Chapter 4 - A View from Above

This chapter will analyze interactive practices that offer the viewer a distant point of observation. These media objects do not ask us to step into the shoes of the vulnerable, nor do they ask us to maintain our position. Instead, they promise us to shift our perspective, and to give an omniscient point of view, by offering the ability to zoom in and out, or follow a moving target. This is, then, an empowered position, or a view from above. I will analyze interactive maps, which typically use a Mercator map display—a "projection" of the globe on a two-dimensional surface—to show migration trajectories over time. These lines are, more or less abstractly, a scaled representation of specific human movement. To analyze the examples presented, I will engage with theories of mapping and cartography, as well as data visualization design and theory.

I am interested in the question of how interactive maps and data visualization might become part of a new form of storytelling. They allow the user to zoom in and out, and, thanks to software such as Tableau and ESRI Story Maps, can now be embedded in a story. The user can explore data, visualizations, and simplifications where bodies become "dots on maps." (Kwan 2007) As part of a story, these visualizations can represent a form of evidence. Bruno Latour considers mapping practices a form of inscription and refers to them as "immutable mobiles." These inscriptions can provide an advantage in a rhetorical and polem-

ical situation (1990).[1] This means that they aim to tell us something in order to provoke a response. As the school of critical cartography has argued, "map making is not a neutral activity divorced from the power relations of any human society." (Edney 1993, 54) What do these practices tell us, then, about migration and power relations? How do software and design standards transform data into storytelling?

In this chapter I argue that the visual display of migration, using design strategies and software, helps construct a specific view of migration. This perspective represents the "humanitarian impulse" behind interactive maps and data visualizations, as it produces an imaginary where the urgency of saving lives is its "raison d'être." (Rangan 2017) To view something from above means assuming an empowered position, and this is connected to the way states view their subjects (Scott 1998). In other words, it simplifies and makes complex entities legible in order to govern. The danger is that migration comes to be seen as a problem in need of a solution (Tazzioli 2020).

4.1 The Visual Display of Migration

To understand interactive maps and data visualizations as "cultural artifacts" it is necessary to look at the context in which they are found, and at the discourses and infrastructures they are embedded within. This means focusing on not only how they are constructed using design strategies, but also understanding their circulation, the use of specific formats, as well as their integration of certain data sets. When we view interactive maps about migration, which display trajectories of people

1 A note on usage is necessary, here. Erhard Schüttpelz argues that Latour's account of the history of maps as "immutable mobiles" is imprecise. Latour claims that such practices and the use of immutable mobiles between the 15th and 17th century led to what could be considered the later dominance of the western world. But, as Schüttpelz argues, these media were not immutable at all. The process of standardization came later. However, maps and other media beginning in the 19th century onwards can be considered "immutable" because they formed part of the practices of standardization (Schüttpelz 2009).

moving across time and space, we are not only looking at a representation, but also at human and software interpretation of data. In order to study interactive maps with data visualizations effectively, then, it is also necessary to consider them as visual and textual practices.

It should be noted that interactive digital maps no longer require the same level of expertise as cartography once did. A variety of tools are accessible in scientific, professional, and amateur contexts. We might use specific software—typically GIS (Geographical Information System)—but many maps made by designers which embed data visualizations can be created using programming languages like Python, SVG, CSS, or Javascript. This software can embed maps and projections using standard libraries, where some specific format—for instance, hemispheric projections—is used to produce an interactive map to visualize data.

I would like to introduce a case study so that we might better understand how data can be used to display the movement of refugees using a series of specific design rules. *The Refugee Project* (2014-2018) is the result of collaboration between Nigerian–American artist Ekene Ijeoma, Hyperakt, a New York City social impact design studio, and the Oak, a Brooklyn-based, independent design-led product studio. *The Refugee Project* seeks to provide a map-based exploration of refugees' migration over time (fig. 12). It uses the UNHCR's data on refugees as well as some original stories with photographs taken from the UNHCR digital archives.

A Mercator map of the world reproduces through differently colored circles the increase or decrease in the number of registered refugees under the protection of the UNHCR. As the creators claim on the website:

> *The Refugee Project* does not consider the large number of economic migrants and other undocumented populations, nor does it show the millions of internally displaced persons in troubled countries around the world. As a result, it is an image almost exclusively of social and

> political crises, rather than of natural disasters or economic turmoil. (The Refugee Project n.d.)[2]

The UNHCR's data on refugees is constantly updated. They now have a website and an app for public use. On the website's homepage, data now refers to "forcibly displaced people," and this might be separated into refugees, asylum-seekers and internally displaced persons (UNHCR 2020b). Refugees represent therefore only a small part of the data. The interactive map of *The Refugee Project* nevertheless uses this data.

To illustrate the number of global refugees over time—written in text form as well as highlighted on a histogram—the map displays circles of varying diameters. When you click on the "play" button on the top left of the page, the circles expand or contract, depending on the number of refugees in a given year. The time span starts in 1975 and ends in 2018. If you stop the image or hover the cursor over a specific country, you can see lines showing the trajectory of exiled refugees. This spatio-temporal way of displaying data is not new. Some cartographic illustrations of the colonial period showed for instance emigration on a global scale (Bacon et al. 2016). Today, these kinds of maps have been updated, and interactivity allows exploration of the data itself. Some scholars have noted, however, that it is important that these maps be sensitive to how movement is represented, and adopt the position of the migrants: "Some media maps—argue a group of cartographers—may confuse 'routes' and 'flows', fueling anxiety of an 'invasion'." (Ibid.)

As Orit Halpern notes in her book *Beautiful Data* (2014), the fetish for data visualizations has a long history, and flourished after World War Two. It was a result of the rise of information infrastructures at the time. Their use highlighted how society—at least in neoliberal countries—was shifting its management of perception and cognition. As Halpern notes, the scientific disciplines (such as cybernetics) that emerged in the postwar period "redefined vision as encompassing

2 These statements featured in the About section of the website before 2018 (see Chapter 5, fig. 30). However, the layout and some aspects of the website changed in 2018.

Fig. 12: The Refugee Project. Actual version of the Website

Image source: screenshot from The Refugee Project (2014-2018), http://www.therefugeeproject.org/#/2018.

the entire relationship structuring the act of observation" (ibid. 206). Moreover, for information designers like Edward Tufte, the effectiveness of graphics depended on how elegant they were. In short, data aimed to be beautiful. Designers and map designers today still follow a series of rules that Tufte helped to define. For him "graphical elegance is often found in simplicity of design and complexity of data" (Tufte [1983]2001). Today, data visualizations are becoming ubiquitous, not only because we are collecting more data, but also because they circulate through new and more pervasive infrastructures—for instance, in standardized formats. Everyone with an Internet connection, not only designers and experts, can access data visualizations and use tools to creatively visualize data. The language of data visualization is evolving into a standardized series of tropes, and often the software used limits what designers—professionals but especially non-professionals—can or cannot employ in their *dataviz*[3].

3 Short for "data visualization."

If we look closely at *The Refugee Project*, we notice that data on refugees by country of origin is displayed in red, and data on refugees by hosting country is in blue (see fig.12). From the circles, lines can depart to a destination or origin country. Their shape and variations cover a time span of almost 30 years. We can browse the map to follow the direction of refugees, starting from a specific country while moving the cursor to a destination country of our choice. The map uses circles and perfect trajectories, which move from A to B in a straight line. The colors are balanced, and we can easily distinguish the two main data sources: on the one side, red for origin countries; on the other, blue for destination countries.

In Andy Kirk's handbook *Data Visualization* (2016), maps are considered as one type of chart—or pure visualizations, models made by data sources. "Visual cues," the book explains, are based on the Gestalt theory of sensory perception, and are "influential visual properties" which a designer must take into account. (ibid., 263)[4] As Kirk further notes, a fundamental part of design is color, which should only be chosen after a designer considers its meaning. Moreover, their choice of color has to respect the defined standards of data legibility, editorial salience and functional harmony (ibid). Decorative effects, therefore, come later. Moreover, color choice also depends on the design's final delivery format (print or digital). Decisions in design, Kirk offers in summary, follow the harmonious employment of the three parameters of hue, saturation, and lightness. In this way, this design theory follows standard color theories.

