

Europlanet - JRA4 IDIS-DataModel-SWG Document

PDAP Resource Types

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1. SCOPE OF THE DOCUMENT

This document proposes a set of Resource Types to be used in IDIS (Integrated and Distributed Information Service) with PDAP (Planetary Data Access Protocol), and their respective required and optional query parameters.

2. PLANETARY DATA ACCESS PROTOCOL (PDAP)

The PDAP protocol has been forged by the International Planetary Data Alliance (IPDA). The latest specification of this protocol can be found at:

<http://www.planetarydata.org/>

As stated in version 1.0 of the PDAP Specification document:

“[PDAP is] a protocol for the retrieval of distributed planetary data. The interface is meant to be reasonably simple to implement by service providers.

The basic summarized functionality of the protocol is as follows: a query defining a certain restriction on the available data is used as a first step to query for candidate data. The service returns a list of candidate hits formatted as a VOTable. For each candidate hit an access reference URL may be used to retrieve the real data. Data may be returned in a variety of formats.

This specification describes the “simple” way to access the data through an HTTP protocol. Other types of more complex access, eventually using SQL-like language, and more complex transports as SOAP, will be worked on within the IPDA technical experts group.”

The list of compulsory input for a PDAP compliant service is:

- DATA_SET_ID
- PRODUCT_ID
- INSTRUMENT_TYPE
- TARGET_TYPE
- TARGET_NAME
- INSTRUMENT_NAME
- MISSION_NAME
- START_TIME, STOP_TIME
- RETURN_TYPE (VOTABLE, HTML, ASCII)
- RESOURCE_CLASS (DATASET, PRODUCT, IMAGE)

3.RESOURCE TYPES

The Resource Type list has been compiled with inputs received from the IDIS-DM-SWG. We also propose here a description of each of the Resource Types.

Ressource Type	Description	Notes
Times Series	1D series of values depending on time	
Maps	2D series of values depending on 2 spatial axes	This Resource type includes both Images and Maps. The difference between these two Resources being usually the Physical Parameter (Images for measured parameters, Maps for derived parameters).
Spectra	1D series of values depending on a spectral axis	The spectral axis is a generic term which could be replaced by Frequency, WaveLength, WaveNumber, Energy, Mass, Charge...
Dynamic Spectra	2D series of values depending on time and on a spectral axis	Same remark as for Spectra.
Spectral Cube	3D series of values depending on 2 spatial axes and on a spectral axis	Same remark as for Spectra.
Volumes (or 3D-Maps)	3D series of values depending on 3 spatial axes	This resource contains either series a values depending on 3 spatial coordinates, or tabulated values in a volumic grid.
Profile	1D series of values depending on a spatial axis	
Dynamic Maps (or Movies)	3D series of values depending on 2 spatial axes and on time	

We can organize these Ressource Types regarding the various axes related to each of them, as shown in the following table:

Resource Type	T ⁽¹⁾	F ⁽²⁾	X ⁽³⁾	Y ⁽³⁾	Z ⁽³⁾
Times series	X				
Dynamic Spectrum	X	X			
Spectrum		X			
Profile			X		
Maps			X	X	
Spectral Cube		X	X	X	
Dynamic Maps (or Movies)	X		X	X	
Volumes (or 3D-Maps)			X	X	X

Notes:

(1) T stands for Time.

(2) F stands for Frequency, but could be WaveLength, WaveNumber, Energy...

(3) X,Y,Z are 3 spatial axes. If at least one of them is selected, their corresponding reference frame must be specified.

In this table, we see that some combination of axes are not present (such as, for instance, a "Dynamic Spatial Profile" that would depend on T and X), as they did not appear during the inventory phase done by the IDIS-DM-SWG.

4. QUERY PARAMETERS

We list here the required query parameters as well as the possible optional query parameters (the optional query parameter list will depend on the resource itself, and on the PDAP service capabilities). For Notes, see at the end of this section.

The query parameters are proposed to be required or optional for the PDAP service query. This does not apply to the Data Model parameters. For instance, it is clear that parameters that are optional for the PDAP query must correspond to required Data Model descriptors.

4.1. Times Series

Group	Fields	req.	opt.	Notes
Time	time_start, time_stop	x		
Parameter	parameter_type, processing_level	x	x	from UCD list from defined list
Target	target_type, target_name, target_region	x x x		from defined list.
Observer	observer_location, observer_speed, observer_orientation, reference_frame		x x x x	(required if others are filed)
Instrument	instrument_name, host_name, instrument_type, mission_name		x x x x	from defined list from defined list from defined list from defined list [1]

4.2. Maps

group	fields	req.	opt.	notes
Time	time_start, time_stop	X		
Parameter	parameter_type, processing_level	X	X	from UCD list from defined list
Target	target_type, target_name, target_region, location_on_target, reference_frame	X X X X X		from defined list from defined list from defined list coordinates from defined list
Observer	observer_location, observer_speed, observer_orientation, reference_frame, phase_angles, solar_elevation_angle, local_time, incidence_angle, emission_angle	X X X X X X X X X		
Instrument	instrument_name, host_name, instrument_type, mission_name		X X X X	from defined list from defined list from defined list from defined list
Frequency	range or filter_name		X	[2]

4.3. Spectra

group	fields	req.	opt.	notes
Frequency	range or filter_name	X		[2]
Parameter	parameter_type, processing_level	X	X	from UCD list from defined list
Target	target_type, target_name, target_region, location_on_target, reference_frame	X X X X X		from defined list from defined list from defined list coordinates from defined list

group	fields	req.	opt.	notes
Observer	observer_location, observer_speed, observer_orientation, reference_frame, phase_angles, solar_elevation_angle, local_time, incidence_angle, emission_angle		X X X X X X X X	required if others are filed
Instrument	instrument_name, host_name, instrument_type, mission_name		X X X X	from defined list from defined list from defined list from defined list
Time	range		X	

