Animating the Battle of Lake Erie with ArcGIS

Yu Zhou

Abstract

On September 10, 1813, Master Commandant Oliver Hazard Perry met and defeated a British flotilla at the Battle of Lake Erie. Perry, with a squadron of nine ships, achieved one of the most significant victories of the War of 1812. The victory secured control of the lake for the United States and became a valuable morale booster for a country desperately in need of good news. To record this historical event, artists have made many paintings of the battle. These presentations, however, usually do not contain accurate spatial information. Scales and directions, for example, are always distorted. In this presentation, maps of ships' location at different time during the battle, based on the latest researches, are produced with ArcGIS. Landsat images are used as the background of the maps. An animation of the battle is also produced.

1. Introduction

On September 10, 1813, Master Commandant Oliver Hazard Perry met and defeated a British flotilla, under Commander Robert Heriot Barclay, at the Battle of Lake Erie. With a squadron of nine ships, Perry achieved one of the most significant victories of the War of 1812. The victory secured control of the lake for the United States and became a valuable morale booster for a country desperately in need of good news.

To display the details of this historical event, artists have made many vivid presentations of the battle (see Figure 1). These drawings, however, do not contain spatial information. Scales and directions, for example, were always distorted. This study intends to use GIS (Geographic Information Systems), with the newest researches, to spatially record the battle events.

Figure 1. The Battle of Lake Erie (adapted from National Park Service, 1999)

2. Background

There are basically two types of visualization methods for the Battle of Lake Erie. The first type involves the artistic expression of the event. Figure 1, for example, is a painting displayed at the Metropolitan Toronto Library (National Park Service, 1999). This type of visualization provides us a dramatic view of the battle. However, the spatial aspect of the battle, a very important element, is totally missing in this format of visualization.

The second type of visualization is in a form between map and drawing. A typical example of this kind of presentation can be found in Benson Lossing's 1868 monumental book "Pictorial Field-Book of the War of 1812." In his book, Lossing made three diagrams showing the relative ship locations during different stages of the battle (see Figure 2, 3, and 4). His diagrams were furnished by U.S. navy Commodore Steven

Champlin, the commander of the Scorpion in the battle. Figure 2, for instance, shows the position of the two squadrons when the American was approaching that of the British in battle order. In the diagram, A is the British squadron, and its vessels are designated by Roman numerals. B is the American squadron, and the vessels are designated by Arabic numerals.

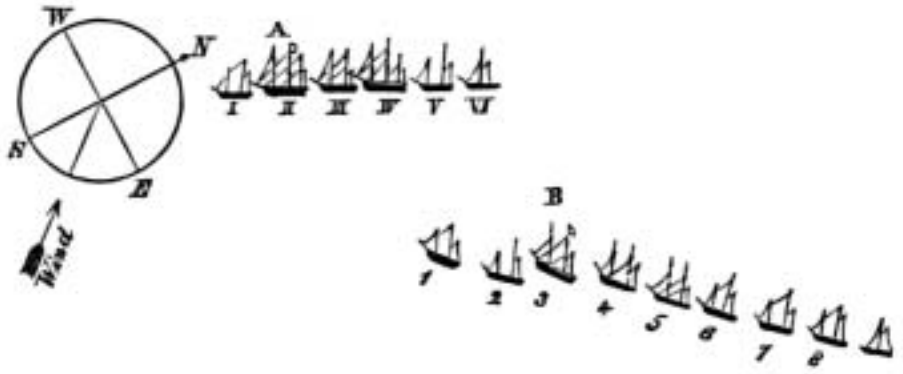

Figure 2. The Two Squadrons Just Before the Battle (Lossing, 1868)

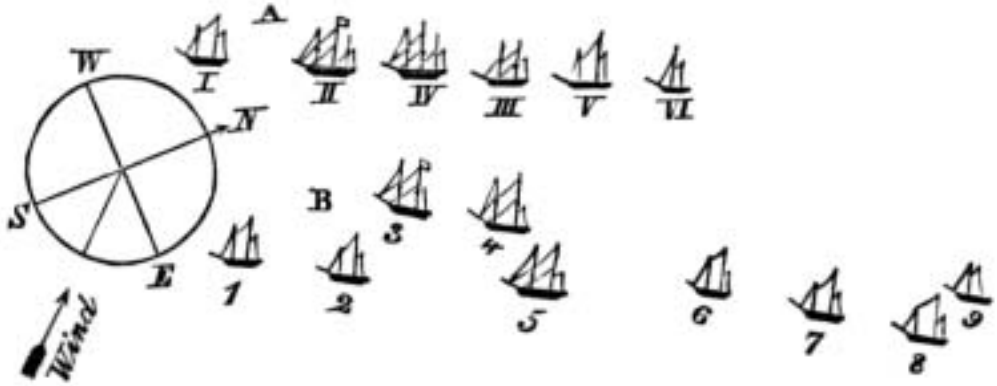

Figure 3. First Position in the Action (Lossing, 1868)

