



The Current Status and Short Term Plans (2011-2015) of the GEONETCast Americas Service

GEONETCast Americas (GNC-A) is a regional contribution to the global GEONETCast system. GNC-A provides a satellite based system to deliver near-real-time, environmental products and data in support of the Global Earth Observation System of Systems societal benefit areas (agriculture, energy, health, climate, weather, disaster mitigation, biodiversity, water resources, and ecosystems).

GEONETCast Americas serves much of North America and the Caribbean Basin and all of Central, and South America. GEONETCast has links with regional environmental data dissemination systems deployed in Europe and Asia.

GEONETCast Americas broadcasts to inexpensive satellite receiver stations based on Digital Video Broadcast standards that are in the geographic footprint of the commercial satellite; currently Intelsat 9.

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1. INTRODUCTION

1a. GEONETCast

Ministers from 58 countries and the European Commission agreed at the third Earth Observation Summit in February 2005 to put in place a Global Earth Observation System of Systems (GEOSS) to meet the need for timely, quality, long-term global information as a basis for sound decision making and to enhance delivery of benefits to society. The ministers also established the intergovernmental Group on Earth Observations (GEO) to take the steps necessary to implement GEOSS.

GEONETCast is a global, near-real-time data distribution system within GEOSS by which environmental data and products from participating data providers will be transmitted to users through a global network of communications satellites using a multicast, broadband capability. This dissemination capability, manifested through a small number of regional but interconnected GEONETCast systems, may be especially useful in parts of the world where high speed land lines and/or internet are not available or in regions where terrestrial communication lines have been disrupted by disasters. It is intended to be complimentary with other existing dissemination systems using other delivery methods.

A motivating factor to increase the use of environmental data across the Americas and the world is to make it accessible to all nations in a cost-effective and efficient manner. GEONETCast promises to facilitate and enhance access to environmental data in the nine societal benefit areas of GEO (agriculture, weather, water resources, energy, health, climate, biodiversity, disaster mitigation, and ecosystems). NOAA, in support of the U.S. Integrated Earth Observation System (IEOS) and consistent with its own mission requirements, is a key global player in environmental data dissemination and the development of a GEONETCast system covering the Americas.

GEONETCast is led by three regional infrastructure providers: the European Organisation for the Exploitation of Meteorological Satellites ([EUMETSAT](#)) in Europe, Africa and the Americas (EUMETCast), the Chinese Meteorological Administration ([CMA](#)) in the Asia-Pacific region (CMACast), and the National Oceanic and Atmospheric Administration ([NOAA](#)) in the Western Hemisphere (GEONETCast Americas).

1b. GEONETCAST AMERICAS SYSTEM CONCEPT

The regional component of GEONETCast for the Americas is GEONETCast Americas. GEONETCast Americas is expected to become a user-driven, satellite based dissemination system supporting decision making in the GEOSS Societal Benefit Areas by providing timely and appropriate environmental data and

information. Products are contributions of partners and data providers. Product providers can send their products directly into the GNC-A system. Products originating from the other regional centers can also be disseminated over the GEONETCast Americas broadcast by disseminating them through the Data Center. The data center is located at the Intelsat Teleport in Ellenwood, GA. The system is administered remotely by NOAA personnel. GEONETCast Americas is a user-driven, satellite based dissemination system supporting decision making in the GEOSS Societal Benefit Areas by providing timely and appropriate environmental data and information. User receive stations are designed to be relatively inexpensive with most of the systems being of the shelf. The software application is available from Kencast Inc.

