Mobile Decision Support Services

*InteractiveNWS (iNWS)*

Improving Decision Support During High-Impact Events Using Mobile Communications

Mike Doney
Aaron Sutula
Andy Edman

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Agenda

- Mobile Decision Support Services (DSS)
  - Why does this matter to the NWS?
  - Corporate Board Decision / Directive

- iNWS Overview

- Mobile DSS Vision
  - Future iNWS Plans

- iNWS Demo
Social Science

Super Tuesday Tornado Outbreak of February 5-6, 2008

87 tornadoes (5 x EF4) in 9 states causing 57 fatalities during a 12-hour period

“Several people specifically noted the need to seek confirmation of a warning…”

“…people may require multiple sources of information throughout their decision making process to assess their personal risk…”

“…a single source of information will not necessarily spur protective action.”

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Challenges

• How can the NWS more effectively provide services that lead to better community response?
  
  – NWS services continue to get better, but *unless we improve* our dissemination and communication capabilities, our effectiveness in supporting communities will be hampered
  
  – This goal is consistent with the NWS mission of protection of life and property, and the emerging vision of improving decision support services for high-impact events

• How do we stay relevant with the technologies our partners and customers are using?
Why is this important to the NWS?

Women, Teens and Seniors Help Fuel 34% Mobile Web Spike

http://blog.nielsen.com  September 30, 2009
The world is changing!

• Less tolerance for community leaders not being aware of impending high-impact events

• Partners becoming increasingly mobile, need for information -- anytime, anywhere

• Cell phones and PDA’s with Internet access are the new communication standard
Why is this important to the NWS?

● NWS is evolving from a one way dissemination paradigm (i.e. one way transmission of products and data) to a **2-way real-time interactive and collaborative environment**

● Current NWS dissemination systems are not keeping pace with consumer technologies that are being adopted

● A customer centric approach allows users to control the information they receive – … this keeps office workload to a minimum

“The fact is, NWS services – principally *direct interaction with decision makers* – are in greater demand than at any time in our nearly 140-year history.”

Jack Hayes, NWS Director 2008

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Should NWS Provide Mobile Messaging Services?

Partner Comments

● “…one more way for the NWS to save lives! Drop the experimental and make it a permanent feature!” - EM, Augusta, GA

● “…like radio and TV were the new notification tools of their time, SMS and e-mail are the new tools of my children. Their use will ultimately provide timely notification and save lives.” - EM, Scandinavia, WI

● “This service fills a large gap in my communications network. My tax dollars are well spent on NOAA and return dividends that greatly exceed my investment.” - First Responder and Trained Spotter, Wheaton, IL

● “Many times I am not in my office, at a computer or next to a radio. Mobile alerts have been a great and key asset for the success of our Emergency Management programs.” - Regional Coordinator, SD Department of Public Safety

► Invited iNWS Briefing to the Director, White House, Office of New Media, April 2009
Corporate Board Decision
August 2009

- **Unanimous Board support** to develop a standardized baseline system to deliver NWS warnings and other critical decision support information to core partners on mobile devices.

- The implementation process, including development of a formal project plan, O&M costs, etc., will be turned over to OST and the RITT.

- Another team and/or OSIP project will be assigned to explore options for offering mobile warnings to the general public.
**Interactive NWS**

**iNWS mobile services**

are designed to

bring critical weather data

and automatic alerts

directly to your

cell phone or mobile device

https://inws.wrhl.noaa.gov
iNWS Features

- **Interactive User Participation**
  - Users manage their own accounts and Weather Alert profiles
  - Users decide alert types, format, geography and scope

- **Dynamic Content / Device Independence**
  - Content is unique and dynamic for EACH USER
  - *Data* are the same NWS products and imagery on the web today!
  - Users can manage content from a cell phone or desktop

- **Web Standards**
  - Such as WMS, Javascript, Java, OCG, Apache, PHP

- **Scalability**
  - Leverage existing Cellular provider and NWS web-farm infrastructure
  - Easy to add modular features, products, and services

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Storm Based Warning Polygons

Corporate Board request (May 2009) for guidance on optimizing the positive impact of polygon warnings

Team lead by CR; recommendations include

- Use “Elongated Pentagons”
- Increase accuracy of warnings by including storm propagation vector and climatology in designing polygons

This illustrates the need for dissemination tools that accurately and precisely leverage polygons for alerting

iNWS is the only tool currently doing this
iNWS Suite of Services

- **iNWS Alerts** — Text based alerts of NWS watches, warnings, and advisories using SMS and email

- **iNWS Mobile** — Mobile Java application for browsing weather data, and configuring iNWS Alerts

- **NWSChat to SMS** — Adds ability for NWS to send text messages to mobile users from NWS chat rooms

- **iNWS Mobile Web** — Weather data formatted for mobile phone web browsers

- **iCWSU** — Aviation weather data formatted for mobile phone web browsers

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iNWS Alerts Via Text Message or Email
- Follow the link in the message for more information

New event. Severe Thunderstorm Warning from 09/14/09 01:08 PM MDT to 09/14/09 02:00 PM MDT for SLC. http://bit.ly/2VGRi
Hydrographs and Station Observations

Hydrologic events account for the largest loss of life for any weather related phenomenon.
Status of Mobile DSS (iNWS)

