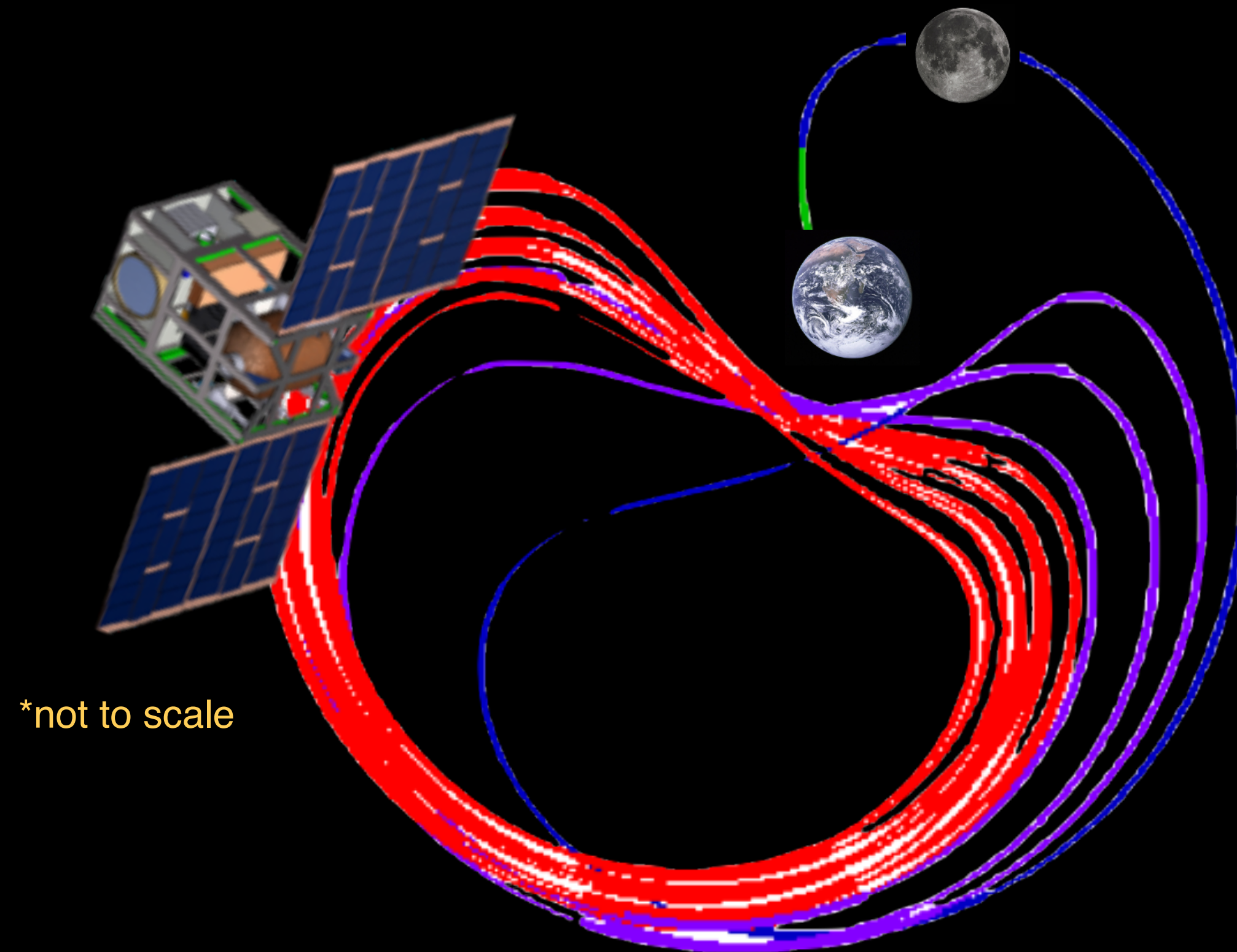




# MoonBEAM

A beyond Earth-orbit GRB detector  
for multi-messenger astronomy



