Perceptual Based Visualization Techniques for Improving Ground Situation Picture Understanding

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Joint Collaboration Between DSO and FSD
Increasing use of sensors and networks will lead to an onslaught of information that will overload the warfighters.
Attempts to Alleviating Information Overload

Fusion engines uses algorithms data reduction techniques as a means of reducing information overload

Collating, eliminating duplicates and correlating large continuous streams of data across space and time
Fused information is still presented in poorly designed MMI.

- Difficult for users to develop an understanding of useful relevant to immediate requirements
- Useful data maybe buried in irrelevant data
- Difficult to retrieve information from the data
- Unable to create displays that allow them to see what they need
- Potential useful information sources maybe ignored, because techniques for extracting information are deficient

Place a tremendous informational and perceptual burden on warfighters!!

- Detailed analysis takes a longer time
- Patterns may be missed in the process
- Loss of Situation Awareness
- Missed opportunities
Alleviating Information Overload

- Human-way out for warfighters to maintain situation awareness, execute current operations, is through organizing information according to visual perception.

- Pattern matching, trend identification, discovering errors, and recognizing gaps.
Aim

- Research and develop novel visualizations, to improve commanders’ ground situation assessment & awareness.
- Data provided by an existing multi-source data fusion engine.
The design effort will identify and draw inspiration from suitable theories of human perception such as pre-attentive features and Gestalt laws for perceiving patterns and adapting scientific techniques for designing visualizations in the project.
Hue, intensity and form are useful for showing target detection, boundary detection, region tracking.
Closed contours are useful for showing footprints and set relationships/groupings among chaotic array of discrete entities.
Totem Pole Stacking

Totem pole metaphor for reducing clutter
Reasoning about Time and Space

Time Space Browser
LIVE DEMO
Future Work

- Translate the perceptual visualizations for Experimentation
  - Information encoding
  - Interference
Thank you