

charles river analytics

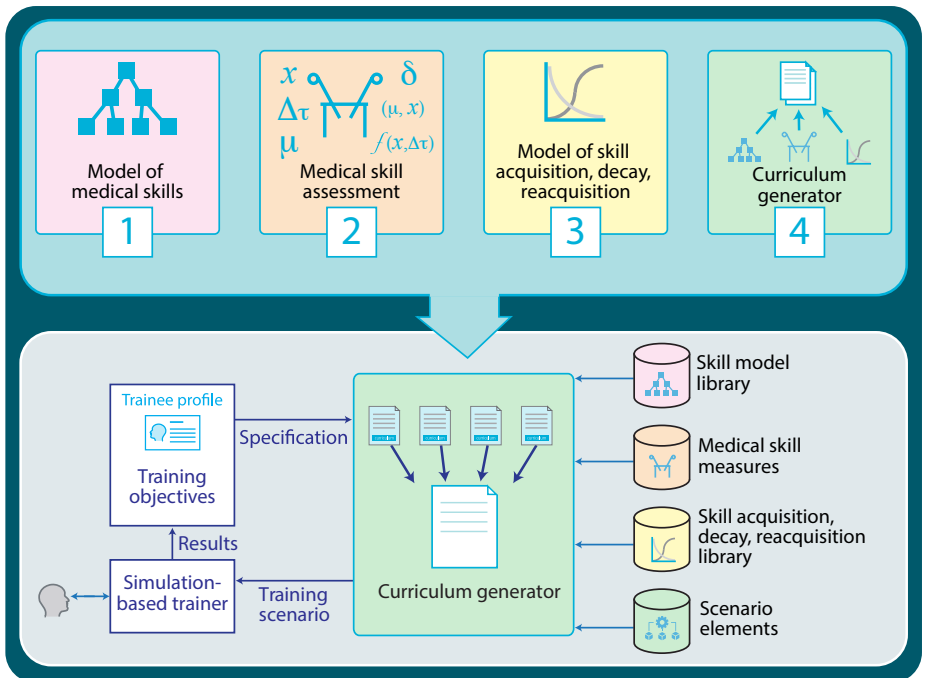


# ADAPTIVE INTELLIGENT TRAINING

# What is adaptive intelligent training?

**Adaptive intelligent training optimizes the learning process by:**

- Adapting to individual needs. Training is tailored to an individual and progresses them as quickly as possible along their unique learning path
- Applying AI to make training more effective and efficient over time with scalable techniques
- Our training platforms empower the individual and the organization to deliver peak performance.



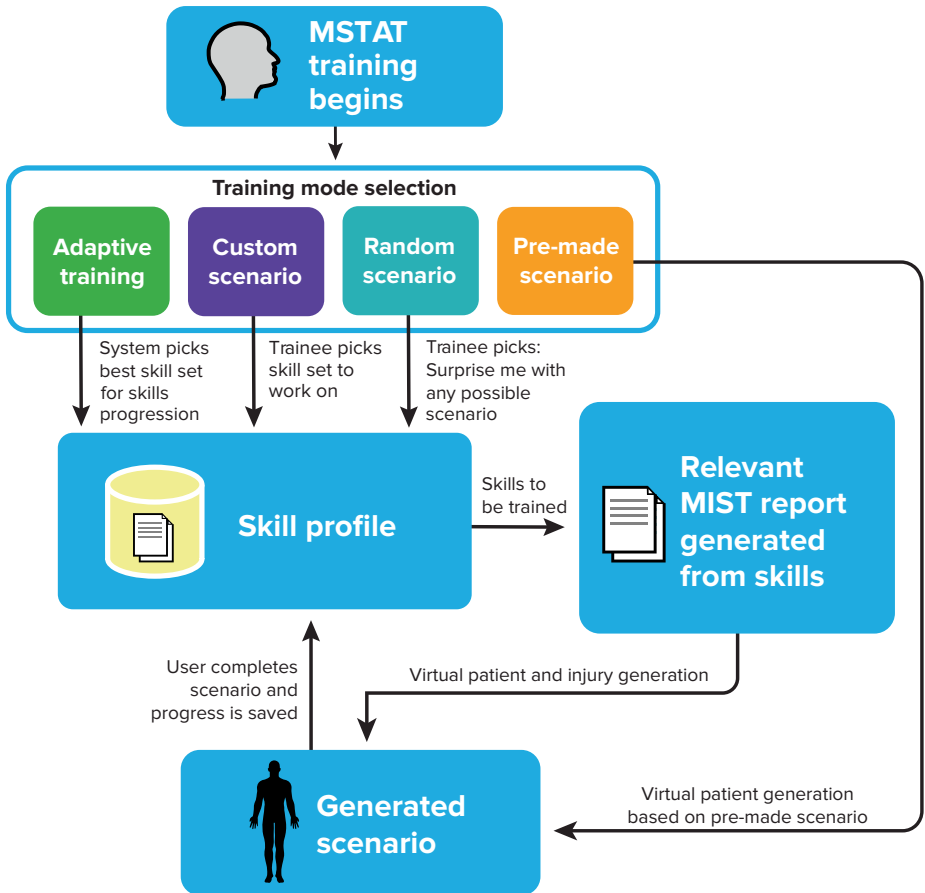
**Our medical training systems model and assess skill decay so clinicians can maintain critical skills.**

