

LiDAR

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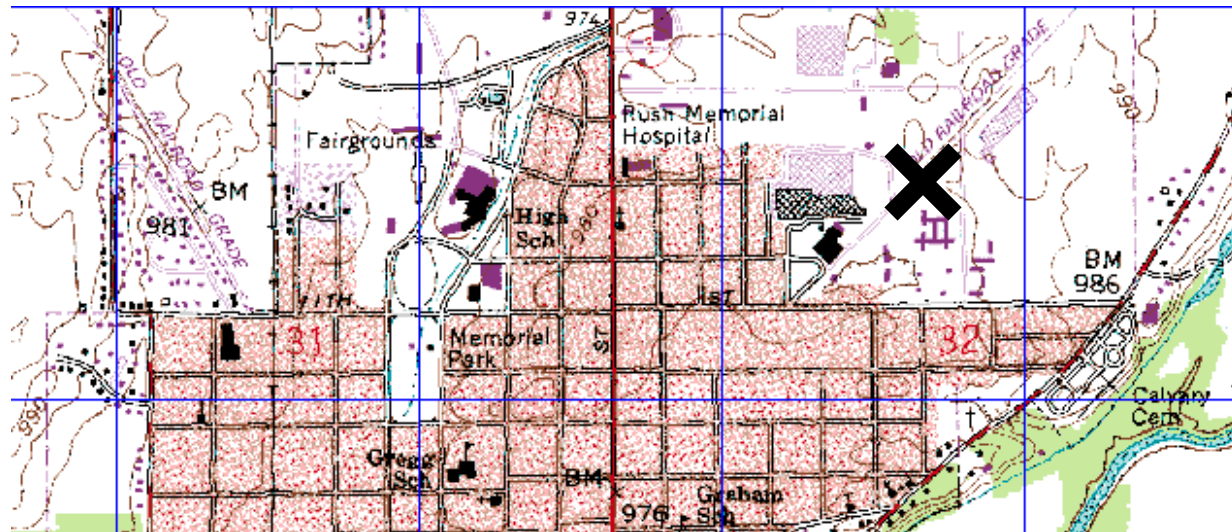
**Williams
Aerial &
Mapping, Inc.**
Photogrammetry & Geospatial Data

Special Thanks to:

Kucera International, Inc.

Williams LiDAR partner for Indiana DNR

X –Marks the spot



“X” may mark the spot on the map where the treasure is buried....

but if “X” is not placed accurately you may never find the treasure.

The equipment

Cessna 310 Aircraft
Sensor
Up to 200khz
Flight management

Many times LiDAR is flown at night

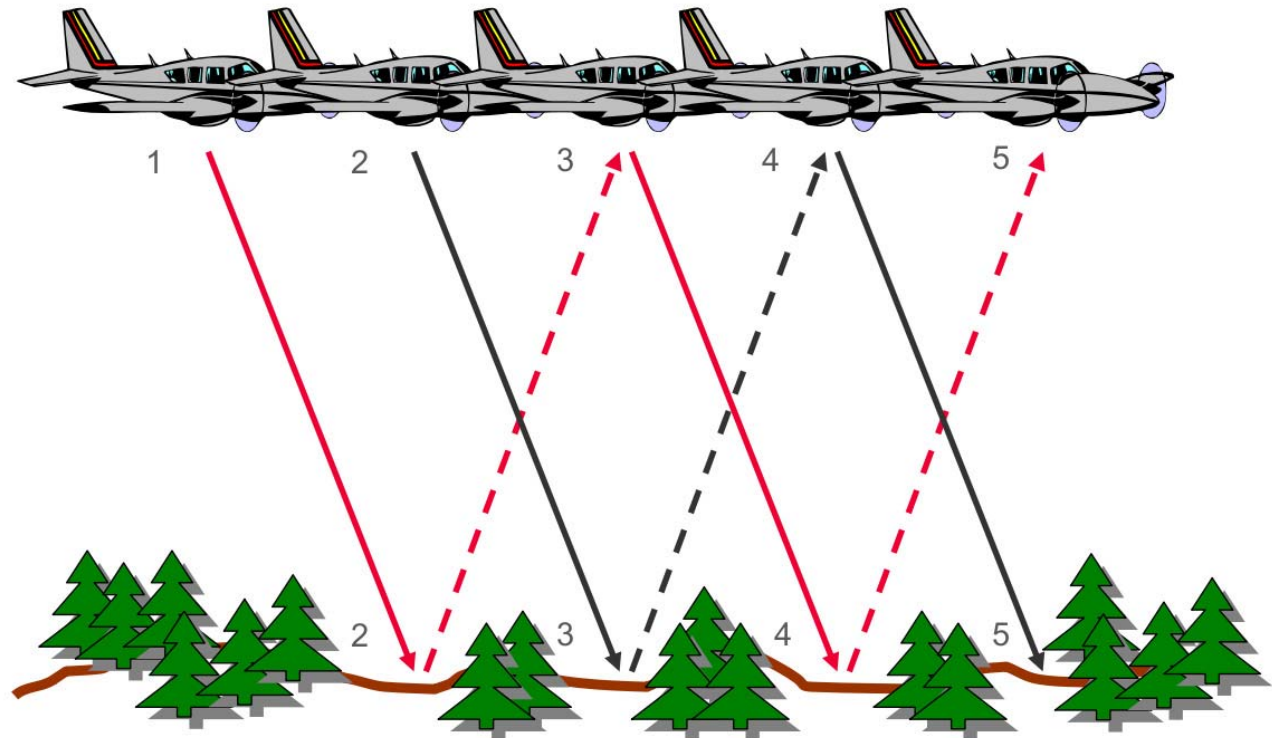


Multiple Pulse in the air (MPiA)

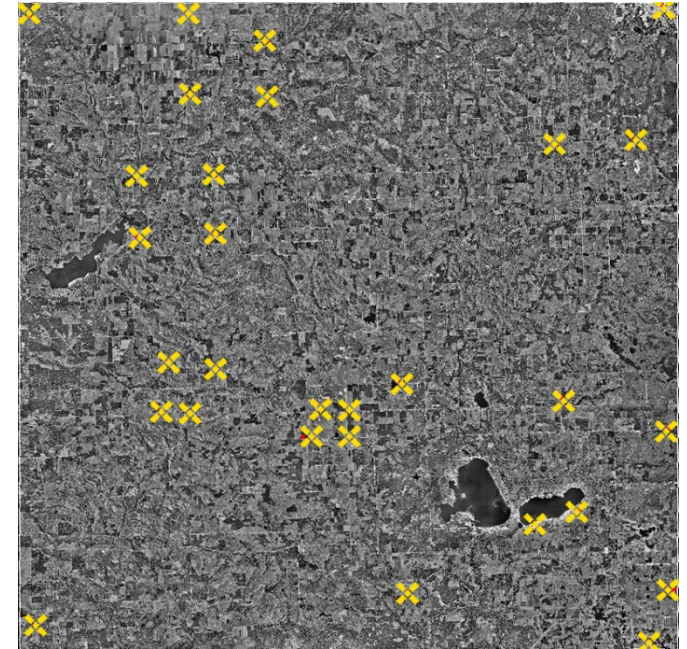
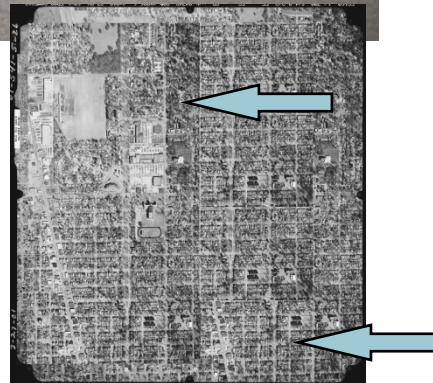
Fundamentals of MPiA technology

