

Mission Overview for a Cislunar Gamma-Ray Burst Detector

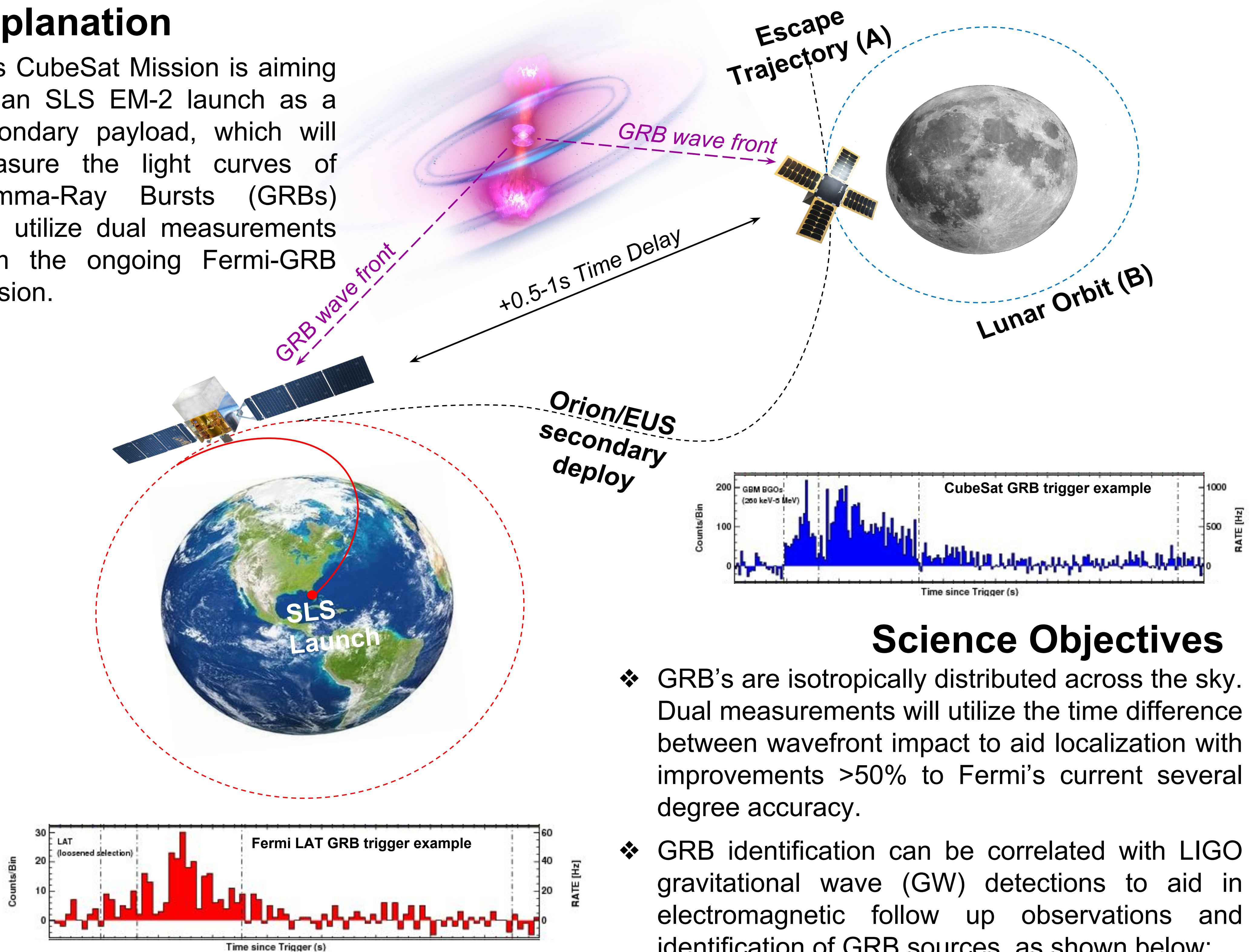
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Overview

The Alabama Space Grant Consortium has begun a multi-university collaborative student effort to design and build a 12U CubeSat with the objective of measuring Gamma-Ray Bursts in deep space. This mission will aim for a launch on SLS EM-2 as a secondary payload and be entirely student designed and built with UAH Space Hardware Club student teams producing the science instrument and systems engineering effort