We see indeed in *The Refugee Project* how different saturations of blue or red refer to higher numbers in the statistical data. The data legibility standard responds in part to the question of why two colors are used: red represents a country and the number of departing refugees; blue represents the number of refugees registered in that country. This feature is called "nominal color" (ibid.), and refers to the categorization of

4 Gestalt theory studies how perception is organized. It claims that the human brain translates reality's complexity into patterns of similarity, proximity, continuity, closure etc (See Arnheim 1954).

different values using different colors. Each color has a qualitative value, which helps to outline the difference between two data sources. Kirk explains that blue typically has a "cold" or negative meaning, while "red" has a warm and positive meaning (Kirk 2016; Arnheim 1954). Red is also used for traffic "stop" signs, thus it not only holds a positive meaning but it also symbolic of danger. If for Gestalt psychologists and designers, choosing a saturated red color means something specific, our everyday experience reinforces this symbolic significance—especially when the color is placed in contrast to other colors such as blue or green. Blue is never used to signify oncoming danger or to remind someone to pay attention.

Overall, this binary color choice, invites us to make a comparison: the contrast of blue and red—which is also color-blind friendly—emphasizes the lines representing refugee trajectories, which spread over the dimension of the territory. We distinguish trajectories over time, compare them between different countries, and switch them from destination to origin nations. The question of *functional harmony* in visualizations means considering the effectiveness of balance in the use of color, suggests that designers should create neither a too chaotic or too boring aesthetic (ibid.). The process of design aims to find a balance—an aesthetic harmony. In other words, a form of beauty.

Given how used we are to inscriptions such as data visualizations, charts, and statistics (from newspapers etc.) we would perhaps not ask why refugee origin countries are displayed in red. But red still carries symbolic meaning. For the designer, it is simply to make information more visible: it is a way to persuade us, because it is visually "better." Nevertheless, it also suggests that the designer does not believe the viewer associates symbolic values with certain colors—which seems unlikely. Colors can also provoke emotional reactions, which of course are highly subjective, but some scholars have demonstrated how they can indeed have an "affective value." (Oyama, Tanaka and Chiba 1962) Following this line of thought, red encourages feelings of excitement and blue provides a calming feeling. Others have found evidence in a cross-cultural study to suggest that red has bad connotations, while blue has good connotations (Adam and Osgood 1973). Beyond any cultural conno-

tations, the distinction between origin (red) and asylum country (blue) clearly distinguishes between those in exile and those that are welcoming to refugees. It marks a separation between the vulnerables and the humanitarians.

In Tufte's book, *The Visual Display of Quantitative Information* ([1983] 2001), he compares graphs over time and highlights the features that make their design more effective. As with Kirk, the book suggests that for data visualization to be beautiful, it needs balance, clarity and simplicity. With regards to color, Tufte argues that it can be used to label, measure, represent or decorate. For data to be attractive, Tufte goes on to explain, data complexity must be rendered accessible (ibid.). Also, graphics should have a "narrative quality, a story to tell about the data" (ibid.). The story that *The Refugee Project* tells is of people moving, and shows us what a "flow" of people moving from one place to another looks like. The increase in size of the circles conveys the growing number of refugees. Yet what this interactive map makes clear using the color transition between red and blue is the unidirectional path of certain "flows." When we click on a country of origin, the map creates lines departing from there to destination countries. And it is the same if we first click on a destination country: the map still shows lines departing from the origin countries. It is always a unidirectional movement; a moving image of a growing emergency in some part of the world.

Refugee trajectories in *The Refugee Project* are incredibly linear and simplified. Borders seems to vanish. At the same time, the number of refugees expands. The image the map creates is that of an undisturbed flow. Its creators have followed the design principles of data visualizations, seeking to make data "beautiful." But this simplified and harmonious visualization offers only a partial account of refugee trajectories, which is on a specific scale, over a finite amount of time. We are distant from the very affective and emotional images of vulnerable refugees, like mothers with their children trying to cross borders. Individuals are reduced to lines, colors, and circles. To overcome this unidirectional and impersonal representation, the creators of *The Refugee Project* added refugee stories that we can consult on one side of the page. Yet, the dominant visual display of migration emphasizes, in this case at a global

level, a growing humanitarian emergency rather than a mere representation of historical data. It is no wonder that this image uses humanitarian data sets.

The Higher Commission for Refugees has been collecting data about human displacement since 1951. This data is collected from hosting country governmental sources, but also from local UNHCR offices and NGOs. The UNHCR releases yearly statistical reports on refugees, asylum seekers and internally displaced persons (UNCHR 2020c; 2020b). *The Refugee Project* used its data sets, but so have other data visualizations such as Lucify.

This other project's subtitle makes clear what it wants to show: *The Flow towards Europe* (2015), see figure 13. This interactive map uses only the data of asylum seekers coming to Europe in recent years, beginning in 2012. On the project's homepage, the creators explain: "Europe is experiencing the biggest refugee crisis since World War II. Based on data from the United Nations, we clarify the scale of the crisis." (The Flow Towards Europe 2015)

Fig. 13: The Flow Towards Europe: data visualization of asylum seekers going to Europe

Image source: screenshot from The Flow Towards Europe (2015), https://www.lucify.com/the-flow-towards-europe/.

Some dots move towards a destination country. A time-lapse can be sped up and slowed down using a sliding button, but the time span always remains between January 2012 and August 2018. The focus is Europe. If we move the cursor over the map, we can see in different opacities of lilac the number—the brighter, the higher—of refugees coming from their origin countries. We do not know, however, how many refugees went to border countries (those physically adjacent to the origin country of migrants). We only know how many reached Europe. For every European country there is a white histogram, thus an indexical representation of data on a vertical scale.

Lucify is a Finnish collaboration between designers, web and software developers, and an independent team funded by a Google Initiative. It is addressed particularly to decision makers and communication experts in the governmental sector, as well as international and national non-governmental agencies. In their blog, the creators explain why they chose to work with the data set:

> This dataset only contains a part of the story. For example, the two million Syrian refugees in Turkey are not counted as asylum seekers, but registered refugees. While the UNHCR publishes some data about registered refugees, it is not as comprehensive as with asylum seekers. We chose to focus on the European perspective of the crisis, and show only asylum seekers arriving in Europe. Thus, we can work exclusively with the UNHCR's asylum seekers dataset. (The Flow Towards Europe 2015)

So, the choice to focus on Europe was driven by the desire to show asylum seekers—not those who have been granted asylum. This is how the creators justify an ethnocentric choice to highlight the number of people arriving exclusively to Europe. Each dot represents 25 to 50 asylum seekers. They distinguish a direct flow from A to B, from some hypothetical center of the origin country to that of a destination country. Although they first also wanted to show migrant routes, they eventually opted to use a single origin and destination point located at the center of each country. On the website they explain that "this makes it easier to see where refugees are coming from and going to." (The Flow Towards

Europe 2015) On the bottom of the page, if we scroll down, we also find another graphic: a simple visualization makes use of soccer field icons (each representing a set of number of refugee in an actual squared area) to compare the number of the "flows" going to Europe with those going to neighboring countries. The *Flow towards Europe* is inaccurate and easy to criticize; it makes Europe the center of the so-called refugee crisis by choosing not to represent—justified by design choices—the global dimension of migrant trajectories. This latter visualization, which seeks to relativize the number of refugees coming to Europe, is much less transparent in its "designer choices." First, it uses no colors. Second, no movement is involved. Third, there is no actual geographical reference. In some way, it conceals information rather than clarifying it. The emphasis is clearly placed upon the apparently unidirectional flow of migrants towards Europe. Again, as in *The Refugee Project*, borders are not visible—even as simple lines distinguishing countries. The Fortress Europe previously discussed is not intelligible. Instead, the impression is that there is no border at all.

