



# Joint Hurricane Testbed: Administrative Update

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The JHT is funded by the US Weather Research Program in NOAA/OAR's Weather Program Office



# Agenda

- **Joint Hurricane Testbed Overview**
  - Transition Decisions on FY17-19 Projects
- **Ongoing JHT & JTTI Projects**
- **Operational Transition Decisions: Metrics & Process**
- **Introduction to the Hurricane and Ocean Testbed (HOT)**



# Joint Hurricane Testbed

Bridging the gap between hurricane research & operations

- JHT began in 2001 under the USWRP
  - Currently in 10th round of projects
  - 98 projects funded to date, pending new FY22 projects
- **JHT Mission:** successfully transfer new technology, research results & observational advances from research groups to operational centers
- Testing is primarily done at the National Hurricane Center, Central Pacific Hurricane Center, or Joint Typhoon Warning Center



# JHT Staff & Funding

- Staff
  - **Wallace Hogsett:** JHT Director, NHC Science and Operations Officer
  - **Jason Sippel:** JHT Assistant Director and HRD Meteorologist
  - **Alan Brammer:** JHT R2O Facilitator/Programmer
  - **Brian Zachry:** JHT Transition Manager
- Current Funding
  - Roughly \$600K for current projects
  - ½ time support for JHT Facilitator/Programmer
  - 0.2 FTE support and HRD for admin support
  - 30K for JTTI project support (real-time demonstration and evaluation)



# JHT Project Overview - 2015-22

- **Round 8 (FY15-17):** 8 projects completed
  - 5 accepted for operational implementation
  - 1 deferred until additional evaluation can be conducted
  - 2 not accepted for operational implementation
- **Round 9 (FY17-19):** 6 projects completed
  - 2 accepted for operational implementation
  - 4 not accepted for operational implementation
- **Round 10 (FY19-22):** 3 projects in progress
- **Round 11 (FY22-24):** New projects under review

# JHT Projects - FY17-19, FY19-22

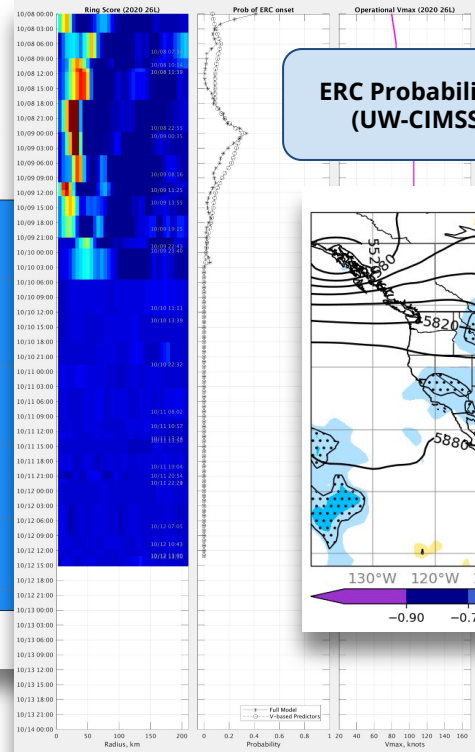
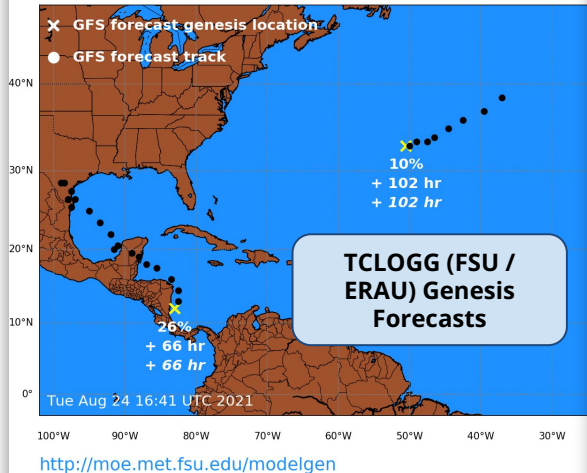


