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Geo-Taxonomy Service Development Summer Internship at the United Nations Office for the Coordination of Humanitarian Affairs, NYC

Henry Mros III
Clark University, henryfm3@gmail.com

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Geo-Taxonomy Service Development

Summer Internship at the

United Nations Office for the Coordination of

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Henry F. Mros, III

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Yelena Ogneva-Himmelberger, Ph.D., Project Advisor

ABSTRACT

Geo-Taxonomy Service Development Summer Internship at the United Nations Office for the Coordination of Humanitarian Affairs, NYC

Henry F. Mros, III

This report provides a detailed account of my internship experience with the United Nations Office for the Coordination of Humanitarian Affairs (UN-OCHA) in New York, New York during the summer, autumn, and winter of 2016. The internship was completed at Two United Nations Plaza and remotely from Clark University under the supervision of UN-OCHA Information Management Programme Officer, Andrej Verity. While temporarily serving as an international civil servant, I had the unique opportunity to contribute my knowledge and skills to an intergovernmental organization that continuously aims to improve the nations of our world. Adhering to the requirements set forth by the M.S. GISDE program at Clark University, this report thoroughly describes my responsibilities as an intern and relates the opportunity to my career goals and academic history.

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Yelena Ogneva-Himmelberger ,Ph.D.
Chief Instructor

ACADEMIC HISTORY

Name: Henry Francis Mros, III

Place of Birth: Taunton, Massachusetts   **Date**: December 08, 1992

Baccalaureate School: Fitchburg State University   **Date**: August, 2015

Baccalaureate Subject: B.Sc., Geographic Science & Technology

DEDICATION

For the instructors who nurture the talent of their students.

ACKNOWLEDGEMENTS

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Chapter 1

Introduction

When my family's hot water tank malfunctioned, it flooded our whole home and forced us to move to a hotel. It was a Hampton Inn and I was in high school. While living there, the women at the front desk treated me as if I were family. As I worked on my homework in the lobby, they would offer their assistance, bake cookies, and formed a genuine friendship. They allowed me to enjoy the hotel pool at any hour and watch movies on the large TV above the lobby's fireplace. The wonderful hotel staff was keeping me entertained and happy while my parents dealt with the insurance company.

Once our house was dry enough to return to, every room needed to be redone. I was given creative freedom over my bedroom. Above my bed, I chose to have a wall-sized panoramic photograph installed. The scene was a night-time view of New York City from the windows of high-rise condominium. On the opposite side, we installed a second wall-sized photograph of NYC. This photograph covered the three walls of the nook that my desk sat within and featured the Twin Towers and the Brooklyn Bridge at dusk. When working from my computer, everything in my peripherals was New York City. Each night I would sit there designing while enjoying the view and imagining.

Before I graduated from high school, my design and photography work would earn me some recognition. The recognition would ultimately bring me to NYC to receive a national gold medal on stage at Carnegie Hall. When leaving Carnegie Hall that evening, the Empire State Building was lit in gold honoring the achievement. It was an exciting experience and made me wonder how it could be outdone.

The next morning, I was given a tour of the offices of Rolling Stone magazine and met with their staff. On the tour, I met a recent college graduate who was designing magazine spreads for the next issue. At this point in my high school career I was still undecided about college. I did not think the cost of attendance was justifiable for art related fields. However, the young professional at Rolling Stone was proof to me that perhaps four years of university could be justified. For his first post-college job, he was working in NYC for a very popular magazine.

Later the next year, I entered college myself as a graphic design major. Two years into the program, I decided to learn more about design by enrolling in a cartography course. This would become the semester that world of GIS would expose itself to me. Shortly after discovering the potential of this unfamiliar subject, I switched majors. My goal then became develop my competence in this new subject to a level that was comparable to that of my design and photography. I knew that if I wanted a satisfying GIS career after college, I needed to advance quickly.

My efforts did not earn me a career after graduation, but rather led to my acceptance at Clark University for a Master's Degree in GIS. One short and fast paced year later, I would find myself living in another Hampton Inn. This time I was there because of ambition, not because of a malfunctioning home appliance. I was living in NYC one block away from my internship at the United Nations. From my hotel room on the 15th floor, the view was just like the one I had surrounded my bedroom desk with a few years before.