The British vessels, A, are indicated by Roman numerals. I., *Chippewa*; II., *Detroit*; III., *Hunter*; IV., *Queen Charlotte*; V., *Lady Prevost*; VI., *Little Belt*. The American vessels, B are indicated by Arabic. 1, *Scorpion*; 2, *Ariel*; 3, *Lawrence*; 4, *Caledonia*; 5, *Niagara*; 6, *Somers*; 7, *Porcupine*; 8, *Tigress*; 9, *Trippe*.

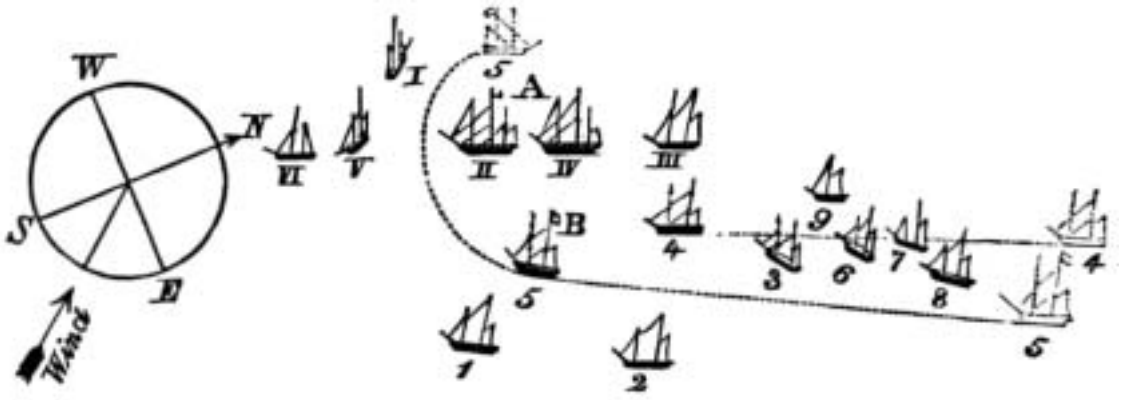

Figure 4. Second Position in the Battle (Lossing, 1868)

From spatial aspect, Lossing's diagrams provided more information than those of artistic paintings. In his presentations, the relative locations were displayed in a simpler, but clear way. These diagrams, however, are not exactly maps. Since there is no geo-referencing established on them, spatial measurements such as distance are impossible. A recent example of such type can also be found in National Park Service's brochure "Perry's Victory and International Peace Memorial" (1999). Although it provides an improved quality to portrait the battle (Figure 5), problems of spatial measurement still exist.

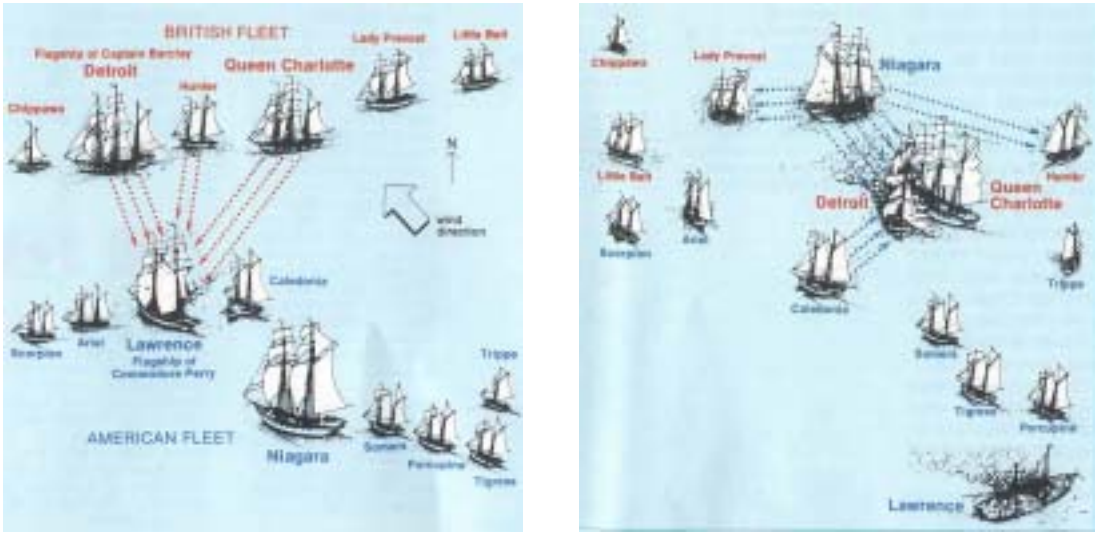

Figure 5. Two Diagrams Showing the Lake Erie Battle (National Park Service, 1999)

