

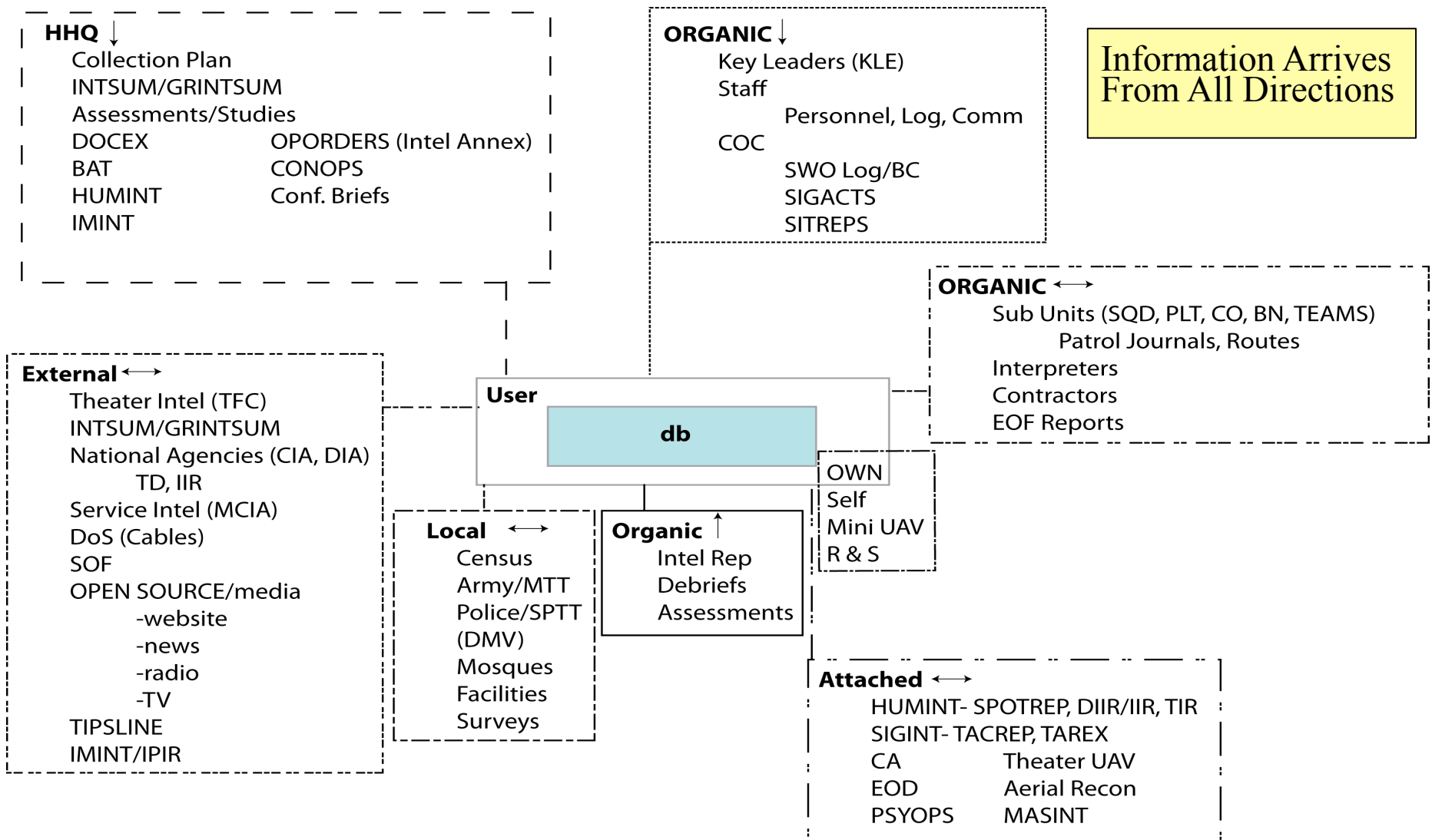
# Semantic Wiki for Tactical Intelligence Applications: A Demonstration



Ontology for the Intelligence Community  
George Mason University  
3 - 4 December 2008

  
**Semandex**  
CONNECTED INTELLIGENCE.

# A user-centric solution to the “data in the wild” problem



# Sample “Data in the wild” sources and formats

UNCLASSIFIED

Source	Subject	Format
HHQ	Operations Order Intel Annex	.doc
HHQ	Concept of Operations (CONOPS)	.doc
HHQ	Intelligence Summary (INTSUM)	.doc
HHQ	Intelligence Collection Plan	.xls
HHQ	Study	.doc
HHQ	Document Exploitation (DOCEX)	.doc
HHQ	BATS database update	.sql
HHQ	SIGINT roll up	.doc
HHQ	HUMINT roll up	.doc
HHQ	HUMINT report (IIR)	.doc
HHQ	Tactical Interrogation Report (TIR)	.doc
HHQ	SIGINT Target Exploitation (TAREX)	.doc
HHQ	SIGINT Tactical Report (TACREP)	.doc
HHQ	List of checkpoints	.xls
HHQ	Spot Report (SPOTREP)	.txt
HHQ	Be On the Look Out (BOLO) list	.xls
HHQ	Detainee status tracker	.xls
HHQ	Detainee list	.xls
HHQ	Link diagram	.anb
HHQ	CERP payments	.xls
Theater Intel	IED TTP roll up	.doc
Theater Intel	Trends/tactics summary	.ppt
Theater Intel	Assessment	.ppt
Theater Intel	Study/Reference (Janes)	.doc
Theater Intel	IMINT IPIR	.doc
Theater Intel	IMINT Product	.ppt
Theater Intel	Intelligence Summary (INTSUM)	.doc
Theater Intel	Graphic INTSUM	.ppt
Theater Intel	Target package	.html
Theater Intel	Weather report	.html
Theater Intel	Black list/target list	.xls
Theater Intel	Tribe list	.xls
Theater Intel	Tipline Report	.doc

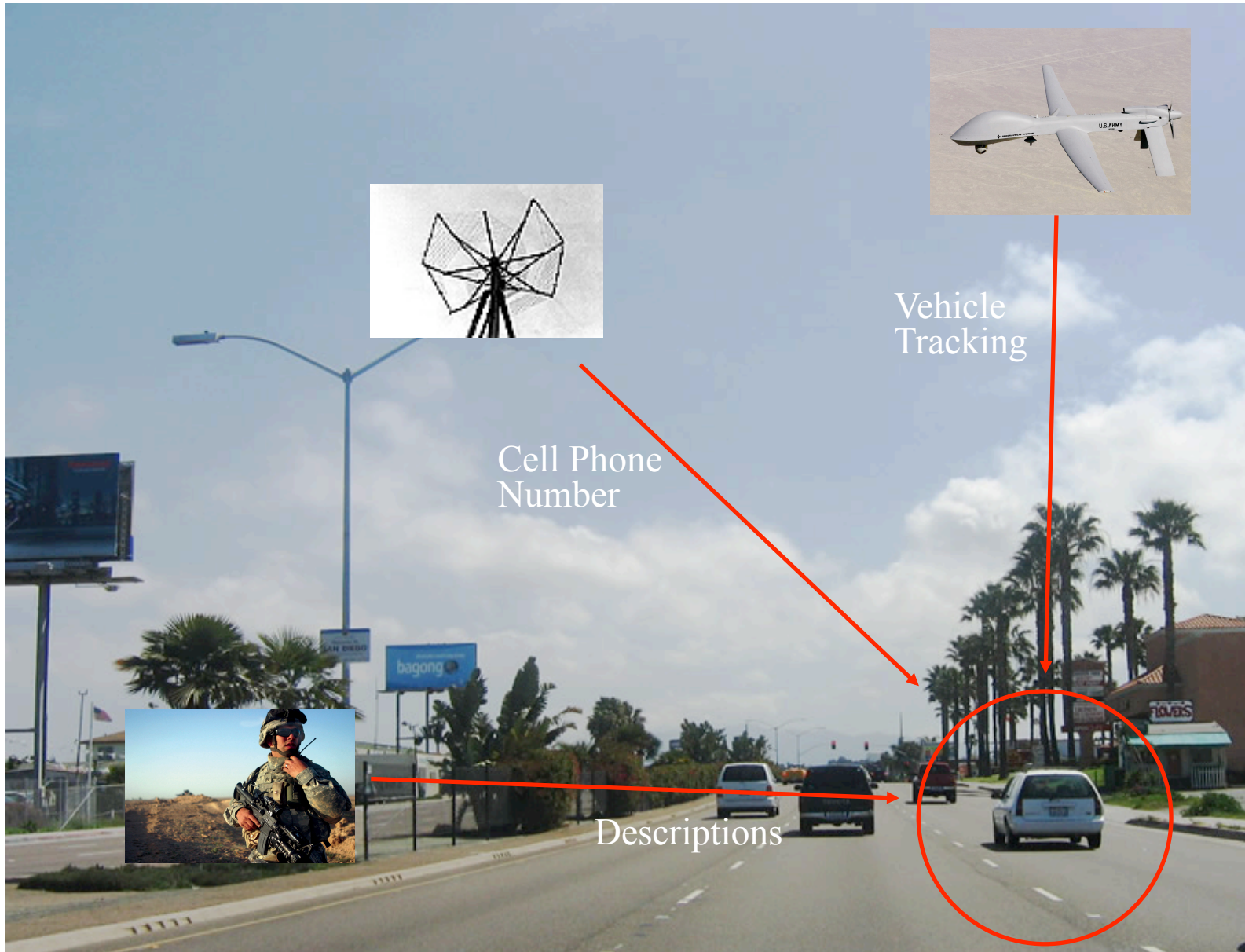
Units	Patrol Routes	GPS*
Units	Patrol Routes	.ppt
Units	Patrol Report	.doc
Units	Incident After Action Report (AAR)	.txt
Units	Friendly static positions	.xls
Units	Mobile positional data	BFT*
Units	List of checkpoints	.xls
Units	Checkpoint (CP/VCP) statistics	.xls
Interpreters	Atmospherics	.wav
Contractors	Information reports	.doc
Unit intel	Information reports	.doc
Unit intel	Patrol debrief	.doc
Unit intel	Incident debrief	.doc
Unit intel	Incident photo	.jpg
Unit intel	Assessment	.doc
Unit intel	Intelligence Report (INTREP)	.txt
Unit intel	Atmospherics	.txt
Unit intel	Captured document	.jpg
Unit intel	Captured video	.mpg
Unit intel	Person/vehicle photo	.jpg
Unit intel	Captured photo	.jpg
Unit intel	Graffiti photo	.jpg
HUMINT Tm	Link diagram	.ppt
HUMINT Tm	Spot Report (SPOTREP)	.doc
HUMINT Tm	Draft IIR	.doc
HUMINT Tm	Tactical Interrogation Report (TIR)	.doc
HUMINT Tm	Route recon	.mpg
HUMINT Tm	Route data	GPS*
SIGINT Tm	Vulnerability assessmnt	.doc
SIGINT Tm	Spot Report (SPOTREP)	.doc
SIGINT Tm	Tactical Report (TACREP)	.doc
MASINT	Target Exploitation (TAREX)	.doc
MASINT	Tracking data (vehicle)	GPS*

