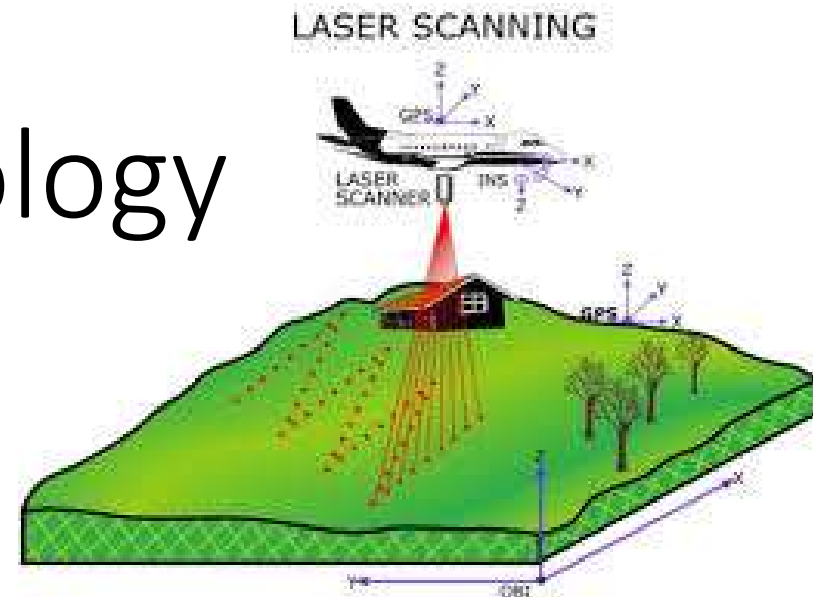


Light Detection And Ranging (LiDAR)

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?

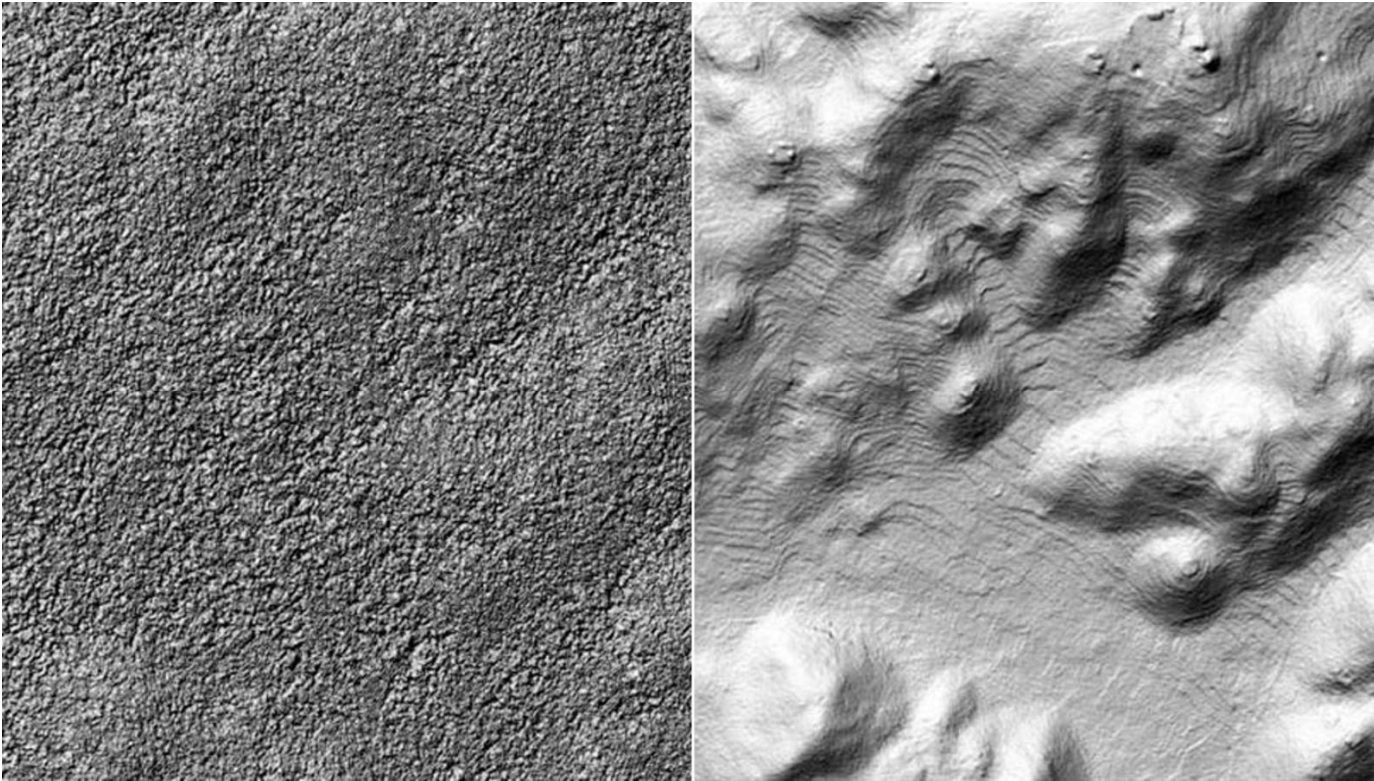
- Field inspection? No – ‘ground truth’ is still needed
- Conventional ground survey? Yes to some extent - depending on the site. Horses for courses.
- Conventional photography? No –
 - Conventional photography can see archaeological traces on levelled ground such as soil stains (on bare ground), crop 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 as 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)**