



The Committee on Earth Observation Satellites

# WGISS:

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## Working Group on Information Systems and Services

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Data Preservation for CEOS

CEOS OpenSearch Project

Technology Exploration Interest Group

Recovery Observatory

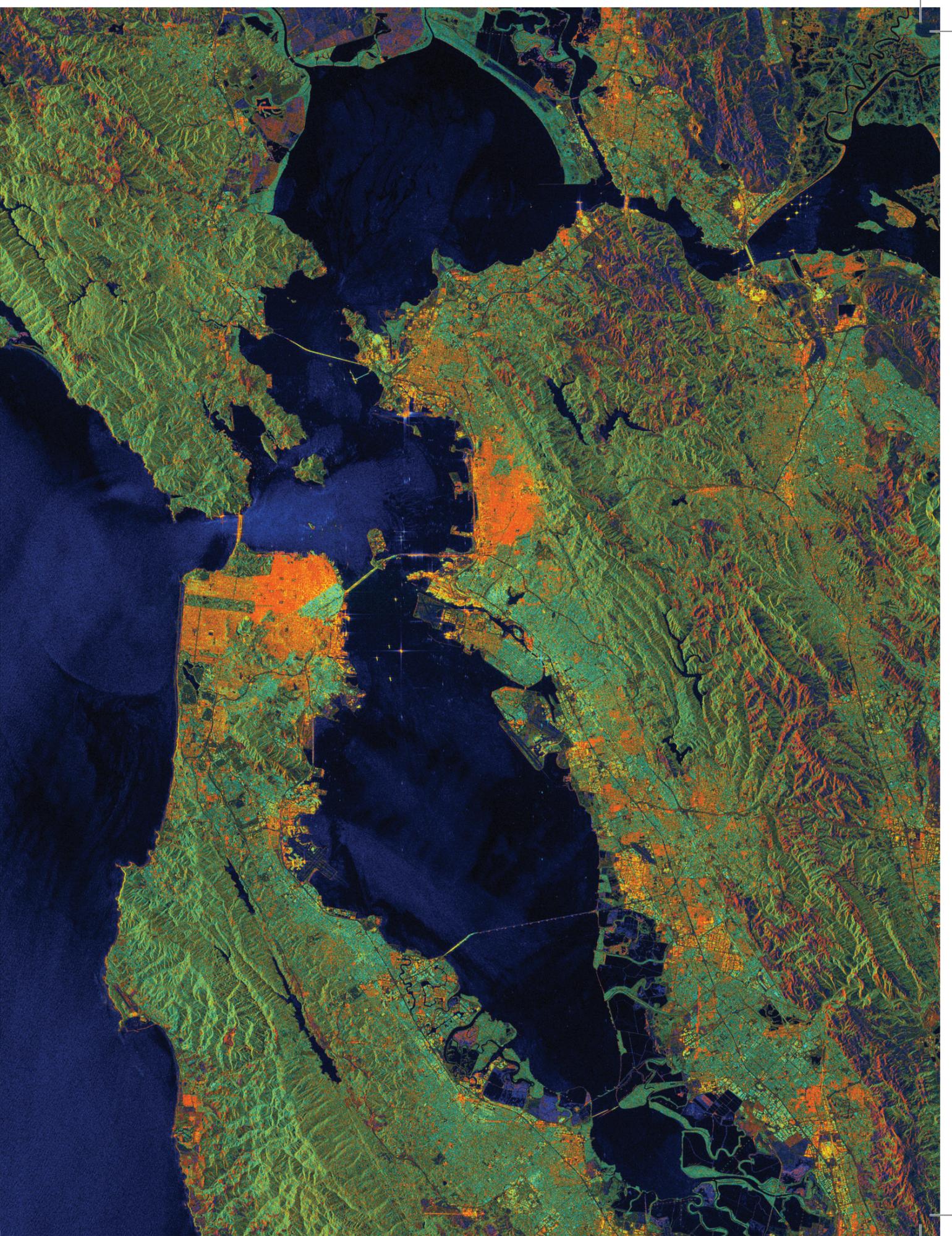
International Directory Network (IDN)

Federated Earth Observation Gateway (FedEO)

CEOS WGISS Integrated Catalog (CWIC)

WGISS Connected Data Assets

For information about WGISS, its projects,  
and the WGISS Document Archive,  
visit <http://wgiss.ceos.org>.





# WGISS Connected Data Assets

## PURPOSE

The WGISS Connected Data Assets include the International Directory Network (IDN), FedEO (Federated Earth Observation Gateway), and CWIC (CEOS WGISS Integrated Catalog). WGISS-supported standards are now used to search and access data from thousands of collections and hundreds of millions of inventory records, with additional data collections and inventory records from CEOS Agencies being added daily to this integrated system.

