

Process Book (CS171 Project)

Project Title: Ukraine Improvised Explosive Devices

Project Team

Online Studio 3 Group 3

Valérie Lavigne
valelavi@gmail.com



Marius Pang
marius.c.panga@gmail.com



Jayaram Shivas Vadakumpram
shivasj@gmail.com



Team Roles

Team Coordinator: Valérie

- Producing a tasks list in Asana from the assignments for each week and making sure all the work is assigned

Code Collaborator: Shivas

- Setting up and organizing the Github repository
- Overall web app layout and designer

Data Stewart: Marius

- Identifying potentially relevant data from various sources, extracting, translating and transforming it to a format that is consistent and easy to merge with the main dataset.

Alternating Responsibilities

Role shared across team members, one team member volunteers each week:

- Team Submitter: Packaging the week's work and submitting it
- Updating the process book
- Tasks for each week are listed in Asana and each team member volunteers for the tasks he/she wants to do, tasks assignment is also discussed at the weekly meeting
- Updating the various supporting documents is done in a collaborative manner, with each member contributing in an agile way with relevant input.

Project Description

Background and Motivation

Valérie works as a defence scientist for Defence R&D Canada and is the Canadian representative on the NATO Research Task Group IST-141 Exploratory Visual Analytics. Through her work, she was exposed to a dataset and presentation about the Ukraine Improvised Explosive Devices (IED) situation produced by the NATO Counter-IED Center of Excellence (NATO C-IED COE) which is an International Military Organization, multinationally manned and funded by contributions from 9 sponsoring NATO nations (<http://www.coec-ied.es/>). Figures 1 and 2 below show current static visualization employed by the C-IED COE to visualize this data.

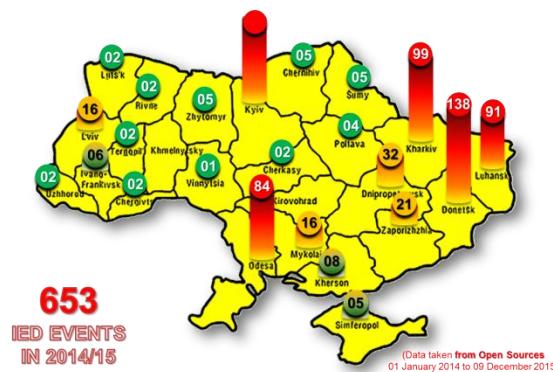


Figure 1: Map of Ukraine IED incidents in 2014-2015.

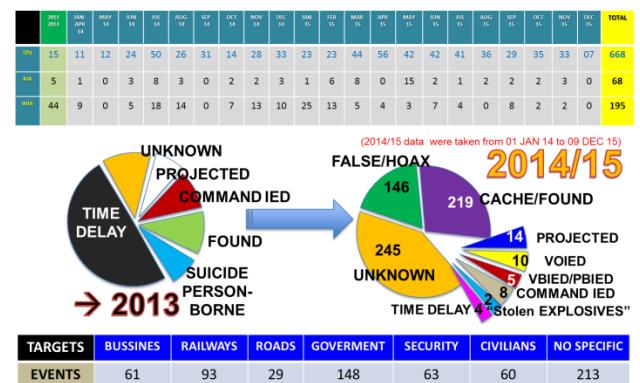


Figure 2: Statistical data about Ukraine IED incidents in 2014-2015.

Valérie, Marius and Shivas agreed that these visualizations could be improved upon using what they learned in the CS171 Visualization class. They decided to take the challenge of creating an interactive visualization for this data. The dataset is interesting because it contains many datatypes (quantitative, geographical, temporal, textual) and it can be augmented using additional data from the web. We intend to share the end result of our project with the NATO C-IED COE.

Project Objectives and Goals

This project will allow the exploration of over 600 Improvised Explosive Devices incidents in Ukraine mostly over the past 2 years for the purpose of highlighting and better understanding the temporal, geographical and political patterns in that data. We will consider additional census data and election statistics to uncover potential regional patterns, as well as publicly available data about the existing conflict in Eastern Ukraine. We intend to employ interactive visualization to generate better insights about the Ukraine IED situation.

Questions

By answering some or all of the questions below, our project aims to provide better insights into the Ukraine IDE situation:

- Is there a temporal pattern in the number of IED incidents?
- Where are the IED incidents located within Ukraine?

- How do the incidents relate to the conflict in Eastern Ukraine? Is there a relation between the number of incidents and the distance to the conflict zone and the political situation?
- Do the ratios of incidents remain stable over time between the different regions? Do the incidents seem to move from one region to another?
- How does the rate of IDE incidents relate to the total number of reported casualties and injuries?
- Do the different types of IEDs have interesting geo-temporal patterns?
- Is the number of incidents correlated with regional census data, more specifically:
 - Are there less or more incidents in Russian speaking regions?
 - Are there less or more incidents in poorer regions?
 - Is there a connections between the incidents and the political allegiance of the regions, according to the 2010 Presidential election data?
- Can we correlate any spikes or patterns in the data with political developments in the conflict (Crimea Annexation, agreed Ceasefire, Ukraine elections ...)
- Is there any additional insight that can be obtained from the free-text incident description field in the main data source?

Tasks

Following is a list of tasks that could be identified in this early phase of the project. As the project progresses, this list will evolve with more tasks being added and some becoming obsolete or irrelevant.

- Data analysis: go over all the candidate data sources and selecting the bits of data that will be relevant to the project
- Data gathering: while our main data source is already in a structured format, the additional sources are not(news articles, PDF files, images). This step involves getting all the relevant data into a structured format (txt or cvs files)
- Data cleaning: make sure the data that has been identified as relevant is in a consistent format. Standardize the handling of incorrect or missing data, as well as any formatting issues
- Data filtering: based on the data analysis outcome, remove any data that is needed for the visualization
- Data model design: identify the JavaScript entities that will contain / reference the source data, and for each such entity define:
 - Relationship with other data (how will it merge with other data)
 - Properties (name and data type) and methods
 - Default sort order

Data

Data Description

NATO Ukraine IED Incidents Data

This is a NATO Unclassified IED events spreadsheet from the NATO C-IED COE. It contains 665 events, with 15 in 2001-2013, about 230 in 2014 and the rest in 2015. It contains the following column headers: Date, Type, KIA (Killed in Action), WIA (Wounded in Action), City, Region, Country, Details, Remarks. There are missing values in the dataset. Table 1 below provides a sample of the data for December 2015.

Table 1: Sample of the Ukraine IED incidents data for December 2015.

DATE	TYPE	K I A	W I A	CITY	REGION	COUNTRY	DETAILS	REMARKS
2015 DEC 09	CACHE/F OUND	0	0	Krama- torsk	DONETSK	UKRAINE	IEDs were found and disposed by Combat Engineers	TBC if they were just landmines
2015 DEC 09	UNK- NOWN	0	0	Kharkiv	KHARKIV	UKRAINE	An IED was blown up in front of a ROSHEN shop	Shopping Center
2015 DEC 08	UNK- NOWN	0	0	Kiev	KIEV	UKRAINE	A device was detonated against a restaurant (L'Kafa)	Boulevard Lesi Ukrainian
2015 DEC 07	HOAX/FA LSE	0	0	Ivano- Frankivsk	IVANO- FRANKIVSK	UKRAINE	Call reporting IED - First Responders action - no explosive	Central Metro/bus sta- tion
2015 DEC 02	CACHE/F OUND	0	0	Kras- noarmiisk	DONETSK	UKRAINE	An IED was found and disposed by EOD	
2015 DEC 02	CACHE/F OUND	0	0	Avdeevka	DONETSK	UKRAINE	A cache with 3 IEDs with TNT was found and cleared	Inside an abandoned house
2015 DEC 02	UNK- NOWN	0	0	Uzhgorod	ZAKAR- PATS'KA	UKRAINE	An IED was detonated against a store in Franko Street	

Ukraine Census Data

We also want to include various statistics about Ukraine to see if we can find patterns between the IED events and these statistics. The data was cleansed and transformed in order to have the same grain and use the same common attributes as our primary data set (the NATO IED dataset). Transformations applied in order to facilitate the data merge with the other datasets: removed irrelevant data from the data set, converted all fields to the correct type, translated the region names to the ones used by the primary data set. The tool used to facilitate these transformations was Microsoft Power BI Desktop Designer.

- 1) Ukraine population by region and settlement type, as per January 1, 2013. The data was obtained from the Ukraine Census website

http://database.ukrcensus.gov.ua/MULT/Database/Census/databasetree_en.asp):

Region	Rural Population	Urban Population	Total Population	Rural Pct	Urban Pct
CHERKASY	649300	753600	1402900	46%	54%
CHERNIHIV	518100	727200	1245300	42%	58%
CHERNIVTSI	549300	373500	922800	60%	40%
CRIMEA	759400	1274300	2033700	37%	63%
DNIPROPETROVSK	607300	2960300	3567600	17%	83%
DONETSK	477500	4363600	4841100	10%	90%
IVANO-FRANKIVSK	816800	593000	1409800	58%	42%
KHARKIV	625500	2288700	2914200	21%	79%
KHERSON	468900	706200	1175100	40%	60%

- 2) Percentage of the Ukraine population that have Russian as their native tongue, as of 2001, from the Ukraine Census website.

Region	Russian Speakers pct
CHERKASY	6.66
CHERNIHIV	10.26
CHERNIVTSI	5.27
CRIMEA	76.55
DNIPROPETROVSK	31.91
DONETSK	74.92
IVANO-FRANKIVSK	1.78

- 3) Ukraine population by region and education level, as of 1989. The data was obtained from the Ukraine Census website:

Region	Have no primary education	Have primary education	Have incomplete secondary education
CHERKASY	6115	49616	112234
CHERNIHIV	5829	55631	119554
CHERNIVTSI	8066	39214	77075
DNIPROPETROVSK	13593	96264	244973
DONETSK	23123	158101	365255
IVANO-FRANKIVSK	10128	58080	103008

Have secondary general education	have incomplete higher education	With higher education	Have vocational education
303899	6449	83259	174145
274914	5641	69288	139274
190552	4912	48489	88589
758944	24173	301055	537767
1043418	28983	347106	747433
277113	6953	80204	145228
617124	27500	313490	365257

- 4) Ukraine population by region and source of income, as of 1989. The data was obtained from the Ukraine Census website:

Region	work in enterprise, organization	work in farm	pension, public assistance	dependant of individuals
CHERKASY	560309	171758	382642	361194
CHERNIHIV	494631	172511	388702	315126
CHERNIVTSI	345132	108218	179730	258798
DNIPROPETROVSK	1811304	151674	768528	978164
DONETSK	2583755	115083	1087434	1328773
IVANO-FRANKIVSK	544690	128203	253116	402271
KHARKIV	1518784	108594	634470	753443
<hr/>				
fellowship	work in cooperative enterprise	work on individual labor contract	working for individual employees	
28353	2506	1007		145
25614	1955	938		96
22139	1980	1315		252
113925	10803	2592		405
133155	10594	3486		520
<hr/>				
	another kind of public support	another source	personal subsidiary economy	
	10935	1273	7231	
	7024	783	5390	
	9028	1181	13028	
	18800	3937	9726	
	33494	6351	9136	

- 5) Ukraine population by region and nationality of income, as of 1989. For this exercise, only the Ukrainian and Russian nationalities were considered. The data was obtained from the Ukraine Census website:

Region	Russians	Ukrainians
CHERKASY	122308	1381742
CHERNIHIV	96562	1292106
CHERNIVTSI	63066	666095
CRIMEA	1629542	625919

Ukraine 2010 Presidential Elections Data

Since the Ukraine started with the removal from power of the previously elected president Viktor Yanukovych, we wish to provide the user with an underlying political map, based on the 2010 presidential elections. The source data has the same geographical grain as our main IED data set (region). Source: <https://commons.wikimedia.org/wiki/User:DemocracyATwork>

Region	Viktor Yanukovyc pct	Yulia Tymoshenko pct
CHERKASY	0.79	1.8
CHERNIHIV	0.48	1.56
CHERNIVTSI	0.48	1.15
CRIMEA	3.22	0.71
DNIPROPETROVSK	4.53	2.1
DONETSK	9.55	0.68
IVANO-FRANKIVSK	0.23	2.87
KHARKIV	4.22	1.33
KHERSON	1.26	0.71
KHMELNYTSKYI	0.75	2.1
KIROVOHRAD	0.8	1.1

Ukraine Map Data

We will use geojson/topojson data about the various regions of Ukraine as we expect some of this information might be displayed on a map. We have found two potentially suitable Ukraine map data files.

