Updates on vocabularies

IVOA InterOpNov2025

Semantics

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RefFrame : Reference Frame Vocabulary

- work with IHDEA/Heliophysics, and especially Bob Weigel (GMU)
- mostly space physics frames from SPASE and CDPP.
- preparation of IVOA note (discussing Frames vs Systems vs coords) + paper (Bob Weigel)
- next:
  - include SPICE kernel frames from planetary missions
  - planetary CRS : https://voparis-vespa-crs.obspm.fr/web/

RefFrame : Reference Frames vocabulary

- Current goal : add terms for « reference systems » that are used in tools (like CDPP) and data models (like SPASE).
- Terms are generic « references » mainly for enabling smoother data discovery
- Specific implementations of frames will be defined as subclasses of those terms.

RefFrame : Reference Frames vocabulary

- For now, it is a simple list in **SKOS** format regrouping SPASE et CDPP frames.
- Proposition of a **thematic grouping** of the frames using SKOS Collection in order to group them by type or center location.
- Discussion about Frames vs Systems vs Coord : need to define the difference between all of this term.

Jump to Filter

- **Azimuth/elevation**
- Body Coordinates
- Callisto Phi-Omega
- Carrington
- Comet solar orbital centered on asteroid LUTETIA
- Comet solar orbital centered on asteroid STEINS
- Comet solar orbital centered on comet churyumov gerasimenko
- Comet solar orbital centered on GRIGG-SKJELLERUP comet
- Comet solar orbital centered on HALLEY comet
- Corrected Geomagnetic
- Corrected Solar Orbital
- Deimos Mean Equator
- Deimos-centric Solar Ecliptic
- Dione Inter-action coordinate System
- Dipole Meridian

Details Visualization Notes (0) Mappings (1)

ID	http://www.test.net/rdf/refframe#AZ_EL
Preferred name	Azimuth/elevation
Definitions	Local azimuth and elevation. (Ground-based observations; Azimuth from North through East.)
In schemes	Refframe vocabulary >
Type	http://www.w3.org/2004/02/skos/core#Concept

Raw data

Jump to Filter

Collections

Earth Centered Frame ×

Comet centered Frame
Deimos Centered Frame
Dione Centered Frame
Earth Centered Frame
Earth's Moon Centered Frame

Geocentric Solar Magnetospheric
Geomagnetic coordinate system
IAU_EARTH
Solar Magnetic coordinates
The Earth-Centered, Earth-Fixed
WGS84

Details Visualization Notes (0) Mappings (0)

ID	http://www.test.net/rdf/reframe#CGM
Preferred name	Corrected Geomagnetic
Synonyms	CGM
Definitions	Corrected Geomagnetic - A coordinate system from a spatial point with GEO radial distance and geomagnetic latitude and longitude, follow the epoch-appropriate IGRF/DGRF model field vector through to the point where the field line crosses the geomagnetic dipole equatorial plane. Then trace the dipole magnetic field vector Earthward from that point on the equatorial plane, in the same hemisphere as the original point, until the initial radial distance is reached. Designate the dipole latitude and longitude at that point as the CGM latitude and longitude of the original point, see http://nssdc.gsfc.nasa.gov/space/cgm/cgmm_des.html.
Member of	Earth Centered Frame >
In schemes	Reframe vocabulary >
Type	http://www.w3.org/2004/02/skos/core#Concept

Raw data

Processing-Level Vocabulary

- ProcessingLevel vs CalibrationLevel ?
  - ProcessingLevel is prefered => processing is not always about calibration.
- In EPN-TAP document: table matching processing levels from VESPA, IVOA, PDS3, PDS4, CODMAC, PSA…
- Propose vocabulary covering all cases, and listing the labels used in the various contexts.
  - Using SKOS and adding properties for each labels. So we only have one concept by Processing level but each can have several label Properties depending on the context.

Most EPN-TAP data services are expected to include Calibrated or Derived data.

