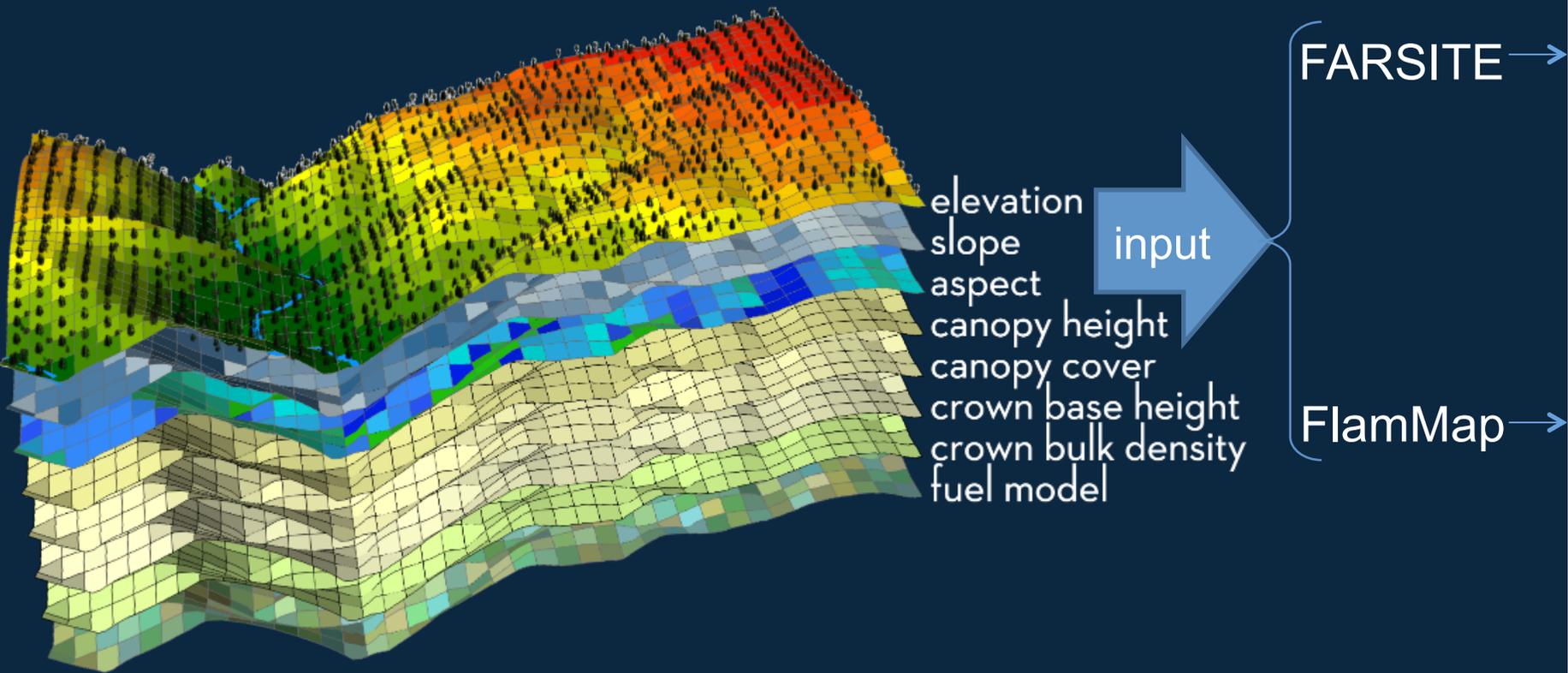
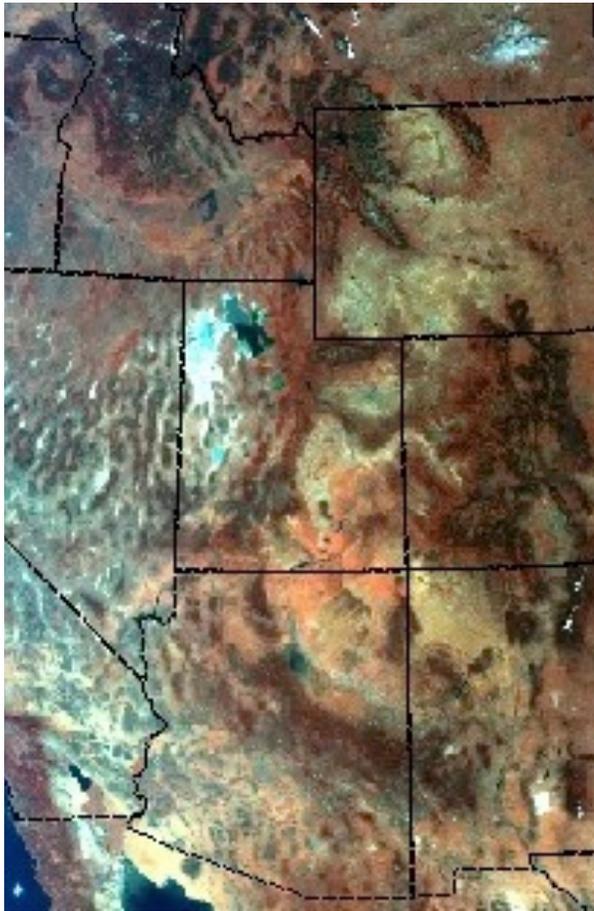