CIA	Telegraphic Dissemination (TD) Report	.doc
CIA	Briefing	.doc
DIA	Report (IIR)	.doc
NGO/PVO	Aid support update	.html
DOS	Crisis update	.html
DOS	Message/Cable	.doc
DOS	Alert/Warning	RSS
DOS	F-77 report	.xls
DOS	Emergency Action Plan (EAP)	.doc
DOS	Intellipedia posting	.html
DOS	OSAC message	.html
USAID	Projects	.doc
CDC	Medical assessment	.doc
SOF	After Action Report	.doc
SOF	Facility survey	.html
OSINT	Update (VOA/BBC)	RSS
OSINT	Media summary	.html
OSINT	Website search	.html
OSINT	Google Earth	.kml
OSINT	Academic database (JSTOR, LXS-NXS)	.html
Local forces	Census data	.xls
Local forces	Black list/target list	.xls
Local forces	Intelligence Summary (INTSUM)	.doc
Local forces	Intelligence Report (INTREP)	.doc
Local forces	Photograph	.jpg
Local forces	Captured document	.jpg
Local forces	Interrogation recording	.wav
Local forces	Mosque atmospherics	.doc
Local forces	Personnel roster	.xls
Local forces	Military ID records (verification)	.doc
Local forces	Arrest records	.xls
Local forces	Prison roster	.xls
Local forces	Atmospherics	.doc

Theater UAV	SPOTREP	.txt
Theater UAV	INTREP	.doc
Aerial Recon	Mission Report (MISREP)	.doc
CA	KLE report	.doc
CA	Meeting notes	.doc
CA	Patrol report	.doc
CA	Infrastructure study	.xls
CA	Personality study	.ppt
PSYOPS	Atmospherics	.doc
PSYOPS	Patrol report	.doc
PSYOPS	Media (SCAME) report	.doc
Engineers	Atmospherics	.doc
EOD	Infrastructure data	.doc
Self	IED analysis	.doc
Self	Intelligence Report (INTREP)	.doc
Self	Photographs	.jpg
Self	Atmospherics	.doc
Self	Intelligence Summary (INTSUM)	.doc
Self	OpOrder Intel Annex	.doc
Self	Local Collection Plan	.xls
Self	List of Named Areas of Interest (NAI)	.xls
Self	List of Targets	.xls
Self	Black list/target list	.xls
Self	BATS query	.sql
Self	Link diagram	.anb
Self	BOLO list	.ppt
Self	Geospatial product	.gif
R&S	Intelligence Report (INTREP)	.txt
R&S	Target photographs	.jpg

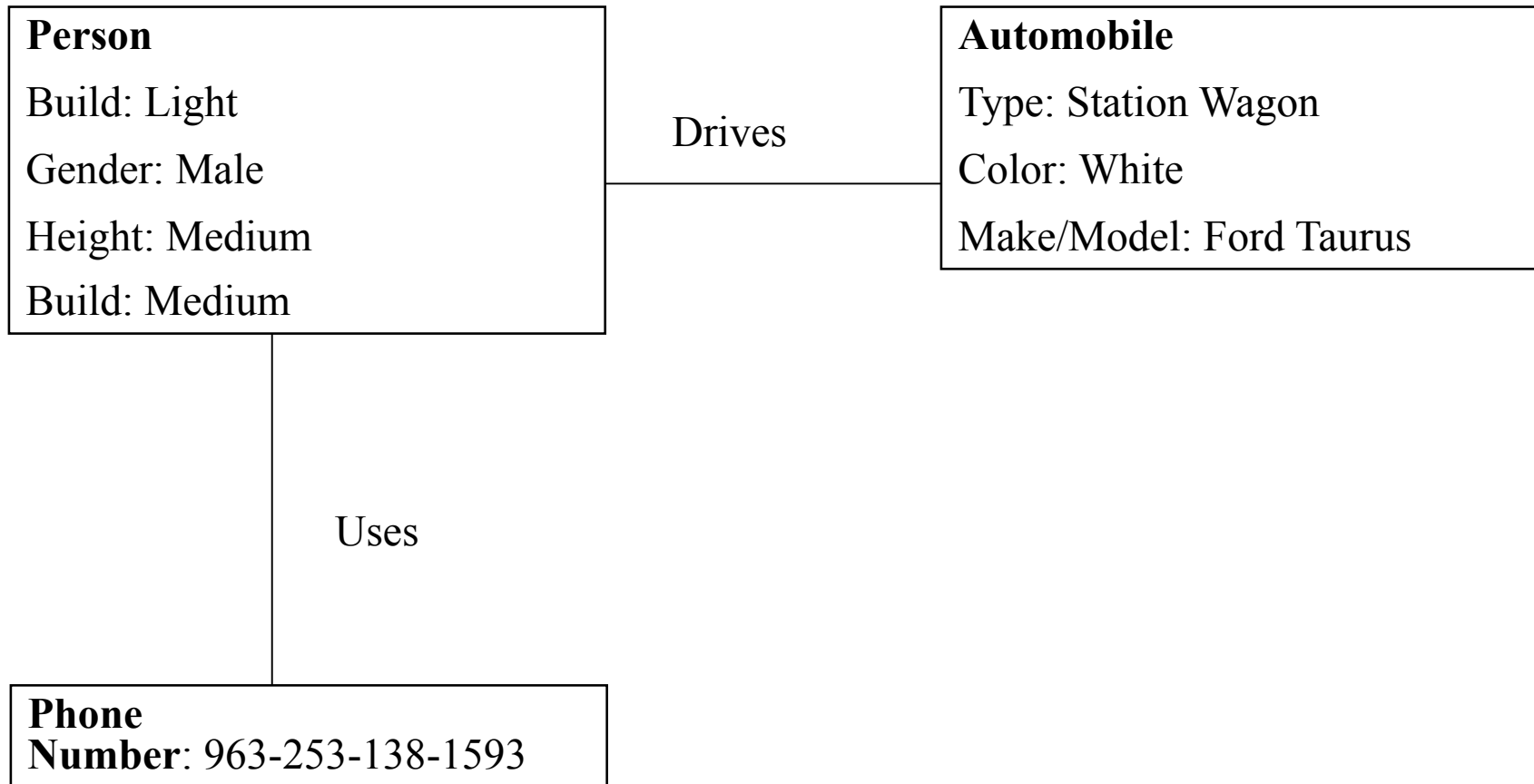
UNCLASSIFIED

# Ontology: Key to Multi-INT threat id and prosecution





# Ontology: Key to multi-source connected intelligence



# From Contextual Questions to Tactical Alerts

## Contextual Questions (Sample)

- People – Who are the high threat level individuals? Where are they? Do we know their name? Could they have multiple identities? Where do they live? Where do they hang out? Where have they been, and where are they likely to be? Do they have any identifiers we can track or spot?
- Places - Where are the enemy bases of operations, bed-down locations, potential planning bases where several targets gather? What's the current status of these locations? Are they active? Who occupies this place? What's the main purpose (religious, political, business, factory)? Who owns it? What are its structural details?
- Organizations – Are these two individuals connected? How? Who and where are the influential individuals in the organization? Where have all the members of this group been in relation to one another (dates, locations and associations)?
- Events - Who and where are the likely perpetrators of an event? Why did they select this target? Why did they not select this other target? Is this activity a threat precursor, based on known tactics and trends? Do we have any data that supports the assumption that this individual was the perpetrator of this attack?
- Information - What's the current AO threat condition? Are there any I&W of threats in progress in our AO? Any SAR regarding surveillance activities? Who are the high intelligence value individuals? Where are they? What information do we have from high intelligence value individuals regarding a group or Person of Interest? *Is this individual a trustable informant?*

