

Capacity Building Task CB-06-04

Task Number	GEONETCast
CB-06-04	GEONETCast , a near real-time data dissemination system – in support of the GEO societal benefit areas -- by which environmental <i>in situ</i> , airborne, and space-based observations, products, and services are transmitted to users through satellites. Where infrastructure contributions are not yet in place, the strategy is to establish GEONETCast on a demonstration basis, then evolve to a fully operational global system with diverse data and product contributions to serve all GEO societal benefit areas. Capacity building needs, particularly in developing countries will be addressed.
Area	
Capacity Building	
Relevant Committee	
ADC	

Description of the Work to be Performed
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GEONETCast is a dissemination system by which environmental satellite and in situ data, products, and services from GEOSS are transmitted to users through communications satellites, using a multicast, access-controlled, broadband capability. An initial technical capability has been demonstrated, and near-global coverage by GEONETCast is expected in 2007. The communication satellite costs for each sector of the globe are funded by one or more partners in GEONETCast, and the day to day management of each sector is their responsibility. Communication satellite providers broadcast using a standard protocol interface, such as used for Direct to Home Television or Direct TV transmission. Different data streams or products could be available on separate channels. The user decides which data are to be received, managed, and saved locally. Reception equipment is generic, off-the-shelf equipment and is relatively inexpensive. A GEONETCast Implementation Group is composed of the task co-leads and operators of regional dissemination infrastructure components.

- The GEONETCast Implementation Group (US/NOAA, China/CMA, EUMETSAT and WMO) to refine details related to developing an initial operational capability with prospective demonstration at Earth Observation Summit-IV.
- Identify those partners that might be able to provide other components, both infrastructure as well as data and products, contributing to a global dissemination capability and undertake all associated technical tasks, as appropriate, necessary to integrate those contributions into the evolving GEONETCast system.
- Continue to work with the GEO User Interface and Capacity Building Committees and others to identify additional data, products, services, and reception requirements to meet user needs in all societal benefit areas under GEO. Further develop regional user communities as well as thematic user communities.
- Develop master schedule through GEO-IV timeframe.
- Report status and proposed way forward to GEO's Architecture and Data Committee, Executive Committee, and Plenary, as appropriate.

Output & Deliverables

- (i) Demo of an initial operational capability of GEONETCast by Earth Observation Summit-IV.
- (ii) Further development of GEONETCast for GEO community participation, including in situ, airborne, and space-based observations and products for and user involvement from all nine societal benefit areas.
- (iii) Preparation of framework agreements with Data Providers, addressing, for example, cost sharing, data policy, user registration, quality of service, duration.
- (iv) Preparation of draft interface specifications for Data Providers.
- (v) Engagement of users and data/product providers in regional fora.
- (vi) Discussions with Russia regarding its potential involvement as a GEONETCast infrastructure provider.
- (vii) A GEONETCast Global Design Document is near final.

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Calendar (incl. milestones)

- (1) (2) Americas data provider and user workshop, 27 June 2007, associated with the ISRSE Conference
- (3) Asian data provider and user workshop, 11-12 October 2007
- (4) Initial operational capability demonstration, Earth Observation Summit-IV, 30 November 2007
- (5) Quarterly reports to the GEO Architecture and Data Committee for transmission to the GEO Secretariat
- (6) Update the initial GEONETCast Implementation Plan.

Financial Contributions (from GEO Operations Budget)

none

Current Status

6 June 2007

The greatest initial challenges in implementing this task have been to work towards global coverage, engage users to identify needs, expand data and products being transmitted beyond meteorology, and demonstrate an initial technical capability.

- NOAA, EUMETSAT and WMO (Co-leads comprising the Implementation Group) refined initial technical details relating to demonstrations in 2006 of GEONETCast (as built upon EUMETCast). NOAA identified and regularly provides data sets from several societal benefit areas, which are added to the EUMETCast data stream. Coordination with WMO's IGDDS, a contributing system to GEOSS (See WE 06 04), has begun.
- As a result of dialogue with prospective users, data providers, and other interested parties, the Implementation Group refined the concept as presented in the initial Implementation Plan, which included a recommended way forward and the continued need to identify and build on user requirements.
- The Implementation Group worked to identify other GEONETCast providers to develop a global dissemination capability and all associated technical tasks.
 - On 30-31 August 2006, the Implementation Group met with China, regarding its FENGYUNCast data dissemination system, to discuss how it might be integrated into the developing GEONETCast system. The China Meteorological Administration (CMA) moved its FENGYUNCast system from Ku-band to C-band in December 2006 so their broadcast now covers as far west as Pakistan and as far east as New Zealand. With the assistance of the Chinese National Space Administration, CMA put receiving stations in seven countries – Bangladesh, Indonesia, Iran, Mongolia, Pakistan, Peru, and Thailand – and provided training workshops in 2006. While data currently being distributed on FENGYUNCast are primarily satellite meteorological data, China expressed its intention to provide a data collection and transmission hub for East Asia for all types of data (*in situ*, airborne, satellite) as well as for all societal benefit areas under GEO. With its contribution, China joined the GEONETCast Implementation Group. Actions are being taken to include Chinese data/products in future GEONETCast demonstrations, as well as to include GEONETCast data/products in FENGYUNCast. Discussions are underway to facilitate and realize an ongoing exchange of data and products between the European and Chinese regional components of GEONETCast.
 - Russia is testing the MITRA satellite data dissemination system. Discussions have commenced regarding its prospective contribution to GEONETCast. In April 2007 Russia proposed MITRA for inclusion in GEONETCast. The GEONETCast Implementation

