

FedEO Report

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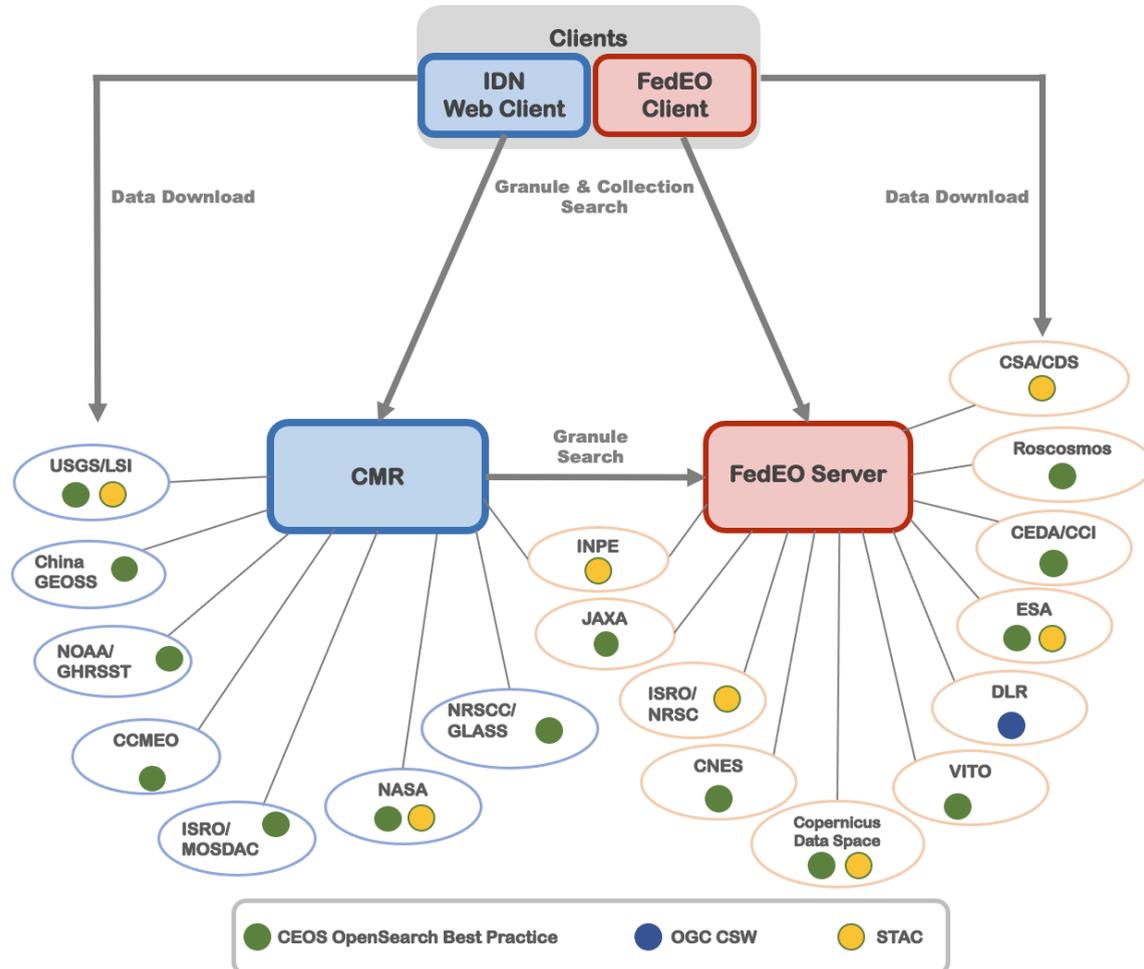
CEOS WGISS #61, Dehradun (India)
Session 4: Data Discovery and Access, 17/03/2026

