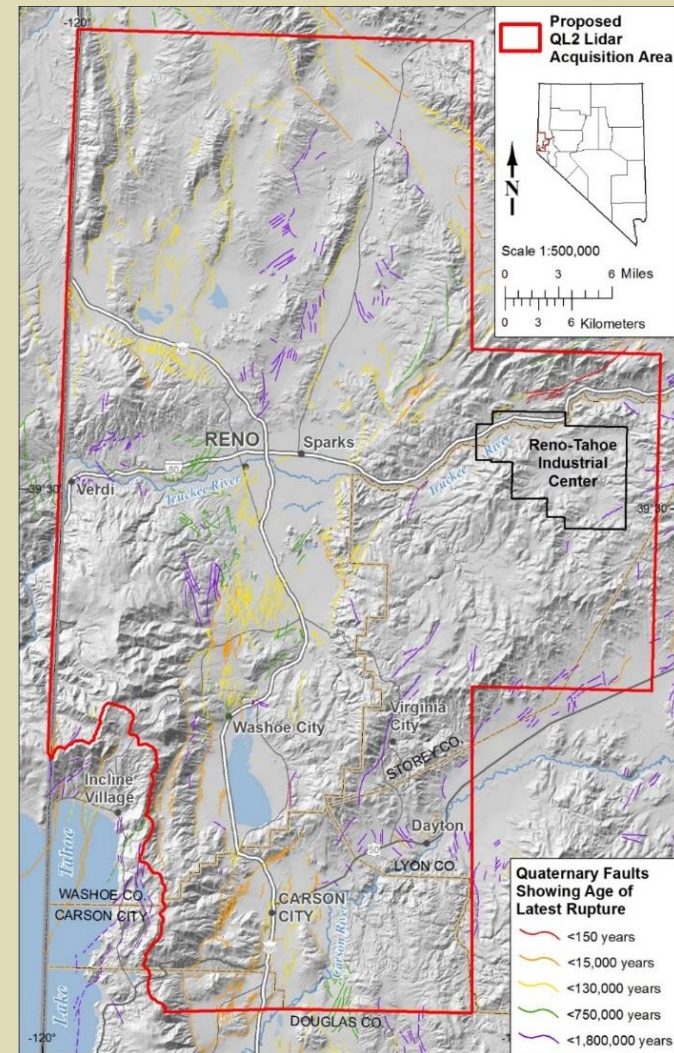


Seth Dee

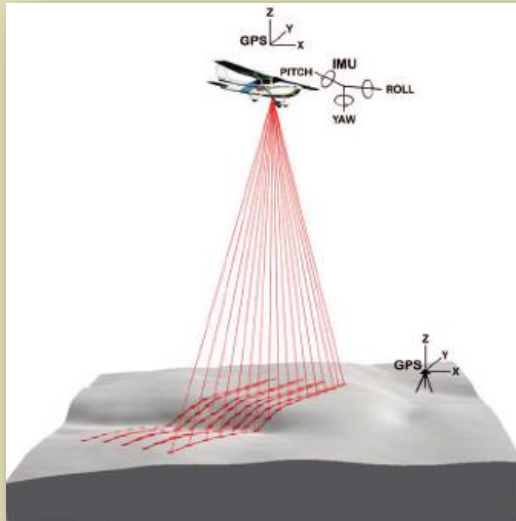
**Nevada Bureau of Mines and Geology (NBMG)*
University of Nevada, Reno**

- What is NBMG?
 - NBMG is the state geological survey of Nevada, whose mission is to provide citizens of Nevada with geological information critical to public safety, economic development, and improving the quality of life.
 - NBMG is a statewide public service unit at UNR and is a part of Mackay School of Earth Sciences and Engineering in College of Science.
 - NBMG scientists conduct research and publish reports on mineral, geothermal, and oil-gas resources, engineering geology, environmental geology, geologic mapping, and Nevada's geologic framework.

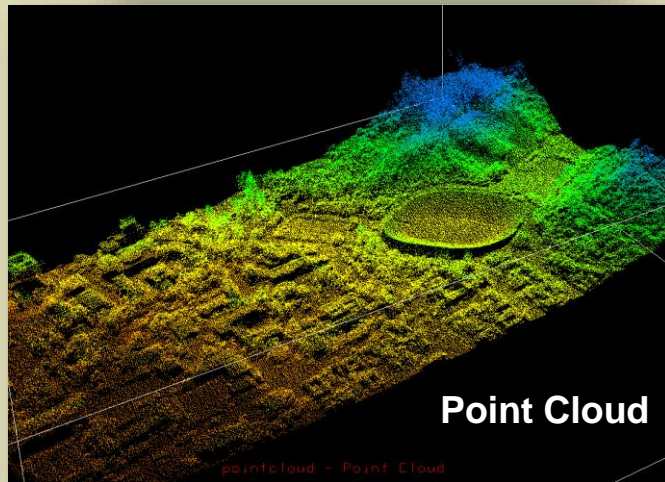
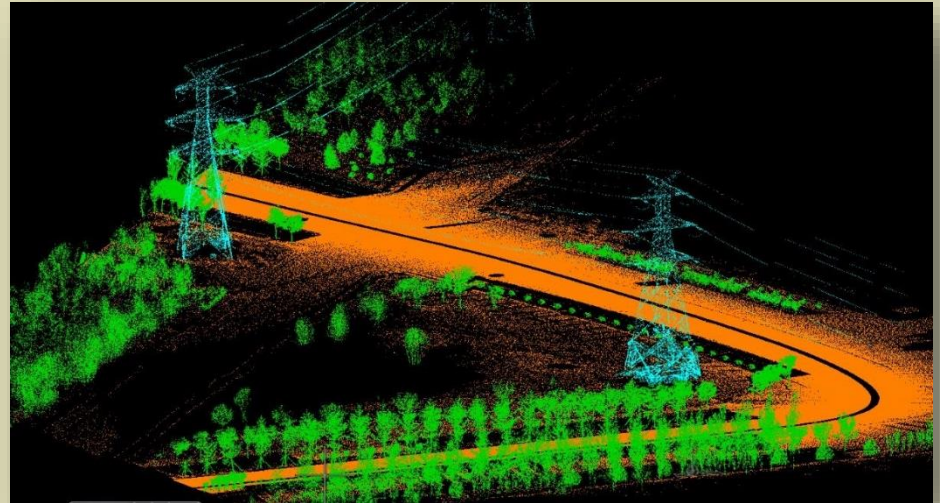