Ukraine Conflict Casualties and Injuries Data

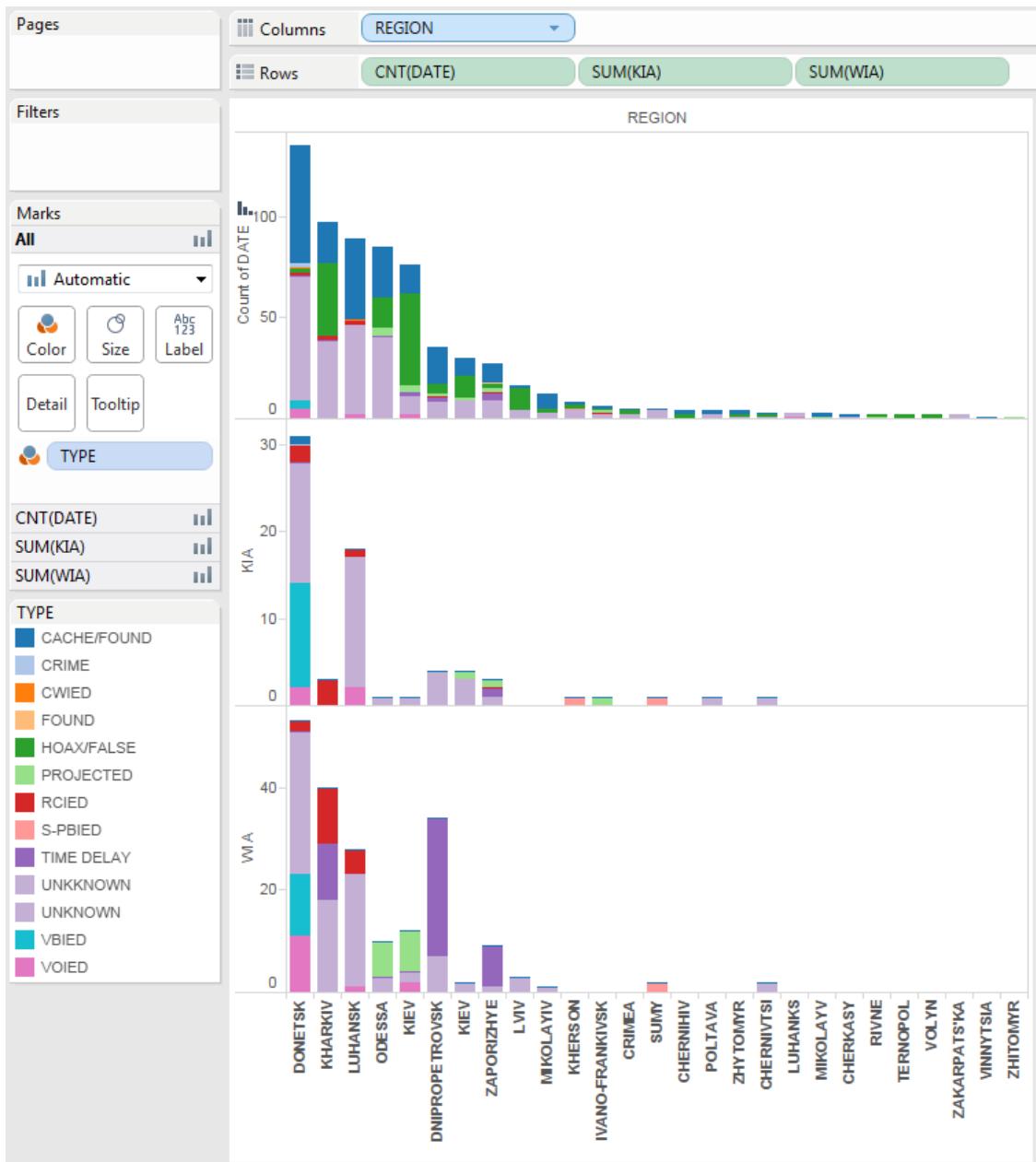
We will consider using this UN report in order to provide additional key facts about the Ukraine conflict (number of casualties and injuries by month), as well as to try to establish a relation between the number of casualties and injuries and the number of IED explosions. The data was available between 16 Feb 2015 and 15 Nov 2015. Source: <http://www.ohchr.org/Documents/Countries/UA/12thOHCHRreportUkraine.pdf>

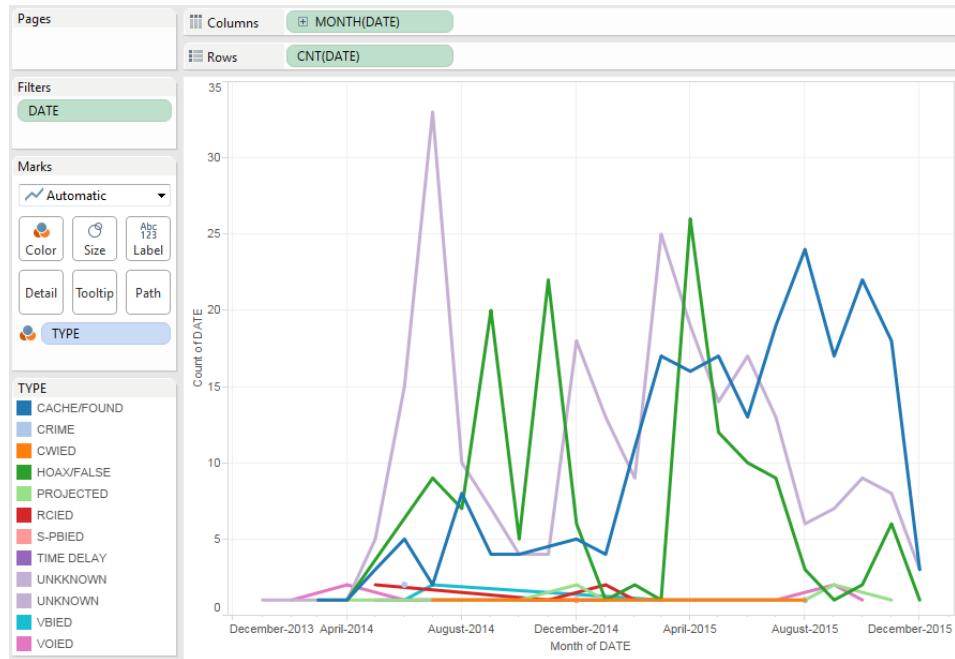
Month	Killed	Injured	Total
Feb-15	17	17	34
Mar-15	24	37	61
Apr-15	9	22	31

Exploratory Data Analysis

Tableau Data Analysis

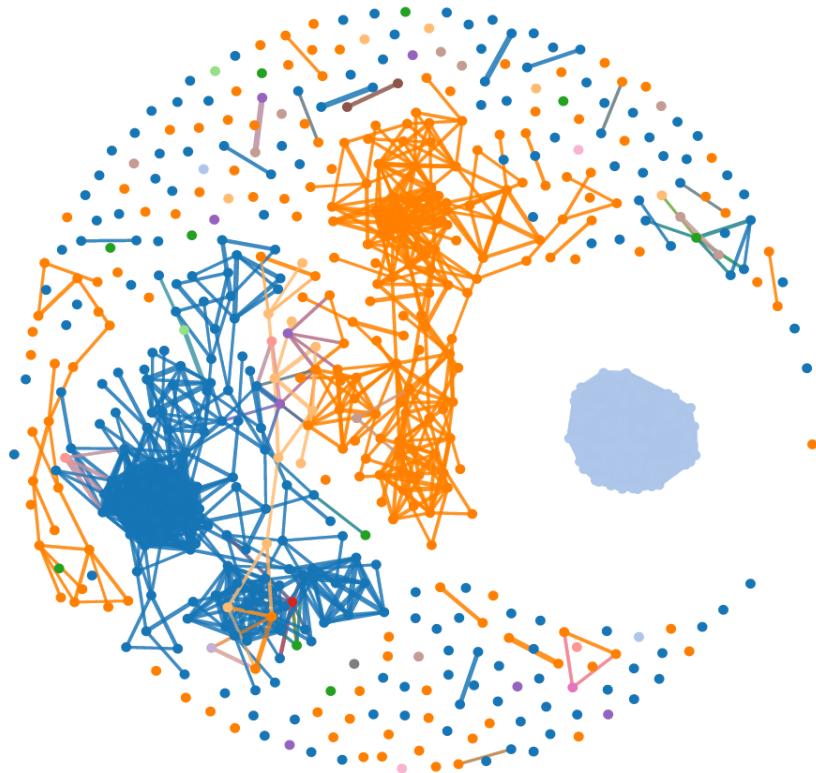
Using Tableau, we explored the number of events, of persons killed and of persons wounded by region. The events are colored by type, which also highlights the presence of data errors like the “UNKNOWN” label. We also explored the number of events happening in the 2014-2015 time period for each event type.





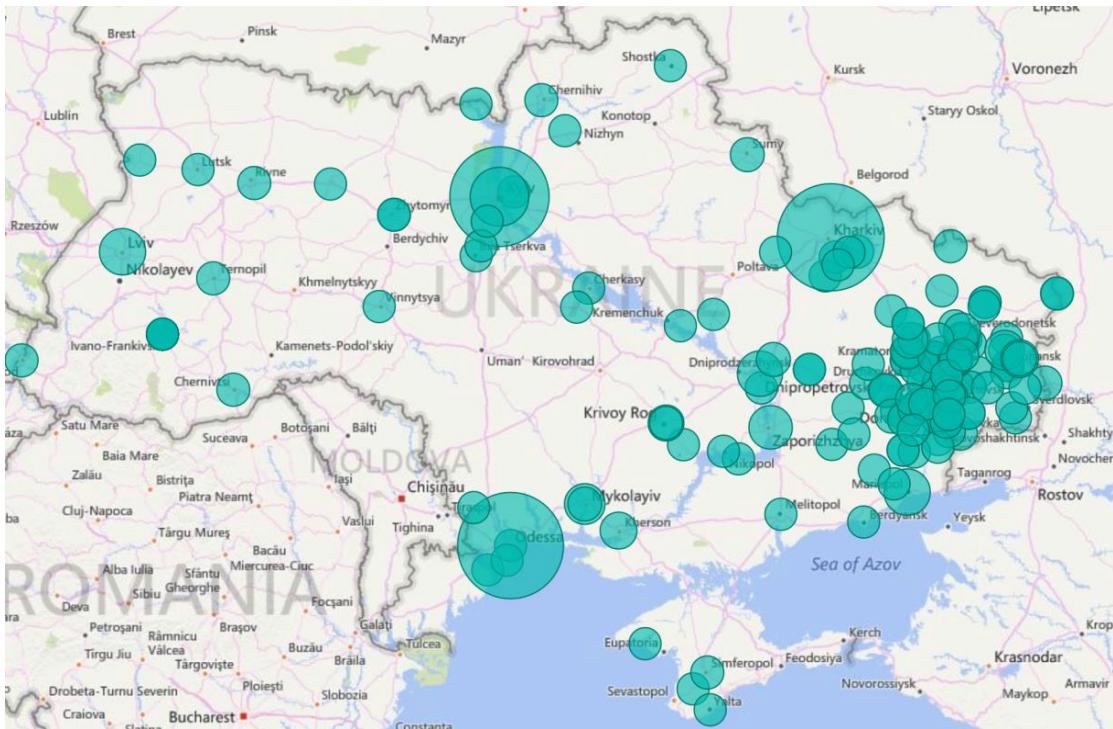
Text Exploration

We produced a force layout to find relationships between the various IED event texts (details and remarks fields) and see the ones which have most unusual words in them.

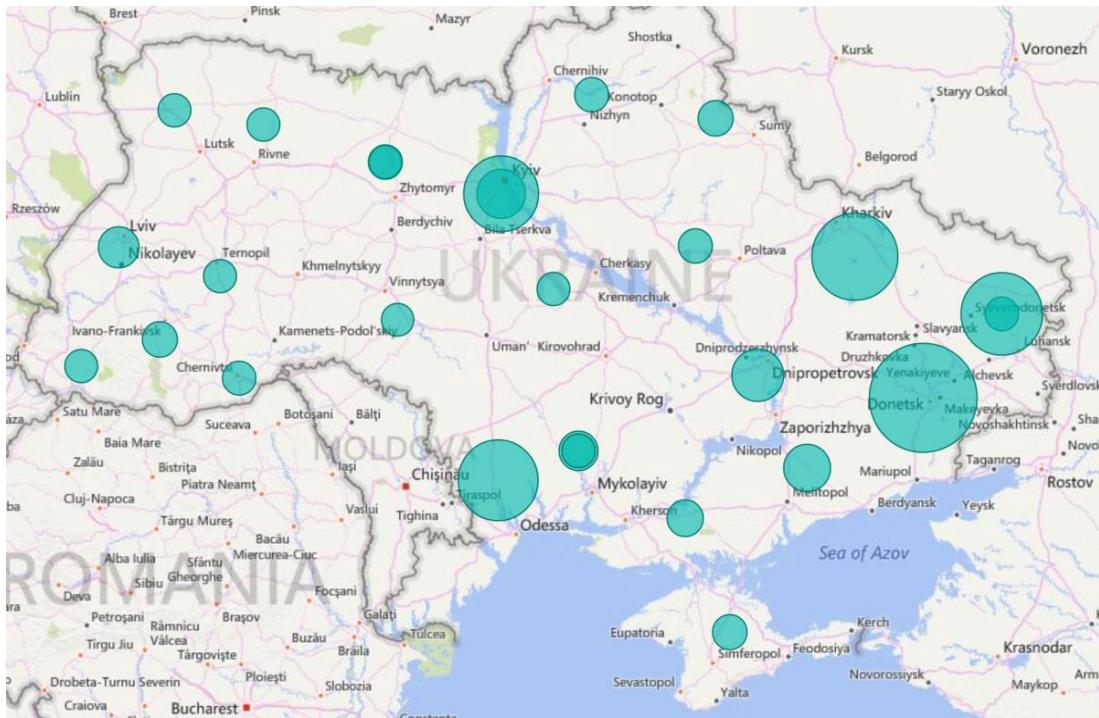


Power BI Map

Using Power BI, we visualized the number of IED events by city and by regions.



