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# The Destruction of UNESCO World Heritage Sites Aleppo and Palmyra in Syria Due to Civil War: Accessioning and Cataloging the Satellite and Drone Imagery into a Museum Collection

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Due to Civil War: Accessioning and Cataloging the Satellite and Drone Imagery
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by
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Capstone project submitted in partial fulfillment of the requirements for the Degree of Master of
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**Abstract**


This **Museum Studies** capstone will discuss the civil **war** inside **Syria**, and the destruction of **UNESCO World Heritage** Sites **Aleppo** and **Palmyra**. This paper will examine the historical importance of these sites, and the **drone** and **satellite** imagery data used to confirm the destruction. This paper will argue that for full preservation of these **cultural heritage** sites that this imagery data should be **accessioned** into a museum collection with the use of professionally-trained **registrars**. This paper will explore this idea further by arguing that this imagery data collected by companies and governments should be handed over with full **copyright** to the museums operating at these two sites inside Syria.

I would like to dedicate this capstone project to the Syrian people who's lives and culture have been permanently altered due to the civil war. I would like to give a serious thank you to my Wife and Children for supporting me through not only my Masters degree, but my Bachelors as well; and also getting off the internet when I needed it. I would also like to thank my Mother and all of my family for continuously encouraging me that I can do this. I also am deeply grateful for Marjorie Schwarzer, the Museum Studies faculty, and USF for all the support and help to get me to this point. Thank you all!

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## Chapter 1: Introduction

The topic I will be discussing in this capstone is very dear to me. As a US Army Veteran who deployed to Afghanistan I witnessed first hand the horrors of war. Though I never witnessed the loss of cultural heritage, I still nonetheless saw how a country can be torn apart by war. This left me wondering how a country—any country— can move forward from war. What happens to all of the destroyed UNESCO World Heritage Sites? How will the loss affect the people, and how will it change our future understanding? In this paper I will explore the cultural heritage loss inside Syria due to the civil war that is currently still taking place.

UNESCO designates World Heritage Sites that are key to our understanding of the past. Because of the recognition International scholars give to World Heritage Sites this destruction happening inside Syria is a monumental loss. The cultural heritage losses that have occurred must be addressed so that at the conclusion of the war Syrians can move forward with confidence that their country can and will be restored to its former glory. Through this paper I will be exploring two UNESCO World Heritage Sites inside Syria; Aleppo and Palmyra. Not only were these sites heavily trafficked through pre-war tourism, they both have grand monuments residing within their territory that dates back millennia that have been either heavily damaged or completely destroyed.

Because of this great loss through this capstone I would like to propose a way to help save the cultural heritage. Satellite and drone footage have been used to confirm the destruction and to recreate 3D models inside Syria. Recognizing that the situation as well as the geopolitics of Syria are still fragile (as of the writing of this paper) this proposal will argue that this imagery data should be giving to Syrian museums to be accessioned and cataloged for future generations

posterity. Aleppo and Palmyra will be rebuilt to an extent, but it must be remembered what is

original and what has been rebuilt. Humanity must never forget how war can destroy our shared

past. I believe that by accessioning these images as objects into a museum collection the great

losses that have been suffered will be remembered, and that Syrians, future scholars and visitors

will have greater understanding of the past.

In Chapter 2 I will explore both Aleppo's and Palmyra's past. I will discuss the grand

monuments that had been built and the great civilizations that had ruled the land. Inside Aleppo

many great powers ruled, these powers helped to create and built the towering structures that

now sit in ruins. Here I will be using Ross Burns' encyclopedic English language book, as not

many English language sources exist on Aleppo history. In Palmyra Roman expansion can be

seen through their masterpiece architectural achievements, that now too sit in rubble. After

analyzing the background of these two UNESCO World Heritage Sites I will then use first hand

sources in the form of media reports and satellite imagery, to examine the vast amount of

destruction that these two sites have incurred. Following that, I will explore the satellite and

drone imagery data and how they have helped in identifying the destruction and preservation

efforts.

Chapter 3 will see my proposal for moving forward. In this chapter I will discuss why I

believe it is important for this imagery data to be accessioned and cataloged into a museum

collection. Here I will set guidelines for what I believe to be the best way to enact my proposal

by using the American Alliance of Museums' *Museum Registration Methods 5th Edition.* I will

also offer some probable financial costs associated with this proposal. Inside Chapter 3 I will be

discussing why I believe this proposal is so important to the stakeholders as I feel this preservation is truly for posterity.

In Chapter 4 I will offer my concluding thoughts and answer some lingering questions. Part of that is offering a solution as to what should be done with this imagery data until the Syrian Civil War has concluded. Here I will also take a moment to reflect on what I have learned in the process of researching and writing this Capstone and why I believe that this preservation is so paramount to all Syrians and for all future generations. This chapter will also discuss something that has been intentionally left out of my literature review, but that I feel would be erroneous if not acknowledged; the loss of human life in Syria.

Finally my appendices will include before and after images of the destruction at some of the most important sites inside Aleppo and Palmyra. For the most part these images will be taken from the ground by photographers, however, some of these images will be the satellite and drone images that I argue should be handed over to the museums for accessioning. Also inside my appendices the reader can find my annotated bibliography of some of the most important sources I used to inform my research.

**Chapter 2: Literature Review**

Due to the current civil war in Syria starting in 2011 many cultural heritage sites in the region have been put at risk. This paper discusses two Syrian UNESCO World Heritage Sites: Aleppo and Palmyra. Both date back millennia, and their destruction annihilates not only beautiful structures but our understanding of the past. To be classified as a UNESCO World Heritage Site, certain criteria must be met; this paper will briefly discuss how both Aleppo and Palmyra came under the protection of UNESCO. Next I will introduce both sides' histories to give context as to what has been lost. The damage and destruction will be discussed in detail, using first hand sources including media reports. I will conclude with how the damage was confirmed via satellite images, and how drone footage may provide hope in salvaging, reconstruction and exposing people from around the world to this tragedy.

**UNESCO Criteria**

A site must meet at least one of ten criteria in order to become a UNESCO World Heritage Site. For the purpose of this paper criteria one to four will be presented since, Palmyra and Aleppo meet one or more of these categories of criteria.. The criteria that Palmyra and Aleppo fall under are as follows:

> (i) [T]o represent a masterpiece of human creative genius; (ii) to exhibit an important interchange of Hunan values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design; (iii) to bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared; (iv) to be an outstanding example of a type of building, architectural or technological ensemble or

landscape which illustrates (a) significant stage(s) in human history…[1]

The ruins of Palmyra show (i) "a unique aesthetic achievement of wealth"; the ruins also created a (ii) "revival of classic architectural styles"; and (iv) "the major public buildings, form an outstanding illustration of architecture and urban layout at the peak of Rome's expansion."[2] Aleppo (iii) "represents an exceptional reflection of the social, cultural and economic aspects of what was once one of the richest cities of all humanity"; and (iv) "is an outstanding example of an Ayyudid 12th century with its military fortifications" with its "encircling ditch and defensive wall."[3] These sites —both rich in cultural heritage— have succumbed to a great tragedy. The need to continue to protect the legacy of both Aleppo and Palmyra are clear as the criteria that these sites have achieved is considerable; they both offer a unique and comprehensive understanding of humanities past.

**Background on Aleppo**

Most of the material here is drawn from Ross Burn's comprehensive English-language volume on the history of Aleppo.[4] In the northern part of Syria lies the UNESCO World Heritage Site of Aleppo, with an inscription date of 1986.[5] The city of Aleppo has had a long history, and according to Burns, archeological excavations in the 1990s revealed that the city of Aleppo had

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[1] UNESCO Website, *The Criteria for Selection,* accessed October 3, 2018, http://whc.unesco.org/en/criteria/

[2] UNESCO Website, *Site of Palmyra*, accessed August 21, 2018, https://whc.unesco.org/en/list/23.

[3] UNESCO Website, *Site of Aleppo*, accessed August 21, 2018, https://whc.unesco.org/en/list/21.

[4] Ross Burns, *Aleppo: A History,* (New York: Routledge; 2017)

[5] UNESCO Website, *Site of Aleppo*, accessed August 21, 2018, https://whc.unesco.org/en/list/21.

been inhabited as far back as the Bronze Age.[6] Indeed, UNESCO on their website concurs that

the city of Aleppo has been inhabited since the 2nd millennium BC.[7] The city of Aleppo being

settled so early may be due to the fact that it is situated between two major trade routes.[8] As

historian Sherban Cantacuzino has pointed out, caravan routes came together in Aleppo causing

it to be frequented and an extremely popular destination.[9] With these major trade routes crossing

through and its popularity as a hub major civilizations have followed each one being conquered

by another even more powerful group. In total, according to UNESCO, Aleppo has been ruled by

nine different major powers, including the Assyrians, Greeks, Romans and Ottomans.[10] Aleppo

was in fact even the capital city of the Amorites, however, under another name (Yamhad) dating

back to the Middle Bronze Age era.[11] It is worth noting that Aleppo has also been called many

names over its history including: Beroed under the Byzantines or Haleb by the conquering Arabs

in the 7th century CE.[12] The oldest information we have to date of Aleppo being occupied though

is under the Amorites, which shows us the importance of Aleppo as a strong hold for many

millennia.

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[6] Burns, 7.

[7] UNESCO Website, *Site of Aleppo*, accessed August 21, 2018, https://whc.unesco.org/en/list/21.

[8] Burns, 4.

[9] Sherban Cantacuzino, *Aleppo*, Ekistics vol 42 no 253 December 1976, 367-371, accessed September 2, 2018, 367, https://www.jstor.org/stable/43618747.

[10] UNESCO Website, *Site of Aleppo*, accessed August 21, 2018, https://whc.unesco.org/en/list/21.

[11] Burns, 9.

[12] Cantacuzino, 367-371.

