

# Planetary Data System

## PDAP Search Protocol



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## PDAP Search Protocol

### CHANGE LOG

Revision	Date	Description	Author
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# PDAP Search Protocol

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## **1.0 INTRODUCTION**

The PDS4 effort will overhaul the PDS data architecture (e.g., data model, data structures, data dictionary, etc.) and deploy a software system (online data services, distributed data catalog, etc.) that fully embraces the PDS federation as an integrated system while leveraging modern information technology.

### **1.1 Document Scope and Purpose**

This document captures the implementation of the Planetary Data Access Protocol (PDAP) for the PDS4 system. This protocol is targeted for implementation as the REST-based interface for the Search Service. This document is intended for the reviewer of the protocol as well as the developer of the protocol (for implementation) and tester of the protocol (for quality assurance).

### **1.2 Method**

This document captures the input and output structures specified by the protocol with no adherence to a particular method.

### **1.3 Notation**

This document does not utilize special notations.

### **1.4 Controlling Documents**

- [1] Planetary Data System (PDS) Level 1, 2 and 3 Requirements, March 26, 2010.
- [2] PDS4 Project Plan, July 17, 2013.
- [3] PDS4 System Architecture Specification, Version 1.3, September 1, 2013.
- [4] PDS4 Operations Concept, September 1, 2013.
- [5] Planetary Data System (PDS) General System Software Requirements Document (SRD), Version 1.1, September 1, 2013.
- [6] Planetary Data System (PDS) Search Service Software Requirements and Design Document (SRD/SDD), Version 1.0, September 1, 2013.

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- [7] Planetary Data System (PDS) Search Scenarios, Version 1.0, September 1, 2013.

### **1.5 Applicable Documents**

- [8] Planetary Data Access Protocol (PDAP), Version 1.1, September 9, 2011.
- [9] VOTable Format Definition, Version 1.2, November 30, 2009.

### **1.6 Document Maintenance**

The system design will evolve over time and this document should reflect that evolution. This document is under configuration control.

## **2.0 DESCRIPTION**

The implementation of the PDAP for the PDS4 system provides an additional interface, beyond the PDS search protocol, for discovery and access to data across the PDS. This implementation conforms with the Planetary Data Access Protocol (PDAP) [8] developed by the International Planetary Data Alliance (IPDA). As described in the Search Service SRD/SDD [6], this protocol is implemented as a REST-based interface for the Search Service.

## 3.0 PARAMETERS

This section details the parameters supported by the implementation. Only the `RESOURCE_CLASS` parameter is required to be specified in a given query request. A query request with just this parameter specified will return all corresponding products from the underlying Search Service.

### 3.1 Common Parameters

The parameters defined in this section are considered common for all PDS products. Unless otherwise stated, each of these parameters may be specified multiple times in a single request. An example of specifying a parameter multiple times can be found in the Syntax section.

#### 3.1.1 INSTRUMENT\_NAME

This parameter is used to identify products associated with or captured from a specific instrument (e.g., Visual and Infrared Mapping Spectrometer or VIMS). This parameter maps to the *name* attribute located in the *Instrument* class in PDS4 product labels. In the case where *product\_class* is equal to "Product\_Instrument" or "Product\_Instrument\_PDS3", this parameter also maps to the *title* and *alternate\_title* attributes, located in the *Identification\_Area* and *Alias* classes, respectively.

#### 3.1.2 INSTRUMENT\_TYPE

This parameter is used to identify products associated with or captured from a specific type of instrument (e.g., Spectrometer). This parameter maps to the *type* attribute located in the *Instrument* class and the *instrument\_type* attribute located in the *Instrument\_PDS3* class in PDS4 product labels.

Although not prevalent in PDS4 product labels, this parameter is common in PDS search scenarios and is facilitated with a taxonomy that relates instrument types with instruments.

#### 3.1.3 RESOURCE\_CLASS

This parameter is used to constrain the types of products returned in the result set subject to the other search criteria. This parameter maps to the *product\_class* attribute located in the *Identification\_Area* class in PDS4 product labels. Supported values for this parameter are `DATA_SET`, `PRODUCT` and `METADATA`. Although `MAP_PROJECTED` can be specified in a query request, it is not supported at this time. If this parameter is not supplied, it defaults to `METADATA`.

