

Geographically Visualizing Consolidated Appeal Process (CAP) Information

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ABSTRACT

Maps are essential visual advocacy devices for humanitarian relief projects. Maps provide advocacy by presenting, disseminating, and analyzing humanitarian relief project information in formats that are easier to understand and reason with. In this paper, we present our preliminary work on geographically visualizing Consolidated Appeals Process (CAP) information. The practical intent of our work is to (a) provide advocacy for CAP projects by geographically representing project information such as funding status so that (b) the nature of a project is better understood, thus potentially leading to increased project donations and improved project funding decision making. We provide examples of a prototype mapping application built to utilize Google Earth™ for representing CAP project information in map-based formats.

Keywords

Humanitarian Information, Advocacy, Consolidated Appeals Process, Visualization, Geographic Information

INTRODUCTION

The Consolidated Appeals Process is a management tool that humanitarian aid organizations use to plan, monitor, and implement humanitarian relief project appeals to the international community and donors (Office for the Coordination of Humanitarian Affairs (OCHA), 2007a). On average, the CAP helps to generate and manage over \$3.1 billion in appeal requests per year¹. In its current form, humanitarian appeal information developed through CAP such as an appeal's financial status (i.e., funds requested and funds received) and project information (the nature of a project, where a project is located etc.) are contained primarily in text-based formats such as spreadsheets.

This paper presents research-in-progress on developing geographic visualizations of CAP information. In particular, we examine the question of how intuitive visual representations of CAP information can be developed that utilize ubiquitous mapping technologies in order to facilitate and support advocacy and awareness for poorly funded appeals. We situate our work within the small, but growing body of humanitarian information management practitioner literature on the general role of visualization as an advocacy device (O'Connor, 2008, Office for the Coordination of Humanitarian Affairs (OCHA), 2008b). Our research extends previous work on the use of visualization as an advocacy device through development of the first *geographic* visualizations of humanitarian financial information. We demonstrate our specific efforts by presenting preliminary work on developing Google Earth™-based representations of country-level and country-specific CAP information. We conclude the paper with areas for future work on the use of maps as advocacy devices for CAP appeals and strategies for evaluating the effectiveness of the visual representations.

BACKGROUND

In this section, we highlight key areas of the application domain our research is related to and provide a brief theoretical framework to position our work within the domain of mapping as an advocacy device.

The Financial Tracking Service (FTS)

The CAP information utilized in our work is primarily drawn from the Financial Tracking Service (FTS) of the United Nations Office for the Coordination of Humanitarian Affairs (OCHA). FTS "is a global, real-time

¹ <http://ochaonline.un.org/cap2005/webpage.asp?Page=1243> (Last retrieved 14 November 2008)

database which records all reported international humanitarian aid (including that for NGOs and the Red Cross / Red Crescent Movement, bilateral aid, in-kind aid, and private donations). FTS features a special focus on consolidated and flash appeals, because they cover the major humanitarian crises and because their funding requirements are well defined – which allows FTS to indicate to what extent populations in crisis receive humanitarian aid in proportion to needs” (Office for the Coordination of Humanitarian Affairs (OCHA), 2008a).

Mapping for Advocacy

Advocacy, in the context of this work, is the basic idea of supporting people in need (Office for the Coordination of Humanitarian Affairs (OCHA), 2007b). For example, reporting on a humanitarian crisis that the main stream media would not cover or would give little coverage to.

Maps can serve a key role as a visual advocacy device. In particular, maps can be used to visually represent complex phenomena, and graphically constrain and model a given state of the environment (such as refugee camp locations, access roads, positions of people, location of events, etc.) (Forbus et al., 2003, Scaife and Rogers, 1996). Representing and constraining complex geographic phenomena through the use of a map can aid reasoning about spatial relationships or aid spatial problem solving about a situation needing advocacy by (a) reducing the amount of information needed to be contained and processed internally (i.e in one’s head) and (b) externally representing a geographic phenomena via a map so it can be understood in different ways. A practical example of this last point is the use of maps to “tell stories” that document changes in a crisis over time (O’Connor, 2008). An example of the use of mapping to tell stories as means to create advocacy is the Crisis in Darfur Project². The Crisis in Darfur project provides place-based information on destroyed villages, internally displaced persons (IDPs) and written and video testimonials of survivors.

