Intelligence Led Policing: Enhancing Force Deployment in Law Enforcement and Counter-Terrorism Using Data & Visual Analytics

Joint Project of DHS, the Port Authority of NY and NJ, PNNL, Rutgers University DIMACS, UMD START and Intuidex, Inc.

Presented by William M. Pottenger, Ph.D.

Project Overview

- CompStat NG™ System Goal
  - Marry law enforcement and counter-terrorism initiatives to aid in force deployment
    - Data collection
    - Data analysis
    - Force deployment
- CompStat NG™ System Components
  - Enterprise Architecture (PNNL SRS)
  - Online data collection / entry
  - Data Warehouse
  - On Demand Analysis and Reporting Tools
    - Reports, Charts & Graphs
    - Visual / Data Analytics

System Pilot at the Port Authority Bus Terminal (PABT)

- Phase 0
  - CompStat NG™ operational in semi-automatic mode
- Phase 1
  - CompStat NG™ operational in automatic mode for PABT Pilot
- Phase 2
  - Online data collection / entry and Data Warehouse operational for PABT Pilot
- Phase 3
  - SRS (Scalable Reasoning System) operational for PABT Pilot
  - Visual / data analytics operational in SRS for PABT Pilot

Phase 0: Overview of Tasks Completed

- Data captured from several data sources
  - VAX/VMS Oracle database
  - Local statistics at commands
  - Other facility-wide databases
- Aided in development of Excel-based crime analysis software
- Generated the first PA CompStat NG™ reports

Phase 1: Overview

- Purchase and configure server hardware for data warehouse
- Set up Sequel server and create a database connected to PA / PABT data sources used in CompStat NG™
- Develop web forms for online data collection / entry
- Develop / enhance crime analysis and reporting system
- Document the system and train staff

Phase 1: Online Data Entry

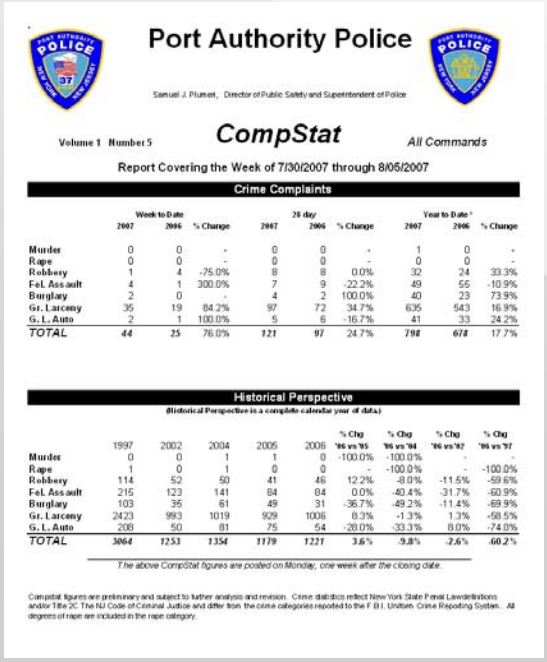
- Copy historical data to the Sequel server and route daily updates to the Sequel database from
  - VAX/VMS CAD / RMS
  - PeopleSoft Payroll System
  - Sick / IOD database
- Develop web data entry forms for use at each facility for online data collection / entry of incident reports on the SQL server
- Develop web forms to store other local information such as
  - Criminal investigations data
  - Summons activity
  - Community Policing Initiatives

Phase 1: Crime Analysis System and Training

- Provide automatic CompStat NG™ Recap Reports
  - Generated on demand from Access/Sequel DBs
- Build on existing CompStat NG™ graphs and charts
  - Link existing chart-generation tools to Access/Sequel DBs
- Provide usage and training documentation; provide training sessions to PANYNJ staff on usage and administration of Crime Analysis System

Phase 1: Recap Reports on Demand

- CompStat NG™ Recap for each facility and job wide
- Includes statistics for seven major crimes, targeted crimes, and/or quality of life issues



Port Authority Police

Samuel J. Plumeri, Director of Public Safety and Superintendent of Police

Volume 1 Number 5 **CompStat** *All Commands*

Report Covering the Week of 7/30/2007 through 8/05/2007

Crime Complaints

	Week to Date 2007	Week to Date 2006	Week to Date % Change	28 day 2007	28 day 2006	28 day % Change	Year to Date * 2007	Year to Date * 2006	Year to Date * % Change
Murder	0	0	-	0	0	-	1	0	-
Rape	0	0	-	0	0	-	0	0	-
Robbery	1	4	-75.0%	8	8	0.0%	32	24	33.3%
FeL Assault	4	1	300.0%	7	9	-22.2%	49	55	-10.9%
Burglary	2	0	-	4	2	100.0%	40	23	73.9%
Gr. Larceny	35	19	84.2%	97	72	34.7%	635	543	16.9%
G. L. Auto	2	1	100.0%	5	6	-16.7%	41	33	24.2%
TOTAL	*44*	*25*	*76.0%*	*121*	*97*	*24.7%*	*798*	*678*	*17.7%*

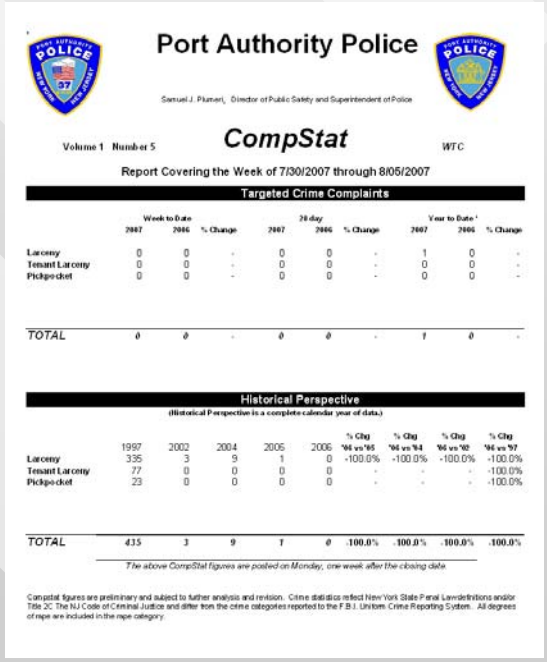
Historical Perspective

(Historical Perspective is a complete calendar year of data.)

	1997	2002	2004	2005	2006	% Chg '06 vs '05	% Chg '06 vs '04	% Chg '06 vs '02	% Chg '06 vs '97
Murder	0	0	1	1	0	-100.0%	-100.0%	-	-
Rape	1	0	1	0	0	-	-100.0%	-	-100.0%
Robbery	114	52	50	41	46	12.2%	-8.0%	-11.5%	-59.6%
FeL Assault	215	123	141	84	84	0.0%	-40.4%	-31.7%	-60.9%
Burglary	103	36	61	49	31	-36.7%	-49.2%	-11.4%	-69.9%
Gr. Larceny	2423	993	1019	929	1006	8.3%	-1.3%	1.3%	-58.5%
G. L. Auto	208	50	81	75	54	-28.0%	-33.3%	8.0%	-74.0%
TOTAL	*3064*	*1253*	*1358*	*1179*	*1221*	*3.6%*	*-9.8%*	*-2.6%*	*-60.2%*

The above CompStat figures are posted on Monday, one week after the closing date.

Compstat figures are preliminary and subject to further analysis and revision. Crime statistics reflect New York State Penal Lawdefinitions and/or Title 2C The NJ Code of Criminal Justice and differ from the crime categories reported to the F.B.I. Uniform Crime Reporting System. All degrees of rape are included in the rape category.