IED events by city

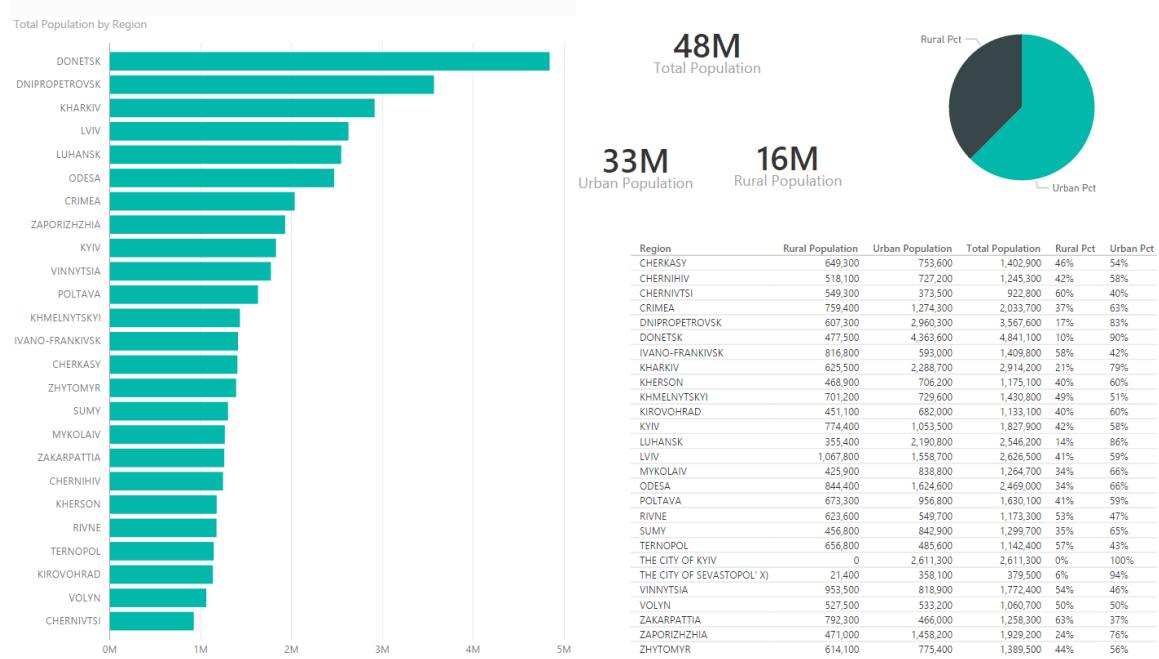


IED events by region

Power BI Statistics

During the data collection exercise we used some graphics to explore and visualize the new dataset, as well as identify some early correlation between this dataset and the IDE dataset:

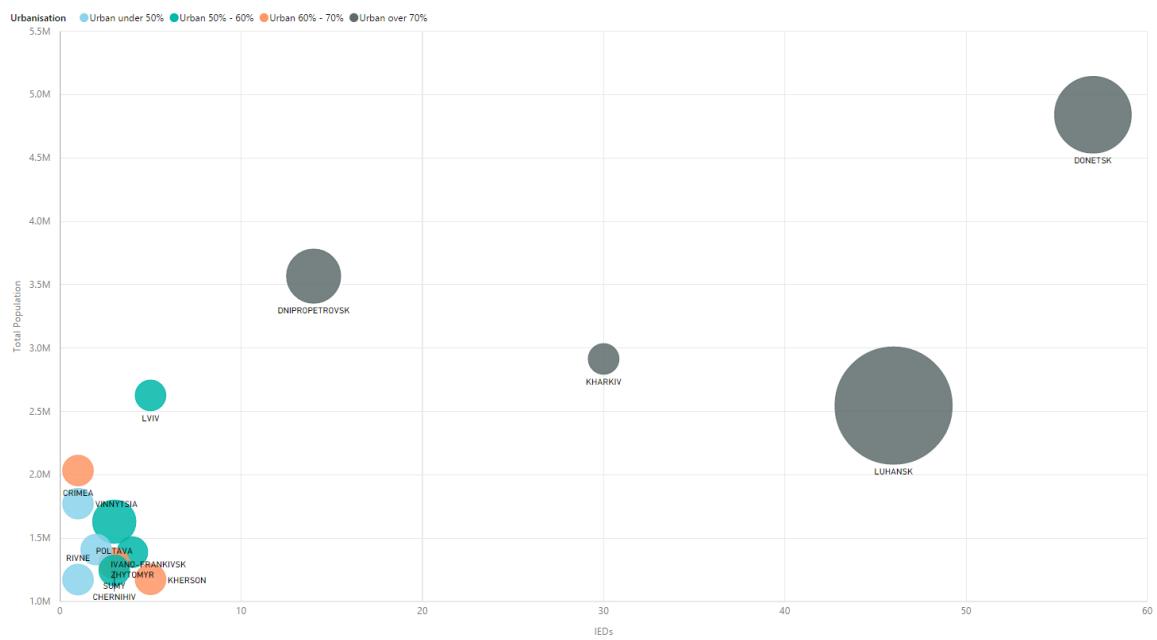
Graphical overview of the population data:



Heat map showing a potential correlation between the population of a region and the number of incidents:



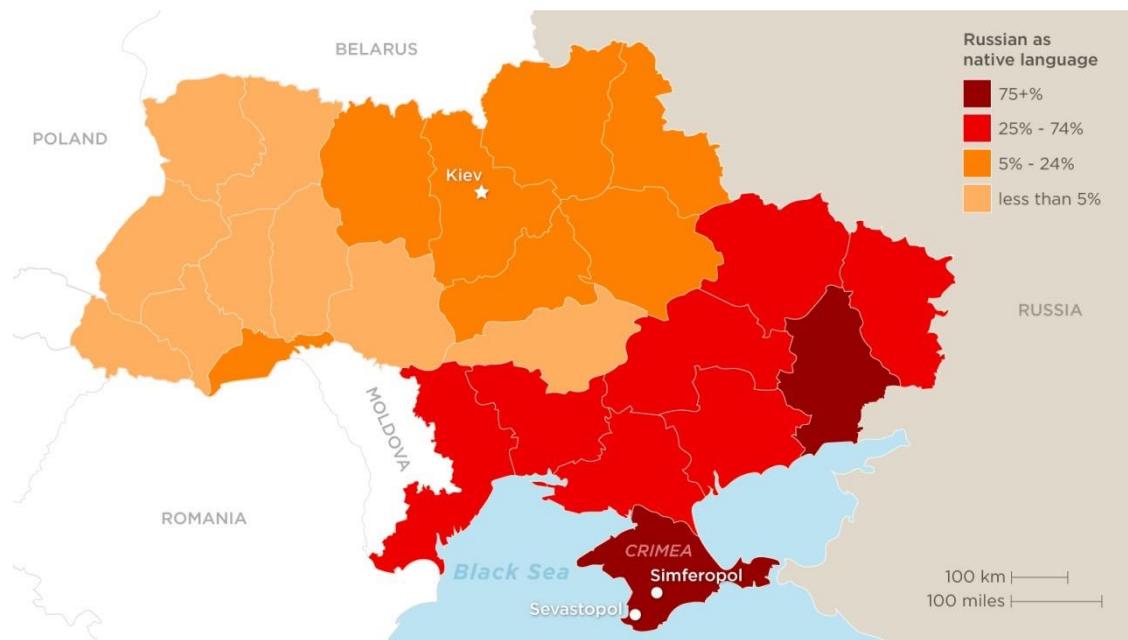
Bubble graph showing regions by number of IDEs, Population and degree of urbanization. The size of the bubbles is the fatalities resulting from the incidents.



Other Sources

Directly on the web, we found a Ukraine map showing the percentage of Russian speakers by regions. This should correspond to the data on language that is available in the Ukraine census data.

<http://www.cnn.com/interactive/2014/02/world/ukraine-divided/>



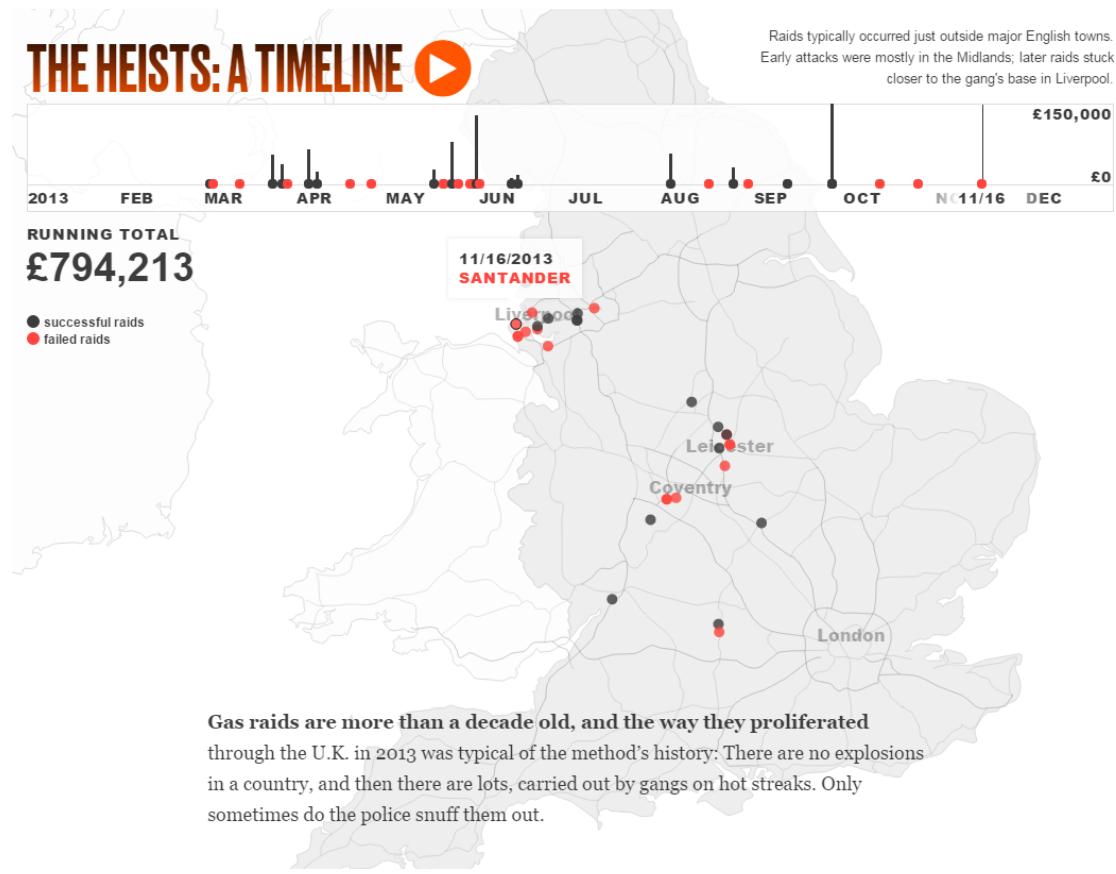
Visualization Design

Inspirations

Map and Timeline

<http://www.bloomberg.com/graphics/2015-atm-bombers/>

This visualization shows the geo-temporal aspects of U.K. ATM bombing incidents. The webpage itself has a very strong storytelling design.