LIDAR DATA ACQUISITION

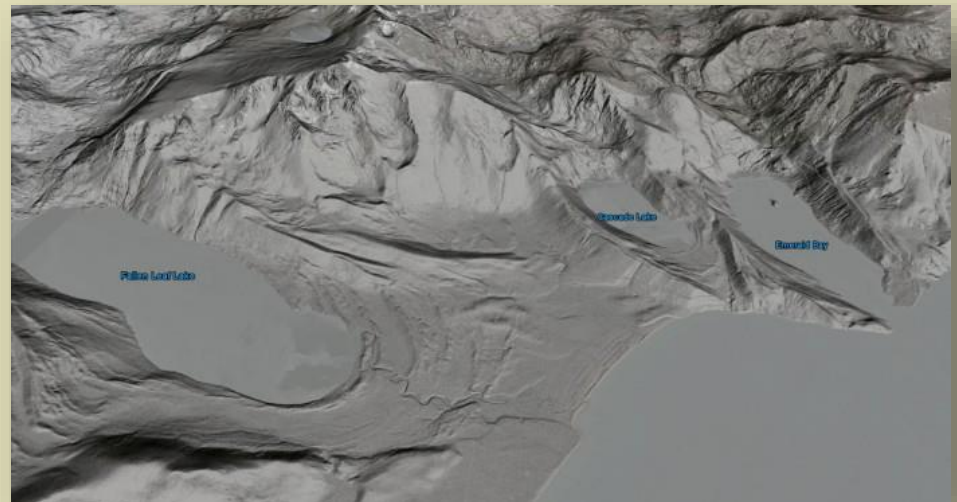
lidar = **l**ight **d**etection and **r**anging



Point Cloud Classification



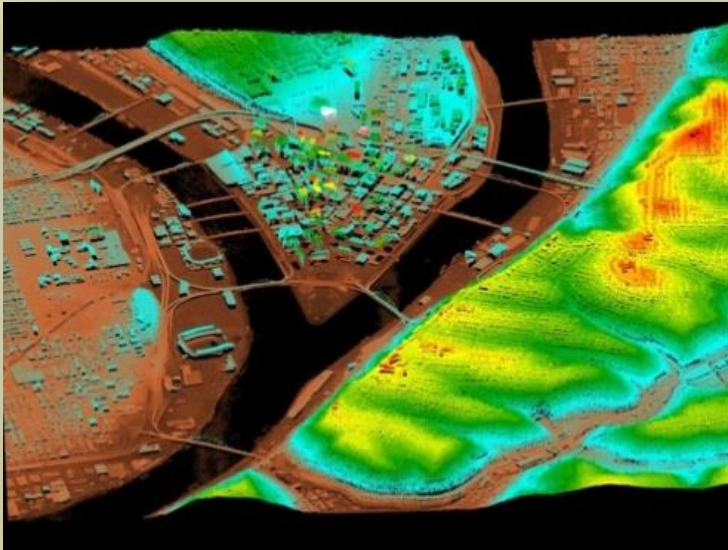
Bare Earth DEM



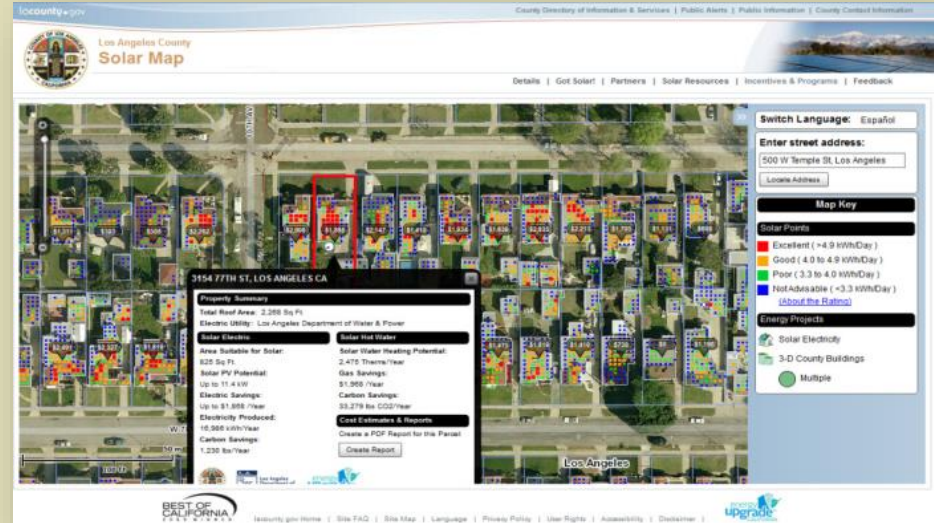
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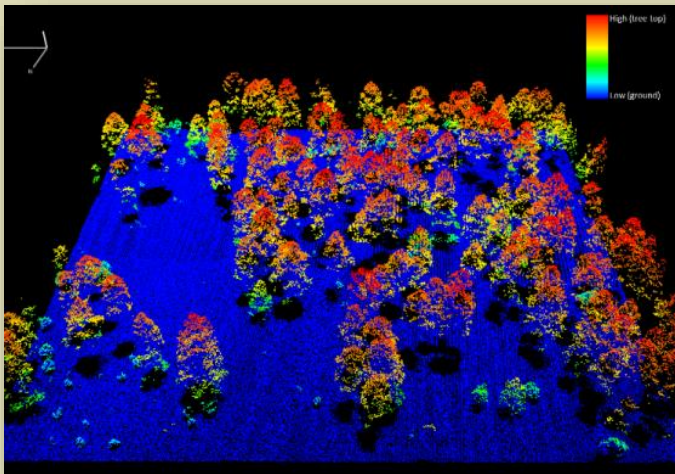
LIDAR APPLICATION



