APT Committee

From: Daniel Sereno <Daniel.Sereno@co.maui.hi.us>
Sent: Tuesday, March 16, 2021 9:19 AM
To: APT Committee
Subject: LiDAR Presentation Slide Show for 3/16/2021
Attachments: LiDAR.pptx

Please see attached.

Mahalo!

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LiDAR

Light Detection And Ranging

Dr. Janet Six

Mr. Dan Sereno

DEFINITION

- Lidar, which stands for *Light Detection and Ranging,* is a remote sensing method that uses light in the form of a pulsed laser to measure ranges (variable distances) to the Earth. These light pulses—combined with other data recorded by the airborne system — generate precise, three-dimensional information about the shape of the Earth and its surface characteristics. (NOAA. What is LiDAR? National Ocean Service Website, https://oceanservice.noaa.gov/facts/lidar.html, 02/26/2021)
- A lidar instrument principally consists of a laser, a scanner, and a specialized GPS receiver. Airplanes and helicopters are the most commonly used platforms for acquiring lidar data over broad areas. Two types of lidar are topographic and bathymetric. Topographic lidar typically uses a near-infrared laser to map the land, while bathymetric lidar uses water-penetrating green light to also measure seafloor and riverbed elevations. (NOAA. What is LiDAR? National Ocean Service Website, https://oceanservice.noaa.gov/facts/lidar.html, 02/26/2021)

WHAT CAN LIDAR BE USED FOR?

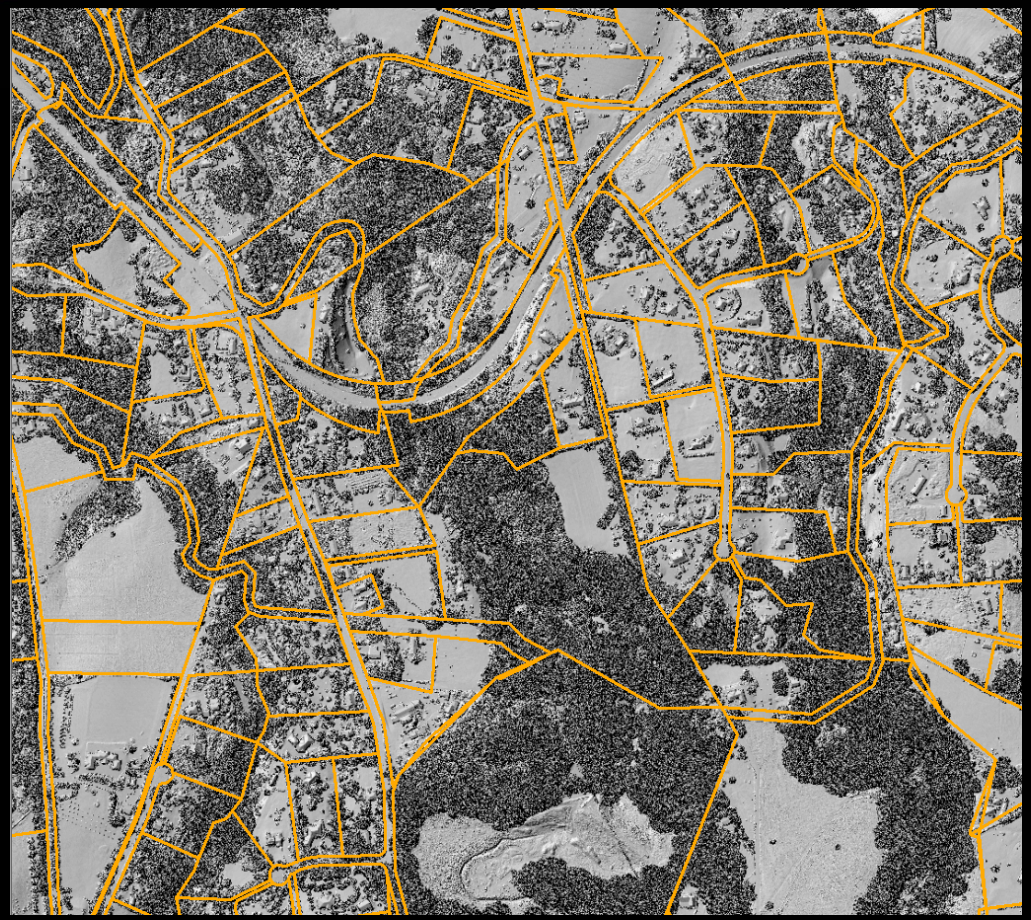
- LIDAR can also be used in any situation where the structure and shape of Earth's surface needs to be known... Its versatility and high resolution give it applications in archaeology, climate monitoring, city planning, meteorology, mining, and much more. (https://www.americangeosciences.org/critical-issues/faq/what-lidar-and-what-it-used, 2021)

