EMWIN Stakeholder Meeting
April 19, 2015

Emergency Managers Weather Information Network (EMWIN) Service Transition 2016/2017

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Agenda

- Introduction / Overview
- GOES-R HRIT/EMWIN Broadcast
- EWMIN GOES-R File Broadcast Format and Naming Convention
- EMWIN ByteBlaster - Internet File Push
- EMWIN FTP Server - Internet File Pull
- Events Calendar and Footnotes
- Questions

Webinar Format

- ***<u>NOTICE</u> - Webinar will be recorded to facilitate NWS meeting minutes and action items. You are free to submit questions or comment before or after the Webinar if you prefer not to be recorded. Send to:***

  _____

- PowerPoint slides are available on EMWIN Home Page, "Documents" tab

  http://www.nws.noaa.gov/emwin/index.htm#tab4

- The presentation will be in English, with a Spanish speaker available to translate and respond to questions received in Spanish.
- Questions will be invited at the end of the presentation. Questions beyond the scope of this forum will be recorded and responses published at a future date.
- All attendees are asked to complete the Meeting Registration Form, if they have not already done so:

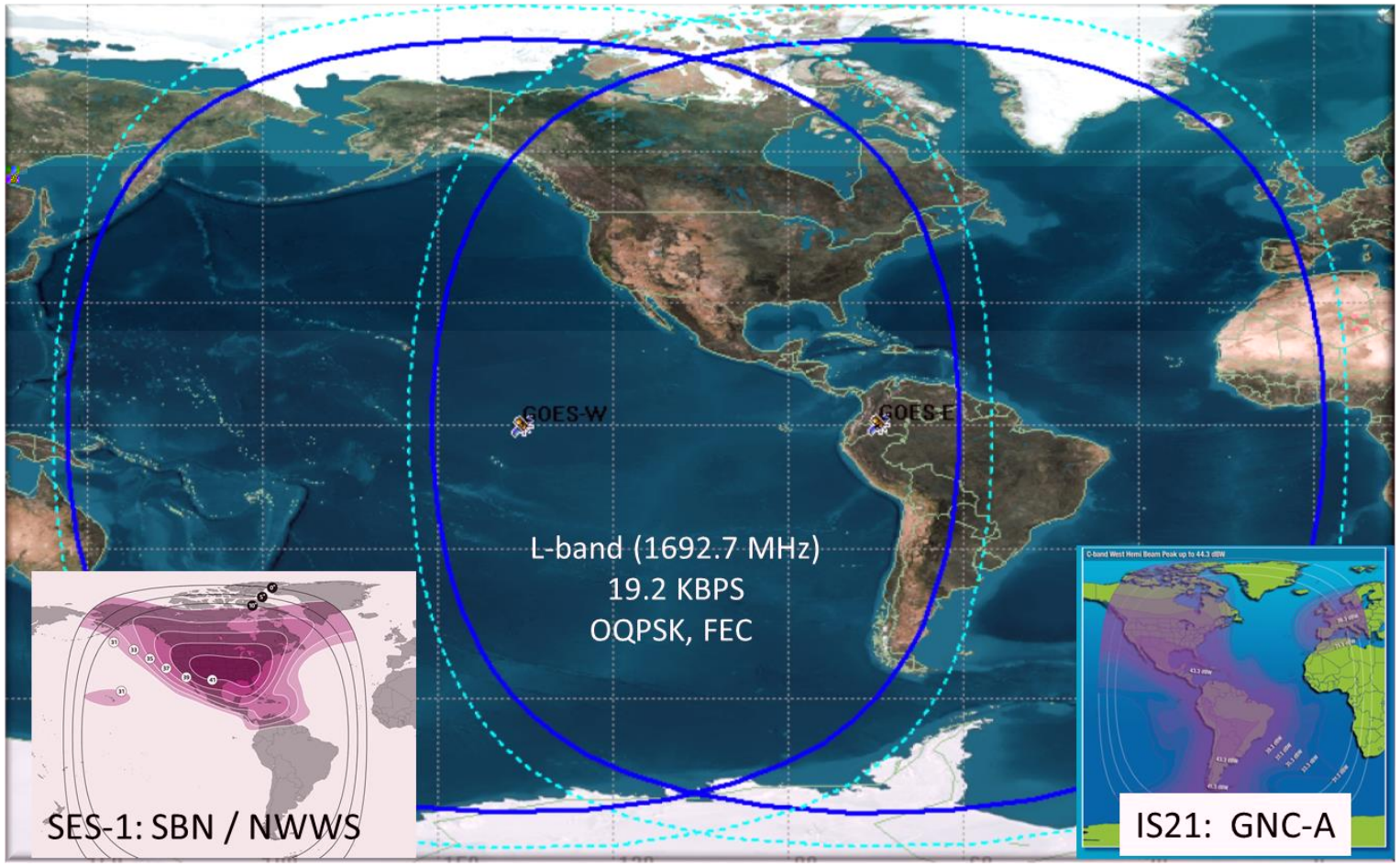
English: https://docs.google.com/a/noaa.gov/forms/d/1JMnpmhsDHjo15OWAmhex1yAzVJ_wBiaBn1EVsv4UAvs/viewform

