



OVERVIEW

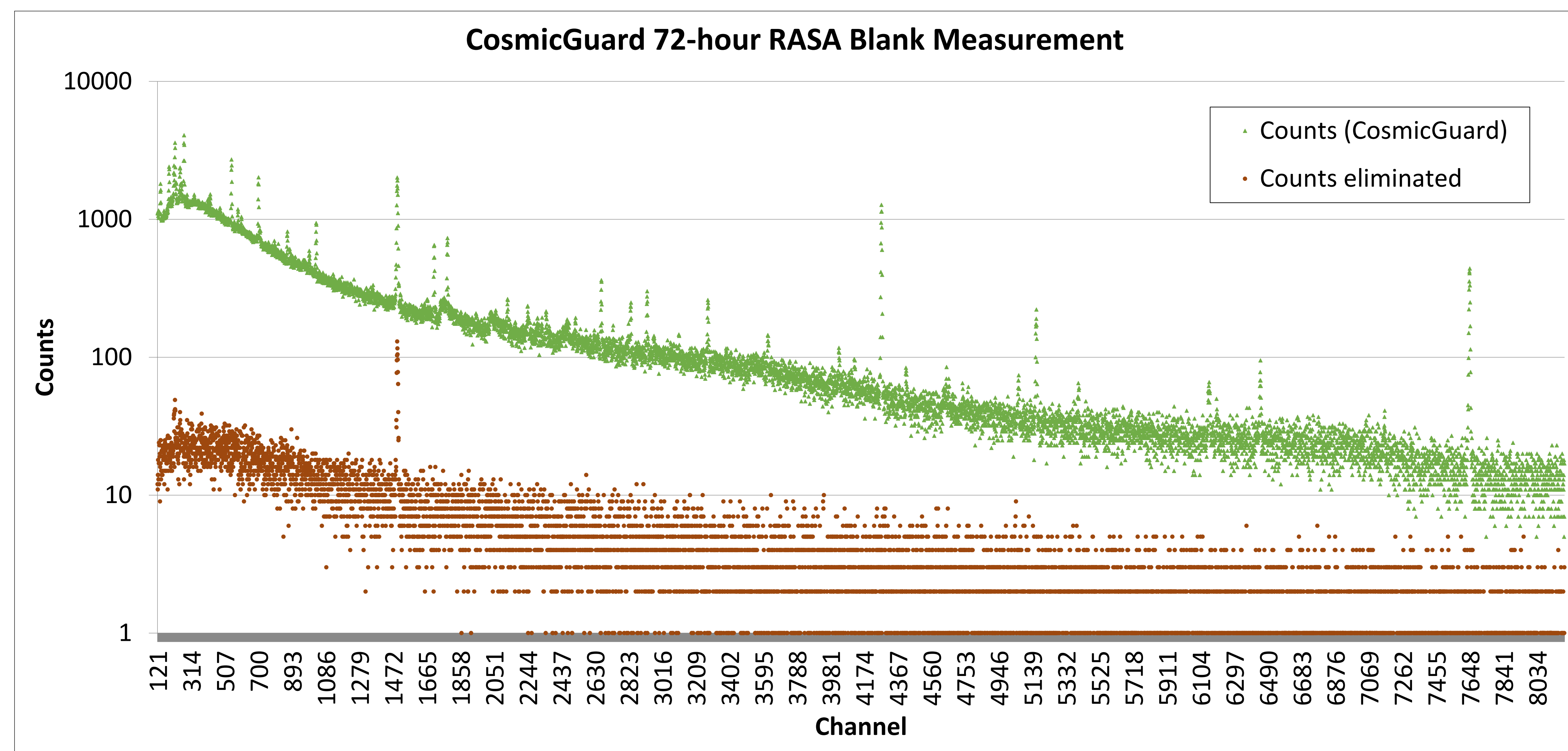
One factor affecting Radionuclide Aerosol Sampler/Analyzer (RASA) detector minimum detectable concentration (MDC) is the level of background counts in the spectrum. Interactions between cosmic rays and high-purity germanium detectors result in increased detector background counts, which increase detector MDC. Anti-coincidence systems reduce counts which originate outside the detector shielding. By eliminating these counts, significant improvements in MDC could be achieved.

