Ensayo: A Virtual Emergency Operations Center Training and Research Simulator

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Overview

• Introduction
• Key Features
• Technologies employed
• Work So Far
  • Architecture and Screenshots
• Future Directions
Emergency Operations Center (EOC): Secure location in which various emergency managers and elected officials gather together to prepare for, manage, and coordinate recovery activities in response to an emergency situation (e.g. hurricane, earthquake, tsunami, pandemic)
In our research, we are working with Miami-Dade County, FL, to build a simulator for

- Training upper level emergency personnel
- Research into emergency management decision making
Inside Miami-Dade EOC
Key Features

- Exercise Developer
- Exercise Simulator
- Decision Making Aids
  - Dashboards
- Remote Login and Participation
- Logging and Analysis Tools
  - Player Reports and Evaluation
- Artificial Agents
Technologies Employed

- Client: XHTML, CSS, JavaScript, Ajax, Reverse Ajax
- Server: PHP, MySQL, Jetty, Dojo, Google Maps
- Interactive Advisor: Program O
- Testing: Selenium, Twill
- Development: all development and deployment is being accomplished in virtual machines
vEOC So Far

3 User Consoles
- Exercise Developer, Exercise Controller
- Trainee Console
- Researcher Console
Exercise Developer, Controller

- Exercise Development Tools
- Exercise Control and Tracking
- Exercise Reports and Evaluation
- External Links
- References
Developer, Controller Architecture
Exercise Developer

- Target Capabilities Developer
- Script Developer
- Handbook Developer
- Player Responsibilities Developer
- Initial Status Developer
Target Capabilities and Exercise Objective Developer

This where Exercise Developers can set the target capabilities list and exercise objectives.

Target Capabilities

<table>
<thead>
<tr>
<th>Mission Area</th>
<th>Activity</th>
<th>Reference</th>
<th>Task</th>
<th>Status</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevent Mission: Counter-Terror Investigation and Law Enforcement</td>
<td>Share Information Related to Investigations</td>
<td>Pre.C1a 4.3.2</td>
<td>Deliver investigation-related information through pre-established channels appropriate for the originating source</td>
<td>Incomplete</td>
<td>Update</td>
</tr>
<tr>
<td>Recover Mission: Structural Damage Assessment</td>
<td>Conduct Inspections and Assessments</td>
<td>Rec.C3a 5.4.4</td>
<td>Determine need for recovery programs</td>
<td>Incomplete</td>
<td>Delete</td>
</tr>
</tbody>
</table>

Performance Metrics

<table>
<thead>
<tr>
<th>Mission Area</th>
<th>Activity</th>
<th>Reference</th>
<th>Measure</th>
<th>Metric</th>
<th>Action</th>
</tr>
</thead>
</table>

Exercise Objectives

<table>
<thead>
<tr>
<th>Objective</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate the ability to gather data, run weather calculation/projection software and assess threat in response to a hurricane formation</td>
<td>Delete</td>
</tr>
<tr>
<td>Demonstrate the ability to activate, staff, and operate the Operations, Planning and Logistics Sections of the Miami-Dade County Emergency Operations Center (EOC) in support of county response to a hurricane</td>
<td>Delete</td>
</tr>
<tr>
<td>Demonstrate the ability to establish and maintain communications among all appropriate response locations and agencies during the to a hurricane</td>
<td>Delete</td>
</tr>
<tr>
<td>Demonstrate the ability to establish and maintain communications among all appropriate response locations and agencies during the to a hurricane</td>
<td>Delete</td>
</tr>
</tbody>
</table>

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Target Capabilities Developer
Handbook Developer

Edit the handbook for the Matt script below:

PURPOSE:
This section describes the purpose of the handbook. The purpose of this exercise is to evaluate player actions against current response plans and capabilities for a hurricane.

SCOPE:
Identify the scope and concept of play, key exercise assumptions, artificialities, and simulations, message preparation instructions, safety and security. Adapt this example for your exercise. Concept of Play: Insert the titles of all positions in the ECC that have been identified as participating in the exercise. All NHC Positions are expected to participate in this exercise.

Exercise Assumptions:
State any assumptions that must be made about the exercise.
- The exercise will be conducted in a no-fault learning environment wherein systems and processes, not individuals, will be evaluated.
- Exercise simulations will be realistic and plausible, containing sufficient detail form which to respond.

Exercise Artificialities:
Exercise players are to accept the following artificialities as a means of facilitating the accomplishment of the exercise objective
n/a

Exercise Simulation:
Simulation during this functional exercise is required to compensate for non-participating organizations, individuals, and field units that would actually be deployed in a real-world response
- The Exercise Director will initiate exercise play.

SCENARIO NARRATIVE:
This section includes weather information and all relevant background information that would be available to the exercise players at the start of the exercise.
This exercise will simulate a category 3 hurricane.
Initial Status Developer

Edit the Initial Status Report for the Matt script below:

Enter/Edit the initial status as plain text:
There is a hurricane coming to Florida! It's name is Earl!