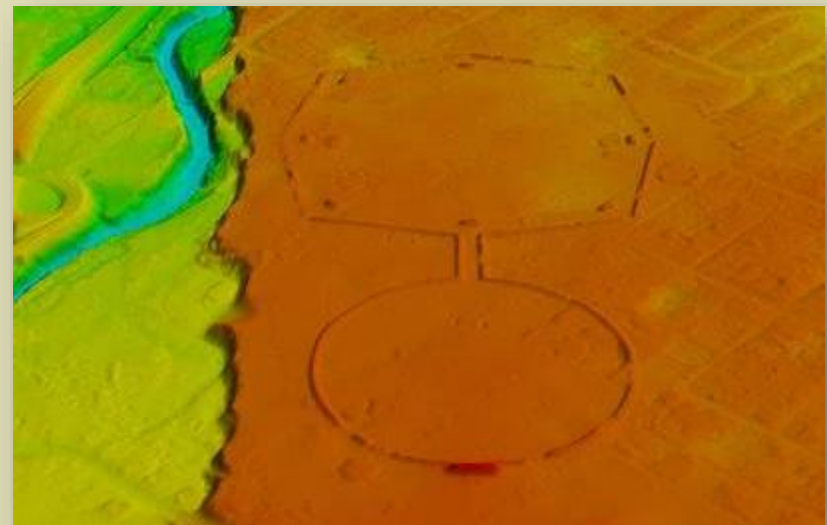
Infrastructure and Land Use Management



Alternative Energy



Forestry and Ecosystem Monitoring



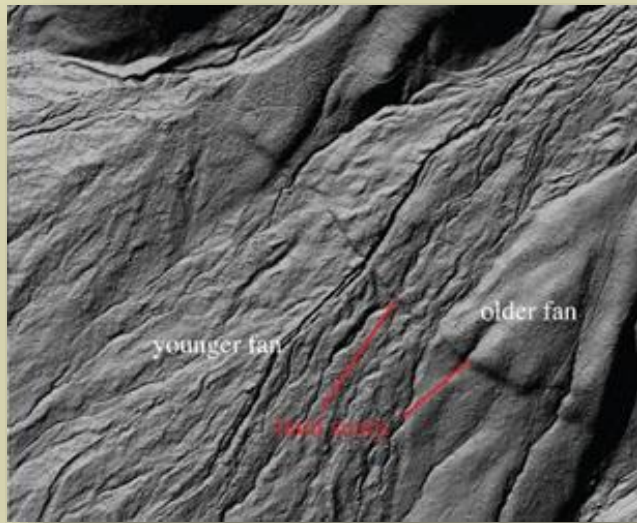
Archaeology



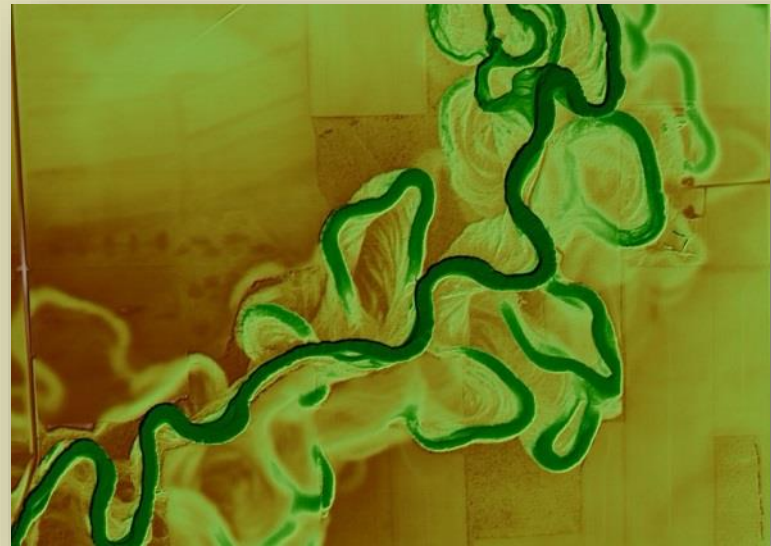
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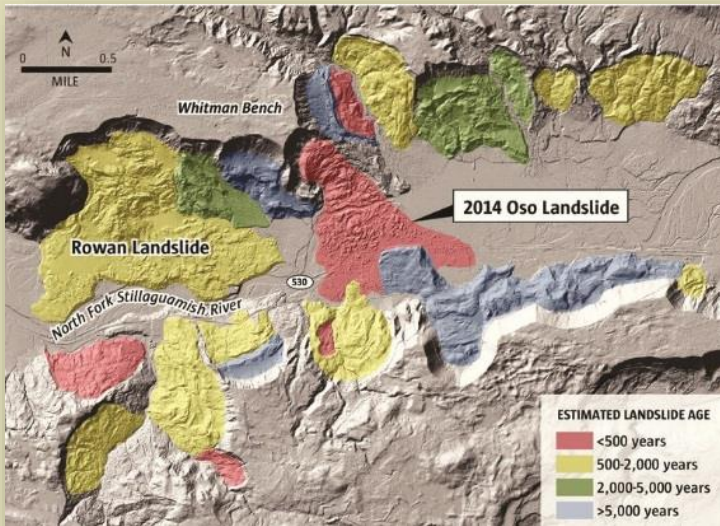
LIDAR APPLICATION