\*not to scale

C. Michelle Hui (NASA/MSFC)

**MSFC:** D. Kocevski, T. Littenberg, C. Wilson-Hodge, J. Wood

**UAH:** M. Briggs, P. Jenke

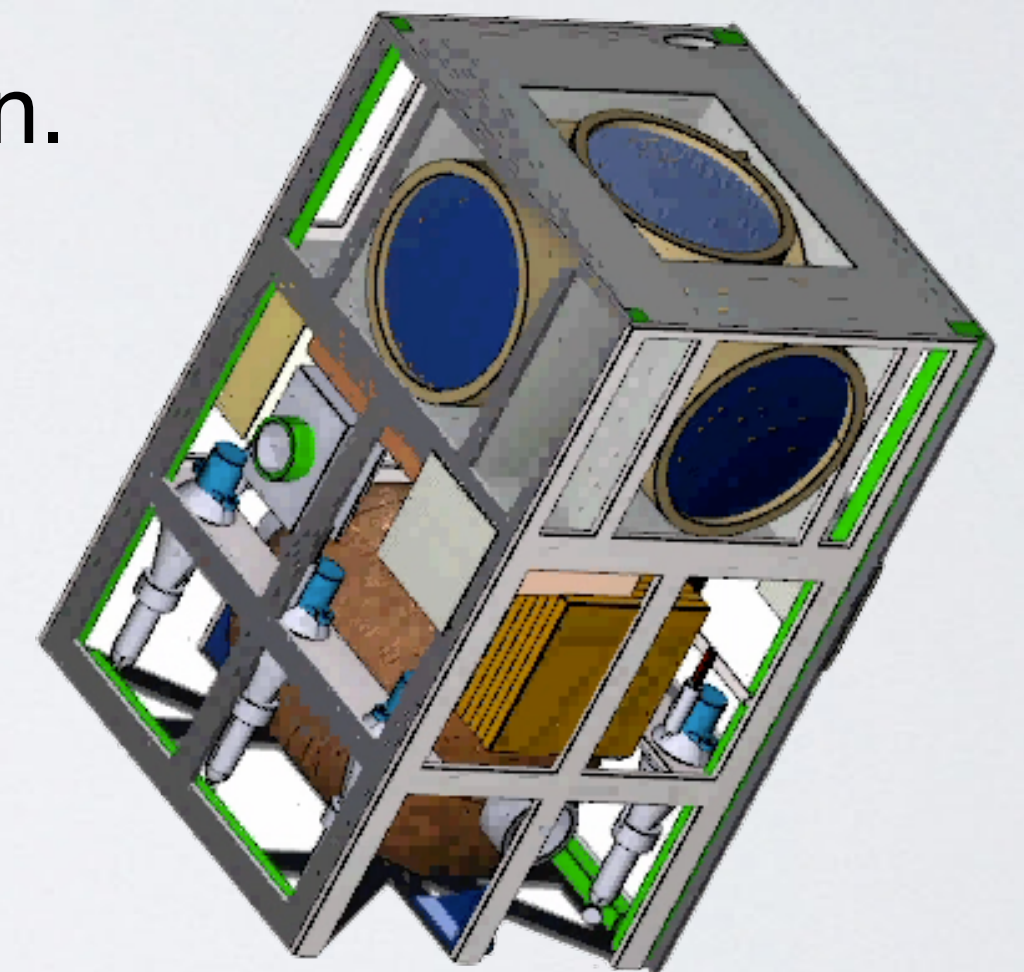
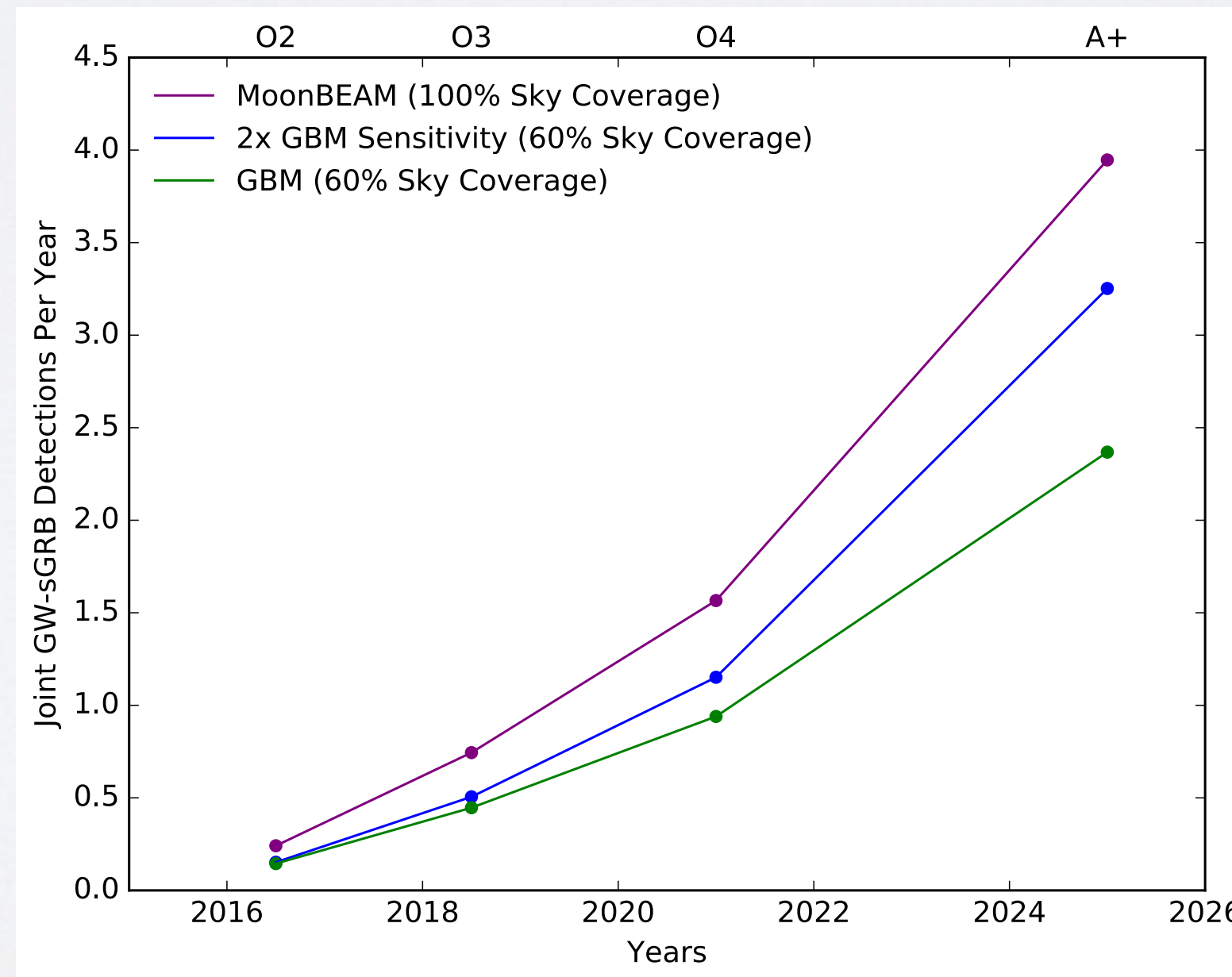