The same creators complemented this visualization with more interactive maps. *The Cost of Displacement* (2015) not only shows a map of Europe, but the entire globe, using a hemispheric projection. This time lapse from 2000 to 2014 shows internally displaced populations together with refugees and asylum seekers. Here, the map uses additional data sources and focuses not simply on Europe but on the rest of the world. A bright shade of red signifies internally displaced people, that is, refugees who have escaped but are still living in their country of origin. White represents the number of refugees exiled from another country. On the website, the creators claim that the color shows people that have been forced to leave their homes due to conflict or violence. That said, they declare that people who have fled natural disasters are not included. Each tiny dot corresponds to 5000 people. According to this map, the number of internally displaced persons in Syria is much higher than the number of refugees who chose to make their way to Europe (white dots represent asylum seekers). Here, refugee data has been buttressed with internal displacement figures from the Internal Displacement Monitoring Centre (IDMC). These numbers cover conflict-

and violence-induced internal displacement. The creators make clear, however, that "some value ranges have been averaged, and some missing data has been interpolated." (The Cost of Displacement 2015) The UN agency for humanitarian affairs, UNOCHA (United Nations Communications Office for Humanitarian Affairs) also supported the project. But as the title of the visualization suggests, there is something else at stake beyond mere representation: the cost. What cost? Are we talking about the material cost? Under the title, a short text reads: "displacement leads to an immense human cost, but it also puts enormous pressure on the humanitarian system. For the first time in history, the United Nations humanitarian agencies and its partners are requesting over 20 billion dollars to meet humanitarian needs" (ibid.).

Initially, this visualization's target audience might seem unclear, because it circulated widely; however, we learn from the creator's statement, that they are mainly addressing decision makers: those who finance and support humanitarian aid, or those working for humanitarian agencies. The language of statistics and data tells us what the reader should expect, or might be looking for. It is not about engaging emotionally with individual stories. This data offers a broader and simplified overview of the so-called "European crisis." But it is exactly this visual display of migration's unidirectional flows that supports an ethnocentric idea of a "crisis" in the first place. For designers, it is perhaps difficult to create a clear global map of migration, which traces the complex routes taken by refugees and migrants. Nevertheless, using a single point of origin and destination creates unidirectional flows, which are far from the real and complex journeys of exiled peoples.

Heaven Crawley and Katherine Jones recently published an article which questions the linear representation of refugees and migrant journeys. Conducting qualitative interviews with refugees, they show that humanitarian and academic discourse often discusses migration flows using concepts such as "transit migration." (2020) This, they argue, is unrepresentative:

> The notion of transit migration contributes to the idea that millions of people are on the move, currently 'stuck' in other countries but ul-

> timately 'heading to Europe.' Whilst 'transit migration' accounts for a relatively small share of arrivals the spectre of potential migration haunts Europe and provides a vehicle—and rational—for policies that aim to manage and control migration flows. (ibid., 3)

This simplified picture of migration's flow also contributes to understand how data has been used and displayed. Even on a global map, the impression is of a European emergency, and if not, a global one.

John Harley, a critical cartographer prominent in the 1980s, first argued that maps are social constructions. For Harley, a location's absence or presence on a map, contributed to its presence or absence in our perception of reality—or in our social construction of it. Critical cartography's aim as to apply Foucauldian principles to maps and unveil their hidden power structures. If maps, before Harley, symbolized the accuracy of the scientific method, then his contribution was to show how unreliable they were. Lucify's first map, for example, in its focus on Europe, obscured what was happening elsewhere. This means that when we develop an interactive map that aims to convey information objectively, we should clarify which data sets are used. But this alone might not be enough. Even on a global scale, as we have seen in the case of *The Refugee Project*, visualizing trajectories by approximating them on a linear scale is dubious as well. In all these cases, the data used has an impact on visual display. Nevertheless, their purpose is clear: to provide decision makers with evidence of an emergency that requires an immediate response. Francois Bahoken, Nicolas Lambert and Philippe Rekacewicz also recently criticized some maps circulated by Frontex (the European Border and Coast Guard Agency), which represent migrants as "thick red arrows" heading to Europe (Bahoken et al. 2019, 21). They claim such depictions reinforce a "rhetoric of invasion." (Ibid.)

It is not only independent companies and artistic collaborations that produce interactive maps of flows using refugee data. The Carnegie Mellon University CREATE Lab's map *Global Refugee Crisis. The Big Picture* (2015) again uses UNHCR data on refugees, and aims to use data visualization to build data literacy. As their mission and values states, they want to use maps to make a social impact:

> By showing the results of our past decisions with visual evidence through time, we create the scaffolding that supports positive future decision-making. We can empower our decision makers in public and private spheres to make more informed, forward-facing choices. Together, we can move from "Is this happening?" to "What do we do about it"? (EarthTime n.d.)

In contrast to Lucify's maps, which focused on the impact on Europe, we can see that migrant displacement or the flow to neighboring countries has a much broader impact, which changes over time. Here, "flows" are mostly directed towards what can be understood as the "Western" world, as opposed to an underdeveloped and unordered world of others. Stuart Hall argues that this division is mostly economic, and that "the West" is a historical, not a geographical, construct. By "Western" we simply mean "[…] a society that is developed, industrialized, urbanized, capitalist, secular, and modern." (Hall 1992, 57) Nevertheless, if we zoom in to get a closer look at a specific nation state, we realize that, once the "flow" starts, neighbouring countries are also affected. For instance, it is clear if you look at figure 14 and zoom in the flow from Syria at the beginning of internecine conflicts in 2011 is directed towards only a very small part of Europe.

This demonstrates how important it is to have a broader, global overview on migration in order to relativize what the creators from Lucify call the "scale of the crisis" for Europe. These interactive maps aim to tell us one thing: the number of refugees is growing over time on a global scale. It is an emergency. Yet they depict a clear inequality in the origin of flows: those starting from non-Western countries are larger. When data on internal displacement is included in representations, we realize that our European "migration crisis" is relative to the migration flows elsewhere. This form of counter-mapping would help to free us from ethnocentric views and realize the limits of small-scale representation. Decision makers need to know that if they want to invest in humanitarian aid, the priority is to bring help where it is most needed.

Fig. 14: Global Refugee Crisis. The Big Picture

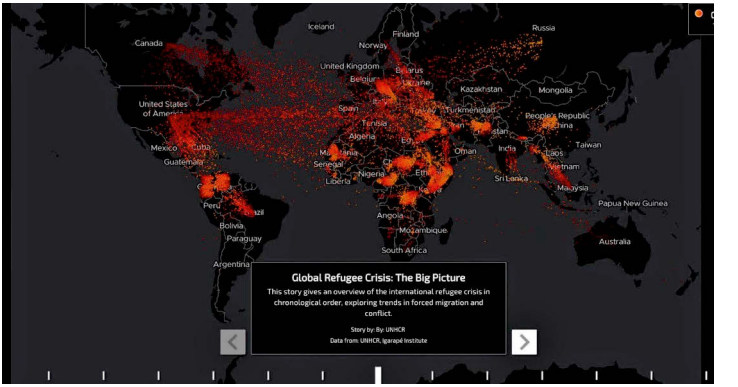

Image source: Global Refugee Crisis. The Big Picture (2015), https://earthtime.org/stories/global_refugee_crisis_the_big_picture.

By scaling movement over time, such "flows" only represent numbers and do not express how slow such trajectories might be. In other words, interactive maps depict migrant routes at a constant speed, and there is no distinction between routes across sea, land or air. A time span, that might expand for over fifty years or sweep just for less than a decade is the prerequisite to display movements. Migration across time and space. This is what we might see, the picture of movement. Represented in its simplicity, as it would be just so easy, to trace a line from a centroid of a country directly to that of a destination country. When I look at EarthTime's interactive map (fig. 14), I am also always astonished by the apparent cascade of reddish-orange dots; like a stream, it increases over time around certain countries, like Syria in 2014-2015, but then ends in nothing. These images representing movement are deeply affective, but they do not explain much about the real scale or speed of the issue—even if it is clarified on the website. Moreover, they remind us of the ways in which humanitarian discourse is shaped from an empowered view. As we watch and interact with the map, we are

able to zoom in and out, and we can obtain certain details. At the very least, we can learn about the data sample they used to produce the visualization. In sum, the choice and availability of data and the scale of time and space used determine the accuracy of the representation of migration routes. Utopically, if we collect enough data, as Jorge Luis Borges envisioned in one of his short stories, the map would become so precise that it became the size of the territory. But of course, this is not an option: a map is ultimately a simplified representation at scale of social or territorial data.

