insert and UpdateMetadata events are triggerable on corresponding service execution or only when inventory metadata attributes have particular values
  - A subscriber can be notified when a granule is inserted or when the metadata for a granule is updated
  - A subscriber can be notified when a granule is inserted with a particular metadata value or when the metadata is updated to a particular value

An Example Descriptor File for OMI_L1b (1 of 19)

```
GROUP = METADATA

  GROUP = COLLECTIONMETADATA
    GROUPTYPE = MASTERGROUP

    OBJECT = DLLName
      Data_Location = "MCF"
      Mandatory = "TRUE"
      NUM_VAL = 1
      Value = "libDsESDTSyBASIC.001Sh.so"
    END_OBJECT = DLLName

    OBJECT = SpatialSearchType
      Data_Location = "MCF"
      Mandatory  = "TRUE"
      NUM_VAL = 1
      Value = "GPolygon"
    END_OBJECT = SpatialSearchType

    GROUP = CollectionDescriptionClass
      OBJECT = ShortName
        Data_Location = "MCF"
        Mandatory = "TRUE"
        NUM_VAL = 1
        Value = "OMI_L1b"
      END_OBJECT = ShortName

      OBJECT = LongName
        Data_Location = "MCF"
        Mandatory = "TRUE"
        NUM_VAL = 1
        Value = "OMI/Aura Level 1b"
      END_OBJECT = LongName

      OBJECT = CollectionDescription
        Data_Location = "MCF"
        Mandatory = "TRUE"
        NUM_VAL = 1
        Value = "This Level 1b data collection contains digitized
counts for 460 OMI visible and ultraviolet wavelength bands and
raw instrument engineering and spacecraft ancillary data."
      END_OBJECT = CollectionDescription

      OBJECT = VersionID
        Data_Location = "MCF"
        Mandatory = "TRUE"
        NUM_VAL = 1
        Value = 1
      END_OBJECT = VersionID
    END_GROUP = CollectionDescriptionClass

    GROUP = ECSCollection
      OBJECT = RevisionDate
        Data_Location = "MCF"
        Mandatory = "TRUE"
        NUM_VAL = 1
        Value = "2000-05-15"
      END_OBJECT = RevisionDate

      OBJECT = SuggestedUsage
        Data_Location = "MCF"
        Mandatory = "TRUE"
```

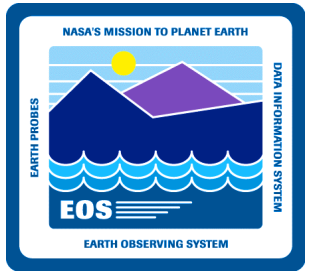
An Example Descriptor File for OMI_L1b (2 of 19)




```
        NUM_VAL = 1
        Value = "Science Research"
    END_OBJECT = SuggestedUsage

    OBJECT = ProcessingCenter
        Data_Location = "MCF"
        Mandatory = "TRUE"
        NUM_VAL = 1
        Value = "GSFC"
    END_OBJECT = ProcessingCenter

    OBJECT = ArchiveCenter
        Data_Location = "MCF"
        Mandatory = "TRUE"
        NUM_VAL = 1
        Value = "GSFC"
    END_OBJECT = ArchiveCenter

    OBJECT = VersionDescription
        Data_Location = "MCF"
        Mandatory = "TRUE"
        NUM_VAL = 1
        Value = "Initial Version."
    END_OBJECT = VersionDescription
END_GROUP = ECSCollection

GROUP = SingleTypeCollection
    OBJECT = CitationforExternalPublication
        Data_Location = "MCF"
        Mandatory = "TRUE"
```

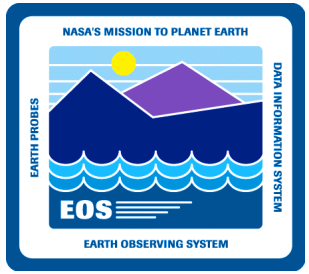
```
        NUM_VAL = 1
        Value = "OMI data contained herein were obtained
through joint  research between the Netherlands (NIVR/KNMI),
Finland (FMI) and the U.S. (NASA) in the Earth Observing System
(EOS) Chemistry Mission."
    END_OBJECT = CitationforExternalPublication

    OBJECT = CollectionState
        Data_Location = "MCF"
        Mandatory = "TRUE"
        NUM_VAL = 1
        Value = "In Work"
    END_OBJECT = CollectionState

    OBJECT = MaintenanceandUpdateFrequency
        Data_Location = "MCF"
        Mandatory = "TRUE"
        NUM_VAL = 1
        Value = "As Needed"
    END_OBJECT = MaintenanceandUpdateFrequency

    OBJECT = AccessConstraints
        Data_Location = "MCF"
        Mandatory = "TRUE"
        NUM_VAL = 1
        Value = "None"
    END_OBJECT = AccessConstraints
END_GROUP = SingleTypeCollection

GROUP = Spatial
    OBJECT = SpatialCoverageType
```

An Example Descriptor File for OMI_L1b (3 of 19)



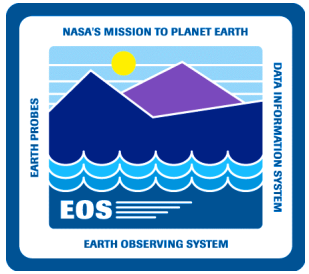

```
            Data_Location = "MCF"
            Mandatory = "TRUE"
            NUM_VAL = 1
            Value = "Horizontal"
         END_OBJECT = SpatialCoverageType

         GROUP = SpatialDomainContainer
            GROUP = HorizontalSpatialDomainContainer

               GROUP = ZoneIdentifierClass
                  OBJECT = ZoneIdentifier
                     Data_Location = "MCF"
                     Mandatory = "TRUE"
                     NUM_VAL = 1
                     Value   = "Universal Transverse Mercator
(UTM)"
                  END_OBJECT = ZoneIdentifier
               END_GROUP = ZoneIdentifierClass

               GROUP = BoundingRectangle
                  OBJECT = WestBoundingCoordinate
                     Data_Location = "MCF"
                     Mandatory = "TRUE"
                     NUM_VAL = 1
                     Value = -180.0
                  END_OBJECT = WestBoundingCoordinate

                  OBJECT = NorthBoundingCoordinate
                     Data_Location = "MCF"
                     Mandatory = "TRUE"
                     NUM_VAL = 1
                     Value = 90.0
                  END_OBJECT = NorthBoundingCoordinate

                  OBJECT = EastBoundingCoordinate
                     Data_Location = "MCF"
                     Mandatory = "TRUE"
                     NUM_VAL = 1
                     Value = 180.0
                  END_OBJECT = EastBoundingCoordinate

                  OBJECT = SouthBoundingCoordinate
                     Data_Location = "MCF"
                     Mandatory = "TRUE"
                     NUM_VAL = 1
                     Value = -90.0
                  END_OBJECT = SouthBoundingCoordinate
               END_GROUP = BoundingRectangle

            END_GROUP = HorizontalSpatialDomainContainer
         END_GROUP = SpatialDomainContainer
      END_GROUP = Spatial

      GROUP = Temporal

         OBJECT = TimeType
            Data_Location = "MCF"
            Mandatory = "TRUE"
            NUM_VAL = 1
            Value = "UTC"
         END_OBJECT = TimeType
```

An Example Descriptor File for OMI_L1b (4 of 19)




```
OBJECT = DateType
    Data_Location = "MCF"
    Mandatory = "TRUE"
    NUM_VAL = 1
    Value = "Gregorian"
END_OBJECT = DateType

OBJECT = TemporalRangeType
    Data_Location = "MCF"
    Mandatory = "TRUE"
    NUM_VAL = 1
    Value = "Continuous Range"
END_OBJECT = TemporalRangeType

OBJECT = PrecisionofSeconds
    Data_Location = "MCF"
    Mandatory = "TRUE"
    NUM_VAL = 1
    Value = 1
END_OBJECT = PrecisionofSeconds

OBJECT = EndsatPresentFlag
    Data_Location = "MCF"
    Mandatory = "TRUE"
    NUM_VAL = 1
    Value = "Y"
END_OBJECT = EndsatPresentFlag

GROUP = RangeDateTime
    OBJECT = RangeBeginningDate
        Data_Location = "MCF"
        Mandatory = "TRUE"
        NUM_VAL = 1
        Value = "2003-01-01"
    END_OBJECT = RangeBeginningDate

    OBJECT = RangeBeginningTime
        Data_Location = "MCF"
        Mandatory = "TRUE"
        NUM_VAL = 1
        Value = "00:00:00.0"
    END_OBJECT = RangeBeginningTime

    OBJECT = RangeEndingDate
        Data_Location = "MCF"
        Mandatory = "TRUE"
        NUM_VAL = 1
        Value = "2003-01-01"
    END_OBJECT = RangeEndingDate

    OBJECT = RangeEndingTime
        Data_Location = "MCF"
        Mandatory = "TRUE"
        NUM_VAL = 1
        Value = "00:00:00.0"
    END_OBJECT = RangeEndingTime
  END_GROUP = RangeDateTime

END_GROUP = Temporal

GROUP = Contact
  GROUP = ContactOrganization
```

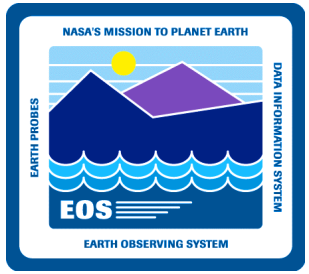
An Example Descriptor File for OMI_L1b (5 of 19)




```
OBJECT = ContactOrganizationContainer
   Data_Location = "NONE"
   Mandatory = "TRUE"
   Class = "1"
   OBJECT = Role
      Data_Location = "MCF"
      Mandatory = "TRUE"
      Class = "1"
      NUM_VAL = 1
      Value = "Archive"
   END_OBJECT = Role
   OBJECT = ContactInstructions
      Data_Location = "MCF"
      Mandatory = "TRUE"
      Class = "1"
      NUM_VAL = 1
      Value = "Contact for format/distribution issues"
   END_OBJECT = ContactInstructions
   OBJECT = ContactOrganizationName
      Data_Location = "MCF"
      Mandatory = "TRUE"
      Class = "1"
      NUM_VAL = 1
      Value = "Goddard DAAC"
   END_OBJECT = ContactOrganizationName
   GROUP = ContactOrganizationAddress
      Class = "1"
      OBJECT = ContactOrganizationAddressContainer
         Data_Location = "NONE"
         Mandatory = "TRUE"
         Class = "1"
```

```
      OBJECT = StreetAddress
         Data_Location = "MCF"
         Mandatory = "TRUE"
         Class = "1"
         NUM_VAL = 1
         Value = "NASA/GSFC Code 902"
      END_OBJECT = StreetAddress
      OBJECT = City
         Data_Location = "MCF"
         Mandatory = "TRUE"
         Class = "1"
         NUM_VAL = 1
         Value = "GREENBELT"
      END_OBJECT = City
      OBJECT = StateProvince
         Data_Location = "MCF"
         Mandatory = "TRUE"
         Class = "1"
         NUM_VAL = 1
         Value = "MD"
      END_OBJECT = StateProvince
      OBJECT = PostalCode
         Data_Location = "MCF"
         Mandatory = "TRUE"
         Class = "1"
         NUM_VAL = 1
         Value = "20771"
      END_OBJECT = PostalCode
      OBJECT = Country
         Data_Location = "MCF"
         Mandatory = "TRUE"
```