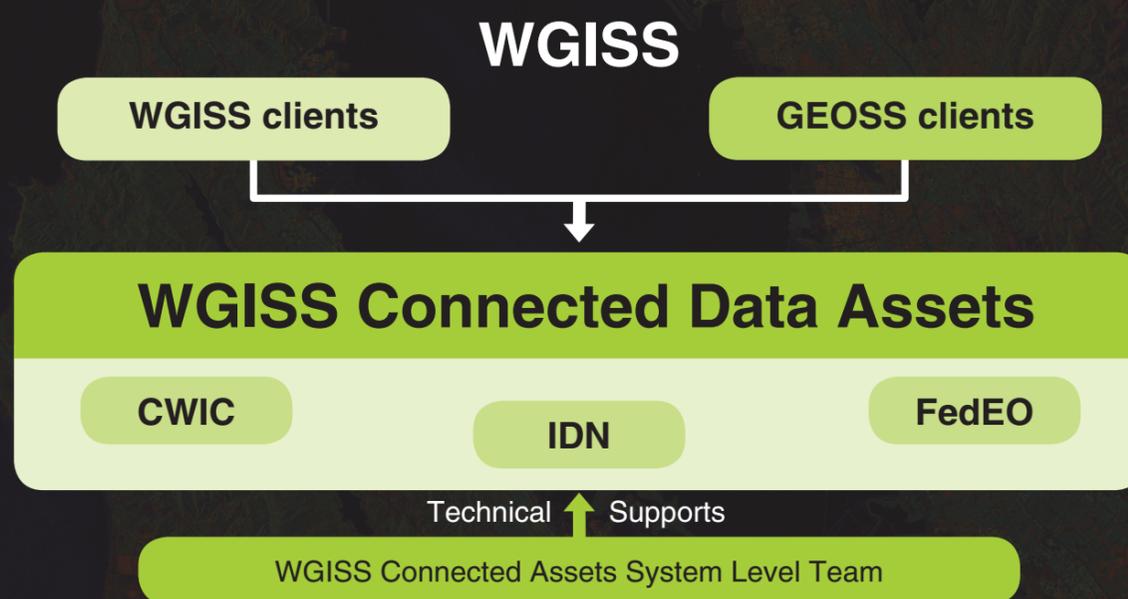
The WGISS Connected Data Assets also provide access to CEOS Agency datasets through their integration with the GEOSS (Global Observation System of Systems) Common Infrastructure (GCI). More and more, CEOS Agencies continue to adopt the WGISS-supported standards (Open Geospatial Consortium (OGC) Catalog Services for the Web (CSW) 2.0.2 and CEOS OpenSearch Best Practices) and make their data discoverable via the WGISS Connected Data Assets. Learn more about accessible CEOS Agency datasets on the WGISS website: [wgiss.ceos.org](http://wgiss.ceos.org).

