



# The Joint Hurricane Testbed – 2017 Update

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

Interdepartmental Hurricane Conference – March 16, 20017

# Joint Hurricane Testbed (JHT)

- Bridge hurricane research & operations
- Began in 2001 under the USWRP
- **Our Mission:** successfully transfer new technology, research results & observational advances from research groups to operational centers
- Testing is done at the National Hurricane Center or Environmental Modeling Center

# JHT: By the numbers

- Number of projects supported: 89
  - 81 completed
    - 52 implemented into operations at NHC or EMC
    - 1 to be implemented
    - 22 not accepted
    - 4 deferred
    - 2 decisions soon forthcoming (FY13-15: 7<sup>th</sup> round)
  - 8 projects started 1 Sep. 2015 (FY15-17: 8<sup>th</sup> round)

# Our process

- Call for Proposals – drafted and disseminated (bi-annually)
- Principal Investigators apply for funding through NOAA
- Seven member Steering Committee rates all proposals
- Funded projects are tested during 1 or 2 hurricane seasons in conjunction with NHC/EMC points of contact
- At the project's end, each are evaluated by NHC/EMC staff
- Implementation of successful projects are then carried out by NHC/EMC staff/PIs

# 2017 and 2018 Plans

- Continued testing during the 2017 hurricane season of 8 currently funded projects (8<sup>th</sup> round – next 8 talks)
- Final reports provided by Principal Investigators – late 2017 and early 2018
- Operational implementation decision made by NHC – 2018
- New proposals funded starting 1 July 2017 (9<sup>th</sup> round)
- Testing conducted during the 2018 hurricane season

# The Joint Hurricane Testbed

The screenshot shows the website interface with a navigation menu on the left and a main content area. The URL [www.nhc.noaa.gov/jht](http://www.nhc.noaa.gov/jht) is highlighted at the top. The page title is "National Hurricane Center". The main content area features a banner for "USWRP Joint Hurricane Testbed" and a section titled "JHT Overview". Below this, there is a "Mission Statement" section, a "News" section with three entries, and a "Main Activities" section with three bullet points. The "News" section includes dates and titles of recent updates. The "Main Activities" section lists key goals of the testbed.

[www.nhc.noaa.gov/jht](http://www.nhc.noaa.gov/jht)  
National Hurricane Center

Home News Organization Search [input] NWS All NOAA Go

Local forecast by "City, St" or "ZIP" [input] Go

Alternate Formats  
Text | Mobile  
Email | RSS  
About Alternates

Cyclone Forecasts  
Latest Advisory  
Past Advisories  
Audio/Podcasts  
About Advisories

Marine Forecasts  
Atlantic & E Pacific  
Gridded Marine  
About Marine

Tools & Data  
Satellite | Radar  
Analysis Tools  
Aircraft Recon  
GIS Datasets  
Data Archive

Development  
Experimental  
Research  
Forecast Accuracy

Outreach & Education  
Prepare  
Resources  
Storm Surge  
About Cyclones  
Cyclone Names  
Wind Scale  
Most Extreme  
Forecast Models  
Breakpoints  
Glossary | Acronyms  
Frequent Questions

Our Organization  
About NHC  
Mission | Staff  
Visitors | Virtual Tour  
Library Branch  
NCEP | Newsletter

Contact Us  
Comments

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twitter

## Joint Hurricane Testbed

### JHT Overview

Overview | Current Projects | Past Projects  
Admin Presentations | Highlights | Staff | Committee

#### Mission Statement

The mission of the Joint Hurricane Testbed is to transfer more rapidly technology, research results, and observational advances of the [Unite Program \(USWRP\)](#), its sponsoring agencies, the academic community improved tropical cyclone analysis and prediction at operational centers.

#### News

20 March 2012: [2012 IHC presentations posted for 2011-2013 projects](#)  
1 November 2011: [Press Release on new 2011 funded JHT projects](#)  
30 September 2011: [New JHT projects \(Round 6, FY11-13\) announced](#)

[View News Archive](#)

#### Main Activities

- Identify new techniques, models, observing systems, etc. with potential via an announcement of opportunity and a proposal, review, and funding.
- Establish and maintain an infrastructure to facilitate the modification and integration of tools, techniques, and data into the operational computing, communication, and display environment.
- Complete tests in a quasi-operational environment of tools, techniques, and data, with metrics for scientific performance, ease-of-use, and support.
- Prepare documentation, training, and performance evaluations of successful tools, techniques, and data to facilitate use and support in operations.