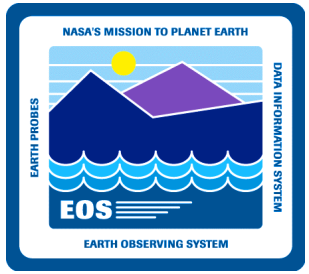
An Example Descriptor File for OMI_L1b (6 of 19)




```
            NUM_VAL = 1
            Value = "USA"
         END_OBJECT = Country
      END_OBJECT = ContactOrganizationAddressContainer
   END_GROUP = ContactOrganizationAddress
   GROUP = OrganizationTelephone
      Class = "1"
      OBJECT = OrganizationTelephoneContainer
         Data_Location = "NONE"
         Mandatory = "TRUE"
         Class = "1"
         OBJECT = TelephoneNumber
            Data_Location = "MCF"
            Mandatory = "TRUE"
            Class = "1"
            NUM_VAL = 1
            Value = "301-614-5224"
         END_OBJECT = TelephoneNumber
         OBJECT = TelephoneNumberType
            Data_Location = "MCF"
            Mandatory = "TRUE"
            Class = "1"
            NUM_VAL = 1
            Value = "Voice"
         END_OBJECT = TelephoneNumberType
      END_OBJECT = OrganizationTelephoneContainer
   END_GROUP = OrganizationTelephone
   GROUP = OrganizationEmail
      Class = "1"
      OBJECT = ElectronicMailAddress
         Data_Location = "MCF"
```

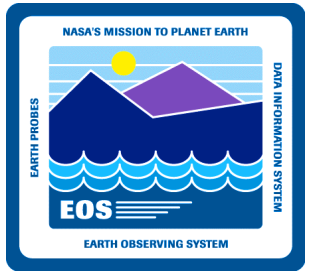
```
            Mandatory = "TRUE"
            NUM_VAL = 1
            Value =
("daac_usg@gsfcsrvr4.gsfcmo.ecs.nasa.gov")
         END_OBJECT = ElectronicMailAddress
      END_GROUP = OrganizationEmail
   END_OBJECT = ContactOrganizationContainer

   OBJECT = ContactOrganizationContainer
      Data_Location = "NONE"
      Mandatory = "TRUE"
      Class = "2"
      OBJECT = Role
         Data_Location = "MCF"
         Mandatory = "TRUE"
         Class = "2"
         NUM_VAL = 1
         Value = "Producer"
      END_OBJECT = Role
      OBJECT = ContactInstructions
         Data_Location = "MCF"
         Mandatory = "TRUE"
         Class = "2"
         NUM_VAL = 1
         Value = "Contact for data content concerns"
      END_OBJECT = ContactInstructions
      OBJECT = ContactOrganizationName
         Data_Location = "MCF"
         Mandatory = "TRUE"
         Class = "2"
         NUM_VAL = 1
```

An Example Descriptor File for OMI_L1b (7 of 19)



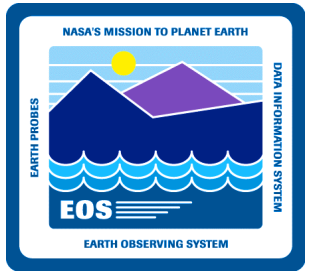

```
        Value = "KNMI"
    END_OBJECT = ContactOrganizationName
    GROUP = ContactOrganizationAddress
      Class = "2"
      OBJECT = ContactOrganizationAddressContainer
        Data_Location = "NONE"
        Mandatory = "TRUE"
        Class = "1"
        OBJECT = StreetAddress
          Data_Location = "MCF"
          Mandatory = "TRUE"
          Class = "1"
          NUM_VAL = 1
          Value = "Newtonweg 1"
        END_OBJECT = StreetAddress
        OBJECT = City
          Data_Location = "MCF"
          Mandatory = "TRUE"
          Class = "1"
          NUM_VAL = 1
          Value = "Leiden"
        END_OBJECT = City
        OBJECT = StateProvince
          Data_Location = "MCF"
          Mandatory = "TRUE"
          Class = "1"
          NUM_VAL = 1
          Value = "Zuid Holland"
        END_OBJECT = StateProvince
        OBJECT = PostalCode
          Data_Location = "MCF"
          Mandatory = "TRUE"
          Class = "1"
          NUM_VAL = 1
          Value = "2333 CP"
        END_OBJECT = PostalCode
        OBJECT = Country
          Data_Location = "MCF"
          Mandatory = "TRUE"
          Class = "1"
          NUM_VAL = 1
          Value = "NLD"
        END_OBJECT = Country
      END_OBJECT = ContactOrganizationAddressContainer
    END_GROUP = ContactOrganizationAddress
    GROUP = OrganizationTelephone
      Class = "2"
      OBJECT = OrganizationTelephoneContainer
        Data_Location = "NONE"
        Mandatory = "TRUE"
        Class = "1"
        OBJECT = TelephoneNumber
          Data_Location = "MCF"
          Mandatory = "TRUE"
          Class = "1"
          NUM_VAL = 1
          Value = "31-71-5245-000"
        END_OBJECT = TelephoneNumber
        OBJECT = TelephoneNumberType
          Data_Location = "MCF"
          Mandatory = "TRUE"
          Class = "1"
```

An Example Descriptor File for OMI_L1b (8 of 19)




```
                    NUM_VAL = 1
                    Value = "Voice"
                END_OBJECT = TelephoneNumberType
            END_OBJECT = OrganizationTelephoneContainer
        END_GROUP = OrganizationTelephone
        GROUP = OrganizationEmail
            Class = "2"
            OBJECT = ElectronicMailAddress
                Data_Location = "MCF"
                Mandatory = "TRUE"
                NUM_VAL = 1
                Value = ("omi@knmi.nl")
            END_OBJECT = ElectronicMailAddress
        END_GROUP = OrganizationEmail
    END_OBJECT = ContactOrganizationContainer

  END_GROUP = ContactOrganization
END_GROUP = Contact

GROUP = DisciplineTopicParameters
  OBJECT = DisciplineTopicParametersContainer

    Data_Location = "NONE"
    Mandatory = "TRUE"
    Class = "1"

    OBJECT = ECSDisciplineKeyword
      Data_Location = "MCF"
      Mandatory = "TRUE"
      Class = "1"
      NUM_VAL = 1
      Value = "Earth Science"
    END_OBJECT = ECSDisciplineKeyword

    OBJECT = ECSTopicKeyword
      Data_Location = "MCF"
      Mandatory = "TRUE"
      Class = "1"
      NUM_VAL = 1
      Value = "Radiance or Imagery"
    END_OBJECT = ECSTopicKeyword

    OBJECT = ECSTermKeyword
      Data_Location = "MCF"
      Mandatory = "TRUE"
      Class = "1"
      NUM_VAL = 1
      Value = "Ultraviolet Wavelengths"
    END_OBJECT = ECSTermKeyword

    OBJECT = ECSVariableKeyword
      Data_Location = "MCF"
      Mandatory = "TRUE"
      Class = "1"
      NUM_VAL = 1
      Value = "Sensor Counts"
    END_OBJECT = ECSVariableKeyword

  END_OBJECT = DisciplineTopicParametersContainer

  OBJECT = DisciplineTopicParametersContainer
```

An Example Descriptor File for OMI_L1b (9 of 19)



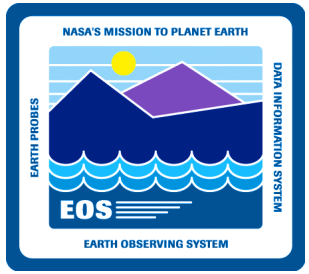

```
    Data_Location = "NONE"
    Mandatory = "TRUE"
    Class = "2"

    OBJECT = ECSDisciplineKeyword
      Data_Location = "MCF"
      Mandatory = "TRUE"
      Class = "2"
      NUM_VAL = 1
      Value = "Earth Science"
    END_OBJECT = ECSDisciplineKeyword

    OBJECT = ECSTopicKeyword
      Data_Location = "MCF"
      Mandatory = "TRUE"
      Class = "2"
      NUM_VAL = 1
      Value = "Radiance or Imagery"
    END_OBJECT = ECSTopicKeyword

    OBJECT = ECSTermKeyword
      Data_Location = "MCF"
      Mandatory = "TRUE"
      Class = "2"
      NUM_VAL = 1
      Value = "Visible Wavelengths"
    END_OBJECT = ECSTermKeyword

    OBJECT = ECSVariableKeyword
      Data_Location = "MCF"
      Mandatory = "TRUE"
      Class = "2"
      NUM_VAL = 1
      Value = "Sensor Counts"
    END_OBJECT = ECSVariableKeyword

  END_OBJECT = DisciplineTopicParametersContainer
END_GROUP = DisciplineTopicParameters

GROUP = SpatialKeywordClass
  OBJECT = SpatialKeyword
    Data_Location = "MCF"
    Mandatory = "TRUE"
    NUM_VAL = 1
    Value = "Global"
  END_OBJECT = SpatialKeyword
END_GROUP = SpatialKeywordClass

GROUP = ProcessingLevel
  OBJECT = ProcessingLevelID
    Data_Location = "MCF"
    Mandatory = "TRUE"
    NUM_VAL = 1
    Value = "1B"
  END_OBJECT = ProcessingLevelID
  OBJECT = ProcessingLevelDescription
    NUM_VAL = 1
    Data_Location = "MCF"
    Mandatory = "TRUE"
    Value = "Level 1b Radiances"
  END_OBJECT = ProcessingLevelDescription
END_GROUP = ProcessingLevel
```

An Example Descriptor File for OMI_L1b (10 of 19)

```
GROUP = Platform
    OBJECT = PlatformContainer

        Data_Location = "NONE"
        Mandatory = "TRUE"
        Class = "1"

        OBJECT = PlatformShortName
          Data_Location = "MCF"
          Mandatory = "TRUE"
          Class = "1"
          NUM_VAL = 1
          Value = "Aura"
        END_OBJECT = PlatformShortName

        OBJECT = PlatformLongName
          Data_Location = "MCF"
          Mandatory = "TRUE"
          Class = "1"
          NUM_VAL = 1
          Value = "First EOS Chemistry Mission Satellite, 1:45
PM Ascending Equator Crossing"
        END_OBJECT = PlatformLongName

        OBJECT = PlatformType
          Data_Location = "MCF"
          Mandatory = "TRUE"
          Class = "1"
          NUM_VAL = 1
          Value = "Spacecraft"
        END_OBJECT = PlatformType
```

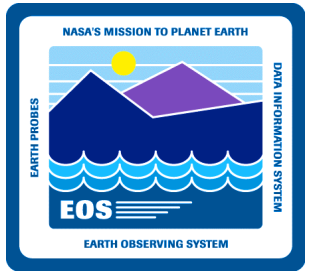
```
GROUP = PlatformCharacteristic
        Class = "1"
        OBJECT = PlatformCharacteristicContainer

          Data_Location = "NONE"
          Mandatory = "TRUE"
          Class = "1"

          OBJECT = PlatformCharacteristicName
            Data_Location = "MCF"
            Mandatory = "TRUE"
            Class = "1"
            NUM_VAL = 1
            Value = "OrbitInclination"
          END_OBJECT = PlatformCharacteristicName

          OBJECT = PlatformCharacteristicDescription
            Data_Location = "MCF"
            Mandatory = "TRUE"
            Class = "1"
            NUM_VAL = 1
            Value = "98.2 degree inclined orbit."
          END_OBJECT = PlatformCharacteristicDescription

          OBJECT = PlatformCharacteristicDataType
            Data_Location = "MCF"
            Mandatory = "TRUE"
            Class = "1"
            NUM_VAL = 1
            Value = "varchar"
          END_OBJECT = PlatformCharacteristicDataType
```