Both visual presentation methods give us some ideas about the battle. Lack of geographic information and spatial sense is a common problem. Without geo-referencing, measuring cannot be performed, the presentation, therefore, will provides distorted information for those who read them. The purpose of this study, thus, is to use updated geo-technology mapping this significant event so that we can describe the event in a spatially precise way.

3. Methods, and Procedures

Fortunately, a large amount of literature about the Battle of Lake Erie exists. One of the recent researches on the battle was the book "A Signal Victory: The lake Erie Campaign 1812-1813" by David Skaggs and Gerard Altoff ((2000). The book documented tremendous information about the battle, including geographic background and spatial arrangement of the ships during the event. Their researches provide us important materials to spatially construct the event.

The maps presented here (Figure 6-10) are the products of using Landsat 7 remote sensing data and ArcGIS software. Landsat 7 data was acquired on August 21, 2001, which is very close to the time when the battle was occurred. The raw data is processed as natural color composition. The image then is geo-referenced to UTM (Universal Transverse Mercator) coordinate system. ArcGIS software is used to display the geo-coded image. In ArcGIS, the distance can be measured precisely in different units (e.g., miles, kilometers, nautical miles, and etc.). Based on information presented in David Skaggs and Gerard Altoff's book (2000), the locations of both British and American squadrons are marked.