This parameter may not be specified multiple times in a single request.

### 3.1.4 START\_TIME

This parameter is used to identify products within a specific data/time range. This parameter maps to the *start\_date\_time* attribute located in the *Time\_Coordinates* class and the *start\_time* attribute located in the *Data\_Set\_PDS3* class in PDS4 product labels. This parameter also maps to the *start\_date* attribute found in the *Investigation* class as well as the *mission\_start\_date* attribute found in the *Mission\_PDS3* class. Formation rule: YYYY-MM-DDThh:mm:ss[.fff].

### 3.1.5 STOP\_TIME

This parameter is used to identify products within a specific data/time range. This parameter maps to the *stop\_date\_time* attribute located in the *Time\_Coordinates* class and the *stop\_time* attribute located in the *Data\_Set\_PDS3* class in PDS4 product labels. This parameter also maps to the *stop\_date* attribute found in the *Investigation* class as well as the *mission\_stop\_date* attribute found in the *Mission\_PDS3* class. Formation rule: YYYY-MM-DDThh:mm:ss[.fff].

### 3.1.6 TARGET\_NAME

This parameter is used to identify products associated with or containing data for a specific target (e.g., Saturn). This parameter maps to the *name* attribute located in the *Target* and *Target\_Identification* classes and to the *alternate\_designation* attribute in the *Target\_Identification* class in PDS4 product labels. In the case where *product\_class* is equal to "Product\_Target" or "Product\_Target\_PDS3", this parameter also maps to the *title* and *alternate\_title* attributes located in the *Identification\_Area* and *Alias* classes, respectively. In addition, this parameter maps to the *target\_name* attribute located in the *Target\_PDS3* class.

### 3.1.7 TARGET\_TYPE

This parameter is used to identify products associated with or containing data for a specific type of target (e.g., Planet). This parameter maps to the *type* attribute located in the *Target* and *Target\_Identification* classes and the *target\_type* attribute located in the *Target\_PDS3* class in PDS4 product labels.

Although not prevalent in PDS4 product labels, this parameter is common in PDS search scenarios and is facilitated with a taxonomy that relates target types with targets.

## 3.2 Resource-Specific Parameters

Additional common parameters are supported in a query request depending on the value of the RESOURCE\_CLASS parameter.



### 3.2.1 DATA\_SET

The following parameter is supported when the RESOURCE\_CLASS parameter is equal to “DATA\_SET”:

#### 3.2.1.1 DATA\_SET\_ID

This parameter is used to uniquely identify a PDS3 data set. This parameter maps to the *data\_set\_id* attribute located in the *Data\_Set\_PDS3* class. This parameter also maps to the *alternate\_id* attribute located in the *Alias* class, which may be specified in a product label. This is a user-specified attribute that will likely contain the value for the *DATA\_SET\_ID* keyword for products migrated from PDS3 to PDS4.

### 3.2.2 PRODUCT

The following parameters are supported when the RESOURCE\_CLASS parameter is equal to “PRODUCT”:

#### 3.2.2.1 DATA\_SET\_ID

See the description above.

#### 3.2.2.2 PRODUCT\_ID

This parameter is used to uniquely identify a PDS3 product. This parameter maps to the *alternate\_id* attribute located in the *Alias* class, which may be specified in a product label. This is a user-specified attribute that will likely contain the value for the *PRODUCT\_ID* keyword for products migrated from PDS3 to PDS4.

### 3.2.3 METADATA

All other parameters are ignored when the RESOURCE\_CLASS parameter is equal to “METADATA”.

## 3.3 Control Parameters

The control parameters allow for managing content returned from a request. These parameters may only be specified once in a single request. An underlying implementation must support pagination of the result set allowing the client to process query results in manageable chunks.

### 3.3.1 PAGE\_SIZE

This parameter allows for specification of the size of the result set. This value represents the maximum number of products returned from a successful query for any single request to the underlying implementation. The default page size may be configurable for a given implementation.

### **3.3.2 PAGE\_NUMBER**

This parameter allows for specification of the offset in the complete result set where the set of returned products should begin. By default, the value is “1” indicating the first page of products in the result set.