Maps and related geographic information technologies such as Geographic Information Systems (GIS) can also serve an implicit visual advocacy role through their ability to aid situation awareness of a crisis. Ideally, improved situation awareness, through visual mediums such as maps, can lead to better informed decision making and crisis response. This sentiment is reflected the following quote taken from the final report of the Global Symposium +5 on Information for Humanitarian Action³ :

“Visualization is an effective strategic information technique for representing complex data and information, displaying patterns, trends and relationships, and depicting a common situational awareness. In this regard, satellite-imagery-derived analysis and GIS are valuable tools to support humanitarian action.” (Office for the Coordination of Humanitarian Affairs (OCHA), 2008b).

GEOGRAPHICALLY REPRESENTING CAP INFORMATION

In this section, we discuss our prototype application for geographically representing CAP information as a means to create advocacy for CAP projects.

Overview

The audience for our application is donors (NGOs, governments, individuals, etc.) that need quick access to CAP information in easily understand formats for decision making. Currently, CAP information can be difficult to access due to the information being stored across multiple web sites or inside reports where it is difficult to find. To address information accessibility issues, the map we have created for geographically representing CAP information is displayed in Google Earth⁴. We used Google Earth as it is a free, widely available, and easy to use mapping program and it allows application users to easily “browse” the earth to find CAP information.

The map features two scale-dependant viewing levels. Specific altitudes of the two viewing levels were arbitrarily chosen and provide the classic “overview and detail” paradigm used in visualization systems. The first viewing level shows appeal information such amounts requested and funding received summarized by country. The second viewing level shows information about specific humanitarian appeals within a country such as organizations making appeals, scope of the appeal, and who specifically has made donations to an appeal. The map was natively built using Keyhole Markup Language (KML) in order to take advantage of Google Earth’s visual and interactive capabilities. Furthermore, the map utilizes other Google technologies such as Google Charts⁵. We will also dynamically fuse hyperlinks to humanitarian situation information into the map to

² <http://www.ushmm.org/maps/projects/darfur/> (Last retrieved 06 January 2009)

³ <http://www.reliefweb.int/symposium/> (Last retrieved 06 January 2009)

⁴ <http://earth.google.com/> (Last retrieved 06 January 2009)

⁵ <http://code.google.com/apis/chart/> (Last retrieved 06 January 2009)

provide a richer geographic context to the appeals shown on the map. In its current form, the map contains static, country-wide appeal information captured during the summer of 2008. The Sudan was used as a case-study for developing country-specific representations as the Sudan had over 900 CAP projects in 2008⁶, and was thus representative of the variability in CAP project information that would be encountered in other countries. The following sub-sections discuss the data sources used to create the map, and provide details on the two viewing levels contained in the map.

Data Sources

Country-level and country-specific CAP data for the map were obtained in spreadsheet form from the FTS web site hosted on ReliefWeb⁷. The spreadsheet data were imported into a relational database to support queries for constructing the map. Figure 1 shows what country-specific CAP data looks like in spreadsheet form.

