



# GEONETCast

**GEONETCast - delivering  
environmental data to users  
world wide**

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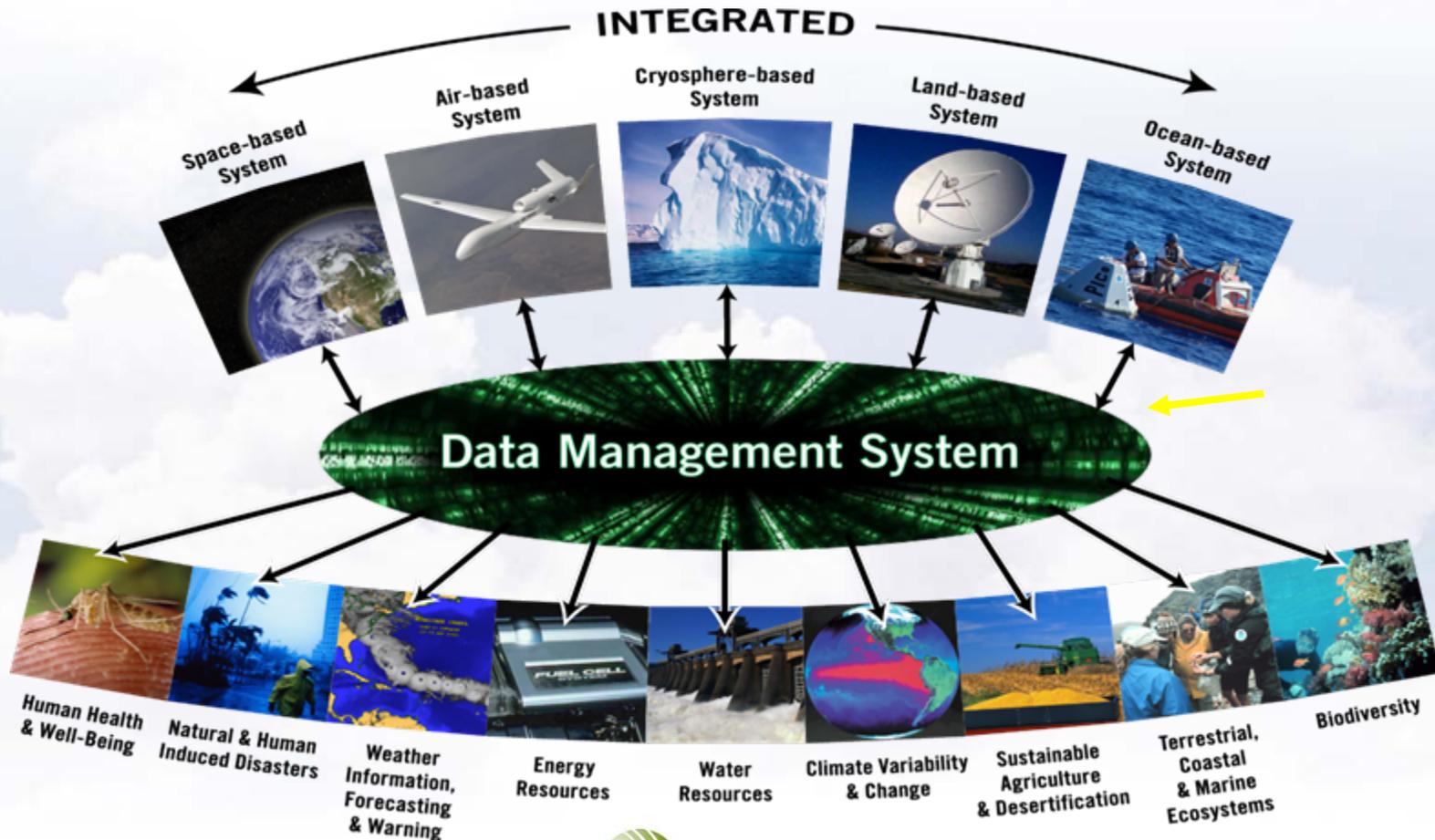


# GEONETCast

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  - GEONETCast Americas
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  - EUM – NOAA
- Global Village

# GEONETCast

## Global Earth Observation System of Systems (GEOSS)



# GEONETCast — what is it?

- A network of dissemination systems providing global delivery of environmental data to Users worldwide;
- Environmental data can be satellite, in-situ or airborne related to any of the 9 GEO SBAs;
- Based on IP over DVB satellite infrastructure;
- Highly scalable infrastructure using open standards and commercially available content delivery platforms;
- Allows the usage of off-the shelf, inexpensive equipment for reception.

**GEO – Group on Earth Observation**  
**SBA – Society Beneficial Area**

# GEONETCast — the link with GEO

- GEONETCast is a Capacity Building task which reports to the Architecture and Data Committee – POC is Linda Moodie at NOAA;
- GEO Data Access workshop at CMA in October;
- GEO Plenary and Ministerial Conference in Cape Town at the end of November;
- GEONETCast is represented in the GEO Report on Progress;
- An article is being prepared for the GEO Book;
- Several papers have been submitted e.g. to IEEE
- One of the significant evolutions in GEONETCast over the last year is the integration of FENGYUNCast.