### **3.3.3 RETURN\_TYPE**

This parameter allows for specification of the format of the result set. By default, the format will be VOTable [9] structure containing the result set. See the Result Set section below for more details on the supported formats.

## 4.0 SYNTAX

The interface is a REST-based interface over the HTTP protocol. The HTTP protocol is pretty basic in nature with respect to passing parameters. The following details the syntax for passing parameters:

```
http://<host>/<path>[?<parameter>=<value>[&
<parameter>=<value>...]]
```

As shown above the “&” symbol separates multiple clauses (parameter/value pairs) and may be interpreted as AND or OR depending on the underlying implementation. For this protocol, the underlying implementation should interpret it as an AND meaning that each clause must evaluate to true in order for a specific product to be included in the result set. The exception to this rule is when a parameter is passed multiple times in a single request. In this case, the multiple values for a given parameter will be evaluated with OR instead of AND.

A query is transmitted as an HTTP GET or POST request. Depending on who you ask, an HTTP GET request has a limit of 2000 characters in length. Because of this limitation, HTTP POST requests are also supported which effectively increases the limit to 5000 characters.

Parameter names in a request are case sensitive, meaning they should be represented in the case for which they are defined in the Parameters section above. Values for the Common Parameters on the other hand, are case insensitive. For example, the target Saturn is represented as “SATURN” in a product label. A query request may represent that value in any case (e.g., Saturn, saturn, etc.) and still result in a hit on the original value that was in upper case.

The base URL, depicted as *http://<host>/<path>* in the example above, will vary based on the underlying implementation and its deployment. The main deployment of the Search Service for PDS, hosting the catalog-level search, will have the following as its base URL:

```
http://pds.nasa.gov/services/search/pdap
```

For the examples that follow, the base URL is represented as *<base-url>*. The following is an example query request:

```
<base-url>?RESOURCE_CLASS=DATA_SET&TARGET_NAME=SATURN
```

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The above query would return Data Set products where *TARGET\_NAME* is equal to "SATURN".

As described earlier in the document, the syntax supports passing certain parameters multiple times in the query request. The following is a PDAP-specific example of this:

```
<base-url>?RESOURCE_CLASS=DATA_SET&TARGET_NAME=SATURN,TITAN
```

The above query would return the same result set as the previous query example but would also include products where *TARGET\_NAME* is equal to "TITAN". The following is a more traditional example of this, which is also supported:

```
<base-url>?RESOURCE_CLASS=DATA_SET&TARGET_NAME=SATURN&  
TARGET_NAME=TITAN
```

The syntax also includes support for wildcards when specifying parameter values. Single character wildcard substitution is accomplished using the "?" symbol and multiple character wildcard substitution is accomplished using the "\*" symbol. Although wildcards are not that useful when it comes to PDS parameter values, the following example demonstrates its use:

```
<base-url>?RESOURCE_CLASS=DATA_SET&TARGET_NAME=SATURN&  
INSTRUMENT_NAME=*INFRARED*
```

The above query would return Data Set products where *TARGET\_NAME* is equal to "SATURN" but only include products where *INSTRUMENT\_NAME* contains the string "INFRARED".

The simple syntax also supports the control parameters for data discovery as described earlier in this document. These include the *start*, *rows* and *return-type* parameters. The following example demonstrates their use:

```
<base-url>?RESOURCE_CLASS=DATA_SET&TARGET_NAME=SATURN&  
PAGE_SIZE=20&PAGE_NUMBER=2
```

The above query would return Data Set products where *TARGET\_NAME* is equal to "SATURN" but the result set would be limited to 20 products per page and start at page 2 within the set.

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The syntax also provides support for specifying a range for a given parameter value. The following is an example of a range query:

```
<base-url>?RESOURCE_CLASS=DATA_SET&TARGET_NAME=SATURN&  
START_TIME=2001-01-01T00:00:00.000Z/2011-12-  
31T23:59:59.999Z
```

The above query will return products where `START_TIME` occurs between the two date/times specified, inclusive. An open-ended range is also supported as demonstrated in the following example:

```
<base-url>?RESOURCE_CLASS=DATA_SET&TARGET_NAME=SATURN&  
START_TIME=2001-01-01T00:00:00.000Z/
```

The above query will return products where `START_TIME` is greater than or equal to the date/time specified.