Port Authority Police

Samuel J. Plumeri, Director of Public Safety and Superintendent of Police

Volume 1 Number 5 **CompStat** *WTC*

Report Covering the Week of 7/30/2007 through 8/05/2007

Targeted Crime Complaints

	Week to Date 2007	Week to Date 2006	Week to Date % Change	28 day 2007	28 day 2006	28 day % Change	Year to Date * 2007	Year to Date * 2006	Year to Date * % Change
Larceny	0	0	-	0	0	-	1	0	-
Tenant Larceny	0	0	-	0	0	-	0	0	-
Pickpocket	0	0	-	0	0	-	0	0	-
TOTAL	*0*	*0*	-	*0*	*0*	-	*1*	*0*	-

Historical Perspective

(Historical Perspective is a complete calendar year of data.)

	1997	2002	2004	2005	2006	% Chg '06 vs '05	% Chg '06 vs '04	% Chg '06 vs '02	% Chg '06 vs '97
Larceny	335	3	9	1	0	-100.0%	-100.0%	-100.0%	-100.0%
Tenant Larceny	77	0	0	0	0	-	-	-	-100.0%
Pickpocket	23	0	0	0	0	-	-	-	-100.0%
TOTAL	*435*	*3*	*9*	*1*	*0*	*-100.0%*	*-100.0%*	*-100.0%*	*-100.0%*

The above CompStat figures are posted on Monday, one week after the closing date.

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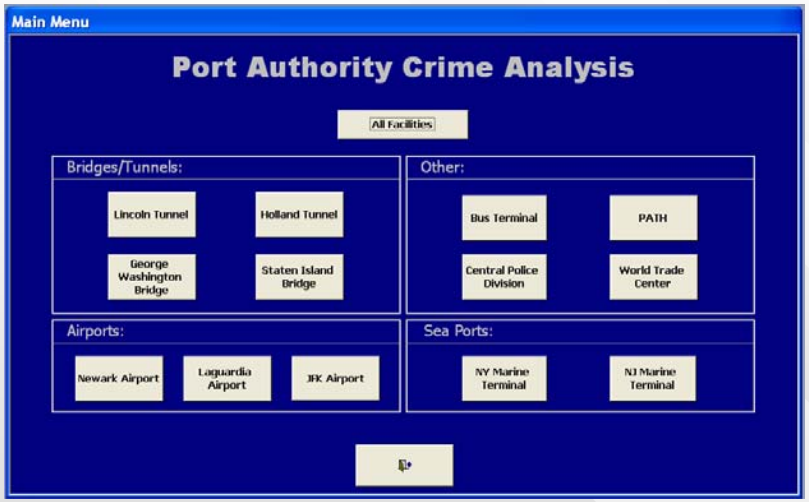
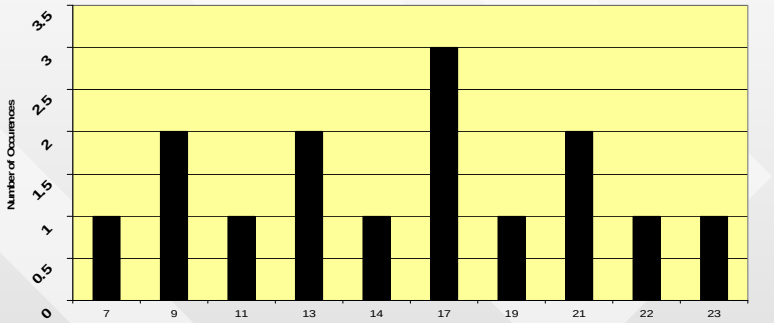
Phase 1: Crime Analysis Software

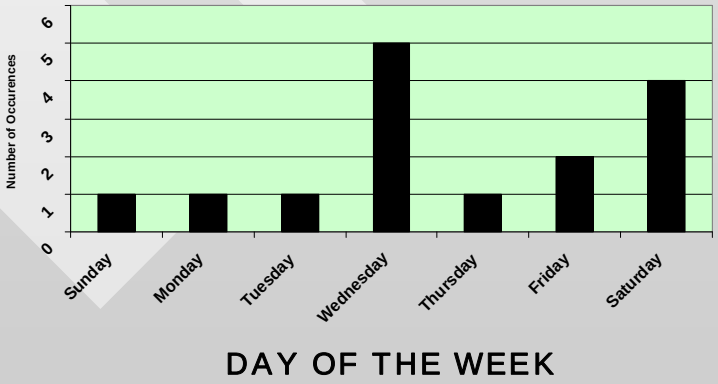
Sorts crime statistics by date, location, time of day, and day of week



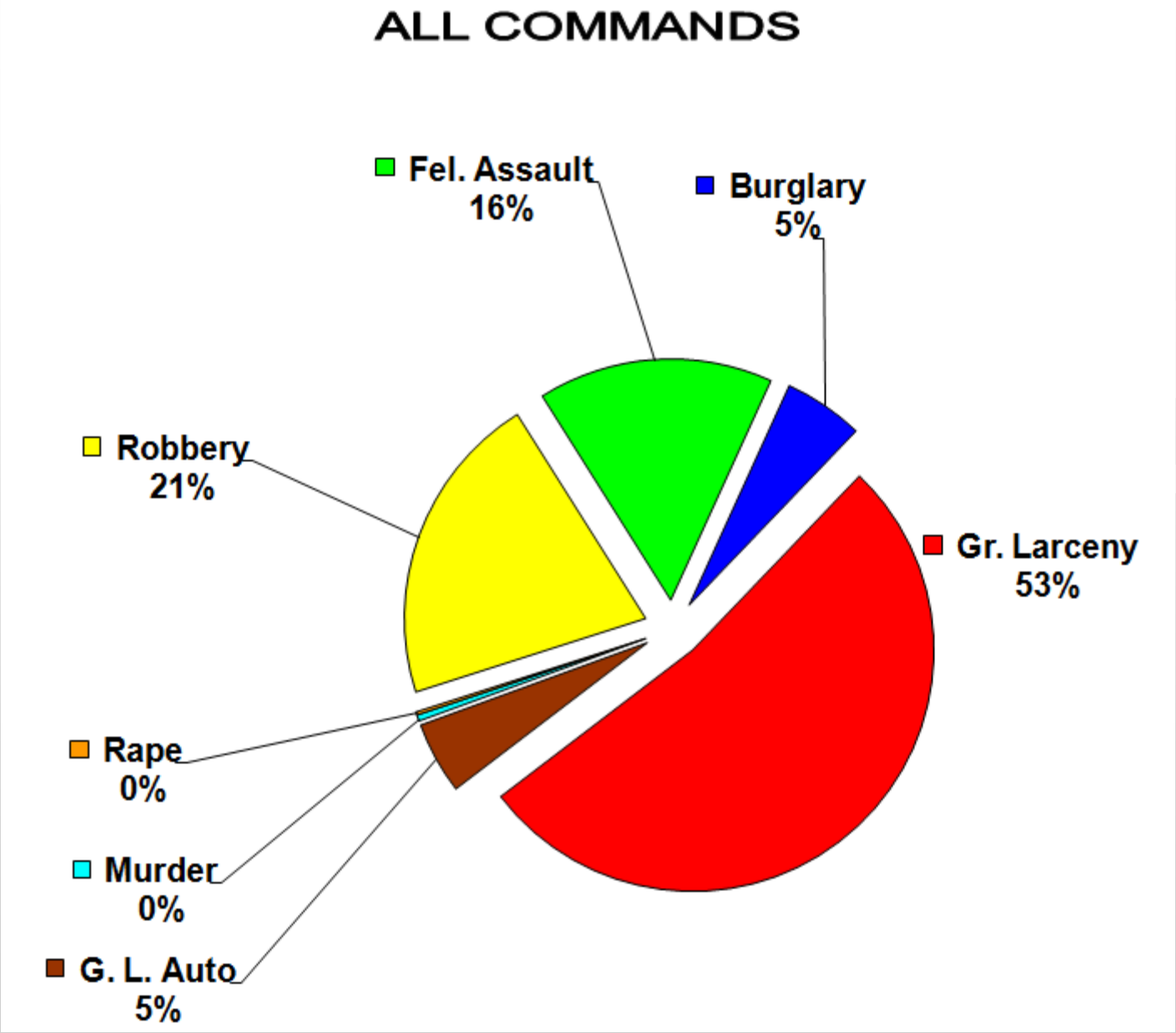
PABT Robbery by Hour (1/01/07 -7/24/07 YTD)