- At OSIP Gate 3
  - SON and Project Plan complete
  - RFP for national SMS contract pending release
  - CONOPS document in final review
- Good collaboration with OST, OCIO, OCWWS
- iNWS as pilot project for RITT
- Transition to National Operational System 2010 - 2012
Future Plans for iNWS

Short-Mid Range

- Integration of Hydro data and alerts
- HYSPLIT data and features

Long Range 2010 --

- Locator GPS-like Feature
- Enhanced Shortlink – more data options
- User Requested Features
  (alert scheduler, SMS or Email selector)
- Incoming Spotter Reports?
Financial Stimulus

2009 NOAA HPCC Grant

- Cell Phones, SMS Services, Multi-platform Mobile Testbed
- High Performance Storage, Postgres/PostGIS Optimization
- iNWS Developer Workshop
- ARL HYSPLIT Training
NWS Collaboration with NOAA Research
ESRL/GSD Geo-Targeted Alerting System (GTAS)

Integration of HYSPLIT* data into Mobile DSS

- GTAS: NOAA-FEMA Joint Project Funded by DHS
  - High-resolution HYSPLIT model using WRF-NMM data
  - GTAS servers hosted at NWS Regional Headquarters
  - Will provide enhanced collaboration between WFOs and EOCs, including R-911, for toxic plume events

Mobile DSS (iNWS) will enable real-time dissemination of HYSPLIT plume models to mobile devices… anytime, anywhere

*HYSPLIT model developed by NOAA/ARL
GTAS link http://fxc.noaa.gov/GTAS/index.html
HYPLIT Trajectory and Dispersion Models

... in the hands of first responders
Enhance the power behind the short-link

New event. Severe Thunderstorm Warning from 09/14/09 01:08 PM MDT to 09/14/09 02:00 PM MDT for SLC.
http://bit.ly/2VGRi

Alert Areas
Warning Polygons
Plus -
RADAR
Satellite
Point Forecast
Observations
HYSPLIT

Event/Hazard Confirmation to stimulate action eg, “Take Shelter”

And Other Platforms- iPhone, Android
iNWS Mobile Vision

Four-pronged approach

- **NWS Mobile DSS (iNWS)**
  - Target Audience – Community leaders and decision makers
  - Alert Types – Sub-catastrophic, ‘usual’ watch/warning/advisory for moderate to high-impact weather that is important to an emergency manager, for example.

- **DHS/FEMA IPAWS Commercial Mobile Alert System**
  - Target Audience – General Public
  - Alert Types – Catastrophic – used only rarely for major events “Reverse 911”; Cell broadcast still years away; Providers must opt-in

- **Private Sector**
  - Target Audience – General public, businesses
  - Alert Types – Value-added and custom alerts

- **General ‘pull’ Technologies** formatted for mobile
  - Web, RSS, etc
NWS Mobile Dissemination Vision

Sector Relationships

Alert Types

Advisories:
Anticipate, Respond and Recover

Watches:
Prepare for Action

Warnings:
Urgent, Immediate Action Required

Target Audience

NWS Mission Driven

Private Sector Profit Driven

IPAWS Public Service – National Defense Driven

Interactive, Targeted Mobile Services
Web2.0 (active)

General Mobile Services
Cell/PDA Internet Browser
Web1.0 (passive)

Push Only Mobile Services
(passive)
Summary

Take-Aways for Mobile DSS (iNWS)

● The NWS Corporate Board has fully endorsed this program

● Mobile dissemination *adds value* to the services we already provide

● It shows that we are ready and willing to engage our users, and society, by using innovative and relevant technologies
iNWS Demo

Key points to look for:

- Self registration and account management
- NWS approves or denies registration requests according to policy.
- User defined content
  - Geography
  - Weather categories
- Alert content customized for each user
- No NWS jargon
- Provide additional information using a hyperlink embedded in the alerts
Background Slides Follow…
Should NWS Provide Mobile Messaging Services?

Ability to Reach Communities

% of US Population with Cell Phones

89.5%

262 Million
Rapid adoption by public
Carried by most people all the time
Infrastructure being developed by private sector

% of US Population with NOAA Weather Radios

20%

60 million
Access at home or business
Special receiver not integrated with general technology
NWS responsible for infrastructure

Should NWS Provide Mobile Messaging Services?
iNWS Mobile and NWR Alerting Systems

**iNWS Prototype**
- Product Decoders
- Data Processors
- Spatial Data Servers
- Databases
- Webservers

**Leverage Private Wireless Infrastructure**
- Cell Service Providers
- IPAWS CMAS Alert Aggregator (when operational)

**Mobile Community Decision Makers**

**2-Way Interactive Access (Web 2.0)**

**NOAA Weather Radio**
- Product Decoders
- Data Processors
- Databases

**NWS Owned/Maintained Infrastructure**

**Fixed Community Decision Makers**

**1-Way Passive/Push Delivery**

**NWS Cost**

**NWS Cost**
Should NWS Provide Mobile Messaging Services?

*Customer Survey Results*

- Technical Quality: 8
- Ease of Use: 8
- Would use Daily: 61%
- Would use Weekly: 22%
- Would use other: 17%
- Should NWS Provide this Service?: 98%

*Averaged Responses (scale of 1 – 10)*

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