Spanish: https://docs.google.com/a/noaa.gov/forms/d/1AirzvxRpXMuc4cOYUIG864D1WI-_OKsDTpHhNdJgqt8/viewform

EMWIN Overview

- Was developed in partnership with the National Oceanic and Atmospheric Administration (NOAA) National Environmental Satellite, Data, and Information Service (NESDIS), and other public and private organizations
- Provides open public access without fee, to a managed set of US National and World Meteorological Organization (WMO) International warnings, watches, forecasts, and other products.
- Sequences highest-priority/most-urgent products ahead of all lower priorities products
- Supplements other NOAA/NWS dissemination services, including:
  - NESDIS GEONet-Cast Americas (GNC-A) satellite broadcast service
  - NOAA Weather Wire System (NWWS) satellite broadcast and Internet services
  - SBN-NOAAPORT Broadcast System
  - NOAA Weather Radio (NWR) VHF Broadcast Service
  - NWS Information Dissemination Service (NIDS) Internet Services
  - NWS Global Telecommunication System (GTS) Internet File Service (GIFS)

GOES Satellite Footprint
Extent of EMWIN Broadcast



EMWIN Dissemination Platforms and Stakeholders

- EMWIN Dissemination Platforms:
  - Satellite broadcast : NESDIS GOES East and West Satellites
  - Internet File Push: EMWIN ByteBlaster client/server file dissemination service
  - Internet File Pull: EMWIN File Transfer Protocol (FTP) server

- Stakeholders:
  - EMWIN, LRIT and GOES-R HRIT/EMWIN Broadcast Interface Community
    - Broadcast Receivers and Antenna Systems
  - Application Software Community
  - Information End User Communities:
    - US National Users – Government, commercial, public and private
    - WMO Regional Association IV (RA-IV) Member States
    - Adjacent WMO Regions (RA-III and RA-V; Pacific Ocean Region)

EMWIN Broadcast Product List and Product Sources

- EMWIN product/bulletin sources:
  - NWWS product stream: US local/national/regional/global products
    - US NWS Weather Forecast Offices / River Forecast Centers (WFO/RFCs)
    - US National Centers for Environmental Prediction (NCEP): Tsunami Warning Centers, National Hurricane Center, Storm Prediction Center, etc.
  - International bulletins received by the NWS
  - Selected weather image products from internet sources (e.g., US Weather Radar mosaics, GOES images, etc.).
- EMWIN text products listing: http://www.nws.noaa.gov/iscs/baseline.html
- EMWIN image products listing:

http://www.nws.noaa.gov/emwin/EMWIN_Image_and_Text_Data_Capture_Catalog-DRAFT.pdf

Forces Driving Change

- GOES-R satellite launch and the new HRIT/EMWIN transponder - scheduled for operation in 2017.

- NOAA's consolidation of dissemination services, under the Integrated Dissemination Program (IDP) - a sustainable enterprise architecture with operations centers located in:
  - College Park, MD
  - Boulder, CO

- IT Security controls to address and reduce operational risks from external threats.