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Group has proposed to meet with Russia to discuss its contribution, data exchange among regions, and other relevant details.

- NOAA has committed to establishing a regional GEONETCast Americas capability, working with other U.S. Government partners. In May 2007 NOAA solicited vendors, through a Request for Proposals, for commercial satellite telecommunications and other services to support GEONETCast Americas. The contract should be awarded by early August with an operational capability in place by early October.
- Members of the Implementation Group participated in a May 2006 Capacity Building Committee Workshop to demonstrate GEONETCast and begin to identify additional data, products, services, and reception requirements to meet the needs of all nine societal benefit areas under GEO. Members of the Implementation Group also engaged in the June 2007 Capacity Building Committee meeting and the User Interface Committee meeting of September 2006 to begin a dialogue on requirements.
- The Implementation Group developed a schedule of demonstrations and other milestones through GEO-III timeframe.
- The GEONETCast task reported on a regular basis its status and proposed way forward to GEO's Architecture and Data Committee.
- A press conference featuring a video news release, comments by the GEO Co-chairs, and a live demonstration of the GEONETCast system took place during the GEO Plenary meeting, November 28-29, 2006. News articles appeared in numerous media, including The Economist, New York Times, and Washington Post.

Demonstrations

GEONETCast was successfully demonstrated at the following venues:

- a. GEONETCast Workshop, hosted by the European Commission, Directorate General-Research, in Brussels, Belgium, 3 May 2006
- b. GEO Capacity Building Best Practices Workshop, hosted by the Brazilian Space Agency in Sao Jose dos Campos, Brazil, 29 May 2006
- c. Meteorological Satellite Data Users Course, Brazil, July 2006
- d. First GEONETCast Participants Meeting, Seattle, USA, 19 July 2006
- e. GEO Architecture and Data Committee Meeting, Seattle, USA, 20-21 July 2006
- f. GEOSS Workshop, International Geoscience and Remote Sensing Symposium (IGARRS), Denver, USA, 30 July 2006
- g. Coordination Group for Meteorological Satellites—34th meeting, Shanghai, China, 30 October 2006
- h. GEO Plenary Meeting, Bonn, Germany, 28-29 November, 2006

Each demo focused on providing information on GEONETCast status and plans, answering questions, soliciting the needs of users, and attempting to identify potential data providers to contribute to GEONETCast. Each demonstration was split into two parts for two categories of prospective GEONETCast participants: data users and data providers. Data user demo: Demonstrated the automatic real-time reception of NOAA's demonstration products from Suitland, Maryland, USA, and EUMETSAT SEVIRI data and products from Darmstadt, Germany at the local receive station at the workshop site.

Data provider demo: Demonstrated the real-time manual transmission of a sample graphical product (which could be any product from a registered public or private sector participant) from the workshop site to EUMETSAT headquarters in Darmstadt, to the uplink station in Usingen, Germany (both via the Internet), up to the Hotbird-6 commercial satellite covering Europe (for the EC demo), and the downlink reception at the local receive station computer...all occurring within one minute. The sample product was transmitted to all EUMETCast receive stations in Europe, Africa, and the Americas. For the Brazilian demo, an additional hop was required, i.e., uplink to the Ku Hotbird satellite, downlinked and turned around in Paris for uplink again to the New Skies 806 C-band

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satellite whose footprint covers Brazil...still occurring within one minute. For the Seattle and Denver demonstrations, yet another communication satellite link was required to hop the data to the demonstration site. At the Seattle demo, the National Aeronautics and Space Administration provided sample data from a thumb drive to illustrate the ease with which data providers can upload products for broadcast. Similarly, at the IGARSS demonstration in Denver Colorado, the U.S. Environmental Protection Agency provided real-time air quality products from a thumb drive that were inserted into the real-time GEONETCast broadcast during the demonstration and received back at the workshop in less than a minute via satellite downlink on the roof of the building.