That being said, the use of a geo-referenced map indicates a belief that even critical cartography shared: we might be able to know the world objectively. This is part of the Enlightenment legacy of "empiricist cartography" which saw the practice as an exact science, driven by experience, experiment, observation and measurement (Edney 1993). For Matthew Edney, in contrast, the history of maps is not linear; instead, maps represent a specific historical and situated practice, which is determined by cultural, social and technological relations (ibid., 54-68). He distinguishes between different "cartographic modes," which combine "cartographic form and cartographic function, of the internal construction of the data and their representation on the one hand and the external *raison d'être* of the map on the other." (Ibid.) For the interactive maps aforementioned, the choice to use specific datasets and design strategies bespeak their historical circumstance. The *raison d'être* of such interactive maps, thus their function, is humanitarian. This is emphasized by the textual explanations that often complement these interactive maps: the maps seek to offer an "urgent" picture of migration, an emergency that requires decision makers (whoever they might be) to respond immediately.

I have analyzed interactive maps and how they display the movement of migration across time. I looked at their power relations and the aims they pursued. In the following paragraphs, I investigate the practice of making such interactive maps and data visualizations and try to engage with the question of how they are transformed into a particular form of storytelling. To do so I will introduce and explain how two pieces of software work.

4.2 Humanitarian Mapping: Data Storytelling with Tableau

Tableau is a piece of software that allows its users to produce, from spreadsheets and other forms of raw data, captivating visualizations which translate data into storytelling. As BI (Business Intelligence) software, it is principally a platform that manages, organizes, shares and makes use of data for various types of companies.[5] As a promotional video advertises, Tableau "empowers" everyone and allows them to "see" and "understand" their data clearly (Tableau n.d.). In another video, Pete Misner, a teacher who defines himself as a geek for data, describes a talk, given by Hans Rosling back in 2007, which "blew is mind" and demonstrated a mastery of storytelling through data. Misner argues that Rosling showed the world the "knowledge compression" that data visualization could offer (ibid.). In the original TED talk offered by Rosling, a doctor that believes in the use of statistics to teach global health, we see some animated infographics, and, like a *bonimenteur* of silent cinema, Rosling[6] uses them to comment on the evolution of data.

For Rosling and Tableau software's developers, data has the potential to tell stories. In the company's advertising video, for example, they compare it to oral narration, where fragments of stories are collected within a "narrative arc." But perhaps more than simply being a requirement of the data itself, storytelling has become a necessity. As Kosara

5 It is a platform because it can be run on several systems and computers using different applications while also enabling data and content sharing. As Corsello explains: "Cloud services platforms (think AWS, Microsoft Azure, Google Cloud Platform) now enable companies to bifurcate the logic functions of applications so that an IT structure can be built for change. While many SaaS have hundreds (and in some cases, thousands) of features, the predefined business logic narrows their ultimate breadth of scope and the flexibility is limited to the modular design of the platform." (2018)

6 Rosling was the founder of Gapminder (a non-profit foundation), that developed in early 2000s a software called "Trendalyzer" to measure data and provide interactive graphics. Google bought it in 2007 and it is now available as an API for the larger public.

Fig. 15: Hans Rosling performing behind some graphic animations

Image source: screenshot from YouTube.com, https://www.youtube.com/watch?v=5JiYcV_mg6A.

and Mackinlay note, the need to communicate data successfully with visualizations is contingent upon the fact that data analysts are not those in charge of making decisions based on these same figures. They observe how certain features support the creation of successful data visualization, and, drawing on previous research, they acknowledge how elements borrowed from other media could help people understand how to shape data visualization.

> Data stories differ in important ways from traditional storytelling. Stories in text and film typically present a set of events in a tightly controlled progression. While tours through visualized data similarly can be organized in a linear sequence, they can also be interactive, inviting verification, new questions, and alternative explanations. (Segel and Heer 2010, 1)

Interactivity, for instance, might help to effectively explore data, but it could also hinder or distract from a story's flow. This notion of flow is inspired by filmmaking and journalism. Clicking or moving the cur-

sor usually enables interactivity in visualizations, and allows for more autonomous user exploration. Interactivity entails different degrees of freedom and fluctuates between an "author-driven" and "viewer-driven" form of storytelling (ibid. 1-10).[7] This is a form of interactivity that either performs the author's explanations (you click, zoom in, and follow a linear construction) or facilitates user exploration.[8] The interactivity of Google Maps, for instance, is a form of viewer-driven storytelling, whereas the use of explanatory textual parts or visualizations organized through a timeline enabled by a play button (such as in *The Refugee Project*) represents author-driven storytelling, because the latter constrains the degree of interaction.

Since 2018, Tableau organizes a yearly competition for the best visualization called "Iron Viz" on its public platform. Recently, Pradeep Kumar participated with his entry "Beyond The Border" (fig. 16). Using Tableau, Kumar created an interactive visualization: a world map showing the flow of refugees to different US cities and states. If we scroll down, we can see other graphs which show the historical numbers of accepted refugees from 1975 onwards. The visualization shows that the eighties welcomed the highest number of refugees, whereas the number of resettlements has dropped in recent years—particularly after President Trump became President. Kumar's sources include the UNHCR database, but also other organizations such as Worldrelief.org, a humanitarian agency that the visualization directly addresses via a "donate" button at the bottom of the screen.

It becomes clear in this visualization what Tableau's developers mean by making data "powerful." The first interactive map visualization depicts plotted lines of refugees trajectories that cover a linear

7 For data visualizations, interactivity might include: "navigation buttons, hover-highlighting, hover details-on-demand, filtering, searching, drill-down, zooming, and time sliders." (Segel and Heer 2010, 8)

8 This also echoes research on user participation with interactive documentaries. Sandra Gaundenzi argues that the role of the filmmaker-creator as author has changed to more of a "facilitator" who organizes and structures user participation (2014).

route from a place of origin to the US. It combines text with data and interactivity "on-demand" using simple finger-scroll navigation.

Fig. 16: Visualization from Beyond the Border: refugees going to the US

Image source: screenshot from Beyond The Border (2018), https://public.tableau.com/app/profile/pradeepkumar.g/viz/BeyondTheBorder/ironviz.

This example reminds us of one of the techniques data visualization inherited from other forms of storytelling: guidance, which is connected to "continuity editing" in filmmaking, and linearity in text or storytelling more broadly (Bordwell and Thompson 2006). Typically, in interactive documentaries and practices, or "ergodic" media, linearity gives way to non-linear forms of storytelling (as we have seen for text-adventures and serious games) which are mostly user-driven (Aarseth 1994). The user decides which path to take. However, as some scholars of interactive documentaries and I have argued, interactivity is not always the best strategy to make storytelling more engaging; it might even constrain the flow of the story.

To achieve narrative flow, thus a form of guidance that helps the user to explore data while emphasizing continuity, the data animates itself through a simple scroll down function. This "animated transition" is more intuitive in mobile formats and today is referred to as "scrol-

lytelling." (Thudt et al. 2018, 71) This is an "author-driven" style because the composition of graphs, maps and animation is organized in linear fashion, and is enabled by the scrolling function.[9] The scrolling, when it animates between pages, provides a transition that moves us further into the story. Indeed, "animated transitions" are typically employed to orient readers, and to help them identify common elements and relationships across disparate graphics (Heer and Robertson 2007). Interactive maps often make use of this form of interactivity to enable animated transitions.

