NOAA HURRICANE FORECAST IMPROVEMENT PROJECT

NWS Funding

HFIP Annual Meeting

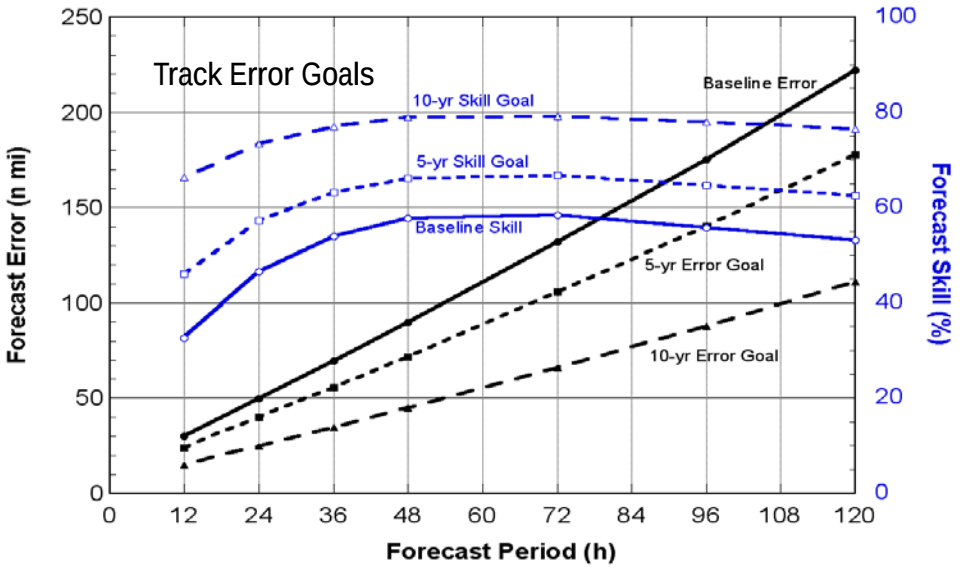
January 12, 2017

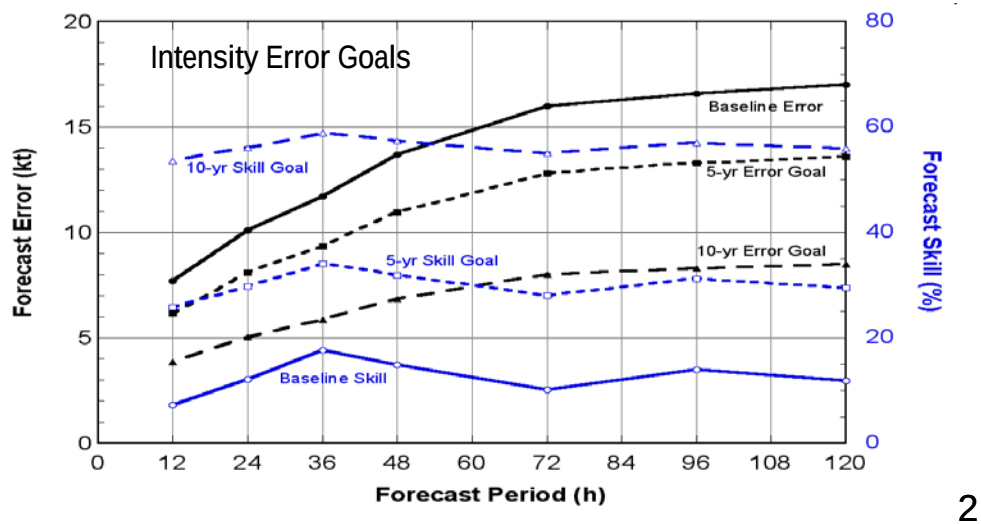
The HFIP Project Vision/Goals

Vision

Organize the hurricane community to dramatically improve numerical forecast guidance to NHC in 5-10 years

- **Goals**
  - Reduce numerical forecast errors in track and intensity by 20% in 5 years, 50% in 10 years
  - Extend forecast guidance to 7 days with skill comparable to 5 days at project inception
  - Increase probability of predicting rapid intensification at day 1 to 90% and 60% at day 5





Appropriation History
(2009-2017)

