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ANCHORING MEMORY IN THE FACE OF DISASTER:  
TECHNOLOGY AND ISTANBUL'S CULTURAL HERITAGE PRESERVATION REGIME

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# Anchoring Memory in the Face of Disaster: Technology and Istanbul's Cultural Heritage Preservation Regime

Ryan ROWBERRY

## I. Introduction

Istanbul, the largest metropolitan area in Turkey with a population exceeding 12.5 million, is one of the world's great cities—a meeting place of cultures, religions and continents. Given its long, rich and tumultuous history, Istanbul's core serves as an urban palimpsest that anchors the memory of past cultures to present generations. One has simply to look at the massive Roman aqueduct built by the Emperor Valens (AD 378) straddling the major arterial thoroughfare of Atatürk Boulevard to see how strands of the city's past have been woven into its modern fabric. Indeed, Istanbul's four World Heritage Sites—(1) the Archaeological Park at the tip of the historic peninsula including the Hippodrome of Constantine, Justinian's Hagia Sophia, the Blue Mosque and Topkapi Palace; (2) the Suleymaniye quarter with Suleymaniye Mosque complex, bazaars and vernacular settlement; (3) the area of settlement around the Zeyrek Mosque (former medieval church of the Pantocrator); and (4) areas along both sides of the famous fifth century Theodosian land walls—form the foundation of contemporary downtown Istanbul.

Istanbul's cultural heritage is also a critical component to the overall economy of Turkey's financial capital. Istanbul was declared the Cultural Capital of Europe in 2010 and heritage tourism, with its direct and indirect stimuli to local businesses and services, comprises a significant part of Istanbul's economy.<sup>1</sup> According to a major credit card index, Istanbul ranks as the sixth hottest global tourist destination and is expected to host 10.4 million

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<sup>1</sup> See F. Gezici and E. Kerimoglu, "Culture, Tourism and Regeneration Process in Istanbul," in *International Journal of Culture, Tourism and Hospitality Research*, vol. 4, no. 3, pp. 252-265 (2010).

tourists in 2013, generating approximately \$8.6 billion dollars in tourism income—a 5.5% increase from the year before.<sup>2</sup> And a 2012 study by Turkey's Culture Ministry's General Directorate of Cultural Heritage and Museums concluded that the Hagia Sophia and Topkapi Palace in Istanbul were the two most visited tourism attractions in Turkey that year.<sup>3</sup>

Yet despite its storied past and bright present, Istanbul's cultural heritage faces several risks from natural disasters. The best known and most researched risk is earthquakes, as Istanbul sits atop one of the world's most active fault lines. Indeed the two major earthquakes that struck Turkey in 1999 prompted the creation of national, provincial and municipal disaster management agencies along with a series of government reports and independent research on earthquake prevention and mitigation.<sup>4</sup> The latest estimate is that there is a 50% probability that a 7.5 Richter scale earthquake will strike Istanbul within the next 30 years, leaving tens of thousands dead and large swathes of Istanbul's physical infrastructure, including many historic sites, in shambles.<sup>5</sup> Other risks to Istanbul's cultural heritage (some of which are linked to earthquakes) include fires, tsunamis in the Sea of Marmara, acid rain and sea-level rise.<sup>6</sup> Thus, the question is not *if* Istanbul will lose vital clusters of its cultural heritage, but *when*.

<sup>2</sup> "Istanbul up to sixth hottest global tourist spot," *Hurriyet Daily News* (28 May 2013).

<sup>3</sup> "Hagia Sophia ranks first in popularity" at <http://www.goturkey.com/en/news/detail/17> (last accessed 5 December 2013).

<sup>4</sup> T. Cekic and E. Yazici, "Spatial Distribution of Housing Investment and Perception of Earthquake Risk in Istanbul Metropolitan Area," in *New Challenges for European Regions and Urban Areas in a Globalised World*, 51<sup>st</sup> Congress of the European Regional Science Association International, (September 2011); S. Erer and I. Salihoglu, *Istanbul Seismic Risk Mitigation and Emergency Preparedness Project (ISMEP) Environmental Management Plan*, Republic of Turkey, Istanbul Special Provincial Administration, Istanbul Project Coordination Unit, (November 2010); M. Erdik and E. Durukal, "Earthquake Risk and its Mitigation in Istanbul," in *Natural Hazards*, vol. 44, pp. 181-197 (2008); F. Gülen et. al., *How Well is Istanbul Getting Prepared for the Earthquake?*, Turkish Court of Accounts (February 2002).