An Example Descriptor File for OMI_L1b (11 of 19)



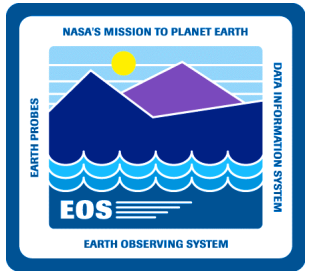

```
            OBJECT = PlatformCharacteristicUnit
               Data_Location = "MCF"
               Mandatory = "TRUE"
               Class = "1"
               NUM_VAL = 1
               Value = "float"
            END_OBJECT = PlatformCharacteristicUnit

         END_OBJECT = PlatformCharacteristicContainer

      END_GROUP = PlatformCharacteristic

      GROUP = Instrument
         Class = "1"

         OBJECT = InstrumentContainer

            Data_Location = "NONE"
            Mandatory = "TRUE"
            Class = "1"

            OBJECT = InstrumentShortName
               Data_Location = "MCF"
               Mandatory = "TRUE"
               Class = "1"
               NUM_VAL = 1
               Value = "OMI"
            END_OBJECT = InstrumentShortName

            OBJECT = InstrumentLongName
               Data_Location = "MCF"
               Mandatory = "TRUE"
               Class = "1"
               NUM_VAL = 1
               Value = "Ozone Monitoring Instrument"
            END_OBJECT = InstrumentLongName

            OBJECT = InstrumentTechnique
               Data_Location = "MCF"
               Mandatory = "TRUE"
               Class = "1"
               NUM_VAL = 1
               Value = "Nadir-viewing wide-field-imaging
spectrometer"
            END_OBJECT = InstrumentTechnique

            OBJECT = NumberofSensors
               Data_Location = "MCF"
               Mandatory = "TRUE"
               Class = "1"
               NUM_VAL = 1
               Value = 2
            END_OBJECT = NumberofSensors

            GROUP = Sensor
               Class = "1"

               OBJECT = SensorContainer

                  Data_Location = "NONE"
                  Mandatory = "TRUE"
                  Class = "1"
```

An Example Descriptor File for OMI_L1b (12 of 19)




```
                    OBJECT = SensorShortName
                       Data_Location = "MCF"
                       Mandatory = "TRUE"
                       Class = "1"
                       NUM_VAL = 1
                       Value = "CCD"
                    END_OBJECT = SensorShortName

                    OBJECT = SensorLongName
                       Data_Location = "MCF"
                       Mandatory = "TRUE"
                       Class = "1"
                       NUM_VAL = 1
                       Value = "Cross-track Scanning
Radiometer"
                    END_OBJECT = SensorLongName

                    OBJECT = SensorTechnique
                       Data_Location = "MCF"
                       Mandatory = "TRUE"
                       Class = "1"
                       NUM_VAL = 1
                       Value = "Radiometry"
                    END_OBJECT = SensorTechnique

                 END_OBJECT = SensorContainer

                 OBJECT = SensorContainer

                    Data_Location = "NONE"
                    Mandatory = "TRUE"
                    Class = "2"

                    OBJECT = SensorShortName
                       Data_Location = "MCF"
                       Mandatory = "TRUE"
                       Class = "2"
                       NUM_VAL = 1
                       Value = "TIR"
                    END_OBJECT = SensorShortName

                    OBJECT = SensorLongName
                       Data_Location = "MCF"
                       Mandatory = "TRUE"
                       Class = "2"
                       NUM_VAL = 1
                       Value = "Thermal Infrared"
                    END_OBJECT = SensorLongName

                    OBJECT = SensorTechnique
                       Data_Location = "MCF"
                       Mandatory = "TRUE"
                       Class = "2"
                       NUM_VAL = 1
                       Value = "Radiometry"
                    END_OBJECT = SensorTechnique

                 END_OBJECT = SensorContainer

              END_GROUP = Sensor

           END_OBJECT = InstrumentContainer
```

An Example Descriptor File for OMI_L1b (13 of 19)




```
            END_GROUP = Instrument

      END_OBJECT = PlatformContainer
   END_GROUP = Platform

   GROUP = CSDTDescription
      OBJECT = PrimaryCSDT
         Data_Location = "MCF"
         Mandatory = "TRUE"
         NUM_VAL = 1
         Value = "Simple Swath"
      END_OBJECT = PrimaryCSDT
      OBJECT = Implementation
         Data_Location = "MCF"
         Mandatory = "TRUE"
         NUM_VAL = 1
         Value = "HDF-EOS"
      END_OBJECT = Implementation
   END_GROUP = CSDTDescription

   GROUP = AdditionalAttributes
      OBJECT = AdditionalAttributesContainer

         Data_Location = "NONE"
         Mandatory = "FALSE"
         Class = "1"

         OBJECT = AdditionalAttributeDatatype
            Data_Location = "MCF"
            Mandatory = "FALSE"
            Class = "1"
```

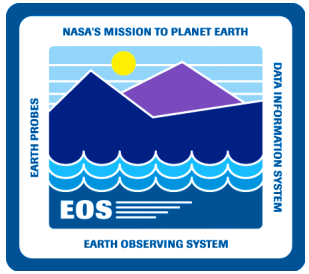
```
            NUM_VAL = 1
            Value = "varchar"
         END_OBJECT = AdditionalAttributeDatatype

         OBJECT = AdditionalAttributeDescription
            Data_Location = "MCF"
            Mandatory = "FALSE"
            Class = "1"
            NUM_VAL = 1
            Value = "Satellite Direction"
         END_OBJECT = AdditionalAttributeDescription

         OBJECT = AdditionalAttributeName
            Data_Location = "MCF"
            Mandatory = "FALSE"
            Class = "1"
            NUM_VAL = 1
            Value = "AscendingDescendingFlg"
         END_OBJECT = AdditionalAttributeName

      END_OBJECT = AdditionalAttributesContainer

   END_GROUP = AdditionalAttributes

END_GROUP = COLLECTIONMETADATA

GROUP = INVENTORYMETADATA
   GROUPTYPE = MASTERGROUP

GROUP = ECSDataGranule
```

An Example Descriptor File for OMI_L1b (14 of 19)

```
    OBJECT = SizeMBECSDataGranule
      Data_Location = "DSS"
      Mandatory = "FALSE"
      TYPE = "DOUBLE"
      NUM_VAL = 1
    END_OBJECT = SizeMBECSDataGranule

    OBJECT = LocalGranuleID
      Data_Location = "PGE"
      Mandatory = "TRUE"
      TYPE = "STRING"
      NUM_VAL = 1
    END_OBJECT = LocalGranuleID

    OBJECT = ProductionDateTime
      Data_Location = "TK"
      Mandatory = "TRUE"
      TYPE = "DATETIME"
      NUM_VAL = 1
    END_OBJECT = ProductionDateTime

    OBJECT = LocalVersionID
      Data_Location = "PGE"
      Mandatory = "TRUE"
      TYPE = "STRING"
      NUM_VAL = 1
    END_OBJECT = LocalVersionID

  END_GROUP = ECSDataGranule

  GROUP = MeasuredParameter
```

```
OBJECT = MeasuredParameterContainer

      Data_Location = "NONE"
      Class = "M"
      Mandatory = "TRUE"

      OBJECT = ParameterName
        Data_Location = "PGE"
        Mandatory = "TRUE"
        Class = "M"
        TYPE = "STRING"
        NUM_VAL = 1
      END_OBJECT = ParameterName

      GROUP = QAFlags

        Class = "M"

        OBJECT = AutomaticQualityFlag
          Data_Location = "PGE"
          Mandatory = "TRUE"
          TYPE = "STRING"
          NUM_VAL = 1
        END_OBJECT = AutomaticQualityFlag

        OBJECT = AutomaticQualityFlagExplanation
          Data_Location = "PGE"
          Mandatory = "TRUE"
          TYPE = "STRING"
          NUM_VAL = 1
        END_OBJECT = AutomaticQualityFlagExplanation
```

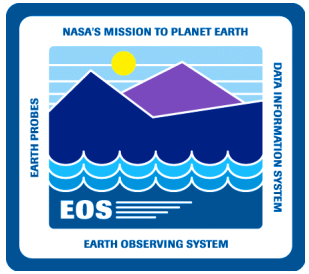
An Example Descriptor File for OMI_L1b (15 of 19)




```
        OBJECT = OperationalQualityFlag
           Data_Location = "PGE"
           Mandatory = "FALSE"
           TYPE = "STRING"
           NUM_VAL = 1
        END_OBJECT = OperationalQualityFlag

        OBJECT = OperationalQualityFlagExplanation
           Data_Location = "PGE"
           Mandatory = "FALSE"
           TYPE = "STRING"
           NUM_VAL = 1
        END_OBJECT = OperationalQualityFlagExplanation

        OBJECT = ScienceQualityFlag
           Data_Location = "DP"
           Mandatory = "FALSE"
           TYPE = "STRING"
           NUM_VAL = 1
           VALUE = "Not Investigated"
        END_OBJECT = ScienceQualityFlag

        OBJECT = ScienceQualityFlagExplanation
           Data_Location = "DP"
           Mandatory = "FALSE"
           TYPE = "STRING"
           NUM_VAL = 1
        END_OBJECT = ScienceQualityFlagExplanation

     END_GROUP = QAFlags
```

```
     GROUP = QAStats

           Class = "M"

           OBJECT = QAPercentInterpolatedData
              Data_Location = "PGE"
              Mandatory = "TRUE"
              TYPE = "INTEGER"
              NUM_VAL = 1
           END_OBJECT = QAPercentInterpolatedData

           OBJECT = QAPercentMissingData
              Data_Location = "PGE"
              Mandatory = "TRUE"
              TYPE = "INTEGER"
              NUM_VAL = 1
           END_OBJECT = QAPercentMissingData

           OBJECT = QAPercentOutofBoundsData
              Data_Location = "PGE"
              Mandatory = "TRUE"
              TYPE = "INTEGER"
              NUM_VAL = 1
           END_OBJECT = QAPercentOutofBoundsData

           OBJECT = QAPercentCloudCover
              Data_Location = "PGE"
              Mandatory = "TRUE"
              TYPE = "INTEGER"
              NUM_VAL = 1
           END_OBJECT = QAPercentCloudCover
```

An Example Descriptor File for OMI_L1b (16 of 19)



