VISAP ‘18

October, 23rd – 26th 2018
Berlin, Germany

Designing beautiful evidences in an era of complexity. When the graphics can reveal profound societal and social issues

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Data and identities

Annotated Portfolio

DESIGNING BEAUTIFUL EVIDENCE IN AN ERA OF COMPLEXITY

When Graphics reveal Global Social Changes and Issues

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Abstract
In this annotated portfolio, we will be introducing four of our map-based data representation-visualization projects. We will therefore precise what founds their respective creative positioning, what they basically have in common, and how they are part of a broader approach in Data Design that mainly aims to achieve the following objective: *re-presenting* 'signs' and 'visual clues', not *presenting* (and so, establishing) 'proofs'. — We shall seek to clarify this distinction of terms which allows the differentiation of two design positions.

Keywords
Data representation/Data visualization, Data Design, Evidence, Clue, Hint, Proof

Introduction
The present-day world is unduly complex to the point that we are no longer able to *understand* it, to *read* it (at both macro and micro levels), to *embrace* it in its essential dimensions, including political, economic, environmental and social ones. From this, as the philosopher Michael Huemer **[1]** explains, it follows a sort of "aphasia" of Politics — losing almost every reference point and thus any ability to act and govern with discernment, the highest representatives of Nation-States would be effectively condemned to *passivity*. According to analysts, the inextricable complexity of the world would come from an "intertwining" of cultural, religious, societal influences and geopolitical as well as geo-economic determinations.

Let us observe that until the beginning of the 21st century (i.e. at the early post-Cold War period), the world (yesterday's world therefore) was still *readable*, *comprehensible* because it might be regarded through a dualistic interpretation. Indeed it used to be caught in a global polarization deliberately instigated and orchestrated by two superpowers both political and ideological: the United States (the proponents of a certain Liberalism) and the former USSR (the defenders of a certain Socialism); in the mid-1950s, the Third World countries as well as those of the "Non-Aligned Movement"[1] (NAM) attempted to act as a sort of "counterbalance". Following the collapse of the Soviet bloc in 1991 (thereby signaling the end of the USSR), the United States held a hegemonic position. Then, the 1990s marked the new era of Globalization[2] leading to a techno-economic revolution — towards a global networked economy. The consequence was a

[1] Including 120 countries according to a census dating from 2012.

[2] Of the superiority (or preponderance) of a global economic system over national economies.

[3] Social discrimination, inequality/inequity and social unrests 'of all kinds'.

[4] Not just "being-in-the-world", that means to worthily inhabit it and interact with.

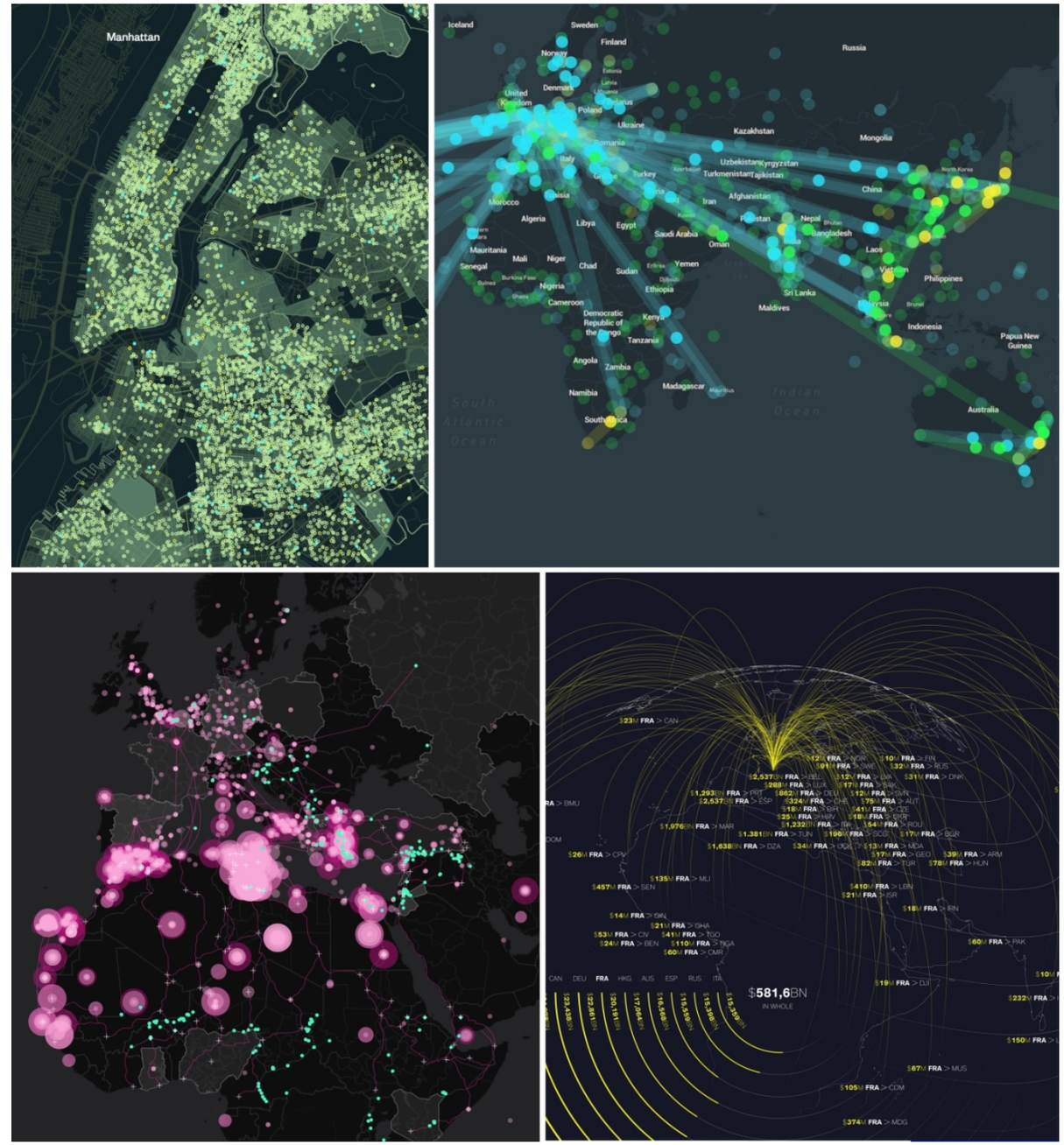
[5] Mixing public and corporate data, raw data from sensors, personal data shared on social media and so on.

complete reorganization of the socio-economic-political "chessboard" fostering (among many other things) an acceleration of Capitalism ("Turbo-Capitalism" [2]) whose "human and social cost" would henceforth appear fairly significant[3]).

In the face of such upheavals, we should be worried about the means at our disposal to remain "present-in-the-world"[4], in other words to keep seeing and thinking the world in a holistic and global way. Indeed we are forced to recognize today that the "classical" cartographic representation models (static or printed, in particular) — those we used until now to keep up with the evolving world — are not fully "effective" to reflect, depict or describe its current complexity. On closer observation, we notice that the recent interactive techniques and methods for massive[5] data representation-visualization (frequently map-based) would be in a position to take over. Strongly helpful for decision-making (political, strategic first and foremost), analysis and heuristic exploration, these software productions (using often idiomatic formalisms) would allow us to apprehend some of the main facts, phenomena and realities of our contemporary world, several of whom are largely ignored and unknown. Available in countless formats and updated in realtime, this new type of "images" (in the broadest sense of the word) might preserve the whole strength and beauty of the *obvious* — the *Beautiful Evidence*, as Edward Tufte [3] wrote, through which we can clearly grasp (by sight and mind) the major changes, issues and challenges facing the planet. Therefore, several questions do arise: what status do these visual productions/"images" acquire? What are their fundamental *values*, their specific *functions* and major *utilities*? Consequently and more broadly, how can all these creations provide both understanding and appreciation of the singularity of approaches in Data Design (process, and purposes)?