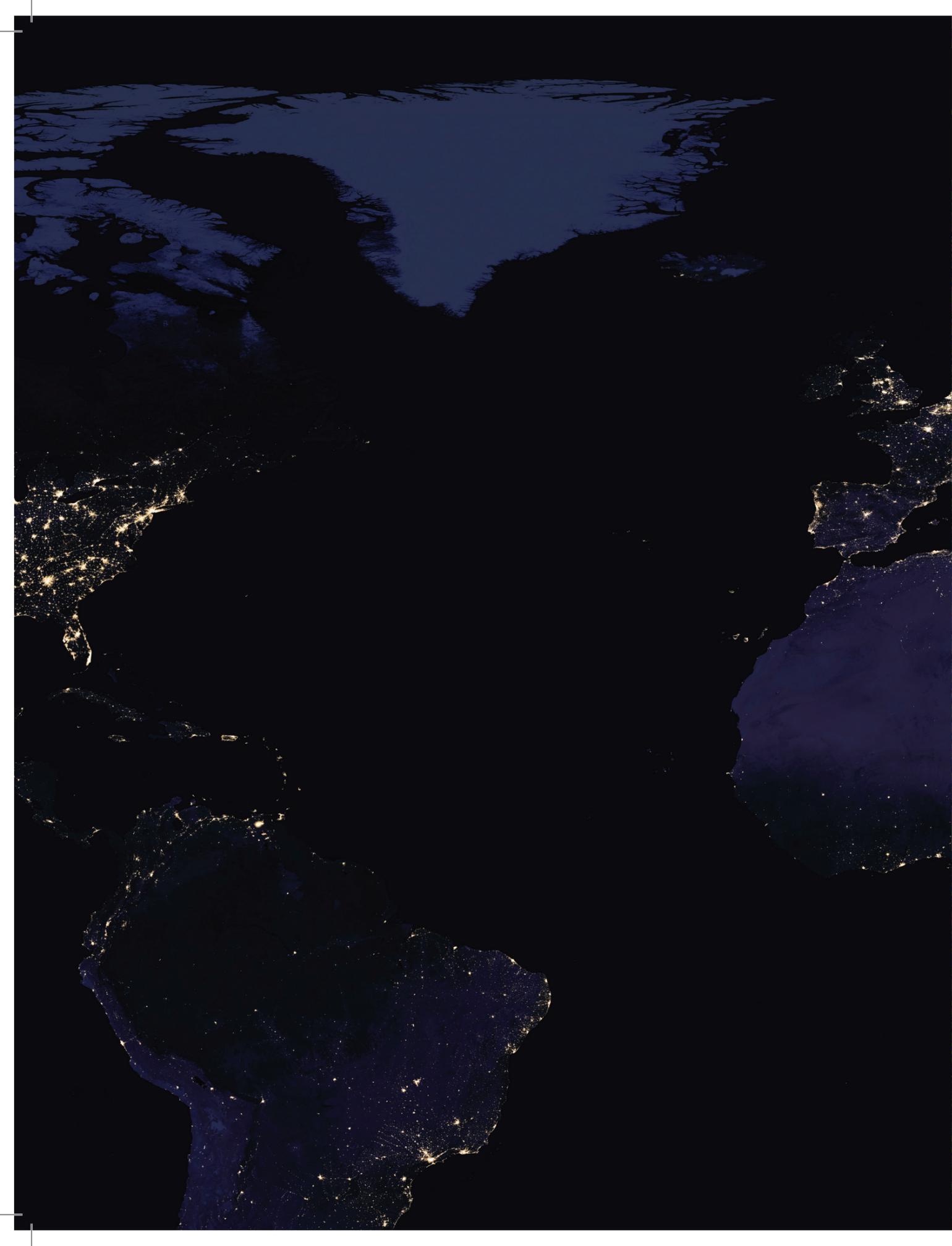
The WGISS Connected Data Assets System Level Team provides coordination and oversight of the operations and evolution of this integrated system and also provides technical support for CEOS partners that offer access to data.

Questions about any system (IDN, FedEO, CWIC) that is part of the WGISS Connected Data Assets systems can be sent to "Access-SysTeam-Help@wgiss.ceos.org".

## Introduction:

The Committee on Earth Observation Satellites (CEOS) is made up of 55 agencies worldwide, committed to coordinating their satellite Earth observation programs and sharing data for a more sustainable and prosperous future. These satellite observations are critical for environmental monitoring, meteorology, disaster response, agriculture and many other applications. The Working Group on Information Systems and Services (WGISS) is a subsidiary body supporting CEOS that promotes collaboration in the development of systems and services that manage and distribute Earth observation data. WGISS creates and demonstrates prototypes supporting CEOS and Group on Earth Observation (GEO) requirements. WGISS also addresses the internal management of EO data, the creation of information systems and the delivery of interoperable services. The activities and expertise of WGISS span the full range of the information life cycle from the requirements and metadata definition for the initial ingestion of satellite data into archives through to the incorporation of derived information into end-user applications.





**CEOS**

# CEOS WGISS Integrated Catalog (CWIC)



*CWIC Data Partners*



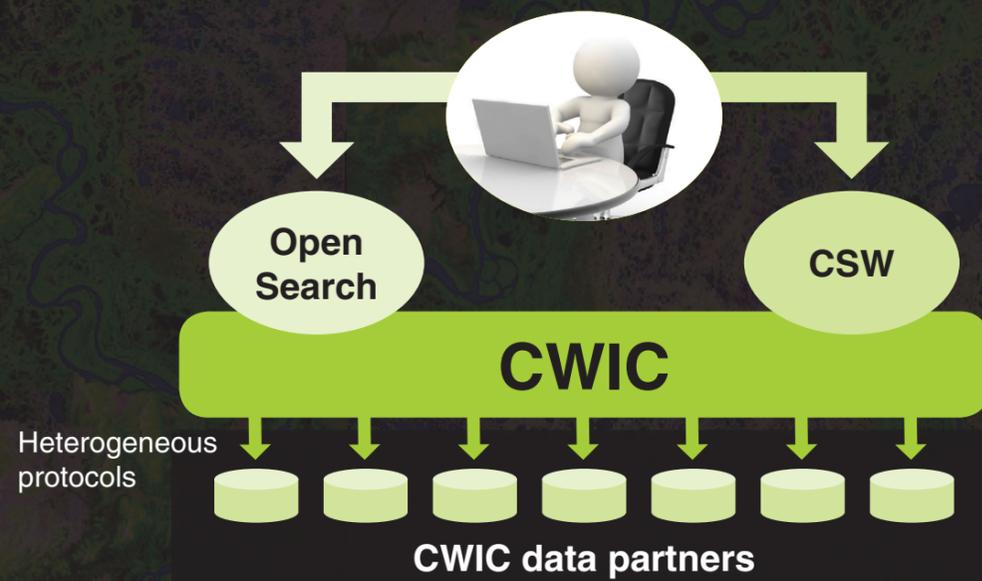
# CEOS WGISS Integrated Catalog (CWIC)

## PURPOSE

The purpose of CWIC is to provide a consistent search interface to help users find and access satellite data made available by CWIC data partners through the use of the WGISS-supported standards, the Open Geospatial Consortium (OGC) Catalog Services for the Web (CSW) 2.0.2, and the CEOS OpenSearch Best Practices.