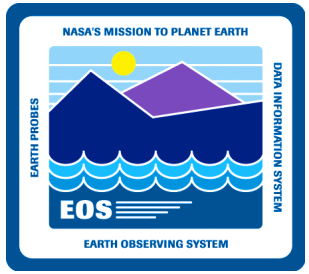

```
        END_GROUP = QAStats

    END_OBJECT = MeasuredParameterContainer

END_GROUP = MeasuredParameter

GROUP = OrbitCalculatedSpatialDomain
    OBJECT = OrbitCalculatedSpatialDomainContainer

        Data_Location = "NONE"
        Class = "M"
        Mandatory = "TRUE"

        OBJECT = OrbitNumber
            Data_Location = "PGE"
            Mandatory = "FALSE"
            Class = "M"
            TYPE = "INTEGER"
            NUM_VAL = 1
        END_OBJECT = OrbitNumber

        OBJECT = StartOrbitNumber
            Data_Location = "PGE"
            Mandatory = "FALSE"
            Class = "M"
            TYPE = "INTEGER"
            NUM_VAL = 1
        END_OBJECT = StartOrbitNumber

        OBJECT = StopOrbitNumber
            Data_Location = "PGE"
            Mandatory = "FALSE"
            Class = "M"
            TYPE = "INTEGER"
            NUM_VAL = 1
        END_OBJECT = StopOrbitNumber

        OBJECT = EquatorCrossingLongitude
            Data_Location = "PGE"
            Mandatory = "TRUE"
            Class = "M"
            TYPE = "DOUBLE"
            NUM_VAL = 1
        END_OBJECT = EquatorCrossingLongitude

        OBJECT = EquatorCrossingTime
            Data_Location = "PGE"
            Mandatory = "TRUE"
            Class = "M"
            TYPE = "TIME"
            NUM_VAL = 1
        END_OBJECT = EquatorCrossingTime

        OBJECT = EquatorCrossingDate
            Data_Location = "PGE"
            Mandatory = "TRUE"
            Class = "M"
            TYPE = "DATE"
            NUM_VAL = 1
        END_OBJECT = EquatorCrossingDate

    END_OBJECT = OrbitCalculatedSpatialDomainContainer
```

An Example Descriptor File for OMI_L1b (17 of 19)

```
END_GROUP = OrbitCalculatedSpatialDomain

  GROUP = CollectionDescriptionClass

    OBJECT = ShortName
      Data_Location = "MCF"
      Mandatory = "TRUE"
      TYPE = "STRING"
      NUM_VAL = 1
      Value = "OMI_L1b"
    END_OBJECT = ShortName

    OBJECT = VersionID
      Data_Location = "MCF"
      Mandatory = "TRUE"
      TYPE = "INTEGER"
      NUM_VAL = 1
      Value = 1
    END_OBJECT = VersionID

  END_GROUP = CollectionDescriptionClass

  GROUP = InputGranule
    OBJECT = InputPointer
      Data_Location = "PGE"
      Mandatory = "TRUE"
      TYPE = "STRING"
      NUM_VAL = 5
    END_OBJECT = InputPointer
END_GROUP = InputGranule
```

```
GROUP = SpatialDomainContainer
    GROUP = HorizontalSpatialDomainContainer
      GROUP = GPolygon
        OBJECT = GPolygonContainer

          Data_Location = "NONE"
          Mandatory = "TRUE"
          CLASS = "M"

          GROUP = GRing

            CLASS = "M"

            OBJECT = ExclusionGRingFlag
              Mandatory = "FALSE"
              Data_Location = "PGE"
              NUM_VAL = 1
              TYPE = "STRING"
            END_OBJECT = ExclusionGRingFlag

          END_GROUP = GRing

          GROUP = GRingPoint

            CLASS = "M"

            OBJECT = GRingPointLongitude
              Mandatory = "FALSE"
              Data_Location = "PGE"
              NUM_VAL = 4
              TYPE = "DOUBLE"
```

An Example Descriptor File for OMI_L1b (18 of 19)



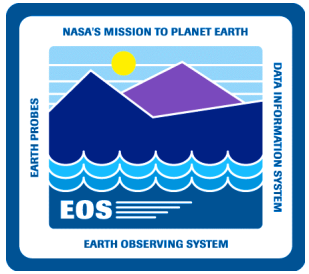

```
            END_OBJECT = GRingPointLongitude

            OBJECT = GRingPointLatitude
              Mandatory = "FALSE"
              Data_Location = "PGE"
              NUM_VAL = 4
              TYPE = "DOUBLE"
            END_OBJECT = GRingPointLatitude

            OBJECT = GRingPointSequenceNo
              Mandatory = "FALSE"
              Data_Location = "PGE"
              NUM_VAL = 4
              TYPE = "INTEGER"
            END_OBJECT = GRingPointSequenceNo

          END_GROUP = GRingPoint

        END_OBJECT = GPolygonContainer
      END_GROUP = GPolygon

   END_GROUP = HorizontalSpatialDomainContainer
END_GROUP = SpatialDomainContainer

GROUP = RangeDateTime

   OBJECT = RangeBeginningTime
      Data_Location = "PGE"
      Mandatory = "TRUE"
      TYPE = "TIME"
      NUM_VAL = 1
   END_OBJECT = RangeBeginningTime

   OBJECT = RangeEndingTime
      Data_Location = "PGE"
      Mandatory = "TRUE"
      TYPE = "TIME"
      NUM_VAL = 1
   END_OBJECT = RangeEndingTime

   OBJECT = RangeBeginningDate
      Data_Location = "PGE"
      Mandatory = "TRUE"
      TYPE = "DATE"
      NUM_VAL = 1
   END_OBJECT = RangeBeginningDate

   OBJECT = RangeEndingDate
      Data_Location = "PGE"
      Mandatory = "TRUE"
      TYPE = "DATE"
      NUM_VAL = 1
   END_OBJECT = RangeEndingDate

END_GROUP = RangeDateTime

GROUP = PGEVersionClass
   OBJECT = PGEVersion
      Mandatory = "TRUE"
      Data_Location = "PGE"
      TYPE = "STRING"
      NUM_VAL = 1
```

An Example Descriptor File for OMI_L1b (19 of 19)

```
          END_OBJECT = PGEVersion
   END_GROUP = PGEVersionClass

      GROUP = ProductSpecificMetadata
         OBJECT = AscendingDescendingFlg
            Data_Location = "MCF"
            Mandatory = "FALSE"
            TYPE = "STRING"
            LENGTH = "10"
            MAXOCCURRENCES = "1"
            VALIDRULE = "Match(Ascending,Descending,Both)"
         END_OBJECT = AscendingDescendingFlg
      END_GROUP = ProductSpecificMetadata

  END_GROUP = INVENTORYMETADATA

   GROUP = UNPARSEDMETADATA
      GROUP = ARCHIVEDMETADATA
         GROUPTYPE = MASTERGROUP
      END_GROUP = ARCHIVEDMETADATA
   END_GROUP = UNPARSEDMETADATA

END_GROUP = METADATA

GROUP = SERVICE
.
.
.
```

```
.
.
.
END_GROUP = SERVICE

/* ESDT Data Type Structure */
GROUP = STRUCTURE
   OBJECT = STRUCTURE
      CSDTType = "Simple Swath"
      CSDTInterfaceType = Conformant
      CSDTImplementation = "HDF-EOS"
   END_OBJECT = STRUCTURE
END_GROUP = STRUCTURE

GROUP = EVENT
.
.
.
END_GROUP = EVENT
END
```

Metadata Configuration File (MCF)



Metadata Configuration File (MCF)

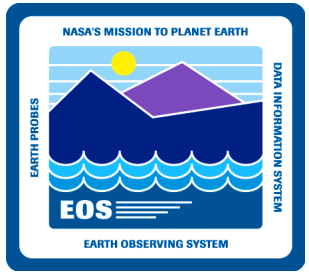
- Built around the 'parameter = value' form to provide maximum flexibility
- Each Inventory metadata element is fully described in the MCF
- For the Inventory level and unparsed metadata the descriptor file contains only a list of the attributes and a specification of how values will be assigned to them; this information is used by the SDSRV to generate an MCF, which is delivered to the Data Processing Subsystem or the Ingest Subsystem on demand
- MCF File Naming Convention
  - Must end with ".MCF"
  - Example: OMI_L1b.001.MCF

An Example MCF File for OMI_L1b (1 of 5)

```
GROUP = INVENTORYMETADATA
GROUPTYPE = MASTERGROUP
   GROUP = ECSDataGranule
      OBJECT = LocalGranuleID
         Mandatory = "TRUE"
         Data_Location = "PGE"
         NUM_VAL = 1
         TYPE = "STRING"
      END_OBJECT = LocalGranuleID
      OBJECT = SizeMBECSDataGranule
         Mandatory = "FALSE"
         Data_Location = "DSS"
         NUM_VAL = 1
         TYPE = "DOUBLE"
      END_OBJECT = SizeMBECSDataGranule
      OBJECT = ProductionDateTime
         Mandatory = "TRUE"
         Data_Location = "TK"
         NUM_VAL = 1
         TYPE = "DATETIME"
      END_OBJECT = ProductionDateTime
      OBJECT = LocalVersionID
         Mandatory = "TRUE"
         Data_Location = "PGE"
         NUM_VAL = 1
         TYPE = "STRING"
      END_OBJECT = LocalVersionID
   END_GROUP = ECSDataGranule
 GROUP = MeasuredParameter
      OBJECT = MeasuredParameterContainer
         Data_Location = "NONE"
         Mandatory = "TRUE"
         CLASS = "M"
```

```
      GROUP = QAFlags
        CLASS = "M
        OBJECT = ScienceQualityFlag
          Mandatory = "FALSE"
          Data_Location = "DP"
          NUM_VAL = 1
          TYPE = "STRING"
          VALUE = "Not Investigated"
        END_OBJECT = ScienceQualityFlag
        OBJECT = AutomaticQualityFlagExplanation
          Mandatory = "TRUE"
          Data_Location = "PGE"
          NUM_VAL = 1
          TYPE = "STRING"
        END_OBJECT = AutomaticQualityFlagExplanation
        OBJECT = AutomaticQualityFlag
          Mandatory = "TRUE"
          Data_Location = "PGE"
          NUM_VAL = 1
          TYPE = "STRING"
        END_OBJECT = AutomaticQualityFlag
        OBJECT = OperationalQualityFlagExplanation
          Mandatory = "FALSE"
          Data_Location = "PGE"
          NUM_VAL = 1
          TYPE = "STRING"
        END_OBJECT = OperationalQualityFlagExplanation
        OBJECT = OperationalQualityFlag
          Mandatory = "FALSE"
          Data_Location = "PGE"
          NUM_VAL = 1
          TYPE = "STRING"
        END_OBJECT = OperationalQualityFlag
```

