

# HURREVAC USERS FEEDBACK REPORT

Baltimore, MD  
January 2008



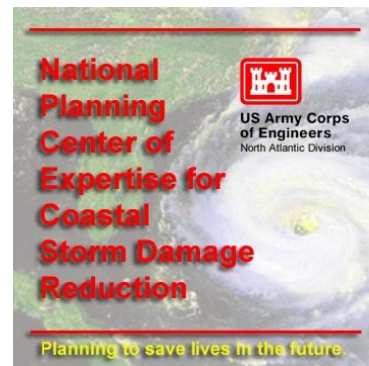
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*Prepared for:* Federal Emergency Management Agency  
National Hurricane Program

*Prepared by:* National Planning Center of Expertise  
for Coastal Storm Damage Reduction  
Hurricane Evacuation Studies Program Office  
North Atlantic Division/Baltimore District



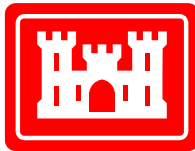
**FEMA**



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Prepared by:

U.S. Army Corps of Engineers  
National Planning Center of Expertise for  
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January 2008  
FINAL

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## **1 BACKGROUND**

This report is a compilation of feedback received from Hurrevac users from October 26-November 13, 2007 regarding their experience with the current Hurrevac2000 software, plus desires for changes and added functionality in future versions of the program. Under contract with the U.S. Army Corps of Engineers, Baltimore District, Sea Island Software and Dewberry have been tasked to revise and upgrade this hurricane tracking and evacuation decision assistance tool over the next two years. User input will guide development of a HURREVAC Strategic Plan and efforts to improve the program interface and functions in the forthcoming version of the software.

## 2 METHODOLOGY

The full community of 7000+ registered Hurrevac users was invited to participate in an online survey. The questionnaire, organized in the five sections described below, asked users to rate various aspects of Hurrevac operation and allowed for free-form text responses as well.

1. User Information – Questions to gauge respondent’s agency and geographical affiliations, plus level of experience with Hurrevac. This basic user information was collected so that responses to later questions could be filtered and further interpreted according to user type.
2. General Impressions and Preferences – Questions to assess how Hurrevac compares to other software in terms of ease of installation/setup, program performance, and utility.
3. Datafeed – Questions to determine what forecast data is most important to Hurrevac users and how they prefer to receive live data.
4. Program Features – Questions to evaluate the utility of specific Hurrevac display modes, utilities, and other program functions.
5. New Features – Questions to evaluate the appeal of specific new functionality that could be added to Hurrevac in the future.

Additionally, a ‘Hurrevac Focus Group’ consisting of approximately 40 core users and key stakeholders in the Hurrevac program was established. This group held initial meetings on November 1, 2007 via a web-based forum. In an effort to host efficient meetings and obtain users feedback, the ‘Hurrevac Focus Group’ was divided into three mini groups that were consolidated by regions (i.e., Atlantic, Gulf of Mexico, and Islands). The purpose of the meeting was to inform this group of plans for upgrading Hurrevac and initiate dialogue on all aspects of the program’s future. The Hurrevac Focus Group will continue to meet and participate in online discussions as the revision and upgrade of Hurrevac progresses.

### 3 SURVEY RESULTS

The online survey generated responses from 1,236 Hurrevac users, 1,118 of which completed the entire 5-page questionnaire. The responses to individual questions are summarized here along with a representative sampling of the comments received.

#### 3.1 User Information

##### 3.1.1 Affiliation

Q. Which of the categories below best describes your agency/organization affiliation?

Local Government	53.0%
State Government	18.7%
Federal Government	10.0%
Military	5.0%
FEMA	5.0%
Relief Organization	2.9%
US Army Corps of Engineers	2.3%
Weather Service	1.8%
Foreign Government	0.5%

A total of 128 respondents identified their affiliation as 'Other'. Some of their descriptions included *Indian tribe, nuclear power plant, National Guard, regional planning council (COG), and university.*

