Cable and Services Layout for the Silicon Vertex Tracker's Insertion Cart

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This document details the cable and services layout of the Silicon Vertex Tracker's (SVT) insertion cart.

The SVT insertion cart, Figs. 1 and 2, is a custom-designed rack that will support the detector from a cantilever fixture and house power supply, power distribution, data acquisition, and slow controls crates.

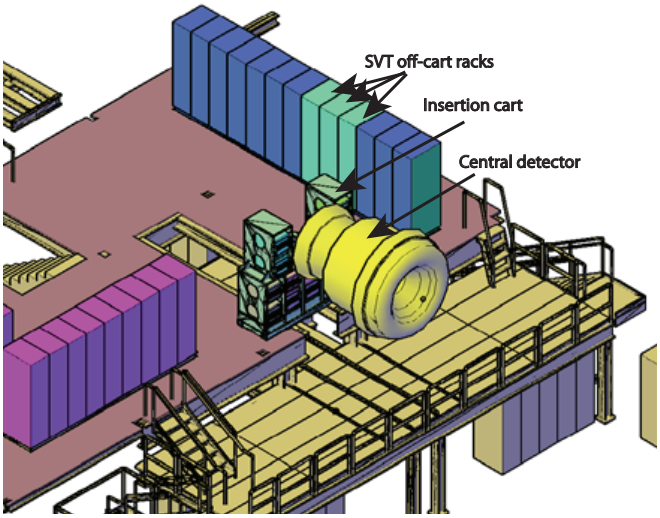

FIG. 1. Space Frame L1 South.

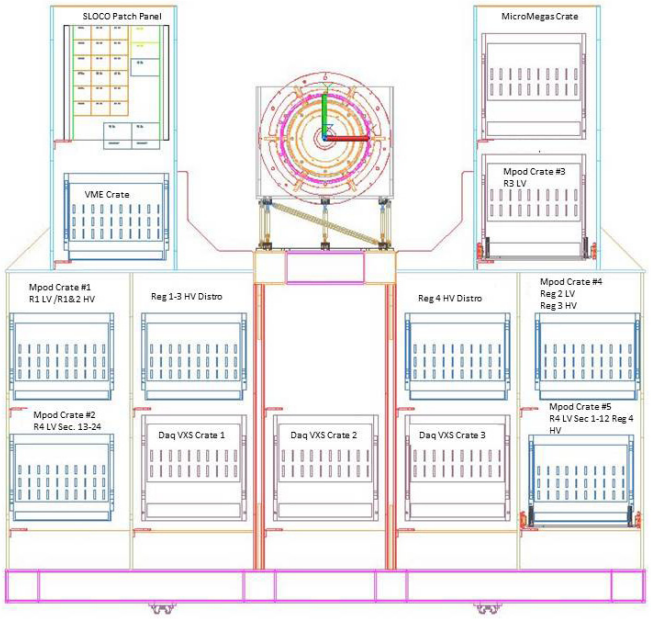

FIG. 2. Insertion cart.

Racks L-20 — L-22, Figs. 1 and 3, on Space Frame Level 1 South will hold equipment that monitors and provides services to the insertion cart. The three VXS crates, five Mpod crates, one VME crate, slow controls power supplies, and a National Instruments PS-15 module on the insertion cart need clean power. The crates, and the RS232 interfaces for each mass flow valve, require network capability. Piping is needed for chiller feed/return (four ½" outer diameter tubings) and dry nitrogen supply (two ¼" outer diameter nylon braid tubings).

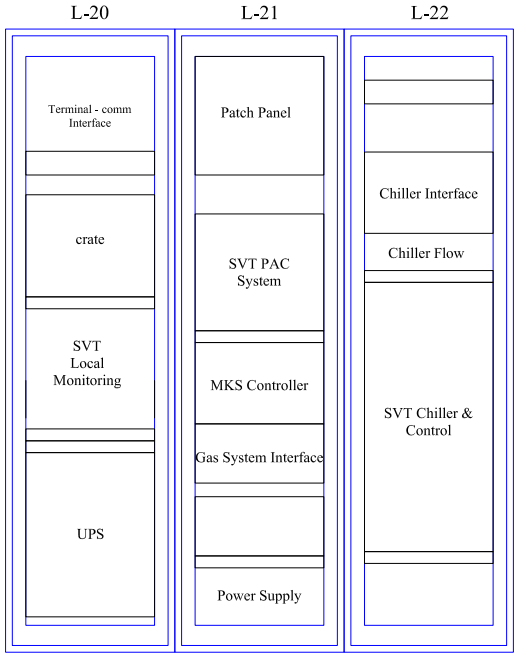

FIG. 3. Off-cart racks.

All cables, coolant lines, and gas lines will be routed from the racks to the insertion cart in such a way that the insertion cart can move between its operational position (in the solenoid) and service position, a travel distance of about six feet.

Cables will be run from the racks to a raised cable tray which runs between the racks and the insertion cart's service position, Fig. 4. Cables and hose lines will be fixed to the end of the cable tray over the insertion cart's service position and again on the insertion cart, with enough slack to accommodate the moving of the insertion cart to its operational position. The loop ends are to be supported by carrier pulleys.

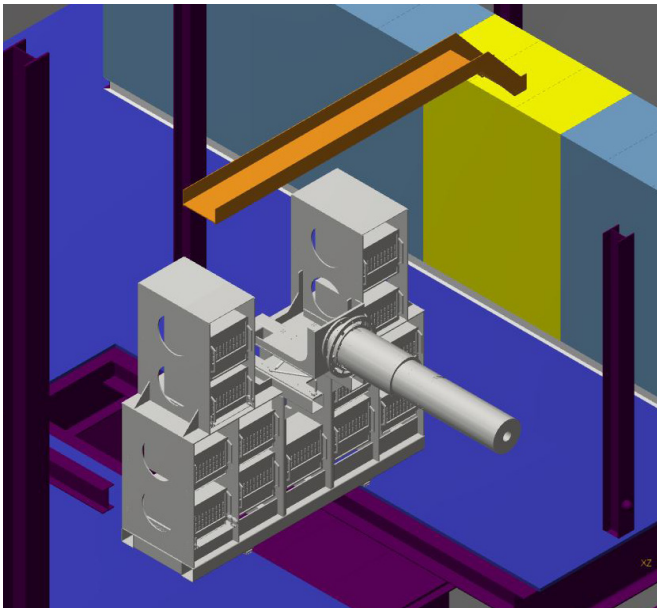

FIG. 4. Isometric view of the insertion cart (service position) with the raised cable tray (in orange). The central detector is not shown..

Clean power will be provided by a hard-wired 120 VAC to an isolation transformer on the insertion cart, which in turn will feed fused power strips on the insertion cart. This feed will run on the floor of the space frame from a UPS on rack L-20.

To control moisture, the SVT detector will be purged with dry nitrogen by the MKS gas control system located in rack L-21. The mass flow valve for the nitrogen can either be mounted in rack L-21 and feed the detector using ¼" outer diameter nylon braid tubing or be mounted on the insertion cart and feed the detector with a shorter line.

In summary, the SVT insertion cart will hold crates needed to power and read out data from the detector. The three off-cart racks will provide support services such as cooling, nitrogen purge for humidity control, network, and local monitoring and controls. Cables and services provided will be routed to the insertion cart from the off-cart racks, and have the ability to move with the insertion cart as it travels about six feet from its service position to its operational position.