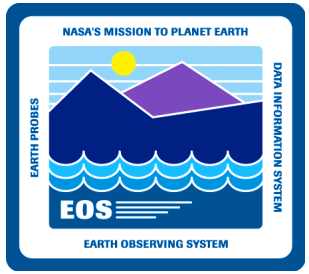
An Example MCF File for OMI_L1b (2 of 5)




```
        OBJECT = ScienceQualityFlagExplanation
          Mandatory = "FALSE"
          Data_Location = "DP"
          NUM_VAL = 1
          TYPE = "STRING"
        END_OBJECT = ScienceQualityFlagExplanation
      END_GROUP = QAFlags
      GROUP = QAStats
        CLASS = "M"
        OBJECT = QAPercentMissingData
          Mandatory = "TRUE"
          Data_Location = "PGE"
          NUM_VAL = 1
          TYPE = "INTEGER"
        END_OBJECT = QAPercentMissingData
        OBJECT = QAPercentOutofBoundsData
          Mandatory = "TRUE"
          Data_Location = "PGE"
          NUM_VAL = 1
          TYPE = "INTEGER"
        END_OBJECT = QAPercentOutofBoundsData
        OBJECT = QAPercentCloudCover
          Mandatory = "TRUE"
          Data_Location = "PGE"
          NUM_VAL = 1
          TYPE = "INTEGER"
        END_OBJECT = QAPercentCloudCover
        OBJECT = QAPercentInterpolatedData
          Mandatory = "TRUE"
          Data_Location = "PGE"
          NUM_VAL = 1
```

```
          TYPE = "INTEGER
        END_OBJECT = QAPercentInterpolatedData
        END_GROUP = QAStats
        OBJECT = ParameterName
          Mandatory = "TRUE"
          CLASS = "M"
          Data_Location = "PGE"
          NUM_VAL = 1
          TYPE = "STRING"
        END_OBJECT = ParameterName
      END_OBJECT = MeasuredParameterContainer
    END_GROUP = MeasuredParameter
    GROUP = OrbitCalculatedSpatialDomain
      OBJECT = OrbitCalculatedSpatialDomainContainer
        Data_Location = "NONE"
        Mandatory = "TRUE"
        CLASS = "M"
        OBJECT = StartOrbitNumber
          Mandatory = "FALSE"
          CLASS = "M"
          Data_Location = "PGE"
          NUM_VAL = 1
          TYPE = "INTEGER"
        END_OBJECT = StartOrbitNumber
        OBJECT = EquatorCrossingDate
          Mandatory = "TRUE"
          CLASS = "M"
          Data_Location = "PGE"
          NUM_VAL = 1
          TYPE = "DATE"
        END_OBJECT = EquatorCrossingDate
```

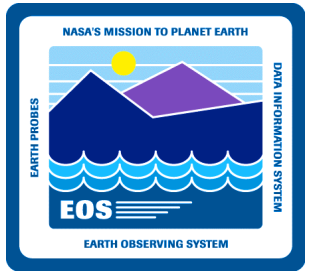
An Example MCF File for OMI_L1b (3 of 5)




```
    OBJECT = EquatorCrossingTime
            Mandatory = "TRUE"
            CLASS = "M"
            Data_Location = "PGE"
            NUM_VAL = 1
            TYPE = "TIME"
          END_OBJECT = EquatorCrossingTime
          OBJECT = OrbitNumber
            Mandatory = "FALSE"
            CLASS = "M"
            Data_Location = "PGE"
            NUM_VAL = 1
            TYPE = "INTEGER"
          END_OBJECT = OrbitNumber
          OBJECT = EquatorCrossingLongitude
            Mandatory = "TRUE"
            CLASS = "M"
            Data_Location = "PGE"
            NUM_VAL = 1
            TYPE = "DOUBLE"
          END_OBJECT = EquatorCrossingLongitude
          OBJECT = StopOrbitNumber
            Mandatory = "FALSE"
            CLASS = "M"
            Data_Location = "PGE"
            NUM_VAL = 1
            TYPE = "INTEGER"
          END_OBJECT = StopOrbitNumber
        END_OBJECT = OrbitCalculatedSpatialDomainContainer
      END_GROUP = OrbitCalculatedSpatialDomain
```

```
    GROUP = CollectionDescriptionClass
      OBJECT = VersionID
        Mandatory = "TRUE"
        Data_Location = "MCF"
        NUM_VAL = 1
        TYPE = "INTEGER"
        Value = 1
      END_OBJECT = VersionID
      OBJECT = ShortName
        Mandatory = "TRUE"
        Data_Location = "MCF"
        NUM_VAL = 1
        TYPE = "STRING"
        Value = "OMI_L1b"
      END_OBJECT = ShortName
    END_GROUP = CollectionDescriptionClass
    GROUP = InputGranule
      OBJECT = InputPointer
        Mandatory = "TRUE"
        Data_Location = "PGE"
        NUM_VAL = 5
        TYPE = "STRING"
      END_OBJECT = InputPointer
    END_GROUP = InputGranule
    GROUP = SpatialDomainContainer
      GROUP = HorizontalSpatialDomainContainer
        GROUP = GPolygon
          OBJECT = GPolygonContainer
            Data_Location = "NONE"
            Mandatory = "TRUE"
            CLASS = "M"
            GROUP = GRingPoint
```

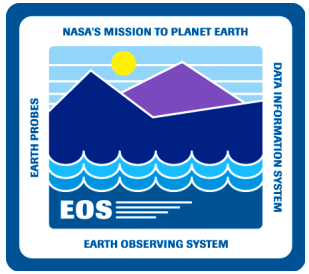
An Example MCF File for OMI_L1b (4 of 5)




```
            CLASS = "M"
            OBJECT = GRingPointLongitude
              Mandatory = "FALSE"
              Data_Location = "PGE"
              NUM_VAL = 4
              TYPE = "DOUBLE"
            END_OBJECT = GRingPointLongitude
            OBJECT = GRingPointLatitude
              Mandatory = "FALSE"
              Data_Location = "PGE"
              NUM_VAL = 4
              TYPE = "DOUBLE"
            END_OBJECT = GRingPointLatitude
            OBJECT = GRingPointSequenceNo
              Mandatory = "FALSE"
              Data_Location = "PGE"
              NUM_VAL = 4
              TYPE = "INTEGER"
            END_OBJECT = GRingPointSequenceNo
          END_GROUP = GRingPoint
          GROUP = GRing
            CLASS = "M"
            OBJECT = ExclusionGRingFlag
              Mandatory = "FALSE"
              Data_Location = "PGE"
              NUM_VAL = 1
              TYPE = "STRING"
            END_OBJECT = ExclusionGRingFlag
          END_GROUP = GRing
        END_OBJECT = GPolygonContainer
      END_GROUP = GPolygon
    END_GROUP = HorizontalSpatialDomainContainer
  END_GROUP = SpatialDomainContainer
```

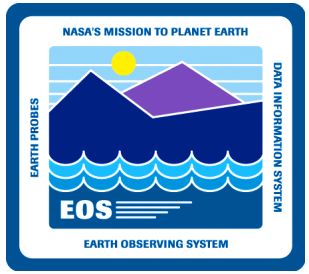
```
    GROUP = RangeDateTime
      OBJECT = RangeEndingDate
        Mandatory = "TRUE"
        Data_Location = "PGE"
        NUM_VAL = 1
        TYPE = "DATE"
      END_OBJECT = RangeEndingDate
      OBJECT = RangeEndingTime
        Mandatory = "TRUE"
        Data_Location = "PGE"
        NUM_VAL = 1
        TYPE = "TIME"
      END_OBJECT = RangeEndingTime
      OBJECT = RangeBeginningDate
        Mandatory = "TRUE"
        Data_Location = "PGE"
        NUM_VAL = 1
        TYPE = "DATE"
      END_OBJECT = RangeBeginningDate
      OBJECT = RangeBeginningTime
        Mandatory = "TRUE"
        Data_Location = "PGE"
        NUM_VAL = 1
        TYPE = "TIME"
      END_OBJECT = RangeBeginningTime
    END_GROUP = RangeDateTime
    GROUP = PGEVersionClass
      OBJECT = PGEVersion
        Mandatory = "TRUE"
        Data_Location = "PGE"
        NUM_VAL = 1
        TYPE = "STRING"
      END_OBJECT = PGEVersion
```

An Example MCF File for OMI_L1b (5 of 5)




```
  END_GROUP = PGEVersionClass
   GROUP = AdditionalAttributes
     OBJECT = AdditionalAttributesContainer
       Data_Location = "NONE"
       Mandatory = "FALSE"
       CLASS = "M"
       OBJECT = AdditionalAttributeName
         Mandatory = "FALSE"
         CLASS = "M"
         Data_Location = "PGE"
         NUM_VAL = 1
         TYPE = "STRING"
       END_OBJECT = AdditionalAttributeName
       GROUP = InformationContent
         CLASS = "M"
         OBJECT = ParameterValue
           Mandatory = "FALSE"
           Data_Location = "PGE"
           NUM_VAL = 1
           TYPE = "STRING"
         END_OBJECT = ParameterValue
       END_GROUP = InformationContent
     END_OBJECT = AdditionalAttributesContainer
   END_GROUP = AdditionalAttributes
END_GROUP = INVENTORYMETADATA
END
```

Metadata File (.met)



Metadata File (.met)

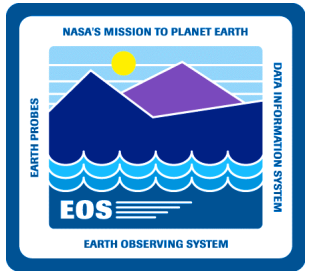
- Built around the 'parameter = value' form
- Provides the inventory level and unparsed metadata attribute values for each data granule file; this information is used by the SDSRV to populate the inventory metadata database
- Each inventory and unparsed metadata element in the .met is fully described in the MCF
- If the attribute is not defined in the MCF, it can not be set in the .met.
- .met File Naming Convention
  - Ought to end with ".met"
  - Example: OMI_L1b20000524190442v1.met

An Example .met File for an OMI_L1b data granule (1 of 5)

```
GROUP                = INVENTORYMETADATA
 GROUPTYPE           = MASTERGROUP

 GROUP               = ECSDATAGRANULE

  OBJECT             = LOCALGRANULEID
   NUM_VAL           = 1
   VALUE             = "OMI_L1b20000524190442v1.hdf"
  END_OBJECT         = LOCALGRANULEID

  OBJECT             = PRODUCTIONDATETIME
   NUM_VAL           = 1
   VALUE             = "2000-05-24T19:04:42.000Z"
  END_OBJECT         = PRODUCTIONDATETIME

  OBJECT             = LOCALVERSIONID
   NUM_VAL           = 1
   VALUE             = "v1"
  END_OBJECT         = LOCALVERSIONID

 END_GROUP           = ECSDATAGRANULE

 GROUP               = MEASUREDPARAMETER

  OBJECT             = MEASUREDPARAMETERCONTAINER
   CLASS             = "1"

   GROUP             = QAFLAGS
    CLASS            = "1"
```

```
OBJECT               = AUTOMATICQUALITYFLAGEXPLANATION
      NUM_VAL        = 1
      CLASS          = "1"
      VALUE          = "Passed all automatic quality checks"
     END_OBJECT      = AUTOMATICQUALITYFLAGEXPLANATION

     OBJECT          = AUTOMATICQUALITYFLAG
      NUM_VAL        = 1
      CLASS          = "1"
      VALUE          = "Passed"
     END_OBJECT      = AUTOMATICQUALITYFLAG

     OBJECT          = OPERATIONALQUALITYFLAGEXPLANATION
      NUM_VAL        = 1
      CLASS          = "1"
      VALUE          = "GSFC DAAC found no Operation problems"
     END_OBJECT      = OPERATIONALQUALITYFLAGEXPLANATION

     OBJECT          = OPERATIONALQUALITYFLAG
      NUM_VAL        = 1
      CLASS          = "1"
      VALUE          = "Passed"
     END_OBJECT      = OPERATIONALQUALITYFLAG

     OBJECT          = SCIENCEQUALITYFLAG
      NUM_VAL        = 1
      CLASS          = "1"
      VALUE          = "Not Investigated"
     END_OBJECT      = SCIENCEQUALITYFLAG
```

