Surface Contamination Monitor (SCM)

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SCM: Large area gas-flow proportional counter (GFPC) using position-sensitive counting technology for surveys of floors or walls

Position-sensitive counting technology offers two main benefits:

- **FAST:** Large area detectors survey floors or walls quickly while covering virtually 100% of surface being monitored
- **SENSITIVE**: Position-sensitive technology allows for summing counts in 25 cm^2 areas (pixels), with associated low background counts. Efficiencies similar to conventional thin-window GFPCs

Detectors are normally fabricated in 1-meter and 2-meter lengths

A single anode wire runs the length of the detector, and the ratio of electric charges received at each end determine the location of the particle interaction along the wire

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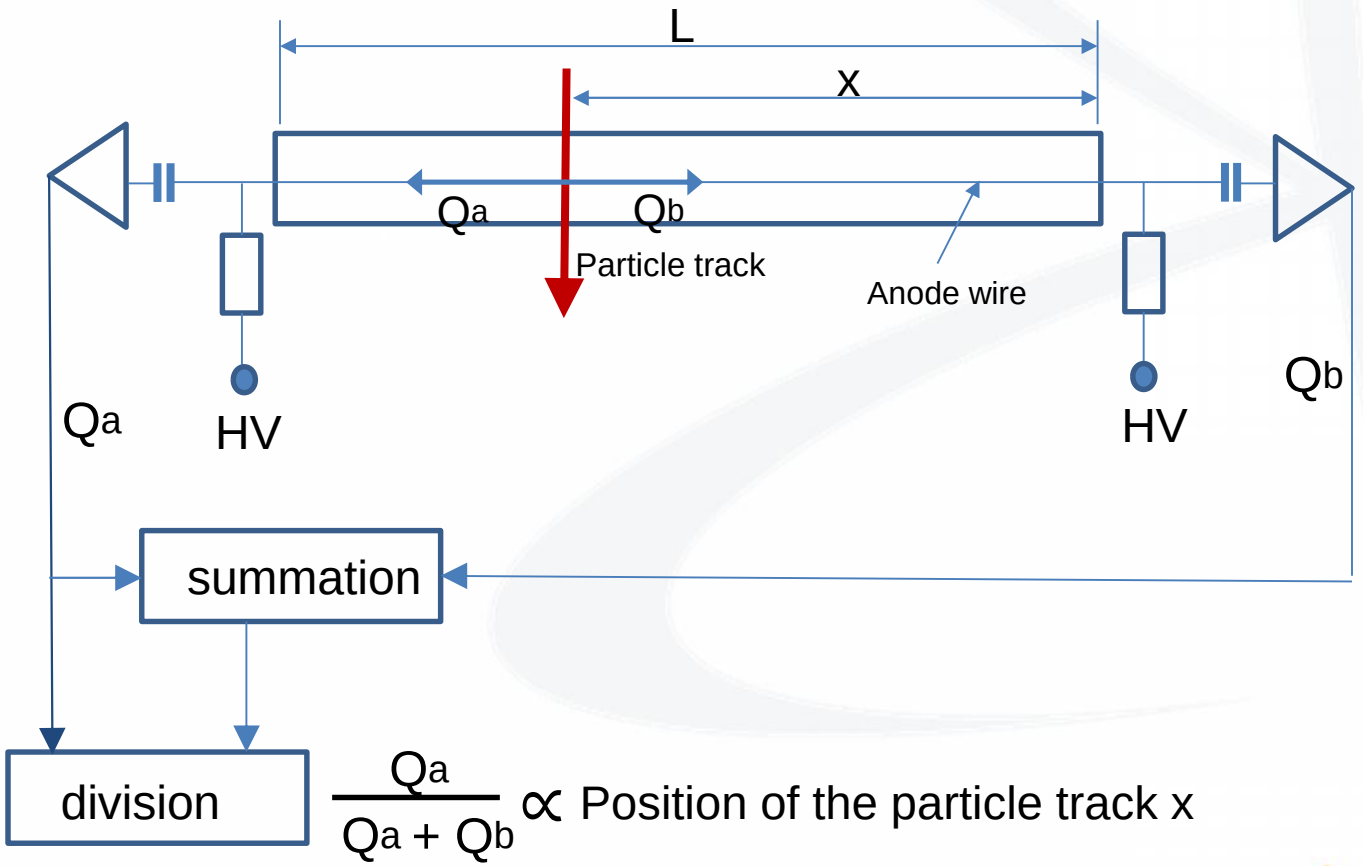
Simplified Diagram Depicting A Position-Sensitive Proportional Counter