Earthquake Hazards



Flood Risk Management



Landslide Mapping



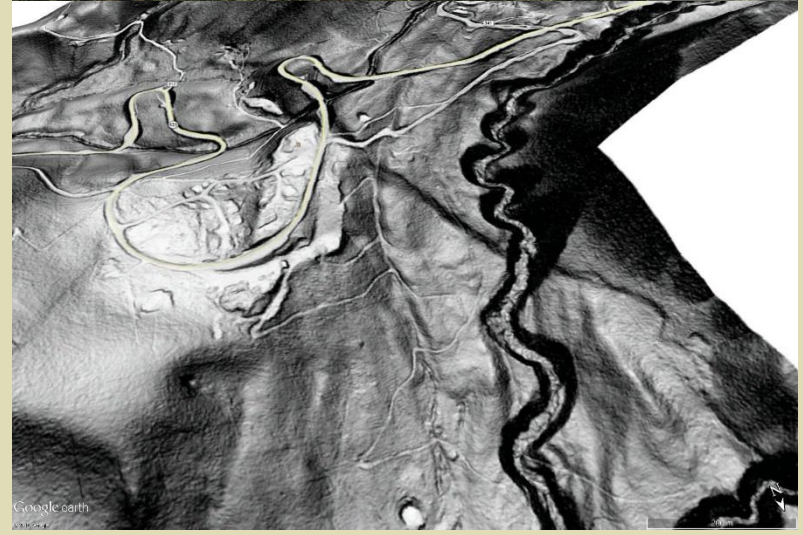
Geologic Mapping



LIDAR APPLICATION



Ophir Creek, Washoe Valley



Galena Creek / Mt. Rose Hwy



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Salt Lake City Lidar

2011: 4,700 km² of Q2 lidar

2013: 3,700 km² of Q1 lidar

Funded by federal and regional agencies:

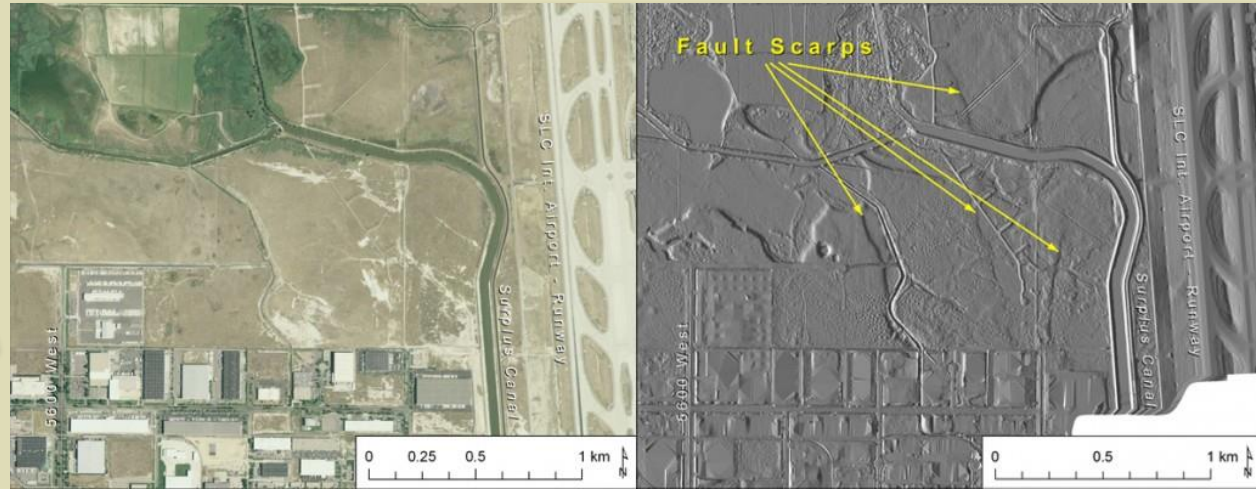
Utah Geological Survey
Salt Lake County Surveyors Office
Utah Division of Emergency Management
City Governments
USGS
FEMA
EPA



Nevada Bureau of Mines
and Geology

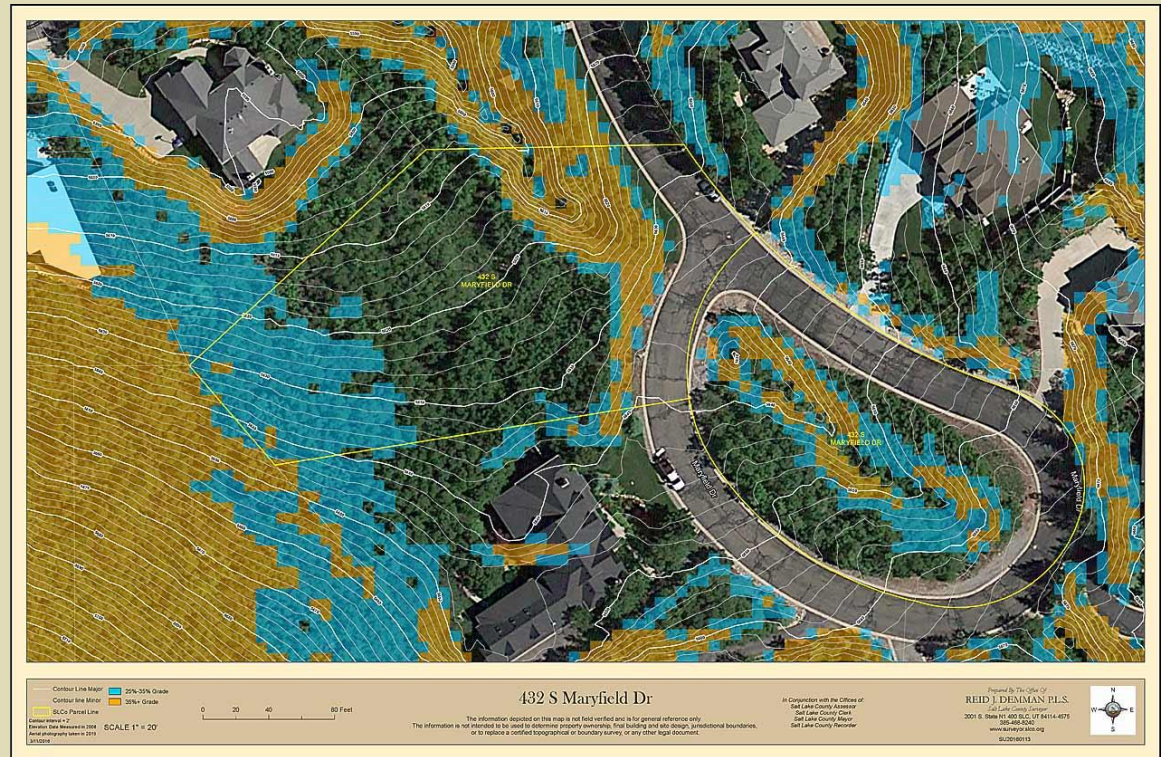
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Salt Lake City Lidar