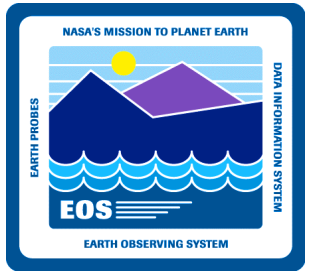
An Example .met File for an OMI_L1b data granule (2 of 5)




```
END_GROUP            = QAFLAGS

    GROUP            = QASTATS
      CLASS          = "1"

      OBJECT         = QAPERCENTMISSINGDATA
        NUM_VAL      = 1
        CLASS        = "1"
        VALUE        = 0
      END_OBJECT     = QAPERCENTMISSINGDATA

      OBJECT         = QAPERCENTOUTOFBOUNDSDATA
        NUM_VAL      = 1
        CLASS        = "1"
        VALUE        = 0
      END_OBJECT     = QAPERCENTOUTOFBOUNDSDATA

      OBJECT         = QAPERCENTCLOUDCOVER
        NUM_VAL      = 1
        CLASS        = "1"
        VALUE        = 30
      END_OBJECT     = QAPERCENTCLOUDCOVER

      OBJECT         = QAPERCENTINTERPOLATEDDATA
        NUM_VAL      = 1
        CLASS        = "1"
        VALUE        = 5
      END_OBJECT     = QAPERCENTINTERPOLATEDDATA

    END_GROUP        = QASTATS
```

```
OBJECT           = PARAMETERNAME
    CLASS        = "1"
    NUM_VAL      = 1
    VALUE        = "Ultraviolet sensor counts"
  END_OBJECT     = PARAMETERNAME

 END_OBJECT      = MEASUREDPARAMETERCONTAINER

END_GROUP        = MEASUREDPARAMETER

GROUP            = ORBITCALCULATEDSPATIALDOMAIN

 OBJECT          = ORBITCALCULATEDSPATIALDOMAINCONTAINER
  CLASS          = "1"

  OBJECT         = STARTORBITNUMBER
    CLASS        = "1"
    NUM_VAL      = 1
    VALUE        = 1
  END_OBJECT     = STARTORBITNUMBER

  OBJECT         = EQUATORCROSSINGDATE
    CLASS        = "1"
    NUM_VAL      = 1
    VALUE        = "2003-01-01"
  END_OBJECT     = EQUATORCROSSINGDATE

  OBJECT         = EQUATORCROSSINGTIME
    CLASS        = "1"
    NUM_VAL      = 1
    VALUE        = "01:00:00.000000"
```

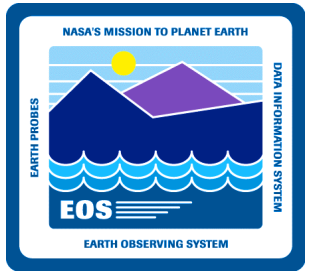
An Example .met File for an OMI_L1b data granule (3 of 5)




```
    END_OBJECT          = EQUATORCROSSINGTIME

    OBJECT              = ORBITNUMBER
      CLASS             = "1"
      NUM_VAL           = 1
      VALUE             = 1
    END_OBJECT          = ORBITNUMBER

    OBJECT              = EQUATORCROSSINGLONGITUDE
      CLASS             = "1"
      NUM_VAL           = 1
      VALUE             = 90.000000
    END_OBJECT          = EQUATORCROSSINGLONGITUDE

    OBJECT              = STOPORBITNUMBER
      CLASS             = "1"
      NUM_VAL           = 1
      VALUE             = 3
    END_OBJECT          = STOPORBITNUMBER

  END_OBJECT          =
ORBITCALCULATEDSPATIALDOMAINCONTAINER

 END_GROUP          = ORBITCALCULATEDSPATIALDOMAIN

 GROUP              = COLLECTIONDESCRIPTIONCLASS

  OBJECT             = VERSIONID
    NUM_VAL          = 1
    VALUE            = 1
  END_OBJECT         = VERSIONID
```

```
OBJECT              = SHORTNAME
    NUM_VAL           = 1
    VALUE             = "OMI_L1b"
  END_OBJECT          = SHORTNAME

 END_GROUP          = COLLECTIONDESCRIPTIONCLASS

 GROUP              = INPUTGRANULE

  OBJECT             = INPUTPOINTER
    NUM_VAL          = 5
    VALUE            = ("OMI_L1a20000524190442v1.hdf",
"CH1OMIL020000524190442v1.bin")
  END_OBJECT         = INPUTPOINTER

 END_GROUP          = INPUTGRANULE

 GROUP              = SPATIALDOMAINCONTAINER

  GROUP              = HORIZONTALSPATIALDOMAINCONTAINER

    GROUP              = GPOLYGON

      OBJECT             = GPOLYGONCONTAINER
        CLASS            = "1"

        GROUP              = GRINGPOINT
          CLASS            = "1"
```

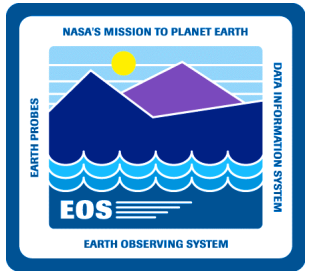
An Example .met File for an OMI_L1b data granule (4 of 5)




```
OBJECT              = GRINGPOINTLONGITUDE
          NUM_VAL           = 4
          CLASS             = "1"
          VALUE             = (-180.000000, 180.000000, 180.000000, -
180.000000)
        END_OBJECT          = GRINGPOINTLONGITUDE

        OBJECT              = GRINGPOINTLATITUDE
          NUM_VAL           = 4
          CLASS             = "1"
          VALUE             = (90.000000, 90.000000, -90.000000, -
90.000000)
        END_OBJECT          = GRINGPOINTLATITUDE

        OBJECT              = GRINGPOINTSEQUENCENO
          NUM_VAL           = 4
          CLASS             = "1"
          VALUE             = (1, 2, 3, 4)
        END_OBJECT          = GRINGPOINTSEQUENCENO

      END_GROUP             = GRINGPOINT

      GROUP               = GRING
        CLASS             = "1"

        OBJECT              = EXCLUSIONGRINGFLAG
          NUM_VAL           = 1
          CLASS             = "1"
          VALUE             = "N"
        END_OBJECT          = EXCLUSIONGRINGFLAG
```

```
END_GROUP           = GRING

    END_OBJECT          = GPOLYGONCONTAINER

  END_GROUP           = GPOLYGON

 END_GROUP            = HORIZONTALSPATIALDOMAINCONTAINER

END_GROUP           = SPATIALDOMAINCONTAINER

GROUP               = RANGEDATETIME

 OBJECT              = RANGEENDINGDATE
  NUM_VAL            = 1
  VALUE              = "2003-01-01"
 END_OBJECT          = RANGEENDINGDATE

 OBJECT              = RANGEENDINGTIME
  NUM_VAL            = 1
  VALUE              = "06:00:00.000000"
 END_OBJECT          = RANGEENDINGTIME

 OBJECT              = RANGEBEGINNINGDATE
  NUM_VAL            = 1
  VALUE              = "2003-01-01"
 END_OBJECT          = RANGEBEGINNINGDATE

 OBJECT              = RANGEBEGINNINGTIME
  NUM_VAL            = 1
  VALUE              = "01:00:00.000000"
 END_OBJECT          = RANGEBEGINNINGTIME
```

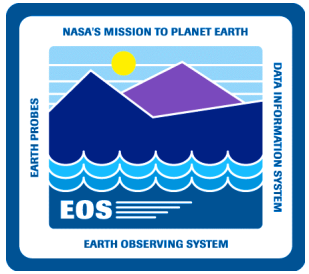
An Example .met File for an OMI_L1b data granule (5 of 5)




```
END_GROUP            = RANGEDATETIME

 GROUP               = PGEVERSIONCLASS

  OBJECT             = PGEVERSION
   NUM_VAL           = 1
   VALUE             = "1"
  END_OBJECT         = PGEVERSION

 END_GROUP           = PGEVERSIONCLASS

 GROUP               = ADDITIONALATTRIBUTES

  OBJECT             = ADDITIONALATTRIBUTESCONTAINER
   CLASS             = "1"

   OBJECT            = ADDITIONALATTRIBUTENAME
    CLASS            = "1"
    NUM_VAL          = 1
    VALUE            = "AscendingDescendingFlg"
   END_OBJECT        = ADDITIONALATTRIBUTENAME

   GROUP             = INFORMATIONCONTENT
    CLASS            = "1"

    OBJECT           = PARAMETERVALUE
     NUM_VAL         = 1
     CLASS           = "1"
     VALUE           = "Descending"
    END_OBJECT       = PARAMETERVALUE
```

```
 END_GROUP           = INFORMATIONCONTENT

   END_OBJECT        = ADDITIONALATTRIBUTESCONTAINER

 END_GROUP           = ADDITIONALATTRIBUTES

END_GROUP            = INVENTORYMETADATA

END
```