## Threat Models

### Threat Characterization

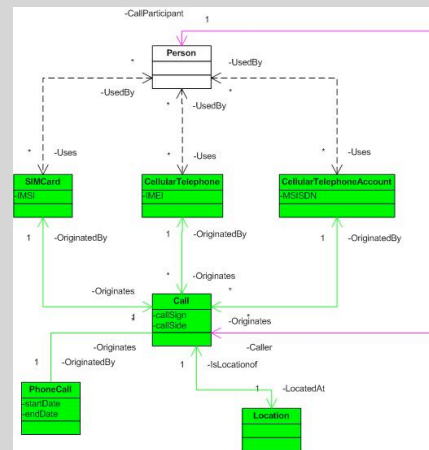
Matching observations



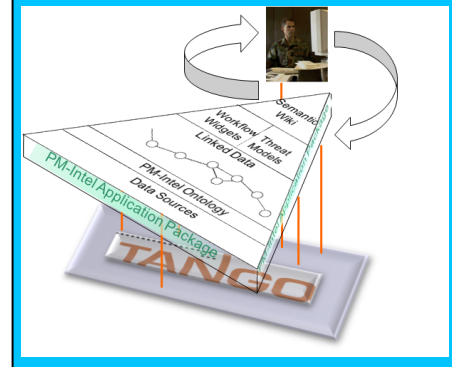
“Phone Call” behaviour events  
To/From Place, Device or Person  
on Black List  
Known code words  
Person Out of Place  
Suspicious Time Patterns  
Unknown device

Events in AO

## Observable Feature Models



## Semantic Wiki for Tactical Applications

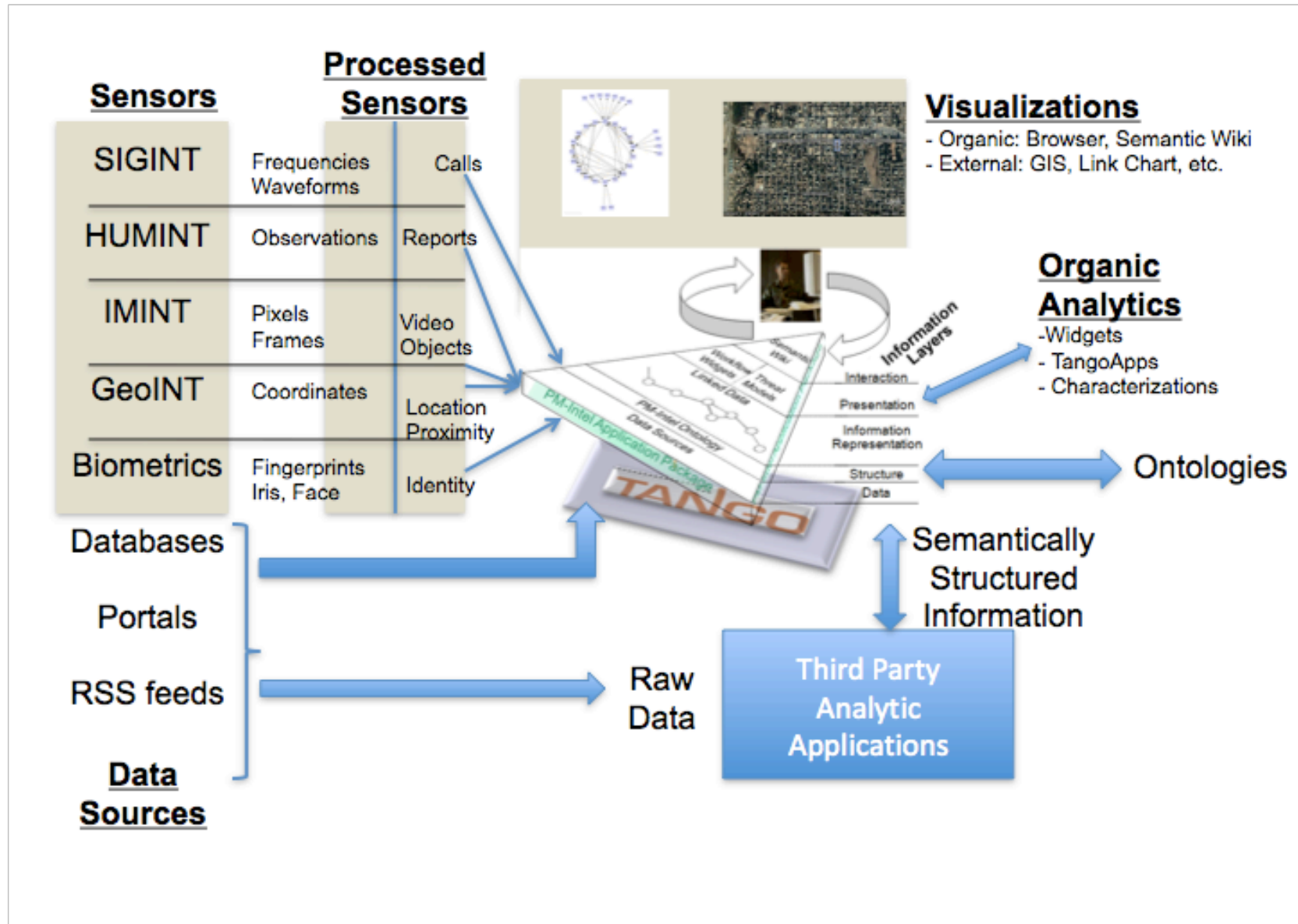


Demo

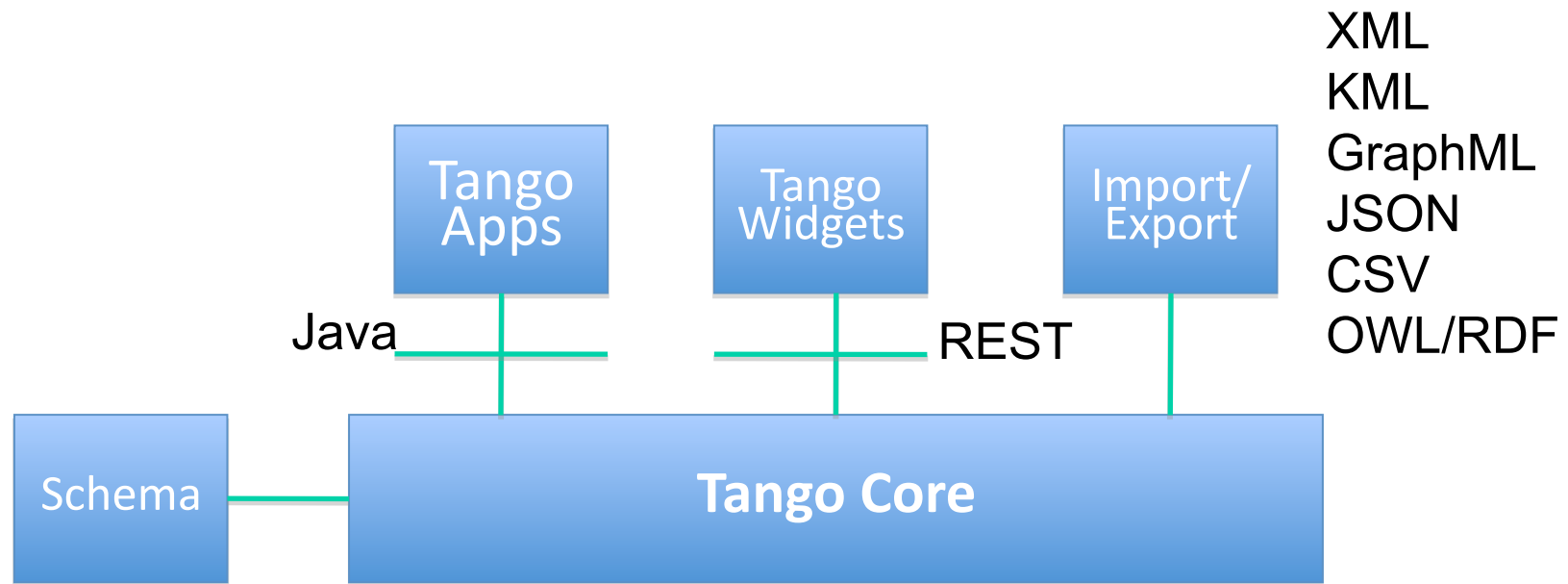


- **Next-generation (Web 3.0) collaborative information management software**
- **Enables people and computers to collaborate in linking and organizing information**
- **Collect, organize and keep up to date critical data regarding people, places, events and other types of entities**
- **Connected Intelligence by Semandex.**

# Connected Intelligence: A Systems View



# Functional Architecture



SWIM is a Tango-based solution consisting of:

1. Domain-specific schema
2. Customized Tango Apps
3. Customized Tango Widgets
4. Specialized Import/Export templates



# Designed for Ease of Use in the Wild

- All relevant information is accessible with a web browser, organized and up-to-date

The screenshot displays the TANGO web application interface. At the top, the TANGO logo is on the left, and the user is logged in as 'admin'. A search bar contains 'All Tango'. Below the search bar, there are links for 'Browse Pages' and 'Browse Smart Lists'. The main content area is titled 'Person: Badr Ali Badr' and includes tabs for 'Person', 'Details', 'Associations', 'Cell Phone Call Plot', 'Files', and 'Notes'. The 'Person' tab is active, showing a profile picture, a 'Black List' status, and an 'Upload Photo' button. To the right, there are 'Actions on this page' and 'Tag this page' sections. Below the profile, there is a 'Phone Call Summary' section with a table of call activity for other users.

