

# Facilitating Sense Making for Situational Awareness

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Air Force MOIE

The logo for the MITRE Technology Program, featuring a stylized graphic of stacked blocks in yellow, orange, and blue to the left of the text.

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# Problem

- **Can information extraction techniques be effective in culling tactical and team coordination data from internet Chat rooms?**
  - **Multiple Chat rooms -> large data volume**
  - **Different users are interested in different topics**
  - **Relating information extracted from Chat with structured data, e.g., intelligence reports**

# Background



**Need tools to facilitate extraction and analysis of information from Chat rooms**

- **Increasing use of internet Chat in military settings**
  - **Complex, team decision-making environments**
    - **e.g., Air Operations Center**
- **Common for users/analysts to monitor multiple Chat rooms for**
  - **Tactical information**
  - **Team awareness and coordination**

# Objective

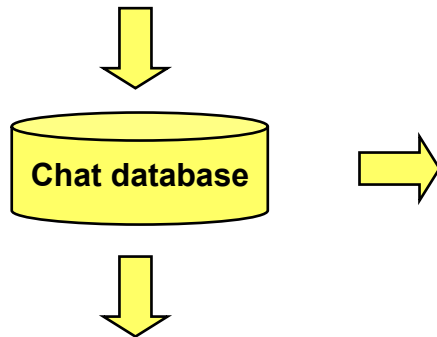
- Combine *information extraction* (IE) with keyword recognition for a set of military domain entity/event classes
- Development of algorithms to correlate elements of Chat with structured data types
- Development of a Java-based software prototype
  - User profiles
  - Drill-down tools

# Activities

- Design software prototype
- Analyze historical Chat logs
  - Extract entity/event classes
- Apply MITRE's "Alembic" IE software
  - Experiment with different algorithms
  - Combine with a military language pre-processor
- Experiment with users in the field

# Highlight

```
[22:20] <ada82> Redcoat launched at least two missiles approx 2213 outside of Camp Minnihaha
[22:20] <JSOTFnAOC> do you have cords on Camp Minnihaha?
[22:21] <ada82> vit /4228N/ /07115W/
[22:21] <DEFSMAC_F> we had no ir or radar indications of tbn launch.
[22:22] <ICEMAN-SA> No Spase based or Radar detected TBM.
[22:22] <ada82> No Spase Based or Radar detected TBM. According to Group W Officer Obie fired 4 Redcoat missiles
and engaged a single TBM, engaged at 2201Z
[22:22] <ada82> I am working to confirm that info
```

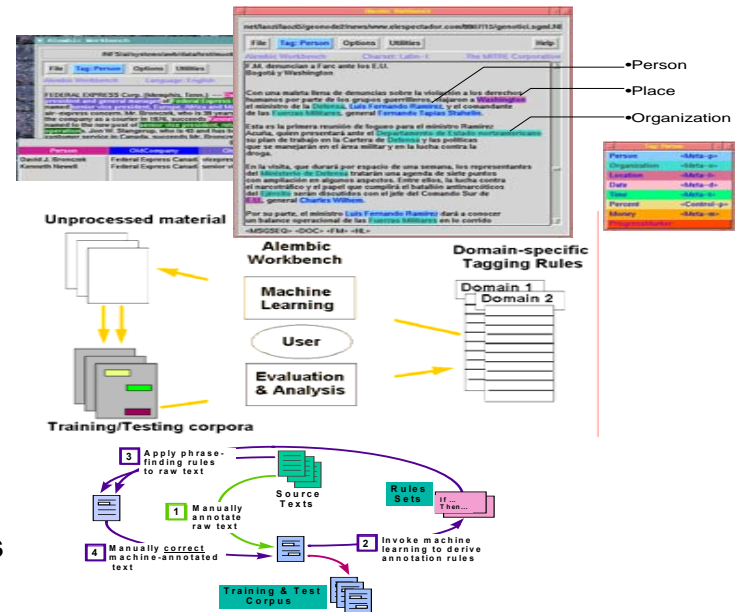


A **military language pre-processor (MLPP)** will extract **user-specified keywords** and **semi-structured data** (e.g., latitude/longitude, aircraft call sign, ELINT notation)



MLPP extracts that which presents a problem for Alembic and provides Alembic a "leg up" on the rest

## Alembic (IE) processes a Chat "document"



# Demonstration

## Display for Chat and analysis details

The screenshot shows a chat window titled "SplitPaneDemo3" with a list of messages on the left and a map view on the right. The messages include timestamps and text such as "[CFACC] [ada82] [2003-03-23 17:16:00.0] out of Camp Minnihaha ADENCOIC ? VCMAIN ? Initial report is TBM engaged and destroyed. Dig [CFACC] [AZ\_INO] [2003-03-23 17:17:00.0] THANK YOU [CFACC] [DEFSMAC\_F] [2003-03-23 17:19:00.0] Any indications of what Redcoats were firing at. Can you confirm Redcoat launch times?". The map view shows a grid with coordinates and a red dot at approximately 26.0 latitude and 39.0 longitude.

