In [2], we parallelize the pipeline to target low GPU execution times were measured on an NVIDIA GeForce RTX 2080. We scaled execution times to estimate performance on an NVIDIA Jetson NX.

Fluence: Fluence describes the energy density induced across the APF detector by a gamma-ray burst. Input size is proportional to fluence. Localized Accuracy

- In [2], we measured our pipeline's ability to accurately localize GRBs.
- Localization error is measured in degrees over 1000 tests for each fluence.
- We achieve consistent sub-degree localization (as few as 2) using fluence.

CPU Performance

- In [2], we parallelized the pipeline to target low power ARM Cortex-A53 processor.
- Execution times are averaged over 200 trials for each fluence.
- Initial source approximation and iterative refinement dominate execution time.

In this work, we accelerate the approximation and refinement stages and estimate running time on an NVIDIA Jetson NX Xavier system. Its 10-watt power requirement makes it comparable to what might fly onboard the APT platform.

References

5. Grati, Guenni, Bash, and Steve Fossett Foundation. We are grateful to the Washington University technical staff including Richard Alnussirat, Jacob Wheelock, Jeremy Buhler, James Buckley, Wenlei Chen, and Dana Braun and Garry Bose, who made invaluable contributions to the development and construction of the prototype detector and the Planck-Bathos instrument.

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GPU acceleration demonstrates an estimated speedup of 3-3.5x for initial source approximation. GPU acceleration of iterative refinement slows the increase of execution time with input size. Execution switches from CPU to GPU for each iteration, incurring overhead.

References

5. Grati, Guenni, Bash, and Steve Fossett Foundation. We are grateful to the Washington University technical staff including Richard Alnussirat, Jacob Wheelock, Jeremy Buhler, James Buckley, Wenlei Chen, and Dana Braun and Garry Bose, who made invaluable contributions to the development and construction of the prototype detector and the Planck-Bathos instrument.