| Project code | Project Title | Appealing agency | Original requirements USD | Revised requirements USD | Funding USD | % Covered | Unmet requirements USD | Uncommitted Pledges USD |
|--------------------|--|------------------|---------------------------|--------------------------|-------------|-----------|------------------------|-------------------------|
| AGRICULTURE | | | | | | | | |
| SUD-08/FSLI0 | Improving Food Security and Livelihoods of IDPs, Returnees, Residents, War and Drought Affected People in Mellit, Maiha, Umkadadah, Al Tawshia and Al Lait Localities- Northern Darfur | COOPI | 1,374,415 | 1,374,415 | 1,526,904 | 111% | -152,489 | 0 |
| SUD-08/FSLI00 | Enhance Capacity for Agriculture, Livestock and Fishery Management for Returnees and Host Communities in the Sobat River Corridor | IRD | 550,000 | 550,000 | 499,968 | 91% | 50,032 | 0 |
| SUD-08/FSLI02 | Twice Agriculture, Livelihoods & Micro-Enterprise (TALME) | Mercy | 1,200,000 | 1,200,000 | 1,275,000 | 106% | -75,000 | 0 |
| SUD-08/FSLI03 | Support to Household Food | NCA | 430,000 | 430,000 | 0 | 0% | 430,000 | 0 |
| SUD-08/FSLI08 | Food Security and Improved Livelihood for Returnees, Targeted IDPs and Vulnerable Groups From Host Communities | UNHCR | 2,966,894 | 0 | 0 | 0% | 0 | 0 |
| SUD-08/FSLI11 | Livelihoods Enhancement and Diversification for IDPs and Vulnerable Communities in | CRS | 1,100,425 | 1,100,425 | 853,726 | 78% | 246,699 | 0 |

Figure 1. CAP Financial Information⁸

A data querying and map production processes, details of which are beyond the scope of this paper, was implemented using Java™ technology to create the two viewing levels of the map.

Viewing Level 1: Country-level Representations of Appeal and Donation information

Viewing level 1 displays in Google Earth™ between altitudes 144000km and 1000km. Viewing level 1 contains 2D and 3D representations of CAP information.

⁶ <http://workplan.unsudanig.org/db/wp/2008/index.php> (Last retrieved 06 January 2009)

⁷ <http://www.reliefweb.int/> (Last retrieved 06 January 2009)

⁸ Source - <http://www.reliefweb.int/rw/fts.nsf/doc/105?OpenForm&rc=1&cc=sdn> (Last retrieved 22 September 2008)

2D Representations

2D representations of country-level information use Google chart technology to dynamically generate pie charts showing relevant financial information inside Google Earth information bubbles. The coupling of charts and project information to a country provides a key advocacy device by allowing for quick access to the appeal financial information for a country. A solid-fill polygon of a country making an appeal was added to the map to provide another form of advocacy through highlighting an appeal country. Furthermore, the information bubbles dynamically fuse's information from relevant sources such as humanitarian situation information⁹ based on the country in question to provide broader context to an appeal. A prototype implementation of these features is shown in Figure 2 which shows funding overview information for the Sudan.

