



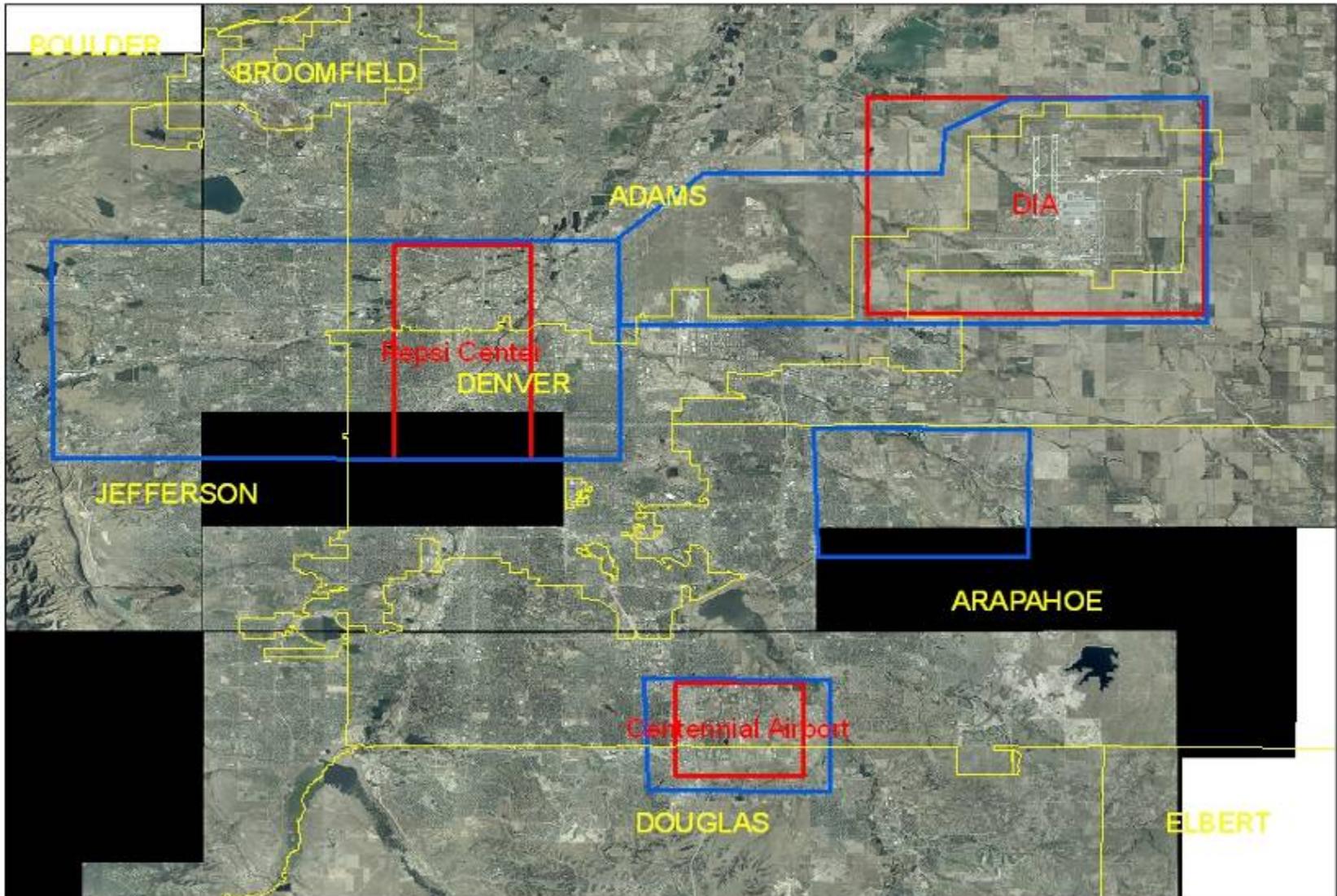
*Supporting DNC through
GIS Collaborative Partnerships*