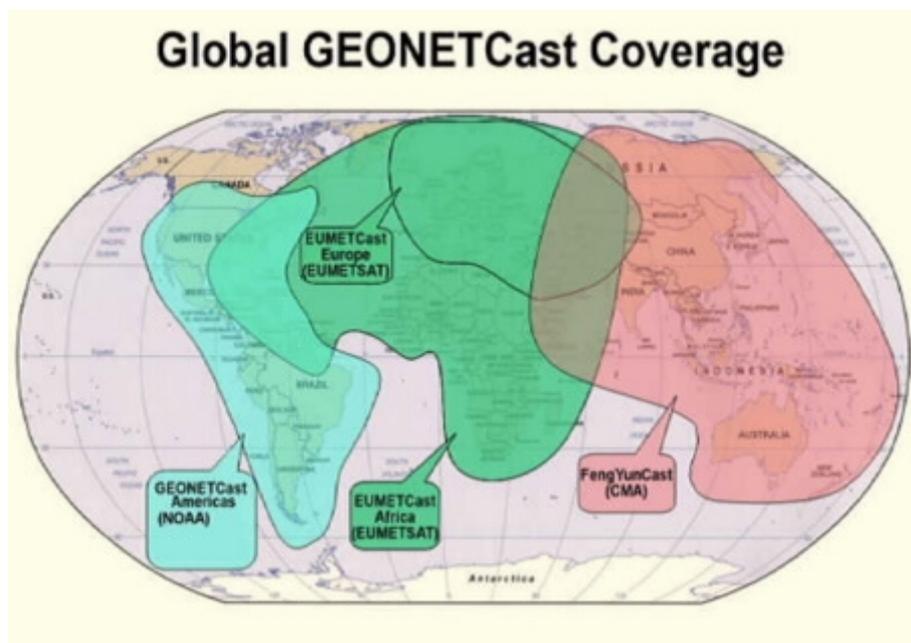


Fig. 1: Notional approximate geographic coverage of the global GEONETCast including other regional components.

2. Current GEONETCast Americas System Configuration

There are three main system components of GEONETCast Americas: 1) data providers, 2) a regional data collection, management, and dissemination system, and 3) distributed user receiver stations. These components are illustrated schematically in Fig. 2. The data providers are shown to the left of the box surrounded by dashed lines. The box enclosed by dashed lines represents the regional data collection, management, and dissemination system and the boxes to the lower right of the dashed line represent user stations.

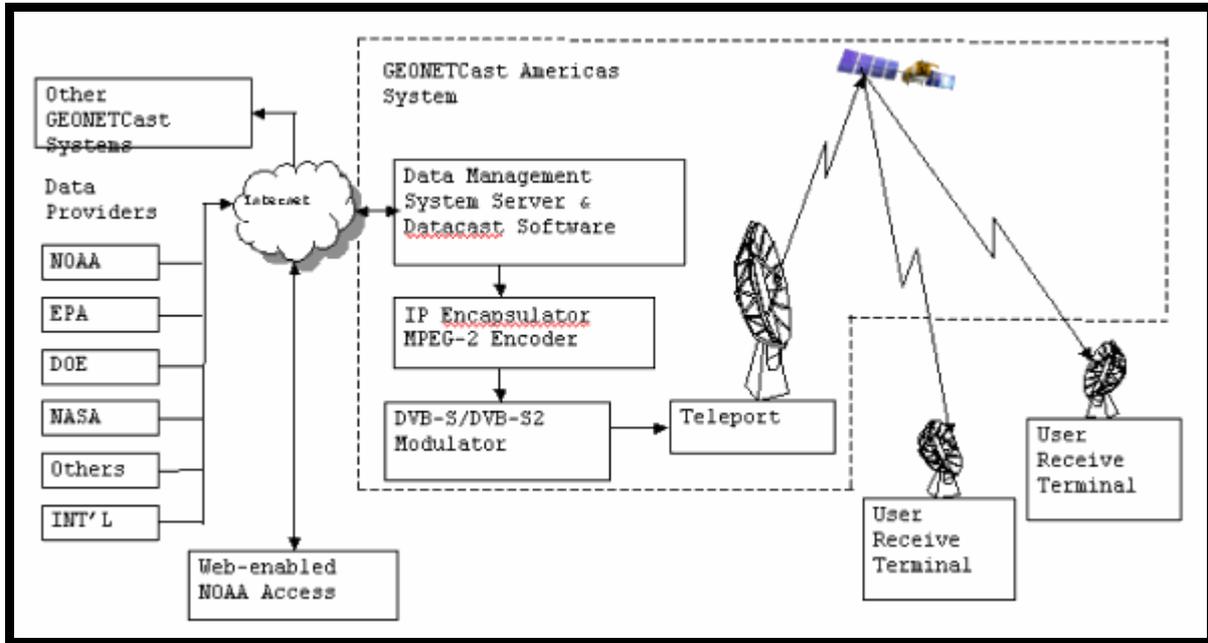


Fig. 2: System architecture illustration.

