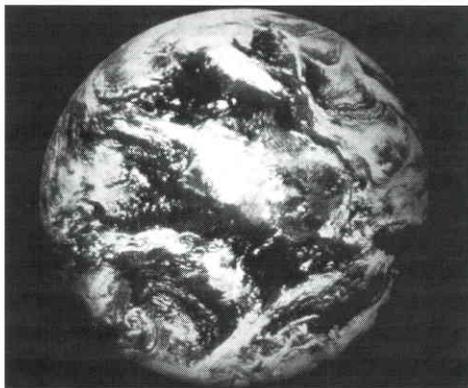# The Ancient Maya as Seen from Space!

It's a jungle out there! Ancient ruins can be just a few feet away and yet totally obscured from sight by the thick overgrowth of centuries. From the air, only the tops of pyramids protrude above the dense rain forest of Guatemala. But "space age" archaeologists are changing this!

In 2004, archaeologist William Saturno (University of New Hampshire) and a team of NASA scientists tested the latest satellite technology to penetrate the dense jungle in the greater area around San Bartolo in northern Guatemala. We reported in glyph notes (November/December 2004 and January/February 2005) on the symposium on this site and Saturno's unprecedented 2001 discovery of the oldest intact murals in the Maya area. At those meetings, we also first learned of his initial test results identifying color variations of plant material in satellite images. They were seeing a contrast of dark trees and foliage with lighter areas. Using the satellite images1, they walked into the jungle and found previously unknown ancient Maya settlements that exactly matched the lighter areas in the images! They concluded that this was not mere coincidence. What was causing the vegetation signature?

A simplified explanation relates to the latest satellite photography, which captures the highest resolution in both visible and near-infrared spectrums to one meter scale. The "signature" of ancient habitation becomes obvious in the color variations of the vegetation, not apparent on the ground to the naked eye. The cause of these variations is directly linked to the excavated limestone and lime plaster used by the Maya in building their structures. As they deteriorated and leached into the soils, the chemical makeup was apparently altered, contributing to the type of foliage growing as well as nutritional differences in trees. A change in the environment was created, providing a fingerprint of past civilization visible today from space.

Last month (March 2006), William Saturno reported at the Maya Meetings in Austin, Texas, that new areas of the San Bartolo site were subsequently explored using satellite imagery. A large number of structures were discovered east (from the mural group) across the arroyo, on top of the hill, greatly expanding San Bartolo proper. Additional satellite photos shown at the Maya Meetings showed the telltale coloration of the ancient Maya occupation throughout a larger area, helping to place the site in context with the region.

The results at San Bartolo are only part of the story. NASA announced in February 2006 that following the initial field test at San Bartolo in 2004, expanded application of this technology has resulted in the discovery of numerous Maya ruins from space around Tikal and Palenque. NASA continues it's commitment to revisit Guatemala each year through 2009 under a Space Act Agreement with the University of New Hampshire, with the support of the Guatemala Institute of Anthropology and History, and the Department of Pre-Hispanic Monuments.

We look forward to even more astounding results when you realize that other than major sites, most of the areas have not even been explored on the ground. This carries profound implications for an overall view of Maya settlement patterns, identifying both small and large areas, as well as those not used by the Maya—all without cutting down trees. The potential for this technology is truly explosive!

Shirley R. Heater

1 Remote sensing and satellite imaging is not new. As early as the 1960s aircraft photos were used to reveal crop stress and predict corn blight. I worked at Lockheed/NASA in Houston in the 1970s in the Data Bank Department which housed thousands of these remote sensing photos. And since that time, we've all seen photos of polluted rivers and lakes exposed in multicolor satellite images. In archaeology, photos of raised fields in the Maya area also revealed the use of intensive agriculture! Tom Sever, NASA archaeologist, has been using satellite imagery to monitor changes in the Peten jungle since the 1980s and recognized the potential for identifying archaeological sites and features.