With these great ruling powers, of course, comes buildings of defense, streets, places of worship and market places. One of the most iconic images of Aleppo today is that of the Citadel built under Islamic rule (Figure 1A). Originally this mound was the site of a temple dating back to the Bronze Age. UNESCO suggests that "the Citadel contains the remains of mosques, palace and bath buildings";[13] making this particular site on the larger site of Aleppo even more impressive. The streets of the old city of Aleppo have been arranged in a Hellenistic manner suggesting that the infrastructure was being built while under the influence of the Greeks.[14] Burns asserts that the reason for this grid patterned streets is that Greek war veterans were slated to be housed in Aleppo.[15] Here, we can observe that the city of Aleppo was clearly a relevant area for past civilizations, and is well justified in being a UNESCO World Heritage Site.

Moving forward along the time line of this city, we see mosques being built throughout the walls of the city. The most famous was the Great Mosque of Aleppo (Figure 2A). This mosque had many constructions, the first being in 715 CE by Suleiman, but by the 12th century CE not much of the original building was left, as fires in 962 CE and 1169 CE destroyed much of the construction. What remained until 2013 when it was destroyed by the Syrian civil war was mainly from the rebuild during the Ayyubid period.[16] This mosque can be seen as the center of the city, as places of worship have been known throughout history to gather large numbers of people around their spaces. Naturally, the areas surrounding the mosque were a prime sphere for

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[13] UNESCO Website, *Site of Aleppo,* accessed August 21, 2018, https://whc.unesco.org/en/list/21.

[14] Cantacuzino, 367-371.

[15] Burns, 32.

[16] Ibid., 79-81.

which businesses would easily crop up. Burns asserts that "the shops of the suqs closely enfolded

the central mosque".[17] These suqs [marketplace] and khans [warehouses] formed the major

shopping district in Aleppo. In the interior of the city one of the most famous suqs sits: al-

Medina. The al-Medina suq is one of the largest known roofed market places protecting its

shoppers from the harsh sun of the desert.[18] Surrounding these suqs were the khans, the

warehouse areas that provided the suq merchants with goods for their stores.[19] One of the oldest

known khans is the Khan al-Jumruk (or al-Gumruk), which has been called as "the grandest of

all Aleppo khans"; built in a much more splendid fashion in comparison to the suqs.[20] By

merging religion and commerce this area became the most frequently visited space in Aleppo,

thus ensuring these businesses' survivability. This center for the city that was created can be seen

as yet another reason this site was designated as being a cultural treasure by UNESCO. The rich

atmosphere generated by combining a market place surrounding a place of worship was not only

well planned, but gave rise to the inclusion of Aleppo becoming a UNESCO World Heritage Site.

### Background on Palmyra

Lost to the western world for centuries in the desert landscape of Syria is the ancient city

of Palmyra. In its zenith under Roman rule it was a community of massive wealth. Roman wealth

allowed for great building to be accomplished, which lead to its inclusion as a UNESCO World

Heritage Site in 1980.[21] However, according to author Richard Stoneman this city was originally

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[17] Ibid., 81.

[18] Ibid., 218.

[19] Ibid., 218.

[20] Ibid., 215.

[21] UNESCO Website, *Site of Palmyra*, accessed August 21, 2018, https://whc.unesco.org/en/list/23.

established during Biblical times by King Solomon.[22] In fact the city is mentioned in the Bible, although under another name; Tadmor.[23] UNESCO confers, stating that; "[A] settlement called Tadmor is mentioned as early as the eighteenth century BC…"  in reference to Palmyra.[24] All sources confirm that Palmyra was fully established centuries before the Roman occupation, making this UNESCO World Heritage Site even more impressive.

The story of Palmyra's grandeur began while under Roman rule where it "lies on the eastern margin of the Roman Provence of Syria."[25] Veyne claims that "what made Palmyra so prosperous: it is located on the shortest path between the Mediterranean and the blue waters of the Euphrates; this path was the only road in the rocky desert".[26] Furthermore, Stoneman asserts that Palmyra became a wealthy caravan city on a major trade route under Roman rule.[27] UNESCO corroborates this stating that; "[T]he history of Palmyra is closely linked to the development of the silk road…";[28] and in fact, Veyne argues that Palmyra was a crucial site for trade as it connected Persia, India and China to that of the Roman Empire.[29] Although it flourished under the Romans, according to UNESCO it had been a caravan city, albeit small,

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[22] Richard Stoneman, *Palmyra and its Empire: Zenobia's Revolt against Rome*, (Michigan: University of Michigan Press; 1992),17.

[23] (II Chron 8:4 [NIV])

[24] UNESCO Website, *Silk Roads: Palmyra,* accessed October 1, 2018, https://en.unesco.org/silkroad/content/palmyra.

[25] Stoneman,18.

[26] Paul Veyne, Translated by Teresa Lavender Fagan, *Palmyra,* (Chicago: The University of Chicago Press; 2017), 21.

[27] Stoneman, 38.

[28] UNESCO Website, *Silk Roads: Palmyra,* accessed October 1, 2018, https://en.unesco.org/silkroad/content/palmyra.

[29] Veyne, 9.

prior to Rome's authority. As a result of this trade Palmyra became a well traveled city where temples, theaters and a Roman style Tetrapylon were built to signify this city as a stronghold of trade for the Roman Empire (Figure 3A). A Tetrapylon is a gateway constructed with four pillars and can include an archway, however, in Palmyra an arch is not present.

The Temple of Bel whose construction began sometime around AD 17 to AD 19 and took about 15 years to complete was one of the best preserved public structures (Figure 4A).[30] But where did this city just beginning to thrive and prosper find the money to built this temple? According Veyne, the Temple of Bel could have been paid for by "commercial profits", "donations of many pious pilgrims" or the even "Roman imperial family".[31] The patron of this remarkable temple may never be fully identified, but what is known is this Temple of Bel represents a feat of architecture that firmly placed Palmyra on the map in the ancient world as a Roman Provence of trade. Not only the Temple of Bel was built during this time, but many other structures that have lasted millennia as well. For instance the Temple of Baalshamin was dedicated only about fifty years later in AD 89; and there is good evidence to support that the Roman Tetrapylon was built during this time as well.[32] A little later in the 2nd century the famous Roman theater was built, during possibly the time of the Emperor Flavian, marking well over a hundred years of Roman dominance and wealth.[33] From this we can conclude that the ancient city of Palmyra was an important area with rich culture, architecture and trade. The

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[30] Stoneman, 52.

[31] Veyne, 9.

[32] Stoneman, 65.

[33] Ibid., 65-66.

importance of this caravan city then and now can be seen through its magnificent buildings and temples that have lasted for nearly two millennia.

Palmyra and all its dominion was lost for a time to the western world, and in fact only "rediscovered" a few hundred years ago. According to Gregorio Astengo the first publicly documented investigation of Palmyra occurred in 1691.[34] However, Stoneman asserts that the the 'rediscovery' was "for the English-speaking world by a group of merchants… in 1678."[35] These conflicting dates may be contributed to the fact that Palmyra was lost only to the western world and not the world as a whole. Irregardless, sometime in the latter half of the 17th century, Palmyra had been reestablished on the map in all its glory. It took another three centuries for it to become an official UNESCO World Heritage Site, but it is a key site to our past and has earned its place in our history.

## Destruction of Aleppo and Palmyra

This brief history of Aleppo and Palmyra leads to the conclusion that these sites are not only rich in culture, but also facilitate a strong understanding of our past going back many millennia. It is almost beyond comprehension that these well-preserved UNESCO World Heritage Sites have met a fate of destruction, this ongoing conflict in Syria has caused major damage and at times total catastrophic loss and destruction. According to *Artnet News*, UNESCO

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[34] Gregorio Astengo, *The Rediscovery of Palmyra and its dissemination in Philosophical Transactions,* The Royal Society Journal of the History of Science, March 16, 2016, accessed October 3, 2018, http://rsnr.royalsocietypublishing.org/content/early/2016/03/12/rsnr. 2015.0059.

[35] Stoneman, 7.

views the premeditated destruction of these cultural sites as a war crime.[36] And in fact, that is

what has been happening during this war. ISIS is known to be responsible for much of the

purposeful damage, but fighters on both sides have permanently destroyed some areas

inadvertently in the throes of conflict.

According to UNESCO, during their first visit to Aleppo to assess the damage a report

details that; "60% of the old city of Aleppo has been severely damaged, with 30% totally

destroyed."[37] In Aleppo the historical monuments that we previously explored have been turned

to ruins. The khan al-Jumruk one of the "oldest covered markets" for instance has been

completely annihilated (Figure 5). Arab News affirms these figures and states; "damage is

everywhere: Alleys blocked off with debris, domes knocked down, shops with no doors and piles

of mangled metal at every turn."[38] Not only is this a destruction of the merchants' livelihoods—

not to mention the human toll— this market place possible one of the oldest in the world is a

great loss for all humanity. The culture lost here will be felt for decades to come. Even with a

rebuild it will never be the same. Bassel Nasri, a leader in the Syrian Chamber of Industry

believes the city will be revived by international organizations.[39] That, however, can be tricky

ground. Many questions need to be answered before these groups come in to ensure the integrity

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[36] Alyssa Buffenstein, *A Monumental Loss: Here are the most Significant Cultural Heritage Sites that ISIS has Destroyed to Date,* Artnet News, May 30, 2017, accessed August 21, 2018, https://news.artnet.com/art-world/isis-cultural-heritage-sites-destroyed-950060.

[37] UNESCO Website, *UNESCO Repots on Extensive Damage in First Emergency Assessment Mission to Aleppo,* January 19, 2017, accessed October 3, 2018, https://whc.unesco.org/en/news/1619/.

[38] *In Aleppo, Old Bazaar Struggles to come back to Life*, Arab News, January 23, 2018, accessed August 27, 2018, https://www.arabnews.com/node/1231326/middle-east.

