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IWARS GSS AoA Study

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- Background
- Infantry Warrior Simulation (IWARS) Overview
- AoA Study Issues
- GSS Description
- Scope
- Approach
- Scenario
- Summary
- Conclusions

- ❑ Co-developed by AMSAA, Natick Soldier Center, and ARL/HRED
- ❑ IWARS is:
 - Analysis driven
 - Entity-based
 - Multi-sided simulation
 - Focused on individual and small-unit dismounted combatants and their equipment
 - Used to assess operational effectiveness across the spectrum of missions, environments, and threats
- ❑ IWARS v1.0 V&V completed in 2006 and accredited by AMSAA and Natick for Army studies in the following areas:
 - Soldier Sensor Performance Analyses
 - Soldier Small-Arms Lethality Analyses
 - Soldier Survivability Analyses
 - Limited Situational Awareness / Battle Command Analyses



Completed Studies

- ❑ Joint Chemical Agent Detector (AEC)
- ❑ Cordon and Search (TRAC)
- ❑ IBCT Increment 1 Evaluation (AEC)
- ❑ Ground Soldier System Analysis of Alternatives (TRAC)

Ongoing Studies

- ❑ Ground Soldier System Evaluation (AEC)
- ❑ Joint Cooperative Target ID-Ground Analysis of Alternatives (USJFCOM)
- ❑ Obscurants Analysis (ECBC)

- ❑ A Milestone C / B decision is set to be made for the Ground Soldier System (GSS) program at the end of 2QFY11.
- ❑ In order to support the Milestone decision TRAC is performing an Analysis of Alternatives (AoA) on the GSS
- ❑ The AoA evaluation consists of the analysis of results gathered from the following efforts:
 - Modeling and Simulation
 - The Land Warrior Limited Objective Experiment (LOE) held at Ft. Benning (completed Spring 2009)
 - In Theatre Assessment
 - Cost Analysis
- ❑ TRAC had contacted AMSAA to provide additional Modeling and Simulation support for the GSS AoA
- ❑ Emerging results of the above analyses were briefed at the Joint Study Advisory Group (JSAG) IPR (Spring 2010)

- ❑ Five Study issues being considered for the GSS AoA
 1. How does each alternative contribute to Force Effectiveness
 2. What is the preferred distribution of GSS in a unit
 3. What are the logistic burdens of the alternatives
 4. What are the life cycle costs of each alternative
 5. Validate the Key Performance Parameters (KPP) and Key System Attributes (KSA) threshold values