<sup>5</sup> S. Erer and I. Salihoglu, *ISMEP Environmental Management Plan*, p. 5; M. Erdik, "Management of Seismic Risk in Istanbul," PowerPoint presentation (April 2013)(on file with the author); A World Bank study based on Turkish research surmised that in Istanbul's Zeytinburnu district alone "at least 2295 buildings out of 16,031 have an extremely high risk of being heavily damaged" in the event of an earthquake greater than 7 on the Richter scale. "Disaster Masterplan for Earthquake Risk Reduction and Mitigation in Istanbul," in *World Bank Institute Distance Learning, Natural Disaster Risk Management Program*, available at: [www.worldbank.mrooms.net/file.php/357/New\\_Sessions/DK-Case\\_Study\\_Istanbul\\_Masterplan-final.pdf](http://www.worldbank.mrooms.net/file.php/357/New_Sessions/DK-Case_Study_Istanbul_Masterplan-final.pdf) (last accessed 5 December 2013).

<sup>6</sup> For risks of sea-level rise to coastal cities, see G. Vince, "The Rising and Sinking Threats to Our Cities" (13 June 2013) at <http://www.bbc.com/future/story/20130613-the-rising-threat-to-our-cities> (last accessed 5 December 2013); "UN Climate Report: Key Findings" available at: [www.bbc.co.uk/news/science-environment-24282150](http://www.bbc.co.uk/news/science-environment-24282150) (last accessed 5 December 2013).

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To assist in preserving Istanbul's priceless cultural heritage, this article examines how technology can help safeguard historic resources and encourages the relevant Turkish authorities to integrate technology more fully into their preservation planning and practices. While there are countless ways that technology might aid historic preservation, this article describes only three of them. The first part examines Istanbul's efforts to establish an accessible, online inventory of historic resources and a powerful, but simple, method for expanding its reach. The second part discusses some of the latest technologies and techniques in digital preservation. And the third part elucidates the range of free, digital online resources from multinational and national organizations that can provide expert guidance on how to protect cultural heritage from disaster and how to manage cultural heritage restoration post-disaster.

## II. Online Inventory of Historic Resources

A foundational principle for any effective historic resources management framework is simple in theory yet bedeviling in practice: *Know what historic resources you have*. To organize historic resources, many national and local governments around the world utilize an online, searchable inventory.<sup>7</sup> Istanbul is no exception. In coordination with the Turkish Ministry of Culture and the Turkish Academy of Sciences Istanbul has embarked upon an ambitious cataloguing project, the "Istanbul Inventory of Cultural Heritage and Cultural Economy" ([www.istanbulkulturenvanteri.gov.tr](http://www.istanbulkulturenvanteri.gov.tr)). The Istanbul Inventory aims to digitally record and map a staggering range of monuments, archaeological sites, historic structures, cultural economy, old maps of the city and museum holdings from an inhabited area boasting millennia of occupation. In this way, as Hakan Tanrıöver, a cultural officer at the Turkish Ministry of Culture and Tourism states, "a vanishing building or the changes at a district and the fading historic fabric can be monitored."<sup>8</sup>

Importantly, most, if not all, of the information in the Istanbul Inventory is made publically available. For example, anyone wishing to know more about a catalogued monument within the Istanbul Metropolitan region can utilize the online "Memorials Inventory Search" within the Istanbul Inventory using different search strategies: building name, building type (e.g., monastery, palace, mosque), position in a county or region or construction

<sup>7</sup> See N. A. Cayirezmez, "Cultural Heritage Inventory System of Turkey on the Web," in XXI International CIPA Symposium, Athens, Greece (October 2007).