Chapter 2

The United Nations

Situated along the eastern shore of Midtown Manhattan upon eighteen acres of international territory resides the inspiring United Nation Headquarters. Behind a vibrant row of 193 flags are four very distinct and unified buildings, each designed to host and serve the delegations of the 193 member states, 5,000 civil servants, 2,000 accredited journalists, and more than a million annual visitors.

General Assembly Building:

The General Assembly Building houses the grand blue, green, and gold General Assembly Hall that is the exclusive venue for the General Assembly meeting each September.

Conference Building:

Connecting the General Assembly Building to the Secretariat Building along the waterfront is the Conference Building which is home to *the Security Council*, *Trusteeship Council*, and the *Economic and Social Council* meeting chambers.

Secretariat Building:

Situated between the Conference building and the Library, the iconic 39-floor Secretariat Building contains 20-acres of quickly reconfigurable office space.

Library Building:

Housing several million United Nations documents, 80,000 maps, and 1,500 atlases is the Dag Hammarskjöld Library. The six-story library is named in the memory of the second Secretary-General of the United Nations. *(2016 United Nations Secretariat Internship Programme New York Prior to Arrival Handbook)*

Together, the *General Assembly*, *Security Council*, *Trusteeship Council*, *Economic and Social Council*, as well as the *Secretariat* form five of the six main organs of the United Nations. The sixth organ, and only organ not located on the grounds of the United Nations Headquarters, is the International Court of Justice that resides in the Peace Palace in The Hague, Netherlands. The six main organs work congruently towards the objectives of the United Nations that is outlined within the 19-chapter, 111 article, *Charter of the United Nations*.

Article 1: The Purposes of the United Nations

1. To maintain international peace and security, and to that end: to take effective collective measures for the prevention and removal of threats to the peace, and for the suppression of acts of aggression or other breaches of the peace, and to bring about by peaceful means, and in conformity with the principles of justice and international law, adjustment or settlement of international disputes or situations which might lead to a breach of the peace;

2. To develop friendly relations among nations based on respect for the principle of equal rights and self-determination of peoples, and to take other appropriate measures to strengthen universal peace;

3. To achieve international co-operation in solving international problems of an economic, social, cultural, or humanitarian character, and in promoting and

encouraging respect for human rights and for fundamental freedoms for all without distinction as to race, sex, language, or religion; and

4. To be a centre for harmonizing the actions of nations in the attainment of these common ends.

OCHA

The Secretariat organ is composed of the thousands of United Nations civil servants who carry out and perform the everyday work needed to meet the objectives mandated by the other main organs. As a part of the Secretariat organ, the Office for the Coordination of Humanitarian Affairs (OCHA) is *"responsible for bringing together humanitarian actors to ensure a coherent response to emergencies."*

OCHA's Mission

- Mobilize and coordinate effective and principled humanitarian action in partnership with national and international actors in order to alleviate human suffering in disasters and emergencies.

- Advocate the rights of people in need.

- Promote preparedness and prevention.

- Facilitate sustainable solutions

Currently, OCHA operates under this mission in 35 regions and countries, across six continents, and in three response efforts to active "L3[1]" emergencies in Iraq, Syria, and Yemen.

