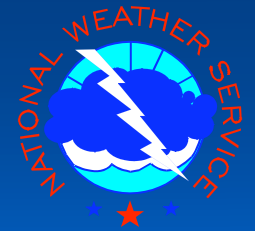




<http://www.nhc.noaa.gov/jht/index.shtml>



# Joint Hurricane Testbed (JHT) 2010 Update

## Transition from Research to Operations

**Jiann-Gwo Jiing**

**Chief, Technical Support Branch, NHC  
JHT Director**

**Shirley Murillo  
NOAA/HRD**

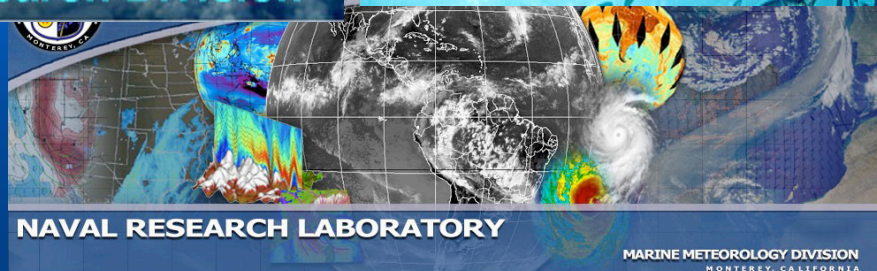
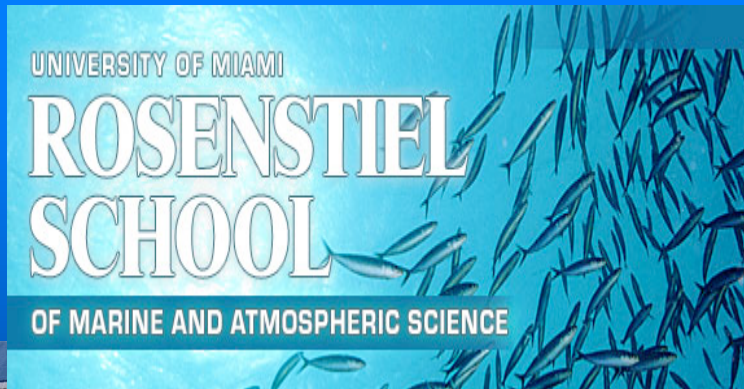
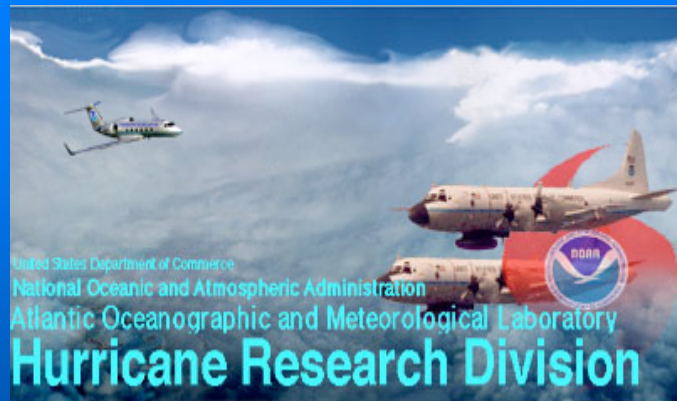
**Chris Landsea  
NHC**

USWRP Testbed Workshop  
Boulder, CO – May 4 and 5, 2010

# The Forecasters (us):



# The Researchers (them):



How to  
bridge  
the  
"valley  
of  
death"?

# JHT Process

- **Principal Investigators apply for funding through NOAA**
- **A seven member Steering Committee rates all proposals**
- **Funded projects are tested during one or two hurricane seasons in conjunction with NHC/ Environmental Modeling Center 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**

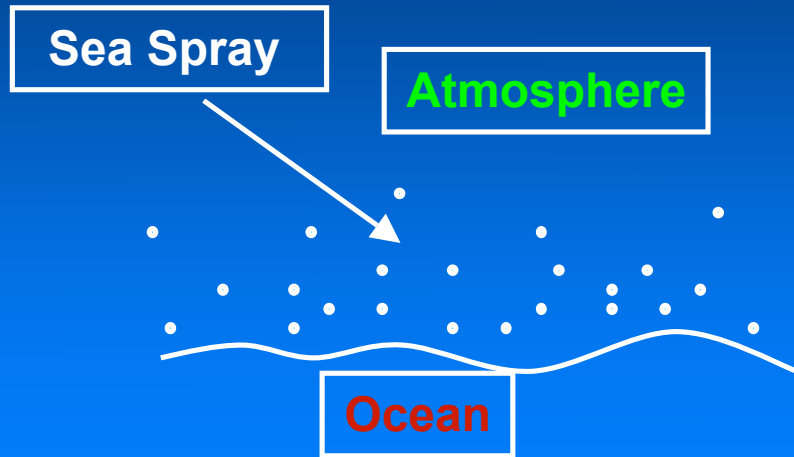
# Summary of JHT projects 2001-2010

- **1) Number of projects supported: 62**
  - 50 completed, 35.5 accepted for operational implementation
  - Number of projects rejected: 5
  - Number of projects completed but pending further investigation (decisions deferred): 9.5
  - Number of projects in process: 12
- **2) Implementation**
  - Number of projects implemented: 31.5
    - Number of numerical modeling related projects implemented by EMC/NCO: 10
    - Number of projects implemented by NHC: 21.5
  - Number of projects accepted but not yet fully implemented by NHC: 4

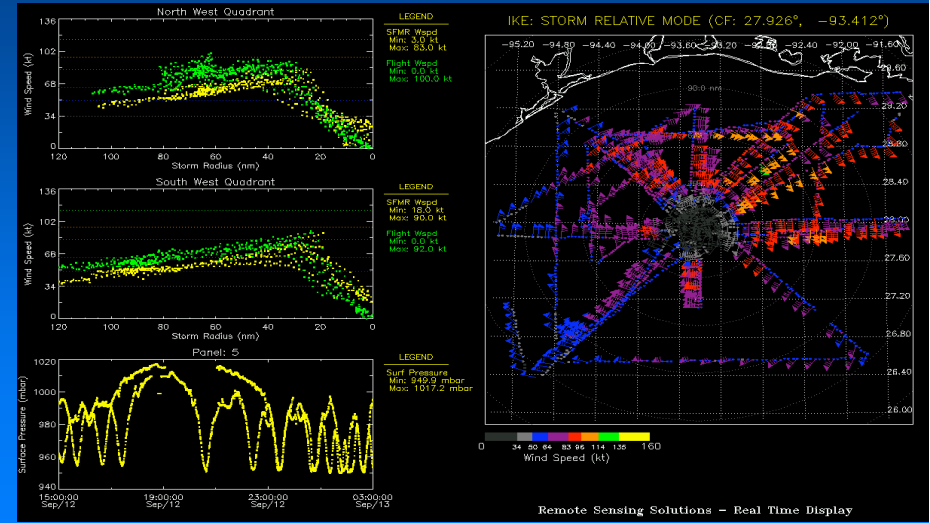
Note:

- 1) Implementation is defined when a project is completed, accepted, and the technique installed on NCEP/NCO or NHC operational systems and runs on operational time frame.
- Some techniques were “implemented” on JHT platform for testing.