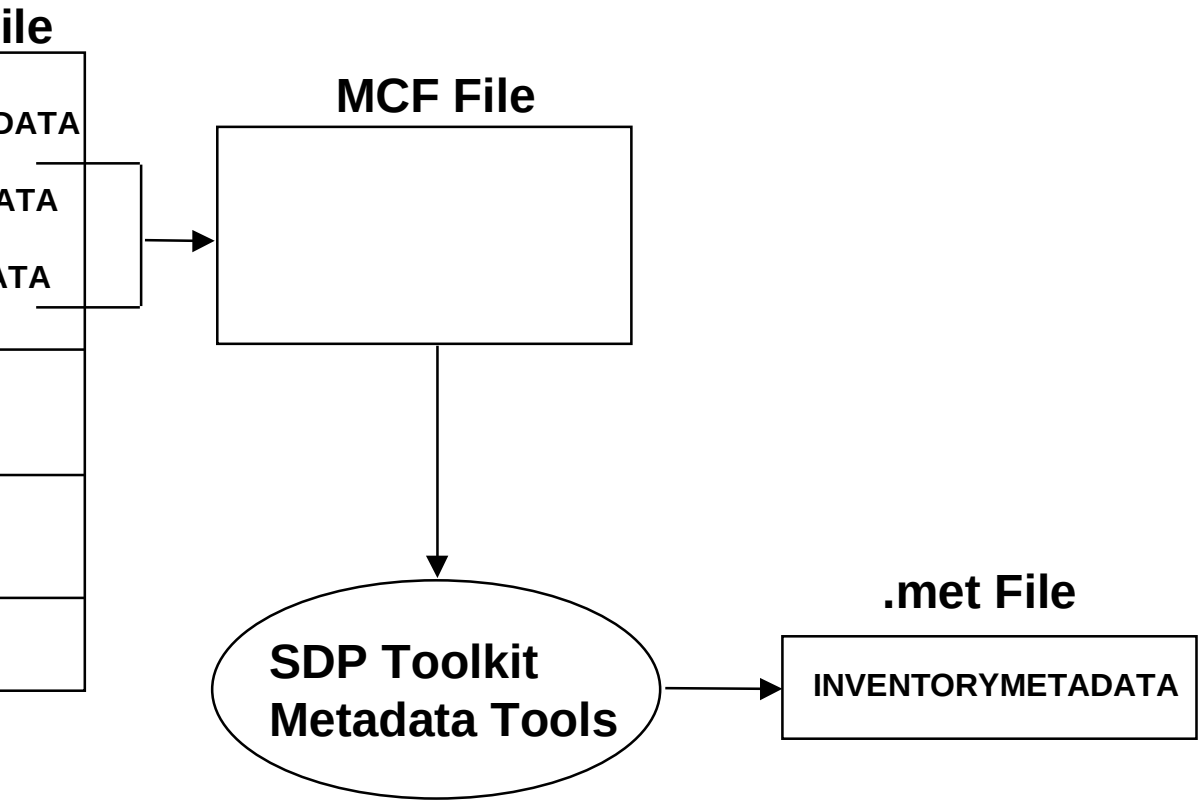
Tools for Descriptor Development



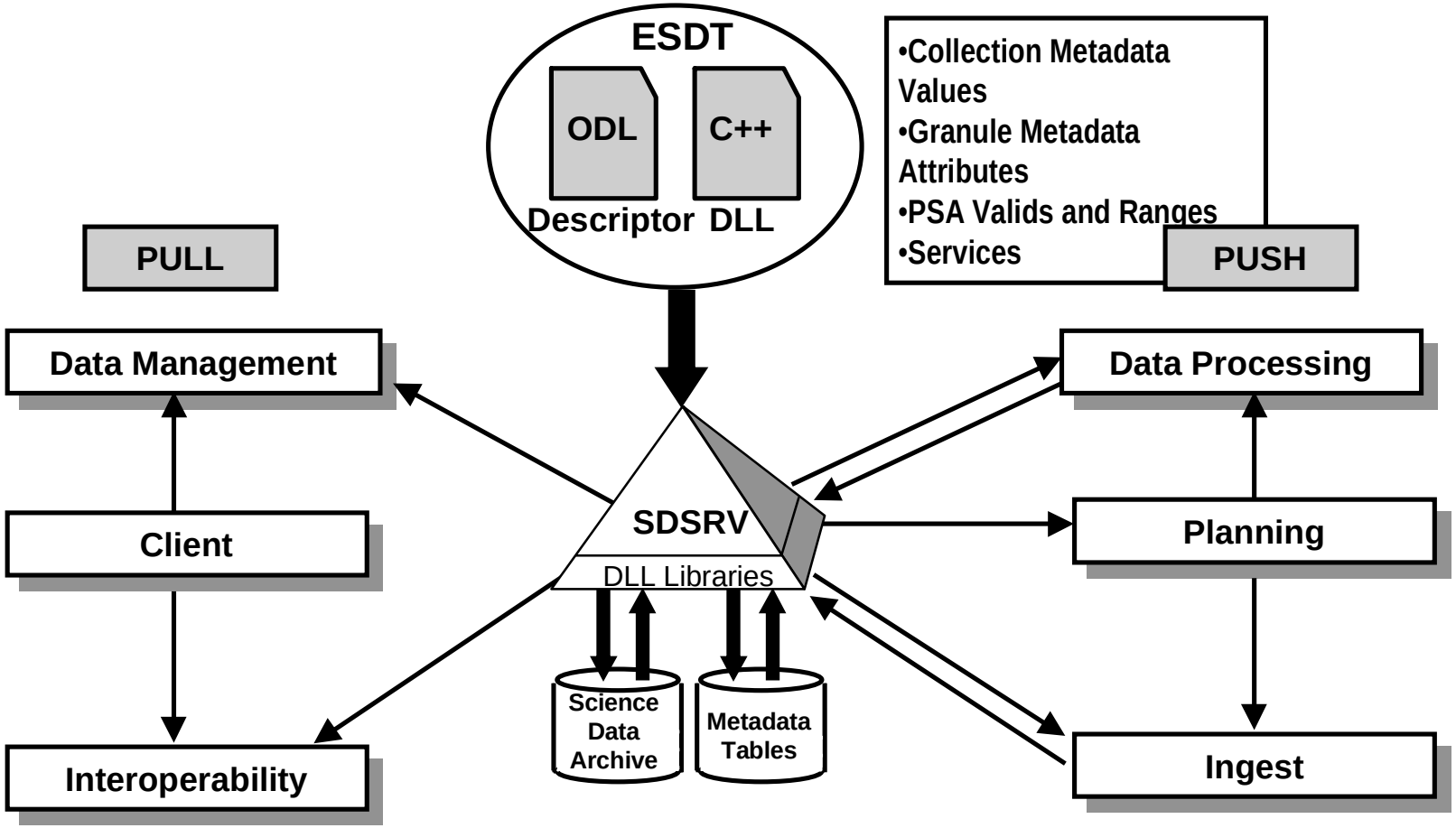
Two methods for ESDT Descriptors development

- **MetaData Works**
  - **URL for MetadataWorks**
    - → **http://et3ws1.east.hitc.com/metadata_works7/**
  - **Interactive data entry tools**
  - **Creates ESDT Descriptors containing both Collection and Granule Level Metadata**
  - **Also includes tools for**
    - → **Verification of valid values**
    - → **Creation of Multiple Descriptor Files by Token Substitution**
- **Using a Template**
  - **Use any editor to fill values of attributes**

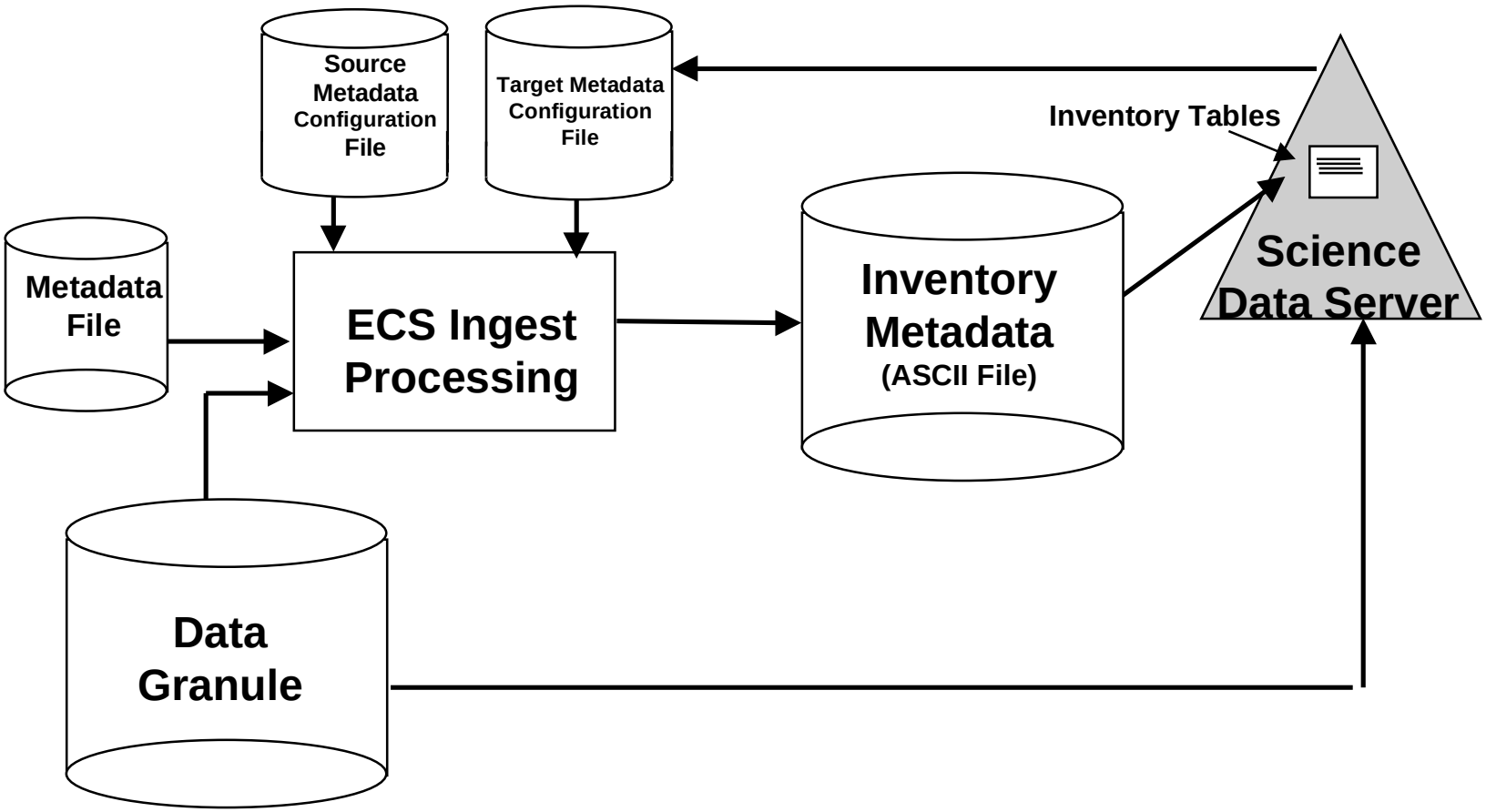
Summary: Descriptor, MCF & .met Files



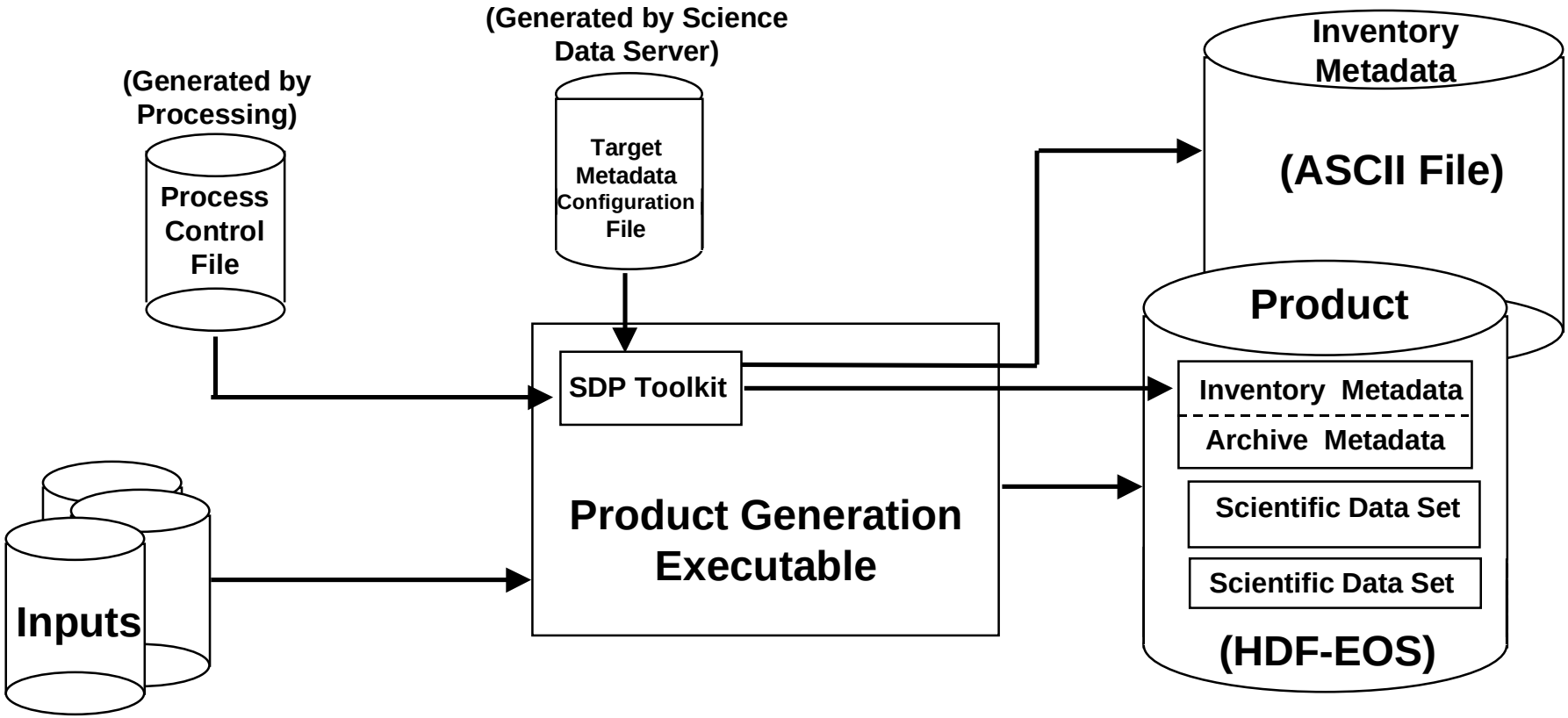
Source and Distribution of Metadata in ECS