2a. Data Providers

The information that is broadcast over the GEONETCast Americas system is contributed by “Data Providers.” Organizations that wish to place products in the system can register these products and then, when approved for broadcast, can place them directly into the data collection file server within the GEONETCast Americas hub. Each provider is given access credentials to gain entry into their specific area on the file servers. The products are placed in a “hot folder” where the datacasting software application picks them up and formats them for broadcast over the satellite. Table 1 is the list of providers currently placing products into the GNC-A system.

Provider Name	Organization Name
NWS	NOAA National Weather Service
CONAE	Comisión Nacional de Actividades Espaciales National Space Activities Commission
EPA	U.S. Environmental Protection Agency
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
IMN Costa Rica	Instituto Metereologico Nacional de Costa Rica/National Metereological Institute of Costa Rica
INPE	Grupo de Organização da Comissão Nacional de Atividades Espaciais / National Institute for Space Research
NADM	North American Drought Monitor of the NOAA/NESDIS National Climatic Data Center
NOAA NESDIS	National Oceanic and Atmospheric administration / National Environmental Satellite, Data and Information Service
RANET	Radio and Internet for the Communication of Hydro-



	Meteorological and Climate Related Information
SERVIR	Project at Water Center for the Humid Tropics for Latin America and the Caribbean (CATHALAC) in Panama
WMO-WMC Washington	National Oceanic and Atmospheric administration / National Weather Service Bulletins

Table 1: Data Providers to GEONETCast Americas

2b. Data Collection, Management, and Dissemination System

The data collection, data management and data dissemination components of the GNC-A system are enclosed in the dashed box and are illustrated schematically in Fig. 2.

After the data files are placed in the “hot folders” by the data providers, the datacasting software application, currently FAZZT provided by Kencast, Inc., prepares the file for transmission, assigns distribution priorities, schedules the transmission and uploads the file to the satellite. The files are then downlinked or broadcast over the C-band GNC-A broadcast to the ground stations within the footprint of the satellite (currently Intelsat 9). The broadcast characteristics and values are shown below in Table 2. The broadcast is formatted using the Digital Video Broadcasting — Satellite or DVB-S standard.

Signal Characteristic	Signal Value
PID	4201
Satellite	IS-9 (PAS-9)
Transponder	7C
Polarity	Vertical
Frequency	3840 MHz
Symbol Rate	27.69 Msym
FEC	7/8
Data Rate	Nominally; 2 Megabits per Second

Table 2: GEONETCast Americas Broadcast Characteristics

GEONETCast Americas does not store files for later re-transmission and data quality issues are negotiated between the data providers and users. GNC-A is a near-real-time dissemination system. This means that once data or information products arrive at the data hub they are turned around and rebroadcast in a timely manner. No near-real-time dissemination guarantees are implied for products that are late in arriving at the data hub from the data providers due to circumstances beyond the control of NOAA or the GEONETCast Americas system. Data providers may contribute any approved data or information products accepting the dissemination timeliness of the system.

2c Receiver Stations

The satellite broadcast is received on the ground by relatively low-cost user receiver stations with commercial off-the-shelf components to the maximum extent possible to minimize user costs. These stations include an appropriately-sized dish antenna for C-band reception (normally 2.4 meter) and a standard personal computer and components necessary to decode the incoming satellite signal and create the data files on the station's hard disk. These components also include standard commercial Digital Video Broadcast-Satellite (DVB-S) receiver boxes or cards and client software. See Fig. 3. Minimum standards and specifications for these components have been published by NOAA for use by potential users and commercial vendors, and a suggested reference implementation of hardware and software has been provided by NOAA for demonstration and validation purposes. This information is included on the web site at <http://www.geonetcastamericas.noaa.gov>. However, the purchase and operation of the receiver station are the responsibility of the user and not the GEONETCast project or NOAA.