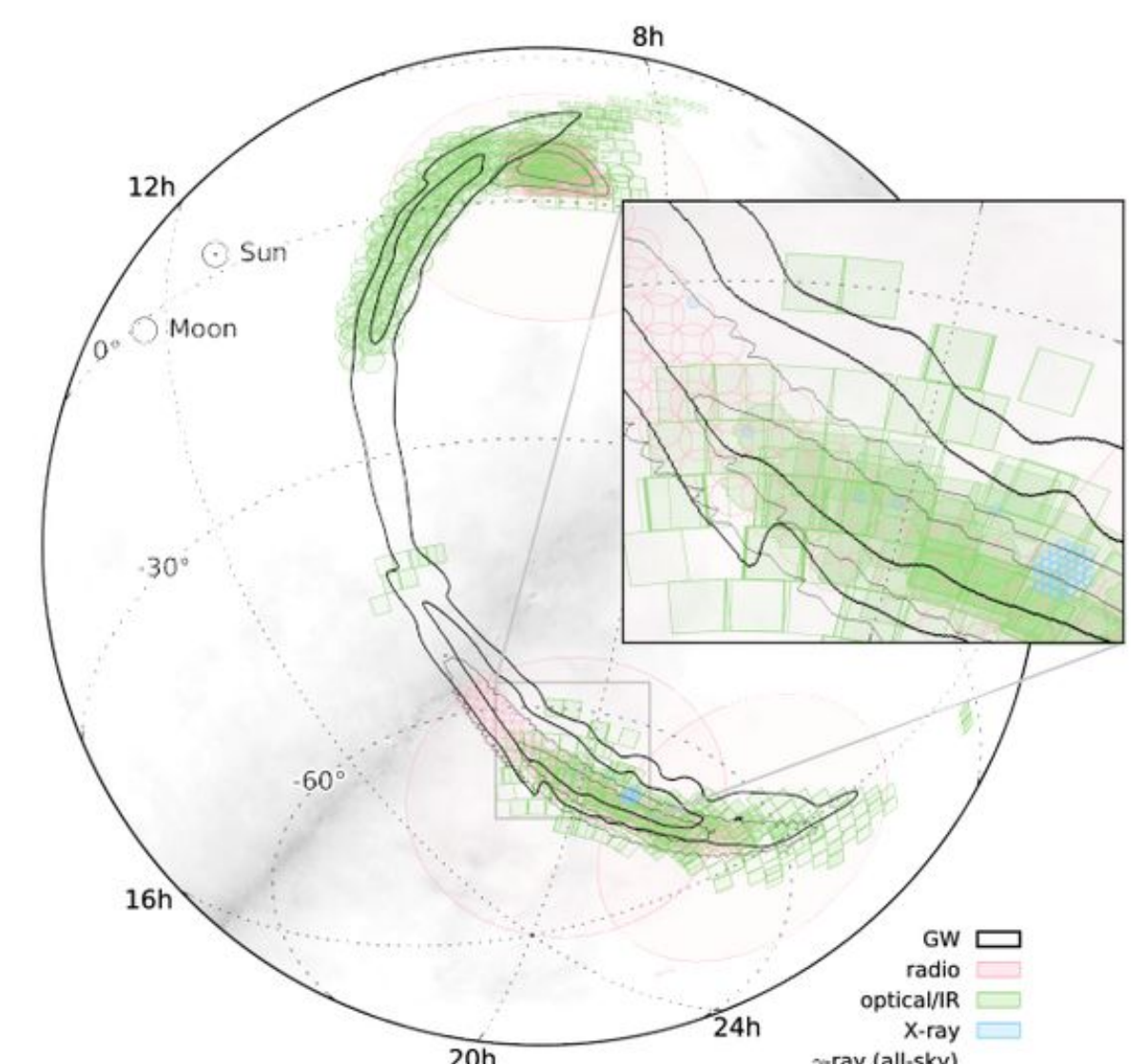
Explanation

This CubeSat Mission is aiming for an SLS EM-2 launch as a secondary payload, which will measure the light curves of Gamma-Ray Bursts (GRBs) and utilize dual measurements from the ongoing Fermi-GRB mission.



Science Objectives

- ❖ GRB's are isotropically distributed across the sky. Dual measurements will utilize the time difference between wavefront impact to aid localization with improvements >50% to Fermi's current several degree accuracy.
- ❖ GRB identification can be correlated with LIGO gravitational wave (GW) detections to aid in electromagnetic follow up observations and identification of GRB sources, as shown below:



Impact

Although this initiative is still in its infancy, it marks an important step in building CubeSat capabilities for students statewide. This mission and future of this kind will strengthen the workforce across the state by enabling students to develop spacecraft and aid in GRB/GW science.

Acknowledgements

Dr. Francis Wessling, Mentor; UAH; Alabama Space Grant Consortium; UAH College of Engineering; UAH Space Hardware Club

[1] Fermi observations of high-energy gamma-ray emission from GRB 090217A - Fermi-LAT and Fermi-GBM Collaborations *Astrophys.J.* 717 (2010) L127-L132 arXiv:1007.3409 [astro-ph.HE]
[2] Localization and broadband follow-up of the gravitational-wave transient GW150914