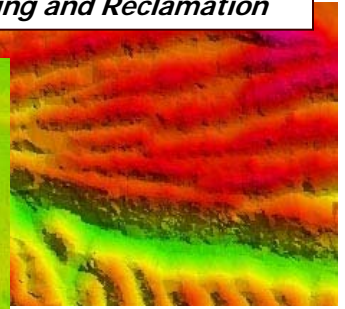
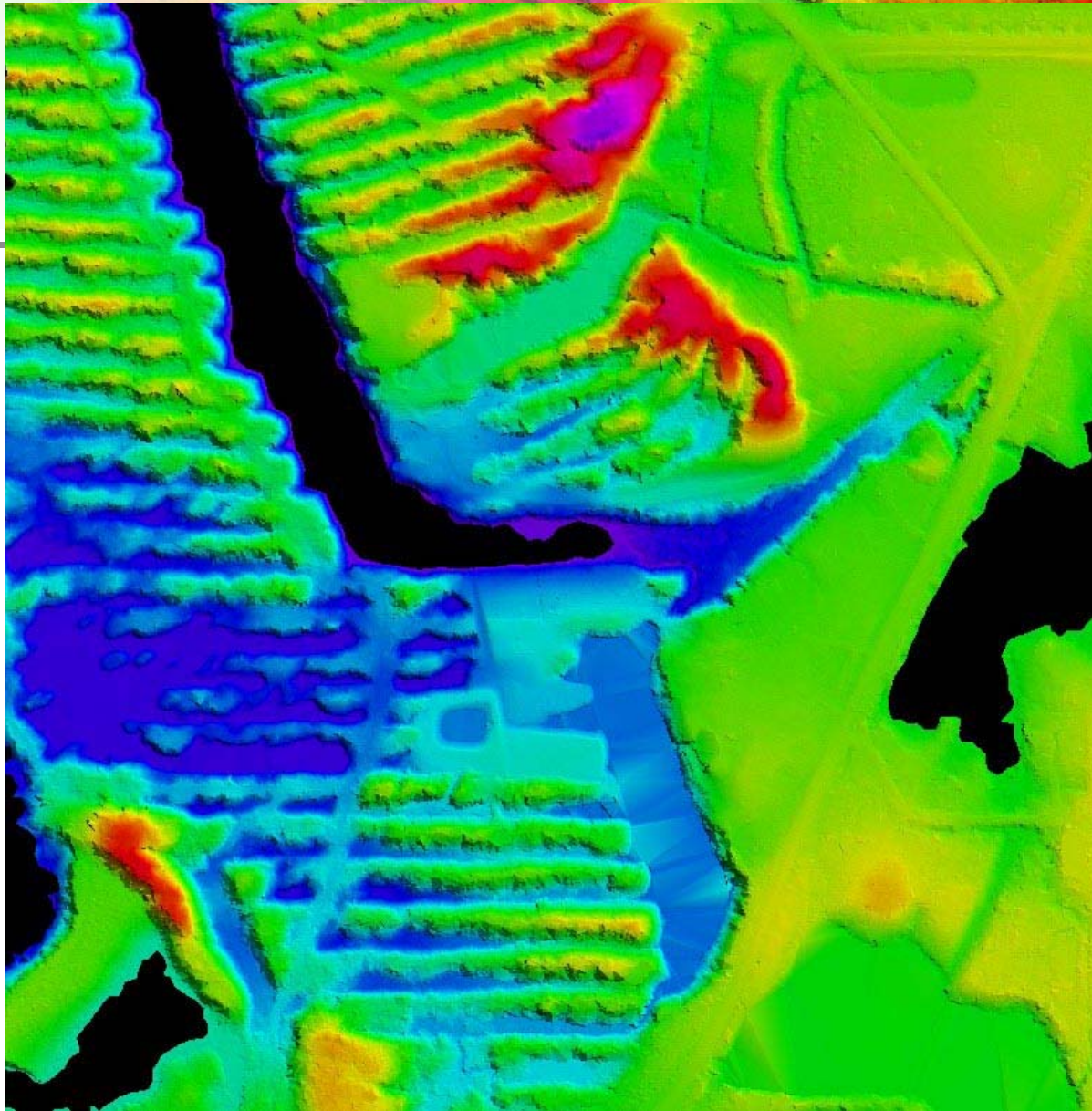
MPiA allows doubling of pulse rate

- the system sends out another pulse before the previously sent pulse returns to the system and is recorded.
- With older generation lidar technologies, a pulse must be recorded before the next pulse is sent.
- The MPiA capability in effect yields a doubling of the point density from any particular flying altitude, and provides greater surface data and/or latitude of system operation.

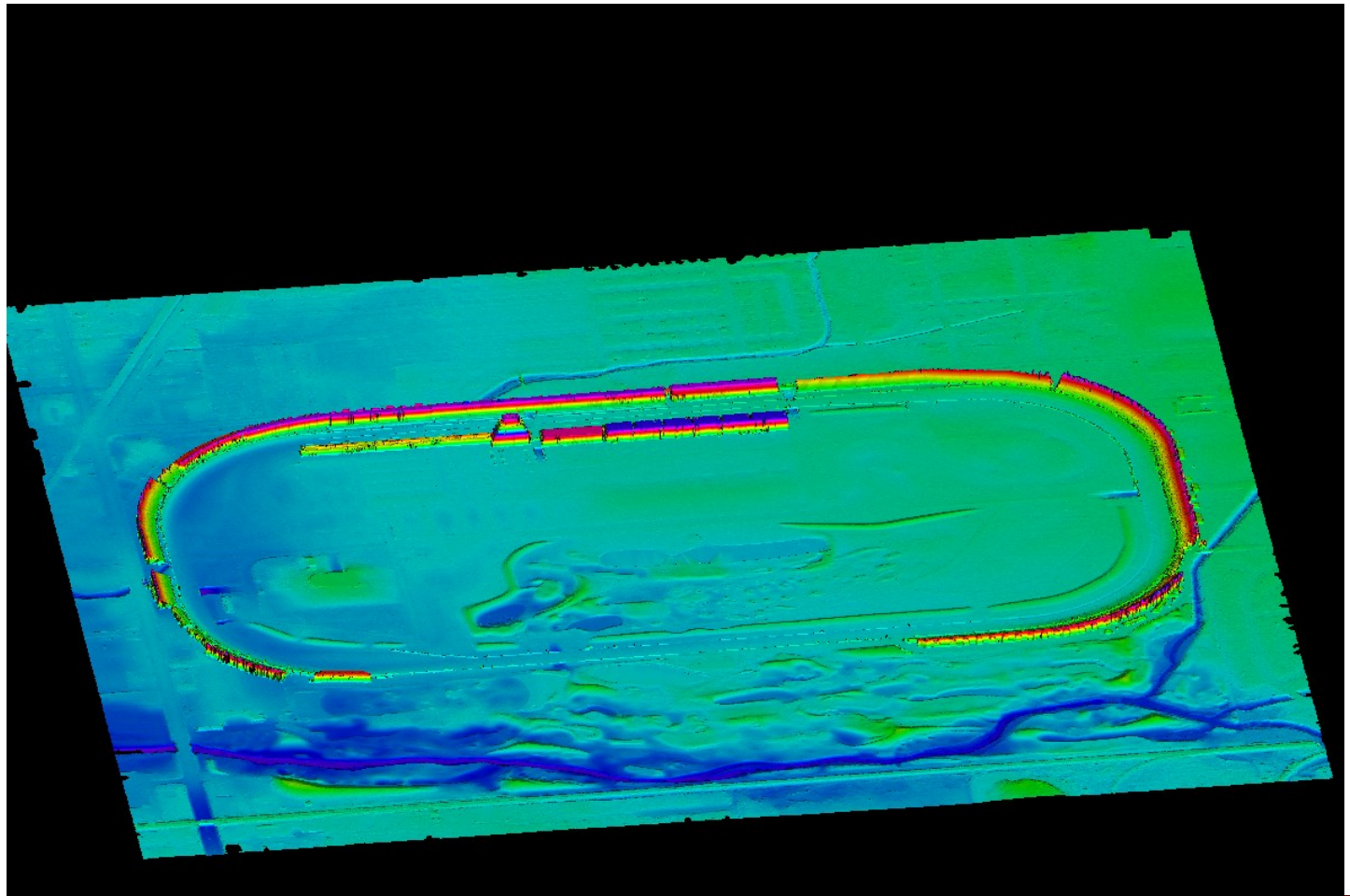


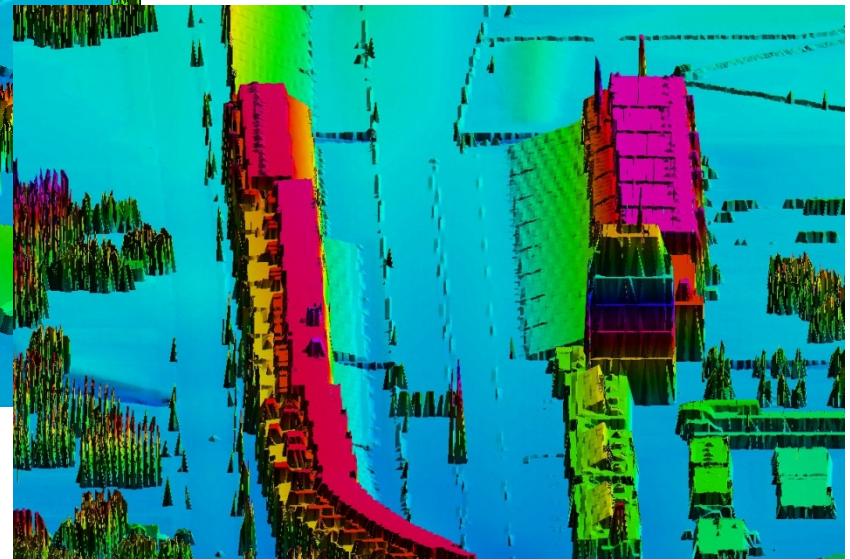
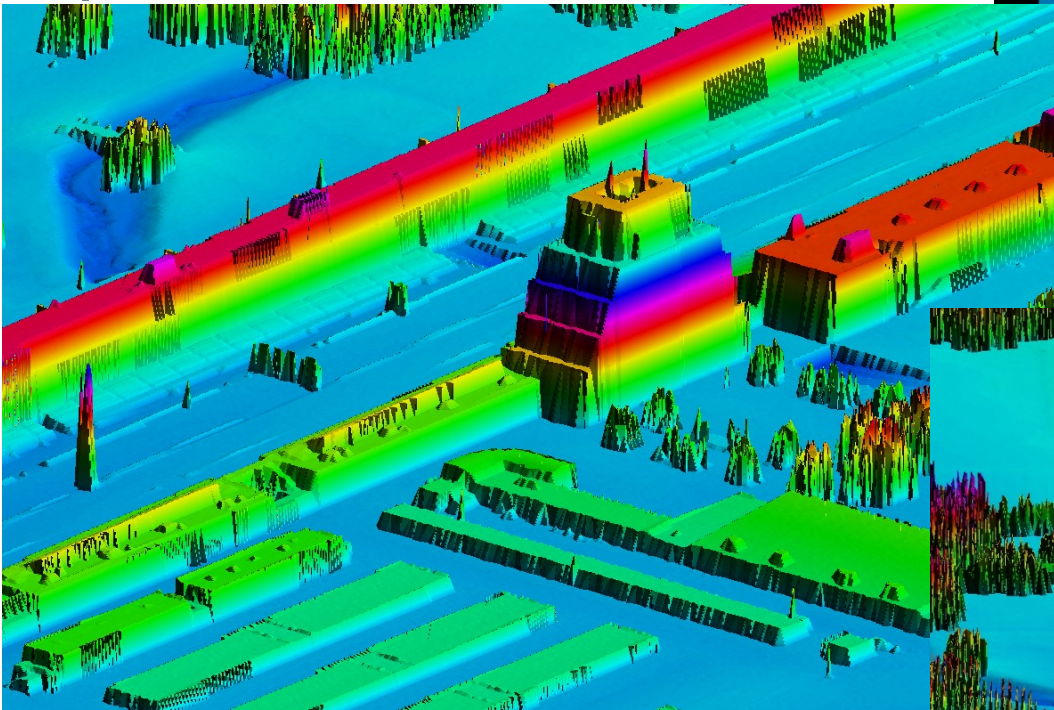
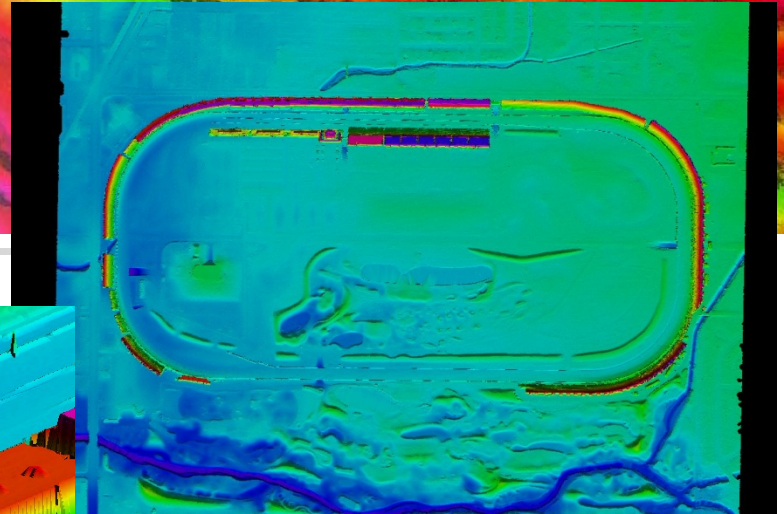
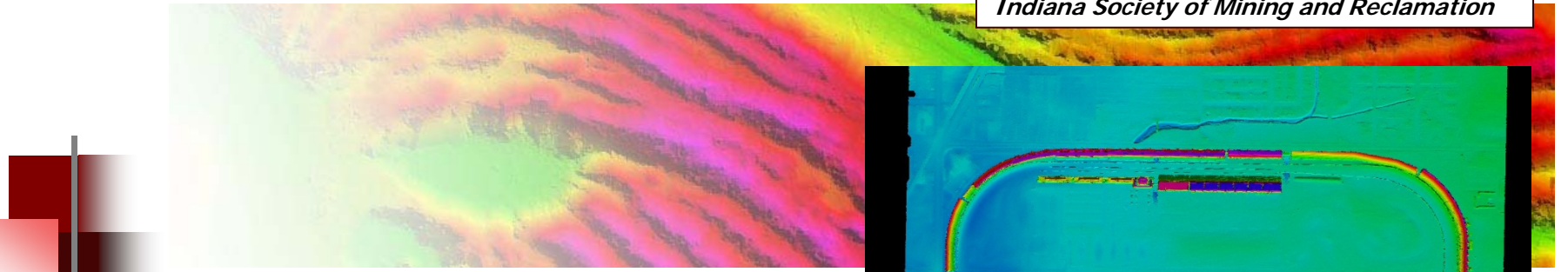
Ground Control