4.4.Dynamic Spectra

group	fields	req.	opt.	notes
Time	range	X		
Frequency	range or filter_name	X		[2]
Parameter	parameter_type, processing_level	X	X	from UCD list from defined list
Target	target_type, target_name, target_region, location_on_target, reference_frame	X X X X X		from defined list from defined list from defined list coordinates from defined list
Observer	observer_location, observer_speed, observer_orientation, reference_frame, phase_angles, solar_elevation_angle, local_time, incidence_angle, emission_angle		X X X X X X X X X	required if others are filed

group	fields	req.	opt.	notes
Instrument	instrument_name, host_name, instrument_type, mission_name		X X X X	from defined list from defined list from defined list from defined list

4.5.Spectral Cube

group	fields	req.	opt.	notes
Time	range	X		
Frequency	range or filter_name	X		[2]
Parameter	parameter_type, processing_level	X	X	from UCD list from defined list
Target	target_type, target_name, target_region, location_on_target, reference_frame	X X X X X		from defined list from defined list from defined list coordinates from defined list
Observer	observer_location, observer_speed, observer_orientation, reference_frame, phase_angles, solar_elevation_angle, local_time, incidence_angle, emission_angle	X X X X X X X X X		
Instrument	instrument_name, host_name, instrument_type, mission_name		X X X X	from defined list from defined list from defined list from defined list

4.6.Volumes (3D-Maps)

group	fields	req.	opt.	notes
Parameter	parameter_type, processing_level	X	X	from UCD list from defined list

group	fields	req.	opt.	notes
Target	target_type, target_name, target_region, location_on_target, reference_frame	X X X X X		from defined list from defined list from defined list coordinates from defined list
Observer	observer_location, observer_speed, observer_orientation, reference_frame, phase_angles, solar_elevation_angle, local_time, incidence_angle, emission_angle		X X X X X X X X	required if others are filed
Instrument	instrument_name, host_name, instrument_type, mission_name		X X X X	from defined list from defined list from defined list from defined list
Time	range		X	
Frequency	range or filter_name		X	[2]

4.7.Profile

group	fields	req.	opt.	notes
Parameter	parameter_type, processing_level	X	X	from UCD list from defined list
Target	target_type, target_name, target_region, location_on_target, reference_frame	X X X X X		from defined list from defined list from defined list coordinates from defined list

group	fields	req.	opt.	notes
Observer	observer_location, observer_speed, observer_orientation, reference_frame, phase_angles, solar_elevation_angle, local_time, incidence_angle, emission_angle		X X X X X X X X	required if others are filed
Instrument	instrument_name, host_name, instrument_type, mission_name		X X X X	from defined list from defined list from defined list from defined list
Time	range		X	
Frequency	range or filter_name		X	[2]

4.8.Dynamic maps (Movies)

group	fields	req.	opt.	notes
Time	range	X		
Parameter	parameter_type, processing_level	X	X	from UCD list from defined list
Target	target_type, target_name, target_region, location_on_target, reference_frame	X X X X X		from defined list from defined list from defined list coordinates from defined list
Observer	observer_location, observer_speed, observer_orientation, reference_frame, phase_angles, solar_elevation_angle, local_time, incidence_angle, emission_angle		X X X X X X X X X	required if others are filed

group	fields	req.	opt.	notes
Instrument	instrument_name, host_name, instrument_type, mission_name		X X X X	from defined list from defined list from defined list from defined list
Time	range		X	
Frequency	range or filter_name		X	[2]

4.9. Notes

[1] Small-Body-Node proposed to have this field required, but it is contradictory with the way we want to query in IDIS. Indeed, the scientist is looking for data he may not know, hence he should not be required to specify the "mission_name".

[2] Frequency is a generic term which could be replaced by WaveLength, WaveNumber, Energy, Mass, Charge... Hence "range" = "freq_min, freq_max" or "lambda_min, lambda_max" or "wavenumber_min, wavenumber_max",...

5. USE CASES

[TDB]

We will discuss here:

- how to integrate "Laboratory Solid Spectra" into the "Spectra" Ressource Type
- how to integrate "Simulation results" into the "Volumes" Ressource Type

...

6. APPENDIX

6.1. IDIS Data Model Science Working Group

This working group (WG) has been initiated in January 2011 after the IDIS General Meeting held in Paris at that time. The WG is composed of scientists and engineers from all the nodes of IDIS.

List of WG Participant:

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The WG agreed to work on 3 tasks:

1. The first task will be to list the various data types and propose a set of query criteria that are relevant for data search in each discipline. This task has been already partially addressed (see Section 3 of the Data Model Specification Document that has been circulated last week on this list), but input are expected from all nodes.
2. The second task will be to discuss how to define the PDAP extensions that are to be proposed to the IPDA. This second task should be a natural outcome of the first task.
3. The third task consists in proposing, defining and/or selecting metadata dictionaries for the IDIS Data Model (i.e. select the standard sources for the possible values describing the data).

The present document is the result of the first task.

6.1.UCD List for Physical Parameter Quantity description

The CDS at Strasbourg (France) proposes a list of Unified Content Descriptors (UCD) for astronomical observations. This list is available on the web¹. This list does not completely

¹ <http://cdsweb.u-strasbg.fr/UCD/>

fulfill our needs in term of physical parameter description. We thus propose to enrich this list with a set of new UCD values which would allow us to correctly describe our datasets.

[TBD]