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TITLE: Visualisation for the Command Post of the Future

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TITLE: Multimedia Visualization of Massive Military Datasets [Atelier OTAN sur la visualisation multimedia d'ensembles massifs de donnees militaires]

To order the complete compilation report, use: ADA408812

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The following component part numbers comprise the compilation report:

ADP013309 thru ADP013341

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Visualisation for the Command Post of the Future

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With the permission of Ward Page, CPOF Program Manager

Command Post of the Future: Introduction

The command post of the future (CPOF) is a DARPA program with several objectives:

(1) to increase the speed and quality of command decisions by means of

- Faster recognition and better understanding of changing battlefield situations
- faster and more complete exploration of available courses of action.

(2) Provide more effective dissemination of commands

- COA capture for dissemination of commander's intent
- Status and capability feedback from deployed operators

(3) Enable smaller, more mobile and agile command structures

- More mobile, distributed command element
- Smaller support tail & reduced deployment requirements

The CPof provides tailored visual renderings to assist immediate understanding

- Match user's cognitive model
- Portray uncertainties;
- Match the user's functional role
- Accommodate the user's background & preferences

We performed a set of limited objective experiments concerning CPOF.

Command Post of Today—Limitations

The characteristics of the current command post include:

- 60+ Workstations, 100+ people
- People are flooded by individual data streams
- Disjointed data systems; fragmented pictures of the battlefield
- No portrayal of uncertainties, inconsistencies or unknowns
- Requires too many people, too much communication

Some consequences are:

- Disjointed systems can cause negative situational awareness
- Increased time to comprehend the significance of information
- Incomplete, inaccurate understanding of the battlefield
- Delayed decisions while waiting for more data, understanding

Command Post of the Future—Operational Impact

Increased Operational Tempo will necessitate

- Faster recognition and better understanding of significant battlefield changes;
- Faster and more complete exploration of available courses of action; and
- More rapid and more accurate dissemination of commands

Smaller, More Mobile Command Structures also imply.

- Fewer staff members;
- Smaller support trail & reduced deployment requirements; and
- More mobile, distributed command organizations

The CPof also anticipates an Increased Span of Control

Results of the Experiments:

Tailored visualizations improved Situation Awareness in measures

- CPOF strongest in complex situations
- CPOF strongest in force-on-force situations
- CPOF strongest in understanding adversary's situation
- Different Strengths Emerged from Alternative CPOF technologies

Time Issues and Others

- Some changes due to control scores getting worse rather than CPOF scores greatly improving
- Time appeared to help in case where visualization technique introduced new concept
- Longer viewing time did not always result in higher scores
- CPOF Technologies generated better situation awareness, particularly in complex situations.
- CPOF Technologies provided better situation awareness than Control, prompted and unprompted, in Force-on-Force situations

Summary

- CPOF technologies had a significant impact on performance as measured.
- CPOF experimental approach captures the strengths and weaknesses
- CPOF technologies appear to improve subjects' overall Situation Awareness compared to traditional methods
- CPOF experimental approach captures strengths and weaknesses of each treatment

Discussion – Paper 13

Visualisation for the Command Post of the Future

- Problems
 - Support increased operational tempo
 - Smaller more mobile command structures
 - Increase speed and quality of command decisions
 - Tailored visualizations
 - Needs to be decision-centered

Bill Wright (Visual Insights)

- Command post today
 - 60+ workstations 100+ people
 - disjoint data systems, fragmented pictures
- CPOF Experiments
 - Experimental structures (battle lab students –40, Aces 8-15)
 - Known scenarios (asymmetric, Guerilla, Urban disaster, Peace Keeping, sustained operations)
 - Use of control displays
 - Users could not interact with displays
 - Studied approaches based on the amount of time available
- LOE-1
 - DARPA Limited Objective Experiment
 - 3 cases being tested with 2 visualisation solutions and one control
 - force on force
 - insurgency
- D-Day Blob
 - 3 dimensional terrain
 - blobs showing deployment
 - thickness of line represents strength of force
 - diameter of blobs shows range of weapons
- Haiti Sit4B –5 Critical events (Visual Insights)
 - Set of text reports on situation
 - Time space and event view on 2D map
 - Show observed events in regions
- Treatment B
 - Used 2D map with integrated charts icons and drill down to charts
- Significant Findings
 - Visualizations generated better situation awareness
 - Visualizations very large improvement in complex situations
 - Blobs better than color coding
 - Drill down method found better than everything on one screen
 - More time helped only in more complex situations
- How is situation awareness defined? –complex definition defined by CPOF