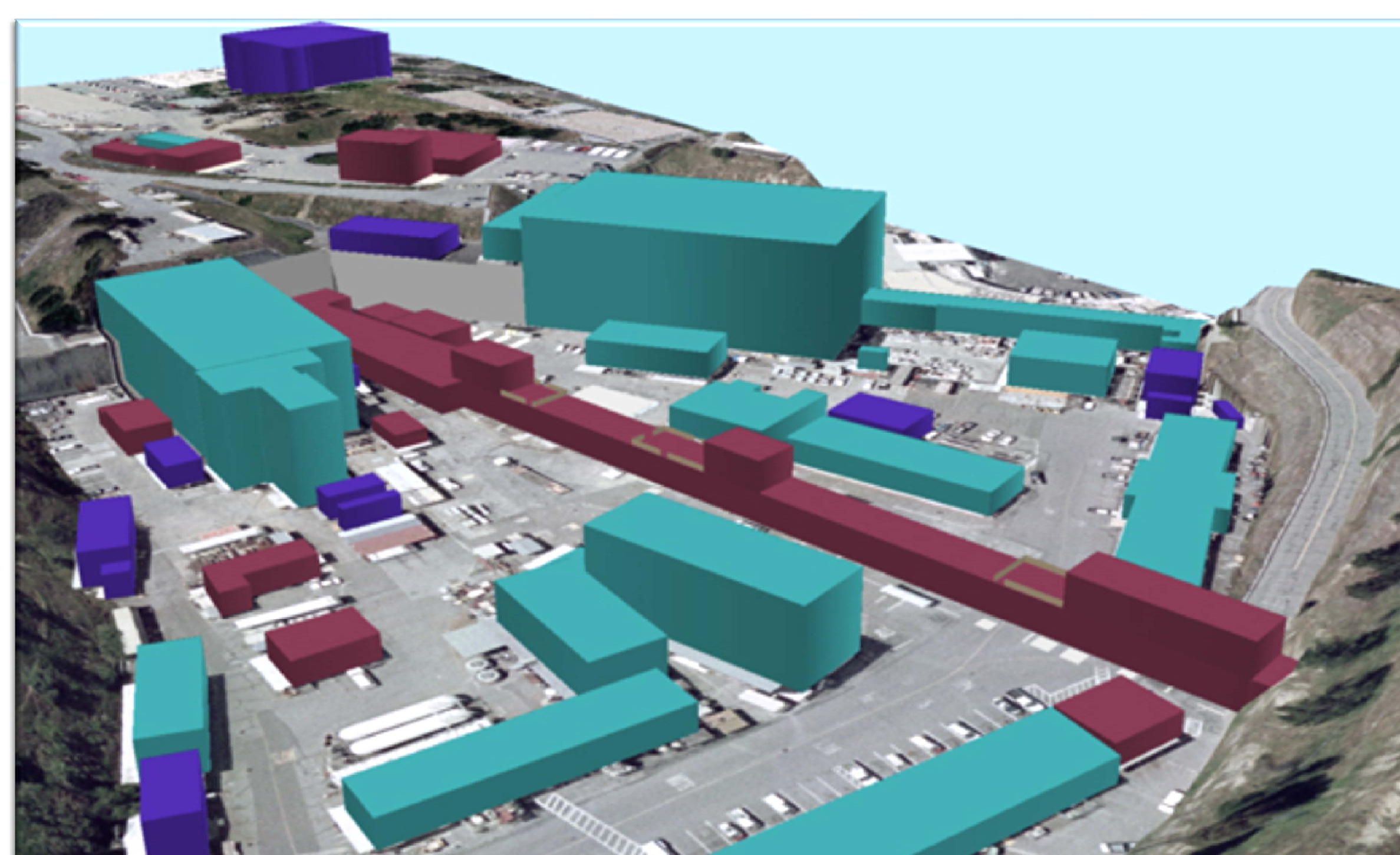


# Integration of Laser Scans Into a GIS

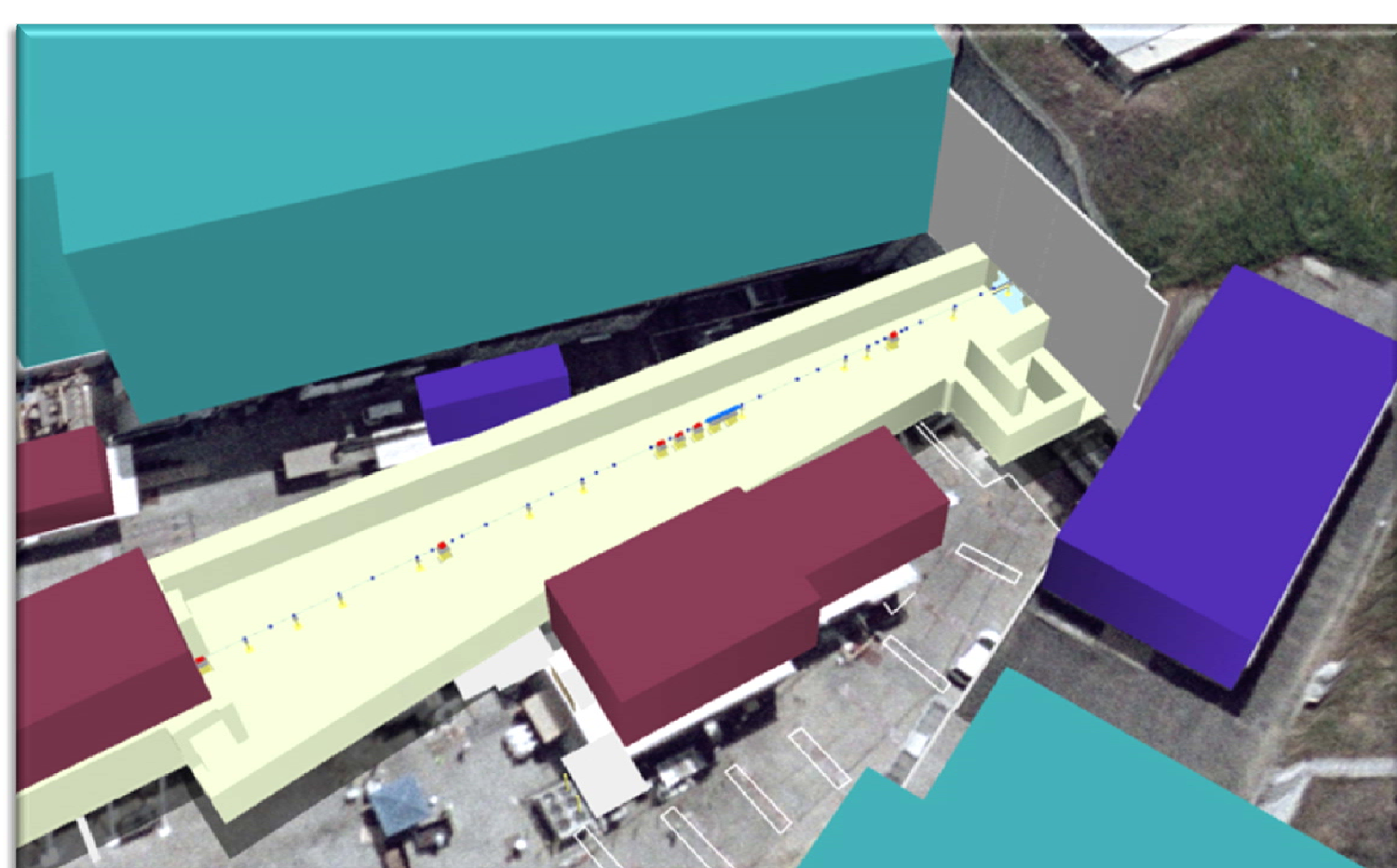
Brian Fuss, Catherine Le Cocq, Michael Gaydosh

The integration of laser scans into a Geographic Information System (GIS) has been investigated. Detailed scans of the Beam Transport Hall (BTH) and Head House in SLAC's Linac Coherent Light Source (LCLS) have been successfully integrated into the SLAC Metrology GIS. These scans were made at various density levels and portions were subsequently added to this evolving information system. This poster highlights some results of this integration and illustrates the usefulness of utilizing laser scans for adding and verifying features in a GIS.