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[1] "L3" is the global humanitarian system's classification for the response to the most severe, large-scale humanitarian crises.
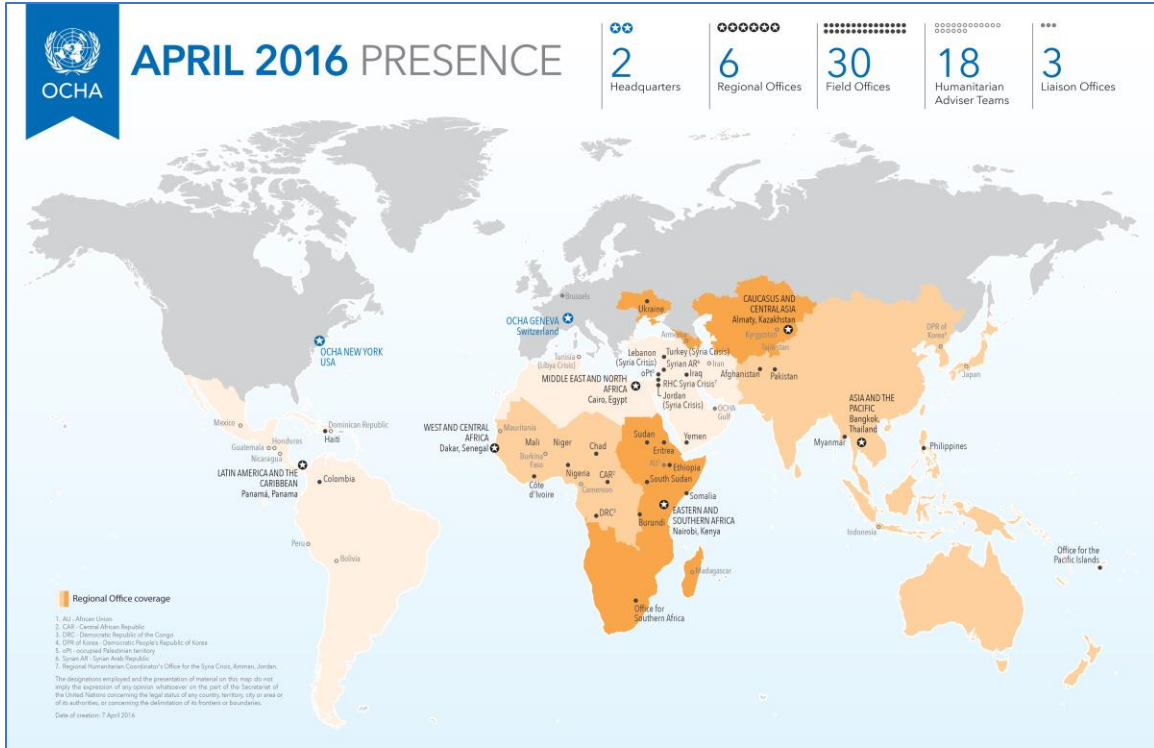
Figure 2.1- UN OCHA's April 2016 Presence (OCHA- Who We are)

Mapping Within OCHA

Many of the maps that OCHA produces are created on the front lines of the emergencies that they respond to or where access to current datasets can be inadequate. When limited data access is combined with the high standards that emergency maps are often held to, particularly those produced by a global organization, minor discrepancies can suddenly propagate into larger complications. This is especially true for regions where boundaries and borders are heavily disputed. Accordingly, all UN maps contain the following statement:

> *"The boundaries and names shown and the designations used on this map*
>
> *do not imply official endorsement or acceptance by the United Nations."*

This statement also addresses situations where dated administrative boundary shapefiles may have been used while the contemporary dataset was still within a lengthy validation processes. These seemingly inherent issues regarding data accessibility and timeliness are currently being addressed and focused on by OCHA's Shared Digital Services (SDS) team.

Shared Digital Services

OCHA's SDS team is a small, but growing, assemblage of individuals from around the world who are selected to apply their knowledge and abilities towards creating a geo-taxonomy service that will be used by several core humanitarian sites. Although SDS team members are not centrally located, they are in kept in constant contact through a suite of purpose-specific technologies. Many geographic limitations are alleviated by the technologies. However, time zone differences still subtly control daily schedules and tasks.

A benefit available to New York based SDS team members is the abundant networking opportunities that occur during international events hosted by the UN. These spontaneous interactions with visiting teams considerably helped SDS further confirm its stance in the geo-taxonomy space. Other humanitarian teams would express interest in such a service, or reveal that they could use, but are not interested in developing service themselves. A brief interaction could greatly reduce the time that SDS would spend on compiling evidence to justify why they needed to create a geo- taxonomy service themselves.