These receive station components are intended to be relatively affordable with a projected cost of approximately \$2000-3000 with the antenna probably being the largest cost at roughly \$1500. The commercial DVB receiver boxes or cards cost approximately \$80-200. It is recommended that the receiver station's personal computer be dedicated to receiving data to eliminate potential loss of data that might occur if the user is running other highly intensive processing applications concurrently. Further software processing of the received data, including data decompression, decoding, archive, and other value-added user processing and analyses, is best performed on external computers, which may be networked to the receiver station, again to prevent loss of incoming data. This additional software is not a part of the GEONETCast Americas system and is the responsibility of the users in cooperation with commercial vendors or other service organizations.



Fig. 3. Components of a typical GEONETCast Americas receiver station.



3. Data Products, Formats, and Channels

GEONETCast Americas is envisioned to eventually become a “one-stop-shopping” system for distribution of diverse environmental data and products for receipt by users with a single GEONETCast receive station. These data and products are disseminated in the form of electronic data files. GEOSS data that are disseminated through GEONETCast Americas may include diverse data or processed value-added products or services from any of the nine defined GEO societal benefit areas, particularly those areas that are currently underserved by existing dissemination systems.

The products are transmitted over virtual channels with a unique identification number and a name linked to a data provider. Users can selectively choose products they wish to receive on their receiver station based on providers. Conversely, users are able to de-select reception of sub-channels they do not need. Unpacked or decoded files are placed in sub-directories in an “incoming” directory based on the sub-channel provider name. Special categories of environmental products for urgent emergency response purposes, including Common Alert Protocol (CAP) products, may be appropriate and may be distributed via a the appropriate organization. Dedicated emergency or alert channel(s) may be assigned highest priority for dissemination when the need arises. Also, a training channel has been established to enable the dissemination of training or educational materials. A low bandwidth announcement channel has been implemented for distribution of administrative or other general use messages.

Although dissemination of meteorological satellite products is within the scope of GEONETCast Americas, it is not intended to be the primary dissemination mechanism for NOAA’s meteorological satellite data nor a replacement for its existing meteorological satellite data dissemination systems. Neither is GEONETCast Americas intended to replace any other primary dissemination system(s) for environmental data, advisories, watches, warnings, etc. in NOAA or elsewhere. In these cases, GEONETCast Americas should be viewed only as augmenting existing dissemination systems (LRIT, EMWIN, APT, HRPT, GVAR, etc.).

There is technically no restriction on formats for data products that a data provider might wish to contribute to GEONETCast for broadcast. Any of a wide variety of standard formatted products can be used; e.g., ASCII, JPEG, GIF, GEOTIFF, Shape, HDF, BUFR, NetCDF, GRIB2, and others. It is obviously in the best interest of the data providers that the data that they disseminate be in standard formats for ease of use, but the system itself imposes no specific requirements on file format other than the information be file-based. Provision of any special decoding or processing software required to decode and/or use data files distributed by GEONETCast resides with the original data providers who contributed that data for broadcast.

There are no recurring subscription charges to obtain the GEONETCast Americas broadcast. Updated software versions must be purchased by the user but there is no annual fee unless the user purchases software maintenance.

4. Short Term Plans (2011-2015) of the GOES LRIT Service

GEONETCast Americas is currently working on several short term projects that will enhance the GNC-A system. These efforts include:

GEONETCast Americas is currently working with a technical team from WMO Region III to determine if GNC-A is an appropriate dissemination path for delivery of environmental data requirements to the region.

Preliminary work is being done to determine if GNC-A is an appropriate satellite dissemination platform for the International Disaster Charter information where traditional terrestrial telecommunications paths are not available or inadequate.

GNC-A will continue its outreach efforts through participation in GEOSS in the Americas Symposiums (Santiago de Chile; October, 2011) and other GEO events that are held in the GEONETCast Americas region.

5. SUMMARY

GEONETCast Americas is an environmental information and data dissemination system that uses commercial satellites for broadcasting information over the Americas. It is a regional implementation of a global integrated GEONETCast system and is a component of the Global Earth Observation System of Systems. The objective is to enable increased availability and utilization of environmental information across the globe and to foster improved communication and decision making for diverse societal benefits. One of the driving forces is to increase access to environmental information through a relatively inexpensive delivery system based on commercial telecommunication standards so that user's costs are kept low. As this system is enhanced and the user and provider community grows, this vision can be begin to be realized in the Americas and beyond through collaboration among all the GEONETCast Americas partners.