Lidar in Mesoamerica since 2016: Acquisition, Ownership, and Accessibility

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In 2016, we were privileged to edit a special section in Advances in Archaeological Practices on lidar in Mesoamerica and are delighted that the editors of AAP have invited us to provide an update to that special section in this blog. At that time, lidar acquisition was still uncommon, with only a handful of projects being fortunate enough to acquire the data that was revolutionizing settlement studies in tropical areas like Mesoamerica. Since 2016, many studies covering large areas in excess of 100 km2 have followed (Golden et al. 2021; Inomata et al. 2018; Ringle et al. 2021; Šprajc et al. 2021; Stanton et al. 2020; Sugiyama et al. 2021), including the major lidar acquisition funded by Pacunam in Guatemala, with phase one covering 2144 km2 in 2016 (Canuto et al. 2018). To alleviate a bias in lidar collection due to the prohibitively high cost of flying small scale surveys, NCALM (National Center for American Laser Mapping), funded by NSF (National Science Foundation), initiated a small project grant program, which allowed seven research projects to acquire smaller areas of coverage ranging in area from 10-30 km2: three in Belize, two in Guatemala, one in Mexico, and one in El Salvador. Several recent studies also have made use of publicly available data from INEGI and Nasa’s G-LIGHT (Inomata et al. 2021; Kokalj and Mast 2021; Ruhl et al. 2018; Schröder et al. 2020).

However, despite the increase in coverage, equity in acquisition, ownership, and accessibility of lidar have not become easier since 2016 in Mesoamerica. We have recently participated in two forums that focused on these issues, Chase in the special collection of papers in the Journal of Computer Applications in Archaeology (2020) and Reese-Taylor in an ethics forum in the Earth Archive Congress (2021). We represent just two of the voices that have grown exponentially to call for more ethics and oversight in archaeological lidar prospection.

While many issues have been raised, ownership may be one of the most imperative. Ownership refers to people or institutions that, first, hold a special interest in lidar and data derived from the lidar, and second, the ownership of the land, resources, and elements captured in lidar data. Given that the vast majority of lidar for archaeological purposes is acquired by researchers from the global north, a digital elitism has emerged (Cohen et al. 2020). Adding to this issue is the fact that to date, no government agencies in Mexico, Guatemala, or Belize have formal written policies that clearly articulate ownership rights and accessibility privileges. Given that lidar data does not only reveal heritage features, but also private homes and businesses, public facilities and infrastructure, along with geographic and environmental data, creating these policies would, no doubt, involve multiple agencies. Yet, government agencies can develop such policies and best practices, this would ignore two significant problems.

One concerns the rights of local residents, including many indigenous communities. Do individuals that live and work on the lands captured by lidar prospection have “moral”
rights to own and control the data? Should local residents have the ability to stop lidar prospection due to privacy concerns? Given that lidar collection can take place from far above the earth’s surface, any proscriptions become problematic (similar to “google earth” or “street view”).

Another involves collaboration with colleagues in countries lacking large funding agencies and technological support. How can the playing field be leveled so that these researchers have the same opportunities to acquire and use lidar in their studies? Is open access the answer and who decides? Because of computer and software costs, open access still privileges use by the global north and is not currently the policy in Belize or, apparently, in Guatemala. Some countries, like Belize, prohibit open access because of concerns about heritage preservation.

None of these questions have easy answers and many obstacles exist in our current institutional and funding models that undercut potential solutions. However, a fresh generation of archaeologists are pushing the ethical boundaries of lidar acquisition/ownership, just as they are the analytical boundaries of remote sensing (see Chase 2021). They are challenging all of us to be active allies and enter dialogues, not only with governments and academic institutions, but also with local communities. Realistically, such issues are beyond the scope of researchers alone; they need to be discussed and promulgated by the countries in which the lidar is being used and placed within broader policy contexts. We are optimistic that these conversations and their ensuing actions can help us achieve the equity and inclusion that is the future of our discipline.
Access to associated research Progression and Issues in the Mesoamerican Geospatial Revolution (by Arlen F. Chase, Kathryn Reese-Taylor, Juan C. Fernandez-Diaz and Diane Z. Chase) is free until the end of June 2022.
About the authors

Kathryn Reese-Taylor has taught archaeology in the Department of Anthropology and Archaeology at the University of Calgary since 2000. Although she maintains broad interests in early complex societies, her principal research focuses on landscape archaeology, urbanism, and the development of complexity in the Maya lowlands. Reese-Taylor has directed archaeological projects in the Belize, Guatemala, and Mexico and published numerous articles, chapters, and reports, often with collaborators and students. Her current project is a multidisciplinary program of research located in southern Campeche centered in the region surrounding an extensive wetland, the Bajo Laberinto. Since 2014, she has analyzed remote sensing imagery, including lidar, to assess landscape modification, urban development, and population dynamics in the Central Karstic Uplands.

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