[39] *Ibid.*

of the site; how will the rebuild change what is left of the cultural heritage; will it be documented

properly; and if so, by whom? Of course, there are many other lingering questions for the fate of

this khan, but these questions must be answered before moving forward. Khan al-Jumruk is not

the only market place destroyed in Aleppo during this war; the Al-Medina suq was destroyed by

fire in the Fall of 2012. In fact, The Aleppo Project states that; 34 of the 45 suqs have viable

damage and 1500 businesses damaged or destroyed. They also affirm the notion that during the

rebuilding phase attention must be paid to 'historical accuracy' to ensure the protection of this

market as a UNESCO World Heritage Site.[40]

Between July 2012 and December 2016 Aleppo experienced some of the worst fighting

for some of the most sustained amounts of time, as it was pinned down by ISIS and other rebel

forces. During this time many structures, in addition to the market places, faced destruction or

damage. A United Nations Institute for Training and Research (UNITAR) report on Aleppo

estimated as late as September of 2016 that 33,521 structures had been damaged within the old

city (Figure 6).[41] However, a later article by the *Washington Post* reports that 35,722 structures

have been damaged.[42] *Artnet News* concurs with this final number as of May of 2017.[43] Though,

a large number of these structures are residential 65% in al-Aqabeh, which is inside the old city,

[40] Camilo Montoya-Guevara, *Aleppo's Al-Medina Souq: Post-Conflict Reconstruction of its Social Functions,* The Aleppo Project, February 2017, accessed October 3, 2018, 2-19, https://www.thealeppoproject.com/papers/aleppos-al-madina-souq-post-conflict-reconstruction-social-functions/.

[41] UNITAR Website, September 18, 2016, accessed October 3, 2018, http://www.unitar.org/unosat/node/44/2510?utm_source=unosat-unitar&utm_medium=rss&utm_campaign=maps.

[42] Laris Karklis, *The Destruction of Aleppo after Five Years of Fighting*, Washington Post, December 22, 2016, accessed August 24, 2018, https://www.washingtonpost.com/graphics/world/destruction-of-aleppo/?noredirect=on.

[43] Buffenstein.

many other non-residential buildings have suffered.[44] It is important to note, that anything within the old city of Aleppo is protected by UNESCO as a World Heritage Site, including the residential buildings (Figure 7A&B). Other than the residential buildings and suqs and khans two great monuments have been severely damaged. The Great Mosque of Aleppo has been turned into ruins (Figure 2B). According to the American Association for the Advancement of Science on April 24, 2013 the destruction of Umayyad mosque's 45 meter tall minaret occurred.[45] The loss of this centuries old minaret and the mosque itself was a powerful blow to the Islamic culture and religion. The famous Citadel dating back millennia has also become a field of debris (Figure 1B). BBC reports that the Syrian Government was using the Citadel as a defensive stronghold, and on the morning of July 12, 2015 an explosion occurred on this site knocking down walls on the Citadel. And according to BBC, " [I]t is not known which side caused the explosion", however, the Syrian government who was using the Citadel claimed it was opposing forces.[46] Irregardless, whoever caused the explosion, it is troubling that the Syrian Government had been using the Citadel which is protected by UNESCO as a military stronghold in the first place. Though, if governmental forces had not occupied the Citadel, rebel fighters most likely would have. In the end, the fact remains, that this defensive structure and all of the old city of Aleppo has been permanently altered for future generations.

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[44] Karklis.

[45] American Association for the Advancement of Science, *Conflict in Aleppo, Syria: A Retrospective Analysis,* Accessed August 24, 2018, https://www.aaas.org/aleppo_retrospective.

[46] *Syria Civil War: Bomb Damages Aleppo's Ancient Citadel,* BBC, July 12, 2015, accessed October 10, 2018, https://www.bbc.com/news/world-middle-east-33499609.

Since the civil war broke out in Syria the city of Palmyra has had two separate occupations that saw its monuments damaged and destroyed. ISIS occupied Palmyra from May of 2015 until March of 2016,[47] and then again from December 2016 until March of 2017.[48] During the first occupation by ISIS it was not just the monuments that suffered a great loss; the former chief of antiquities Khaled al-Assad who was one of the most knowledgable experts in the field on Palmyra was executed by beheading.[49] Sadly, that was not the only human life ISIS would take during this first occupation. ISIS prisoners had been bound to Roman columns alongside ammunition charges and murdered, that according to journalist Jason Farago of the *New York Times* was; "crimes against the present and the past at once."[50]

During the first occupation by ISIS the Temple of Bel was completely destroyed. "The 2,000-year-old temple, described by antiquity officials as the 'the most important temple in Syria', was hit by an ISIS triggered explosion…" in September of 2015 (Figure 4B).[51] The BBC concurs that during this time that the Temple of Bel was destroyed and quotes Irina Bokova the then Director-General of UNESCO as saying this is "cultural cleansing by violent extremist" in response to the destruction that occurred at Palmyra during both occupations.[52] In the course of

[47] Jason Farago, *The Ancient Syrian City ISIS is Destroying, Preserved Online*, New York Times, February 15, 2017, accessed August 24, 2018, https://www.nytimes.com/2017/02/15/arts/design/palmyra-syria-isis.html.

[48] Buffenstein.

[49] Farago.

[50] Ibid.

[51] Clair Voon, *Aerial Photos of Palmyra Show Extent of Damage done by ISIS*, Hyperallergic, May 4, 2016, accessed August 24, 2018, https://hyperallergic.com/295770/aerial-photos-of-palmyra-show-extent-of-damage-done-by-isis/.

[52] *Syria: IS Destroys Part of Palmyra's Roman Theater,* BBC, January 20, 2017, accessed October 10, 2018, https://www.bbc.com/news/world-middle-east-38689131.

this invasion, ISIS toppled and destroyed a 2,000 year old statue of a lion —Al Lat Lion— that

sat in front of the Palmyra Museum (Figure 8A&B). ISIS followed this horrific act up by raiding

and looting the museum to sell items on the black market to finance their war efforts and their

cultural heritage crime spree.[53]

During the second occupation of ISIS, they wasted no time in their continued destruction

of the remaining monuments. Though, ISIS only held Palmyra for roughly 4 months during this

second assault, they continued their bombardment. Satellite images in early 2017 of Palmyra

while still under control of ISIS gave the world its first look at the destruction of the famous

Roman theater and Tetrapylon (Figure 3B).[54] *Artnet News* agrees that it was during this time that

the theater and the Tetrapylon received damage by explosives.[55] The destruction and damage that

occurred at Palmyra has been a major hit for the cultural heritage sector. According to National

Public Radio; "ISIS often claims its destroys ancient sites because it considers the pre-Islamic art

works heretical."[56] The fact that this destruction was purposeful makes it all the more troubling.

By denying future generations of Syrians an understanding of their region's past is a crime unto

itself. This site holds a key to our past understanding of Roman expansion and influence of

turning a small caravan city into an oasis. The major reasons for Palmyra being listed as

UNESCO World Heritage Site has been severely damaged or destroyed by ISIS permanently.

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[53] Buffenstein.

[54] Camila Domonoske, *ISIS Destroys Ancient Theater, Tetrapylon in Palmyra, Syria says,* NPR, January 20, 2017, accessed October 10, 2018, https://www.npr.org/sections/thetwo-way/2017/01/20/510732864/isis-destroys-ancient-theater-tetrapylon-in-palmyra-syria-says.

[55] Buffenstein

[56] Domonoske.

**Satellites and Drones**

As a result of this war in Syria, having actual boots on the ground to monitor these

UNESCO World Heritage Sites is out of the question because of the danger; instead a turn to

satellite images is required to observe the damages that is inflicted upon these sites.[57] In the cases

of both Palmyra and Aleppo these satellite images have been used by archaeologists and

researchers to confirm the damage that the sites have incurred during the fighting. According to

Jesse Casana and Mitra Panahipour, this is in fact happening as "…analysis of recent high-

resolution satellite imagery is a powerful way to monitor looting and site destruction remotely."[58]

It is because of this satellite imagery and footage that the world has been made aware of the dire

situation at many UNESCO World Heritage Sites in Syria; where media reporting was made

inaccessible by the fighting. Many programs monitor these sites using satellites. The American

Schools of Oriental Research Cultural Heritage Initiatives (ASOR CHI) is one of them; ASOR

CHI aims to monitor and report damages and "conduct emergency response projects and

developing post-conflict rehabilitation plans" among other objectives.[59] Part of the ASOR CHI

project is to use satellite data to find and record where the damage to cultural heritage sites was

happening.[60] These satellite images were able to give real time analysis that might have been

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[57] Jesse Casana, Mitra Panahipour, *Satellite-Based Monitoring of Looting and Damage to Archaeological Sites in Syria*, Journal of Eastern Mediterranean Archaeology and Heritage Studies Vol 2 No 2 (2014), 128, accessed September 2, 2018, https://www.jstor.org/stable/10.5325/jeasmedarcherstu.2.2.0128

[58] Ibid.,129.

[59] Michael Danti, Scott Banting, Susan Penacho, *The American Schools of Oriental Research Cultural Heritage Initiatives: Monitoring Cultural Heritage in Syria and Northern Iraq by Geospatial Imagery*, Geoscience Vol 7 No 4 2017, September 28, 2017, accessed September 13, 2018, 1, http://www.mdpi.com/2076-3263/7/4/95.

[60] Ibid.,2.

otherwise unavailable at the time. Without these images, cultural heritage professionals and the world at large would have had to rely solely on media reports; which could be spotty at best in conflict zones. It appears that CHI's ongoing goal to monitor and report damage has been incredibly beneficial to professionals inside the cultural heritage sector. Many professionals were waiting to gain access, and with CHI they were able to prepare their next step of preservation in advance. With this knowledge, we can determine that this data has been incredibly important to both scholars and professionals understanding of the situation.

It is not just satellite imagery data that has helped our insights and allowed us to plan and move forward. Drone footage has also been incredibly beneficial. As "[A]dvances in control engineering and material science made it possible to develop small-scale unmanned aerial vehicles (UAVs) equipped with cameras and sensors."[61] Previously, drones were used for military applications; however, because of these advances in science they are now being used in the cultural heritage sector. The information they have provided has been invaluable, as smaller drones launched by cultural heritage professionals have been used to capture images of both Palmyra and Aleppo. An article by Wenang Anurogo and eleven other scholars suggests: "… many photogrammetric mapping methods have used UAV/unmanned drones or drones to retrieve

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[61] Markus Quaritsch, Emil Stojanovski, Christian Bettstetter, Gerhard Friedrich, Hermann Hellwagner, Bernhard Rinner, Michael Hofbaur, Mubarak Shah, *Collaborative Microdrones: Applications and Research Challenges*, Conference Paper January 2008, accessed August 27, 2018, https://www.researchgate.net/profile/Bernhard_Rinner/publication/220987129_Collaborative_microdrones_Applications_and_research_challenges/links/0fcfd5107e7469c025000000.pdf.

and record data from an object on earth."[62] Drone footage is set apart from satellite images.