Please see the [Joint Hurricane Testbed Terms of Reference](#) (PDF) for more details.

Rappaport et. al., 2012 - *BAMS*

## THE JOINT HURRICANE TEST BED

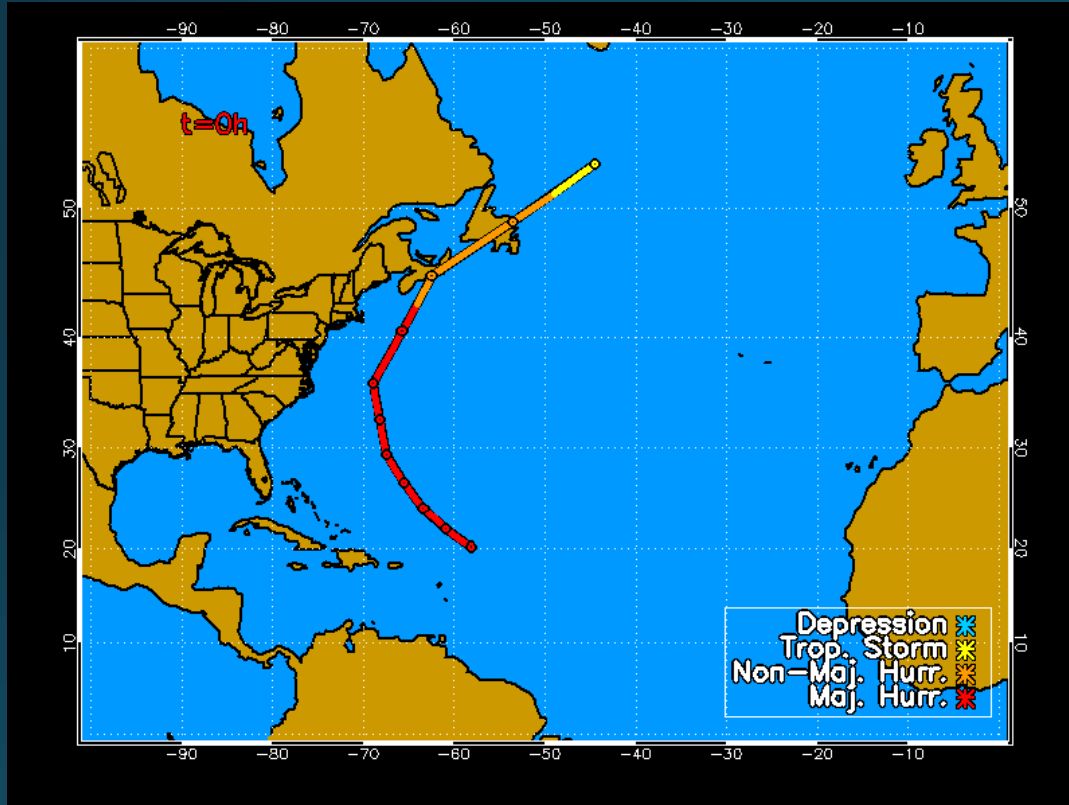
Its First Decade of Tropical Cyclone  
Research-To-Operations Activities Reviewed