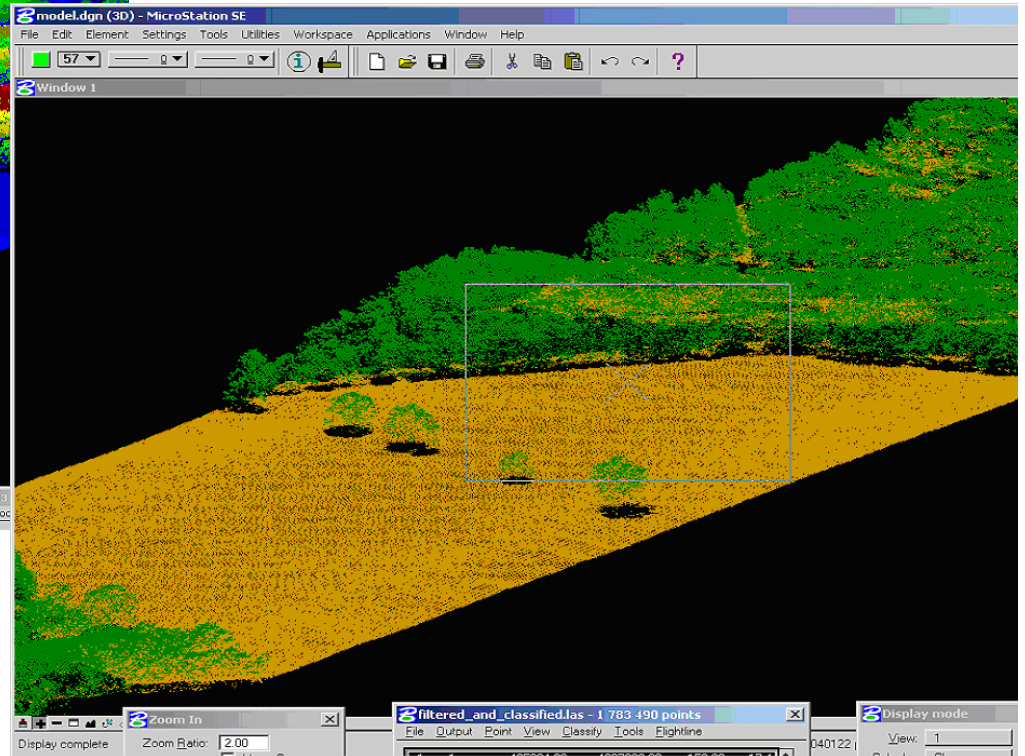
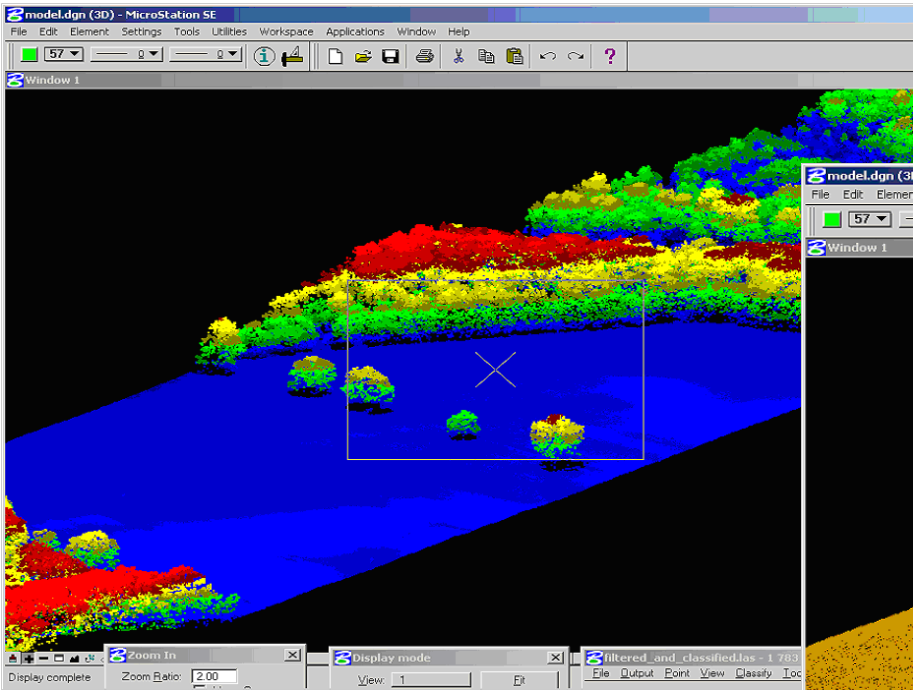
Indianapolis Motor Speedway