## 5.0 RESULT SET

This section details the result set formats supported by the search protocol. If the RETURN\_TYPE parameter is not specified in the query request, a VOTable formatted response is returned containing the result set.

### 5.1 Virtual Observatory Table (VOTable)

This section describes the VOTable format for the result set. A full example of a VOTable formatted result set can be found in Appendix B. The VOTable formatted result set is obtained by specifying the RETURN\_TYPE parameter in the query request as follows:

```
<base-url>?RETURN_TYPE=VOTABLE
```

The VOTable document returned from the query request has the following XML structure:

VOTable	Resource	Description		
		PDAP Version		
		Query Status		
		Total Records		
		Page Number		
		Page Size		
		Table	Fields	
			Data	Rows

The entire document is considered the VOTable and is represented by the root element <VOTABLE>, which has one child element <RESOURCE>, which consists of the following children:

#### Informational Elements

The informational elements provide details regarding the query service and query status.

- **Description**  
A description of the service responding to the query request represented by the element <DESCRIPTION>.
- **PDAP Version**  
The version of the PDAP specification that the service conforms to represented by the element <INFO name="PDAP VERSION" value="X"/>. The value attribute contains the version.
- **Query Status**  
Indicates the status of the query request represented by the element <INFO name="QUERY STATUS" value="X"/>. The value attribute contains the status. A value of "OK" represents a successful query.

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- **Total Records**  
The total number of products that matched the criteria of the query request represented by the element `<PARAM name="TOTAL RECORDS" value="X"/>`. The value attribute contains the product count.
- **Page Number**  
The offset in the complete result set where the set of returned products resides represented by the element `<PARAM name="PAGE NUMBER" value="X"/>`. The value attribute contains the page number.
- **Page Size**  
The number of products contained in the result set represented by the element `<PARAM name="PAGE SIZE" value="X"/>`. The value attribute contains the page size.

### Table

The table contains definitions of fields that describe each product in the result set represented by the element `<FIELD>`. The data is then contained within rows (`<TR>`) in a table (`<TABLEDATA>`), which is a child of the data (`<DATA>`) element.

## 5.2 Extensible Markup Language (XML)

This section describes the XML format for the result set. A full example of an XML formatted result set can be found in Appendix C. The XML formatted result set is obtained by specifying the `RETURN_TYPE` parameter in the query request as follows:

```
<base-url>?RETURN_TYPE=XML
```

The XML document returned from the query request has the following structure:

Response	Header	Status	
		Query Time	
		Parameters	
	Result Set	Documents	Fields

The entire document is considered the Response and is represented by the root element `<response>`, which consists of the following children:

### Header

The header contains information about the query request and is represented by the element `<lst name="responseHeader">`. This element consists of the following children:

- Status

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Indicates the status of the query request and is represented by the element `<int name="status"/>`. A value of "0" represents a successful query while non-zero values represent an unsuccessful query.

- Query Time  
Indicates the amount of time in milliseconds for the query request to complete and is represented by the element `<int name="QTime"/>`.
- Parameters  
Lists the parameters that were provided in the query request. This child is represented by the element `<lst name="params">` and consists of a corresponding child element for each parameter passed.

### **Result Set**

The result set contains an entry for each product that matched the query criteria. This child is represented by the element `<result name="" numFound="" start="" maxScore="">`. The *numFound* attribute indicates the number of products in the result set. The *start* attribute indicates the position of the first product in the result set with respect to the entire result set. The *maxScore* attribute indicates the top score for all of the products in the result set. The score indicates how well the product satisfies the query criteria. Each product in the result set is contained in a child document and is represented by the element `<doc>`. Each document in turn contains a number of child fields, which describe the product returned. The list of fields returned will be elaborated on in a future version of this document.



