Building a Weather-Ready Nation For Aviation

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Case for Change
“Average” Year and Trends in the U.S.

- 650 Deaths
- $15B in Losses
- 26,000 Severe Thunderstorms
- 6 Atlantic Basin Hurricanes
- 1,300 Tornadoes
- 5,000 Floods

Regardless of the cause, the trend shows an increasing number of extreme weather events at increasing cost to the nation.

(Image source: Munich Re, 2014)
Case for Change

Southeast Tornado Outbreak
April 27-28, 2011

Coordination calls with emergency managers beginning on day 3

96% of tornadoes located within SPC Watch Ave. Warning Lead Time = 24 minutes

Deadliest outbreak since 1936
~190 tornadoes
~311 fatalities
NWS Evolution Toward Building a Weather-Ready Nation

Timeline

- 2010: NOAA Strategic Plan, "Deepwater Horizon - Snowmageddon"
- 2011: NWS Strategic Plan - "Building a Weather Ready Nation"; WRN Pilot Projects Start; Birmingham WRN Science Workshop
- 2012: "Second to None" Study; Drought/Wildfires; Irene; Drought/Wildfires; Mid-Atlantic Derecho
- 2013: New England Blizzard; Sandy; Oklahoma Tornadoes; Colorado Flooding; Midwest Tornadoes
- 2014: Southern US Snowstorm; Arctic Outbreak

Events:
- 2010: MS River Flooding, Fukushima/Tsunami, Midwest Blizzard
- 2011: Spring Floods, Drought & Wildfires
- 2012: Irene, Mid-Atlantic Derecho
- 2013: Sandy, Oklahoma Tornadoes
- 2014: Sandy, Colorado Flooding, Midwest Tornadoes, Southern US Snowstorm, Arctic Outbreak
Becoming a Weather-Ready Nation is about building community resilience in the face of increasing vulnerability to extreme weather.

NOAA is developing new decision support services, improving technology to track and forecast storms, and expanding its dissemination efforts to achieve far-reaching national preparedness for weather events.

Decreasing Vulnerability by Increasing Resilience
Weather-Ready Nation

Five Major Focus Areas

- Impact-based Decision Support Services
- Communications/Outreach
- Science & Technology Advances
- Information Delivery
- Innovative Partnerships

External to NOAA
IDSS has four elements:

- Better understanding of societal impacts.
- Making our information more relevant to decision makers.
- Participating directly in decision making for those decisions fundamental to the role of government, especially the protection of life and property.
- Counting on market forces to provide diverse decision-support services across the entire economy.
Taking NWS to the Next Level

Impact-based Decision Support Services

Recent Successes:

- Integrated Impact Decision Support Unit embedded at the FAA’s Command Center
- Improved consistency of services at NWS’s 21 Center Weather Service Units
- New Decision Aids for Traffic Flow Management
- Focused efforts at the Aviation Weather Testbed (AWT) to address IDSS
  - Operational Bridging
  - Aviation Weather Statement
AWC National Aviation Mets at FAA ATCSCC

Decision support @ ATCSCC

Support Collaborative Decision Making

Focus on greatest NAS weather impacts
FAA Air Traffic Control System Command Center (ATCSCC)

NOAA Administrator Award Winners
Secretary of Transportation Anthony Foxx
Decision Support
AWS
WOW- Wall of Weather
We need partners’ help in transforming society to become ready, responsive and resilient to increasing extreme weather threats.

NOAA will continue to improve outreach, IDSS, S&T, and dissemination methods.

Building a Weather-Ready Nation requires the entire Weather Enterprise to work together to deliver information for better community, business, and personal decision making.

- SOCIETAL RESPONSE EQUAL TO RISK -
Reenergized General Aviation Safety Emphasis

GENERAL AVIATION: IDENTIFY AND COMMUNICATE HAZARDOUS WEATHER

What is the Problem?

The overwhelming majority of aviation-related deaths in the United States occur in general aviation (GA) accidents. In 2011, there were 1,466 GA accidents, of which 263 were fatal. 444 people were killed, and the accident rate per 100,000 flight hours remains substantially higher in GA than in commercial aviation (6.51 for GA compared to 1.5 for on-demand Part 135 operations and 0.162 for scheduled Part 121 operations). Historically, about two-thirds of all GA accidents that occur in instrument meteorological conditions (IMC) are fatal—a rate much higher than the overall fatality rate for GA accidents.

A frequent cause of or contributing factor to these accidents is hazardous weather. For example, on December 18, 2011, a Piper carrying the pilot and four passengers impacted terrain following an in-flight breakup near Bryan, Texas. NTSB investigators determined that the probable cause of the failure was the pilot’s inadvertent encounter with severe weather, which caused a failure of the left wing. One of the issues identified in the investigation was the presentation of weather radar data in the cockpit, obtained through the pilot’s subscription to satellite-based weather services.