Chapter 3

Internship Change

Midway through the summer of 2016, I received an unusually succinct email from a person in Switzerland named Andrej Verity. Andrej was inquiring about my availability and interest in UN-OCHA's *Infographics, Video & Innovative Promotion* internship. Oddly, Andrej did not even introduce himself within the two lines of text that comprised the body of his message. Instead, he included a link to his blog. However terse the message seemed, it kindly concluded with: *"You have a great profile for this internship and I would love to have you join me and the team in New York."* Refreshed by the candor of Andrej's message, I confirmed both my availability and interest.

A week would end up passing before I would hear from Andrej again. Nevertheless, the receipt of his second message upheld my sanguine hopes that he was working towards obtaining the necessary approval for my official engagement from management in New York.

Although the final answer from management did not come for an additional month, it's arrival was paired with a new opportunity to work on a much more exciting and intensive project with OCHA's Shared Digital Services team. I was asked if I would be willing to work with SDS on creating a much-needed geo-taxonomy service within the humanitarian space. And as I was forewarned, with my official acceptance came an eruption of paperwork from human resources.

Responsibilities

Since the Geo-Taxonomy project was still in its early stages, my responsibilities began with seeing if any similar services or geo-taxonomies were in existence. As I performed this general landscape

analysis, I recorded the features, properties, and characteristics of the services that I came across in a matrix. The documents and charts that the analysis produced would be kept on hand and used to counter any future suggestions that perhaps SDS should subscribe to another service rather than creating their own.

The creation of a custom service would require much more initial effort, but the benefit would lie in the fact that the long-term consistency would not be the responsibility of an external party. My analysis indicated that many previous geo-taxonomy services became derelict rather quickly due to complications surrounding the maintenance of the services. To avoid a similar fate, it was decided that expensive GIS software packages would not be used for maintaining the service or its database. A service that was expensive to maintain was not a viable option, especially since comparable UN initiatives were quick to perish with budget adjustments.

Open source projects seemed like the ideal alternative to managing the project's cost, however, the UN is not authorized to share government data with any tool or entity that allows its service be used for profitable purposes. This technicality quickly barred SDS from leveraging several projects that utilized Open Street Map. Without obscuring any of the features of existing services, many of them could be rejected either on their price, or their Open Street Map connection.

For the first few weeks of my internship, SDS was still exploring ideas to see what would be needed to fill the geo-taxonomy gap that they knew existed. *What technology was needed? What new team members were needed? Is the proposed tech stack efficient? Are these features necessary and practical?* Even while these questions were still being addressed, SDS had created a clear definition of what their service would do and how the minimum viable product's (MVP) goals would be met.
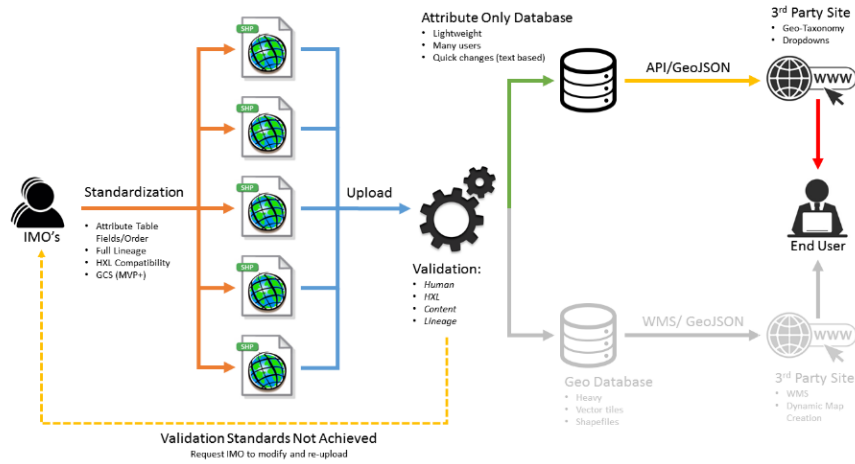
Figure 3.1- Geo-Data Validation Process (Henry Mros)

Color connections represent MVP goals for the service. Light grey connections represent future goals for the service.