## **APPENDIX A    ACRONYMS & ABBREVIATIONS**

The following acronyms made an appearance in this document:

HTTP	Hypertext Transfer Protocol
IPDA	International Planetary Data Alliance
JPL	Jet Propulsion Laboratory
NASA	National Aeronautics and Space Administration
OFSN	Online File Specification Name
PDAP	Planetary Data Access Protocol
PDS	Planetary Data System
PDS3	Version 3.8 of the PDS Standards
PDS4	Version 4 of the PDS Standards
PDS 2010	The initial identifier of the PDS4 Project
REST	Representational State Transfer
SDD	Software Design Document
SRD	Software Requirements Document
URL	Uniform Resource Locator
VOTable	Virtual Observatory Table
XML	Extensible Markup Language

## APPENDIX B VOTABLE FORMATTED RESULT SET

This appendix details an example of an VOTable formatted result set. The following example provides the basic structure of the VOTable format:

```
<?xml version="1.0" ?>
<VOTABLE version="1.1">
  <RESOURCE type="results">
    <DESCRIPTION>NASA Planetary Data System PDAP Query
Service</DESCRIPTION>
    <INFO name="PDAP VERSION" value="X"/>
    <INFO name="QUERY STATUS" value="X"/>
    <PARAM name="TOTAL RECORDS" value="X"/>
    <PARAM name="PAGE NUMBER" value="X"/>
    <PARAM name="PAGE SIZE" value="X"/>
    <TABLE>
      <...>
      <DATA>
        <TABLEDATA>
          <TR>
            <...>
          </TR>
          <...>
        </TABLEDATA>
      </DATA>
    </TABLE>
  </RESOURCE>
</VOTABLE>
```

Based on the following query request:

```
<base-url>?RESOURCE_CLASS=DATA_SET&
DATA_SET_ID=A12A-L-SWS-3-SOLAR-WIND-28S-RES-V1.0
```

The following is a complete example of the VOTable formatted result set:

```
<?xml version="1.0" ?>
<VOTABLE version="1.1">
  <RESOURCE type="results">
    <DESCRIPTION>NASA Planetary Data System PDAP Query
Service</DESCRIPTION>
    <INFO name="PDAP VERSION" value="1.1"/>
    <INFO name="QUERY STATUS" value="OK"/>
    <PARAM name="TOTAL RECORDS" value="1"/>
    <PARAM name="PAGE NUMBER" value="1"/>
    <PARAM name="PAGE SIZE" value="50"/>
    <TABLE>
```