There is a definitive superiority of drones over satellite imagery; the cost of drones is quite less

and usually yields better high-resolution images when compared to its counterpart.[63] The satellite

images have been used most frequently to confirm the damage and destruction at both Aleppo

and Palmyra, where as the drones are used for a different method, such as Three-Dimensional

(3D) models after the fact of destruction.[64] ICONEM, a company that documents damaged

cultural heritage sites is actively using drones to recreate 3D models, working alongside the

Directorate-General of Antiquities and Museums (DGAM) in Palmyra.[65] The work that

ICONEM is doing is notable even though there may be a concern with their actual objectives.

According to Hyperallergic, ICONEM "did not respond to inquiries regarding the primary

purpose of the photographs…" and states that ICONEM may "lack[s] the information necessary

not just to fully understand the history of the sites but also the project's process and intention."[66]

In fact, a look into their website does appear to give a motive of profit rather than posterity.

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[62] Wenang Anurogo, Muhammad Zainuddin Lubis, Hanah Khoirunnisa, Daniel Sutopo Pamungkas, Aditya Hanafi, Fajar Rizki, Ganda Surya, Arini Dewi Lestari Situmorang, Dirgan Timbang, Perdi Novanta Sitombing, Catur Agus Lukitasari, Novita Ayu Dewanti, *A Simple Aerial Photogrammetric Mapping System Overview and Image Acquisition using Unmanned Aerial Vehicles (UAVs),* Journal of Applied Geospatial Information Vol 1 No 1 2017, May 29, 2017, accessed September 2, 2018, 11, https://www.researchgate.net/profile/Wenang_Anurogo2/publication/318112712_A_Simple_Aerial_Photogrammetric_Mapping_System_Overview_and_Image_Acquisition_Using_Unmanned_Aerial_Vehicles_UAVs/links/595a5af7aca2728a137ab089/A-Simple-Aerial-Photogrammetric-Mapping-System-Overview-and-Image-Acquisition-Using-Unmanned-Aerial-Vehicles-UAVs.pdf.

[63] Ibid.,12.

[64] Ibid.,14.

[65] Redazione Archeomatica, *Save the Syrian Heritage: Technologies to Document Palmyra and Endangered World Heritage, Interview to Yves Ubelmann, ICONEM's CEO,* September 2017, accessed August 26, 2018. http://ojs.mediageo.it/index.php/archeomatica/article/viewFile/1483/1350.

[66] Voon.

Certain keywords jump out at the viewer of their webpage, for example; "[I]nnovative start up" and "[C]lients" leading one to believe this may by a for profit company rather than the non-profit one would hope and expect to see.[67]

In conclusion, we can see the Syrian Civil War has caused major destruction and losses at the cultural heritage sites of Aleppo and Palmyra. These UNESCO World Heritage Sites, even though heavily damaged, will continue to be important for our understanding of the past, and continue to be a livelihood for the citizens of Syria. From media reports we can see that much of the history of these sites has been lost, but we must do whatever we can to hold on to our understanding. With the help of drone and satellite data, cultural heritage professionals have been able to map out the exact amount of destruction and damage incurred at both Palmyra and Aleppo. Because of this data these professionals were able to confirm the damages and construct plans in advance of being on site. This has greatly helped the cultural heritage sector in Syria begin to move forward. However, a major lingering question left is; after the war and reconstruction what will happen to all of this original imagery data?

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[67] ICONEM Website, accessed October 3, 2018, http://iconem.com/en/.

**Chapter 3: Proposal**

**A. Defining the Project**

Now that I have summarized the background of both Aleppo and Palmyra and why these sites are so important to world civilization and history, I will explore a solution to the lingering question we left with at the end of the previous chapter. I will argue that the satellite and drone imagery data that was been used to confirm and create Three-Dimensional (3D) models of the destruction must be preserved. Currently, this data is being stored online and on servers by companies and governments. The concern is what happens to the images and data if the websites or companies change their primary purposes, or if technology changes make it difficult for the data to be updated or integrated to the new format. I seek to prevent the potential data loss and loss of our understanding with the project outline in this chapter.

I propose, that all drone and satellite data of the UNESCO World Heritage Sites at Aleppo and Palmyra be treated like any other museum material. High-resolution images and the data they capture should be handed over to Syrian museums and accessioned, cataloged, and cared for by museum registrars, using best practices and standards. I believe the images these companies, non-profits, and world powers have collected would best be kept at the actual location of the destruction to ensure future generations understand of exactly what has occurred; this will be especially important once reconstruction of these sites is completed. Each of the two sites have a major museum that I believe would be best for the potential objects to be housed: In Aleppo, the Aleppo National Museum should be used, and in Palmyra, the Museum of Palmyra should be used. I would also take it one step further and argue that the images should not only be handed over to the museums in question, but they should also be handed over with full

copyrights. From there, each museum should use registration methods to care for this very important collection. I detail later in this chapter how I see this could best be done to protect the objects in question.

Currently, the war in Syria is still ongoing and the need for this information to be preserved is incredibly serious, therefore a museum or non-profit outside of the country with strong ties to Syria should be approached to hold the material until the end of the war. That is not to say the safe-haven museum or non-profit should accession these materials themselves, but rather hold them physically in their possession until the Syrian Civil War is resolved. The museum or non-profit chosen to hold these objects must also understand and be willing to return the objects once the request has been submitted by The Aleppo National Museum and the Museum of Palmyra. The major issue is the decision for return should not be contingent upon the safe-haven museum's or non-profit's approval, but rather when the museums in Aleppo and Palmyra decide that they are ready for the material to be returned.

## B. Why this Project is Needed

I believe that the need for this project is crucial, not just for our generation, but also for future generations. We must never forget the tragedy of this destruction and loss of life. If we fail to preserve this data in an institution inside Syria, and more specifically in Aleppo and Palmyra we create the potential to lose understanding of these sites' context; future research could be skewed and a loss of contextual knowledge could be permanent. This project would ensure these objects stay with the World Heritage Sites, or adjacent to them. The constant care they would be receiving by registrars would ensure that what was destroyed is not forgotten.

The objects themselves require this constant care, and a museum is the best place for this care to happen. Part of this care involves regular inventories by registrars, which is crucial for the preservation of these objects. If a loss does arise during inventory, a solution can be created quickly to prevent other losses, and to hopefully recover what was lost. However, these images are not officially objects yet as they still reside with the companies and world powers that have created them; currently, they are just data. This project would change these images from 'just data' into the irreplaceable objects that they should be treated as. By doing so a lasting memory through this preservation and would be created that would allow for future understanding. Exhibits could be created and travel the world to bring this knowledge to all of humanity.

Both the Aleppo National Museum and the Museum of Palmyra, as well as Syria in general, would greatly benefit from accessioning the images into their collection with full copyright. By being in the collection, researchers and archeologists would have access to these images, which would allow understanding while conducting surveys. Many of the texts on these sites are not in English or French or other Western languages, but a picture speaks a thousand words and gives meaning to researchers. These images would also increase cultural tourism once the war is over, bringing much needed money into the country. Once these sites are conserved or are rebuilt, these images can be used as a tool to inform visitors what is original and what was rebuilt. These images are the key to our memory spanning generations, and as such need to be treated with the utmost care as objects inside the museums of Aleppo and Palmyra.

**C: Goals D: Objectives**

*Goal # 1*

The primary goal is the preservation of the documents themselves. In this case, it is the satellite and drone data imagery that needs to be preserved in an institution, with full copyright.

*Objective #1*

The best way to preserve this data would be to accession and catalog each individual image. Although I acknowledge the fragility of the current geo-political situation these images should be handed over to the museums of both Aleppo and Palmyra. I believe the best way to achieve this objective is for the companies and governments that currently possess them to release the high-resolution images to the museums, stored on the highest quality hard drive systems. This data can be on a network system, but I believe it would be most beneficial for the museums to accession the master hard drive into their collection. I would argue that once the museums have been given possession of the data, high-end printed images should be developed and cataloged in a group accession with the data systems.

*Objective #2*

Before these images are fully accessioned into the collection, the matter of copyright must be resolved. Legal council will have to be contacted to arrange these details, but this is one of the most important parts of this proposal. The museum cannot function properly with these images if ownership remains with a company or government. I would like these governments and companies to offer the copyright of these images free of charge when possible. Of course, some costs may need to be recuperated in order to finance business operations. I would argue that both the Aleppo National Museum and the Museum of Palmyra should create a global fundraising campaign to help support this endeavor.

**Goal #2**

My proposal's second goal is to retain the memory of the past and what has happened in Syria. This goal is more intangible, but can be facilitated through the tangible, i.e. exhibitions.

*Objective #1*

The first objective is to hold in the collection the contextualization of the memories of the past. This is done, of course, by the images being present in the collection. With these images readily accessible in the collection, museum curators have the ability to create exhibitions to share the knowledge of the sites' past. These potential exhibitions can expand humanities understanding of the past while commemorating the loss of cultural heritage and life that occurred during the Syrian war conflict.

*Objective #2*

In order to retain this memory for future generations, placement of these images will be crucial. I would argue that the images taken of the destruction be displayed at each major site, along with text. Many of the buildings and monuments will likely be rebuilt; therefore, we must remind those that visit these sites what has occurred in the past, while also reminding them that these are rebuilds. This is of utmost importance because within one to two hundred years the generational memory will have faded, and the visitors must understand that these monuments are not totally original. The original sites were a great feat of architecture in their day, and they deserve to be recognized for just that. I would even take it one step further by arguing that images prior to the war and destruction be displayed alongside the images of destruction as well. This will give the visitor as well as others a contextual understanding of these UNESCO World Heritage Sites.

**E. Stakeholder Analysis**

It is the people that matter, just as much as these UNESCO World Heritage Sites and these images. I have identified five major stakeholders that this project will actively affect now and in the future. The main goals of this recommendation are centered around these individual groups and their understanding of the past and present.