The administrative boundary data that would feed the geo-taxonomy service would originate from the Information Management Officers (IMO's) in the countries where OCHA operates. The data submitted by the IMO's would have to adhere to a list of standards before entering the validation process. If the submitted data were in accordance with the standards, they would be stored in two separate places. The attributes of the geo-data would be stored on a server dedicated to providing the attributes to other websites through an API. By only storing the attributes from the geo-data on this server, the server would remain quick and responsive while being accessed by highly visited sites such as *Humanitarian ID, HumanitarianResponse.Info, Relief Web, and UN Financial Tracking Services*. Simultaneously, the complete copy of the geo-data would be stored on a geo-server that would eventually feed a web mapping service containing the administrative boundaries of the countries that OCHA operates in.

After the geo-taxonomy data flow was decided upon, additional components of the project could begin to move into place. My role became suggesting the standards that the submitted geo-data would need to adhere to. I would provide SDS with insight as to what is efficient and possible with regards to geo-data. With the new objective clearly defined, I began a review of the common operational datasets

(CODs) available through Humanitarian Data Exchange, which led to attribute field names becoming the first focus of the standardization process.

CODs were reliable in regards to their contents, but not in organization. When downloading a third level administrative boundary COD shapefile, the shapefile could contain any combination of the parenting administrative boundaries. The shapefile could contain a single parenting boundary, every parenting boundary, or none. If a parenting boundary was indeed present in a shapefile, it likely did not possess the same attributes as its child boundary. And if the parenting boundary did have the same fields as the child boundary, the fields may not have been similarly labeled. Such inconsistencies regarding attribute labeling and organization are present in the Dominican Republic of Congo COD listed below.

Dominican Republic of Congo COD			
Admin 0	**Admin 1**	**Admin 2**	**Admin 3**
	chef_lieu	adm1_code	code_ins
	code_ins	adm1_name	nom
	nom	adm2_code	origine
	origine	adm2_name	sce_geo
	sce_geo	adm3_code	sce_sem
	sce_sem	adm3_name	surface
	surface	cntry_name	type
		hrname	
		hrparent	
		hrpcode	
		rowcacode1	
		rowcacode2	

Table 3.1- Dominican Republic of Congo administrative level three attribute table (COD)

For comparison, below is the attribute table from the Central African Republic COD. The two CODs essentially contain the same content in regards to administrative boundaries, but are organized very differently; Central African Republic being much more organized and consistent across administrative levels. Notice that each administrative level is complete and the syntax is uniform.

Central African Republic			
Admin 0	**Admin 1**	**Admin 2**	**Admin 3**
admin0name	admin0name	admin0name	admin0name
admin0pcod	admin0pcod	admin0pcod	admin0pcod
admin0refn	admin1name	admin1name	admin1name
objectid	admin1pcod	admin1pcod	admin1pcod
shape_area	admin1refn	admin2name	admin2name
shape_leng	objectid	admin2pcod	admin2pcod
	rowcacode1	admin2refn	admin3name
	shape_area	objectid_1	admin3pcod
	shape_leng	rowcacode1	admin3refn
		rowcacode2	objectid_1
		shape_area	rowcacode1
		shape_leng	rowcacode2
			rowcacode3
			shape_area
			shape_leng

Table 3.2- Central African Republic administrative level three attribute table (COD)

After sifting through dozens of CODs, consistent attribute field names were suggested. Human readability was a key consideration since it would significantly increase the efficiency of the data review process for SDS's incipient service. The goal, however, was to automate the data revision process with scripts as SDS's service developed. The field names to receive such attention were also the field names that appeared most frequently and in many different forms: *administrative, p-code, reference name, alternative name*, and the six official languages of the United Nations. Below is a table of recommended attribute field names and an example of their use for a level one administrative boundary shapefile.

adm0_ar	adm0_en	adm1_ar	adm1_en	adm1_refn	adm1_alt
العراق	Iraq	العراق	Al-Qādisiyah	Al-Qadisiyah	Qadisiyah
Administrative boundary (level 0) in Arabic	*Administrative boundary (level 0) in English*	*Administrative boundary (level 1) in Arabic*	*Administrative boundary (level 1) in English*	*Administrative boundary (level 1) unaccented*	*Administrative boundary (level 1) alternate name*

Table 3.3- administrative level one boundary shapefile attribute table usage example

With the findings from the common operational dataset analysis, I composed a document that would defend the logic and syntax of the proposed attribute labeling standards. Currently, the document is under review by a team of consultants and software specialists. To date, the document has given rise to two different groups of thought. One view is that shapefiles are archaic and a greenfield project should not focus on them. The other view is that many quality datasets lie within old government systems and implementing shapefile capabilities into a new service is worthwhile.

