IMMERSIVE SIMULATION TECHNOLOGY

SIMPLE AND EFFECTIVE STRATEGIES TO MAKE YOUR EXERCISES MORE REALISTIC

For decades, tabletop exercises have looked pretty much the same: a facilitator reads out a narrative, paper inputs are handed to participants, and notes are recorded on flip charts. While effective, maintaining interest and buy-in for these exercises is becoming increasingly challenging. In the past few years, a number of new products have entered the market that provides easy and inexpensive ways to make exercises more realistic, interactive and immersive. In this session, participants will explore a number of accessible technologies and gain insight into how they can be used to create effective and reusable exercises for their organizations.

Welcome to our Workshop

Introduction

Housekeeping

Housekeeping

- Sign-in
- Introductions
- Coffee break
- Cell phones & pagers
- Handouts

JIBC | School of Public Safety & Security | Emergency Management Division

What is the purpose of this workshop?

This workshop has been developed in order to create a better understanding of the types of immersive simulation tools and technologies that are commonly available.

This session will accomplish three specific objectives related to this purpose:
- *Review various off-the-shelf simulation technologies*
- *Explore practical methods for incorporating simulation technologies into the design and conduct of discussion-based exercises*
- *Outline process for creating reusable technological components for discussion-based exercises*

What is an Immersive Simulation?

The term "immersive simulations" is used to describe exercises that use technology to model how an emergency scenario would unfold in response to player actions. This differs from the concept of "virtual reality" which describes the creation of virtual (computer based) three dimensional worlds.

Using immersive simulation technology allows for the better engagement of exercise players. These technologies take the burden of having to constantly prompt players off of the facilitator, putting it onto technological resources.

As new technologies become more widely available, new possibilities have emerged for engaging exercise players. For example, the exercise narrative may be presented in a series if mock news stories played on a television screen; problem statements may be provided in the form of BlackBerry messages; players may plot the virtual movement of first responders into geographic information systems (GIS) such as Google Earth. These resources, once requiring large budgets and a great deal of expertise to use, have now become the tools of choice for exercise designers.

Where does Immersive Simulation Technology fit into exercise design?

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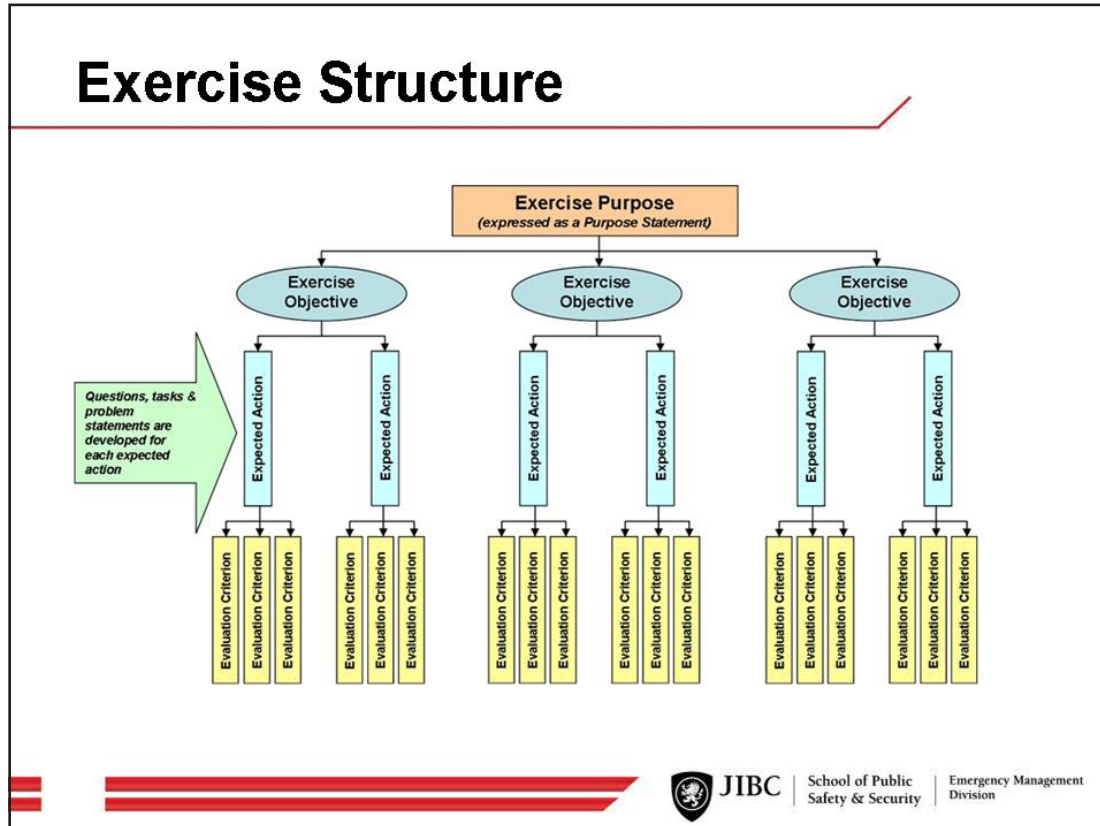
Introduction

How are exercises structured?

Exercises should be designed with a specific purpose and objectives in mind. The planning of an exercise involves creating materials that fit into the hierarchy shown above. Each of the items in the hierarchy describes a unique component of the exercise:

> The *Purpose Statement* describes the goal of the exercise in one, concise statement;

> The *Objectives* describe the specific actions that need to occur in order for the exercise to successfully complete its purpose;

> The *Expected Actions* are a list of the individual, discrete tasks that need to be completed in order for players to successfully complete an objective;

> The *Evaluation Criteria* is used to determine how successfully each objective was completed (Note: they are not used to judge or grade individual player performance.

> Throughout the exercise, Players will be prompted to perform the expected actions through a series of *Questions, Tasks, Problem Statements*.

Using this hierarchy, the exercise design team will be able to identify where future planning, training and exercising will be most beneficial. It also ensures that player conversations are focused on, and aligned to, the desired outcome of the exercise.

