Brief Data Collection & Processing Report
2018-12_Inomata_MX_MiddleUsumacinta Tabasco, Mexico
PI: Takeshi Inomata - inomata@arizona.edu
School of Anthropology -University of Arizona
Report Version 1.1 (20200511)

Data Collection Summary:

Collection Dates, # Flights:	Eight flights, June 9-18, 2019 (DOY: 160-168)
Aircraft, Equipment:	Piper Navajo PA-31-350 (Tail No. N640WA), LIDAR: Optech Titan (14 SEN/CON 340)
Flight Plan Parameters:	Flying Height: 650 m AGL, Swath Width: 750 m, Overlap: 50%, Line Spacing: 690 m
Equipment Parameters:	PRF: 150 kHz, Scan Frequency: 26 Hz, Scan Angle: ± 30° ± 2°
Planned Laser Pulse Density:	Mean 15 pulses/m²
Requested/Collected Area:	743 / 911.5 km² (collected area computed from DEM filled nodes. P01 47.9/71.6, P02 138/174.2, P03 254/295.9, P04 182.4/222.3, P05 100.8/110.1, P06 7/16.6, P07 12.9/20.8. See Figure 1 for polygon numbering.

GNSS Reference Station Summary:

1.	NCALM_Palenque	17.5116426° N, 91.99020605° W, 77.853 m - IGS-08 Epoch:2019.4458
2.	NCALM_Tenosique	17.47675716° N, 91.42541526° W, 36.737 m
3.	NCALM_Finca	17.17849346° N, 91.48578701° W, 132.497 m

Data Products Summary:

Horizontal / Vertical Datum:	IGS-08 Epoch:2019.4458 (Ellipsoidal Heights)
Projection / Units:	WGS-84 UTM Zone 15N / meters
Point Cloud Tiles:	3996 total 500 m × 500 m tiles in LAS format (Version 1.2); P01 323, P02 753, P03 1283, P04 977, P05 484, P06 75, P07 101. Classified into **ground** (class 2 using strict parameters), **close to ground** (class 8 -0.2 m < hagl ≤ 0.2 m), **building** (class 6) , **low vegetation** (class 1 based on 0.21 m < hagl ≤ 3 m), **medium vegetation** (class 3 based on 3.01 m < hagl ≤ 10 m), **high vegetation** (class 4 hagl > 10 m), **high noise** (class 18), **low noise** (7). Building classification was only performed on tiles with a high density of modern building structures.
Raster Sections	Each kind of raster data described below was generated for the seven mapped polygons. Some large polygons were broken down into smaller sections (P02, P03, P04, P05).
Bare-Earth Elevation Model:	ESRI FLT formats @ 50 cm grid spacing from classified ground returns + close to ground.
First-Surface Elevation Model:	ESRI FLT format @ 50 cm resolution based only on first returns from all channels.

A detailed summary of the equipment and processing techniques used by NCALM is included in the Data Collection & Processing Summary. Specific information on the sensor can be found in https://www.mdpi.com/2072-4292/8/11/936 and specific information regarding NCALM procedures for the collection and processing of lidar data for archeological studies can be found in https://www.mdpi.com/2072-4292/6/10/9951.

Special notes:

1. Direct validation of the lidar raster datasets elevation within the project area was conducted based on a sample of 962 kinematic GPS check points (dual frequency differential processing) collected on June 18, 2019 over the P01 AOI (near Tenosique). This validation yielded a standard deviation (precision) of 0.019 meters with a mean error (accuracy) of -0.041 meters. The vertical bias of -0.041 meters was removed from the data prior the production of the final point cloud and raster dataset.

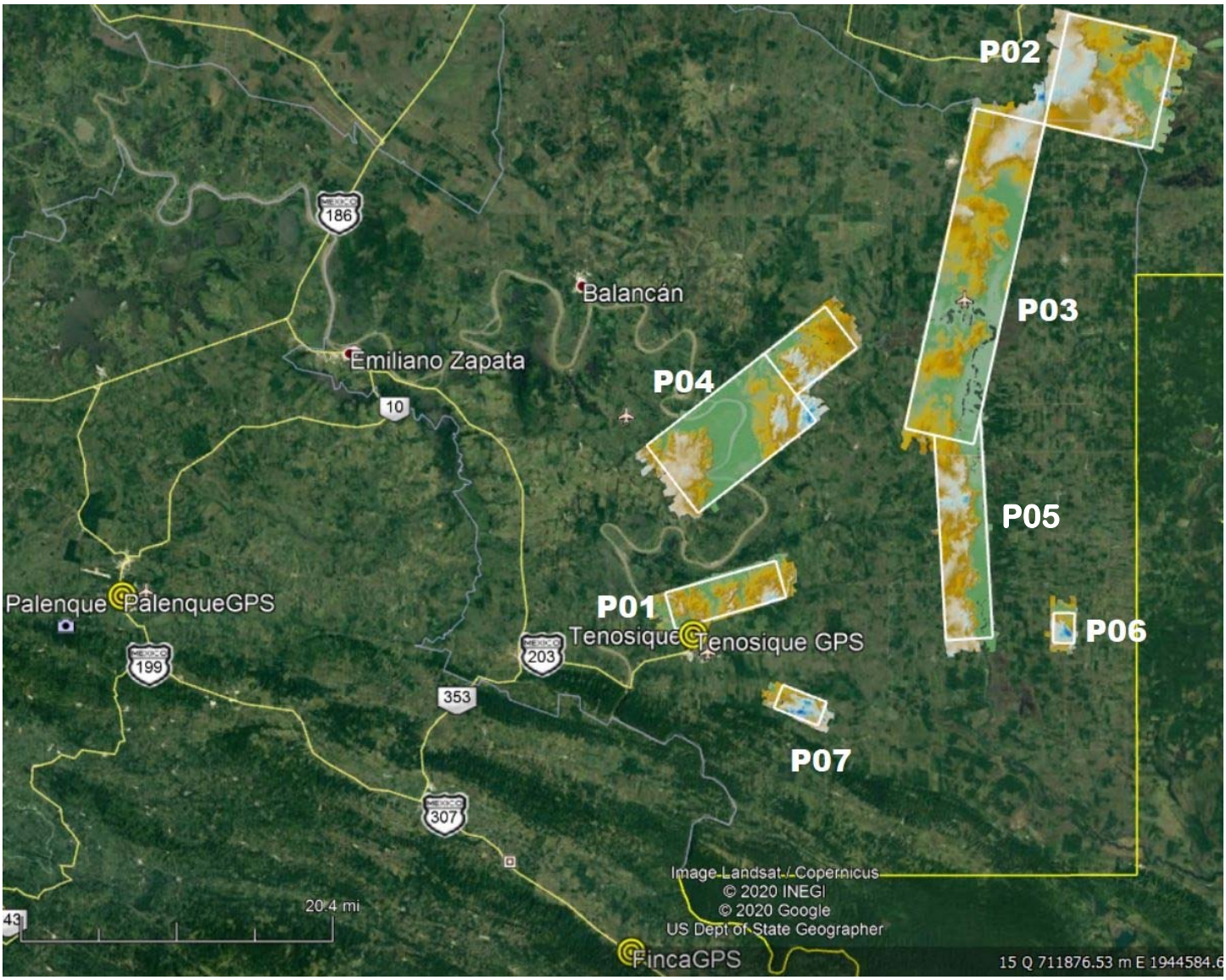

Figure 1. Mapped areas of interest (P01-P07) and location of the three GPS base stations.