EPN-TAP2	CODMAC	PSA	NASA	PDS3	PDS4	ObsTAP	Description
1	1 (raw)	(0?)		UDR	Telemetry	0	Unprocessed Data Record (low-level encoding, e.g., telemetry from a spacecraft instrument. Normally available only to the original team)
2	2 (edited)	1	0	EDR	Raw	1	Experiment Data Record (often referred to as "raw data": decommutated, but still affected by instrumental effects)
2 or 3	_			_	Partially calibrated		Processed beyond the raw stage, but have not yet reached calibrated status (PDS4)
3	3 (calibrated)	2	1A	RDR	Calibrated	2	Reduced Data Record ("calibrated" in physical units, no resampling)
5 (yes, 5)	4 (resampled)		1B	REFDR	Derived	3	Reformatted Data Record (mosaics or composite of several observing sessions, involving some level of data fusion)
5	5 (derived)	3	2-5	DDR	Derived	4	Derived Data Record (result of data analysis, directly usable by other communities with no further processing)
6	6 (ancillary)			ANCDR	Derived		Ancillary Data Record (extra data specifically supporting a data set, such as coordinates, geometry… but also dark currents, flat fields…)

Notes:

Jump to

Filter

- Calibrated data
  - Partially calibrated data
- Derived data generic
  - Ancillary data
  - Derived Reformatted data
    - Derived data
      - Level 2
      - Level 3
      - Level 4
    - Resampled Data
- Edited data
  - Partially calibrated data
- Raw data

Details | Visualization | Notes (0) | Mappings (0)

ID	http://www.ivoa.net/rdf/processing-level#Calibrated_data
Preferred name	Calibrated data
Definitions	Reduced Data Record ("calibrated" in physical units, no resampling)
In schemes	Processing-level concept scheme >
Type	http://www.w3.org/2004/02/skos/core#Concept

Raw data

rdf:type	http://www.w3.org/2002/07/owl#NamedIndividual http://www.w3.org/2004/02/skos/core#Concept
skos:prefLabel	Calibrated data
skos:definition	Reduced Data Record ("calibrated" in physical units, no resampling)
epncore-label	3
char-label	CALIBRATED
obscore-label	2
CODMAC-label	3
NASA-label	1A

Processing-Level

- Use-case :
  - Search for « calibrated data » in EpnCore and ObsCore :
    - Select the CalibratedData concept in the vocabulary :
      - Use epncore-label for EpnCore queries (value = 3)
      - Use obscore-label for ObsCore queries (value = 2)

- Possible to find relations and associated labels

UAT updates for Heliophysics

- **UAT (Unified Astronomy Thesaurus) extension for supporting heliophysics**:

  - led by Ryan McGranagham (IHDEA/Heliophysics).