The CWIC software translates data searches done via Open Geospatial Consortium (OGC) Catalog Services for the Web (CSW) or CEOS OpenSearch into the format understood by each of CWIC's data partners and then translates the search results back into the format understood by the original search tool.

CWIC data partners include NASA (National Aeronautics and Space Administration), NOAA (National Oceanic and Atmospheric Administration), USGS (United States Geological Survey), INPE (National Institute of Space Research – Brazil), CCMEQ (Canadian Center for Mapping and Earth Observations), ISRO (Indian Space Research Organisation), AOE CAS (Academy of Opto-Electronics Chinese Academy of Science), NRSCC (National Remote Sensing Center of China), EUMETSAT (European Organisation for the Exploitation of Meteorological Satellites), and several agencies in Australia.



CWIC Architecture

The WGISS working groups provide support to these four Focus Areas





# Federated Earth Observation Gateway (FedEO)

## PURPOSE

FedEO (Federated Earth Observation Gateway) offers a unique entry point to a growing number of scientific catalogues and services for, but not limited to, European and Canadian EO missions. FedEO is deployed within the European Space Agency (ESA) infrastructure as a gateway to:

- Providing brokered discovery, access, and ordering capability for EO mission product catalogues and archives based on HMA (Heterogeneous Missions Accessibility) interfaces;
- Implementing the CEOS OpenSearch Best Practices and OGC standards for an increased number of discoverable and accessible EO data collections;
- Enabling the interconnection between CEOS Community Catalogues and Clients.

FedEO was initially developed as a prototype for the GEO/GEOSS (Group on Earth Observations/ Global Earth Observation System of Systems) and EO-DAIL (Earth Observation Data Access & Integration Layer). However, since the 2012 CEOS Plenary, FedEO has also begun facilitating access to European mission data in the international context and primarily through CEOS.

In order to ensure the highest level of interoperability for both users and data providers, FedEO is aligned to the most recent OGC, ISO, and CEOS standardisation guidelines.