PABT Robbery by Day (1/01/07 -7/24/07 YTD)

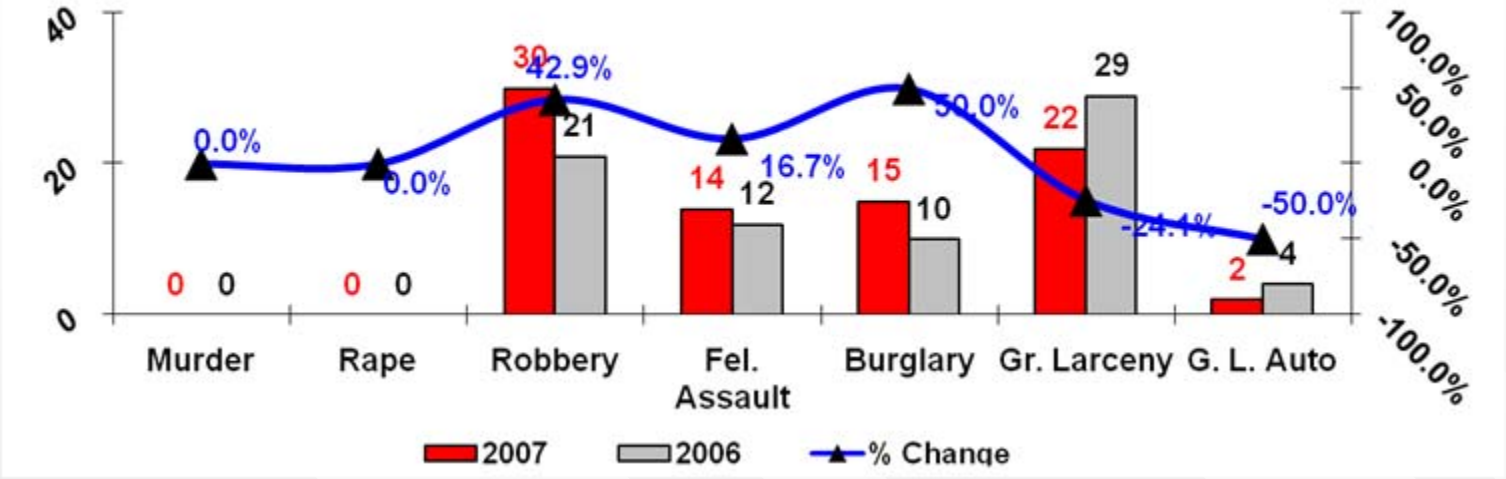


OVERALL MAJOR CRIME ACTIVITY BY PERCENTAGE



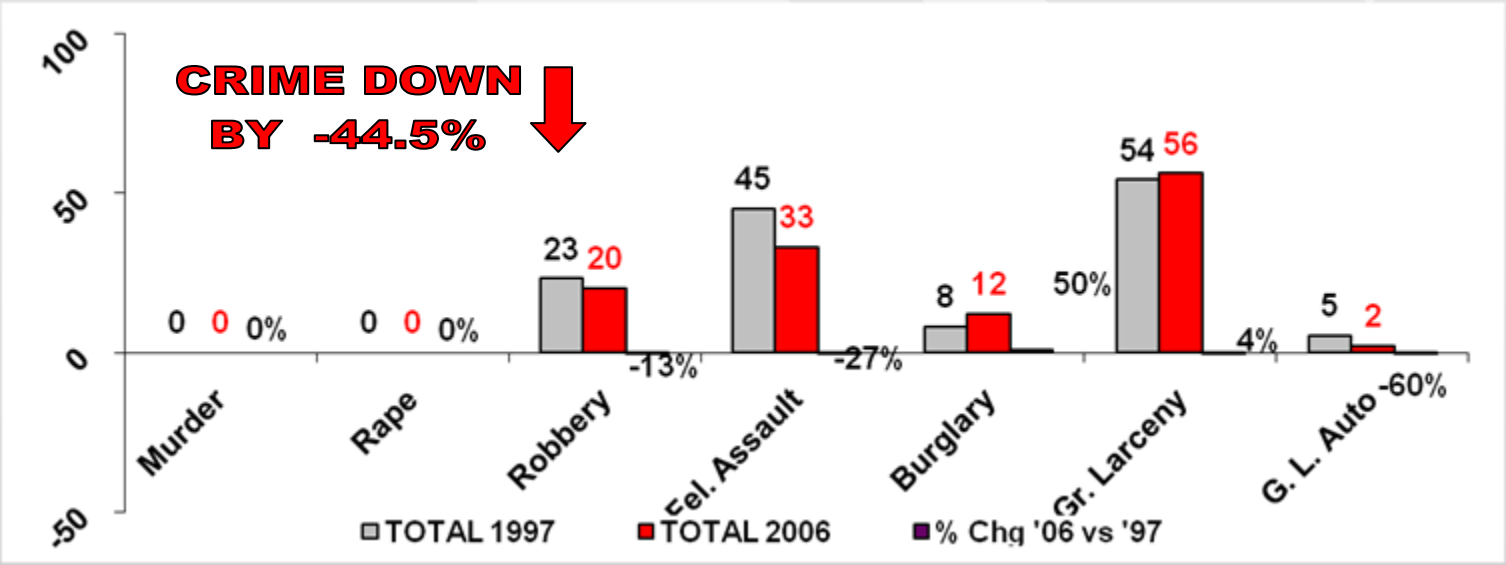
PA BUS TERMINAL - 7 MAJOR CRIMES

2006 vs. 2007

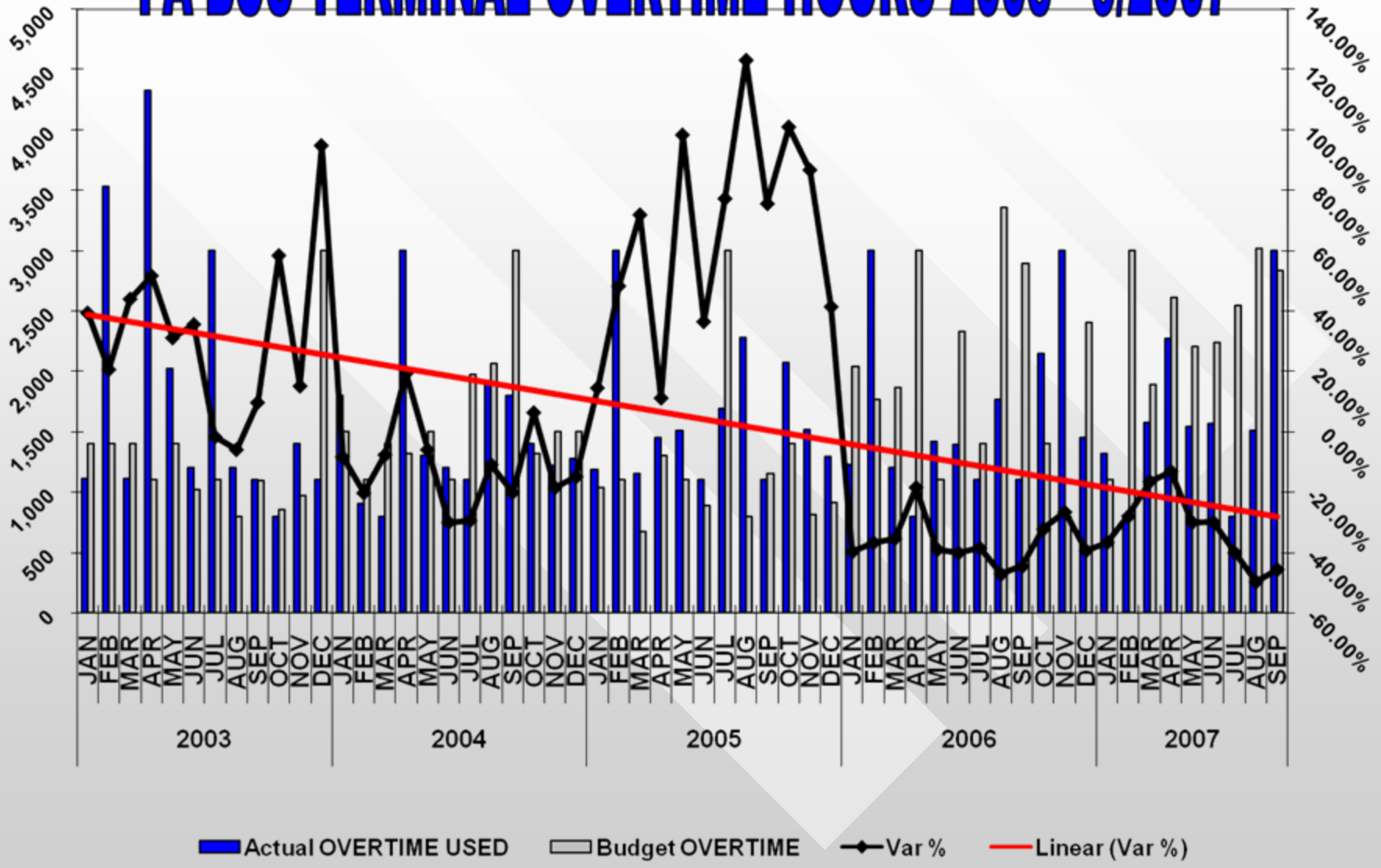


PA BUS TERMINAL - 7 MAJOR CRIMES

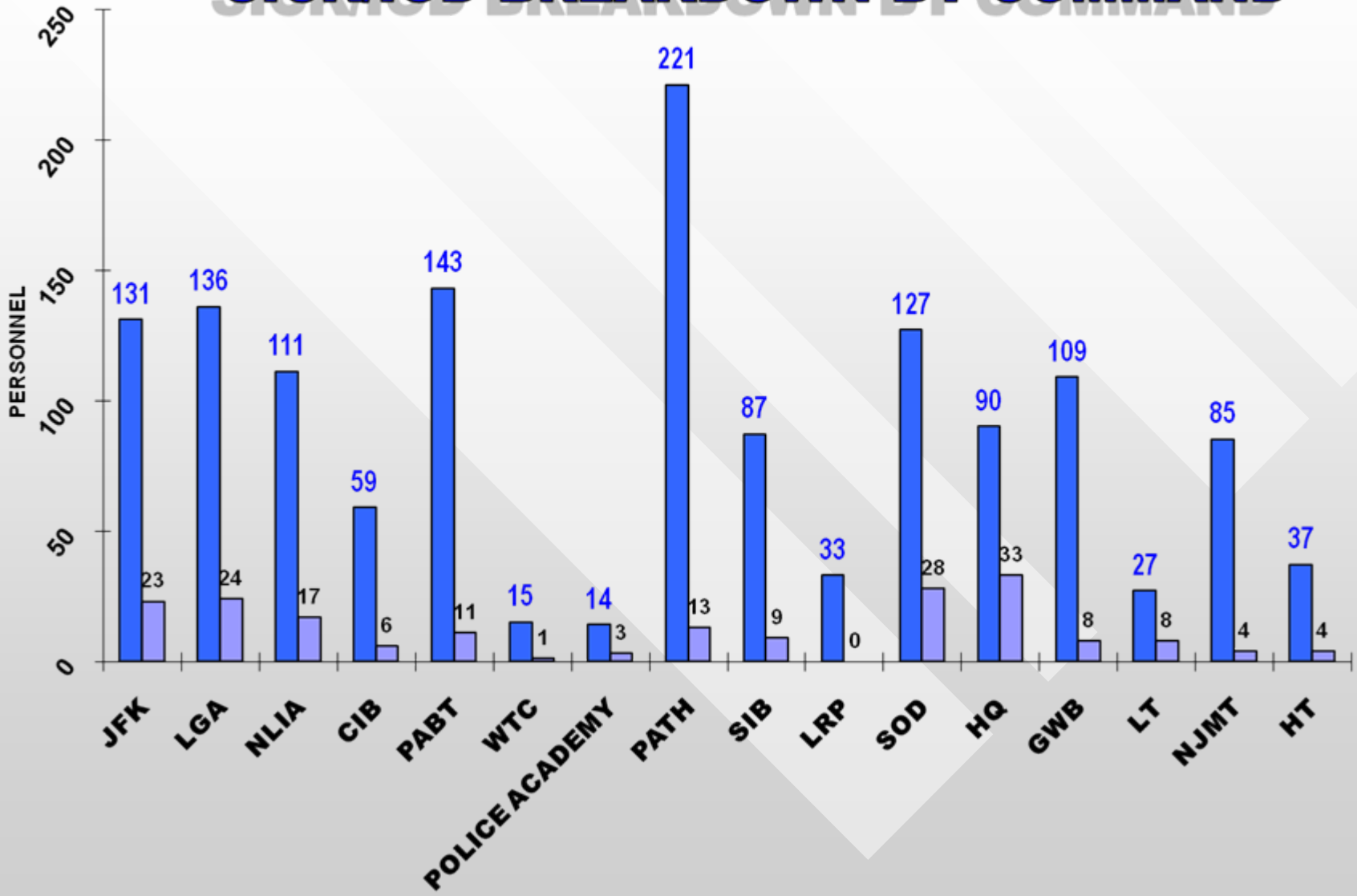
1997 vs. 2006



PA BUS TERMINAL OVERTIME HOURS 2003 - 9/2007