Outline

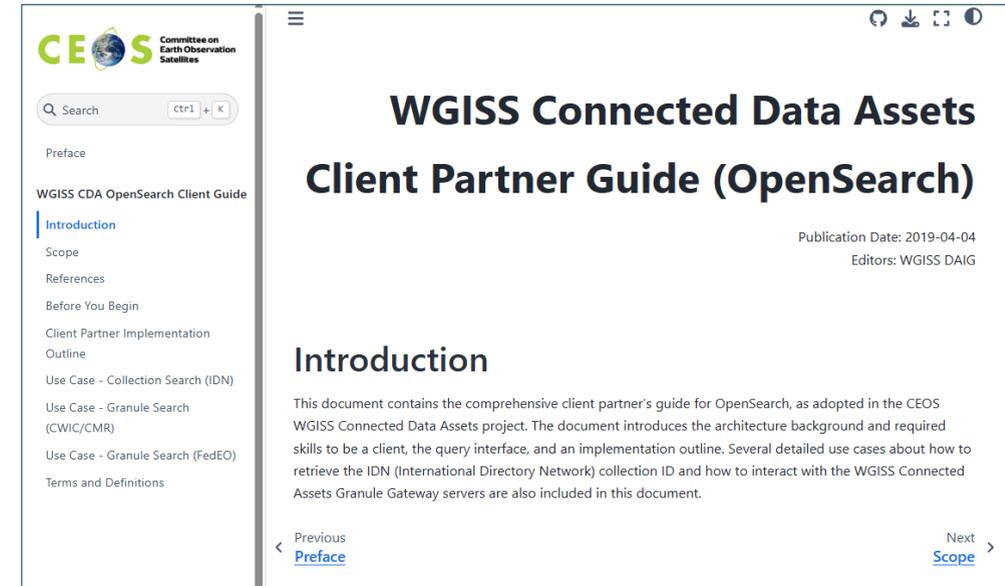
- FedEO Collections and Collaborations
- FedEO Integration activities
- Evolution since WGISS-60
- Action status
 - STAC Validation
 - Discovery ARD collections
- Further work

WGISS Connected Data Assets

- FedEO: Federated Earth Observation missions access



- WGISS Members Connection on progress**
- CSIRO/GA
 - EC
 - EUMETSAT
 - GISTDA
 - ICHEC
 - UKSA



Connected Data Assets Client Partner Guide:

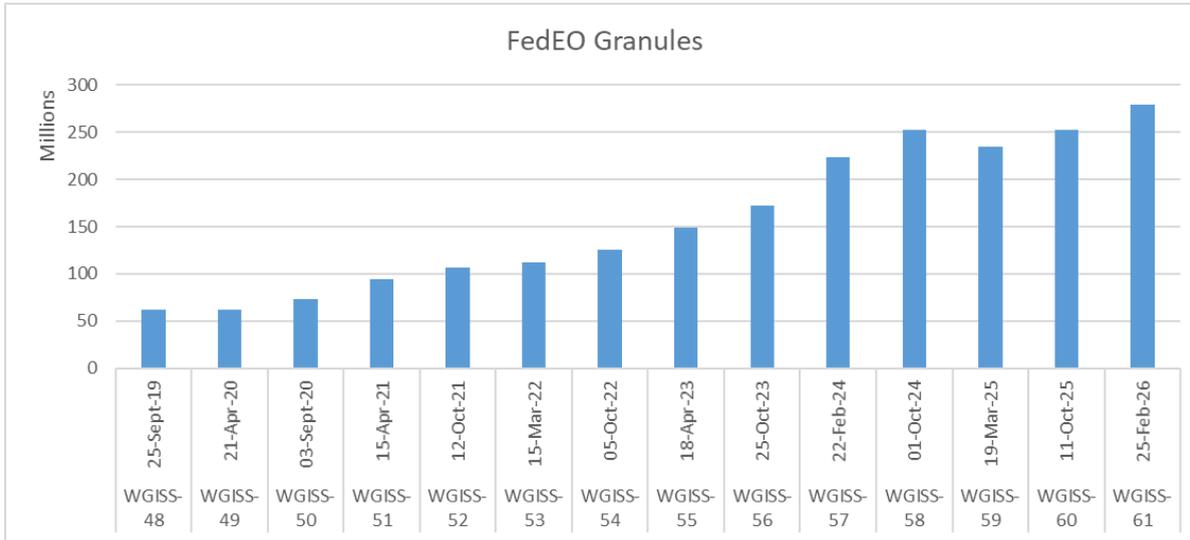
<https://ceos-org.github.io/wgiss-cda>

<https://github.com/ceos-org/wgiss-cda>

<https://ceos.org/ourwork/workinggroups/wgiss/access/connected-data-assets/cda-datasets/>



FedEO Collections and Collaborations



Connector	Total dataset num	Total granule num
NRCAN	7	0
ESA-MAAP	44	10495825
ESA	202	54551458
SCIHUB	6	115834620
DLR	51	730315
EUMETSAT	20	0
VITO-TERRASCOPE	122	22962885
VITO-GLOBALLAND	50	96146
CCI	356	4260625
CMEMS	285	0
ECV	532	0
Sinergise	2	35561557
ROSCOSMOS	29	0
INPE	90	5533411
CNES	8	5394462
CDSE	143	0
ISRO	53	0
JAXA-GPORTAL	1023	23448481