The English term "evidence" covers a double meaning in French, in particular: it can be translated as "proof" or as "clue". Indeed, these two words have, at least in French, very distinct directions of meaning, distinct implications. The first one (proof) refers to producing concrete "demonstrations" (in clear and indisputable manners), to delivering factual elements related to given topics/subjects, to specific questions and/or issues (this is here about empirical corroboration). The second lies in delivering/submitting to people's criticisms and judgements (not only to the experts/analysts' sagacity) a *re*-presentation of fragments of the reality of the world in which we live in — sort of 'snapshots' of real life which require to be *attested*, *authenticated* (of apparent "signs" that indicate with 'probability', that *show*, *exhibit* or *expose* something). Starting from this distinction of

terms, the challenge is to demonstrate that Data Design, as a specialized field of Design, is not on the side of “proof”, striving to produce observable facts and phenomena upon which the fundamental axiomatic propositions (universally accepted) rely — referring here to conclusive scientific evidence that guides the current political behaviors: *evidence-based policymaking* (towards a political objective of transparent, effective management) — but on the side of “clue” throwing out into the real world a wide range of *possibilities* (a mix of ideas, visions, conceptions, "projections", perceptions and sensations). These last productions do not intend to produce an effect of "truth", to attest a reality, but rather to foster intelligence and curiosity, to provide food for thought (enchanting the *eye*, and inspiring the *mind*). The four selected projects deal with some of today's global social changes and issues, attempting to make them both *perceptible* and *intelligible*.



From left to right, top to bottom:

“NYC’ Cut-Throats. When Social Vulnerability goes hand in hand with fear of Crime”, 2018.

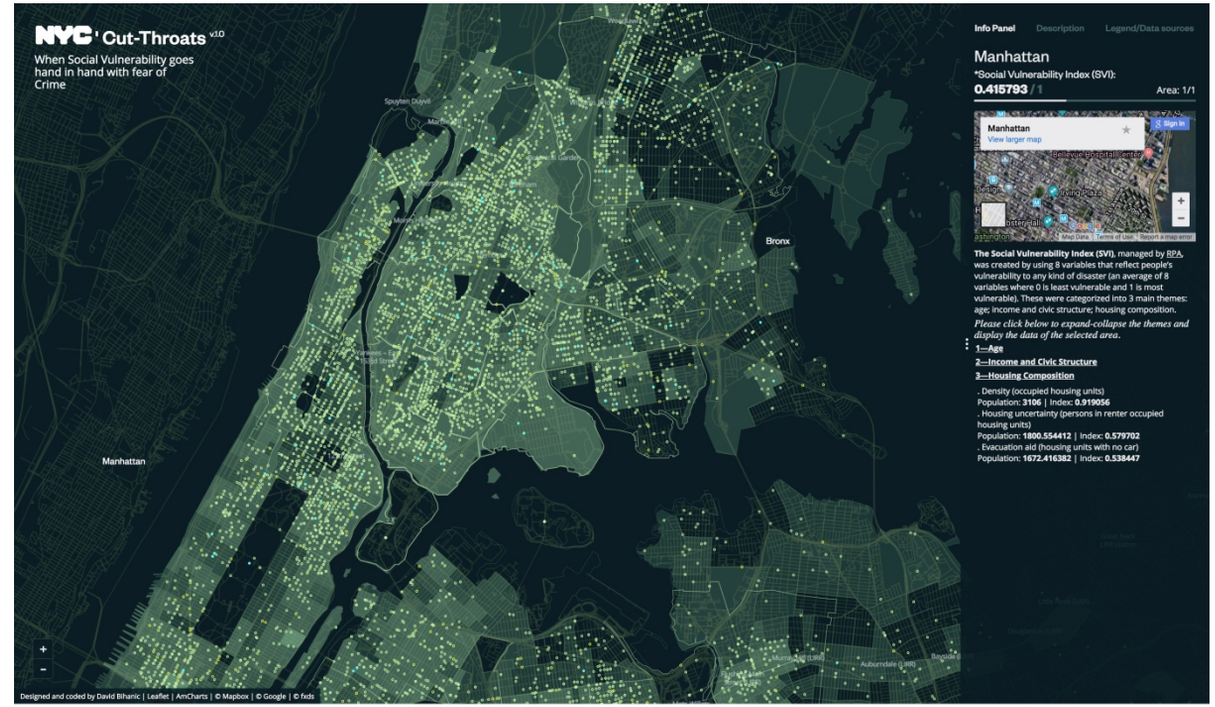
“Air Traffic Patterns. International Airport Rankings and Busiest Air Routes around the World”, 2017.

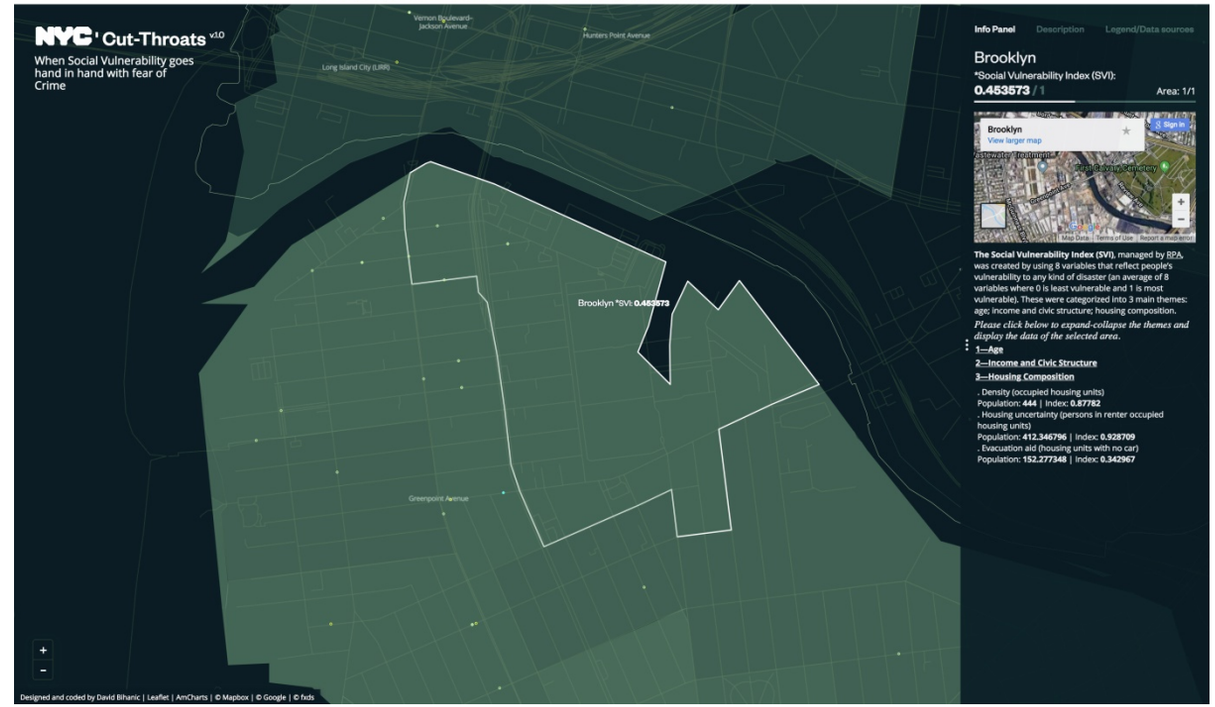
“Deadly crossings to Europe. Refugees crossing Mediterranean Sea (2000-2016)”, 2016.