# GEONETCast — the systems

- ***EUMETCast***, operated by EUMETSAT, providing coverage of Europe, Middle East, Africa and the Americas;
- ***FENGYUNCast***, operated by CMA, providing coverage of Asia/pacific region;
- ***GEONETCast Americas***, operated by NOAA, soon to provide coverage of the Americas (due to enter initial operations Nov/Dec '07);

# GEONETCast – Implementation Group

- The **Implementation Group** consists of CMA, EUMETSAT, NOAA and WMO, + Russia to join;

The operational **GEONETCast Implementation Group** is responsible for managing the demonstration and implementation activities.

It is based on a flexible arrangement which is currently open to additional infrastructure providers and operators.

The constitution of this group could be adjusted to reflect additional contributors and major participants as the **GEONETCast** demonstration and implementation evolves.

- The implementation group meets via telephone conference every two weeks at 14:00 UTC

# GEONETCast — Basic Documents

- Set of basic GEONETCast documents describes scope of activities:
  - Implementation Plan
  - Global Design
  - Product Guide
- Currently working on a draft ‘GEONETCast Partnership Agreement’;
- And an Interface Document for Data Exchange between Network Centres (GNC)

# GEONETCast — Standards

## STANDARDS

### - Overview

GEONETCast consists of a number of major components:

- Existing dissemination infrastructure;
- Data Providers/Sources;
- The global environmental User community.

Three regional systems are seen as the minimum required to establish global geographic coverage. Should additional regional systems be made available, the GEONETCast concept is flexible and scalable enough to easily accommodate them.

# GEONETCast — Standards

## - Service Standards

- Each regional system provides a single entry point – known as a Network Centre;
- The Network Centre can be linked together to provide data exchange between Network Centres;
- Each Network Centre should provide connectivity and system capacity to Data Providers from all GEO Societal Benefit Areas within the region;
- Each Network Centre should provide bandwidth to support data dissemination from outside the region;
- Network Centre operators are responsible for managing and interfacing with Users in coordination with Data Providers located within the region;
- Network Centre operators are responsible for managing and interfacing with Users in coordination with the other Network Centre operators acting in place of Data Providers of the other regions.

# GEONETCast — Standards

## -Technical Standards

At the technical level, a number of standards have emerged as forming the baseline for dissemination systems which contribute to the GEONETCast infrastructure:

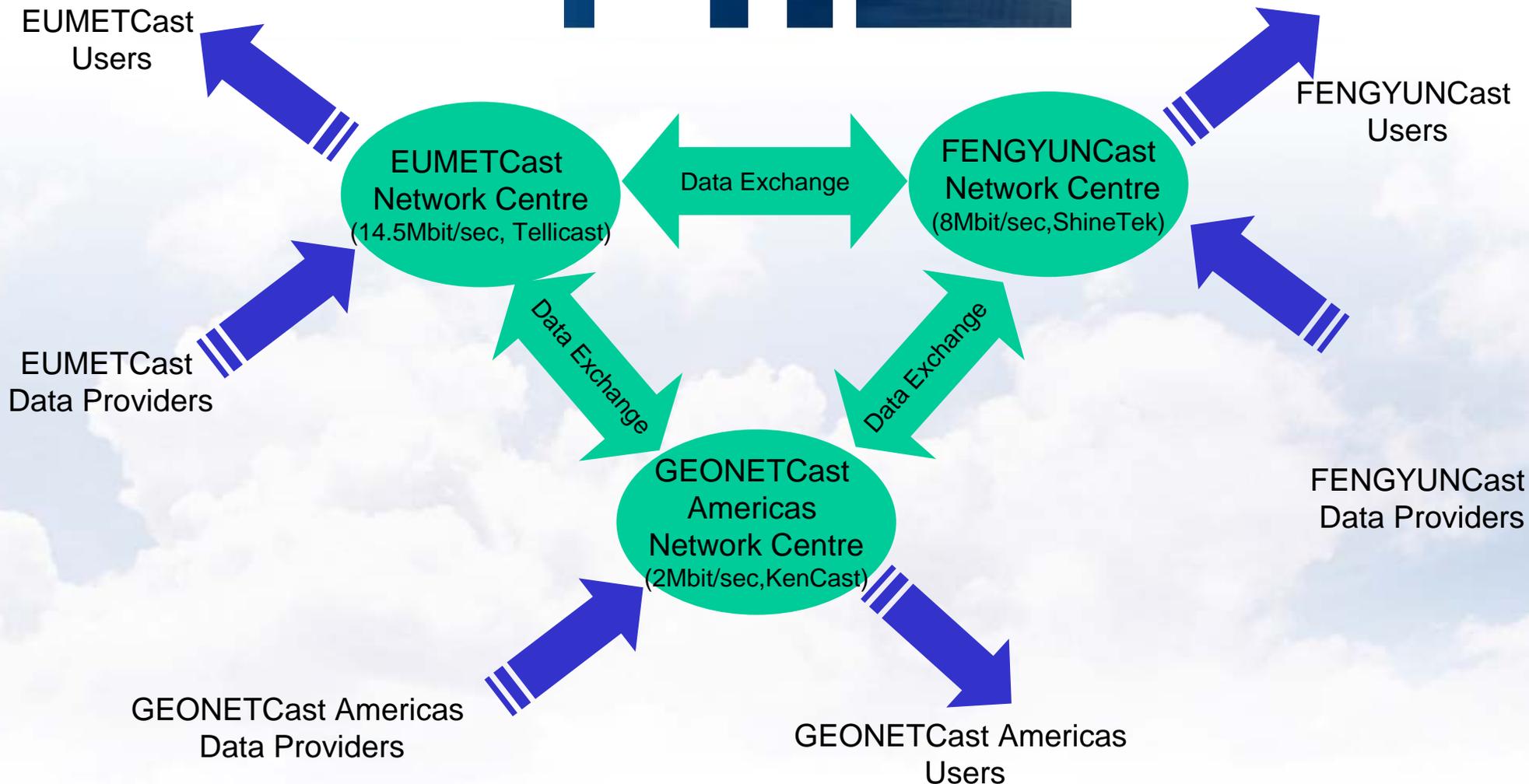
- Contributing dissemination systems should be generic, multi-service dissemination systems, based on standard Digital Video Broadcast (DVB) technology;
- Using commercial broadcast channels on television, direct-to-home (DTH) telecommunication satellites;
- Utilising commercial, off-the-shelf, commonly available reception equipment;
- Using Internet Protocol (IP) over DVB standard coding;
- Systems should support transparent transfer of files – files should be received exactly as sent;

