

Open Standard KML Interface for LCLS Survey Data



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A new Keyhole Markup Language (KML) graphical user interface was developed for survey and alignment data on the latest SLAC project. Through this interface users both inside and outside the Alignment Engineering Group have access to various survey data sets and other relevant information for the ongoing Linac Coherent Light Source (LCLS) project. A set of open-standard KML graphical elements are embedded in Google Earth. They depict the newly constructed LCLS tunnels allowing anyone to quickly link to relevant survey data by way of Google Earth. This poster highlights development and features of this open-standard interface.

Introduction

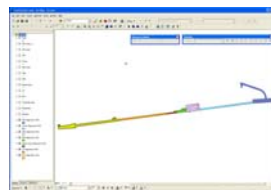
A graphical user interface has been created using Google Earth as a basis for presenting surveying and alignment data. Easy access to this data for the ongoing Linac Coherent Light Source (LCLS) project aides in providing key information on Alignment Engineering Group efforts. SLAC's Microsoft SharePoint website provides this information and the Google Earth interface enhances access by providing a graphical means to pick the relevant data. This example shows an overview of the LCLS structure including some selected survey control monuments.



This KML model can be loaded into your own copy of Google Earth by going to this link located at the Alignment Engineering Group's website: <http://www-group.slac.stanford.edu/met/Align/LCLS/LCLS.html>

KML Graphical Elements

LCLS tunnels are represented by a set of graphical elements that are spatially geo-referenced into the Google Earth environment. These elements are created using Keyhole Markup Language (KML) code that describe the attributes and position of a 3D model representing a real-world object. KML standards are specified by the Open Geospatial Consortium which is an international voluntary group of government, commercial, nonprofit and research organizations developing standards for geospatial content and services.

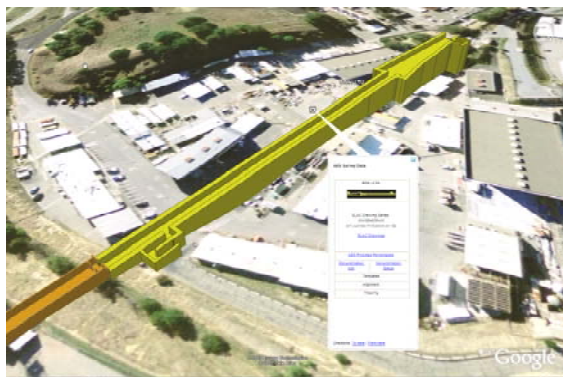


```
<!-- KML Placemark Example -->
<Placemark>
  <name>Station 100</name>
  <description>Station 100</description>
  <styleUrl>#style1</styleUrl>
  <Point>
    <coordinates>
      -122.201765559, 37.451690254544, 102.10800126195
    </coordinates>
  </Point>
</Placemark>
```

In the case of LCLS, the individual tunnels are created by taking a 2D plan representation of each tunnel and extruding it vertically. The KML features are translated into a set of models for Google Earth from an ArcMap platform. The 3D models represent the walls and floor of each structure using geo-referenced models providing a simplified view of the complete tunnel layout. Note that the underground tunnels would not actually be visible in Google Earth if placed at their true height.

Sharing Information

LCLS alignment data can be accessed through Google Earth which acts as a common shared graphical platform used for choosing information of interest. Information sharing such as this promotes the ideal of moving away from independent systems or data sources towards the sharing of applications and resources. The process of sharing a common platform enables organizations to integrate traditionally independent data into a central or single system. The example here illustrates how alignment data stored on SLAC's SharePoint site can be accessed through Google Earth.



A screen-shot of the 3D model in Google Earth focuses on the the Beam Transport Hall (BTH). Spatially the tunnel is shown in its correct position relative to the geo-referenced aerial photos of SLAC found in Google Earth. By selecting a placemark (information point), the relevant Sharepoint surveying data is displayed.

The placemark below has been selected providing a link to further information about a SLAC LCLS reference point (Station-100). Google Earth provides a graphical means to quickly access a report on this station.