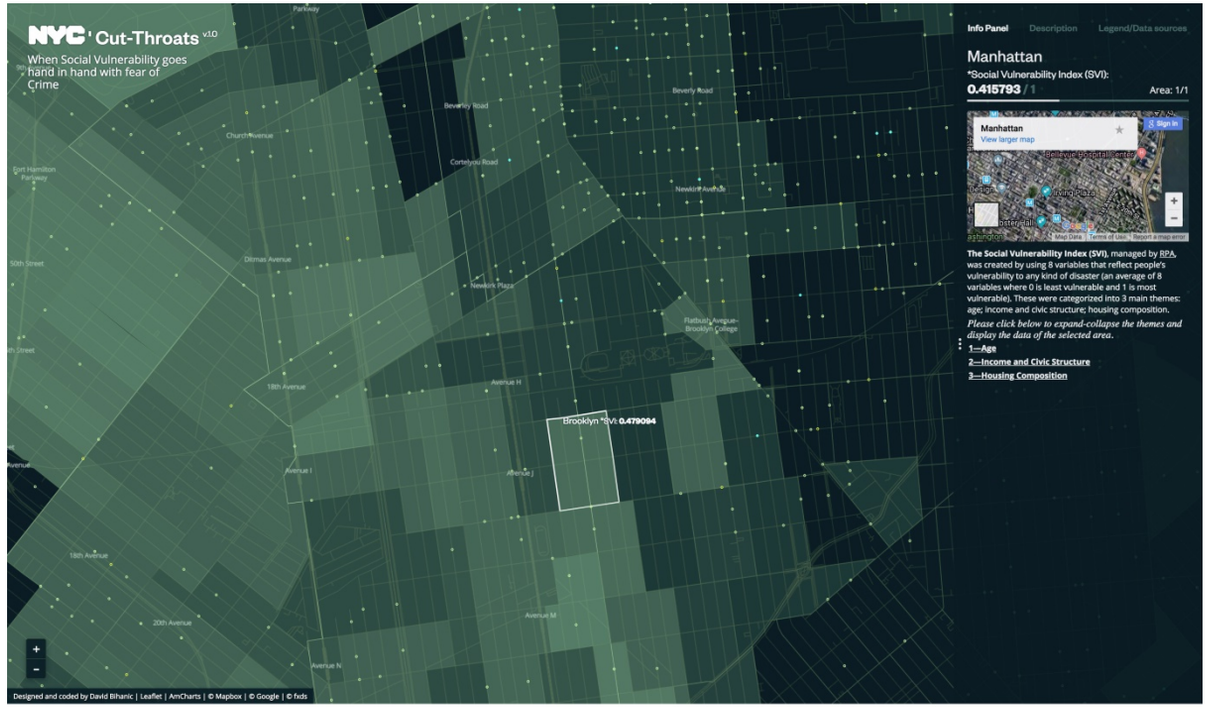
“Migrant remittances from France”, 2016.

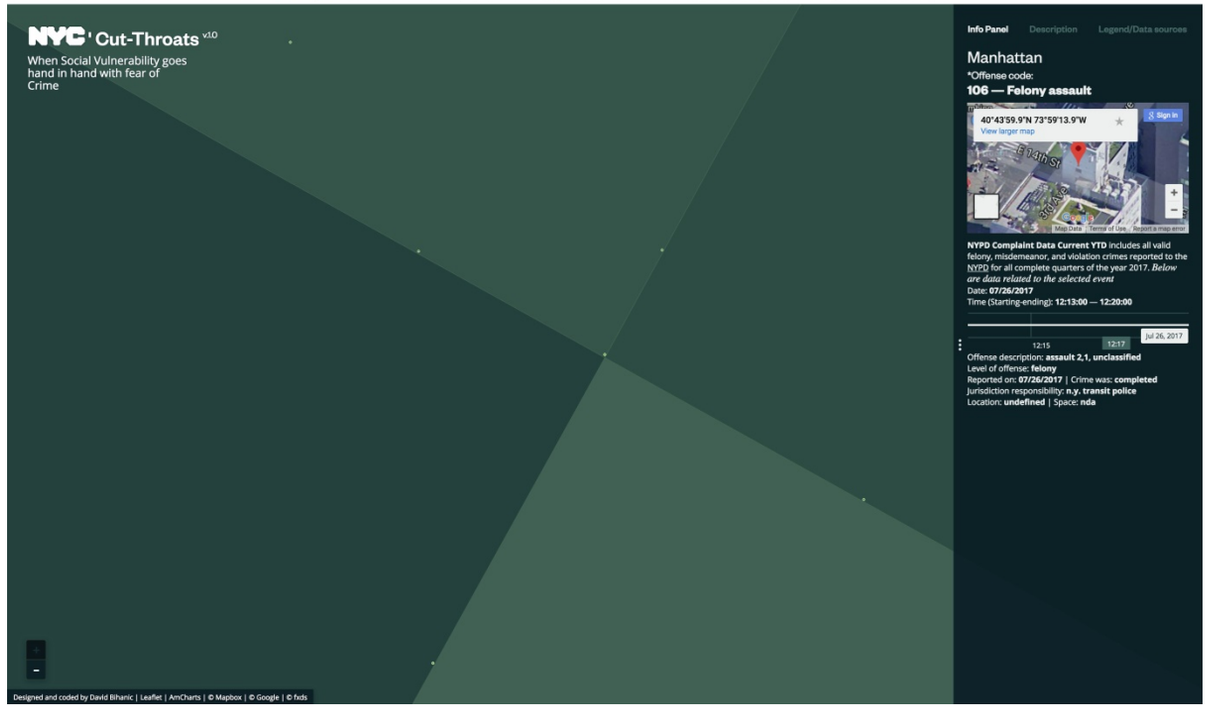
"NYC' Cut-Throats. When Social Vulnerability goes hand in hand with fear of Crime"

In the words of Bill de Blasio and his team members, the New York City government would be at the brink of definitively rooting out crime, that is to say putting an end to all forms of violence against persons, as well as violations of their physical (and mental) safety starting with the most serious: intended and unintended killings and aggravated assaults. *The statistics speak for themselves*, argue (in substance) the elected local officials; the rate of crime is constantly decreasing: 330 homicides in 2017, compared to 334 in the previous year, according to the New York Times; a record rate, the lowest since the end of World War II. A spectacular fall *versus* the dramatic peak of 2,245 deaths recorded in 1990.