# GEONETCast — Standards

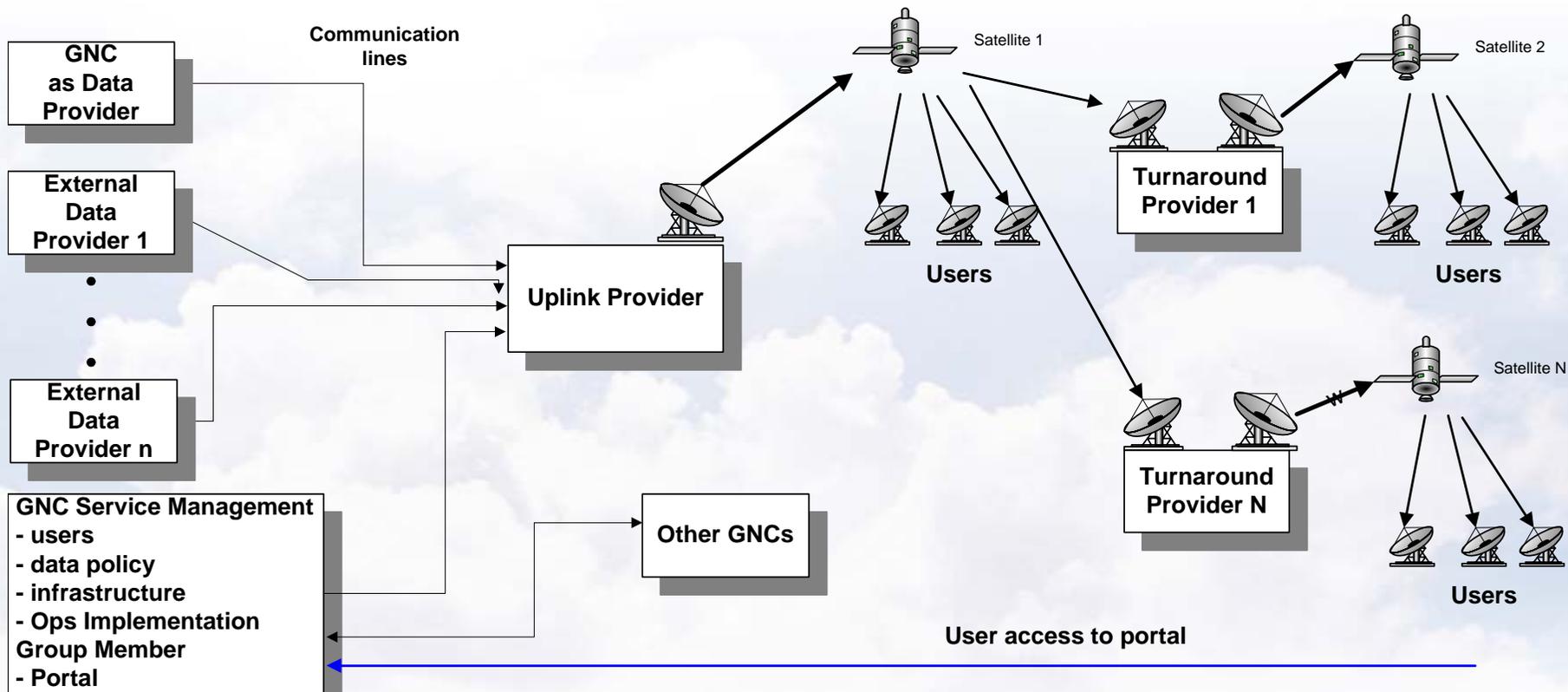
## -Technical Standards..continued

- Use of standard, openly described file formats is encouraged – examples currently in use are L/HRIT, BUFR, GRIB, HDF, netCDF;
- Contributing systems should provide secure access control at individual file and User level;
- The systems should be open, flexible, and scalable at both the Network Centre and User Terminal level;
