**Cross-Sectional Literacy and Ultrasonography Trainer Fact Sheet**
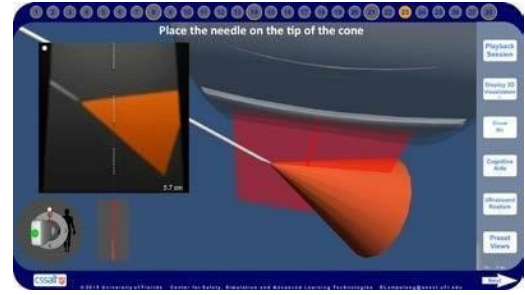University of Florida Center for Safety, Simulation & Advanced Learning Technologies



This robust, turnkey mixed reality simulator is designed to help novices understand and acquire fundamental cross-sectional literacy and ultrasonography (US) skills. Based on the premise that it is a cognitive overload for novices to learn both US skills and unfamiliar anatomy, the trainer gets rid of anatomy as a "distraction" so that learners can focus on hands-on US skills acquisition. Anatomy is instead replaced by virtual regular and familiar 3D objects like cylinders, cubes and pyramids. Designed for austere environments, this procedure-agnostic simulator does not require wireless or internet access or wet fluids; accepts 110/220V, 50/60Hz. It can be unpacked/set up/be operational by an unfamiliar person in 5-7 minutes. The portable simulator fits inside a military-spec padded case with inbuilt wheels and telescoping pull-handle that meets airline checked luggage size limits (L+W+H=60"), weight < 50lbs.

https://simulation.health.ufl.edu/technology-development/augmented-reality-mixed-simulation/cross-sectional-literacy-ultrasonography-trainer/

**Ultrasonography Techniques:**

- PART; uses all Degrees of Freedom of US probe
- Scout scan
- Needling; tilt peek and slide
- Maintaining a short axis view while following a vessel
- Sidedness

**Components:**

- Virtual, regular and familiar 3D objects such as cones and cylinders encased in gel
- Virtual model of simplified targets and no-go areas
- Tracked instruments: needle, ultrasound probe, virtual camera (interoperable between SMMARTS-compliant simulators)
- Common SMMARTS modular stand for use with other modular anatomies and procedures
- Automated scoring and replay system for after action review (AAR)
- Instructional materials teach fundamental cross-sectional literacy skills and ultrasonography techniques and procedures

**Technology:**

- Adheres to SMMARTS (System of Modular Mixed and Augmented Reality Tracking Simulators) rapid simulator development platform specifications
- Quick-release placement and indexing of SMMARTS-compliant anatomies to SMMARTS platform
- Uses familiar, regular 3D objects like cylinders and cones that have readily recognizable reference planes or features
- Precise sub-millimeter tracking of all events
- High-durability skin can be rejuvenated in-situ for indefinite re-use

**Features:**

- Integrated structured curriculum
- Hybrid cross-sectional view (3D viz in back half)
- Adjustable virtual ultrasound targets and difficulty levels
- Anisotropy simulation for needles and other objects
- Adjustable view modes for realism and AARs
- Cognitive aids for US probe and needle orientation
- Ultrasound probe with depth markers
- Tactile feedback of bone and ligament puncture
- Debriefing with replay of past/saved procedure