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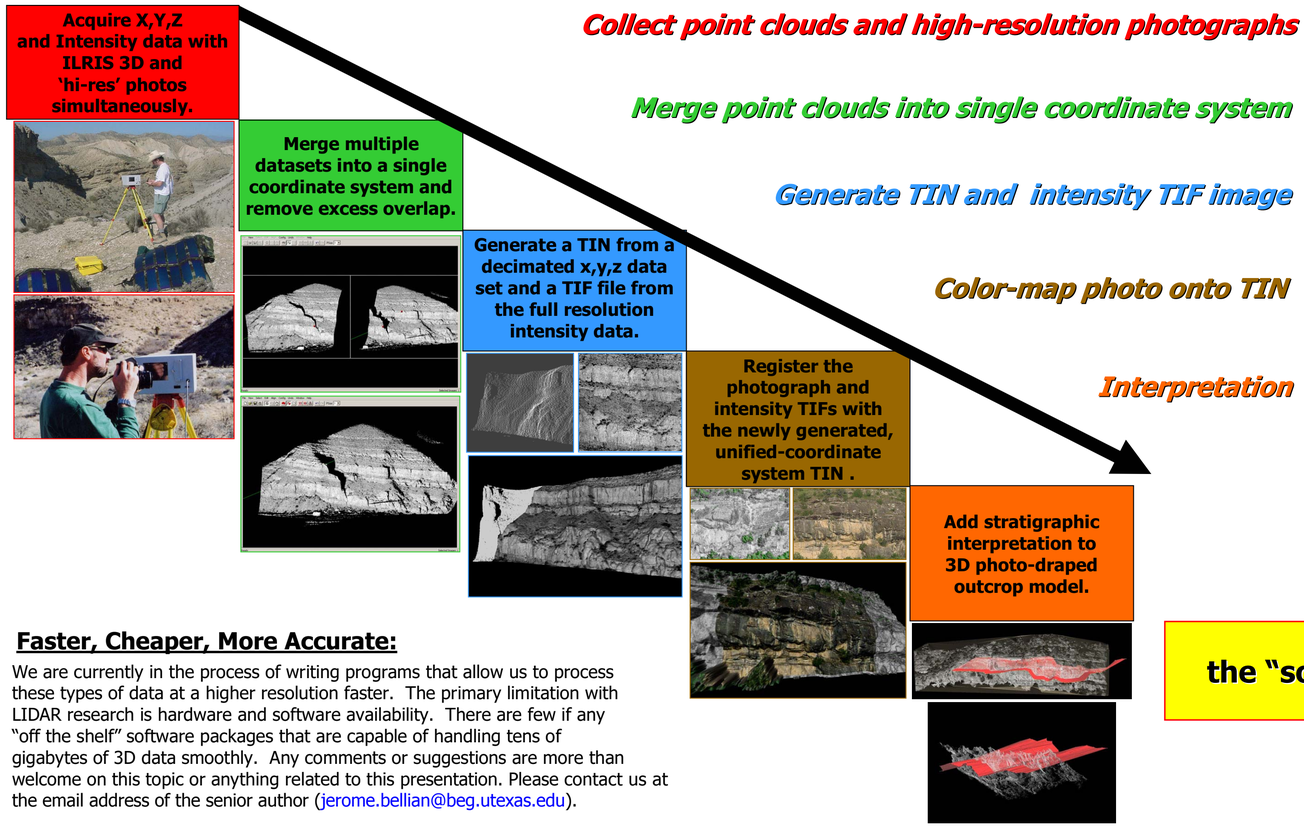
Long-range Research Goals at the Bureau of Economic Geology



Faster, Cheaper, More Accurate:

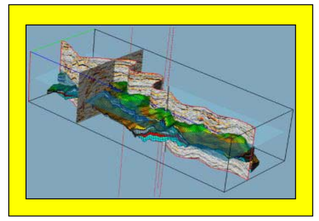
We are currently in the process of writing programs that allow us to process these types of data at a higher resolution faster. The primary limitation with LIDAR research is hardware and software availability. There are few if any "off the shelf" software packages that are capable of handling tens of gigabytes of 3D data smoothly. Any comments or suggestions are more than welcome on this topic or anything related to this presentation. Please contact us at the email address of the senior author (jerome.bellian@beg.utexas.edu).

