



# **2017 Summer Partners Meeting**

**Dr. Louis W. Uccellini**

**Director, National Weather Service**

**NOAA Assistant Administrator for Weather Services**

**August 1, 2017**

**Madison, WI**

# Outline

- **Weather Research and Forecasting Innovation Act 2017**
- **FY17 Budget; Annual Operating Priorities**
- **Dissemination**
- **GFS Upgrade → Next Generation Global Prediction System**
- **Connecting Tactical Steps to Strategic Outcomes**

# Weather Research and Forecasting Innovation Act

## Sec. 101 – Directed toward the NWS Mission

15 USC 85011.

### **SEC. 101. PUBLIC SAFETY PRIORITY.**

In conducting research, the Under Secretary shall prioritize improving weather data, modeling, computing, forecasting, and warnings for the protection of life and property and for the enhancement of the national economy.

### - Reauthorize USWRP, HFIP, Tornado Research

- 201 – Improving Sub-seasonal and Seasonal Forecasts
- 301 – Weather Satellite and Data Innovation
- 401 – Federal Weather Coordination
- 501 – Tsunami Warning, Education, and Research

**Signed into law on April 18**

# Weather Research and Forecast Innovation Act of 2017

Public Law 115–25  
115th Congress

## An Act

To improve the National Oceanic and Atmospheric Administration's weather forecast through a focused program of investment on affordable and advanced technology in observational, computing, and modeling capabilities to improve the accuracy of weather forecasting and prediction of high impact weather events to expand commercial opportunities for the provision of weather services for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*

### SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) SHORT TITLE.—This Act may be cited as the "Weather Research and Forecasting Innovation Act of 2017".

(b) TABLE OF CONTENTS.—The table of contents of this Act is as follows:

Sec. 1. Short title; table of contents.  
Sec. 2. Definitions.

#### TITLE I—UNITED STATES WEATHER RESEARCH AND FORECASTING INNOVATION IMPROVEMENT

Sec. 101. Public safety priority.  
Sec. 102. Weather research and forecasting innovation.  
Sec. 103. Tornado warning improvement and extension program.  
Sec. 104. Hurricane forecast improvement program.  
Sec. 105. Weather research and development planning.  
Sec. 106. Observing system planning.  
Sec. 107. Observing system simulation experiments.

**Signed into law on April 18**

131 STAT. 108

PUBLIC LAW 115–25—APR. 18, 2017

(b) PRIMARY ROLE OF WARNING COORDINATION METEOROLOGISTS.—The primary role of the warning coordination meteorologist shall be to carry out the responsibilities required by this section.

(c) RESPONSIBILITIES.—

(1) IN GENERAL.—Subject to paragraph (2), consistent with the analysis described in section 409, and in order to increase impact-based decision support services, each warning coordination meteorologist designated under subsection (a) shall—

(A) be responsible for providing service to the geographic area of responsibility covered by the weather forecast office at which the warning coordination meteorologist is employed to help ensure that users of products of the National Weather Service can respond effectively to improve outcomes from weather events;

(B) liaise with users of products and services of the National Weather Service, such as the public, media outlets, users in the aviation, marine, and agricultural communities, and forestry, land, and water management interests, to evaluate the adequacy and usefulness of the products and services of the National Weather Service;

(C) collaborate with such weather forecast offices and State, local, and tribal government agencies as the Director considers appropriate in developing, proposing, and imple-