WHAT CAN THE COUNTY OF MAUI USE LIDAR FOR?

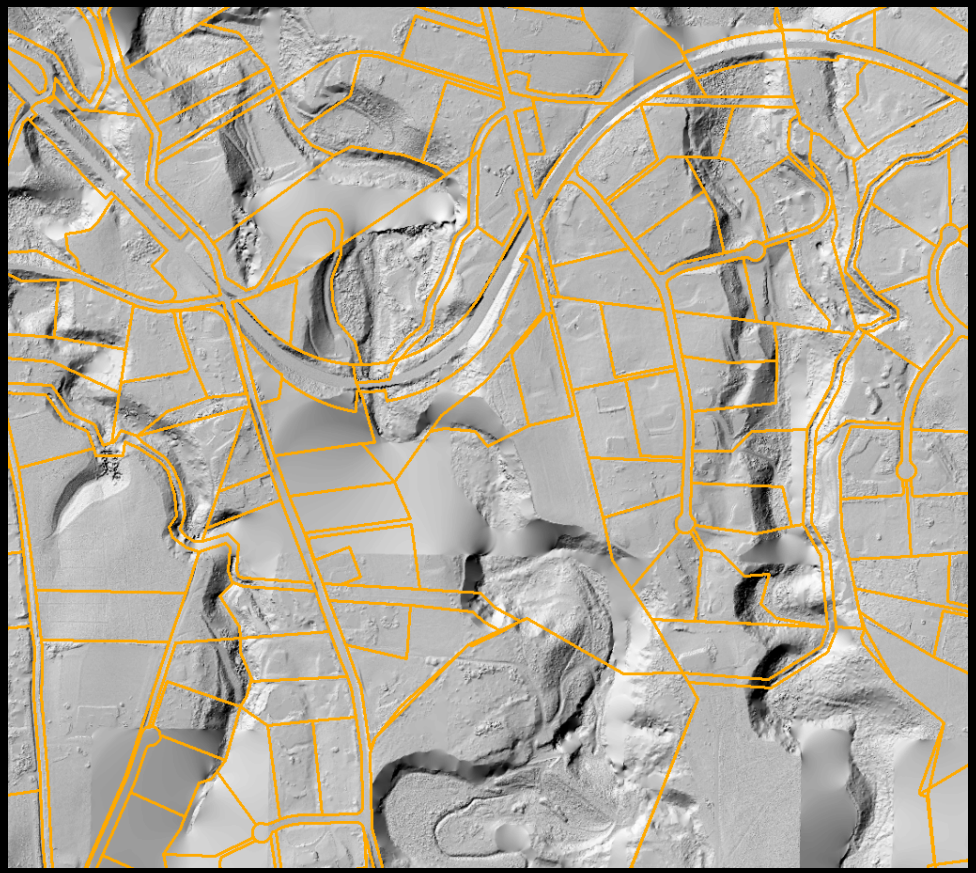
- Archaeological studies (Dr. Janet Six)
- Post-event assessment/analysis, i.e. after brush fire what structures, etc. may be revealed/accessible?
- Post-event restoration, i.e. if we have to create a fire break, what did the surrounding landscape look like before so we know how to restore it as close a possible to pre-event condition?
- Volumetric beach/coastal morphology change detection, how much sand was lost during a storm/event, or over the last 5 years?
- Creation of elevation maps
- Creation of slope maps used for designing water and wastewater infrastructure
- Viewshed/sound wave analysis, i.e. does my lanai have an ocean view?
- Flooding/sea level rise analysis, what buildings or coastal properties will be affected by a flood or sea level rise?
- Vegetation growth/change/monitoring
- Road sign inventory and maintenance
- Road pavement and striping condition assessment
- Dune, or other geological formation, monitoring
- Landslide analysis and prediction
- Urban survey, modeling, and planning
- Many, many more uses…

