

VELoCiRaPToRS

Venting and Exhausting of Low Level Air Contaminants in the Rapid Pneumatic Transportation of Radioactive Samples System

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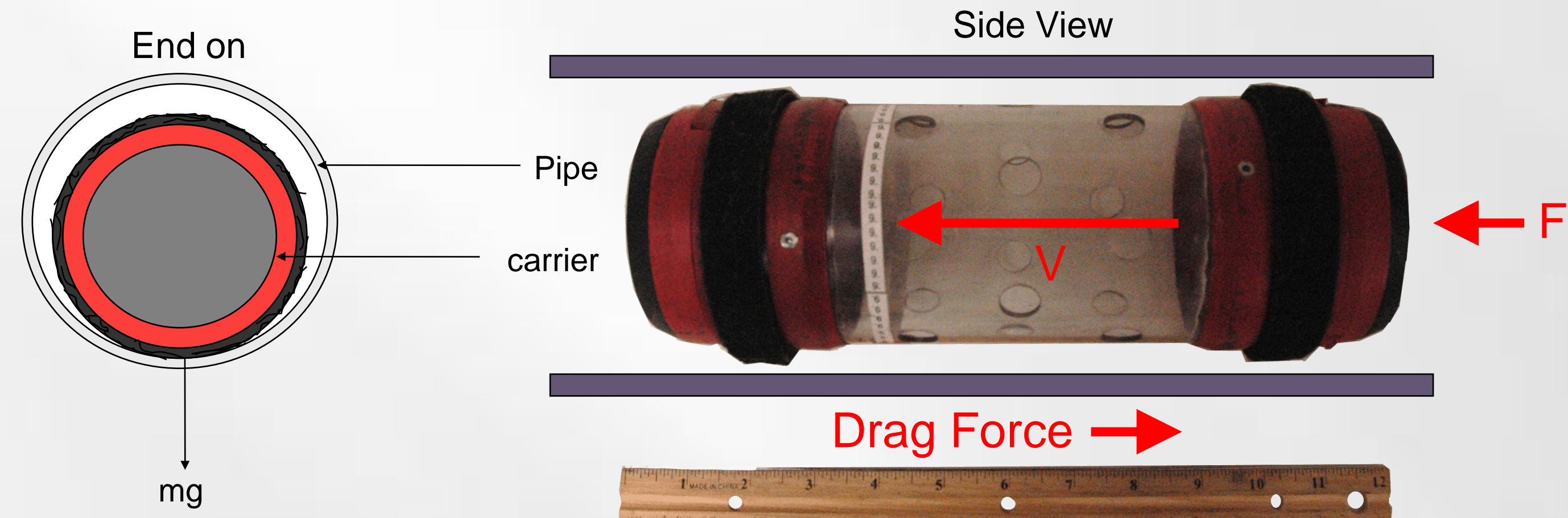


Abstract

This system will transport radioactive materials quickly and safely at NIF. Radioactive samples are conveyed via controlled differential pressure. The carrier will be vented by an exhaust blower to remove radioactive gases until the radiation level is acceptable. Then, the carrier will travel to a counting station. The completed system can be controlled manually or automatically. Reliability tests have been successfully performed using an inactive carrier.

RaPToRS

- It is a flow system, thus it has minimal friction and minimal driving force
- Maximum speed achieved: 12.3 m/s \approx 28 mph
- Over 1100 successful trials were run
- Overbore in 90 pipes to prevent jamming



