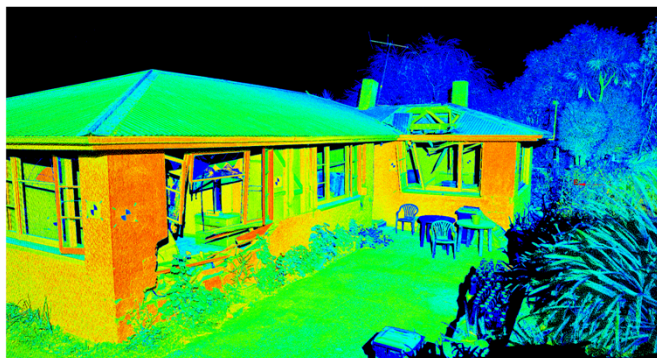


2018 Joint Wall of Wind and RAPID Experimental Facility User Workshop

May 2018



RAPID NHERI
Natural Hazards Reconnaissance

FIU | Wall of Wind
NHERI Experimental Facility

Agenda

May 17, 2018		
Time	Item Description	Room
8:15	Shuttle leaves the hotel for the workshop venue	
8:45-9:00	Sign-in	EIC 2830
9:00-9:15	Welcome, introductions and workshop schedule (working breakfast)	EIC 2830
9:15-9:45	About the NHERI Wall of Wind (WOW) Experimental Facility (EF)	EIC 2830
	About the NHERI RAPID Experimental Facility (EF)	EIC 2830
10:00-12:00	Tour of the NHERI WOW Experimental Facility and live test demonstration	Wall of Wind
12:00-13:00	Funding opportunities to use the NHERI EFs (Working Lunch)	EIC 2830
13:00-13:30	Engineering for Civil Infrastructure program; Q&A session with the program director, Dr. Joy Pauschke	Zoom/ EIC 2830
13:30-14:30	NHERI RAPID EF: Equipment Portfolio and Facility Use	EIC 2830
14:30-15:15	Test design and planning using NHERI WOW EF: Aeroelastic, Aerodynamic, Destructive and Wind-Driven Rain Tests	EIC 2830
15:15-15:30	Break	EIC 2830
Parallel Sessions-Location: EIC 2830		
15:30-16:30	One-on-one sessions between EF teams and participants to discuss research ideas and	NHERI WOW EF Project portfolio
16:30-17:30	(30min sessions-Registration required- Click here to register)	NHERI RAPID Facility: Analysis of Live Test Data and Field Case Studies
17:30-18:30	One-on-one sessions between EF teams and participants to discuss research ideas and (30min sessions-Registration required- Click here to register)	
19:00	Dinner: Workshop attendees are encouraged to meet at 7 pm for dinner. Location to be determined - Dinner will be at participants expense	

About the NHERI Program

Natural Hazards Engineering Research Infrastructure (NHERI)

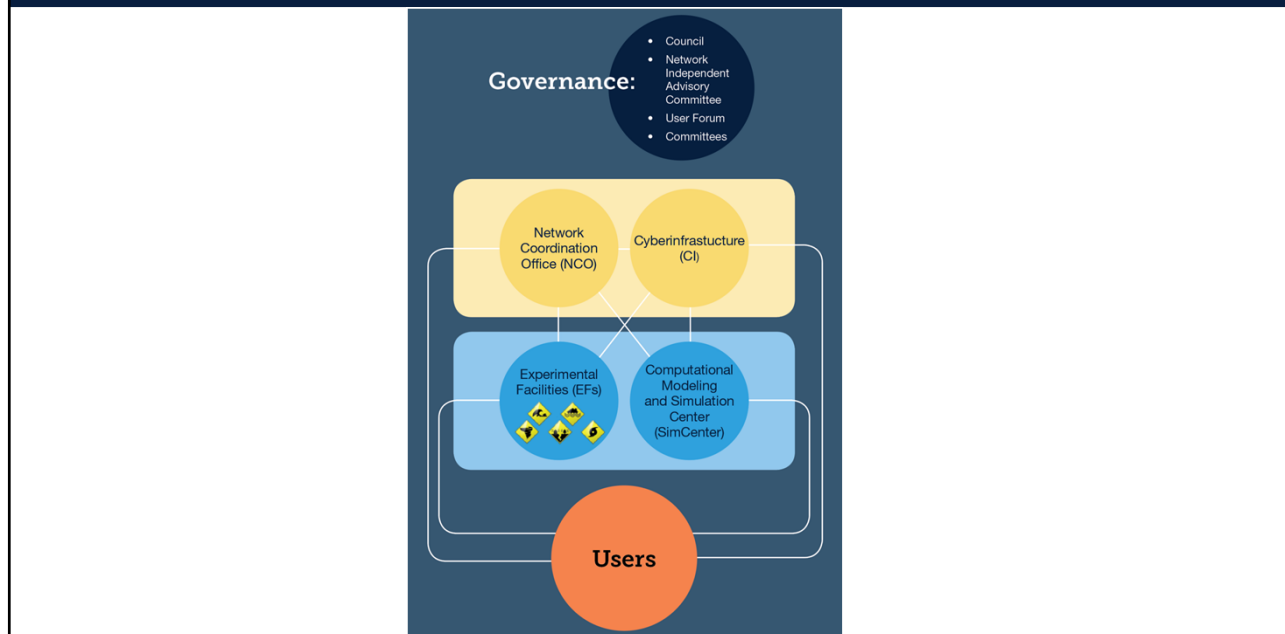
- A distributed, multi-user, national facility that provides the natural hazards engineering community with access to research infrastructure (earthquake and wind engineering experimental facilities, cyberinfrastructure, computational modeling and simulation tools, and research data), coupled with education and community outreach activities.
- NHERI enables research and educational advances that contribute knowledge and innovation for the nation's civil infrastructure and communities to prevent natural hazard events from becoming societal disasters.