One of the most noteworthy groups I have identified is our future generations. This group is especially important as we must never forget what has happened during this horrid war. Future generations must always be aware of not only the destruction of war, but that these monuments and building have been rebuilt. In 500 years these future generations will hopefully be visiting these sites and they must be made aware that parts of these buildings are not original, and that they were once heavily damaged or destroyed. Without these images inside of the museums' collections and displayed at the sites, the possibility arises that people could believe that these structures are completely original, when in fact only parts of the originals remain. By maintaining these images and properly displaying them we allow the contextual understanding to be preserved. We must continuously identify what structures have been rebuilt for these future generations.

It is not just the future generations of visitors that are an important stakeholder group, but also the scholars and researchers of our future. The images accessioned and cataloged into the museum's collection is of utmost importance for cultural heritage professionals. These professionals make educated assertions about these sites and without these images this knowledge could be lost. The more access to these images that researchers and scholars are afforded through the museums, the more likely their research will be grounded in truth. Not

having these images easily available in the museum's collections obscures the understanding of these sites. That is why I believe this group's inclusion in this stakeholder analysis is vital. Also noteworthy is that if these museums or institutions were to close, their collections would most likely be transferred or sold to similar institution, thus ensuring this knowledge is always accessible for this group of stakeholders.

Museum staff is also a significant stakeholder group in this project; not just the curators but also the registrars. The registrars will be responsible for completing the accessioning and cataloging process, as well as maintaining and caring for the collection of images. The registrars will be on the front lines of dealing with this collection, and are an important part of this analysis. The curators also stand out in this stakeholder group, since they have the main responsibility of creating exhibitions with these images and displaying the images at the sites. Therefore, the curator must have full access to all of the drone and satellite imagery to ensure that the proper content is displayed and to give the viewer the full comprehensive history. In order to create object labels that bare true facts, the curators must have access to all images associated with the destruction, having only some of these images equates to having only some of the story. For this reason, all the drone and satellite images must be accessioned and cataloged into these museums collections.

The communities of people that surround these structures are the most vital group of stakeholders. Not only has this group witnessed the horrors of war, many have lost family member, homes and businesses. Therefore, we must do everything in our power to ensure that these surrounding communities do not lose their past, their heritage. By securing and safeguarding these drone and satellite images, we ensure that these communities never forget the

impressive culture that they come from. Though current generation will not forget their heritage, future generations will need these images to understand not only the horrors of war, but to understand their cultural past. Many of these structures will be rebuilt, but it is imperative that future generations from surrounding communities know the difference between what is original and what was rebuilt for posterity.

The final group that I believe has a stake in seeing these images is the future visitors. Once the Syrian civil war has concluded and these structures have been rebuilt, cultural tourism will begin to pick up. When this occurs these drone and satellite images must be present in the collection and on display. The current generation needs to see and understand how terrible this war was. They need to be reminded why all war is so atrocious, and to grasp how devastating war can be, while at the same time be reminded why we strive for peace. The visitors will come and see rebuilt cities, they will not see the crumbled structures that were once great. That is why these images are so important, not just for our future generations' contextual understanding, but ours as well.

**F. Resources**

Considering that the museums in both Aleppo and Palmyra have been heavily damaged and looted during the war, once they are reopened new technologies and registration resources will be needed. These resources will be crucial not just for the images included in this proposal, but for the museum's entire collection. The basic resources needed should come from the museums; funds. However, to obtain the images, a fundraising campaign might be needed.

In order to acquire the satellite and drone imagery data with full copyright a fundraising campaign may be necessary. In the U.S., the fee as of this writing to obtain copyright of original

work under a group registration is 55 USD, which is used "for databases that predominantly consist of photographs…"[68] Since some of the satellite data is from U.S government satellites, I believe these images could be affordably purchased. I would first recommend, though, asking for these images with copyright to be donated, and again I would defer to legal counsel for the logistics. For the companies that have been using drones this may be a bit trickier, as ICONEM, for instance seems to be a for profit company. In this case, I would recommend that the museum offer a set amount to the companies for each database, using funds from the fundraising campaign. This amount is hard to define as costs for these companies are unknown and outside of the scope of this paper. However, I would challenge these companies to donate the drone images and the copyright for the future posterity of humanity.

Once these images with copyright are acquired by the museums, the images will need to be accessioned and cataloged. To accomplish this, each museum must have computer hardware and database software. For the purpose of this paper, I will labor under the assumption that when these museums reopen their doors to the collection, if any computers are still inside the museum they will likely be out of date. Therefore, each museum will need to research which new computer models will fit the needs of their individual institution. The museums will most likely also need to update their database software as it too will likely be out of date. Again, both museums will need to evaluate their individual database software needs. For the purpose of this paper, I have done some research on the costs associated with the purchase of both computers and databases. Depending on the needs, new computers can run from 300 USD and up. While I would suggest that the individual museums' staff conduct research, I feel that a more expensive

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68 Copyright Website, https://www.copyright.gov/about/fees.html, accessed October 31, 2018.

computer would best serve their needs, as 300 USD is the bare minimum. The database software

chosen should dictate the type of computer necessary. The pricing of software can cost in the

thousands for the institutions. For instance, Argus runs 150 USD monthly,[69] while Past Perfect

can cost around 5,000 USD for start up, and 700 to 1,000 USD annually for maintenance.[70]

However, there are platforms out there that are free of charge like CollectionSpace.[71] Again, this

needs to be at the discretion of the individual institutions based on needs.

    As mentioned previously, I believe that not only should these images be in a digital

format, the museums should have a high-quality hard copy of each image to be cataloged. Of

course, printer costs is another variable to be addressed. A good quality printer for the purposes

of printing these images can run around 2,500 USD.[72] Since these images will be accessioned

into the collection a higher-quality printer should be purchased. Once these images are printed

they will need to be stored using registration methods in archival boxes to ensure that they are

kept in good condition. Depending on the size of printing, archival photographic box prices can

vary; at a minimum the museum will be spending 18 USD per box.[73] Obviously, this can become

expensive quickly; therefore, this project should be done over a period of time to defer the

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[69] Argus Website, https://www.getapp.com/industries-software/a/argus/pricing/, accessed October 31, 2018.

[70] Past Perfect Website, http://museumsoftware.com/pricing.html, accessed October 31, 2018.

[71] Collection Space Website, http://www.collectionspace.org/faq/#top, accessed November 2, 2018.

[72] Bay InkJet Website, https://www.bayinkjet.com/products/canon-pro-2000-photographic-printer?utm_medium=cpc&utm_source=googlepla&variant=20857127750&cmp_id=886866647&adg_id=46132556364&kwd=&device=c&gclid=Cj0KCQjwjvXeBRDDARIsAC38TP5XappHe0cG8OKDIoWVv0wDdn4uYHkuGh6xfrWleGbY1xxw7OuYGEwaAj7BEALw_wcB, accessed November 2, 2018.

[73] Gaylord Archival Website, https://www.gaylord.com/c/Archival-Storage-Boxes, accessed October 31, 2018.

immediate costs to future budgets. However, I believe that having a hard copy of the image is critical to this project and should be done as soon as possible.

The final resource needed to complete this proposal is the human resources. Depending on the number of images, at least two full-time professionally-trained registrar would need to be kept on staff for the duration of this project, keeping in mind that this is not the only collection that needs to be cared for and added to the new database. For this reason, I strongly suggest that these museums hire two registrars as additions to their collections management team. To further help these registrars and each museum as a whole, I believe that two or three interns may be necessary. However, these do not need to be paid positions unless there are available funds to do so. With two registrars and two to three interns this project should have the resources needed to complete the cataloging and necessary care of the objects.

## G. Guidelines

Once all the objects and images have been acquired and accessioned they can be formally cataloged into the collection. I would like to now set forth guidelines to be followed in order to properly achieve the cataloging according to *Museum Registration Methods 5th Edition*.

Each hard drive or server acquired by the museum should be individually cataloged and marked. From there, each image on the devices should be cataloged using the same transaction number as the hard drive or server the image originates from. My recommendation is that these images be stored on the devices in TIFF formatting, as this format suffers little to no quality loss and is a good format for archival storage.[74] If TIFF formatting is unavailable, I would suggest

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[74] Edited Rebecca A. Buck, Jean Allman Gilmore, *Museum Registration Methods 5th Edition,* (Washington: The AAM Press; 2010), 280.

JPG, which would be the next best as far as losses and storage are concerned.[75] Following the

cataloging of these devices and their data, the images should be printed in high-quality. These

images should take a numbering system that associates the images with their origins, but that

gives them their own unique number to ensure ease of locating the object.

I believe the best numbering system is as follows:

**I.** Hard Drive and Servers[76]

- 2018.1.1; 2018.1.2 and so on, if done under the same transaction. If done under a

    separate transaction the second number in this compound will change, however, the

    formatting should remain the same. It is also important to note that as these devices come

    in over the years the first number that consist of the year will also change this is just an

    example for clarity.

**II.** Images on Hard Drives and Serves[77]

- 2018.1.1.1, 2018.1.1.2; 2018.1.2.1, 2018.1.2.2 and so on. This fourth number in the

    compound is to represent the individual image on the hard drive or server. I believe that

    each image on these devices should be numbered separately for two reasons. Firstly, in

    the case that there are any losses, it can be quickly identified; secondly, it provides for

    ease of association for the printed images. Again, it should be noted this is with the

    knowledge that these devices are from the same transaction, and that the second number

    will change as more devices come in over the years and from different sources.

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[75] Ibid., 280.

[76] Ibid., 206.

[77] Ibid., 206.

**III.** Printed Images[78]

- 2018.1.1.1A, 2018.1.1.2A; 2018.1.2.1A, 2018.1.2.2A and so on. This number is the same as the image on the device with an inclusion of a letter to distinguish the image as a printed object. This allows each printed object to be associated with the original object. If more high-quality prints are made for the collection, that should be cataloged rather than archived then the next images would follow the logical path of the alphabet.

