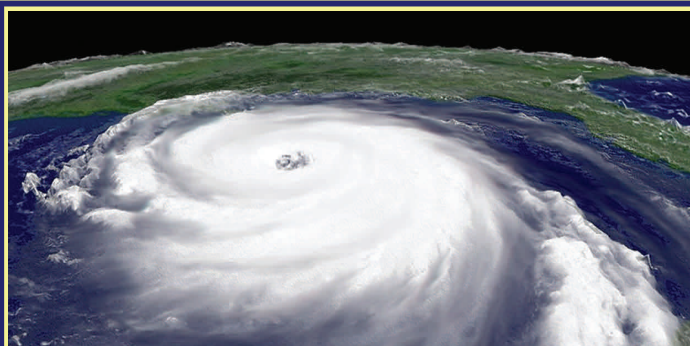




# Florida Public Hurricane Loss Model

**Purpose:** To develop and maintain a public computer model to assess hurricane wind, surge and flood related risk and to project annual expected insured residential losses for specific properties, zip codes, counties and regions in Florida. To estimate insured losses for user defined scenarios. This public model can also be used to quantify the cost benefits of hurricane mitigation, which is a major contribution as hurricane damage must be lowered in order to sustain Florida's economy.

**History:** In 2001 the Florida Office of Insurance Regulation funded FIU to develop a public hurricane loss model for the purposes of assessing hurricane wind risk and predicting insured losses for residential properties. The model was first certified in 2007 by the Florida Commission of Hurricane Loss Projection Methodology—the gold standard for such models. The latest version 5.0 was certified in August 2013. The model has been deemed 'accurate and reliable' for predicting insured residential losses in Florida.



### OBJECTIVES

- Assess hurricane risk and project expected insured residential losses in Florida
- Project insured losses for hurricane events
- Provide service to the State of Florida and the insurance industry

### BENEFITS

- Provide assistance in the residential rate making process
- Make catastrophe modeling affordable for smaller firms
- Provide transparent wind, surge and flood hazard, vulnerability and insured loss models
- Validate assumptions, analysis and results generated by proprietary models
- Help evaluate reinsurance risk
- Assess the efficacy of disaster mitigation strategies

### TEAM

- FIU International Hurricane Research Center
- FIU School of Computing & Information Sciences
- FIU College of Business
- Florida State University
- Florida Institute of Technology
- Hurricane Research Division, NOAA
- University of Florida
- University of Miami
- Notre Dame University