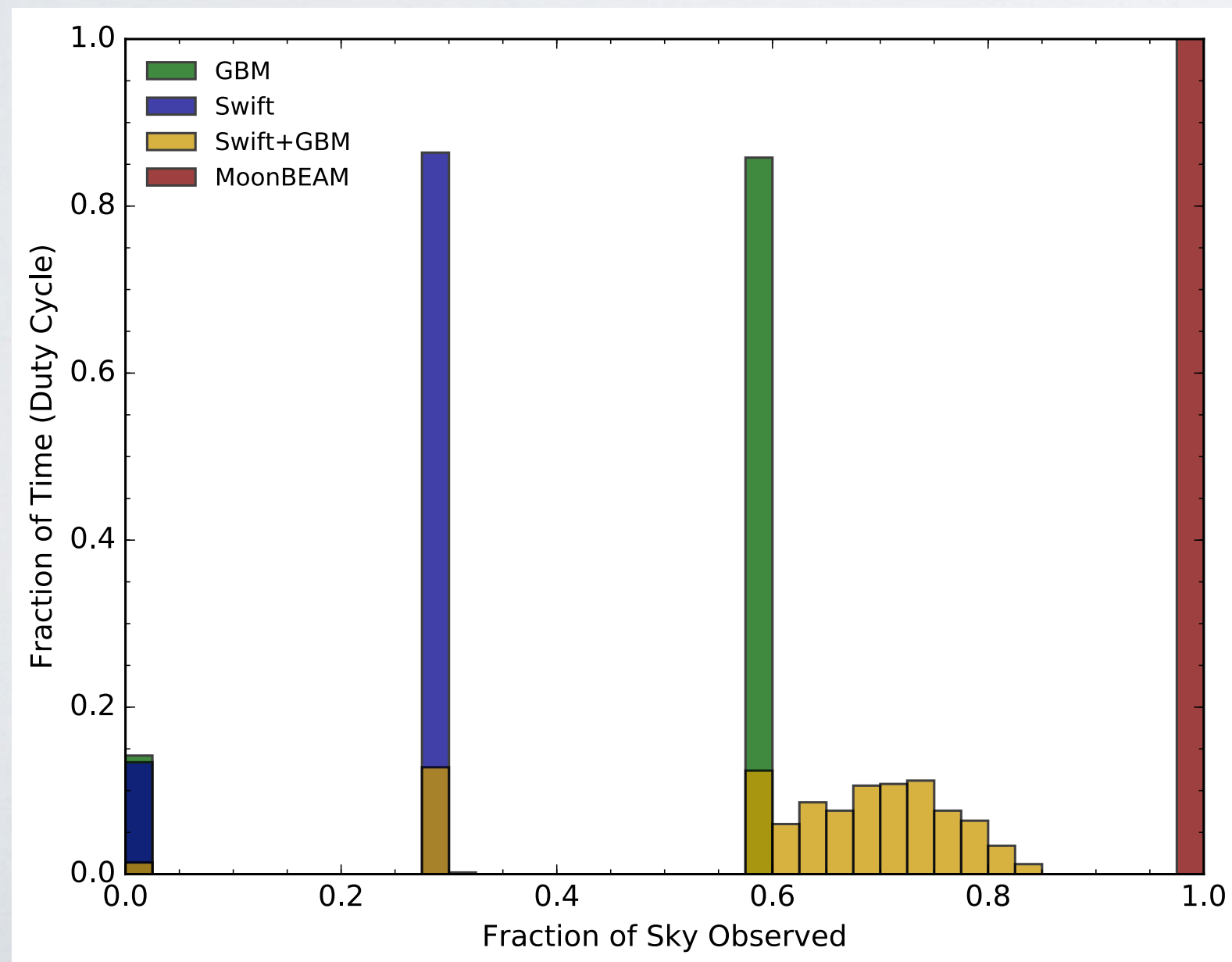
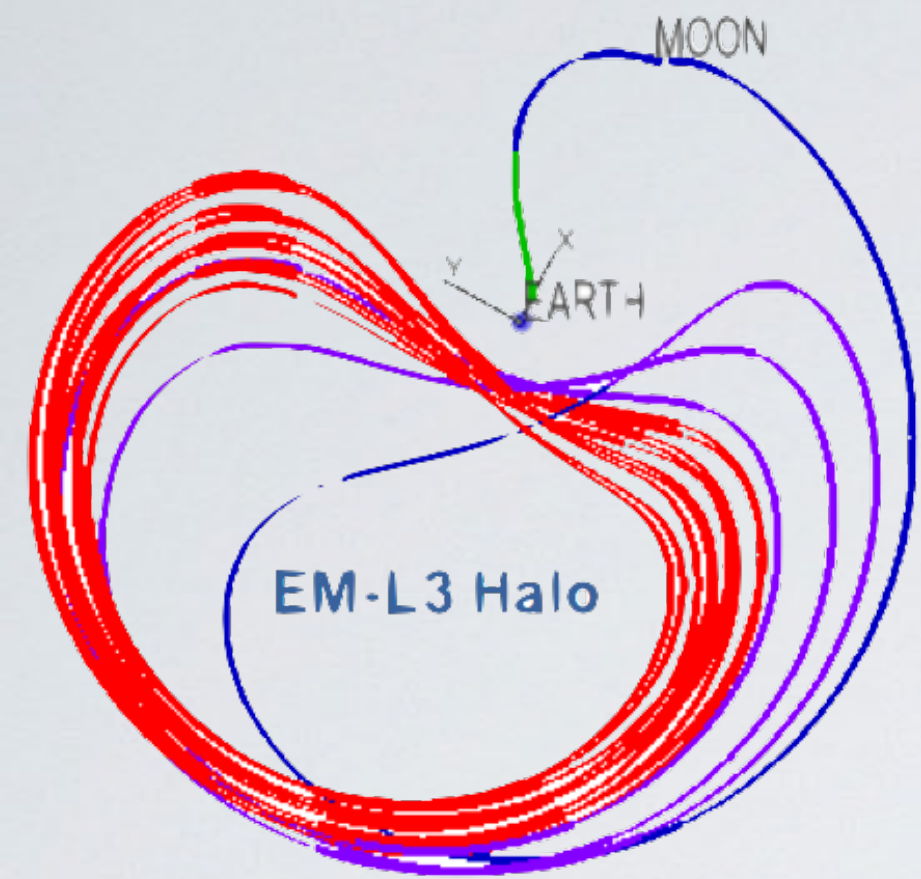
**USRA:** C. Fletcher, A. Goldstein, O. Roberts