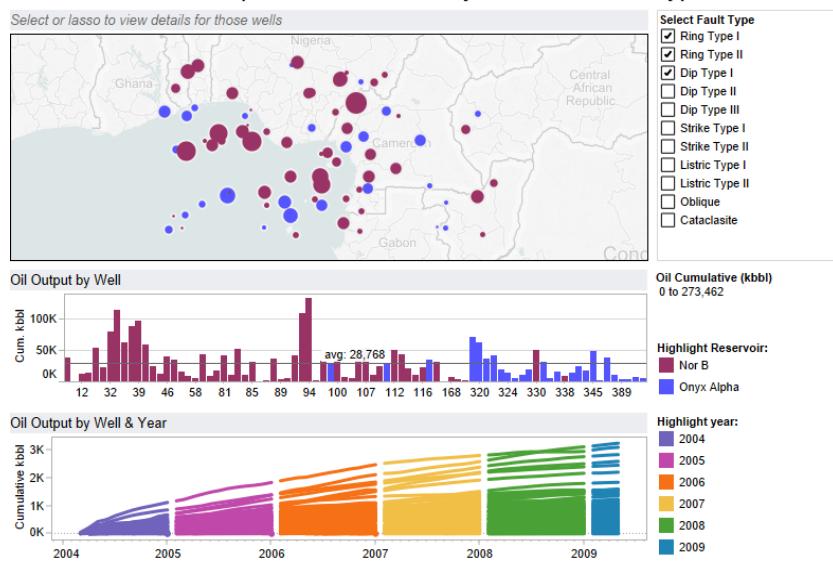


Linked Views

<http://www.kms-world.com/solutions/industries/oil-gas>

This visualization links multiple data aspects together with an interesting use of colors.

Asset Output - Time Trends by Well and Fault Types

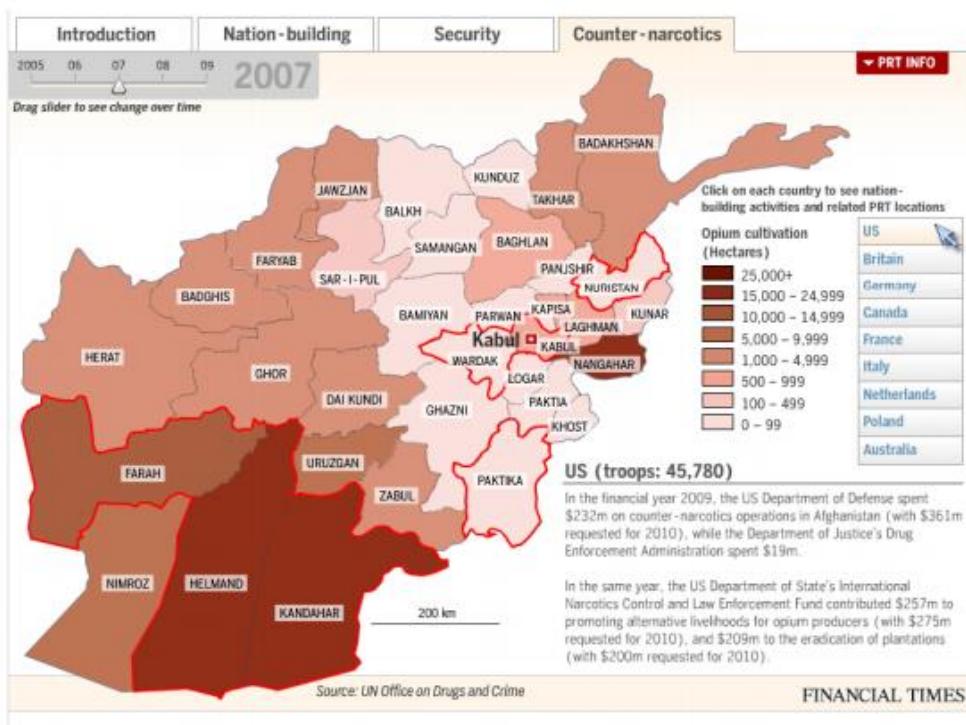


Interactive Storytelling

<http://vis.stanford.edu/files/2010-Narrative-InfoVis.pdf>

This visual does a great job at guiding the reader through the visualization and highlighting key events, while at the same time introducing more context and bridging the gap between story and interactive visual.

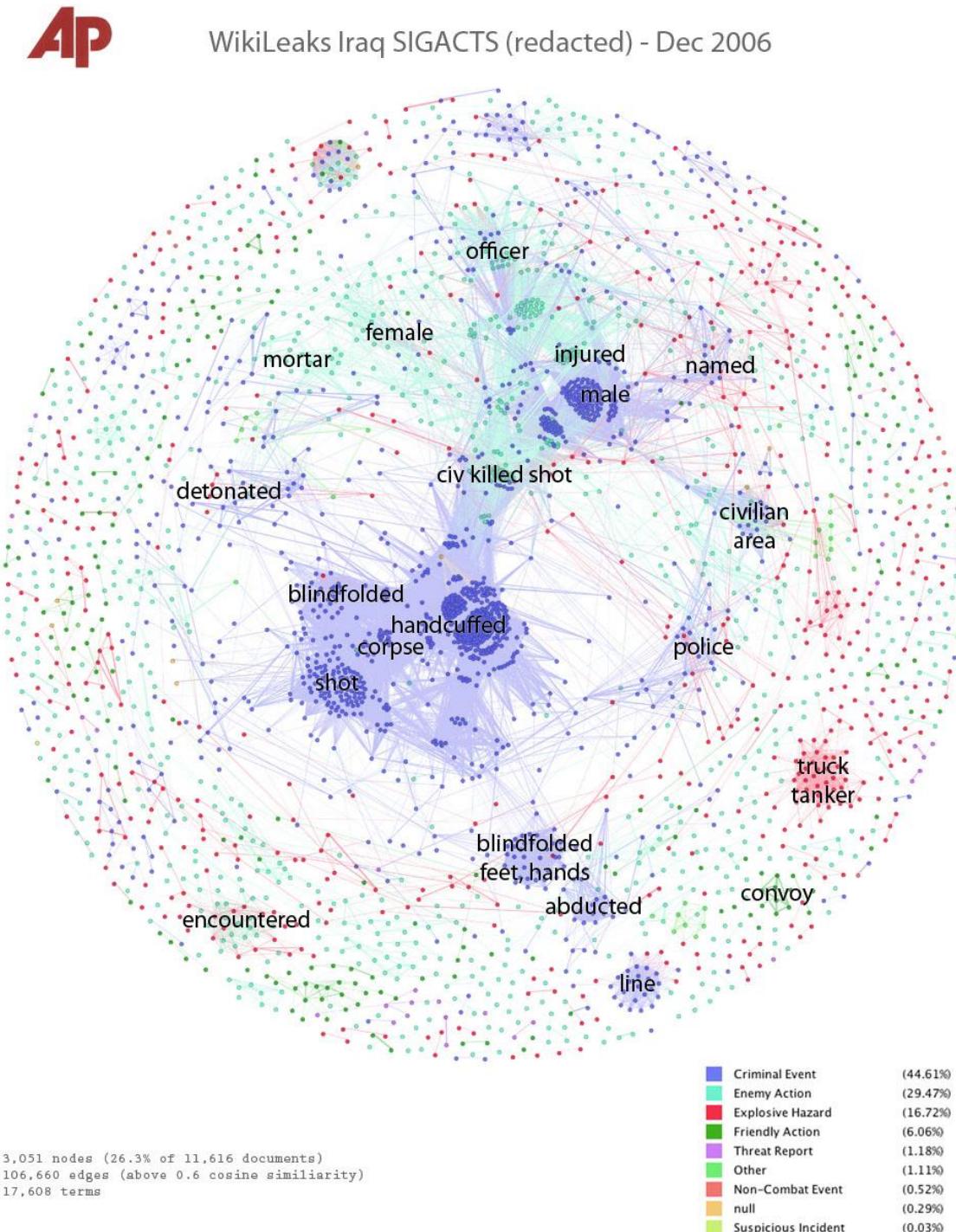
Afghanistan: Behind the Front End. Financial Times



Visualizing Text

<http://jonathanstray.com/a-full-text-visualization-of-the-iraq-war-logs>

This visualization is a great way to look into the logs of text for the various incidents and get insights from textual data. It shows how various incidents could be related.

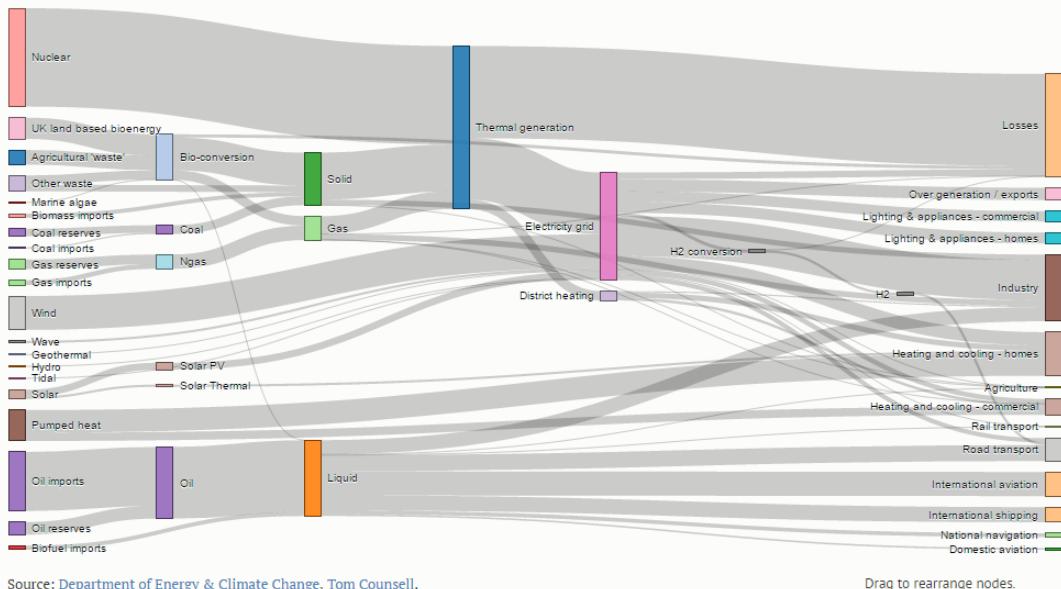


Categorical Data

<https://bost.ocks.org/mike/sankey/>

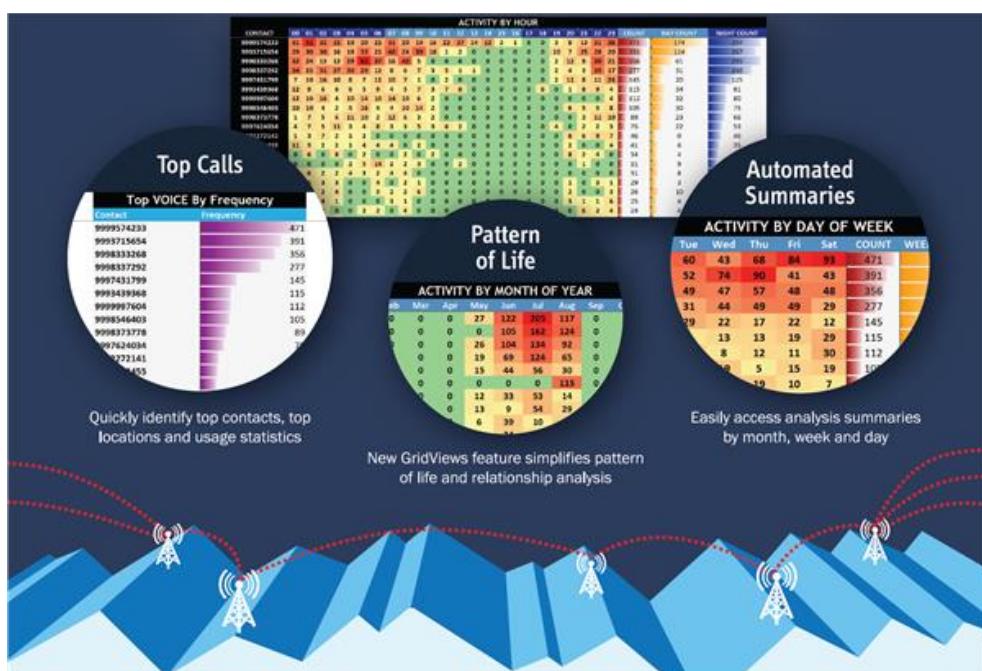
A Sankey diagram of IED events types, regions, cities, numbers of killed victims and wounded persons could show patterns in the data.

