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# Textron Systems, Geospatial Solutions Technical Writing Internship

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# TEXTRON SYSTEMS, GEOSPATIAL SOLUTIONS

# TECHNICAL WRITING INTERNSHIP

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A MASTER'S PROJECT

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Jie Tian, Chief Instructor

ABSTRACT

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My internship at Textron Systems, Geospatial Solutions took place from June 1 to July 31, 2015 where I worked under the supervision of Denise Harrington. My time at Textron Systems in the Geospatial Solutions department was divided into one large project and several smaller projects. I was required to spend time getting to know the GIS software in order to complete these projects. The large project consisted of writing and developing a Quick Reference Guide for a solution called GeoCatalog Discover. The smaller projects I completed consisted of writing several tutorials presenting ease of use of GIS tools and exploitation of geospatial data using two products – GeoCatalog Discover and RemoteView. This report provides detailed descriptions of my internship experience and the projects I completed as well as some examples of the projects.

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Jie Tian, Ph.D.

Chief Instructor

# ACADEMIC HISTORY

Name: Casia Terenzoni Date: December 2015

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Finally, I would like to thank my supervisor, Denise Harrington for all of her hard work during my summer internship and for all of her efforts in making my two months at Textron Systems a wonderful professional experience. The success of my internship is owed to her.

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# GLOSSARY

GIS – Geographic Information Science

IDCE – International Development, Change, and Environment Department at Clark University

GISDE – GIS for Development and Environment program in the IDCE

ESRI – Environmental Systems Research Institute

SSU – Salem State University

QRG – Quick Reference Guide

GCD – GeoCatalog Discover

# CHAPTER 1: INTRODUCTION

I graduated from SSU in May, 2013. At the time I was working full time as an infant/toddler teacher, applying to any job that involved GIS. But I ran into the same problem at each and every company I applied to: I had no real experience in the GIS field besides my B.S. degree, and nobody would hire me. Time started passing quickly, I was still working full time as a teacher and my unhappiness started to show. I was determined to use my GIS degree and my determination led me to the GISDE program at Clark University the following year.

Of the three options that the GISDE program lets their students choose from as a requirement, I chose to follow the internship route. I spent an average of two months applying to about fifteen internships, until I found the opening at Textron. After finding Textron, it quickly became one of my top choices for the internship requirement because of my interest and passion for using GIS in the field of defense. This paid internship took place at one of the many locations of Textron Systems at 201 Lowell Street, Wilmington, MA 01887 and lasted from June 1 to July 31. I worked with one other intern, Kaity Kenniv, a current senior and technical writing major at Cedarville University in Ohio. We shared an office together and were able to collaborate with our summer projects for the two months we were there.

Chapter 2 of this paper will describe Textron Systems and the department Geospatial Solutions where I interned in greater detail. Chapter 3 will discuss my internship responsibilities and summer projects. Chapter 4 will provide my assessment of my internship and what I learned throughout the two months of working at Textron. Chapter 5 will provide a summary and conclusion of my internship experience.

# CHAPTER 2: DESCRIPTION OF ORGANIZATION

## 2.1 Organization Introduction

Textron Systems is a global multi-industry corporation (TEXTRON, 2015a). Textron's businesses develop and integrate products, services, and support that help present solutions serving the needs of defense, homeland security, aerospace, infrastructure protection, as well as other customers all around the world (TEXTRON Systems, 2015a). The company was founded in 1923 by Royal Little as a small textile company (TEXTRON, 2015b). It has since developed into a large global and extremely successful multi-industry corporation.

## 2.2 Organization Structure

Within Textron Systems there are a total of nine businesses; these include Advanced Information Solutions, Electronic Systems, Geospatial Solutions, Lycoming Engines, Marine & Land Systems, Support Solutions, Unmanned Systems, Weapon & Sensor Systems, and TRU Simulation and Training (TEXTRON Systems, 2015a). All of these businesses are industry leading developers and integrators of unmanned systems, advanced marine craft, armored vehicles, intelligent battlefield and surveillance systems, geospatial management and analysis systems, intelligence software solutions, precision weapons, piston engines, test and training systems, and total lifecycle sustainment and operational services (TEXTRON Systems, 2015a). I spent my summer working in Geospatial Solutions.