NHERI: Awardees

Eleven Individual Awards:

- Network Coordination Office (NCO: Purdue University)
- Cyberinfrastructure (CI: University of Texas at Austin)
- Computational Modeling and Simulation Center (SimCenter: University of California, Berkeley), and
- Experimental Facilities for earthquake engineering and wind engineering research

NHERI: Structure



NHERI: Experimental Facilities (EFs)

- Florida International University: Wall of Wind
- University of Washington: Post-disaster Rapid Response Research Experimental Facility (RAPID)
- University of Florida: Powell Family Structures and Materials Laboratory
- Lehigh University: Advanced Technology for Large Structural Systems (ATLSS)
- University of Texas at Austin: Dynamic in-situ testing using large-scale mobile shakers
- University of California, Davis: Center for Geotechnical Modeling (CGM)
- University of California, San Diego: Large High Performance Outdoor Shake Table (LHPOST)
- Oregon State University: O.H. Hinsdale Wave Research Laboratory

FIU | Wall of Wind NHERI Experimental Facility



NHERI Wall of Wind Experimental Facility



- Wall of Wind (WOW) Experimental Facility (EF) under FIU International Hurricane Research Center (IHRC) is a legacy of Hurricane Andrew
- Wind Engineering Program since 2005; 12-Fan WOW since 2012; 55 refereed journal publications on wind engineering; 2 patent applications; 14 PhDs in the area of wind engineering (plus 7 PhD candidates); 2 Post-Docs
- PIs have received several NSF research funding (Regular, MRI, CAREER, Collaborative, EARS, I-Corps) and non-NSF funding (USAID, DOE, FDOT, DEM, Industry)
- Co-PI Irwin has vast experience in the wind issues on iconic structures (e.g., 828 m Burj Khalifa); Co-PI Zisis has experience in codification
- EF Team has conducted ~\$10M in research and industry projects since 2012

NHERI WOW EF: Our Scientific Vision



To enable frontier research and education to impart resiliency and sustainability to new and existing buildings, cladding systems, and lifeline infrastructure, to prevent wind hazards from becoming community disasters.

NHERI WOW EF: Meet the Team

FIU | Wall of Wind
NHERI Experimental Facility



NHERI WOW EF: Facility

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NHERI Experimental Facility



- Open jet large wind tunnel
- 12 electric fans in an arc-focal arrangement
- Wind field cross-sectional area: 20ftx14ft (WxH)
- Wind speed range: 10mph – 157mph
- Open, Suburban and Uniform exposures
- Turn table diameter: 16ft
- Turn table capacity: 105,000lb static and 52,000lb dynamic
- Rotational speed range: 0.015-0.0014 min/deg

NHERI WOW EF: Key Strengths



Unique Experimental Resources and Testing Capabilities

- Up to Category 5 hurricane winds simulations
- Multi-Scale Testing (full-, large-, small-scale)
- Destructive Testing (to predict progressive failures in buildings and infrastructure elements)
- Wind-Driven Rain simulations (to study water intrusion)
- Various Structures (buildings, bridges, renewable energy systems, lifeline infrastructures)

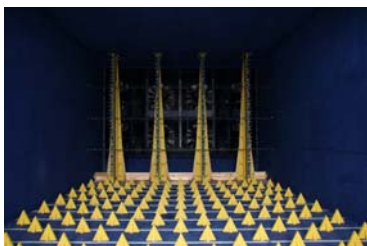
NHERI WOW EF: Facility



Building and Operations and Control Center



Control Room



Flow Management and Rain Nozzles

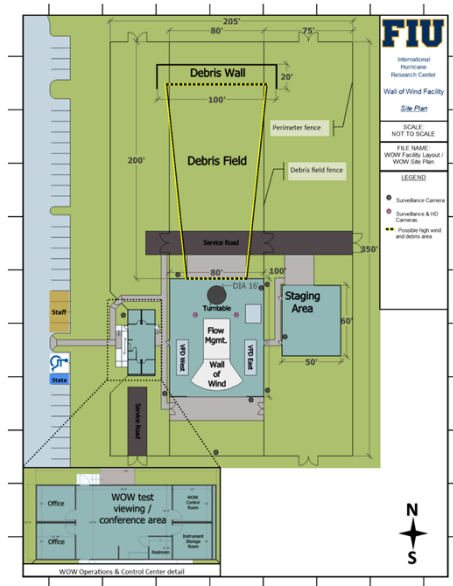


WOW Turntable (16 ft. Diameter)



