The GSICS Collaboration Servers - a Vehicle for the International Collaboration

P. Miu[1] & H. Rothfuss[1]
on behalf of the GSICS Data Working Group

(1) EUMETSAT

Global Space-based Inter-Calibration System (GSICS)

What is GSICS?

- Global Space-based Inter-Calibration System
- Initiative of CGMS and WMO
- An effort to produce consistent, well-calibrated data from the international constellation of operational meteorological satellites

What are the basic strategies of GSICS?

- Best practices/requirements for prelaunch characterisation (with CEOS WGCV)
- Improve on-orbit calibration by developing an integrated inter-calibration system

This will allow us to:

- Improve consistency between instruments
- Produce less bias in Level 1 and 2 products
- Retrospectively re-calibrate archive data
- Better specify future instruments

GSICS Global Space-based Inter-Calibration System

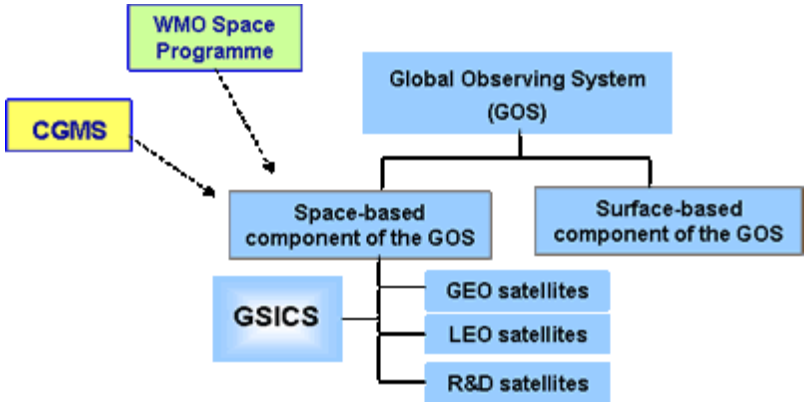
EUMETSAT CNES JMA

NOAA CMA KMA

ISRO NASA WMO

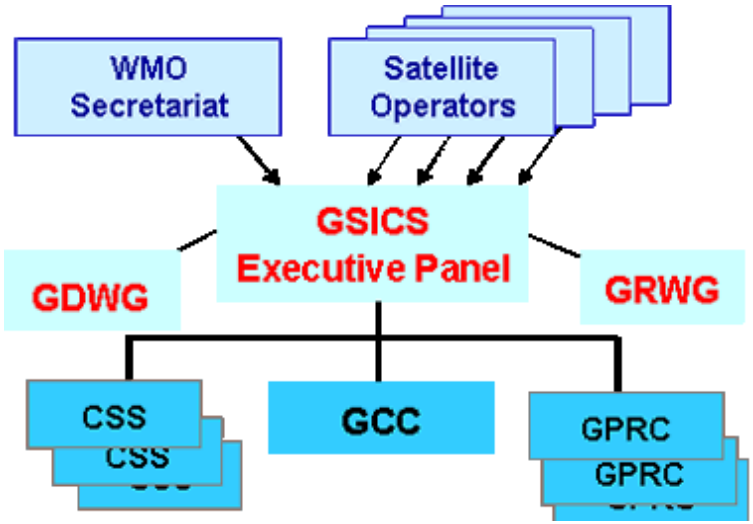
NIST JAXA

GSICS Organisation



GSICS as an element of the space-based component of the Global Observing System

- **Organizations contributing to GSICS:**
  CMA, CNES, EUMETSAT, ISRO, JAXA, JMA, KMA, NASA, NIST, NOAA, WMO
- Overseen by GSICS Executive Panel
- Assisted by Research Working Group (Algorithms) and Data management Working Group (Servers, Formats)
- **GSICS activities rely on:**
  - GSICS Coordination Centre (GCC) operated by NOAA/NESDIS
  - Processing & Research Centres (GPRC) operated by each satellite operator
  - Calibration Support Segments (CSS) including field sites and laboratories



Calibration Support Segments (reference sites, benchmark measurements, aircraft, model simulations)

Regional Processing Research Centers at Operational Space Agencies

GSICS Collaboration Servers: What are they?