  - reorganised hierarchy in UAT for heliophysics terms

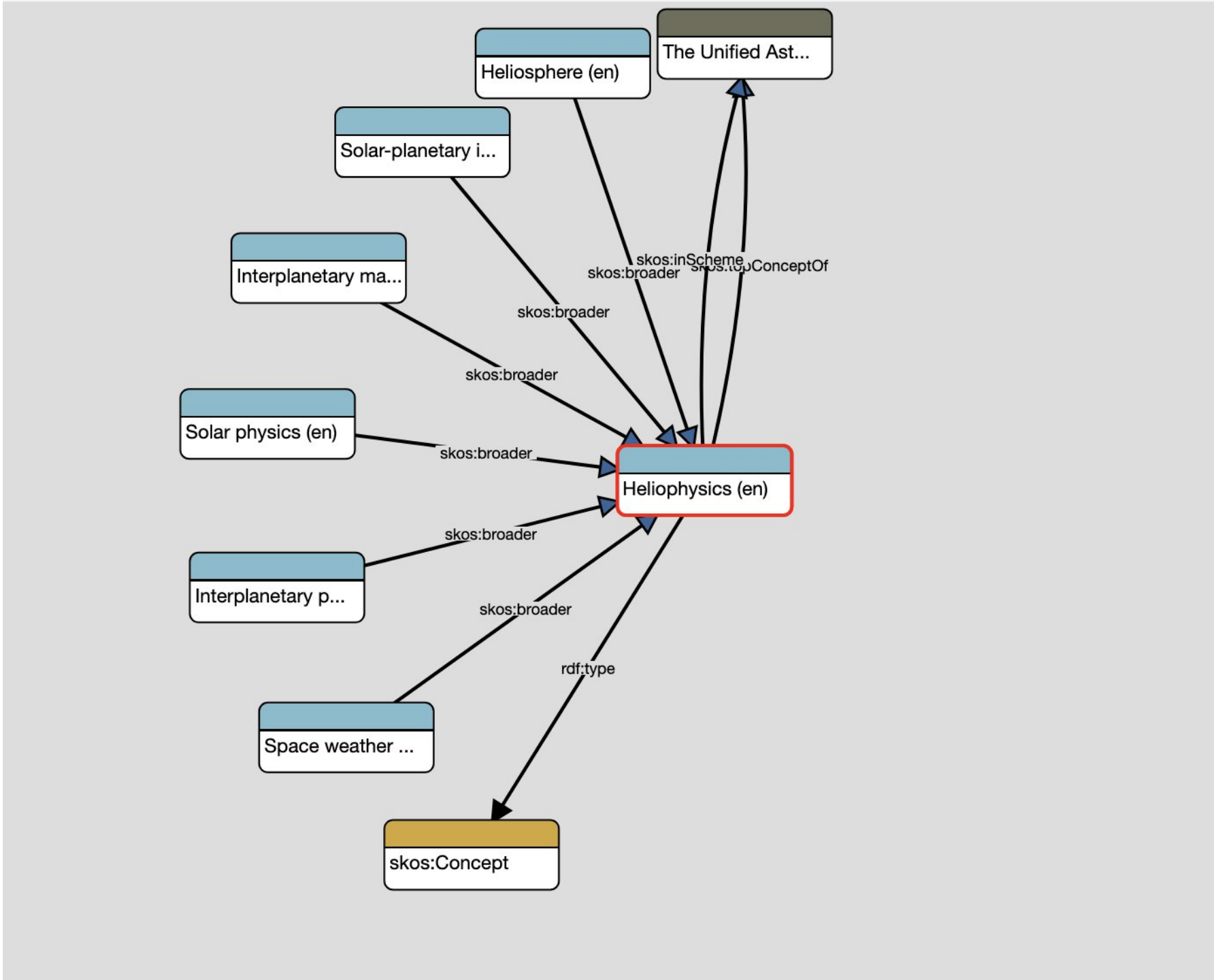
  - new terms for heliophysics regions, new top level concept (Heliophysics)

=> should be in the next release (6.0, ~January 2026)

UAT updates for Heliophysics

- Creation of a top level Concept **Heliophysics**
- **Solar Physics** moved under Heliophysics
- Additions for planetary magnetospheres
  - Bowshock
  - Magnetosheath
  - Foreshock
  - Magnetotail
  - Magnetopause
  - Lobes
  - Cusp
  - Inner Magnetosphere (contain numerous additional regions like plasmasphere, radiation belts (detailed in the region-based taxonomy)
- Additions for Earth Ionosphere