- Quality of service should be ensured and regularly monitored;
- Catalogues of transmitted data should be maintained and made available for consultation by Users in order to facilitate data discovery and subscription;
- Dissemination should be organised in multiple multicast channels corresponding to product categories, which are associated with Programme Identifiers (PID).

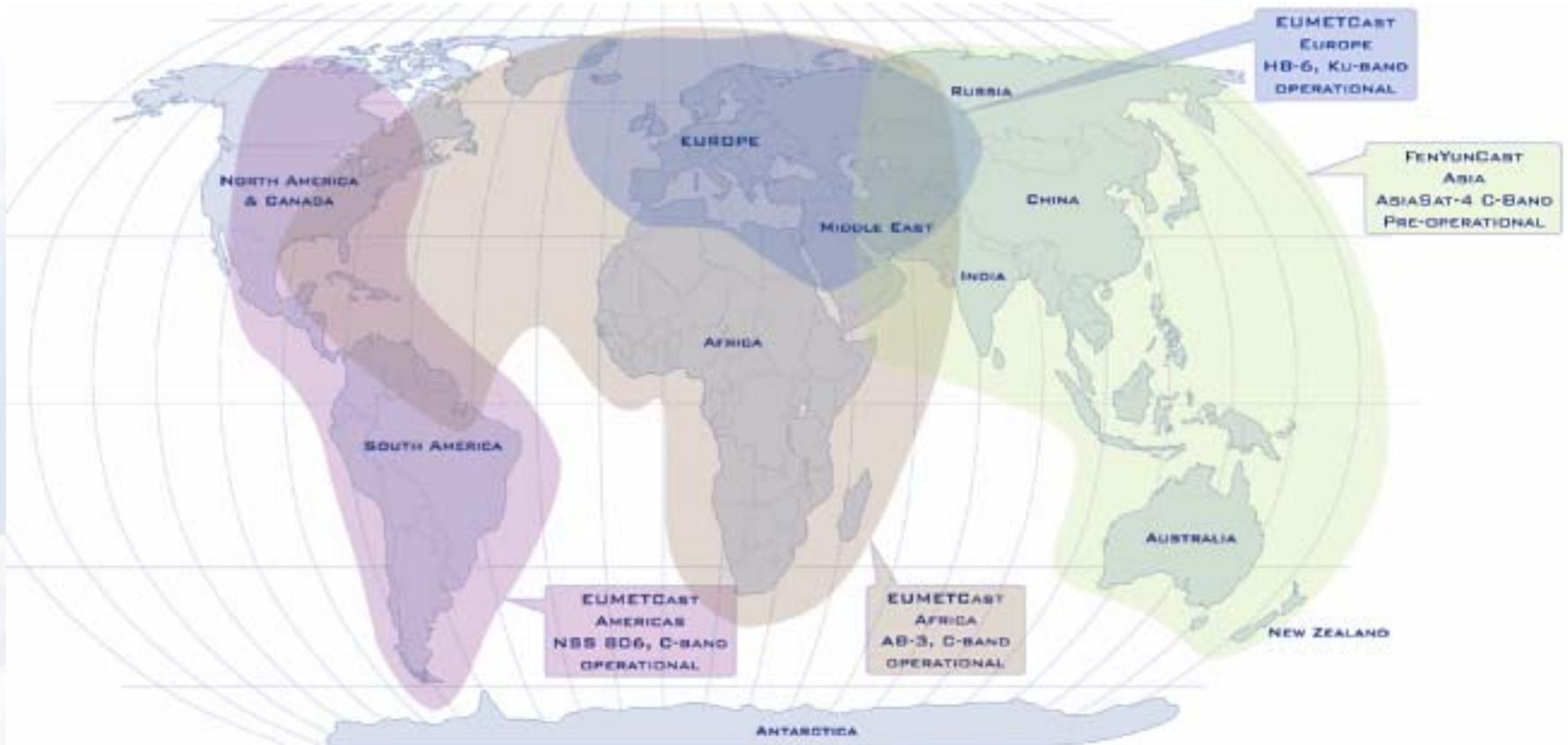
# GEONETCast – A model for data interoperability



