HANDS ON HAZMAT TRAINING USING IMMERSIVE SIMULATION ENVIRONMENTS
February 4, 2021

Who are we?

➢ John Rolando, Matt Hayden, Carl Bautista – Spectral Labs

➢ Nick Vent – SD County Environmental Health, retired

Why are we here?

- The purpose of this class is to introduce immersive, videogame-based Computer Based Training (CBT) and show how it can be applied.

- CBT is a consistent, ubiquitously available and cost-effective training which offers an opportunity for dramatic advances in both worker safety and inspector effectiveness for a number of applications.

Agenda

- This 15-minute PowerPoint briefing will cover:
  - Background on Spectral Labs' core technology, "RAILS", and past CBT applications that have been developed
  - A look ahead at the training being demonstrated today (NIEHS funded training for FRO HAZWOPER)
  - Quick overview of how to get help and ask questions today
- The remainder of the time you will be playing through the three CBT modules that we've made available for this course.

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But first…

➤ Let's get you started downloading the first training module – leave Zoom running but open a web browser

➤ https://dev.spectrallabs.com/webgltest/FROST/

➤ Click "Training Modules" button on the upper right of the screen as shown, then select "Hazmat Introduction and Recognition"

➤ Then come back to your Zoom window (*give a thumbs up when you're ready /chat for help*)
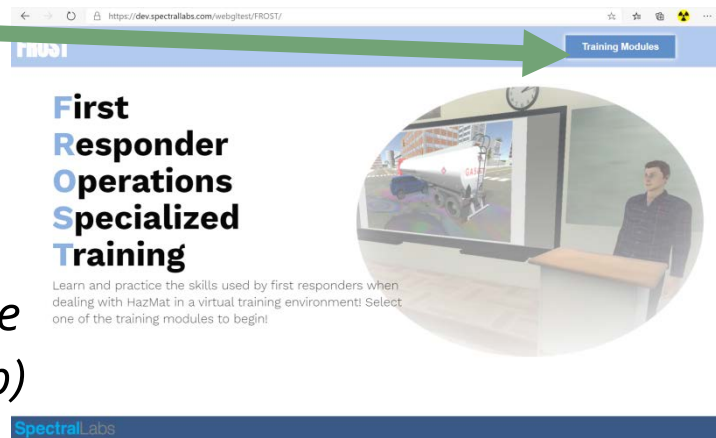
More about who we are: Spectral Labs Core Competencies/Capabilities

- Spectral Labs Incorporated (SLI):
  - Is an Employee-Owned Company
  - Was founded in 2009 in San Diego, CA
  - Has grown from 5 founders to 20+ technical professional employee owners
  - Is ISO9001:2015 Certified
  - Has a DCAA Approved Accounting System
  - Holds an approved Radiation Material License from the State of California
- SLI R&D activities include:
  - Full Scale Production of Radiation Particle Detectors/Samplers for NAVSEA
  - Major DHS/CBP R&D Program to develop a Next Gen Cargo Container inspection system upgrade to support DHS/CBP non-intrusive inspection
  - Design of a cost effective gamma ray spectrometer
  - Training "games" that model Gamma Flux and Chemical Dispersion – *we call this serious games platform "RAILS"*

Spectral Labs' core technology, "RAILS"

RAILS ≠ Trains

RAILS = Training
CBRNE Focused Computer Based Training Leveraging Video Game Technologies

Realistic, Adaptive, Interactive Learning System (RAILS)

RAILS Rad/Nuc—Original DNDO Funded Product
(Oct 2009 – Aug 2013)

•Rad/Nuc instrument training for Law Enforcement – <u>Video Game Technology with Real, Accurate Radiation Transport Physics</u>

•Initial SBIR programs (Phases 1, 2, and 3) allowed Spectral Labs to develop radiation transport models and implement them in a proprietary game engine, along with other training specific features.