### Planned Enhancements

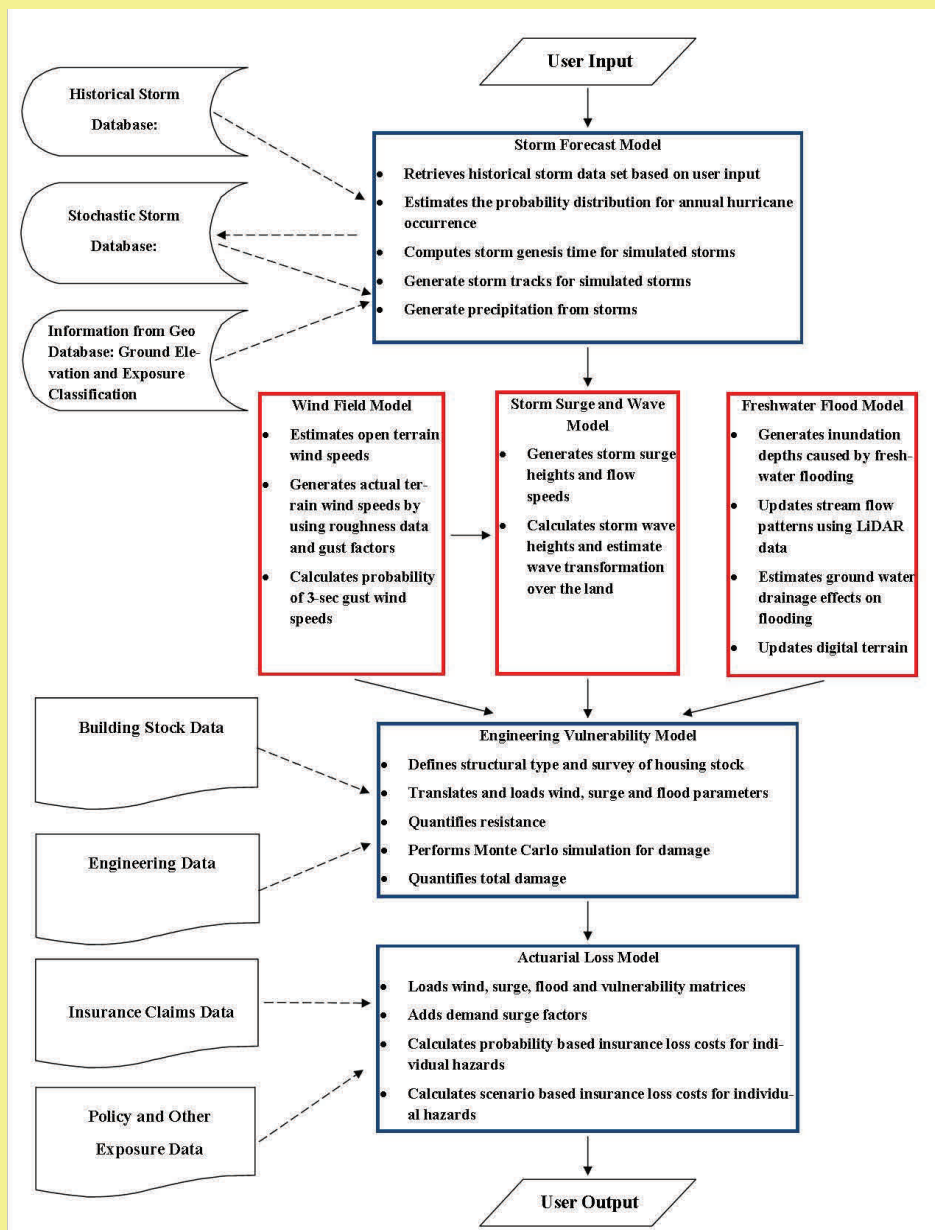
- In 2013 the State of Florida funded FIU to enhance the FPHLM by adding both a storm surge and inland flooding component.
- The new model will assess storm surge and hurricane related rain flooding risk and estimate both the insured and uninsured losses they may create.
- The enhancement effort will take 3-4 years.

### What Can the Enhanced Model Do?

- Estimate the potential damage to residential properties from storm surge and inland flooding.
- Provide a state of the art innovative non-proprietary integrated wind field/storm surge/flood model that can distinguish wind losses from flood losses.
- Provide a more refined and actuarially sound method of estimating insured losses and determining fair pricing of all sources of hurricane risk.
- Assess the efficacy of disaster mitigation strategies and pre and post-disaster resource allocation.
- Provide assistance to regulators and the re/insurance industry in the rate making process.



## MODEL FLOW DIAGRAM



- The certified model consists of three major components: wind, vulnerability (damage), and actuarial insured loss.
- A fourth component for storm surge and rainfall flooding is under development and scheduled for release in 2016.
- The components are developed and validated independently before being integrated.
- The computer platform is designed to accommodate future hookups of additional sub-components or enhancements.
- The vulnerability module feeds into the loss module which produces both insured loss (for wind, surge, and flood) and uninsured loss (for surge and flood).

### Wind Model

Development of the wind hazard and hurricane wind field models including: annual hurricane occurrence model, storm genesis model, storm intensity and track model, inland decay model, terrain roughness model, windfield model, peak gust wind model, hurricane probability model, input and output data base development, stochastic simulation and sensitivity analysis, treatment of uncertainties, and validation.

### Storm Surge & Freshwater Flood Models (planned)

Development of an integrated storm surge/flood/wave model including: computing storm and wave parameters for damage functions in terms of stochastic storm data sets digital elevation data to estimate stream flow patterns, generate flooding inundation depths.

### Vulnerability Model

Development of a series of wind, surge, and flood vulnerability (damage) functions for a variety of residential structures and contents including: curve modifications, data collection, sensitivity analysis, treatment of uncertainties, estimate benefit of mitigation and validation.

### Actuarial Loss Model

Development of models to estimate probabilistic insured losses and event based losses: modeling distributions for losses, actuarial policy modifications, statistical analysis, data collection, and validation.

### Computer Software Model

Development of computer architecture including: developing and maintaining databases, software development for the various hazards, vulnerability, and insured loss models as well as testing, validation, integration, and documentation of the computer models.

### FOR INFORMATION CONTACT:

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Please also visit: <http://www.ihrc.fiu.edu> and <http://www.cis.fiu.edu/hurricaneloss/>