	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17
WCOSS PAC (HFIP	6.000M	3.000M	3.000M	2.000M	2.000M	4.000M	4.000M	4.000M	2.000M
NWS ORF	*15.040M	*14.040M	*14.044M	*14.044M 8.540M Due to NWS reprogram	**13.004M 1.999M Due to NWS reprogram	13.004M 3.2M due to reprogram of Sandy	4.500M	4.500M	1.500M (PB) Under 6mo CR
Hurr Sandy Suppl					10.066M	3.600M Use for FY14 R2O Enhancement			
OAR ORF	6.100M	6.100M	6.100M	6.000M	5.800M	5.800M	5.800M	5.800M	5.800M
TOTAL	*$27.140M	*$23.140M	*$23.144M	*$18.540M	*$22.737M	*$22.804M	$14.300M	$14.300M	$9.300M

*Includes $1,040K in NCEP Base allocation for HWRF and SLOSH O&M
** OMB Restored NOAA and DOC proposed reductions

Proposed 2017 HFIP Spend Plan

ORF Spending	Org	$$
HWRF Modeling team (EMC)	EMC	1,600,000
Product Development / AWIPS / Storm Surge	NHC	940,000
Grants	Univ	760,000
DTC Support + Ensemble Dev	NCAR/GSD + NCAR	500,000
ATCF & COAMPS-TC (NRL)	NRL	200,000
Wind Speed Prob Model dev	CSU	165,000
HFIP Program Office Support	STI	200,000
Total		**4,500,000 (CR)**

PAC Spending	$$
O&M/Labor on Jet System	1,100,000
Boulder Utilities (Power/Rent/Facility)	810,292.38
Total	**2,000,000**

2016 Awarded Mission-Oriented Research Grants ($1.518M – 2yrs)

Project Title	Principle Investigator	PI Affiliation	Start date	End date	Total budget (Yr 1 &2)
Evaluating Methods of Parameterizing Model Error in the HWRF Ensemble Prediction System	Ryan Torn	SUNY Albany	9/1/16	8/31/18	$328,574
Characteristics of Hurricane Intensity Error Growth and Predictability Limit in the HWRF Model	Chanh Kieu	Indiana Univ	9/1/16	8/31/18	$205,843
Probabilistic Prediction of Tropical Cyclone Track, Intensity, and Structure with an Analog Ensemble	Christopher Rozoff	Univ of Wisc	9/1/16	8/31/18	$352,627
Further Advancement of HWRF Self-consistent Ensemble-variational Hybrid Data Assimilation System to Improve High Resolution Hurricane Vortex Initialization	Xuguang Wang	Univ of Oklahoma	9/1/16	8/31/18	$292,285
Improving HWRF's Ability to Predict Rapid Change in Tropical Cyclone Intensity Governed by Internal Physical Processes	Ping Zhu	Florida Int'l Univ	9/1/16	8/31/18	$339,161

Near-Term Priorities under 2017 Budget Reduction

- Leverage NGGPS resources to maintain cross-NOAA and external community involvement
- Operational Partnership for Multi-Model Ensembles in all Basins
- Focus on improvements of model physics (scale aware), vortex initialization and data assimilation
- Evolution of Hurricane Forecast System includes:
  - global-to-local scale predictions with emphasis on multi-scale interactions
  - Improved forecasts for land falling storms and downstream applications
  - Precipitation after land fall
  - Development of Nesting Technology
- Continued focus on high-resolution ensembles, advanced air-sea-wave-land-hydrology coupled systems
- Improved products to the forecasters

We Will Achieve Long Term Goals – just will take little longer!

R&D HPC
Configuration of Jet System

	Install Date	Total Cores	Performance (Tflops)	Storage (TB)
Phase 1 (Njet)	Aug 2009	3184	35.6	350
Phase 2 (Tjet)	Aug 2010	10600	113.0	416
Phase 3 (Ujet)	Oct 2011	16648	182.0	1166
Phase 4 (Sjet)	Aug 2012	22088	272.0	1613
Phase 5 (Vjet)	Aug 2014	24456	340.26	3261
Phase 6 (Xjet)	Oct 2015	32520	576	3773
Phase 7 (Xjet+) expansion	Aug 2016	45388	820	4400

Questions?