Sample Exercise: Pandemic

Objectives and Expected Actions:

1. Examine the impact of a pandemic on the maintenance of service levels
     a. Identify factors that may impact the redeployment of staff
     b. Identify issues around loaning/accepting of staff through mutual aid

2. Explore methods to maintain open communications with staff and residents.
     a. List key points to be included in public messaging, regarding reductions in the communities service levels
     b. Identify information to be shared with staff, regarding the communities pandemic response

Scenario:

It is Wednesday, December 9, 2010 and, as predicted, the flu season is off to a terrible start. H5N1 is running rampant through almost all communities in the lower mainland, with new cases springing up every day. This has been flu like no other in recent memory. Those that are ill find themselves nearly incapacitated with a dry cough, chest pains, pounding head-aches, and high fevers. The virus has had a knock-on effect across the community. Shopping malls, movie theatres, bars and restaurants are all empty. Many private contractors have been cancelling services due to illness. The upshot of the pandemic has been the increase in business to local medical equipment providers. It is nearly impossible to find masks, ventilators, and other medical equipment due to short supply and hoarding by the public.

The community has had a number of difficult issues to deal with. To start the Mayor and majority of council are sick and remaining at home. This has raised questions of whether there will be a quorum to hold next Monday's Council meeting. Also, staff numbers are down at least 20-25% in every department. Diminished staffing has meant the City has had to consider scaling-back non-essential services. However, determining what these services are has not been an easy task. Facility maintenance has become a major issue as many facility staff are away sick. During the last week, there have been multiple requests for additional personnel to maintain the new disinfection regimes needed to keep the flu at bay. Also, mutual aide requests have come in from neighbouring communities asking for the loan of personnel to conduct building inspections. A number of facilities are at risk of closing due to lack of personnel. Of major concern is the Sports Centre; all staff certified to monitor and administer the anhydrous ammonia for the ice rink are sick. The limited availability of trained lifeguards is making it difficult to maintain appropriate coverage at the Pool.

Questions:

1. What factors/criteria do you feel should be considered before reassigning/redeploying staff? How might union agreements impact redeployments?
2. Should the community consider loaning of staff to other municipalities? Conversely, should the city accept mutual aide staff from other municipalities?
3. What high-level messaging should go out to the public regarding reductions in the communities service levels?
4. What key information must be shared with staff regarding the communities response to the pandemic?

Sample Exercise: Chlorine Spill

Objectives and Expected Actions:

1. Assess the potential impact of a chlorine spill on the downtown community core
      a. Identify the isolation & protective distances needed for small and large spills
      b. Identify residents and businesses that may be impacted by this event

2. Locate on a map an appropriate area for an Incident Command Post
      a. Identify a suitable ICP location (e.g. outside of the isolation/protective areas)
      b. Determine how changes in weather may influence the location of the ICP

Scenario:

It's 9:15 am on Thursday, October 7 2010. The weather has been hovering around the freezing point for the past week; the snow and ice have been melting and refreezing making for some slippery conditions. While the community has been salting the sidewalks and roadways, drivers haven't been so careful - there have been a number of fender benders in the past few days.

A trailer carrying multiple ton-containers of chlorine makes its way through the community, travelling at 60km/h. As the driver approaches the main intersection in the downtown, he accidentally drops a lit cigarette in the cab. Distracted, he reaches for it and fails to notice the traffic light changing to red. A refrigerated truck travelling through the intersection slams into the cab. With a crash, the trailer tips and rolls over. It is now on its side, lying diagonally across the intersection. Diesel fuel is pouring out of the cab and onto the road. The force of the collision has also put a small gash in the side of one of the ton-containers; as liquid spills out, a greenish haze begins to form. The refrigerated truck fared a bit better, remaining upright. However, the driver was ejected through the windshield and onto the road.

Some drivers have pulled over and parked by the side of the road. Others have left their cars and are trying to rescue the unconscious trailer driver, who appears to be trapped in the cab. The driver of the refrigerated truck appears to have been killed by the impact. Within minutes, 9-11 service receives dozens of calls about the event.

The scene is becoming chaotic. Pedestrian and staff from local businesses are coming out of nearby buildings to watch the event. A tourist bus continues to unload passengers who begin taking pictures on their camera phone. A nearby hot-dog vendor begins offering 1/2 price hot dogs.
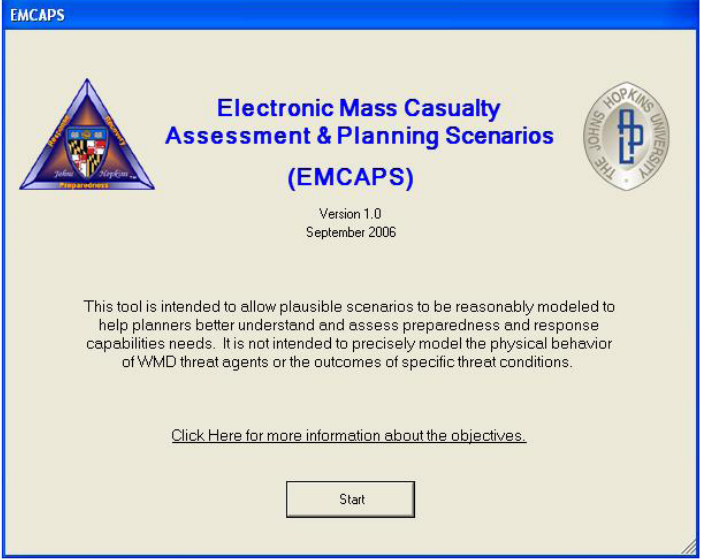
Questions and Tasks:

1. On a map, identify the areas requiring initial isolation, and protection.
2. Based on your knowledge of the community and the scenario presented so far, create a list of groups that would be impacted by this spill.
3. Based on the response required for this event, identify on the map potentially suitable locations for an Incident Command Post.
4. With what is known about this chemical, how might changes in the weather impact the suitability of the location if the Incident Command Post?