<sup>8</sup> H. Tanrıöver, "Istanbul Cultural Heritage and Cultural Industry Inventory," in *5<sup>th</sup> International Congress on Science and Technology for the Safeguard of Cultural Heritage in the Mediterranean Basin*, Istanbul, Turkey (November 2011) p. 319.

date (if known).<sup>9</sup> Search results for monuments include extensive information, such as: the address of the monument; the county in which the monument is located; links to Google Maps pinpointing the location of the monument; the architectural style; the identity and age of the structure; and physical properties of the monument (e.g., support system, interior features, technical fittings).

Turkey's outstanding efforts to digitally record Istanbul's irreplaceable cultural heritage provide a solid foundation for protecting Istanbul's historic resources. To date, more than 800 historic maps of the city have been digitized; nearly 10,000 historic sites have been catalogued and mapped using geographic information systems (GIS); all books and theses about Istanbul since 1923 have been scanned; forty years of archives from the Archaeological Museums of Istanbul have been digitized; and over 60,000 photos of historic resources are embedded in more than 150,000 web pages.<sup>10</sup> Additionally, the Turkish Academy of Sciences annual periodical, *Journal of Cultural Inventory* (*Kültür Envanteri Dergisi*) and the UNESCO World Heritage Committee's approval of Istanbul's 2011 Historic Peninsula Site Management Plan—which encompasses all four of Istanbul's World Heritage areas—offers compelling evidence that Turkey takes its responsibility to preserve Istanbul's cultural heritage very seriously.<sup>11</sup>

Yet, much remains to be done. While the bulk of Istanbul's major, visible historic resources have been digitally recorded, the extensive urban demolition and regeneration process currently underway in the city exhumes historic resources on a daily basis.<sup>12</sup> Such "construction-related" excavated cultural heritage also needs to be recorded before new construction begins—a particularly daunting task when Istanbul is experiencing acute population pressures needing swift alleviation, economic uncertainty, budgetary constraints and the looming specter of disaster that may strike at any moment. There are also certainly smaller-scale historic resources (e.g., facades) in Istanbul's many neighborhoods, as well as subterranean and underwater cultural heritage that deserve cataloguing and protection but are low priority.<sup>13</sup>

<sup>9</sup> [www.istanbulkulturenvanteri.gov.tr/kentsel-anit/user-search/code/b](http://www.istanbulkulturenvanteri.gov.tr/kentsel-anit/user-search/code/b) (last accessed 5 December 2013).

<sup>10</sup> Tanrıöver, "Istanbul Cultural Heritage," p. 319.

<sup>11</sup> The Istanbul Historic Peninsula Site Management Plan is available at: [www.alanbaskanligi.gov.tr/files/Management\\_Plan\\_090312\\_TUM.pdf](http://www.alanbaskanligi.gov.tr/files/Management_Plan_090312_TUM.pdf) (last accessed 5 December 2013).

<sup>12</sup> See, e.g., P. Turgut, "Turkey's Gold Rush: Is Istanbul's New Skyline a Boom or a Bubble?" in *The Nation* (24 October 2012); M. Young, "The Face of Urban Renewal and Preservation in Istanbul," in *Untapped Cities* (25 April 2011); Gezici and Kerimoglu, "Culture, Tourism and Regeneration Process in Istanbul."

<sup>13</sup> N. Gültekin, "Cultural Heritage Management: The Case of Historical Peninsula in Istanbul," in *Gazi University Journal of Science*, vol. 25 (2012) p. 241.

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A powerful technological tool that can aid Turkish authorities in their quest to create a digital inventory of Istanbul's cultural heritage is online crowd sourcing. Simply put, online crowd sourcing allows someone to obtain needed services and/or content by soliciting voluntary contributions from the online public community rather than hiring employees or paying suppliers.<sup>14</sup> Online crowd sourcing has been an extremely effective tool for preserving cultural heritage in many countries. For instance, the National Library of Finland is using online crowd sourcing to index its scanned archives.<sup>15</sup> Similarly, the University of Cape Town in South Africa is using online crowd sourcing to transcribe collections containing the Bushman's language, stories and way of life.<sup>16</sup> The National Geographic Society, based in the United States, is using online crowd sourcing to analyze millions of satellite images of Mongolia showing potential archaeological sites in the hopes of discovering the tombs of Genghis Khan and his descendants.<sup>17</sup> And an English non-profit organization has utilized online crowd sourcing and online crowd funding—funds donated by the interested public online—to provide both finances and labor for an expert-led excavation of a Bronze Age causeway composed of millions of timbers in the Cambridge shire fens.<sup>18</sup>