Sankey Diagrams



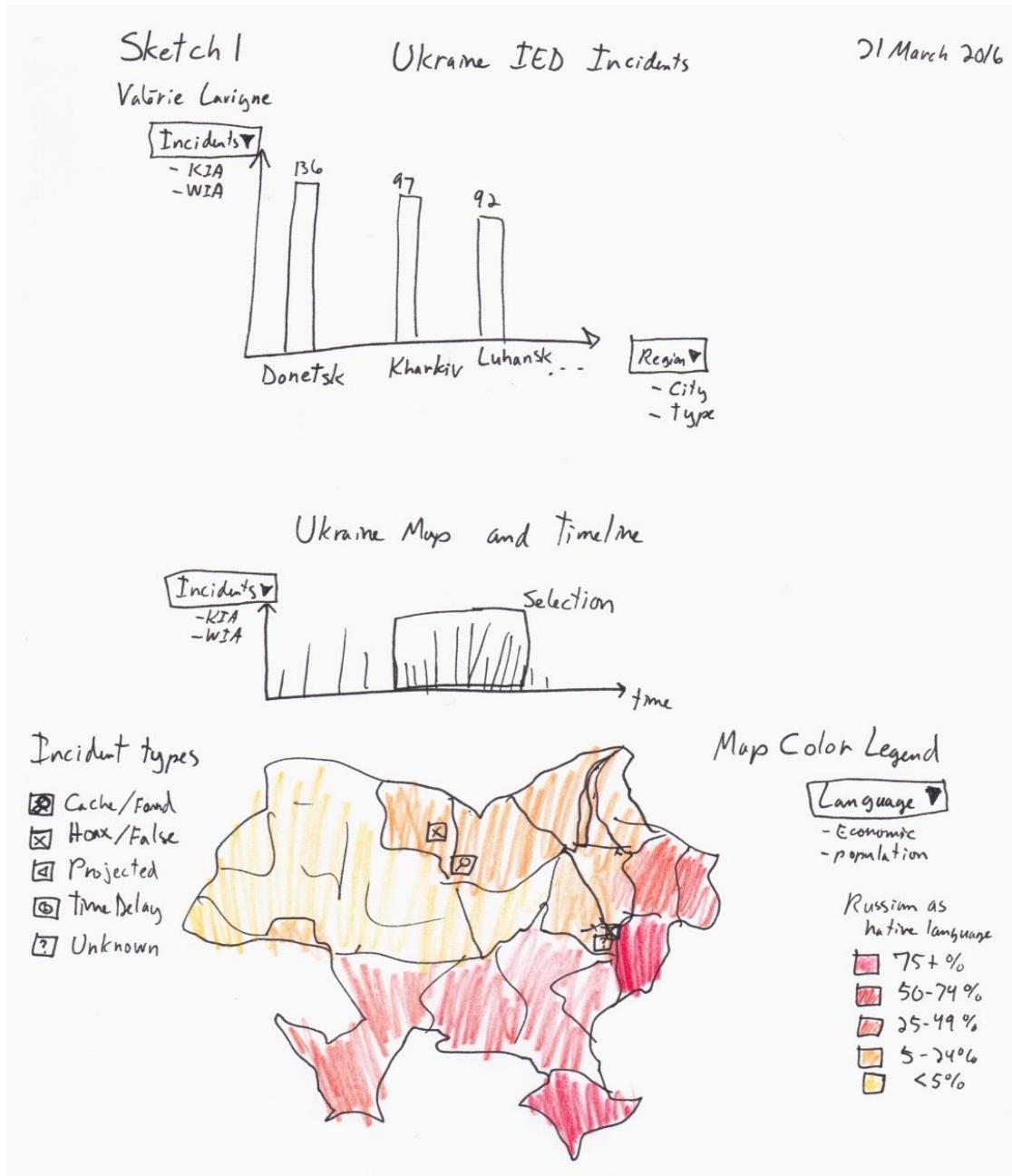
Heat Matrix

[http://www.geotime.com/geotime\(s\).aspx](http://www.geotime.com/geotime(s).aspx)



Design Evolution – First Iteration

First Iteration Sketch 1



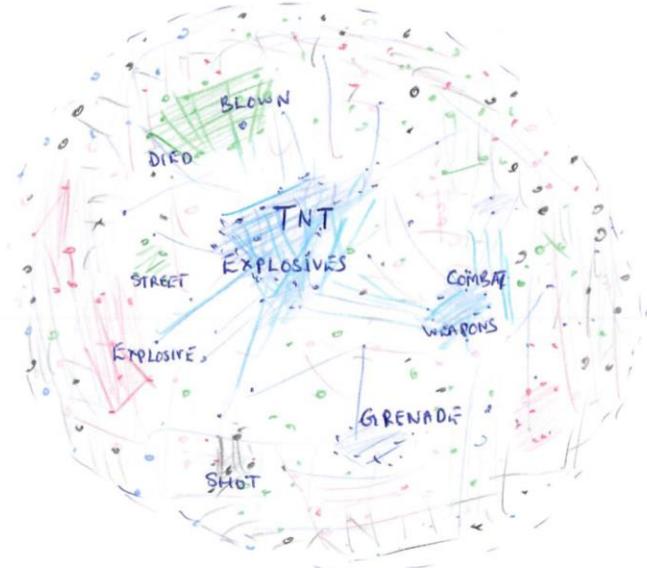
First Iteration Sketch 2



First Iteration Sketch 3

Full Text Viz of Ukraine IED Event Log

- Shiva Jayaram
8/28/2018



Cache/Found	(250)
Hoax/False	(100)
Projected	(75)
Time Dday	(60)
Unknown	(45)

T. Jayaram
Text Nodes positioned Using TF-IDF
650 Nodes
5800 Terms

Design Evolution – Second Iteration

Sketches



Ukraine IED Events - SKETCH1



Feature List

Introduction page

- Produce basic page
- Visualization static map screenshot in the background
- Add high-level KPIs / counters
- Animate high-level KPIs / counters

Map and timeline

- Find a suitable Ukraine geojson/topojson
- Create a basic Ukraine map visualization
- Find the latitude and longitude to associate with each region and city
- Display IED events as color-encoded dots on the map
- Merge data sets about regions information
- Implement map-shaped buttons to allow the user to select a specific overlay for the map (population, education ...)

- Color map regions according to the user selection
- Create a IDE timeline visualization and use that to brush the main map
- Create a total IED events over time bar chart that will also act as a filter for the map
- Add IED events tooltips with more information about the event
- Add region tooltips with more information about the region
- Insert mini version of the secondary visualizations
- Prepare and create a text visualization to help with the guided navigation

Text analysis

- Parse text
- Display a word network
- Add a details view with samples of text with the selected word
- Create the log timeline

Sankey Analysis

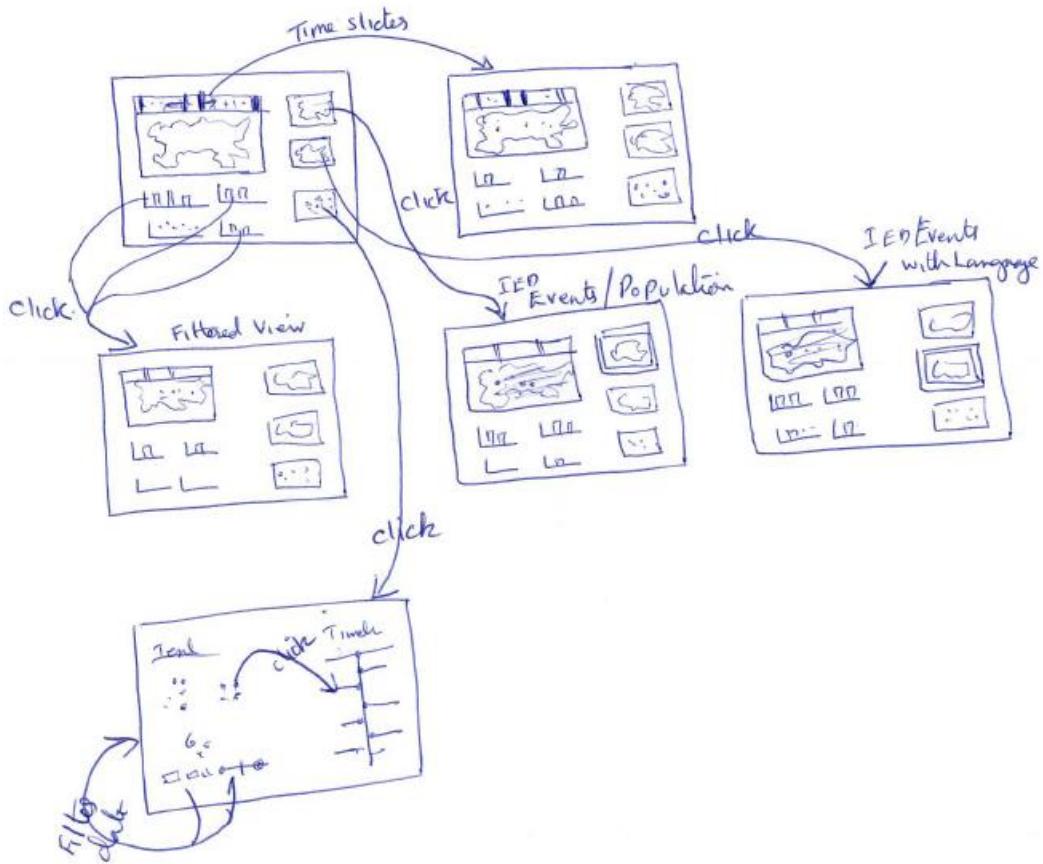
- Produce a Sankey diagram with the IED events data
- Produce additional Sankey diagrams showing other relations within the data

Storytelling

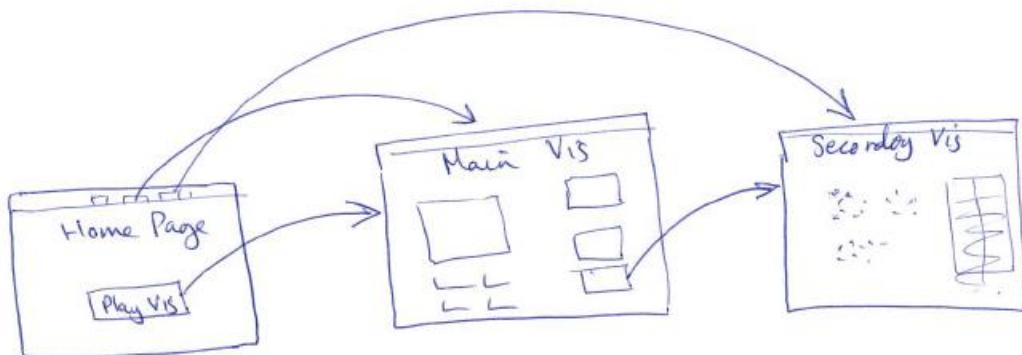
- Produce the overall webpage layout frame
- Decide on a guided exploration flow

Storyboard

Story board - (visualization).

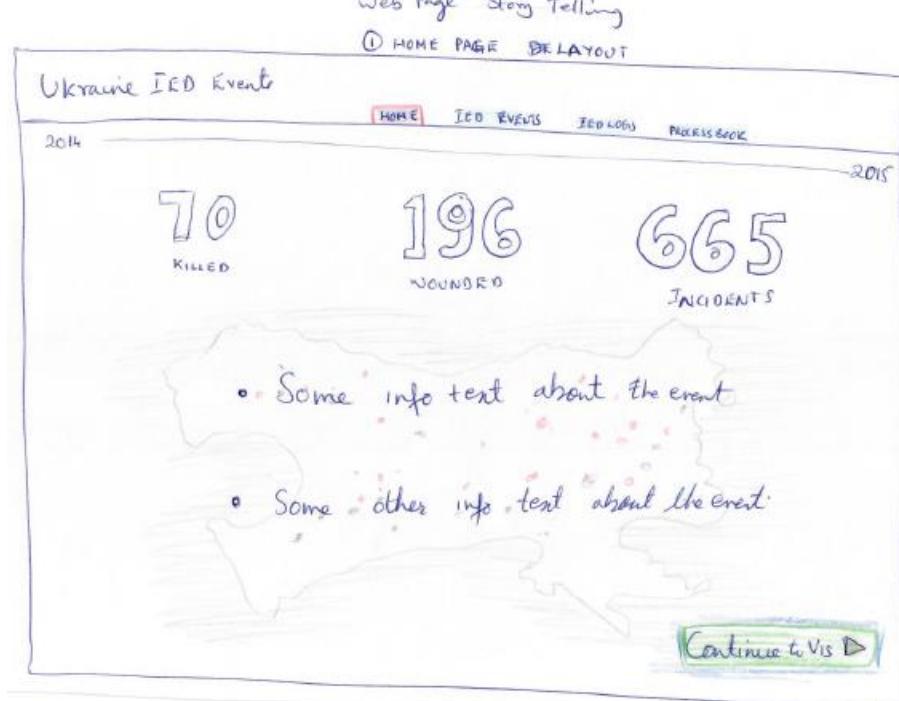
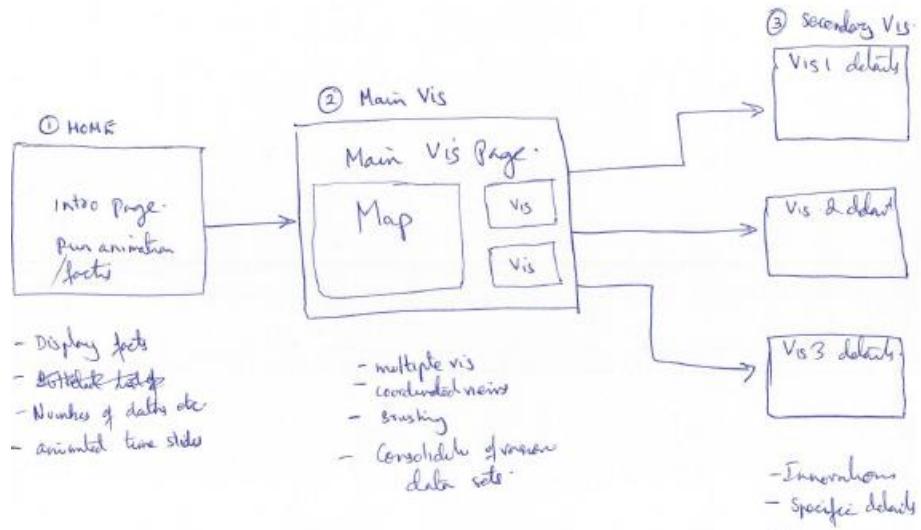


Story board - (web site).