# What are the benefits of adaptive intelligent training?

## Adaptive intelligent training lets you:

- Achieve a higher skill level across trainees in the same amount of time by holding training time constant
- Train groups faster when they have the same skill level by holding training criteria constant

With adaptive intelligent training, you can reduce training costs and improve skill levels across your organization.



MSTAT offers trainees a variety of training modes, each using the trainee's unique skill profile to create relevant and realistic training scenarios.

# Training features

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- **Analytics** characterize your simulation data
- **Agents (AI)** act as virtual patients and teammates
- **Interfaces** offer special capabilities, such as speech and XR
- **Scenario builders** help you author and generate scenarios

Analytics	Agents (AI)	Wellness	Scenario builder	
■	■	■	■	EFFECTIVE
■	■	■	■	MSTAT
■	■	■	■	MARC
■	■	■	■	TMT
■	■	■	■	VITAMMINS
■	■	■	■	SHIELD
■	■	■	■	RELAX

## Projects

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**EFFECTIVE.** Comprehensive virtual environment for training medical and operational skills for austere, mass casualty environments

**MSTAT.** Multi-platform, screen-based practice environment for single-patient trauma care

**MARC.** Augmented reality simulation of medical wounds to improve realism

**VITAMMINS.** Virtual patient simulation and tutoring system for teaching and assessing trauma care skills

**TMT.** Manikin accessory for classroom and field exercise tourniquet skill training

**SHIELD.** Training exercises and self-assessments that help Marines cope with stress

**RELAX.** Application that helps Veterans improve anger management using cognitive behavioral therapy

# Training procedures in context: EFFECTIVE

EFFECTIVE is the Department of Defense’s first comprehensive system to train military personnel on medical care and logistics in austere, far-forward environments. EFFECTIVE lets medical professionals safely visit—and revisit—a challenging environment, better preparing them for real-world scenarios.



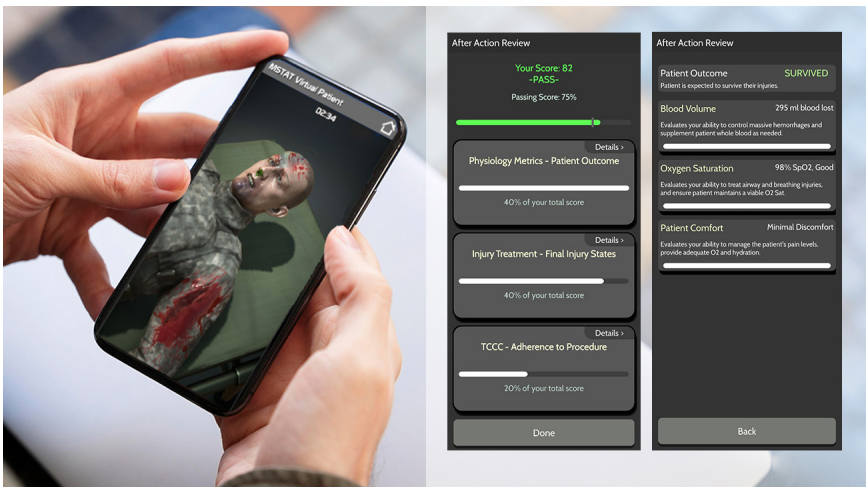
**In this scenario, developed in EFFECTIVE, a trainee plays from the perspective of the Incident Commander to allocate resources and assign helper medics to perform tasks on casualties. They also interpret mission requirements to make decisions about patient care.**

EFFECTIVE captures important decision-making themes based on existing resources and past experiences of military medical personnel, and then automatically assesses trainee proficiency against objective performance metrics linked to these skills.