## 2.3 Location

Textron Systems products and services are engaged throughout six continents but the company also maintains a physical presence around the globe which includes the United States, India, Canada, Australia, and the United Kingdom (TEXTRON Systems, 2015b). Headquartered in Providence, Rhode Island, there are also Textron businesses located in approximately twelve U.S. states. Many of these locations in the U.S. specialize in primarily one of the many businesses mentioned above but also incorporate smaller departments focusing on one or more of the other businesses as well. For example, the Wilmington, MA location where I interned is Weapon and Sensor Systems, but I worked in a small Geospatial Solutions department there. Geospatial Solutions main office is actually located in Sterling, VA (TEXTRON Systems, 2015c).

## 2.4 Areas of Expertise

Textron Systems provides superior customer services to all of their clients around the world. Each business within Textron Systems has their own specialized area of expertise. Examples of products and services provided by each of Textron's businesses are smart weapons, Map HT (Mapping the Human Terrain), range simulation equipment, geospatial data management systems and software, SCTV (Survivable Combat Tactical Vehicle), and Unmanned Aircraft Systems; these are just a few of the many products and services offered by Textron Systems (TEXTRON Systems, 2015d). The top buyers of Textron Systems products and services are the United States military branches. It is because of this that I was drawn to Textron

Systems in the first place, it is my goal to use GIS in the field of defense upon graduating from Clark.

### 2.5 Employee Organization

"Textron Systems is one team, accomplishing the incredible (TEXTRON Systems, 2015e)". With a worldwide network of businesses, Textron Systems employs thousands of workers around the globe. A facet of security that contributes to employee organization is security badges. Each employee is required to have a security badge that contains a certain level of security on it depending on the employee's position within the company. Due to Textron's size, organization plays a huge role in maintaining an efficient business system. Being able to run each business individually in an organized manner so that Textron Systems as a whole is a successful corporation is important.

### 2.6 GIS Applications

Each business within Textron uses GIS in some form. Textron Systems is known to incorporate GIS through a wide range of products provided for visualizing, interpreting, and managing geospatial data specifically in ways that improve "situational understanding and deliver actionable intelligence to the user (TEXTRON, 2015c)." For example, the software developed by Textron Systems within the business Geospatial Solutions (that I had the pleasure of working with all summer) is GIS software that is used for data storage, manipulation, analysis,

and exploitation of geospatial data. The tools that I used were all similar to those that I used in the courses Introduction  to GIS, Introduction to Remote Sensing, and Advanced Vector GIS.

### 2.7 Organization Strengths and Weaknesses

For such a large corporation, Textron Systems is run very smoothly. I think that having each location within the United States focus on primarily one business within the company is a extremely effective way to get results. The only weakness of working in Wilmington, MA is that it is primarily Weapon and Sensor Systems business and the Geospatial Solutions department is especially small. We often had online meetings where we had to call into the Geospatial Solutions department located in Sterling, VA. Working in a small department within Textron Systems was difficult because due to its small size and small amount of people working there, there was a lot of work to get done often in small periods of time. During my internship there was only one technical writer for the whole department (my supervisor).  About half way through the internship my supervisor hired a full time technical writer therefore there were two full time tech writers and two full time intern tech writers.

# CHAPTER 3: INTERNSHIP RESPONSIBILITES

## 3.1 Program Orientation and Organization

The intern program at Textron is very well organized. The first day of work consisted of orientation for all of the summer interns regardless of department. Company policies were covered, as well as financial topics, the company's ethical policies, etc. At 2:00 on the first day we were then escorted to our respective department to meet our supervisors. The Geospatial Solutions department in Wilmington, MA is a small department so I met with all the employees in the department on my first day. There was only one other intern with me in Geospatial Solutions this past summer whom shared an office with me.

On our first day we were all given a hard copy of a "Summer Calendar" consisting of events during the summer that we were to attend. There were small tours of the building scheduled for the first few days of work, and throughout the two months of the internship there were "meet and greet" lunches. These were to introduce interns to people of higher positions within Textron, which was beneficial because it was a good way to make connections.