Person	Last 7 Days Call Activity	Call Direction	Call Status	Action
Person : Feroz Majid Ikram	2 calls	1 calls to, 1 calls from	BWG: Black List	Add this Person to my WatchList
Person : Alim Haji Bukari	2 calls	1 calls to, 1 calls from	BWG: White List	Add this Person to my WatchList
Person : Rajaa Sayf	2 calls	2 calls to, 0 calls from	BWG: White List	Add this Person to my WatchList
Person : Ali Abu Hamza				

# Semantics dictate how users edit and update pages

<b>High Value Target</b> <input type="text" value=""/>	<b>Hair Color</b> <input type="text" value="select a Hair Color"/>	<b>Beard Color</b> <input type="text" value="select a Beard Color"/>
<b>Religion</b> <input type="text" value="enter a new Religion"/> - +	<b>Hair Length</b> <input type="text" value="select a Hair Length"/>	<b>Beard Style</b> <input type="text" value="select a Beard Style"/>
<b>Gender</b> <input type="text" value="select a Gender"/>	<b>Hair Style</b> <input type="text" value="select a Hair Style"/>	<b>Beard Style</b> <input type="text" value="select a Beard Style"/>
<b>Sexual Orientation</b> <input type="text" value="select a Sexual Orientation"/>	<b>Hair Comments</b> <input type="text" value="enter a new Hair Comments"/> - +	<b>Beard Comments</b> <input type="text" value="enter a new Beard Comments"/> - +
<b>Weight (lbs)</b> <input type="text" value="enter a new Weight (in lbs)"/> - +	<b>Build</b> <input type="text" value="select a Build"/>	<b>Eye Color</b> <input type="text" value="select a Eye Color"/>
<b>Height (inches)</b> <input type="text" value="enter a new Height (in inches)"/> - +	<b>Race</b> <input type="text" value="select a Race"/>	<b>Eye Comments</b> <input type="text" value="enter a new Eye Comments"/> - +
	<b>Ethnicity</b> <input type="text" value="enter a new Ethnicity"/> - +	

| [Cancel](#)

# Semantics dictate how users link pages

The screenshot displays the TANGO web application interface. At the top, the TANGO logo is on the left, and the user is logged in as 'admin' with links for 'Home' and 'logout'. A search bar contains 'All Tango' and a 'Go' button. Navigation links for 'Browse Pages' and 'Browse Smart Lists' are also present. Below the search bar, there are links to 'Star this page' and 'Delete this page'.

## Person: Badr Ali Badr

The main content area features a tabbed interface with the following sections:

- Person** (selected)
- Details**
- Associations**
- Cell Phone Call Plot**
- Files**
- Notes**

Four data boxes are displayed in a 2x2 grid:

- Phones (IMEI) associated with this person:** none. Includes an input field: "add a new Phone (IMEI)".
- Member of these Organizations:** none. Includes an input field: "add a new Organization".
- Associated Facilities:** none. Includes an input field: "add a new Facility".
- Family Members:** none. Includes an input field: "add a new Family Member".

On the right side, there are three utility panels:

- Actions on this page:** Includes "Email you when page changes" and "Add an Action (coming soon)".
- Tag this page:** Includes "Add a Tag".
- Special Pages:** Includes "Upload a file" and "Bulk data load".
- Administrator Options:** Includes "edit your profile", "configure Tango", and "view / add users".

# ...and users can add their own tags to any page too

The screenshot shows the TANGO web application interface. At the top, it says "logged in as admin" with "Home" and "logout" links. The search bar contains "All Tango" and "enter a page name". Below the search bar, there are "Browse Pages" and "Browse Smart Lists" options. The main content area is titled "Person: Badr Ali Badr" and includes tabs for "Person", "Details", "Associations", "Cell Phone Call Plot", "Files", and "Notes". The profile section shows a photo of a man, a "BWO Status: Black List" badge, and a "Target Status: ? Status not set" indicator. There are buttons for "Upload Photo" and "ON my WatchList [remove]". Below this, there are links for "View call locations in Google Earth", "See all locations", "See locations in last 24 hours", and "See locations in last week". There are also buttons for "Export as GraphML" and "Weighted Call Graph".

The "Phone Call Summary" section is visible below, with a "Sort By:" dropdown set to "Total Calls". It lists several contacts:

- Person : Feroz Majid Ikram**: 2 calls, Last 7 Days Call Activity (1 call to, 1 call from), BWG: Black List, Add this Person to my WatchList.
- Person : Alim Haji Bukari**: 2 calls, Last 7 Days Call Activity (1 call to, 1 call from), BWG: White List, Add this Person to my WatchList.
- Person : Rajaa Sayf**: 2 calls, Last 7 Days Call Activity (2 calls to, 0 calls from), BWG: White List, Add this Person to my WatchList.
- Person : Ali Abu Hamza**: (partially visible)

On the right side of the profile, there are several action boxes:

- Actions on this page**: Includes "Email you when page changes" and "Add an Action (coming soon)".
- Tag this page**: Includes "Add a Tag".
- Special Pages**: Includes "Upload a file", "Bulk data load", and "Administrator Options".

## Tag this page

"known terrorist"

Separate each tag with a space: To create a multi-word tag, use double quotes: "multi word example"

## Tag this page

known terrorist

# Semantics lets users create Smart Lists

The screenshot shows the TANGO web application interface. At the top, the logo "TANGO" is displayed in orange. To the right, the user is logged in as "admin" with links for "Home" and "logout". Below the logo, there is a search bar with the text "Find / Add a page" and a dropdown menu currently set to "All Tango". To the right of the search bar is a text input field labeled "enter a page name" and a "Go" button. Further right are two buttons: "Browse Pages" and "Browse Smart Lists".

The main content area is titled "Browse Smart Lists". Below the title, there is a paragraph: "To create a new **Smart List** go to **Browse Pages**, choose the type of pages you wish and then **Add filters** to narrow the list down to exactly what you want."

There are three columns of links under the heading "Assets":

- Assets**
  - Persons not on any BWG List
  - Persons not on any Target List
  - Persons on Black List Receiving from Facilities on Black List
  - Persons on High Value Target List
  - Persons on the Black List
  - Persons on the Go Target List
  - Persons on the Grey List
- Assets (cont...)**
  - Persons on the Neutral Target List
  - Persons on the Off Limits Target List
  - Persons on the White List
  - Persons on White List Calling from Facilities on Black List
  - All PhoneCalls
  - Phone Calls Mentioning Code Words
  - PhoneCalls Any -> BlackList
- Assets (cont...)**
  - PhoneCalls BlackList -> Any
  - PhoneCalls BlackList -> BlackList
  - PhoneCalls BlackList -> GreyList
  - PhoneCalls BlackList -> WhiteList
  - PhoneCalls GreyList -> BlackList
  - PhoneCalls WhiteList -> BlackList

Below the "Assets" section, there is a section titled "System Smart Lists". A configuration dialog is open, showing the following text: "List each Cell Phone Account (MSISDN) that matches **ALL** of the following rules: (blank values are ignored)".

The dialog has two sections:

- Properties**: A dropdown menu set to "Name", followed by the text "is", and an empty text input field. There are minus and plus icons to the right.
- Links**: A dropdown menu set to "Any Link to...", followed by the text "this page...", and an empty text input field. There are minus and plus icons to the right.

At the bottom of the dialog, there is a text input field labeled "name of smart list" and two buttons: "Create Smart List" and "View Results of Rules".