# Trauma assessment training: MSTAT

Medical training for primary and secondary trauma assessment is vital to medical personnel. That's why Charles River Analytics is developing MSTAT, a mobile application that lets users practice trauma treatment skills on virtual patients.

MSTAT tracks trainee skill progression—users can select from a library of pre-built cases loaded on the app, or choose to train on novel, automatically generated scenarios tailored to their individual needs.



**MSTAT presents users with virtual patients in unlimited scenarios so they can practice treating injuries and receive immediate feedback on their performance**

MSTAT's interactive virtual patients present varying levels of injury, providing hands-on training for skills that can then be easily transferred to real-life scenarios.

The convenience of mobile training means practice opportunities are available anytime, anywhere, including during breaks while on shift or deployment. Virtual training helps trainees master the rapid, critical decision-making needed to save lives, giving them the confidence to perform quickly when they face real-life emergencies.

# Tactical combat casualty care training: MARC

An ongoing US Army study, Squad Overmatch-TC3, found that military medics lack access to realistic Tactical Combat Casualty Care (TC3) simulations. MARC addresses this gap with commercially available AR technologies that portray realistic, virtual wounds overlaid on live actor patients.



**MARC's AR uses real-time human pose estimation and wound rendering to make training more realistic**

MARC gives users a realistic and detailed training experience and assesses how they apply medical procedures within realistic scenarios developed by medical subject matter experts. MARC's simulation technology offers organizations a cost-effective and realistic alternative to staid classroom exercises while equipping medics with the skills they need to perform lifesaving interventions.



# Adaptive medical and patient care training: VITAMMINS

VITAMMINS is a virtual intelligent tutor that improves the quality and efficiency of medical skill training by classifying a medical professional's skills and adapting its training content to meet their unique learning needs. Adaptive training systems like VITAMMINS can reduce training costs and time while maximizing learning.



The VITAMMINS medical simulation UI was designed for the military medical domain but is now used at Penn State University to create scenarios and cues for trauma nurses

We worked with Professors Frank Ritter and Chris Garrison of Penn State University to create skill models in VITAMMINS. These models can assess and develop deep knowledge about complex procedural skills and challenges that medical personnel might face.

This detailed adaptive training benefits patients directly; they will receive a higher quality of care from medical professionals who are better trained to meet the needs of tomorrow's medicine.

## Junctional tourniquet training: TMT

Charles River Analytics is developing the Tourniquet Master Training (TMT) system to provide training on the latest tourniquet technologies, such as the Sam Junctional Tourniquet (SJT) and the Abdominal Aortic Junctional Tourniquet™ (AAJT). TMT allows pre-hospital medical providers to practice using junctional tourniquets on manikins, improving medical efficacy and reducing training costs.



**The Abdominal Aortic Junctional Tourniquet™**  
(Photo courtesy of Compression Works)

TMT includes a sensor system linked to a software-based virtual mentor that provides automatic, objective assessment and feedback during training. A mobile application provides refresher training during deployment or when a manikin is not available for practice. TMT works with multiple types of manikins and can adapt to future tourniquet technology advances.

**To learn more about how we can work with you,  
email [contactus@cra.com](mailto:contactus@cra.com).**

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## **Solutions to serve the warfighter, technology to serve the world.**

Charles River Analytics uniquely combines agile innovation and leading-edge research with a decades-long track record of hardened engineering in austere environments to create best-in-class solutions to diverse, challenging problems.

We were founded in 1983 to perform results-focused research for the US Government. In 2012, we became a 100% employee-owned company, setting the stage for the next generation of innovation, service, and growth.

Decades of government-funded innovation have generated an extraordinary breadth of core IP, which we harness to create an ongoing stream of breakthrough research.

The tools we develop maximize a trainee's transfer of skills through ecological mapping of real-world scenarios to computer generated training scenarios, reducing training equipment, development, execution, and maintenance costs.

Our immersive applications place trainees in gamified environments that are realistically rendered. To optimize training, we measure physiological signals and the cognitive workload of each trainee to create adaptive curriculums tailored to each individual.

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