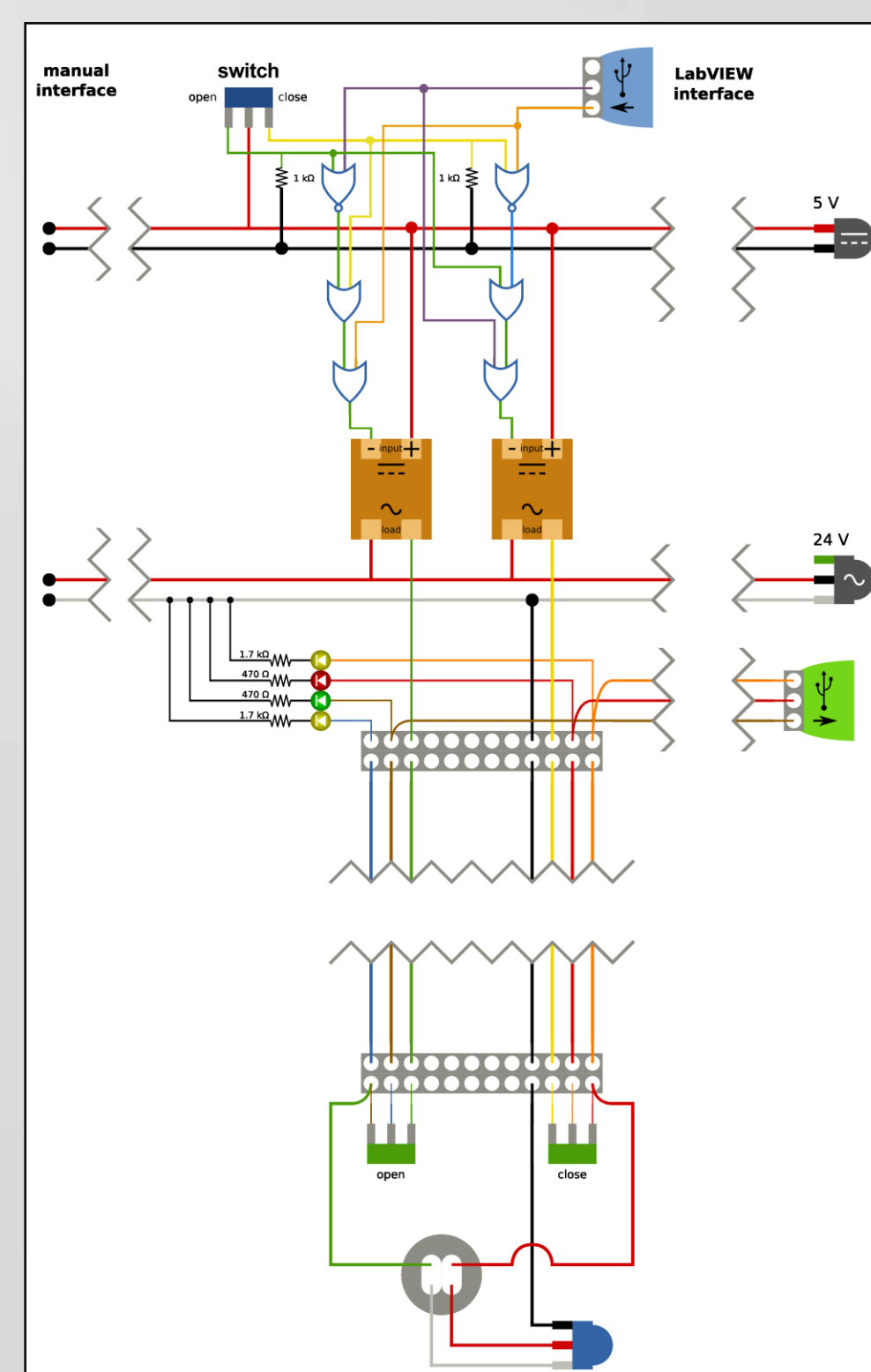
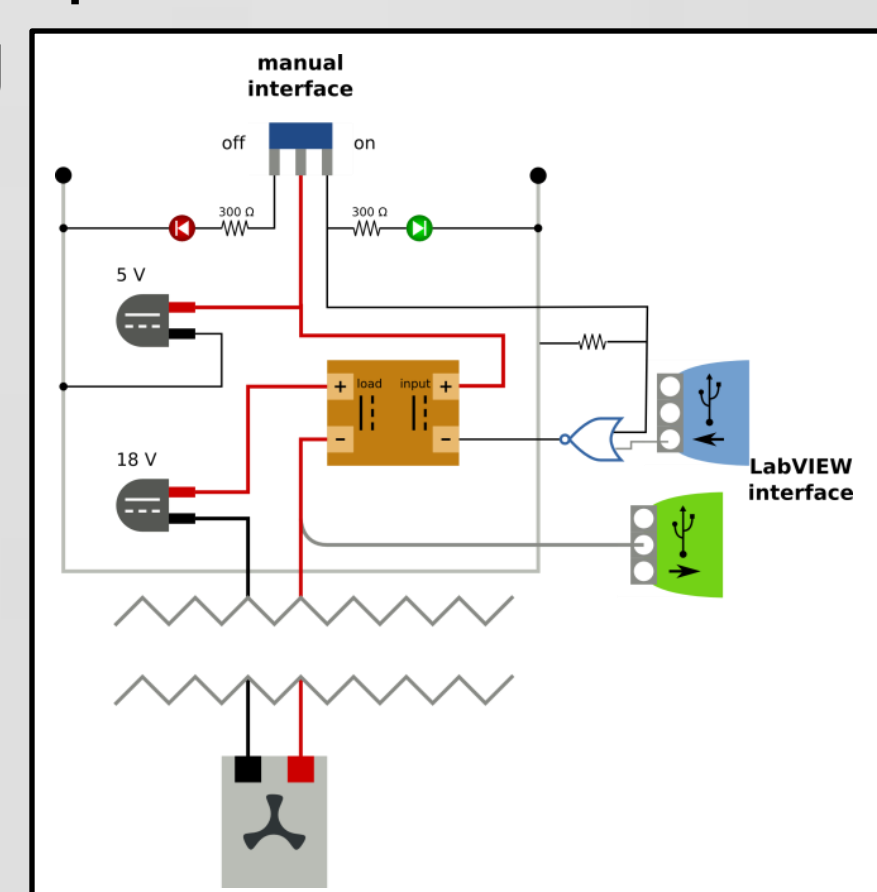
•Used to transport neutron-activated graphite discs from a reaction chamber to a gamma ray counting station