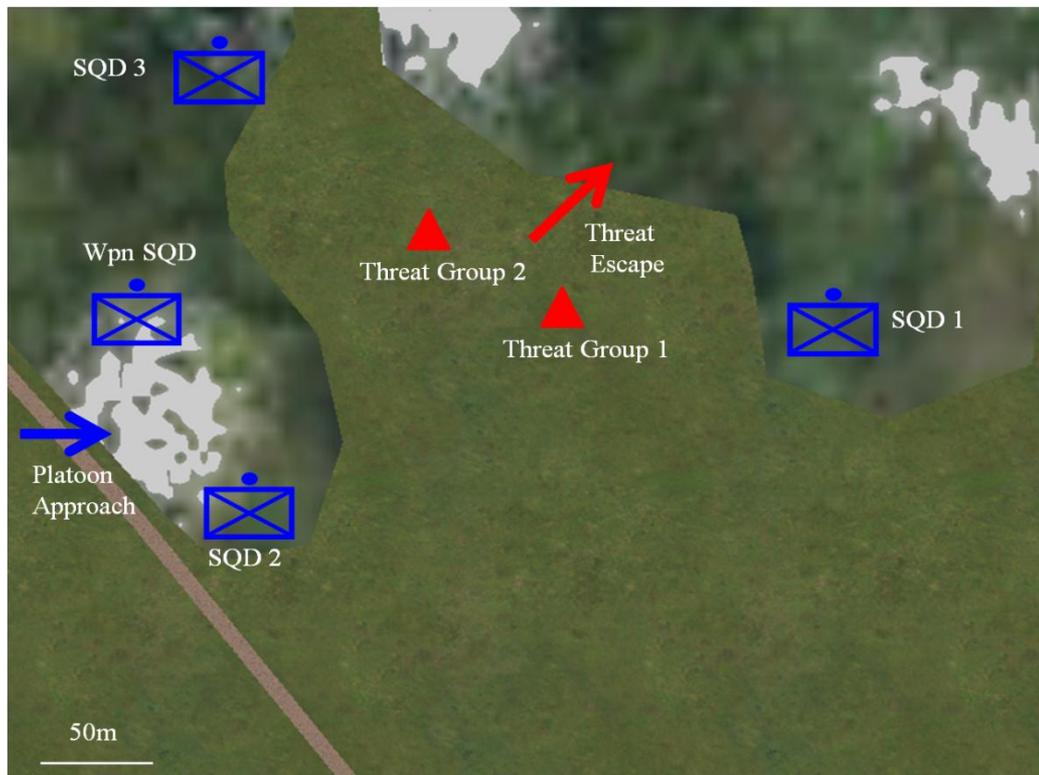
- ❑ IWARS is addressing 1 and 2



- ❑ Provides Situational Awareness and understanding to the dismounted Soldier
- ❑ Hands free digital display screen used to view information
- ❑ Graphics displayed on screen allow the Soldier to view their current position and the position of other Soldiers equipped with GSS
- ❑ Soldier is able to interact with the digital display

- ❑ Purpose: Support the GSS AoA using the IWARS small unit combat simulation
- ❑ Problem Statement: What is the preferred distribution of the GSS in an Infantry Platoon?
 - GSS vs No GSS - Does the GSS enhance the combat effectiveness of platoon size units versus not having GSS?
 - Basis of Issue (BOI): Does the GSS employed down to the Team Leader level enhance the combat effectiveness of a platoon over GSS employed only down to the Squad Leader level?
- ❑ Objective: Perform a study using IWARS that will assess the operational impact of the GSS employed in a platoon sized unit
 - Review the scenarios, Operation (Op) Orders, and data collected during the LOE conducted at Ft. Benning
 - Based on the Op Orders develop IWARS scenarios that are similar to each of the 5 LOE scenarios

- ❑ TRAC-WSMR and Natick converted Ft. Benning terrain used in the LOE into IWARS format
- ❑ The following scenarios were developed for the study (Note: IWARS scenarios were developed with consultation from Military Subject Matter Experts (SME))
 - Day Area Recon
 - Day Raid
 - Night Cordon Search
 - Night Ambush
 - Night Attack
- ❑ Software changes were made in IWARS in order to incorporate the Target Acquisition Degradation Through Vegetation (TAD-V) methodology
- ❑ Each scenario was run with the Friendly forces having the following Alternatives
 - No GSS
 - GSS Squad Leader Basis of Issue (SL BOI)
 - GSS Team Leader Basis of Issue (TL BOI)
- ❑ The Primary MOEs considered were Mission Success, Survivability of Friendly forces, and Lethality of Friendly forces



Situation: Threat are reported to be establishing Outpost/Listening Post (OP/LP) in the area to gain information and operational patterns of US forces. If attacked they will attempt to withdraw and reestablish OP/LP elsewhere.

Mission: Execute area recon to prevent threat emplacing OP/LPs and destroy any that have been established.

Threat Force Size: 14 personnel

Scenario Description: Based on Situational Awareness Squad 1 identified Southern Threat camp; however, due to terrain features they were unaware of the Northern camp. Squad 1 maneuvers through woods in order to engage the Southern Threat from the East. Squad 3 maneuvers to take position in the wood line West of the Threat camp. They then engage the camp. Squad 2 and the Weapons Squad provide support to engage any threat individuals that attempt to flee south.

