# TERRAINVISION® PROJECT EXPERIENCE

In 2001 Johnson, Kunkel & Associates opened its TerrainVision® Division to address the mapping needs of clients involved in large area development.

This division primarily involves the application of LiDAR (**Li**ght **D**etection **A**nd **R**anging) for topographic mapping and aerial photography of areas which are too large, too remote, or too heavily vegetated to be efficiently mapped by other means. LiDAR is a process which digitizes the earth's surface with a scanning laser from a GPS positioned aircraft. This state-of-the-art technology enables mapping even through dense vegetation, and no survey panel points are required since the LiDAR data points are referenced by direct differential GPS. The aerial photography is then very accurately ortho-rectified from the numerous features visible in both the photography and the LiDAR data set. The table below summarizes our LiDAR projects to date:

| YEAR | CLIENT / PROJECT | PROJECT TYPE | END USE | PROJECT AREA (AC) | AREA (SQ-MI) | CONTOUR INTERVAL (FT) | ELEVATION DATA POINTS | AVERAGE LINEAR POINT SPACING (FT) | AERIAL PHOTOGRAPHY |
|---|---|---|---|---|---|---|---|---|---|
| 2001 | KLT Gas Inc. | Coal Bed Methane Site | Engineering Design | 6,583 | 10.3 | 2 | 12,320,850 | 4.8 | B&W - 6" Pixel |
| 2001 | Gary Copperud | Proposed Subdivistion | Engineering Design | 878 | 1.4 | 2 | 1,061,798 | 6.0 | B&W - 6" Pixel |
| 2001 | The Legends | Proposed Subdivistion | Engineering Design | 173 | 0.3 | 2 | 183,124 | 6.4 | B&W - 6" Pixel |
| 2001 | West End Village | Proposed Subdivistion | Engineering Design | 151 | 0.2 | 2 | 226,110 | 5.4 | B&W - 6" Pixel |
| 2001 | Grassy Creek Ranch Preserve | Proposed Subdivistion | Engineering Design | 3,367 | 5.3 | 2 | 2,620,118 | 7.5 | B&W - 6" Pixel |
| 2001 | Mt. Harris at Grassy Creek | Proposed Subdivistion | Engineering Design | 2,621 | 4.1 | 2 | 2,435,421 | 6.8 | B&W - 6" Pixel |
| 2002 | American General Media / Myers | Proposed AM Radio Tower | Engineering Design | 3,185 | 5.0 | 2 | 939,055 | 12.2 | LIDAR Intensity Map |
| 2002 | Lafarge North America | Gravel Mining Operation | Permitting | 5,729 | 9.0 | 2 | 25,053,124 | 3.2 | Color - 6" Pixel |
| 2002 | Eagle Mountain Ranch | Proposed Subdivistion | Engineering Design | 305 | 0.5 | 2 | 363,621 | 6.0 | Color - 6" Pixel |
| 2002 | Learning Curve | Proposed Driveway | Engineering Design | 597 | 0.9 | 2 | 374,594 | 8.3 | Color - 6" Pixel |
| 2002 | Squaw Creek Metro District | Existing Subdivision | Planning | 8,047 | 12.6 | 2 | 9,666,356 | 6.0 | Color - 6" Pixel |
| 2002 | Steamboat Ski & Resort Corp. | Existing Ski Resort | Planning | 8,547 | 13.4 | 2 | 10,410,410 | 6.0 | Color - 6" Pixel |
| 2003 | U.S. Army Corps of Engineers | NASA CLPX Project | Research | 2,718 | 4.2 | 2 | 3,883,700 | 5.5 | Color IR - 6" Pixel |
| 2003 | U.S. Army Corps of Engineers | NASA CLPX Project | Research | 2,965 | 4.6 | 2 | 6,049,462 | 4.6 | Color IR - 6" Pixel |
| 2003 | Town of Gypsum | Municipality | Land Use Planning | 24,666 | 38.5 | 2 | 31,830,212 | 5.8 | Color - 6" Pixel |
| 2004 | Adams Rib Development | Proposed Subdivision | Engineering Design | 5,027 | 7.9 | 2 | 7,194,796 | 5.5 | Color - 6" Pixel |
| 2004 | Lafarge North America | Gravel Mining Operation | Permitting | 2,899 | 4.5 | 2 | 4,094,618 | 5.6 | Color - 6" Pixel |
| 2004 | Traer Creek Metro District | Proposed Subdivision | Engineering Design | 4,593 | 7.2 | 2 | 6,200,154 | 5.7 | Color - 6" Pixel |
| 2004 | Windance Ranch | Proposed Subdivision | Engineering Design | 2,785 | 4.4 | 2 | 4,457,861 | 5.2 | Color - 6" Pixel |
| 2004 | Sweetwater Resort | Proposed Subdivision | Engineering Design | 1,958 | 3.1 | 2 | 3,133,341 | 5.2 | Color - 6" Pixel |
| 2005 | U.S.D.A. Forest Service | Forest Biometrics | Research | 1,236 | 1.9 | 2 | 4,684,767 | 3.4 | Color IR - 6" Pixel |
| 2005 | Granby Ranch | Proposed Subdivision | Engineering Design | 6,711 | 10.5 | 2 | 4,806,914 | 7.8 | Color - 6" Pixel |
| 2005 | Redhawk Ranch | Proposed Subdivision | Engineering Design | 3,035 | 4.7 | 2 | 2,172,032 | 7.8 | Color - 6" Pixel |
| 2005 | Wilderness Ranch | Proposed Subdivision | Engineering Design | 3,265 | 5.1 | 2 | 1,956,635 | 8.5 | Color - 6" Pixel |
| 2005 | Battle Mountian | Proposed Subdivision | Engineering Design | 8,610 | 13.5 | 2 | 9,720,016 | 6.2 | Color - 6" Pixel |
| **TOTAL** | | | | **110,650** | **172.9** | | **155,839,089** | **5.6** | |

With over 170 square miles mapped, creating topography from over 150 million elevation data points, we are confident that we are the most experienced firm deploying LiDAR based products in the Rocky Mountains.

Within the TerrainVision® Department we also have extensive experience employing a myriad of tools to process and transform data and images. We are able to transform large LiDAR or GIS data sets into any defined coordinate system and datum. We have extensive experience creating coordinate system definitions for archaic local systems. We have even developed proprietary software to enable definition of difficult tilted datums, allowing accurate integration of new elevation data sets.

In addition to base mapping services, we also have extensive experience providing a full range of map analysis products including:

- Photo-Simulations
- Viewshed Analysis
- Slope Analysis
- Skyline Analysis
- Shadow Mapping
- Solar Intensity Mapping