The suggested attribute labels for administrative boundary shapefiles have were created to be easily compatible with the new Humanitarian Exchange Language (HXL). As is, HXL cannot be used

directly with shapefiles. One reason for this incompatibility is because HXL relies on certain ASCII characters that are not supported by shapefiles. Another reason is because HXL's attribute names are concatenative in nature and often exceed shapefile character limits.

HXL is a collection of standard terms called "tags" that can be concatenated and added to tabular data to ensure that the records and fields are accurately labeled in a standardized way. Any spreadsheet can have HXL added to it quickly, which is why *HXLstandard.org's* homepage boasts a three step *"30 second HXL Tutorial"*. However, the implementation of HXL into a shapefile is not as simple due to the limitations of shapefiles listed above.

The strength of HXL comes from the fact that the data tables produced in an emergency are not always consistent with each other. For example, field names indicating *"Women Affected"* could be labeled as *"wo_affect", "affected_w", "affect_f", "f_affected"*. HXL was designed to standardize and correct fopr such inconsistencies. To include HXL in a dataset, a new row is added to the table, and the most appropriate HXL tag is typed into the new cell. Tags can also be concatenated to form more descriptive field names. HXL would have labeled each variation of *"Women Affected"* as *#affected+f.*

① Grab a **spreadsheet** of humanitarian data.

Cluster	District	People affected	People reached
WASH	Coast	9000	9000
WASH	Mountains	1000	200
Education	Coast	15500	8000
Education	Mountains	750	600
Health	Coast	20000	3500
Health	Mountains	3500	1500

② Insert a **new row** between the headers and the data.

Cluster	District	People affected	People reached
WASH	Coast	9000	9000
WASH	Mountains	1000	200
Education	Coast	15500	8000
Education	Mountains	750	600
Health	Coast	20000	3500
Health	Mountains	3500	1500

③ Add some **HXL** hashtags.

Cluster	District	People affected	People reached
#sector	#adm1	#affected	#reached
WASH	Coast	9000	9000
WASH	Mountains	1000	200
Education	Coast	15500	8000
Education	Mountains	750	600
Health	Coast	20000	3500
Health	Mountains	3500	1500

Table 3.4- HXL's "30-second tutorial"

Once data becomes compatible with HXL, either through direct mapping of attributes or through other methods, the encapsulated data can leverage the strengths of HXL. Another one of HXL's benefits

is how easily statistics that can be calculated across datasets based on the HXL stored within. A user could easily calculate how many people were recorded as *"affected"* in an emergency across datasets and then further investigate the amount of affected men, women, and children within the *"affected"* category.

Shapefile attribute standardization was the first of many components that needed to be developed before the geo-taxonomy service could begin to move forward with the power of HXL and mesh with other humanitarian labeling standards. Reaching the point where a suggested standard could be submitted for review was a multinational and multi-team effort. With early errors and oversights corrected for, the suggested standard could begin to branch out and progress much more quickly.

In the future, when SDS's service is more mature, shapefiles will be directly converted into less restrictive formats upon submission. And trough scripts added to the geo-data validation process (figure 3.1), standardized attribute field names will be transformed into pure HXL for increased compatibility.