Mission Success

Scenario	Baseline vs GSS		GSS (SL) vs GSS (TL)	
	Baseline	GSS	SL BOI	TL BOI
Day Area Recon	6%	73%	73%	77%
Day Raid	27%	53%	53%	66%
Night Cordon Search	100%	100%	100%	100%
Night Ambush	42%	52%	52%	79%
Night Attack	20%	79%	79%	100%

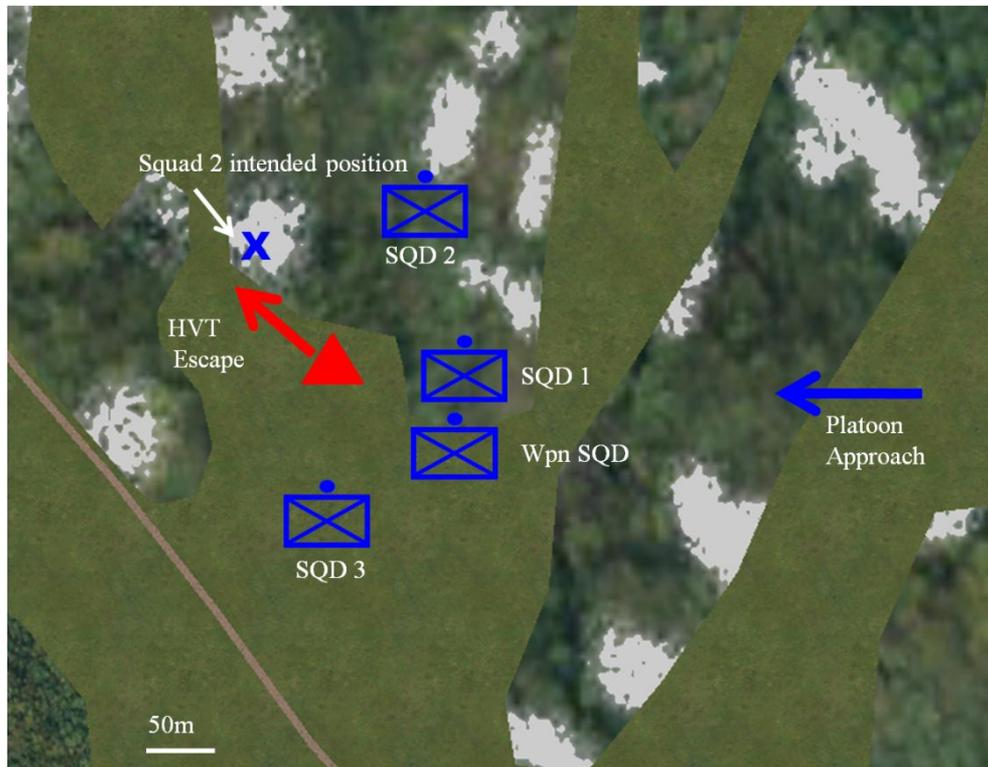
■ Statistically Significant
■ Not Statistically Significant

- ❑ GSS shows significant improved mission success over not having a GSS in 3 of the 5 scenarios
- ❑ GSS at the TL level shows significant improvement over having the GSS only down to the SL level in 3 of the 5 scenarios
- ❑ Friendly Lethality either remained unchanged (Cordon Search) or increased in all scenarios with the use of GSS
- ❑ Friendly Survivability increased in 2 scenarios and decreased in 3. The decrease was due to increased Threat targets engaged which led to significant improvement in Mission Success

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- ❑ IWARS scenarios show an overall improvement in Friendly force effectiveness when using GSS because of:
 - Increased Situational Awareness
 - Improved Command and Control
- ❑ In 3 scenarios the GSS TL BOI shows improvement over SL BOI because improved Command and Control provides individual Fire Teams the ability to move independently of whole Squad
- ❑ Results included in TRAC briefing at the JSAG IPR

