Update on Vocabularies

Vocabulary management and vocabulary content

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  - Ontologies (hence vocabularies) should be versioned;
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- Semantic interoperability and FAIR principles:
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  - URIs should be used instead of terms (less implicit).
- **Proposal**: Enforce using full URIs when possible (hence including version).
  - If “term” only is used (instead of full “URI”): this would mean the latest version of the vocabulary should be used.

Vocabulary management

Vocabulary versions and full URIs - example

- https://voparis-ns.obspm.fr/rdf/epn/2.0/product-type redirects to latest version with link to previous one.

PADC Vocabulary: Product Types for EPNcore metadata

This is the description of the vocabulary `http://voparis-ns.obspm.fr/rdf/epn/2.0/product-type` as of 2024-03-28.

The previous version is available at http://voparis-ns.obspm.fr/rdf/epn/2.0/product-type/2023-11-11.

> This vocabulary is not yet approved by the IVOA. This means that terms can still disappear without prior notice.

The EPNcore product-type parameter describes the high level scientific organization of the data product linked by the access_url parameter, or directly included in the table (in which case the value is 'ci' for catalogue_item). EPNCore currently defines several types listed below. The data provider must select the type most adapted to his data. In complex situations (e. g., when a file contains several data products), several types can be used to describe the same granule by using a hash-separated-list — although using several granules to describe the file content may be a better solution. In EPN-TAP these types are identified by a 2-characters ID, so that multivalued queries are unambiguous.

```
<> a owl:Ontology;
    owl:versionIRI <http://voparis-ns.obspm.fr/rdf/epn/2.0/spatial-frame-type/2024-05-07> ;
    owl:priorVersion <http://voparis-ns.obspm.fr/rdf/epn/2.0/spatial-frame-type/2023-11-11> ;
    dc:created "2024-05-07";
    vann:preferredNamespacePrefix "epnsftyp";
    dc:creator [ foaf:name "Erard, S." ],
    [ foaf:name "Cecconi, B." ];
    dc:license <http://creativecommons.org/publicdomain/zero/1.0/>;
    rdfs:label "EPNcore Spatial Frame Type"@en;
    dc:title "EPNcore Spatial Frame Type"@en;
    dc:description """Provides the "flavor" of the coordinate system, which defines the
nature of the spatial coordinates (c1,c2,c3) in the EPNCore table and queries,
and the way they are defined. A value is always required (use "none" if not
applicable, although "body" is found in older services and may be OK). This may
be different from the coordinate system associated to / included in the data
themselves. The reference frame itself is defined by the
spatial_coordinate_description parameter, and the frame center can be specified
using the spatial_origin parameter in case of ambiguity.""";
    ivoasem:vocflavour "SKOS".
```

Vocabulary management

New vocabulary source option

- Currently, the “Vocabularies” git repository keeps the vocabulary source in two places:
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- In some recent cases (e.g., the ObsFacility vocabulary, or the draft UCD vocabulary), storing the source as a RDF file would allow to store more information, used for different purposes:
  - e.g., for ObsFacility, the RDF file contains all the known aliases (with a lang tag).

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  - e.g., for ObsFacility, the RDF file contains all the known aliases (with a lang tag).

- Modification of the convert.py script to build (https://ivoa.net/rdf/) is already done (my fork of repo).

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vocabulary API early discussion

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- However, if we want to build to tools helping research teams to use the IVOA vocabulary terms is open science context, we probably need a search interface.
  - use-case - data publication: data steward / documentalist fills in a DMP for a science team, including our vocabulary terms (i.e.: IVOA-UAT, RefFrame, ObsFacility…), so that they can be inserted in Datacite metadata, in linked-data metadata…
  - use-case - FAIR assessment: having IVOA vocabulary terms used in DOI landing pages metadata (using URIs), makes dataset more easily finable and interoperable (e.g.: using standard RefFrame or ObsFacility terms)
  - use-case - refined search: search for data from a specific ObsFacility (e.g.: LOFAR), enabling extension of the query to parts of the facility (individual LOFAR stations throughout Europe)

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  - use-case - refined search: search for data from a specific ObsFacility (e.g.: LOFAR), enabling extension of the query to parts of the facility (individual LOFAR stations throughout Europe)
- need for an programmatic interface (API), example:
  - search for a term: https://api.[...]/search?q=magnitude&ontology=ivoa-uat (ontoportal API style)
  - need for capability to get the metadata for a term (e.g.: to get the its relations) without loading the full vocabulary.

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    <term> ivoasem:deprecated ":__" .

    A more standard way to say that is:
    <term> a owl:DeprecatedClass .
    Non breaking change could be to declare this in the ivoasem RDF file

    owl:DeprecatedClass owl:equivalentClass [rdf:type owl:Restriction ; owl:onProperty ivoasem:deprecated ; owl:hasValue ":__"] .

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  - “useInstead” property indicates what term should be used when a term is deprecated.
    We could add the following statement in RDF to make sure external libraries understand what to do:

    ivoasem:useInstead owl:equivalentProperty dct:isReplacedBy .