## 3.2 Projects: QRG

The main project I worked on throughout the course of two months was the creation of a QRG for Textron Systems GeoCatalog Discover software. GCD is an extension of Textron Systems RemoteView software and is an online database that enables the user to create a library of geospatial data (TEXTRON Systems, 2015f). Data can be searched, downloaded, and opened directly into Textron's RemoteView product for analysis and exploitation of data and imagery.

The first step in writing about any software is learning its intricacies. Software that I needed to learn prior to writing the QRG consisted of GCD, Snag-It, and Adobe InDesign. The first task was to use a product called Snag-It which is a high quality screen capture software. Every toolbar, button, interface, and menu was captured in GCD so that images can be pulled into the QRG and diagrams can be created for visual aide. Adobe InDesign, which is a desktop publishing software, was then used to create and lastly publish the QRG.

Basic topics were covered in the QRG; for example, how to log into GeoCatalog Discover, how to navigate and zoom, query for data, edit queries, manage user settings, etc. Figure # displays an image of the table of contents with each topic introduced in the QRG. The QRG is broken up into two sections: the user section and the administrator section. The administrator section contains topics that users do not need to perform, such as adding new libraries of data and ingesting data.

Before publishing, the QRG needed to be proof-read many times by people within Textron Systems Geospatial Solutions, both by people with no experience and by people who have much experience with the software. This ensured that people of all levels can easily follow the steps in the QRG with no difficulty. Each time the QRG was reviewed and tested, it became QRG D1 (draft 1), QRG D2, etc. until it is tested and reviewed at least ten times. During my last week of the internship the QRG was on Draft 3 and was being sent to Textron Systems located in Missoula, Montana for reviews in their Geospatial Solutions department.

### 3.3 Projects: Tutorials

Another project was writing several tutorials presenting ease of using GIS tools within Textron Systems Geospatial Solutions software's GCD and primarily, RemoteView. RemoteView software "…provides users advanced, yet easy-to-use toolsets for imagery and multi-image analysis, motion imagery analysis, geospatial data management, publishing and product generation, 3D visualization, tactical mission planning, precision positioning and third-party-integration (TEXTRON Systems, 2015g)." This software reminded me immensely of TerrSet/IDRISI software because of the similarity of GIS and the overall appearance of it. Microsoft Word was used to write the tutorials using strict guidelines for formatting, fonts, captions, images, etc. Data for these tutorials was given to me directly by my supervisor and was also given out to buyers when purchasing Textron's software.

Each tutorial contains detailed information about the topic it covers, as well as specific steps on how to accomplish each GIS topic. After finishing each tutorial, complete with images and step by step instructions, the final step is to import the finished product into Author-It. Author-It is a publishing program that Textron Systems uses to publish all of their tutorials. Importing the tutorial is done by simply highlighting the text in Microsoft word and copy and pasting the text directly into Author-It. The tutorials I created are as follows: Comparative Views Tutorial, Multi-Image Analysis Tutorial, Vector Themes Tutorial: Importing and Analyzing Vector Layers, RVConnect Tutorial, Creating a Mosaic Tutorial.

The Comparative View Tutorial and Multi-Image Analysis Tutorial both walk through how to find geospatial data using GCD to download the data from that database directly into RemoteView where GIS operations are performed. These are the only two tutorials that used

both of these software's together. The Comparative Views Tutorial is useful because users learn how to compare geospatial data using RemoteView's tools called "Create Comparison", "Blend Images", "Colorized Difference", and "Flicker Between Images". The Multi-Image Analysis Tutorial primarily shows the user how to display more than one image side-by-side for analysis purposes and to create an Imagestack which allows the user to flip through the images one on top of the other.

The Vector Themes Tutorial and the Creating a Mosaic Tutorial were both performed with only RemoteView software. Vector Themes showed the user how to import and analyze vectors into RemoteView, how to adjust the vector layer symbology, save the project, change layer permissions of a vector layer, perform a query with a point vector layer, cut the query to create a new vector layer, add labels to the new vector layer, and lastly to publish the results to a PDF document. The Creating a Mosaic Tutorial showed the user how to create a mosaic with two images which initially stitched them together to form a single composite. The steps involved opening the images, creating a mosaic, managing the mosaic, adding a title and map features, saving the project, and publishing the mosaic to a KML or KMZ.