Collaboration

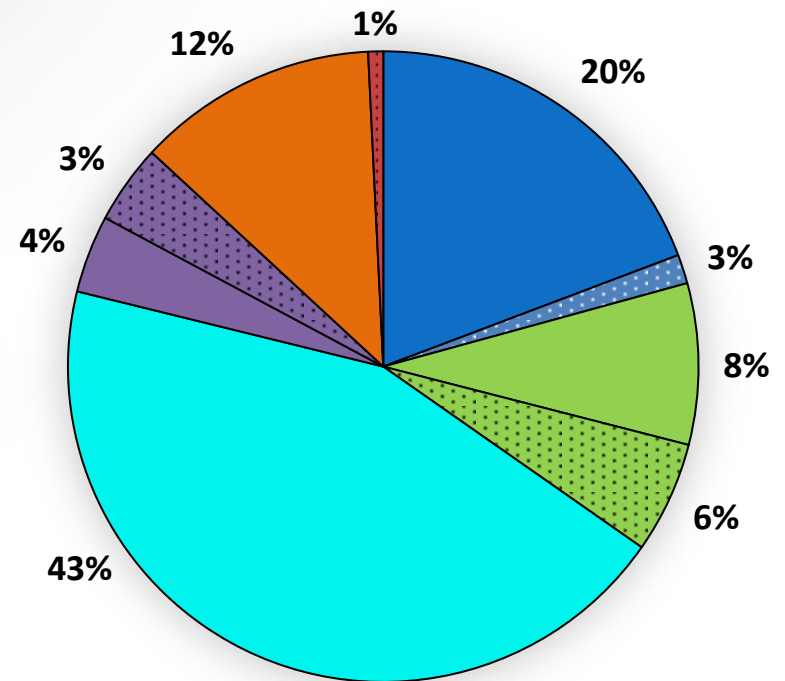
**(1) IN GENERAL.—Subject to paragraph (2), consistent with the analysis described in section 409, and in order to increase impact-based decision support services, each warning coordina-**

# FY 2017 Omnibus Enacted Level Composition by Portfolio

| PPA                                    | Funds*           | Full Time Employees (FTE) |
|--|------------------|---------------------------|
| Observations ORF                       | 216,363          | 804                       |
| Observations PAC                       | 32,755           | -                         |
| Central Processing ORF                 | 92,790           | 232                       |
| Central Processing PAC                 | 66,761           | 24                        |
| Analyze, Forecast and Support ORF      | 487,325          | 3,010                     |
| Dissemination ORF                      | 46,743           | 81                        |
| Dissemination PAC                      | 34,619           | -                         |
| Science and Technology Integration ORF | 136,558          | 488                       |
| Facilities PAC                         | 7,650            | -                         |
| <b>TOTAL</b>                           | <b>1,121,564</b> | <b>4,638</b>              |

\* In thousands of dollars

Funds Breakdown



- Observations ORF
- Observations PAC
- Central Processing ORF
- Central Processing PAC
- Analyze, Forecast and Support ORF
- Dissemination PAC
- Dissemination ORF
- Science and Technology Integration ORF
- Facilities PAC

# FY 2017 Portfolio Highlights

## Observations

- NEXRAD Service Life Extension
- ASOS SLEP
- Radiosonde frequency migration
- Achieve IOC for GOES-16
- Weather Buoy Recapitalization
- Auto-launchers

## Science & Tech Integration

- Complete GOES-16 training development (SIFT)
- National Water Model v 1.1
- GDAS/GFS upgrade (last spectral upgrade)
- NNGPS Dynamic Core Integration
- HWRP upgrade
- Implement Impacts Catalog IDSS Portal
- National Blend of Models v3.0

## Facilities

- Complete relocation of WFO Davenport & WFO Boston
- Initiate Facility Assessments for 3rd 1/3
- Complete Phase 1 disposal of Annette Island, Alaska

## Central Processing

- AWIPS configured for GOES-16 data
- Complete use case development for NAWIPS
- Extend the performance period WCOSS (4.2 PF) supercomputing systems and service.