Staging Area

NHERI WOW EF: Experimental Resources



- 16,000 square feet fenced-off area for wind testing
- 3,000 square feet pre-test specimen staging/construction/instrumentation building with a fabrication shop
- 12-fan WOW apparatus
- Operations and Control Center (OCC) for controlling, monitoring and viewing the tests
- 1:15 small-scale WOW apparatus
- Data uploading to NHERI repository (compliant with CI policies)
- Diverse portfolio of measurement instruments
- Telepresence, video capture and surveillance system

NHERI WOW EF: Experimental Resources

Instruments	Type of Measurements and Specifications
Cobra probes	Wind speed and turbulence
Uni-axial load cells	Force
JR3 tri-axial load cells	6-DOF forces and moments
Strain gauges	Strain
Pressure scanners	Differential pressure
Accelerometers	Tri-axial acceleration
String potentiometers	Displacement
LVDT	Displacement
Laser displacement sensors	Displacement
Inclinometers	Rotation
Tri-axial inertial sensors	Tri-axial accelerometer, magnetometer and gyroscope, temperature sensor and pressure altimeter
Parsivel ² laser disdrometers	Size and speed of precipitation
Rain measurement gauges	Wind-driven rain rate and rainwater deposition
Weather sensors	Temperature and humidity
Smoke generator	Flow visualization
HD and surveillance cameras	Test monitoring and telepresence
Form 2 Desktop SLA 3D Printer	Build Volume 145×145×175 mm

NHERI WOW EF: Year 1-2 NSF Supported Upgrades **FIU** Wall of Wind

NHERI Experimental Facility

Year 1:

- Upgraded data storage and data management services
- Enhanced telepresence capabilities
- Equipped the lab with a 5 Ton bridge crane



Year 3:

- Installing automated roughness and adjustable spires
- Acquiring a 3-axis traversing system

NHERI WOW EF: Upcoming Developments

FIU Wall of Wind

NHERI Experimental Facility

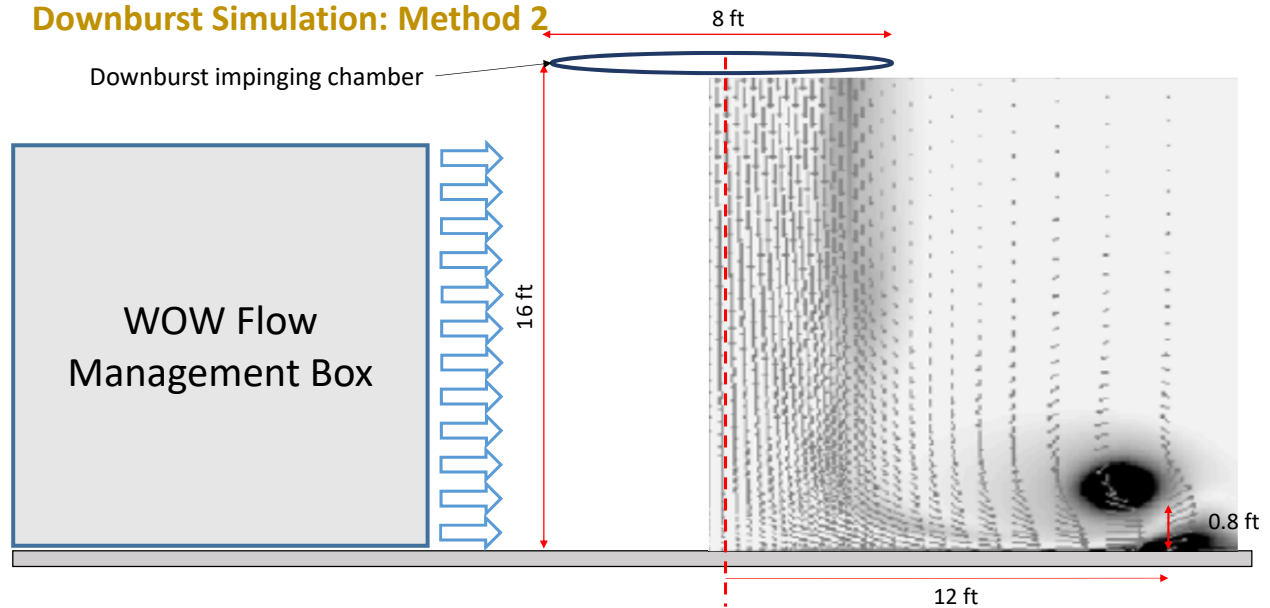
Downburst Simulation: Method 1

- Proof of concept using the small scale WOW



NHERI WOW EF: Upcoming Developments

Downburst Simulation: Method 2



Q&A Session