### 3.1.2 Location

Q. What is your state or province? \*

Florida	19.2%	Pennsylvania	0.9%
Texas	12.5%	Guam	0.7%
North Carolina	8.5%	California	0.6%
Virginia	6.7%	Colorado	0.4%
Louisiana	6.1%	Delaware	0.4%
Georgia	5.3%	Arkansas	0.3%
New Jersey	4.6%	Idaho	0.3%
Alabama	4.4%	Illinois	0.3%
South Carolina	4.2%	Kentucky	0.3%
Mississippi	3.7%	New Hampshire	0.3%
Puerto Rico	3.3%	New Mexico	0.3%
Maryland	2.6%	Oklahoma	0.3%
New York	2.6%	US Virgin Islands	0.3%
Washington D.C.	1.8%	Vermont	0.3%
Massachusetts	1.7%	Manitoba	0.2%
Connecticut	1.5%	Oregon	0.2%
Hawaii	1.5%	Utah	0.2%
Maine	1.1%	West Virginia	0.2%
Rhode Island	1.1%	Wisconsin	0.2%

\*Only categories selected by two or more respondents are reported here.

### 3.1.3 Knowledge of Software

Q. How do you rate your knowledge of the software?

**Expert User** – very familiar with Hurrevac and experienced in interpreting program output 24.5%

**Intermediate User** – basic understanding of Hurrevac operation for tracking storms 64.3%

**Novice User** – very little experience using Hurrevac 11.3%

## 3.2 General Impressions and Preferences

### 3.2.1 Installation and Setup

Q. How would you rate the ease of Hurrevac installation and setup relative to that of other software programs that you use?

	Excellent	Good	Average	Poor	N/A	Rating Average*
<b>Installation of the core program</b>	<b>52.4%</b>	37.9%	7.8%	0.9%	0.9%	3.4
<b>Installation of specific plug-ins</b>	38.2%	<b>40.5%</b>	14.0%	2.9%	4.4%	3.2
<b>Setup /customization within the program</b>	28.9%	<b>43.5%</b>	20.0%	3.0%	4.6%	3.0

\*Rating average based on ranked scoring range of Excellent(4), Good(3), Average(2), and Poor(1).

Some users commented that they had not handled the installation and setup and relied on their IT specialist to install Hurrevac. Users generally stated that the installation of the core program was straightforward, though they would prefer that plug-ins and customization be a part of the main installation of Hurrevac. Also, survey participants suggested that automatic updates to the program should be integrated into the datafeed.

A few users mentioned difficulties with getting Hurrevac's FTP functions to work within their networks. A military user brought up the issue that the Navy cannot run Hurrevac directly on their computers due to security issues with FTP, stating that a *"Problem with HURREVAC as currently accessible for Navy users is the CITRIX server that hosts the system to meet the Navy's IA security requirements makes the system almost non-functional due to processing delays."*

### 3.2.2 Performance

Q. How would you rate Hurrevac's performance relative to that of other programs you use?

	Excellent	Good	Average	Poor	N/A	Rating Average*
<b>Program stability</b>	<b>55.2%</b>	35.6%	6.1%	0.8%	2.2%	3.5
<b>Program speed</b>	<b>48.7%</b>	39.6%	8.5%	0.8%	2.4%	3.4

\*Rating average based on ranked scoring range of Excellent(4), Good(3), Average(2), and Poor(1).

Nearly all user comments focused on Hurrevac's data download speed and reliability. Some reported positive experiences such as *"download of current data is very fast"* and *"Both in office (big pipe thru Texas A&M) and on the road (aircard or sat uplink) we find the program to perform very well. Sometimes with the air card we see timeout errors on the retrieval of data but that should be expected."* More comments highlighted difficulties with the download process,

stating experiences such as *“Occasionally hangs during a download. Requires a re-download or occasional program restart.”*

### 3.2.3 Overall Operation

Q. Indicate whether you agree or disagree with the following statements regarding Hurrevac’s overall operation?

	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree	N/A	Rating Average*
<b>Menus and buttons are intuitive</b>	33.3%	<b>57.2%</b>	7.6%	1.2%	0.7%	3.2
<b>Help system is comprehensive</b>	26.7%	<b>54.4%</b>	9.6%	1.4%	7.9%	3.2
<b>Novice user can understand</b>	25.5%	<b>47.7%</b>	21.0%	4.6%	1.3%	3.0
<b>Experienced user has plenty of options</b>	<b>54.5%</b>	35.4%	3.2%	0.4%	6.6%	3.5

\*Rating average based on ranked scoring range of Strongly Agree(4), Somewhat Agree(3), Somewhat Disagree(2), and Strongly Disagree(1).