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Transitioning HRIT/EMWIN from GOES-NOP to GOES-R (NESDIS-1)

- Improved data products for hemispheric retransmission
  - Faster full disk images: between 15 and 30 minutes
  - Warnings, Watches, Tropical Storm Information
  - Copy of GOES Data Collection System (GOES DCS)
- Requires new antenna and receiver hardware
  - Receiver frequency shift to 1694.1 MHz from:
    - EMWIN 1692.7 MHz and LRIT 1691.0
  - BPSK Modulation; EMWIN shift from Offset QPSK
  - Data Rate to a combined 400 Kilobits per Second from: EMWIN: 19.2 Kbps and LRIT : 128 Kbps (combined 147.2)

HRIT/EMWIN Downlink Characteristics (NESDIS-2)

- Coding – BPSK
  - Convolutional rate ½ code with constraint length 7 concatenated with Reed Solomon (255,223) with Interleave = 4
  - Square Root Raised Cosine filtering using an Alpha factor of 0.3
  - The resulting "Necessary Bandwidth" for this signal will be 1.205 MHz
- Modem Required: predicted C/No is in the range of 63-67 dB
- Maximum Demodulator Required is -
  - Eb/No is 4.6 dB for a BER of $1x10^{-8}$ after decoding
- Minimum Antenna System
  - At 5 degree elevation, the minimum antenna is 1.2 meter.
  - At 10 degrees or more elevation the minimum size is 1.0 meter
  - Using a LNA or LNB with a system noise temperature of about 200 K will provide a G/T of 1.0 dB/K or -0.3 dB/K respectively

Transition from LRIT and EMWIN to HRIT/EMWIN (NESDIS-3)

	LRIT / EMWIN Based on GOES-NOP	HRIT/EMWIN On GOES-R Series
Full Disk, NH, SH images	3 Hourly Full Disk; .5 hour NH/SH; follows GOES East/West Schedule. RSO issue	Variable but planned 3 Channels of Full Disk every 15 minutes
Modulation	LRIT BPSK EMWIN offset QPSK	BPSK
Receiver Center Frequency	LRIT 1691.0 MHz (L-Band) EMWIN 1692.7 MHz (L-Band)	1694.1 MHz (L-Band)
Data Rate	LRIT 128 Kbps EMWIN 19.2 Kbps	400 Kbps
Antenna Coverage	Earth Coverage to 5^0	Earth Coverage to 5^0
Imagery Data Sources	GOES NOP Imager (IR,VIS,WV) MTSAT Imager	ABI (3 or more bands) HBI (3 bands hourly-GOES W
EMWIN Products	Full Suite of Current Products	Combined w/ LRIT Products
GOES DCS	Copy of DCS observations	Copy of observations

HRIT/EMWIN Summary (NESDIS-4)

- HRIT/EMWIN will provide at least 3 channels of GOES-NOP and / or GOES-R imagery along with warnings, watches and forecast products along with a copy of the GOES-DCS (Data Collection System) observations
- New data rate, center frequency and modulation (EMWIN Users)
- Ground receive stations are Commercial Off-The-Shelf utilizing a 1 – 1.2 meter antenna
- Documents and updates to be posted on the GOES-R web site:
  - http://www.goes-r.gov/
  - http://www.goes-r.gov/users/hrit.html

EMWIN Services Transition Agenda

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EMWIN GOES-R File Broadcast Format and Naming Convention

- Broadcast Format. EMWIN products will be transmitted as a contiguous file on the HRIT/EMWIN broadcast.
  - a departure from the GOES-NOP Quick Block Transfer (QBT) protocol packet transmission, where every file is broken into multiple 1024-byte segment

- File Rebroadcast. EMWIN Priority 1 and 2 products will be broadcast twice approximately 5 seconds apart, to help assure product reception in marginal or noisy radio frequency environments.

- File Names. The EMWIN file naming convention has been revised to follow the WMO format identified in WMO Pub 386.
  - EMWIN broadcast example:

    radgrtlk.gif

  - HRIT/EMWIN broadcast examples:

    A_FXUS65KABQ121804AAB_C_KWIN_20160112180911_008996-2-AFDABQNM.TXT

    Z_QATA00KWBC221605_C_KWIN_20160122161502_000542-3-RADGRTLK.GIF

EMWIN GOES-R File Naming Convention

A_FXUS65KABQ121804AAB_C_KWIN_201601121809_008996-2-AFDABQNM.TXT

1. **A** – "pflag" on how to decode the product identifier
   - A – Standard WMO product heading follows
   - Z – Originating Center's local product identifier (used for Images)

