Process Book

# Project Title: Ukraine Improvised Explosive Devices

# Project Team:

Online Studio 3 Group 3

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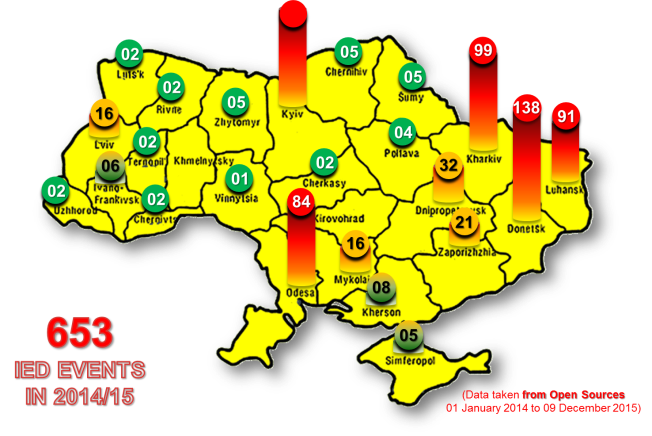
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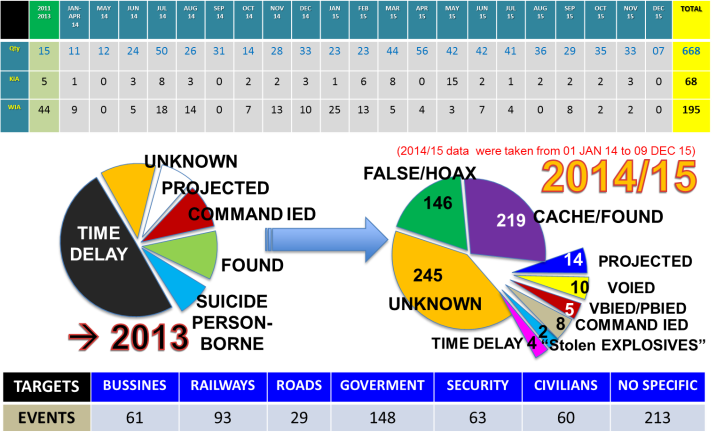


# Background and Motivation

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 665 Improvised Explosive Devices incidents in Ukraine mostly over the past 2 years for the purpose of better understanding the temporal and geographical patterns in that data. We will also consider additional census data to uncover potential regional patterns. We intend to employ interactive visualization to generate better insights about the Ukraine IED situation.

# Questions

Here are some questions our project should help answer:

* Is there a temporal pattern in the number of IED incidents?
* Where are the IED incidents located within Ukraine?
* Do the ratios of incidents remain stable over time between the different regions? Do the incidents seem to move from one region to another?
* Do the different types of incidents have interesting geo-temporal patterns?
* 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?

# 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, Group, 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** | **KIA** | **WIA** | **CITY** | **REGION** | **COUNTRY** | **DETAILS** | **GROUP** | **REMARKS** |
| 2015 DEC 09 | CACHE/FOUND | 0 | 0 | Kramatorsk | DONETSK | UKRAINE | IEDs were found and disposed by Combat Engineers |  | TBC if they were just landmines |
| 2015 DEC 09 | UNKNOWN | 0 | 0 | Kharkiv | KHARKIV | UKRAINE | An IED was blown up in front of a ROSHEN shop |  | Shopping Center |
| 2015 DEC 08 | UNKNOWN | 0 | 0 | Kiev | KIEV | UKRAINE | A device was detonated against a restaurant (L'Kafa) |  | Boulevard Lesi Ukrainian |
| 2015 DEC 07 | HOAX/FALSE | 0 | 0 | Ivano-Frankivsk | IVANO-FRANKIVSK | UKRAINE | Call reporting IED - First Responders action - no explosive |  | Central Metro/bus station |
| 2015 DEC 02 | CACHE/FOUND | 0 | 0 | Krasnoarmiisk | DONETSK | UKRAINE | An IED was found and disposed by EOD |  |  |
| 2015 DEC 02 | CACHE/FOUND | 0 | 0 | Avdeevka | DONETSK | UKRAINE | A cache with 3 IEDs with TNT was found and cleared |  | Inside an abandoned house |
| 2015 DEC 02 | UNKNOWN | 0 | 0 | Uzhgorod | ZAKARPATS'KA | UKRAINE | An IED was detonated against a store in Franko Street |  |  |

### Ukraine Map Data

We will a 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 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. So far, we found the population of each district, as per Jan 2013 (<http://ukrstat.gov.ua/operativ/operativ2013/ds/kn/kn_e/kn0113_e.html>), as well as the monthly wages by region from 1995 to 2015 (<http://ukrstat.gov.ua/operativ/operativ2006/gdn/prc_rik/prc_rik_e/dszpR_e2006.htm>).