Drawing on the crowd sourcing experience of other countries, Turkey could create an online portal attached to the Istanbul Inventory. This portal could offer training modules to Istanbul's citizens on cultural heritage recording practices and afterwards ask them to collect and upload descriptive information, statistics, pictures, videos and maps on historic resources in their neighborhoods. The information uploaded to this portal could be screened and vetted by the Istanbul Inventory authorities before adding it to the Inventory, ensuring quality control. In this way, Turkey could gather and preserve vast amounts of data related to Istanbul's cultural heritage in a short period of time and at minimal cost. Furthermore, such a strategy also fosters civic pride, a sense of community and a deeper, more tangible connection to the

<sup>14</sup> One leading crowdsourcing platform is [www.crowdsourcing.org](http://www.crowdsourcing.org)

<sup>15</sup> T. De Benetti, "Digitalkoot: Crowdsourcing Finnish Cultural Heritage" available at [www.crowdsourcing.org/document/digitalkoot-crowdsourcing-finnish-cultural-heritage/9397](http://www.crowdsourcing.org/document/digitalkoot-crowdsourcing-finnish-cultural-heritage/9397) (last accessed 5 December 2013).

<sup>16</sup> N. Munyaradzi, "Crowdsourcing to Preserve Bushman Heritage" available at [www.crowdsourcing.org/article/-crowdsourcing-to-preserve-bushman-heritage/21527](http://www.crowdsourcing.org/article/-crowdsourcing-to-preserve-bushman-heritage/21527) (last accessed 5 December 2013).

<sup>17</sup> "Field Expedition: Mongolia" available at [www.crowdsourcing.org/video/field-expedition-mongolia-/3414](http://www.crowdsourcing.org/video/field-expedition-mongolia-/3414) (last accessed 5 December 2013).

<sup>18</sup> J. Palmer, "Flag Fen hosts 'crowdsourced' Bronze Age Archaeology Dig," *BBC News Science & Environment* (13 August 2012) available at [www.bbc.co.uk/news/science-environment-19192220](http://www.bbc.co.uk/news/science-environment-19192220) (last accessed 5 December 2013).

city's past, particularly for those of younger generations who are adept at using technology.<sup>19</sup> It also offers peace of mind knowing that when a disaster occurs that as much cultural heritage as possible has been preserved for future generations.

### III. Technologies and Techniques in Digital Preservation

Digital technologies with direct applications for preserving cultural heritage are plentiful and expanding rapidly. This section cannot discuss in detail all of these technologies. Rather, it offers a description of various cutting-edge technologies and techniques, with illustrative examples, that are currently being employed to successfully identify and protect cultural heritage in different parts of the world. Turkey should explore using these technologies or expand on their current use, to preserve Istanbul's unique historic resources before disaster makes it impossible.

Geomatics is the study of mapping the earth using varied surveying techniques. It has become a critical component in cultural heritage preservation. Geographic information systems (GIS), is an example of a geomatics technique that is widely used across the world, including Turkey. GIS digitally visualizes, analyzes, maps and interprets data related to physical geography, including historic sites in urban areas. For instance, a team from the University of Illinois in the United States used satellite images from Google Earth and GIS software to create an interactive map of the historical footprint of Barking Abbey in England, a structure demolished in the sixteenth century.<sup>20</sup> Projects like this one offer an example of how GIS can be used to precisely locate and reconstruct the outline of ancient structures, of which Istanbul has many.

