Introduction to Structure from Motion (SfM) Photogrammetry for Earth Science Research and Education

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**Introduction** to SfM = lectures, hands-on data processing and analysis examples.

**Overview** of the basic principles of SfM, with emphasis on theory, application examples, software workflow basics, practical considerations.

**Goal** = solid intro to SfM and a foundation for future learning. We also hope that it will inspire you to explore the technology and to explore new applications in research and education.
Agenda…

Course page:

http://kb.unavco.org/kb/article/2016-gsa-introduction-to-
structure-from-motion-sfm-photogrammetry-for-earth-
science-research-and-education-short-course-859.html
• **Name & affiliation?**

• **Your interest in SfM & application area?**

• **Previous SfM or lidar experience?**
Video...

https://www.youtube.com/watch?v=yxLMk120vMU
High resolution topography

**Airborne LiDAR**
- onboard GPS and IMU constrain position and orientation of aircraft
- distance between scanner and ground return determined from delay between outgoing pulse and reflected return

**Structure from Motion**
- motion of camera provides depth information
- sequence of photographs
- scene structure refers to both camera positions and orientations and the topography
- features matched in multiple photographs

**Terrestrial LiDAR**
- lines show track of scan across ground
- circles show actual ground return footprints