Understanding the potential of virtual environments for improving C2 performance

Ken Hudson, Loyalist College
Mark E. Nissen, US Naval Postgraduate School

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Outline

• Background
• Can VE improve performance?
• Initial experiment and analysis
• Aspects of VE leading to improved performance
• Current experimental approach
• Next steps
• ELICIT: multiplayer online game
  —Counterterrorism intelligence domain
  —Like game *Clue*: ID fictitious terrorist plots

• Used for C2 experimentation
  —Examine org forms, learning, trust, culture, others
  —Very thin, textual interface

• Interested in extending into immersive VE
What is a Virtual Environment?

• Customizable platform for interaction
• Synchronous and persistent network
• People are represented as avatars
• Flexibility of usage
Virtual environment “Second Life”
Design elements to support Neutral Valence

- Interior space only free from natural world complexities
- Subtle texturing of spaces
- Constant ambient lighting
- Narrow range of environmental stimuli
Neutral space prototype
Can VE improve C2 performance?
Canadian border simulation
Border simulation results

- 2007: 58%
- 2008: 86%
- 2009: 94%

Interview Skills
Initial experiment
Second Life Viewer 2.0
Participant perspective
## ELICIT results FTF vs. CM

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>N</th>
<th>Standard Deviation</th>
<th>Standard Error</th>
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<tbody>
<tr>
<td>ID Time CM (in seconds)</td>
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<td>14</td>
<td>219</td>
<td>58</td>
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<tr>
<td></td>
<td><strong>2554</strong></td>
<td>14</td>
<td><strong>279</strong></td>
<td><strong>74</strong></td>
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<tr>
<td>ID Time FTF (in seconds)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Who Score CM</td>
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<td>14</td>
<td>.363</td>
<td>.097</td>
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<tr>
<td>Who Score FTF</td>
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<td><strong>.426</strong></td>
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<td>Where Score CM</td>
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<td>Where Score FTF</td>
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<tr>
<td>When Score CM</td>
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<td>When Score FTF</td>
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<tr>
<td>Identify Composite FTF</td>
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<td>14</td>
<td><strong>.327</strong></td>
<td><strong>.087</strong></td>
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</tbody>
</table>
Aspects of VE leading to improved performance

- Participant centered experience
- Contextually situated learning
- Fully utilize VE style of interactions
- Identification of self with avatar
- Sense of being in environment (presence)
- Sense of sharing environment with others (co-presence)
Current experimental approach

• Seeks to harmonize native attributes of virtual environments that lead to enhanced performance by augmenting user interface and allowing for a broader range of interactions than the initial experiment.
ELICIT in HUD
Next steps

- Proceed with experimentation with ELICIT game-play through HUD
- Enhanced experimentation using ‘paper clue’ version of ELICIT in both F2F and CM
- Explore potentialities of integrated abELICIT within virtual environment