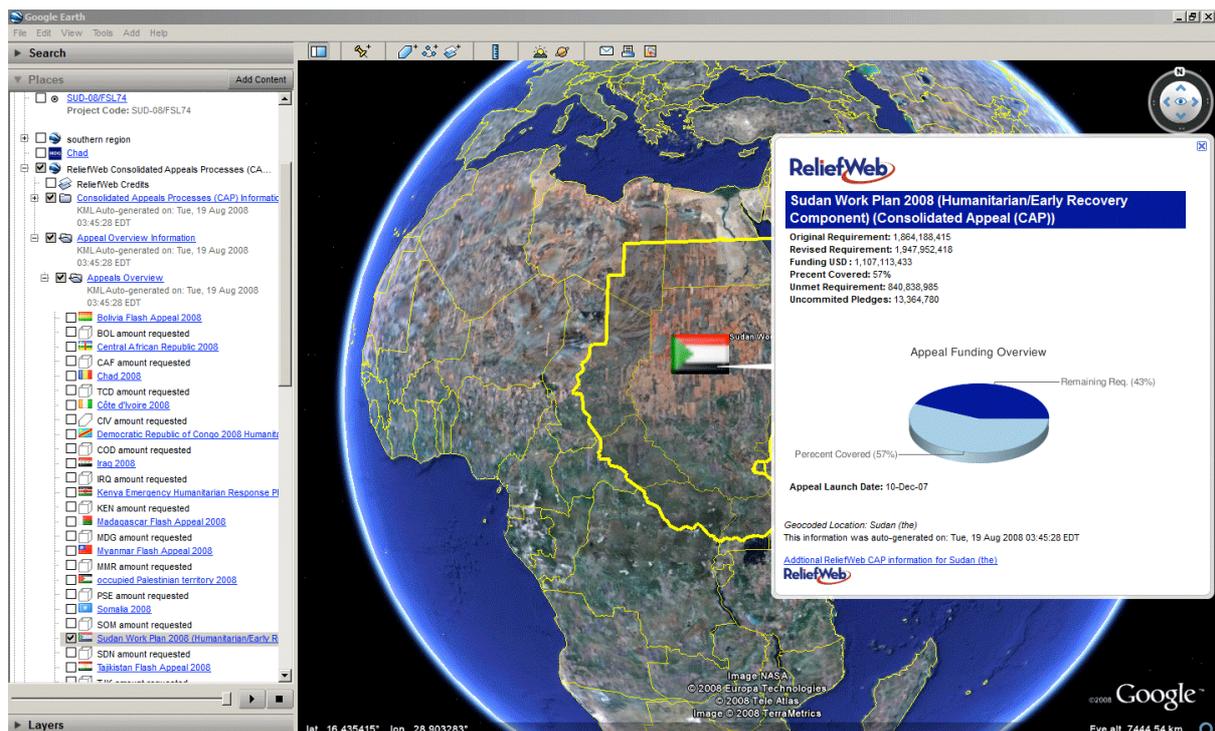


Figure 2. 2D Representations of Country-level CAP Information

3D Representations

3D representation of country appeal requests and funding received are based on the classic visual advocacy metaphor of a thermometer used in fund raising activities¹⁰ where a thermometer represents the overall amount of funds needed, and is “filled” as donations are made. To implement this idea, country outlines were used to create wire frames scaled in 3D space to represent the overall funding requests for a country, and filled based on the total amount of funding received. A prototype implementation of this feature is shown in Figure 3 which shows a 3D view of appeal requests and funding received for various countries in Africa.

⁹ See <http://www.reliefweb.int/rw/dbc.nsf/doc104?OpenForm&rc=1&cc=sdn> for an example from the Sudan (Last retrieved 04 December 2008)

¹⁰ See <http://www.fundraisingbrick.com/blog/add-a-cool-thermometer-to-measure-campaign-success/> for an example (Last retrieved 04 December 2008)

