

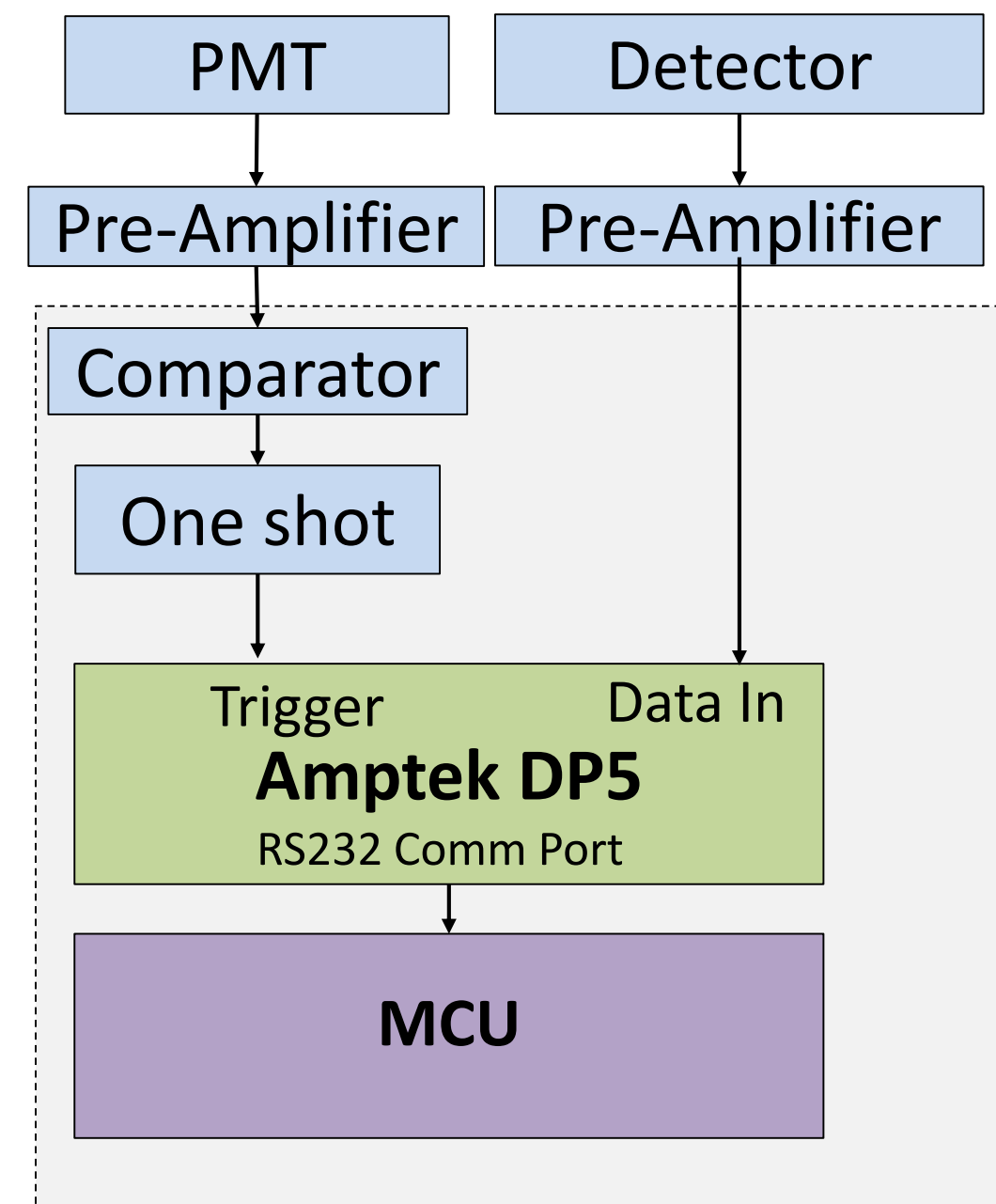
Electrical Characteristics of a Balloon-Borne Radiation Instrument

