RHTT (Robotic Human Type Target)

Biography

Caliente SimIS

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Caliente SimIS is a joint venture between Caliente and SimIS. The company combines SimIS's expertise in robotics, modeling and simulation, with Caliente's leadership in thermal and hit detection technologies, to develop a moving robot platform utilizing a modular design for the military live fire training market and beyond. Caliente is a HUBZone certified small business based in Fort Wayne, Indiana, and SimIS is an 8(a) certified small business headquartered in Portsmouth, Virginia.

The Pitch

The Caliente SimIS RHTT (Robotic Human Type Target) system is a mobile, four wheeled, robotic trackless target developed for the military live fire training market and beyond. The robot will react to various levels of engagement, differentiating between lethal hits, non-lethal hits, and near misses to exhibit human like behaviors and reactions, including replicating threats. The Caliente SimIS RHTT improves training realism and accelerates the development of marksmanship and other human dimensions of warfighting by improving soldier readiness, situational awareness and resiliency.

Aligned with the U.S. Army's Force 2025 goals for more realistic moving training targets, the RHTT is deployable in a wide array of training environments. The all-terrain wheels (without the constraint of a track or rail) allow the RHTT to maneuver on all areas – on or off range.

The X1 system is manually operated, while the X2 (in development) can be either fully autonomous or operate within scenario defined boundaries like SDZ (surface danger zone) ranges. The X2 will feature the ability to preprogram scenarios and include technology to capture data such as location of miss and hit (LOMAH), for both instant feedback to the trainee as well as after action review (AAR) built in. The X2 will also feature options that will allow it to interact with the Army's TRACR (Targetry Range Automated Control and Recording) and FASIT (Future Army System of Integrated Targets) systems for ease of integration into existing range infrastructure, and allow for the possibility of linking to synthetic training environments.

Caliente SimIS RHTT Features/Benefits:

PLATFORM – Four wheeled robotic mobility platform provides stability on all types of terrains (indoor and outdoor, wet and dry, paved and unpaved). The system will feature an electronics enclosure with computer, all onboard software, peripherals and batteries. The chassis will feature an easily interchangeable mount, so the Caliente SimIS RHTT can also be used for other non-target deployments, including use as role players, chemical and biological agent detection, camera based observation, and etc.

MOBILITY - Foam filled tires allow the RHTT to navigate unimproved terrain while surviving being shot without disabling robot. Tracks are also available as an option.

ARMOR – X1 features a low cost, hardened chassis for use behind berm (ricochet protected) or in non-live fire exercises (eg role player). X2 will have a modular, field replaceable armor system rated for 5.56 to 7.62mm rounds, and will feature ricochet mitigation for enhanced live fire range safety.

BATTERY POWER – X1 designed with traditional lead acid, 18ah battery for 1.5 hours continuous or 6 hour typical duty cycle (depending on operating conditions. X2 will feature next gen lithium iron phosphate system for longer operating time/lower weight (2 hours continuous/8.5 hour typical duty cycle). Lithium iron phosphate has been selected due to its proven safety in military settings compared to other lithium battery chemistries. System peripherals will include a battery charging unit.

CONTROL INTERFACE/COMMAND AND CONTROL SYSTEM – X1 to be tele-operated via radio/joystick (current), smartphone or computer (in development). X1 will also allow for semi-autonomy via route record/replay. X2 will add the ability to program a tactical controller for full autonomy with intelligent/realistic response, including coordinated, swarming and/or reactive behaviors. There will also be an X2-SDZ model that will feature scenario defined boundaries that will prevent a robot from ever leaving a range's perimeter situationally defined scenarios for use on SDZ (surface danger zone) ranges.

COLLISION AVOIDANCE – Utilizes laser or similar sensor system for navigation and obstacle avoidance and bypass, including sharp grades and tall grass.

SPEED – X1 speed to approximate human running up to 6 miles per hour; X2 up to 8 miles per hour.

WEIGHT – X1 to be lightweight – easing transport and setup (<100 pounds); X2 will be durable yet manageable weight, easing transport, setup and extending battery life/operating time (current plan <400 pounds; goal of 325-350 pounds).

MANNEQUIN/TARGET – A 3D plastic dummy is the primary target, replicating human shape, form, features and height.

HIT DETECTION – Hit detection sensors within the mannequin/target and signal-conditioning electronics within the chassis enclosure register target being struck and signal the target to fall and stop (lethal hit), or pause/run/counter engage (non-lethal hit). Options include LOMAH (location of near miss and hit), as well as a shot location detection system that allows to robot to determine directionality of fire and counter engage (utilizing existing laser based systems like OGES-2 or MILES).