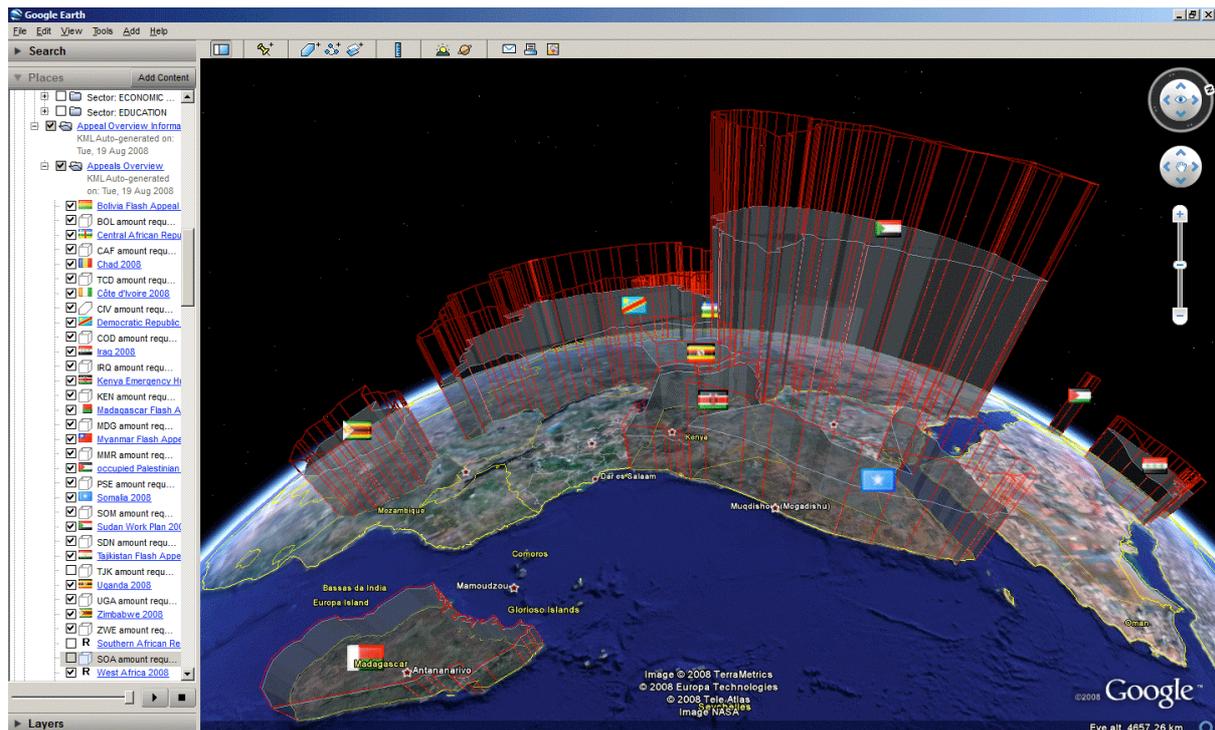


Figure 3. 3D Representations of Country-level CAP Information

Viewing level 2: Country-specific Representations

Upon zooming in past altitude 1000km, viewing level 2 will display in Google Earth and viewing level 1 will be hidden in order to prevent the view from becoming cluttered. Viewing level 2 contains 2D representations of country-specific CAP information.

Country-specific CAP information shown on the map is primarily developed through automated geo-coding of projects using an algorithm and place-name database specifically tailored for use with humanitarian information and discussed in Tomaszewski (2008). Once geocoded, each project lists (a) basic project information (sponsoring agency, humanitarian sector), (b) amount of funds requested, (c) amount of funds received or not, and (d) a listing of individual project donors. Like viewing level 1, project financial information is dynamically represented in pie charts using Google chart technology. Each of these features provide advocacy for CAP projects by allowing map users to quickly review the funding financial status of a project, visually understand a projects needs and see who, if anyone at all, has donated to a project.

Specific CAP projects are organized in the Google Earth legend based on the humanitarian sector (Agriculture, Shelter and Non-food items, Coordination and Support Services, Health, Food, Protection/Human Rights/Rule of Law, Water and Sanitation, Mine Action, Economic Recovery and Infrastructure) the project is related to. Organizing projects by sector make specific project information easier to navigate by using filters. Prototype implementations of these features are shown in Figure 4 which shows funding details for a Coordination and Support Services project in the Sudan.