How can we model fire behavior in the forest?

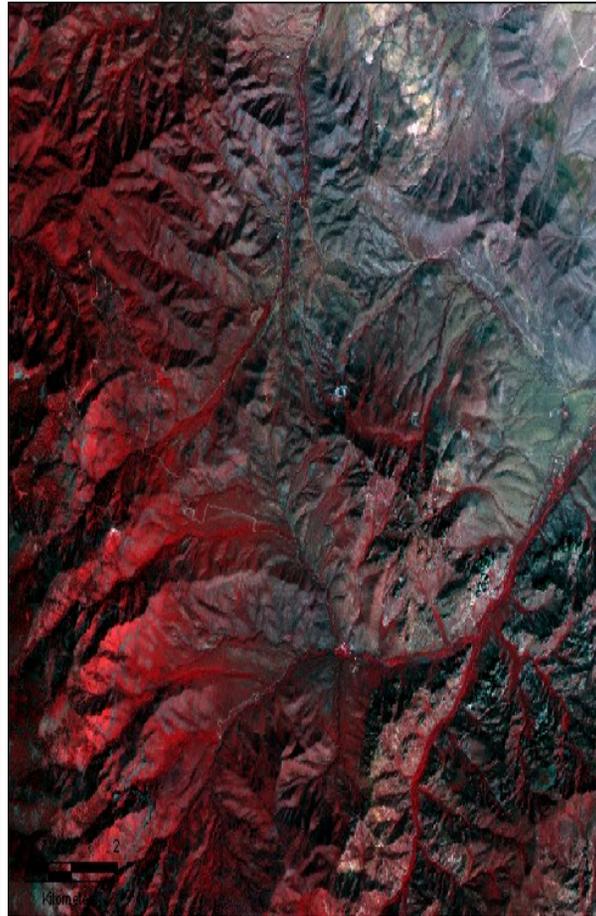




Optical Remote Sensing: the View from Overhead



...MODIS
..1km

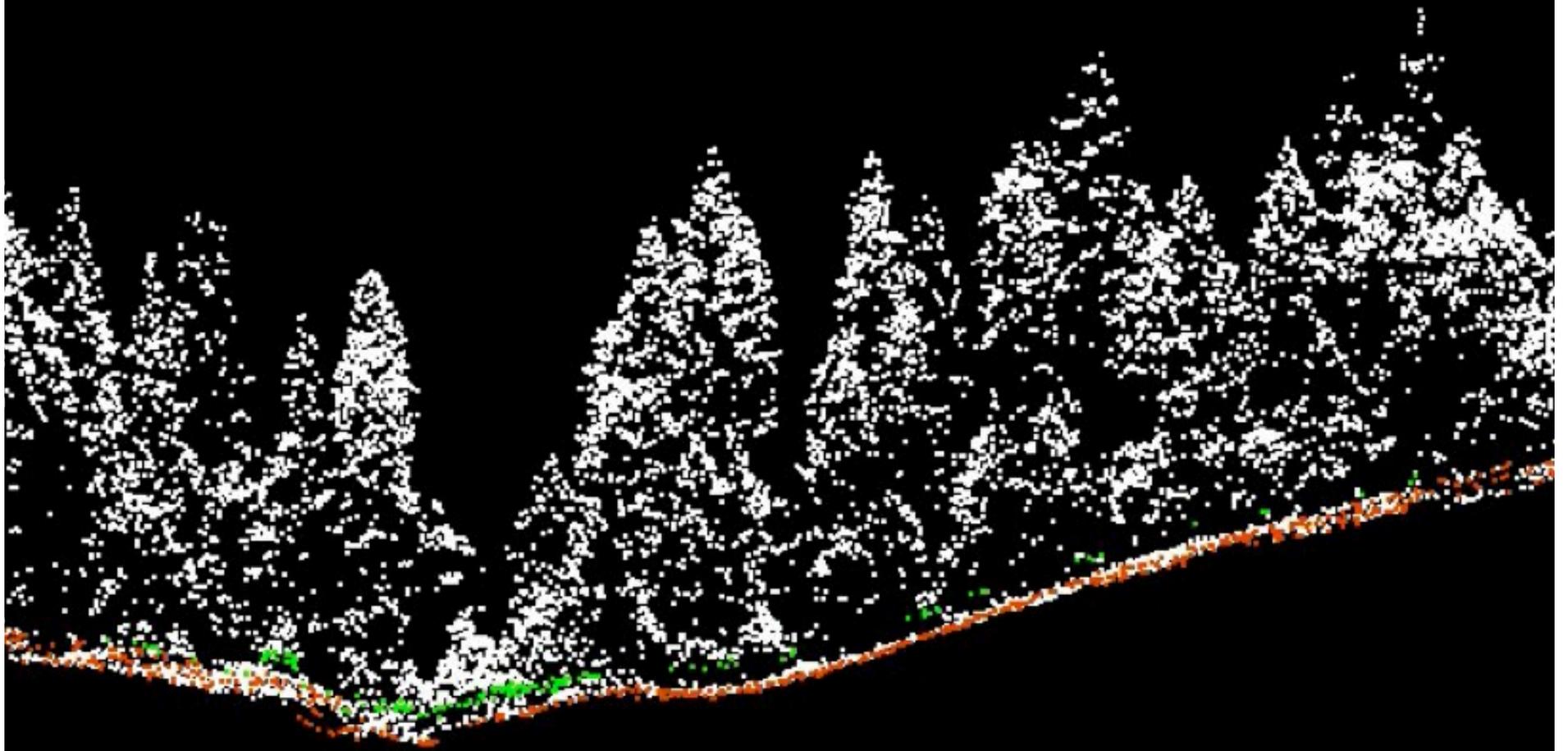


Landsat
30m



Orthophotography...
1m..

...But with optical remote sensing, we can't get much about the vertical structure in forests...



LiDAR = Light Detection And Ranging



how does it work?

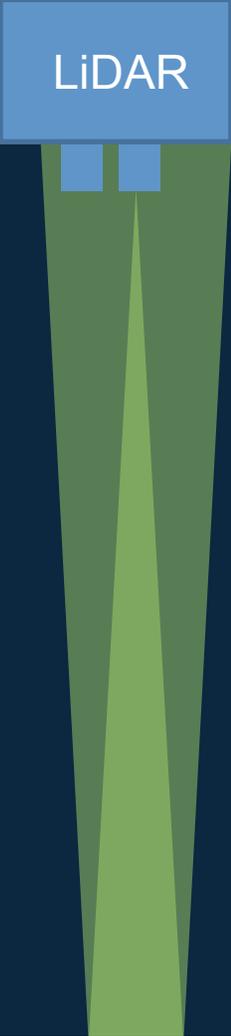


*amplitude of
ected signal*

t

how does it work?

LiDAR

A diagram showing a blue rectangular box labeled "LiDAR" at the top. From the bottom of this box, a narrow, vertical green beam of light extends downwards. The beam is wider at the top and tapers as it goes down. At the very bottom of the beam, there are two small blue rectangular shapes, possibly representing a sensor or a target. The background is a dark blue gradient.