**WRN Ambassador Initiative**  
**5900+ Ambassadors**

## Dissemination

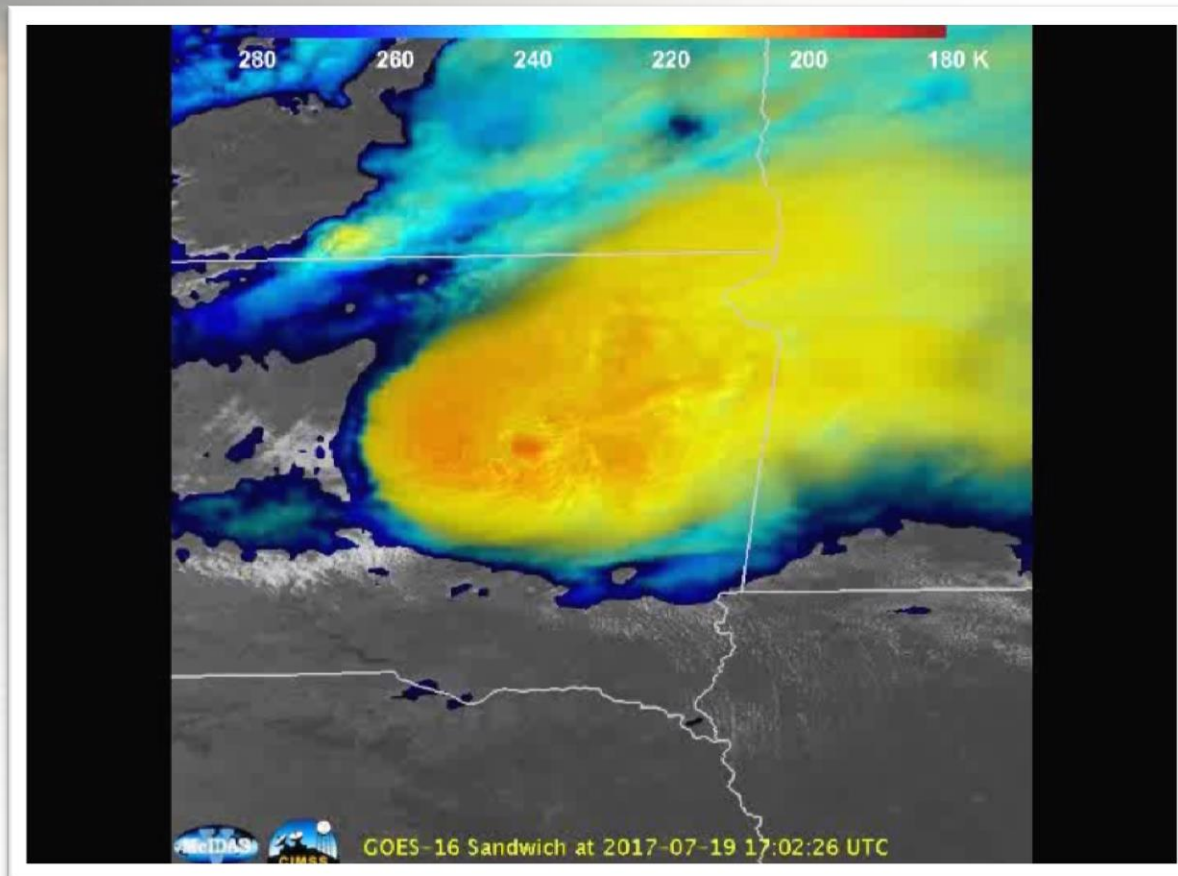
- Shutdown legacy NWSTG
- OneNWS upgrades for 50 CONUS sites
- Mass Dissemination for hazardous weather
- GOES-16 Readiness

## Analyze, Forecast, Support

- Evaluation of National Blend of Models prototype demonstration
- Impacts Catalog demonstration to show integration with field ops
- Operational Storm Surge Watch/Warning in 2017
- Integration of GOES-16 products into SWPC operations & website
- CONOPS for NWC Operations Center
- Probabilistic snowfall experiment expanded to 44 WFOs
- Add WFOs to DOT Pathfinder Project

# GOES-16: Redefining Mesoscale Meteorology

Derecho that moved across South Dakota and Minnesota, and into northern Iowa on July 19, 2017.