## The Test Site



The LCLS building in the Research Yard was chosen for the study area. Data from sources including CAD, laser scans and field surveys were combined and integrated. The ESRI GIS database kept track of all drawing entities and "knows" all the associated qualities and quantities of the entity including its geometric location and accuracy. The Research Yard study area is shown on the center right of the aerial photo and the other image is a GIS-generated view of the same area from a different angle. In this particular example the buildings are colored according to their associated SLAC directorate. (Aerial photo from SLAC Today, April 19, 2010.)



This is a view of the LCLS Head House with the roof removed. The beamline components have been modeled and integrated at their ideal positions.

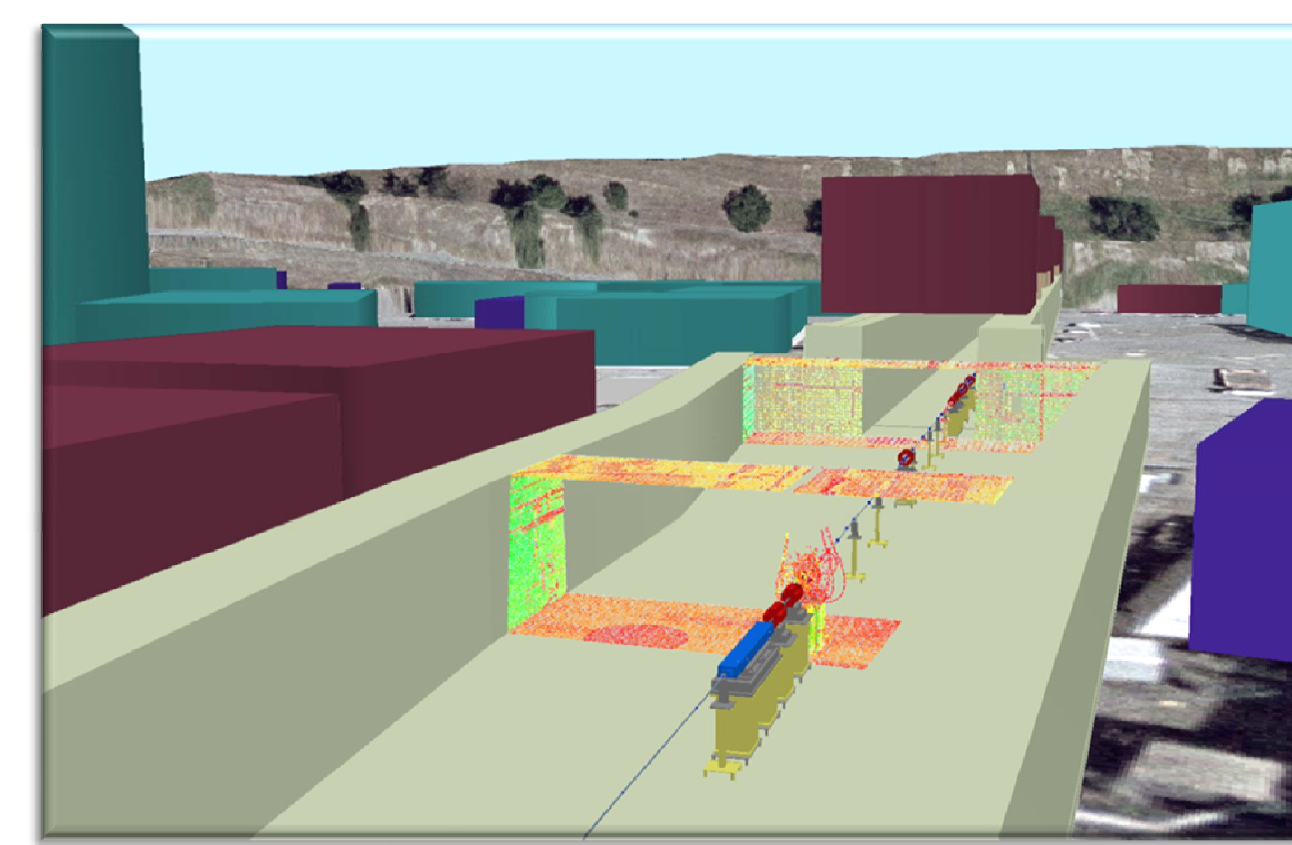
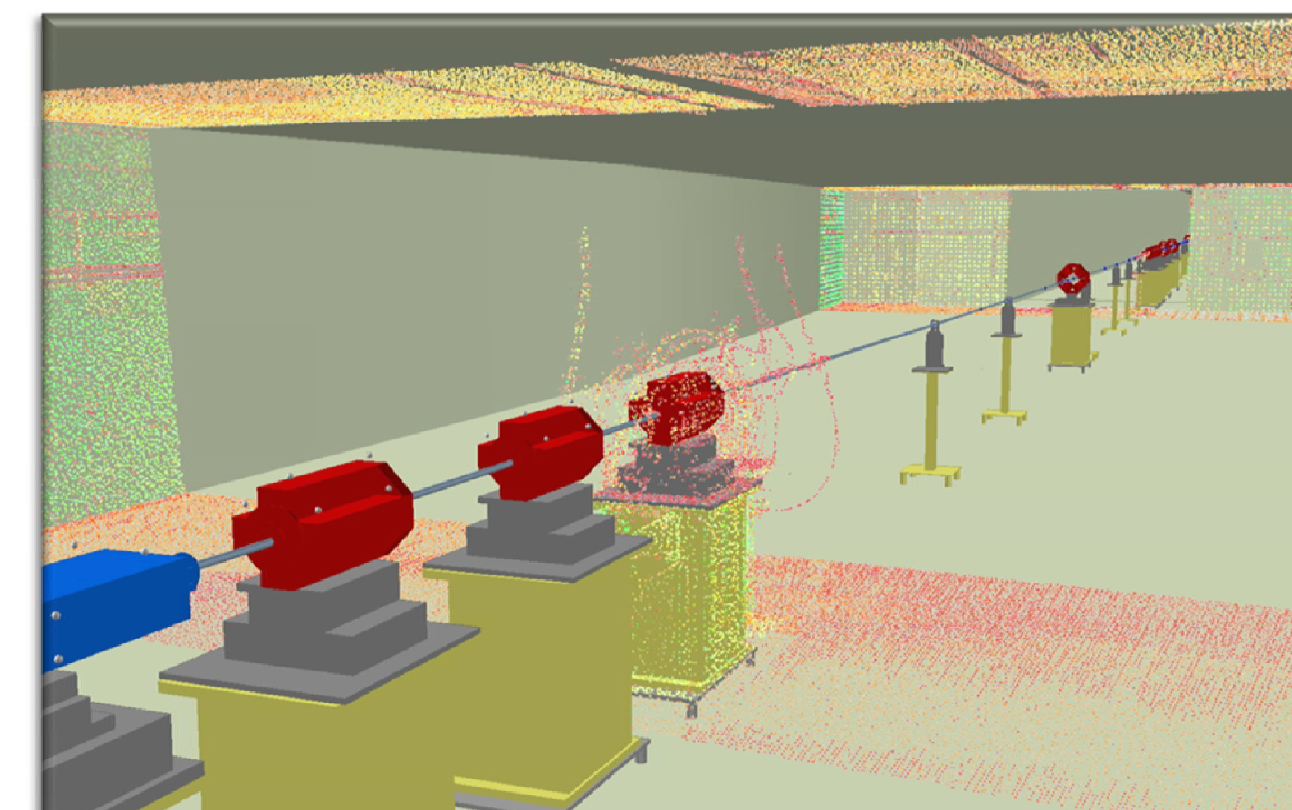
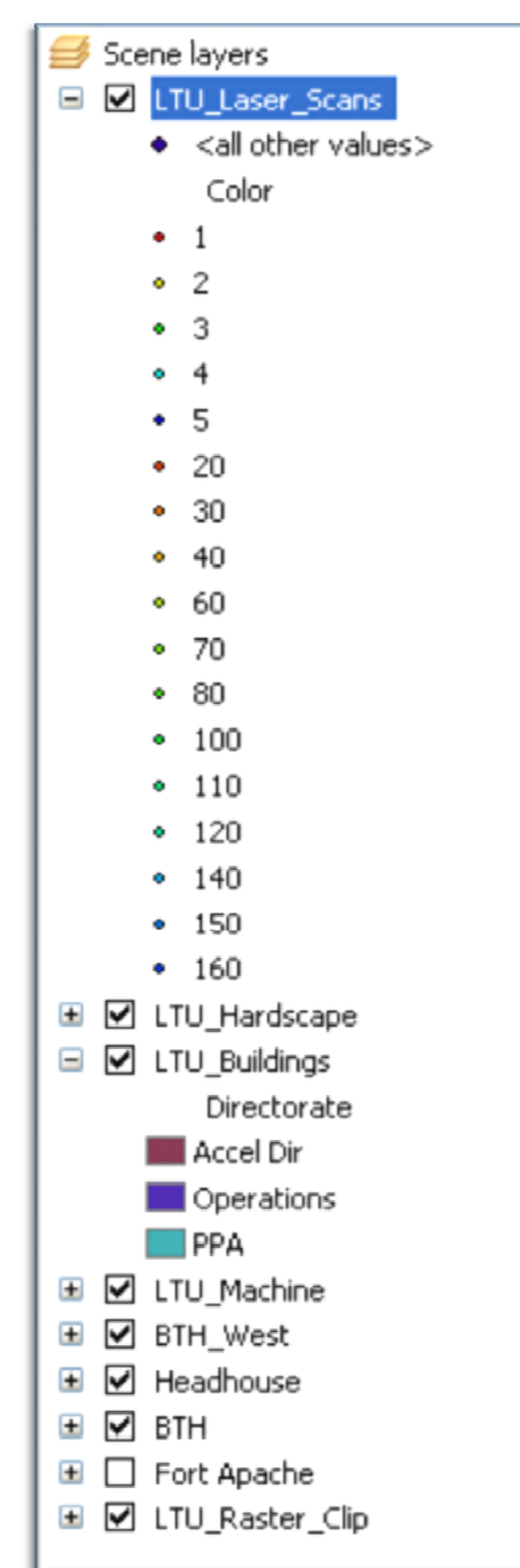
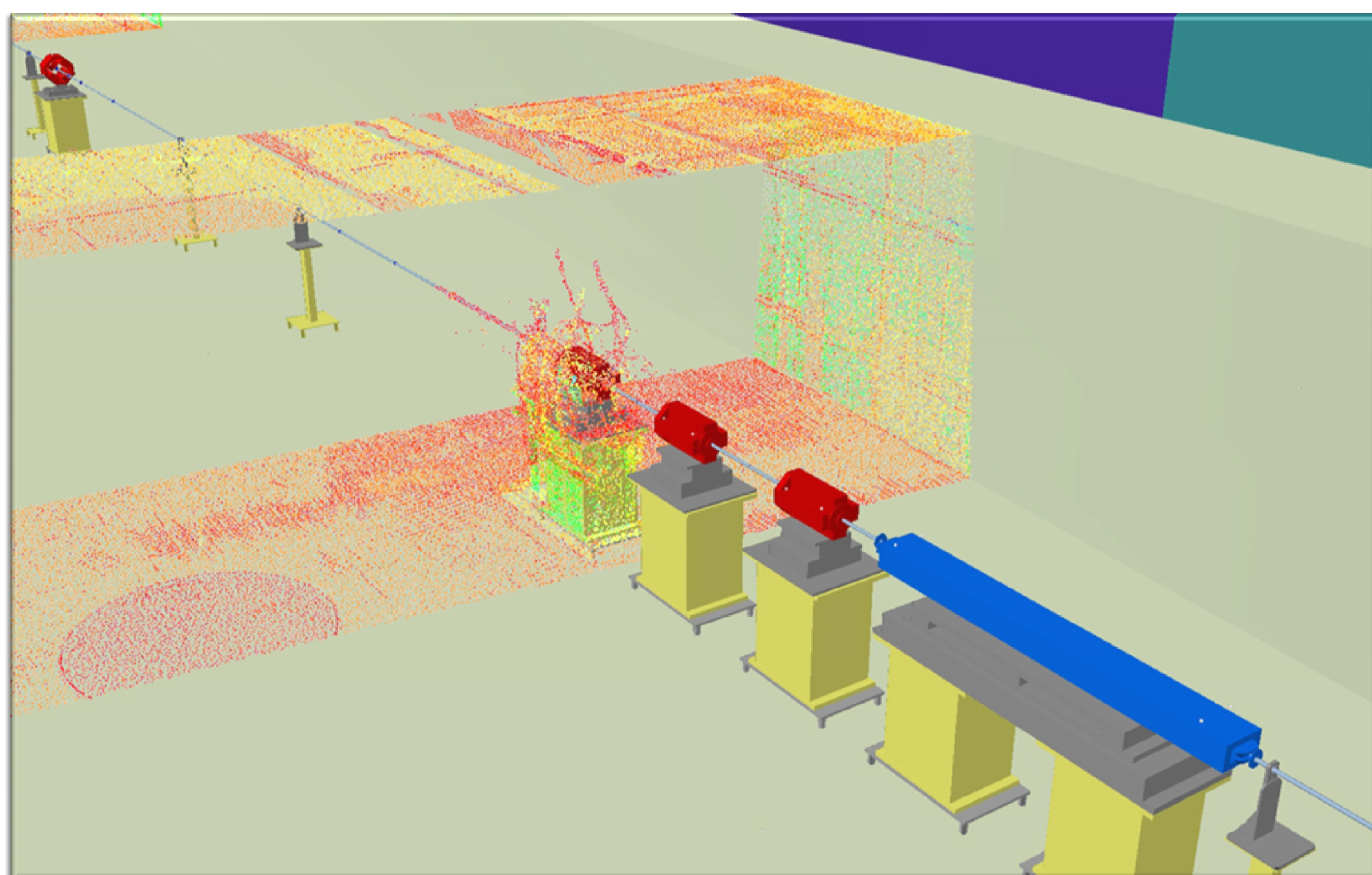


The GIS will be used for facilities management focusing on office space and occupant data. One quick method for creating a floor-plan is to use a laser scanner both inside and outside the building.



All magnets, supports, reference tooling balls, etc. are tied to the Metrology and LCLS databases. (Photo of components in the BTH.)

## LCLS Laser Scan



The challenge was to see if scan data would geometrically combine using ESRI's built-in geographic map projections. Our Z+F IMAGER 5006i laser scanner measured everything inside the tunnels and a sample scan region was chosen for this illustration. The image on the left represents a section of the Head House centered around a quadrupole. For efficient visualization, only about 10% of the actual scan data was used. Support equipment such as electrical and plumbing supplies can be seen around the quadrupole magnet and the circle on the floor is a region that was not scanned from one scanner position. The GIS database contains all metadata about the scans including scan intensity values which were directly modeled from the traditional Z+F scanner intensity color scheme. The GIS combination of all the sources of data came together very well. In particular, the laser scanner points correctly intersected the CAD objects which were measured and positioned using traditional surveying methods.