Used by local agencies for:

- Geologic mapping and hazards
- Flood control modeling
- Building footprints
- Boundary disputes
- Grading plans and pre-construction bids
- Slope maps for “Foothills and Canyon Overlay Zones”
- Rooftop solar
- Geotechnical consulting projects
- Aerial imagery rectification

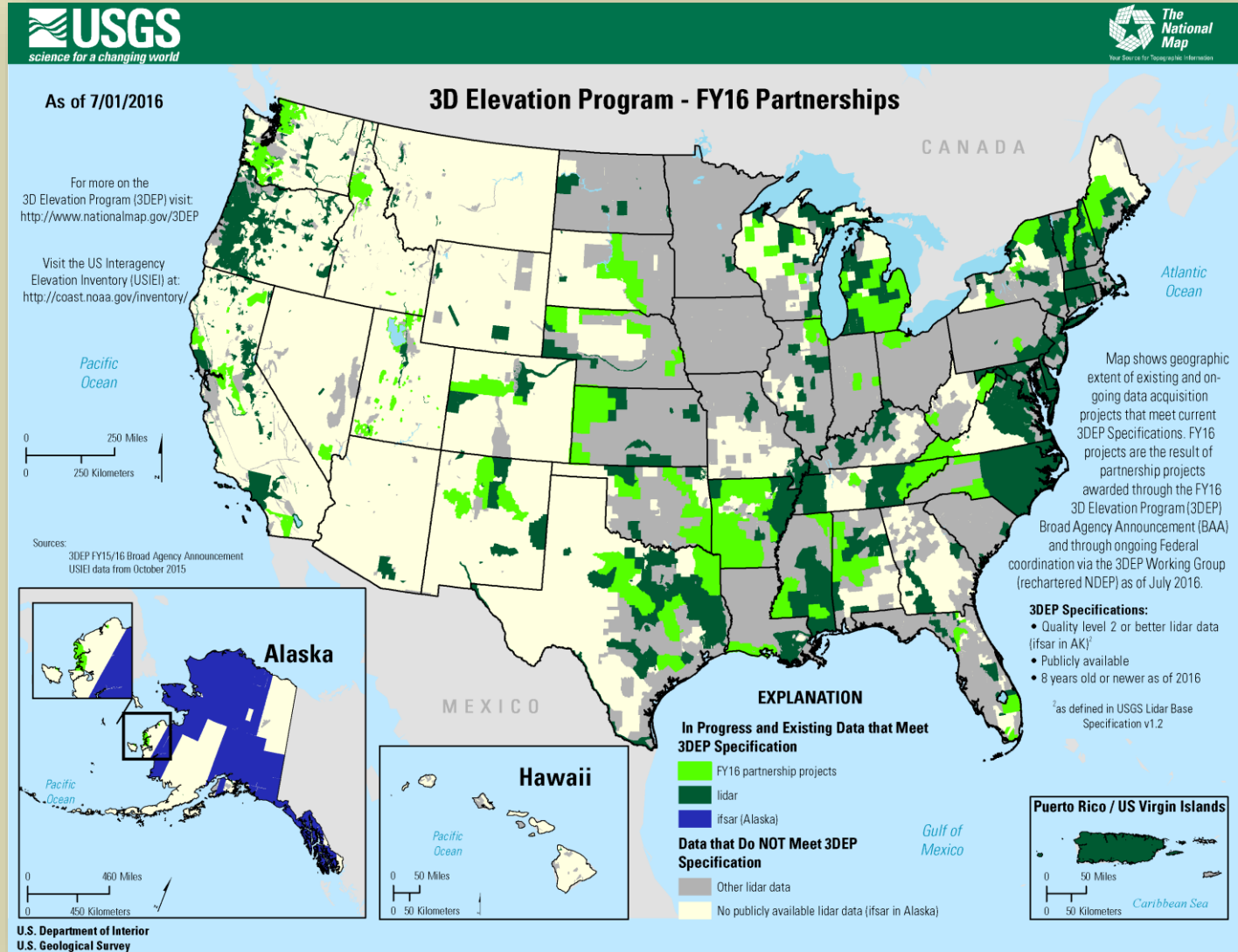


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USGS 3DEP PROGRAM

- U.S. Geological Survey 3D Elevation Program
- Goal of collecting lidar data of the conterminous U.S. over an 8-year period
- Competitive proposal process requiring at least 50% match for acquisitions



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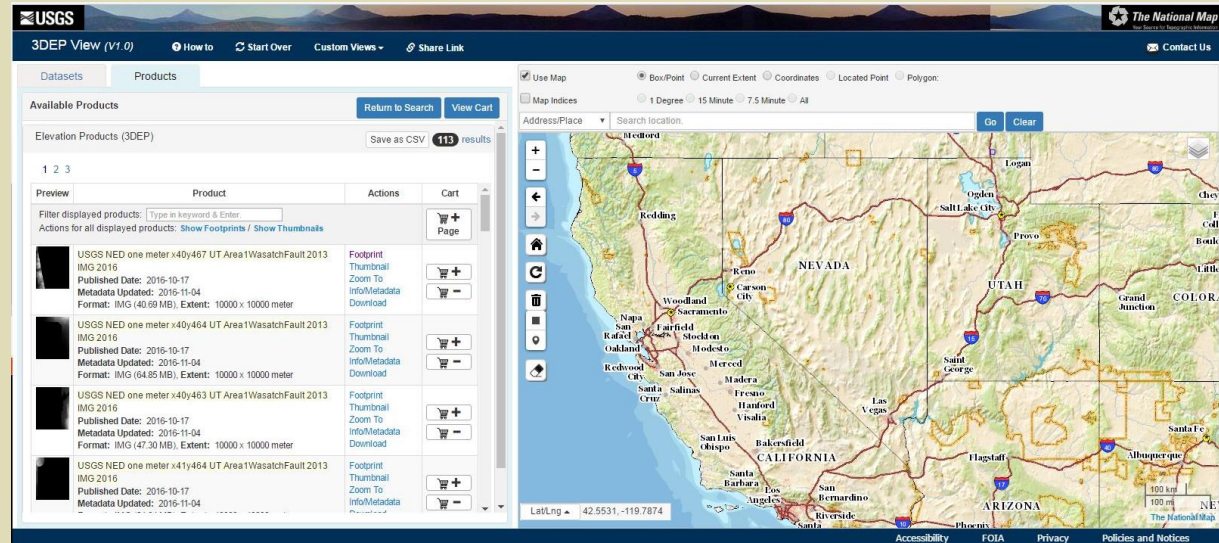
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USGS 3DEP PROGRAM

