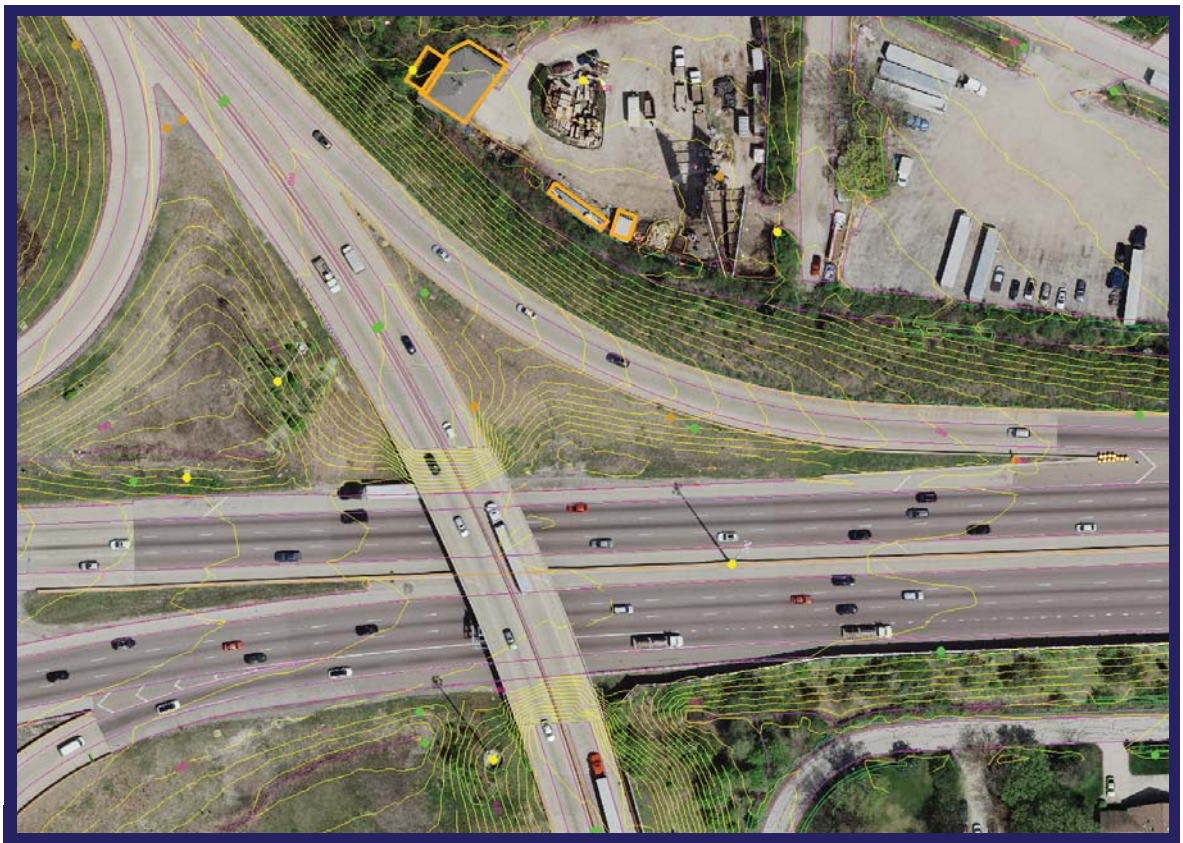
Large-Scale Mapping of I-55 in Chicago by Surdex

State Departments of Transportation (DOTs) often seek high-accuracy imagery and lidar, as well as derivative products (such as elevation models and planimetric features) for roadway and bridge planning and design projects. To meet its ongoing need for geospatial data, the Illinois Department of Transportation (IDOT) maintains agreements with photogrammetric firms, such as Surdex, for professional services including photography acquisition, topographic mapping, and lidar collection, among others. Surdex has fulfilled numerous work orders under its contract with the IDOT, all including imagery and a few also including lidar.

One of the more notable recent work orders Surdex completed for IDOT included 30 road miles of 0.15' resolution imagery and 4 points per square meter (ppsm) lidar data over Interstate 55 in Chicago. This work order was first filed in March of 2017.

Acquiring high resolution/density aerial data requires precise planning. For this project, Surdex enlisted the help of our subcontractor Prairie Engineering to provide 200 survey control points, as the IDOT contract required that survey be performed by an Illinois Registered Land Surveyor.

This project area also required very careful flight planning because it required low flights over a heavily populated and highly developed area. Surdex's flight crews had to coordinate with Chicago Tracon (Chicago Approach Control) to fit into the air traffic flow at not only Midway and O'Hare airports but also other airports in the area. Acquisition was therefore limited by air traffic conditions as well as weather conditions, making this stage particularly challenging. The imagery and lidar data were acquired by the end of May.