- Gain an intuitive feel for time, distance, and shielding effects
- Safely interact with sources dangerous to use in real-world training scenarios
- Find virtual SNM sources normally unavailable for real-world training

RAILS allows users to experience how different materials attenuate radiation
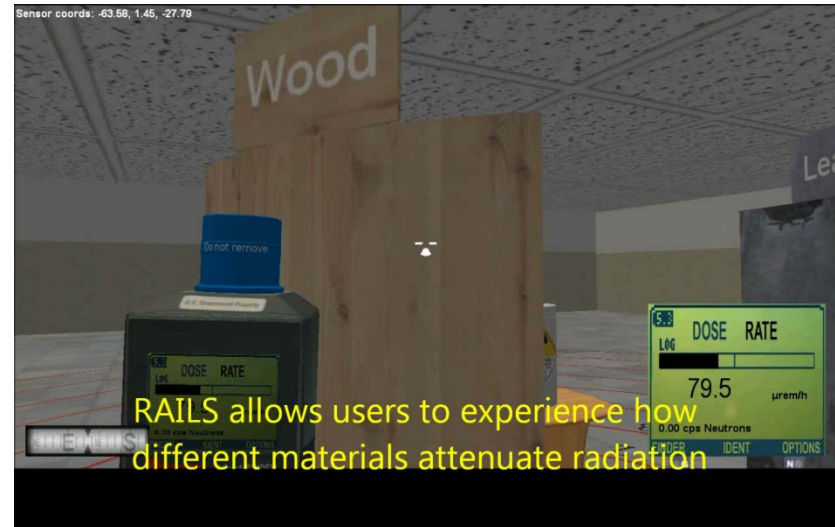
RAILS-CHEM (CTTSO)

- Added chemical dispersion modeling and explosive trace (and bulk) simulation capability, hours of training content and new features (e.g. player health)

- Target Audience: First Responders (Fire, Hazmat)

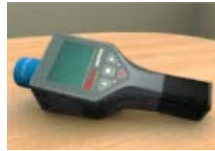- Approximate number of Agencies: **> 250 agencies** (fire, hazmat, law enforcement)

RAILS Core Technology Anchor Programs

RAILS has Wide CBRNE Device Support

RadEye

identiFINDER

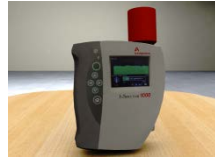PackEye

MultiRAE Pro

Draeger Tubes

M908

Polimaster 1703

Inspector 1000

Radiagem

First Defender

AP4C

Scintrex E3500

Mini rad-D

Gr-135

Pager-S

Mini Radiac

Sabre 5000

FLIR Fido

RAILS Core Technology Anchor Programs

RAVEN PhI/PhII SBIR (AFWERX): Maintenance Training for military services (2018/19)
VR Based Training

RAILS-CHEM: CTTSO funded effort to model chemical sensors (2013)
Chemical Dispersion Models

RAILS-Search and Secure: DOE funded effort to tailor training for overseas support (2014)
Update to Unity, New Modules/Equipment

RAILS-CNSC: Canadian Nuclear Safety Commission funding module for HS students on radiation basics (2018) *Further Improved Web Deployment*

RAILS-X: CTTSO funded effort adding Explosive Trace Detection (2015)
Explosive Trace Detection

RAILS: Originated with DNDO Phase I, II, III SBIR (2009-2013)

Vendor Supported RAILS: Contracts from RAE Systems to add training for new equipment, strong interest from FLIR and others (Various)

RAILS-EPA: Contract Through Battelle to develop TTX Exercise support for post-event sample strategy (2017)

RAILS-OSU: Web deployed RAILS based training for familiarizing on radiation detection lab (2017)
Web Deployment

RAILS-NIEHS: National Institute of Environmental Health Sciences, Worker Training Program – RAILS modules for Hazmat workers (2017)

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RAILS Core Technology Anchor Programs

RAILS, has grown from Rad/Nuc training to lab simulation maintenance etc.