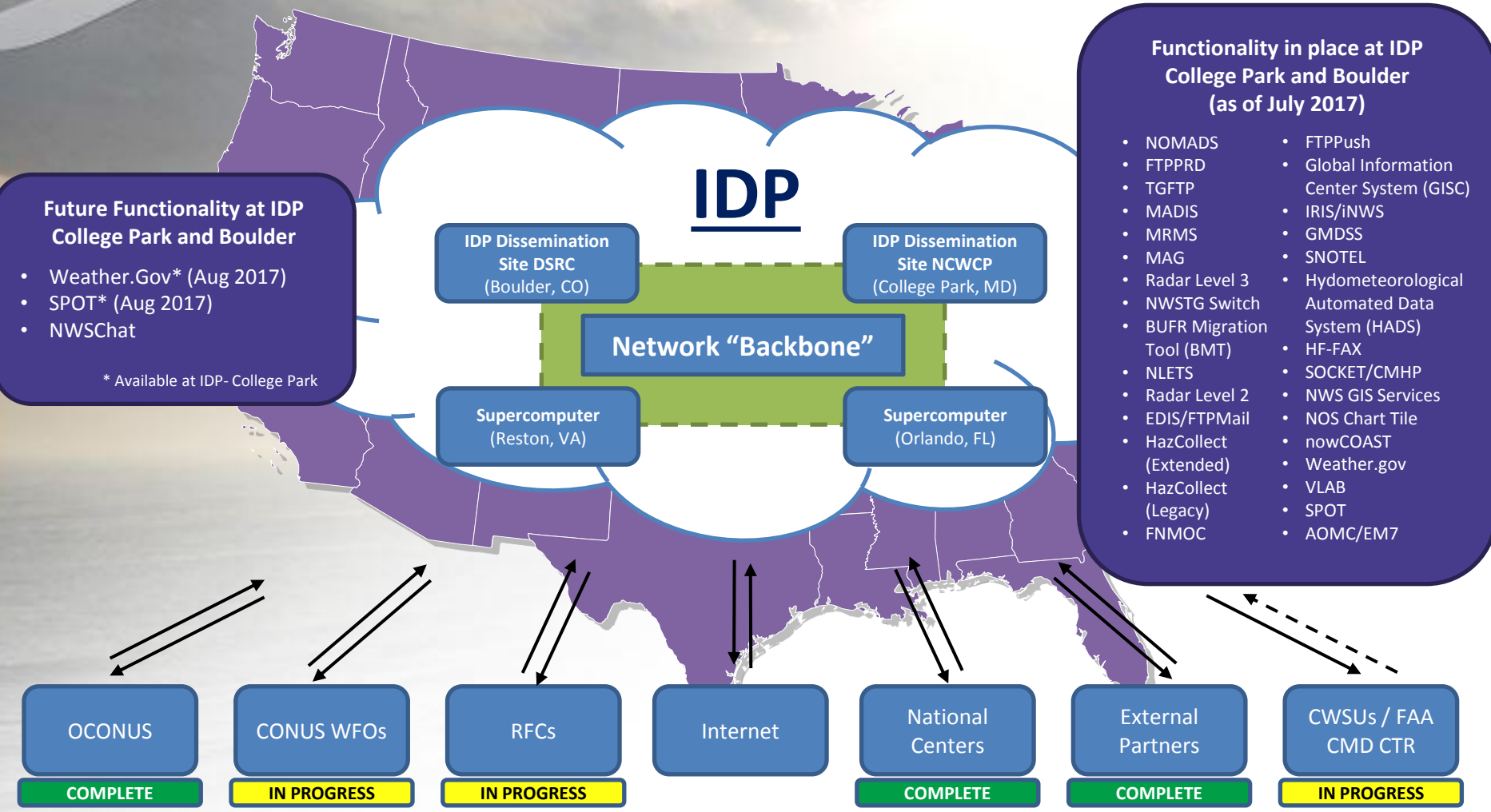


Credit CIMSS for this imagery

The GOES-16 data is preliminary, non-operational data and undergoing testing

# Integrated Dissemination Program (IDP)

## Long-Term Sustainable Solution



**Future Functionality at IDP College Park and Boulder**

- Weather.Gov\* (Aug 2017)
- SPOT\* (Aug 2017)
- NWSChat

\* Available at IDP- College Park

**Functionality in place at IDP College Park and Boulder (as of July 2017)**

- NOMADS
- FTTPRD
- TGFTP
- MADIS
- MRMS
- MAG
- Radar Level 3
- NWSTG Switch
- BUFR Migration Tool (BMT)
- NLETS
- Radar Level 2
- EDIS/FTPMail
- HazCollect (Extended)
- HazCollect (Legacy)
- FNMOC
- FTPPush
- Global Information Center System (GISC)
- IRIS/iNWS
- GMDSS
- SNOTEL
- Hydrometeorological Automated Data System (HADS)
- HF-FAX
- SOCKET/CMHP
- NWS GIS Services
- NOS Chart Tile
- nowCOAST
- Weather.gov
- VLAB
- SPOT
- AOMC/EM7

**“OneNWS” Network**

The future OneNWS network will consolidate all operational networks (OPSnet, Regional, etc.) as a single managed network under NCEP Central Operations (NCO).



[Click to Update Status \(Refresh Page When Complete\)](#)

Last Updated:

7/27/2017 7:23:39

**Overall Status:**

**Additional Operational and/or Milestone Comments:**

**Dissemination**

07/26 1015Z-1115Z: IDP's CP unexpectedly lost a compute blade causing multiple processes to fail, most of which had redundant processes running on other blades. NOMADS lost radar3 data and the GFS model stopped updating on tgftp at 198 hrs for approx. 30 min. Processes were shifted to alternate blades. Root cause of the blade failure remains under investigation.

07/26 1915Z-2045Z: IDP College Park processing contention cause multiple products to be missed or delayed. Failing MRMS, NOMADS and FTPPRD process to IDP Boulder restored full functionality.

IMPACTS:

- MRMS failed to create tiles across as much as 1/4 of the USA (mainly NE area)
- data transfer queues from Tide to NOMADS delayed RTMA, weatherfax, and AWC files for up to 2 hrs