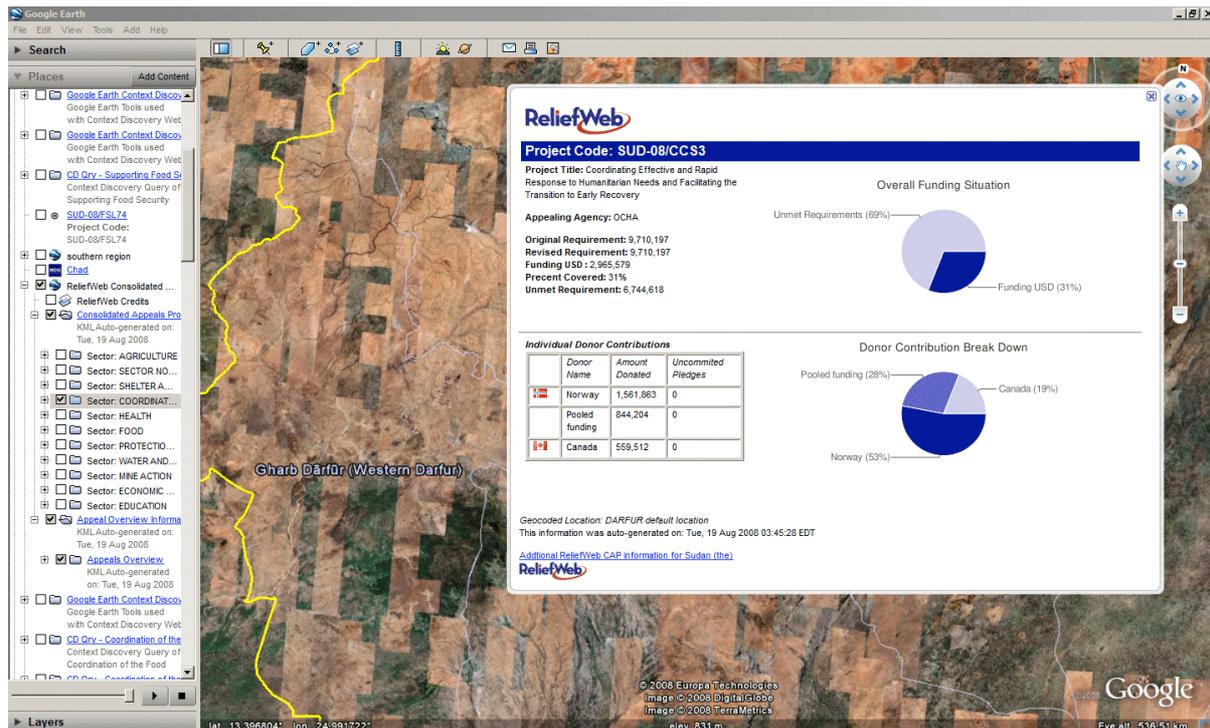


Figure 4. 2D Country-specific CAP Information from the Sudan

FUTURE WORK

Numerous areas exist for future research and development of the geographic visualizations presented in this paper. In the following sub-sections, we outline two high-priority areas for future work.

Technological Improvement

As previously stated, our map is currently a prototype based on static data. The next logical step is to develop a dynamic version of the map. The primary method we foresee to accomplish this goal is the development of a web service to access real-time FTS data. By developing a web service to access FTS data, the map layer developed for this project can present humanitarian relief project and appeal information as a disaster unfolds - a critical aspect for disasters requiring rapid response and funding like the Myanmar Cyclone of 2008¹¹. Future versions of our map will be accessible to Google Earth clients using a KML network link object. The KML network link object will reference a production server that (1) accesses the real-time FTS web-service, (2) dynamically creates the map layer in KML format, and (3) send the results back to Google Earth clients, thus ensuring that map layer is representing up-to-date appeal and project information.

Evaluating the success of the map

Once we develop a public, production version of our map, it is critical to evaluate the success of the map to ensure that the map is in fact creating advocacy for CAP projects. In this context, we will consider the map to be a "success" if greater awareness of CAP projects is obtained, or ideally, donations are made to projects based on information and understanding derived from our map. A preliminary list of metrics we are considering for evaluating the success of the map include, but are not limited to (a) quantification of the number of requests made to the KML network link object (discussed in the previous sub-section), (b) quantification of the number of times and from where on the map hyperlinks links contained on our map are accessed from Google Earth™ in order to determine which specific appeal projects and/or appeal countries are receiving the most attention from map users, (c) general feedback on the map obtained through the ReliefWeb website, and (d) donations made to various appeal projects that can be directly attributed to the map. Other areas for future evaluation of

¹¹ <http://ocha.unog.ch/fts2/pageloader.aspx?page=emerg-emergencyDetails&emergID=15549> (Last retrieved 04 December 2008)

the map would be usability studies with relevant humanitarian stakeholders using standard usability techniques such as focus groups that can be modified for evaluating geovisualization applications (Robinson et al., 2005).

CONCLUSION

Maps have the potential to be critical financial decision-making support devices and means of advocating for poorly funded humanitarian appeals. In this paper, we have demonstrated our preliminary work on geographically visualizing CAP information at country-level and country-specific viewing scales using Google Earth™. Ideally, by presenting CAP information in map-based, visual formats, information about humanitarian relief project appeals can be quickly obtained and understood, ultimately leading to the improvement of the lives of people affected by crisis around the world.

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