

# ELICIT

The Experimental Laboratory  
for Investigating Collaboration,  
Information-sharing and Trust

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# ELICIT Overview

- Introduction
- Base Experiment
- ELICIT Software Platform
- ELICIT Based Research Effort
- Preliminary Results
- Next Steps

# ELICIT Introduction

- ELICIT-Experimental Laboratory for Investigating Collaboration, Information-sharing, and Trust
  - Part of the Command and Control Research Program (CCRP)'s network-centric warfare initiative
  - Engaged in developing and testing principles of organization that transfer power and decision rights to the edge of the organization
  - Needed to frame testable hypotheses about the relative effectiveness of edge organizations in comparison to other methods of organization through a series of real-world simulations
  - Facility was created to run these experiments

# Key Requirements for Facility

- Non-intrusive instrumentation to capture real-time organizational interactions
- Configurable tools and techniques that can accommodate testing for the different factors that might affect “edge performance”
- Edge and traditional hierarchy organizational models
- Privacy controls
- Automated experiment procedures
- Realistic, relevant, missions that either mimic real world missions or are themselves actual missions
- Controlled task

# Base Experiment

- Hypothesis testing experiment
- Live subjects, multi-user
- Task is to identify the who, what, where and when of an adversary attack
- Run in edge or traditional hierarchy mode
- Experiment software records all actions for analysis

# Experiment A

- **Definition of Performance:** the average time and average number of actions the team's subjects require to complete the task.
- **Null Hypothesis 1:** Measures of self-synchronization do not correlate with performance.
- **Null Hypothesis 2:** There is no difference in performance in achieving a mission between those subjects who have increased shared awareness and those that do not.
- **Null Hypothesis 3:** The platform-derived measures of trust and shared awareness do not correlate with the results of these same measures using traditional social network analysis of survey-gathered data.
- **Null Hypothesis 4:** There is no difference in performance in achieving a mission between those groups with a command and control organization and those groups with an edge organization.

# Experiment B

- **Null Hypothesis 5:** There is no difference in performance in achieving a mission between those subjects in DoD and those subjects in educational organizations.

# ELICIT Software Platform

- Software application that supports a real time exercise in information sharing and trust among groups of 17 participants
- Supports configurable task scenarios

# Task

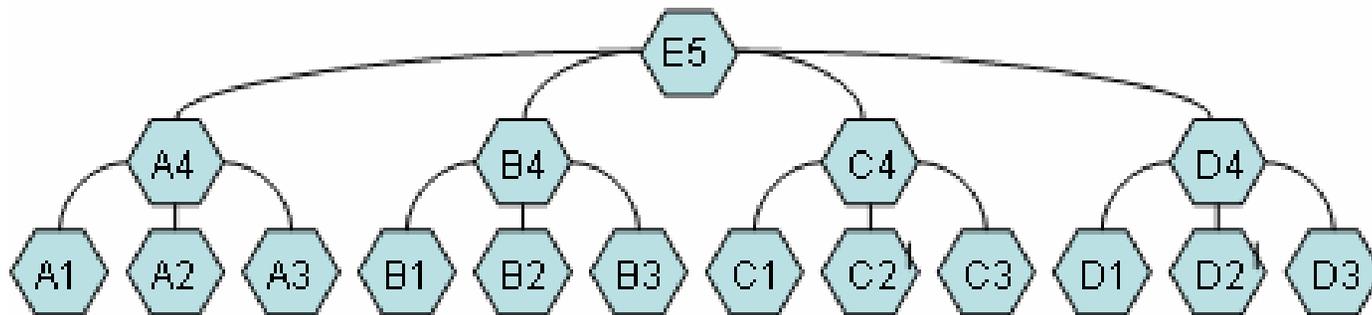
- Identify the who, what, where and when of an adversary attack
- Task scenarios are anonymized
- Participants periodically receive factoids about the situation
- No one person has all the information needed
- Task success requires communication
- All communication is through the experiment software
- Participants are anonymized

# Factoids

- Scenario information is divided into 68 factoids (4 for each participant)
- Distribution is controlled by a table (.csv format)
  - Currently factoids are evenly distributed without identifying their source, and all are true
  - Example “All the high value targets of Omegaland are well protected”
- Some contain key information
- Some contain supporting information
- Some contain non relevant information (noise)