Most questions during the course of the workshops focused on the following clarifications:

- EUMETCast and the developing GEONETCast are data dissemination services and do not currently include data collection, quality control, archival, or retransmission. They assure that data files that flow into the “pipe” also flow out on the other end without loss.
- They enable near real-time data flow, so if you miss a real-time transmission, you need to get the data/product from the data provider. Most GEONETCast receive units are envisioned to be running 24x7.
- Archived data is better received from the data provider via the Internet or other existing infrastructures.
- Use of terrestrial-based dissemination networks (e.g., Internet), development of a clearinghouse and inventory, and questions regarding formats and interoperability are all questions regarding the overall GEOSS architecture – of which GEONETCast is one element – under the remit of the GEO Architecture Committee. GEONETCast is neither the whole GEOSS architecture nor a data processing system. The intent of GEONETCast is to be invisible and seamless to the user.
- There is a perceived need for better specification of expected types of users.

User Involvement

Development of the GEONETCast initiative for GEO community participation, including data products for and user involvement from all nine societal benefit areas.

On 19 July 2006, the GEONETCast co-leads (EUMETSAT, United States/NOAA, and WMO) held the first official GEONETCast participants meeting, the purpose of which was to:

- Ensure that there is a consensus understanding of the initiative;
- Identify those partners that might be able to provide other components, both infrastructure as well as data or products, contributing to a global dissemination capability;
- Work with those participating as users to identify additional data, products, services, and reception requirements to meet the needs of all nine societal benefit areas under GEO;
- Discuss the future framework of the 2007-2009 GEO Work Plan and any desired GEONETCast input;
- Discuss development of a GEONETCast Implementation Plan; and
- Demonstrate an initial GEONETCast capability.

The July 19 date was chosen to take advantage of the GEO Architecture and Data Committee (ADC) meeting on 20-21 July 2006, as the GEO ADC has oversight responsibility for the GEONETCast task.

"GEONETCast Workshop on Implementation, Data Sharing, User Requirements and Capacity Building" will be held in Beijing, China, from 11 to 12 October 2007. The purpose of this event is to facilitate the task implementation, advocate data sharing and attract more data providers and users under GEO for capacity building. A user training activity will be conducted. The workshop will also serve as an opportunity for a GEO regional communication campaign for the Ministerial Summit. The workshop will be open to all GEO Members, GEONETCast task contributors, GEONETCast Asia Pacific (FENGYUNCast) users and potential users, as well as the GEO User Interface Committee and Capacity Building Committee.

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Coordination with other tasks of committees

GEO Member Potential Contributions Reported to date

Asia-Pacific Region

As part of the global Regional ATOVS Retransmission System (RARS), coordinated by WMO and being implemented as part of the IGDDS, a contributing system to GEO-NETCast and primarily serving the weather societal benefit area, countries in the Asia-Pacific region are establishing exchange of real-time ATOVS data, initially using the WMO Global Telecommunication System (GTS). Asia-Pacific RARS is now running with about 10 HRPT stations supplying data mainly to Tokyo and Melbourne via ftp over GTS. Once the Chinese FENGYUNCast C-Band transmission is available, this data can be uplinked to IGDDS and GEONETCast and broadcast back over the required regions of coverage. A South American RARS is also being established. Eventually, most of the globe will be covered by communications satellite broadcasts of real-time meteorological satellite data.

China

The Chinese FENGYUNCast C-Band transmission is available now.

Germany

Mr Hoffmann is involved through his WMO/CBS activities, too. Dr Schröder is member of the WMO-CBS CT-MTDCF (coordination team for the migration to table driven code forms) and has been nominated as German Member of the GEO-Architecture & Data Committee.

Japan

MEXT/JAXA will contribute to GEONETCast by:

- 1) Providing data of JAXA's satellite sensors, which may include the images originally planned to be distributed through the Sentinel-Asia, to other planned GEOSS dedicated data dissemination systems such as GEONETCast, ESA's GEONet, etc. However, distribution format and policy of each data set must be addressed.
- 2) Dissemination of data originally planned to be distributed in other GEOSS dedicated data dissemination systems, such as GEONETCast, ESA's GEONet, etc., to Asia-Pacific region through the Sentinel-Asia.

Note: The Sentinel-Asia is a data sharing project dedicated to disaster management using Web-based Geographic Information System (WebGIS) having some nodes in Asia-Pacific region. Satellite images gained by Daichi (ALOS) sensors and MODIS are planned to be distributed through it.

South Africa

1. Ground segment station - serve as a reception and distribution return path to identified customers in AFRICA during pilot phase;
2. Engage a local D-T-H design team in developing the required application (software) and related hardware;
3. Avail ICT specialists to the GEO design team.

United Kingdom

UK is establishing an internal arrangement to provide user experience of the EUMETCast and developing GEONETCast systems in operation.

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United States

US/NOAA is coordinating with other U.S. Government agencies, e.g., Department of Energy, Environmental Protection Agency, NASA, and with EUMETSAT regarding provision of products to include in the broadcast in the near future. NOAA has committed to establishing a regional GEONETCast Americas capability, working with other U.S. Government partners. In May 2007 NOAA solicited vendors, through a Request for Proposals, for commercial satellite telecommunications and other services to support GEONETCast Americas. The contract should be awarded by early August with an operational capability in place by early October.