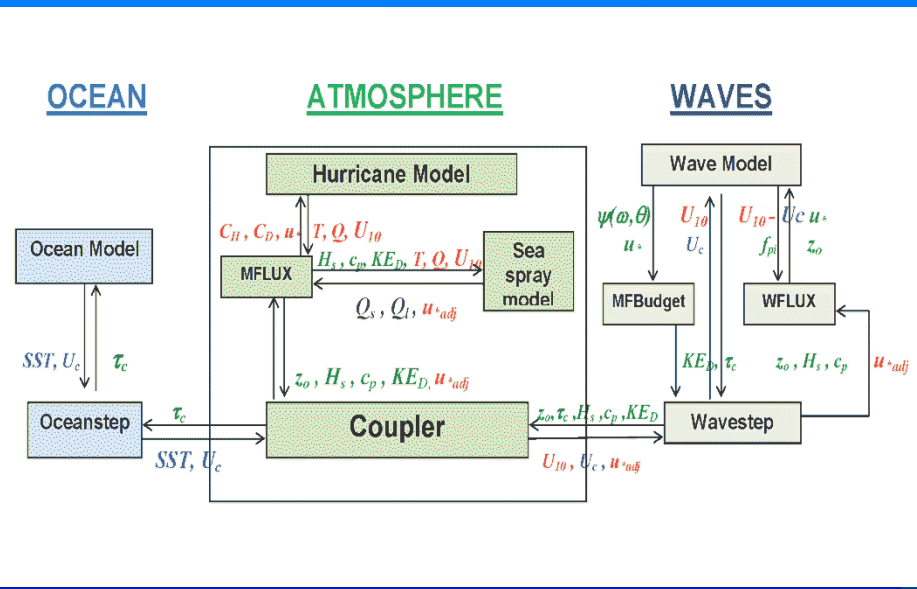
# Highlights of 4th Round Completed Projects



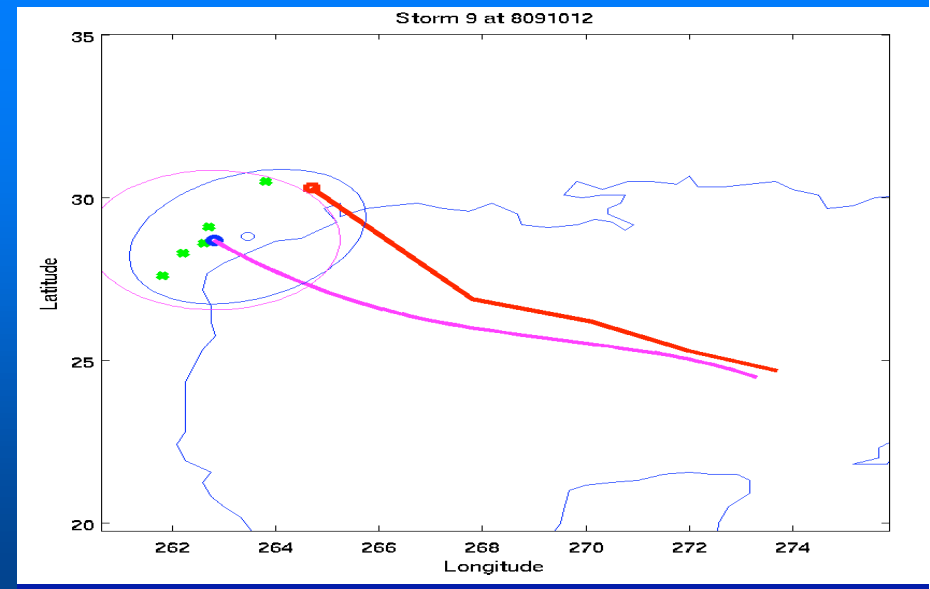
Sea Spray Parameterization – Bao/Fairall



