HANDS ON HAZMAT TRAINING USING IMMERSIVE SIMULATION ENVIRONMENTS

I-3/22 John Rolando & Carl Bautista

March 22, 2022

24th California Unified Program Annual Training Conference
March 22, 23, 24, 29, 30, 31 - 2022

Who are we?

- Spectral Labs
  - John Rolando – VP Technology Development
  - Carl Bautista – Lead Unity Developer

Why are we here?

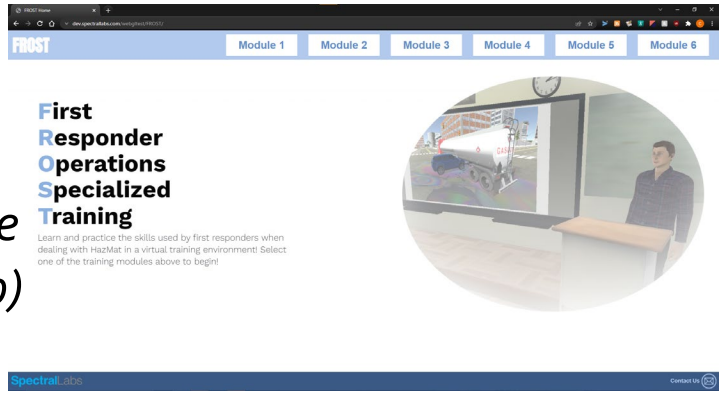
- The purpose of this class is to introduce immersive, videogame-based Computer Based Training (CBT) and show how it can be applied.
- CBT is a consistent, ubiquitously available and cost-effective training which offers an opportunity for dramatic advances in both worker safety and inspector effectiveness 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 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 CBT modules that we've made available for this course.

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/
- Hover over "Module 1" on the upper part of the screen as shown, then click it to 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 ~30 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)

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RAILS Core Technology Anchor Programs

RAILS Rad/Nuc—Original DNDO Funded Product

(Oct 2009 – Aug 2013)

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

•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

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RAILS Core Technology Anchor Programs

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)

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RAILS Core Technology Anchor Programs

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RAILS Core Technology Anchor Programs

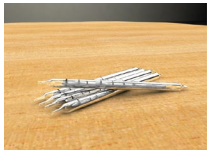
RAILS has Wide CBRNE Device Support


RadEye


identiFINDER


PackEye


MultiRAE Pro


Draeger Tubes


M908


Polimaster 1703


Inspector 1000


Radiagem


First Defender


AP4C

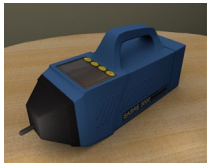

Scintrex E3500


Mini rad-D


Gr-135


Pager-S


Mini Radiac


Sabre 5000


FLIR Fido

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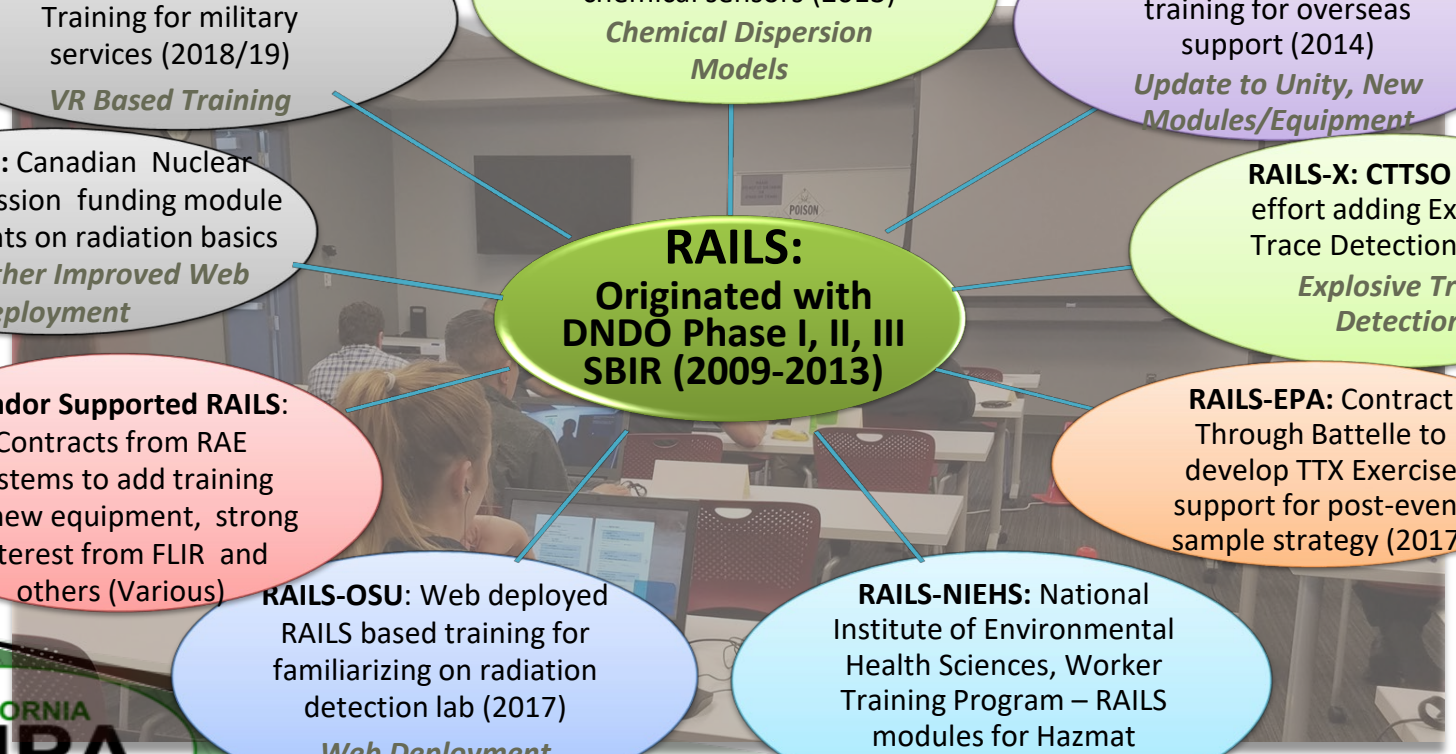
RAILS Core Technology Anchor Programs