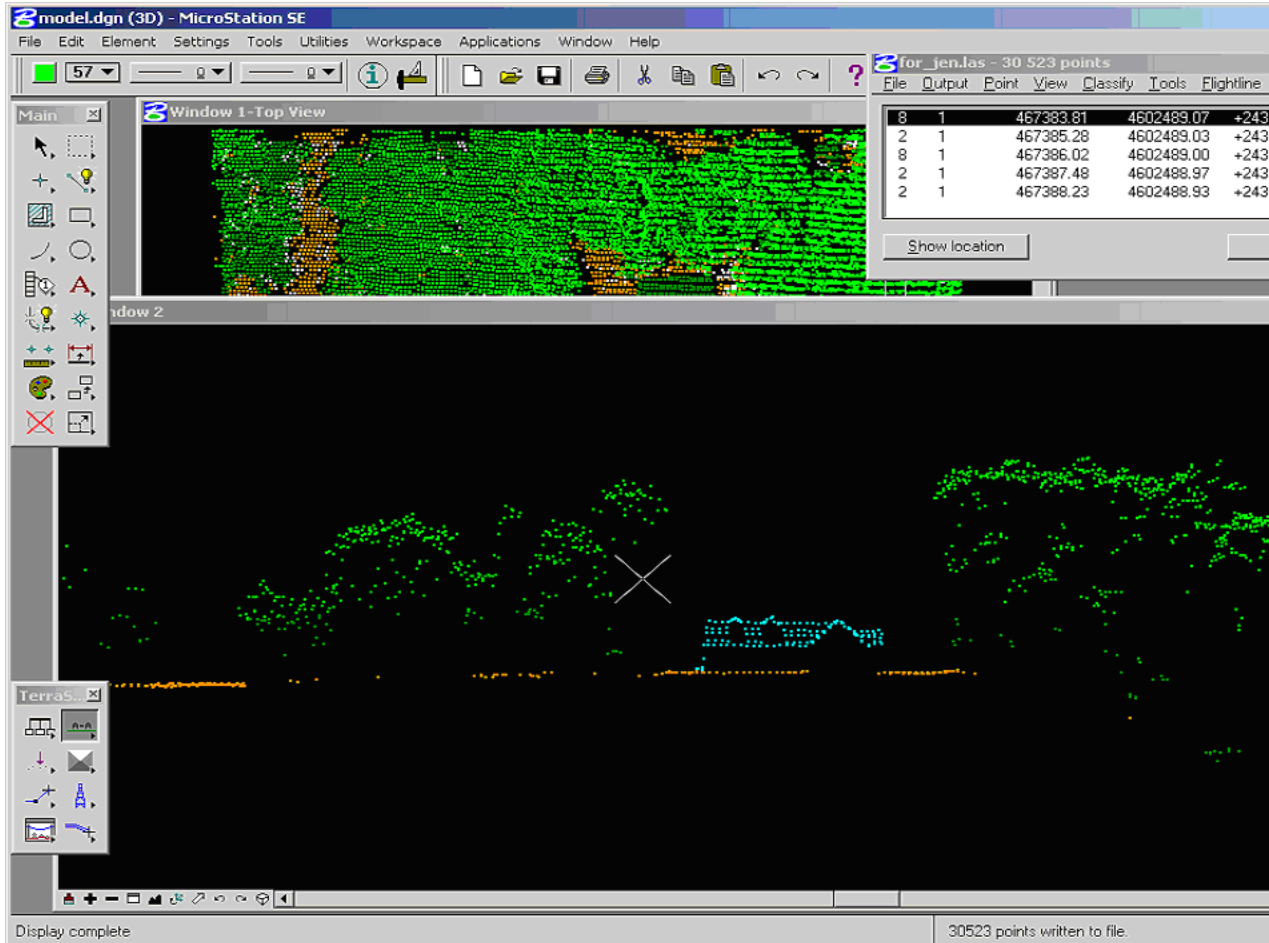


LiDAR Classification

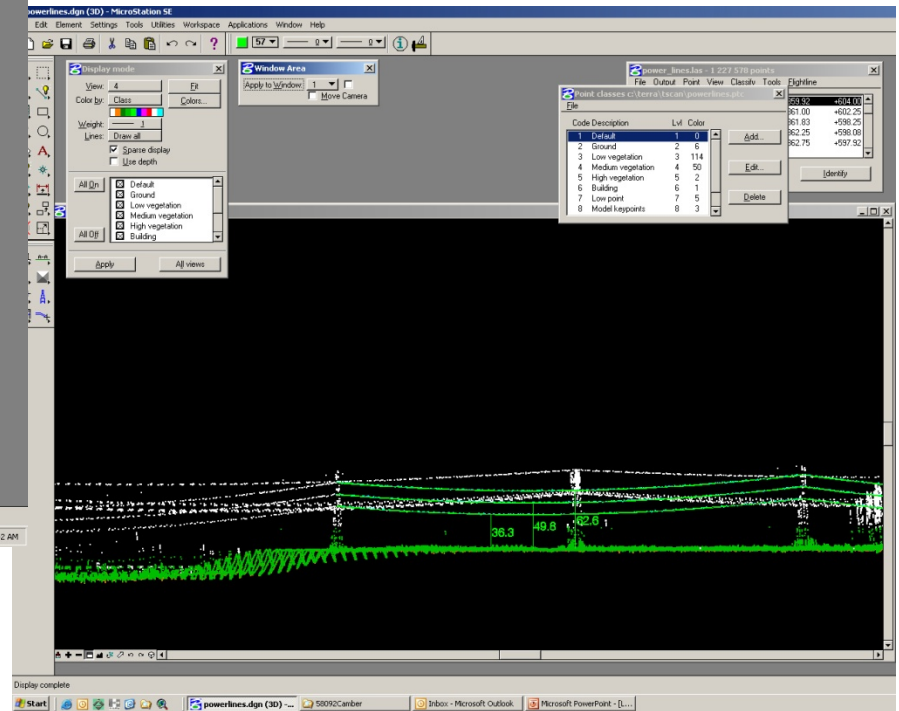
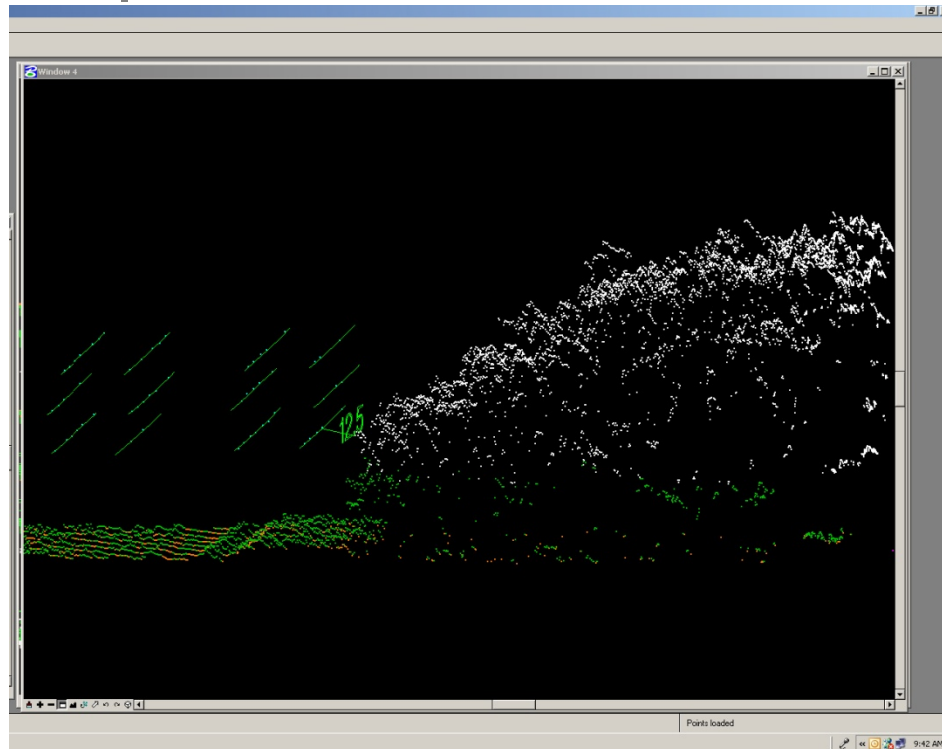
Separation of Vegetation and Ground Points