# GEONETCast – System Design

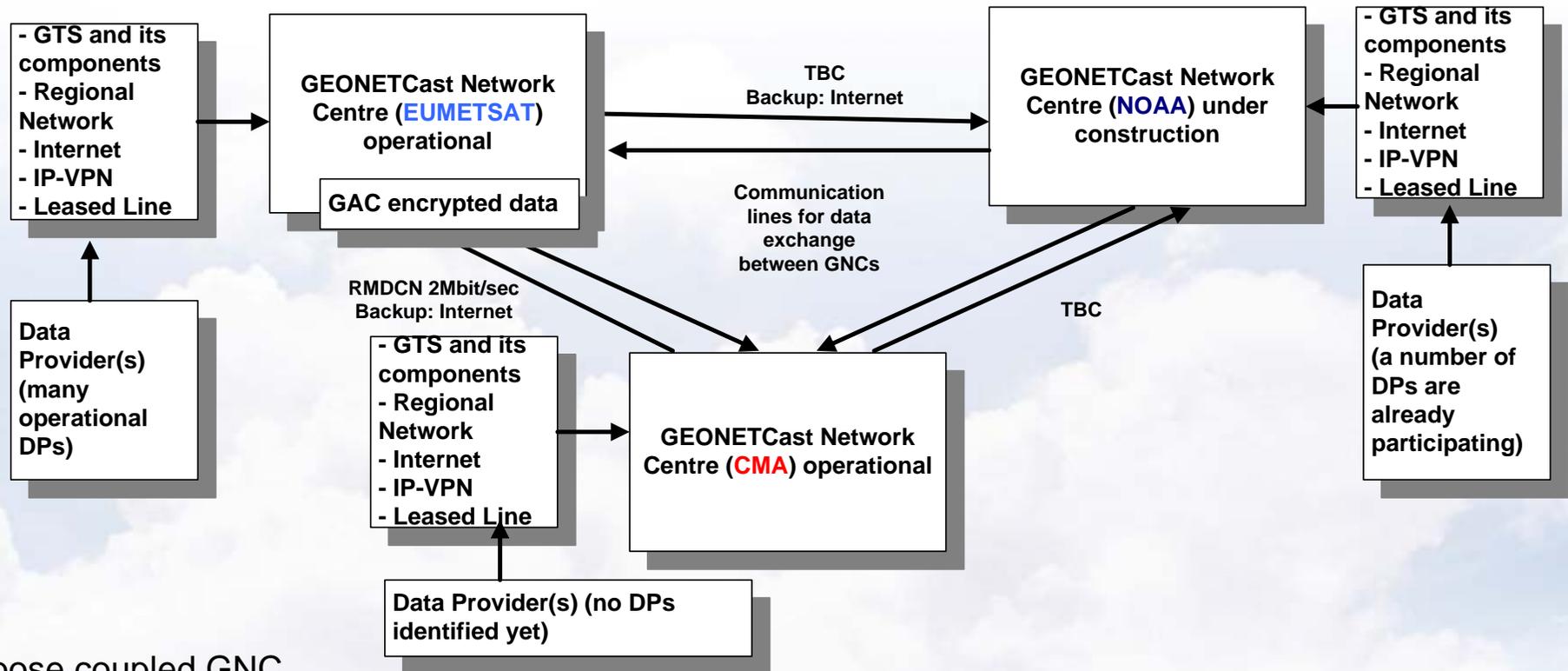


# GEONETCast – System Design



- Coverage = 99% of the populated world
- Nearly simultaneous data availability across coverage

# GEONETCast – Data Exchange



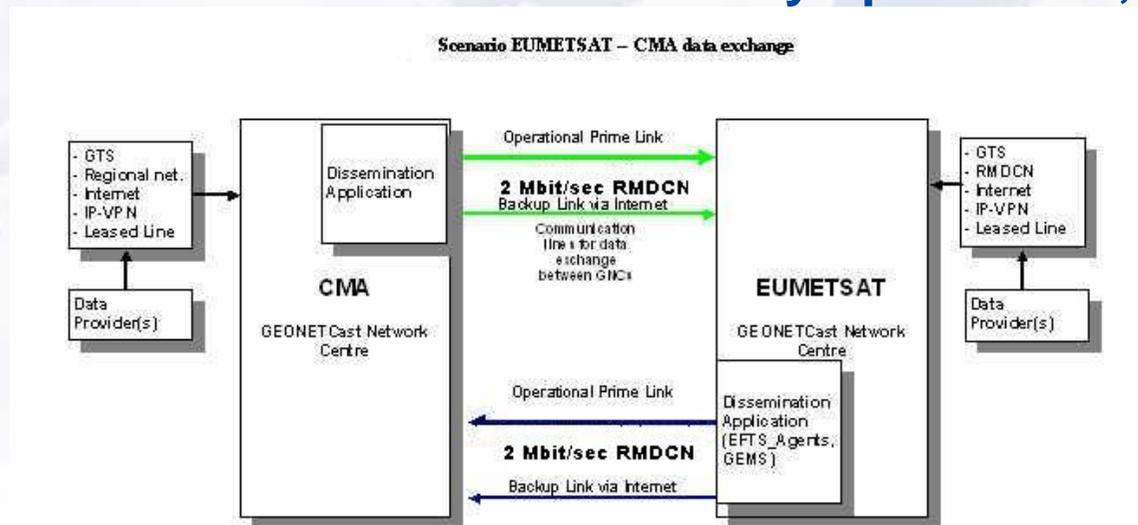
- Loose coupled GNC
- Maximum re-use of existing infrastructure
- Data exchange via bi-lateral business-to-business relation and encryption (GAC) of own data