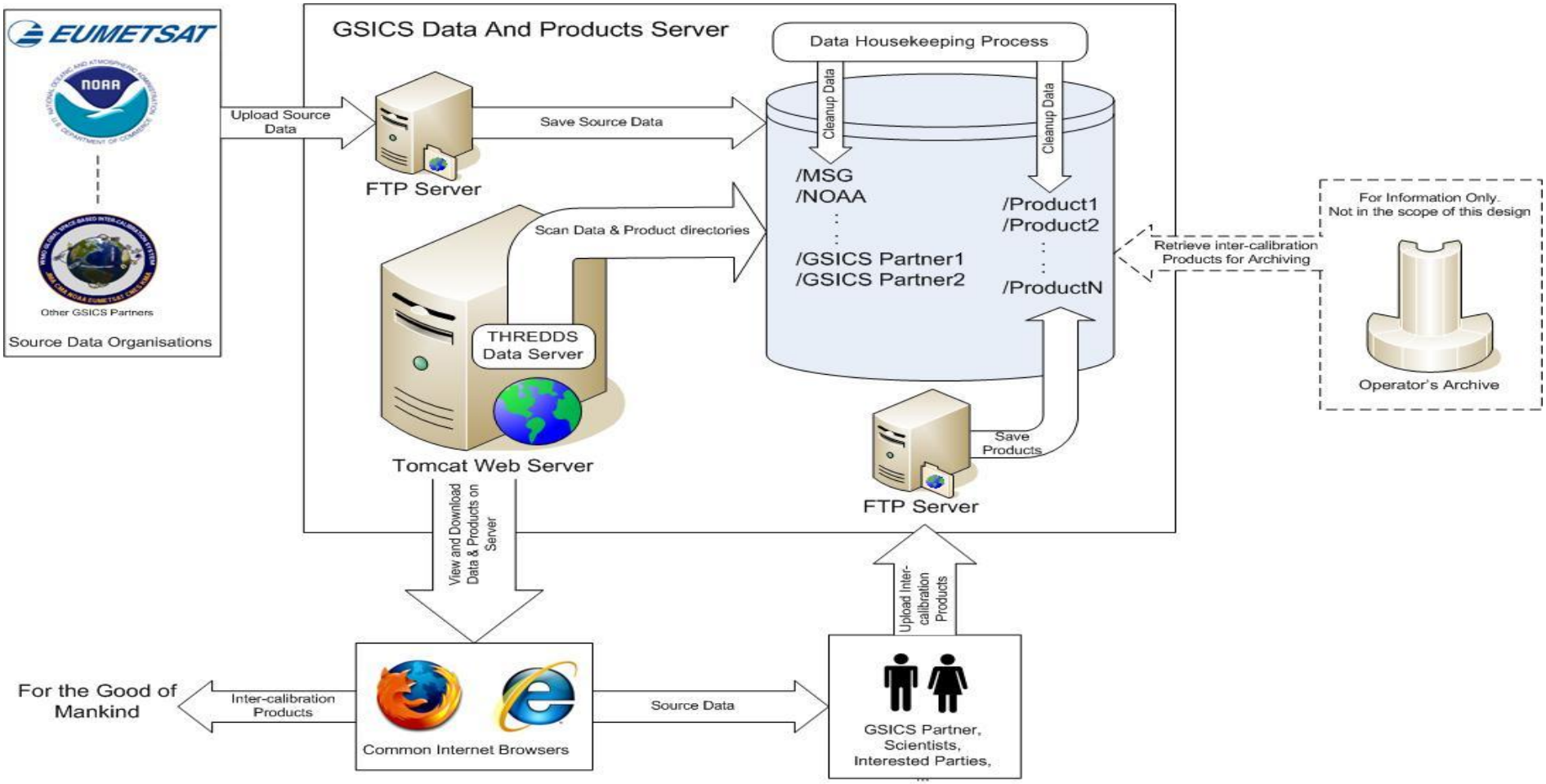
What are the GSICS Collaboration Servers?

- The servers are also known as Data and Product Servers.
- They provide a set of services for the GSICS user community to support data exchange and access to relevant products used in the calibration of satellite data.

Who has implemented one of these servers?

- EUMETSAT has a fully operational server, receiving comparable satellite data sets from EUMETSAT and JMA. The first sets of demonstration GSICS products generated from these data sets are on the server for validation by experts in the GSICS community.
- NOAA has implemented a GSICS server providing a redundancy node for the GSICS collaboration servers network. Currently the server pulls data and products from the EUMETSAT GSICS server.
- Both JMA and CMA are in the process of implementing their own GSICS servers to be part of the GSICS collaboration servers network.