# Subject Organization

- Traditional Hierarchy



- Edge



# ELICIT Software

- Downloadable client, installed on each participants' laptop (typically in groups of 17)
  - Software allows CCRP to precisely model specific C2 and edge organization processes
  - Fully instruments all interactions
- Downloadable server, installed on moderator's laptop

# Server Software Features

- Logs all actions (participants, moderator and server) to server file
- Distributes factoids
- Supports configurable
  - Scenarios (sets of factoids and their distribution)
  - Countries
  - Participant names (for anonymization)
  - URLs for instructions (vary by group)
  - URLs for surveys (vary by group)
- Dashboard for experiment moderator

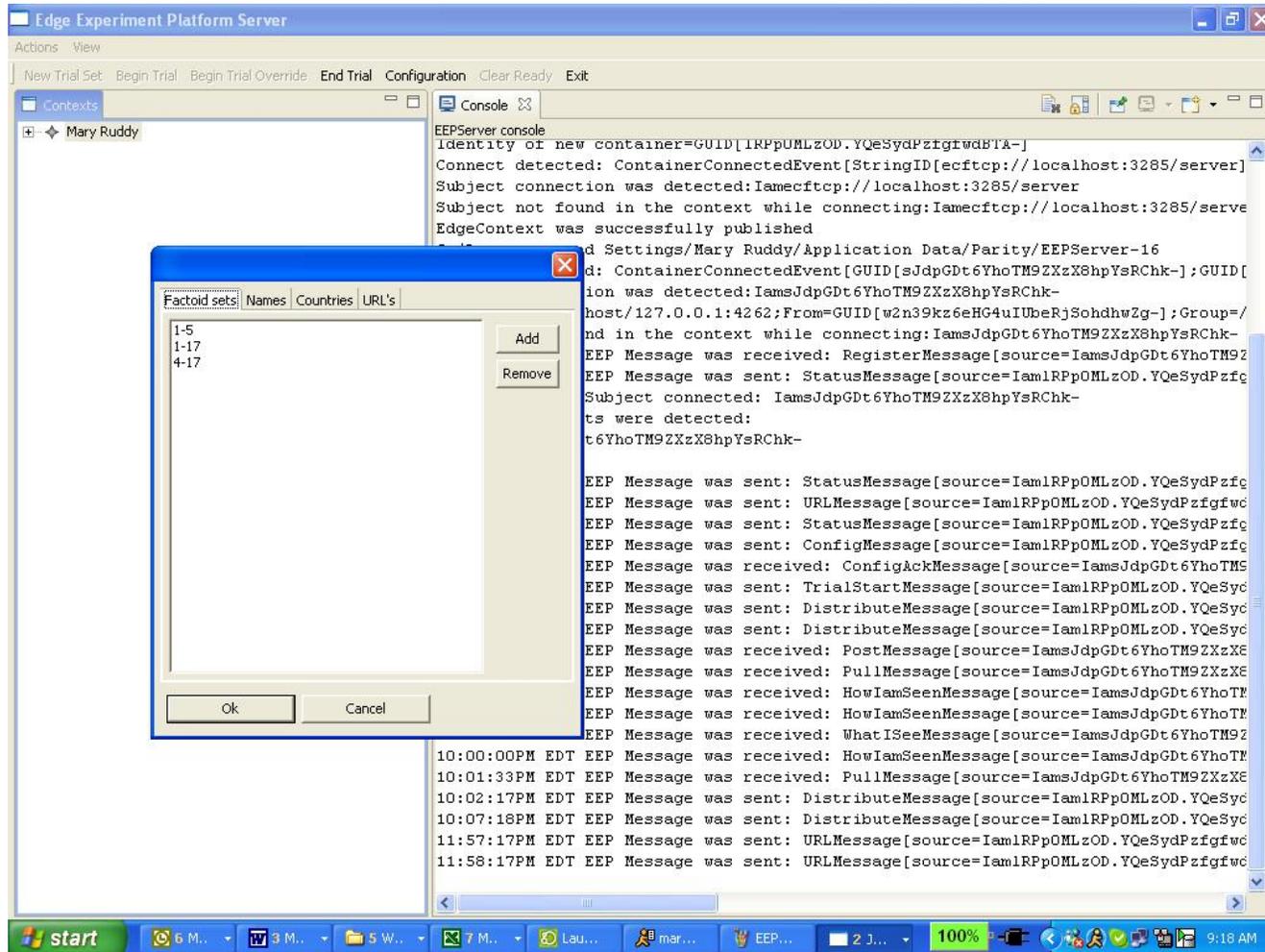
# Server – Experiment Setup

The screenshot displays the 'Edge Experiment Platform Server' application window. A 'Setup factoid sets' dialog box is open, prompting the user to configure settings for 17 subjects in a trial set. The dialog includes the following fields:

- Names:** A dropdown menu currently set to 'std names'.
- Number of trials:** A dropdown menu set to '4'.
- Trial 1:** A dropdown set to '1-17' and a secondary dropdown set to 'c1'.
- Trial 2:** A dropdown set to '1-17' and a secondary dropdown set to 'c1'.
- Trial 3:** A dropdown set to '1-17' and a secondary dropdown set to 'c1'.
- Trial 4:** A dropdown set to '1-17' and a secondary dropdown set to 'c1'.

At the bottom of the dialog are buttons for '< Back', 'Next >', 'Finish', and 'Cancel'. The background window shows a 'Console' view with a list of system messages, including 'Message was received: WhatISeeMessage', 'Message was received: HowIamSeenMessage', 'Message was received: PullMessage', and 'Message was sent: DistributeMessage', among others. The Windows taskbar at the bottom shows the 'start' button, several open applications, and the system clock at 10:08 AM.

# Server – Experiment Set up



# Client Software Features

- Sends all participant actions to server file
- Communicates with server over Internet
- Two capability options (Edge and Traditional Hierarchy)

# Participant User Interface

The screenshot displays the 'Edge Experiment Platform' interface. At the top, the subject name is 'Whitley [IamsJdpGDt6YhoTM92XzX8hpYsRChk-]' with 'Actions' and 'View' options. Below this is a toolbar with 'Add to MyFactoids', 'Share...', 'Post...', 'Refresh', 'Identify...', and 'Ready'. The main content area is divided into two sections: 'InBox' and 'My Factoids'.

**InBox**

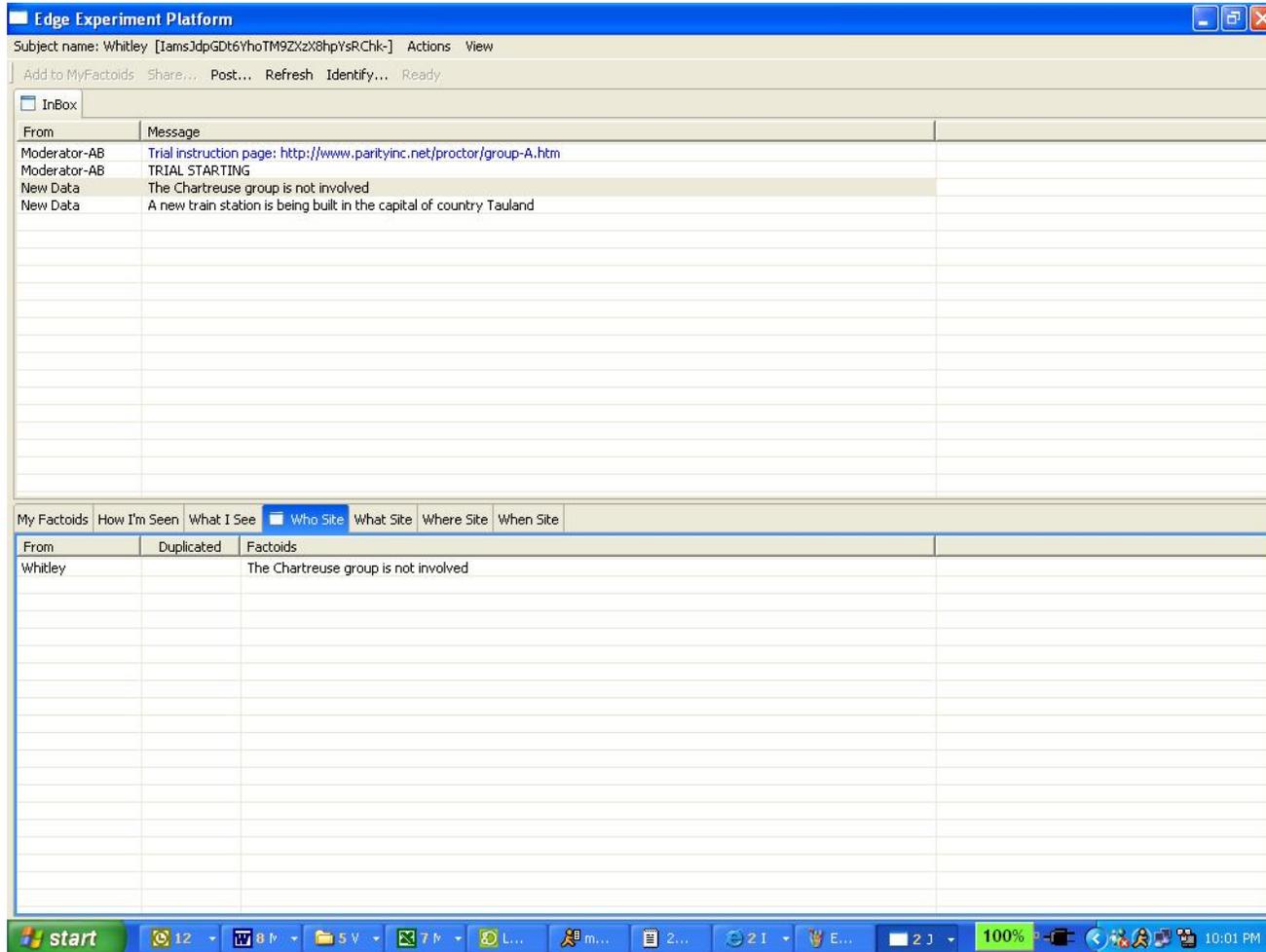
From	Message
Moderator-AB	Trial instruction page: <a href="http://www.parityinc.net/proctor/group-A.htm">http://www.parityinc.net/proctor/group-A.htm</a>
Moderator-AB	TRIAL STARTING
New Data	The Chartreuse group is not involved
New Data	A new train station is being built in the capital of country Tauland
New Data	Tauland is land locked
New Data	The attack will be at 11:00