**IDP Applications**

|                 |            |              |         |             |           |
|-----------------|------------|--------------|---------|-------------|-----------|
| BMT             | Chart Tile | EDIS         | FTP     | FTPMail     | FTPPush   |
| FTPS            | GIS        | GISC/OpenWIS | GMDSS   | HC Extended | HC Legacy |
| HF Fax          | Himawari   | iNWS         | IRIS    | MADIS       | MAG       |
| MRMS            | Network    | NIDS (IDP)   | NLETS   | NOMADS      | nowCOAST  |
| Radar 2         | Radar 3    | SNOTEL       | Sockets | SPOT        | TGFTP     |
| Trouble Tickets | VLAB       |              |         |             |           |

**Non-IDP Applications**

|       |       |       |      |                |         |
|-------|-------|-------|------|----------------|---------|
| AHPS  | CADAS | EMWIN | NDFD | NIDS (Non-IDP) | NWSChat |
| Other |       |       |      |                |         |

**Color-Code Key:**

Milestone Achieved

Fully Capable

Degraded Capability

No Capability

**Overall Status:****Additional Operational and/or Milestone Comments:****Circuits**

07/24 0600Z-Present (onenwsnet)(backup): PAGO PAGO lost connectivity via 1 of 2 antennas due to a faulty cooling fan. The 2nd replacement fan has been requested. Minimal impact while remaining antenna continues to function.

07/26 2230Z-0000Z (onenwsnet)(outage): Canada unable to send data to NWS due to an incorrect NCO firewall change. Queued data was received once the firewall configuration was reverted back to working state.

**Observations**

Lightning

Marine

RADAR

Satellite

Surface

Upper Air

Other

07/1530Z-1645Z: GOES-16 data unavailable on remote centers' GWSAS system. Harris advised that they were experiencing processing issues and only sending approx. 1/3 of the products.

**Central Proc.**

AWIPS

Models

NAWIPS

Regional IT

WCOSS

Sunday-Thursday: WCOSS system in Orlando unavailable to developers due to scheduled maintenance.