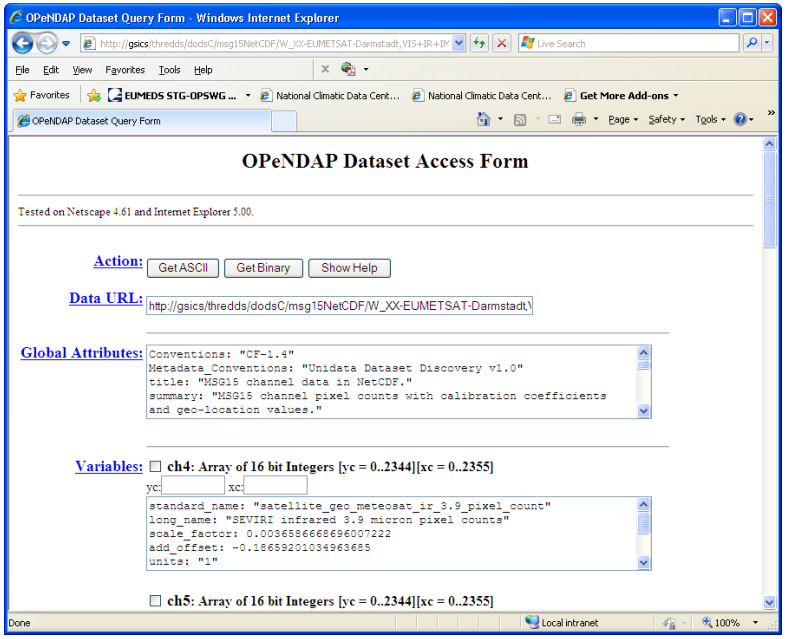
GSICS Data and Products Server:
High Level Design



GSICS Data and Products Server: Services for Data Access

Available services to access the data on the Servers

- Catalogue generation using THREDDS
  - (listing of directories, listing of files in directories, providing metadata of directories and files)
- Data download using THREDDS
  - http download
  - ftp download
- Data upload (restricted to GPRC's)
  - ftp upload (filename based cataloguing, rolling Archive)
- File content access using OPenDAP
  - Access in ASCII
  - Access in Binary



Planned Service in future:

- Visualisation using OGC WMS / WCS

User registration to receive update info

GSICS Data and Products Server:
What has been done so far

- The GSICS Data Working Group (GDWG) provides the technical expertise in supporting the infrastructure to the GSICS project.
  The GDWG has implemented the following:

- Collaboration Servers design, implementation and operations.
  - **GSICS Data Management Server User Guide**, Draft.
  - **GSICS Data Management Server Operations Service Specification** (and supporting documentation) Action GDWG 03_22, Draft.
  - **EUMETSAT Archive NetCDF Format Proposal**, Draft.

- GSICS has adopted the netCDF file format for data storage with a set of conventions and instructions that GSICS files need to follow, e.g.
  - CF metadata convention version 1.4
  - Standard names for GSICS variables (e.g. Satellite_scan_angle; collocation_time_difference; ...)
  - Mandatory metadata for files: "global attributes" (e.g. Title, Institution...)
    for variables: "variable attributes" (e.g. Standard_error, units...)

  For best practices how to store and organise data in a NetCDF file, refer to GSICS WIKI

GSICS Data and Products Server:
What has been done so far

- GSICS has adopted the **WMO GTS File Naming Convention**. The standard format for all GSICS data set and product names facilitates a clear identification of their origin and content and is important in the maintenance of the infrastructure (e.g. File upload).

- Examples of file names:
  - Source file:
    W_XX-EUMETSAT-Darmstadt,VIS+IR+IMAGERY,MSG2+SEVIRI_C_EUMG_20100908213010.nc