*amplitude of
ected signal*

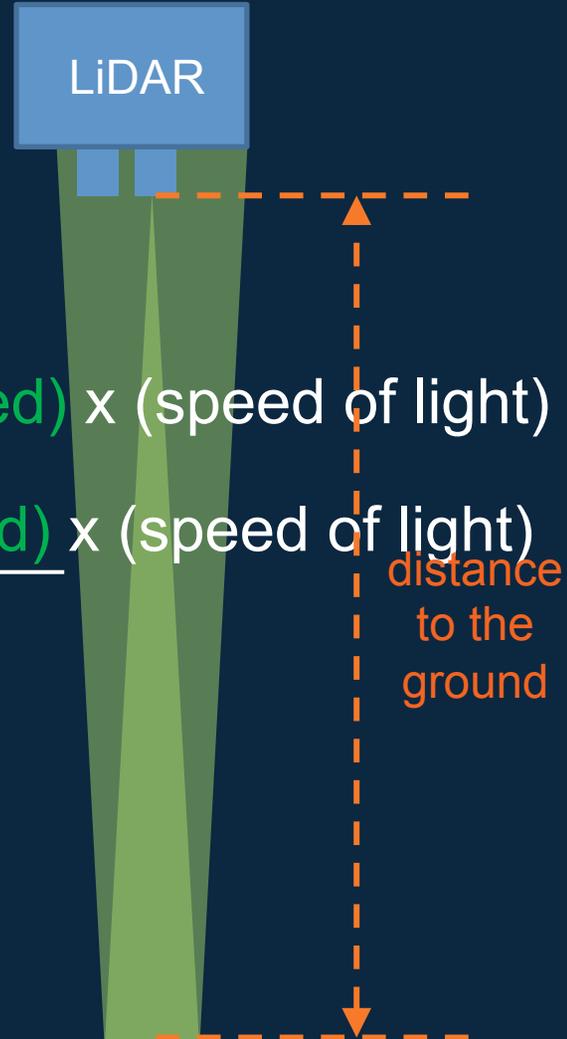
t

how does it work?

distance = time x speed

total *distance* traveled = (total *time* traveled) x (speed of light)

distance to the ground = $\frac{(\text{total } \textit{time} \textit{ traveled}) \times (\text{speed of light})}{2}$



what about multiple returns?