**AFS**

None

**Facilities**

None

**Color-Code Key:**

Milestone Achieved

Fully Capable

Degraded Capability

No Capability

# Computer Status/Model Implementation Supported through HFIP and Sandy Supplemental

## Key Atmospheric Model Upgrades Complete:

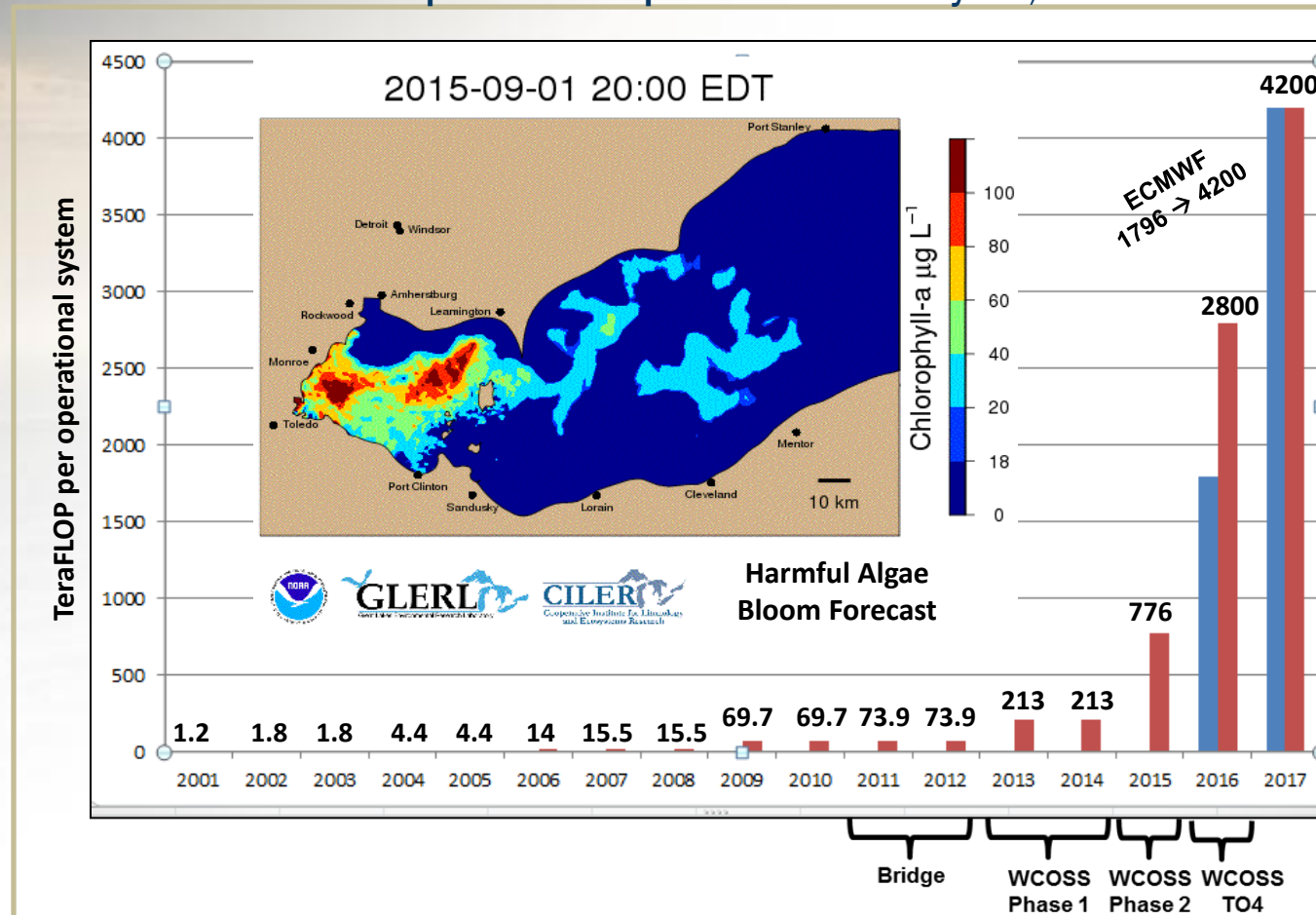
- August 2016: HRRR v2.0 and RAP v3.0
- August 2016: National Water Model (NWM) initial implementation
- Mar 2017: NAM v4.0
- Apr 2017: Probabilistic Storm Surge (PSURGE) upgrade
- May 2, 2017: RTMA upgrade
- **Global Forecast System (GFS) v14 upgrade - July 19**
- Hurricane WRF (HWRF) - July 26
- National Blend of Models v3.0 - July 27