EMCAPS

EMCAPS

Electronic Mass Casualty Assessment & Planning Scenarios (EMCAPS)
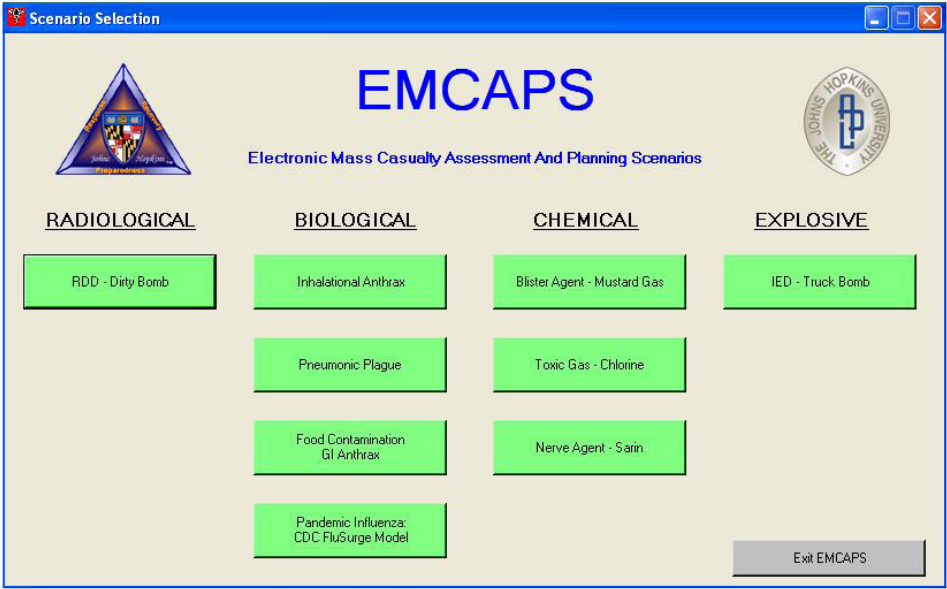
Version 1.0
September 2006

This tool is intended to allow plausible scenarios to be reasonably modeled to help planners better understand and assess preparedness and response capabilities needs. It is not intended to precisely model the physical behavior of WMD threat agents or the outcomes of specific threat conditions.

Click Here for more information about the objectives.

Start

EMCAPS

EMCAPS

Electronic Mass Casualty Assessment And Planning Scenarios

RADIOLOGICAL	BIOLOGICAL	CHEMICAL	EXPLOSIVE
RDD - Dirty Bomb	Inhalational Anthrax	Blister Agent - Mustard Gas	IED - Truck Bomb
	Pneumonic Plague	Toxic Gas - Chlorine	
	Food Contamination GI Anthrax	Nerve Agent - Sarin	
	Pandemic Influenza: CDC FluSurge Model		

Exit EMCAPS

What is EMCAPS?

EMCAPS is a computer program that models various disaster scenarios, providing data that can be used to create realistic exercise scenarios. The program can create models for the following hazards: anthrax, plague, food contamination, blister agents, nerve agents, other toxic agents, dirty bomb, and improvised explosive device attacks. The program can be freely downloaded from the **John Hopkins Office of Critical Event Preparedness and Response** web site (address below).

How do I use EMCAPS?

1. Download and install a copy of this program onto your computer
2. Review the various hazards that EMCAPS can model and determine if these match up with the focus of your proposed exercise
3. If so, identify the basic characteristics of your community and hazard. These characteristics may include: population density, size of population, temperature and other weather conditions, local hospital resources (number of beds), etc.
4. Once you have this information, launch EMCAPS and select the scenario you would like to model. Enter your information and follow the instructions
5. Use this information to develop your initial and follow-up scenarios.
6. Additionally, you may provide this information to players during the course of the exercise in the forms of mock reports, emails, and phone calls from hospitals and other agencies.

As a word of caution, this planning tool and its scenarios were designed to address the United States Department of Homeland Security capabilities-based planning scenarios and may not reflect Canadian practices or characteristics.
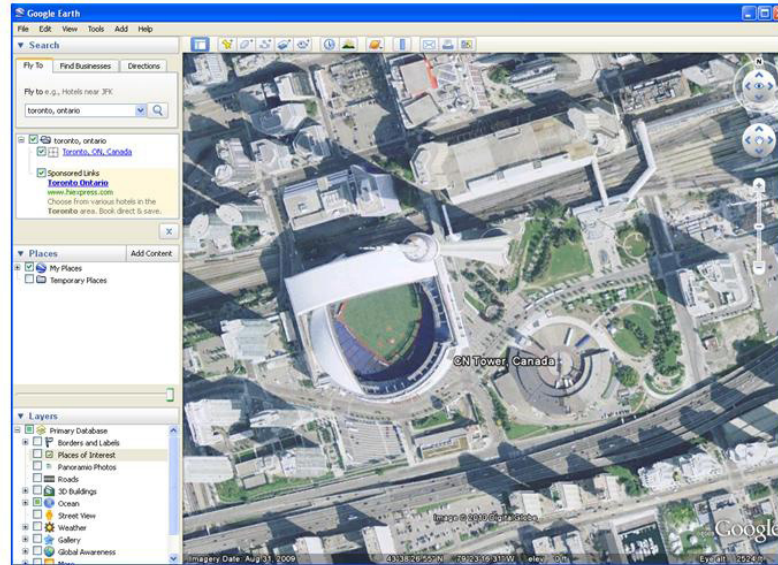
How do I get a copy of EMCAPS?