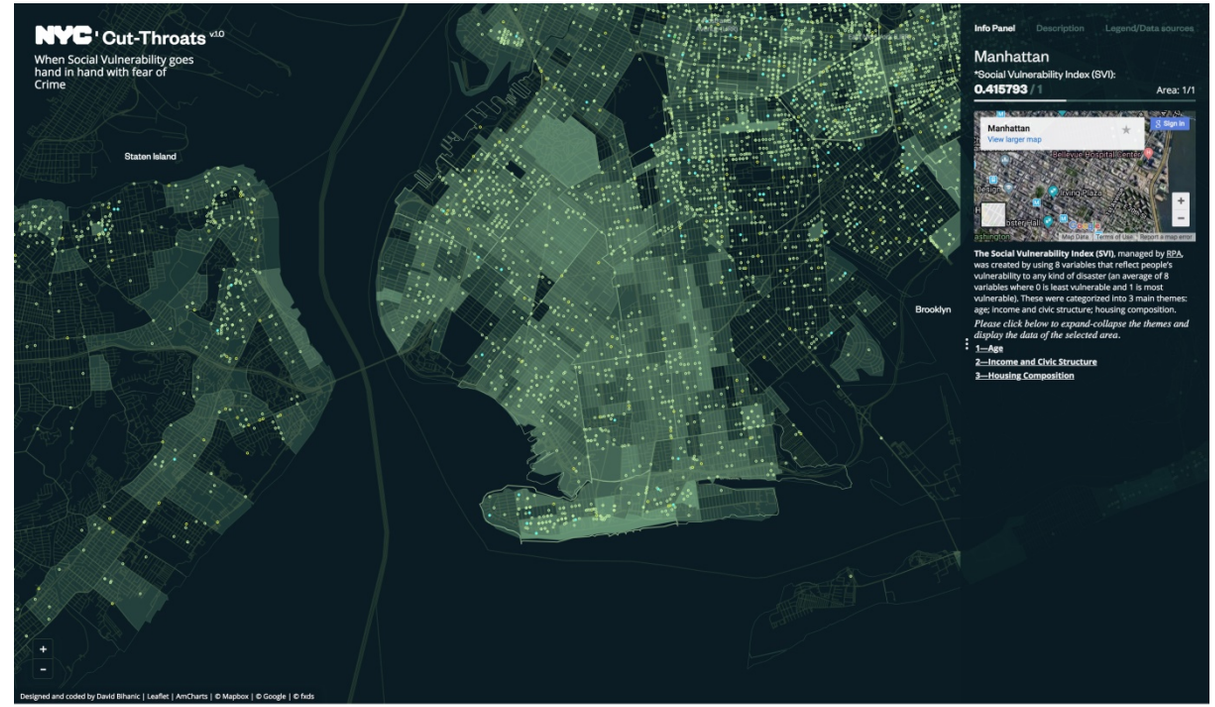


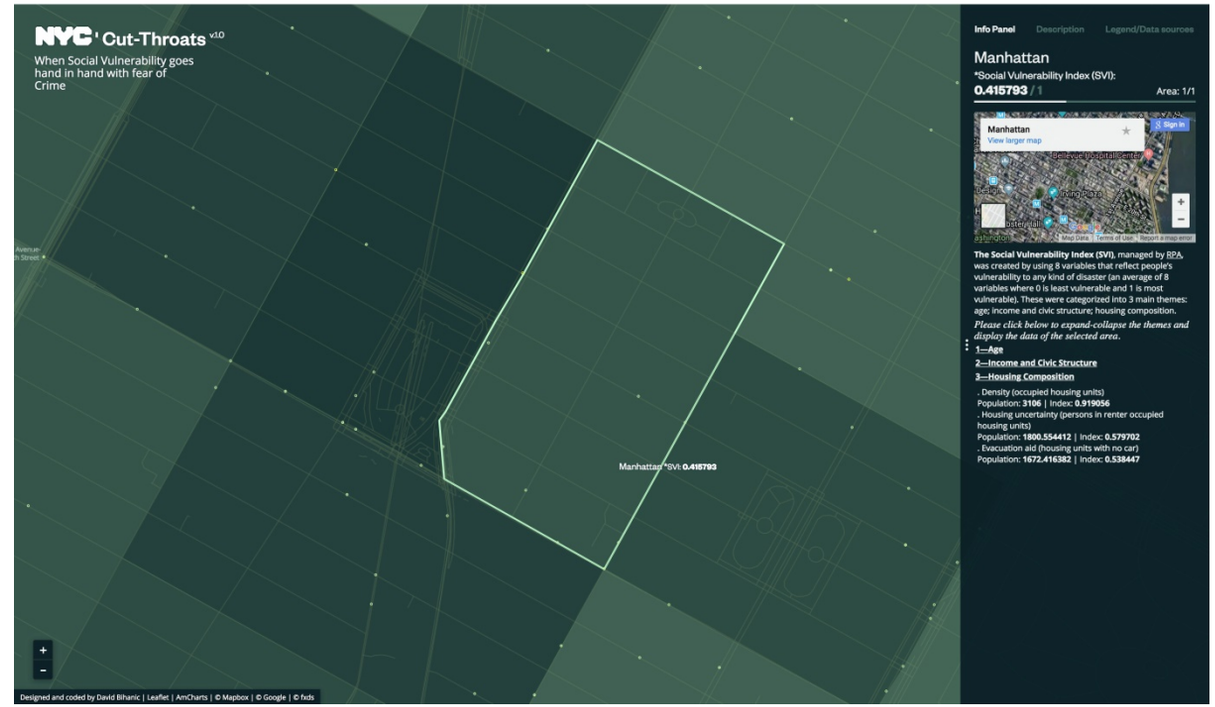
Let us remind ourselves the commitment made at the time by Rudolph Giuliani (former mayor of the city) to pursue a "Zero-Tolerance" policy against crime (a slogan borrowed from Ronald Reagan). The Republican had then engaged in a fierce fight against offenders and criminals promising the inhabitants the return to a quality of life lost during the previous decade. This was his second aim (and slogan): the famous "Quality of life policing".

What is the concrete situation today? If the crime rate has indeed declined, does that mean, arithmetically, the quality of people's lives is improving? And if so, do the living conditions really progress for all citizens? In the present webmap, we have reconciled two datasets: a first one drawing up a list of the major crimes committed in NYC during the year 2017 (such as murders, assassinations, beatings and further types of physical attacks) — these data are provided by the police authorities — and a second one listing a whole series of measures dealing with the social vulnerabilities on the territory — Social Vulnerability Index (SVI) is produced by Regional Plan Association. A general observation emerged from this webmap: if the quality of life is apparently improving for certain individuals, many

others still fall prey to crimes which are rampant in some boroughs, quarters and streets where social distress is most acute. We are all aware of the huge social fragmentation that splits the city in two (NYC is home to both the very rich and the very poor). But what may be less well known is that misery, poverty and fragility are often, if not always, linked to insecurity, physical (also psychological) suffering and constant fear.

With this web-based data visualization, we did not intend to produce any “proofs” (persuasive evidence) but rather to provide “visual clues” as food for reflection and debate (some patterns for further analysis and investigation). We designated a possible line of approach, defined a framework and highlighted potential issues. We brought a new perspective, graphically formulated working hypothesis for study, and explored what is hiding behind the world of *appearances*. — In some ways, the data-based art project of Herwig Scherabon entitled “Landcapes to Inequality” [4] has some similar objectives to our own. One of the main goals is to capture a certain sense of reality, to deliver informative impressions (in other words, to provide *insights*). Now, we are working with sociologists from the University of Paris 1 Pantheon-Sorbonne on key issues brought to light here and yet unresolved: the significant relationships (in different cities worldwide) between "precarious social position" and "vulnerability to hate-motivated crime".





Project released on June, 2018.

Description webpage:
<http://www.davidbihanic.com/nyc-cut-throats>

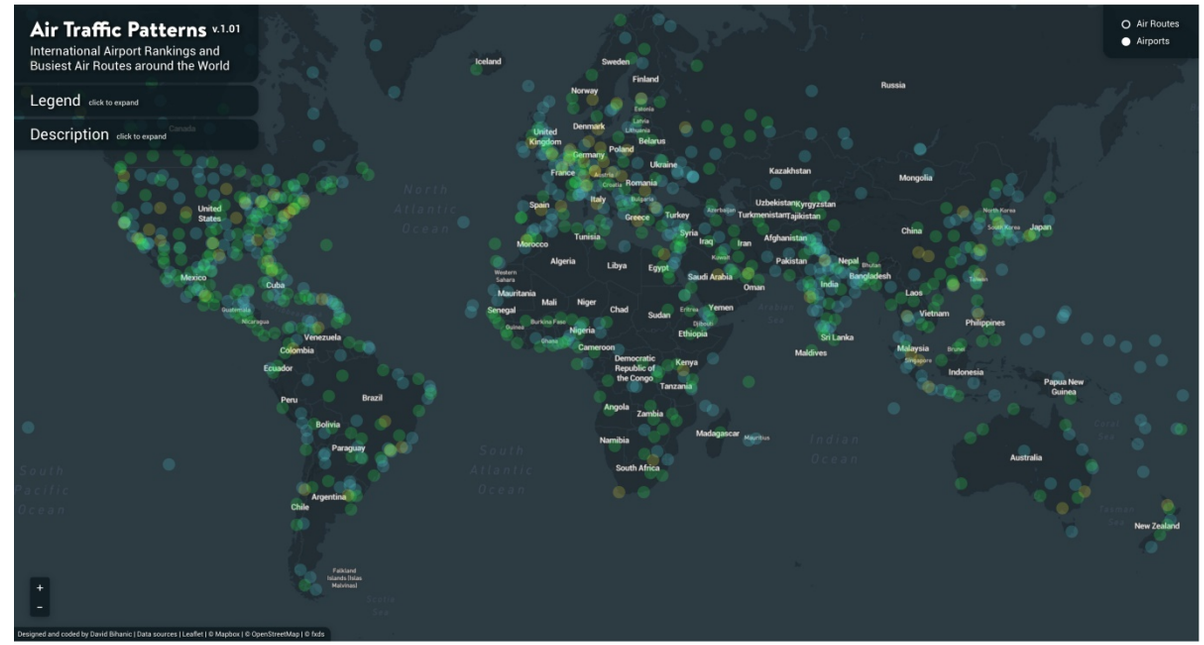
Online project (only available in Chrome and Opera browsers): <http://www.davidbihanic.com/nyc>