System Components

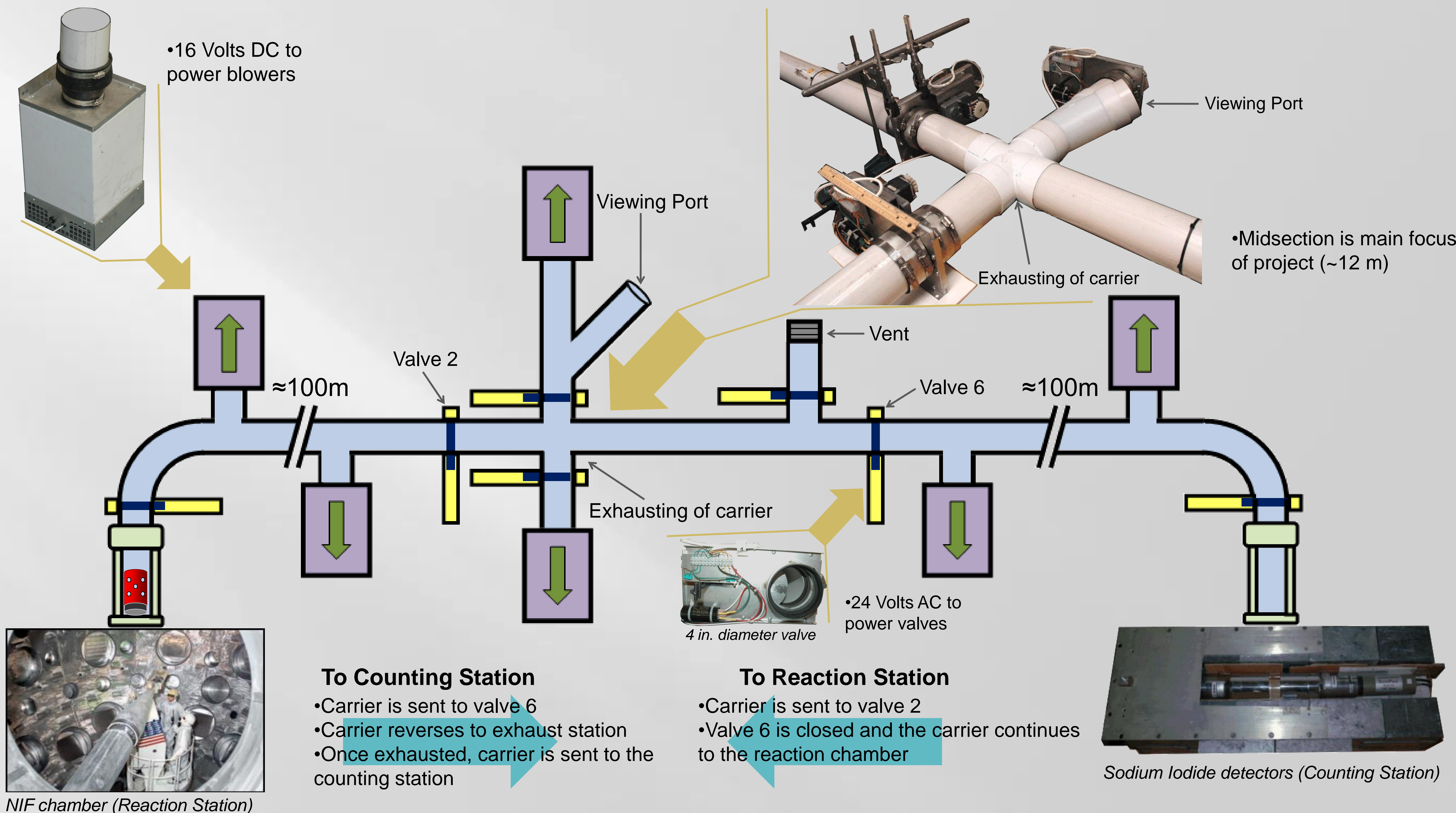
- System requires a control circuit for the valves and blowers
- Electronic safety system prevents users from making conflicting decisions in manual or automatic mode
- Digital relays power the valves and blowers
- Blowers and vacuums control the carrier speed
- Carrier pneumatically brakes at counting station