Updates since WGISS-60:

- 278 million granules (was 252)*
- 3023 collections (was 3000)
- NRCAN (new)
 - 7 collections
- CDSE:
 - From 134 to 143 collections
- INPE:
 - From 80 to 90 collections.
 - From 4.4 to 5.5 million granules
- ESA:
 - EOCAT: from 49 to 54 million granules
 - MAAP from 3.5 million to 10.5 granules
 - SCIHUB (100+ million) replaced by CDSE (0)

(*) not all granules can be automatically counted (e.g. CDSE, ISRO, NRCAN...).

Integration – NRCAN EODMS

- STAC backend catalogue
 - 7 collections incl. Radarsat-2.

Radarsat-2_Tropical_Rain_Forest_Products

Description
Radarsat-2 Tropical Forest Products

License various
Temporal Extent 2008-02-14 0:00:00 UTC until present

Assets

- > OGC 17-069r3 metadata [METADATA] [GEOJSON]
- > ISO 19139 metadata [METADATA] [ISO.19139+XML]
- > ISO 19139-2 metadata [METADATA] [ISO.19139 2+XML]
- > DIF-10 metadata [METADATA] [DIF 10+XML]
- > OGC 17-084r1 metadata [METADATA] [GEOJSON]
- > HTML [METADATA] [HTML]
- > ISO 19115-3 metadata [METADATA] [ISO.19115 3+XML]

Items

- 04746c96-fe0b-50ca-925f-72a66df56a55 (2009-02-17 21:50:49 UTC)
- 251e4ca9-e1b7-57f1-9434-6748fb85a859 (2009-02-17 21:50:35 UTC)
- 2fd6a4ec-557b-54f9-81bf-4c78fc28a86b (2009-08-22 10:33:06 UTC)
- 4009a1a0-884c-54d2-ae26-7f5adfd944a (2009-07-29 10:32:43 UTC)

Search

Search for Collections | Search for Items

Search Terms
Enter one or more search terms...
Search for at least one of the given terms in fields such as the title and the description.

Temporal Extent
Select date range
All times in Coordinated Universal Time (UTC).

Spatial Extent
Filter by spatial extent

Additional filters
Match all filters (and) | Match any filters (or)
Add filter +

Parent identifier: EOP:NRCAN:EODMS

Items per page
Default
Number of items requested per page, max. 1000 items.

Collections

- NAPL**
National Air Photo Library
1920-01-01 0:00:00 UTC until present
- Radarsat-1-FRED**
Radarsat-1 Raw Data in FRED format (signal data)
1996-01-01 00:00:00 UTC – 2013-05-01 00:00:00 UTC

- Future work:
 - NRCAN, CSA, MDA as Providers
 - Collection science keywords.

Integration – UKSA

- STAC interface
 - NovaSAR SLC

NovaSAR_01_29850_slc_11_211225_093256_HH_2

Collection: novasar_l2ard_hh
NovaSAR-1 CEOS-ARD (level 2) HH polarization
2019-07-13 00:00:00 UTC – 2025-10-04 23:59:59 UTC

Metadata

General	
Time of Data begins	2021-12-25 9:32:52 UTC
Time of Data ends	2021-12-25 9:32:52 UTC
Published	2021-12-25 15:50:38 UTC
Platform	NovaSAR_01
License	License
Time of Data	2017-02-06 22:26:56 UTC
Instruments	SAR
Constellation	NovaSAR_01
Updated	2025-12-01 16:36:49 UTC

Processing

Facility	SSTL
Processing Time	2021-12-25 15:50:38 UTC
Software	RD-Chirp Scale (1.14)

Assets

- Download: DATA, ZIP
- QL_image_HH: OVERVIEW, TIFF
- OGC 10-157r4 metadata: METADATA, GML
- OGC 17-003r2 metadata: METADATA, GEOJSON
- ISO 19139 metadata: METADATA, ISO19139+XML

Additional Resources

Alternative representation

- JSON-LD (schema.org) metadata
- JSON-LD (GeoDCAT-AP) metadata

Source metadata

- Status:
 - Feasibility tests metadata generation and publication (S3).
- Next steps:
 - TBD by UKSA.