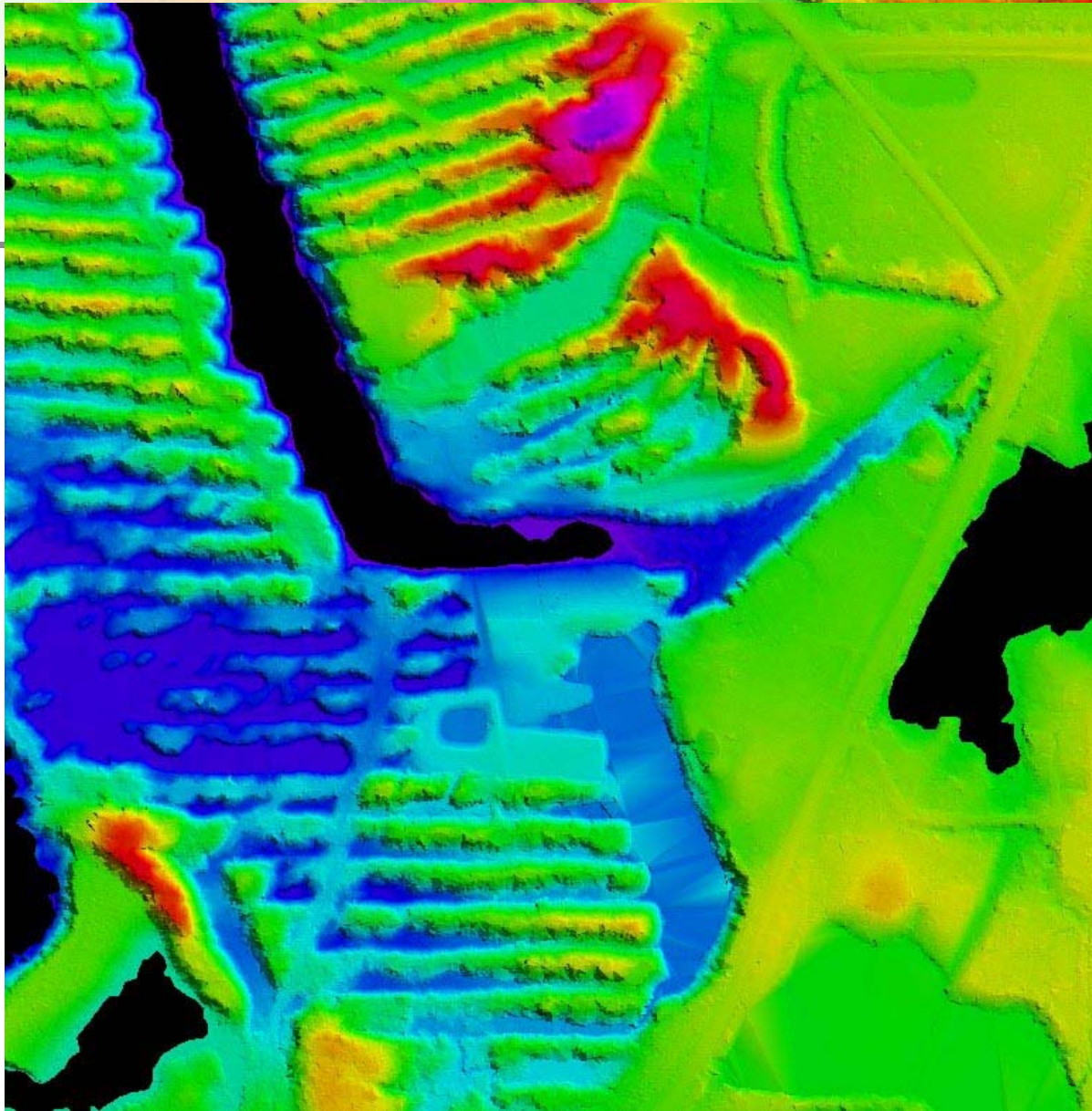


House - Dormers



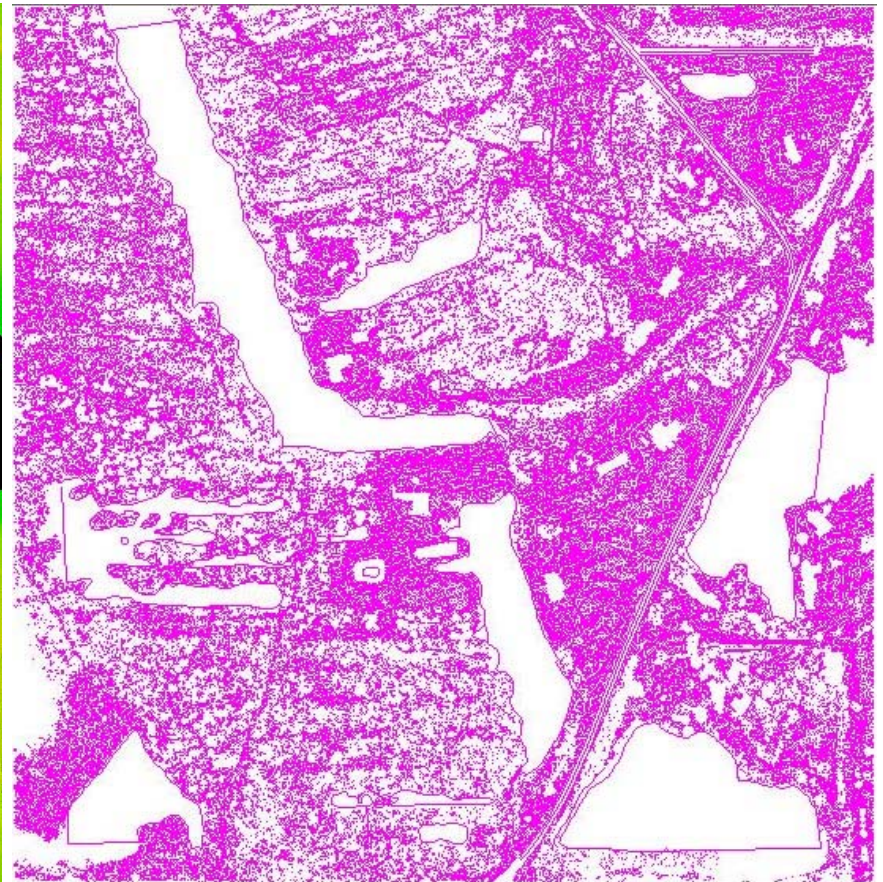
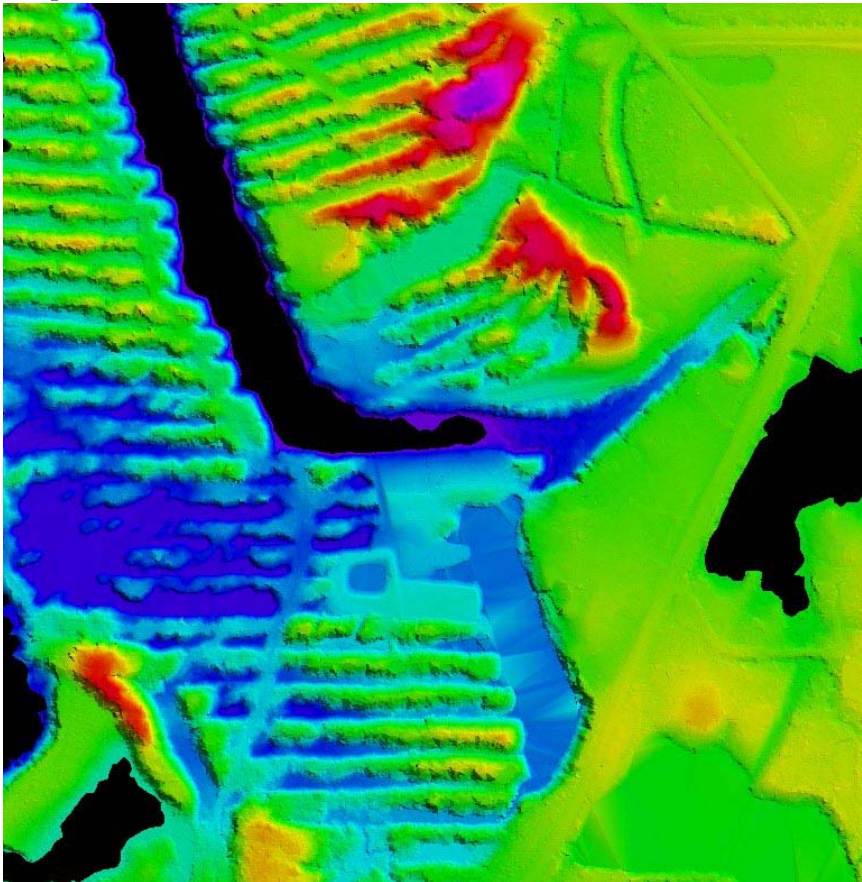
Powerlines