Figure 3.5- HXL reference postcard (Front)

Figure 3.6- HXL reference postcard (Rear)

Internship Part II

Shortly after returning to Clark for the new semester, my internship was extended to the maximum duration of six months. During this period, I began to collaborate with a more geo-focused team in Geneva, Switzerland. With the team in Geneva, I worked on automating and speeding up QA and data validation processes by developing scripts and tools. The goal was to have a set of tools for ArcGIS that would ensure:

- Encoding is in UTF-8 or higher

- Projection is defined, correct, and consistent

- Admin layers are closed polygons

- Data extent is correct

- Multipart geometry check

- P-codes are unique

- P-code attribution is consistent

- Admin Names are checked for uniqueness

- P-code attribution is consistent across all layers

- Admin Name attribution is consistent across all layers

- Admin layers are nested by geometry

- Admin layers are nested by attribution

As the semester progressed and became more demanding, the time that I could dedicate to developing these tools diminished. I was allowed to work on scripting new tools without any hard deadlines and was occasionally tasked with investigating new services as they became discovered. This fair balance that I was awarded allowed me to give my academic endeavors the attention that they demanded while still contributing to the SDS team in a meaningful way.

Chapter 4

Required Skills

As an intern with the SDS team, finding a niche where my knowledge was pertinent was difficult at first. Each team member was an expert in their respective area and very competent in peripheral subjects. Before I could find my place, I had to identify a gap that I could fill. To do that, I had to learn what each team member was capable of and what they were focusing on. Familiarity took a few weeks to develop, but as I became more involved with team calls, my understanding of the team increased. In many ways, understanding my new environment was the first obstacle to becoming an effective team member.

Once I had become familiar with the team, I had to learn how to keep pace with them. As each branch of an SDS project would develop, the number of contributors and reviewers would increase. This would allow our efforts to gain traction and exposure across the organization and humanitarian space. As collaboration increased though, patience became more crucial since gaps in working hours (due to time zones) became more of a factor and could seemingly halt progress. There were times when I needed to speak with someone west of NYC before I could speak with someone east of NYC, and both calls needed to occur before the next step could be initiated. It could take two days to conduct two ten-minute calls. Situations like this, when you were going against the direction of time zones, required coordination and organization in order to keep a project progressing smoothly.

When a call was scheduled, it was important to be quick and concise. The person on the other end, was not going to listen to you think aloud. Some contributors only worked for the team six days a month, others split their working hours among multiple teams equally. Their time was valuable and their

availability could be very limited. When requesting team members to review a document, it was not expected that feedback would be provided within a day or two. If you were patient and coordinated though, you could schedule your interactions in a way that allowed you to keep your portion of the project in motion regardless of response times.

Required Knowledge

My knowledge of geo-data was critical to finding my niche within the team. There wasn't any need for geo-processing, spatial analyses, remote sensing, or time series analyses. And those were the skills I acquired at Clark that set me apart from the others. It ended up being my experience with various geographic data formats and my knowledge of their capabilities that allowed me to find a place within the team. Although I was not directly processing geo-data, understanding what would be required of the data to perform certain functions allowed me to find my niche and provide the team with valuable input.

As other team members were working together on the structure and organization of the geo-server, I was interpreting the geo-terminology and specifications of the software and geo-server. Decisions for the geo-server were largely dictated by the quality of the internet connection in areas where the internet was least available. *Could a geo-file be updated through a text-message? How difficult is it to get the attributes from a geo-file into another format? How light is this file format? Which format is most compatible with a taxonomy? How are geo-files typically stored in a geo-database? Is it sensible to have one server for the attributes and another for the geometries?* Having only ever worked with personal geo-databases on a desktop, this conversation made it apparent that I needed to learn more about databases and servers on an enterprise scale. During this time, I created a matrix to compare features and capabilities of various geo-server packages, as well as what companies and organizations used them. Upon sharing the results, I discovered that another portion of the team had come to same conclusions and that my results served as verification to them that they were on the right track.

Another role that I had on the team was to serve as the "geo eyes and ears." While SDS was performing a landscape analysis of existing services, I would join calls and meetings to interpret the more geo-intensive portions of the conversation. Occasionally there would be development teams who would visit the UN and Andrej would schedule a coffee with them so that we could learn more about the direction that they are taking their service in. Other times there would be a call where Andrej would Skype the other group and I'd join the call as a listener to interpret the geo portions of the conversation. Afterwards, Andrej and I would tease apart the details to see what may have been over embellished or what may be worth implementing into SDS's service. Being competent in as many GIS related areas as possible during these conversations was crucial since it was impossible to know which GIS topics would arise in advance.

