Google Earth Shows Clandestine Worlds

Heather Pringle
THE PRISON CAMP AT THE U.S. NAVAL station in Guantánamo Bay, Cuba, has been a secretive proposition from the start. The U.S. government has never released official information on the size of the camp or the layout of its buildings. The 176 detainees still there are not permitted to speak directly to journalists.

For human-rights advocates, Gitmo is terra incognita, a place of many unknowns, and its clandestine nature and location on foreign soil have helped fuel suspicions about the treatment of detainees there. In a new study published in *World Archaeology* this week, archaeology Ph.D. student Adrian Myers of Stanford University in Palo Alto, California, strips away part of the secrecy. By analyzing a series of satellite images easily accessible on Google Earth, Myers has drawn the first independent map of Gitmo and charted its explosive growth over the past 7 years. "He has taken the archaeological eye and turned it on Google Earth images of a heavily clouded political prison," says cultural anthropologist David Price of St. Martin's University in Lacey, Washington. "And this is telling us something about what's going on at Gitmo."

Myers's analysis of the prison is one of an eclectic array of archaeological studies that use Google Earth—an inexpensive online service combining satellite images and maps—to explore concealed activities and to push the boundaries of archaeological research. Researchers are using the software to track looting on an unprecedented scale, for example, scrutinizing sites scattered across Jordan. And in war-torn Afghanistan, where ground surveys are too dangerous, Google Earth's images allow archaeologists to virtually field-walk huge swaths of terrain and survey for new sites.

Archaeologists have used satellite images since the 1980s, but the current projects would be unthinkable with expensive commercial satellite imagery, which also requires remote-sensing expertise. Google Earth doesn't work well everywhere, but in some places it is spurring archaeologists to venture into entirely new fields. The looting studies, for example, are "a great first step in raising public awareness of the problem," says archaeologist Morag Kersel of DePaul University in Chicago, Illinois, "and it shows that Google Earth can be used for a lot more than identifying your own backyard."

Myers began studying Google Earth images of Guantánamo Bay in April 2009 while gathering data for his dissertation on the archaeology of internment camps. At first, he wondered whether he would be able to see the prison, given that Google Earth gets images from private companies that are subject to laws restricting the release of images of military installations and other sensitive places. Myers expected Gitmo to be blurred out. But it wasn't. "When I navigated there," he says, "I remember saying, 'Holy crap, you can see it.'"

Myers downloaded Google Earth's high-resolution images of Gitmo taken on three dates between April 2003 and February 2008. He then loaded them into a geographical information system and identified features such as roads, guard towers, and barbed wire fences. To better interpret what he was seeing, he compared the satellite images with official ground photos of the prison and with plans he found in a leaked government report. "That was key," says Susan Wolfinger, a remote-sensing expert at the American Association for the Advancement of Science (which publishes *Science*). "That extra contextual information helps you to interpret it."

By comparing the dated satellite images, Myers traced the prison's evolution. Initially, the government built temporary plywood barracks surrounded by chain-link
fences. But as the war dragged on, it built a more permanent facility, Camp Delta, that contained structures closely resembling concrete supermaximum-security prisons. It also significantly expanded Gitmo. Over a 5-year period beginning in April 2003, the number of prison structures soared by nearly 40%; floor space expanded from 42,920 to 61,558 square meters, an increase of about 40%.

Myers thinks the makeshift prison in 2003 reveals how the U.S. military was caught off-guard by the war on terror, capturing suspects before it had prepared a prison, and that the later building boom signaled an intention to hold prisoners for a long period. Given the many questions that human-rights groups have raised about the covert prison over the years, adds Wolfinbarger, it’s somewhat surprising that an archaeologist was the first to map it: “I can’t believe that someone in geography didn’t think to do this.” (A Pentagon spokesperson declined to comment on Myers’s study and said she could not confirm that the images were of Gitmo.)

Myers argues that his study serves the public interest by creating an independent record that cannot be erased later. “These kinds of prison camps disappear really quickly when their use is up,” he says. “After the Second World War, the American government tried to strip away and bulldoze the Japanese-American internment camps.”

He notes, however, that using Google Earth images raises ethical issues. Google Inc. does not ask landowners for permission to post online satellite images of their property, including military bases. That policy could potentially violate privacy rights or jeopardize national security.

Google says it isn’t revealing anything that it shouldn’t. By law, the United States government can exert shutter control over all commercial remote sensing carried out by U.S. companies, including the ones that supply images to Google. “The government could block or alter the images if it wanted to, but it chooses not to,” says Google spokesperson Kate Hurowitz.

While Myers uses Google Earth to examine a secretive prison, others are using the technology to peer into another covert world: the illegal trade in antiquities. Archaeologists have long lacked hard data on the extent and intensity of looting worldwide, which they say makes it more difficult to persuade policymakers to take action. And in the past, attention has often focused on the plundering of single artifacts such as the Euphronios Krater, a finely painted bowl looted from an Etruscan tomb.

Noting an abundance of Jordanian antiquities in British shops, archaeologist Daniel Contreras of Stanford University and independent archaeologist Neil Brodie wanted to quantify the extent of looting in Jordan. They calculated that using commercial satellite imagery would require between $0.9 million and $2.5 million, plus considerable remote-sensing expertise. They lacked both, so they settled on Google Earth, which has imagery only in visible wavelengths but is cheap and

issue of Antiquity.

Contreras believes that Google Earth will help focus attention on the broader picture of looting. The new studies reveal the scale of the problem “that goes far beyond the loss of individual contexts,” he says. He’s now looking into the feasibility of a Google Earth crowd-sourcing project, recruiting citizens to examine online images for signs of looting.

While Contreras and others scan for looters, others are using Google Earth to search for new archaeological sites. La Trobe University Ph.D. student David Thomas put in his last field season in Afghanistan in 2005; after that, security concerns and bureaucracy prevented fieldwork. But Afghanistan has a rich past, with large areas virtually unknown to archaeologists. So Thomas decided to survey the countryside with Google Earth.

He and his small team started off by analyzing imagery of 45 known medieval sites. While they were mapping a massive fortress known as Qal’a-i Hauz—the only recorded site in Afghanistan’s Registan Desert—they decided to prospect for new sites to the north. Poring over images encompassing 1367 square kilometers, the team identified 451 possible new sites in the harsh desert, ranging from small burial mounds and single-family dwellings to deserted villages, reservoirs, and subterranean canals. The images were so clear and detailed, says Thomas, that “you could even tell the buildings that were mosques because they had a mihrab [a bulge in the western wall that contains a prayer niche] pointing toward Mecca.” Their work was published in the Aerial Archaeology Research Group News in 2008.

Thomas’s team now needs to ground-truth and date the sites. But already, he says, the project has demonstrated the importance of surveying deserts and other inhospitable regions. Although Google Earth images can’t be used everywhere—the image resolution varies from place to place, and some images just show thick cloud cover—he considers them a cheap and effective way to search for sites in Afghanistan. “I think the potential is huge,” he concludes. “There are 46,000 square kilometers of high-resolution Google Earth images for Afghanistan, and all we’ve done is look at less than 1% of that.”

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