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```
<FIELD ID="DATA_SET.DATA_SET_ID" ucd="DATA_SET_ID"
utype="pdap:DATA_SET.DATA_SET_ID" datatype="char"
arraysize="*" />
<FIELD ID="DATA_ACCESS_REFERENCE"
ucd="DATA_ACCESS_REFERENCE"
utype="pdap:DATA_ACCESS_REFERENCE" datatype="char"
arraysize="*" />
<FIELD ID="DATA_SET.DATA_SET_NAME"
ucd="DATA_SET_NAME" utype="pdap:DATA_SET.DATA_SET_NAME"
datatype="char" arraysize="*" />
<FIELD ID="DATA_SET.INSTRUMENT_ID"
ucd="INSTRUMENT_ID" utype="pdap:DATA_SET.INSTRUMENT_ID"
datatype="char" arraysize="*" />
<FIELD ID="DATA_SET.INSTRUMENT_HOST_NAME"
ucd="INSTRUMENT_HOST_NAME"
utype="pdap:DATA_SET.INSTRUMENT_HOST_NAME" datatype="char"
arraysize="*" />
<FIELD ID="DATA_SET.INSTRUMENT_TYPE"
ucd="INSTRUMENT_TYPE" utype="pdap:DATA_SET.INSTRUMENT_TYPE"
datatype="char" arraysize="*" />
<FIELD ID="DATA_SET.INSTRUMENT_NAME"
ucd="INSTRUMENT_NAME" utype="pdap:DATA_SET.INSTRUMENT_NAME"
datatype="char" arraysize="*" />
<FIELD ID="DATA_SET.PRODUCER.INSTITUTION_NAME"
ucd="INSTITUTION_NAME"
utype="pdap:DATA_SET.INSTITUTION_NAME" datatype="char"
arraysize="*" />
<FIELD ID="DATA_SET.PRODUCER.NODE_NAME"
ucd="NODE_NAME" utype="pdap:DATA_SET.NODE_NAME"
datatype="char" arraysize="*" />
<FIELD ID="DATA_SET.PRODUCER.FULL_NAME"
ucd="FULL_NAME" utype="pdap:DATA_SET.PRODUCER.FULL_NAME"
datatype="char" arraysize="*" />
<FIELD ID="DATA_SET.MISSION_NAME" ucd="MISSION_NAME"
utype="pdap:DATA_SET.MISSION_NAME" datatype="char"
arraysize="*" />
<FIELD ID="DATA_SET.START_TIME" ucd="START_TIME"
utype="pdap:DATA_SET.START_TIME" datatype="char"
arraysize="*" />
<FIELD ID="DATA_SET.STOP_TIME" ucd="STOP_TIME"
utype="pdap:DATA_SET.STOP_TIME" datatype="char"
arraysize="*" />
<FIELD ID="DATA_SET.TARGET_TYPE" ucd="TARGET_TYPE"
utype="pdap:DATA_SET.TARGET_TYPE" datatype="char"
arraysize="*" />
<FIELD ID="DATA_SET.TARGET_NAME" ucd="TARGET_NAME"
utype="pdap:DATA_SET.TARGET_NAME" datatype="char"
arraysize="*" />
<FIELD ID="RESOURCE_CLASS" ucd="RESCLASS"
utype="pdap:RESOURCE_CLASS" datatype="char" arraysize="*"
/>
```

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```
<FIELD ID="DATA_SET.REFERENCE_FORMAT"
ucd="REFERENCE_FORMAT"
utype="pdap:DATA_SET.REFERENCE_FORMAT" datatype="char"
arraysize="*" />
<FIELD ID="DATA_SET.PUBLISHER" ucd="PUBLISHER"
utype="pdap:DATA_SET.PUBLISHER" datatype="char"
arraysize="*" />
<FIELD ID="DATA_SET.CONTRIBUTOR" ucd="CONTRIBUTOR"
utype="pdap:DATA_SET.CONTRIBUTOR" datatype="char"
arraysize="*" />
<FIELD ID="DATA_SET.PUBLISHING_DATE"
ucd="PUBLISHING_DATE" utype="pdap:DATA_SET.PUBLISHING_DATE"
datatype="char" arraysize="*" />
<FIELD ID="DATA_SET.RIGHTS" ucd="RIGHTS"
utype="pdap:DATA_SET.RIGHTS" datatype="char" arraysize="*"
/>
<DATA>
<TABLEDATA>
<TR>
<TD>A12A-L-SWS-3-SOLAR-WIND-28S-RES-V1.0</TD>
<TD>http://pds.nasa.gov/ds-
view/pds/viewDataset.jsp?dsid=A12A-L-SWS-3-SOLAR-WIND-28S-
RES-V1.0</TD>
<TD>APOLLO 12 ALSEP/SWS SOLAR WIND 28-SEC
RESOLUTION TABLES V1.0</TD>
<TD>SWS</TD>
<TD>APOLLO 12 LUNAR SURFACE EXPERIMENTS
PACKAGE</TD>
<TD>FARADAY CUP</TD>
<TD>SOLAR WIND SPECTROMETER</TD>
<TD>nasa</TD>
<TD>Geosciences</TD>
<TD>DAVID WILLIAMS</TD>
<TD>APOLLO 12</TD>
<TD>1969-11-19T18:42:13.000Z</TD>
<TD>1976-03-25T08:35:57.000Z</TD>
<TD>SATELLITE</TD>
<TD>MOON</TD>
<TD>DATA_SET</TD>
<TD></TD>
<TD></TD>
<TD></TD>
<TD>2007-06-29T00:00:00.000Z</TD>
<TD></TD>
</TR>
</TABLEDATA>
</DATA>
</TABLE>
</RESOURCE>
</VOTABLE>
```

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## APPENDIX C XML FORMATTED RESULT SET

This appendix details an example of an XML formatted result set. The following example provides the basic structure of the XML format:

```
<?xml version="1.0" encoding="UTF-8"?>
<response>
  <lst name="responseHeader">
    <int name="status">value</int>
    <int name="QTime">value</int>
    <lst name="params">
      <...>
    </lst>
  </lst>
  <result name="response" numFound="value" start="value"
maxScore="value">
    <doc>
      <...>
    </doc>
  </result>
</response>
```