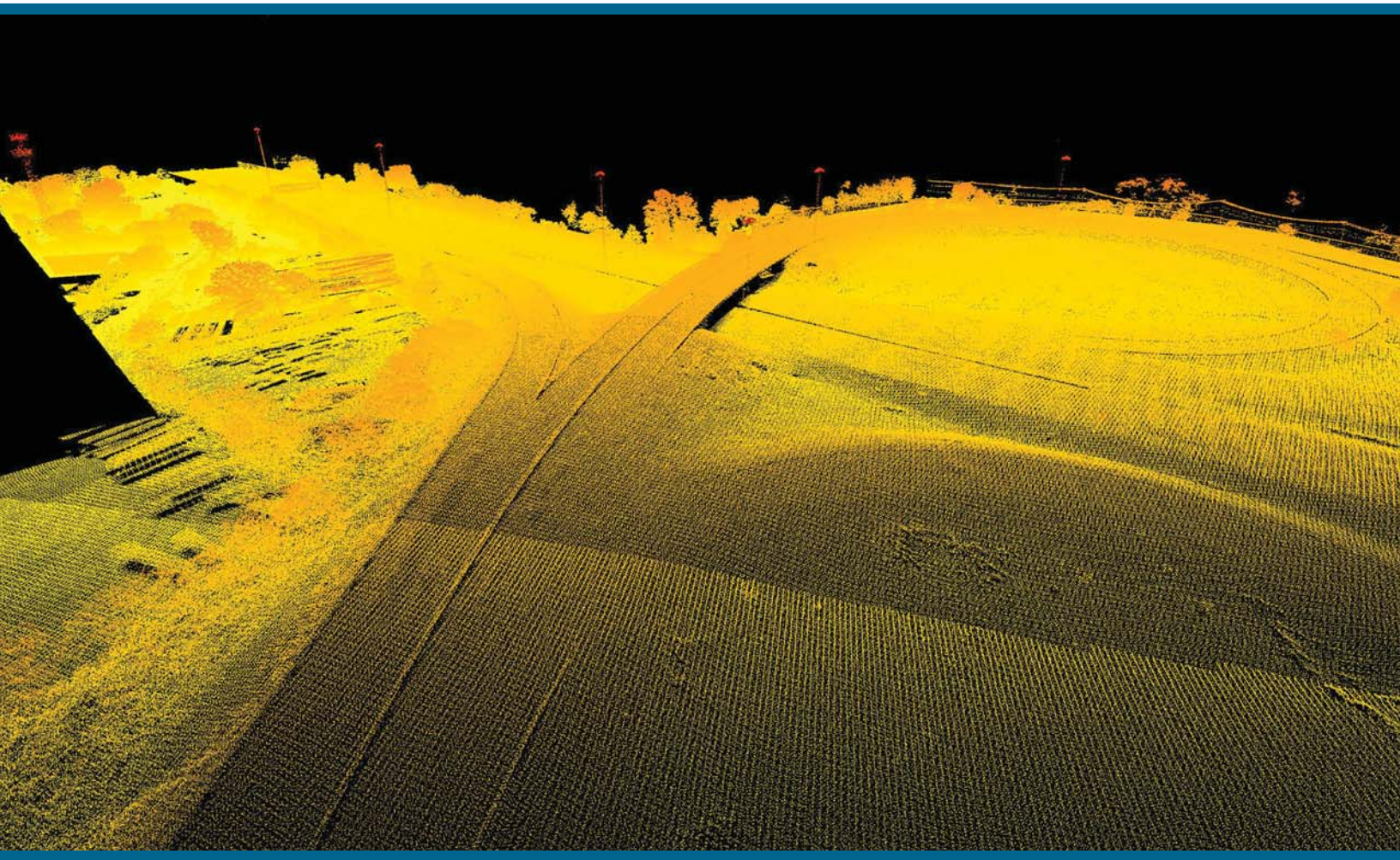
Planimetric and topographic data over orthoimagery, Interstate 55 in Chicago

Large-Scale Mapping of I-55 in Chicago by Surdex

Surdex then began the processing phase of the project. We completed the lidar data processing first because it was used to create a Digital Elevation Model (DEM) that was used for the orthoimagery processing. In the end, Surdex provided the following deliverables:

- Bare-earth lidar point cloud
- Digital Elevation Model (DEM)
- Digital Surface Model (DSM)
- Hydrological features (in a geodatabase)
- 1' contours (Digital Terrain Model)
- Orthoimagery tiles (compressed and uncompressed)
- Metadata
- 1"=50' scale planimetric mapping features

Several datasets were dependent upon the accuracy of one or more other datasets. Our rigorous processing and numerous quality assurance / quality control checks ensured the data was produced to the required specifications and were critical to keeping production on schedule. The project was ultimately a success, providing the Illinois DOT with vital elevation, imagery and planimetric data for their work.



Lidar point cloud of Interstate 55 in Chicago