## Upcoming Model Upgrades:

- Initial implementation of Hurricanes in a Multi-scale Ocean-coupled Non-hydrostatic (HMON) - August 1

**In Progress** Increase of HPC capacity to 4.2 petaFLOPs  
(for primary and backup, respectively—for a total of 8.4 PF)

Planned Acceptance for Operations: January 15, 2018



# GFS V15 and GEFS V12 Implementation

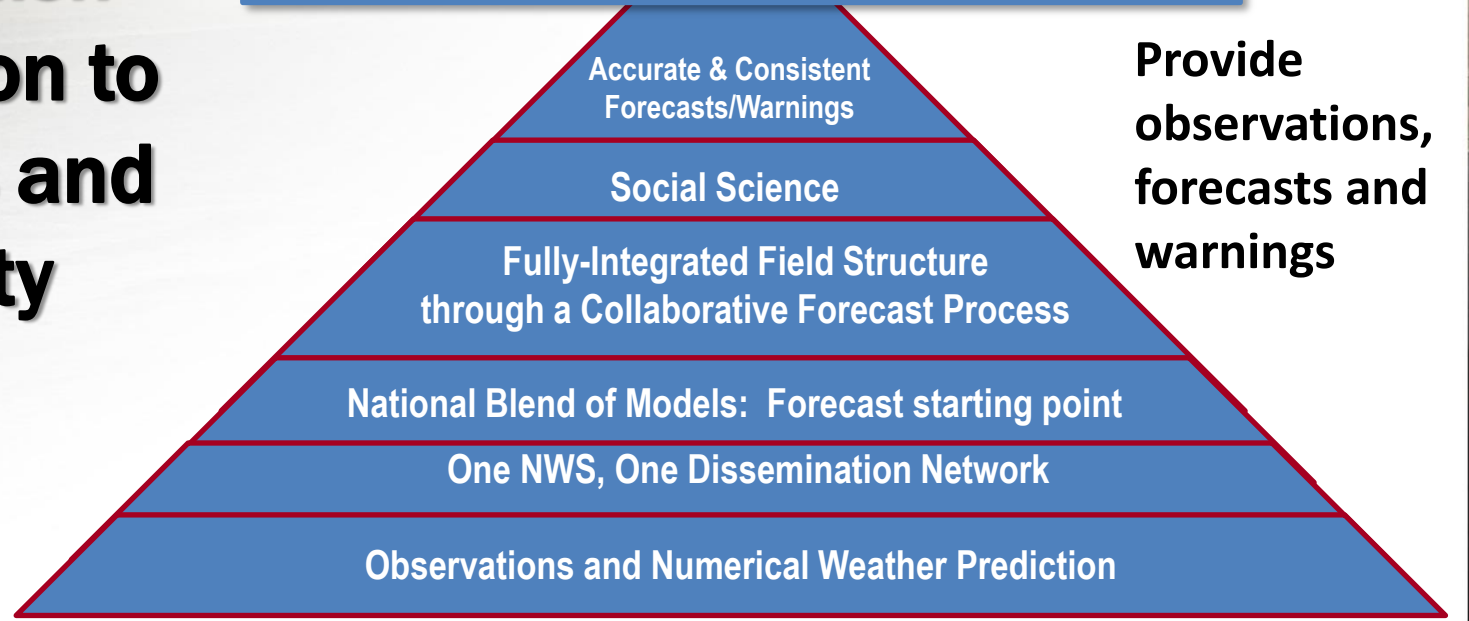
## Implementation Plans for Global Forecast System (GFS V15) and Global Ensemble Forecast System (GEFS V12)