Less well-known, however, are some incredible laser-based innovations that are revolutionizing cultural heritage practices, particularly archaeology. One of these is LIDAR (Light Detection and Ranging). LIDAR is a remote sensing technology that measures distance by illuminating a target with a laser and analyzing the reflected ultraviolet, visible and infrared light. LIDAR instruments may be affixed to aircraft and used to create high resolution digital terrain maps (including elevations) of vast tracts of land, including

<sup>19</sup> Researchers in England have begun measuring the impact and value that participation in cultural endeavors has on people. See [www.gov.uk/government/publications/case-programme-understanding-the-drivers-impacts-and-value-of-engagement-in-culture-and-sport](http://www.gov.uk/government/publications/case-programme-understanding-the-drivers-impacts-and-value-of-engagement-in-culture-and-sport) (last accessed 5 December 2013).

<sup>20</sup> "GIS Applications in the Reconstruction of Medieval Structures" available at: [www.uis.edu/gis/projects/GISWebApplications/#GISApplicationsReconstructingMedievalStructures](http://www.uis.edu/gis/projects/GISWebApplications/#GISApplicationsReconstructingMedievalStructures) (last accessed 5 December 2013).

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seafloors.<sup>21</sup> It can even map features beneath forest canopy and vegetation, revealing important archeological and geographic information (e.g. dried river channels) that might otherwise be obscured using traditional “boots-on-the-ground” methods.<sup>22</sup> The English government, for example, is utilizing LIDAR in its National Mapping Programme, which aims to “provide a national standard for archaeological mapping and recording with consistent aerial sources, archaeological scope and methods.”<sup>23</sup> LIDAR instruments may also be used to create detailed architectural surveys of historic areas,<sup>24</sup> scan individual historic buildings,<sup>25</sup> and noninvasively analyze paintings, frescoes and other two-dimensional historical surfaces to aid in restoration work and prevent deterioration.<sup>26</sup>

Another laser-based technology that has significant application to cultural heritage preservation is 3-D laser scanning. A 3-D laser scanner analyzes and collects data on the shape and appearance of an object, which is then used to construct digital, three dimensional models. One particularly noteworthy organization using 3-D laser scanning to preserve heritage is Cy Ark, which was formed following the Taliban's destruction of the 1600-year-old Bamiyan Buddhas in Afghanistan. Cy Ark is an international non-profit organization dedicated to digitally preserving world heritage sites before they are lost to war, natural disasters or time. Using traditional surveying methods, digital photography and high resolution 3-D laser scanning, Cyark creates 3-D “engineering-grade data [that] can then be used to create highly accurate

<sup>21</sup> When creating topographic maps, LIDAR uses infrared light over land and visible green light to penetrate water and depict seafloors.

<sup>22</sup> For example, using LIDAR, researchers recently discovered the lost medieval city of Mahendraparvata beneath dense forest in Cambodia. Mahendraparvata, founded around the beginning of the ninth century, is believed to be the first city in the Angkor Empire and predates Angkor Wat by three centuries. See V. Woollaston, “Lost Medieval City Found in Cambodia Using Revolutionary Scanning Technology and Indiana Jones-style Jungle Expedition,” in *MailOnline* (15 June 2013). Available at: <http://www.dailymail.co.uk/sciencetech/article-2342339/Cambodian-lost-city-using-revolutionary-scanning-technology.html> (last accessed 5 December 2013).

<sup>23</sup> “National Mapping Programme” available at: [www.english-heritage.org.uk/professional/research/landscapes-and-areas/national-mapping-programme/](http://www.english-heritage.org.uk/professional/research/landscapes-and-areas/national-mapping-programme/) (last accessed 5 December 2013).

<sup>24</sup> C. O. Kivilcim, “Architectural Survey for Documentation of Cultural Heritage with New Sensor Technologies,” in *Remote Sensing for a Changing Europe*, ed. D. Maktav (2009) pp. 530-534.

<sup>25</sup> F. Nex and R. Rinaudo, “Photogrammetric and LIDAR Integration for the Cultural Heritage Metric Surveys,” in *International Archives of Photogrammetry, Remote Sensing and Spatial Information Sciences*, vol. 38 (2010) pp. 490-495.