Moving forward from the numbering system, but still following *Museum Registration Methods 5th Edition*, I would like to outline storage and inventories. Hopefully, these newly accessioned and cataloged objects can be stored at an offsite location, as that is the safest approach. However, if that's not a possibility, these objects should be stored in a secured area of the museum. This should be in a less trafficked area and access should be restricted to essential personnel only. Temperature and Relative Humidity should be maintained at all times, and the printed images should be housed in archival boxes; this is to ensure long-term preservation.[79] Finally, after the completion of this project and proper storage annual inventories should be conducted to provide proper protection and care for the objects.[80] My recommendation for the inventory is as follows; bi-yearly 100 percent review of hard drives and servers, and 20 percent yearly review of printed images (100 percent after five years). These inventories are essential to this project and must be a requirement, as any losses can affect future contextualization.

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[78] Ibid., 206.

[79] Ibid., 293-297.

[80] Ibid., 300.

**Chapter 4: Concluding Thoughts**

The project I have outlined is a crucial step forward that must be made for the preservation of both Aleppo and Palmyra. I have shown the importance of these sites to history and I believe that this proposal will safeguard the contextualization at these sites. Aleppo will rebuild as well as Palmyra though perhaps not to the same extent. Regardless, it must be documented and well known that these sites are not completely original. The images of these sites and their destruction will play an essential role to the future contextualization. By preserving these images visitors, cultural heritage professionals and future generations will continually have an accurate perception of all layers of the past.

In Chapter 3 I outlined the museums I have chosen for these images to be accessioned to and I would like to justify this reasoning. In Aleppo I have chosen the Aleppo National Museum. This museum in my opinion would be the best choice because I believe it may have the adequate funding necessary to complete this proposal as it is a National museum. Like the National Museum in Damascus this museum provides the large-scale site with the appropriate amount of visitor traffic to generate maximum awareness to the rebuilt sites. This will be essential in the many years to come. In Palmyra I have chosen the Museum of Palmyra. This choice is more banal, as my research leads me to believe that the Museum of Palmyra is the only museum within the city; making this museum the clear choice. My major concern for this museum though, is the funding, hopefully a fundraising campaign can be initiated to help pay the costs of this project. I do believe that it is very important for these images and their data to be housed and shown at these specific sites; if fundraising is an issue, I would like to advocate for the larger museums in Syria to help fund this project.

The civil war inside Syria is still currently ongoing. Because of the war the data that I propose to be handed over immediately needs to be protected. After extensive research I would like to offer a solution. I would like to propose that the non-profit *Heritage for Peace* look after this data imagery until the individual museum signals it is ready for their return. I believe that the best way for this non-profit to store this information is in data form and that no images be printed or cataloged until it is given back to Syria. *Heritage for Peace's* mission statement incapsulates an organization that has Syria's best interests at heart.

It states:

> Heritage *for* Peace is a non-profit organization whose mission is to support all Syrians in their efforts to protect and safeguard Syria's cultural heritage during the armed conflict. As an international group of heritage workers we believe that cultural heritage, and the protection thereof, can be used as a common ground for dialogue and therefore as a tool to enhance peace. We call on all Syrians of any religion or ethnicity to enter into a dialogue and work together to safeguard their mutual heritage.[81]

This non-profit is made up of cultural heritage professionals and as such does not belong to any one state, government, or museum. Their staff includes cultural heritage professionals from all around the globe as well as two Syrian nationals; which is of utmost importance as this provides *Heritage for Peace* with a Syrian voice.[82] I fully believe that when these two museums inside of Syria ask for this data set of images to be returned and demonstrate that they can care for them there will be no issues with handing over the objects. Because of this I believe the data would be in safe-hands awaiting its return home.

It is my hope that this project could move forward. I understand that as of this writing not all companies and governments may be able or willing to release this data due to the current

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[81] Heritage for Peace Website, http://www.heritageforpeace.org/about-us/mission-statement/.

[82] Heritage for Peace Website, http://www.heritageforpeace.org/about-us/who-we-are/.

sensitivities inside the region, however, I do hope that some will come forward. I have made it clear that all drone and satellite images should be handed over, however, some would be better than none. This research gave me the opportunity to understand why Syria's history is so essential to all of humanity's past, and I trust that after reading this others may feel the same. I anticipate that some will feel my proposal is too strong, but if I would have watered down my expectations I do not feel that would give the cultural heritage lost credence. I appeal to those within the cultural heritage sector to campaign for Syria's right to this data.

The loss of cultural heritage to this war is a travesty; but the bigger tragedy was the loss of life due to this war. When I speak of how important it is to not lose this cultural heritage, it is not just for the sake of history, but also as a remembrance for all those who have lost their lives. The images that show the destruction of cultural heritage and the stories associated with them will allow the memory of those lost to this war to live on, as well as those who are still with us but have lost family, friends, homes, and businesses to this civil war.

For future generations and cultural heritage professionals to have an understanding of the correct contextualization in both Aleppo and Palmyra is imperative. To do that these images must be accessioned, cataloged, displayed, and preserved. Though pieces of these buildings and monuments will remain original, not all will and that must be remembered. The drones and satellites that have captured these images allow for visitors to understand what exactly has been rebuilt and displays the resilience of the Syrian people.

**Appendix A: Bibliography**

American Association for the Advancement of Science. "Conflict in Aleppo, Syria: A Retrospective Analysis." Accessed August 24, 2018. https://www.aaas.org/aleppo_retrospective.

The American Association for the Advancement of Science website offers a collection of satellite images as well as an investigation into the destruction of Aleppo. The images and data on this website support the amount of damage reported via news agencies as well as adds a strong discourse on the subject. The images on this website present before and after satellite photographs of the damage that has occurred. I believe this website will be informative to my research on the destruction that has taken place. I also view this website as a possible source of satellite images that could be handed over to institutions.

Anurogo, Wenang, Muhammad Zainuddin Lubis, Hanah Khoirunnisa, Daniel Sutopo Pamungkas, Aditya Hanafi, Fajar Rizki, Ganda Surya, Arini Dewi Lestari Situmorang, Dirgan Timbang, Perdi Novanta Sitombing, Catur Agus Lukitasari, Novita Ayu Dewanti, "A Simple Aerial Photogrammetric Mapping System Overview and Image Acquisition using Unmanned Aerial Vehicles (UAVs)," Journal of Applied Geospatial Information Vol 1 No 1 2017, May 29, 2017, accessed September 2, 2018, https://www.researchgate.net/profile/Wenang_Anurogo2/publication/318112712_A_Simple_Aerial_Photogrammetric_Mapping_System_Overview_and_Image_Acquisition_Using_Unmanned_Aerial_Vehicles_UAVs/links/595a5af7aca2728a137ab089/A-Simple-Aerial-Photogrammetric-Mapping-System-Overview-and-Image-Acquisition-Using-Unmanned-Aerial-Vehicles-UAVs.pdf.

This article is composed of scientific research on drones and photogrammetric mapping. One of the articles main highlights is how the drones findings are presented. This article gives the reader background into how drones actually work. I believe this will inform my research into the technical aspects of how drones are used.

Archeomatica, Redazione, "Save the Syrian Heritage: Technologies to Document Palmyra and Endangered World Heritage, Interview to Yves Ubelmann, ICONEM's CEO," September 2017, accessed August 26, 2018. http://ojs.mediageo.it/index.php/archeomatica/article/viewFile/1483/1350.

This article is an interview with ICONEM's CEO Yves Ubelmann. The ICONEM company is producing 3D models using drone footage to help reconstruct the sit of Palmyra. In this interview the CEO is explaining exactly what they company is doing and how the differ from other online databases. Though this company is working with DGAM (Directorate-General of Antiquities and Museums) I am concerned what will happen to these images if this company goes out of business or changes its scope in the next 50 to 100 years. I believe this article will help me prove the need for these images to be handed over to the institution running this site with full copyright.

Buffenstein, Alyssa, "A Monumental Loss: Here are the most Significant Cultural Heritage Sites that ISIS has Destroyed to Date," Artnet News, May 30, 2017, accessed August 21, 2018, https://news.artnet.com/art-world/isis-cultural-heritage-sites-destroyed-950060.

       This article details the destruction that has happened in Syria to its date of release. The Artnet article speaks to the importance of the sites destroyed, and gives a timeline of the occupation of ISIS. This timeline is representative of all of Syria and includes both Aleppo and Palmyra. It details the destruction and the losses that have occurred. I believe this Artnet article demonstrates the amount of damage that happened at both Aleppo and Palmyra and will strengthen the understanding of this catastrophe in my paper.

Cantacuzino, Sherban, "Aleppo," Ekistics vol 42 no 253 )December 1976), 367-371, accessed September 2, 2018, https://www.jstor.org/stable/43618747.

       This article by Sherban Cantacuzion provides background into the importance of Aleppo's past. This city was a popular trade route and still houses a large bazaar that has been used for centuries. This article underlines the importance of Aleppo and gives reason to why and how this city has remained so well maintained (until recent events). This article is crucial to my research into why this World Heritage site is so influential. This article is even more essential with the knowledge that not many scholarly sources are available on the background of this site.

Casana, Jesse, Mitra Panahipour, "Satellite-Based Monitoring of Looting and Damage to Archaeological Sites in Syria," Journal of Eastern Mediterranean Archaeology and Heritage Studies Vol 2 No 2 (2014), 128-151, accessed September 2, 2018, https://www.jstor.org/stable/10.5325/jeasmedarcherstu.2.2.0128

       This article speaks on the drone and satellite footage used to pinpoint the amount of destruction in areas where access is finite. Palmyra is discussed, as well as other sites in Syria that can be used for comparison. The article also brings into light the amount of looting done prior to the war and suggests that this destructive looting intensified during the war. I believe that this article will provide my paper with not only solid comparisons, but will also provide evidence of these images needing to be accessioned and cataloged for future use.

Danti, Michael, Scott Banting, Susan Penacho, "The American Schools of Oriental Research Cultural Heritage Initiatives: Monitoring Cultural Heritage in Syria and Northern Iraq by Geospatial Imagery,: Geoscience Vol 7 No 4 2017, September 28, 2017, accessed September 13, 2018, http://www.mdpi.com/2076-3263/7/4/95.