Quality Level	Source	Vertical Accuracy RMSEz	Nominal Pulse Spacing (NPS)	Nominal Pulse Density (NPD)	DEM Post Spacing
QL1	Lidar	10 cm	0.35 m	8 points/sq. meter	0.5 meter
QL2	Lidar	10 cm	0.7 m	2 points/sq. meter	1 meter
QL3	Lidar	20 cm	1.4 m	0.5 points/sq. meter	2 meters
QL4	Imagery	139 cm	N/A	N/A	5 meters
QL5	Ifsar	185 cm	N/A	N/A	5 meters

- The 3DEP program funds acquisitions at QL2 specification
- If using USGS contracted lidar vendor:
 QL2 = estimated \$255 / sq. mile **(estimates came back at \$230 / sq. mile)**
- Applicant can cover cost of upgrade to QL1 at \$525 / sq. mile

- All lidar data acquired from the 3DEP program is made publicly available through the USGS National Map portal

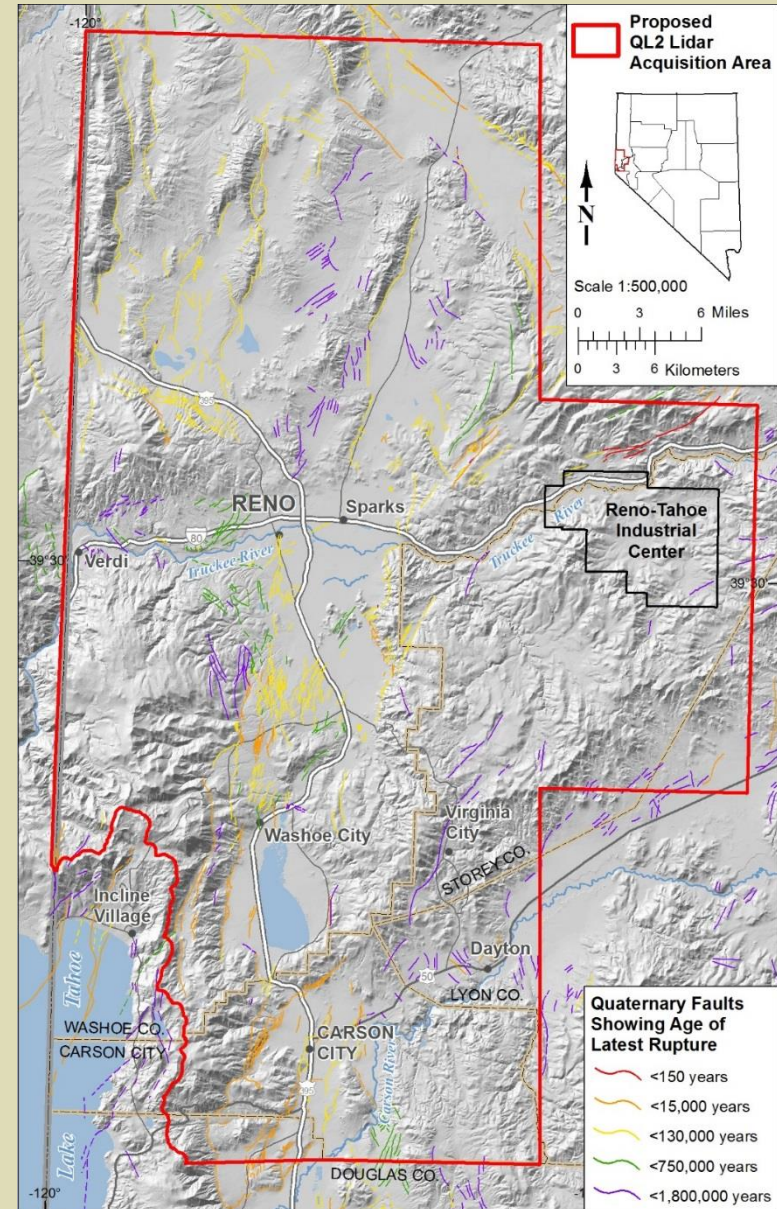


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Reno – Carson City Urban Corridor Lidar Proposal

- Nevada Bureau of Mines and Geology/UNR
- Proposal incorporates Reno – Carson City urban corridor
 - ~1372 square miles for QL2 Lidar
 - Major populated areas in northern Nevada
 - Major transportation corridors
 - Tahoe-Reno Industrial Center
- Applications
 - Urban growth and associated infrastructure
 - Earthquake hazards – 8 earthquakes M6 or larger in past 160 years
 - Flood risk management – Truckee and Carson Rivers
 - Flash-flood, debris flow hazards on small catchments
 - Landslide hazards
- Funding – Total proposal \$349,605
 - **\$174,605 secured from USGS**
 - **\$175,000 match from local entities**
 - \$150,000 provided by UNR Vice President for Research and Innovation Office
 - \$25,000 additional funds needed to maximize match (\$16,000 to maintain current area)