Link: http://www.hopkins-cepar.org/EMCAPS/EMCAPS.html
Cost: Free
Other: Some scenario modelers require access to Microsoft Excel

Google Earth & SketchUp

Google Earth

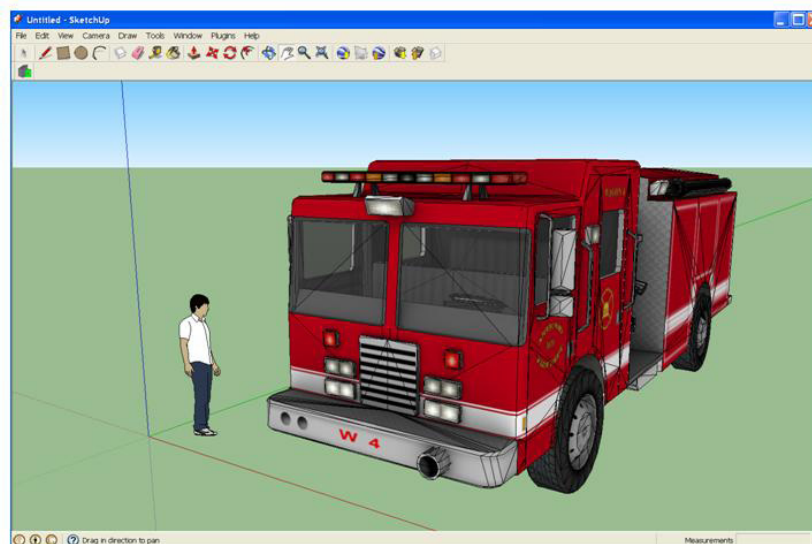## Google SketchUp

What is Google Earth?

Google Earth is a computer program that provides a simple way of exploring different types maps and satellite images. The strength of this program is its ability to stitch together a variety of maps, providing a practically seamless view of an area. The program also serves as a simplified geographic information systems (GIS) software program - meaning, it can pull from a variety mapping and other data from a variety of sources. The program can be freely downloaded from Google (address below).

What is SketchUp?

Google SketchUp is a computer program that provides a simple way to draw three-dimensional images, known as "models". The user can easily create, colour and texture these models, then view them from a number of perspectives. A major feature of this program is that it allows users to add these models directly to Google Earth. The program can be freely downloaded from Google (address below).

How do I use Google Earth and SketchUp?

1. Download and install a copy of each of these programs onto your computer
2. Launch SketchUp. Go to File, then 3D Warehouse, then Get Models
3. Browse the available models. Select a model then click Download Model. Click Yes when asked if the model should be loaded directly into SketchUp. Once loaded, left-click to place your model on the screen
4. Click the Pan tool (looks like a hand) to move your model. Use the Orbit tool (looks like to arrows in a ball) to orbit around your model
5. Leave SketchUp open and launch Google Earth. On the left side of the screen, expand the Layers section (click on the arrow beside Layers). Check the checkbox beside 3D Buildings. Then enter the address where you would like to place your model in the Search box and click the magnifying glass.
6. Zoom in on the address, the press R (this ensure you have a fully top-down view of the address)
7. Go back to SketchUp, Click the Get Current View tool (looks like a planet with an arrow pointing down). Google Earth will pop up for a moment. The current view of Google Earth will appear under your model
8. Using the Pan tool and other tools, reposition your model. Then click the Place Model tool (looks like a planet with an arrow pointing up). Google Earth will popup with your model on the map

How do I get a copy of Google Earth?

Link: http://earth.google.com/
Cost: Free (Professional version costs $400 USD)
Other: An internet connection is required to use all the features

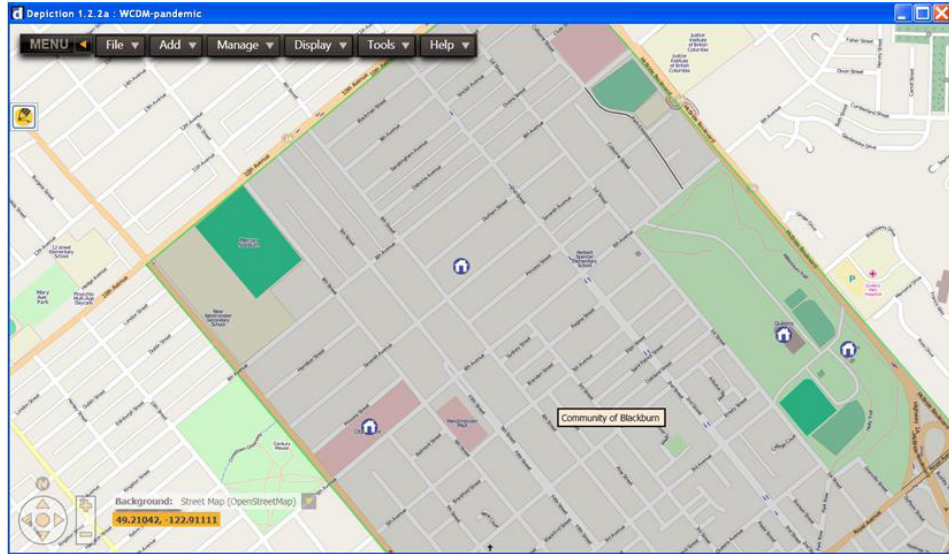## How do I get a copy of SketchUp?

Link: http://sketchup.google.com/
Cost: Free
Other: An internet connection is required to use all the features

Depiction
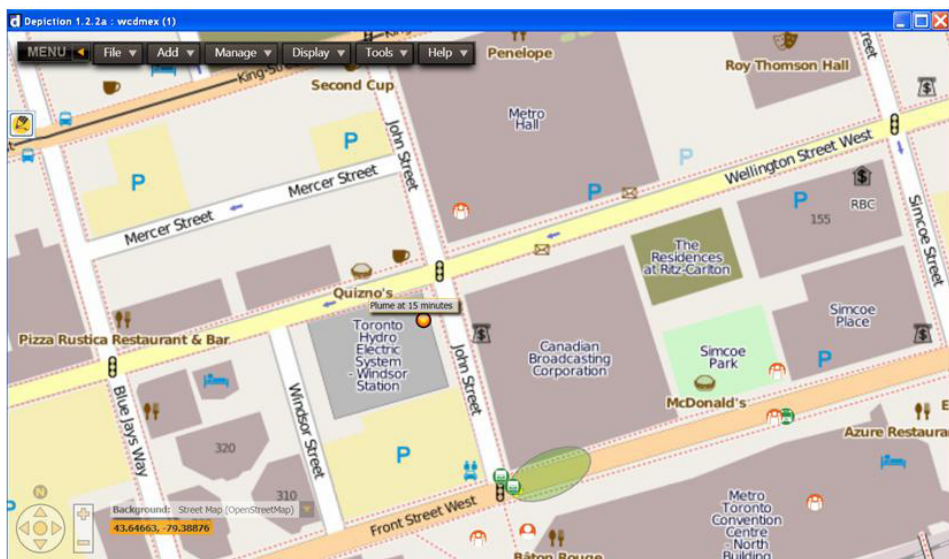
Depiction

What is Depiction?