       This article reflects on the Cultural Heritage Initiatives or CHI that documents the destruction in war torn countries; like that of Syria. The findings report in the damage done in Syria that was confirmed using satellite images. A section devoted to the destruction of Palmyra allows for the understanding of how these satellite images helps professionals disseminate the waves of destruction. This article will strengthen my argument of images of this caliber to be accessioned and cataloged. I believe the the waves of destruction seen throughout this paper will also help in the understanding of the great loss seen in Palmyra.

"In Aleppo, Old Bazaar Struggles to come back to Life," Arab News, January 23, 2018, accessed August 27, 2018, https://www.arabnews.com/node/1231326/middle-east.

Intagliata, Emanuele E., "Palmyra after Zenobia AD 273-750," x-xiv, accessed September 2, 2018. https://www.jstor.org/stable/j.ctt2272712.5.

In this Arab News article a light has been shone on the disastrous aftermath of the civil war in Syria. This article explains the amount of damage that has occurred at the famous covered bazaar in Aleppo. Here is highlighted not just the destruction of these shops, but also the human toll. These shop owners now must rebuild their livelihoods, but this market will never be the same. I believe this article will be influential for my research; to provide evidence of why it is important that the satellite and drone footage should be accessioned into institutions. This site will be rebuilt, but we must always remember what parts are original and which have been rebuilt for future generations contextual understanding.


Karklis, Laris, "The Destruction of Aleppo after Five Years of Fighting," Washington Post, December 22, 2016, accessed August 24, 2018, https://www.washingtonpost.com/graphics/world/destruction-of-aleppo/?noredirect=on.

The Washington post article provides statistical data on the destruction of Aleppo. This article compares satellite images from prior to the occupation of Aleppo by rebel forces until the city was recaptured by the governmental regime. The data in here provides a snapshot of the major World Heritage sites most affected by this war. I expect this data to enhance my argument on the amount of destruction that has occurred to World Heritage sites; as well as the images in this article will be used in my appendices to contribute to visual evidence.


Quaritsch, Markus, Emil Stojanovski, Christian Bettstetter, Gerhard Friedrich, Hermann Hellwagner, Bernhard Rinner, Michael Hofbaur, Mubarak Shah, "Collaborative Microdrones: Applications and Research Challenges," Conference Paper January 2008, accessed August 27, 2018, https://www.researchgate.net/profile/Bernhard_Rinner/publication/220987129_Collaborative_microdrones_Applications_and_research_challenges/links/0fcfd5107e7469c025000000.pdf.

This paper reports on how microdrones with cameras can give aerial perspectives in locations that could be difficult to assess. The paper lays out what must be done when using micro drones to capture the best images and data (e.g. using multiple drones at once) to assist the user. In this document, though the 'disaster management' section speaks mainly to natural disasters, the main points can be extrapolated and applied to the sites on Palmyra and Aleppo. I believe this research will help my paper to be firmly rooted in scientific data and provide me with helpful tools to explain how drones work and why this data is important.


Stoneman, Richard, "Palmyra and its Empire: Zenobia's Revolt against Rome," Michigan: University of Michigan Press, 1992.

This book conveys the story of Palmyra under Roman rule. More importantly this text gives dates of creation of Roman buildings and monuments. Not only does this book offer these dates, but it also adds context to the creation of the builds and offers possible suggestions as to who may have paid for these monuments, and why. This book will provide my research with valuable background information on Palmyra. With the lack of scholarly research on Palmyra, I believe this book will play an integral role in informing my research.

UNESCO. "Report of the UNESCO Rapid Assessment Mission to the World Heritage "Site of Palmyra."" April 23-27, 2016. Accessed August 21, 2018. https://whc.unesco.org/document/142423.
UNESCOm sent a team to Palmyra in the Spring of 2016 to assess the damage and make recommendations foe the future. This document is the report of this findings. The report discusses documenting the damage with photos for rebuilding the site. This shows that photos of the site on the ground and aerial photos via ICONEM have been taking. This assessment will provide my paper with evidence that these 'documented' photos should be accessioned and cataloged using museum registration methods into a collection. I also believe there is a strong case to be made for ICONEM to hand over full copyright of the images taken for future posterity.

Unesco Website, "Site of Aleppo," accessed August 21, 2018, https://whc.unesco.org/en/list/21.
The UNESCO website provides background information on the importance of Aleppo's past infrastructure. This website also provides information as to why UNESCO designated the old city of Aleppo as a World Heritage site. This material together contributes to the understanding of the importance of the site of Aleppo. I believe this UNESCO webpages on Aleppo will help provide my paper with some solid research considering the lack of previous research on this subject.

Unesco Website, "Site of Palmyra," accessed August 21, 2018, https://whc.unesco.org/en/list/23.
The UNESCO website delivers background information on the site of Palmyra, and its relevance as a "caravan oasis". Also discussed on this webpage is the major architecture built during this caravan period. This website also offers explanations as to why the site of Palmyra had been deemed a World Heritage Site by UNESCO. Again, the amount of research done on the site of Palmyra seems to be limited and I trust this website will contribute to some solid background material; as well as the understanding as to why it fits the World Heritage Site criteria.

Voon, Clair, "Aerial Photos of Palmyra Show Extent of Damage done by ISIS," Hyperallergic, May 4, 2016, accessed August 24, 2018, https://hyperallergic.com/295770/aerial-photos-of-palmyra-show-extent-of-damage-done-by-isis/.

This article conveys information of the drone footage captured bu ICONEM a start up company that is creating 3D models of the Aleppo and Palmyra site. This Hyperallergic article highlights what has been damaged and destroyed in Syria, but more importantly shows what is being done with drone images by corporations. Though this company is doing important work this article alludes that the work is being done as proprietary rather than posterity; as ICONEM has given no response to what is the "primary purpose of the photographs". This article will not only inform my research into what is happening with drone footage, but will also provide evidence as to why I am proposing the handing over of these images to institutions. I expect this article will be pertinent to my argument and provide information into what this particularly company is doing from an unbiased source.

**Appendix B: Sources Consulted**

American Association for the Advancement of Science. "Conflict in Aleppo, Syria: A Retrospective Analysis." Accessed August 24, 2018. https://www.aaas.org/aleppo_retrospective.

Anurogo, Wenang, Muhammad Zainuddin Lubis, Hanah Khoirunnisa, Daniel Sutopo Pamungkas, Aditya Hanafi, Fajar Rizki, Ganda Surya, Arini Dewi Lestari Situmorang, Dirgan Timbang, Perdi Novanta Sitombing, Catur Agus Lukitasari, Novita Ayu Dewanti, "A Simple Aerial Photogrammetric Mapping System Overview and Image Acquisition using Unmanned Aerial Vehicles (UAVs)," Journal of Applied Geospatial Information Vol 1 No 1 2017, May 29, 2017, accessed September 2, 2018, https://www.researchgate.net/profile/Wenang_Anurogo2/publication/318112712_A_Simple_Aerial_Photogrammetric_Mapping_System_Overview_and_Image_Acquisition_Using_Unmanned_Aerial_Vehicles_UAVs/links/595a5af7aca2728a137ab089/A-Simple-Aerial-Photogrammetric-Mapping-System-Overview-and-Image-Acquisition-Using-Unmanned-Aerial-Vehicles-UAVs.pdf.

Archeomatica, Redazione, "Save the Syrian Heritage: Technologies to Document Palmyra and Endangered World Heritage, Interview to Yves Ubelmann, ICONEM's CEO," September 2017, accessed August 26, 2018. http://ojs.mediageo.it/index.php/archeomatica/article/viewFile/1483/1350.

Astengo, Gregorio, "The Rediscovery of Palmyra and its dissemination in Philosophical Transactions," The Royal Society Journal of the History of Science, March 16, 2016, accessed October 3, 2018, http://rsnr.royalsocietypublishing.org/content/early/2016/03/12/rsnr.2015.0059.

Edited Buck, Rebecca A., Jean Allman Gilmore, "Museum Registration Methods 5th Edition," Washington: The AAM Press; 2010.

Buffenstein, Alyssa, "A Monumental Loss: Here are the most Significant Cultural Heritage Sites that ISIS has Destroyed to Date," Artnet News, May 30, 2017, accessed August 21, 2018, https://news.artnet.com/art-world/isis-cultural-heritage-sites-destroyed-950060.

Burns, Ross, "Aleppo: A History," New York: Routledge; 2017.

Cantacuzino, Sherban, "Aleppo," Ekistics vol 42 no 253 )December 1976), 367-371, accessed September 2, 2018, https://www.jstor.org/stable/43618747.

Casana, Jesse, Mitra Panahipour, "Satellite-Based Monitoring of Looting and Damage to Archaeological Sites in Syria," Journal of Eastern Mediterranean Archaeology and Heritage Studies Vol 2 No 2 (2014), 128-151, accessed September 2, 2018, https://www.jstor.org/stable/10.5325/jeasmedarcherstu.2.2.0128.

Danti, Michael, Scott Banting, Susan Penacho, "The American Schools of Oriental Research Cultural Heritage Initiatives: Monitoring Cultural Heritage in Syria and Northern Iraq by Geospatial Imagery,: Geoscience Vol 7 No 4 2017, September 28, 2017, accessed September 13, 2018, http://www.mdpi.com/2076-3263/7/4/95.

Domonoske, Camila, "ISIS Destroys Ancient Theater, Tetrapylon in Palmyra, Syria says," NPR, January 20, 2017, accessed October 10, 2018, https://www.npr.org/sections/thetwo-way/2017/01/20/510732864/isis-destroys-ancient-theater-tetrapylon-in-palmyra-syria-says.

Farago, Jason, "The Ancient Syrian City ISIS is Destroying, Preserved Online," New York Times, February 15, 2017, accessed August 24, 2018, https://www.nytimes.com/2017/02/15/arts/design/palmyra-syria-isis.html.

Heritage for Peace Website, http://www.heritageforpeace.org/about-us/mission-statement/.

ICONEM Website, accessed October 3, 2018, http://iconem.com/en/.

"In Aleppo, Old Bazaar Struggles to come back to Life," Arab News, January 23, 2018, accessed August 27, 2018, https://www.arabnews.com/node/1231326/middle-east.

