Data Collection & Processing Report for LiDAR survey of transects along the Yucatan Peninsula and San Gervasio, Mexico.
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Data Collection Summary:

Collection Dates and Flights:	Five flights flown between April 29 and May 03, 2017 (DOYs 118, 119, 120, 121, 123), Flight 1 118 San Gervasio LAS Lines x01 to x09. Flights 2-5 Yucatan areas. DOY 119 LAS lines x001 to x023, 120 LAS lines x024 to x047, 121 LAS lines x048 to x068, 123 LAS lines x069 to x072. Where x corresponds to the channel number (1,2, or 3).
Aircraft and Equipment:	Piper PA-31-350 Navajo Chieftain (N640WA), Optech Titan MW (14SEN/CON340)
Flight Plan Parameters:	Flying height: 550 m AGL, Swath width: 280 m, Overlap: 50%, Line spacing: 140m
Equipment Parameters:	PRF: 175 kHz per channel (525 kHz total), Scan Frequency: 29 Hz, Scan Angle: ± 27°, 2° cut-off in processing. Nominal Laser Shot Density 21 shots/m².
Requested / Collected Area:	266.6 / 388.9km²

GNSS Reference Station Summary:

Flight(s)	Station	Latitude	Longitude	Ellipsoidal Elevation (m)
F1	MMCN	21.03283	86.86291	-4.837
F1	Cancun	21.02646	86.81134	-9.089
F2, F3	Chichen	20.67919	88.56867	20.079
F2, F3	COBA	20.49153	87.73342	-5.106
F3	Tulum	20.21773	87.43742	-5.93
F4	Tulum	20.21783	87.43708	-5.81
F4	Cancun	21.02648	86.81135	-8.954
F5	Tulum	20.21786	87.43729	-5.914

Data Processing Summary:

Horizontal / Vertical Datum:	IGS08 (EPOCH:2010.0000) / WGS84 Ellipsoid Heights
Projection / Units:	UTM Zone 16N / meters
Point Cloud Tiles:	500 m × 500 m tiles in LAS format (Version 1.4), classified as default, ground, low medium, and high vegetation. 60 tiles for San Gervasio and 2079 for Yucatan.
Raster Sections	To optimize hard drive space and memory usage the DEM, DSM and hillshade rasters were broken down into 13 sections (See Figure 1, Table 1).
First Surface Elevation Model:	ESRI FLT format @ 50 cm resolution from first returns detected on channel 2 (1064 nm, nadir looking).
First Surface Hillshade:	ESRI-created raster @ 50 cm resolution from the .flt DSM using illumination parameters (315° Az, 45° Elev).
Bare-Earth Elevation Model:	ESRI FLT format @ 50 cm resolution from classified ground-class points from all channels.
Bare-Earth Hillshade:	ESRI-created raster 50 cm resolution from the .flt DEM using illumination parameters (315° Az, 45° Elev).

Conventions followed:

Flight Line Numbering:	The flight number assigned to each of the returns contained on the .LAS tiles has been encoded with four digits #### (i.e. 1012). Where the first digit corresponds to the Titan Channel (1: 1550, 2: 1064, 3: 532 nm) and the next three digits correspond to the sequential order of each flight strip ranging from 001 to 064. Note for the San Gervasio point clouds the flight number were encoded with only 3 digits.
PC Tile Naming:	The 500 m tiles follow a naming convention using the lower left coordinate (minimum X, Y) as the seed for the file name as follows: XXXXXX_YYYYYYY. For example if the tile bounds coordinate values from easting equals 556000 through 556500, and northing equals 3769000 through 3769500 then the tile filename incorporates 556000_3769000.

ArcGIS Products Naming:	Due to the limited number of characters that can be used for ArcGIS data products the following format was followed: **NNNN_S_TWR##**. Where "NNNN" correspond to the 4 letter identifier for the project area; the sixth character "S" in an indicator for the project section area; the eight character "T" represent the type of raster and it can be an "G" for a grid or "H" for a hillshade; the ninth character "W" represent what kind of data was used to create the raster and it can be an "E" for elevation or an "I" for intensity; the tenth character "R" represents the type of return that was used for creating the raster and could be a "F" for First return or "G" for ground return, the last two characters "##" represent the raster resolution in decimeters.

A detailed summary of the equipment and processing techniques used by NCALM is included in the Data Collection & Processing Summary.