Storytelling here combines data with statistics and visualizations to emphasize readability via guidance. For Hans Rosling, the founder of Gapminder and inspiration for Tableau, data visualization has a fundamental role in spreading fact-based information. He believes in fighting ignorance with a "fact-based worldview." (Rosling et al. 2018) By facts he of course means data, and by "fact-based worldview" he means looking at the world through statistical data instead of sensational TV news, which privileges the extraordinary over the ordinary (ibid.). That said, not every data visualization creator's agenda is the same. In the case of interactive maps about migration, the purpose is not only to reveal certain facts to a wider audience, but also to encourage the audience to donate to the cause.

I will now introduce another piece of software that uses geographical information datasets as well as spreadsheets.

4.3 Humanitarian Mapping: Mapping Data with Story Maps

In 2016, the ESRI (Environmental Systems Research Institute), a billion-dollar company and leader in geographical information system software, launched a free storytelling tool for its professional GIS software,

9 As Segel and Heer argue, "a strongly author-driven approach works best when the goal is storytelling or efficient communication. We see this approach used in comics, art, cinema, commercials, business presentations, educational videos and training materials." (2011, 146)

ArcGIS. Named "Story Maps" the tool is easy-to-use, combines GIS imagery with text and other material, and is responsive across mobile platforms. With several template options, it allows every ArcGIS user to create interactive stories with maps and data. The developers of Story Maps explain how their software works thus:

> The linear, scroll-driven layout of (this) story map works to deconstruct a highly complex issue into manageable chapters. We are drawn into a richly immersive experience by a combination of maps, photos, videos, charts, and text. A consistent color palette brings all of the visual elements into harmony. (ESRI n.d.)

The software helps to create a linear story divided into chapters, made interactive only by the scrolling function. Here, maps and text are combined with additional charts and statistics, but also audiovisual material. As the designers suggest, the experience you create can be "immersive," while all the elements will conform to design rules and the principle of "harmony" (Kirk 2016). The idea behind Story Maps is to provide a tool that not only GIS experts and programmers can work with, but everyone with basic computer skills.[10] The developers first published *The Uprooted* (2016), a scrollytelling story, as an example of how the tool works. It centers on refugees and displaced persons in general, although there is a specific focus on the recent Syrian conflict. The homepage of *The Uprooted* presents a looped video showing a group of migrants walking in what it looks like a countryside environment. This introductory image is used to capture the viewer's attention and offer a glimpse of the story. The story's title is superimposed on the image, as is the subtitle "War, sectarian violence, and famine have forced more than 50 million people from their homes—the largest number of displaced people since World War II" (The Uprooted 2016). There is also

10 Although the free trial version is available for 21 days, the yearly cost is around 100 dollars. There also exists free software like StorymapJS which can be accessed directly from your browser. The latest version emphasizes the fact that you can choose between different designs without a great deal of programming knowledge or design skills.

a watermark in the lower left corner of the screen: UNHCR/Viktor Pesenti. Some data sources are mentioned: UNHCR and Airbus Defense and Space. If you scroll down, you first read text. By scrolling even further down, you read and view more data on internally displaced people. There are photos of people in refugee camps (in Zaatari and in Somalia) but also stills of migrant groups gathered in a train station in Hungary.

Two graphics appear after the text and you can compare them using scroll-enabled animation. They show the number of refugees (in violet) from 1995 to 2015. This number does not show a significant change over time unless you add, via a scrolling function (in blue), the number of internally displaced people, which has been rising since 2012. With further scrolling, a Mercator map of the world appears, which compares the number of refugees and internally displaced people in 2014 (figg. 18 and 19). Scaled circles in the same violet and blue display the number for each country, whose names are written only on top of the largest circles. This feature of keeping the same color is an example of "semantical consistency." (Segel and Heer 2011)

The subsequent pages depict the three countries with the highest number of refugees. This information is once again displayed on a hemispheric map, where you can only view the side of the globe closest to the country of origin. Here, the number of refugees in violet refers to figures on a small window on the right side, but you also see arrows departing from source countries in different gradients of color, length and width, which display, on scale, the trajectories of refugees going to foreign countries (fig. 20). Continuing your scroll, you reach a new chapter of the story highlighted with a title. It focuses on the civil war in Syria, and images of destruction. Another map guides attention to Syria, its neighboring countries, and the location of some refugee camps—outside and inside Syrian territory. Circles again show the population of the camps in terms of people living there. You can recognize the camps of Zaatari in Jordan, and Domiz and Kawergosk in Iraq—the same camps that featured in *Refugees* and *Refugee Republic*. The next chapter of the story focuses on Zaatari, the largest refugee camp in the Middle East, which is also now the fifth-largest city in Jordan. Several images testify to the size of the camp,

Fig. 17: The Uprooted: homepage viewed on a smartphone

Image source: screenshot from The Uprooted (2016), © UNHCR/Viktor Pesenti.

Fig.18 and 19: The Uprooted: Map of displaced people across the world, showing data for refugees (above) and IDP (below) in 2014

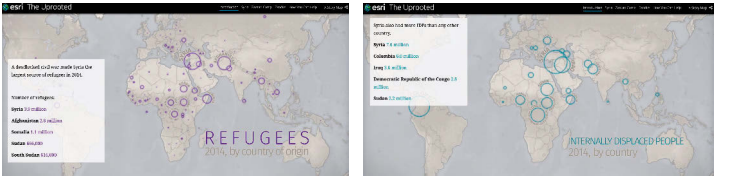

Image source: screenshots from The Uprooted (2016), https://storymaps.esri.com/stories/2017/the-uprooted/.

Fig. 20: The Uprooted (2016): a hemispheric map displaying refugee flows from Syria in 2014

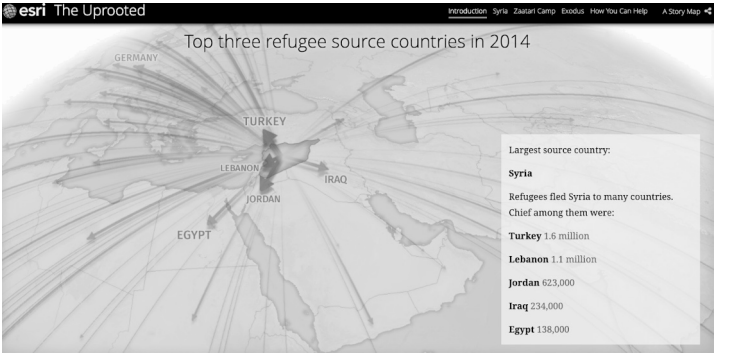

Image source: screenshot from The Uprooted (2016), https://storymaps.esri.com/stories/2017/the-uprooted/.

such as an aerial view by the US State Department which shows the site's crowded landscape from above. There are also family photos of refugee residents and satellite images that depict the camp. You can zoom in and out of the satellite view, and, as you scroll, layers of data are added. For instance, different colors identify schools, hospitals, but also community gathering areas and thoroughfares.

Fig. 21: The map is a satellite image from The Uprooted

Image source: screenshot from The Uprooted (2016), © CNES 2012-2015, Distribution Airbus DS, ESRI.

In *The Uprooted*, Story Maps combines layers of information from different sources including satellite images captured and analyzed by Airbus Defense (a division of Airbus that was funded in 2014 by the European Aeronautic Defence and Space, EADS). This satellite imagery and other geo-referenced data entries (for instance, the locations of Refugee camps) are, in Harun Farocki's parlance, "operational images." (2003) These can be analyzed and re-worked using the ArcGIS system. The concept typically refers to the substitution of the human eye with a form of machine vision, specifically in the realm of military operations (Farocki 2003). As Paglen explains:

> Harun Farocki was one of the first to notice that image-making machines and algorithms were poised to inaugurate a new visual regime. Instead of simply representing things in the world, the machines and their images were starting to "do" things in the world. In fields from marketing to warfare, human eyes were becoming anachronistic. It was, as Farocki would famously call it, the advent of 'operational images.' (2014, n.p.)