Enter a new image only if you wish to change the current image (hurricane.jpg). You may only enter a .jpg file that is under 14MB.

Submit

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Script Developer

This is the place where individuals can come to edit various scripts for trainees.

Time:  
Inject Number:  
Receiving Agency: ALL  
Sender: Your Unit Rep  
Comm Medium: Face-to-Face  
Message Type: Task  
Message Text:  
EXPLAN OBJ:  
Expected Action:  

<table>
<thead>
<tr>
<th>Time</th>
<th>Inject Number</th>
<th>Receiving Agency</th>
<th>Sending Agency</th>
<th>Message Type</th>
<th>Message Text</th>
<th>Comm Medium</th>
<th>Explan Obj</th>
<th>Expected Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>0002</td>
<td>1</td>
<td>311 Unit Leader</td>
<td>Coast Guard</td>
<td>Info</td>
<td>The ocean is very dangerous with waves of up to 11 feet.</td>
<td>Radio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0005</td>
<td>2</td>
<td>ALL</td>
<td>Exercise Controller</td>
<td>Info</td>
<td>This is a status update to all players.</td>
<td>PDA</td>
<td></td>
<td>You are expected to acknowledge this update.</td>
</tr>
</tbody>
</table>
Player Responsibilities Developer

Below are the current player responsibilities for this exercise. Fill in the blank field and click the "Add" button to add a new responsibility.

Current Responsibilities:
- [ ] Obtain briefing from Branch Director
- [ ] Attend Operations Briefing
- [ ] Review assignments and incident activities with subordinates and assign tasks
- [ ] Ensure subordinates observe required safety precautions
- [ ] Implement Incident Action Plan for Division or Group
- [ ] Submit situation and resource status information to Branch Director
- [ ] Coordinate activities with adjacent liaisons
- [ ] Determine need for additional resources and make request through Branch Director or adjacent liaisons
- [ ] Report special occurrences or events to Branch Director

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Database Control Tools

Please select a script to set-up or reset the script-specific tables.
Script: [Please select a script...]  Reset Script Tables

Or select a script to clear the user-specific tables.
Script: [Please select a script...]  Reset User Tables

Or select a script to archive script tables.
Script: [Please select a script...]  Archive Script Tables

Or select a script to remove the script archive tables.
Script: [Please select a script...]  Delete Archive Tables
Exercise Controller

- Exercise Controller
- Exercise Log
Exercise Controller

Exercise Controller Desktop

Select a Script to Run

Select One

Open

Exercise Time:

0000

<table>
<thead>
<tr>
<th>Time</th>
<th>Inject Number</th>
<th>Receiving Agency</th>
<th>Sending Agency</th>
<th>Message Type</th>
<th>Message Text</th>
<th>Communication Tool</th>
<th>Explain Obj</th>
<th>Expected Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>0002</td>
<td>1</td>
<td>311 Unit Leader</td>
<td>Coast Guard</td>
<td>Info</td>
<td>The ocean is very dangerous with waves of up to 11 feet.</td>
<td>Radio</td>
<td></td>
<td></td>
</tr>
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<td>ALL</td>
<td>Exercise Controller</td>
<td>Info</td>
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<td>PDA</td>
<td></td>
<td>You are expected to acknowledge this update.</td>
</tr>
</tbody>
</table>
Trainee Console

- Exercise Background
- Boards
- External Links
- References
- Reports
- Interactive Assistant
- Dashboards
- Inject Status
- Communication Tools
Player Handbook

This is the player handbook for the exercise:

PURPOSE:
The purpose of this exercise is to evaluate player actions against current response plans and capabilities for a hurricane.

SCOPE:

Concept of Play:
All EOC Positions are expected to participate in this exercise.

Exercise Assumptions:
- The exercise will be conducted in a no-fault learning environment wherein systems and processes, not individuals, will be evaluated. -Exercise simulations will be realistic and plausible, containing sufficient detail form which to respond. -Exercise players will react to the information and situations as they are presented, in the same manner as if this had been a real incident.

Exercise Artificialities:
n/a

Exercise Simulation:
- The Exercise Director will initiate exercise play.

SCENARIO NARRATIVE:
This exercise will simulate a category 3 hurricane.

PLAYER PROCEDURES and RESPONSIBILITIES:
none
Initial Status Report

The following is the Initial Status Report for this exercise:

There is a hurricane coming to Florida! It's name is Earl!
### Main Status Board: Common Operating Picture

#### Infrastructure

Status: Road Closures:

<table>
<thead>
<tr>
<th>Road Name</th>
<th>Closed From</th>
</tr>
</thead>
</table>

#### Human Services

Points of Distribution Status:

<table>
<thead>
<tr>
<th>POD</th>
<th>Status</th>
<th>Results</th>
</tr>
</thead>
</table>

Hospitals Status:

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Status</th>
<th>Accomodations</th>
</tr>
</thead>
</table>

#### Public Safety

Shelters Status:

<table>
<thead>
<tr>
<th>Shelter</th>
<th>Status</th>
<th>Accomodations</th>
</tr>
</thead>
</table>

---

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Status Boards
Exercise Development Tools

Disaster Map

Use this map to plot disasters and share points with other vEOC participants.

