The main source of work for the alignment engineering group since 2018 has been the construction of LCLS II. Here is a list of the highlights:

- Completed the installation and alignment of the sym equipment, and beam components from the injector at sector 9 to the undulator hall.
- Finished the fiducialization, installation and alignment of the new soft X-ray undulators. The soft X-ray undulators have been commissioned with the copper irises.
- Fiducialized, installed and aligned new front end mirrors and instruments for the soft X-ray line. The soft X-ray front end components have been commissioned with the copper irises.
- Built two new e-beam dumps to handle the super conducting accelerator beam. One is located in the BSY and the other after the Undulator hall.

**GIS**

Metrology’s Geospatial program is continuing in its development of GIS products and services for various groups throughout the SLAC laboratory. All GIS websites have been updated to the new JavaScript standard which means faster response on more devices including smart phones and tablets. Efforts are ongoing with further automation through Python coding for SLAC’s Building and Space Management GIS which is tied into SLAC’s phone and building databases. Several new GIS websites have been created including those for ongoing construction projects, a building damage assessment dashboard, building sprinkler impairment, fire impairment, building utility outages, environmental protection for erosion and runoff.

Maps and data are continuing to be enhanced for GIS services including emergency pre-incident planning, fire barrier impairments, designated smoking areas and all types of utilities. Significant work was completed on a helicopter survey of SLAC’s 10 kilometer 230 kV main power supply line. This line traverses over dense foliage and undulating terrain. A GIS website was created to provide all the fly-over information including LIDAR data, aerial photos, wire head profiles, tree identification, growth concerns, access and land parcel information, water features and much more. This website has been a significant success and being used continuously by various environmental and safety personnel.

**FACET II**

FACET II was shutdown in April 2016 to allow the first ten sectors to be used for the super conducting linac of LCLS II. The FACET II project installed a new injector and three new bunch compressors which have all been aligned and commissioned.

FACET II will use the middle third of SLAC’s two-mile-long linear accelerator to generate high-density beams of electrons and their antimatter counterparts, positrons. This produces large, electric and magnetic fields in a very short time – ideal for creating exotic states of matter and researching advanced accelerator technologies.

**LCLS**

LCLS is responsible for the design and construction of the LST camera. It currently is the world’s largest camera for astronomy. The 3.2-gigapixel digital camera takes a 15-second exposure every 20 seconds once installation and commissioning is complete. The main imaging is performed by a mosaic of 189 CCD detectors each of 16 megapixels. Allowing for down time due to maintenance, bad weather and other contingencies, the camera is expected to take over 200,000 pictures per year. The Metrology Department is mainly involved with quality inspection of parts and alignment of components during the assembly of the camera. The camera is scheduled to be shipped to the Vera C. Rubin Observatory in Chile in the Spring 2023.

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