# Semantics help find likely people

- **Tango App runs multiple weighted local queries and scores results**

- Persons Associated With Call Sign (Exact Match)
- Persons Associated With Call Sign (Sounds Like)
- Persons Associated With Call Sign (String Contains)
- Persons By Name (Sounds Like)
- Persons By Name (String Contains)
- Persons Linked to IMSI
- Persons Linked to IMEI
- Persons Linked to MSISDN

Find Person(s) to attach as originator of this Phone Call

Search (view people on your WatchList, let Tango find likely people, or run a search)

My WatchList | Find Likely People | Mohammed | Search

Results (Persons already linked to the call are in bold):

Rank	Person	Score	Hits	Reason(s)	Link to this Call
1	Abu Karim bin Mohammed Al Tikriti	0.7	2	Finds persons given a full or partial name	☆☆☆☆
2	Ali Muhammad Ata	0.6649999999999999	1	Finds persons given a full or partial name	☆☆☆☆

Create an 'Unknown' Person | Link this call to a new Unknown person (you can update properties of that person as you gain information)

# Establish identity of caller by provided call sign

- Operators link devices to people
- Tango automatically links people to call ends
- Tango searches call transcripts of linked calls
- Tango returns likely people

The screenshot shows the Tango web interface. At the top, the Tango logo is on the left, and the user is logged in as 'admin'. A search bar contains 'All Tango'. Below the header, the page title is 'Phone Call: TEST-IMSI-2 call to TEST-IMSI-1 at 2008-09-27T19:16:30.000-04:00'. The main content area is divided into sections: 'Originator' (IMSI: TEST-IMSI-2, Call Sign: Oncle), 'TACREPs' (none), and 'Gist' (transcript of a conversation). A modal window titled 'Find Person(s) to attach as originator of this Phone Call' is open, showing search results for the call sign 'Oncle'. The results table lists two people: All Abu Hanza and Rajaa Sayf, both with a score of 0.85 and one hit. The reasons for the links are 'Person linked to Call Sign that sounds like search term'. The modal also includes a search bar, a 'Search' button, and a 'Create an Unknown Person' button.

logged in as: admin Home logout

Find / Add a page All Tango enter a page name Go Browse Pages Browse Smart Lists

Star this page Delete this page

Phone Call: TEST-IMSI-2 call to TEST-IMSI-1 at 2008-09-27T19:16:30.000-04:00

Phone Call Notes Exports

Originator

IMSI  
TEST-IMSI-2

Call Sign  
Oncle

Attach a Person as Originator

TACREPs  
none

Create a TACREP

Gist  
TX: Trouble at mill.  
RX: Oh no. What sort of trouble?  
TX: One on't cross beams gone owt askew on treddle.  
RX: Pardon?  
TX: One on't cross beams gone owt askew on treddle.  
RX: I don't understand what you're saying.  
TX: One of the cross beams has gone out askew on the treddle!!  
RX: Well what on earth does that mean?  
TX: I don't know. Mr Wentworth just told me to come in here and say that there was trouble at the mill, that's all - I didn't expect a kind of Spanish Inquisition.  
RX: Nobody expects the Spanish Inquisition! Our chief weapon is surprise...surprise and fear...fear and surprise.... our two weapons are fear and surprise...and ruthless efficiency.... Our three weapons are fear, surprise, and ruthless efficiency...and an

Find Person(s) to attach as originator of this Phone Call

Search (view people on your WatchList, let Tango find likely people, or run a search)

My WatchList Find Likely People Oncle Search

Results (Persons already linked to the call are in bold):

Rank	Person	Score	Hits	Reason(s)	Link to this Call
1	All Abu Hanza	0.85	1	Person linked to Call Sign that sounds like search term	☆☆☆☆
2	Rajaa Sayf	0.85	1	Person linked to Call Sign that sounds like search term	☆☆☆☆

Create an Unknown Person Link this call to a new Unknown person (you can update properties of that person as you gain information)

Actions on this page  
Email you when page changes  
Add an Action (coming soon)

Tag this page  
Add a Tag

Special Pages  
Upload a file  
Bulk data load

Administrator Options  
edit your profile  
configure Tango  
view / add users

# Users import data from external sources

The screenshot shows the TANGO web application interface. At the top, the user is logged in as alan@semandex.net. The main heading is 'Import Data'. Below this, there is an instruction: 'With this page, you can upload a bulk amount of Tango page properties by a copy-and-paste from programs like Excel or Notepad. List the names for each property in the first row and the values for each page in the rows thereafter.'

**Example:**  
name,iso2,iso3  
United States,US,USA  
Canada,CA,CAN  
Mexico,MX,MEX

Paste your comma delimited or tab delimited data here

With each new page

Add it to your homepage

Tag it  To tag pages with multiple tags, separate with spaces

Pick the Type of data you are importing

- Address
- Affiliation
- Area
- Area Characterization
- Building
- Characterization
- Company
- Course of Action (COA)
- Operation
- Operation Task
- Outsourced Employee
- Path
- Path Finder Task
- Photograph
- Place Type
- POPAccount

The 'DataLoader' dialog box is open, showing a table of imported data:

Name	% Complete	Errors
XmlFile:GraphImporter - system-tangoapp.xml(3223)	100%	1
TextFile:GraphImporter - system-tangoapp.txt(3225)	100%	1
TextFile:GraphImporter - tangoapp-enable.txt(3257)	100%	1
XmlFile:GraphImporter - tangoapp-enable.xml(3255)	100%	0
TextFile:GraphImporter - tangoapp.txt(3243)	100%	1
XmlFile:GraphImporter - tangoapp.xml(3242)	100%	0
TextFile:GraphImporter - system-tangoapp-enable.txt(3233)	100%	1
XmlFile:GraphImporter - system-tangoapp-enable.xml(3222)	100%	1

Loaded 72 of 72 lines for ToriTreeTemplate.xml using data from /tmp/tango-content18819 lines/s, NaN concepts/s; 0 total concepts loaded

# Users are kept always up-to-date

The screenshot displays the TANGO web interface for a Cell Phone Account (MSISDN) 1112223333. The interface includes a top navigation bar with the TANGO logo, a search field, and user information. The main content area is divided into several sections:

- Navigation:** Tabs for "Cell Phone MSISDN", "MSISDN Call Plot", "Associations", and "Notes".
- People who use this account:** A list showing "Ali Jabbar Al-Fulani" with an "add a new Person" button.
- Cell Phones Linked to this Account:** A section with an "add a new Cell Phone" button.
- Made these Calls:** A list of outgoing calls with timestamps, each followed by a "[x]" icon. The list includes calls originating from 1112223333 at various times in 2008. An "add a Call" button is at the bottom.
- Received these Calls:** A list of incoming calls with timestamps and "[x]" icons. The list includes calls received by 1112223333 at various times in 2008. An "add a new Call" button is at the bottom.
- Actions on this page:** Includes "Email you when page changes" and "Add an Action (coming soon)".
- Tag this page:** Includes an "Add a Tag" button.
- Special Pages:** Includes "Upload a file" and "Bulk data load".
- Administrator Options:** Includes "edit your profile", "configure Tango", and "view / add users".

At the bottom of the page, the text "©2008 Semandex Networks" is visible.

# Event pages are automatically created

logged in as **admin** [Home](#) [logout](#)

**TANGO** Find / Add a page    [Browse Pages](#) [Browse Smart Lists](#)

[★ Star this page](#) [🗑 Delete this page](#)

## Phone Call: 9643871575229 call to 9643871578904 at 113400Z

**Phone Call** [Notes](#)

<b>Originator</b>	<b>Receiver</b>
MSISDN <a href="#">9643871575229</a>	MSISDN <a href="#">9643871578904</a>
<b>Call Sign</b> - DataLoader	<b>Call Sign</b> <b>Khalifa</b> - DataLoader
<input type="button" value="Attach a Person as Originator"/>	<input type="button" value="Attach a Person as Receiver"/>

**TACREPs**

[68cb911b-b285-4d10-b9c1-e7f81e2a7430](#)

**Actions** on this page

- [Email you when page changes](#)
- [Add an Action \(coming soon\)](#)

**Tag** this page

[Add a Tag](#)

**Special Pages**

- [Upload a file](#)
- [Bulk data load](#)

**Administrator Options**

- [edit your profile](#)
- [configure Tango](#)
- [view / add users](#)

**Gist**

TX: Khalifa, my sister is missing. Have you seen her?  
RX: No.  
TX: I don't know where she is.  
RX: Can you ask around?  
TX: Yes I will.  
RX: Thank you. I'm so worried with all that's going on that someone may have her.  
TX: Do you think the Americans might have her?  
RX: They might, but I don't think so they usually take people at night. He disappeared during the day.  
TX: Do you think the insurgents have her?  
RX: I don't know. That's why I'm asking around.  
TX: She could be at the market.  
RX: Maybe, I haven't checked there yet.  
TX: Yeah, she's probably there.  
RX: I will check. Thank you. Ma'as salaama.  
TX: Ma'as salaama.