*FedEO Interoperability Context*

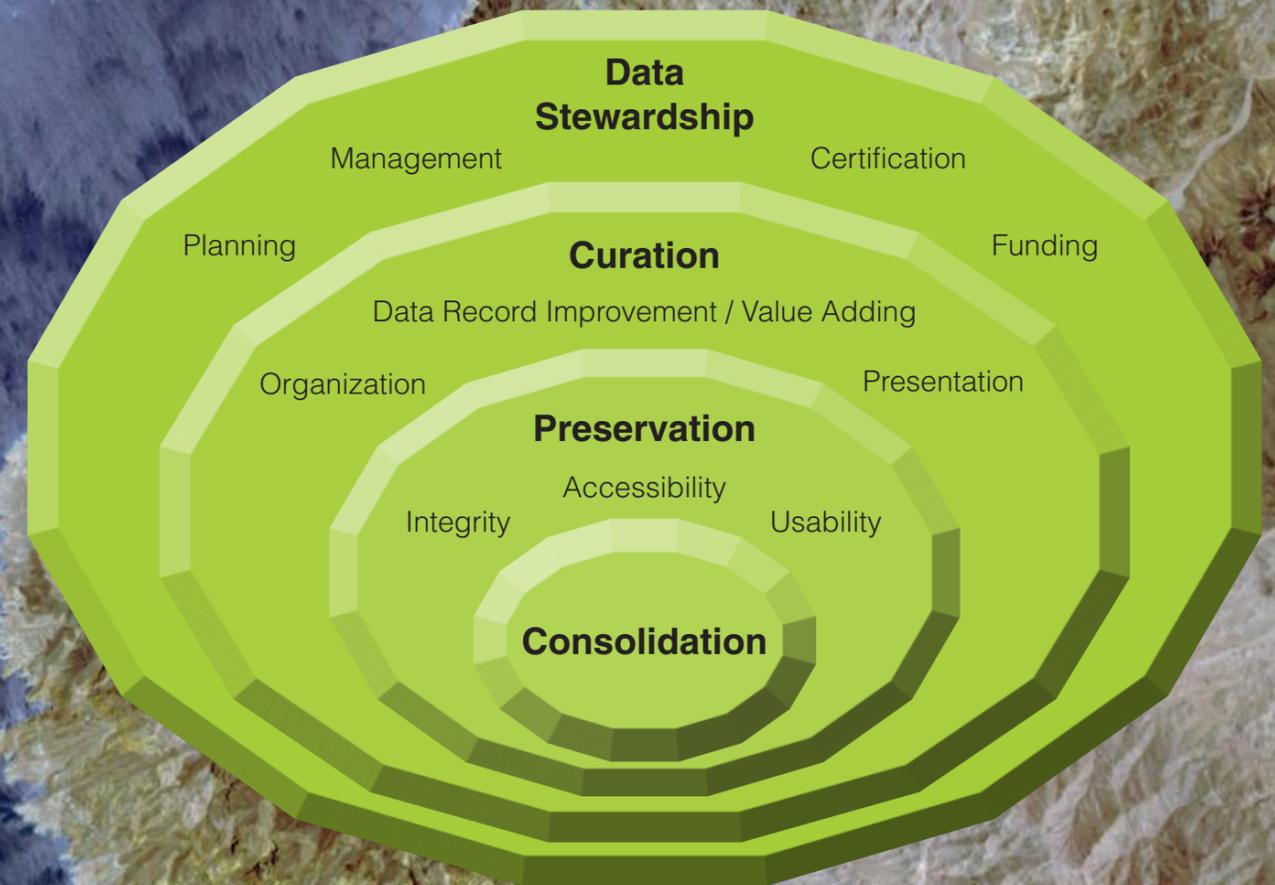
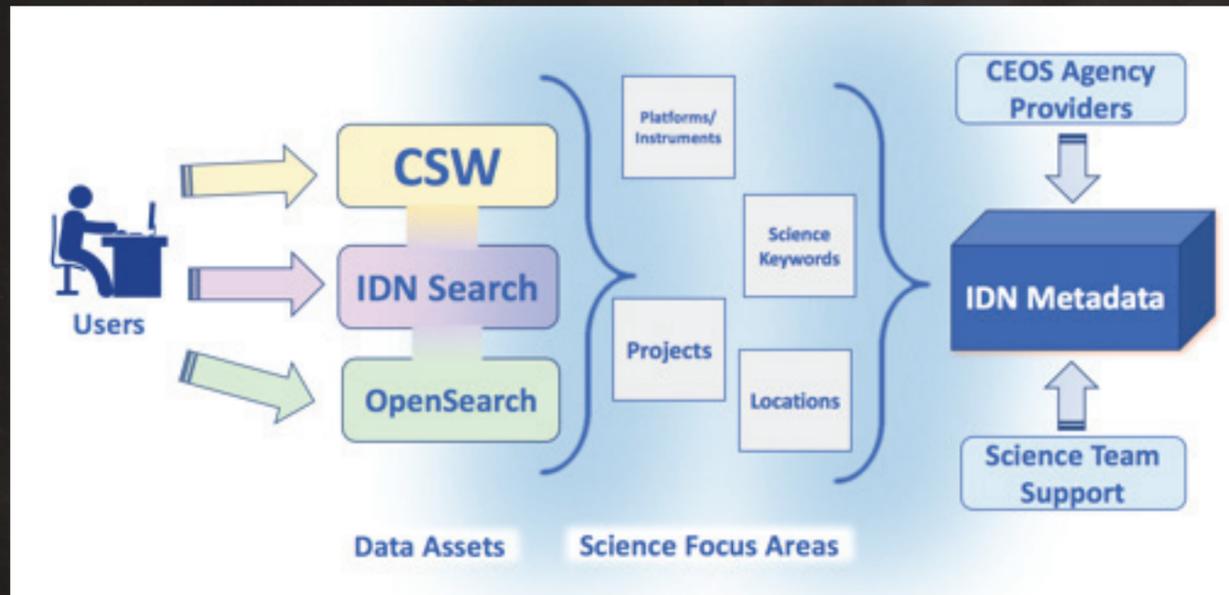


# International Directory Network (IDN)



# Data Preservation for CEOS

Earth observation data are unique snapshots of the condition of Earth at a specific point in time. As such, they constitute an asset for all of humankind that must be preserved, i.e., safeguarded against loss and kept accessible and usable for current and future generations. The importance of safeguarding these data becomes even more apparent when one considers the over 40 years worth of data available in Earth observation archives around the world – and the increasing demand for monitoring long-term variations in environmental parameters, such as sea surface temperature or global ozone distributions, which require long-time series of data. Moreover, with the advent of new, high-resolution Earth observation missions, data volumes are expected to grow significantly in the near future.