Central Region NSDI
Partnership Office



NGA DNC Imagery Footprints

NGA DNC Lidar Footprints

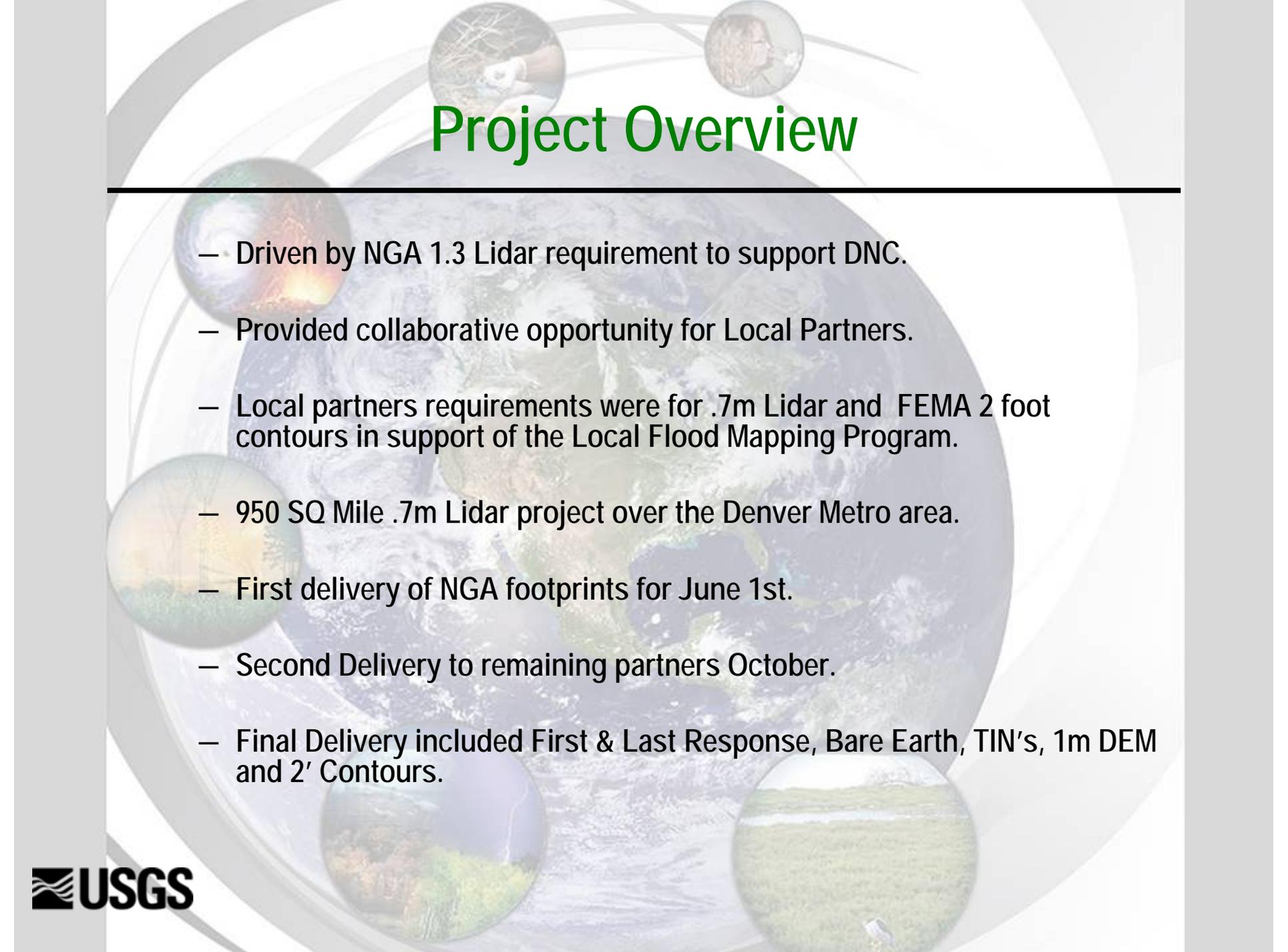


DNC Event Areas

An aerial photograph of downtown Denver, Colorado, showing a dense grid of buildings and streets. A large, winding highway interchange is visible on the left side. Two specific areas are highlighted with white arrows and labels: Invesco Field, a large stadium with a green field, and the Pepsi Center, a large arena. The text 'DNC Event Areas' is overlaid in large white letters at the top center.