Depiction is a geographic information systems (GIS) software program which allows the user to pull information from a variety of sources and present it in a single, interactive map. Data can be drawn from spreadsheets, online maps, images, webcams, and complex mapping files (like GML). The program then allows the user to use this data to model a variety of "what-if" events - for example, how a chemical plume might form and dissipate given certain weather conditions. A single license can be purchased from the Depiction web site for $199 USD (address below).

How do I use Depiction?

1. Purchase a license from the Depiction web site. Download and install a copy of Depiction onto your computer
2. Launch Depiction (this may take a few moments. Click New Depiction
3. Enter a location you wish to view, then click Go To Location
4. When prompted, set the boundaries for this "depiction" (their term for map) then click Done
5. Depiction will now prompt you to select a variety of data sources that may be added to your map. Urban areas tend to have more data sources available than rural areas. You may add additional data sources once the depiction has loaded
6. Once your "depiction" has loaded, scroll over the gray boxes on the map. Left click and hold to move these boxes. As you move these boxes around the map, the data for the area beneath the box is revealed
7. Left click and hold on the map to explore. Use your mouse wheel to zoom
8. Locate the menu bar at the top left. Click Add. A menu will pop up.
9. If you have additional GIS data to import, click File. In the browse bar, locate your data file, then click Add.
10. To add a plume, click Add, then Mouse. Under the column As This Element, scroll down and click Plume, then click Add. Click on a location of the map where a plume could occur
11. In the Element Information menu, add details about your plume; specifically chemical type, wind speed, wind direction, amount of release, and elapsed time. Click Add. The element is now visible in your map
12. To add a time lapse that is visible using a revealer: create a second plume following the instructions in steps 10 & 11. In the Element Information menu, specify a longer period of time
13. Click Display. In the Show Always tab, uncheck the box beside the new plume you created. Click the Show In Revealer tab. Click New Revealer, provide a name for this revealer in the box provided, and press enter. Now check the box beside the new plume. Click Close
14. The new revealer will appear on your depiction. Move this revealer around the map to view the size of the plume after the time specific in the element information.
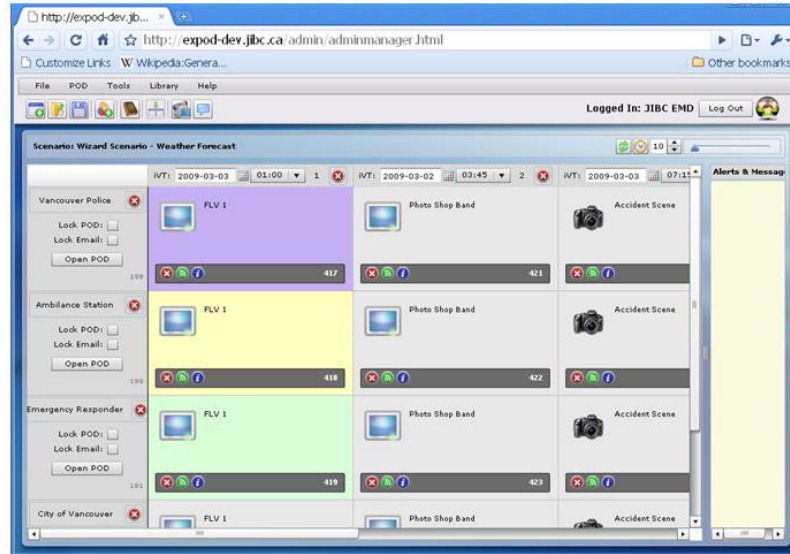
How do I get a copy of Depiction?

Link: http://www.depiction.com/
Cost: $199 USD per license
Other: An internet connection is required to use all the features

ExPod

What is ExPod?

ExPod is a web-based learning tool that is used to enhance training or exercises. The program allows facilitators to create a workshop or exercise by dropping a series of pre-created "inputs" (movies, images, documents, etc.) and tasks onto a timeline. Participants, after having logged into the ExPod web site, view the inputs and respond to the tasks. The strength of the program is that it allows participants to log in and join the training or exercise from practically any location. Additionally, evaluators and subject matter experts can log in and provide feedback online. Access to this program is only available through contacting the JIBC Emergency Management Division (address below).

How do I use ExPod?

1. Contact the JIBC Emergency Management Division and arrange for use of ExPod
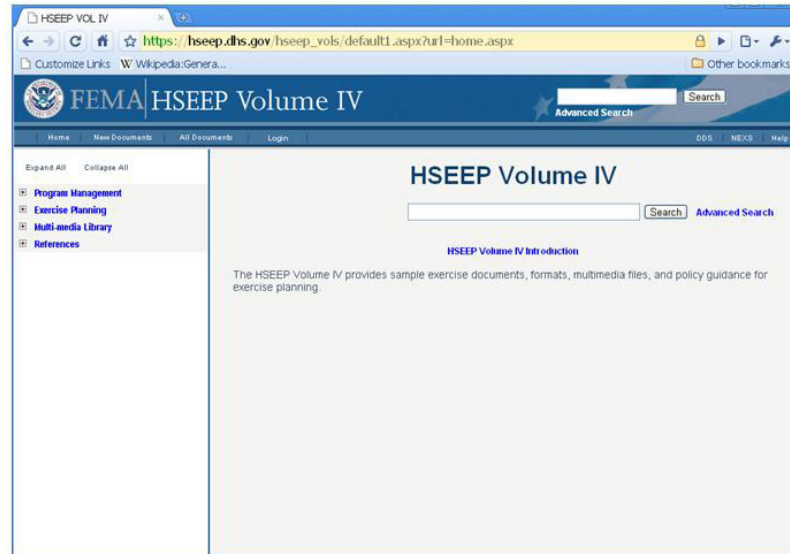
How do I access ExPod?