## IDN METADATA



Atmospheric Science



Hydrospheric Science



Biospheric Science



Geoscience



Remote Sensing

## SCOPE

Activities focus on EO Data, Metadata, and Associated Knowledge:

- Long-term archiving approaches, systems, and media
- Formats and standards
- Lifecycle concepts
- Valorization and curation



# Data Preservation for CEOS



# International Directory Network (IDN)

## ACHIEVEMENTS

- Raised awareness on EO data stewardship.
- Shared investigations, developments, experiences, and lessons learned relating to EO data preservation
- Full list of documents that comprise the White Papers, Best Practices, Guidelines, and Recommendations on the WGISS website
- Implemented Joint Activities and Pilot Projects on specific data preservation topics and Long-Term Archive Strategies
- Implemented a CEOS “Data Purge Alert” service

## SCOPE

The CEOS International Directory Network (IDN) Master Directory assists researchers by providing free, online access to information about scientific datasets (metadata) in the Earth sciences, including geoscience, hydrospheric science, biospheric science, satellite remote sensing, and atmospheric science. This metadata describes data held by university departments, government agencies, multinational organizations and other organizations all over the world.

The WGISS IDN Interest Group is responsible for coordinating activities among participating international agencies to maintain, improve, and expand the functions and use of the CEOS IDN.

CEOS Agencies register their data collections in the IDN for their heritage data as well as for new mission datasets. The IDN also aligns itself with the WGISS-supported standards for search (Open Geospatial Consortium (OGC) Catalog Services for the Web (CSW) 2.0.2 and CEOS OpenSearch Best Practices) and provides the “collection search” function for the WGISS Connected Data Assets integrated system.

## PURPOSE

Data Preservation and Curation activity objectives include:

- Enabling the sharing of agency investigations, developments, experiences, and lessons learned related to EO data stewardship
- Drafting common cross-agency best practices and/or guidelines for data stewardship for potential adoption by WGISS
- Sponsoring technical exchanges and conducting joint activities and/or pilot projects on specific data stewardship topics
- Establishing and maintaining a CEOS “Data Purge Alert” service
- Contributing to Group on Earth Observation (GEO) Standardization activities

## BACKGROUND

WGISS accomplishes its Data Preservation and Curation efforts through the Data Stewardship Interest Group (DSIG). In addition to data archiving, the DSIG mandate covers data and associated knowledge consolidation and valorization aspects.

The DSIG helps extend the existing European framework for data preservation and management cooperation to all CEOS Agencies.

IDN Homepage  
<https://idn.ceos.org/>



# Recovery Observatory



# CEOS OpenSearch Project

## PURPOSE

The Recovery Observatory aims at demonstrating the value of using satellite Earth Observations to support Recovery from a major disaster:

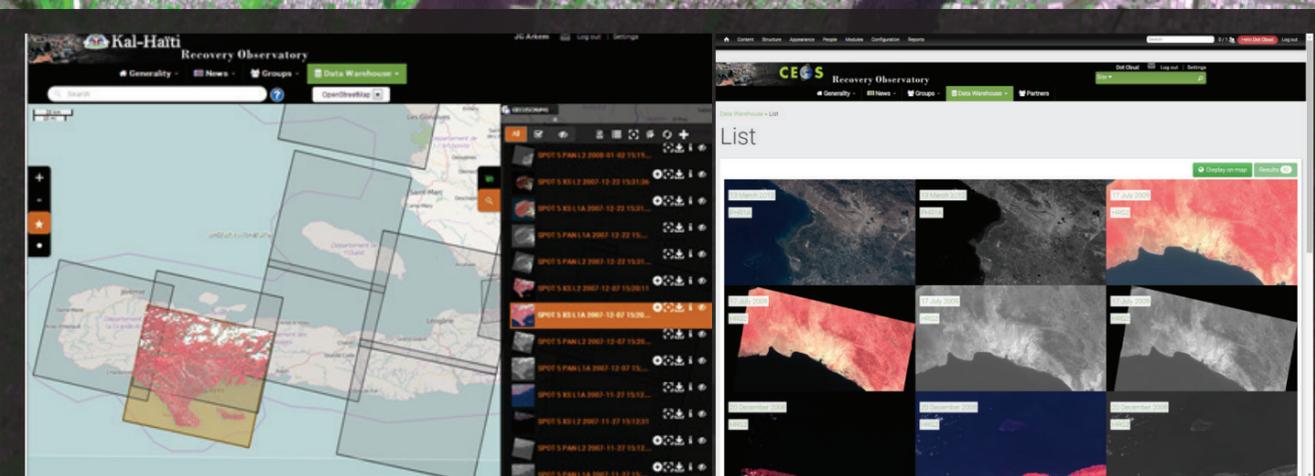
- Assessment of damages on built and natural areas
- Change monitoring
- Reconstruction planning & monitoring

CEOS officially triggered the Recovery Observatory for impact of Hurricane Matthew in Haiti in December 2016. This system aims at tracking recovery of buildings, transportation network, agricultural activities and environmental rehabilitation for a period of three to four years.