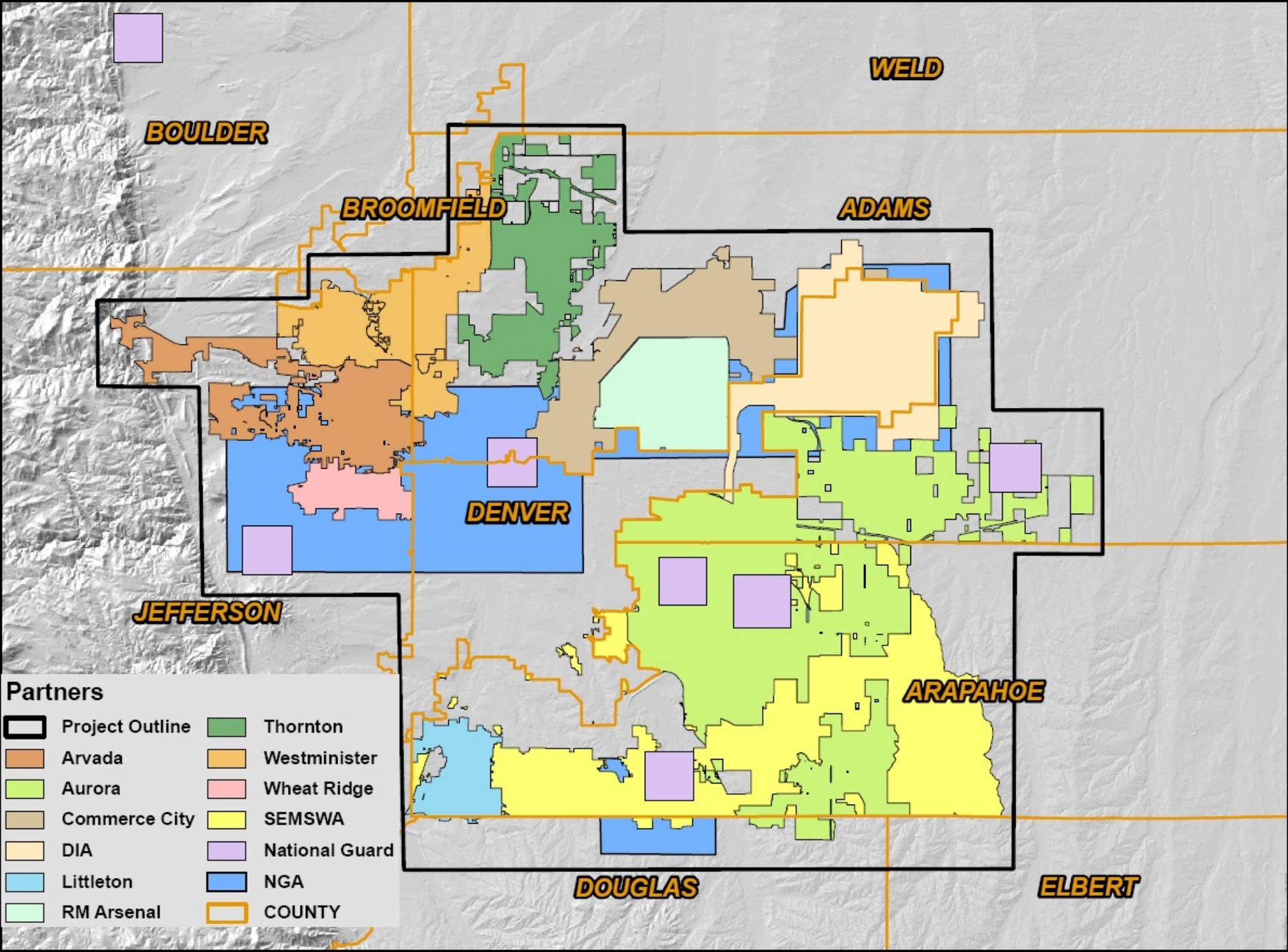
Invesco Field

Pepsi Center

The slide features a central background image of the Earth from space. Surrounding this are several circular inset images: a person in a white lab coat, a woman with glasses, a landscape with a river, and a field with a white fence. The title 'Project Overview' is centered at the top in a large green font.

Project Overview

- Driven by NGA 1.3 Lidar requirement to support DNC.
- Provided collaborative opportunity for Local Partners.
- Local partners requirements were for .7m Lidar and FEMA 2 foot contours in support of the Local Flood Mapping Program.
- 950 SQ Mile .7m Lidar project over the Denver Metro area.
- First delivery of NGA footprints for June 1st.
- Second Delivery to remaining partners October.
- Final Delivery included First & Last Response, Bare Earth, TIN's, 1m DEM and 2' Contours.