Link: emergency@jibc.ca
Cost: Based on project; contact EMD for more details
Other: None

H.S.E.E.P.
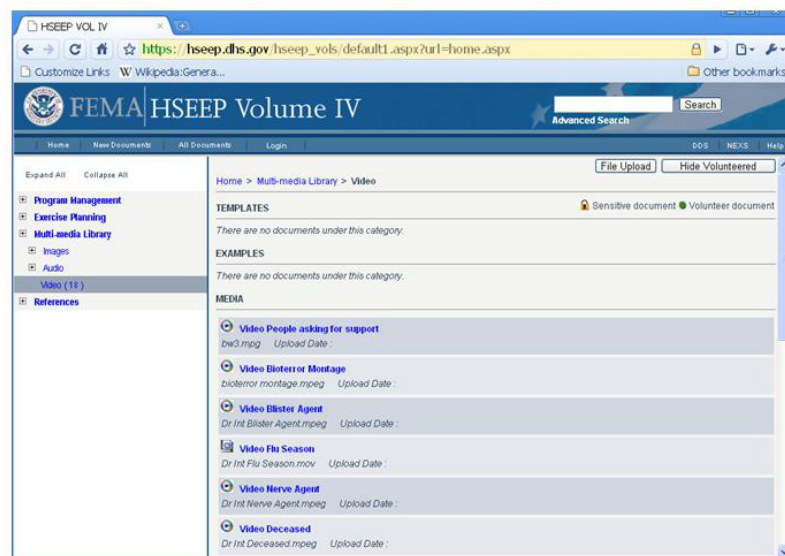
What is H.S.E.E.P.?

The Homeland Security Exercise and Evaluation Program, or H.S.E.E.P., is the formal name of the exercise program used by the United States Department of Homeland Security. Part of this program involves the sharing of exercise materials and resources through an online library. This library contains resources related to the 5-phase exercise cycle and includes documents, images, audio and video clips. Most of the materials in the online library may be freely downloaded from the HSEEP web site (address below). Some materials are locked; permission to access these materials are only granted to United States citizens.

How do I use H.S.E.E.P.?

1. Go to the HSEEP web site
2. To access media resources, click Multi-media Library on the left hand side of the screen. Then click on either Images, Audio, or Video. Select from the various folders provided. Click on a media file to download it
3. To access print resources, click Exercise Planning on the left hand side of the screen. Select from the various folders provided. Click on a file to download it
4. Note: after downloading a file, your computer may not match it to the correct icon. For example, a Word file may appear with the default Windows icon. This should not affect your ability to open or play the file

How do I access H.S.E.E.P.?

Link: https://hseep.dhs.gov/hseep_vols/
Cost: Free
Other: Materials are intended for the American emergency management community

myemresources.com

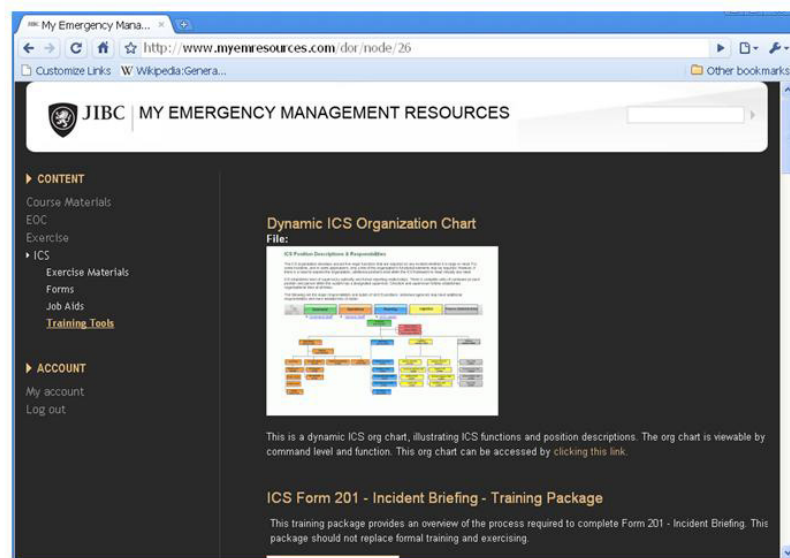## What is myemresources.com?

myemresources.com is a web site hosted by the JIBC Emergency Management Division. This web site serves as an online library of educational resources, and contains downloadable quick reference guides, template exercises, poster sets and checklists, forms and documents, videos, and other job aids. Most of the materials in the online library may be freely downloaded from myemresources.com; some items, such as videos, are viewable within the site.

How do I use myemresources.com?

1. Go to myemresources.com
2. If this is your first time accessing the site, click Create New Account at the top of the screen. Follow the instructions to create an account. Once you have created your account, log into the web site
3. To access exercise videos, click Exercise on the left hand side of the screen. Then click Exercise Materials. To play the videos, click on the triangle in the middle of each one. Expand the videos to full screen by clicking the Expand icon (it looks like a small box with arrows in the corners)
4. To access exercise design materials, click Exercise on the left hand side of the screen. Then click Forms. Click on each form to expand it; click Download to download a copy of the form
5. To access the Exercise Design Quick Reference Guide, click Exercise on the left hand side of the screen. Then click Job Aids. Click on the Guide to expand it; click Download to download a copy of the Guide

How do I access myemresources.com?

Link: http://www.myemresources.com/
Cost: Free
Other: New materials are being added weekly

Fire Studio

What is Fire Studio?

Fire Studio is a computer program which allows the user to overlay a digital image with various animated hazards - smoke, fire, explosions, etc. These animations can be made to change over time, worsening or resolving based on a predetermined storyline. These animations can then be exported and played either as a flash video (with version 4.1) or on a Player version of Fire Studio (for older versions). A single Instructor license can be purchased from the Digital Combustion web site for $870 USD (address below); Player licenses (for older versions of the editor) can be purchased for $220 USD.