Integration – USGS



- STAC interface
 - Landsatlook.usgs.gov integration in ESA MAAP
 - 18 collections including CEOS-ARD
 - Open issue with inaccessible quicklooks
 - Empty queryables lists ?

Connector	Total dataset num	Total granule num
USGS	18	49492354



Evolution since WGISS-60

- Update of STAC WebMapLink Extension for WMTS (v1.3.0)
 - <https://github.com/stac-extensions/web-map-links>
- Update of STACBrowser supporting STAC WebMapLink for WMTS
- Update of FedEO STAC endpoint
 - Many ESA EOCAT granules (available in FedEO) have associated WMTS information...

Browse Search FedEO Clearinghouse Language: English

OC2_OPER_OCM2_LA_2B_20160325T101313_20160325T101642_034441_0005_0009_0141

Collection Up Source Share

Map Thumbnails

Collection

OceanSat-2 NRT data

HTML ESA, in collaboration with GAF AG, acquired and processed every day OceanSat-2 passes over Neutrelitz reception station from January 2016 to November 2021. All passes were...
2015-10-27 00:00:00 UTC – 2021-11-07 23:59:59 UTC

Metadata

General

Time of Data begins	2016-03-25 10:13:13 UTC
Time of Data ends	2016-03-25 10:16:42 UTC
Platform	OceanSat-2
Time of Data	2016-03-25 10:13:13 UTC

Assets

GetTile [HTTP://WWW.OPENGIS.NET/SPEC/OWC-GEJSON/1.0/REQ/WMTS#GETTILE](http://www.opengis.net/spec/owc-geojson/1.0/req/wmts#gettile) **JPGPNG**

Base Layers

- OpenStreetMap

Layers

- OC2_OPER_OCM2_LA_2B_20160325T101313_20160325T101642_034441_0005_0009_0141

```
{  
  "wmts:encoding": "rest",  
  "uriTemplate": "https://eocat.esa.int/wmts03/1.0.0/OCM2_LA_2B/default/2016-03-25T10:13:13Z--2016-03-25T10:16:42Z/WGS84/{TileMatrix}/{TileRow}/{TileCol}.jpgpng",  
  "rel": "wmts",  
  "wmts:layer": "OCM2_LA_2B",  
  "href": "https://eocat.esa.int/wmts03/1.0.0/WMTSCapabilities.xml"  
}
```

Evolution – Planned

- Support for discovering CEOS-ARD collections
 - Search parameters
 - Quality metadata encoding (STAC, ISO, ..)
- Alignment with ESA MAAP catalogue software version.
- More fine-grained STAC collection search (with Filter Extension):
 - CQL2 JSON
 - CQL2 Advanced Comparison Operators (LIKE, BETWEEN, IN).
- STAC Fields extension: <https://github.com/stac-api-extensions/fields>
 - To control content of response
- STAC responses as default response type.
- May include some evolutions from OGC Testbed-21 (DQ4IPT)
 - Support for ISO19115-4 (GeoJSON)

Action Status - “STAC Validation Tool”

WGISS-58-17

DAIG to look into a tool to validate a provider STAC interface against the Service Metadata and Discovery Best Practices.

- Ongoing development to support CEOS EO Collection and Granule Discovery Best Practices with STAC
 - Preliminary version “in-progress” on FedEO Validation Environment.
 - Priority on CEOS requirements/recommendations
 - User interface inspired by INSPIRE Metadata Validator
 - Tests to be made conditional on “conformance classes” still
 - Existing tools/checks still to be integrated.



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Action Status - "STAC Validation Tool"

- Checks are organized as per CEOS WGISS Best Practices Document
- Requirement: green/red. Recommendation: green/orange

HOME

CEOS Committee on Earth Observation Satellites

fedeo
Federated EO missions support environment

STAC BEST PRACTICES VALIDATOR

STAC URL:

Maximum number of collections:

Maximum number of items:

Fast test:

VALIDATE

Status Failed
Duration 7.8 s

	Total Count	Failed	Passed
Requirements	28	0	28
Recommendations	14	6	8

- ▶ General Failed: 1 / 9
- ▶ Granule Catalog 7
- ▶ Collection Catalog 9
- ▶ Granule Metadata Failed: 2 / 9
- ▶ Collection Metadata Failed: 3 / 8

No more than n iterations

Do not retest "failed" requirement

of included requirements in this group

Action Status - “STAC Validation Tool”

- Individual requirements grouped per chapter.
- Link to individual requirements in GitHub repository.