Fig. 22: The map was created during the RefuGIS project

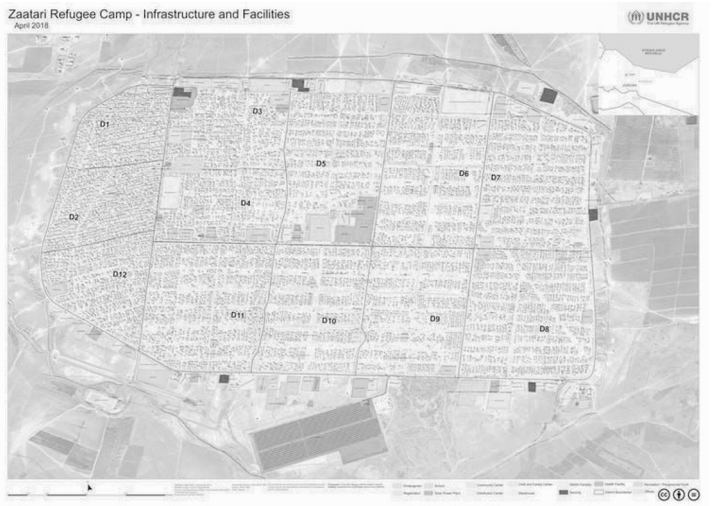

Image source: screnshot from The Uprooted (2016), UNHCR (CC License).

ESRI lead an experiment at Zaatari Refugee Camp in 2018 which made use of these operational images. The UNHCR, along with the Rochester Institute of Technology (RIT) and International Relief and Development (IRD), created Refugee GIS, or RefuGIS, a project which aims to teach Syrian refugees living in Zaatari to learn and build the GIS services necessary to manage and engage the camp's growing community.[11] Some

11 As the project manager of RefuGIS explains, "In early 2019, I spent five weeks in Zaatari camp as part of a sabbatical from the Rochester Institute of Technology. My goal was to teach the refugees of the RefugGIS project how to create stories with Story Maps. It was also fortunate that a 2018 article I'd published in The Conversation had been viewed by Allen Carroll, founder of the Story Maps team. Allen contacted me about the project and generously offered to support the RefugGIS team in creating story maps." (ESRI 2019)

images that the Zaatari produced are similar to those used in *The Uprooted* (fig. 22).[12] These elaborate cartographic images combine different media formats—an aerial view with photographic/textual data collected in camp—but also attest to a collaboration between a proprietary software company and refugees themselves. The latter learn to use GIS software, and in exchange, they provide information and labor to the UNHCR, which collects the maps with their own agenda. The view provided for users scrolling to the bottom of *The Uprooted* is informed by the combination of all these practices, including operational images and their machine vision.

The next chapter of *The Uprooted* focuses on the refugee exodus to Europe, using photos and text to narrate the general route refugees take by land and sea. Users can explore an interactive three-dimensional map. The display uses arrows, and the color violet represents a few main routes and thus the flow of refugees. As with some of the interactive maps aforementioned, the focus is on refugees heading to Europe. Scrolling down, these animations zoom in on specific routes and highlight, using colored bold lines, certain European borders. Rhetorical questions highlight how different "routes" instead of flows have been used. On a window on the left or right, a photo of a fence and a short text explains, for instance, that in "response to the sudden influx of refugees" in 2012, Greece built a fence at its border with Turkey (The Uprooted 2016). The same thing happened in Bulgaria, Macedonia and Hungary. But these countries did not just build material fences, but also what the creators call a "technical fence" (a border which is not exclusively material but also administrative). These fences generate a long wall that goes from the Black Sea to the Adriatic Sea, reminding us of the immaterial limits of so-called Fortress Europe. Here, borders manifest along the Schengen territory, between Denmark and Sweden, Austria and Hungary, and along the Germany's eastern border. Despite the visually documented growth of thicker borders—whether high-tech or material—the next chapter of *The Uprooted* shows photos of happy

12 See also a report that shows in part images created through ArcGIS (Tomaszewski 2018).

refugees starting a new life in Europe. The last chapter is more of an invitation than part of the story itself. It replies to the question "What can I do about it?" and suggests how you might help. With hyperlinks to a few organizations such as the UNHCR, IRC (International Rescue Committee) IOM (International Organization for Migration), Mercy Corps and Missing Maps, we are invited to donate money or volunteer for the cause.

Besides the more well-known UNHCR and IOM, there are other humanitarian organizations cooperating like Mercy Corps. This humanitarian agency was founded in 1979 as a response to the Cambodian conflict and is headquartered in Oregon in the United States. It operates in 40 nation-states across the world and supports, with financial aid, vulnerable people in situations of conflict, famine and natural disasters. The other international organization mentioned is "Missing Maps," whose name already suggests some kind of invisibility. It is not an agency but an institution that, as explained on its website homepage, is defined as "collaborative project in which you can help to map areas where humanitarian organizations are trying to meet the needs of vulnerable people." The OpenStreetMap Team founded it together with the American Red Cross, the British Red Cross and Medécins Sans Frontierès. Among its members it counts the George Washington University in D.C., GIS teams from CartONG (a humanitarian mapping organization), the Geo-informatic Science Institute in Heidelberg, and other teams, groups, and volunteers working with geographical information tools. This project, then, highlights the democratic and participative potential of GIS on the Web. Indeed, humanitarian agencies support open source projects such as OpenStreetMap so as to fulfil their own solidarity agendas:

"Humanitarian organizations use mapped information to plan risk reduction and disaster response activities that save lives" (Missing Maps n.d.). The images produced by such projects as well as software like ArcGIS contribute to a larger database of operational images with a

humanitarian aim. However, these images do not stand alone but they form part of Storymaps' storytelling structure.[13]

For the creators and users of Story Maps, the scrollytelling function in *The Uprooted* is an example of how users might make use of analyzed satellite images and deploy GIS software for a new purpose: the humanitarian cause. The developers of Story Maps outline, for example, four steps to build a story map. Their first recommendation is to aggregate data into, for instance, different countries to help user comprehension, as well as adding flow charts—that is, diagrams that depict a process (a link guides you to the ArcGIS options for implementing flowcharts). Second, they suggest following design principles. Third, they suggest mixing interactive maps with static ones, and allowing users to switch from one to another. The fourth and last recommendation is to *add a donate page*. Giving the example of *The Uprooted* they write: "This map concluded the story with a call to action, so it collaborated with ESRI's nonprofit team to compile a list of organizations with links to 'donate' pages" (ESRI n.d.). ESRI's commitment to social change is clearly strong; they wish to take action and help solve world problems through the power of mapping. It is not uncommon, either, as I have pointed out with regards to other interactive maps, that creators use an additional button with a link that redirects users to a humanitarian organization's donation page. But it is interesting to note that part of what they consider a successful design includes adding a link or a page to encourage donations directly. As a directive, the humanitarian impulse informs the design of stories about migration. Story Maps is an example of software which enables users to create a coherent story by combining not only audio-visual material and text with interactive features, but also operational images, renderings made with GIS software

13 As they further explain: "it follows a typical slideshow format, but incorporates interaction mid-narrative within the confines of each slide. This structure allows the user to further explore particular points of the presentation before moving ahead to the next stage of the story. (..) an interactive slideshow allows for interaction mid-narrative, a more balanced mix of author-driven and reader-driven approaches." (Hegel and Heer 2010, 1146)

merging geo-spatial imagery with other data (gathered through drones, for instance), and statistical data provided by INGOs and governmental sources.

