



Improving Forecasting and Assimilation (IFAA) Portfolio

Hurricane Supplemental Overview
TCORF / 73rd IHC
March 13, 2019

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Bipartisan Budget Act of 2018



ORF:

\$120,904,000, to remain available until September 30, 2019, as follows:

- 1) \$12,904,000 for repair and replacement of observing assets, Federal real property, and equipment;
- 2) \$18,000,000 for marine debris assessment and removal;
- 3) \$40,000,000 for mapping, charting, and geodesy services; and
- 4) **\$50,000,000 to improve weather forecasting, hurricane intensity forecasting, flood forecasting and mitigation capabilities, and data assimilation from ocean observing platforms and satellites**

PAC:

\$79,232,000, to remain available until September 30, 2020, as follows:

- 1) \$29,232,000 for repair and replacement of Federal real property and observing assets; and
- 2) \$50,000,000 for improvements to operational and research weather supercomputing infrastructure and for improvement of satellite ground services used in hurricane intensity and track prediction



Spend Plan Overview

The approved \$50M spend plan was divided across 5 NOAA Line Offices. There are 27 projects across four primary focus areas:

Accelerate Improvements in Weather Forecasting

\$18.440M
Allocated
Funding

8 Projects

OAR: \$18.440M

Accelerate Improvements in Flood Forecasting and Mitigation

\$8.252M
Allocated
Funding

5 Projects

NWS: \$6.750M
NOS: \$1.502M

Accelerate Improvements in Hurricane Intensity Forecasting

\$10.548M
Allocated
Funding

7 Projects

NWS: \$7.250M
OAR: \$2.750M
OMAO: \$0.548M

Accelerate Data Assimilation from Observations to Improve Forecasting

\$12.760M
Allocated
Funding

7 Projects

OAR: \$1.250M
NWS: \$7.000M
NESDIS: \$4.510M





Management and Oversight Teams



- **Executive Oversight Team Leads (OAR, NWS, NESDIS)**
 - John Cortinas, Ming Ji, Harry Cikanek
- **Program Management Oversight Team**
 - Mark Vincent, Nicole Kurkowski, Kevin Garrett, Jim Sullivan
- **Support Oversight Team**
 - Segayle Thompson, Eric Locklear, Michelle Chawlk, Larry Evans, Tammie Herrin, Ericka Rosier, Nysheema Lett, Meka Laster, Shanie Gal-Edd, Danielle Tillman, Tristan Dietz, Kandis Boyd, Tamara Battle, Brenda Alford
- **Grants Management Division (GMD)**
 - Raishan Peterson, William Ball, Brenda Valentine, Nadia Musa



Potential Risks & Risk Management



ID	Score	Trend	TITLE	APPROACH
R-001	24	↔	Timely Execution of funds	Watch
R-002	18	↔	Sufficient capacity of R&D computing	Watch
R-003	14	↔	Timely access to R&D computing	Watch
R-004	16	↔	Timely recruitment of qualified scientist	Mitigate
R-005	16	↔	Timely execution of project plans	Mitigate
R-006	11	↔	Oversight and management of large number of projects across Los	Watch
R-007	16	↑	WCOSS moratorium causing downstream delay- Provide NCO resource modification	Mitigate

Risk Score

5	11	16	20	23	25
4	7	13	18	22	24
3	4	9	15	19	21
2	2	6	10	14	17
1	1	3	5	8	12
	1	2	3	4	5

Trend

- ↑ Increasing (Worsening)
- ↔ Unchanged
- ↓ Decreasing (Improving)

Approach

- Mitigate
- Watch
- Accept
- Share
- New





Key Opportunities

- Supplemental funding enables significant acceleration of priority HFIP activities and Unified Forecast System (UFS) activities
 - Development of next-generation Hurricane observing and forecast technology, named HAFS
 - Atmospheric and oceanic data assimilation
 - Physics for NGGPS/UFS
 - Community Infrastructure
 - Effective risk communication of warnings



Programmatic Events

- 27 projects have been approved by Line Office AAs
- OMB waiver was approved
 - Allows up to 48 mo period of performance on grant awards
- Non-competitive Request for Applications (RFA) for grants -
 - **Closes: Friday, 15 Mar 2019**
- All funds must be obligated in full by **30 Sep 2019**
- HSUP team is finalizing stringent monthly reporting processes and monitoring requirements





