FACILITIES SUPPORT GROUP (FSG)

Dan Green and Stephen Pordes

The Facilities Support Group was formed as part of the Experimental Areas Department (EAD) during the recent reorganization. The group consists of 14 people and has been charged with the maintenance and upgrade of Fermilab experiment facilities, viz: 1) the Multi-Particle Spectrometer (MPS) in the Meson Area, 2) the electronic detectors associated with the 15-ft bubble chamber, 3) the neutrino flux monitoring system, 4) the Tagged Photon Spectrometer (TPS), and 5) test beams. With support and advice from other groups in the Research and Accelerator Divisions, FSG is also undertaking some projects which are of general utility to experimenters at Fermilab, including the development of a transition radiation counter for particle identification, the installation of a simple phototube testing facility, and the establishment of a standard two-component gas system for drift and proportional chambers based on the TPS design.

At the MPS the apparatus is being upgraded for experiments E-557/E-672. In particular, the FSG has been involved with evaluation of the Laboratory standard multiwire proportional chamber readout (TM-1158); the first use of this Laboratory standard system will be at the MPS for E-557/E-672. A chamber winding machine (TM-1164) has been installed and commissioned in Lab 6 as a new facility. This winder is available to all Fermilab user groups, but with priority given to support of the facilities. Initially, it will be used to wind the 10 ft × 10 ft proportional chambers for the new E-706/E-672 spectrometer facility in the new MW beam. (See **Fermilab Report**, March 1983 for the beam-line naming convention.) Prototypes will be tested in the E-557/E-672 apparatus during the next running period.

In the Neutrino Area, a new Cherenkov counter for the dichromatic beam is under design and new ion chambers will be fabricated for monitoring the muon flux (FN-382). The Tevatron-era neutrino flux monitoring scheme was discussed at the recent Neutrino Beams Workshop (**Fermilab Report**, March 1983). The addition of electronic detectors to the 15-ft bubble chamber is in progress. A new Internal Picket Fence (IPF), which will cover the upstream half of the bubble chamber as well as the downstream one, is being built at CERN and will be installed in December of 1983. A new External Muon Identifier (EMI) will also be installed at this time. The EMI, consisting of about 3000 proportional tubes, is being constructed by the FSG using a mechanical design developed by the MIT group in E-594.

The definition of specific projects in the Proton Area and on the TPS in particular will start soon. As projects of general utility to Fermilab experiments, we have accumulated, repaired, and tested all leftover beam-line scintillation counters.

Additional counters for beam tagging facilities will be repaired upon request. Cherenkov grade PMTs have also been accumulated, tested, and inventoried. Additional tubes will be tested upon request.