**GSFC:** E. Burns, J. Perkins, J. Racusin, J. R. Smith



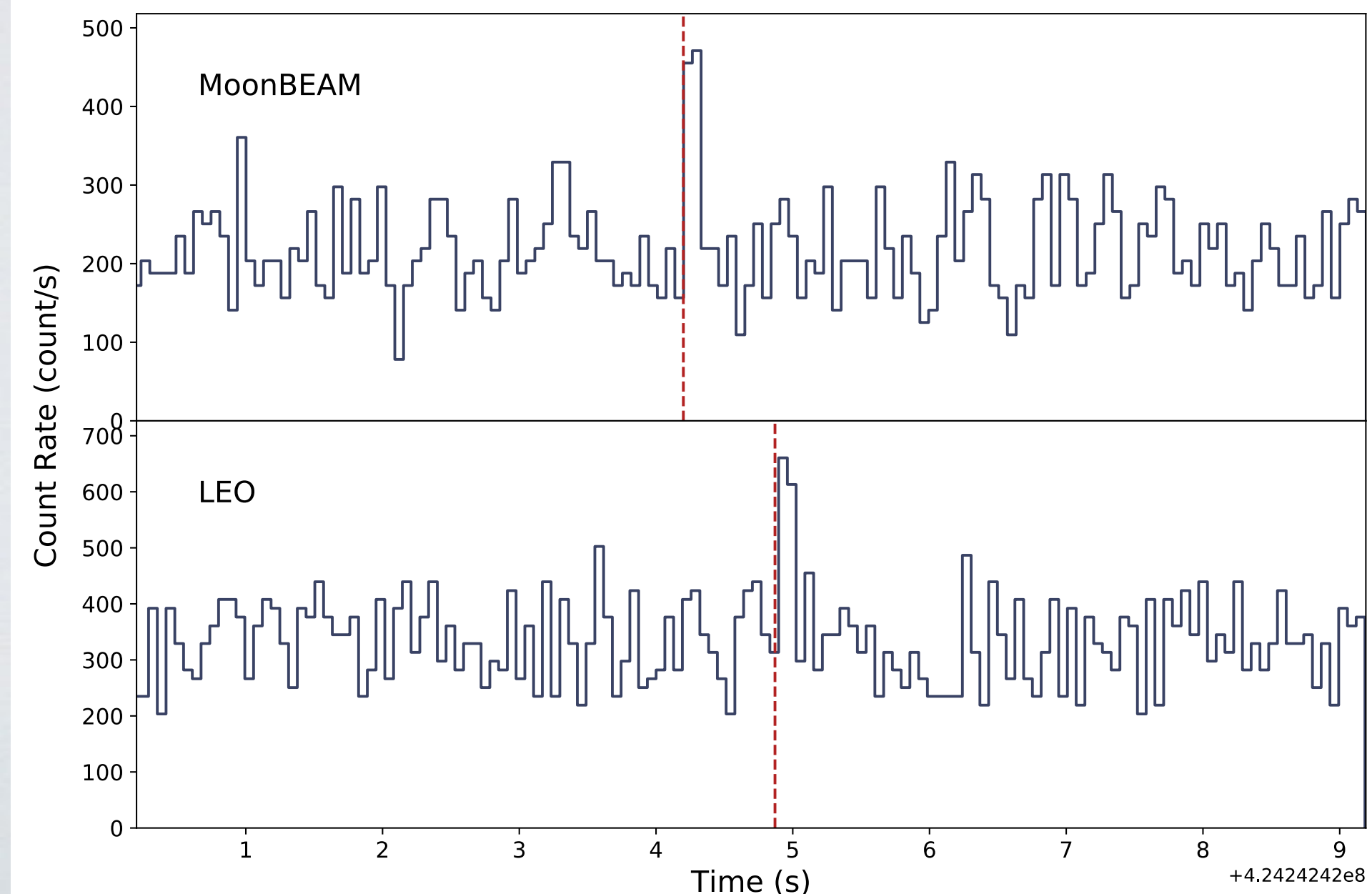


- 2-year SmallSat mission concept to detect gamma-ray bursts.
- Science instrument is 5 detector modules (NaI/CsI phoswich + SiPM) positioned to maximize sky coverage.
- Cislunar orbit at L3 point of Earth-Moon system (95,500 — 665,000 km from Earth).
  - ▶ Earth occults < 0.1% of sky at maximum.
  - ▶ High duty cycle, no SAA passage.
  - ▶ More stable background compared to Low Earth Orbit.
  - ▶ Additional localization improvement with IPN-like timing triangulation.



SGRB rate estimate  
**30-70/year**  
 \*assuming single-crystal detector

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Median-bright GRB at 45deg baseline  
MoonBEAM average distance from Earth

MoonBEAM localization of an average GRB  
MoonBEAM + LEO instrument timing  
annulus  
Combined posterior (loc area reduced by  
factor of 3)