Based on the following query request:

```
<base-url>?RESOURCE_CLASS=DATA_SET&
DATA_SET_ID=A12A-L-SWS-3-SOLAR-WIND-28S-RES-V1.0&
RETURN_TYPE=XML
```

The following is a complete example of the XML formatted result set (long text field values were replaced with "..."):

```
<response>
  <lst name="responseHeader">
    <int name="status">0</int>
    <int name="QTime">14</int>
    <lst name="params">
      <str name="DATA_SET_ID">A12A-L-SWS-3-SOLAR-WIND-28S-
RES-V1.0</str>
      <str name="RESOURCE_CLASS">DATA_SET</str>
      <str name="RETURN_TYPE">XML</str>
    </lst>
  </lst>
  <result name="response" numFound="1" start="0"
maxScore="9.45217">
    <doc>
      <arr name="instrument_type">
```

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```
<str>FARADAY CUP</str>
</arr>
<arr name="citation_description">
  <str>...</STR>
</arr>
<arr name="data_set_name">
  <str>
    APOLLO 12 ALSEP/SWS SOLAR WIND 28-SEC RESOLUTION
    TABLES V1.0
  </str>
</arr>
<arr name="abstract_text">
  <str>
    This data set contains daily tables of time
    ordered, 28-second-resolution plasma parameters, mainly of
    the solar wind, as observed on the Moon at the Apollo 12
    ALSEP site by the Apollo 12 Solar Wind Spectrometer from 19
    November 1969 through 25 March 1976.
  </str>
</arr>
<arr name="investigation_stop_date">
  <date>1969-11-24T00:00:00Z</date>
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<arr name="instrument_name">
  <str>SOLAR WIND SPECTROMETER</str>
</arr>
<arr name="node_id">
  <str>Geosciences</str>
</arr>
<arr name="nssdc_data_set_id">
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</arr>
  <str name="title">
    APOLLO 12 ALSEP/SWS SOLAR WIND 28-SEC RESOLUTION
    TABLES V1.0
  </str>
  <arr name="data_set_description">
    <str>...</str>
  </arr>
  <arr name="description">
    <str>
      Daily tables of time ordered, 28-second-
      resolution measurements of solar wind plasma on the Moon
      acquired by the Apollo 12 Solar Wind Spectrometer from 19
      November 1969 through 25 March 1979.
    </str>
  </arr>
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## PDAP Search Protocol

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</arr>
<arr name="instrument_host_name">
  <str>APOLLO 12 LUNAR SURFACE EXPERIMENTS
PACKAGE</str>
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<arr name="target_name">
  <str>MOON</str>
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  <date>1976-03-25T08:35:57Z</date>
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  <str>nasa</str>
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    Daily tables of time ordered, 28-second-
resolution measurements of solar wind plasma on the Moon
acquired by the Apollo 12 Solar Wind Spectrometer from 19
November 1969 through 25 March 1979.
  </str>
</arr>
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  <str>Product_Data_Set_PDS3</str>
</arr>
<arr name="confidence_level_note">
  <str>
    Confidence Level Overview
    ===== These data tables are
restorations of the original binary data recorded by the
SWS experiment and were reviewed internally at the NSSDC
for accuracy and completeness. Review ===== This data set
was peer-reviewed in December 2007 and was accepted for the
PDS archive pending the resolution of liens (completed in
August 2008).
  </str>
</arr>
<arr name="data_set_id">
  <str>A12A-L-SWS-3-SOLAR-WIND-28S-RES-V1.0</str>
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<arr name="resource_id">
  <str>
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## PDAP Search Protocol

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l-sws-3-solar-wind-28s-res-v1.0__browserp_a12a-l-sws-3-
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  </str>
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l-sws-3-solar-wind-28s-res-v1.0__dvo_a12a-l-sws-3-solar-
wind-28s-res-v1.
  </str>
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L-SWS-3-SOLAR-WIND-28S-RES-V1.0
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</arr>
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  <str>DAVID WILLIAMS</str>
</arr>
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