Lab Training Oregon St., Health Physics

- Web-deployed primer for remote students before they arrive to perform labs in-person
- Initial design & dev **~2 months**

Gamma Gear Canadian Nuclear Safety Commission

- Web-deployed educational game
- Basics of radiation for HS students
- Initial design & dev **~4 months**

Navy Maintenance Training Demo

- Web/Tablet-deployed interactive repair trainer
- Prototype design & dev **~2 months**

Carbon 12 Atom
6 Protons
6 Neutrons
6 Electrons

Dose

Did you do your safety?
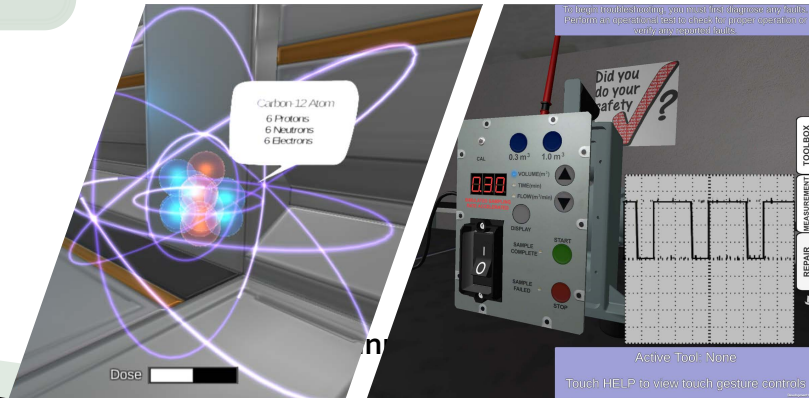
Today's Demonstrated CBT Modules

➢ Today's Modules Demonstrate a Web-Deployed, linear, video game based immersive training style of CBT, but with a more rigid structure than typical RAILS modules

➢ The more rigid form factor is necessary because of the large amount of information that needs to be conveyed in HAZWOPER training – these modules are meant to provide knowledge rather than practice

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Today's Demonstrated CBT Modules

➢ Spectral Labs was awarded a Phase I and later Phase II SBIR funded by the WTP to develop and test a worker safety focused hazmat training module.

➢ For the Phase I effort, Spectral Labs developed two modules, one for off-site assessment and one for onsite

➢ The two together cover 29CFR1910.120(c).

➢ Studies were conducted with Southwestern College to evaluate learning based on pre/post test data

➢ Additional data was collected from local public safety workers

➢ **This was demonstrated at the 2019 CUPA Conference**

Today's Demonstrated CBT Modules

➤ There are a total of 3 Web Deployed modules available today which were developed in the first half of our Phase II NIEHS WTP Program

1. Hazmat Introduction and Recognition
2. Hazard Classes, Placards, and Labels
3. ERG & Radiation

It takes about 1 hr 50 minutes to go through all three modules; *you will continue to have access to these modules (and be able to share them) for two weeks following this class.*

First
Responder
Operations
Specialized
Training

Learn and practice the skills used by first responders when dealing with HazMat in a virtual training environment! Select one of the training modules to begin!

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Hazmat Introduction and Recognition

- This module provides an overview of hazmat and introduces 4 dispatch scenarios that will be used throughout the training.
- You will spot hazmat warning signs across the 4 scenarios.
- You will also learn about how to recognize when hazmat is involved in other situations.

Hazard Classes, Placards, and Labels

- You will learn about the 4 EPA classifications of hazmat and the origins of the term.

- You will also learn about the 9 hazard classes and their associated placards and labels, as well as how placards are used.

ERG Radiation

- This module introduces students to the DOT 2020 Emergency Response Guidebook (ERG) and serves as a primer to using the **digital or hardcopy** version of the book.
- You are asked to have your own copy available to use as reference to answer questions to progress through the module.
- This module also provides information about ionizing radiation and describes basic radiation safety principles.

https://dev.spectrallabs.com/webgltest/FROST/

Any Questions?

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Spectral Labs Incorporated

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