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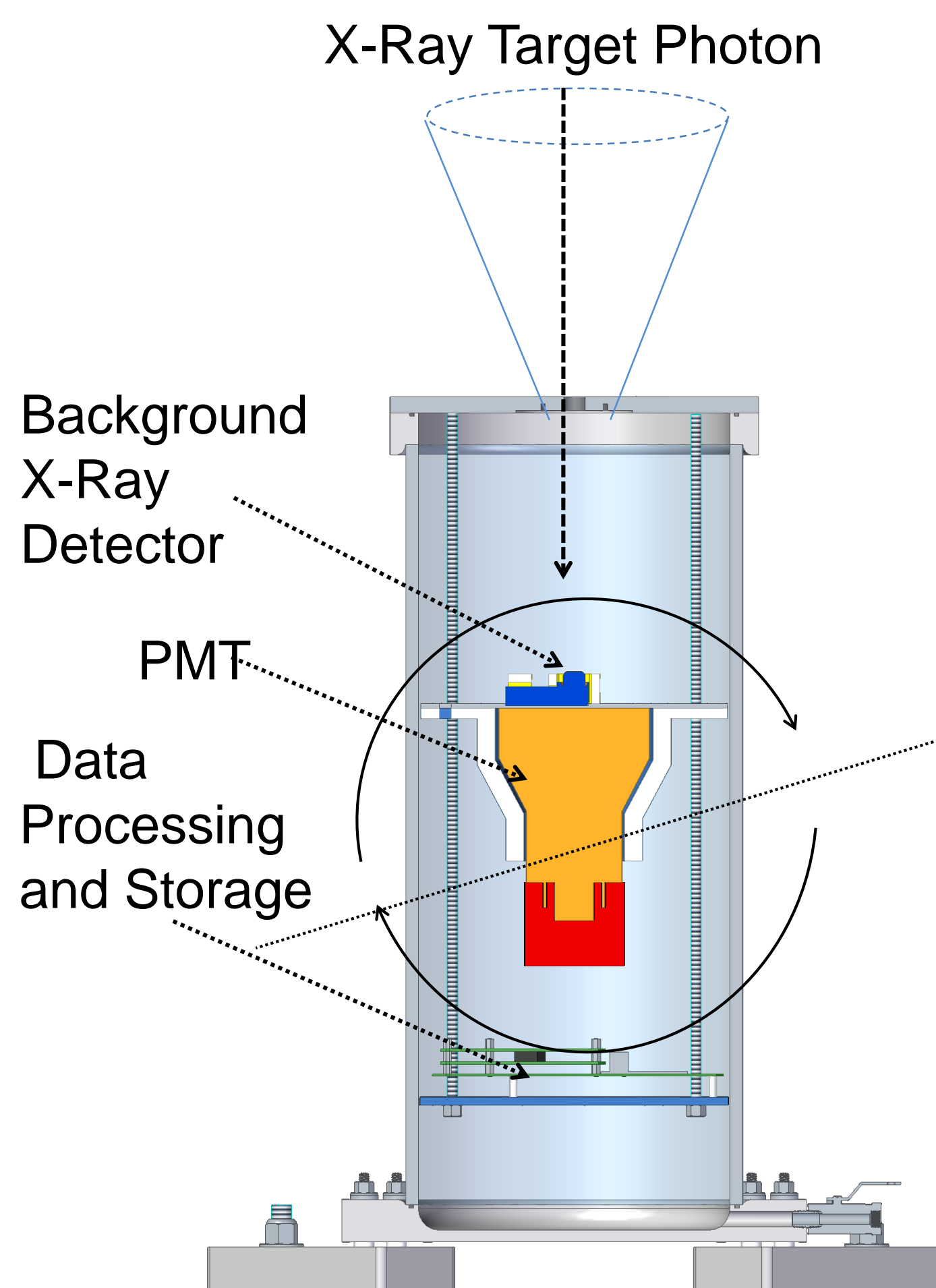
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Overview/Introduction

ALFRED is a high energy radiation detection instrument that uses anticoincidence shielding to veto background signals. Instrument requirements included veto circuitry for the anticoincidence shield, power management for the system, and noise reduction for the science data pipeline. The veto circuitry was designed, simulated, tested, and then calibrated for reduced background radiation counts.