Add Flood  Add Fire  Add Radioactivity  Add First Aid

Clear My Changes  Save Map

Directions
- Select a type of disaster to add.
- Click on the map to insert a vertex.
- Click on a vertex to remove it or drag a vertex to move it.
- Floods/Radiation are regions with at least 3 points and Fires/First Aids are single points on the map.
- Click Save Map to save changes.
- Click on an existing item (icon) to remove it.

Powered by Google Maps
Mission/Tasks

This is the place where individuals can view the status of mission/tasks created/received.

<table>
<thead>
<tr>
<th>ID</th>
<th>Time</th>
<th>Type</th>
<th>Agency</th>
<th>Mission/Task</th>
<th>Priority</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2010-11-06 13:31:30</td>
<td>Mission</td>
<td>311 Unit Leader</td>
<td>How many calls have come in to the center today?</td>
<td>Flash</td>
<td>pending</td>
</tr>
<tr>
<td>3</td>
<td>2010-11-06 13:32:43</td>
<td>Task</td>
<td>American Red Cross</td>
<td>We need 2 additional shelters on the East Side</td>
<td>Flash</td>
<td>pending</td>
</tr>
</tbody>
</table>

Mission/Tasks

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Shelter Reports

<table>
<thead>
<tr>
<th>Shelter</th>
<th>Status</th>
<th>Accomodations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walter High</td>
<td>Open</td>
<td>75</td>
</tr>
<tr>
<td>Austin High</td>
<td>Open</td>
<td>60</td>
</tr>
</tbody>
</table>
### Dashboard Data

#### Lives Data

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Saved</th>
<th>Injured</th>
<th>Lost</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-29-10</td>
<td>Aventura</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>10-30-10</td>
<td>Aventura</td>
<td>3</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>10-30-10</td>
<td>Bay Harbour Village</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>10-31-10</td>
<td>Bay Harbour Islands</td>
<td>4</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>
Chat with AIDAC

You: menu
AIDAC: Please make a selection by entering only the number.
You: 2
AIDAC: An inject is an update from another agency or individual that requires your attention.
You: menu
AIDAC: Please make a selection by entering only the number.
You: 1
AIDAC: The vEOC is a virtual Emergency Operations Center for training and evaluation.
Cost Dashboard
Lives Dashboard

Cumulative Lives Data

<table>
<thead>
<tr>
<th>Date</th>
<th>People Saved</th>
<th>People Injured</th>
<th>Lives Lost</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-29-10</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>10-30-10</td>
<td>8</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>10-31-10</td>
<td>10</td>
<td>7</td>
<td>5</td>
</tr>
</tbody>
</table>

Lives Data Per Day

<table>
<thead>
<tr>
<th>Date</th>
<th>People Saved</th>
<th>People Injured</th>
<th>Lives Lost</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-29-10</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>10-30-10</td>
<td>6</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>10-31-10</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Lives Lost by Location

- Aventura: 12.5%
- Bay Harbour Islands: 25%
- Bay Harbour Village: 75%
Communication Tools
Researcher Console

- Researcher Tools
- Exercise Reports
- References
Researcher Architecture

[Diagram showing various components such as Exercise Logs, Geographical Information System, Data Processor, Script Viewer, Player Reports, Evaluation Metrics, and Authentication.]
Player Evaluation

Player evaluation for Assistant Mayor on the Matt script:

Percent of injects missed: 0%
Average inject response time: 0 seconds
### View Script

<table>
<thead>
<tr>
<th>Time</th>
<th>Inject Number</th>
<th>Receiving Agency</th>
<th>Sending Agency</th>
<th>Message Type</th>
<th>Message Text</th>
<th>Comm Medium</th>
<th>Explan Obj</th>
<th>Expected Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>0002</td>
<td>1</td>
<td>311 Unit Leader</td>
<td>Coast Guard</td>
<td>Info</td>
<td>The ocean is very dangerous with waves of up to 11 feet.</td>
<td>Radio</td>
<td></td>
<td>Tell all callers about conditions and advise not to go into water.</td>
</tr>
<tr>
<td>0005</td>
<td>2</td>
<td>ALL</td>
<td>Exercise Controller</td>
<td>Info</td>
<td>This is a status update to all players.</td>
<td>PDA</td>
<td></td>
<td>You are expected to acknowledge this update.</td>
</tr>
</tbody>
</table>

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Future Directions

• Advanced Dashboards
• Advanced Evaluation Metrics
• Trial Exercise with Miami-Dade County
• vEOC Release on Source Forge
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• Notre Dame Zahm Research Travel Fund
Summary

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Questions