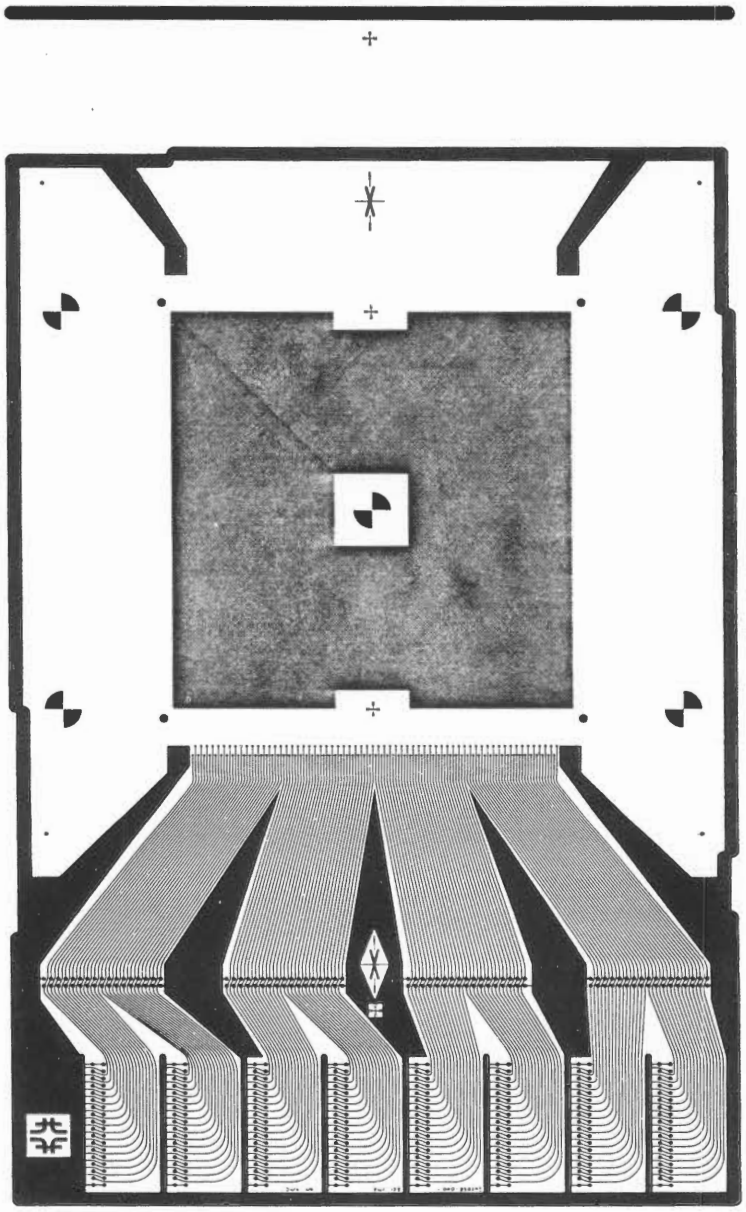
As regards gas systems, we have adopted the TPS two-component, gas-mixing system as a standard. This system is well documented, satisfies all safety requirements, and will rapidly pay for itself in a large volume drift-chamber system. It will probably be used in the new Lab E drift-chamber system. We have also adopted a standard alcohol bubbler system which is installed in the TPS and the MPS. Documentation is available upon request.

Recently, we have extended our services by designing a standard beam PWC. The chamber (TM-1179) has 1-mm wire spacing, with 128 wires per plane and can be mounted on a standard EAD air SWIC stand. The operating gas can be Ar/CO_2, and the output connectors mate to the Fermilab standard PWC readout electronics. We have decided to install these in all test beams (MB, NW, NT), and we have solicited orders from experimenters. The MPS and the new muon beam have so far responded with requests.

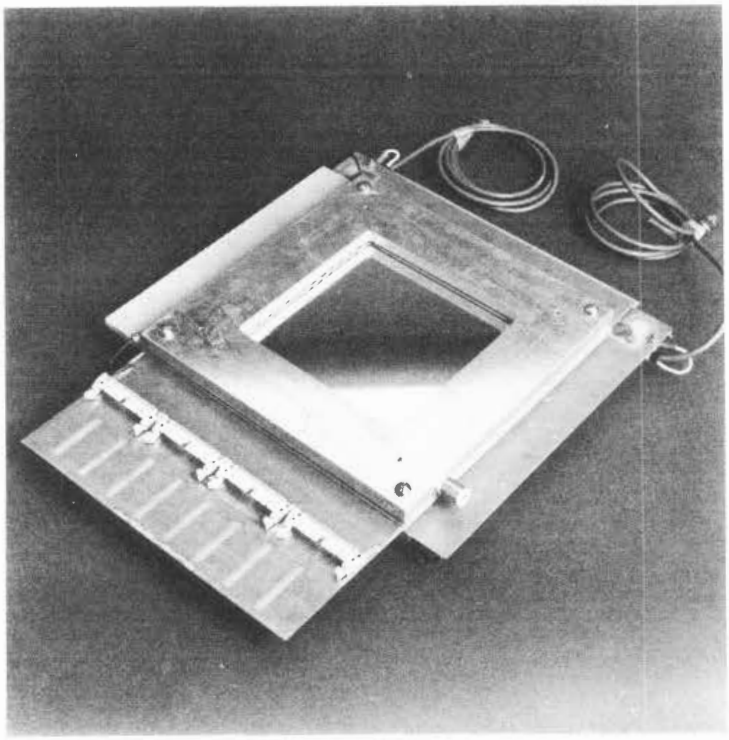
Several experiments in Tevatron-era secondary beams require particle identification. To this end, the FSG has recently tested a prototype Transmission Radiation Detector module at Brookhaven consisting of 200 polyethylene foils followed by 3 gaps of FSG standard PWC filled with xenon/methane. The proposed detector will consist of 10 such modules and the tests demonstrated that the detector will yield ~10 detected transition X rays per 500 GeV pion.