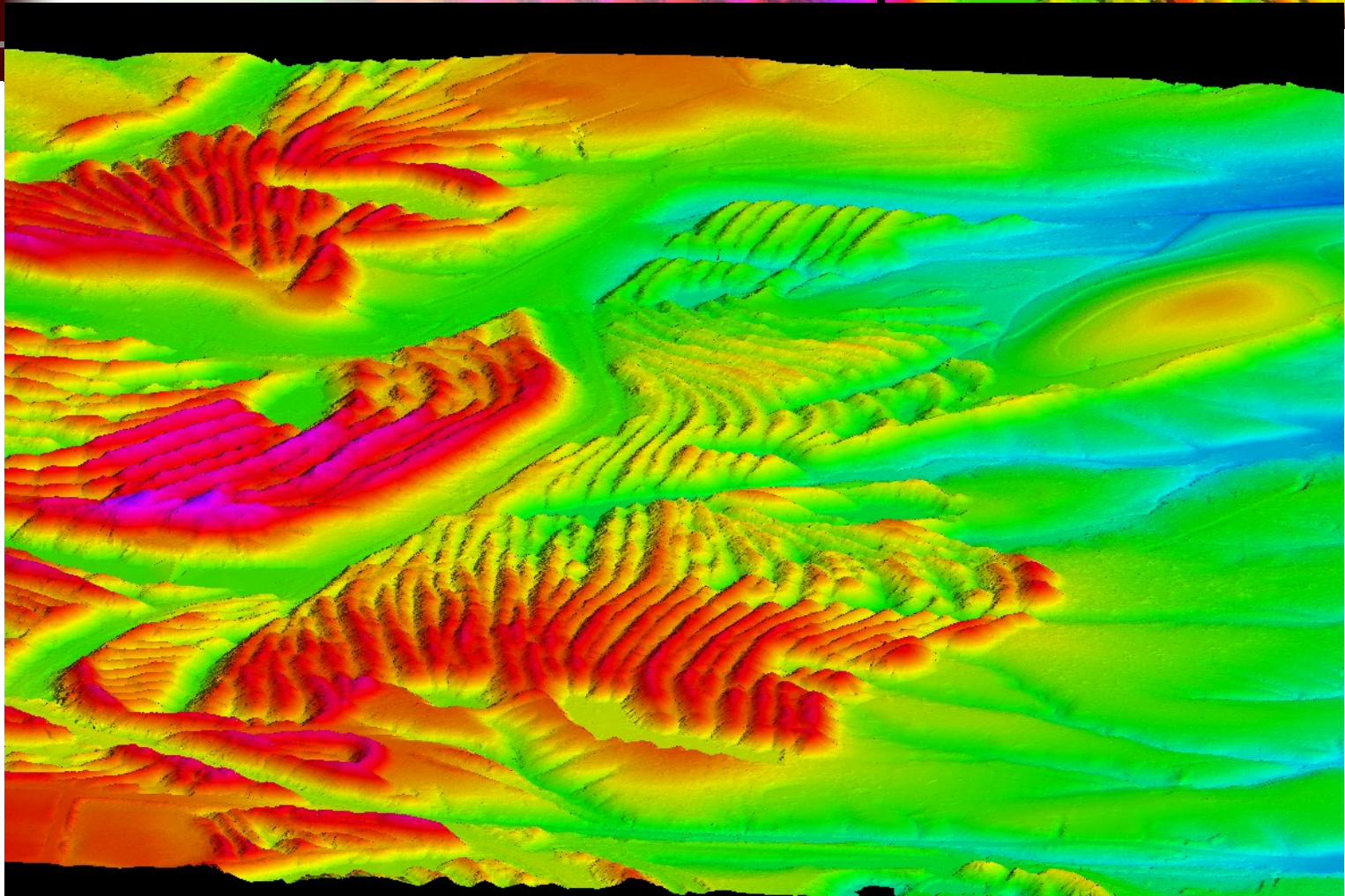


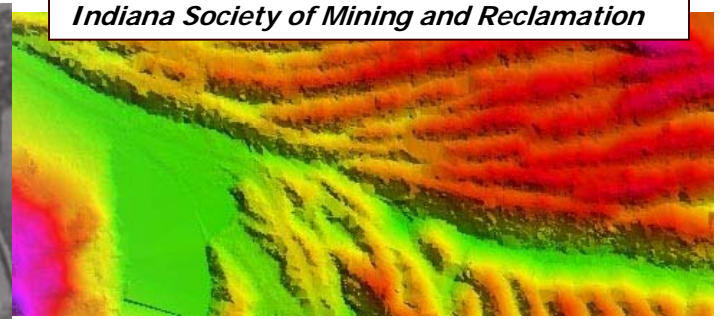
LiDAR

Shaded relief map – breaklines and spots



Ground oblique





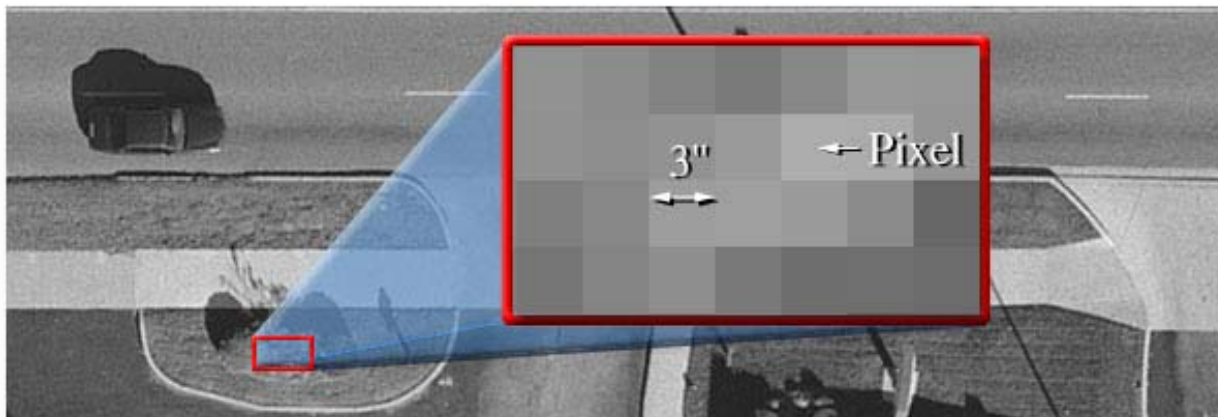
Flight Map

Color imagery

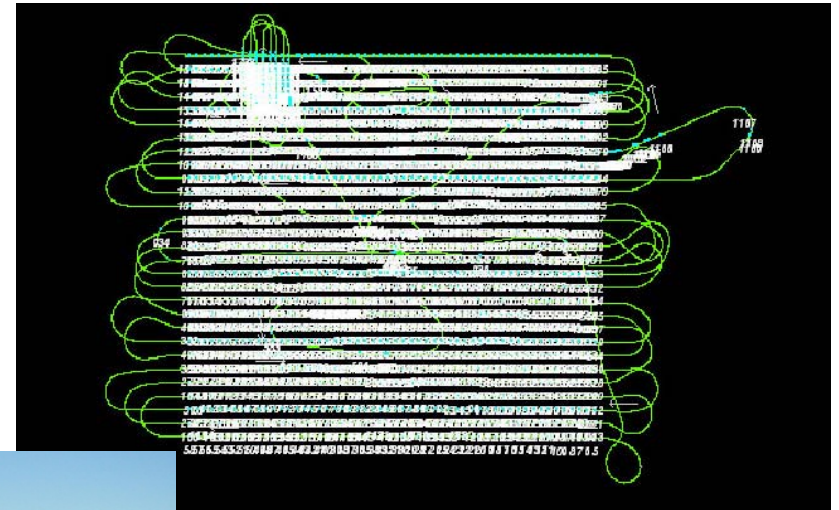
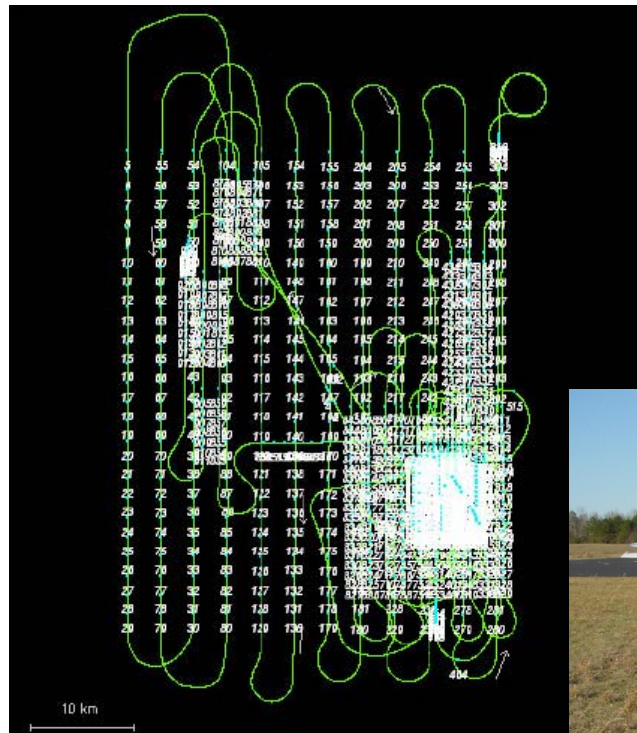


What is a pixel?

- Pixel = **P**icture **E**lement
- Picture element = smallest piece of information in a digital image
- B&W – 256 shades of grey
- Color – RGB (red, green, blue)
256 shades of color for each