The diagram illustrates the GUI for User Profiles, organized into several sections:

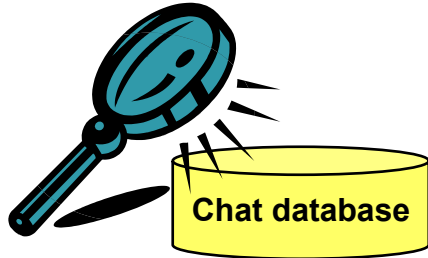
- User Identity**: Includes fields for "User Name" (e.g., Chris Berube) and "User ID" (e.g., CDB123).
- Chat Rooms**: Lists options for "CFACC", "Kmart", "ISR", and "UAV".
- Semi-Structured Data in Chat**: Includes fields for "Latitude/Longitude" (up to 5 regions) with sub-fields for Start time, End time, Beg Lat, End Lat, Beg Lon, End Lon, Ctr Lat, Ctr Lon, and Radius; "AC Call Sign" (e.g., Yahoo 12) with Start time and End time; "BE Number" (e.g., 12345) with Start time and End time; and "ELNOT" (e.g., B789Z) with Start time and End time.
- Entity/Event Class in Chat**: Includes radio buttons for "ELINT Report", "Air Defense Activity", "Geo-Location", "Missile Launch", and "Correlation w/Structured Data".
- Correlation w/Structured Data**: Includes checkboxes for "GMTI reports", "GMTI tracks", and "SIGINT reports", along with fields for "Start time", "End time", "Rectangular acceptance region" (with  $\Delta$ Lat and  $\Delta$ Lon), "Circular acceptance region" (with Radius), and "Statistical distance" (with Probability %).
- Specific Keywords in Chat**: Includes a field for "Enter list of keywords, e.g., IED, damage, JSTARS".

## GUI for User Profiles

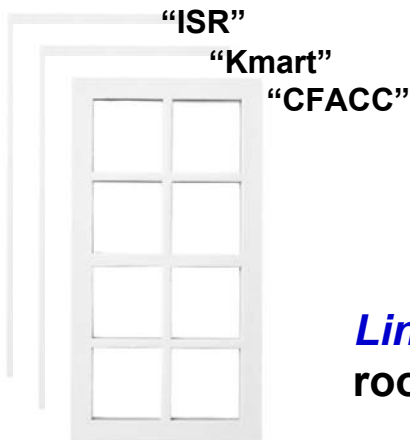
# Impacts

- **Fills immediate needs of military Chat users**
  - **Situational awareness; analysis**
- **Provides “permanent” Chat archive**
- **Paves way for developing**
  - **Higher inferences in Chat**
  - **Models for collaboration using Chat**
- **Adds to the literature on information extraction and data correlation**

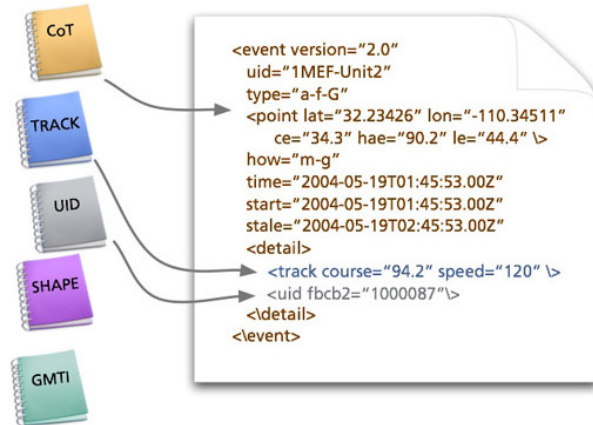
# Future Plans



Develop a playback (“*forensic*”) capability to better support analysts



*Link* extracted Chat *across* multiple Chat rooms (*correlation, data mining*)



Replace Chat entity/event classes with *Cursor on Target (CoT) classes (schema)* to facilitate interoperability