Intagliata, Emanuele E., "Palmyra after Zenobia AD 273-750," x-xiv, accessed September 2, 2018. https://www.jstor.org/stable/j.ctt2272712.5.

Karklis, Laris, "The Destruction of Aleppo after Five Years of Fighting," Washington Post, December 22, 2016, accessed August 24, 2018, https://www.washingtonpost.com/graphics/world/destruction-of-aleppo/?noredirect=on.

Montoya-Guevara, Camilo, "Aleppo's Al-Medina Souq: Post-Conflict Reconstruction of its Social Functions," The Aleppo Project, February 2017, accessed October 3, 2018, 2-19, https://www.thealeppoproject.com/papers/aleppos-al-madina-souq-post-conflict-reconstruction-social-functions/.

"Palmyra's Temple of Bel Destroyed, Says UN," BBC, September 1, 2015, accessed November 13, 2018, https://www.bbc.com/news/world-middle-east-34111092.

Quaritsch, Markus, Emil Stojanovski, Christian Bettstetter, Gerhard Friedrich, Hermann Hellwagner, Bernhard Rinner, Michael Hofbaur, Mubarak Shah, "Collaborative Microdrones: Applications and Research Challenges," Conference Paper January 2008, accessed August 27, 2018, https://www.researchgate.net/profile/Bernhard_Rinner/publication/220987129_Collaborative_microdrones_Applications_and_research_challenges/links/0fcfd5107e7469c025000000.pdf.

Ruck, Joanna, "Destruction of Aleppo: Then and Now in Pictures," Guardian, December 21, 2016, accessed August 24, 2018, https://www.theguardian.com/world/2016/dec/21/aleppo-syria-war-destruction-then-and-now-in-pictures.

"Syria Civil War: Bomb Damages Aleppo's Ancient Citadel," BBC, July 12, 2015, accessed October 10, 2018, https://www.bbc.com/news/world-middle-east-33499609.

"Syria: IS Destroys Part of Palmyra's Roman Theater," BBC, January 20, 2017, accessed October 10, 2018, https://www.bbc.com/news/world-middle-east-38689131.

Stoneman, Richard, "Palmyra and its Empire: Zenobia's Revolt against Rome," Michigan: University of Michigan Press, 1992.

Tharoor, Ishaan, "How Will Aleppo and Mosul Survive Today's Wars? Their Shared History Offers Some Clues," Washington Post, December 16, 2016, accessed October 29, 2018, https://www.washingtonpost.com/news/worldviews/wp/2016/12/16/aleppo-and-mosul-are-bound-together-by-history-now-they-are-part-of-a-21st-century-tragedy/?postshare=2131481899684598&utm_term=.628b079c318a.

UNESCO Website, "UNESCO Repots on Extensive Damage in First Emergency Assessment Mission to Aleppo," January 19, 2017, accessed October 3, 2018, https://whc.unesco.org/en/news/1619/.

UNESCO. "Report of the UNESCO Rapid Assessment Mission to the World Heritage "Site of Palmyra."" April 23-27, 2016. Accessed August 21, 2018. https://whc.unesco.org/document/142423.

UNESCO Website, "Silk Roads: Palmyra," accessed October 1, 2018, https://en.unesco.org/silkroad/content/palmyra.

Unesco Website, "Site of Aleppo," accessed August 21, 2018, https://whc.unesco.org/en/list/21.

Unesco Website, "Site of Palmyra," accessed August 21, 2018, https://whc.unesco.org/en/list/23.

UNESCO Website, "The Criteria for Selection," accessed October 3, 2018, http://whc.unesco.org/en/criteria/.

UNITAR Website, September 18, 2016, accessed October 3, 2018, http://www.unitar.org/unosat/node/44/2510?utm_source=unosat-unitar&utm_medium=rss&utm_campaign=maps.

UNITAR Website, "Damage Density in the City of Aleppo, Syria," December 16, 2016, accessed November 13, 2018, http://www.unitar.org/unosat/node/44/2508?utm_source=unosat-unitar&utm_medium=rss&utm_campaign=maps.

UNITAR Website, "UNOSAT Palmyra Roman Tetrapylon and Amphitheatre Damage Assessment," January 20, 2017, accessed October 29, 2018, http://www.unitar.org/unosat/node/44/2537?utm_source=unosat-unitar&utm_medium=rss&utm_campaign=maps.

Veyne, Paul, Translated by Teresa Lavender Fagan, "Palmyra," Chicago: The University of Chicago Press; 2017.

Voon, Clair, "Aerial Photos of Palmyra Show Extent of Damage done by ISIS," Hyperallergic, May 4, 2016, accessed August 24, 2018, https://hyperallergic.com/295770/aerial-photos-of-palmyra-show-extent-of-damage-done-by-isis/.

**Appendix C: Images**



Sandra Auger/Omar Sanadiki/Reuters via *The Guardian* Figure 1A (Citadel before)



Sandra Auger/Omar Sanadiki/Reuters via *The Guardian* Figure 1B (Citadel after)

Omar Sanadiki/Reuters via *The Guardian* Figure 2A (The Great Mosque before)



Omar Sanadiki/Reuters via *The Guardian* Figure 2B (The Great Mosque after)
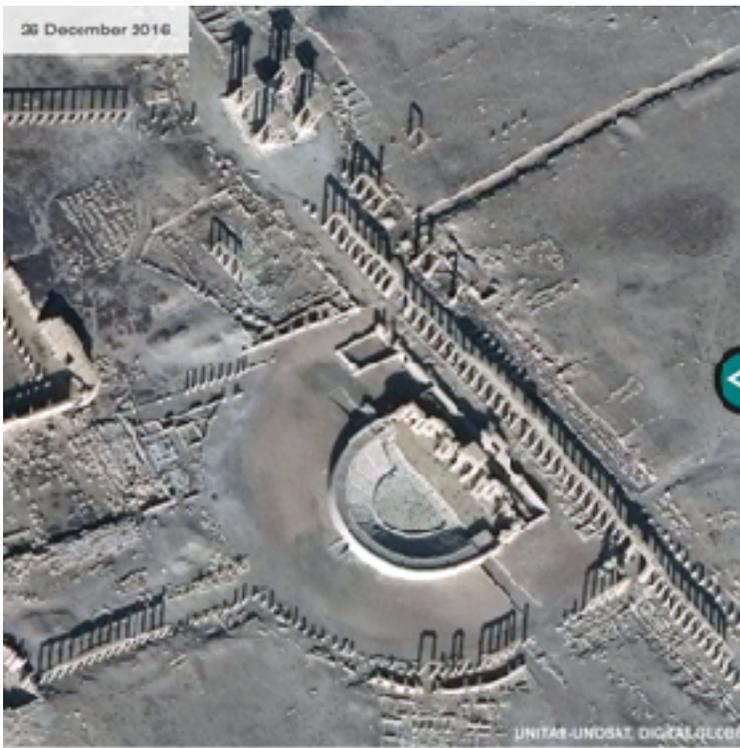
UNITAR-UNOSAT via *BBC* Figure 3A (Roman Theater and Tetrapylon before)



UNITAR-UNOSAT via *BBC* Figure 3B (Roman Theater and Tetrapylon after)

Reuters via *BBC* Figure 4A (Temple of Bel before)



The main entrance of the Temple of Bel (all photos courtesy Iconem/DGAM)

ICONEM/DGAM via *Hyperallergic* Figure 4B (Temple of Bel after)

A bulldozer removes rubble from damage of the old market in the old city of Aleppo, Syria. (AP)

Khan al-Jumruk via *Arab News* Figure 5 (After destruction)
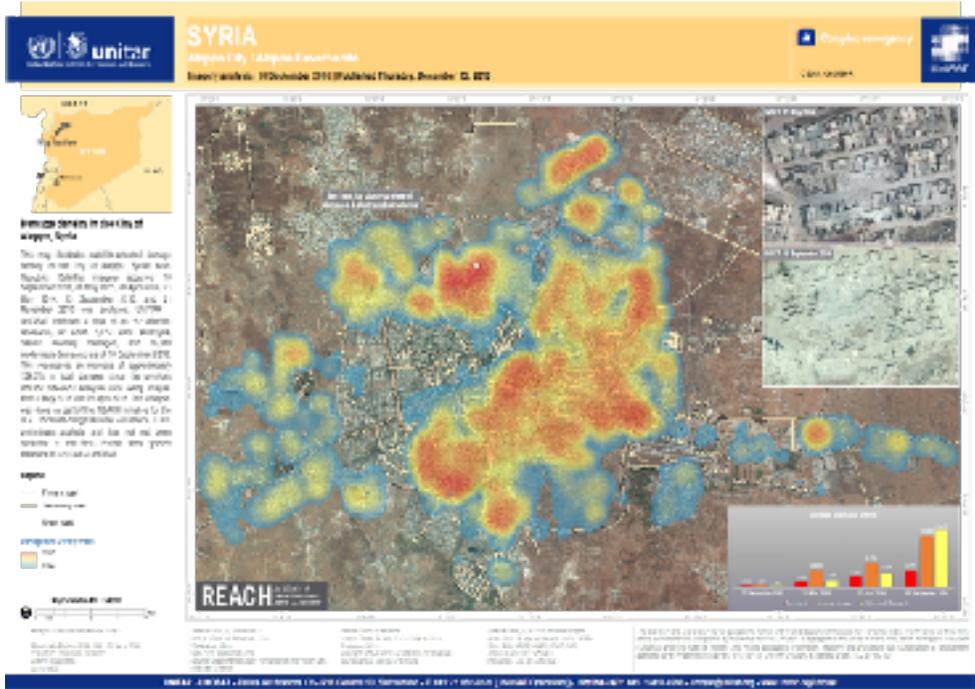


UNITAR-UNOSAT Figure 6 (Damage density of Aleppo maps )

Omar Sanadiki/Reuters via *The Guardian* Figure 7A (Old City of Aleppo before)



Omar Sanadiki/Reuters via *The Guardian* Figure 7B (Old City of Aleppo after)

DGAM via *Artnet News* Figure 8A (Al Lat Lion before)



DGAM via *Artnet News* Figure 8B (Al Lat Lion after)