Back-Ups

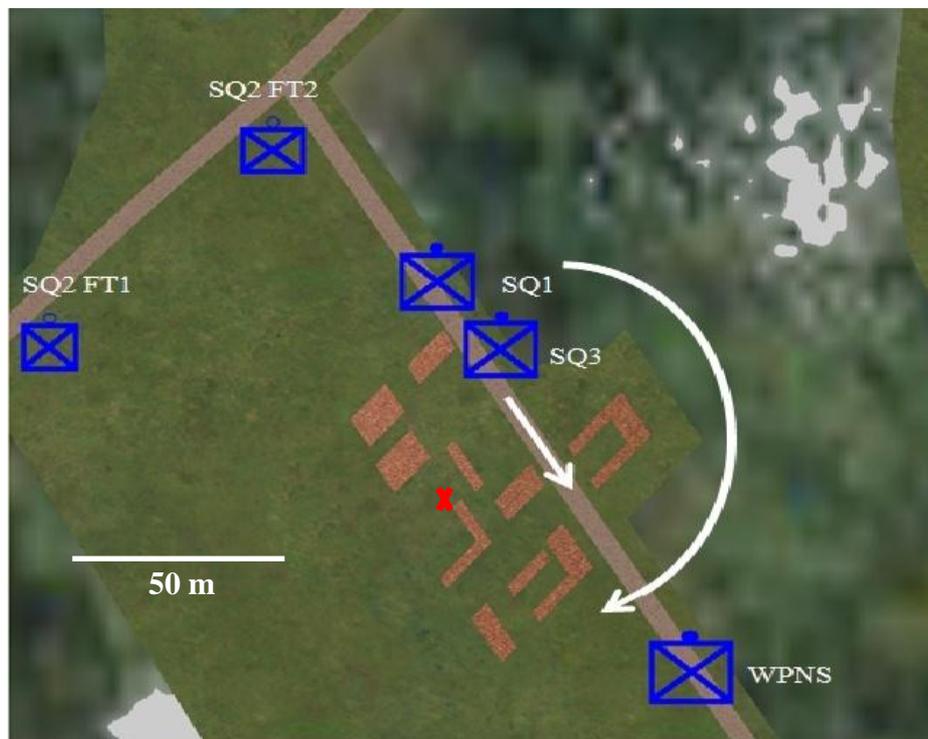


Situation: Threat forces are conducting a coordination meeting; however precision fire mission ruled out due to large number of civilians in the location. Threat forces will attempt to delay US interdiction by engaging and fighting, while SPF evacuates High Value Target out of the area.

Mission: Conduct raid in order to capture High Value Target.

Threat Force Size: 14 personnel

Scenario: Friendly Platoon approaches enemy camp from the east. Squad 2 maneuvers north west to block Threat's north and west escape routes. Squad 3 maneuvers southwest and then northwest to block Threat escape to the south. Squad 1 and Weapons Squad conduct raid from the East.