Most users seemed to regard Hurrevac as a sophisticated program not targeted to *“a novice in hurricane preparedness,”* but somewhat useable for beginners—*“The basic buttons are easy to remember once used (not quite intuitive, but good). There is a substantial learning curve with the menus for a new user.”*

Many survey participants mentioned the importance of training, without which *“A novice would still have some issues interpreting the results and understanding the terminology.”* *“Training is necessary. One must understand about hurricanes and understand how to use Hurrevac for it to be more beneficial than NHC public products. But with training and understanding, Hurrevac simply has the potential to save lives. No doubt about it.”*

Several participants specifically mentioned Hurrevac’s Exercise Track Wizard for creating hypothetical storms—*“I would like to see the Exercise Track Wizard be beefed up some. I built a storm for an exercise and ended up having to manual edit on somewhere around 50 advisories. As a layman, it was a difficult maneuver. Would have been easier if the utility for exercise tracking was a little more user friendly. Or maybe I just needed better help directions.”*

Also specifically mentioned by several users was some confusion and difficulty working with multiple storms and other map layers at one time—*“I have some trouble getting the storms to show simultaneously. Also, if the 'active' storms came up on the map when a new download of data took place, then I'd save about 5 steps in getting an idea of what was happening. I like the toggle between forecasts (in time) feature to see how the predictions are tracking.”* *“It is hard to switch back and forth between options. ie wind, rain, path, or different storms”*

### 3.3 The Datafeed

#### 3.3.1 Data Delivery Method

Q. What is your preferred method for receiving live data for Hurrevac?

**Current system of downloading data when I press a button within the program 60.1%**

**New advisories ‘pushed’ to my computer when they are available 39.9%**

Comments were mixed on the preferred download method—“*We prefer that our computers receive no data without specific human oversight of the decision.*” versus “*Automatic updates for Storms in our area would be of great use. Hopefully the update could be tied to submit an e-mail notice of update.*” Many stated that both options should be available.

#### 3.3.2 Products

Q. How important do you feel that the following types of products are in Hurrevac?

	Very Important	Somewhat Important	Not Important	Rating Average*
<b>Storm tracks (.stm files)</b>	<b>98.2%</b>	1.8%	0.0%	3.0
<b>Tropical weather outlook</b>	<b>76.4%</b>	20.7%	2.9%	2.7
<b>Public advisories (.pub files)</b>	<b>71.7%</b>	25.8%	2.6%	2.7
<b>Advisory discussions (.pub files)</b>	<b>54.3%</b>	40.6%	5.1%	2.5
<b>Marine advisories (.mar files)</b>	<b>48.3%</b>	43.3%	8.4%	2.4
<b>River flood outlook (.rfo files)</b>	<b>64.8%</b>	30.1%	5.1%	2.6
<b>Rainfall forecast (.qpf files)</b>	<b>80.7%</b>	17.4%	1.9%	2.8
<b>Rainfall discussion (qpfdisc.txt)</b>	46.2%	<b>46.6%</b>	7.2%	2.4
<b>Tide station data</b>	<b>65.2%</b>	28.9%	5.9%	2.6
<b>River gage data</b>	<b>63.0%</b>	31.1%	5.9%	2.6
<b>ETIS (Evacuating Traffic Information System)</b>	<b>67.6%</b>	26.7%	5.7%	2.6

\*Rating average based on ranked scoring range of Very Important(3), Somewhat Important(2), and Not Important(1).

Users generally believed that all of Hurrevac’s current products are important, though the ETIS data, in particular, has geographically limited applicability—“*I don't use all of these, but see value in all of them.*” One user also commented on the technical challenges of data sharing – “*I believe that the options are important; it's just that it is difficult to incorporate the output efficiently and quickly with other software technology to present a common operating picture.*” Others commented that they use only the graphical products in Hurrevac, preferring to view text products on the Internet. Web sites of official government agencies such as NHC and local NWS forecast offices were mentioned, as well as commercial sites such as Weatherunderground.com.

Guidance model tracks, the forecast tracks generated by various statistical and dynamical prediction models, were the most often requested addition—*“The only thing I really wished Hurrevac did was to show the various models out there - right now I go to the Atlantic Hurricane Pages and Weatherunderground to look at the outliers - an example in the discussion a couple of times a year a forecaster will state that they have confidence in one model or another - while we react based on the overall cone - it is helpful for me to look at that specific models guidance.”*

Among other suggestions for new products to incorporate, satellite and radar overlays were mentioned by several; also shelter data – *“a linkage for the National Shelter System,”* and local forecast office information, possibly through a web *“links page for other information.”* Better storm surge and wind prediction products are desired as well.