GAC = GEONETCast Access Control

# GEONETCast – Data Exchange

As part of the GEONETCast design, links have been established between Network Centres:

- The NOAA data providers - EUMETSAT link uses the Internet;
- The CMA-NOAA link is yet to be put in place;
- The **CMA-EUMETSAT** link uses the RMDCN with Internet back-up and can be considered **technically operational**;



# GEONETCast — Data Exchange

- This configuration is currently under further operational validation, and seems to be working stable;
- The ongoing tests do not involve dissemination via the multicast systems yet;
- A number of technical (bandwidth, timeliness, data formats) and legal issues (data policy, encryption, user registration) need to be addressed as we progress towards enabling dissemination.

RMDCN – Regional Meteorological Data Communication Network (WMO RA-6)

# GEONETCast — CMA -> EUM list

	<b>Dataset/Product</b>	<b>Volume</b>
1	FY-2C Nominal data (hourly data)	215 MB/hr
2	Sandstorm image (hourly data)	982 KB/hr
3	FY-2C Atmospheric Motion Vectors (IR, WV 6 hourly)	600 KB/6hr
4	Precipitation estimate (6 & 24 hourly data)	1MB/product
5	FY-2C Black body brightness temperature (hourly, daily, 5 days, 10 days, monthly data)	1MB/product
6	Total cloud cover (hourly data)	1MB/hr
7	Precipitable water from a clear sky (3 hourly data)	1MB/hr
8	Surface incidence solar radiation (daily data)	30KB/day

# GEONETCast — CMA -> EUM list

	<b>Dataset/Product</b>	<b>Volume</b>
9	Cloud land moisture profile (3 hourly data)	1MB/3hr
10	Cloud type (hourly data)	1MB/hr
11	Snow cover(daily data)	33KB/day
12	Outgoing longwave radiation (3 hourly, daily, 5 days, 10 days, monthly data)	2MB/product

# GEONETCast – EUM -> CMA list

	<b>Dataset/Product</b>	<b>Availability</b>	<b>Volume</b>
1	METEOSAT 7 (VIS, WV, IR) – Data Policy applies High-resolution half-hourly data	RMDCN	18 MB/hr
2	METEOSAT 9 (VIS, HRV, WV, IR) – Data Policy applies High-rate hourly data	RMDCN	79 MB/hr
3	METEOSAT 7 Met Products AMV, CSR, UTH, CLA, SST	RMDCN (+GTS)	1.25 MB/hr

# GEONETCast — EUM -> CMA list

continued

	<b>Dataset/Product</b>	<b>Availability</b>	<b>Volume</b>
4	METEOSAT 9 Met Products: CLM, GII, AMV, CLA, CLAI, CTH, TH, TOZ	RMDCN (+GTS)	18 MB/hr
5	Other Satellite Data (GOES 11 and 12)	RMDCN	10 MB/hr
6	METOP, NOAA-18 ATOVS (HIRS, MHS, AMSU)	RMDCN (+GTS)	9.5 MB/hr
7	JASON-1 OSDR	GTS	120KB/hr
8	Auxillary data (necessary to use the data above, ProductNavigator, etc.)	RMDCN	0.5Mb/daily

# GEONETCast — Data Exchange Next Steps

## – *Establish the mechanisms to implement Data Policies:*

- Applies to EUM access-controlled satellite data (non-essential);
- Proposed solution for this data is to encrypt (GAC) the relevant datasets before sending to CMA over RMDCN;

## – *Set up a Data Exchange and Re-Distribution Agreement:*

- Iterate on a draft agreement whilst proceeding with the technical implementation;
- EUM Member States endorsement will be required.

## – *Implement “User services” at all GNC:*

- “user services” are necessary to allow users to register to GEONETCast data sets in all GNC areas
- Users of specific datasets will require:
  - Access to FENGYUNCast from CMA;
  - Access to the specific datasets from EUM in accordance with EUM Data Policy.

# GEONETCast — Product Navigator

- The Product Navigator has been developed to give Users information on environmental products;
- Target is to use it as a Data Discovery tool for all products available on GEONETCast;
- This includes all products available on FENGYUNCast;
- The navigator is currently hosted on the EUM web site;
- It is planned to also make it available directly via EUMETCast dissemination and include it into the data exchange with FENGYUNCast;
- It can be found at <http://www.eumetsat.int/products>.