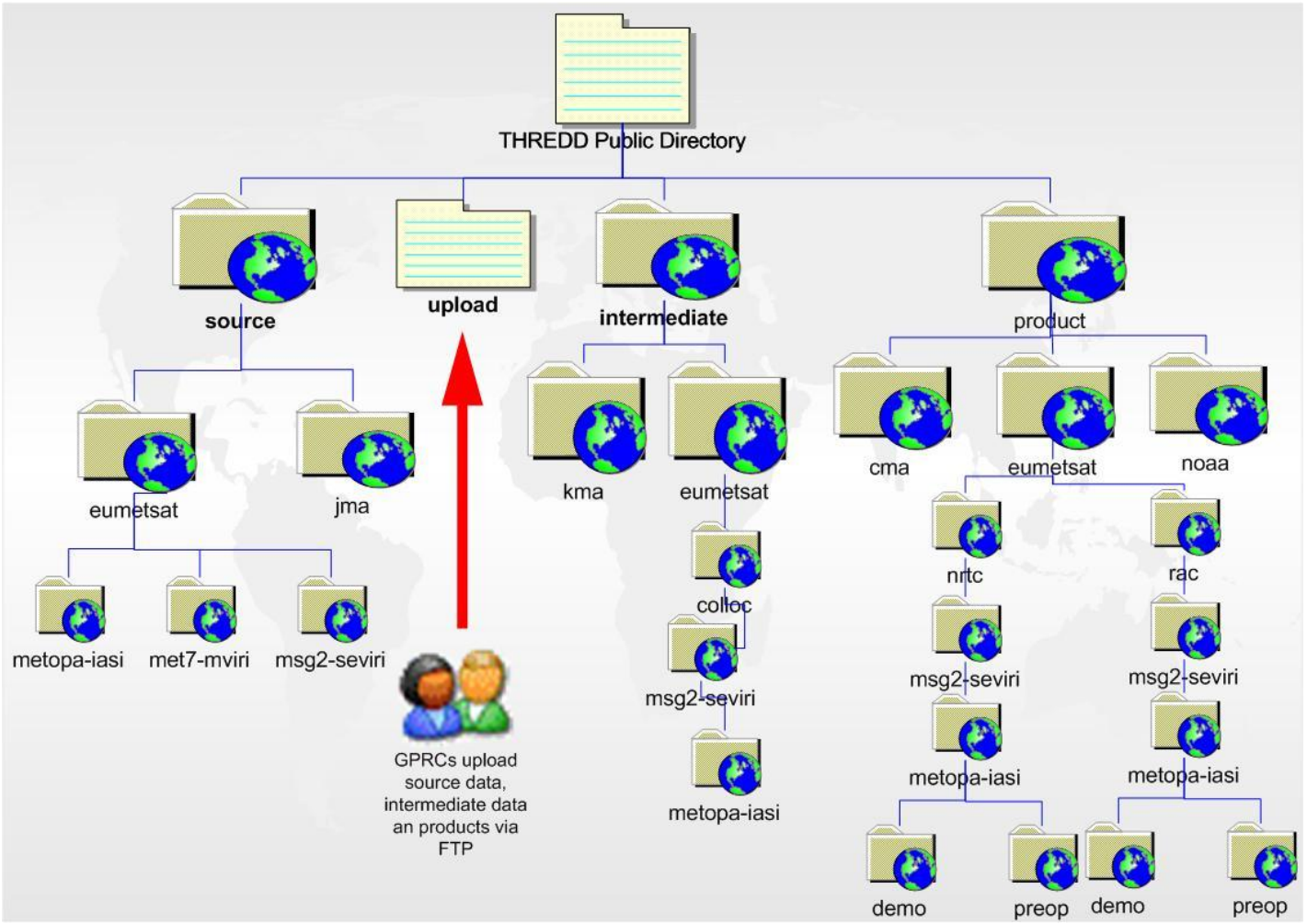
    means: a MSG2 Image file from EUMETSAT acquired on 2010-09-08 21:30 UTC

  - Product file:
    W_XX-EUMETSAT-Darmstadt,SATCAL+RAC,MET7+MVIRI-MetOpA+IASI_C_EUMG_20100907000000_demo_03.nc

    means:
    A file originating from EUMETSAT, containing Reanalysis correction coefficients for the Meteosat-7 MVIRI (monitored) Instrument derived from comparisons with the Metop-A IASI (reference instrument). The coefficients validity period starts at 2010-09-07 00:00:00Z. The file's data is in the demonstration phase and its major version number is 3.

GSICS Data and Products Server

Organisation of data and products



GSICS Data and Products Server

Source Data and Products

- **Comparable Source Data Sets available** on the EUMETSAT Data and Products Server:
  - MFG15 netCDF data sets
  - MSG15 (Met8, Met9) netCDF data sets (subsets)
  - MTSAT2 Imager netCDF data sets

  } 2 hour coverage / day

  - IASI 1c netCDF data sets

- **First products available** on the Server
  Members of GRWG perform comparisons between:
  - MFG15 and IASI 1c
  - MSG15 and IASI 1c
  - MTSAT2 Imager with IASI 1c and AQUA AIRS

  } In demonstration mode

- Intermediate Data Sets can be loaded onto the server to facilitate internal Cooperation and development / validation.