https://github.com/astrothesaurus/UAT/issues/452#issuecomment-3098531611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Interplanetary ma...
skos:inScheme
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Interplanetary p...
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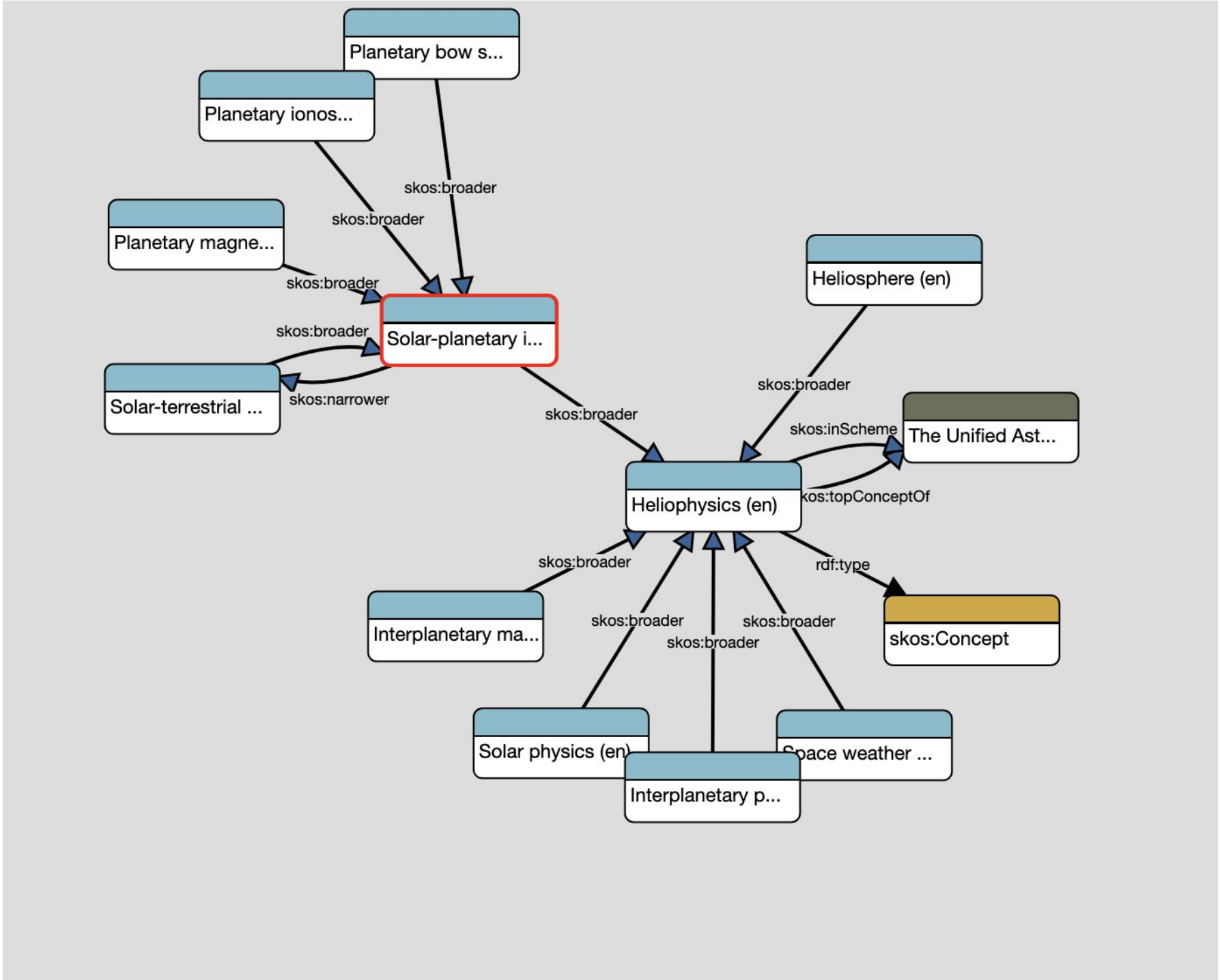
Space weather ...
skos:Concept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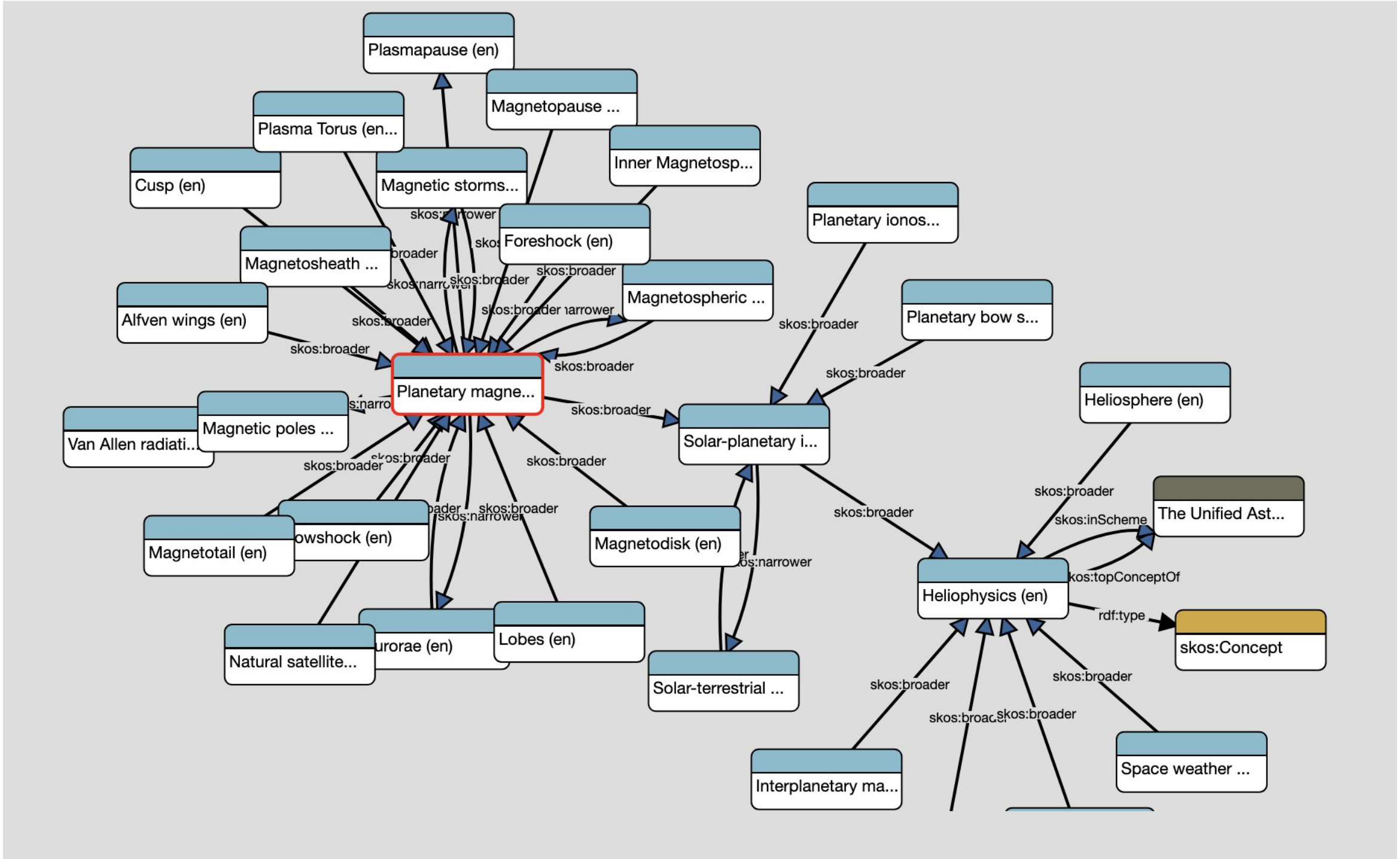