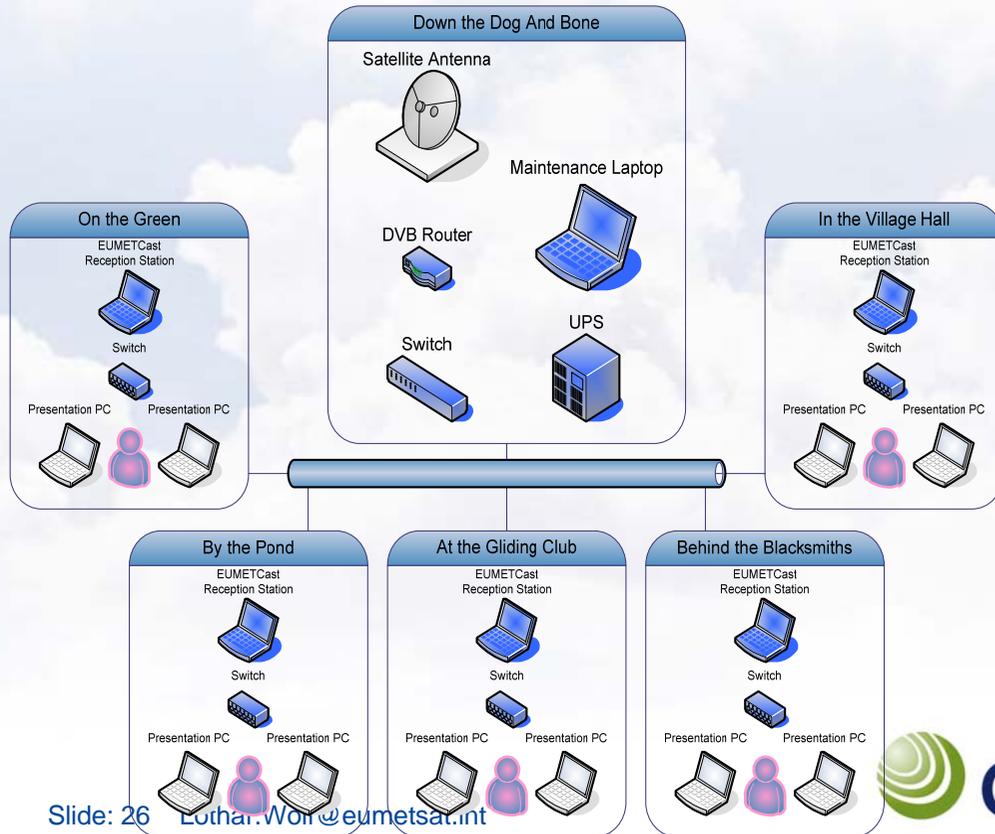
# GEONETCast — Product Navigator

The screenshot shows the 'EUMETSAT Data and Products Navigator' web application. The browser window title is 'EUMETSAT Data and Products Navigator - Microsoft Internet Explorer'. The address bar shows 'http://www.eumetsat.int/products/indexer.html'. The page header features a banner with the text 'The Product Navigator Environmental Satellite Data, Products and Software'. Below the banner are navigation links: 'Product Navigator Home', 'Navigator User Manual (pdf, 21 KB)', and 'EUMETCast channels (pdf, 13 KB)'. A search bar is present with the text 'Search by words' and a 'Search!' button. Below the search bar are several filter dropdown menus: 'Type' (set to '--all--'), 'Societal Benefit' (open dropdown showing options like Agriculture [24], Biodiversity [14], Climate [92], Disasters [7], Ecosystems [5], Energy [5], Health [5], Water [31], Weather [178]), 'Product Provider' (set to '--all--'), 'Parameter' (set to '--all--'), 'Coverage' (set to '--all--'), 'Dissemination' (set to '--all--'), and 'Product Status' (set to '--all--'). There is a 'Reset' button and a 'Show Un...' checkbox. Below the filters, it says '205 results found' and 'Pages: 1 2'. A pagination bar shows numbers from 7 to 26. The main content area displays two product entries. The first entry is titled '1D-Var retrieval packages' and includes details for 'Product Provider' (NWP SAF), 'Societal Benefit Area' (Weather, Climate), and 'Product Status' (Operational). The second entry is titled 'Active Fire Monitoring (FIR)' and includes details for 'Product Provider' (EUMETSAT), 'Societal Benefit Area' (Disasters, Agriculture), and 'Product Status' (Operational). The browser's taskbar at the bottom shows the Windows Start button, the current application 'EUMETSAT Data and ...', and the system clock '08:31'.