- DataLoader



# Users set and receive alerts for when new data is added


logged in as **admin** Home logout

**TANGO** Find / Add a page All Tango enter a page name Go Browse Pages Browse Smart Lists

★ [remove star] Delete this page

## Person: Abdul Quddus Al-Kabir

Person Details Associations Cell Phone Call Plot Files Notes



Upload Photo

BWG Status:  
**Not Set**  
(click to set)

Target Status:  
**? Status not set**

Add Abdul Quddus Al-Kabir to my WatchList

View call locations in Google Earth

- See all locations
- See locations in last 24 hours
- See locations in last week

Export as GraphML

Weighted Call Graph

### Phone Call Summary

There are no phone calls on record for Abdul Quddus Al-Kabir

### Actions on this page

- Email you when page changes
- Add an Action (coming soon)

### Tag this page

Add a Tag

### Special Pages

- Upload a file
- Bulk data load

### Administrator Options

- edit your profile
- configure Tango
- view / add users

# Analysts workflow is captured linking widgets together



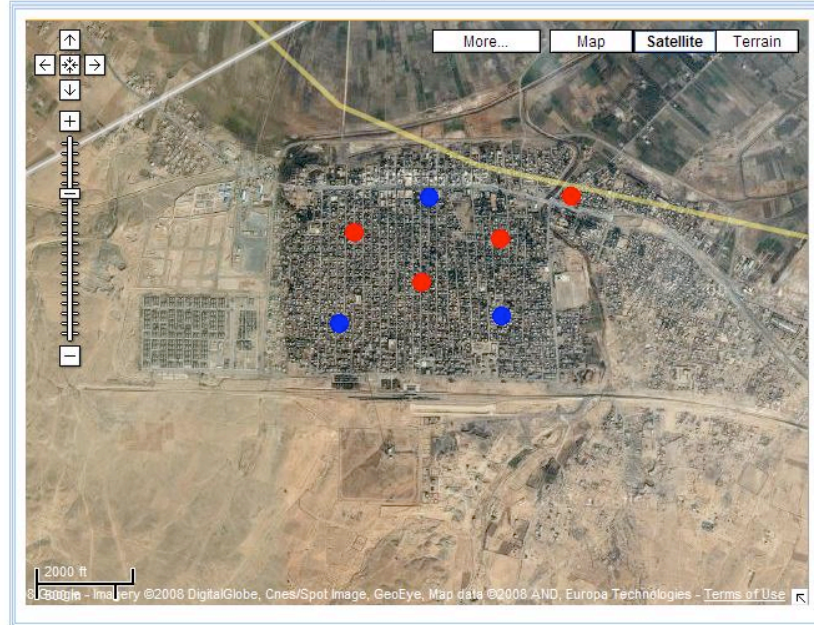
Homepage: admin

[edit your profile](#) | [configure Tango](#) | [view / add users](#) | [view Tango status](#)

[Add a widget to your homepage](#)

Tagged with "Homepage"

Page	Last Updated
Judicial Acts	Today
Criminal Acts	Today



Page	Last Updated
Assault & Battery	Today
Burglary	Today
Murder	Today
Burglary	Today
Detainment	Today
Arrest	Today
Detainment	Today
Indictment	Today

Page	Last Updated
Assault & Battery	Today
<b>Perpetrator(s):</b> Hakim Farook Al-Mouniri	
<b>Victim(s):</b> Saad 'Abd Al-Tahiti	
<b>Description:</b> Hakim struck Saad in the head with a hand tool (shovel) during an argument over farmland boundaries and grazing rights. Minor injuries including a cut on left temple, bruising and a large welt.	



# Semantics facilitate location-based analysis



# Event-based architecture supports time-based analysis

TANGO

logged in as **admin** [Home](#) [Logout](#)

Find / Add a page  enter a page name  [Browse Pages](#) [Browse Smart Lists](#)

[Star this page](#) [Delete this page](#)

## Cell Phone Account (MSISDN): 9643872693643

Cell Phone MSISDN
**MSISDN Call Plot**
Associations
Notes

2300							
2200							
2100							
2000							
1900							
1800							
1700							
1600							
1500							
1400							
1300							
1200							
1100			4	4		1	
1000							
0900							
0800							
0700							
0600							
0500							
0400							
0300							
0200							
0100							
0000							
	Sun	Mon	Tue	Wed	Thu	Fri	Sat

**Call Filter**

Start Date:  End Date:

**Call End Points**

Select / Unselect All Any BWG Both call ends

<input checked="" type="checkbox"/> Cell Phone Account (MSISDN): 9643871578734	Unknown	1 call(s) from	0 call(s) to
<input checked="" type="checkbox"/> Person: Badr Ali Badr	White List	0 call(s) from	1 call(s) to
<input checked="" type="checkbox"/> Cell Phone Account (MSISDN): 9643873156380	Unknown	2 call(s) from	1 call(s) to
<input checked="" type="checkbox"/> Cell Phone Account (MSISDN): 9643872219175	Unknown	0 call(s) from	2 call(s) to
		0 call(s)	1 call(s)

**Actions on this page**

- Email you when page changes
- 

**Tag this page**

- 

**Special Pages**

- Upload a file
- Bulk data load

**Administrator Options**

- edit your profile
- configure Tango
- view / add users

©2008 Semadex Networks



# Users maintain situational awareness over space and time

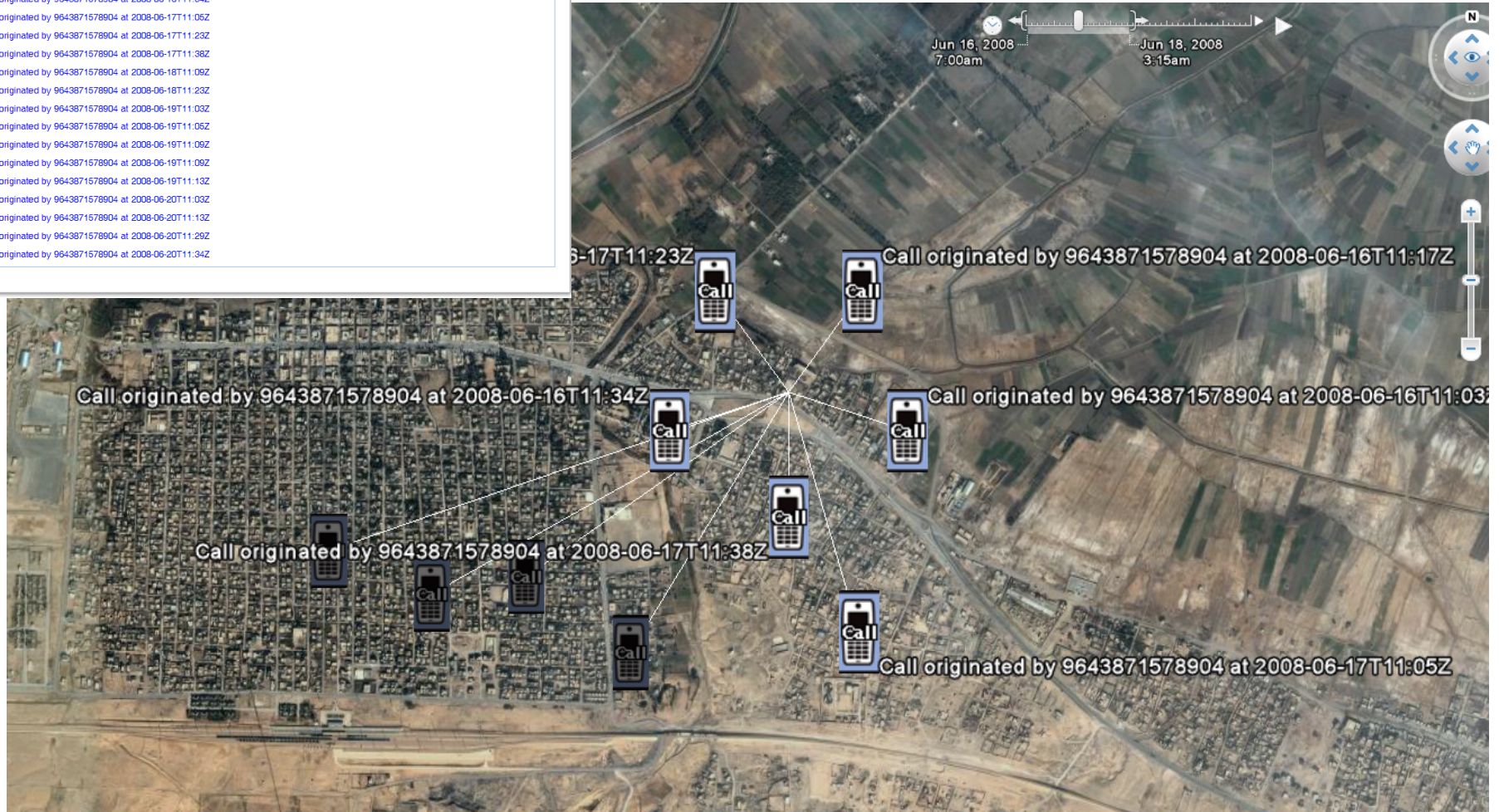
## Smart List: Call Within 0.062 miles of Abdul Quddus Al-Kabir Residence

