WESTT: Analytical prototyping for command and control

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The human factor

• NEC/NCW
  – Cognition as a function of the entire system
  – Flexible, agile teams
    “Doing things better and doing better things”
  – Handling complexity

• Impacts upon human factors/performance issues
  – Workload
  – Error
  – Situation awareness
  – Time
  – Teamwork
Aims and objectives

• System for examining NEC/C4 activity
  – Analysis of field studies and experiments
  – Supports ‘analytical prototyping’
    • Iterative manipulation of data to meet goals
  – Accessible to a wide population
    • NEC/NCW is an issue “for everyone”
  – Multilayered examination of data from different perspectives
  – Use of existing databases
Network of networks

- **Knowledge needed to achieve success in carrying out tasks**
- **Command and operational structure needed for task performance**
- **Distribution and spread of knowledge within the team**
Task Network

• Workload
  – How many people, doing what, for how long?
  – Reference to databases of task loadings.

• Error
  – Error trees and cumulative risks

• Time
  – Actions and their ordering (critical path)
A. UML Use Case

B. UML Sequence Diagram
Social Network

• **Number of communications**
  – Are individuals communicating as expected?
  – Communications workload (overload?)

• **Centrality**
  – Position within the topography of the network

• **Sociometric status**
  – Normalised measure of role in network as a function of communication load
Knowledge network

- Distributed cognition & shared information
  - Cognition as the processing, transformation and communication of information
  - Group phenomenon
  - Actors need not
    - Be fully aware of the information they process
    - Control the process

- Challenge of representing conceptual space in which an operation occurs

- Measure of Situation Awareness
  - Ownership of knowledge objects considered over time
  - Knowledge management issues if task/social network design is changed
  - Bound to both Task and Social networks
Conclusions

- Human factors and cognition as a systemic aspect of NEC/NCW
- WESTT software
  - Theoretical framework and the tool to do it
  - Rapid analytical prototyping
- Software available on request
- Already used in a range of projects
  - Fire, Police, Navy, RAF & Army
  - Positive feedback from SMEs; experiments in progress
  - Unforeseen benefits: “soft issues” and training
Further information

• Website: http://www.hfidtc.com

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