If we turn to another Story Maps creation which uses satellite data, we will see another example of operational images being integrated into a story. Produced by the UNHCR mapping team in Bangladesh, *Rohingya Refugees: Emergency at a Glance* (2018) uses the cascade template and combines it with 3D computational images as well as charts and data visualizations. It was released in 2018, one year after the Rohingya refugees settled into an area of Kutupalong-Balukhali. This area, close to the border with Myanmar, was created as a refugee camp by the Bangladeshi government in 1991. In 2017, facing anti-Islamic persecution in Myanmar, thousands fled the country and settled in and around this location. The Story Map recounts this process of settlement and its implications for the growing population. As the text, part of the story map, explains: "approximately 671,000 Rohingya refugees have fled targeted violence and serious human rights violations in Myanmar since August 2017." (Rohingya Refugee Emergency at a Glance 2018)

The story develops via the scrolling function, issues are highlighted with short blocks of text, and animating maps display data about the settlement. A simple map that traces the borders of different camps within the location shows, in shades of blue, the presence of shelters as well their distribution and density. If the user scrolls down, the same map becomes a "heat map," thus a visualization which uses different shades of red to emphasize the congested nature of the shelters, which—as the text next to the chart explains—does not conform to the UNHCR's basic living requirements. These images were produced using a combination of drone imagery and statistics, and they show how operational images can become part of narratives that aim to make a social impact. Indeed, they show us how such images operate: "images not only have expressive or illustrative, representational of referential functions, but also augment and create significant events. In all cases they are crucial factors within the dynamics of political conflicts" (Eder and Clonk 2016, Introduction).

Fig. 23: Rohingya Refugee: Emergency at a Glance: a heat map of congestion

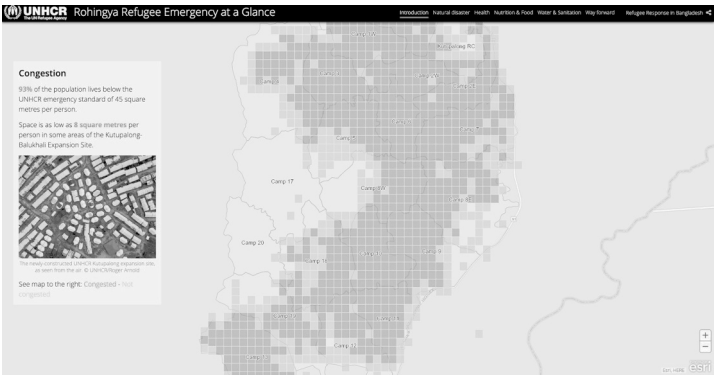

Image source: screenshot from Rohingya Refugee: Emergency at a Glance (2018), © ESRI, Gere, Garmin, USGS.

The use of drone and satellite imagery has become more and more common. This is especially true for regions in the world where ground-level documentation is difficult to acquire (when there is a lack of government urban planning, for example). These alternative forms of vision supply, in short time, the required information in the case of an emergency. They are operational images that form part of a humanitarian operation.

The story of the precarious settlement is narrated in a similar manner to *The Uprooted*, using a combination of different sources of data, imagery and text. It uses the same template for scrollytelling and views from above. Some of the images are collected by international agencies, such as UNOSAT. UNOSAT (or UNITAR) is a UN agency that "provides high-quality geo-spatial information to UN decision makers, member states, international organizations and non-governmental organizations."(UNITAR n.d.)[14] In other words, their experts enable

14 They also add "Our mission is to deliver integrated satellite-based solutions for human security, peace and socio-economic development, in keeping with the

information from the GIS system to be easily accessible to UN agencies and workers worldwide. The team that worked on *Rohingya Refugees Emergence at a Glance* is composed of the mapping unit of the UNHCR and local Bangladesh UNHCR workers. Thanks to data sources obtained by the UNHCR, the Asian Disaster Preparedness Center (ADPC), IOM, Inter Sector Coordination Group (ISCG), REACH Initiative and WHO, they were able to create a series of maps that shows danger within the settlements: for instance, issues related to health and hygiene, the probability of natural disasters and potential destruction of property due to unsafe construction methods. They even created a 3D simulation which is navigable using the cursor, and that shows the areas where sudden floods could create dangerous situations (fig. 24). The model is a combination of imagery, data and statistical predictions.

Fig. 24: Rohingya Refugee: Emergency at a Glance : a 3D model of the Rohingya settlements in Kutupalong-Balukhali

Image source: *screenshot from* Rohingya Refugee: Emergency at a Glance (2018), © UNHCR.

mandate given to UNITAR by the UN General Assembly since 1963." (UNITAR n.d.)

The Story Map ends again with a donate button, and some links to the UNHCR website that manages the emergency in Bangladesh. For instance, we are redirected to a page of statistics that underlines the lack of financial resources, and how much money is still needed to properly manage the situation. The UNHCR argues that for this situation, only around thirty percent of the funding has been received. Next to a pie chart, the website offers reports (from different agencies) to show how critical the situation is: between 4 and 12 July 2017, "709mm of rain fell in parts of the Kutupalong refugee settlement, out of a July average of about 1040mm for Cox's Bazar. A combination of landslides, floods and wind damaged or destroyed hundreds of structures and temporarily displaced thousands of refugees" (IOM 2019). This page is part of a larger website called the "operational portal," which is entirely dedicated to data collected by the UNHCR around the world. It is navigable by country or situation, and the latter are pinned to a Mercator Map and can be accessed through a simple click. Of the 23 so-called "active situations," one is the refugee response in Bangladesh. A second link at the end of the story map brings us instead to the official UNHCR page of the "Rohingya Emergency," which features a YouTube video showing images of the settlement in Bangladesh. Superimposed titles and emphatic background music inform us about the difficult situations faced by the refugees, and ends by inviting us to donate.

ESRI emphasizes the importance of storytelling. Different kinds of data sets can be combined with several other types of imagery—photos, videos, 3D models and charts, as well as maps and graphics—and text to create, using a simple scroll function, the impression of a narrative arc. What the user might experience through all this is a "flow" which, instead of the discrete browsing of pages, creates a flux of animations and floating windows via the simple act of scrolling. This ensures continuity in the constant interchange of images, text, data visualizations etc. Different media formats are combined through this flow into a form of linearity that instead of travelling in unidirectional fashion, can be easily pulled back—by scrolling up—to switch between, say, data visualizations, so as to better understand what they depict or highlight. It

feels more like browsing pages than watching a video. But is this flow and the continuity that it creates storytelling?

At least, this is what the developers of Story Maps think. They created the first version with this "cascade" template as an easy form that would be accessible to mobile platforms. Scrolling down on our smartphones to check news, social media, etc. is a daily activity for most, but this does not necessarily translate to reading or browsing a story. From scrollying to scrollytelling, a certain coherence is necessary. In Story Maps the red thread, as we might call it, is most certainly the lines of text in between sections, which organize and connect the diverse materials presented. Story Maps's aim, it seems, is to arrange such information using storytelling strategies so as to address a wider audience, composed not only of decision makers, but also the general public. As for BI software like Tableau, the impetus behind creating a platform which combines different data sources to tell a story highlights how important it has become to make data legible to a large audience.

Data collected by the UNHCR and other agencies often has a creative commons license, and can therefore be easily shared to produce interactive maps, infographics, data visualizations and, of course, story maps. In 2014 HDX, the Center of Humanitarian Data, was funded as a service offered by the OCHA, and share much of this data.[15] Its mission "is focused on increasing the use and impact of data in the humanitarian sector." The persuasive rhetoric shaped by this view from above, which results from "phantom" positioning, as Farocki calls it (2004), is moved by a unambiguous "humanitarian impulse," (Rangan 2007).

15 As the website explains: "We define humanitarian data as: data about the context in which a humanitarian crisis is occurring (e.g., baseline/development data, damage assessments, geospatial data), data about the people affected by the crisis and their needs, data about the response by organizations and people seeking to help those who need assistance." (HDX n.d.)

4.4 Scaling, Simplifying, Governmentalizing. Viewing from Above

I argued at the beginning of this chapter that interactive maps offer us a distant perspective. I claimed that maps as interactive practices about migration construct a specific "scopic regime." (Jay 1988) Teresa Castro refers to this use of maps in cinema as a "mapping impulse." (2009). She investigates their use in the early cinema of panoramas, atlases and aerial views and wonders if: "early non-fiction film, which brought the 'whole world within reach'(Mélie's' ill-fated Star Film company slogan: 'le monde à portée du regard'), is traversed by a general mapping impulse, associated—but certainly not limited—to the territorializing impulse of nation-states, different imperial projects and other scientific and commercial ventures." (Ibid.)