This is a list of: All Call pages

List | Map View

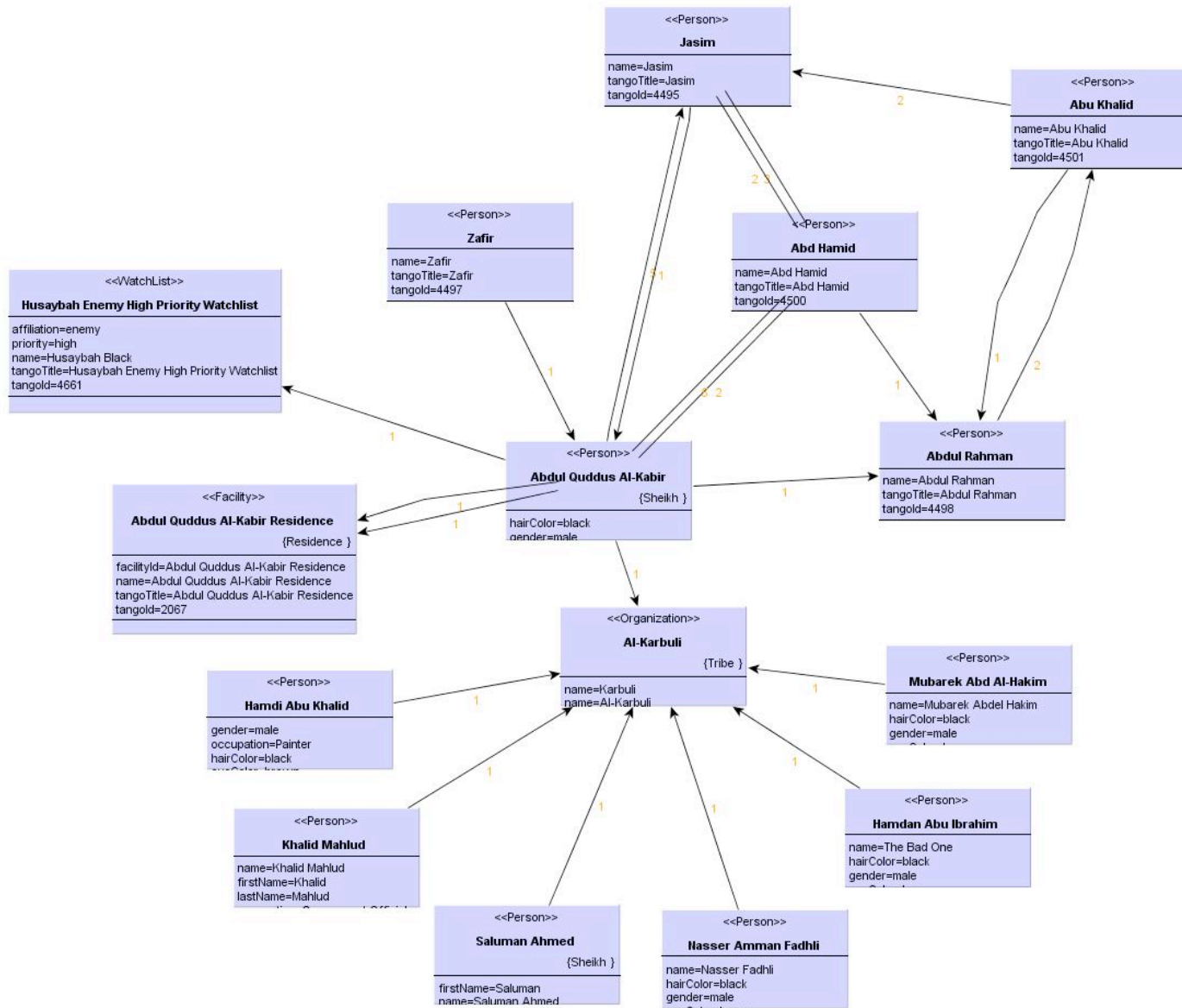
17 Results

- Call originated by 9643871578904 at 2008-06-16T11:03Z
- Call originated by 9643871578904 at 2008-06-16T11:17Z
- Call originated by 9643871578904 at 2008-06-16T11:34Z
- Call originated by 9643871578904 at 2008-06-17T11:05Z
- Call originated by 9643871578904 at 2008-06-17T11:23Z
- Call originated by 9643871578904 at 2008-06-17T11:38Z
- Call originated by 9643871578904 at 2008-06-18T11:09Z
- Call originated by 9643871578904 at 2008-06-18T11:23Z
- Call originated by 9643871578904 at 2008-06-19T11:03Z
- Call originated by 9643871578904 at 2008-06-19T11:05Z
- Call originated by 9643871578904 at 2008-06-19T11:09Z
- Call originated by 9643871578904 at 2008-06-19T11:13Z
- Call originated by 9643871578904 at 2008-06-20T11:03Z
- Call originated by 9643871578904 at 2008-06-20T11:13Z
- Call originated by 9643871578904 at 2008-06-20T11:29Z
- Call originated by 9643871578904 at 2008-06-20T11:34Z



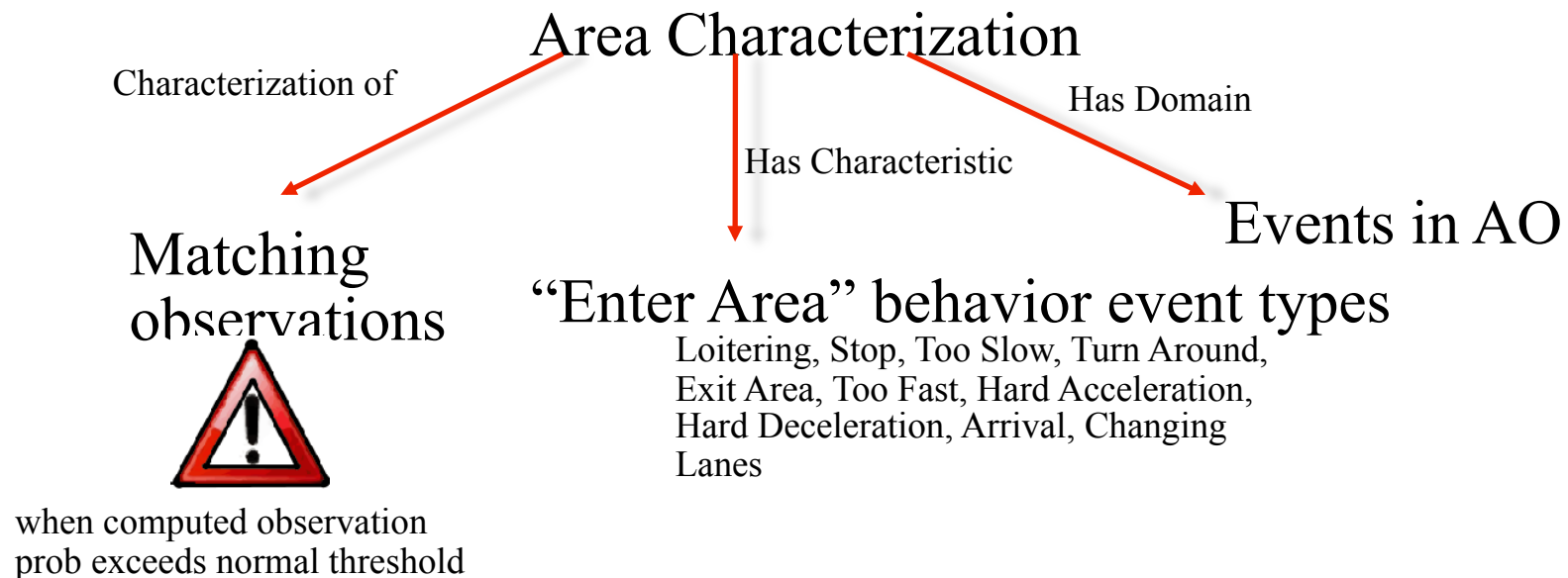


# One-click data export enables association-based analysis



# Contextual Questions for an IED Attack

- How can we counter the same threat in the future?
  - Can we find any patterns that provide future indications, TTPs or related information?



# IED Scenario: Area Characterization Page

## Characterization: Area Characterization

[subscription graphml](#) - [subscription xml](#) - [create radial subscription](#) - [create behavior subscription](#) - [create decomposed behavior subscription](#) - [the matrix](#)  
GraphML: [\(weighted\)](#)

**Page** | Location

Show: [all](#) [properties](#) [links](#) [resources](#) [files](#) [notes](#)

### Properties

---

### Links

Show All Details Add New Link

Page	Page Type	Last Updated
<b>Appears On List</b>		
▶ <a href="#">Subscription for TangoApp Characterizer(Characterization)</a>	List	Today
▶ <a href="#">Subscription for TangoApp VitalSigns(Characterization)</a>	List	Today
<b>Characterization of</b>		
<b>Has Characteristic</b>		
▶ <a href="#">Loitering in AO</a>	List	Today
▶ <a href="#">Stop in AO</a>	List	Today
▶ <a href="#">Too Slow in AO</a>	List	Today
▶ <a href="#">Turn Around in AO</a>	List	Today
<b>Has Domain</b>		
▶ <a href="#">Events in AO</a>	List	Today
<b>Is Of Interest To</b>		
▶ <a href="#">admin</a>	User	Today

### External Resources

Add External Resource

Empty

#### Actions on this page

- Email you when page changes
- [Add an Action \(coming soon\)](#)

#### Tag this page

- [Add a Tag](#)

#### Export this page

- KML (static)
- KML (live)
- GraphML
- Include historical locations (KML)

#### Special Pages

- [Upload a file](#)
- [Bulk data load](#)

#### Administrator Options

- [edit your profile](#)
- [configure Tango](#)
- [view / add users](#)

# IED Scenario: Area Characterization

## Page Monitoring Events

### Characterization: Area Characterization

[subscription graphml](#) - [subscription xml](#) - [create radial subscription](#) - [create behavior subscription](#) - [create decomposed behavior subscription](#) - [the matrix](#)  
 GraphML: (weighted)