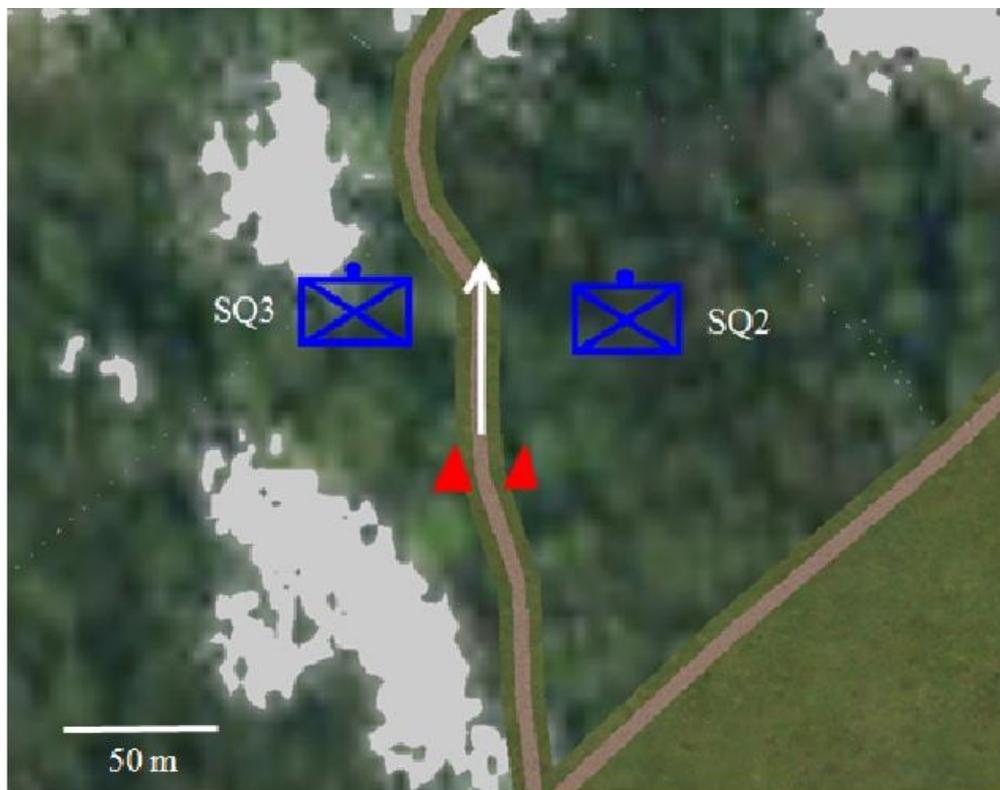


Situation: Threat reported to be using building (unknown) to store small, IED materials, and possible 82mm mortar rounds. Threat plan on moving the cache at an undetermined time because of frequent US patrols in the village.

Mission: Execute cordon and clear of the village and locate and destroy threat personnel and equipment

Threat Force Size: 4 personnel

Scenario Description: Squad 2 and the Weapons Squad provide security at the North and South entrance to the village. Squad 3 enters the town first and receives fire from 4 Threat individuals located in a building near the southern edge of the village. Squad 3 seeks cover and engages the threat while Squad 1 maneuvers to locate and clear the building.