BY EDWARD N. RAPPAPORT, JIANN-GWO JIING, CHRISTOPHER W. LANDSEA,  
SHIRLEY T. MURILLO, AND JAMES L. FRANKLIN

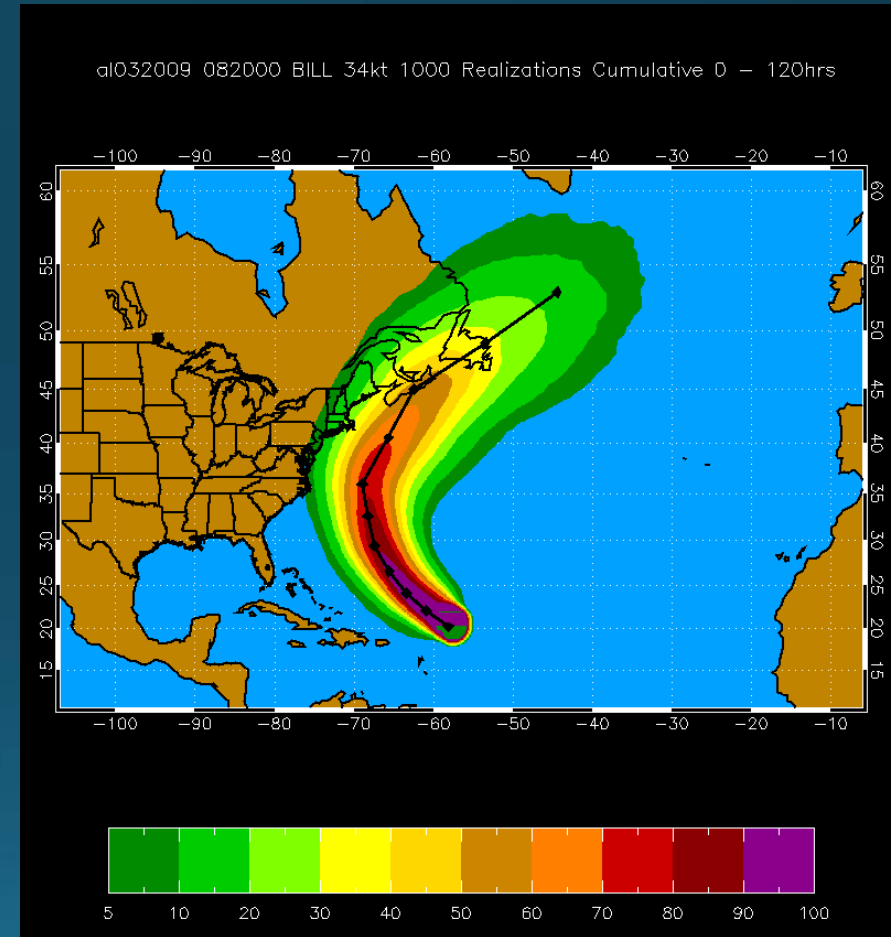
Collaboration between researchers, forecasters and technology specialists facilitated the development and implementation of numerous projects benefitting forecast operations.

# Wind Speed Probabilities

## Hurricane Bill 20 Aug 2009 00 UTC



1000 Track Realizations



34 kt 0-120 h Cumulative Prob.



# Wind Speed Probabilities

ZCZC MIAFWSAT4 ALL  
 TTA000 KNHC DDHMM  
 HURRICANE WILMA PROBABILITIES NUMBER 20  
 NWS TPC/NATIONAL HURRICANE CENTER MIAMI FL  
 0900Z THU OCT 20 2005

...THIS IS AN EXPERIMENTAL PRODUCT FOR 2005...

AT 0900Z THE CENTER OF HURRICANE  
 WILMA WAS LOCATED NEAR LATITUDE 18.3 NORTH...  
 LONGITUDE 85.0 WEST WITH  
 MAXIMUM SUSTAINED WINDS NEAR 130 KTS...150 MPH...240 KM/HR.

CHANCES OF EXPERIENCING WIND SPEEDS OF AT LEAST

- ...34 KT (39 MPH... 63 KPH)...
- ...50 KT (58 MPH... 93 KPH)...
- ...64 KT (74 MPH...119 KPH)...