We are considering using the output of the 2011 Ukraine census as another data source for this project (<http://database.ukrcensus.gov.ua/MULT/Database/Census/databasetree_en.asp>). We could extract more dimensions like education, sources of livelihood and especially native language. The data seems to be at region level, similar in grain to the NATO data. Also, derived from the census, we have the number of Russians in Ukraine, by province, in 2001: (<https://en.wikipedia.org/wiki/Russians_in_Ukraine>).

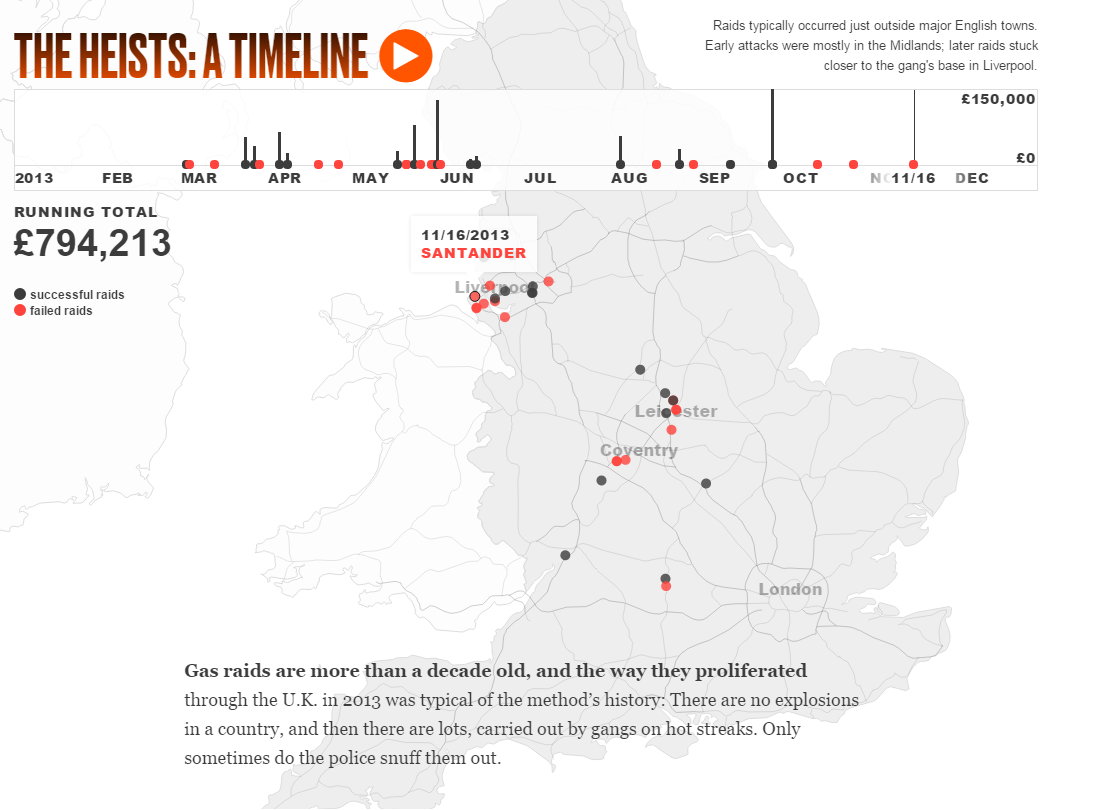
# Visualization Design

## Inspirations

### Map and Timeline

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

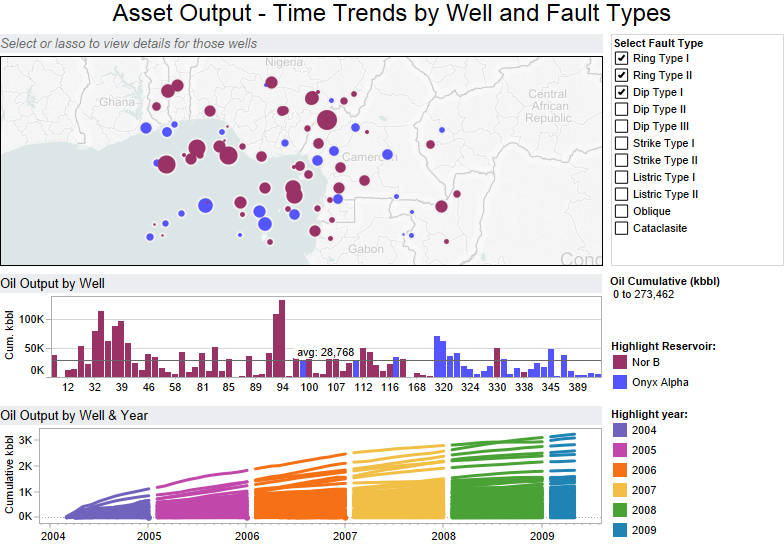
This visualization shows the geo-temporal aspects of U.K. ATM bombing incidents. The webpage itself has a very strong storytelling design.