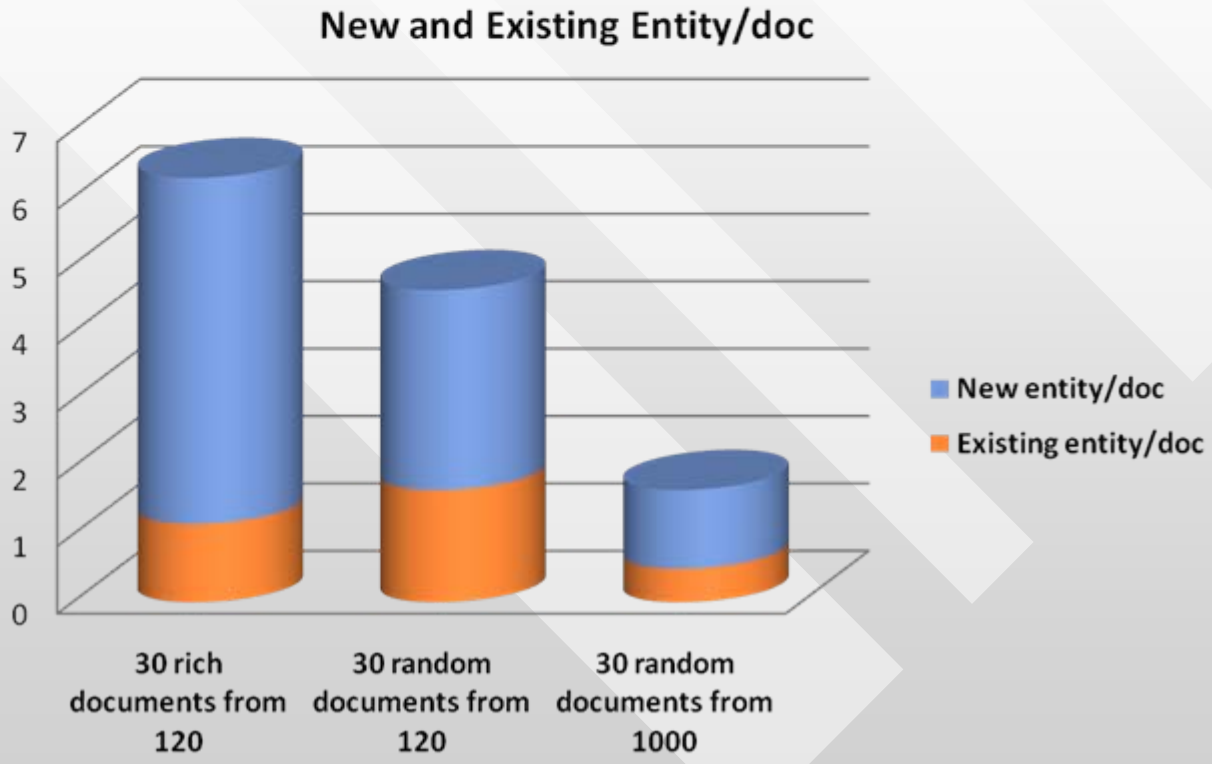
ABSENCE CONTROL UNIT
SICK/IOD BREAKDOWN BY COMMAND



Phase 2: Data Warehouse

- Incorporate information and support real-time updating from
  - Global Terrorism Database @ START
  - CompStat NG™ Access/Sequel DBs
  - Other potential data sources
    - Weather data: daily/hourly reports from weather stations of the three major airports