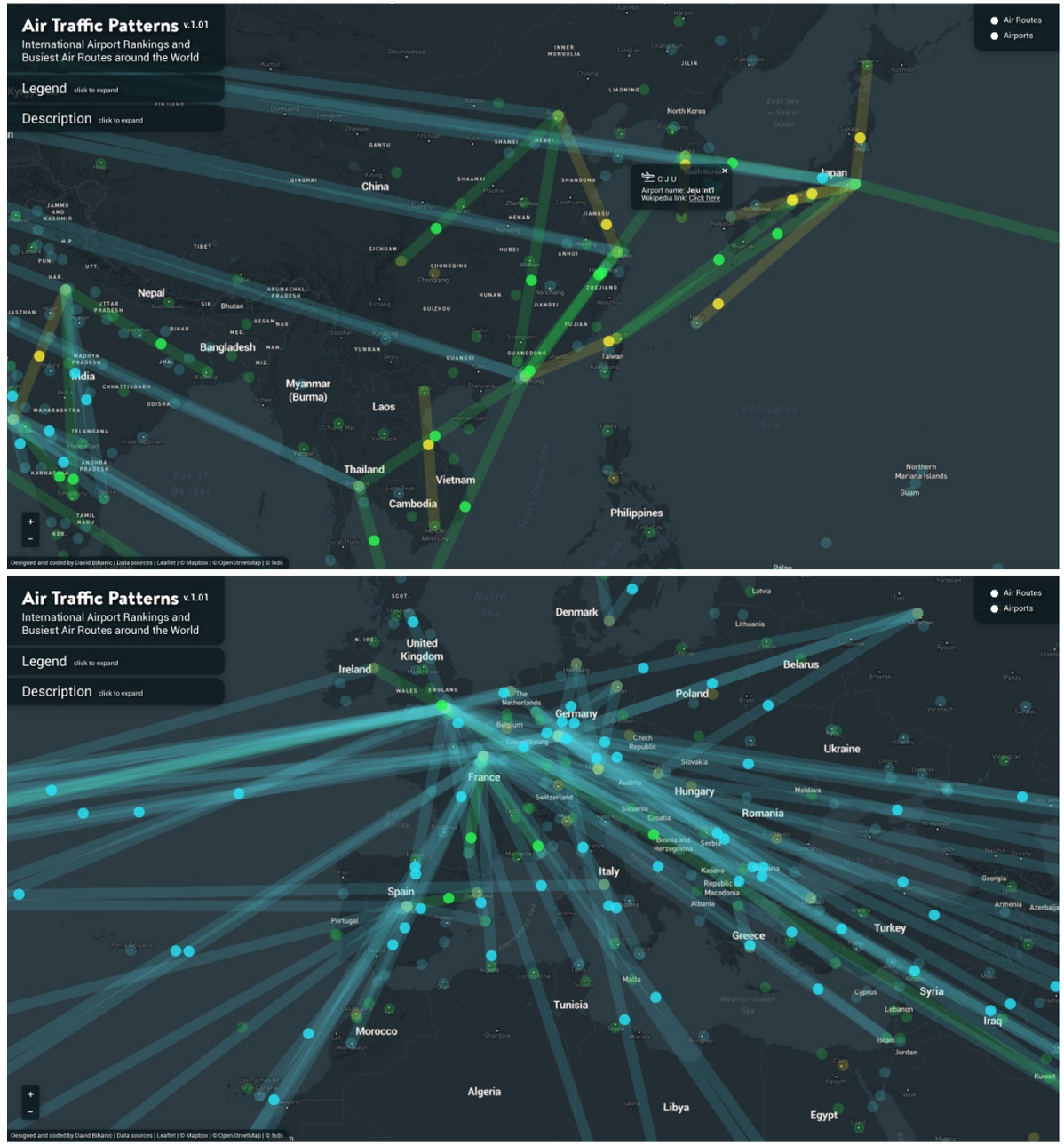
Data sources:
Regional Plan Association (RPA), Social Vulnerability Index (SVI). Created: December 30, 2014, 15:59. Last updated: March 2, 2015, 02:54.

New York Police Department (NYPD), NYPD Complaint Data Current YTD (parsed KY_CD:101-355-106;104-116-233). Created: October 29, 2016. Last updated: March 22, 2018.

"Air Traffic Patterns. International Airport Rankings and Busiest Air Routes around the World"

Every day, all around the world, tens of thousands of aircrafts furrow the skies. For all these flights, when comparing their frequency or recurrence (combined with the number of passengers), it is possible to distinguish the destinations that travelers value the most, either for business or pleasure. These movements from one point to another of the globe, once formalized/materialized onto a map, reveal an astounding network, a huge and irregular meshing whose geometry (globally and locally) provides us with an entirely new vision of inhabited territories. Depending on the different forms and figures (patterns) that stand out against the background map, we can notice concentrated or high-density areas (densified mesh), geographical zones/regions of major interest, but also, conversely, other areas that are partly neglected, ignored by the greatest number of people. That is precisely what this data visualization sets out to show.





The colored vectors represent the most traveled air routes — three categories are calculated based on the number of passengers per year (2016), each is given a specific color. Moving dots represent the numerous flights in and out; their speed depends on the number of flights recorded weekly. A myriad of fixed dots identify the location of major airports around the world. Color coding allows differentiating them according to their level of attendance — a three-level scale is chosen. Tooltips are available by clicking on each vector or dot, each incorporates additional information: distance in kilometers/miles between two points (flights from one airport to another) and time trip; names of each airport and the link to their Wikipedia page).

More than a study on the increasing volumes of air traffic (and relative complexity), we aimed, with this web-based data visualization project, to depict (and so expose to public view) a supposed fundamental change: the global social and economic polarization seems to be shifting towards Asia (especially China) which would hence become the new centre of the world — we did not produce a "proof" of that, we designed a kind of big picture (composed on the basis of different datasets) offering "signs" that allow us to catch a glimpse of this new possible or probable reality.

Project released on September, 2017.

