



USC
ict
institute for creative technologies

USC
UNIVERSITY
OF SOUTHERN
CALIFORNIA

Commercial Platform Training Aids

Dr. Michael van Lent
Research Scientist
vanlent@ict.usc.edu
(310) 574-5710

Games vs. Learning

Command/Leadership Training

- Training leaders...and soldiers to become leaders:
 - Company (PC)
 - Squad (Console)
- Not skill trainer
- Primary:
 - Decision-making, Strategic Planning, Synchronization, Adaptation, Flexibility
 - ICCC week 8: Battlefield Synchronization
- Contemporary operational environment



Execution

- Research:

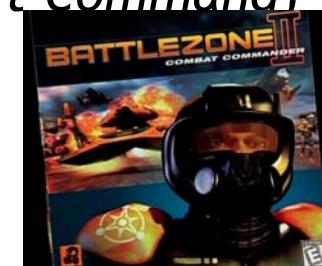
- Artificial Intelligence
 - Dr. Michael van Lent
- Evaluation
 - Dr. Harry O'Neil, ARI

- Subject Matter Experts

- The Infantry School, Ft. Benning
 - West Point

- World-class game developers:

- SONY Imageworks/Pandemic
(*Dark Reign, Battlezone, MechWarrior*)
- Quicksilver
(*Master of Orion, Starfleet Command*)



First Deliverable



- Full Spectrum Command Boardgame
 - Initially a proof of concept
 - Firepower & maneuver techniques
 - Emphasizing adaptive thinking
 - Re-configurable for scenario customization
- Delivered Jan 02
 - 4 months after funding



Second Deliverable

- Full Spectrum Command
 - PC-based training aid
 - Light Infantry Company
 - AAR featuring “Explainable A.I.”
- Delivered Feb. 03
 - 17 months after funding
 - ARI evaluation (currently ongoing)



FULL SPECTRUM COMMAND™



[Play Scenario](#)

[Load Saved Game](#)

[Load Saved AAR](#)

[Multiplayer](#)

[Edit Scenario](#)

[About FSC](#)

Quit FSC X

BATTALION OPORD

- Background Information

1. Situation
2. Mission
3. Execution
4. Service Support
5. Command & Signal

- a. Task Org
- b. Intel
- c. Fire Support
- d. ROE
- e. Engineer

BACKGROUND INFO:

GENERAL SITUATION: Kazar is a small country to the south of Gordo. Gordo invaded Kazar to secure natural resources and to establish an access point to the sea through Kazars major port.

Gordo and Kazar were part of the same national state before the end of the Cold War. After the Cold War they both claimed their own independence and established international boundaries that were recognized by the United Nations. Gordo felt it had historical claims to central Kazar and many of the people living in central Kazar have ethnic ties and sympathies to Gordo.

Gordo used the ethnic ties inside of Kazar as a reason for its invasion. Through a long border war and with help from UN air cover Kazar has been able to repel the Gordian invasion and reestablish the international border. All Gordian conventional troops have returned to Gordo. However, through the use of its Special Police Force (SPF) Gordo has been able to continue to disrupt and destabilize the central Kazar region. Gordian SPF still operate inside of Kazar and have some support from the local population.

General Marlenc has tight control over all SPF forces operating inside of central Kazar. He is known to be hostile to the UN and other peacekeepers. His capture or destruction would help

Central Kazar 1200hrs Neutralization of General Marlenc

Prev Image

Next Image

DEPLOY



ZOOM:

VIEW MAPS:

[Map 1](#) [Map 2](#) [Map 3](#)

Warrior Radio Maneuver Element Radios

OPORD

RCPA

ORDERS



RELATIVE COMBAT POWER ANALYSIS

[CREATE DEFAULT](#)

DEPLOY

Headquarters:

XO 1SGT

*** 1st Platoon



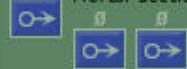
*** 2nd Platoon



*** 3rd Platoon

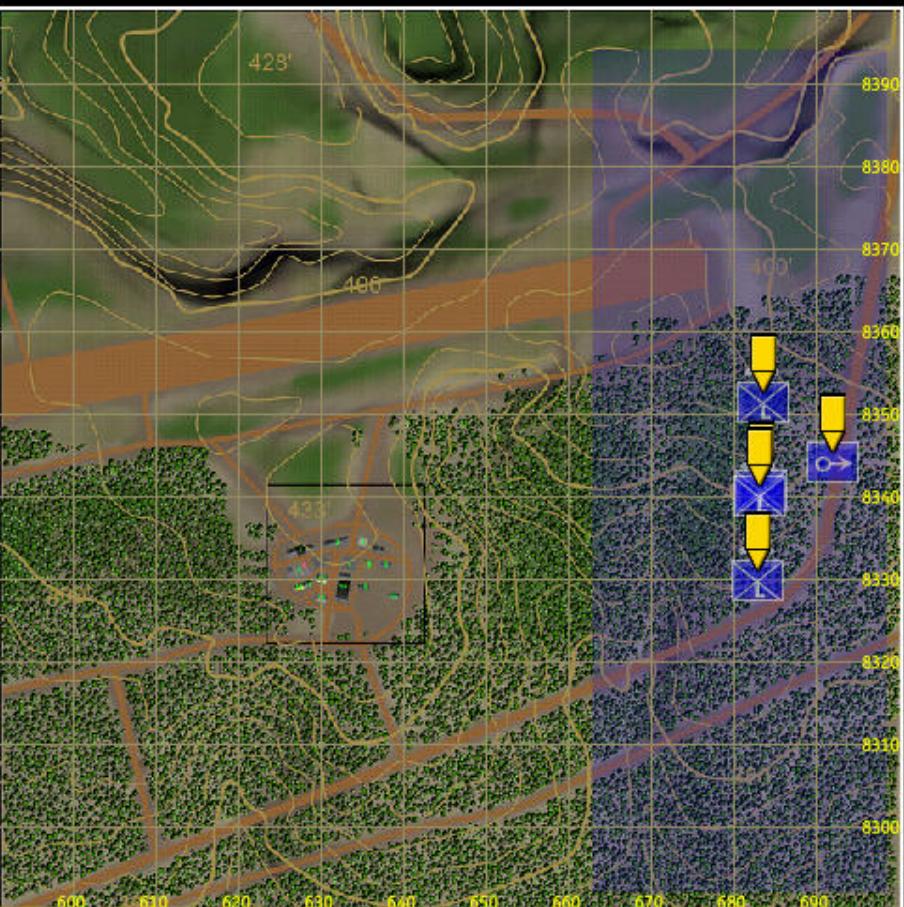


** Mortar Section



0 0

Small Arms Ammo Load Machine Gun Ammo Load Remove Ammo Load



MANEUVER ELEMENTS CREATION BOX

[NEW](#)

[DELETE](#)

Leader

DEPLOY

[ACCEPT](#)

Maneuver Elements

Black : Commander

XO 1SGT

Red : 1st Platoon



White : 2nd Platoon



Blue : 3rd Platoon



Cannon & Mortar Section

Warrior Radio Maneuver Element Radios



OPORD

RCPA

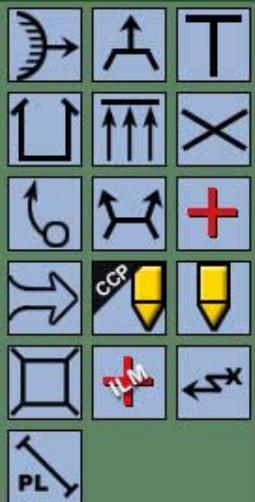
ORDERS

PLAN

LOOK UP

12:00:46

Tasks



RESET

UNDO

CLEAR FRAGO

OPORD

RCPA

ORDERS



ZOOM:

VIEW MAPS:

Map 1 Map 2

PHASE: 2

Red: 1st Platoon



Alpha
Bravo

White: 2nd Platoon



Bravo

Blue: 3rd Platoon



Alpha
Bravo

Green: Mortar Section



CSS

COMMIT ACTIONS



GPS: 06411:83467

DIRECTION: SW

TIME: 12:05:33



Standing



FULL SPECTRUM COMMAND

AFTER-ACTION REPORT

DECISION POINTS:

- 12:04:01 - Enemy Contact
- 12:04:01 - Friendly WIA
- 12:04:01 - Friendly WIA
- 12:04:02 - Enemy WIA
- 12:04:03 - Enemy WIA
- 12:04:03 - Enemy WIA
- 12:04:06 - Friendly WIA
- 12:04:06 - Friendly KIA
- 12:04:07 - Enemy WIA

ANSWER TO QUESTION:



GPS: 06327:83465

DIRECTION: SE

TIME: 12:04:18

12:04:03

12:00:48

12:06:04

VIDEO PLAYBACK CONTROLS

Jump to time:

GO



STATS

OPORD

BLUE PLAN

RED PLAN

REVIEW

FULL SPECTRUM COMMAND™



Play Scenario

Load Saved Game

Load Saved AAR

Multiplayer

Edit Scenario

About FSC

Quit FSC X

See me for a live demo

Behavior Representation in FSC



- “Game industry AI”
 - 200 semi-autonomous animated entities
 - 60% of the CPU processing
- Control AI
 - Integrated in the event loop
 - Pathing, stance, firing, animation
 - Lots of spatial info embedded in the map
- Command AI
 - Separate processing thread
 - Platoon, squad, fire team, OPFOR behavior
 - Task hierarchy of ~100 tasks
 - Each task implemented as a C++ function

Third Deliverable

- Full Spectrum Warrior
 - Microsoft X-Box training aid
 - Light Infantry Squad
 - AAR Assistant featuring “Explainable AI”
- Will deliver August 03



AI Research Challenge

- Synthetic participants don't participate in after-action review
 - Difficult to understand what happened
 - Difficult to understand why it happened
 - Difficult to teach and learn
- Solution: Explainable AI (XAI)
 - Explainable AI for medical diagnosis
- Extend this idea to new domains
 - Military simulation and training
 - Computer Games



FULL SPECTRUM COMMAND

AFTER-ACTION REPORT

DECISION POINTS:

- 12:08:50 - Enemy Contact
- 12:08:50 - Friendly WIA
- 12:08:52 - Enemy WIA
- 12:08:52 - Enemy WIA
- 12:08:54 - Enemy KIA
- 12:08:54 - Enemy WIA
- 12:08:54 - Enemy WIA
- 12:08:54 - Enemy WIA
- 12:08:54 - Enemy KIA
- 12:08:54 - Enemy WIA
- 12:08:55 - Enemy WIA
- 12:08:55 - Enemy KIA
- 12:08:55 - Enemy KIA

ANSWER TO QUESTION:

2nd Platoon's mission is Task Organize to Breach Obstacle. This mission consists of a single step.



GPS: 06372:83350

DIRECTION: N

TIME: 12:09:03

12:00:34

12:08:51

12:09:32

VIDEO PLAYBACK CONTROLS

Jump to time:

GO



STATS

OPORD

BLUE PLAN

RED PLAN

REVIEW



TL
AR
G

SL
TL
AR
GR

ALPHA

Alpha

SL Sgt. Garment
TL Cpl. Schrader
AR Pfc. Picos
C Pvt. Mendez
R Pvt. Deau



EYÜPÇAŞA



Future Directions

- Deeper explanations
 - What happened?
 - Why did it happen?
 - How can we do better?
- Proactive explanations
- Mentoring
- More training aids
 - Full Spectrum Command 1.0S
 - Full Spectrum Leader (platoon)
 - Counter Terrorism RPG
 - Full Spectrum Observer



Nuggets and Coal



- Nuggets
 - FSC: "I don't think I have ever been more proud in my Army career as I was when I showed America what we had put together."
 - MAJ Brent Cumming
SGI, CATD
 - FSW: 4 nominations and 2 "Game Critics Choice" awards
- Coal
 - Research is a tax on production
 - Need to complete the transition