    - Traffic data: from PA traffic engineering
- Integrate the multiple sources of information
- Integrate information extraction capability from police incident data and GTD

Phase 2: Information Extraction From Unstructured Data



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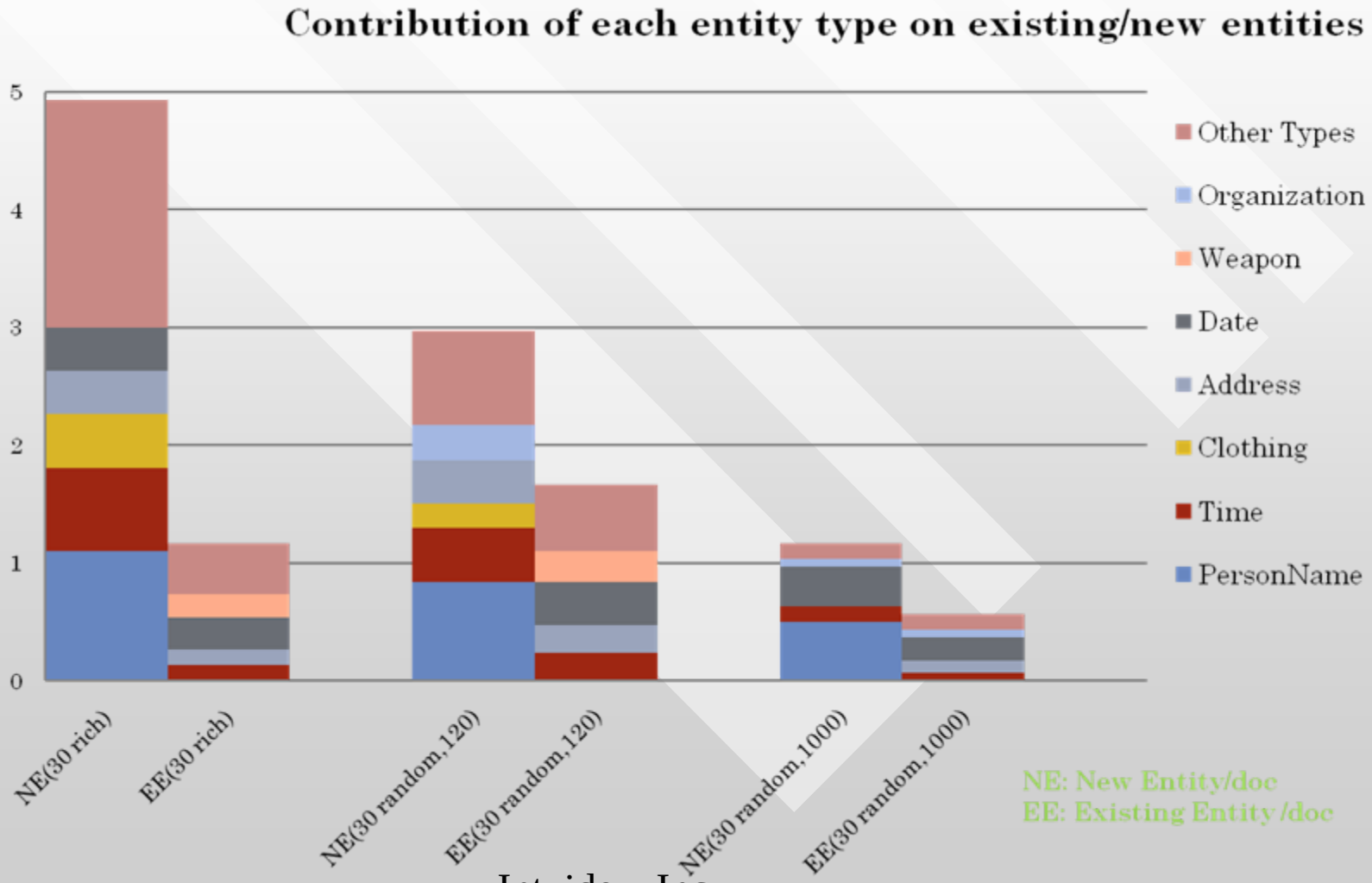
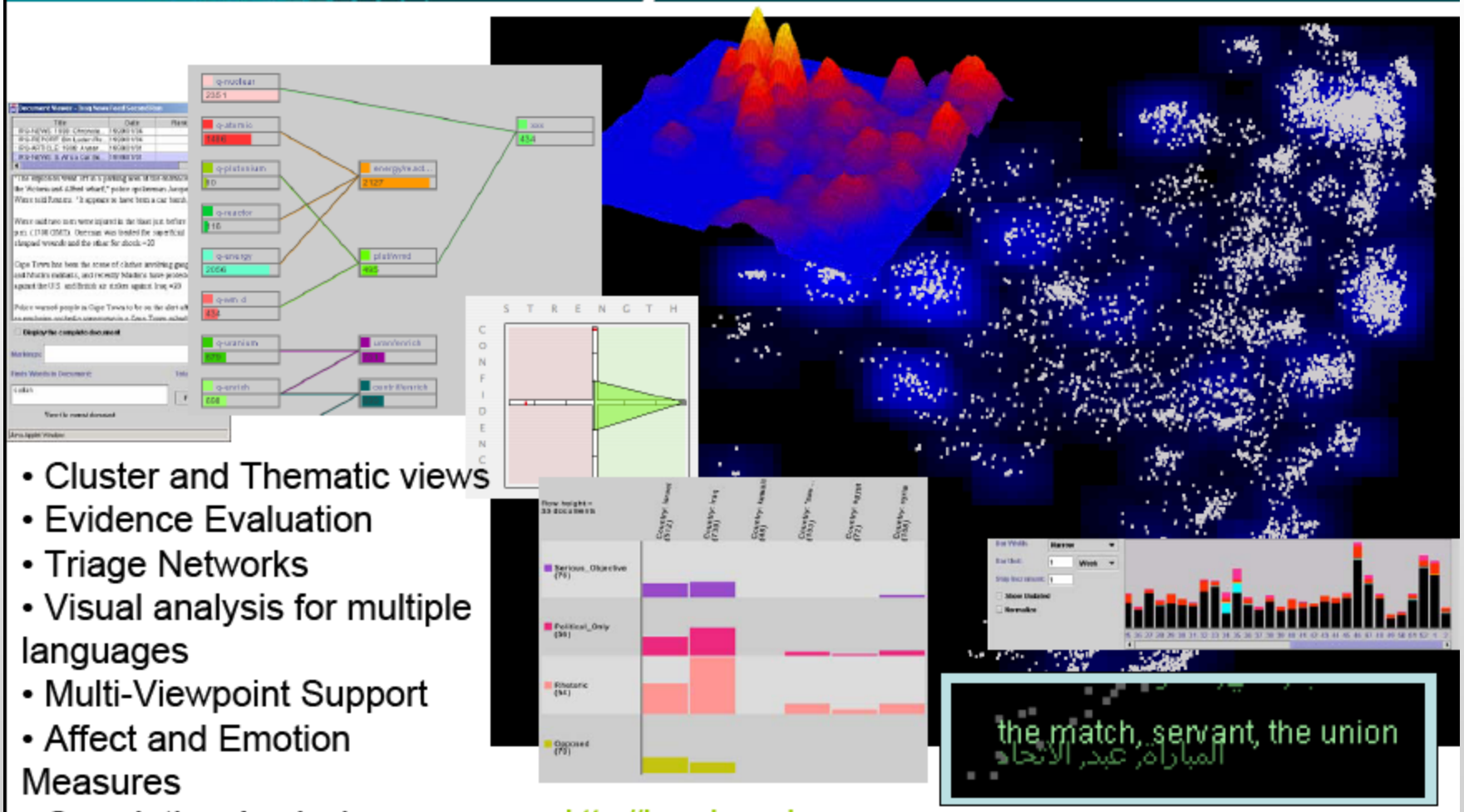