Visualization Tool & SFMR – Carswell/Uhlhorn



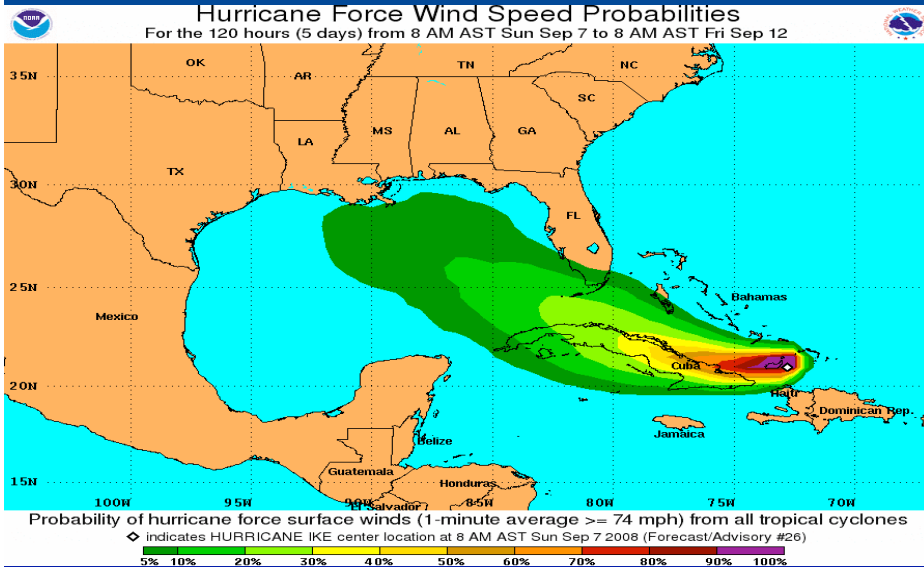
Coupled TC-Wave-Ocean - Ginis



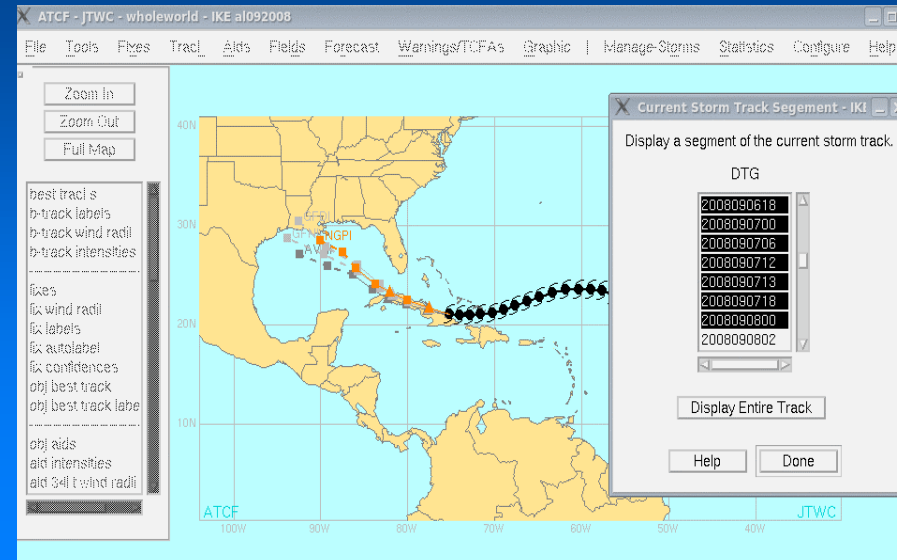
TC Dressing – Hansen



# Highlights of 4th Round Completed Projects

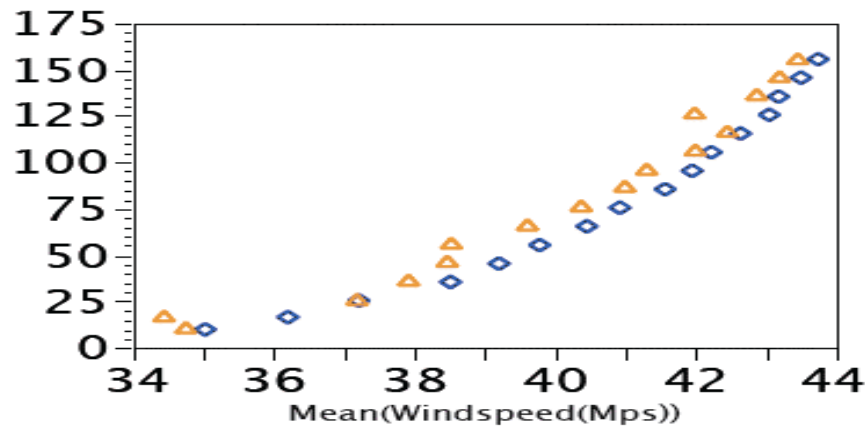


Improved Wind Probabilities – DeMaria/Knaff

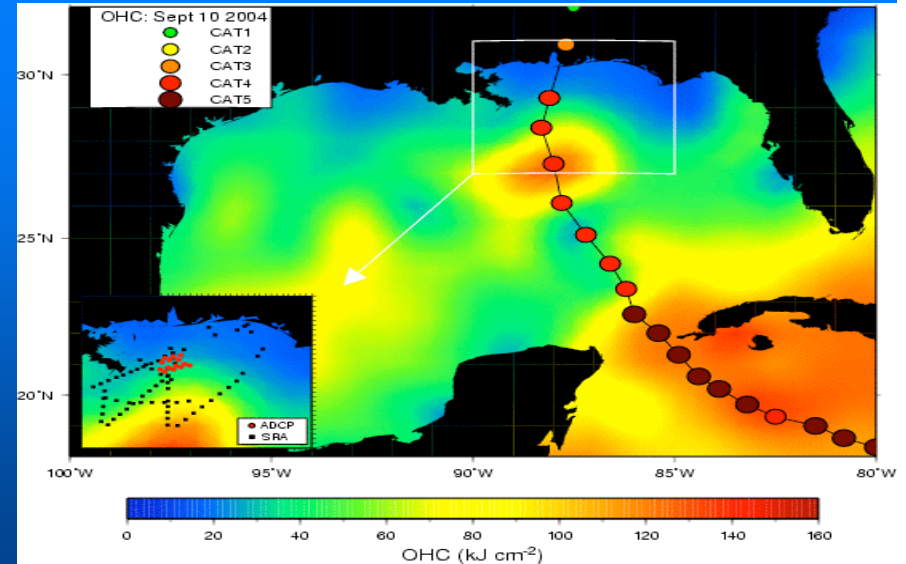


Enhanced ATCF - Sampson

## 40-49 MBL



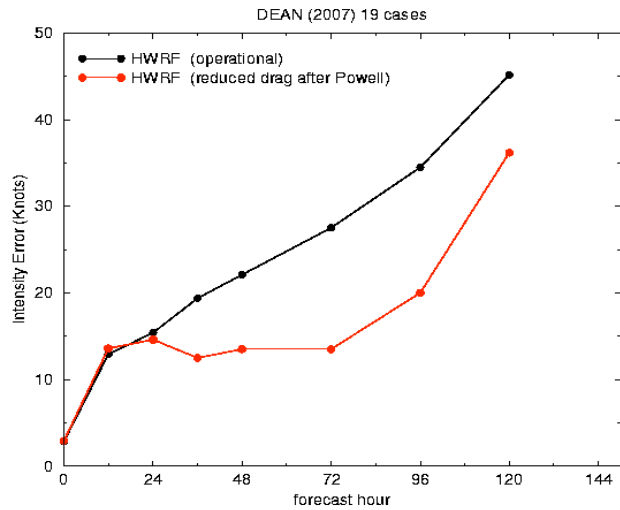
Drag Coefficient in Shallow Water - Powell