Some commented that they wished some of Hurrevac’s functionality could be carried over into additional states—*“Although I know it is not in the scope, I would like to see an expanded data coverage area into AR (Arkansas). In 05 rains from Rita threatened AR and it would have been nice to do the river flood modeling in AR like is done in the coastal states.”*

### 3.4 Program Features

#### 3.4.1 Display Modes

Q. How useful do you find these various Display Modes of Hurrevac?

	Very Useful	Useful	Somewhat Useful	Not Useful	Rating Average*
<b>Single Plot (wind extents at one hour</b>	<b>73.5%</b>	24.0%	2.3%	0.3%	3.7
<b>Wind Swath (wind extents for 72 hours)</b>	<b>84.2%</b>	14.3%	1.4%	0.2%	3.8
<b>Animated Plot</b>	<b>73.2%</b>	22.1%	4.0%	0.7%	3.7
<b>Error Swath</b>	<b>75.1%</b>	21.3%	3.3%	0.4%	3.7
<b>Overlay Mode (multiple storms)</b>	<b>50.9%</b>	35.8%	12.2%	1.1%	3.4
<b>Overlay Mode (multiple advisories)</b>	<b>54.7%</b>	35.5%	8.9%	0.9%	3.4
<b>Historical/Yearly Plot Mode</b>	38.0%	<b>42.7%</b>	17.0%	2.3%	3.2

\*Rating average based on ranked scoring range of Very Useful(4), Useful(3), Somewhat Useful(2), and Not Useful(1).

All display modes were highly rated. Several commented specifically on the utility of displaying multiple advisories—*“Use of multiple advisories on the same storm is invaluable during early planning stages. We compare at any given time, the storms actual path relative to the predicted path for that advisory. This gives us some indication of how accurate the prediction models are working for a particular storm. During the early planning stages, this information is extremely useful to me - no one does this better than Hurrevac.”*

Some users had suggestions on how best to organize and display data in Hurrevac--*“It would be nice to have separate windows for certain features so they can be looked at on the same screen. Keep storm tracking and evacuation decision data in one window and if I want to look at rain*

and flood I could open a new window that just have menu items for that only, same for historic storms, surge maps, ETIS, tide data, shelter module, exercise wizard, etc. This would also reduce menu items and buttons on the tracking and evacuation decision window and make it similar to learn and use.”

Also suggested were “I would like to refine the windswaths to see the hurricane bands (cat 1 – 5)” and “The animated plot is great, but could it also leave the swath behind it as it goes?”

Other users commented on limitations of current data—“Something needs to be done in order to improve the wind display for non-symmetrical and landfalling storms. Would need to work with NHC in order to do this, but the overestimation of winds has caused problems with regard to timing via HURREVAC vs. timing in WFO forecasts, which account for wind field differences over land.”

### 3.4.2 Utilities

Q. How useful do you find these various utilities of Hurrevac?

	Very Useful	Useful	Somewhat Useful	Not Useful	Rating Average*
<b>GIS Export</b>	<b>41.4%</b>	38.7%	15.4%	4.6%	3.2
<b>Coordinates and Measurement Tool</b>	<b>55.9%</b>	34.4%	8.6%	1.1%	3.5
<b>Advisory Text Viewer</b>	<b>46.8%</b>	41.9%	9.5%	1.8%	3.3
<b>Shelters Data Viewer</b>	27.9%	<b>41.2%</b>	21.7%	9.1%	2.9
<b>Exercise Track Wizard</b>	35.8%	<b>44.5%</b>	16.1%	3.7%	3.1
<b>Storm Statistics Viewer</b>	42.6%	<b>45.8%</b>	10.1%	1.6%	3.3

\*Rating average based on ranked scoring range of Very Useful(4), Useful(3), Somewhat Useful(2), and Not Useful(1).

The GIS Export utility was most commented upon. Many stated that this function was very important—“As storms approach I use the GIS export feature to brief upper management - this is very useful” but that it needed improvement--“Need to make the export of the GIS layers simple...currently we have to pick each layer at a time for export...there has to be an option to export all”

Many also commented that shelter functions are useful if the data is available—“The Shelter data viewer is also a great tool to have, it allows us to push out shelter locations and information to field commanders. This allows them to understand where to evacuate personnel to during rescue operations within their area of operations.”