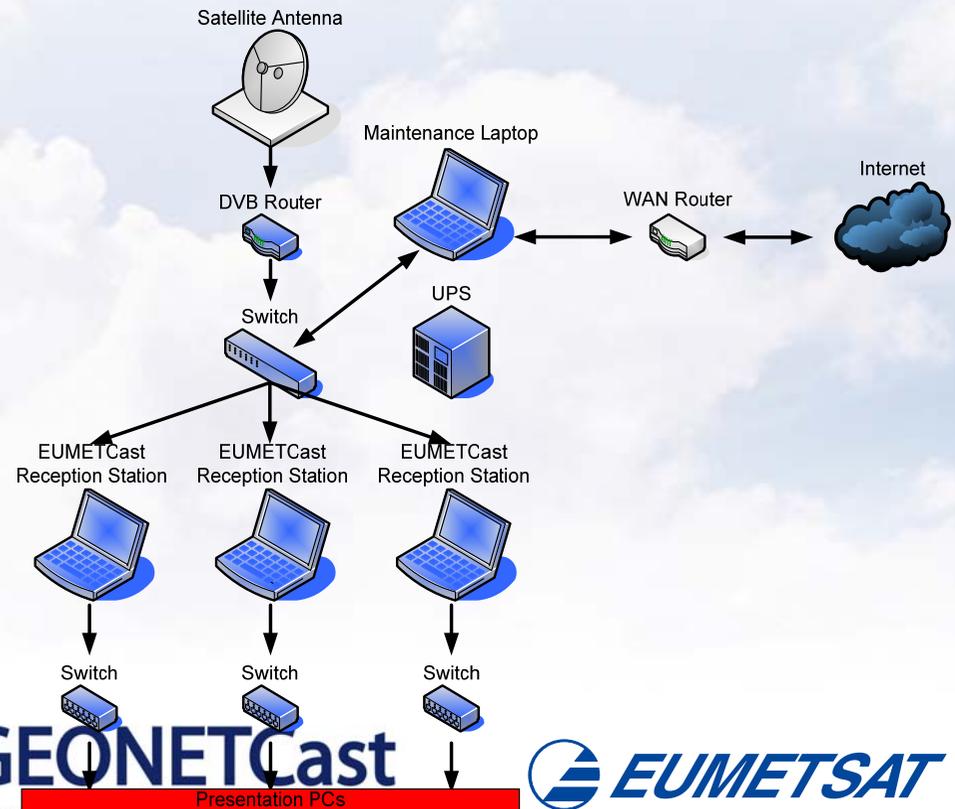
# GEONETCast – Global Village

- “GEONETCast Global Village”
- Providing real-time reception of GEONETCast data and visualisation of sample products linked to all SBAs

GEONETCast Global Village Presentation

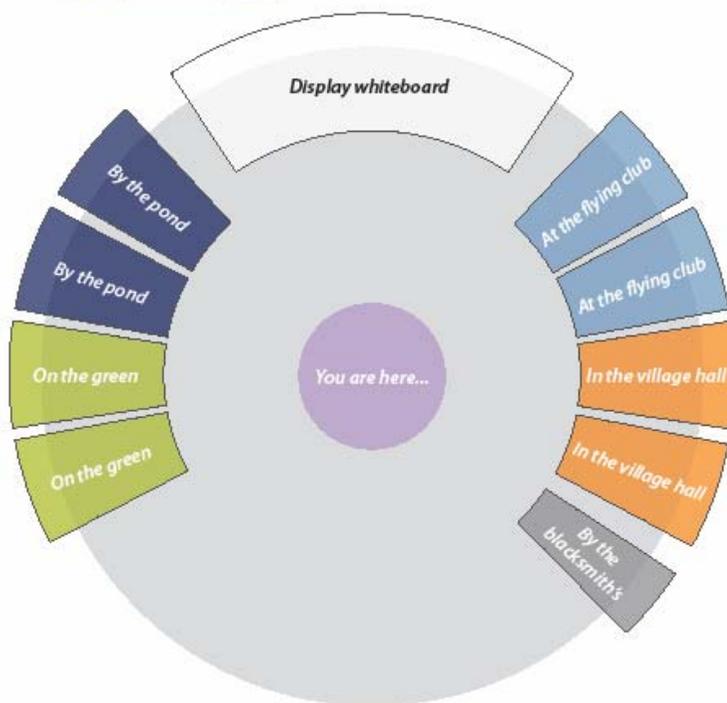


GEONETCast Global Village Network



# GEONETCast – Global Village

## GEONETCast Global Village



2007 Joint EUMETSAT & AMS Conference Amsterdam

### You are here...

Environmental data at your fingertips

Product Navigator

### On the green...

Representing land surface product applications

LSA-SAF

Land surface analysis products

VITO

VG4AFRICA products

### By the pond...

Representing marine & ocean product applications

NASA-JPL

Jason Ocean Sensor Data Record

Danish Meteorological  
Institute (DMI)

Yellow Sea (YEOS) ocean products

OSI-SAF

products for ocean-atmosphere analysis

### At the flying club...

Representing atmospheric product applications

EUMETSAT

Meteorological products

### In the village hall...

Application software, station set-up and global satellite data

EUMETSAT/NOAA

Meteosat, Metop & GOES image loops

ITC/National University of  
Rwanda

Station set-up, MSG SEVIRI reception

South African Weather  
Service (SAWS)

SUMO application software

### By the blacksmith's...

GEONETCast global design and reception specifications

EUMETCast

FENGYUNCast

# GEONETCast – Global Village





# GEONETCast – Global Village





# GEONETCast – Global Village





# GEONETCast

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environmental data to users  
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