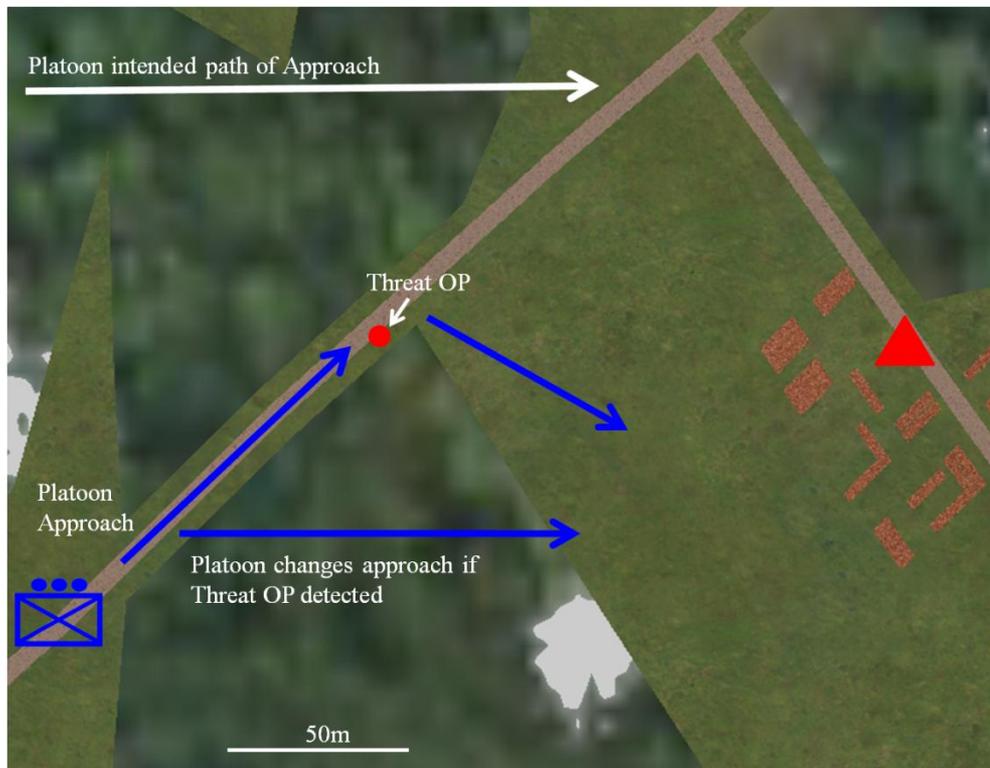


Situation: Threat had been emplacing IED's and conducting ambushes along various routes within the area. Intel reports indicate that threat forces will attempt to emplace an IED and ambush US forces along the north/south road.

Mission: Conduct area ambush along the north/south road in order to prevent threat forces from further interdicting US forces operation along the north/south road.

Threat Force Size: 10 personnel

Scenario Description: The platoon set up two ambushes along the North/South road. Squads 2 and 3 were located near the southern end of the road and Squad 1 and the Weapons Squad's ambush was located farther north. The threat moved up the road and were ambushed by Squads 2 and 3.



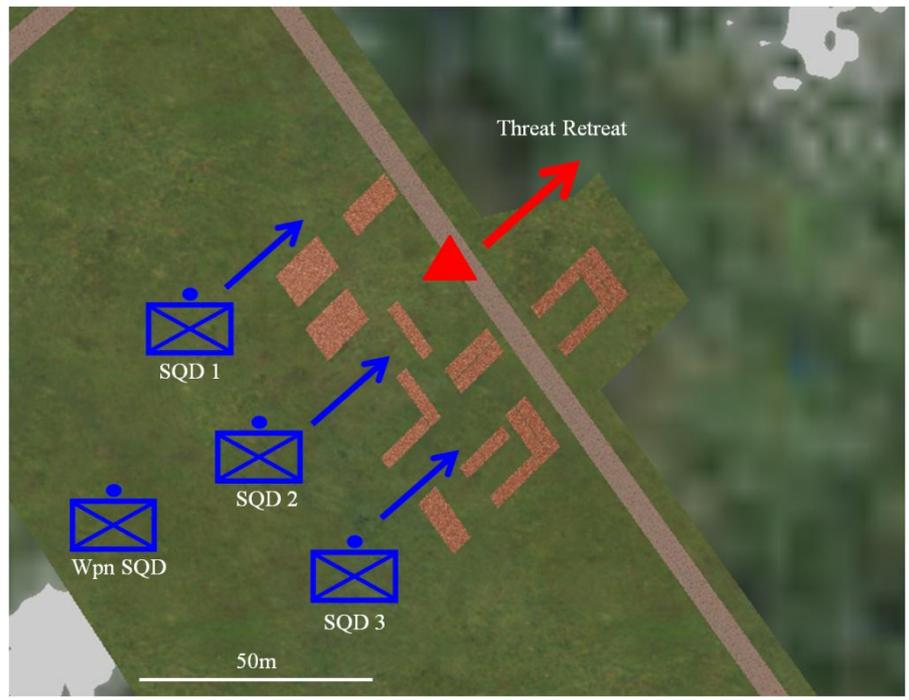
Situation: Intel reports confirm Threat base camp and training facility. Threat will likely establish OPs on avenues of approach and IED along trains to provide early warning. Threat may remain and fight to inflict casualties and buy time for the evacuation of enemy SPF, civilian personnel, equipment, and supplies.

Mission: Attack threat village in order to destroy training camp, kill or capture camp trainer, and prevent training of local forces.

Threat Force Size: 14 personnel

Scenario: Friendly forces maneuver south and west of threat training camp in order to destroy the threat training facility and kill/capture threat SPF. As the platoon approaches the town, the platoon encounters a threat OP. If the OP detects the Friendly platoon, he alerts the Threat force prior to the platoon's attack. Otherwise, the Friendly force proceeds through the woods and attacks the training camp from the southeast woodland.

Base Case



GSS Cases