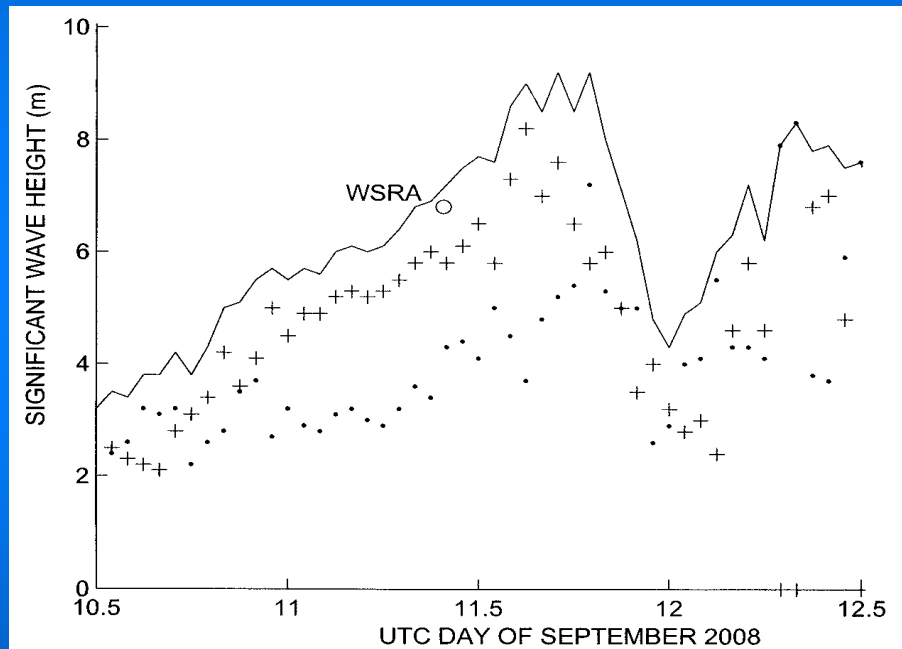
Ocean Model Parameterizations - Shay

# Highlights of 4th Round Completed Projects

HWRF – Surface Flux Formulations



HWRF Transition - Tuleya



Waves from Aircraft - Walsh

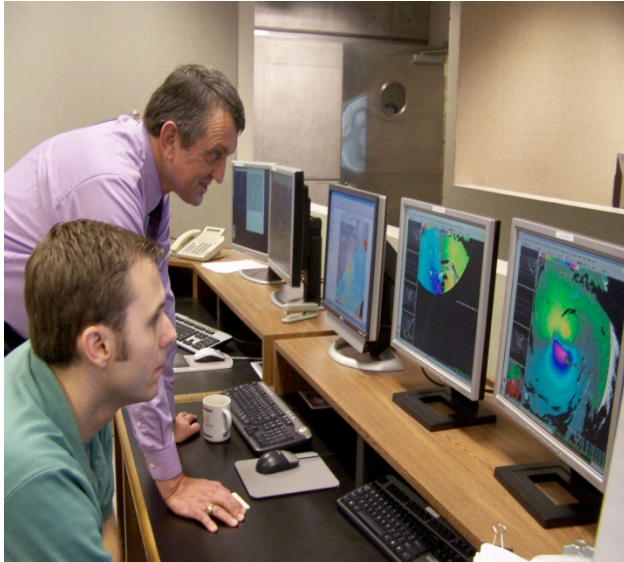
# Factors Considered in NHC Decisions on Operational Implementation

- **Forecast or Analysis Benefit:** expected improvement in operational forecast and/or analysis accuracy
- **Efficiency:** adherence to forecaster time constraints and ease of use needs
- **Compatibility:** IT compatibility with operational hardware, software, data, communications, etc.
- **Sustainability:** availability of resources to operate, upgrade, and/or provide support



# Challenges for 2010

- **Implement newly accepted projects (NHC)**
  - JHT final review/reports to NHC Director
  - NHC Director makes implementation decision
  - Staff at NHC works to implement accepted projects
- **Test and evaluation (with NHC & EMC)**
  - Prepare real-time testing & evaluation for 5<sup>th</sup> round projects
  - Set up necessary software code and data flow
- **Prepare for 6<sup>th</sup> round (FY11) projects**
  - Funding announcement – July 2010
  - LOIs due – August 2010
  - Full Proposals due – October 2010
  - Funding Decisions – March 2011
  - Projects Start – August 2011



# **NHC's Visiting Scientist Program**



**Bring in 12 Researchers and Outside Forecasters Annually**

**Visit During the Peak (Aug-Oct) of the Season**

**Learn About Operational Tools, Resources, & Constraints**

**NHC Forecasters Exposed to New Ideas & Methods**

**Funded through Hurricane Forecast Improvement Prog.**

# Acknowledgements

- **JHT Steering Committee**
- **Shirley Murillo, JHT Admin. Asst.**
- **Chris Landsea, JHT Admin. Asst.**
- **Jose Salazar, JHT meteorologist/programmer**
- **NHC and EMC forecaster and points of contact**
- **NHC/Technical Support Branch staff**
- **JHT principal investigators and other funded participants**
- **John Gaynor/Roger Pierce (USWRP)**
- **NHC admin staff**



<http://www.nhc.noaa.gov/jht/index.shtml>



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## Transition from Research to Operations

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Boulder, CO – May 4 and 5, 2010

# JHT Website


<http://www.nhc.noaa.gov/jht/index.shtml>

Joint Hurricane Testbed - Home - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.nhc.noaa.gov/jht/index.shtml

NCEP Systems Monitor



**USWRP**  
**Joint Hurricane Testbed**

- [JHT Home](#)
- [Terms of Reference \(PDF\)](#)
- [Staff](#)
- [Steering Committee](#)
- [Main Activities](#)
- [Highlights - 2001 to present](#)
- [New Projects \(2007-2009\)](#)
- [Current Projects \(2005-2007\)](#)
- [Past Projects](#)
- [Administrative Presentations and Information](#)

**Mission Statement**

The mission of the Joint Hurricane Test Bed is to transfer more rapidly and smoothly new technology, research results, and observational advances of the [United States Weather Research Program \(USWRP\)](#), its sponsoring agencies, the academic community and other groups into improved tropical cyclone analysis and prediction at operational centers.