BOULDER

WELD

BROOMFIELD

ADAMS

DENVER

JEFFERSON

ARAPAHOE

DOUGLAS

ELBERT

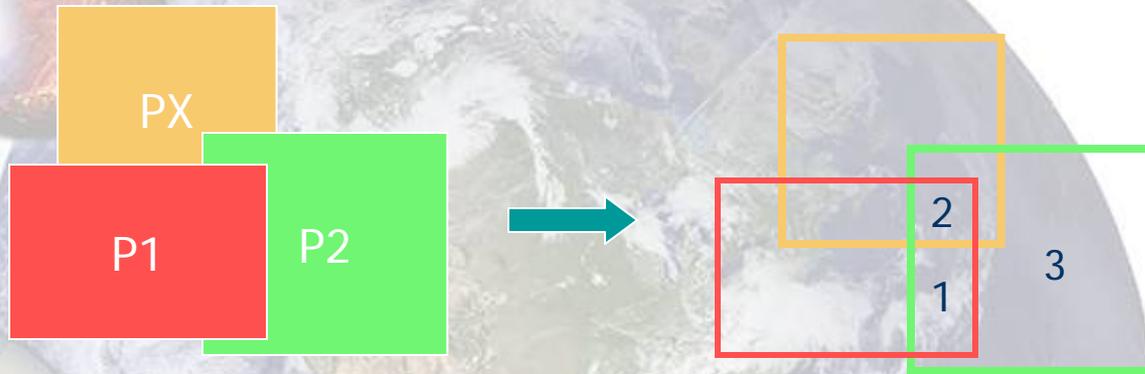
Partners

- | | |
|--|--|
|  Project Outline |  Thornton |
|  Arvada |  Westminister |
|  Aurora |  Wheat Ridge |
|  Commerce City |  SEMSWA |
|  DIA |  National Guard |
|  Littleton |  NGA |
|  RM Arsenal |  COUNTY |

Couple Issues

- Project had a short timeline due to early delivery for DNC.
- Initial hesitance in providing a Independent Government Cost Estimate, until confirmation of partners.
- Availability and approval for local funds requires flexibility.
- IGCE determines Partner participation, in turn determines project area.
- Funding agreements included, 9 JFA's & 2 MIPR's required prior to DI-1 & actual estimate from contractor.
- DI-1 funding commitment based on IGCE prior to Actual cost, Actual Cost was \$70K less.
- State helped with building the Cost Model, so determining the Partners cost based on the actual cost was fairly easy.