A peer reviewed paper with a description and capability assessment of the instrument used to collect these data can be found at: http://www.mdpi.com/2072-4292/8/11/936.
Capability Assessment and Performance Metrics for the Titan Multispectral Mapping Lidar. Remote Sens. 2016, 8, 936.

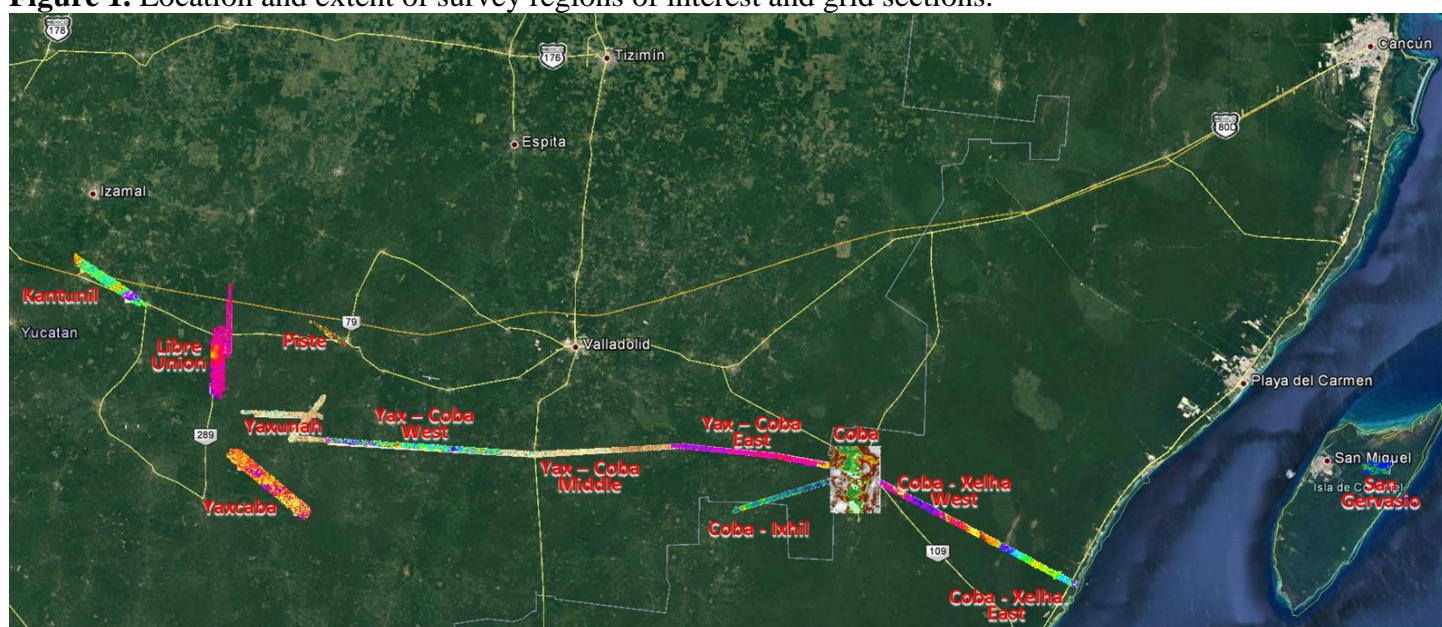**Figure 1.** Location and extent of survey regions of interest and grid sections.

Table 1. Extent and covered area of the different raster sections

Raster Name	X Min	X Max	Y Min	Y Max	# Filled Nodes	km²
SGer_O_GEF05	513498	519002	2265498	2268502	38567250	9.641
Coba_GEF05	419498	428502	2258998	2271002	412473077	103.118
CbIx_GEF05	401998	419502	2258998	2265502	58576246	14.644
CbXh_W_GEF05	428498	446002	2254498	2265002	82236561	20.559
CbXh_E_GEF05	445498	463002	2245998	2256502	85432595	21.358
YxCB_E_GEF05	390998	419502	2266998	2271502	101882980	25.471
YxCB_M_GEGF05	360998	391502	2268498	2271502	107748302	26.937
YxCB_W_GEF05	329998	361502	2268998	2272502	115764888	28.941
Yaxun_GEF05	315498	330502	2271498	2280002	109933081	27.483
Yaxca_GEF05	312998	328002	2257998	2270502	174768973	43.692
LibUn_GEF05	309998	314002	2278998	2299502	154561234	38.640
Piste_GEF05	327498	334002	2288498	2293502	23084934	5.771
Kantu_GEF05	285998	299002	2295498	2305002	98319079	24.579