**WHAT'S NEW**

**Updated May 8, 2006:**  
[Please read about the new projects for 2007-2009](#)

**Updated November 21, 2006:**  
[The JHT FY07 AFFO Application Deadline has been reopened.](#)

**Updated June 16, 2006:**  
[The JHT FY07 Announcement of Federal Funding Opportunity has been released.](#)

**Added April 26, 2006:**

- [The 2005 First Year Reports are available in the Project Table](#)
- [Joint Hurricane Test Bed \(JHT\): 2006 IHC Update, Dr. Jiann-Gwo Jiing, JHT Director, Technical Support Branch Chief, TPC/NHC, Interdepartmental Hurricane Conference, 22 March 2006 presentation. \(PDF format\)](#)

[View News Archive](#)

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[Return to NHC Home](#) – [Contact NHC](#)

Done

Thank you



# 2009-present Major Activities

- **Second year for nine 4<sup>th</sup> round projects – August 2008-July 2009**
- **Testing of 4<sup>th</sup> round projects**
  - Collaboration with PI
  - Programming
  - Establishing data flow
  - Generating output for forecaster use/evaluation
- **Final Reports from Principal Investigators – August 2009-February 2010**
  - Feedback from NHC and EMC points of contact

# Implementation (NHC)

- **Some relative easy**
- **Some very complicated**
- **NHC contributes  $\geq 0.5$  FTE/yr on implementation**
- **JHT IT facilitator assists in the process**
- **NCEP/EMC and NCO also contributed**

**Operational Centers are not funded for this task**

# Supplemental Slides



# 2009-present Major Activities

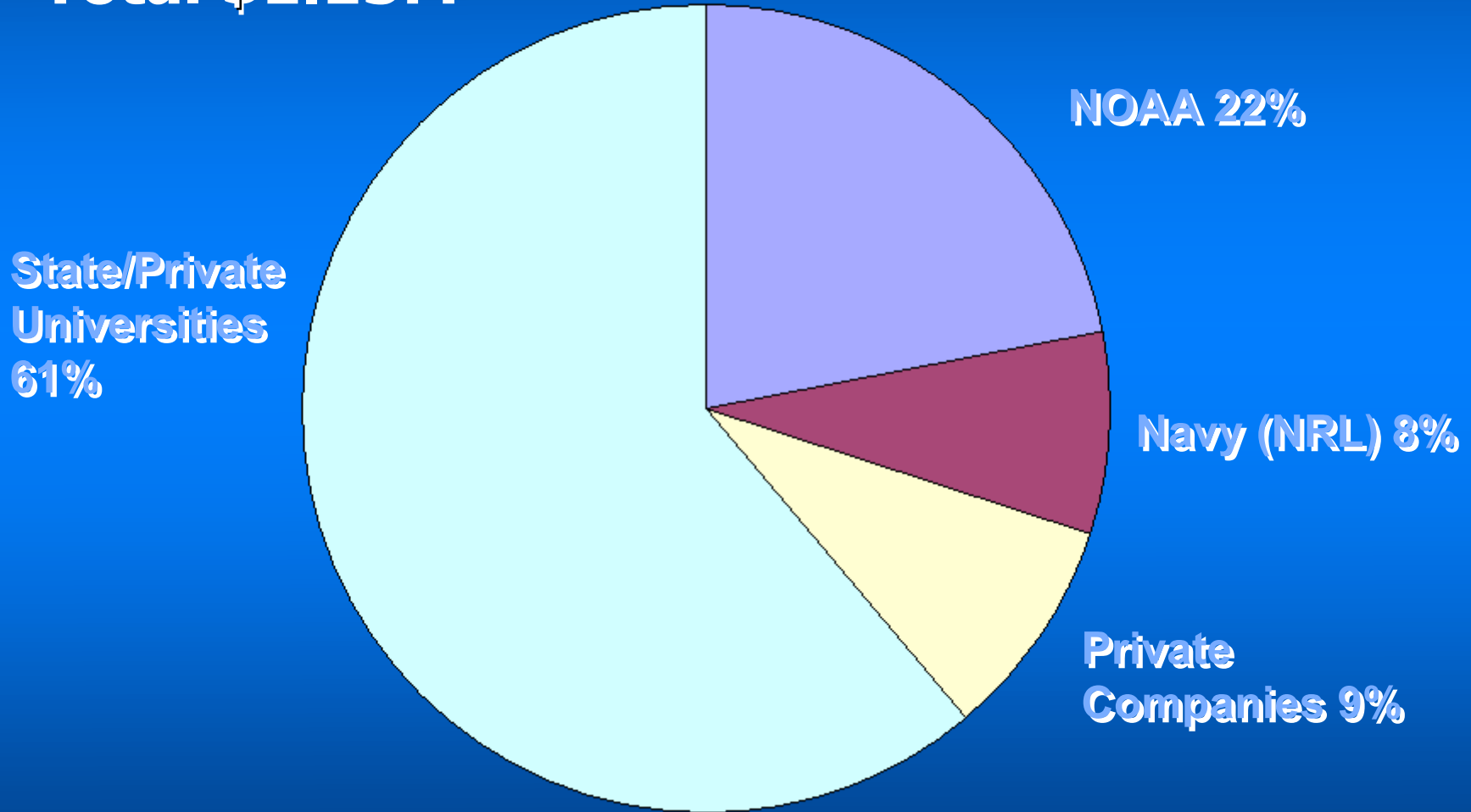
## 5th Round Project Focus Areas

Primary Area of Focus	# of Projects
Improvements to dynamical models (for track, intensity, and precipitation forecasts)	5
Statistical intensity forecast guidance	3
Enhancements to observed data, assimilation	1
Tropical cyclone structure/wind/wave distribution	2
Enhancements to operational environment	1
<b>Total</b>	<b>12</b>

# 5th Round (FY09) Funding Distribution

**Total \$1.15M**

Actual





# NHC Contributions to JHT

## *Logistics*

- Dedicated physical space in operations, offices

## *Personnel*

- NHC dedicating about 1.5 FTE spread across ~12 people
  - 0.5 FTE reimbursed by USWRP for quarter-time JHT Director and one quarter-time JHT administrative assistant
  - NHC contributing 1.0 FTE, including NHC member on JHT Steering Committee, forecasters, and technical support staff
- Forecaster and technical points of contact (POC)
- Programming, system administration, and network support
- Administrative support

## *Computing Resources*

- Network connectivity
- Operational data flow

# JHT Infrastructure

## *Personnel*

- Quarter-time Director (NOAA FTE)
- 7-member Steering Committee
  - Three from NOAA (one TPC), two from DOD, and two from the academic community
  - TPC member serves as co-Chair
- Two quarter-time administrative assistants (NOAA FTE)
- One IT Facilitator (meteorologist/programmer)