What Clark Taught Me & What I learned

The early stages of my internship dealt with conducting a landscape analyses to help ensure that our geo-taxonomy service was needed and could fit into the current market place. Simultaneously, the team was planning the geo-requirements for the service's future API. At this point, I was not familiar enough with API's to contribute in a meaningful way. Team members would sometimes rephrase API questions to me so that I could understand, and I would sometimes do the same when discussing GIS concepts. Had I been more familiar with API's when starting the internship, I would have been assigned more challenging work earlier on. At the point when API knowledge was needed, there was no window of opportunity for me to learn.

When the new semester began, I was enrolled in "Web Mapping & Open Source GIS" which had me working with and becoming familiar with API's. This helped me earn an extension for my internship. After the extension was granted, the focus moved to me developing tools for speeding up geo-data quality assurance and validation processes. Andrej was on a flight back to NYC when he sent me a quick

message informing me that he spoke with a few people overseas and they were wondering if I could develop tools for ArcGIS. This time, unlike the API offer, I had experience developing scripts from the course *Programming for GIS* and could take on the responsibility immediately.

SDS taught me the value of open source software. Prior to the internship, I had not explored open source software extensively. The internship though, required me to explore open source GIS options in great detail. The eye-opening moment was when I realized that with the right open source tools in hand, the team had enough talent to create their service without having to make any expensive purshaes. Because the Geo-taxonomy service was unique, there wasn't any single existing option that could do everything the team would require of it. By leveraging open source software, the team could create a service that did exactly what they wanted without any excess or shortcomings.

Internship & Career Goals

When applying for internships, I had expected to receive one that would have me continuously cleaning data and geo-processing. Instead, I was fortunate enough to be offered an internship that allowed me to think and be a part of a talented team. My position required a master's degree and provided me with experiences that matched. This combination has let my work experiences catch up with my academic qualifications and has made me a more balanced candidate for future opportunities. Becoming overqualified while remaining underexperienced is an easy gap to fall into as a student. This internship has helped me close that gap.

While still unsure of which direction my career will go, my internship has further confirmed that switching from graphic design to GIS in undergrad was not a terrible idea; although it was my graphic design past that initiated this GIS internship through a call for an infographics intern.

Chapter 5

Conclusion

Over the last few months, I have had nothing but positive interactions with the United Nations and their staff. Andrej had recognized my situation early on and transformed the opportunity in to an experience where I had the freedom to work on projects that would lead my young career into self-selected directions.

This internship was my first professional GIS experience since becoming immersed in the subject. The opportunity to be a part of the SDS team has proved to me that my decision to pursue a career in the in the GIS field was a wise choice. Although I am still unsure of what lies ahead once the internship concludes, my internship experience and academic career has prepared me well for the next opportunity.

BIBLIOGRAPHY

Charter of the United Nations [online]. Source. Available from:
http://www.un.org/en/charter-united-nations/ [Accessed 28 Oct 2016].

Financial Tracking Service [online]. Source. Available from:
https://ftsbeta.unocha.org/ [Accessed 27 Oct 2016].

Humanitarian Data Exchange [online]. Source. Available from:
https://data.humdata.org/ [Accessed 27 Oct 2016].

Humanitarian Exchange Language (HXL) [online]. Source. Available from:
http://hxlstandard.org/ [Accessed 11 Nov 2016].

Humanitarian ID [online]. Source. Available from:
https://humanitarian.id/#/ [Accessed 28 Oct 2016].

Humanitarian Response [online]. Source. Available from:
https://www.humanitarianresponse.info/ [Accessed 27 Oct 2016].

OCHA- Who We Are [online]. Source. Available from:
http://www.unocha.org/about-us/who-we-are/ [Accessed 28 Oct 2016].

Relief Web [online]. Source. Available from:
http://reliefweb.int/ [Accessed 28 Oct 2016].