Data and Products Servers: Planned Activities

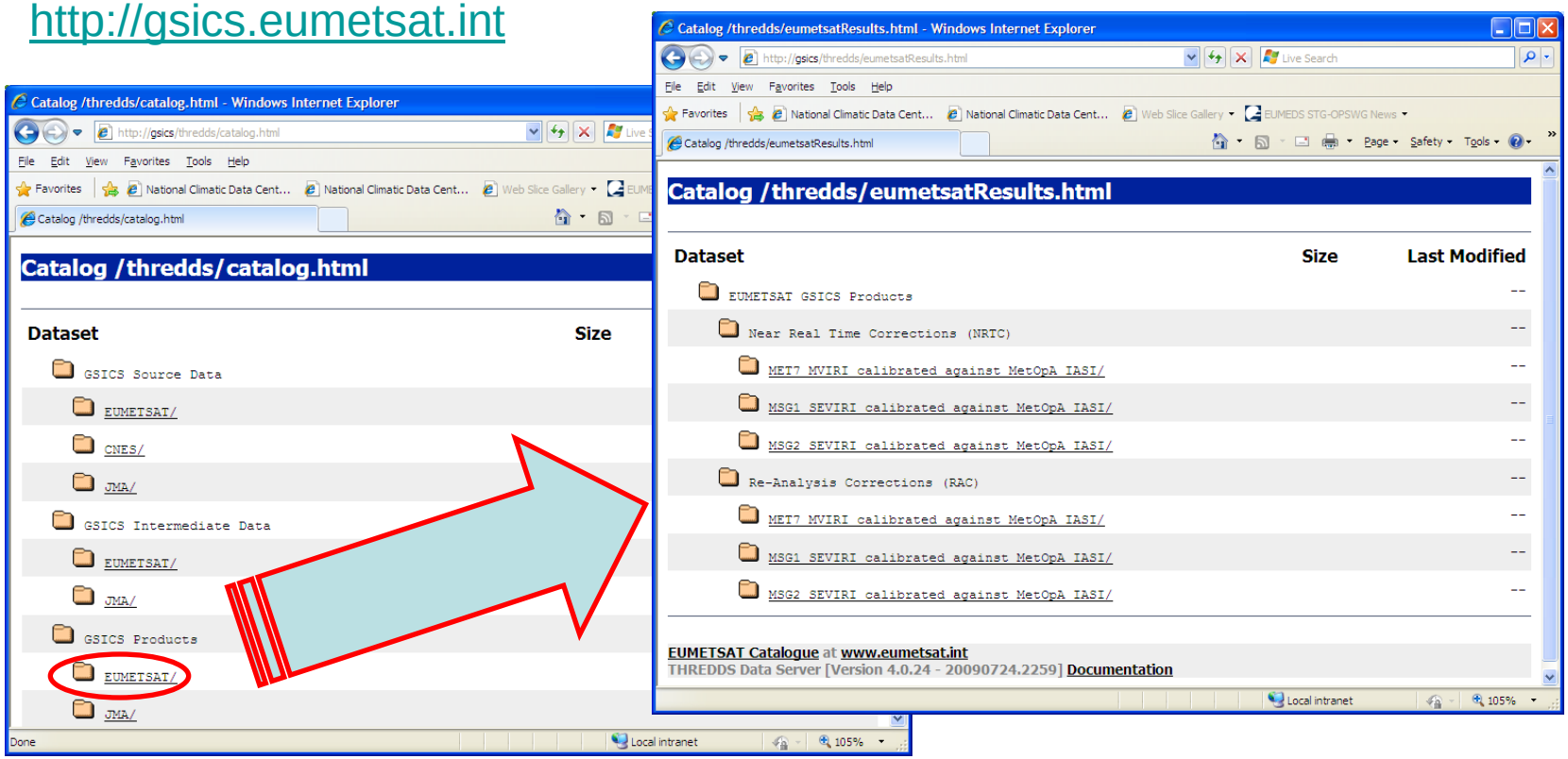
Planned activities:

- Other GPRC's to fully implement Data and Products Server
- Implement the mechanism for transfer of source data sets between GPRC data and product servers.
- Further support to the GRWG in creating GSICS correction products
- Analyse how best to improve the server's services in terms of the GSICS products created from the source data sets (e.g. automated processes for data access).
- Examine the porting of the netCDF data sets from version 3 to version 4.