Summary:

Ground based LIDAR is a tool that provides geologists a quick, accurate, quantitative tool to better understand stratigraphic relationships at the sub-seismic scale. The use of an instrument that can easily lend high resolution photographic integration combines the old and the new as far as outcrop analysis goes. In order to build more accurate reservoir models, we need to acquire more accurate data from which to build reservoir models. LIDAR provides a safe, fast, effective, and inexpensive method of gathering enormous amounts of highly accurate data with a minimum of "down time" between acquisition and generation of a geological model.

the "so what"

Geological Model

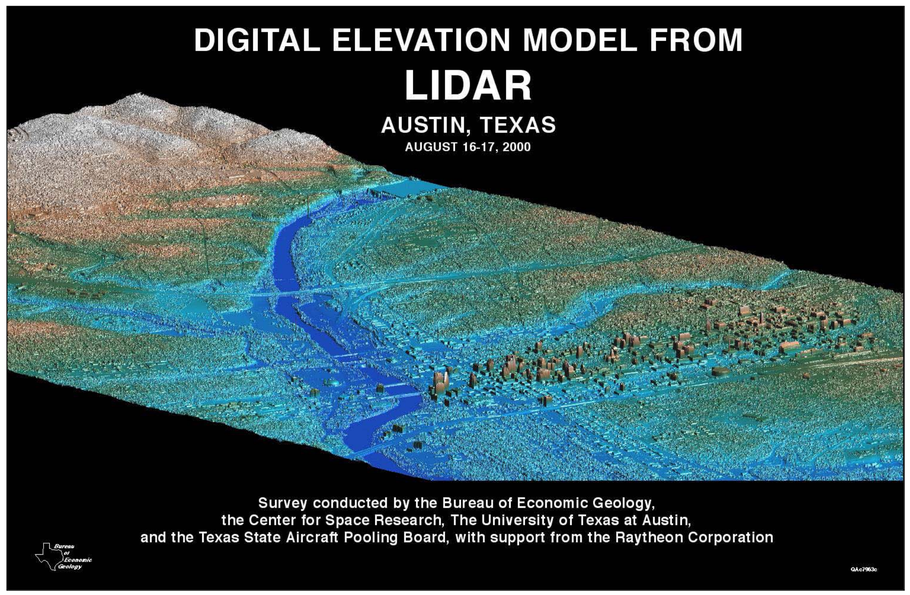


Conclusions:

Photo-pan geology has worked well for us in the past, much in the way that 2D seismic worked for us in the past and still has its place in our geological tool box. It seems clear however that, like the advent of 3D seismic, 3D outcrop photographic modeling is the next logical step to quantify what we can see in order to better select analogs for what we can't see in the subsurface. 3D imaging and digital outcrop analysis are becoming as critical as the Brunton compass and the hand lens. The more quantitative we can be in our understanding of depositional systems, the better we will become at predicting ahead of the bit with more unknowns due to fewer wells, fewer cores and deeper targets. In undrilled basins one of our strongest tools is still a solid outcrop analog to predict what we can't see in the seismic.

Looking Forward

Airborne and Ground Based LIDAR Integrated Digital Elevation Models



The left image is the greater Austin area surveyed in early 2000 showing a 0.5 meter DEM color coded to elevation. The above figure (courtesy of the Center for Space research) is an IKONIS satellite image (one meter resolution) of the UT campus draped over the ALTM DEM shown on the left. The image to the right is a larger scale window of the intersection in the foreground of the image above. The detail of the sides of buildings and data beneath underpasses is missing from airborne photos and surveys because they are line of sight instruments that can not see under objects they cannot fly under. The utility of a ground-based instrument (especially one with mm resolution) can clearly be understood from the limitations airborne only surveys encounter. A distant hope is the eventual integration of multi-or hyper-spectral scanners for ground surveys at high resolution and moderate cost.