

# **Survey and Investigation of Buildings Damaged by Category III Hurricanes in FY 2014-15**

Presented to the

Florida Building Commission  
State of Florida Department of Business and Professional Regulation

by

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## **1. Introduction**

The documentation of hurricanes making landfall in the State of Florida should include both a direct quantification of ground level wind speeds and an assessment of the resultant damage to the infrastructure. The common reliance on the NHC hurricane intensity Saffir-Simpson rating to calibrate damage to wind speed suffers from the gap in knowledge between ocean winds and ground level wind behavior. The combined dataset of measured ground level winds and infrastructure damage closes the loop between wind loads and resultant damage, and helps in the development of effective mitigation strategies.

The Florida Coastal Monitoring Program includes the quantification of overland winds near populated areas using portable wind monitoring weather towers, and the documentation of residential infrastructure performance. At the request of FBC Staff, we propose to continue the partial support of this effort through the Florida Building Commission in the 2014-2015 cycle. This includes the maintenance and deployment of data collection equipment, the transportation infrastructure (tow vehicles), and the use of this infrastructure for the deployment of UF personnel to document damage. The personnel deploying the wind monitoring equipment will provide an initial triage report to the cognizant FBC program manager for all landfalling hurricanes, providing the information needed to authorize a detailed damage assessment deployment for any damaging hurricane. The targets (structural types, age groups, etc.) of a damage assessment effort will be determined in conjunction with the Program Director. Please refer to the FY2012-13 final report for Task 1 for more information about the damage assessment plan.

## **2. Statement of Work**

- Maintain data collection and transport equipment as necessary for measuring intensity of land-falling hurricanes and documenting damage
- Perform field data collection preparation to include: purchase and organize data collection and recording equipment; documenting equipment and software for database construction
- Deploy wind monitoring assets in the event of a land-falling hurricane
- Provide an initial triage assessment of damage to the residential infrastructure
- Organize a formal damage assessment effort if directed by the Program Manager

### 3. Conditions for Deployment

The wind monitoring equipment is to be deployed in the event that the

1. 5-day forecast warning “cone” issued by the National Hurricane Center overlaps the State of Florida and the
2. storm is forecast to be a Saffir-Simpson Hurricane Wind Category III, IV or V storm during the forecast period

A damage assessment will be performed in the event that a Saffir-Simpson Hurricane Wind Category III, IV or V storm makes landfall in Florida or causes sustained wind speeds over land in Florida that are estimated to be > 110 mph. FBC Staff may request field reconnaissance for a Saffir-Simpson Hurricane Wind Category II hurricane.

### 4. Budget

The cost of a given deployment can vary widely depending upon three variables: distance to impact region from Gainesville, FL; length of deployment in days for travel to, deployment, retrieval, and return; and the number of assets deployed (FCMP has six portable towers)

We have estimated the cost for a single deployment / damage assessment:

1. Fuel for transport of equipment and personnel. Assuming travel from Gainesville to Homestead, FL, the cost is \$4.25/gallon diesel, 4 vehicles, 367 miles X 2 drive to area + 250 miles scouting / surveying (984), 8 miles/gallon =  $4 \times 984 / 8 \times \$4.25 = \$2091$ . Travel costs may also be used to support transportation to/from Florida Building Commission meetings
2. Food and shelter for personnel
  - a. 12 people X 7 days X \$46/day per diem = \$3864
  - b. 4 faculty/staff X 6 nights days \* \$145/night = \$3480
  - c. 8 students / 2 students per room X 6 nights \* \$145/night = \$3480
3. Equipment preparation, maintenance, upgrade and operation. \$500 Est.
4. Salary for personnel (see budget)
5. Analysis, validation and dissemination of collected wind and meta data

Table 1. Budget

<b>Budget</b>	<b>Amount</b>
Salaries	\$27,087
Fringe Benefits	\$5,783
Equipment	\$0
Utilities	\$0
Travel	\$12,915
Misc. (M&S, Tuition)	\$2,872
Indirect Cost/Overhead	\$4,866
<b>TOTAL</b>	<b>\$53,523</b>

The miscellaneous cost includes \$500 for equipment preparation, maintenance and upgrade, \$872 in graduate student tuition, and \$1,500 for vehicle preparation.

Research personnel time and will be reported and certified using a “loaded” rate computed from the following table. Note that the indirect cost shown in Table 1 is computed from the indirect cost in Table 2 + the indirect cost associated with the travel and miscellaneous categories.

Table 2. Breakdown of the hourly compensation rate

Person	Hours	Hourly Rate	Fringe	Tuition	IDC	Total
F. Masters	80	\$73.18	\$20	\$0.00	\$9	\$8,231
D. Prevatt	80	\$63.47	\$18	\$0.00	\$8	\$7,138
K. Gurley	80	\$65.93	\$18	\$0.00	\$8	\$7,415
Lab Staff*	80	\$29.19	\$9	\$0.00	\$4	\$3,385
Admin Asst	20	\$23.30	\$11	\$0.00	\$3	\$746
Grad. Students	80	\$21.00	\$3	\$10.90	\$2	\$2,962
Undergrad. Students	640	\$10.00	\$0	\$0.00	\$1	\$7,153

\*Multiple lab staff may be used. Maximum anticipated hourly rate shown

The personnel time in Table 2 reflects the estimated time commitment to this deliverable, however the UF professors (Gurley, Masters, Prevatt) work in a team. These hours may be used to support other projects supported by the sponsor during 2014-2015.

This project may be performed in conjunction with related projects (e.g., NSF CMMI 1055744).

## 5. Deliverables

- A report providing technical information on the problem background, results and implications to the Code submitted to the Program Manager by June 1, 2015
- A breakdown of the number of hours or partial hours, in increments of fifteen (15) minutes, of work performed and a brief description of the work performed. The Contractor agrees to provide any additional documentation requested by the Department to satisfy audit requirements.