Storytelling

High Level Page Flow



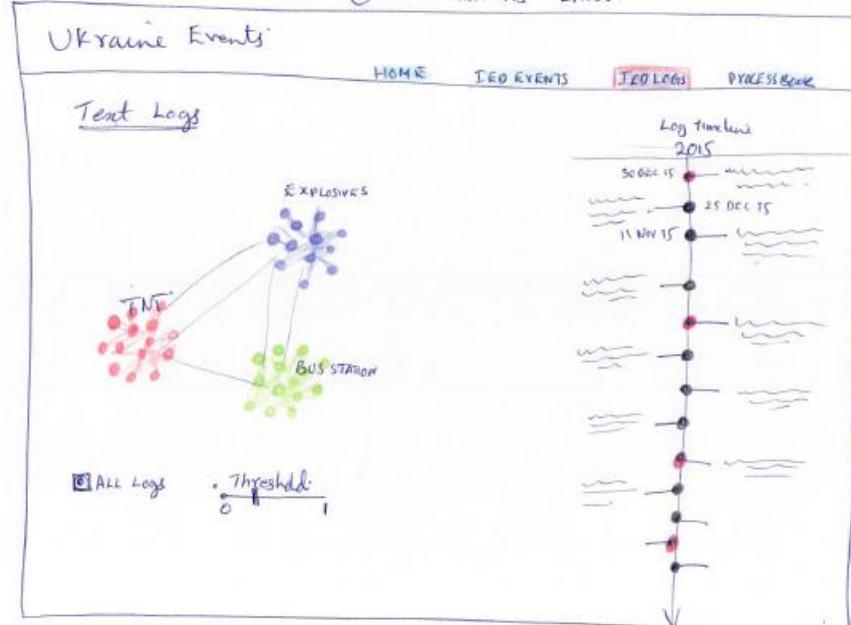
Web Page Story Telling

② Main Vis LAYOUT



web page story telling

③ SECONDARY VIS LAYOUT



Design Evolution – Evaluation

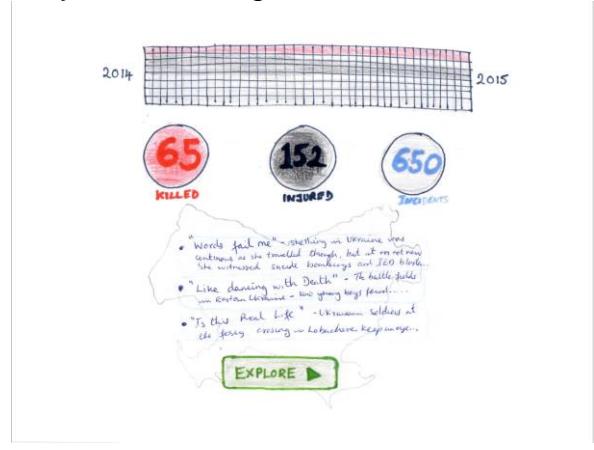
Feedback from Peer Evaluation

Question 1: From the prototype sketches Where and When did the incidents happen? Imagine how you can proceed to find out in which regions had high incidents rate. Can you tell around where and When were the most IED events?	
Nick:	From what I can see: As the user drags the time slider left to right, IED events will appear in the map below and the charts on the right will update. To determine the region with the highest incidence of IEDs I would drag all the way from left to right once through to see which areas of the time slider had the most as well as the charts on the right and the most plot points in the map.
Khaladkar:	I think as far as the When part of the question goes, the interactive slider above the map would be my choice to explore the visualization. I can see the number of IED explosions through the little bars below the slider and choosing the position on slider is the best way to answe the "When" part.
	For the where part, I would be inclined to visually see the map and click on the region that shows the highest spots. Once the user clicks on the map, he can see how the peripheral visualizations respond and explore further.
Kliyara Philip	Yes, When - Slider on top should give the user an indication when the most number of incidents occurred.
	Where - The Bar chart for region should tell you which region had most number of incidents, clicking on which should show the data on the map.
Question 2: From the prototype sketches provided, what do you understand from our story line flow?	
Nick:	There will be an introduction with some interesting facts as well as some context to the Ukraine conflict. The user will then be guided first to an overview of where IED events are occurring in Ukraine and then to section on how the incidents breakdown and finally to an animated word cloud.
Khaladkar:	The initial introduction page gives a high level understanding of the importance of the issue. I see that as a concise summary to get the user engaged into exploring further.
	The user is then directed to what one would call as the "core" of the visualization. The When & Where part of the question. I think the positioning is right as most users would be interested in seeking these answers from the visualization.

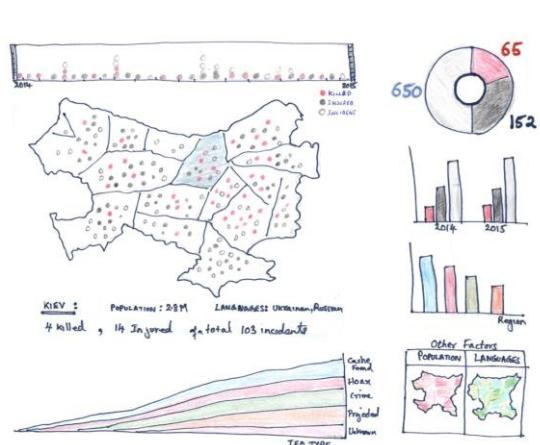
	The next pane is used to answer any follow-up questions about IEDs that the user might have. Looks like the Sankey has IED types on left and something else on the right. Perhaps, if the data is available, I would be interested in knowing how harmful is a particular type of IED? (# of victims and # of injured on the right side)
	The last part is an attempt to answer "How". As a user, I don't think the word cloud provides much of an insight in this department. It's going to be a gathering of all those ominous words that are used to report such unfortunate incident.
Kliyara Philip	Summary statistics page with the option to go to 3 separate views - where & when, what and how?
	Does not look like there is any interaction between view 2 and 3 (No arrows between the two). Having that would add continuity to the story.
	For instance if time filter carries from view 1 to 2, it will keep the data relevant between the two views.
Any additional feedback:	
Khaladkar:	I think the overall idea is very interesting. Here's another comment I had - 1. The donut on the top right corner has 3 elements - victims, injuries and incidents. And that seems to be a uniting theme for the different visualizations. Which works great. But somehow the donut seems to be violating tufte's data integrity principle. The 3 elements are not on the same scale.
Kliyara Philip	My assumption - An incident results in killed and injured numbers. Do-nut Chart - Incidents and Injured, Killed does not seem to be at the same granularity. One would assume an incident results in killed and injured,
	and therefore they cannot be on the same level.
	Encoding on map - the three circles for an incident will overlay as they will have the same lat, long. It would be hard for the user to decipher.
	Slider Chart - Similar issue as do-nut chart, data points not at the same granularity.

Redesign

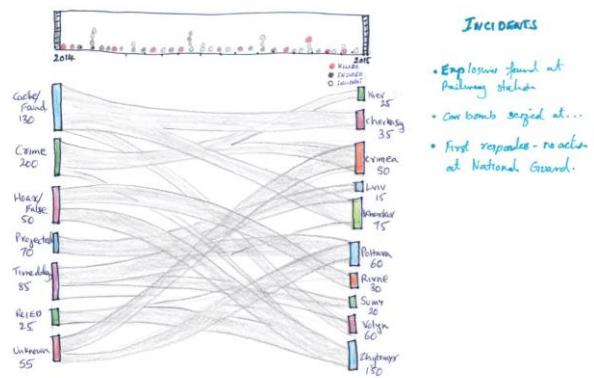
Why are we doing this visualization?



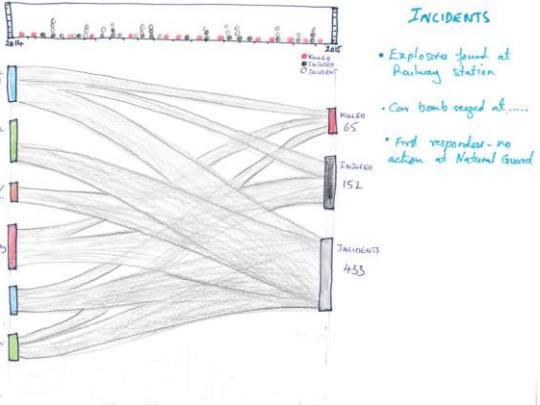
Where and When did the incidents happen?



What kind of incidents were they?



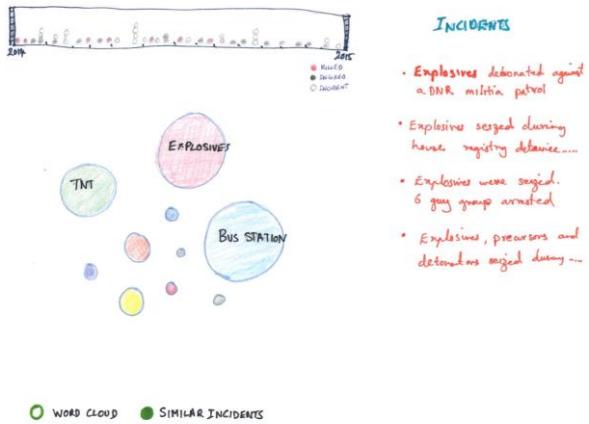
What kind of incidents were they?

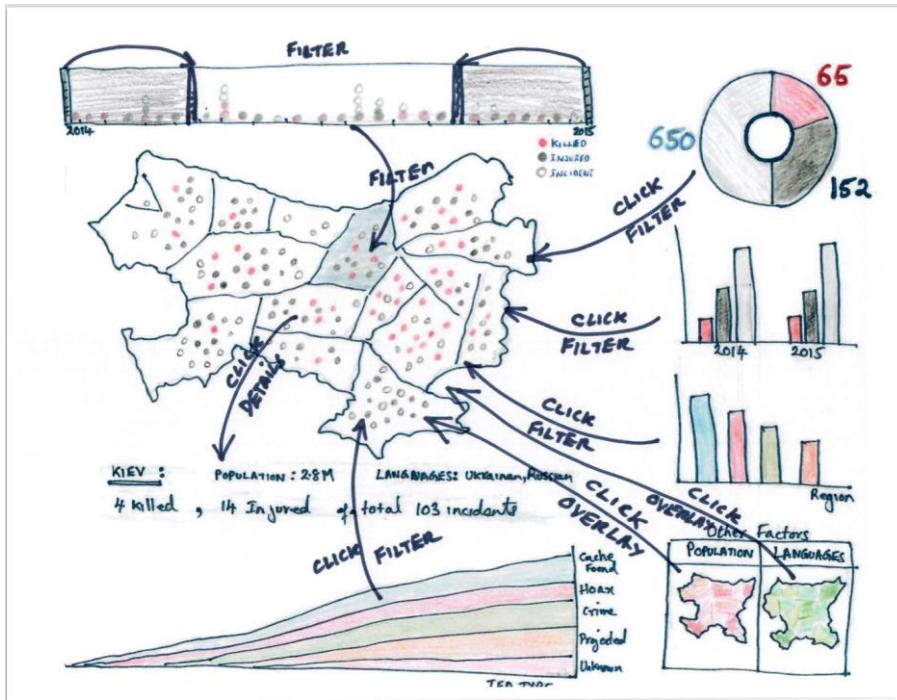


How were incidents related?



How were incidents related?





Feedback from TF Gus Wezerek

Group 3 initial project plan feedback

Hey all, some thoughts:

First, really interested to see this dataset visualized. We get a lot of repeat datasets in this class, but I've never seen anything like this.

You've mentioned a lot of ancillary datasets (news articles, timeline, elections). I'm eager to see some of that brought in (especially the timeline), but definitely focus on your primary dataset first so you don't get stretched too thin and run out of time to add polish. Because there are so many questions that you can answer, consider a page design that breaks the narrative into subsections with smaller, targeted graphs for each section. That sort of pacing could be more effective than a combination map/time series view where the user is left to find the story for themselves.