Figure 6. West Lake Erie

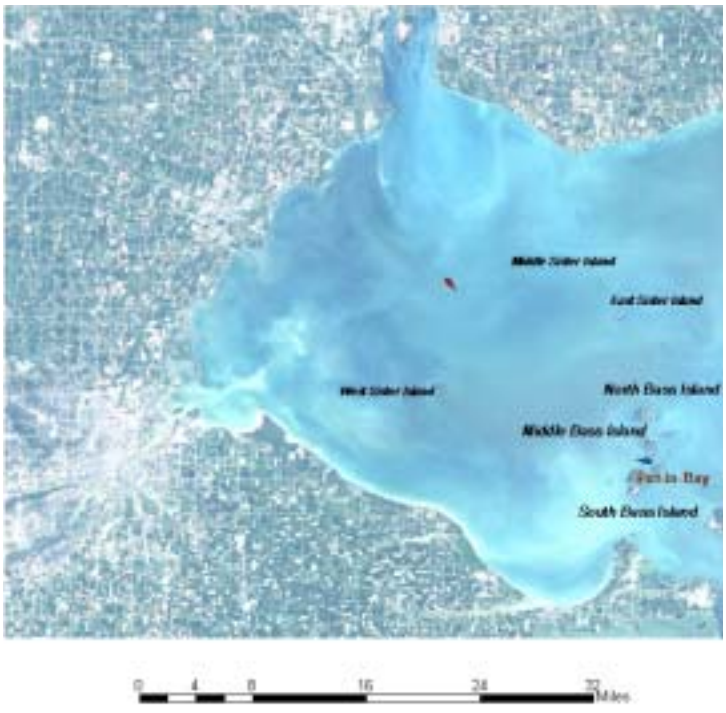

Figure 7. Before Battle at 0700 Hours

Figure 8. Before Battle at 1000 Hours

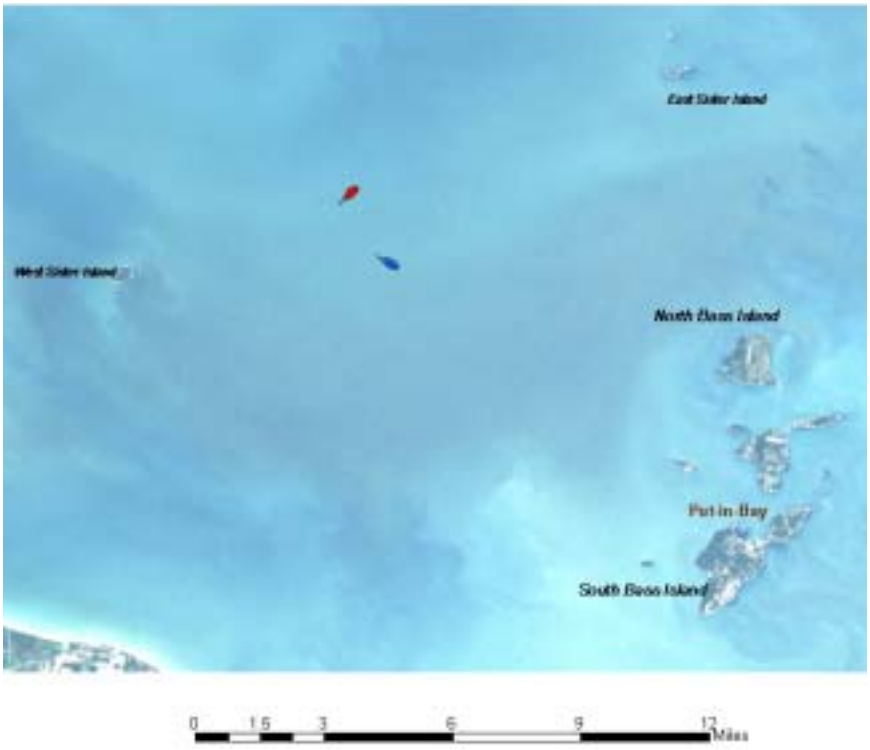

Figure 9. The Battle of Lake Erie Began at 1145 Hours

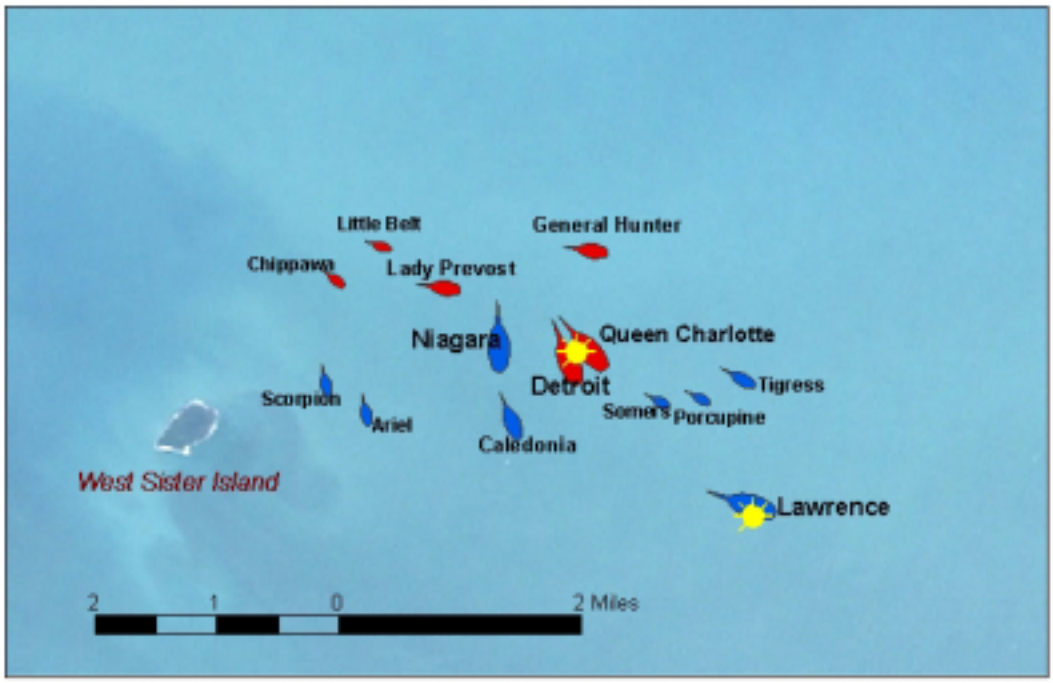

Figure 10. The Battle of Lake Erie Ended at 1500 Hours

4. Conclusions

Geo-technology can retrieve historical events in a spatial-correct way. While remote sensing can provide a vivid geographic background, GIS can map the event accurately. With other technology, the dynamics of the event can also be displayed in an animated form.

References

Lossing, Benson J. (1868). Pictorial Field-Book of the War of 1812. New York: Harper & Brothers Publishers.

National Park Service, U.S. Department of the Interior (1999). Perry's Victory and International Peace Memorial, Ohio.

Skaggs, David Curtis and Gerard T. Altoff (1997). A Signal Victory: The Lake Erie Campaign 1812-1813. Annapolis, Maryland: Naval Institute Press.

Author Information

Yu Zhou
Associate Professor
Department of Geography
Bowling Green State University
Bowling Green, OH 43403
(419)372-7828 (voice)
(419)372-0588 (fax)
yzhou@bgnet.bgsu.edu