Archaeologist uses computers and satellite images to search for early human settlements

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A Harvard archaeologist has dramatically simplified the process of finding early human settlements by using computers to scour satellite images for the tell-tale clues of human habitation, and in the process uncovered thousands of new sites that might reveal clues to the earliest complex human societies.

As described in a paper published March 19 in the [Proceedings of the National Academy of Sciences](), Jason Ur, the John L. Loeb Associate Professor of the Social Sciences, worked with Bjoern Menze, a research affiliate in MIT's Computer Science and Artificial Intelligence Laboratory to develop a system that identified settlements based on a series of factors – including soil discolorations and the distinctive mounding that results from the collapse of mud-brick settlements.

Armed with that profile, Ur used a computer to examine [satellite images]() of a 23,000 square-kilometer area of north-eastern Syria, and turned up approximately 9,000 possible settlements, an increase of "at least an order of magnitude" over what had previously been identified.

"I could do this on the ground," Ur said, of the results of the computer-aided survey. "But it would probably take me the rest of my life to survey an area this size. With these computer science techniques, however, we can immediately come up with an enormous map which is methodologically very interesting, but which also shows the staggering amount of human occupation over the last 7,000 or 8,000 years.

"What's more, anyone who comes back to this area for any future survey would already know where to go," he continued. "There's no need to do this sort of initial reconnaissance to find sites. This allows you to do targeted work, so it maximizes the time we have on the ground."

More information: "Mapping patterns of long-term settlement in Northern Mesopotamia at large scale," by Bjoern H. Menze and Jason A. Ur, *PNAS*.

Provided by Harvard University