•Circuit schematic for the valves

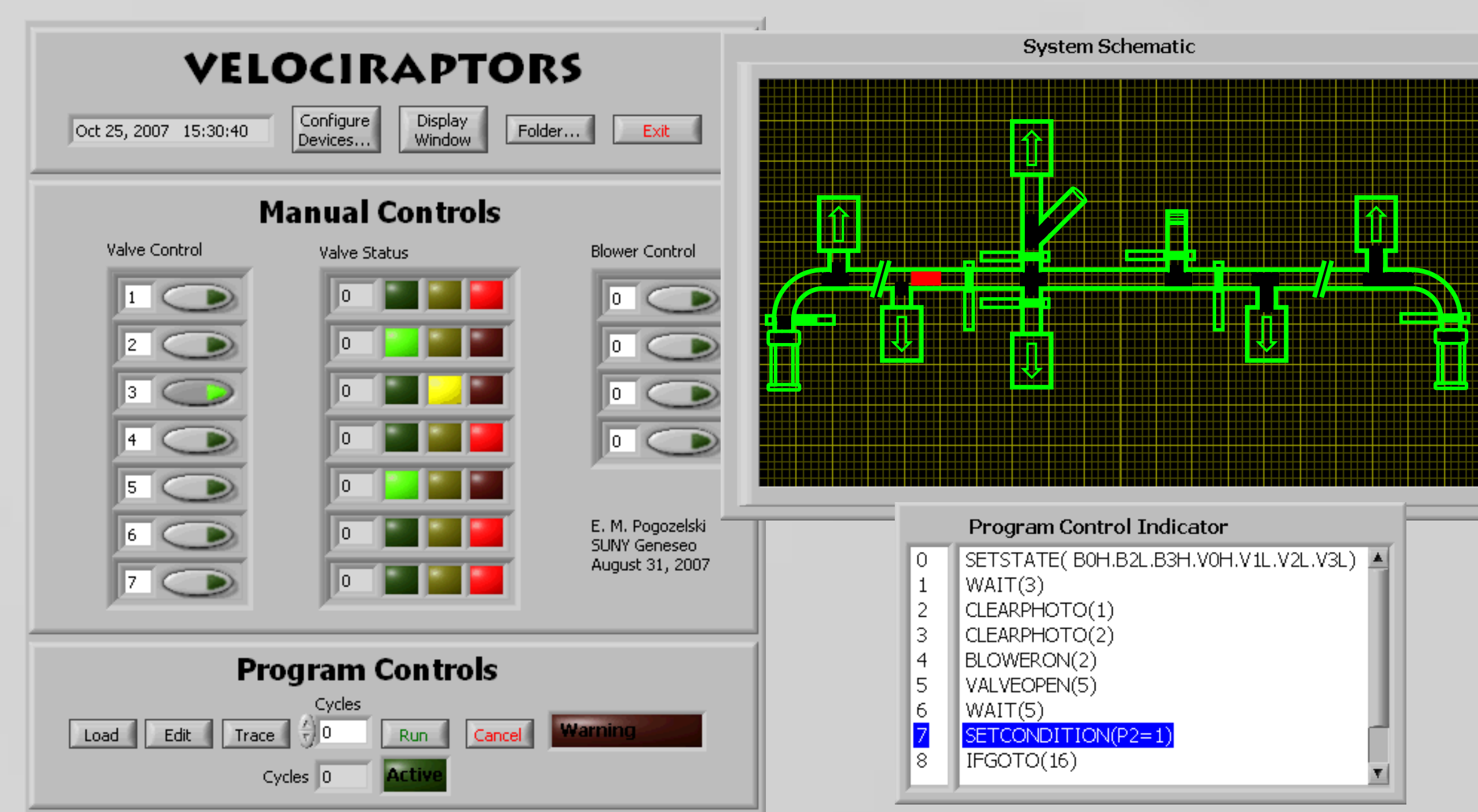
•Circuit schematic for the blowers



VELoCiRaPToRS Schematic



Control Panel



- LabVIEW permits hundreds of trials to test the reliability of the system
- The system diagram shows the state of each valve and blower
- The carrier is displayed in LabVIEW as it progresses through the system

LabVIEW front panel