**My Factoids**

From	Duplicated	Factoid
New Data		The Chartreuse group is not involved

The Windows taskbar at the bottom shows the Start button, system tray icons for volume, network, and battery, and the system clock displaying 10:10 PM.

# Participant UI – Who Website



# Participant UI – How I’m Seen

The screenshot displays the 'Edge Experiment Platform' interface. At the top, the subject name is 'Whitley [IamsJdpGDt6YhoTM9Zx2X8hpYsRChk-]' with 'Actions' and 'View' options. Below this is a toolbar with 'Add to MyFactoids', 'Share...', 'Post...', 'Refresh', 'Identify...', and 'Ready'. The main content area is divided into two sections: an 'InBox' and a 'My Factoids' section.

The 'InBox' section contains a table with the following data:

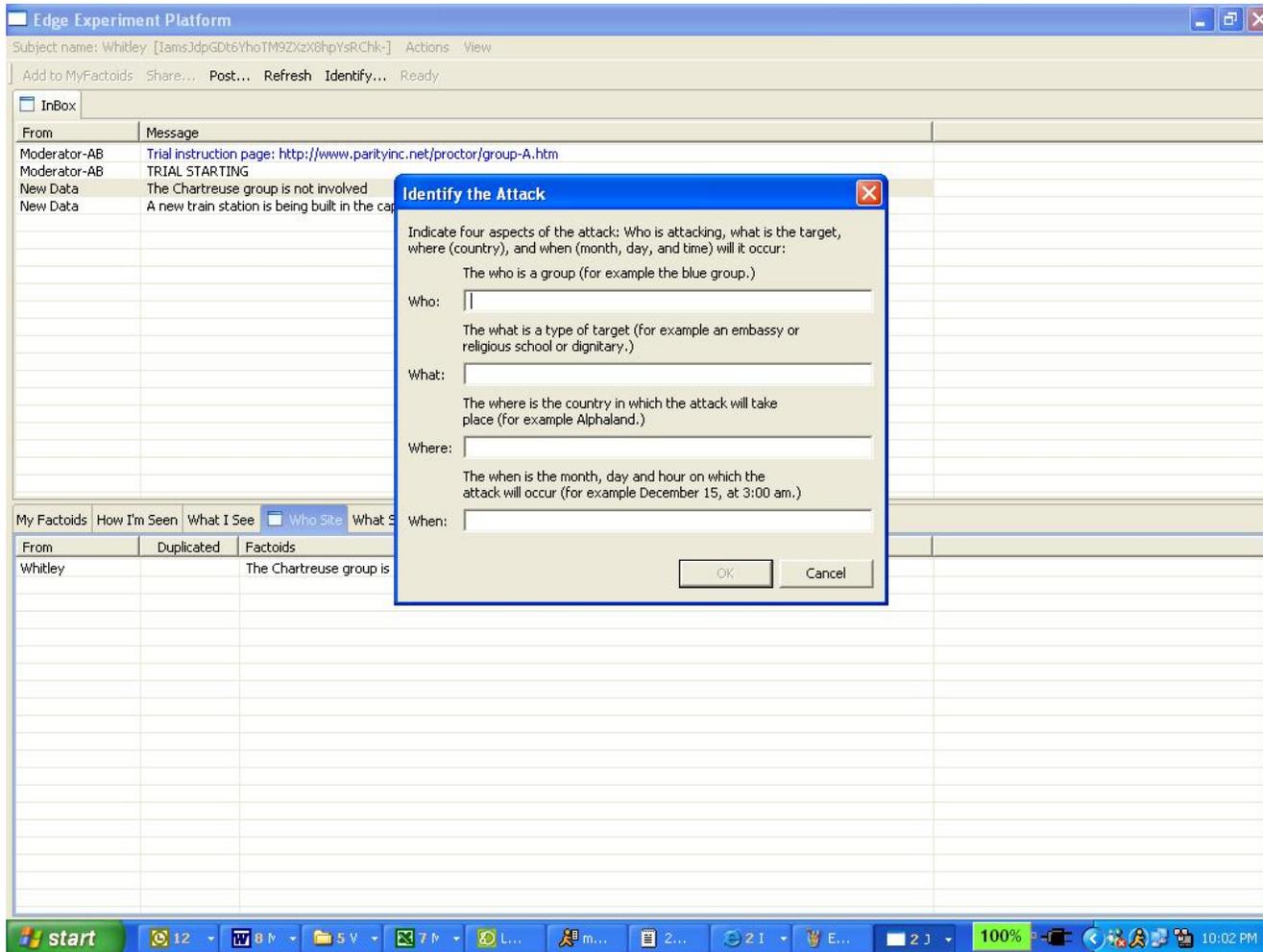
From	Message
Moderator-AB	Trial instruction page: <a href="http://www.parityinc.net/proctor/group-A.htm">http://www.parityinc.net/proctor/group-A.htm</a>
Moderator-AB	TRIAL STARTING
New Data	The Chartreuse group is not involved
New Data	A new train station is being built in the capital of country Tauland

The 'My Factoids' section is currently set to 'How I'm Seen' and displays a table with the following data:

Name	Rank	Team	Group	Country
Whitley	Team member		A	Tauland

The Windows taskbar at the bottom shows the 'start' button, several open applications, a system tray with a 100% volume indicator, and the time 10:01 PM.

# Participant UI – Identify Action



# Participant Actions

- Share factoid with individual
- Post factoid to website (who, what, where, when)
- Add to factoid to My Factoids list
- View website (who, what, where, when)
- What I see website (other participants)