| Timeline                                 | FY17   |    |    |   | FY18   |    |  |  | FY19 |   |    |                        | FY20 |    |
|--|--|----|----|---|--|----|--|--|------|---|----|------------------------|------|----|
| Component                                | Q1   | Q2 | Q3 | Q4  | Q1   | Q2 | Q3   | Q4   | Q1   | Q2  | Q3 | Q4                     | Q1   | Q2 |
| FV3 GFS Beta (Experimental)              | Evaluate, prepare and document FV3 dycore for GFS  |    |    | Implement FV3 dycore in NEMS & coupled to GFS Physics Cycled FV3GFS experiments |  |    |  | Experimental (beta) implementation of FV3GFS                                 |      |   |    |                        |      |    |
| Post-Processing, Downstream applications | Pre- and post-processing, verification & downstream  |    |    |   |  |    |  |  |      |   |    |                        |      |    |
| FV3 GDAS                                 | Preliminary GSI/EnKF DA for FV3; Assimilation of new satellite datasets (GOES-16, JPSS, COSMIC-2 etc.)                         |    |    |   | Cycled DA testing with advanced high-resolution configuration, tuning and optimization |    |  |  |      |   |    |                        |      |    |
| GFS 15.0 Implementation                  |  |    |    |   |  |    |  | retrospective + real-time parallels, evaluation and transition to operations |      | GFS V15 in operations                             |    |                        |      |    |
| FV3 GEFS Reanalysis                      | Develop and test low resolution FV3GFS with FV3GDAS, configure it for reanalysis (ESRL)  |    |    |   | Produce ~20-year reanalysis datasets using FV3GFS/GDAS (ESRL)                          |    |  |  |      |   |    |                        |      |    |
| Ensemble configuration & Reforecasts     | Configure FV3GFS ensemble resolution, members, physics, coupling to ocean and sea-ice, and extend forecasts to weeks 3&4 (EMC) |    |    |   |  |    | Finalize FV3GEFS V12 configuration* & produce ~20-year reforecasts (extended to 35 days) |  |      |   |    |                        |      |    |
| GEFS V12 implementation                  |  |    |    |   |  |    |  |  |      | Evaluate FV3GEFS V12 performance out to weeks 3&4 |    | GEFS V12 in operations |      |    |

**Pulling It all together to build a Weather-Ready Nation and to accomplish our mission to save lives and property**



To save lives and property



Provide observations, forecasts and warnings

# 2017 East New Orleans Tornado



|                       |                  |
|-----------------------|------------------|
| Date :                | February 7, 2017 |
| Strength:             | EF-3             |
| Track Width:          | 1/3 mile         |
| Tornado Track Length: | 10 miles         |
| Warning lead time:    | ~33 minutes      |
| Injuries              | 33               |
| <b>Fatalities:</b>    | <b>0</b>         |

- NWS local outreach and preparedness activities over a 4-year period
- Deep relationships with Emergency Managers/WRN Ambassadors
- Dissemination of forecasts and warnings
- Public awareness
  - Daytime event, visual confirmation, schools sheltered
- Collaborative forecast preparations within NWS and the larger enterprise a success
  - **Over 100 meetings and table-top exercises held in the city in the years preceding event**
- IDSS provided days in advance of the tornado



# **A Measure of Success**

**“Partnership with the NWS has revolutionized the EM community from one that reacts to events to one that proactively prepares and stays ahead of extreme events.”**

**Eric Waage\***

**Director of Emergency Management, Hennepin County Minnesota**

# Summary

- **NWS is Building a Weather Ready Nation - Touching every county in the U.S.**
- **Weather Research and Forecasting Innovation Act is directed toward the Mission of the NWS**
- **System upgrades (GOES 16, WCOSS, etc) are providing our workforce with the tools needed to carry out the mission.**
- **Emergency Management – Partnership with the NWS has revolutionized the EM community from one that reacts to events to one that proactively prepares and stays ahead of extreme events.**
- **Ongoing effort to Evolve the NWS to focus on the partnerships with the Emergency Management and Water Resource Managers – Build the reliable state of the technology/services infrastructure from observations – to modeling – to dissemination – to forecasts for IDSS support.**