## *Computing Resources*

- Server and workstations
- Software

TPC/ NHC Priority <sup>1</sup>	JTWC Priority <sup>1</sup>	Operational Need <sup>1</sup>	Linkage to Research Needs
1	1	Guidance for tropical cyclone intensity change, with highest priority on the onset, duration, and magnitude of rapid intensification events. Similar guidance is also needed on when rapid over-water weakening (such as had been observed in recent Gulf of Mexico hurricanes) will occur.	A1a-f, B1, B2, B3a-e, B6, B7
2	2	Improved capability to observe the tropical cyclone and its environment to support forecaster analysis and model initialization.	B1, C1-C3
3	5	Statistically-based real-time guidance on guidance for track, intensity and precipitation (e.g., multi-model consensus approaches), provided to forecasters in probabilistic and other formats.	B5,B6
4	6	Enhancements to the operational environment to increase forecaster efficiency, by expediting analysis, forecast, coordination, and/or communication activities.	C1c
5	7	Additional operational guidance on coastal inundation (e.g., storm surge and waves).	A4, A5, B2, B3, B6
6	8	Improved and extended track guidance. Identification, and then reduction of, the occurrence of guidance and official track outliers, focusing on both large speed errors (e.g., accelerating recurvers and stalling storms) and large direction errors (e.g., loops), and on specific forecast problems, including interactions between upper-level troughs and tropical cyclones, track forecasts near mountainous areas, and extratropical transition.	A2, B1-B3, B5-B6
7	3	Guidance for tropical cyclone genesis that exhibits a high probability of detection and a low false alarm rate, and/or provides probability of genesis.	A3, B1-B3, B5-B7
8	9	Operational analysis of the surface wind field (including maximum sustained winds) in tropical cyclones. This also includes methods for forecasting the wind field over elevated terrain and high-rise buildings.	B1, B2, C1-C3
9	4	Guidance for changes in tropical cyclone size/wind structure and related parameters, including combined sea heights.	A1a-g, B1-B7
10	10	Guidance on the operational utility and relative merits of high-resolution model output compared to lower resolution ensemble model output.	B6, B7
11	11	Guidance for tropical cyclone precipitation amount and distribution.	A4, B1-B7
12	12	Improved utility of microwave satellite and radar data in tropical cyclone analysis.	B1, C1c
13	13	Improved techniques for estimating the intensity of tropical cyclones passing over and north of sea-surface temperature gradients (e.g., in the eastern North Pacific Ocean and the Atlantic Gulf Stream).	C1
14	14	Quantitative guidance tools for seasonal tropical cyclone forecasts for the Atlantic and North Pacific basins, using statistical and/or dynamical methodologies.	A6,B2, B6

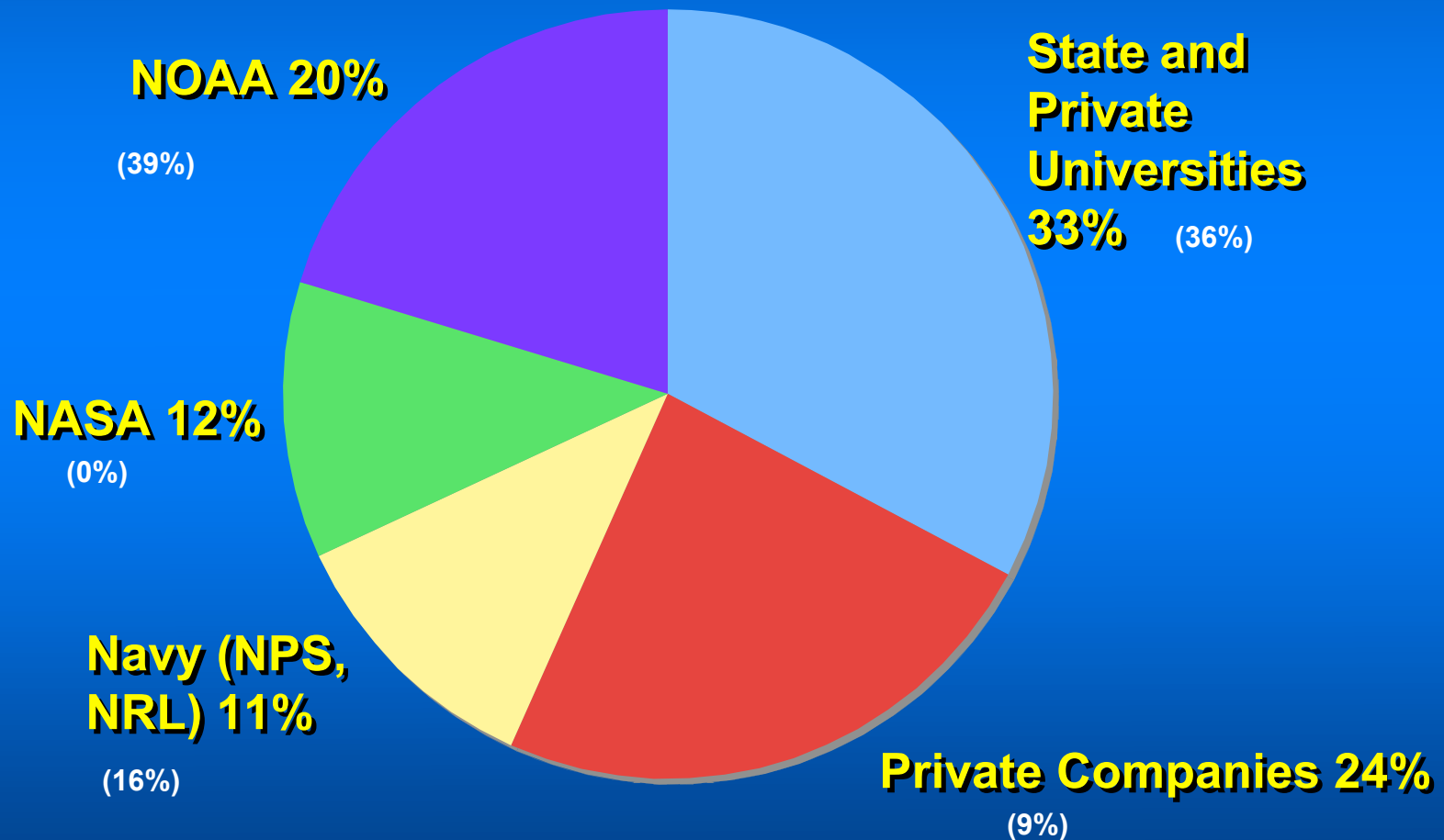
# 2008-present Major Activities <sup>Cont.</sup>