- How I'm seen website (my role in exercise)
- Identify attack

# Example Experiment Protocol

- Software Installation
- 1:00-1:05 Welcome Remarks
- 1:05-1:15 Pre-Briefing Video
- 1:15-1:45 Round I – Familiarization
- 1:45-2:00 – Break – [No talking about the task]
- 2:00-3:00 Round II
- 3:00-3:15 Round II Survey
- 3:15-3:20 Debriefing Video
- 3:20-4:00 Questions, Thoughts, Comments

# ELICIT-Based Research Effort

- Experiments have been run at: Evidence Based Research, Boston University, West Point and Naval Post Graduate School
- Beginning to work with additional groups in Canada, Singapore, Portugal
- Many more runs needed in different organizations
- CCRP is making the platform available to research groups who agree to share resulting data and perform base experiment runs

# Sessions on ELICIT-Related Work

- 194 - The ELICIT Experiment: Eliciting Organizational Effectiveness and Efficiency under Shared Belief
- 017 - Hypothesis Testing of Edge Organizations: Laboratory Experimentation using the ELICIT Multiplayer Intelligence Game
- 092 - Hypothesis testing of Edge Organizations: Empirically Calibrating an Organizational Model for Experimentation

# Preliminary Results

- Preliminary results show higher performance in Edge organization due to broader dissemination of factoids. Military subjects trained for operating in hierarchies perform well in hierarchies
- Less “sharing” of factoids than needed for optimal task effectiveness

# Next Steps

- Raw data and materials posted to <http://www.dodccrp.org/html2/parity.html>
- ELICIT User Group Meeting Friday morning
- For more information contact
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Questions ?