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

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

Explosive Trace Detection

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

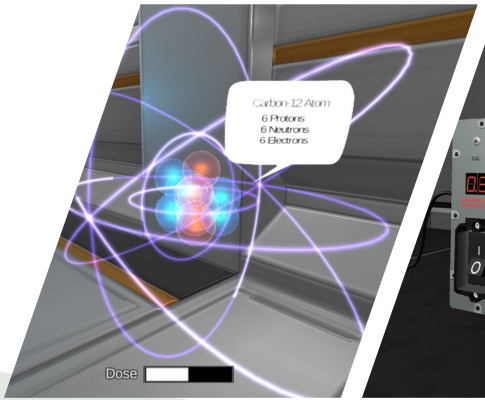
RAILS, has grown from Rad/Nuc training to lab simulation maintenance etc.

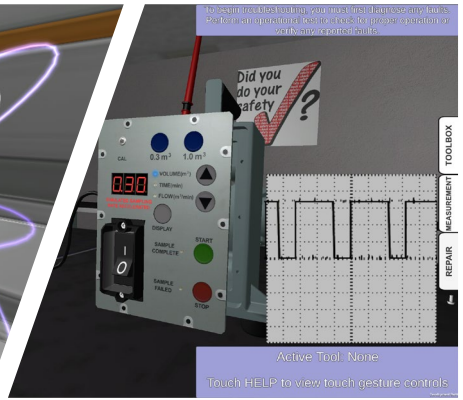
Lab Training Oregon St., Health Physics

- 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**

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**

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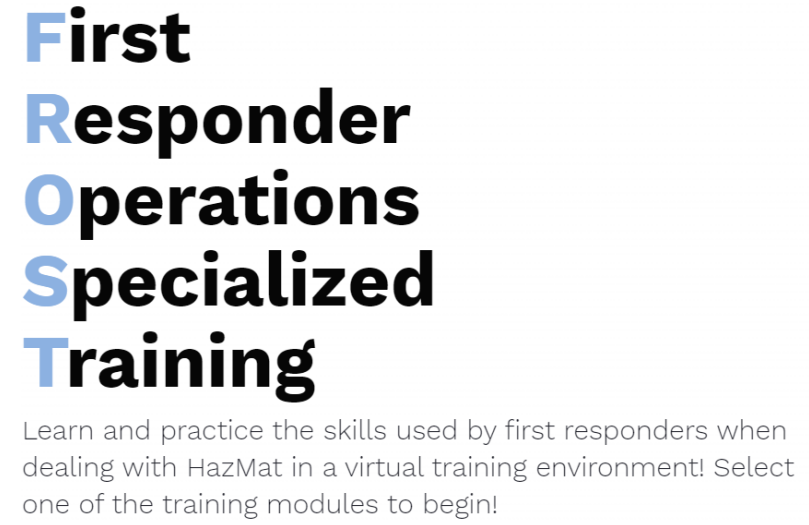
Today's Demonstrated CBT Modules

- There are a total of 7 Web Deployed modules available today which were developed during our Phase II NIEHS WTP Program

1. Hazmat Introduction and Recognition
2. Hazard Classes, Placards, and Labels
3. ERG & Radiation
4. NIOSH Introduction
5. ERG and Radiation
6. Shipping Papers, Containers, and Other Documents
7. GEBMO



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Today's Demonstrated CBT Modules

You will continue to have access to these modules (and be able to share them) following this class through May of 2022. There is a lot of content!

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

Any Questions?

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