COSMIC GUARD INSTALLATION AT GDMS TESTBED

General Dynamics Mission Systems (GDMS) performed testing of the Canberra CosmicGuard system at the GDMS testbed in Chantilly, Virginia. The CosmicGuard system was mounted on top of a RASA system without permanent hardware modifications. This upgrade could be added to existing IMS RASA systems using a Multi-Channel Analyzer (MCA) with anticoincidence capability without additional hardware modifications or redesign.

The CosmicGuard was connected to a Canberra Lynx MCA for anticoincidence gating. The Lynx integrated oscilloscope was used to tune the anticoincidence timing. Gated and ungated copies of the spectrum were stored to the MCA to allow direct comparison of spectra with and without cosmic veto applied.

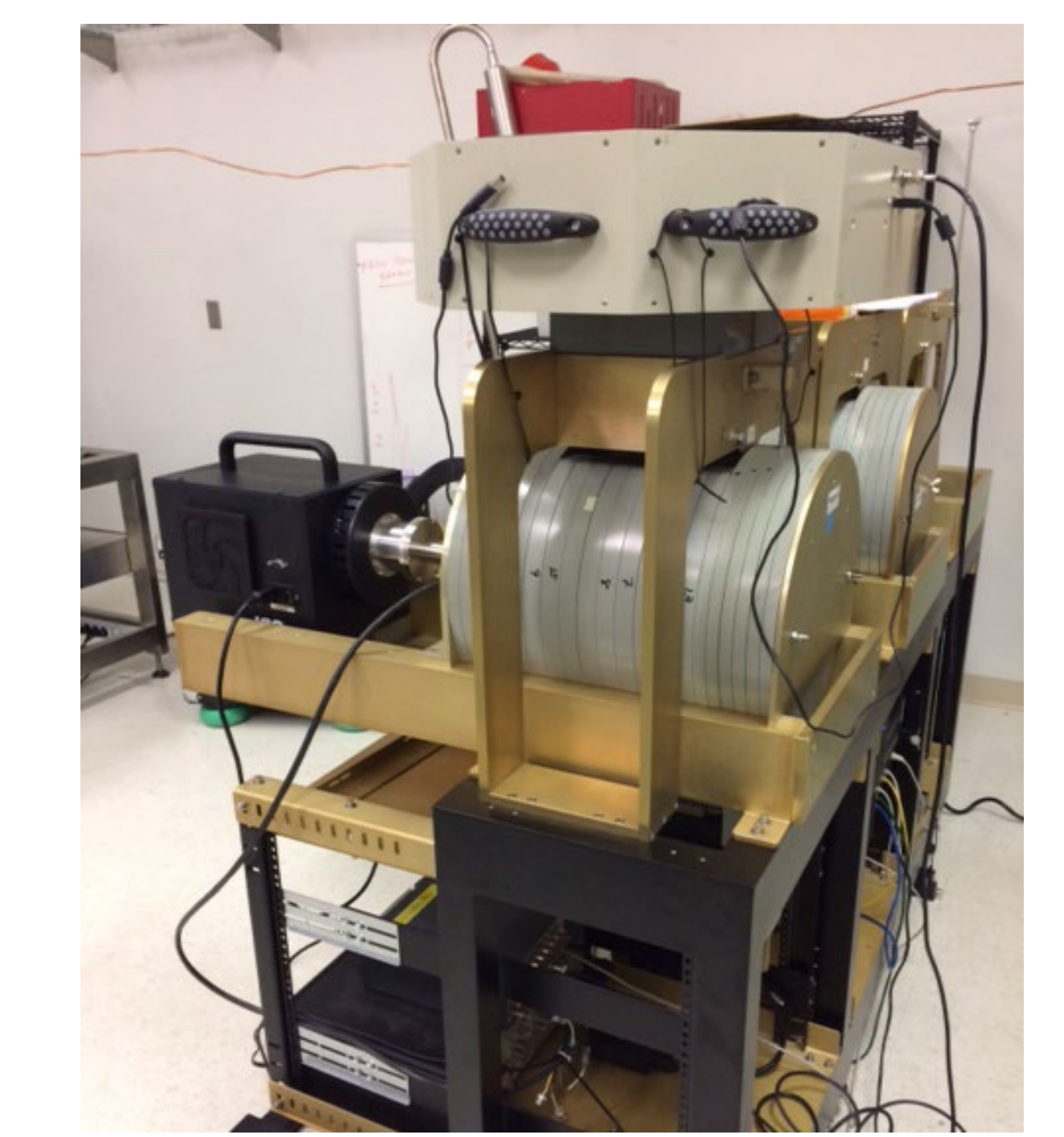
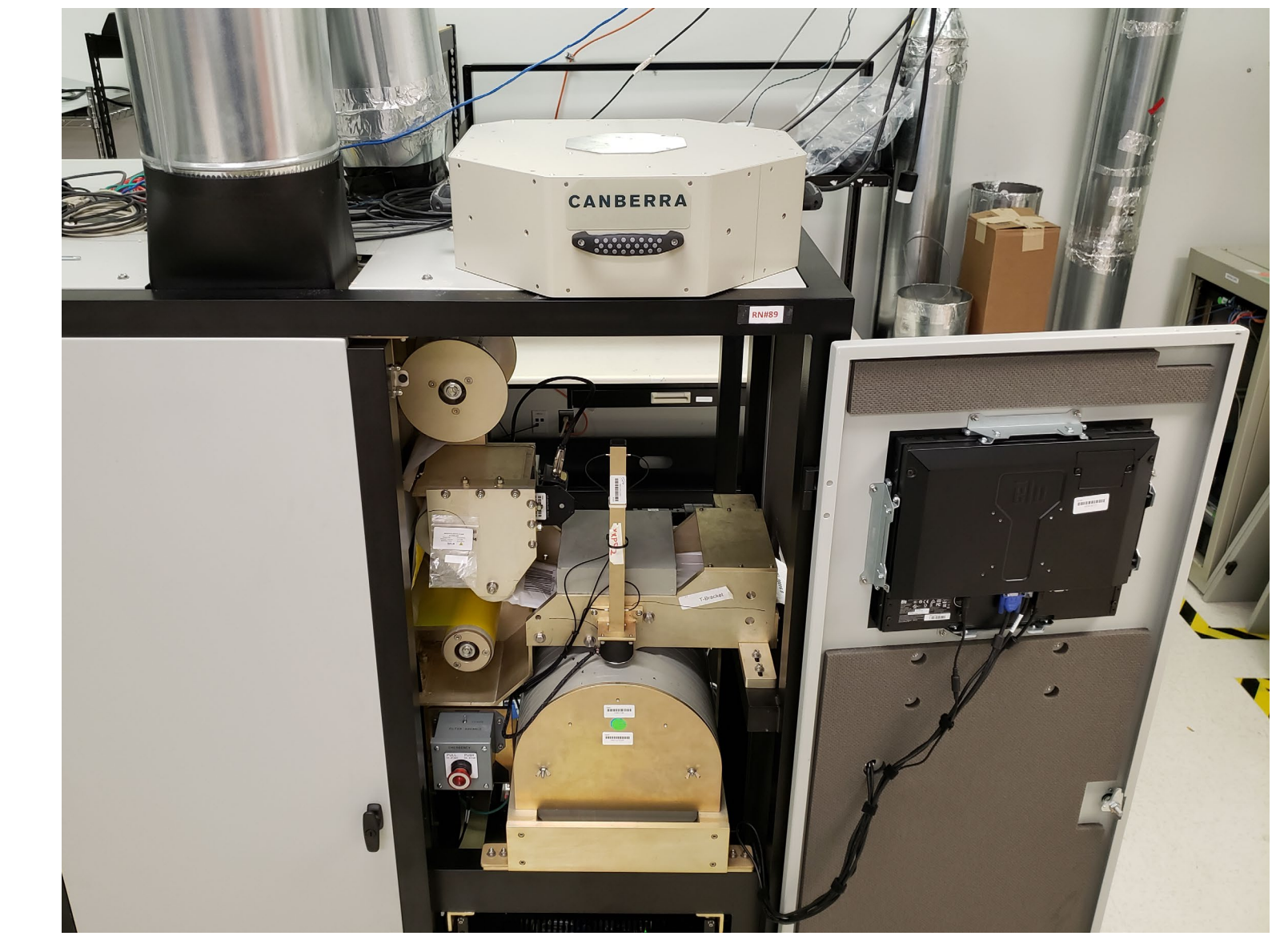
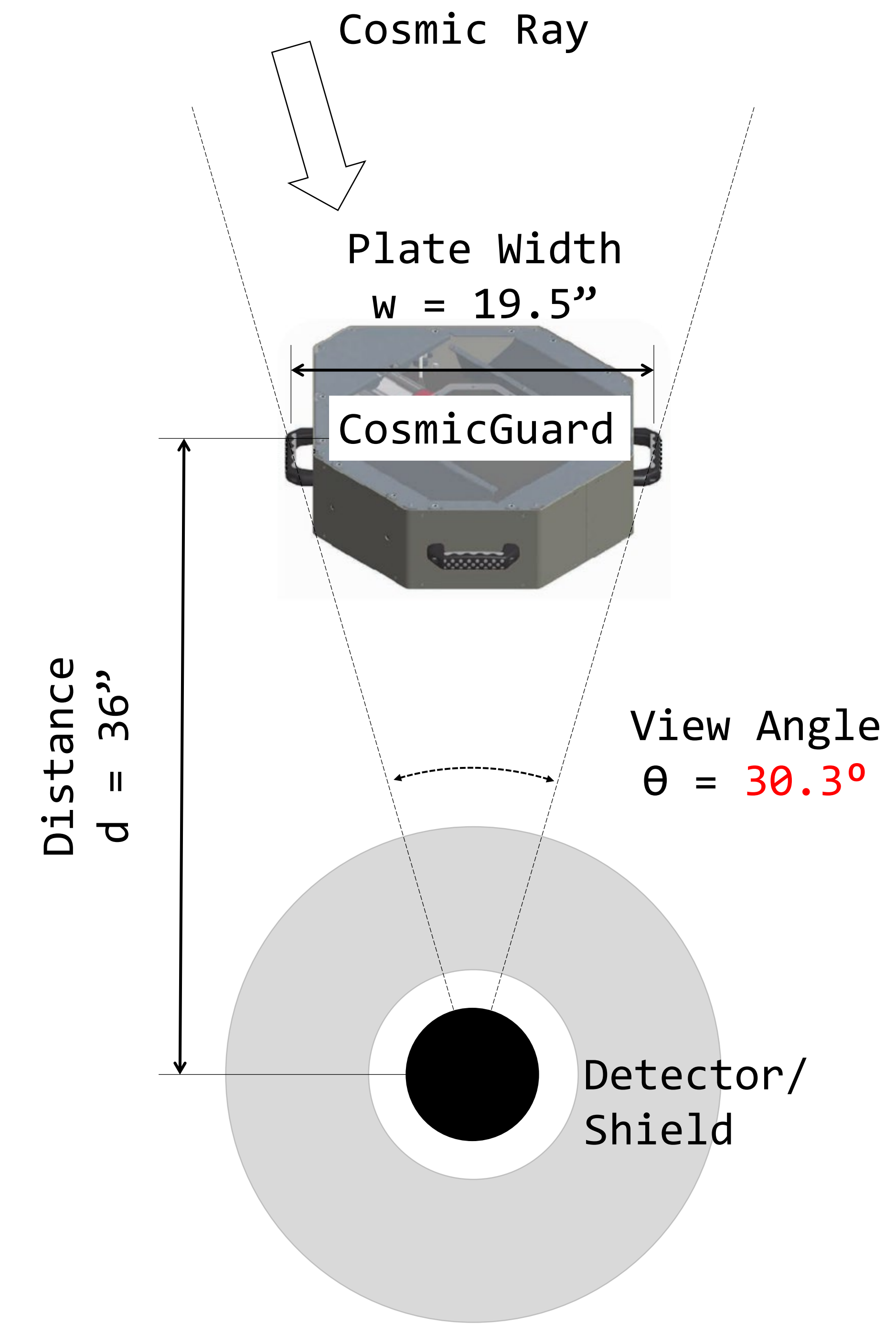
RESULTS



	No Cosmic Veto	With CosmicGuard	Improvement
Total Counts	1,539,022	1,495,811	2.81%
24-hr Blank MDC (uBq/m³)	8.75	8.59	1.93%

2.8% Background Reduction
1.9% Blank MDC Improvement

EXPERIMENTAL SETUP



CONCLUSIONS AND FUTURE WORK

- ❖ Successfully tested commercial off-the-shelf cosmic veto system on RASA system with no hardware modification or redesign.
- ❖ 2-3% background reduction
- ❖ 2% MDC improvement
- ❖ Potential for greater effect at IMS stations with higher cosmic background
- ❖ Modifications to hardware design to improve view angle of veto detectors have potential to improve cosmic and terrestrial background counts

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