Funding Cycle (FY)	Project Title	Principal Investigator(s)	Status
2017	Evolutionary Programming for Probabilistic Tropical Cyclone Intensity Forecast	Paul Roebber and Clark Evans (UW-Milwaukee)	Not Accepted
2017	<b>Improvements to Operational Statistical Tropical Cyclone Intensity Forecast Models Using Wind Structure and Eye Predictors</b>	<b>Galina Chirokova (CSU/CIRA), John Kaplan (AOML/HRD)</b>	Accepted
2017	<b>Improvements and Extensions to an Existing Probabilistic TC Genesis Forecast Tool Using and Ensemble of Global Models</b>	<b>Bob Hart (FSU), Dan Halperin (Embry-Riddle)</b>	Accepted
2017	Estimation of Tropical Cyclone Intensity Using Satellite Passive Microwave Observations	Haiyan Jiang (Florida Intl Univ.)	Not Accepted
2017	Transition of Machine-Learning Based Rapid Intensification Forecasts to Operations	Andrew Mercer and Kimberly Wood (MSU)	Not Accepted
2017	Ensemble-based Pre-genesis Watches and Warnings for Atlantic and North Pacific Tropical Cyclones	Russ Elsberry (UC-CS)	Not Accepted
2019	Further improvements and extensions to the tropical cyclone logistical guidance for genesis (TCLOGG)	Robert Hart, FSU; Dan Halperin, Embry-Riddle	TBD
2019	Upgrades to the M-PERC and PERC Models to Improve Short Term Tropical Cyclone Intensity Forecasts	Derrick Herndon, UW Madison	TBD
2019	Transitioning Ensemble-based TC Track and Intensity Sensitivity to Operations	Ryan Torn, Albany	TBD

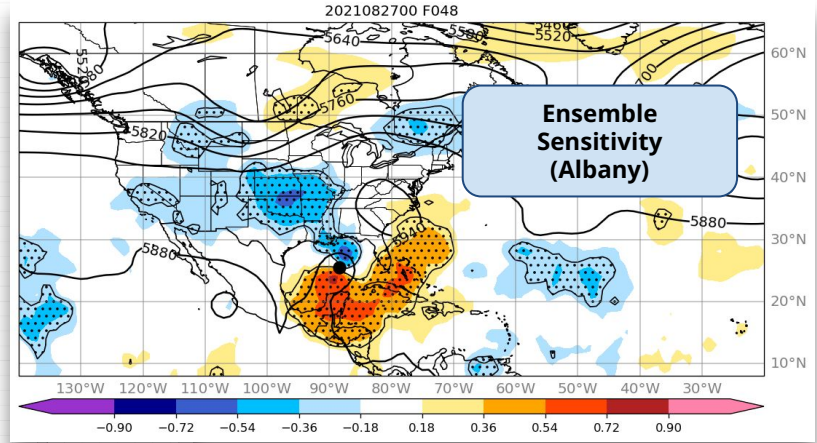


# JHT - Current Projects

Experimental 0-48 h TC genesis probability  
GFS model output initialized 2021-08-24 12Z



**ERC Probabilities (UW-CIMSS)**





# JTTI - Current Projects

- FY18: 1 Project transitioned - available in METv10.1.0-beta5 release
  - Dan Halperin: Adding tropical cyclone genesis verification capabilities to the Model Evaluation Tools – Tropical Cyclone (MET-TC) software
- FY20: 2 Projects in JHT Evaluation
  - Taylor Trogdon & Nate Hardin: Generating Storm Surge Hazards using Hazard Services
  - Galina Chirokova: Use of Ocean Stability Data and Machine Learning to Improve Tropical Cyclone Situational Awareness and NHC Statistical-Dynamical Intensity Guidance
- FY21: 2 Projects in JHT Evaluation
  - Kate Musgrave: Integration of Model Large-Scale Environmental Diagnostics for Tropical Cyclones into the MET-TC Verification Package
  - Andrea Schumacher: Unification and Improvements to Guidance for National Weather Service Tropical Cyclone Wind and Storm Surge Hazard Products