FOR LOCATIONS AND TIME PERIODS DURING THE NEXT 5 DAYS

PROBABILITIES FOR LOCATIONS ARE GIVEN AS IP(CP) WHERE

IP IS THE PROBABILITY OF THE EVENT BEGINNING DURING  
 AN INDIVIDUAL TIME PERIOD (INDIVIDUAL PROBABILITY)

(CP) IS THE PROBABILITY OF THE EVENT OCCURRING BETWEEN  
 06Z THU AND THE FORECAST HOUR (CUMULATIVE PROBABILITY)

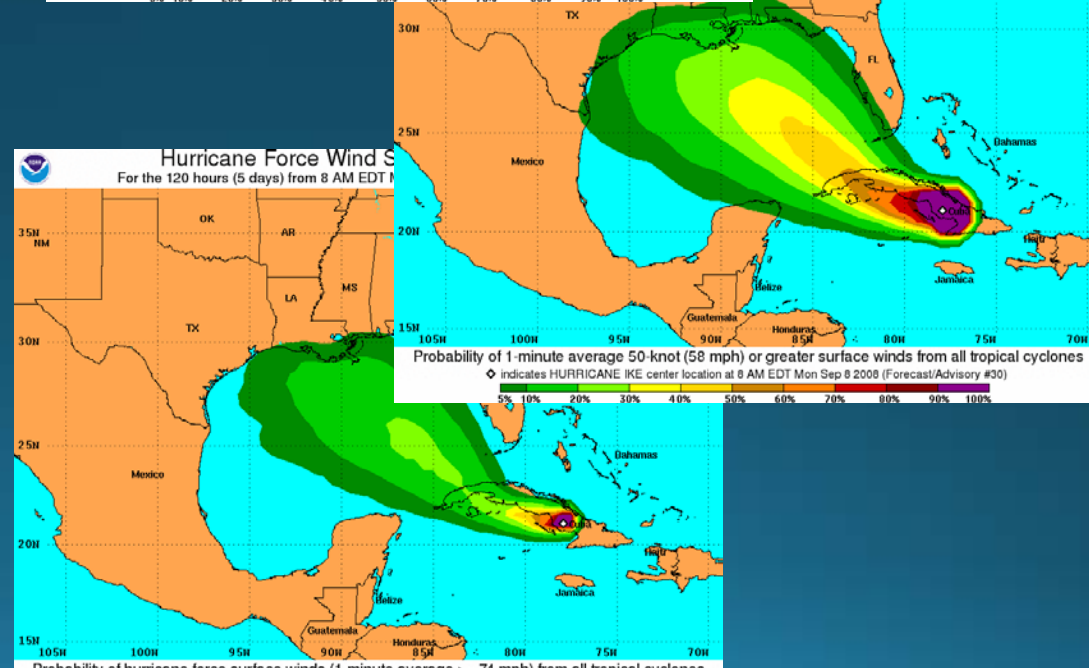
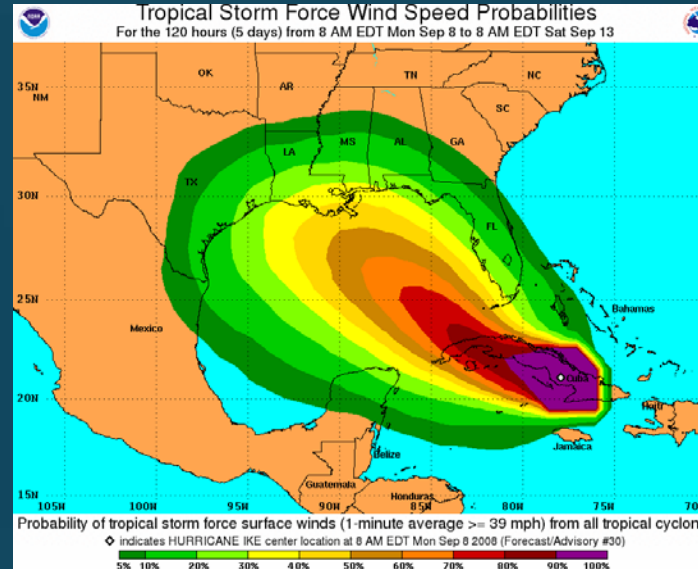
PROBABILITIES ARE GIVEN IN PERCENT

X INDICATES PROBABILITIES LESS THAN 0.5 PERCENT  
 LOCATIONS SHOWN WHEN THEIR TOTAL CUMULATED 5-DAY  
 PROBABILITY IS AT LEAST 2.5 PERCENT

Z INDICATES UNIVERSAL COORDINATED TIME (GREENWICH)