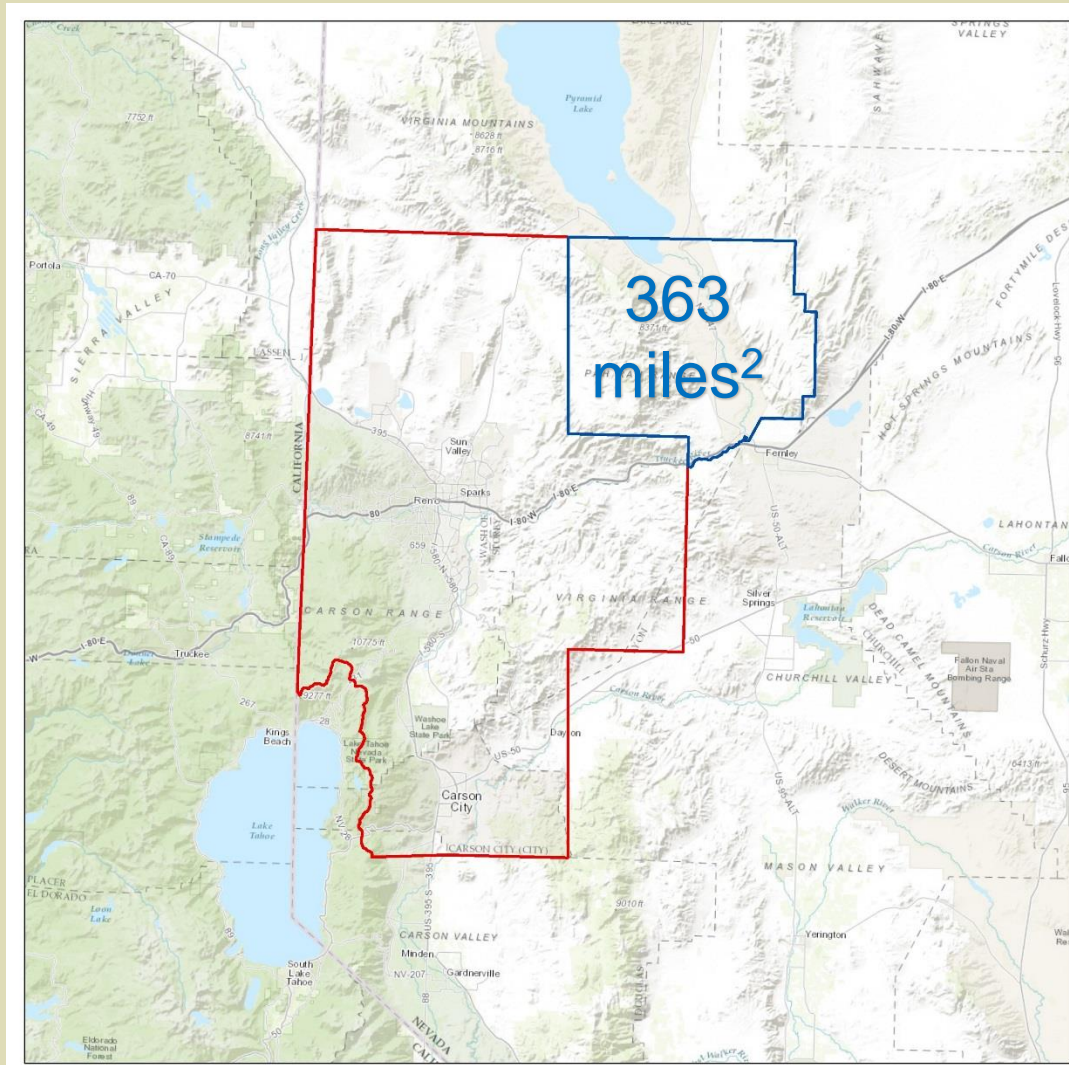
Nevada Bureau of Mines
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Reno – Carson City Urban Corridor Lidar Proposal

Further support:

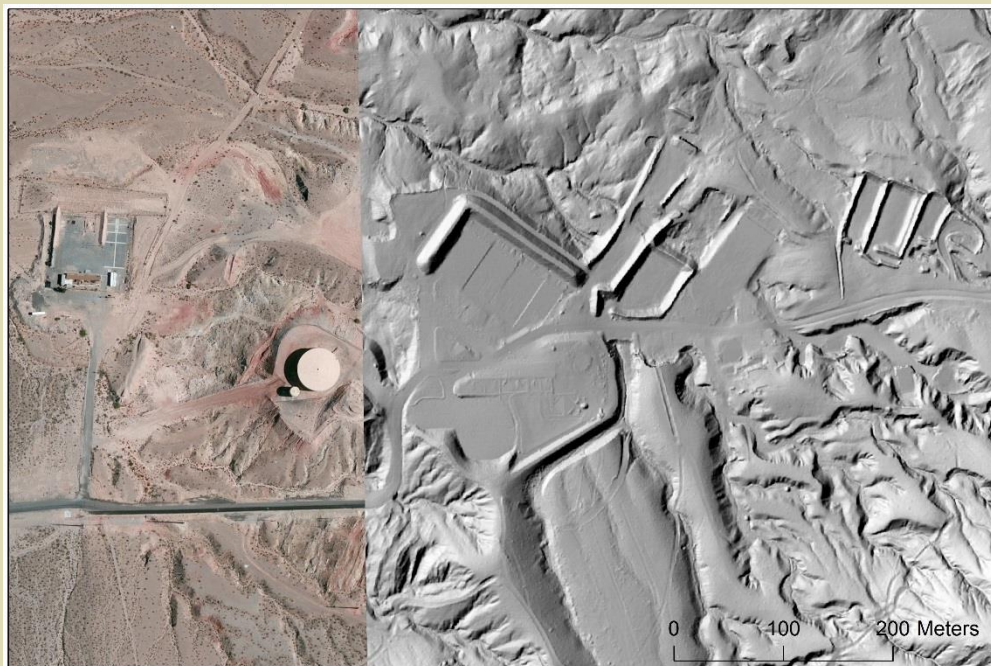
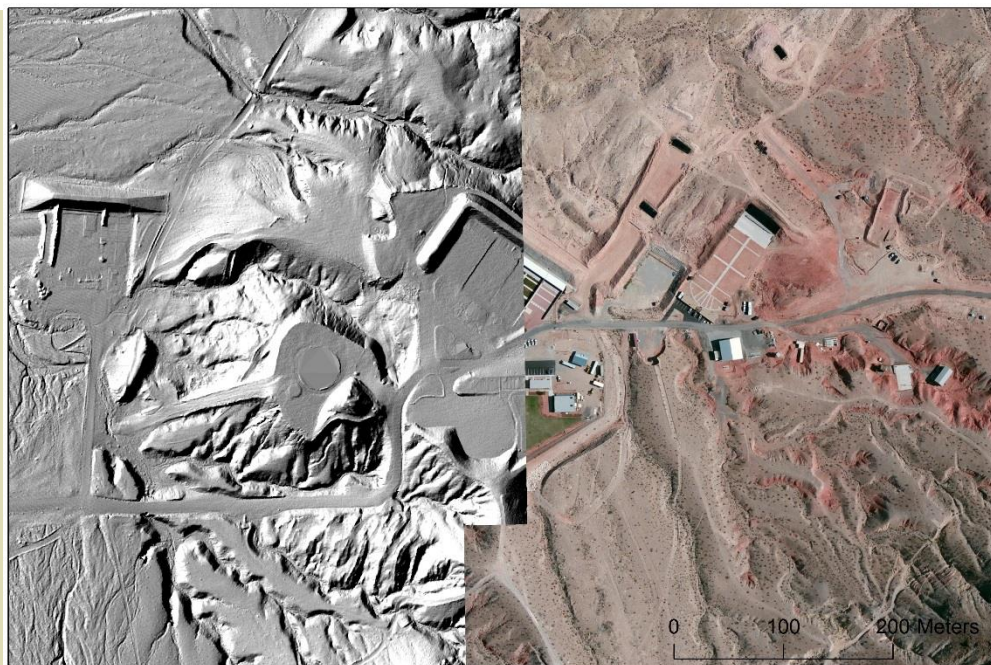
- Funds to expand the Q2 acquisition area (\$230 / sq. mile)
- Possible to pursue additional 3DEP match
- Enhance a portion of the acquisition to Q1 resolution (\$525 / sq. mile)