Phase 3: Visual Analytics

- Overarching goal is to *reduce relative risk*
- Specify visualization tools and potential integration
  - PNNL In-Spire
  - PNNL Scalable Reasoning System (SRS)
- Deploy Assessment Wall
- Verify appropriate security, functionality, and connectivity with the data warehouse
- Provide usage and training documentation; provide training sessions to PANYNJ staff on usage and administration of visual analytics system

IN-SPIRE: Advanced Text Analysis Platform



- Cluster and Thematic views
- Evidence Evaluation
- Triage Networks
- Visual analysis for multiple languages
- Multi-Viewpoint Support
- Affect and Emotion Measures
- Correlation Analysis
- Streaming Data

http://in-spire.pnl.gov

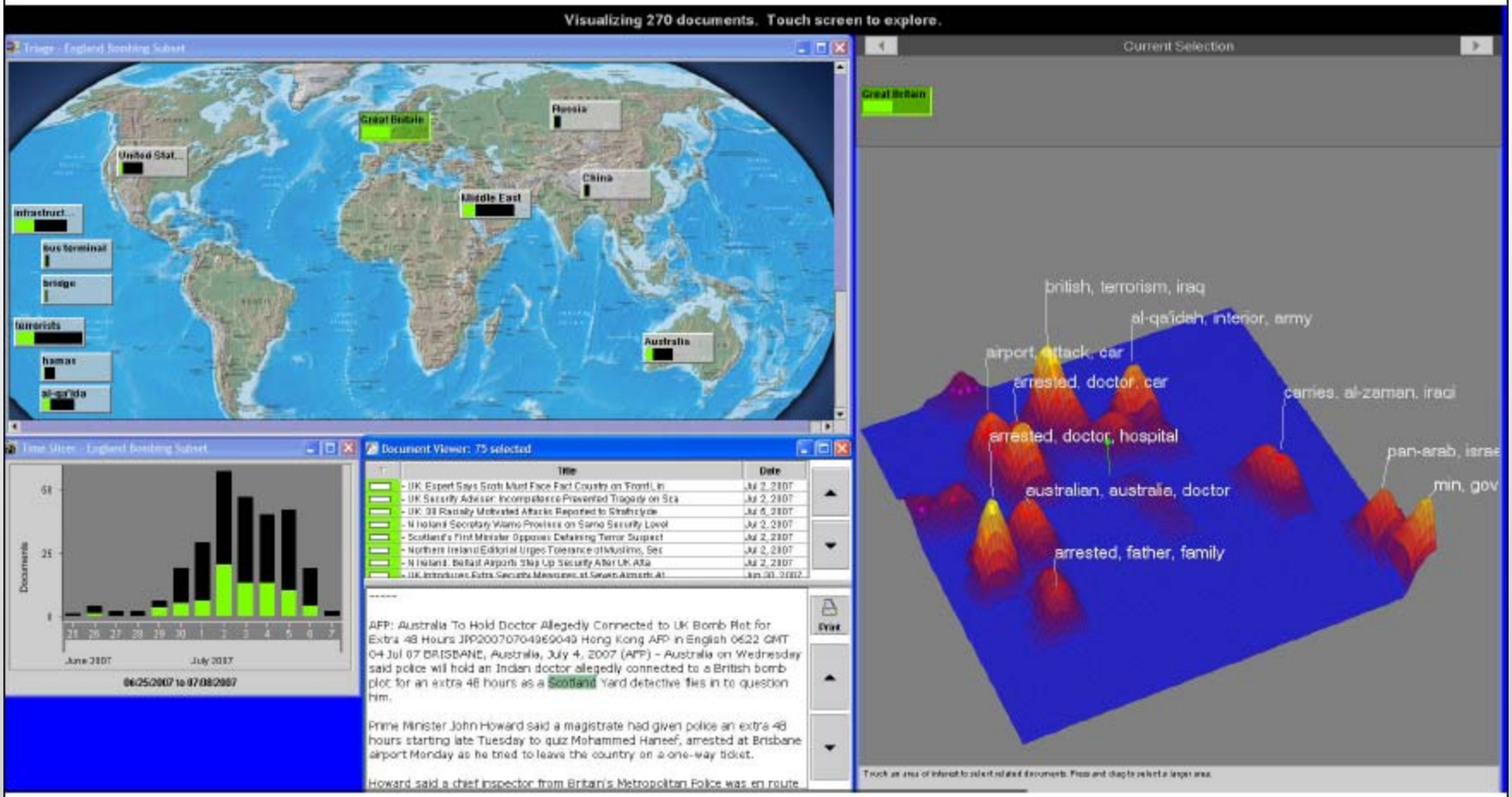
The Assessment Wall

Developed an interactive information visualization system that provides an up-to-date overview and helps users intuitively find documents of interest on a large touch display.

