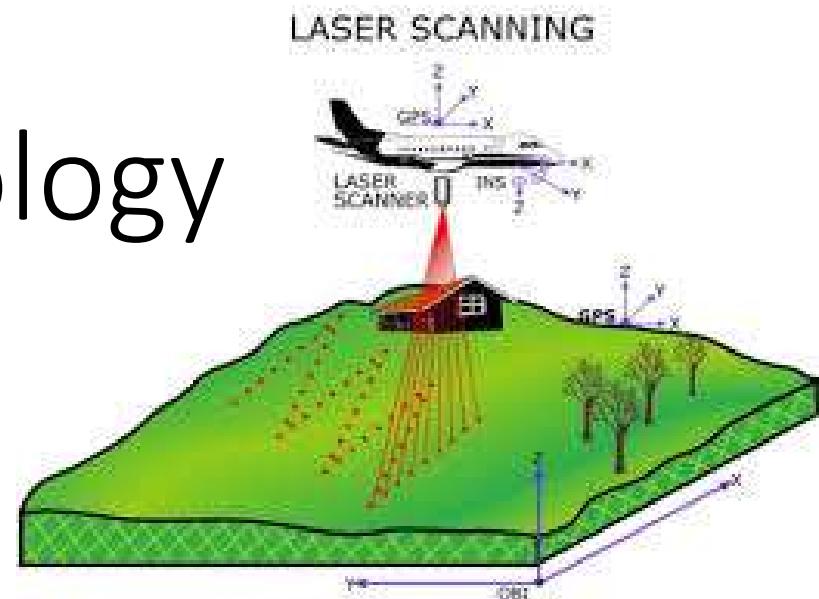


Light Detection And Ranging (LiDAR)

and Archaeology



What is it?

- LIDAR is like Radar – but uses laser light (See video)
- It develops plots of the terrain as seen in reflection of the laser light
- The plots need to be displayed in some mode to show up the features
- Commonly done from a plane but works at a closer range from drones or ground based vehicles or fixed stations, or at longer range from satellites.
- Fixed stations - sometimes called 3D Laser Scanning
- Simpler than side scanning radar – but the latter can penetrate cloud.

Used For:

- Ground form and structures surveys (using last return to see around vegetation)
- Vegetation Surveys (first return to last return difference)
- Ground movement (before and after comparisons) e.g. Earthquakes
- Archaeology – detecting ancient traces in the ground surface.
- Archaeology – recording successive states of an excavation as layers are removed
- Archaeology – buildings records



Advantages:

- Can see through quite heavy vegetation including forests (better in winter in deciduous forests)
- Can be used day or night
- Can change the angles of virtual illumination of the model on the screen displayed data to best see the features
- Can use different coloured lasers to different effect (some better for vegetation – others for ground surface)
- Quite a lot taken for other purposes has archaeological use

Disadvantages:

- Has been expensive compared to traditional aerial photography
- Storage security – archaeologists are interested in past images whereas few others are
- Doesn't record colour (but if contemporary colour images are available they can be digitally overlaid on the digital terrain model that the Lidar output produces).

Angkor
Cambodia, only
partly cleared of
jungle.



Replaces?

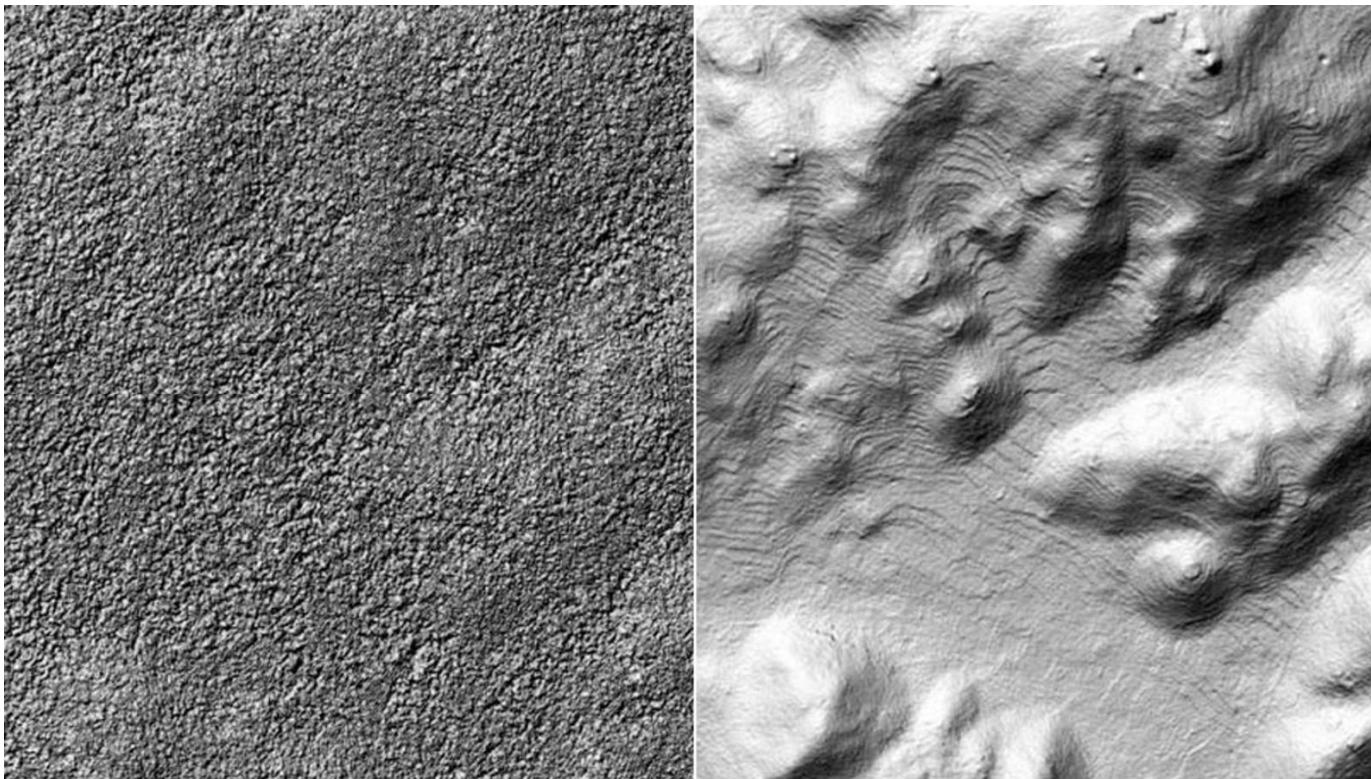
- Field inspection? No – ‘ground truth’ is still needed
- Conventional ground survey? Yes to some extent - depending on the site. Horses for courses.
- Conventional photography? No –
 - Conventional photography can see archaeological traces on levelled ground such as soil stains (on bare ground), crop marks and parch marks, that Lidar does not see.
 - Shadows of cryptic surface features might be seen by chance in low oblique light situations that might be missed in manipulating the Lidar output.
- Geotech methods (Magnetic, resistivity and ground penetrating radar surveys) ? No – Lidar stops at the surface.



Carpow, Scotland. Conventional photography. Roman fort with no surface features – buried walls show a parch marks in summer pasture (right). Would show nothing on Lidar.

Results

- New Forest England – (Video)
- South Georgia Whaling Station Leith Harbour – (Video)



**Mayan city of Caracol, Belize,
which is obscured by dense
forest (left)**