Project Cost Model ESRI "Union" Tool

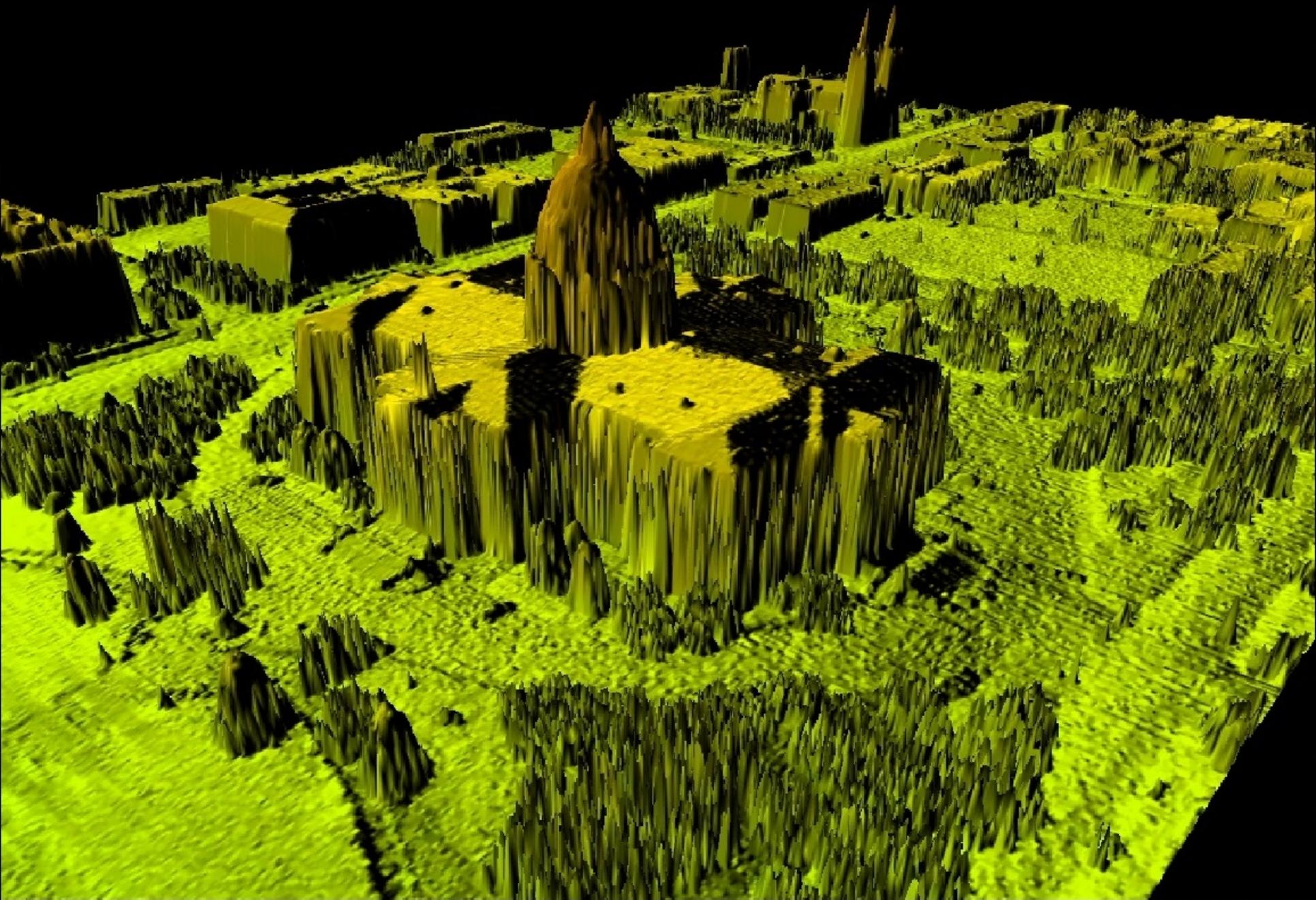


Area	Partner 1	Partner 2	Partner X	Total SQ/MI
1	X	X		x.xx
2	X	X	X	x.xx
3		X		xx.xx
Totals	x.xx	x.xx	x.xx	x.xx

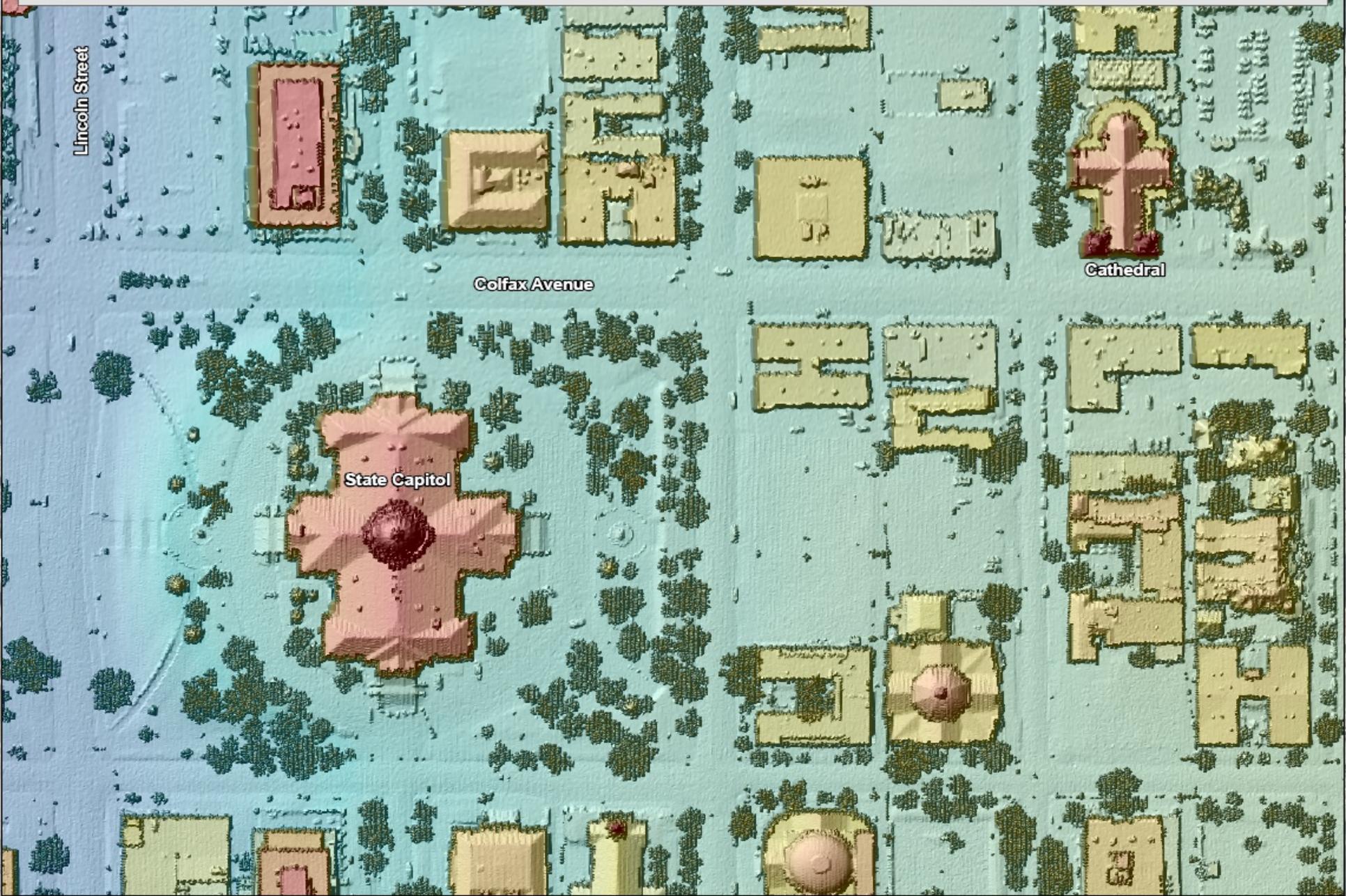
Financial Breakdown..