What can be done?

In the almost 50 years of NTSB accident investigations, NTSB’s recommendations to weather issues fall into three broad areas:

1. pilot training and operations;
2. the creation of weather information and advisories; and
3. the collection and dissemination of weather information particularly by the NWS and the FAA.

The first line of defense in preventing a GA weather-related accident is the GA pilot, he or she makes the decision of when and where to fly the aircraft. Therefore, appropriate training on how to obtain and use the proper information to address hazardous weather is critical. In addition, granting pilots, as well as FAA-contracted weather briefers, access to real-time weather information through weather cameras connected to remote aircraft navigation systems.
On May 6, 2014, NTSB provided thoughtful recommendations identifying challenges facing the NWS and FAA in providing weather information for safe and efficient flight.

Nine recommendations (5-NWS & 4-FAA) designed to prevent accidents and save lives.

NWS will respond to these recommendations within 90 days.
NTSB Recommendations

Consistency
(esp. between aviation and public information)

NWS Coordination

Mountain Wave Activity
Consistency Between 155 NWS Aviation Support Offices

1. Aviation Weather Center (AWC)
2. Alaska Aviation Weather Unit (AAWU)
3. Volcanic Ash Advisory Center (VAAC)
4. Specialized National Centers (NCEP Centers)
5. Center Weather Service Units (CWSUs)
6. Weather Forecast Offices (WFOs)
FAA and NWS Aviation Weather Requirements Working Group (ARWG)

Agreed to in 2012 by FAA Chief Operating Officer and NWS Director

Goal: Improve NWS products in support of Aviation
# ARWG Preliminary Analysis

## Non-ICAO products with high potential for change(s):

- **Area Forecast**
- Freezing Level Graphic
- Weather Depiction Chart
- Radar Summary Chart
- Aviation Watch Notification Message

## Non-ICAO products with some potential for change(s):

- Convective SIGMET
- Center Weather Advisory
- Winds and Temperatures Aloft
- Meteorological Impact Statement

## Additional products with constraints—little potential for change(s):

- International Aviation Route Forecast
- Collaborative Convective Forecast Product
- Current Icing Potential
- Forecast Icing Potential
- Graphical Turbulence Guidance

## Products required under international obligation—little potential for change(s):

- SIGMET
- AIRMET
- Graphical AIRMET
- Aviation Tropical Cyclone Advisory
- Volcanic Ash Advisory
- Terminal Aerodrome Forecast
1. ARWG identified a suite of existing equivalent NWS graphical information that can be used
   • Acceptable alternatives for flight planning
   • Not necessarily identical information
2. Federal Register notification published 6/19
   • Currently Soliciting feedback through 8/4
3. FAA will ...
   • Continue to consult with users
   • Complete a Safety Risk Assessment
   • Provide recommendations to NWS
4. NWS ‘Change of Service’ notification will be submitted for an early 2015 transition date
Initial Aviation Weather Statement Needs for an TFM Area of Concern*

- Onset: Thunderstorm activity is expected within 4 hours
- Cessation: Thunderstorm activity expected to end within 4 hours
- Consistency: Conflicting thunderstorm forecasts
- New Information: Thunderstorm activity is expected to cease earlier

*An area of concern includes en route traffic flows, Core 30 terminal operations and special event airspace.
Taking NWS to the Next Level
Science and Technology Advances

Probabilistic Forecasting
Collaborative Experiments

Decision Support Tools
New Products
Taking NWS to the Next Level
Integrated Dissemination Program

- **NextGen IT Web Services (NGITWS)**
- **High Speed Networking**
- **Multiple-Radar Multiple Sensor (MRMS)**
- **Meteorological Assimilation Data Ingest System (MADIS)**

- **AWC Web Services**
  - ADDS
  - WIFS
  - IFFDP
- **NWS Web Presence**
  - NIDS
- **National Operational Model Archive & Distribution System (NOMADS)**
- **Model Analysis & Guidance (MAG) Web Site**

National Weather Service
How can organizations be a part of and contribute toward building a Weather-Ready Nation?

- All levels of government
- Weather, Water, Climate Enterprise
- Academia
- Businesses & non-profits

Formal recognition of organizations that work with NOAA toward building a Weather-Ready Nation

- Promote WRN messages and themes
- Engage with NOAA on potential collaborations
- Share success stories
- Serve as an “Example”

Visit: www.noaa.gov/wrn
Strengthening Partnerships
WRN Ambassador Initiative

Early Successes
- Outreach during preparedness weeks
- Press releases and media interviews
- Community events
- WRN Ambassador Congressional testimony
- More consistent WRN messaging
- Expansion of stakeholder engagement to non-traditional sectors
  - Insurance
  - Health
  - Real-Estate
  - Museums/Science Centers

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WRN Ambassador Information and Application