Hey all, just finished reading over your finalized project proposal. Very impressed by the data collection and munging so far. -Extremely- happy to see such robust data exploration. I'm going to push you on your page design. A few thoughts:

- * Explore one or two additional layout options. What would the page look like if it went very long, and you encouraged the user to scroll through each section? Right now you have a dashboard-esque design, which is very dense and signals that the user needs to have some sort of familiarity and goal already in mind in order to glean any insight from the graphs. I suspect that a general audience will also be interested in your visualizations. Pacing out the charts could help ease them into your narrative.

- * Are some of the extra datasets redundant? For instance, % Russian speaking and Election results?

Think about how to edit and frame any extra data so that it feels essential to the story you're telling and not simply tacked on.

- * If you're going to use bar charts by region, I'd recommend rotating them 90 degrees so that they read more like a list.

- * For the stacked area chart, is the total area meaningful? My guess is no, unless there's a singular agency that's responding to all these occurrences, as then the total area represents the full allocation and breakdown of their energies.

- * Could you organize the page into subsections with the same graphs for each different type of IED?

What stories would that reveal? A predominance of grenade IEDs in one region and time delay IEDs in another, perhaps? Or could small multiples help lighten the density of having everything on one chart?

- * What's the story behind all the unknown IEDs? Even if you choose not to visualize it, an explanation will

help contextualize the quality of the dataset and give the reader a sense of why people collect this data and what sort of difficulties they encounter. Don't hesitate to reach out to the creators of the dataset for an interview/answer.

* Finding administrative geojson, especially for contested regions in Ukraine, could be difficult. I don't have too many sources, but I'd encourage you to start with Natural Earth, which a lot of journalists use.

* Intrigued by your text analysis part of the project. Not sure if you're going to have any clear takeaways, but I say run with it and see where it takes you.

* I like the big numbers treatment as an editorial design element. You should also think about using a photo or two to the situate the reader and set the tone for the project.

I also wanted to check in: How are things going? Any outstanding questions/worries? As you've started to work with the data, have you been able to share munging tips and tricks for getting it into the right JSON objects, etc.?

Good work with the expert evaluation. For your own future user testing, be sure to ask single, specific questions of the user. "Do you understand our storytelling" is more likely to elicit opinions than reveal patterns that inform whether your design decisions will work.

The sketches your teams has been producing are really great and I can't wait to see the prototype. I think your editorial flow is spot-on. I do have one question: Are "killed" and "injured" a subset of "incidents"? I'm getting mixed messages from the donut chart and the redesigned Sankey. If they aren't, I'd suggest renaming "incidents" to "incidents with no injury" or something similar, just to make that immediately clear to the reader. Not a huge fan of the word cloud, but I'll wait until I see it with live data to determine how much it adds to the story. One more thing: There's so much analysis here that I'd love to see you call attention to specific locations or incident types that illuminate what it's like to live/deal with IEDs in part of Ukraine. A little confused by some of the decisions in the redesigned sketches, but again, I'll wait until the prototype before judging.

Hey all, looking forward to chatting tomorrow. Just opened up your project. Fantastic work. Some thoughts, so I don't forget:

* The opening visualization needs some polish. Aside from the missing units and labels, the resolution is too high and the number of incidents is too dense to spot patterns and get a sense for trends. A good fit for this chart could be a simple line chart, with each point being the aggregated incident counts for the month. You could add one or two callout labels for months with high human losses and save the in-depth column graph for the exploratory interface.

* Some intro text, a quote or an image could really help set the tone on the splash page.

* Labels or tooltips, at the very least, would help make the map of Ukraine much more legible. Could you put a map of the area behind the chart so that those who are unfamiliar with Ukraine know which countries border it, whether it's landlocked, etc.?

* Does Nb mean "number"? Always try to avoid abbreviations! I think you have room for the full label, or you could just simplify to "IED Incidents."

* At some point before the map you should define what constitutes an "incident."

* The 'area' option seems unnecessary.

* A tooltip on the heatmap would be very useful.

* Think about whether orange is the right choice for the summary bar charts on the heatmap, given that you're already using the reds to encode frequency in the cells.

* Would add navigational links or forward/back links to the bottom of each view so that you help users who don't think to explore via the main nav.

* Who/Why seems more like an 'Introduction.' I thought it was a page that I hadn't visited until I clicked it.

* Make sure to standardize naming. Are you using "KIA" or "Killed." Also would like a lot more context on the What page. I need help understanding what this data means, because you've convinced me that it's interesting!

* Not sure if you're using SVG for the tooltips on the network graph, but would definitely consider switching to normal HTML so you can take advantage of text wrapping. The tooltip text went off my screen in a few instances.

* What takeaways do you want the reader to leave with from the How page? Could you remove elements from the page and still achieve those goals? The text analysis is very interesting, but there's a lot of data and exploratory UI between me and knowing which words recur in these reports.

Again, great work. You're nearly there. Looking very good as is.

Implementation

Project Timeline

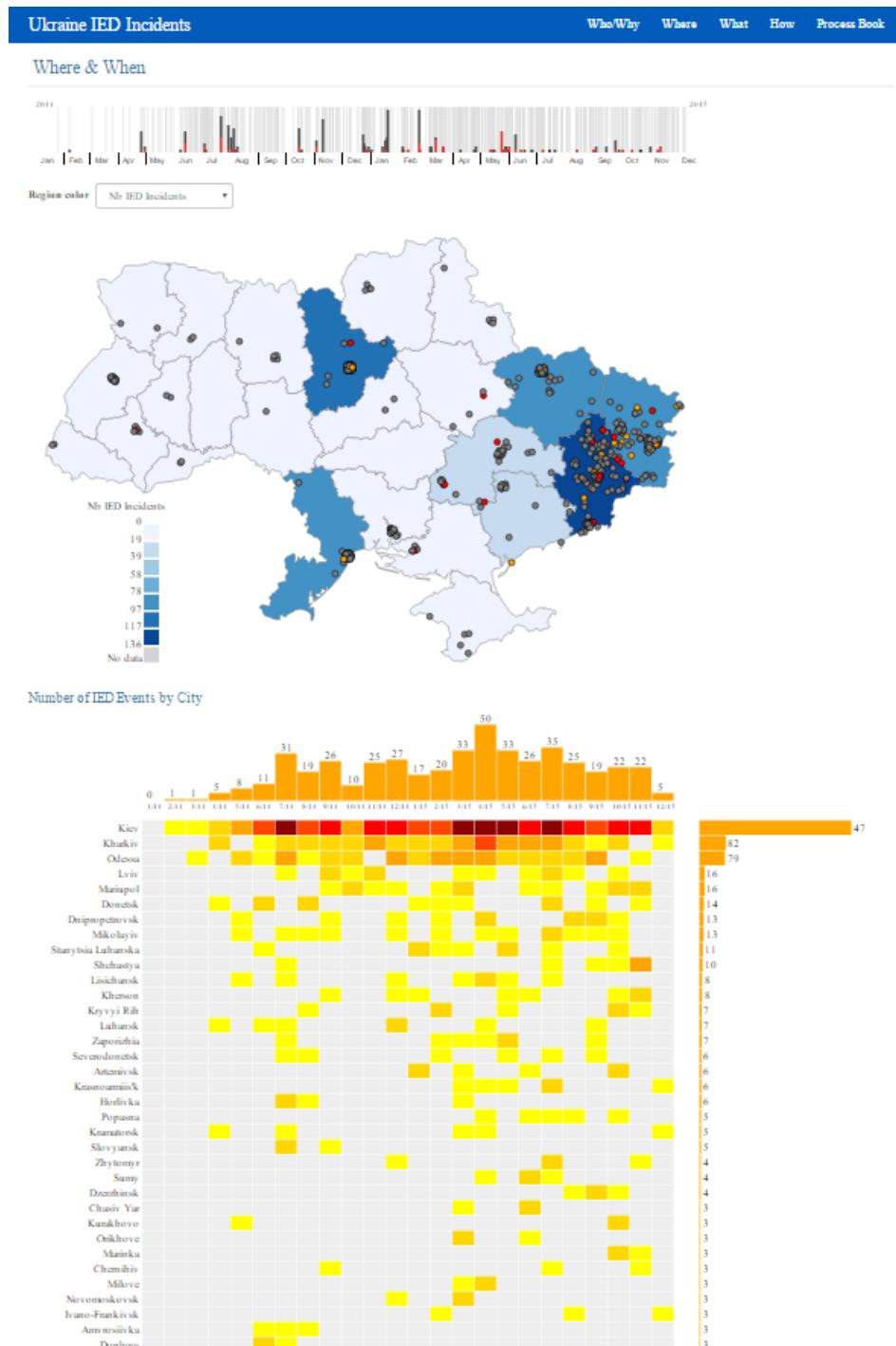
X = initial plan, green = completed, yellow = partial, orange = late

Visualization Component	Feature	Apr 11 Final Design	Apr 18 Project V1	Apr 25 Project V2	May 2 Final Project	Must Have
Introduction Page	Produce basic page			X		Yes
	Visualization static map screenshot in the background			X		No
	Add high-level KPIs / counters			X		Yes
	Animate high-level KPIs / counters			X		No
Map and timeline	Find a suitable Ukraine geojson/topojson	X				Yes
	Create a basic Ukraine map visualization	X				Yes
	Find the latitude and longitude to associate with each region and city	X				Yes
	Display IED events as color-encoded dots on the map		X			Yes
	Merge data sets about regions information		X 80%			Yes
	Implement map-shaped buttons to allow the user to select a specific overlay for the map (population, education ...)		X			Yes
	Color map regions according to the user selection		X			Yes
	Color IED incident dots on map according to the user selection		X			Yes
	Create a IDE timeline visualization and use that to brush the main map			X		Yes
	Create a total IED events over time bar chart that will also act as a filter for the map			X		No

	Add IED events tooltips with more information about the event	x			Yes
	Add region tooltips with more information about the region		x		No
	Insert mini version of the secondary visualizations	x			Yes
	Prepare and create a text visualization to help with the guided navigation			x	No
Text analysis	Parse text	x			Yes
	Display a word network		x		Yes
	Add a details view with samples of text with the selected word		x		No
	Create the log timeline		x		No
Sankey Analysis	Produce a Sankey diagram with the IED events data		x		Yes
	Produce additional Sankey diagrams showing other relations within the data			x	No
City Analysis	Produce a heatmap of IED incidents per city		x		No
	Produce a bar chart of IED in incidents per city		x		No
	Produce a bar chart of IED in incidents per month		x		No
	Allow the heatmap to show KIA and WIA			x	No
Storytelling	Produce the overall webpage layout frame	x			Yes
	Decide on a guided exploration flow	x			Yes

Prototype V1

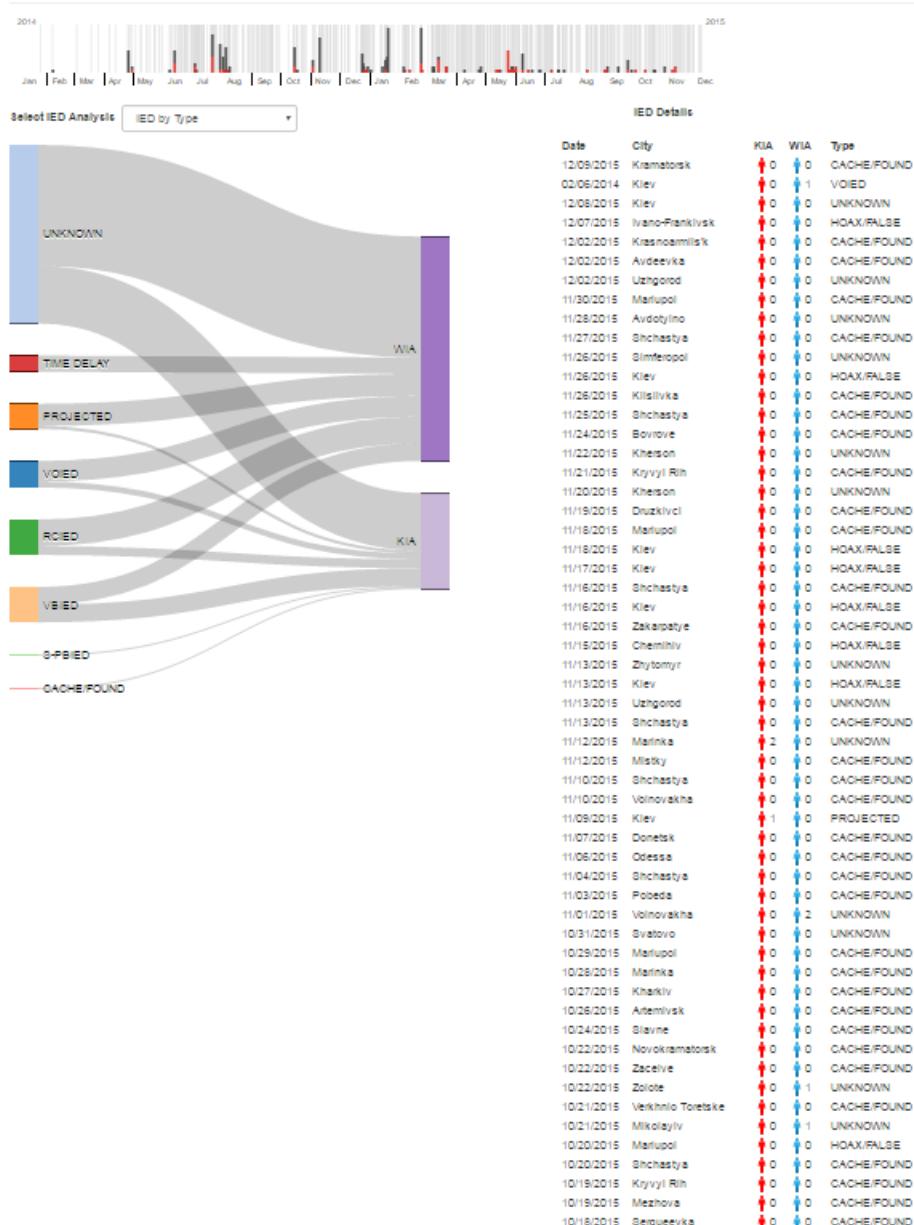
Here are screenshots showing the current state of prototype version 1.