Description webpage:
<http://www.davidbihanic.com/air_traffic>

Online project:
<http://www.davidbihanic.com/airtraffic>

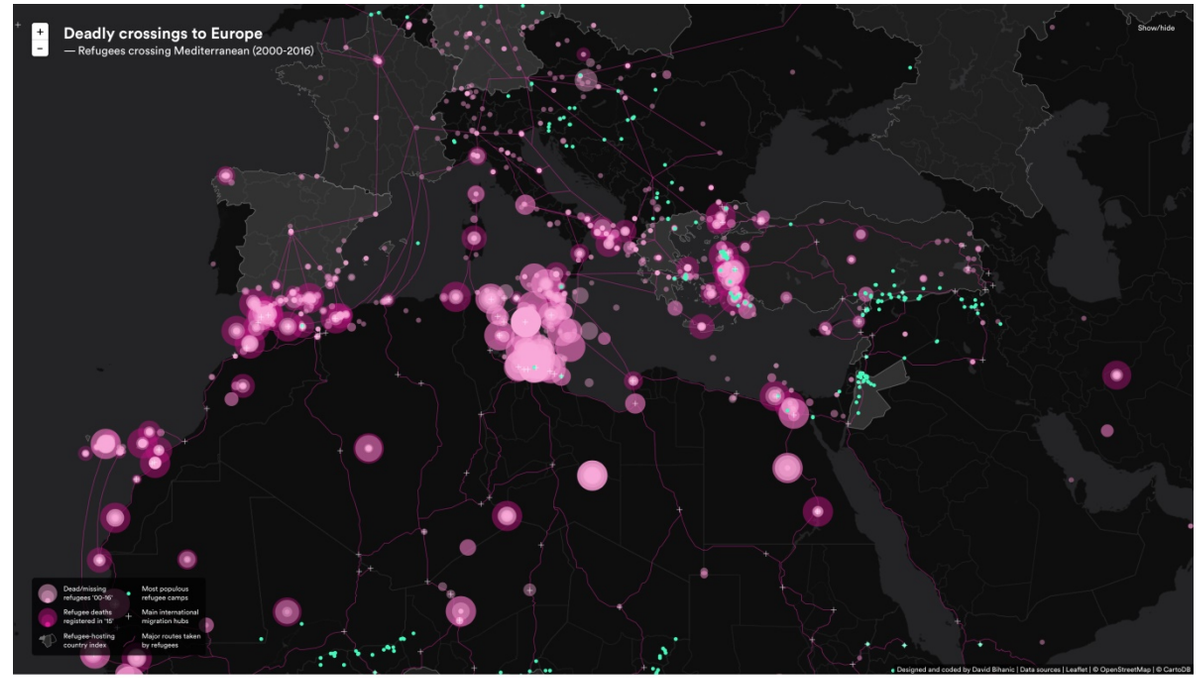
Data sources:
The International Air Transport Association (IATA) World Air Transport Statistics (WATS); Flightradar24 (Database) Live Flight Tracker that shows Air Traffic in Real Time; OpenFlights (Route Database) Free Open-Source Tool for logging, mapping, calculating and sharing Flights and Trips; OurAirports Website providing Collected Data on Airports around the World, Plane Finder Flight Tracker with Live Tracking Map for over 12000 Aircrafts; FlightStats Global Flight Tracker and Travel Planning; Flight Aware Live Flight Tracker and Flight Status Application; Eurostat (Transport Database) European Union (EU) Statistics; Flight Manager Time and Distance Calculator, Skyscanner Flights Search and Price Comparator for air-ticket; SkyscraperCity World's largest Online Forum on Urban Related Topics; City-Data Social Network sharing Data and Analytics; Wikipedia (Famous) Free Online Encyclopedia.

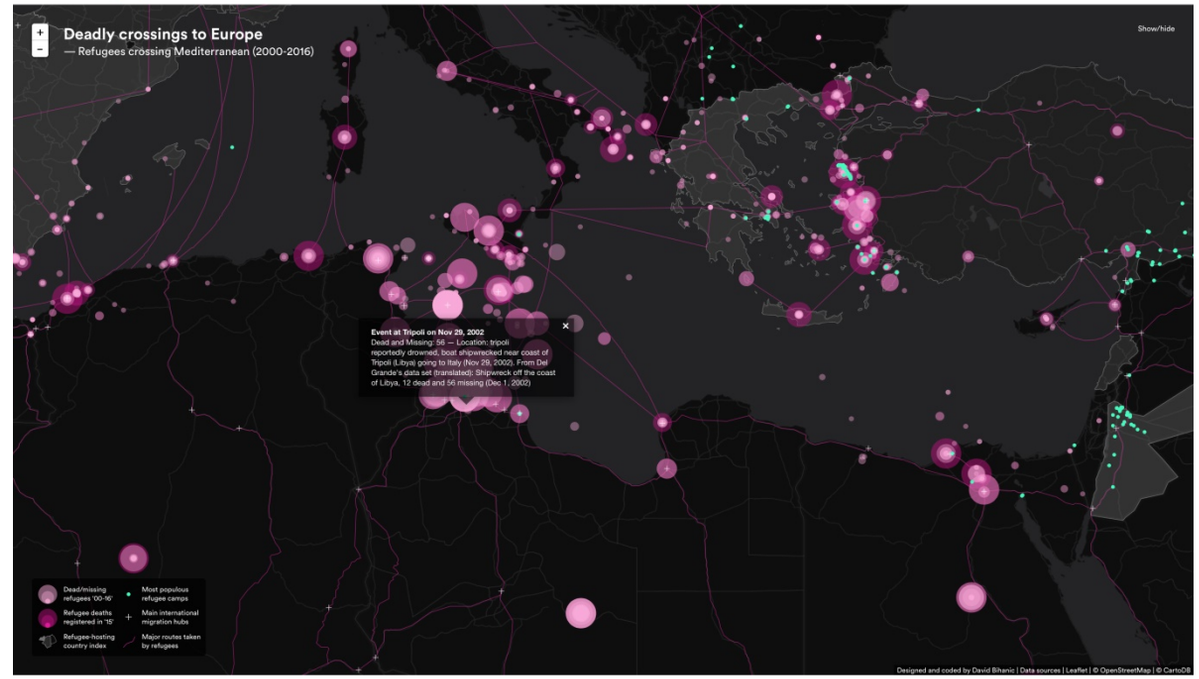
“Deadly crossings to Europe. Refugees crossing Mediterranean Sea (2000-2016)”

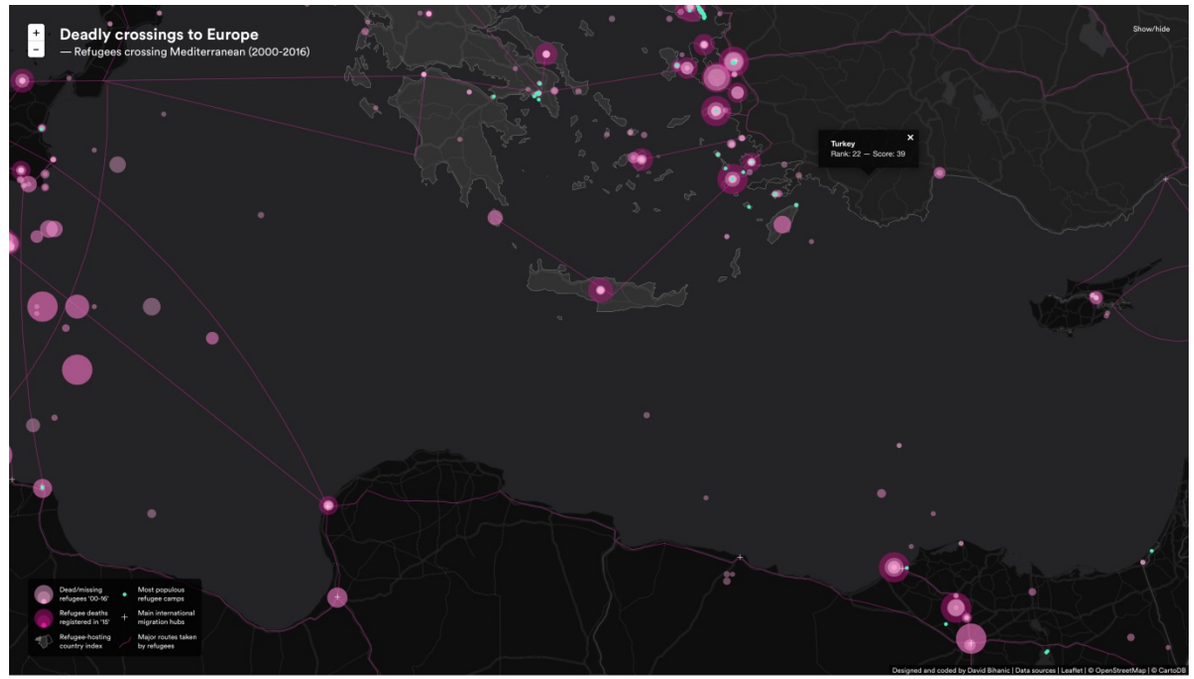
The world is facing the most significant migration crisis in its history. Even on this very day, millions of refugees are scrambling to reach the EU after fleeing war-torn countries such as Iraq, Syria and Libya. According to the International Organization for Migration (IOM), around 35,000 of them died or went missing between January 2000 and September 2016. The majority of deaths were due to drowning or exhaustion. In 2015, 1 million of refugees tried to cross the Mediterranean — more than 3,770 were reported to have died.