2. **FXUS65KABQ121804AAB** – WMO Product Identifier
   - T1T2A1A2ii - Data designators
   - CCCC - Location indicator
   - YYGGgg - International date-time group
   - [BBB] - Additions, corrections, amendments indicator

3. **KWIN** – EMWIN system transmission
4. **20160112180911** – file creation date/time stamp (yyyyMMddhhmmss)
5. **008996** – EMWIN sequence number to ensure uniqueness.
   - Increment by 1 for each new file. Range: 000000 through 999999; then back to 000000

6. **2** – Priority, with range 1-4.
7. **AFDABQNM.TXT** –GOES-N file name (NNNC2C3C4qq). - - -
8. ---

See EMWIN (DRAFT) GOES-R Filename Convention:
http://www.nws.noaa.gov/emwin/EMWIN_GOES-R_filename_convention_160225-0900a.pdf

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EMWIN ByteBlaster Internet File Push

- Byte Blaster:
  - Client/Server Internet Based Service (NWS is one of many participants)
    - Client software is used to receive products from other servers
    - Local server may have many clients - when file is received it is immediately distributed
    - A server may collect products from different sources (e.g., satellite broadcast, local LAN, or as a client to another ByteBlaster server)
    - Multiple daisy chains are possible: Server -> Client/Server -> Client/Server ->…
  - LoadMaster (NWS)
    - Agent for load balancing clients on registered servers
    - Assists in reassignment of clients when a registered server is no longer active
- Future Service Outlook
  - IDP Environment does not currently support the Windows environment
  - Existing operational IDP file-push protocol (e.g., XMPP) does not adequately support binary file transfer today.
  - Alternative 1: Switch to NWWS End User Client software to receive a portion of the EMWIN distribution
    - Provides an Internet push of all EMWIN US-National text products, and then some
    - Does not include EMWIN International or Image Products
  - Alternative 2: Continue to operate client/server networks in absence of the NWS ByteBlaster Servers and LoadMaster

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EMWIN FTP Server Internet File Pull

- EMWIN FTP Service:
  - Compressed sets of EMWIN files grouped by time interval

TEXT
Two minutes (twomin.zip)
Five minutes (fivemin.zip)
Fifteen minutes (fifteen.zip)
One Hour (onetext.zip)
Three hour (threetxt.zip)

IMAGES
One hour (oneimage.zip)
Three hour (threeimg.zip)

- Future Service Outlook
  - Enterprise EMWIN FTP Service Description
    - Anonymous FTP servers – account/registration is not required
    - Will provide separate GOES-N and GOES-R services to support the two different file naming conventions.
  - Status: In development .
  - Implementation Date: On or about December 2016

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EMWIN Events Calendar

Date	Description
May 11, 2016	**EMWIN SATELLITE BROADCAST OUTAGE** - 3 to 12 hour scheduled outage, commencing at 0800 (EDT) - Impact is likely to be limited to GOES-E - Additional information on EMWIN Web page and NOXX10 Bulletin
Jul 2016	NWS-Proposed EMWIN Stakeholder Follow-up Webinar
Oct 13, 2016	GOES-R launch -- 1743 (EDT)
Dec 2016	NWS Enterprise EMWIN IDP Transition Completed - New NWS Enterprise GOES-R / GOES-N FTP services + Users transition to new IP addresses - NWS ByteBlaster and LoadMaster servers shut down
Feb 2017	GOES-R HRIT/EMWIN Post Launch Testing (PLT) - EMWIN End User participation and reports
2017	NOAA decision to deploy GOES-R to East or West
2017	GOES-R placed on station (East or West) & declared operational

Footnotes

- EMWIN Web Page:
  - http://www.nws.noaa.gov/emwin/
- EMWIN Support :
  - nws.emwin.support@noaa.gov
- NWWS EUC software can be used to receive US local, state, national, regional and global products from the Internet and by satellite broadcast. To request an NWWS Open Interface User Account and the no-cost End User Client Software:
  - Account - User ID and Password:
  - http://www.nws.noaa.gov/nwws/#tab3
  - EUC Software Request:

    http://www.nws.noaa.gov/nwws/#tab4

Questions

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Are you interested in attending the proposed EMWIN Stakeholder Follow-up Webinar in July 2016?