The visual regime of interactive maps is nevertheless a way of viewing which requires interaction, and an exploration of the map itself. Looking at interactive practices as "cultural artifacts" forces us to look at their dynamic context, and to analyze how they are embedded in specific cultural, social and material infrastructures. Maps use prior interpretations of data and they entail the use of other practices for gathering data and visualizing it.

In interactive maps, this data helps illuminate a crisis situation, and an emergency that is in need of—prompt or continuous—financial support and direct humanitarian aid. The narratives, then, are a form of persuasive rhetoric. Hulman and Diakopoulos discuss "visualization rhetoric," and argue that certain common design techniques influence the reading of data visualizations (2011, 2231). They investigate different visual strategies for the display of data sets and show how omissions in data, fixed comparisons and visual cues may also generate connotations which exceed the intent of the designers. In this sense, designers and creators of data visualizations must not only follow rules to create beautiful visualizations, but they also bear the responsibility of considering "the unintended effects their choices may have." (Ibid. 2239) As Hulman and Diakopulous note, "how data is framed—they claim—or presented can significantly affect interpretation" (ibid.). Bruno Latour,

in turn, has argued that once maps are established and accepted, they become immutable, mobile, reproducible, re-combinable and scalable, and thus tools for control (1990, 19-68). As Latour argues: "the great man is a little man looking at a good map." (Ibid., 56)

This practice of data collecting and map creation itself responds to a modality of rationalization that started with early modernity (the first data visualizations also belong to that time).[16] James C. Scott refers to these practices of rationalization in his book *Seeing Like a State* (1998), in which he claims that maps, surveys, registers, and data collections represent a form of legibility and simplification that attempts to overcome the opacity of the world. For him, it implies a "viewer whose place is central and whose vision is synoptic (…) a view not afforded to those without authority" (ibid., 79). Humanitarian organizations make use of satellite images and other data gathered from repositories of governmental and international agencies, software corporations like ESRI, but also from other sources like Google Maps or OpenStreetMap. And with software such as Tableau and Story Maps, professionals can let this information become part of the story.

The way this imagery is gathered suggests not a singular perspective, but rather, as MacKenzie and Munster label it, a practice of "invisual" observation. They argue that the use of algorithmic vision employed by drones, for instance, but also, I would add, the use of data sets in visualizations, creates an "omniscient" perspective: "seeing—as a position from a singular mode of observation—has become problematic since many visual elements, techniques, and forms of observing are highly distributed through data practices of collection, analysis and prediction." (MacKenzie and Munster 2019, 3)

This view therefore not only represents migrant trajectories and refugee movements, but it produces an "operational image" as well (Farocki 2003; Paglen 2004). The aim is to simplify, and to make legible in order to govern.

16 See, for instance, the data visualization in John Snow's maps during London's cholera outbreak in 1854 featured in Tufte ([1983] 2001).

Complex human movements are converted into a series of arrows, dots, and histograms. Individual stories of exiled people transform into a collective story of global movement. Often, these visual displays risk reinforcing incorrect assumptions around migration such as "flow," and that migration is a form of incoming invasion. This is especially evident in all those interactive maps that focus on refugee data exclusively vis-à-vis Europe. This ethnocentric view depicts migration as a crisis for Europe, as the continent is shown as the sole recipient of such flows (Adams 2018). This way of looking is not only a view from above, but it is an empowered view from Europe, addressing the user as a European citizen. The visual display of migration through interactive maps and data visualization is therefore a mean of simplifying mobility by scaling migratory movements. Often, it ignores the speed of movement. It offers a perspective over time, using a timeline, but from a European or Western-centered point of view. As Bacon et al. write: "The majority of maps of migration flows give the impression of a territory where social problems, administrative and (geo)political obstacles and distance are not taken into account." (2016, 8)[17]

Motivated by a "humanitarian impulse" (Rangan 2017), humanitarian mappings offer decision makers, but also through storytelling software the wider public, the hope of managing and controlling migration. These practices suggest migration is "a problem to be governed," which requires an urgent response (Tazzioli 2020). It reveals a governmental rationality behind the practice of humanitarianism (Fassin 2012). Data on refugees and displaced peoples acts as rational and empirical evidence, suggesting on the one the world can be known objectively by data; and on the other, a drive to find solutions, assess risks, control, manage and support human beings beyond the borders of individual countries, which fail to protect refugees and migrants. By inverting this rationality, "humanitarian reason" (Fassin 2012) becomes a justification

17 As cartographers underline, it is still a challenge today to map migratory movements. A map that takes into account all flows and countries of origin would need, they argue, around 38,000 arrows. Such a map would be, they claim, not impossible but rather illegible (Bacon et al. 2016).

for governmentality, which looks beyond the subjects of the state and its citizens, and tries instead to render visible those apparently outside the law, and manage and control their mobility.[18]

The "scale" and the proportions of migration on a global level display the measure of movement. Indeed, that is how the Finnish company responsible for Lucify defined their first interactive map: "We clarify the scale of the crisis." This is also why they chose "Lucify:" it is a compound of luce (the latin *Lux*/*lucis*, or light) and the verbalizing suffix "-ify," which means that "lucify" "sheds light" on a phenomenon. Oddly enough, my first association was instead with Lucifer, the fallen angel of late Christianity. But despite this unsuccessful choice of name, their idea of working with data also represents a belief in the potential of digital creation. They declare on their website: "we believe this new medium has vast untapped potential, especially for creating and sharing understanding about important systemic problems with complex dynamics. In our work, we explore, use, and spread knowledge about the potential of the digital medium for that purpose." (Lucify n.d.)

The potential of what they call a "new medium" (again and again, there is this idea of novelty being the savior to our problems), refers to their creations—thus visualizations—that might shed light on "systemic problems with complex dynamics." (Ibid.) As Martina Tazzioli, who studies the nexus between migration and governmentality suggests, rather than focusing on the "violent functioning of border regimes a critique should be pay attention to the knowledge we generate about migration." (2020, 132)

One day, perhaps, as the protagonist of Jorge Luis Borges foresees in "On Exactitude in Science," the map might match the territory. For now, it is not possible. The use of data within maps and its visual display should not simply provide "balance" or "harmony" as some data visualizations designers seem to suggest. Maps, of course, do not—cannot—match the territories they represent, as the belief that the "objec-

18 Referring to the Foucauldian notion of governmentality, Didier Fassin writes: "governamentality includes the institutions, procedures, actions, and reflections, that have populations as object." (Fassin 2011, 214)

tive" use of data will give the "real picture" of a situation is just that: a belief. All data, as Johanna Drucker argues, is capta: "Data are capta, taken not given, constructed as an interpretation of the phenomenal world, not inherent in it." (2014, 128) In other words, data is not objective information—it is also part of the practice of presentation itself. As Krugan points out with regards to "para-empirical data:"

> Data are always translated such that they might be presented. The images, lists, graphs, and maps that represent those data are all interpretations. And there is no such thing as neutral data. Data are always collected for a specific purpose, by a combination of people, technology, money, commerce, and government. The phrase "data visualization," in that sense, is a bit redundant: data are already a visualization. (2013, 35)

Refugees for instance, understood as "dots," only tell us about how a specific country has categorized a human being based on their nationality—but nationality itself is not a given. As Drucker points out, "Nations, genders, populations, and time spans are not self-evident, stable entities that exist a priori." (Ibid. 129) The way we display this data, like flows on maps, also structures our view. As Krugan argues, when looking at geovisualizations it means taking no real perspective or point of view. They construct instead a spatial interpretation and rather a "view from nowhere." (Nagel 1989) What does it mean to view from above? It means reproducing a point of view which is already in place: a cosmopolitan-oriented view, and a humanitarian one. The interactive maps showing flows might be more or less able to tell migration as a story, but they clearly articulate the humanitarian governmentality behind their creation.