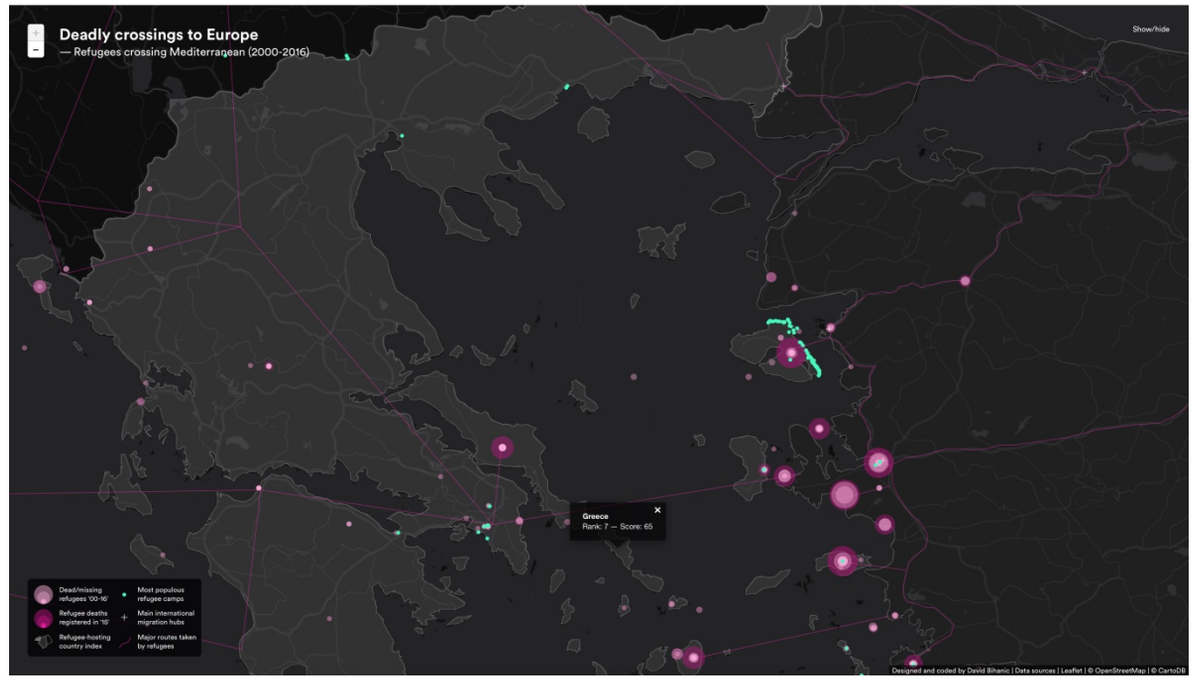
The “Deadly crossings to Europe” project consists of an interactive map that graphically represents (and locates) the dead and missing refugees who attempted to cross the Mediterranean over that period (2000-2016) — detailed information is available by clicking on each dot. This webmap also shows the major routes they have taken, the main international migration hubs, and the most populous refugee camps — the leading host countries for refugees are identified in the background.

The first objective of this project (encouraged by the International Organization for Migration — IOM) was to make everyone clearly aware of this large-scale human tragedy. In addition, our aim was to encourage selfless action (emanating from different public and/or private actors). Our deep intent was to foster local community initiative that provides assistance to the refugee and immigrant





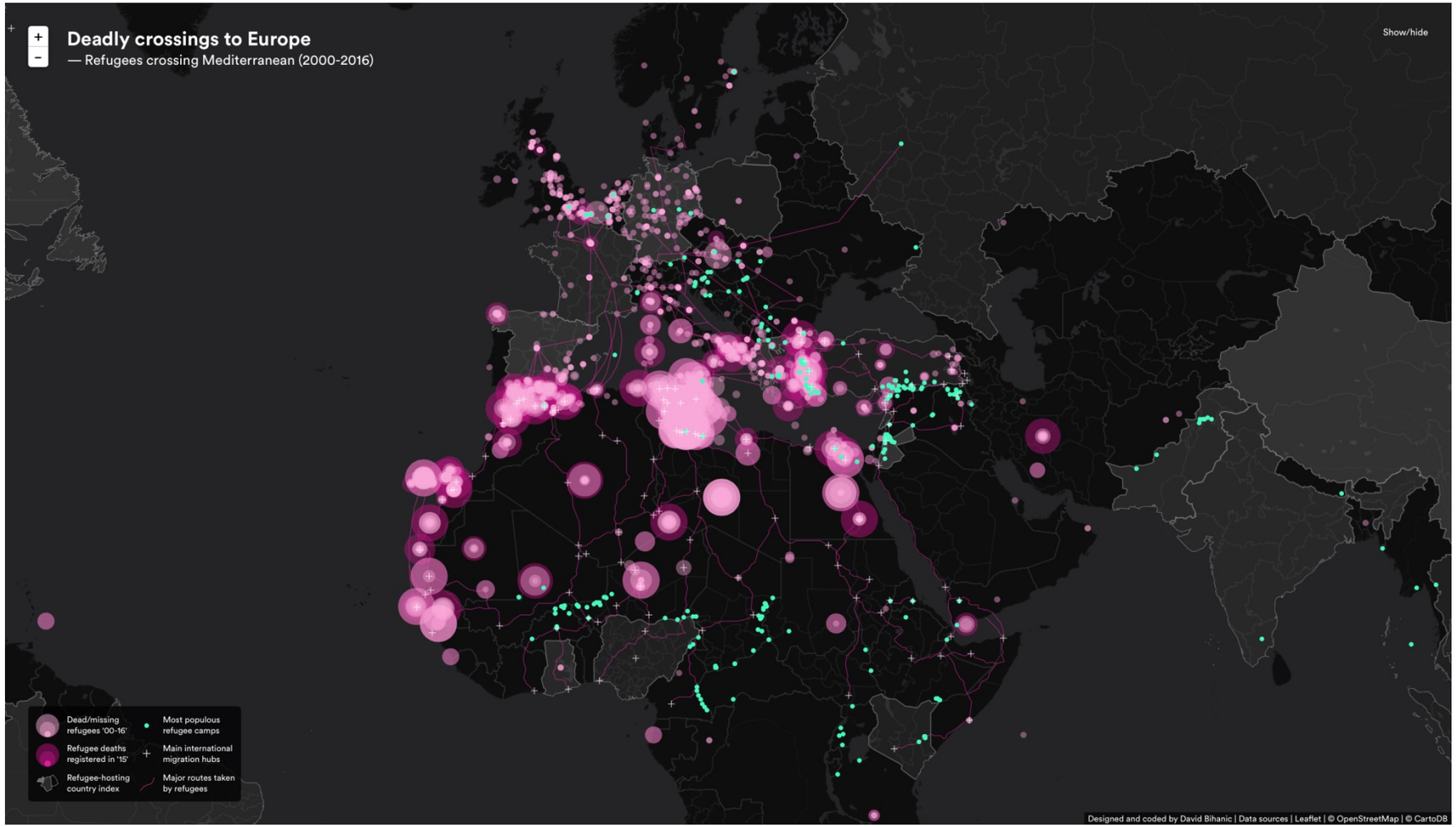




populations in Europe. To do so, we did not want to steer/channel action, to promote specific health or social assistance, for instance, or to direct the public to any specific NGOs. we rather sought to encourage the public to move forward constructively by finding their own way to support these migrating families who have risked their lives in search of a better future (towards constructive involvements); in other words, we were seeking to transform sudden 'bursts of conscience' into concrete altruistic behaviors and acts (favoring of bottom-up actions).

Data visualization has the ability to influence and persuade its audience (for better or worse). This refers to a certain 'cathartic' power, closely tied to its inherent educational capacity and amazing incentive effect. Data designers (like any other) have an ethical responsibility to contribute to building an equal, harmonious and more human world. With this project, we hope to modestly contribute to this immense task, and in doing so act responsibly.

Note that the Islamic Relief of France (Secours Islamique France-SIF, an international non-governmental humanitarian organization) with the Ateliers Henry Dougier Editor have published this web-based data visualization (an augmented-reality-based book mixing "paper" and "digital" [5]) in order to raise donor awareness of this tragic situation (as well as to convince potential donors of the importance of that specific issue). We are currently studying the significant impacts of this operation already covered by a positive assessment.