Project List and Budget



1	Accelerate Improvements in Weather Forecasting	18,440,000
	Accelerate Improvements in prediction of Extreme Precipitation	1,000,000
	Accelerate Improvements in Model Physics	4,000,000
	Accelerate the development of Common Infrastructure	3,000,000
	Accelerate NGGPS elements related to severe weather prediction, esp landfalling tropical storms & hurricanes	1,300,000
	Accelerate Stand Alone Regional FV3 CAM Development	1,200,000
	Accelerate FV3-based ensemble prediction system	2,750,000
	Enhance Operational MRMS to improve Model Initialization and forecaster situational awareness of Severe Weather	3,690,000
	Accelerate Effective Communication of weather forecasts and warnings to decision makers	1,500,000
2	Accelerate Improvements in Flood Forecasting & Mitigation	8,252,000
	NOS/IOOS - Regional Obs - IOOS support to integrated water level Modeling	1,252,000
	NOS/COOPS Tampa Bay Improvements	250,000
	Accelerate Coupling NWM with ESTOFS	3,000,000
	Accelerate Flood Inundation mapping Improvements	1,750,000
	NWS/DIS - Ensure effective Dissemination of new and improved data and information	2,000,000





Project List and Budget



3	Accelerate Improvements in Hurricane Intensity Forecasting	10,548,000
	Accelerate Hurricane Forecast Improvement Plan	2,000,000
	Accelerate re-Engineering of Hurricane Analysis and Forecasting System (HAFS)	2,150,000
	Improve Storm Surge Modeling	1,650,000
	Accelerate Improvements in NHC Forecast Techniques	750,000
	Improve Seasonal Hurricane Forecasts	700,000
	OAR-OWAQ Sustained Ocean Observations	2,750,000
	OMAO - Test and Evaluation of next-generation in-situ measurement systems	548,000
4	Accelerate Data Assimilation from Observations to Improve Forecasting	12,760,000
	Optimize current observing system to improve prediction of extreme weather	750,000
	Observing System Simulation Experiments (OSSEs)	500,000
	Mitigate drop-outs in forecast skill; EFSO study	2,500,000
	Accelerate development of JEDI infrastructure, testing and evaluation of assimilating new satellite data, global and CAM FV3-based data, and marine and hydrologic data	3,850,000
	Observation Processing	650,000
	Other STAR related JCSDA projects	1,500,000
	Contribution to JEDI Development	3,010,000





HAFS Participating Supplemental Projects



Coordinated 7 Hurricane Supplemental Plans to Accelerate Improvements in Hurricane Intensity Forecasting

- 1A.3: Accelerate Development of Common Infrastructure (NCAR/NESII)
- 1A.4: Accelerate NGGPS elements related to severe weather prediction, especially landfalling tropical storms and hurricanes (HRD & GSD)
- 3A.1: Accelerate implementation of the updated HFIP Plan (HRD)
- 3A.2: Accelerate re-Engineering of Hurricane Analysis and Forecasting System (HAFS) (EMC)
- 3B: Sustained Ocean Observations - Train for, prepare, deploy "picket fence" gliders; deliver, assess data (AOML)
- 4A.1: Optimize current observing system to improve prediction of extreme weather (AOML)
- 4A.2: Data Impact Studies (OSE/OSSE) (AOML)



Outcomes of HSUP projects for HAFS development



- Reproduce HWRF functionality and skill with FV3 based HAFS
- Accelerate moving nest implementation in FV3
- FV3 nests coupling to ocean and waves using NEMS NUOPC
- Implement vortex initialization for FV3
- Implement inner-core Hybrid En-VAR DA
- Implement HWRF Physics using CCpp



Outcomes to Storm Surge HSUP project (3A-3)



- Extend coupled hurricane model to surge, hydrology and inundation
 - Incorporate HSOFS in AWIPS II/SBN
 - Complete NWPS unstructured grids to advance TWL
- Extend storm surge forecast lead times to 3 days with same skill as 2-day
 - Develop updated Gulf of Mexico PETSS basin for post-tropical storms
- Accelerate storm surge model upgrades for OCONUS
 - Develop coupled HSOFS-WAVEWATCH III for Atlantic (incl PR/VI)
- Accelerate development of P-surge ensembles
 - Conduct ensemble feasibility study
 - Enhance HSOFS ensemble hindcast



Accelerate Effective Risk Communications of Warnings HSUP proj (1B-2)



- Assessing how the public consume and process changing tropical cyclone forecasts over time
- Optimizing tropical cyclone information
 - Conduct a NHC website usability study from a public perspective
- Modernizing the TC product suite by evaluating NWS partner
 - Baseline study on TC information needs and the utility of the current product suite in supporting key decision-making
- Assessing numeracy skills of forecasters, partners, and publics to improve TC product uncertainty communication, IDSS, and training
 - Baseline assessment of forecaster, NWS core partner, and public's understanding of probabilities



Outcomes for NHCs Forecast Techniques HSUP proj (3A-5)



- Improve statistical post-processing techniques – extend track and intensity forecasts to seven days
- Review and improve SFMR derived high velocity wind speed accuracy (currently suspect)
- Develop advanced diagnostic tools (3D visualization of model data for real-time assistance and post storm analysis)



Questions?