Comments on other utilities included: “The Exercise Track Wizard needs an overhaul. It is very cumbersome. It also requires too much meteorological expertise to be used effectively by beginners. It should provide suggested positions; based on start point, end point, and time interval. It should allow you to customize from an automatically generated model, not require you to create from nothing.”

### 3.4.3 Annotation and Labeling

Q. How useful do you find the annotation and labeling features of Hurrevac?

	Very Useful	Useful	Somewhat Useful	Not Useful	Rating Average*
<b>Storm track labels</b>	<b>70.9%</b>	25.9%	2.9%	0.3%	3.7
<b>Storm information box</b>	<b>66.8%</b>	28.8%	4.2%	0.2%	3.6
<b>Custom annotation</b>	<b>46.1%</b>	40.8%	11.5%	1.6%	3.3
<b>Wind tags</b>	<b>58.4%</b>	34.4%	6.5%	0.6%	3.5
<b>Range marks</b>	<b>58.4%</b>	34.4%	6.5%	0.6%	3.4

\*Rating average based on ranked scoring range of Very Useful(4), Useful(3), Somewhat Useful(2), and Not Useful(1).

Users commented that Hurrevac’s labeling and annotation functions are important to them, stating that these *“are great for making quick briefing graphics”* and *“help me in my briefings to Commanders giving them time lines they can understand. Also good for our aviation protocols.”*

Some mentioned having trouble manipulating crowded labels—*“Moving the storm track labels can be quite difficult. It would be better if you could select a storm track label, rather than hoping you are in the right area for the nearest storm track label when you wish to move them.”* Others stated a desire for enhanced wind tag capability—*“Wind tags could be improved if the wind field representation could be improved.”*

### 3.4.4 What-If Functions

Q. How useful do you find Hurrevac’s What-If functions?

	Very Useful	Useful	Somewhat Useful	Not Useful	Rating Average*
<b>Wind Decay Model (MEOWs)</b>	39.6%	<b>43.7%</b>	14.4%	2.3%	3.2
<b>Average Error Cone</b>	<b>55.0%</b>	34.7%	8.6%	1.7%	3.4
<b>Average Error Ellipse</b>	<b>41.4%</b>	44.1%	12.2%	2.3%	3.2
<b>Alternate Track</b>	<b>49.1%</b>	39.9%	9.3%	1.8%	3.4

\*Rating average based on ranked scoring range of Very Useful(4), Useful(3), Somewhat Useful(2), and Not Useful(1).

Most of the comments came from users who stated that they don’t use and/or understand Hurrevac’s What-If menu—*“Do not know how to use the What-If function. Another training issue.”* Alternately, a few commented appreciatively that the What-If functions are *“the things that I can’t get anywhere else”* and *“all very important features.”* No one made suggestions for specific improvements.

### 3.4.5 Timing Functions

Q. How useful do you find Hurrevac’s timing functions?

	Very Useful	Useful	Somewhat Useful	Not Useful	Rating Average*
<b>Wind Timing Lists</b>	<b>50.3%</b>	38.2%	10.1%	1.4%	3.4
<b>Forecast Closest Approach List</b>	<b>55.5%</b>	33.4%	9.5%	1.6%	3.4
<b>Evacuation Timing Lists</b>	<b>49.3%</b>	35.8%	12.0%	2.8%	3.3
<b>Evacuation Bar Graphs</b>	39.5%	<b>41.9%</b>	15.2%	3.4%	3.2
<b>Graphical Timing (Decisions Arcs)</b>	<b>50.9%</b>	37.3%	9.8%	1.9%	3.4
<b>Custom Timeline</b>	<b>42.1%</b>	42.0%	13.2%	2.7%	3.2

\*Rating average based on ranked scoring range of Very Useful(4), Useful(3), Somewhat Useful(2), and Not Useful(1).

Many users reported that they did not use and/or understand many of Hurrevac’s timing functions—*“We are a response organization, as such we see the efficacy of these features even though we rarely use them. The exception is the Wind timing lists which are extremely valuable because we try to move components into place prior to the tropical storm winds.”* The need for training on these functions was underscored.

