

BUILDING A LARGE, OUTDOOR, UNDERGROUND GEOPHYSICAL EDUCATION LABORATORY AT COLORADO SCHOOL OF MINES

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The Department of Geophysics at Colorado School of Mines is building a large, outdoor, underground laboratory for geophysical education. The project began in Spring 2016 with the demolition of the old physics building, Meyer Hall, and construction of the CoorsTek Center for Applied Science and Engineering in its place. In preparation for construction, a large grassy field, Kafadar Commons, was stripped and established as a staging area in front of the Green Center and the future CoorsTek building. The Department of Geophysics was subsequently given a small, one-time window of opportunity, between the completion of CoorsTek and the rebuild of Kafadar Commons, to construct the underground laboratory with distributed sensors, boreholes, and numerous targets of varying physical properties, geometries, depths, and levels of overlap/interference. The field site has been designed by Senior Design students and their advisor, working closely with additional geophysics faculty, the CSM Architect, and colleagues and alumni from the USGS, Army Corps of Engineers, Sandia National Labs, and Pacific Northwest National Labs. The targets have been selected to represent, as best as possible, sources related to civil infrastructure, archaeology, forensics, humanitarian efforts, geology, and hazards. The project items include:

- Shallow, deep, dipping, isolated, and overlapping utility targets with varying electrical and magnetic properties
- Large dipping cement slab
- Granitic block
- Building foundation
- Interconnected archaeology walls
- Cemetery with modern and old toe-pincher coffins, bones, and a shallow grave
- Large M with eight distinct segments: cement, clay, rock, wood, iron, aluminum, pvc with water, and pvc with air
- 55 gallon plastic drum with highly saline water
- UXO grid
- DAS/DTS grid
- Open and metal cased boreholes
- Well-pair straddling a utility tunnel with specialized electrodes for cross-hole ERT and seismic
- A few surprise targets

The collection of items offers numerous opportunities for both single-method and integrated interpretations. The laboratory is currently under construction with an expected completion of December 2017 and preliminary data shortly thereafter.