How do I use Fire Studio?

1. Purchase a copy of the Instructor Edition of the Fire Studio program from the Digital Combustion web site. Install this copy onto your computer
2. For older versions of Fire Studio (3.1), purchase one or more copies of the Player version and install to player computers
3. Launch Fire Studio. Click New, the OK
4. Click Image, then scroll through clip art. Select an image by clicking Add
5. Click Fire. Click the button beside the type of fire you wish to use. Click on the background image where you would like the fire to appear, then click Add. (When you click the background image, you will not see any indicator that you have clicked - this is normal)
6. To add smoke, hazardous materials, or clip art (e.g. Pumpers) follow the same actions as in step 5
7. To import your own image, right-click on background image, select Background, then Import. Navigate to your image and click Import. (All images must be 640 X 480 pixels)
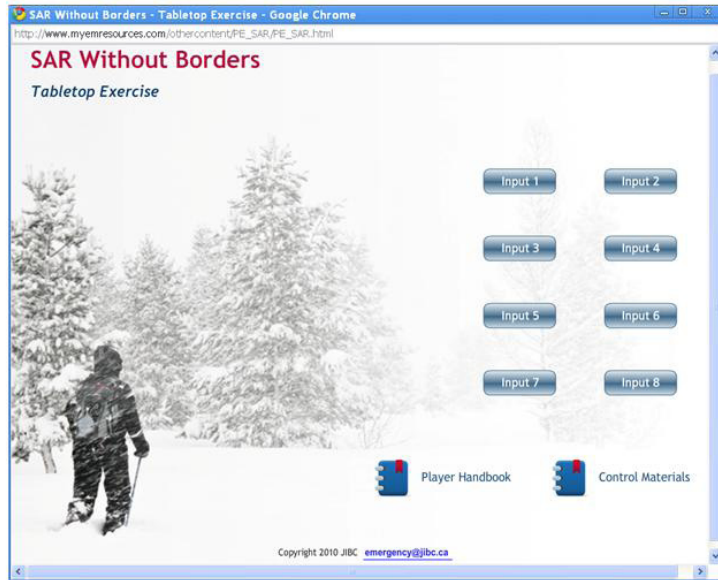
How do I get a copy of Fire Studio?

Link: http://www.digitalcombustion.com/
Cost: Free 14-day trial version of Fire Studio 3.1; 4.1 Instructor license is $870
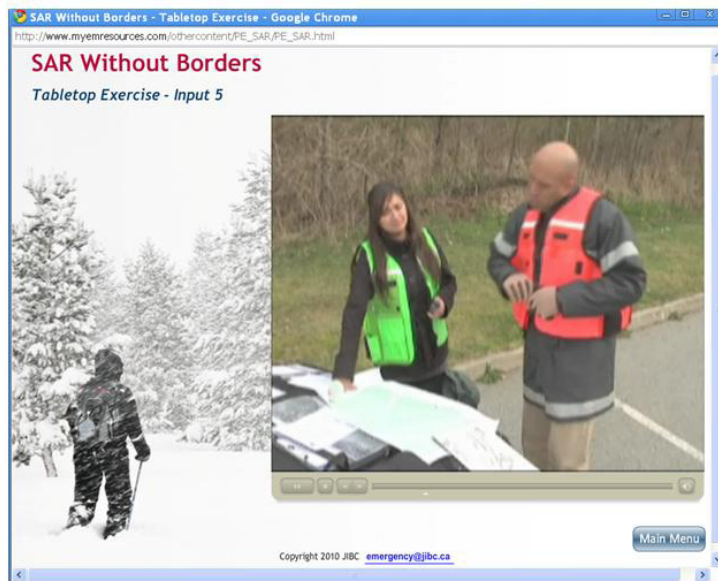Other: None

Adobe Flash

What is Adobe Flash?

Adobe Flash is a multimedia platform that allows the user to images, animations, audio, and video to a web page. Flash also allows users to interact with the web page in a variety of ways - mouse clicks, keyboard, microphone, etc. Once a Flash component has been created it is embedded on a web page, allowing the user to interact with the site content. A trial version of Adobe Flash Builder can be downloaded from the Adobe web site (address below); full licenses can be purchased for $699 USD.

How do I use Adobe Flash?

1. Purchase a copy of Flash Builder from the Adobe web site. Install this copy onto your computer
2. Work through the Getting Started series of tutorials provided by Adobe (located at http://www.adobe.com/devnet/flash/)

How do I get a copy of Adobe Flash?
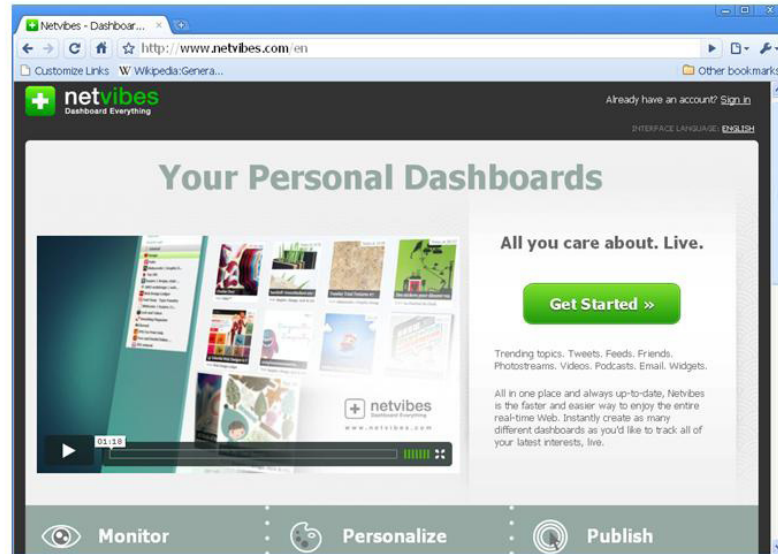
Link: http://www.adobe.com/products/flashbuilder/
Cost: Free trial; full license costs $699 USD
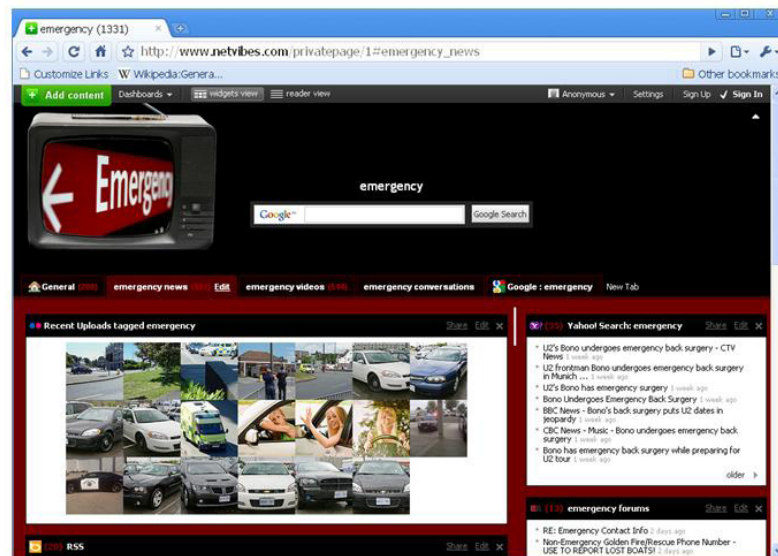Other: Requires considerable web design experience