The last tutorial I wrote was called RVConnect Tutorial. RVConnect is an extension of RemoteView software that offers "geospatial intelligence analysts real-time interoperability between RemoteView and Esri's industry leading GIS application, ArcGIS (TEXTRON Systems, 2015f)." RVConnect provides integration between the two applications by enabling data and geospatial analysis workflows to be shared across both applications (TEXTRON Systems, 2015f).

# CHAPTER 4: ASSESSING THE INTERNSHIP

## 4.1 Skills Required

Skills required for this internship included a basic understanding of GIS tools and software, presentation skills, and technical writing skills. Learning new GIS software came easily to me due to the fact that I learned all of these tools and forms of analysis that I was writing about at Clark University as well as at SSU. Presentation skills were required because as each intern had to present to their department. At the end of the internship program I presented to the Geospatial Solutions department in Wilmington, MA as well as in Sterling, VA through an audio/video conference. The presentation covered all of my projects and accomplishments throughout the summer. The practice that Clark gave me presentation-wise in my first year of the GISDE program was tremendously helpful. Technical writing skills were the biggest part of the internship that I was least familiar with.

## 4.2 Skills Learned

I learned what it was like to work in a corporate company and a professional environment, which I found beneficial because interning in this environment was great practice for the future. I learned to not be afraid to ask questions. From the start of the internship, everybody in Geospatial Solutions was great about making sure that I was not afraid to ask questions which made my internship experience not only easier but more comfortable. I learned new GIS software primarily used for defense purposes which was exciting to me considering defense is the field I desire to work in. I was able to view firsthand what the U.S. defense branches would use Textron's software for.

All GIS skills learned at Clark University came in handy in my work at Textron Systems. For example, the Geospatial Solutions department in Wilmington, MA consists of just two full-time technical writers. One of them being my supervisor, Denise Harrington, and the other a new hire right out of college; the new hire did not know much about GIS and often sent me emails inquiring about certain GIS tools and definitions such as supervised classification versus unsupervised classification with raster data.

The biggest skill that I had to learn was technical writing. I was required to learn and follow the Microsoft Manual of Style textbook. This entailed learning what words to use and what words to avoid, as well as knowing how to use Microsoft styles for each heading, image caption, and different bodies of text for everything. For example, when I tell the user to click a button on a toolbar, it must be "click" and not "select", "choose", "push", or "press".

### 4.3 Relation to Career Goals

This internship related to my course studies and overall career goals. I have always wanted to work in the defense field using GIS and Textron Systems is primarily a defense company. Starting my professional career in the Geospatial Solutions department of a large GIS defense company was ideal to my future goals. My studies at Clark University related to this internship because all of my internship projects touched on in my studies at Clark University. For example, the tutorials that I wrote covered GIS tools that were used in courses such as Introduction to GIS, Introduction to Remote Sensing, and Advanced Vector GIS.

### 4.4 Recommendation

I would recommend this internship to other IDCE students if they were interested in using GIS software and have a passion for writing. Being a GIS student definitely helped for this internship. Not many of the people I worked with knew a lot about specific GIS tools so as an intern it was great to be able to share my knowledge with everybody in the department. I would not recommend this internship to anybody who strictly wanted to spend their internship performing GIS analyses, there was tremendous amount of writing involved in this internship. It was not a hands-on GIS internship therefore it would not suite some GIS students. A lot of connections were made though because it is such a large company and the internship program provides many opportunities to meet people in many different Textron Systems departments, which was one part of the internship I enjoyed.

# CHAPTER 5: CONCLUSION

I consider myself honored to have had the opportunity to intern at Textron Systems this past summer. It was a brilliant experience to work for a GIS company that primarily uses their software for defense purposes. The skills I learned and the connections I made will be important for not only future job searches but for my own personal learning experience. Even though the department I interned in was small, I had the experience of working in a large corporate environment. I was able to write about GIS tools and provide GIS knowledge to other employees, and I couldn't have asked for a better first internship experience.

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