## 4th Round Project Focus Areas

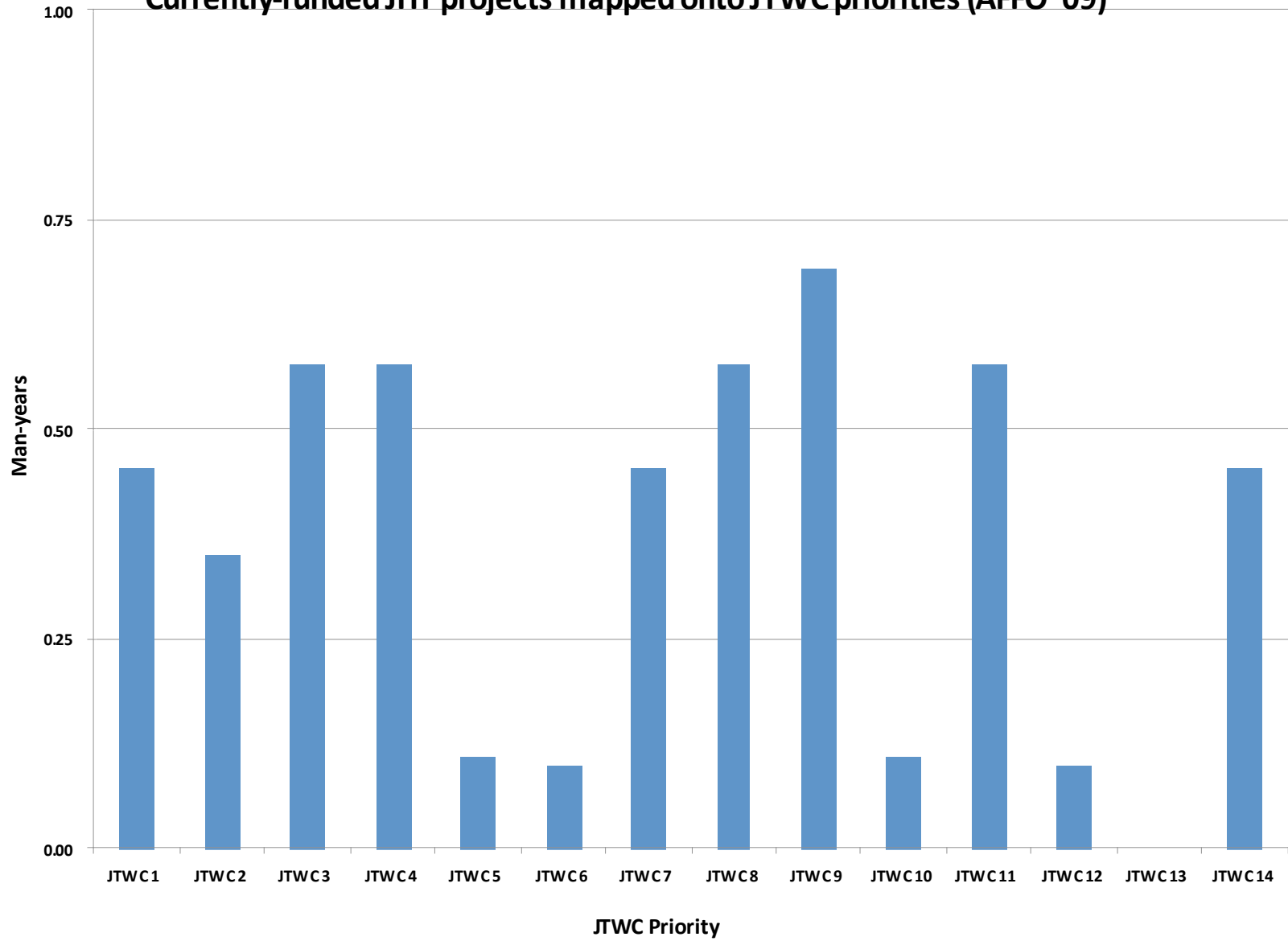
Primary Area of Focus	# of Projects
Improvements to dynamical models (for track, intensity, and precipitation forecasts)	5
Statistical intensity forecast guidance	1
Enhancements to observed data, assimilation	0
Tropical cyclone structure/wind/wave distribution	2
Track forecast guidance	1
Enhancements to operational environment	1
<b>Total</b>	<b>10</b>