VISUAL SPECTRUM PHOTOGRAPHY (PICTOMETRY) OF THE KAUPAKALUA AREA WITH TAX PARCELS

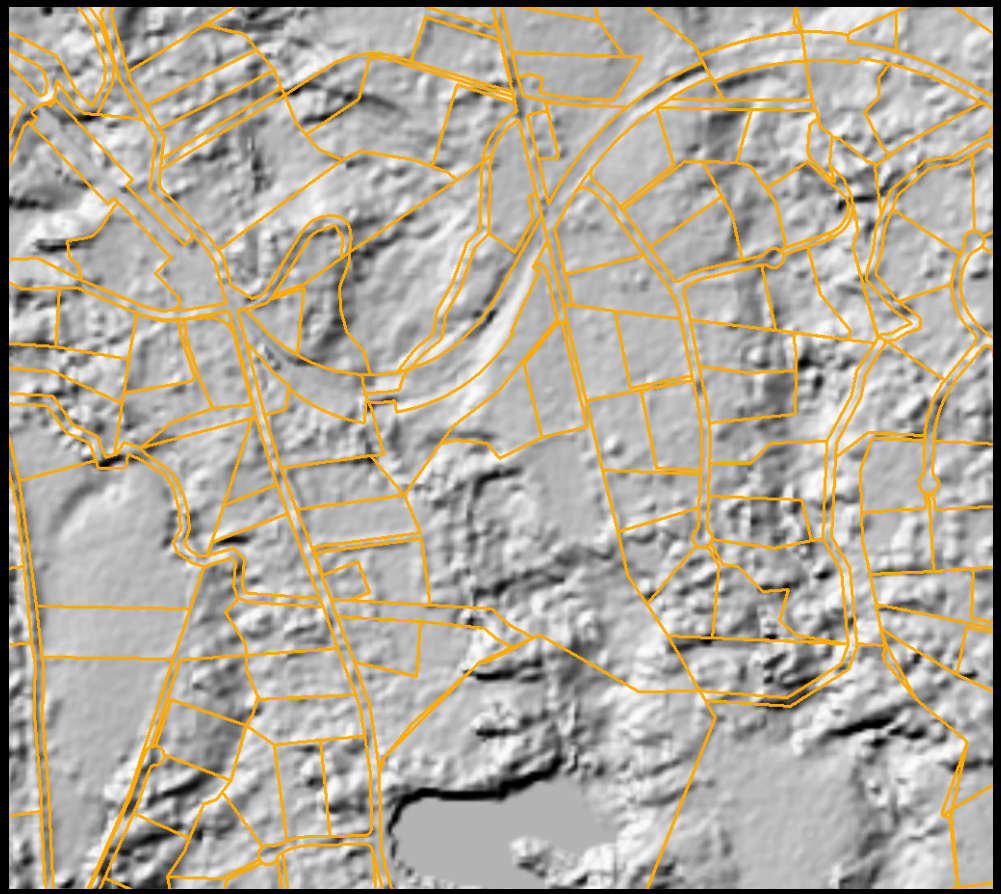
SURFACE MODEL LIDAR, SHOWING ROOFTOPS, CARS, AND VEGETATION IN THE KAUPAKALUA AREA WITH TAX PARCELS



BARE EARTH LIDAR, SHOWING THE GROUND BENEATH VEGETATION, A RIVER BED AND OTHER GROUND ANOMALIES IN THE KAUPAKALUA AREA WITH TAX PARCELS



BARE EARTH FROM IFSAR (INTERFEROMETRIC SYNTHETIC-APERTURE RADAR) SATELLITE OF KAPAKALUA AREA.
NOTE: SIGNIFICANT REDUCTION IN RESOLUTION.



CURRENT LiDAR DATASET COVERAGE