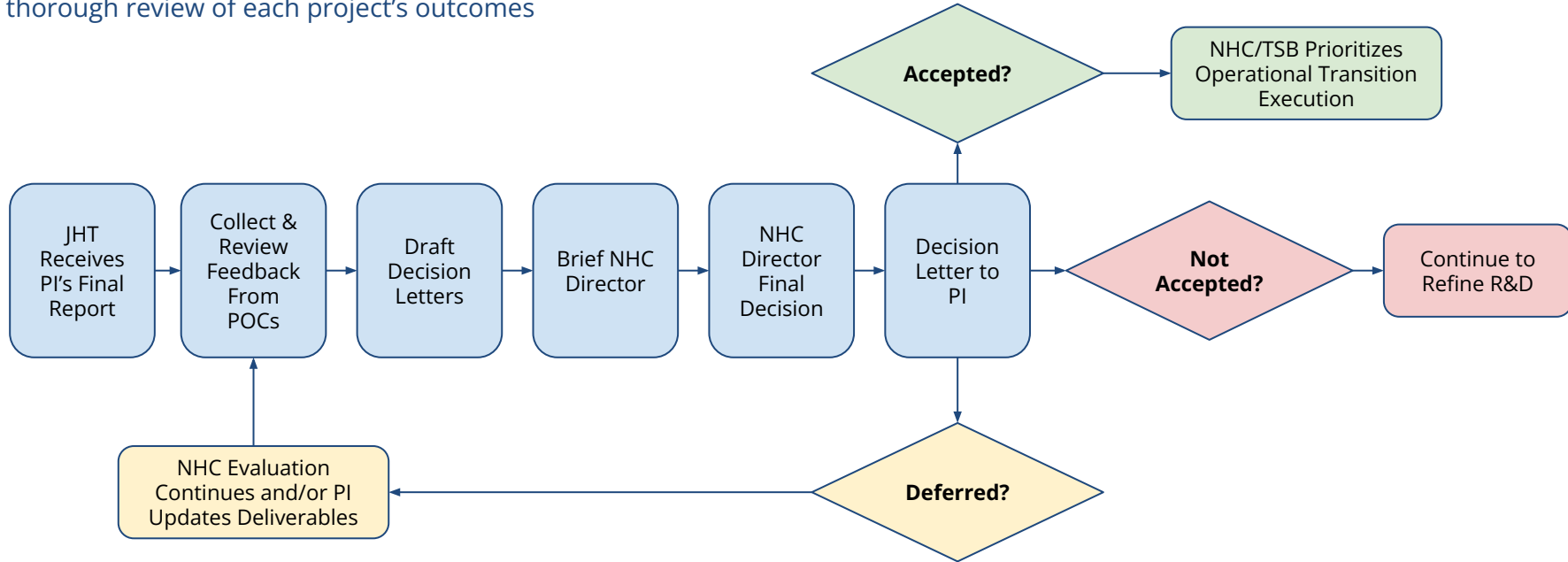
# Operational Implementation Metrics

- **Forecast or Analysis Benefit:** expected improvement operational forecasts and/or analysis benefit
- **Efficiency:** adherence to forecaster time constraints and ease of user's needs
- **Compatibility:** IT compatibility with operational hardware, software, data, communication, etc.
- **Sustainability:** availability of resources to operate, upgrade, and/or provide support (O&M)



# NHC Transition Decision Process

Upon completion of each round of projects, JHT leadership conducts a thorough review of each project's outcomes





# JHT Implementation Summary

- 98 projects supported in 10 funding rounds since 2001
  - 63 accepted for operational implementation
  - 31 not accepted
  - 1 deferred
  - 3 projects ongoing
- **High R2O success rate** - 66% of completed JHT projects have been accepted for operational implementation



# JHT Lessons Learned: Evolving R2O at NHC

Areas where we want to evolve:

- **Casting a wide net** to consistently transition all R2O projects (JHT, HFIP, JTTI, non-NOAA, supplementary funding, etc)
- **Integrating the full spectrum of disciplines**, including social and other natural sciences (e.g. oceanography) & taking a holistic view of improving forecasts - e.g., FACETS, IDSS
- **Enabling physical and virtual collocation** of forecasters, researchers, users, and R2O experts
- **Providing an isolated test environment** that mimics operations
- **Gaining speed** and removing technical barriers



# Last Year's Testbed Prototype...





# The Hurricane and Ocean Testbed (HOT)

- The William Lapenta Laboratory at NHC, Home of the HOT:
  - A **physical**, collaborative environment to consider all aspects of the forecast continuum - from observations to actions
  - A **virtual** technology ecosystem to test hurricane and ocean R&D in a quasi-operational environment
- HOT is a home for all projects, testbeds, etc. across the value chain that require NHC T&E
  - Establishes efficient pathways to rapidly progress Readiness Levels (RLs) of hurricane and ocean innovations





The William Lapenta Laboratory at NHC:  
Home of the Hurricane and Ocean Testbed (HOT)

Isolated Virtual  
AWIPS Cloud  
Environment

Whiteboard  
and Video Wall

A/V Demonstrations

Experiment  
Workstations

Development  
Workstations

Collaboration Area



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