3. Block Diagram of Veto Circuitry

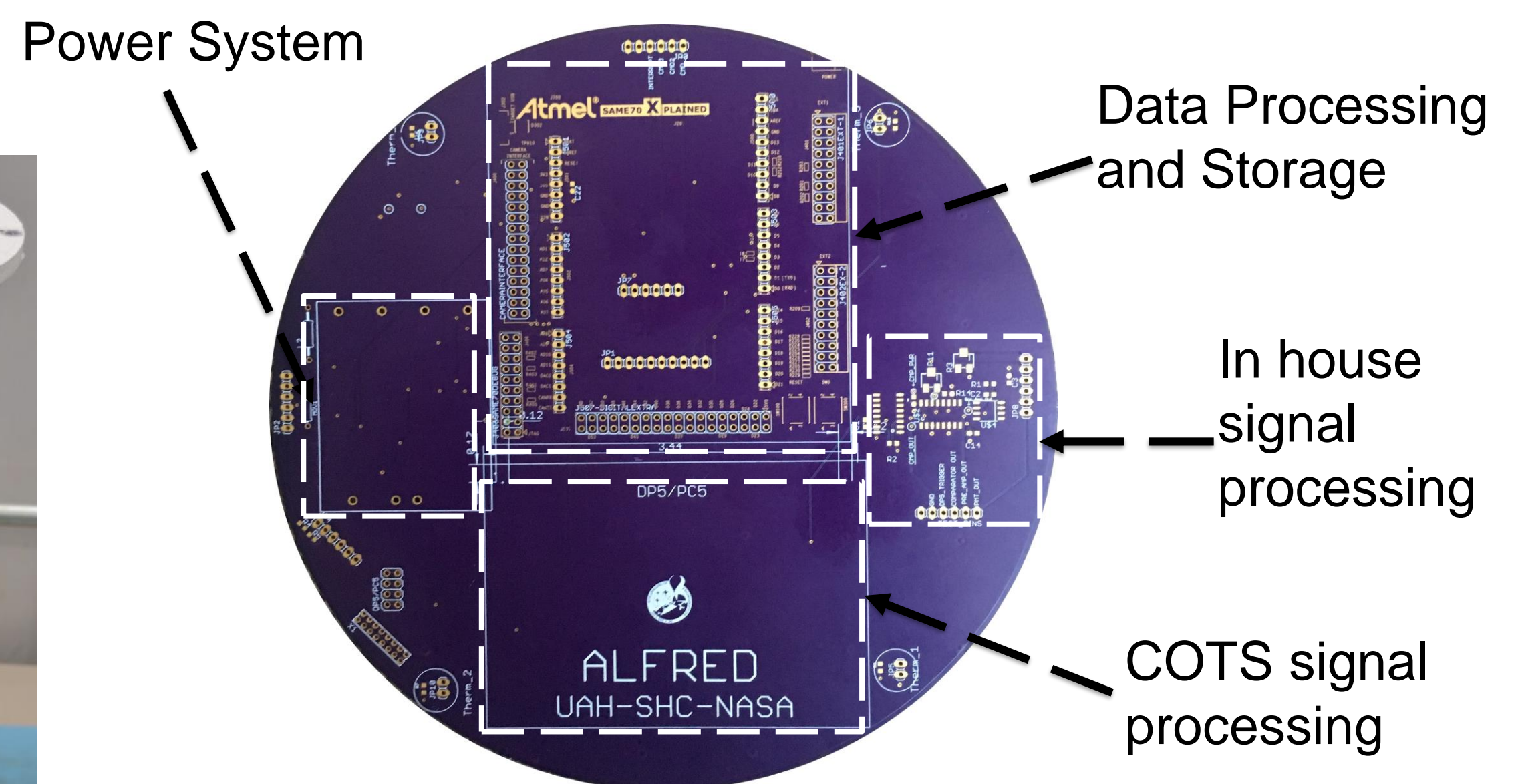


1. CAD Model of the Instrument Assembly



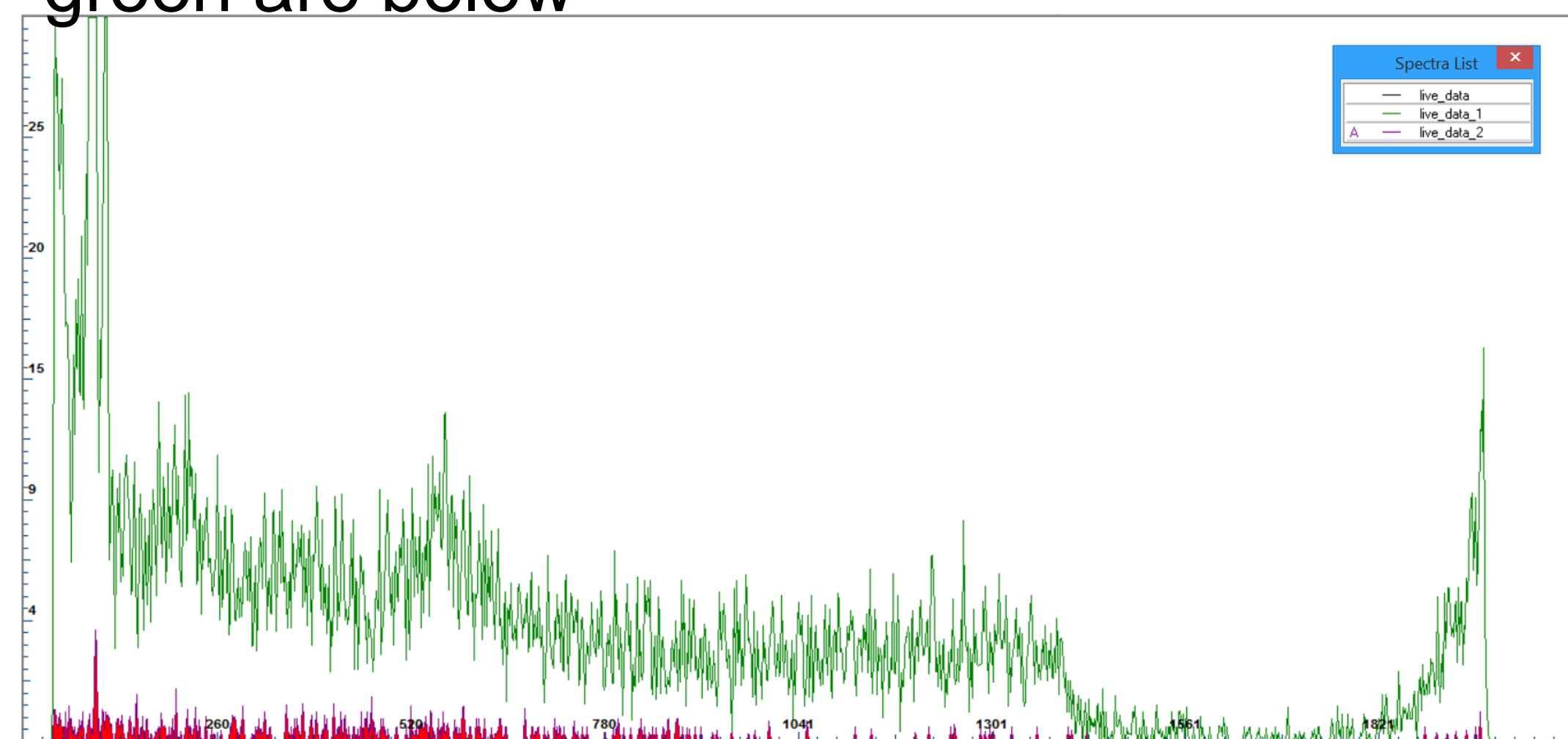
2. Internal Assembly

Key Findings/Results



4. Instrument Circuit Board

49.45% reduction of counts over the whole flight and 21.24% reduction during the float was measured for the high altitude flight in New Mexico. Ground test results showing the difference between veto in red and no veto in green are below



5. Ground Test Results

Methodology

The anti-coincidence shield was designed so simultaneous events on the simulated optics and the shield would not be registered in the COTS signal processing unit. For this purpose, inhouse veto electronics that digitized the events on the shield were constructed. The digitized signal determined the trigger state on the DP5. Only events when the trigger state was low were registered.

Acknowledgements

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4. Space Hardware Club