### Linked Views

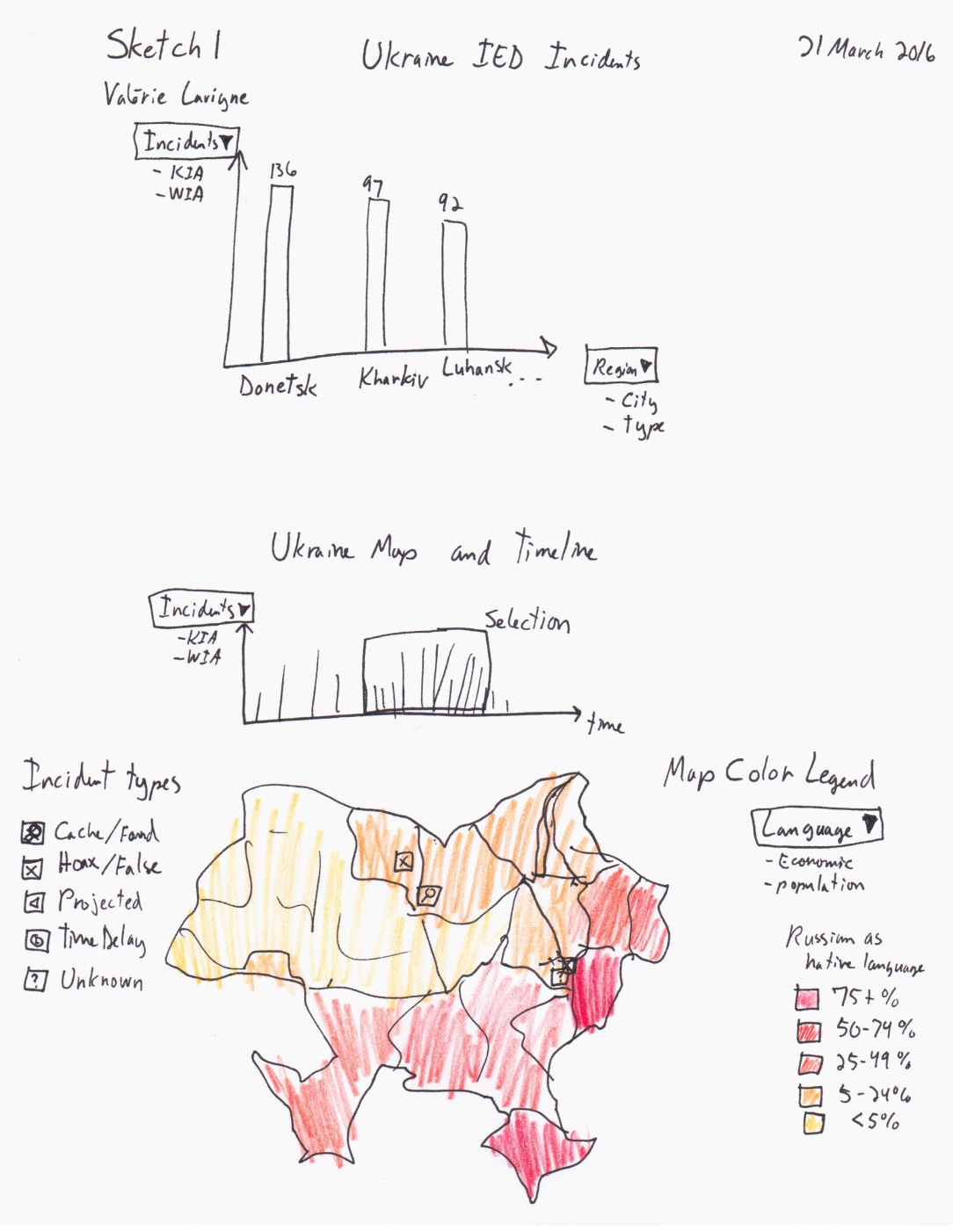
<http://www.kms-world.com/solutions/industries/oil-gas>

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



## Design Evolution

### Sketches 1



### Sketch 2

### Sketch 3

(insert sketches)

## Exploratory Data Analysis (coming soon, using Tableau)