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Magnetopause ...
Plasma Torus (en...
Inner Magnetosp...
Cusp (en)
Magnetic storms...
Foreshock (en)
Planetary ionos...
Magnetosheath ...
Magnetospheric ...
Alfven wings (en)
Planetary bow s...
Planetary magne...
Heliosphere (en)
Magnetic poles ...
Van Allen radiati...
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The Unified Ast...
Magnetotail (en)
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Heliophysics (en)
skos:Concept
Natural satellite...
Lobes (en)
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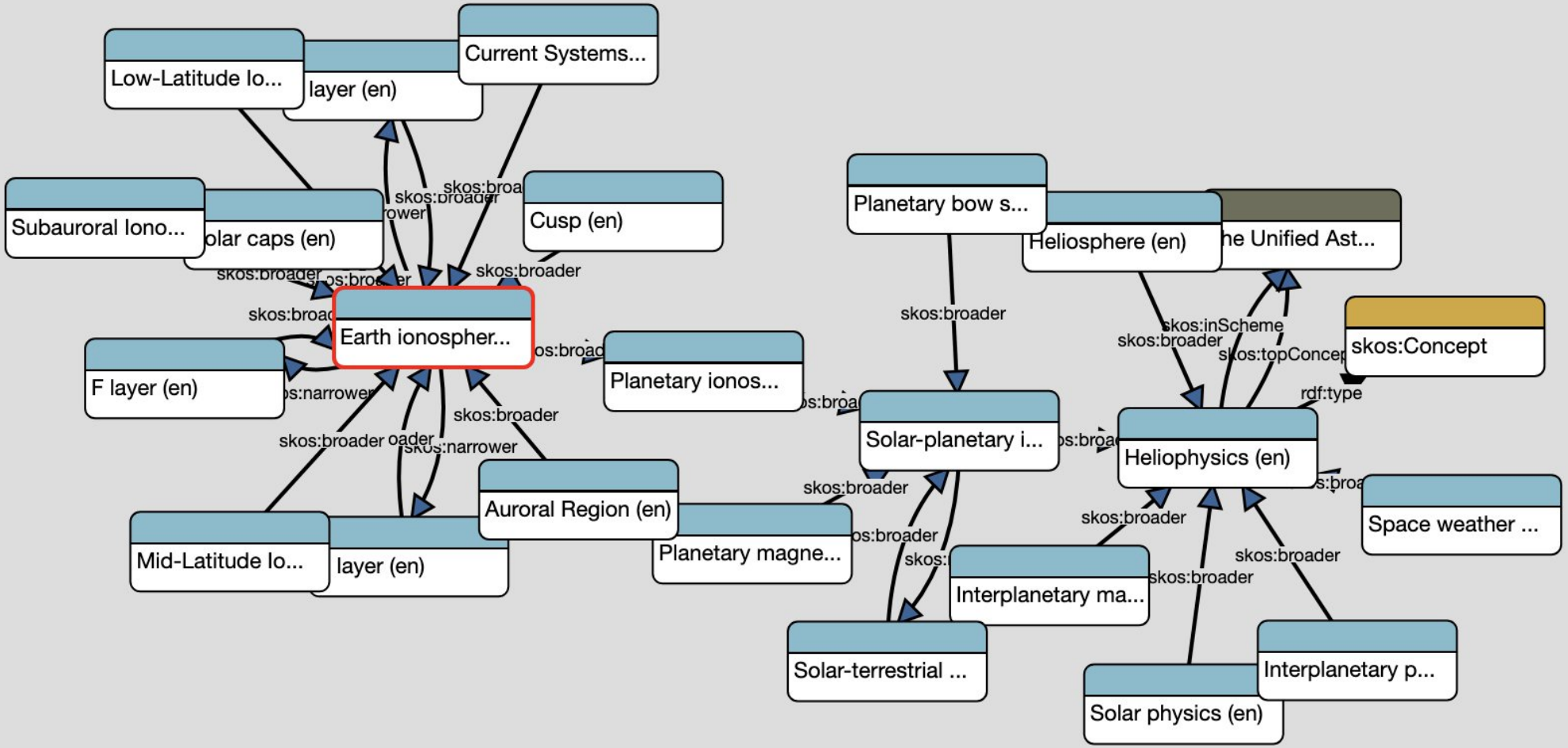
Low-Latitude Io...
layer (en)
Current Systems...
Subauroral Iono...
olar caps (en)
Cusp (en)
skos:broader
Earth ionospher...
F layer (en)
Planetary ionos...
skos:narrower
skos:broader
Auroral Region (en)
Mid-Latitude Io...
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