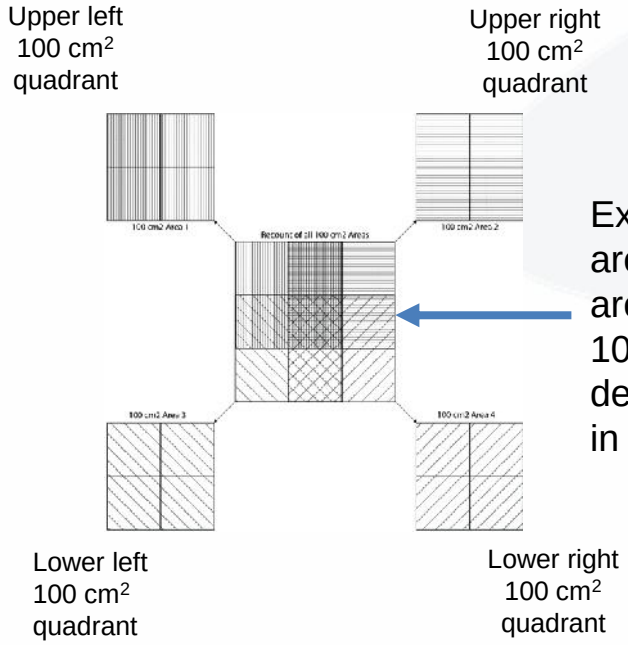


$$\frac{Qa}{Qa + Qb} \propto \text{Position of the particle track x}$$

Improved Survey Performance

- Constant survey speed maintained by drive motors
- Data logged directly to computer
- Detector mount maintains fixed surface to detector distance
- Not subject to grid registration errors
- Improved detection capability
- System can be operated manually by a technician or autonomously using robotics and LiDAR-based Simultaneous Location and Mapping (SLAM)

Improved Detection Capability



Example 225 cm^2 survey area; center pixel counts are used in 4 separate 100 cm^2 areas to determine highest activity in any 100 cm^2 area

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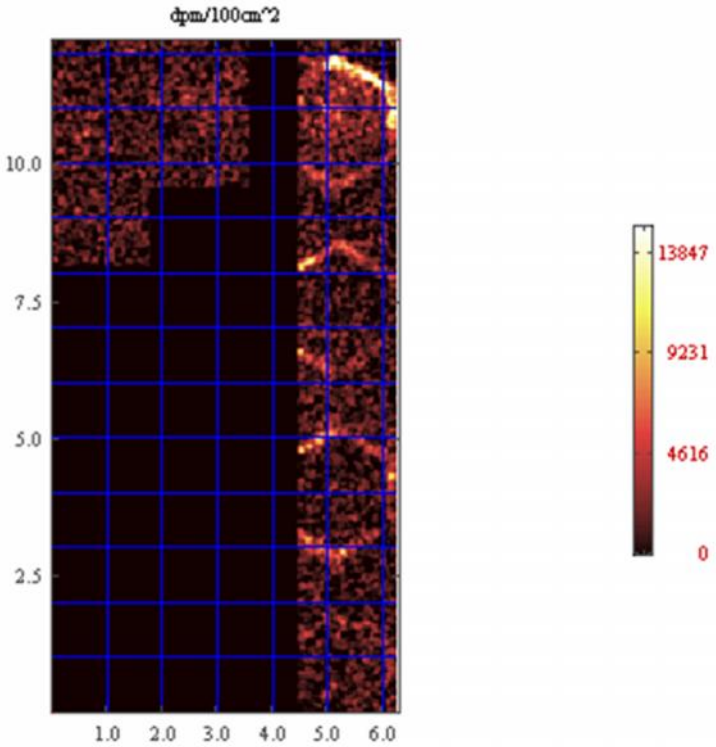
Automated Survey Reporting

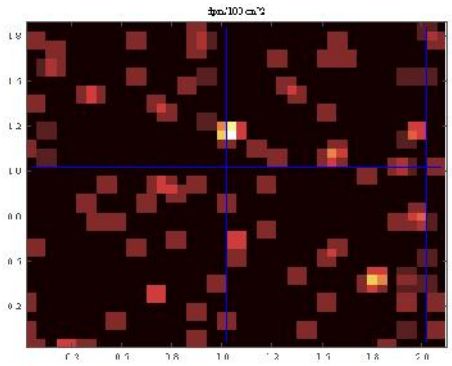
- A summary of survey parameters
- A cumulative frequency distribution plot (CFD) of the survey data
- A 2-D color image of the survey area results to clearly indicate the location of any residual activity (see below)
- A statistical summary of the survey data (mean, maximum, minimum, & standard deviation)
- An exception report with a 2-D display of areas over action levels (both 100 cm^2 and 1 m^2)
- If the system used is equipped with SLAM capabilities, 3D pointcloud, and mesh files containing map coordinates and sample results for each 100 cm^2 virtual detector unit



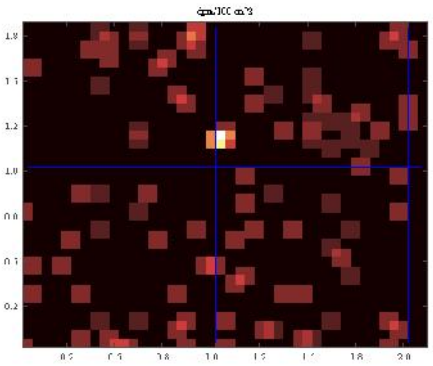
Recount (Coincidence) Mode

- Useful for meeting very low scan minimum detectable concentrations, especially for alpha contamination
- Second detector is mounted a fixed distance behind the first detector
- Data from both detectors is recorded in a single pass
- Software compares results of the two detectors for each 100 cm^2 area
- Eliminates most false positive results

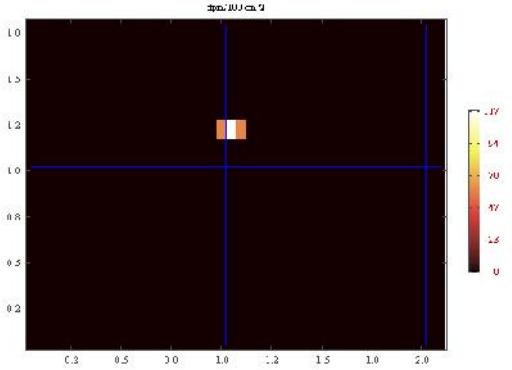
Primary Detector



Recount Detector



Coincidence Logic Applied



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