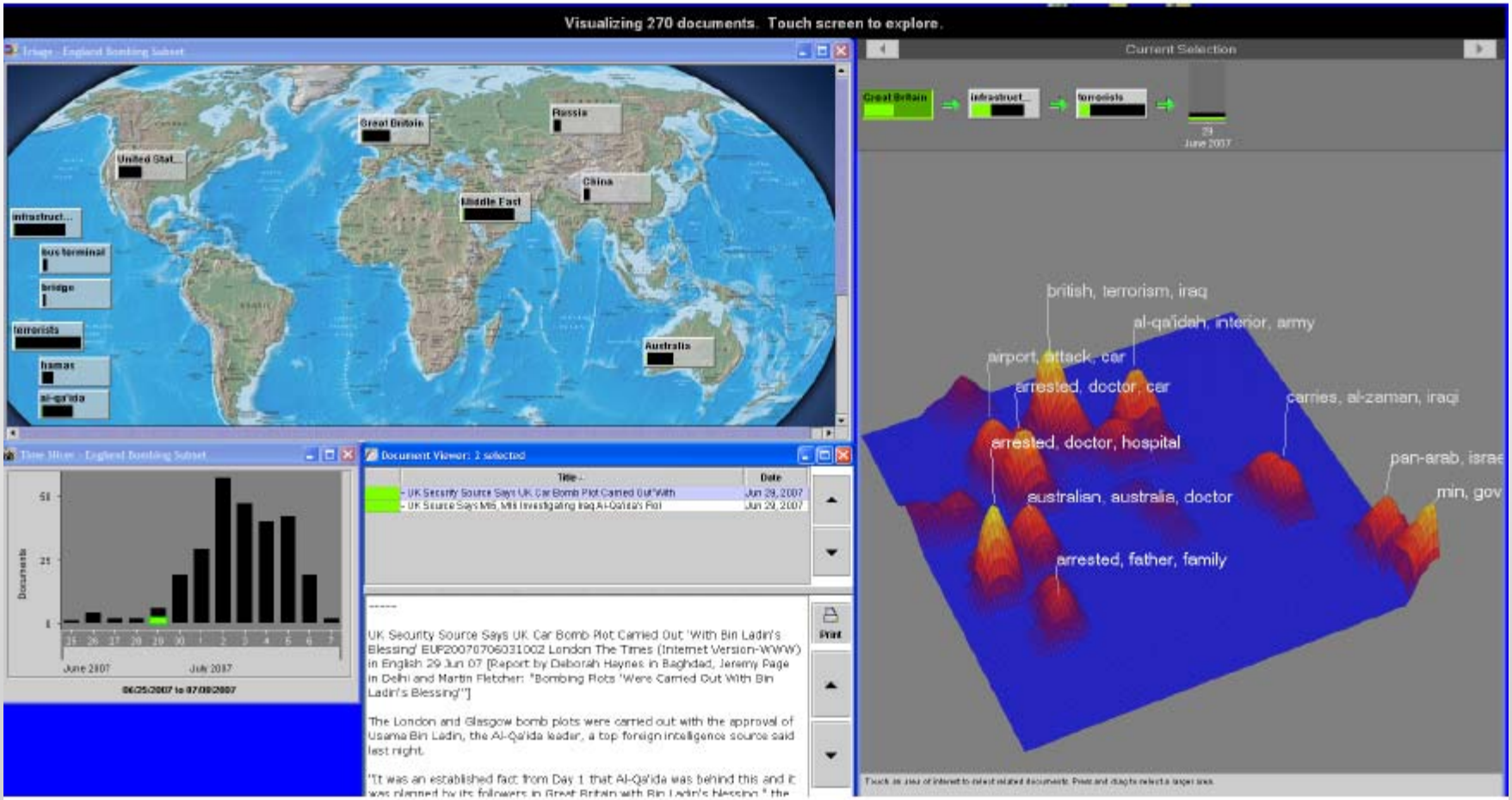
- **A walk-up usable interface that provide anyone instant analytical capability.**
- **Designed for team collaboration and discussion of analytical tasks.**
- **Simple interface design to provide rapid analytical results is ideal for command room style utility.**

Partnership Funding

The Assessment Wall



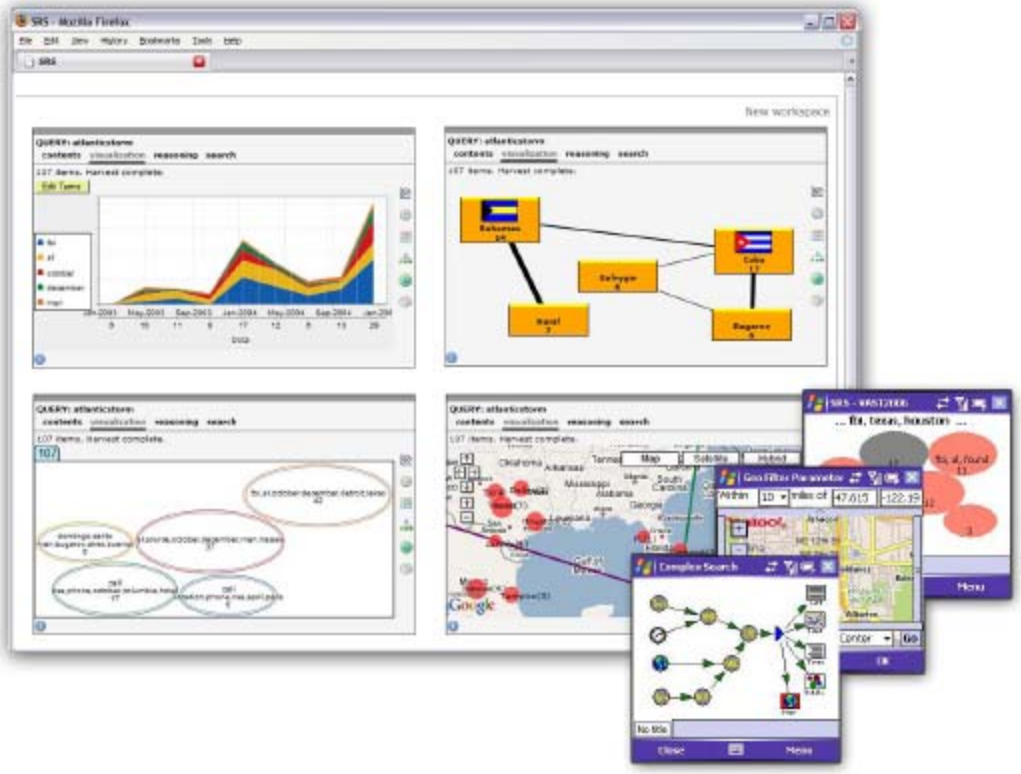
The Assessment Wall



Scalable Reasoning System

AIM

Develop a thin-client platform for integrating diverse visual analytic applications in an approachable interface for knowledge discovery.