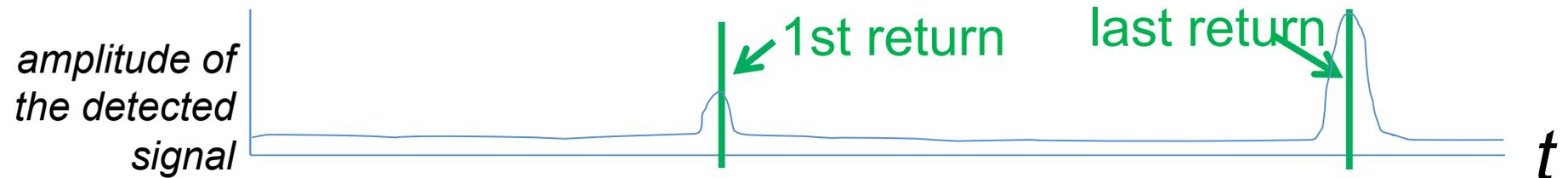
LiDAR



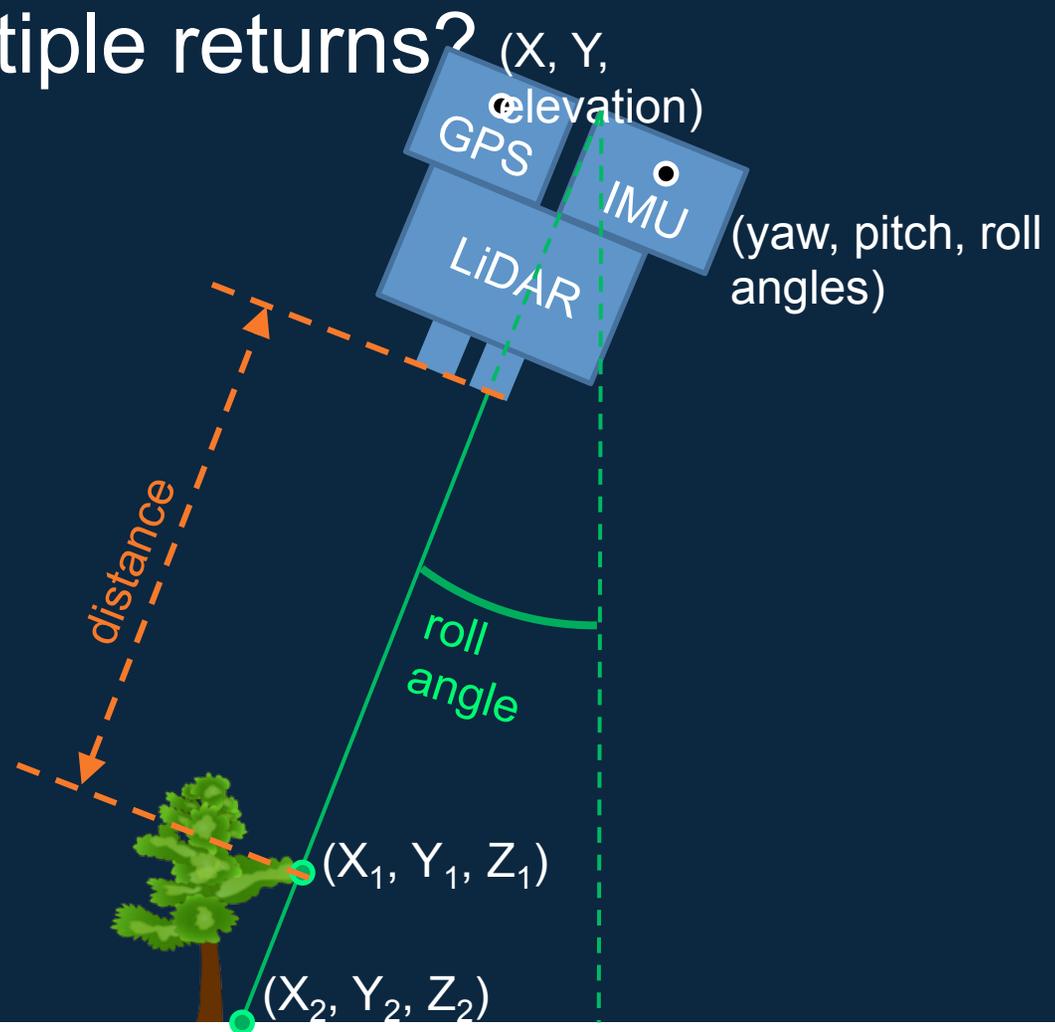
*amplitude of
ected signal*

t

what about multiple returns?

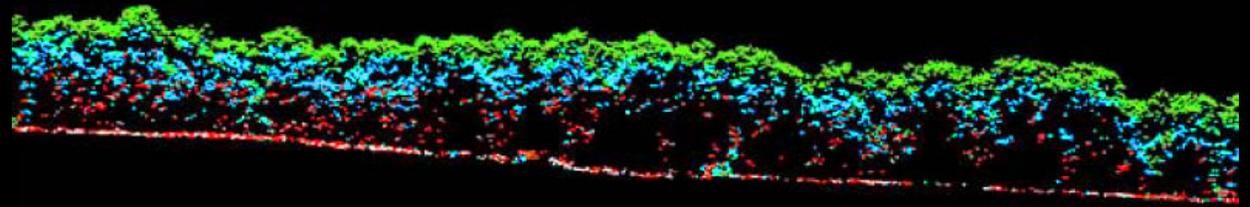


what about multiple returns?

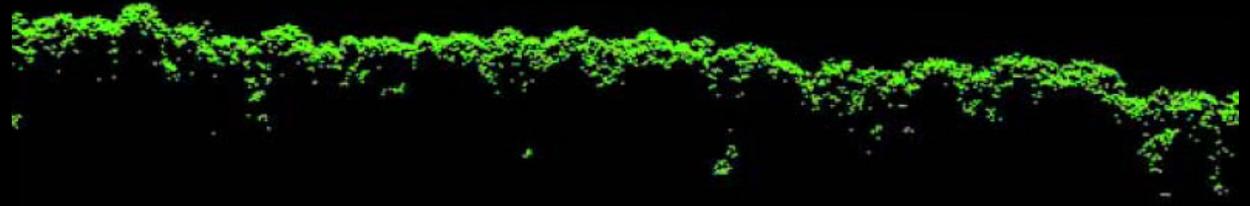


Discrete Lidar yields multiple returns

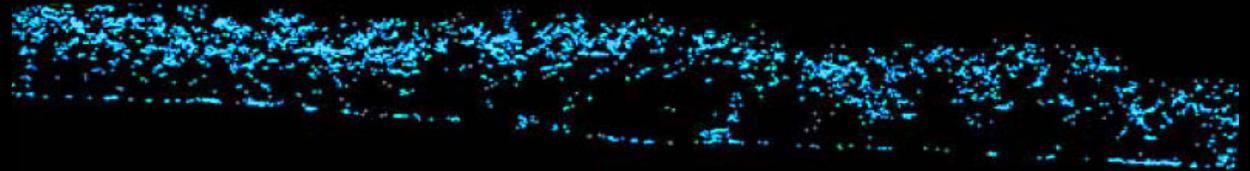
all returns



first returns



second returns



third returns



last returns



Lidar Data Products

Individual Trees

- Isolated from the point cloud, containing location, height, diameter

CHM – Canopy Height Model

- Height information about vegetation *features with elevation removed*

DSM – Digital Surface Model

- Elevation information about *all features* in the landscape, including vegetation, buildings and other structures

DTM – Digital Terrain Model

- Elevation information about bare-earth surface *without the influence of vegetation or man-made features*