Others recognized Hurrevac’s timing functions as critical—*“Evacuation timing list is huge for our military operations. It allows us to gage, when our forces and installations need to be evacuated. It also allows us a timeline to evacuate our own troops and have response forces in position and ready prior to assist local and State evacuation planning and reverse lanes.”*

One user commented that easier to access would be helpful—*“This items would be VERY useful if they were not so difficult to use. Needs to be a simple right click on a county to bring up a menu that would let you add these features and leave them on until you turn them off.”* Another suggestion was to accommodate timing alerts for multiple counties—*“An option that would allow a user to pick one or more locations (Cities) and the program auto post a decision arch and label of timing. Still keep the option as it is now. This would be quick and easy planning tool that would simply allow the user to look several hours ahead.”*

### 3.4.6 Flood Tools

Q. How useful do you find Hurrevac’s various flood tools?

	Very Useful	Useful	Somewhat Useful	Not Useful	Rating Average*
<b>River gage display</b>	<b>49.8%</b>	35.1%	10.5%	4.6%	3.3
<b>Tide gage display</b>	<b>50.7%</b>	34.5%	10.7%	4.1%	3.3
<b>Rainfall forecast</b>	<b>65.5%</b>	27.2%	5.5%	1.9%	3.6
<b>River flood outlook</b>	<b>51.0%</b>	34.5%	9.7%	4.7%	3.3

\*Rating average based on ranked scoring range of Very Useful(4), Useful(3), Somewhat Useful(2), and Not Useful(1).

Several users commented that Hurrevac’s flood tools make it a year-round program for them--“*I use the rainfall forecast and flood outlook every day, not just in hurricane season*” and continued enhancement of the flood tools is desired—“*We are the primary response component in Texas. Need I say more....Any other tools like the four above that will help us in this area would be appreciated.*” Some stated that they don’t use the various tools due to lack of rivers or flooding issues in their areas.

### 3.5 New Features

#### 3.5.1 Potential Features

Q. Rate how useful you would find these potential additions to Hurrevac.

	Very Useful	Useful	Somewhat Useful	Not Useful	Rating Average*
<b>Finer resolution basemaps</b>	<b>66.8%</b>	27.2%	5.1%	0.9%	3.6
<b>Shapefile import capability</b>	<b>45.8%</b>	38.5%	13.0%	2.6%	3.3
<b>HTTP datafeed</b>	<b>51.6%</b>	38.5%	8.0%	1.9%	3.4
<b>Satellite imagery (GOES, Quikscat, etc)</b>	<b>76.0%</b>	19.4%	3.9%	0.7%	3.7
<b>Guidance model tracks</b>	<b>62.9%</b>	31.0%	5.5%	0.6%	3.6
<b>Wind probabilities</b>	<b>75.5%</b>	21.4%	2.7%	0.4%	3.7
<b>Surge probabilities</b>	<b>73.0%</b>	21.0%	5.1%	0.9%	3.7
<b>Flood inundation areas</b>	<b>72.5%</b>	22.7%	4.1%	0.7%	3.7
<b>Automatic notifications of new storms/advisories</b>	<b>76.9%</b>	17.2%	4.8%	1.1%	3.7

\*Rating average based on ranked scoring range of Very Useful(4), Useful(3), Somewhat Useful(2), and Not Useful(1).

Users generally commented favorably on all new features that were suggested in the survey:

*“All of the above capabilities would enhance Hurrevac. I really like the idea of data being pushed to Hurrevac as soon as it is available, similar to data being pushed to my pc via EMWIN. The ability to overlay the model tracks over the forecast tracks can be an enhancement for the experienced user. If the capability were added to use census data to account for population, and to have some analyses based on that, i.e., how many people would be impacted by hurricane force winds within x hours, would be helpful. Also, perhaps the mapping can use layers, which can be turned on or off such as done with GIS programs and other mapping software. I use Delorme Street Atlas on a daily basis, and use the layers for similar to GIS. Perhaps there could be a way to import/export layers into these types of programs from Hurrevac. Another idea would be to display NWS data in Hurrevac such as Tornado Watches/Warnings, Storm Reports, etc.”*

*“This program is the backbone of what I do during hurricane season. If you can combine some of the info from SLOSH, buoy data, lightning strike data and model data it would be perfect.”*

### 3.5.2 Additional Ideas

Additional ideas proposed by users:

Interface with mobile technology--*“I would like to see a version of Hurrevac that can be downloaded and updated on a PDA/Smart phone. Many Emergency Management workers now carry PDA/smartphones with Internet capabilities. It would helpful to have the ability to get updates on your cellular device to receive up to the minute information about storms without sitting at your office or home computer.”*

Extended storm tracking period--*“Provide data for storms later in their lifecycle. We often get the most flooding from these slow-moving remnants. Provide a forum or message-board option for users to discuss the program and any developing tropical threats.”*

Executive summary-type reporting-- *“I cut and paste the chart, Advisories and Discussions for storm updates to state agencies including the Governor’s Office. Many times I have to go to the NHC website to download the satellite imagery so I would like to be able to get it from HURREVAC. Again I like the One-Stop and get it all approach.”*

GIS-like functionality--*“The potential for more layers (GIS style functionality), where radar imagery, QuikSCAT, satellite, topography, etc. could be overlaid would be very useful. This tool has improved forecast accuracy of local effects immensely in recent years, in addition to providing a powerful briefing tool for emergency managers. Please keep up the great work!”*

Intuitive interface with active help system--*“Please make it as intuitive as possible. If you can add popups of 'what do you want next? ' to make the options available to people like me who do not use this program habitually. I don't know about a lot of the options available and don't know to even search for them. If you dangled them in front of me and I could choose 'yes or no' as to whether or not I wanted to access them, I could decide and then go further into the program. Yes, this may be insulting to a seasoned weather person, but not all of us are. Thanks for the chance to chime in here”*

## 4 CONCLUSIONS

Many survey participants left favorable comments throughout the survey regarding the current features of Hurrevac. A common thread was seen throughout, which one user summed up as “*I think it’s a great program; I hope any new additions -- while welcome -- won’t dramatically increase the complexity of the software. Its simplicity is part of its usefulness.*”

Members of the Hurrevac Focus Group also echoed this sentiment during their initial teleconference and online discussions. They stressed that Hurrevac is primarily a tool for the local government emergency manager and should never lose that focus. The group also concluded that far more should be done in terms of user training—a point that is driven home by the number of survey respondents who stated that they don’t use and/or understand many of Hurrevac’s What-If and Timing functions.

The following changes to the operation, maintenance and conversion of Hurrevac are suggested as a result of the user feedback:

1. **Expand Hurrevac’s training programs and help system** to ensure that users are getting full use of the program’s functionality. Onsite training should be dramatically increased from the small number of sessions that currently are held at the start of each hurricane season. In depth training should include storm scenario exercises in which participants practice tracking a storm and making decisions based on program analysis. A robust, distance learning-interactive training module could be developed to supplement the training needs. A more comprehensive and interactive help system should be integrated into future version of the program. The main help system should be internet-based so that edits can be made without the need to distribute new versions to all users. Within the software, tool tips and wizards should be developed that direct the user to logical ‘next steps’ or ‘other considerations.’
2. **Develop a new data distribution system for Hurrevac** that is more robust and user friendly. The new system should be based on http protocols, rather than FTP that has been problematic for Hurrevac users in restrictive networks. Future versions of Hurrevac should provide users with the option to automatically receive data of interest and be alerted of its availability.
3. **Streamline Hurrevac’s installation, setup, and customization procedures** into a single wizard-driven installation process. All necessary evacuation data and map plug-ins should be automatically installed along with the core program based on the users indication of their area of interest.
4. **Retool Hurrevac’s What-If and Timing functions** to be more intuitive to operate and interpret results. ‘Local Areas of Interest’ and Decision Time Alert’ settings should be more obviously integrated into the menus and tools for these functions. Tabular reports generated by these functions should include more explanatory text and legends for colors

and symbols used within. Executive or summary reports are also recommended that would combine output from multiple What-If and Timing functions.

5. **Enhance Hurrevac's interoperability with GIS programs** through expansion of its data input and output capabilities. Export of storm track and windfield data to shapefile format should be a one-step process that creates a package of data layers. A significant new feature would be to allow users to import their own point, line, and polygon data for overlay on Hurrevac's basemaps. Certain imported data (shelter, critical facility and other facilities locations, as well as demographic data, for example) could possibly be included in program analysis as well.

Overall, users seemed enthusiastic about having new and improved features incorporated into future versions of Hurrevac and the program must evolve to keep pace with changing computer technologies. The Hurrevac Strategic Plan will discuss the above recommendations in greater detail and further address how the program will continue to build upon its long and successful history.