EPNcore Vocabularies

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  - https://voparis-ns.obspm.fr/rdf/epn/2.0/product-type/
  - https://voparis-ns.obspm.fr/rdf/epn/2.0/spatial-frame-type/
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- not pushed yet to ivoa-std/Vocabularies repo:
  - need to push updates of convert.py script first, to include new relations
  - need to check relations with existing IVOA vocabularies

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- Proposal
  - define UCD classes by their composition rules:
    - P = Primary word
    - S = Secondary word
    - Q = P or S
    - C, V and E are Q with special meaning (Color, Vector and Photometry)
  - add a “has_ucd” property with “domain” = UCD words
  - then declare UCD words as individuals of a UCD class, e.g.:

```
ucd:arith.diff a ucd:S ;
    rdfs:label "arith.diff"@en ;
    rdfs:comment "Difference between two quantities described by the same UCD"@en .
```

UCD Vocabulary

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- Note the declaration of the UCD classes would look like this:

```
ucd:C rdfs:label "Colour Index"@en ;
    rdfs:comment "A colour index, and can be followed by two successive word describing a part of the electromagnetic spectrum"@en ;
    rdfs:subClassOf ucd:Q .

ucd:V rdfs:label "Vector"@en ;
    rdfs:comment "Such a word can be followed by another describing the axis or reference frame in which the measurement is done"@en ;
    rdfs:subClassOf ucd:Q .

ucd:E rdfs:label "Photometric Quantity"@en ;
    rdfs:comment "A photometric quantity, and can be followed by a word describing a part of the electromagnetic spectrum"@en ;
    rdfs:subClassOf ucd:Q .

ucd:P a owl:Class ;
    rdfs:label "Primary"@en ;
    rdfs:comment "The word can only be used as ``primary'' or first word."@en .

ucd:S a owl:Class ;
    rdfs:label "Secondary"@en ;
    rdfs:comment "The word cannot be used as the first word to describe a single quantity"@en .

ucd:Q a owl:Class ;
    rdfs:label "Primary or Secondary"@en ;
    rdfs:comment "The word can be used indifferently as first or secondary word."@en ;
    owl:equivalentClass [ a owl:Class ;
            owl:unionOf ( ucd:P ucd:S ) ] .
```

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- Not sure we can do:
  How to describe composite UCDs (e.g.: “phot.count;em.IR")? we may be able to write:
  <col3> has_ucd (ucd:phot.count ucd:em.IR) . # this is an ordered list
  but I need to check this…

RefFrame Vocabulary

Southern spring clean-up?

- Current RefFrame vocabulary is limited to a set of terms:
  AZ_EL, BODY, ECLIPTIC, EQUATORIAL, FK4, FK5, GALACTIC, GALACTIC_I, GENERIC_GALACTIC, ICRS, SUPER_GALACTIC, UNKNOWN
  plus a series of (already) deprecated terms:
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- **Special question**: the *geo_app* term comes from very far away back in time (even before *votable*: Sébastien traced it back in *astrores* and before). Shouldn’t we get rid of this one?

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- Planetary Sciences:
  - A list of planetary Coordinate Reference Systems have been adopted by the OGC ecosystem (Earth sciences). See here: http://voparis-vespa-crs.obspm.fr:8080/web/
  - This list includes references frames and projections.
  - Importing the reference frames into RefFrame should be easy (24 frames).

ObsFacility Vocabulary

Almost there!

- Long standing action: gathering a list of terms for observation facilities.
- Required for interoperability and discoverability of dataset based on telescope name or spacecraft name.
- Semantic reminder:
  Observation Facility = the concept bearing the location of the observation
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- Not in scope:
  - modelling the observation facility (classification, metadata, relation to instruments)
  - instruments

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  Wikidata has a lot of identifiers already mapped together: great starting point.
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- Process:
  - Export from Wikidata and merge additional terms and aliases and produce a curated list of terms with aliases.
  - list of terms + external identifiers + relations => IVOA Vocabulary
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- Plan:
  - first version with terms having an ObsCode or a SPASE id or a PDS id (almost there)
  - decisions to be made on the accepted terms, curation of label and description
  - second version making sure that all VOResource/ObsCore/EPNcore observation facility values can be mapped to a term in the vocabulary.
  - then: updates through VEP.

ObsFacility Vocabulary

Example

```
obs:gemini-north a owl:Class ;
    rdfs:label "Gemini North"@en ;
    rdfs:comment "northern hemisphere facility of the Gemini Observatory (wikiata:Q6140627) (obscode:T15)"@en ;
    skos:altLabel "Q6140627",
        "T15",
        "frederick c. gillett gemini telescope"@en,
        "gemini north observatory"@en,
        "gemini north telescope"@en,
        "the frederick c. gillett gemini telescope"@en ;
    skos:exactMatch <http://www.wikidata.org/entity/Q6140627>,
        <https://minorplanetcenter.net/iau/lists/ObsCodesF.html#T15>,
        <urn:nasa:pds:context:facility:observatory.gemini_north-maunakea> .

obs:gemini-south a owl:Class ;
    rdfs:label "Gemini South"@en ;
    rdfs:comment "southern hemisphere facility of the Gemini Observatory (wikiata:Q19673584) (obscode:I11)"@en ;
    skos:altLabel "I11",
        "Q19673584",
        "gemini south observatory"@en,
        "gemini south telescope"@en,
        "gems"@en ;
    skos:exactMatch <http://www.wikidata.org/entity/Q19673584>,
        <https://minorplanetcenter.net/iau/lists/ObsCodesF.html#I11>,
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```

Projection Vocabulary

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- Why:
  - EPN-TAP has a “map_projection" keyword, not constrained.
  - HiPS should contain metadata tracing the original projection of the dataset (complain from planetary science geek)

- Need for a vocabulary?

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- FITS WCS document also has list of projections.
- Let’s start this.

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- Proposal by Laurent Michel with *obscore* terms.
  EPNcore terms to be added and mapped.
  Other terms: CODMAC, PDS3, PDS4… should also be mapped