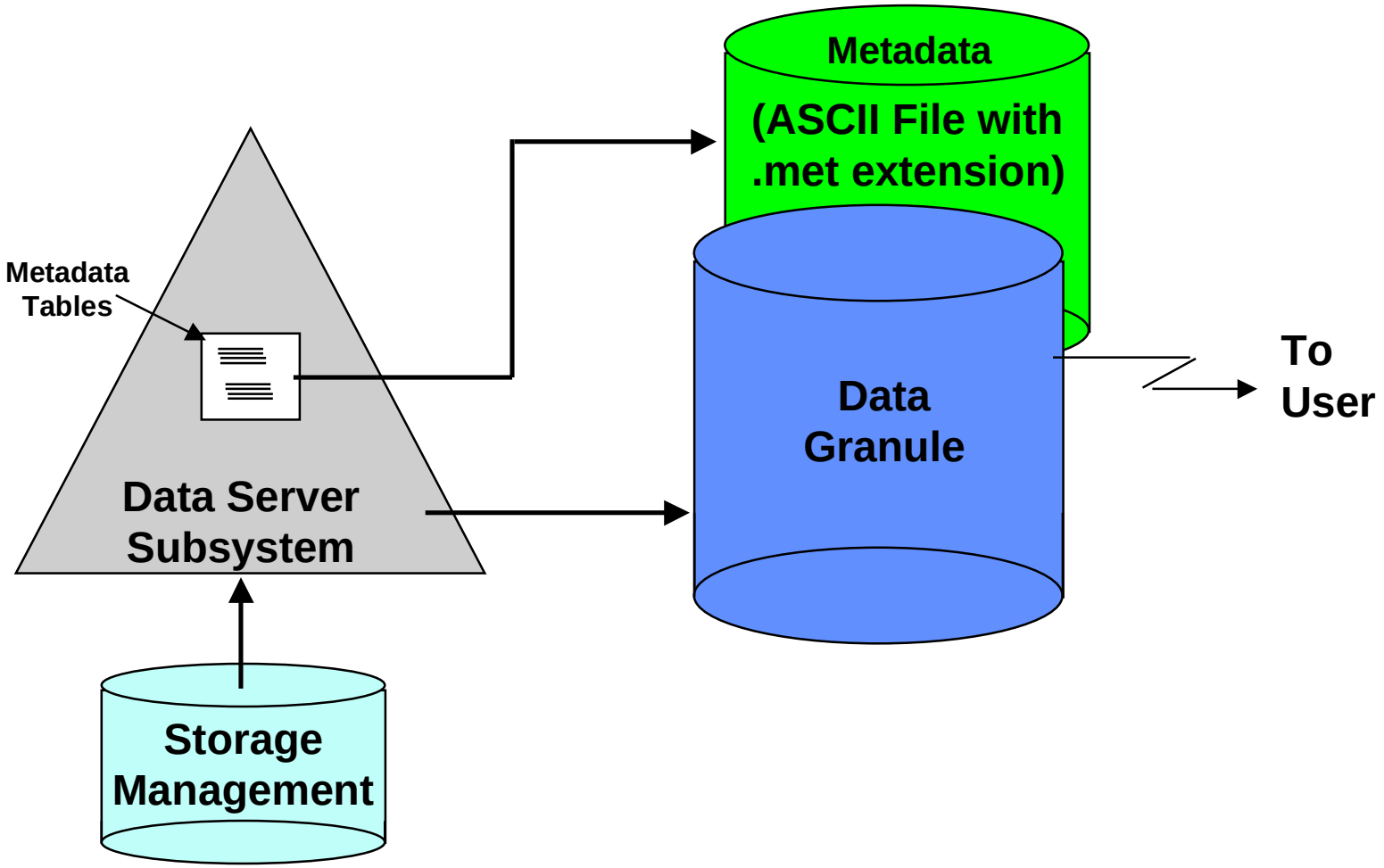
Ingest Granule Metadata Generation



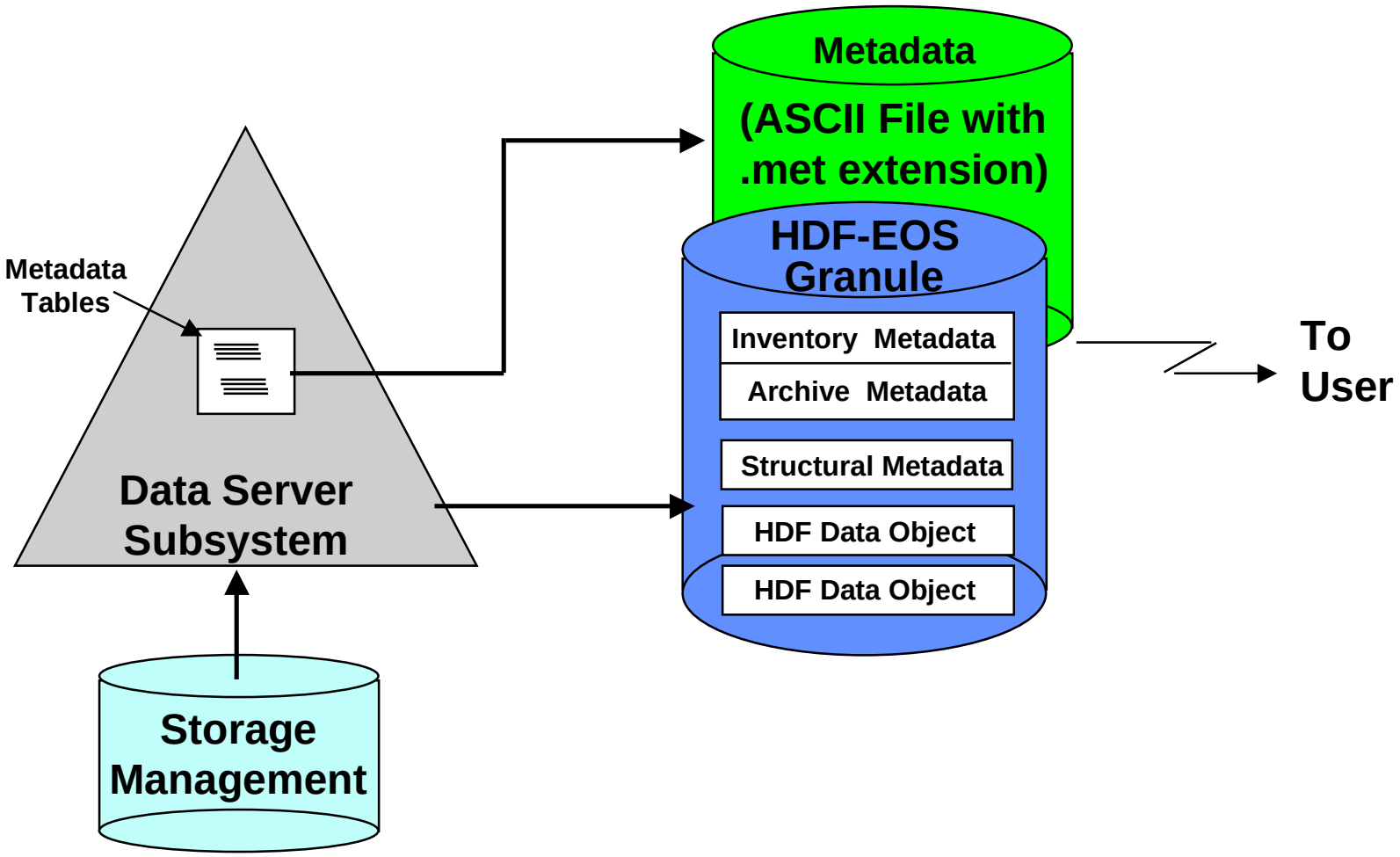
Processing Granule Metadata Generation



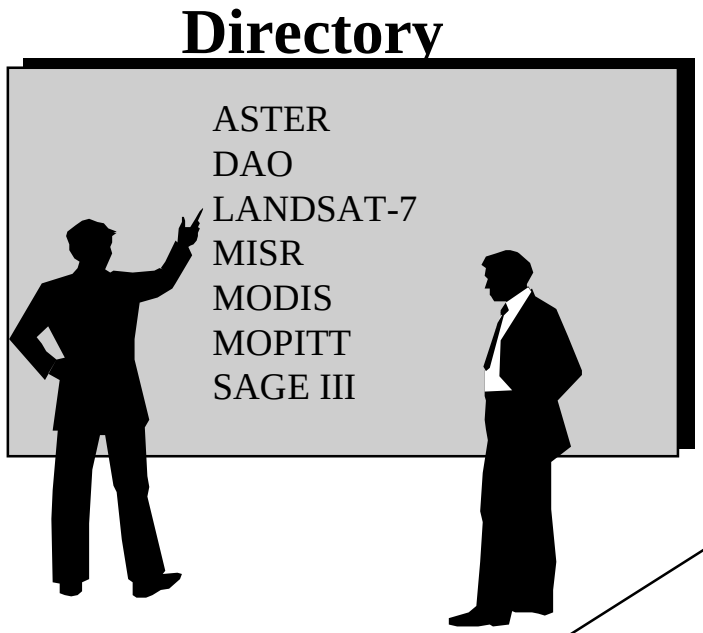
ECS Data Distribution



ECS Data Distribution of HDF-EOS Products

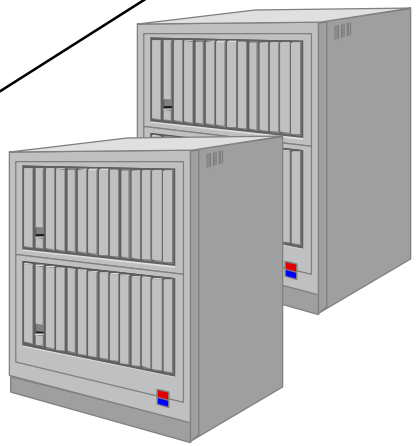


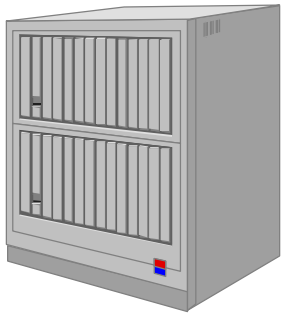
Metadata in the ECS Directory vs. Inventory

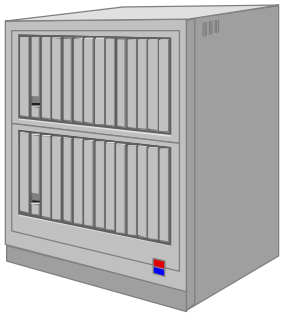


Collections of Science Data

Inventory







Distributed Storage of **Granules** of Science Data and Documentation