----- WIND SPEED PROBABILITIES FOR SELECTED LOCATIONS -----

TIME PERIODS		FROM	FROM	FROM	FROM	FROM	FROM	
		06Z THU	18Z THU	06Z FRI	18Z FRI	06Z SAT	06Z SUN	
PERIODS		TO	TO	TO	TO	TO	TO	
		18Z THU	06Z FRI	18Z FRI	06Z SAT	06Z SUN	06Z MON	
FORECAST HOUR		(12)	(24)	(36)	(48)	(72)	(96)	
		(120)						
LOCATION	KT							
MIAMI FL	34	X	X ( X )	X ( X )	2 ( 2 )	16 (18)	23 (41)	5 (46)
MIAMI FL	50	X	X ( X )	X ( X )	X ( X )	6 ( 6 )	11 (17)	3 (20)
MIAMI FL	64	X	X ( X )	X ( X )	X ( X )	2 ( 2 )	5 ( 7 )	1 ( 8 )
KEY WEST FL	34	X	X ( X )	2 ( 2 )	7 ( 9 )	26 (35)	18 (53)	3 (56)
KEY WEST FL	50	X	X ( X )	X ( X )	1 ( 1 )	14 (15)	11 (26)	1 (27)
KEY WEST FL	64	X	X ( X )	X ( X )	X ( X )	8 ( 8 )	5 (13)	1 (14)
MARCO ISLAND	34	X	X ( X )	X ( X )	5 ( 5 )	20 (25)	23 (48)	4 (52)
MARCO ISLAND	50	X	X ( X )	X ( X )	1 ( 1 )	10 (11)	12 (23)	2 (25)
MARCO ISLAND	64	X	X ( X )	X ( X )	X ( X )	5 ( 5 )	6 (11)	X (11)

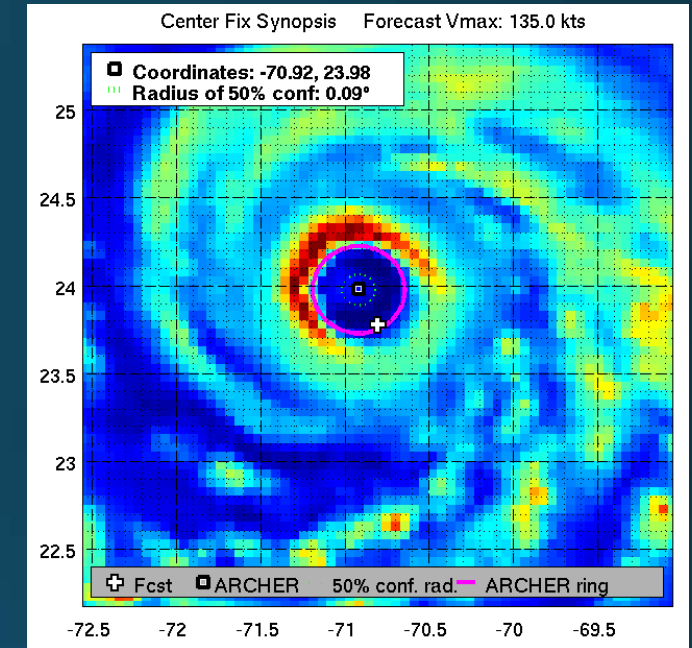
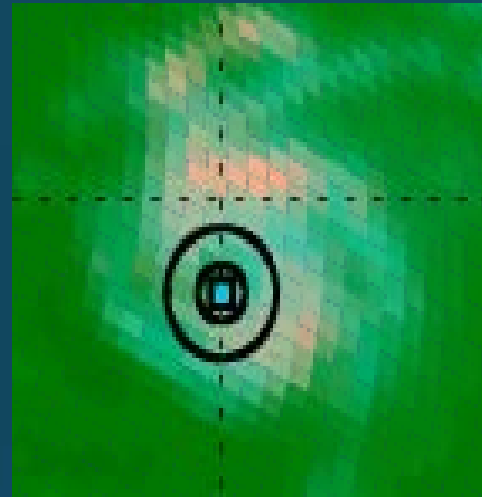