Page
Location

Show: all properties links resources files notes

#### Properties Edit Properties

Name	Tango Sync ID
<b>Area Char</b> - admin	snapshot
Path Finder ID	Tango Title
monitor	<b>Area Char</b> - TangoServer
<b>True</b> - admin	learn
Link Count	<b>True</b> - admin
Last Updated	normalThreshold
Tango ID	
<b>1285</b> - TangoServer	

#### Links Add New Link

Show All Details

Page	Page Type	Last Updated
<b>Appears On List</b>		
Subscription for TangoApp Characterizer(Characterization)	List	Today
Subscription for TangoApp VitalSigns(Characterization)	List	Today
<b>Characterization of</b>		
EnterArea for Sedan #1 at 2008-04-18T16:35:21.630-05:00	Enter Area	Saturday
EnterArea for Truck #1 at 2008-04-18T16:34:21.630-05:00	Enter Area	Saturday
EnterArea for Truck #2 at 2008-04-18T16:34:21.630-05:00	Enter Area	Saturday
EnterArea for Truck #3 at 2008-04-18T16:34:21.630-05:00	Enter Area	Saturday

#### Actions on this page

- Email you when page changes
- Add an Action (coming soon)

#### Tag this page

[Add a Tag](#)

#### Export this page

- KML (static)
- KML (live)
- GraphML
- Include historical locations (KML)

#### Special Pages

- Upload a file
- Bulk data load

#### Administrator Options

- edit your profile
- configure Tango
- view / add users

# IED Scenario: Area Characterization With Profiled Events Detected



logged in as, admin Home Logout

Find / Add a page  Go

Browse Pages | Browse Smart Lists

★ [remove star] Delete this Page

## Characterization: Area Characterization

[subscription graphml](#) - [subscription xml](#) - [create radial subscription](#) - [create behavior subscription](#) - [create decomposed behavior subscription](#) - [the matrix](#)

GraphML: [\(weighted\)](#)

Page Location

Show: all properties links resources files notes

Properties

Links

Show All Details Add New Link

Page	Page Type	Last Updated																														
<p>Appears On List</p> <ul style="list-style-type: none"> <li>Subscription for TangoApp Characterizer(Characterization) List Today</li> <li>Subscription for TangoApp VitalSigns(Characterization) List Today</li> </ul>																																
<p>Characterization of</p> <ul style="list-style-type: none"> <li>TurnAround for Sedan #1 at 2008-04-18T16:36:21.630-05:00 TurnAround Today</li> <li>TooSlow for Sedan #1 at 2008-04-18T16:35:51.630-05:00 Too Slow Saturday                             <table border="1"> <thead> <tr> <th>Role</th> <th>Start Date</th> <th>End Date</th> </tr> </thead> <tbody> <tr> <td>0.01282051282051282</td> <td>--</td> <td>--</td> </tr> </tbody> </table> </li> <li>Stop for Truck #1 at 2008-04-18T16:34:51.630-05:00 Stop Saturday                             <table border="1"> <thead> <tr> <th>Role</th> <th>Start Date</th> <th>End Date</th> </tr> </thead> <tbody> <tr> <td>0.038461538461538464</td> <td>--</td> <td>--</td> </tr> </tbody> </table> </li> <li>Stop for Truck #2 at 2008-04-18T16:34:56.630-05:00 Stop Saturday                             <table border="1"> <thead> <tr> <th>Role</th> <th>Start Date</th> <th>End Date</th> </tr> </thead> <tbody> <tr> <td>0.038461538461538464</td> <td>--</td> <td>--</td> </tr> </tbody> </table> </li> <li>Stop for Truck #3 at 2008-04-18T16:35:01.630-05:00 Stop Saturday                             <table border="1"> <thead> <tr> <th>Role</th> <th>Start Date</th> <th>End Date</th> </tr> </thead> <tbody> <tr> <td>0.038461538461538464</td> <td>--</td> <td>--</td> </tr> </tbody> </table> </li> <li>Loitering for Farmer at 2008-04-18T16:33:51.630-05:00 Loitering Saturday                             <table border="1"> <thead> <tr> <th>Role</th> <th>Start Date</th> <th>End Date</th> </tr> </thead> <tbody> <tr> <td>0.01282051282051282</td> <td>--</td> <td>--</td> </tr> </tbody> </table> </li> </ul>			Role	Start Date	End Date	0.01282051282051282	--	--	Role	Start Date	End Date	0.038461538461538464	--	--	Role	Start Date	End Date	0.038461538461538464	--	--	Role	Start Date	End Date	0.038461538461538464	--	--	Role	Start Date	End Date	0.01282051282051282	--	--
Role	Start Date	End Date																														
0.01282051282051282	--	--																														
Role	Start Date	End Date																														
0.038461538461538464	--	--																														
Role	Start Date	End Date																														
0.038461538461538464	--	--																														
Role	Start Date	End Date																														
0.038461538461538464	--	--																														
Role	Start Date	End Date																														
0.01282051282051282	--	--																														

### Actions on this page

Email you when page changes

Add an Action (coming soon)

### Tag this page

Add a Tag

### Export this page

- KML (static)
- KML (live)
- GraphML

Include historical locations (KML)

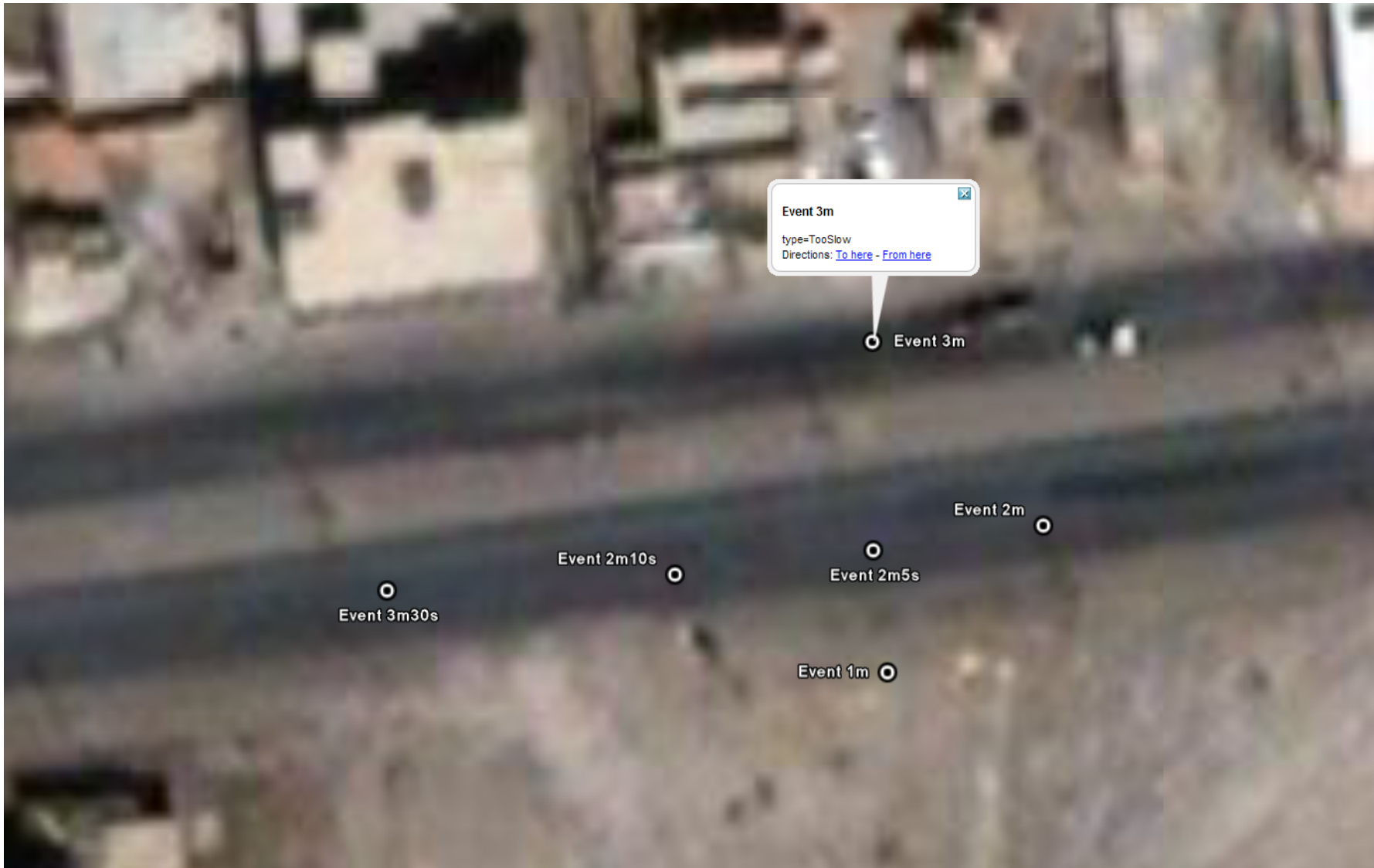
### Special Pages

- Upload a file
- Bulk data load

### Administrator Options

- edit your profile
- configure Tango
- view / add users

# IED Scenario: Pre-Attack Events Detected



# Questions?

POC: Dr. Daniel Reininger  
dan@semandex.net

David Ihrie  
dihrie@semandex.net