Ukraine IED Incidents

Who/Why Where What How Process Book

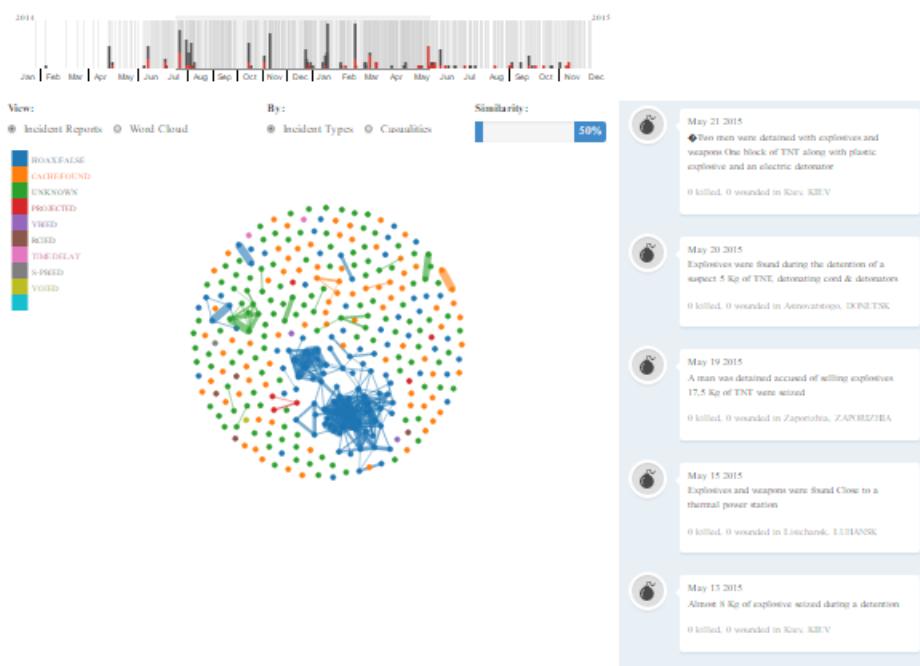
What



Ukraine IED Incidents

Who Why Where What How Process Book

How did the IED actions happen?



Prototype V2

Here are screenshots showing the current state of prototype version 2.

Ukraine
Improvised Explosive Device Incidents

Why Where What How Process

Since the collapse of the Kremlin-supported government in February 2014, Ukraine has been affected by political and economic turmoil.

What followed the turmoil was the emergence of an energized public who would do anything to get their freedom.

We will analyse the various incidents that occurred between January 2014 to December 2015. Our exploration of over 800 Improvised Explosive Devices (IED) incidents in Ukraine over the past 2 years for the purpose of highlighting and better understanding the temporal, geographical and political patterns in the data. The following shows the summary of the incidents that happened.

Killed: 65 **Wounded:** 152 **Incidents:** 650

The following shows all incidents from January 2014 to December 2015.

Explore the Data

Population: 43,054,433
Type: CACHE/FOUND, UNKNOWN, HOAX/FAKE, PROJECTED, VOID, CURED

Summary

Background to the conflict
In February 2014, the Kremlin-supported government of Ukraine collapsed. The demise of the regime was brought about by bitter protests over a decision by the government to reject closer relations with the European Union. What followed the turmoil was the emergence of a pro-Western, pro-reform government and an energized public generally anxious to lessen Moscow's influence and committed to addressing the need for serious reforms.

Ukraine's problems are not solely political and economical. Russia responded to the change over government in 2014 by seizing Ukraine's Crimea region and annexing it.

Improvised Explosive Devices (IED)

An IED can be almost anything with any type of material and initiator. It is a "homemade" device that is designed to cause death or injury by using explosives alone or in combination with toxic chemicals, biological toxins, or radiological material. IEDs can be produced in varying sizes, functioning methods, containers, and delivery methods. IEDs can utilize commercial or military explosives, homemade explosives, or military ordnance and ordnance components. They are unique in nature because the IED builder has had to improvise with the materials at hand. Designed to defeat a specific target or type of target, they generally become more difficult to detect and protect against as they become more sophisticated.

IEDs can be hidden anywhere: on animals, planted in roads or strapped to a person. They can be detonated via cell phones or trip wires, among other methods. They can be deployed everywhere: in a combat environment or in the middle of a busy city. The adaptability of IEDs to almost any situation makes them difficult to detect.

IEDs, or Improvised Explosive Devices, are one of the main causes of causalities among troops and exact a heavy toll on local populations.

Explore the Data

Key locations: Kryvyi Rih, Donetsk, Luhansk, Mariupol, Dnipro/Donetsk, Mykolaiv, Odesa, Zaporizhzhia, Kherson, Kirovohrad, Lutsk, Chernivtsi, Ivano-Frankivsk, Severodonets'k, Krasnodon, Horlivka, Kramatorsk, Kryvyi Rih, Sumy, Dnipro/Donetsk

Explore the Data

Legend: Cache/Found, Unknown, Hoax/Fake, Projected, Void, Cured

Station, metro, central

Ukraine Improvised Explosive Device Incidents

Why Where What How Process

Where did the Incidents Occur?

Ukraine regions are not equally affected by IED incidents. Incidents were concentrated in three cities: Kiev, Kharkiv and Odessa. There were over 80 incidents in each. However, although there was a much higher number of incidents reported for these cities than for any other city (almost 100), less than 10 persons were killed in those 360 incidents.

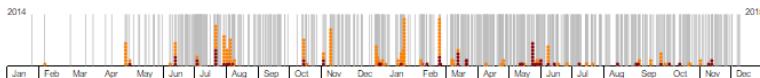
Show Me Kiev

Most of the remaining IED incidents are spread in the Donetsk and the Luhansk regions, representing 136 and 92 incidents respectively. These two areas are also the most active regions for IED incidents at the end of 2015.

Show Me Donetsk

In the reported incidents, many different types of IEDs were mentioned. Some types are more dangerous than others.

Continue to IED Types Exploration ►



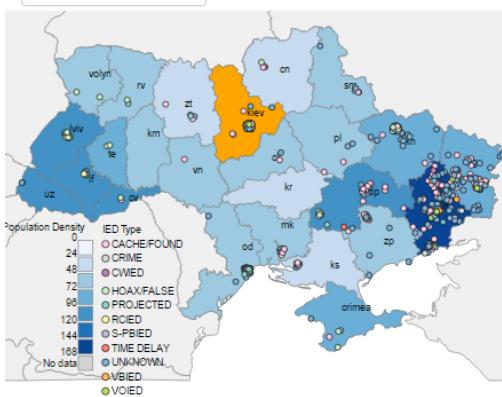
 65 Killed  152 Wounded  650 Incidents

Region color

Population Density

Circle color

IED Type



IED Events

0	1	3	6	10	14	17																	
1/14	2/14	3/14	4/14	5/14	6/14	7/14	8/14	9/14	10/14	11/14	12/14	1/15	2/15	3/15	4/15	5/15	6/15	7/15	8/15	9/15	10/15	11/15	12/15

Kiev
Birovry
Bila Tserkva
Sokolivka
Bykivnia
Krasne

1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

99

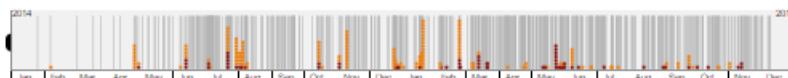
What type of explosives were used?

An IED is a "homemade" device that is designed to cause death or injury by using explosives alone or in combination with toxic chemicals, biological toxins, or radiological material. IEDs can be produced in varying sizes, functioning methods, containers, and delivery methods. They can also be classified in various predefined types in order to aid analysis. Unfortunately, it is often the case that there is not enough information to assign an IED to a specific type.

While 88% of incidents resulted in no casualties, partly because they were hoaxes and false alarms and partly because they were found on time, there is still a significant number of injuries and fatalities. The most dangerous types of IEDs have been identified to be the Remote Controlled devices (RCIEDs), leaving behind 6 dead and 18 wounded, and the Vehicle-borne explosive devices(VBIEDs), leaving behind 12 dead and 12 wounded.

Find out more about how these incidents occurred by going to the next page.

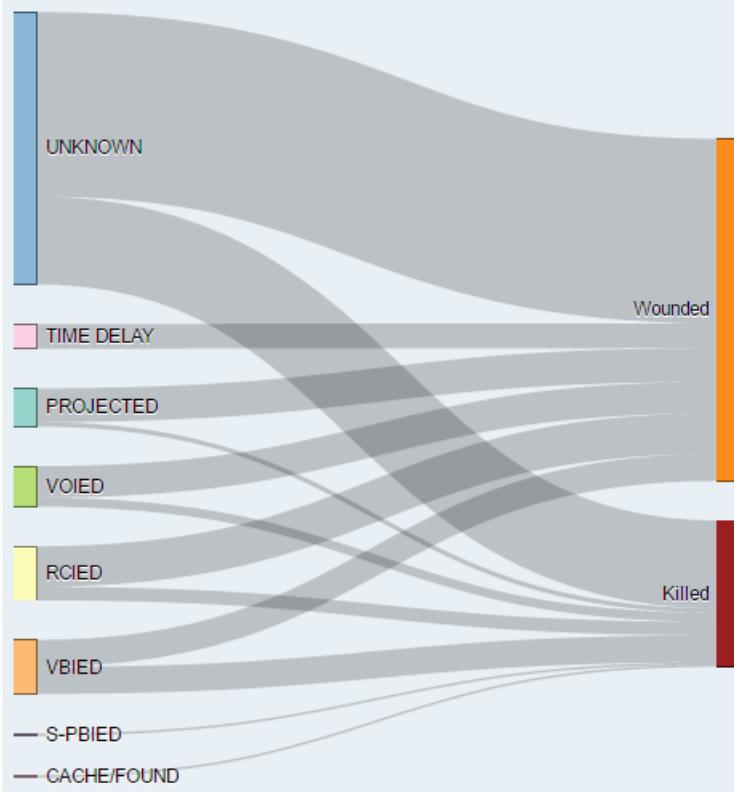
[Continue to Incident Analysis ►](#)



 65 Killed  152 Wounded  650 Incidents

View:

Casualties by Incident Type Incidents by Type and Outcome



-  Nov 01 2015
An IED was used against a night club
0 killed, 2 wounded in Volnovakha, DONETSK
-  Oct 22 2015
The detonation of an IED caused injuries to one soldier
0 killed, 1 wounded in Zazika, LUGANSK
-  Oct 21 2015
Detonation of a device inside an apartment
0 killed, 1 wounded in Mikolayiv, MIKOŁAJIW
-  Sep 28 2015
A device was blown up in a railway station in "Southern Vzryvpalet" station. Suspect was detained hours later.
0 killed, 1 wounded in Kiev, KIEV
-  Sep 24 2015
An IED blown up during a military tank competition it was hidden inside a combat vehicles battery compartment
1 killed, 3 wounded in Torez, DONETSK

How these Incidents Occurred? - Interpreting the Free Text Reports

In this exploration we want to analyze the free text summary written for each incident. For the process of finding report similarity, we first used the TF-IDF and Cosine Similarity algorithms to find similarity between all the incident reports. Then for our analysis we consider two reports to be similar only if their threshold is 50% or higher. To gather important words across report clusters, we first find the three most important words in each of the reports. This was found using TF-IDF (Term Frequency, Inverse Document Frequency) scores. Then for each cluster of nodes we gather all the important words from each node and take the top three scored word. The font size of the words is determined by the frequency of occurrence in the cluster.

By clustering the incident reports in this method we can see that most similar incidents that were reported in metro stations, administration buildings were hoax or false reports which leaded to no casualties.