<sup>26</sup> L. Caneve et al., “Scanning LIDAR Fluorosensor for Remote Diagnostics of Artworks,” in *Knowledge, Diagnostics and Preservation of Cultural Heritage* (2012) pp. 117-122.



documentation drawings for site conservation and realistic visualizations for education and interpretation.”<sup>27</sup> The resulting 3-D interactive images are stored in a free, online library. And Cy Arkshares its knowledge and processes with local organizations, schools and universities, while providing online lesson plans for teachers integrating the 3-D archaeological data.<sup>28</sup>

3-D laser scanning can also be used on a more modest level. For instance, several universities and museums in England have partnered together to create a free, online archive of digital 3-D models of 1,600 medieval and early modern bones, skulls and skeletons exhibiting various diseases. Such a resource preserves the fragile skeletons from handling, while providing the public, archaeologists and medical community with valuable information.<sup>29</sup> Given the ease and speed of 3-D laser scanning (hand-held 3-D laser scanning devices exist), this technology would be particularly suitable for documenting discoveries from construction excavations in Istanbul prior to new construction.

Of course, not all technologies with cultural heritage applications revolve around lasers; some of them rely on sound, chemistry or X-rays. Researchers in England have used acoustic imaging—using sound wave reflections to create 3-D digital pictures—to map the sunken city of Dunwich, which was lost to the sea over the course of centuries.<sup>30</sup> This technology may be particularly useful for identifying and preserving remnants of Istanbul’s cultural heritage located underneath the Bosphorous or the Sea of Marmara. Chemists from Denmark have also discovered how to extract information from soil in the immediate vicinity of buried skeletons to deduce important nutritional and medical information about the final months and days of that person’s life.<sup>31</sup> And a collaboration of researchers from several universities in the United Kingdom have developed a technique using X-ray technology that can read text composed of iron-gall ink in rolled scrolls or folded manuscripts without

<sup>27</sup> “About CyArk” available at: [www.archive.cyark.org/aboutcyark](http://www.archive.cyark.org/aboutcyark) (last accessed 5 December 2013).

<sup>28</sup> “Lesson Plans” available at: [www.archive.cyark.org/education-lesson-plans](http://www.archive.cyark.org/education-lesson-plans) (last accessed 5 December 2013).

<sup>29</sup> M. Kennedy, “Online in 3D: The ‘Grotesque Beauty’ of Medieval Britons’ Diseased Bones” in *The Guardian* (8 December 2013) available at [www.theguardian.com/science/2013/dec/08/digitised-diseases-bones-online-3d-medieval-britons](http://www.theguardian.com/science/2013/dec/08/digitised-diseases-bones-online-3d-medieval-britons) (last accessed 8 December 2013).

<sup>30</sup> R. Eveleth, “Scientists Map Britain’s Most Famous Underwater City” (13 May 2013) available at <http://blogs.smithsonianmag.com/smartnews/2013/05/scientists-map-britains-most-famous-underwater-city/> (last accessed 5 December 2013); See also M. Hogenboom, “Shape of a Room ‘Heard’ by Acoustic Echoes,” in *BBC News: Science & Environment* (18 June 2013) available at: [www.bbc.co.uk/news/science-environment-22941278](http://www.bbc.co.uk/news/science-environment-22941278) (last accessed 5 December 2013).

<sup>31</sup> K. Rasmussen et al., “Mercury in Soil Surrounding Medieval Human Skeletons,” in *Heritage Science*, vol. 1, No. 16 (2013) pp. 1-10.

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subjecting them to the stress of unrolling or unfolding.<sup>32</sup> Using this technology, some of Istanbul's most fragile documents may be preserved and historians and others could gain access previously unusable written sources.

#### IV. Online Cultural Heritage Preservation Resources

Disasters threaten cultural heritage around the globe and lessons learned in one part of the world may spark innovations in another. Within the past several years several multinational and national organizations have compiled various types of reports concerned with cultural heritage preservation pre-and-post disaster. Almost all of these reports are free and accessible online (in English or French). Turkish cultural heritage management authorities should avail themselves of these materials to inform their own cultural heritage preservation practices and strategies. This section outlines some of the most important online resources available from both multinational and national organizations regarding cultural heritage and disaster.