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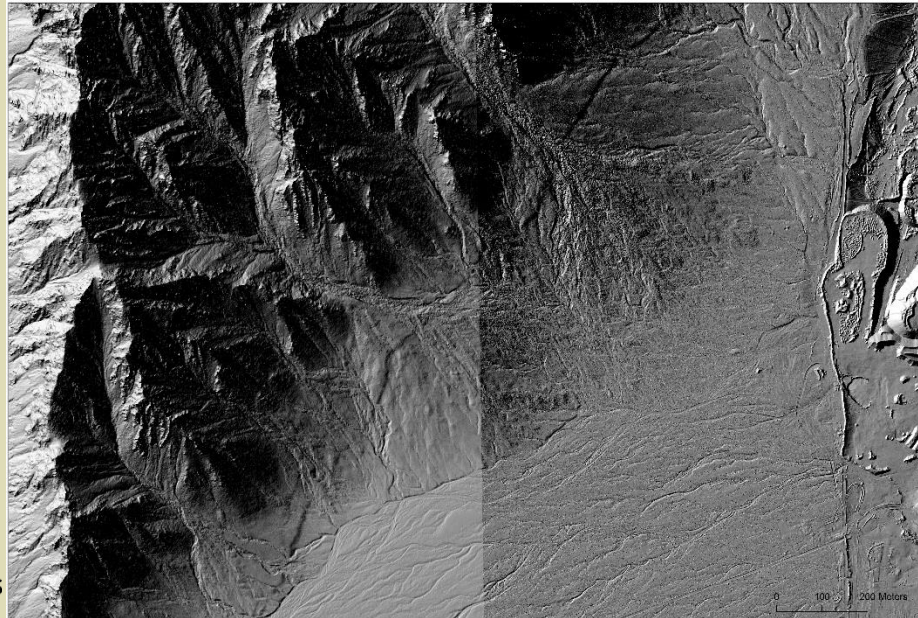
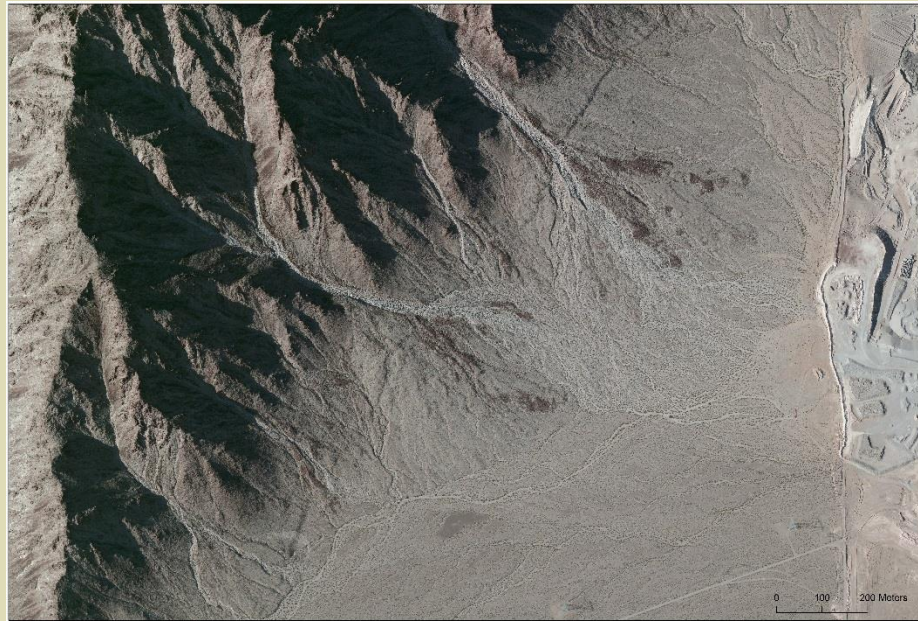
Q1 vs Q2



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Q1 vs Q2



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