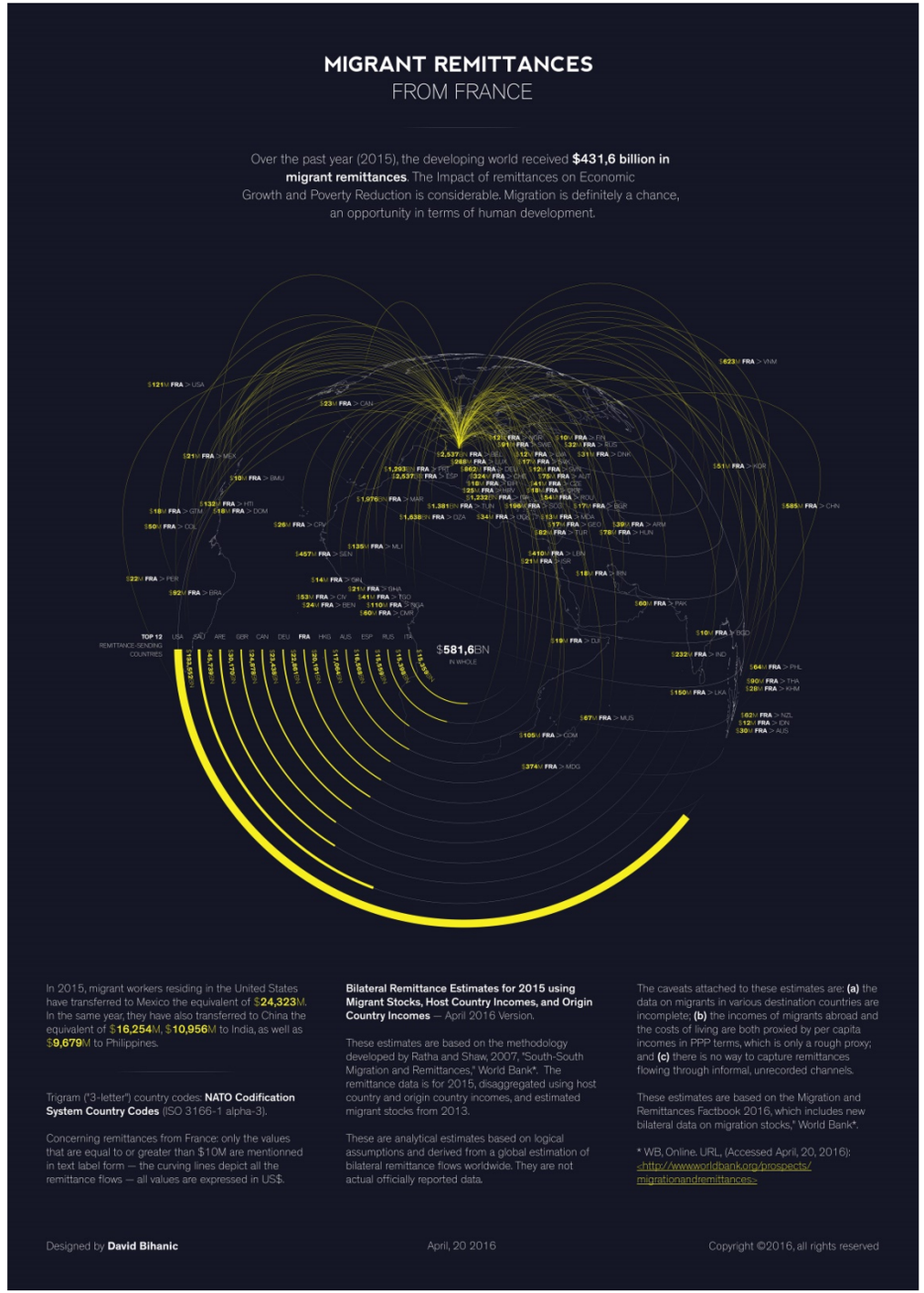


Project released on September, 2016.

Description webpage:
<http://www.davidbihanic.com/deadly-crossings-to-europe>

Online project:
<http://www.davidbihanic.com/refugees>

Data sources:
IOM (International Organization for Migration) – GMDAC (IOM's Global Migration Data Analysis Centre), UNHCR (United Nations High Commissioner for Refugees), HDX (The Humanitarian Data Exchange), WFP(World Food Programme) – ICMPD (WFP GeoNode, International Centre for Migration Policy), Reuters, United (European Network against nationalism, racism, fascism and in support of migrants and refugees), The Migrants' Files (Journalism++ SAS, Journalism++ Stockholm, Dataninja), National Geographic, Esri, DeLorme, HERE, UNEP-WCMC (United Nations Environment Programme-World Conservation Monitoring Centre), USGS (United States Geological Survey), NASA (National Aeronautics and Space Administration), ESA (European Space Agency), METI (Japanese ministry of economy trade and industry), NRCAN (Natural Resources Canada), GEBCO (General Bathymetric Chart of the Oceans), NOAA (National Oceanic and Atmospheric Administration), increment P Corp.



"Migrant remittances from France"

Over the past year (2015), the developing world received $431,6 billion in migrant remittances. The Impact of remittances on Economic Growth and Poverty Reduction is considerable. Migration is definitely a chance, an opportunity in terms of human development. Surprisingly enough, some people around the world fail to see it as such.

Note that in 2015, migrant workers residing in the United States transferred to Mexico the equivalent of $24,323M. In the same year, they also transferred to China the equivalent of $16,254M, $10,956M to India, as well as $9,679M to The Philippines.

In this project, we focused on the French situation but, of course, we would obtain quite similar "insights" (not the same results, in the strict sense) dealing with other countries. Here again, the design of "*sensitive* clues" (what defines "beautiful evidence", to our way of thinking) has prevailed over the production of "proofs". Our intention was to provide a new global perspective on human migration (in a graphical way), another informed viewpoint that shall not lead to a definitive conclusion, but participate more broadly in constructing a certain idea of the social and cultural diversity.

Project released on April, 2016.

Description webpage:
<http://www.davidbihanic.com/migrant-remittances>

Project:
<http://www.davidbihanic.com/wp-content/uploads/2016/04/migrant_remittances_ENG.jpg>

Data sources:
Bilateral Remittance Estimates for 2015 using Migrant Stocks, Host Country Incomes, and Origin Country Incomes — April 2016 Version.

These estimates are based on the methodology developed by Ratha and Shaw, 2007, "South-South Migration and Remittances," World Bank*. The remittance data is for 2015, disaggregated using host country and origin country incomes, and estimated migrant stocks from 2013.

These are analytical estimates based on logical assumptions and derived from a global estimation of bilateral remittance flows worldwide. They are not actual officially reported data.

The caveats attached to these estimates are: **(a)** the data on migrants in various destination countries are incomplete; **(b)** the incomes of migrants abroad and the costs of living are both proxied by per capita incomes in PPP terms, which is only a rough proxy; and **(c)** there is no way to capture remittances flowing through informal, unrecorded channels. These estimates are based on the Migration and Remittances Factbook 2016, which includes new bilateral data on migration stocks," World Bank.

Conclusion

One of multiple tasks of Data Design is to invent data representation languages that can increase awareness and understanding of complex realities of the present world, to grasp the major issues we now face. Consequently, a prime objective of Data designers is not just to expose data in a visual form, but rather to make the data the raw material of a new public opinion construction process: towards creative achievements (infographics, data visualizations and so on) which promote open discussions, debates, stimulate the production and interchange of fresh ideas, and foster the emergence of opinion communities. The four projects we presented are part of this collective effort.

Acknowledgements

I've strongly appreciated the support of the International Organization for Migration's and the Islamic Relief of France (Secours Islamique France-SIF) in the context of communication and valorization of the "Deadly crossings to Europe (...)" project. A first thank-you goes to them. I'm also very grateful to Thomas Dubot, Xavier Olive and Thomas Polacsek from the French Aerospace Lab for their assistance in finding reliable data sources in the framework of the "Air Traffic Patterns" project. I especially want to thank my collaborator and friend, Thibault Jaillon, for his precious advice and guidance in data visualization programming. Lastly, I thank Ramona Bourhis and Pauline Rothea for proofreading this article.

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