Link to Requirement/Recommendation

The screenshot shows the STAC Validation Tool interface. At the top, a 'General' section indicates 'Failed: 1 / 9'. Below this, a list of requirements and recommendations is shown, each with a status indicator (e.g., '3', '2', '2', '2', '2', '2', '2'). The 'Recommendation 3420: Root relation' section is expanded, showing 'Failed: 1 / 2'. It includes a link to 'More information: CEOS-STAC-REC-3420' and a 'Status Failed' label. The 'Recommended 'root' link in feature.' section shows 'Status Failed (1/2)' and a 'Context' link to 'https://kbs.spacebel.be/catalogue/search'. A message at the bottom states: 'Feature 'K02_OTPF_K02_MSC_2F_20091110T025507_20091110T025507_AABBCC_E108_N155' has no 'root' link.'

Action Status - “STAC Validation Tool”

- Link to individual requirements or recommendations in GitHub repository.

▼ Requirement 4310: Granule search endpoints

More information: [CEOS-STAC-REQ-4310](#)

Status Failed

Context <https://emc.spacebel.be/collections>

Messages

```
Does not advertise links to items for collection ENVISAT.ATS.AR__2P.
```



v1.0.1 stac-collection-and-granule-discovery-best-practices / granule-catalogs.md

Preview Code Blame 91 lines (57 loc) · 6 KB Raw

Endpoints

CEOS-STAC-REQ-4310 - Granule search endpoints [Requirement]

CEOS STAC granule catalogs shall advertise and provide the endpoints for granule search per individual collection in the STAC Collection representation as a Link object with rel="items" and type="application/geo+json".

Action Status - “STAC Validation Tool”



- Implementation status:
 - Current version (under test) at <https://geo.spacebel.be/validator>
 - Verify current test results / test behavior
 - Bring tests inline with the declared conformance classes, e.g. when no “collection search” conformance, skip all related tests.
 - Extract content to perform more tests without user inputs (text search based on titles etc..)
 - Integrate additional tests from original open-source library including “STAC Extension schema validation”



Action Status – “CEOS ARD Keywords”

WGISS-59-30

CEOS-ARD Oversight Group to work with CEOS MIM Database team and LSI-VC to identify and develop ‘CEOS-ARD’ keywords to be provided to DAIG for FedEO and IDN, to support discovery of the datasets. CEOS-ARD Oversight Group should consider how to recommend the use of these keywords to support better discovery of CEOS-ARD datasets.

Due:
WGISS-60

- Action underway – Preparation of Guidance document by DAIG (GitHub) – subject of separate presentation.

The screenshot shows a web browser displaying a GitHub page titled "STAC Encoding". The page content includes:

- A search bar with "Search" and "Ctrl + K" buttons.
- A table of contents on the right side listing various encoding standards like ISO19139, ISO19115-3, ISO19115-4, STAC Encoding, DIF10, UMM-JSON, GeoDCAT-AP, and OGC 17-084r1.
- Main text: "This section describes best practices for STAC [12] collection metadata encoding. The proposed encoding uses the draft STAC CEOS-ARD Extension [13]."
- An "Example: 4.1" section: "Documenting conformance with specification or conformance class in STAC collection [12] metadata using the STAC CEOS-ARD Extension [13]."
- A code block showing a JSON-LD STAC collection metadata example:

```
{
  "stac_version": "1.0.0",
  "type": "Collection",
  "title": "EnMAP L2A HSI Products",

  "ceosard:specification": "SR",
  "ceosard:type": "optical",
  "ceosard:specification_version": "5.0",

  "links": [
    {
      "rel": "ceos-ard-specification",
      "href": "https://ceos.org/ard/files/PFS/SR/v5.0/CARD4L_Product_Family_Specification",
      "type": "application/pdf",
      "title": "CEOS-ARD Product Family Specification for Surface Reflectance (PDF)"
    }
  ],
}
```

Conclusion

- Adoption by data providers of STAC accelerates federations with CDA and FedEO
 - CSA EODMS catalogue integrated.
 - Integration of EUMETSAT, CNES, DLR, CSIRO catalogues in progress. Require further interactions with the respective partners
- STAC Online Validator progress
 - Requires further work
- Several CEOS WGISS actions ongoing
 - Incl. discovery of CEOS-ARD datasets (VITO, CSIRO, DLR, etc.)

Spare slides