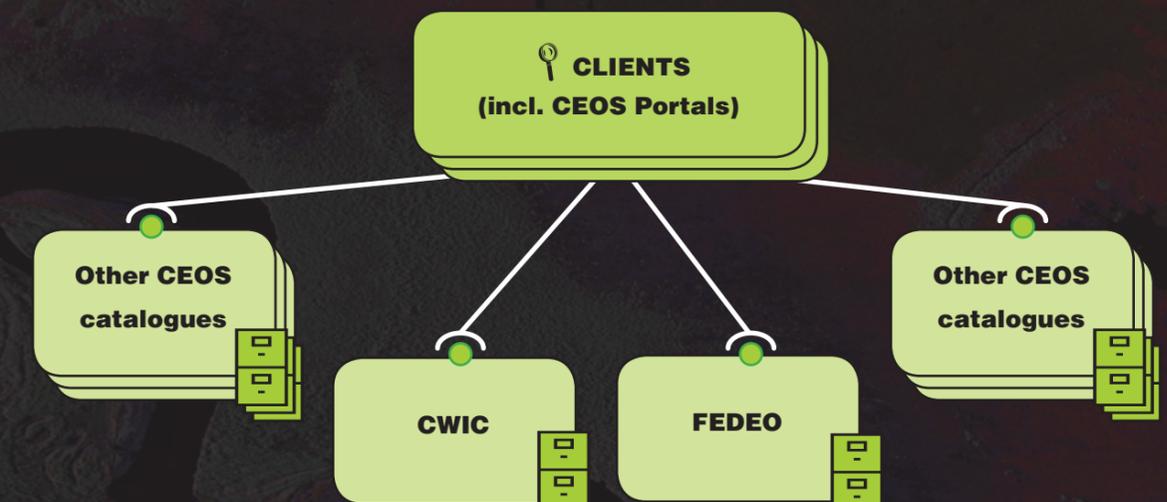
## PURPOSE

The CEOS OpenSearch Project aims to increase the level of interoperability among CEOS systems interfaces by:

- Promoting the use of the CEOS OpenSearch by Earth observation data providers as a means of improving data discovery
- Collecting the expectations and requirements of data providers interested in OpenSearch implementation
- Removing ambiguity in implementations where possible
- Facilitating the aggregation of data search results from disparate Earth data providers via OpenSearch common standards
- Enabling clients to access search engines via an OpenSearch Description Document (OSDD) without prior knowledge of or experience using the interface
- Facilitating smooth integrations between related OpenSearch implementations, such as a dataset resource collection that refers to granule resource collections from another provider



Data Warehouse- Product Search Capability



CEOS OpenSearch



# CEOS OpenSearch Project



# Technology Exploration Interest Group

## RESULTS

The CEOS OpenSearch project did not attempt to define a new standard, but rather, leveraged existing international guidelines to produce both a CEOS OpenSearch Best Practice and a CEOS OpenSearch Developer Guide. Current versions of these documents can be found on the WGISS website.

### CEOS Open Search Best Practice Guide

Objective: to collect and describe requirements about the OpenSearch interface, while remaining as implementation/technology independent as possible. This document provides server implementation best practices for the EO OpenSearch search service that facilitates standardized and harmonized access to metadata and CEOS Agency data, including that of CWIC and FedEO.

### CEOS Open Search Developer Guide

Objective: to provide guidelines for the implementation of an OpenSearch search engine aligned with the Open Search Best Practice requirements.

## PURPOSE

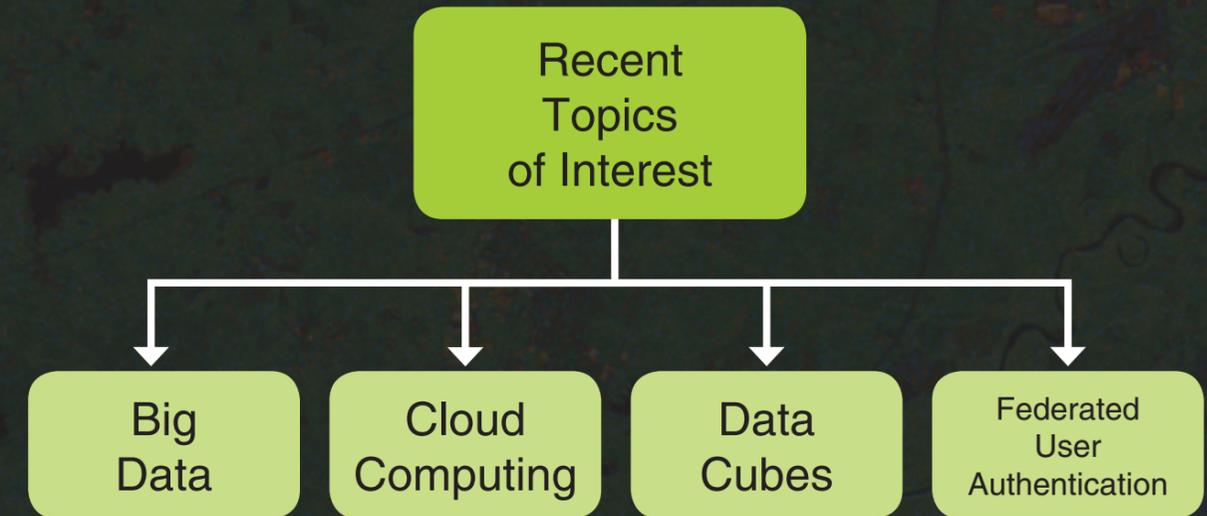
To serve as a forum for exchanging technical information and lessons-learned experiences about current and trending software technologies, services, and other internet-related software technologies.