The premier multinational organization concerned with cultural heritage preservation is the United Nations Educational, Scientific and Cultural Organization (UNESCO). UNESCO has pioneered the concept of preserving "world heritage"—objects, structures and areas displaying outstanding universal value. In 2010, UNESCO published a resource manual called *Managing Disaster Risks for World Heritage*.<sup>33</sup> The manual is not only designed to raise awareness of the threat of disasters to World Heritage sites, but also provides the international community with a sound methodology "for identifying, assessing and then reducing these risks, with a view to preserving their heritage and ensuring that it contributes – to its full potential – to the sustainable development of their communities."<sup>34</sup> *Managing Disaster Risks for World Heritage* begins by explaining what disaster risk management is and why it is so important in cultural heritage preservation. It then describes how one might identify and assess disaster risks; prevent disaster risks or mitigate their impact; prepare for and respond to emergencies; recover and rehabilitate World Heritage properties after a disaster; and how to implement, reassess and reappraise the disaster risk management plan.<sup>35</sup> Although this

<sup>32</sup> "Reading the Unreadable," *Cardiff University News Centre* (22 May 2013) available at: <http://www.cardiff.ac.uk/news/articles/reading-the-unreadable-11092.html> (last accessed 5 December 2013).

<sup>33</sup> United Nations Educational, Scientific and Cultural Organization, *Managing Disaster Risks for World Heritage* (2010). Available at: <http://whc.unesco.org/en/activities/630/> (last accessed 5 December 2013).

<sup>34</sup> Id. at p. 3.

<sup>35</sup> Id. at p. 4.

manual is designed for World Heritage sites like the four located in Istanbul, it can (and should) be used as a model for preparing disaster risk management plans for a much wider spectrum of Istanbul's rich cultural heritage.

Another valuable UNESCO resource for Turkey and Istanbul is the recently completed UNESCO two-volume publication, *Case Studies on the Conservation and Management of Historic Cities*.<sup>36</sup> These volumes provide a detailed description of 40 examples of cultural heritage preservation practices employed in 34 historic cities in Africa, Asia, North and South America and Europe. The motivations prompting these case studies were two-fold. One developed from an international debate on historic urban landscapes between UNESCO, national and local governments and development banks—which are increasingly aware of the importance of heritage in urban development strategies.<sup>37</sup> The second impetus came from the cities themselves, specifically their involvement on issues regarding the role of culture in urban development, management and governance. The ultimate objective of these volumes is to “analyse and identify tools that had been developed by site managers and decision-makers, using specific cases which were proposed by the cities and to share the skills developed by local governments.”<sup>38</sup> These 40 examples, therefore, represent an important set of good practices in the field of urban heritage and “illustrate different types of urban and heritage interventions, each associated with a theme: conservation and valorization; governance and the relation with the public; planning; development.”<sup>39</sup> These historic city case studies should serve as an invaluable resource for Turkey in creating and refining its cultural heritage preservation regime for Istanbul, its most historic city.

Aside from UNESCO, many individual nations have developed excellent online materials related to cultural heritage preservation and disaster that can inform Turkish preservation practices. Some of the most noteworthy online resources come from English Heritage, the United Kingdom's statutory advisor on the historic environment.<sup>40</sup> Given that much of the United Kingdom

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## V. Conclusi

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<sup>36</sup> United Nations Educational, Scientific and Cultural Organization, *Case Studies on the Conservation and Management of Historic Cities*, 2 vols., (October 2012). Available at: [www.whc.unesco.org/en/activities/634](http://www.whc.unesco.org/en/activities/634) (last accessed 5 December 2013).

<sup>37</sup> For instance, the World Bank has developed its own guiding principles for cultural heritage preservation which include strategies for disaster preparation, mitigation and post-disaster recovery. See A. Jha et al., *Safer Homes Stronger Communities: A Handbook for Reconstructing after Natural Disasters*, The World Bank (2010) pp. 173-179. Available at: [www.gfdrr.org/housingreconstruction](http://www.gfdrr.org/housingreconstruction) (last accessed 5 December 2013).