# 4th Round (FY07-08) Recommended Funding Distribution

**Total \$1.04M (\$1.5M announced)**

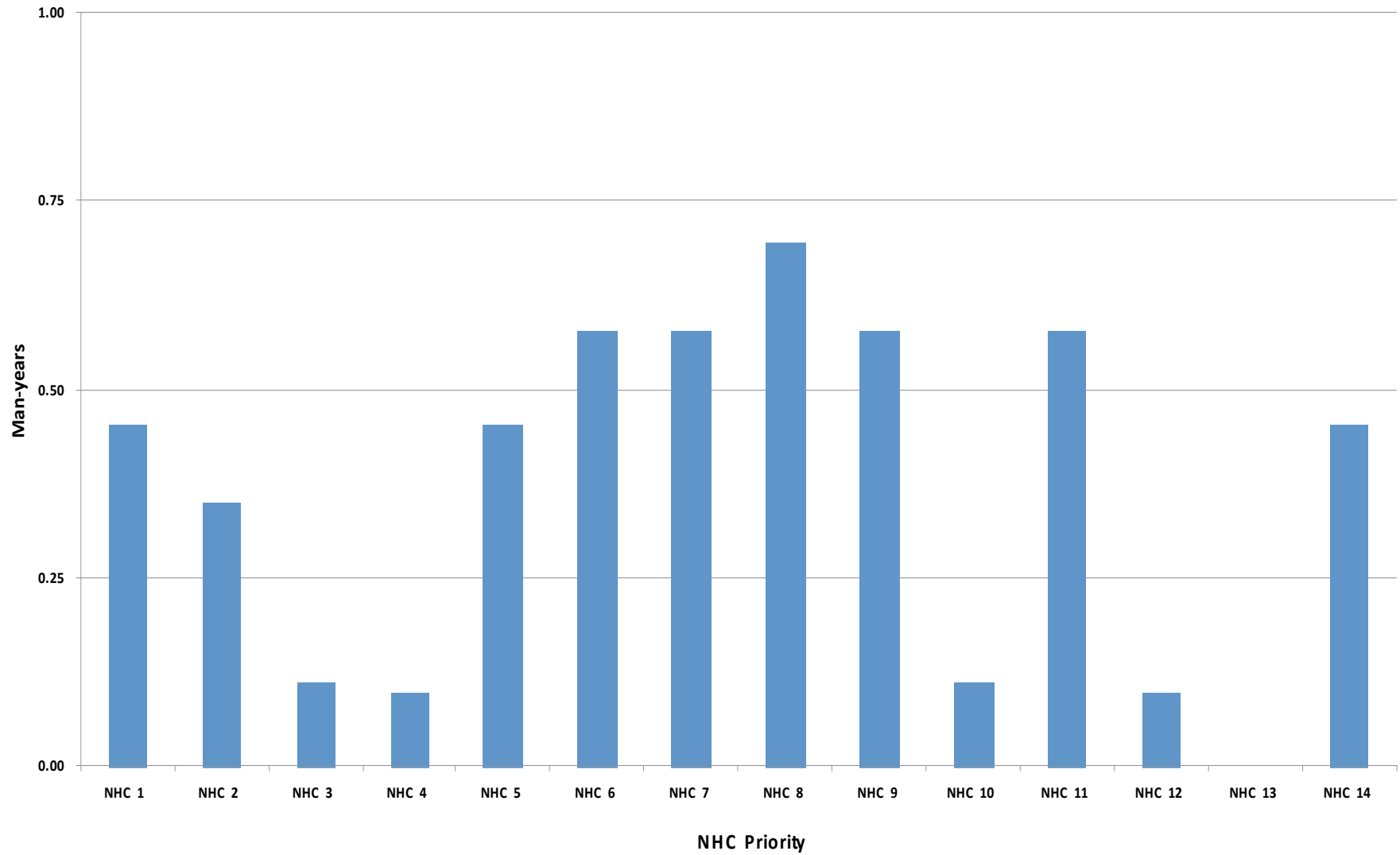


Currently-funded JHT projects mapped onto JTWC priorities (AFFO '09)

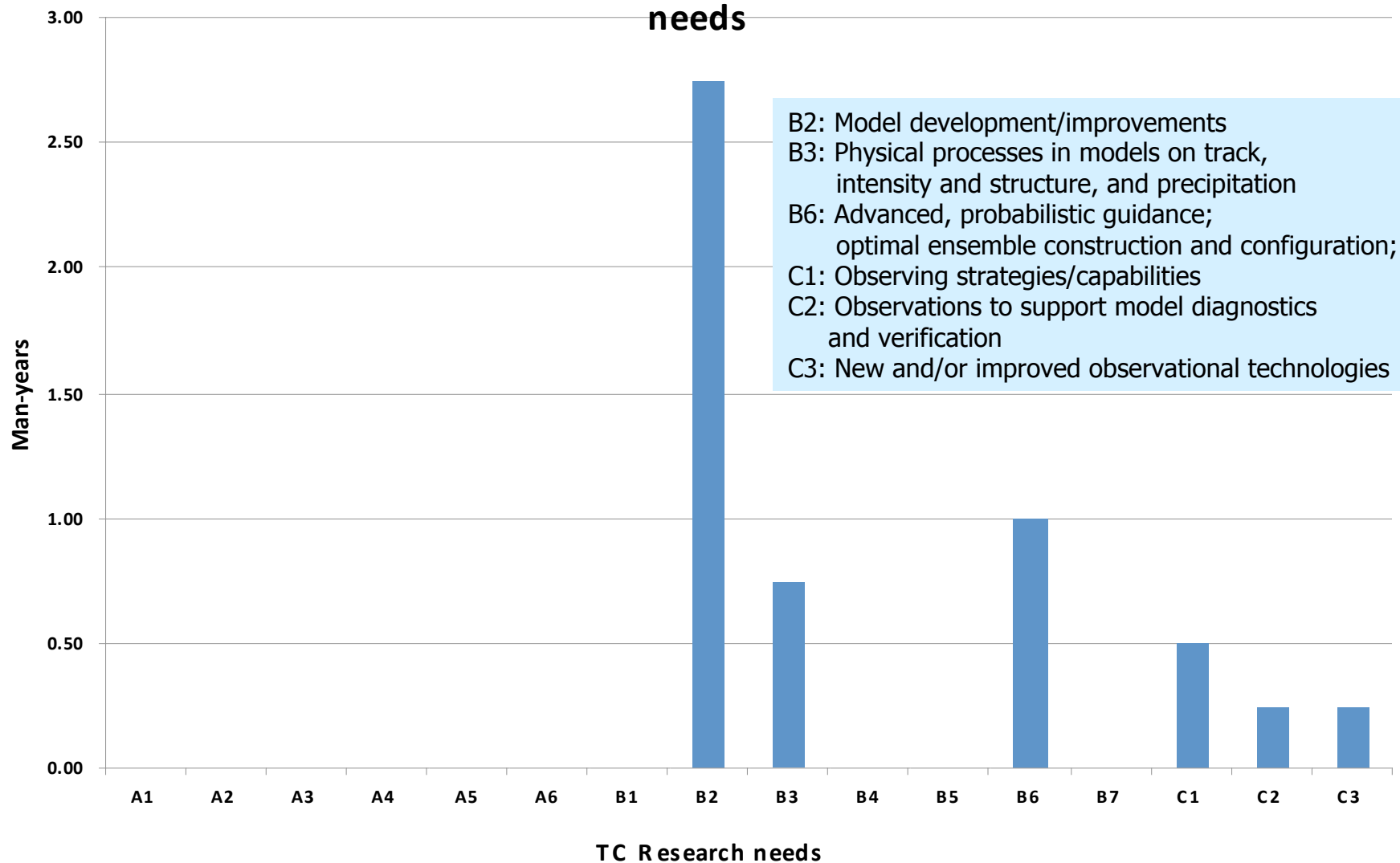




Currently-funded JHT projects mapped onto NHC priorities (AFFO '09)



## Currently-funded JHT projects mapped onto TC research needs



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The mission of the Joint Hurricane Test Bed is to **transfer** more rapidly and smoothly new technology, research results, and observational advances of the United States Weather Research (USWRP), its sponsoring agencies, the academic community and other groups into improved tropical cyclone analysis and prediction at operational centers.