NetVibes

What is NetVibes?

NetVibes is an online dashboard tool. Dashboards draw information from a variety of sources, organizing and displaying it in a single view. NetVibes can be configured to pull information from a variety of sources - news groups, YouTube, images, RSS feeds, and webcams. NetVibes if free to use; a profile can be setup by visiting their web site (address below).

How do I use NetVibes?

1. Purchase or rent an internet enabled camera
2. Got to http://www.netvibes.com. When prompted to create a new Dashboard View, click Default. Once page has finished loading, click New Tab and name it Camera
3. Click Add Content, then Add A Feed. Enter the RSS feed of the internet enabled cameras purchased or rented earlier
4. Rearrange the page layout by clicking Edit on the Camera tab. Select from the 1,2,3 or 4 box layout

How do I access to NetVibes?

Link: http://www.netvibes.com/
Cost: Free
Other: RSS feeds may not be secure

Emergeo FusionPoint

What is FusionPoint?

Emergeo FusionPoint is a web-based Crisis Information Management System (CIMS) that uses an easy-to-use dashboard view. FusionPoint pulls information from a variety of sources to maintain a picture of an emergency event - this includes user reports and log, OpenGIS and ESRI mapping, RSS feeds, GIS data, webcams, and other web sources. Users configure their dashboard based on the information they require to complete their task. Access to this resource is only available through contacting Emergeo (address below).

How do I use FusionPoint?

1. Contact Emergeo and arrange for a demonstration of FusionPoint
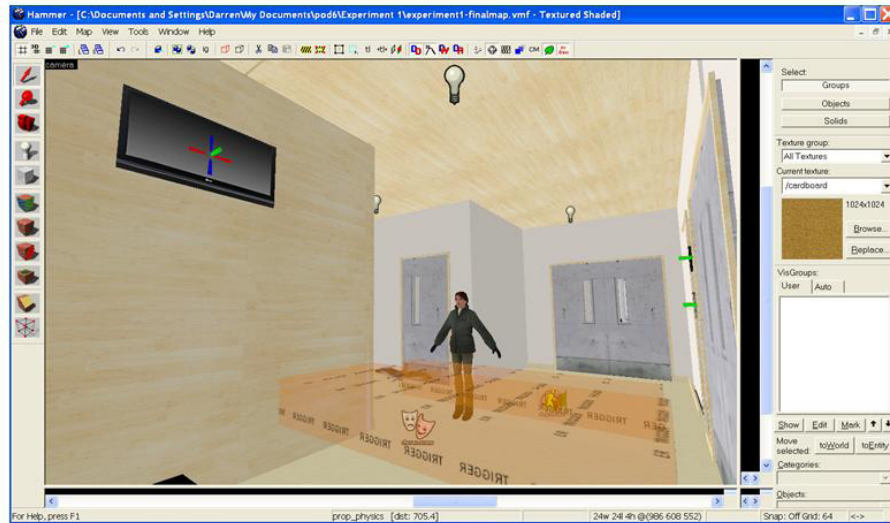
How do I access FusionPoint?

Link: http://www.emergeo.com/solutions/fusion-point
Cost: Contact Emergeo for details
Other: None

Source Engine & Hammer Editor

Steam Engine & Hammer Editor

Steam Engine & Hammer Editor

What is the Source Engine?

The Source Engine is a 3-D game engine developed by Valve Corporation. A game engine is a software program (or series of interconnected programs) which are used to develop a video game. Source is a very popular engine as it provides for realistic physics in a game. For example, an item that is thrown in game reacts to gravity, wind, etc. For the purposes of exercise design, Source is not a program that would be purchased - rather, it would come with the purchase of a game which uses the Source engine.

What is Hammer Editor?

The Hammer Editor is a tool used to create levels in video games that use the Source engine. The program can be freely downloaded from Valve with the purchase of one of their games.

How do I use Source and the Hammer Editor?

1. Download and install "Steam" on your computer (Steam is a program which provides easy access to games and resources)
2. Purchase and download a Source powered game from http://store.steampowered.com/
3. Under Tools, select and download Source SDK
4. Launch the game purchased earlier. Close the game (this step is required to generate files which are only created when a game has been launched)
5. Launch Source SDK. Click Hammer Editor
6. Go to http://developer.valvesoftware.com/wiki/Your_First_Map and follow the instructions for creating a map

How do I get a copy of the Hammer Editor?

Link: http://store.steampowered.com/
Cost: Free with purchase of Source powered game (e.g. Half-Life 2, costing $7.99)
Other: An internet connection is required to use all the features

Closing

Comments & Questions

www.jibc.ca/emergency

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