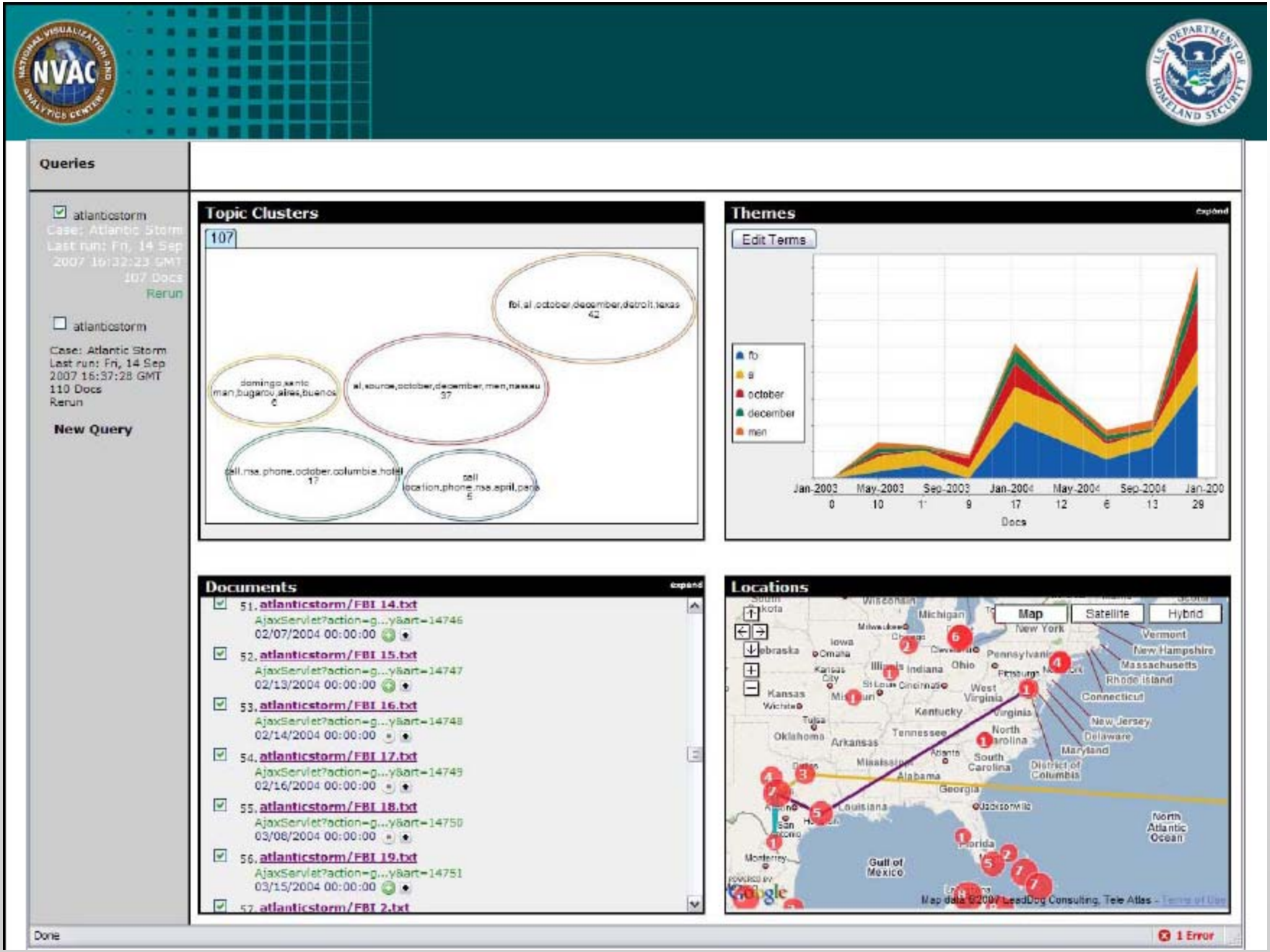


Scalable Reasoning System

IMPACTS

- Users can easily discover topical, temporal, and geographic patterns in their data.
- Customers can easily integrate visualization into their existing web portals.
- Real-time information sharing builds situation awareness.

ARJIS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Rerun
atlanticstorm
Case: Atlantic Storm
Last run: Fri, 14 Sep 2007 16:37:28 GMT
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Rerun
New Query
Topic Clusters
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domingo,santo man,bugarou,aires,buenos 6
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Themes
expand
Edit Terms
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a
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december
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Illinois
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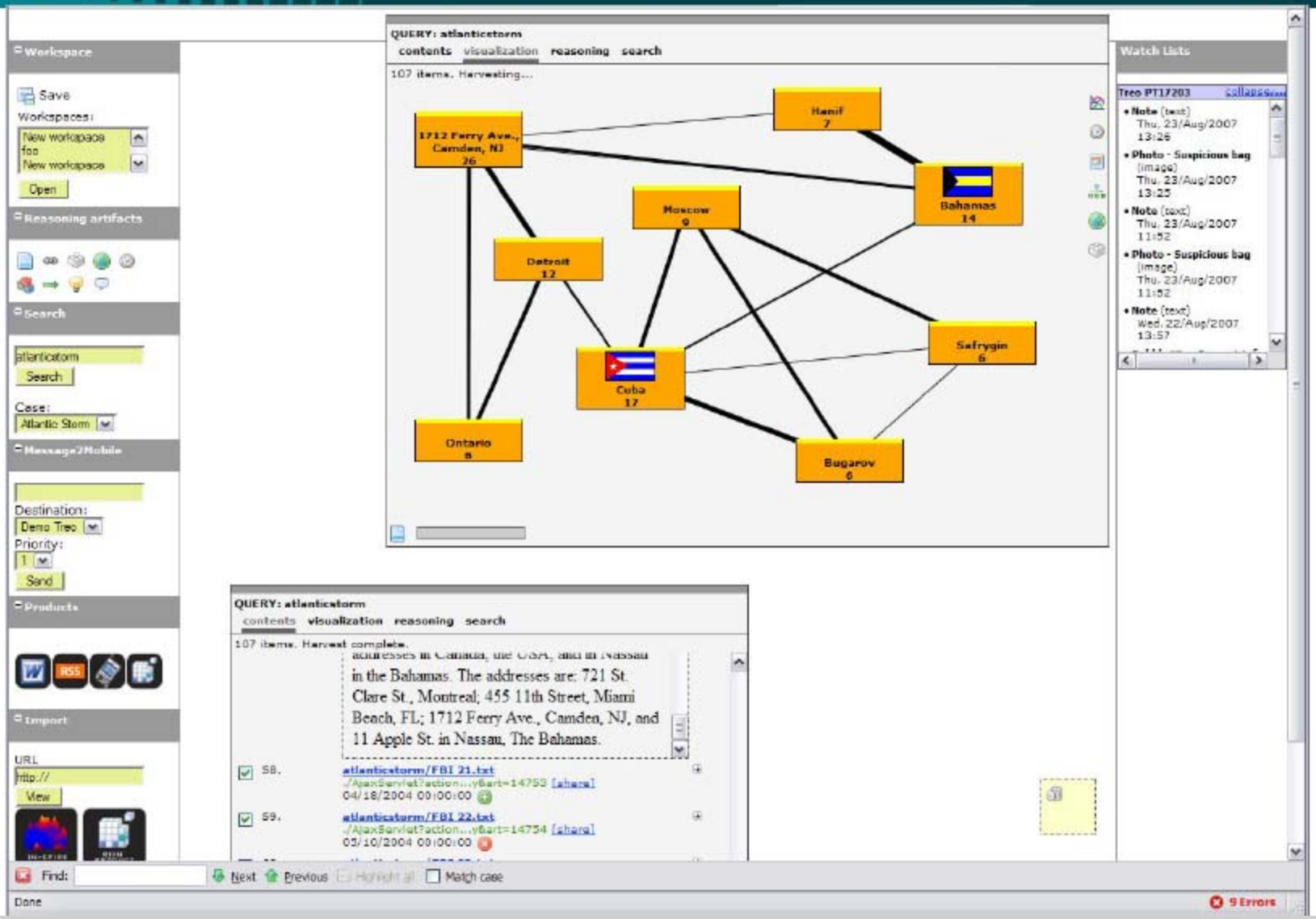
Scalable Reasoning System



Conclusion

CompStat NG™ Supports

- CompStat Crime Analysis
  - Charts, graphs and reports for managing force deployment in counter-terrorism and the fight against crime
- Data Warehouse
  - Leverage underutilized everyday data through automatic information gathering /extraction and intelligence generation
  - Discover trends that aid in counter-terrorism and crime prevention efforts
  - Support suspect identification
- Visual / Data Analytics
  - Mine valuable links between people, places and things
  - Enable command staff to quickly visualize crime and other trends

Executive Director Tony Shorris' Goal: A "*national model*" for counter-terrorism and crime prevention and analysis!