# Current Project Highlights - FY15-17: 8<sup>th</sup> round

## Tropical Cyclone Genesis Index: Dunjon

	ATLANTIC TC GENESIS INDEX												
	AL972013 10/01/13 18 UTC												
TIME (hr)	0	6	12	18	24	36	48	60	72	84	96	108	120
TCGI (%)							45.1						65.0
HDIV (x10 <sup>-7</sup> s <sup>-1</sup> )	-3.0	-4.0	-1.0	-3.0	-5.0	0.0	-6.0	1.0	-5.0	0.0	-4.0	0.0	0.0
VORT (x10 <sup>-6</sup> s <sup>-1</sup> )	1.3	1.6	1.6	1.7	1.6	1.5	1.1	0.8	1.0	0.5	1.1	1.1	1.1
DV24 (x10 <sup>-6</sup> s <sup>-1</sup> )	0.3	0.0	-0.1	-0.7	-0.5	-0.7	-0.1	-0.3	0.1	0.6	0.0	-0.1	-0.3
VSHD (kt)	5	9	11	9	9	17	19	19	19	26	24	28	27
MLRH (%)	67	67	64	63	67	64	68	62	64	52	54	52	54
PCCD (%)	42	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TNUM	1.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
LAT (deg N)	16.8	17.2	17.8	18.5	20.3	22.9	25.0	26.3	27.6	28.3	29.2	30.1	31.4
LON (deg W)	83.0	83.5	84.4	85.1	85.8	87.0	87.4	87.5	86.8	86.5	85.5	84.4	82.9
DTL (km)	169	172	217	259	132	154	382	358	270	188	56	-5	-140
TRACK SOURCE	AVNO	AVNO	AVNO	AVNO	AVNO	AVNO	AVNO	AVNO	AVNO	AVNO	AVNO	AVNO	AVNO



U.S. NAVAL RESEARCH LABORATORY

### NRL Tropical Cyclone Page

Storm Home | Microwave | Scatterometry | Vis/IR | ATCP | Environment

Pass Mosaic | Mosaic | List | Instant Loop | Animated Gif

Storm List

Sensor	% Cov	89H	89 Diff	89 Color	37H	37 Diff	37 Color	19H	19 Diff	Vis	IR Color	IR Dvorak	RGB Test 1	RGB Test 2	RGB Test 3
F08 SSM/I	55.7	■													
F16 SSM/I	62.7	■													
AMS R3	96.0	■													
TMI	33.9	■													
WINDSAT	49.0	■													
MWI	66.0	■													

Currently: Saturday, August 13, 2016 18:44:14 UTC (Z)

Switch | Reverse | Rock | Next | Previous | Speedup | Slowdown | Refresh | Zoom In | Zoom Out

Speed bar for animations

GCOM-W1 AMSR2 89H 2016/07/25 22:11:00Z NRL-Monterey

Rapid Intensity Forecasting: Jiang

Eyewall Replacement Cycle  
ARCHER: Wimmers

### Matrix of RI probabilities

RI (kt / h)	20/12	25/24	30/24	35/24	40/24	45/36	55/48
SHIPS-RII:	17.4%	64.3%	54.0%	37.1%	30.9%	62.9%	70.6%
Logistic:	7.1%	42.6%	43.0%	19.6%	12.3%	55.7%	56.8%
Bayesian:	0.9%	47.6%	34.5%	8.3%	3.5%	10.1%	36.4%
Consensus:	8.5%	51.5%	43.9%	21.6%	15.6%	42.9%	54.6%

NRL web page upgrades: Cossuth

RI SHIPS improvement: Rozoff

# Best Practices/Lessons Learned

- **Dedicated Admin. Staff**
  - JHT Director and Admin. Assistant: work closely with ops center and PIs
  - IT computer programmer for JHT projects
- **Process is proposal driven**
  - Includes NHC/CPHC/JTWC and EMC's areas of priority
  - Provide info on operational center's IT environment
- **Seven member Steering Committee**
  - Representatives from the Tropical Cyclone community
  - Review and rank proposals
- **When projects begin, PIs are partnered with forecasters**
  - Continuous interaction throughout transition process
  - PI provide semi-annual progress reports

# Metrics for Operational Implementation

- **Forecast or Analysis Benefit:** expected improvement operational forecast and/or analysis accuracy
- **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