<sup>38</sup> See [www.whc.unesco.org/en/activities/634](http://www.whc.unesco.org/en/activities/634) (last accessed 5 December 2013).

<sup>39</sup> Id.

<sup>40</sup> [www.english-heritage.org.uk](http://www.english-heritage.org.uk) (last accessed 7 December 2013).

<sup>41</sup> “Rapid Co uk/professi reports (las

<sup>42</sup> Id.

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<sup>44</sup> *Istanbul Hi Peninsula S Plan\_0903*

and Turkey (including Istanbul) is comprised of fragile coastline that is particularly vulnerable to climate change, floods and coastal erosion, England's development of the Rapid Coastal Zone Assessment Survey (RCZAS) may be of particular interest.<sup>41</sup> Using a two-phase approach, RCZAS fill gaps in the existing knowledge of the coastal historic environment and provide an adequate baseline from which to respond to challenges like climate change or coastal erosion. The first phase uses GIS to capture data from a variety of sources (e.g., aerial photographs, LIDAR, historic maps) and create a contemporary snapshot of the coastal historic environment. The second phase is a swift walk-over survey designed to verify the GIS snapshot created in phase one, identify and characterize historic sites not visible from the air and assess the overall significance and vulnerability of the coastal environment.<sup>42</sup> The RCZAS is just one example of an online resource from England that may aid Turkey in preserving Istanbul's cultural heritage.<sup>43</sup> Undoubtedly, cultural heritage management agencies in England and other countries have a wealth of experience to share.

## V. Conclusion

As the Mayor of the Istanbul Metropolitan Municipality, Dr. Kadir Topbas, eloquently stated in his endorsement of Istanbul's World Heritage Site Management Plan, "Istanbul is the 'hope chest' of civilisations where Europe and Asia, East and West converge."<sup>44</sup> To protect this 'hope chest' from disaster (which will surely come) and preserve it for the future, innovations in cultural heritage planning and practices are necessary. Fortunately, we live in an age when technology is revolutionizing how we preserve the memories and achievements of our past from being permanently erased by disaster. Today's technology allows us to rapidly create and catalogue 3-D maneuverable images of historic sites, landscapes and objects and distribute this information instantly to a global audience. New cultural heritage preservation techniques to prepare for and mitigate disaster may also be shared worldwide with a few clicks of a button. While there is certainly no substitute for actually

<sup>41</sup> "Rapid Coastal Zone Assessment Survey Reports." Available at: [www.english-heritage.org.uk/professional/advice/advice-by-topic/marine-planning/shoreline-management-plans/rczas-reports](http://www.english-heritage.org.uk/professional/advice/advice-by-topic/marine-planning/shoreline-management-plans/rczas-reports) (last accessed 7 December 2013).

<sup>42</sup> Id.

<sup>43</sup> Another useful online resource from English Heritage is *Conservation Bulletin 57*, which discusses how cultural resources might adapt to climate change. Available at: [www.english-heritage.org.uk/publications/conservation-bulletin-57/](http://www.english-heritage.org.uk/publications/conservation-bulletin-57/) (last accessed 7 December 2013).

<sup>44</sup> *Istanbul Historic Peninsula Site Management Plan* (October 2011) p. iii. The Istanbul Historic Peninsula Site Management Plan is available at: [www.alanbaskanligi.gov.tr/files/Management\\_Plan\\_090312\\_TUM.pdf](http://www.alanbaskanligi.gov.tr/files/Management_Plan_090312_TUM.pdf) (last accessed 5 December 2013).

standing in the hallowed, holy spaces of the Hagia Sophia and marveling at its revolutionary architecture and fragile frescoes, there is also little excuse for failing to anchor the memories of Istanbul's unique heritage in digital form while we have the tools, talents and time to do so. No doubt some may balk at the price of doing this. But it is hard, if not impossible, to place a contemporary cost on preserving inherited heritage that will inspire and draw millions of people to Istanbul for centuries to come.

## Felâh Alın Kültür

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