Primary goals include:

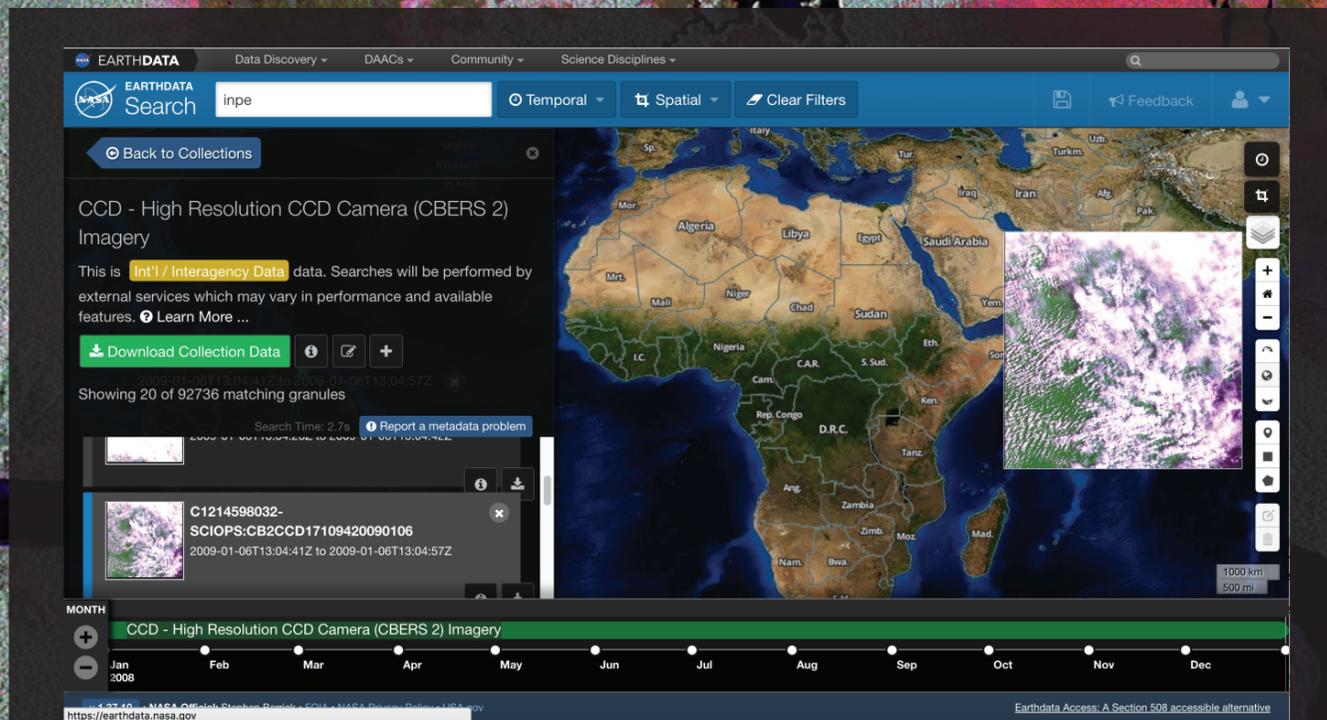
- Providing CEOS/WGISS Agencies opportunities to collaborate and discuss current and future technology solutions
- Researching technologies that can help the Earth observation community be flexible and adaptable in their IT infrastructure
- Facilitating CEOS/WGISS understanding of all generations of technology and supporting the implementation of both legacy and leading edge technologies into Earth observation data systems
- Promoting technologies in CEOS/WGISS that prove beneficial to the Earth observation community

Recent topics of interest: Big Data, Cloud Computing, Data Cubes, Federated User Authentication

## Technology Exploration Interest Group



Technology Exploration Interest Group



CEOS OpenSearch Screenshot