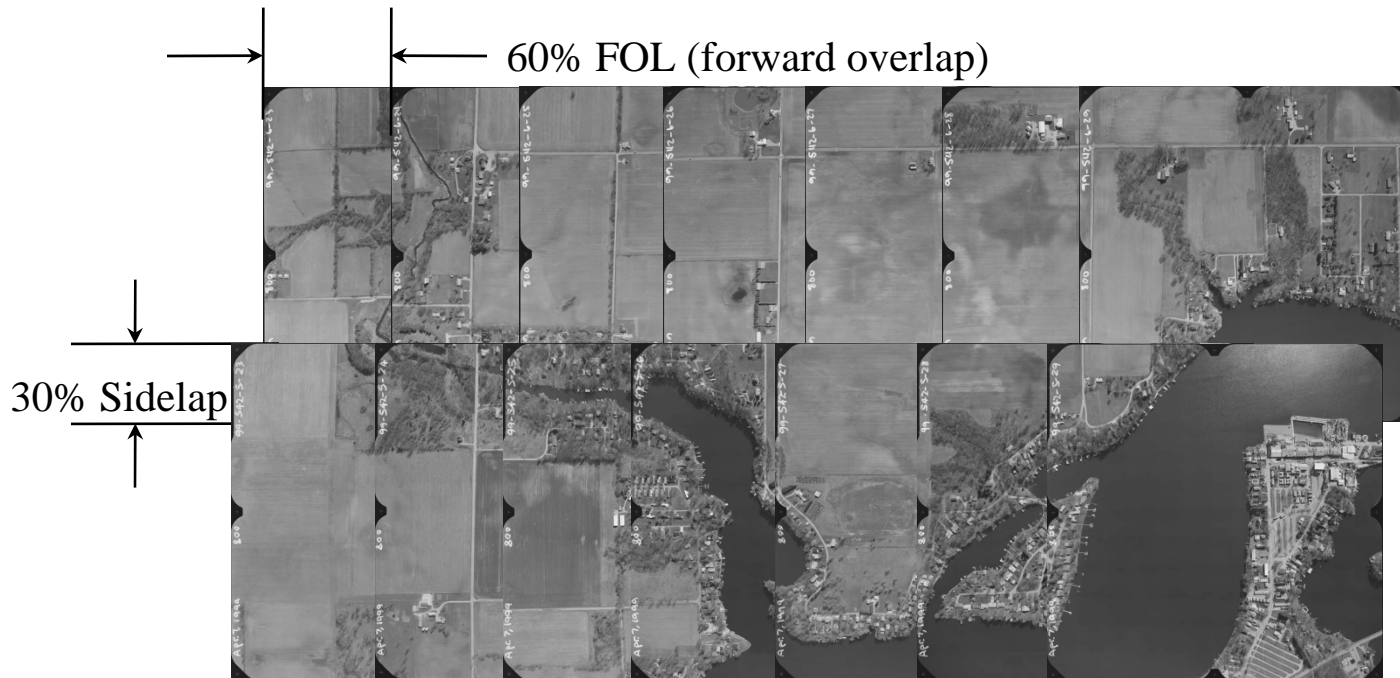


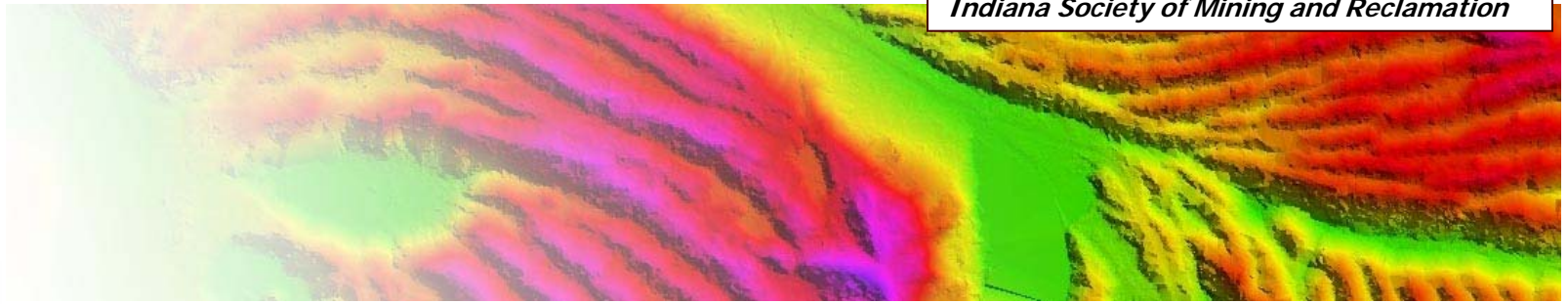
Airborne GPS and IMU



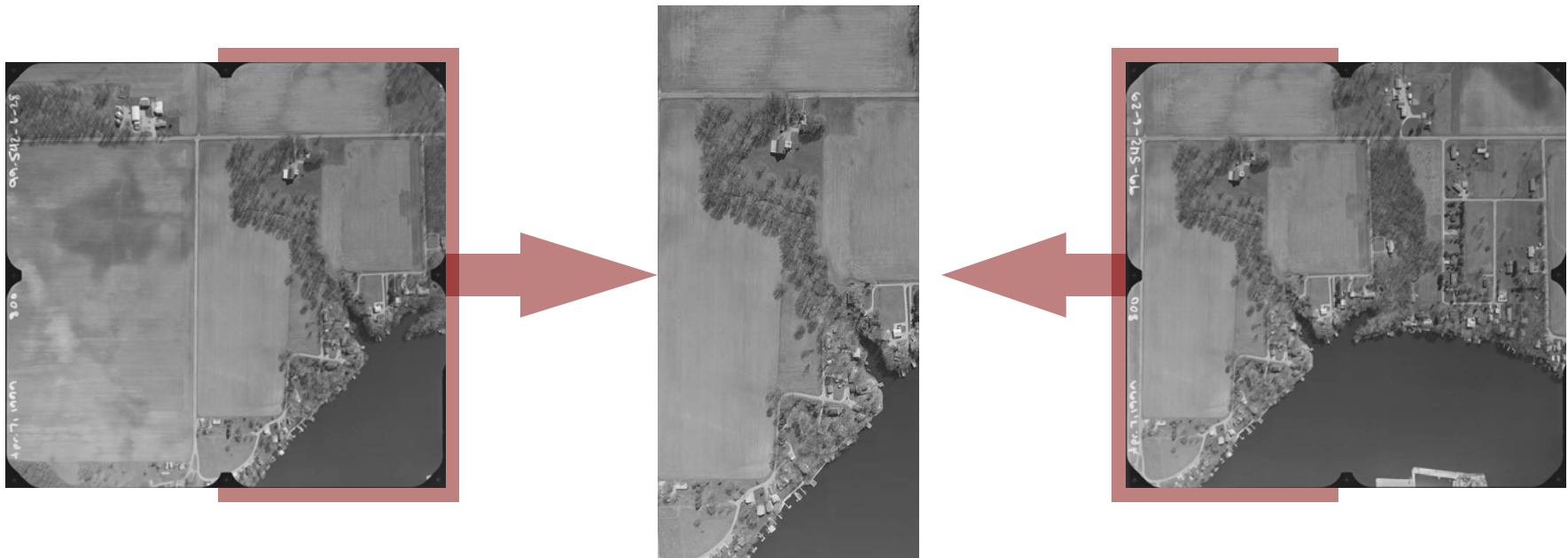
Aerial Triangulation

- Aerial triangulation is used to mathematically supplement the ground control.
- The end result allows the photogrammetrist to accurately measure in X,Y & Z anywhere within the block of photography





- Data is collected by accurately positioning the model and mapping the specified detail

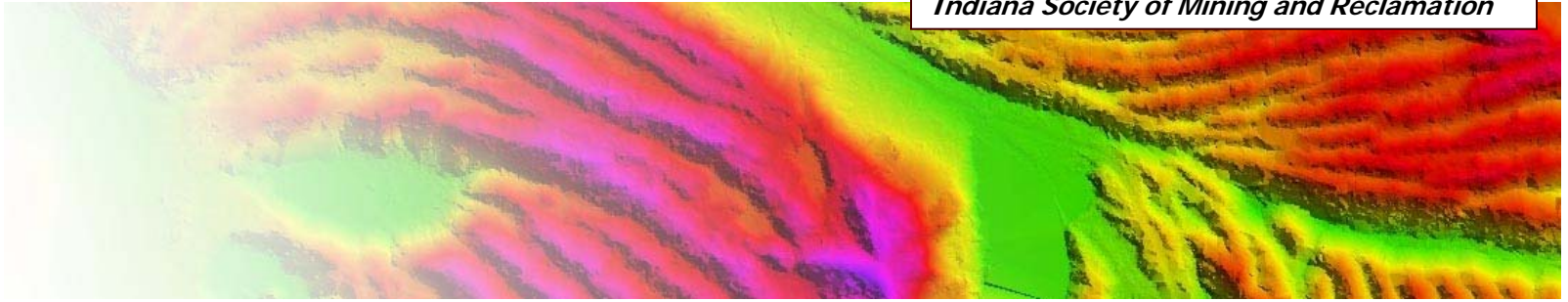


Stereo Model

Stereo Compilation

- Stereoplotter operators digitize planimetric detail and/or surface model features (DEM) one model at a time each model taking sometimes hours to map