Finally, the FSG has been involved in design and commissioning of test beams. Typically, the FSG will outfit these beams with scintillators, threshold Cherenkov counters, and PWC beam spectrometers. In the Tevatron era, the test beams will be MB ($\leq$ 200 GeV, clean $e^{\pm}$ beam), NW ($\leq$ 250 GeV, hadrons), NT ($\leq$ 500 GeV, calibration and Lab F test beam), and MT (old MPS after 1985, $\leq$150 GeV, hadrons).

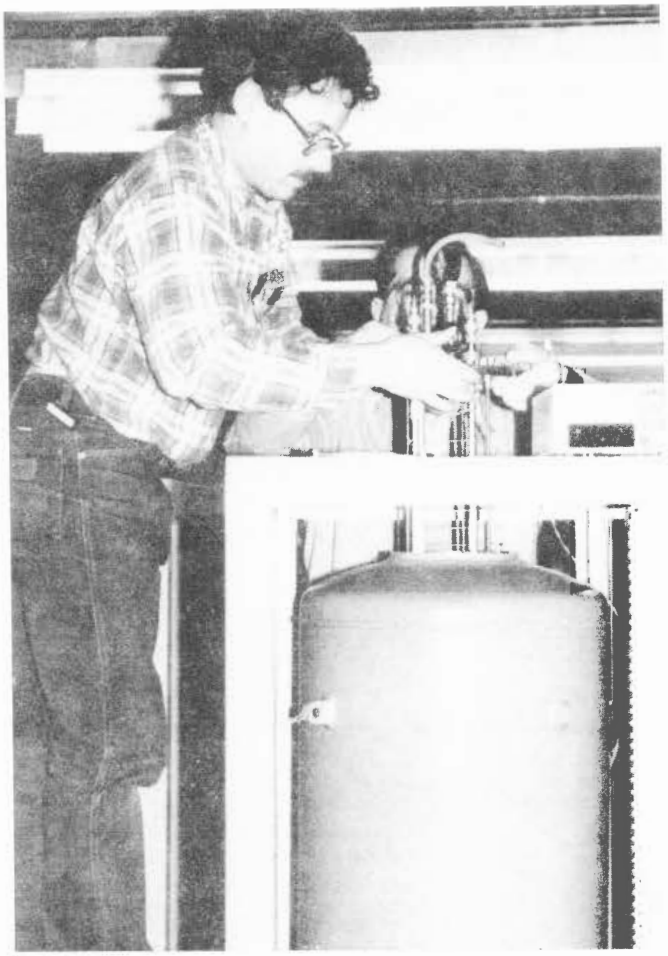
In general, the goal of the Facilities Support Group is to provide beam-line instrumentation services and to help maximize the physics produced in the experimental area facilites.



Sense Plane Artwork for the EAD beam PWC module.



A single-plane EAD beam PWC module.
(Photograph by Fermilab Photo Unit)



Ralph Pasquinelli (left) and Moyses Kuchnir lowering a superconducting stochastic-cooling filter assembly into a dewar for tests.

(Photograph by Fermilab Photo Unit)