GSICS Data and Products Server:
User Access - Examples

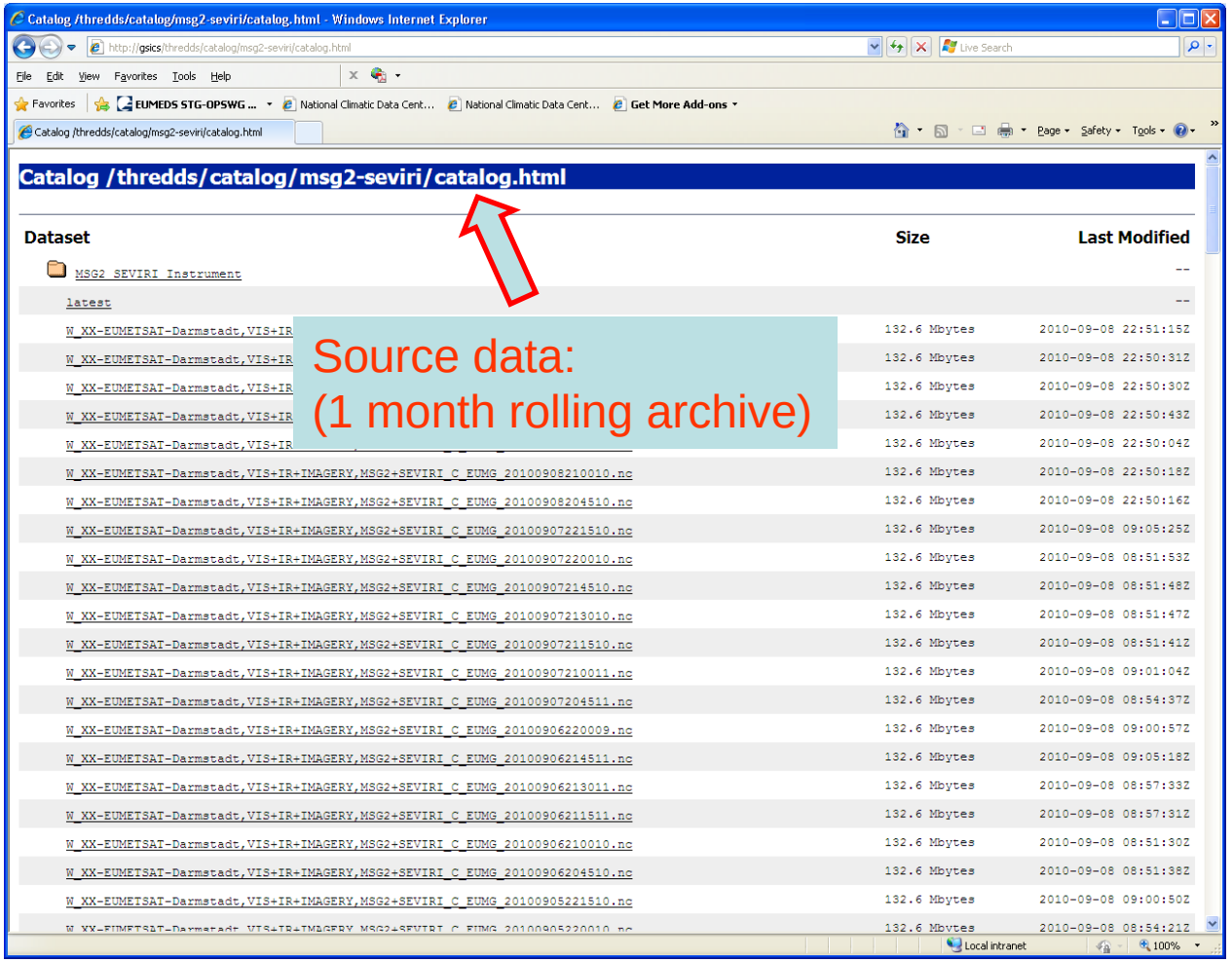
Downloading source data and products

The EUMETSAT Data and Product Server went live on the 1st April, 2009. It can be accessed via any web browser using the following URL: http://gsics.eumetsat.int



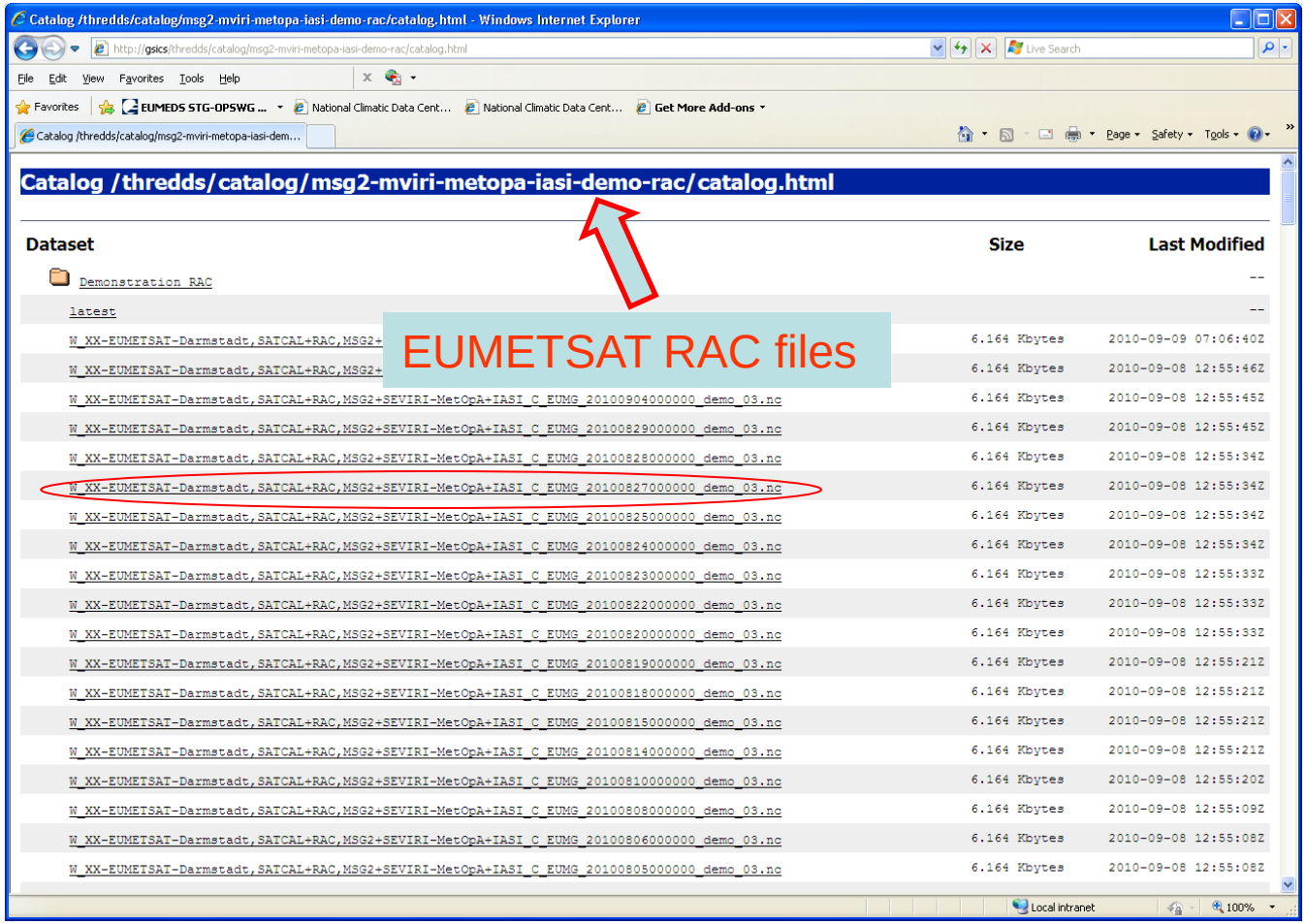
GSICS Data and Products Server:

User Access - Examples

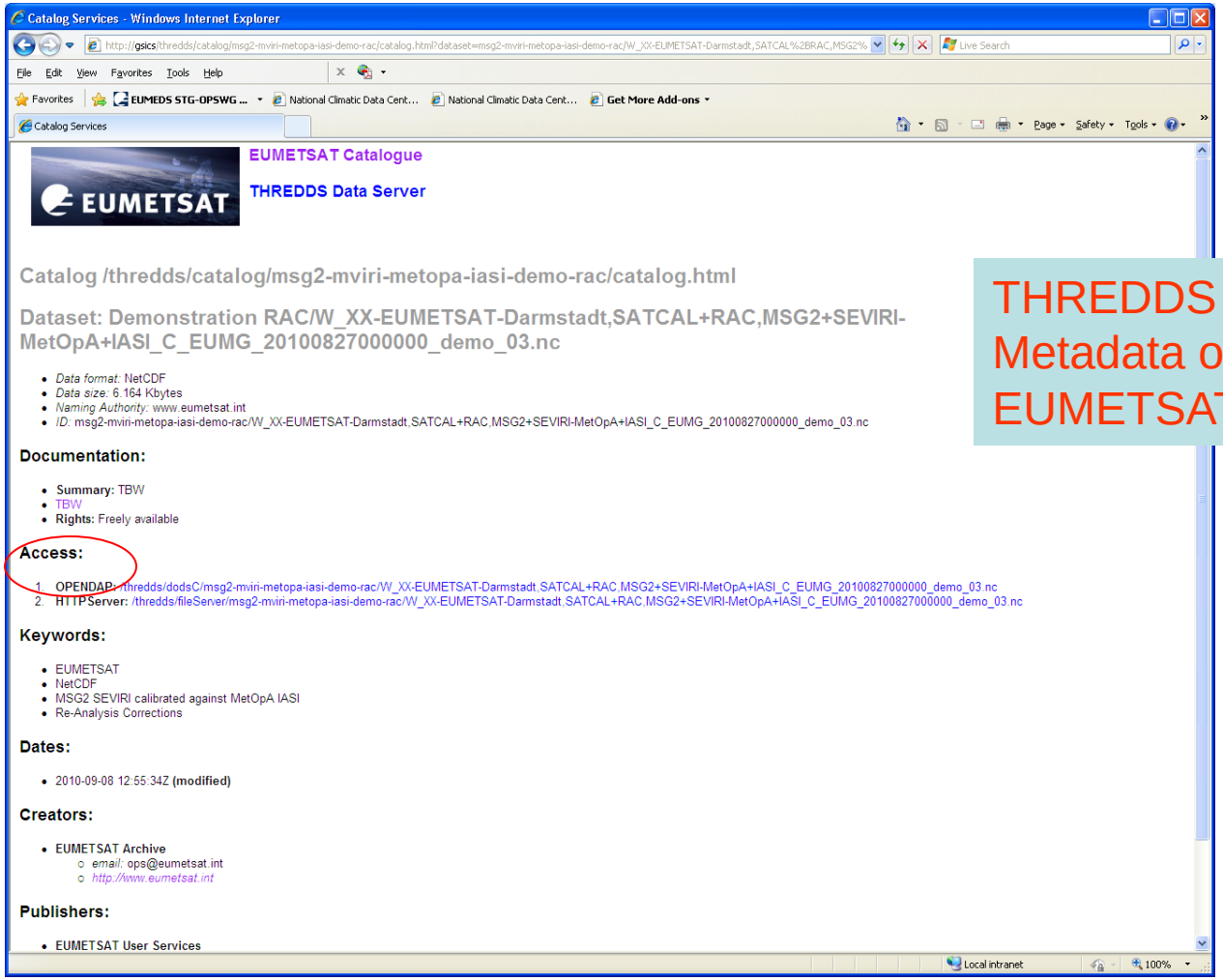


GSICS Data and Products Server:

User Access - Examples



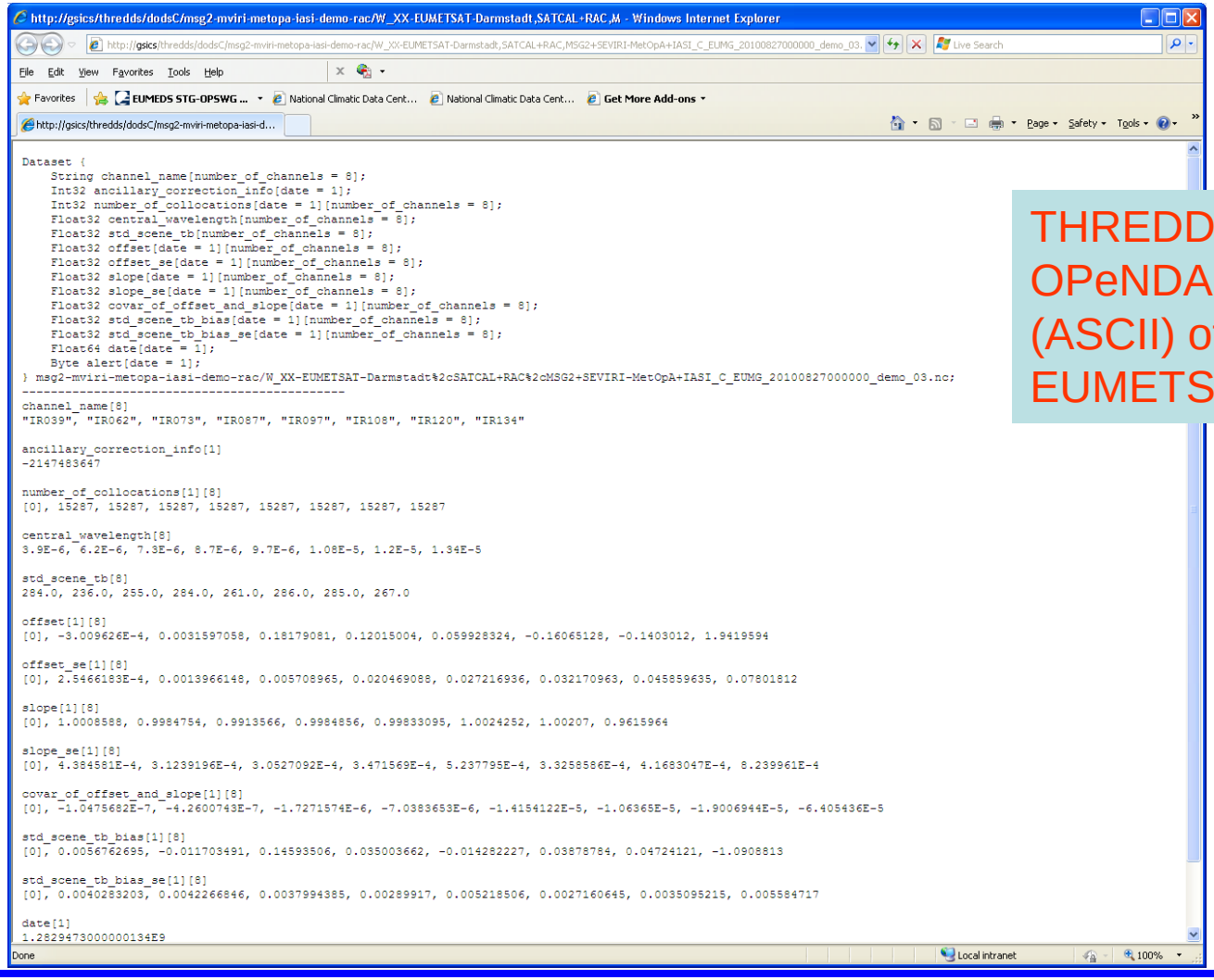
GSICS Data and Products Server:
User Access - Examples



THREDDS defined Metadata of selected EUMETSAT RAC file

GSICS Data and Products Server:

User Access - Examples



THREDDS enabled OPeNDAP access (ASCII) of selected EUMETSAT RAC file

End of Presentation

Thank you for your attention

http://gsics.wmo.int

http://gsics.eumetsat.int

https://cs.star.nesdis.noaa.gov/GSICS/WebHome