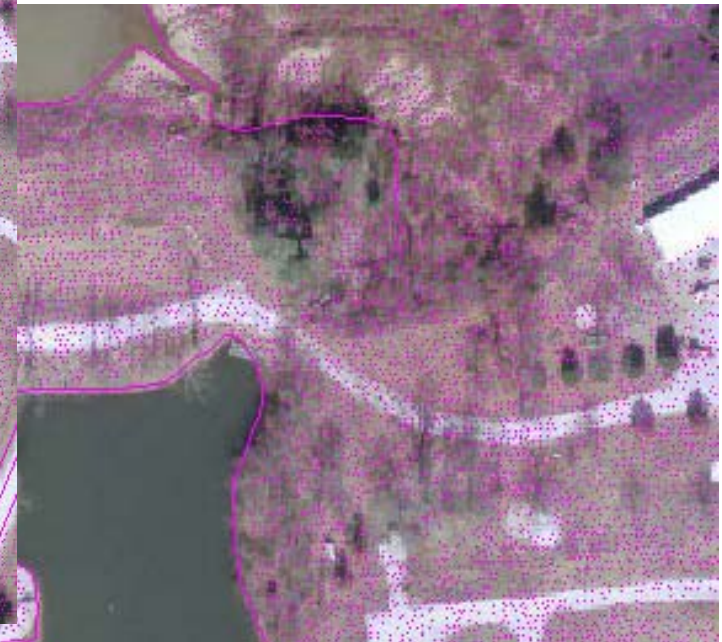




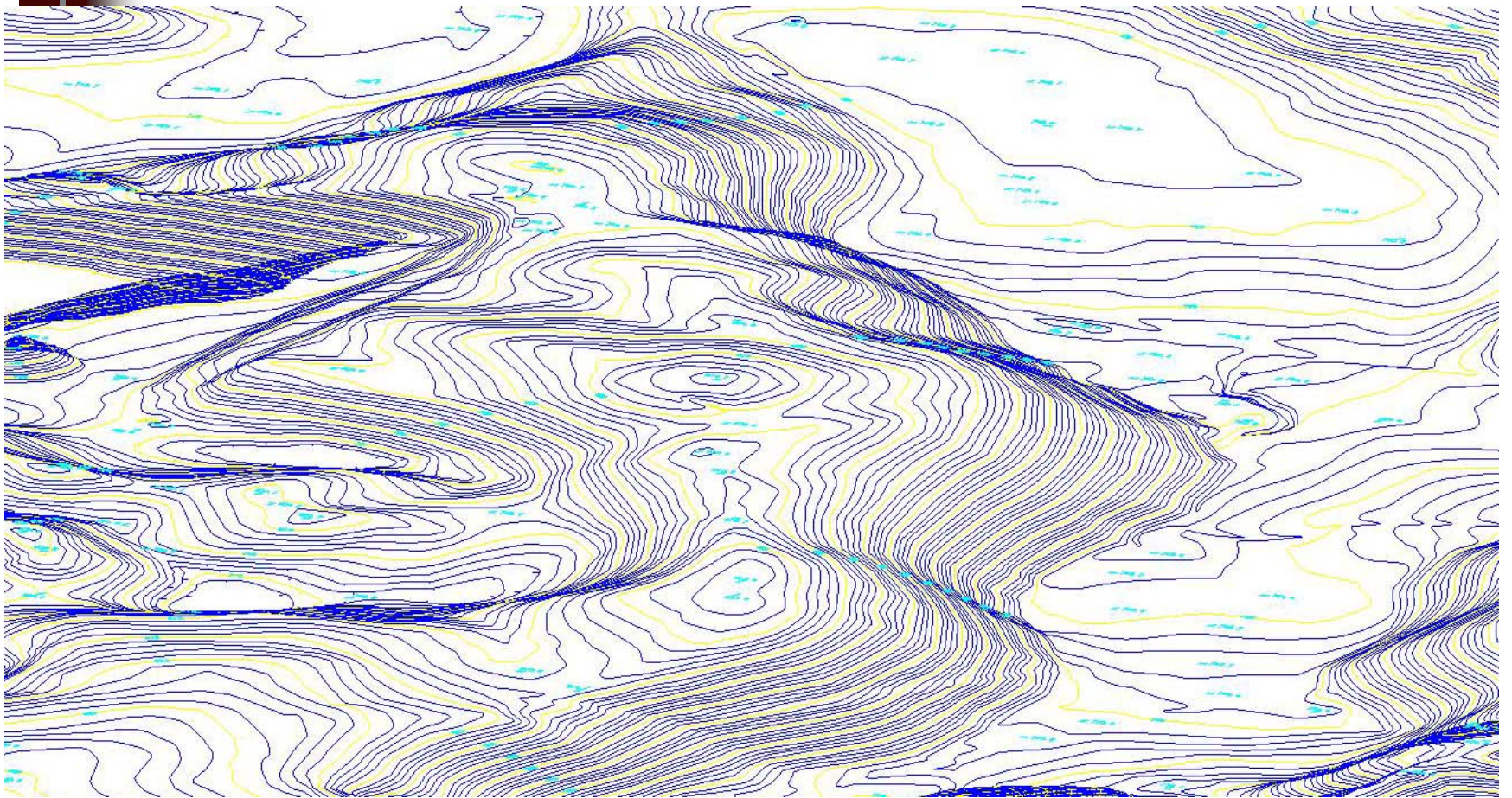
Photogrammetry



- LiDAR data varified
- Breaklines added
- Contours generated



Contours



Plan Mapping

Plan features are collected

- Buildings
- Roads
- Water



Final Deliverables – Map & Ortho

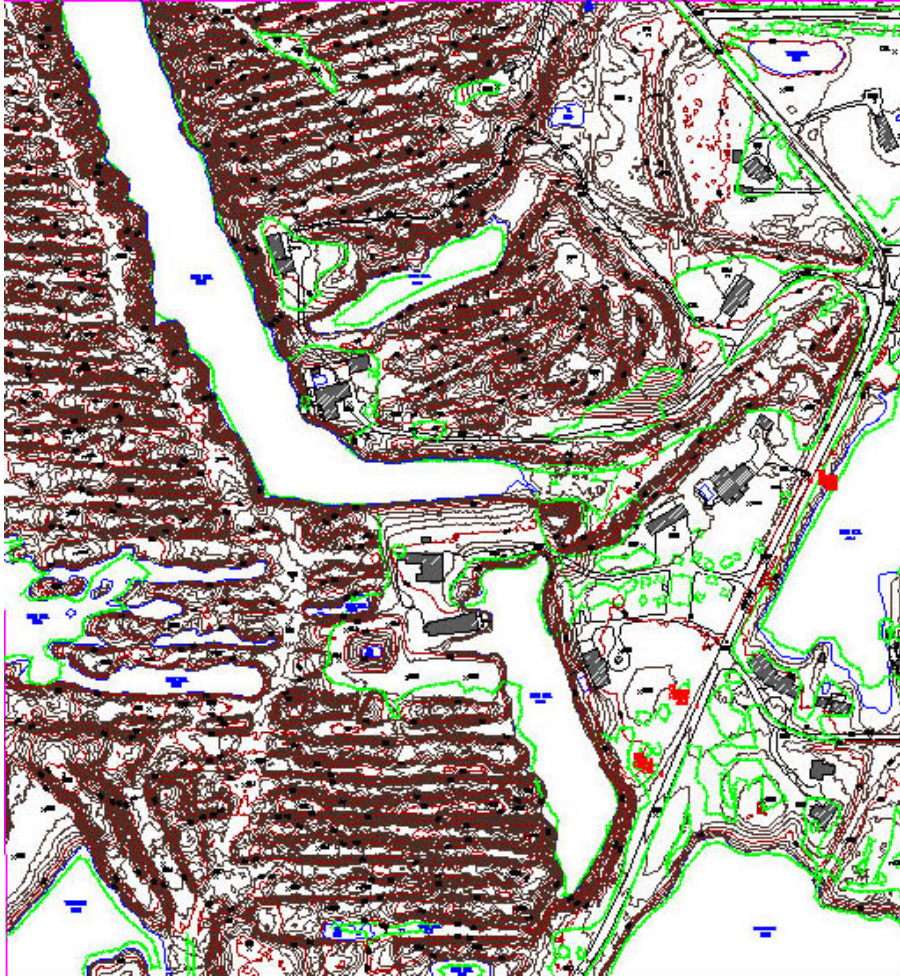
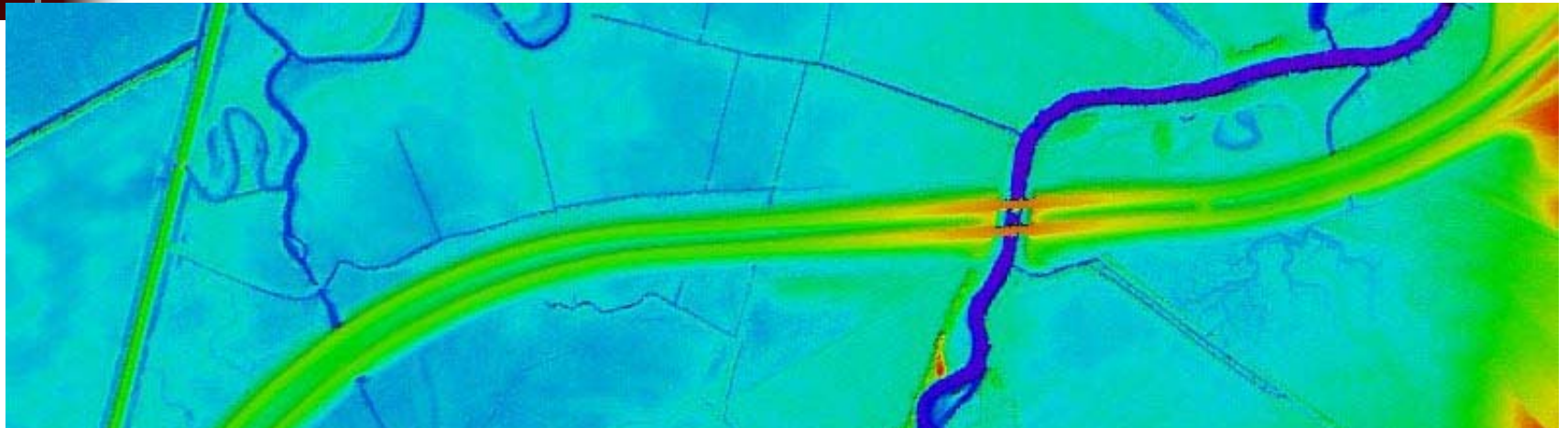
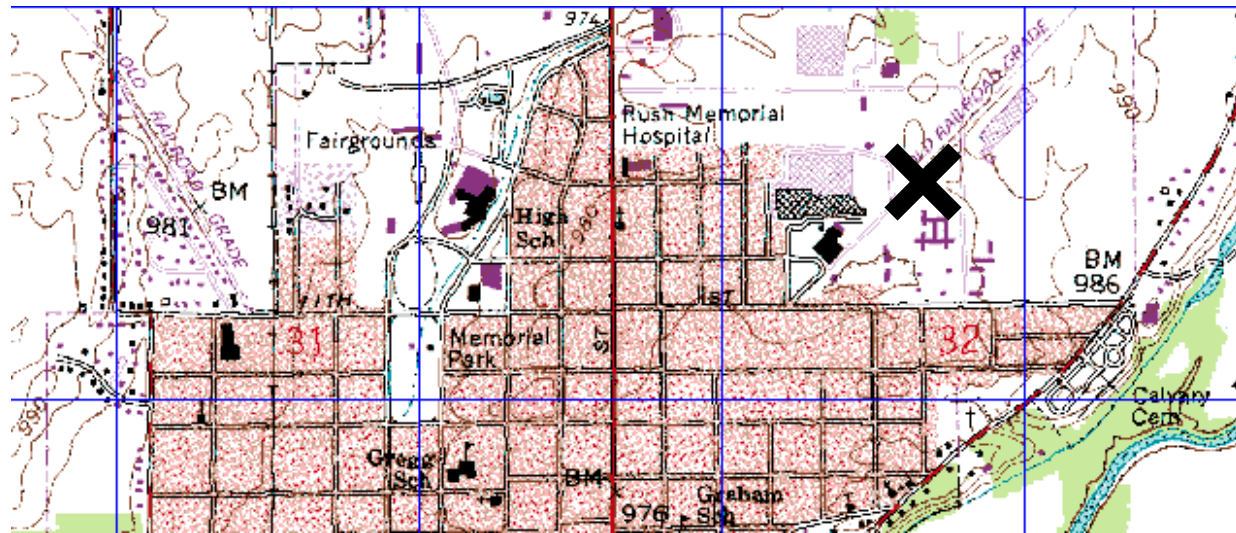


Image from LidAR intensity

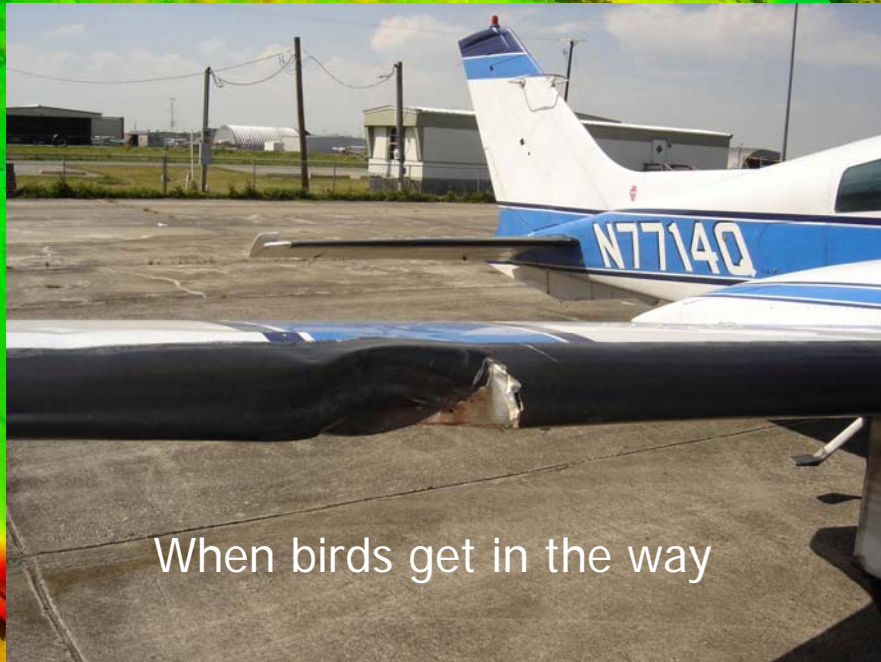




“X” may mark the spot on the map where the treasure is buried....

but if “X” is not placed accurately you may never find the treasure.

QUESTIONS ?



When birds get in the way



Thank you for your attention !