	Unburdened	Burdened
■ Aurora	\$66,666	\$70,000
■ SEMSWA	\$28,571	\$30,000
■ NGA	\$384,761	\$404,000
■ Westminster	\$12,906	\$13,551
■ Commerce City	\$11,640	\$12,222
■ DIA	\$10,757	\$11,295
■ National Guard	\$5,663	\$5,946
■ Littleton	\$5,015	\$5,266
■ Wheatridge	\$1,808	\$1,899
■ Arvada	\$9,558	\$10,036
■ Thornton	\$12,449	\$13,072
■ Total	\$549,799	\$577,289

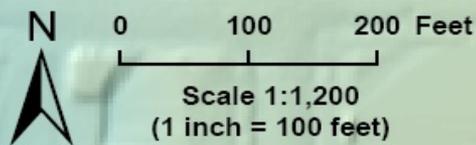
3-D View of Lidar Digital Surface Model (DSM): Capitol building is in the foreground, looking northeast. The lidar DSM surface can be used to visualize the landscape in various software packages that support three-dimensional modeling.



All>Returns Lidar Digital Surface Model (DSM): Lidar DSM data has been processed from truly "raw" lidar returns, but reflects the earth's surface as the sensor first sees it, and thus contains buildings, trees, and other objects. Note that this lidar is of high enough resolution to capture vehicles (rectangular objects on the streets and in parking lots). DSM elevation data is useful for obtaining building and tree heights, and can be used in conjunction with imagery to make realistic 3-D models of the landscape (see frames below).



Bare-earth Lidar Digital Terrain Model (DTM): Lidar DTM data is derived from the unfiltered digital surface model (DSM) lidar via a proprietary process which removes buildings, vegetation cover, and other objects. These high resolution lidar DTM datasets are analogous to USGS digital elevation models (DEMs), which reflect bare-earth topography at a lower spatial resolution.



2-Foot Contours Derived from Bare-earth Lidar Digital Terrain Model (DTM): These contours were made from the lidar DTM and show the utility of the high resolution lidar for urban planning, floodplain mapping, and other applications.



6-Inch Natural Color Georegistered Imagery: This high resolution aerial imagery (6-inch pixels) was collected within a few weeks of the lidar acquisition, and shows a great level of detail for urban planning and other applications. Although this imagery has not yet been ortho-rectified (removing "building lean" so that all objects appear as if the observer was directly above), it is geo-registered to allow accurate co-positioning with other geospatial data.



3-D View of Imagery Draped over Lidar Digital Surface Model (DSM): Cathedral is in foreground, looking southwest toward Capitol. Imagery can be draped over the lidar DSM surface to add more detail to three-dimensional landscape models.



Sums it Up

Arvada Reporter, "Due to the economies of scale, the City of Arvada will achieve this data for a total cost of \$17,771. By comparison, one metro-area city of similar size recently paid \$80,000 for the same data. Another city requested bids for LIDAR coverage in 2007 and received bids of up to \$100,000."

Questions

