



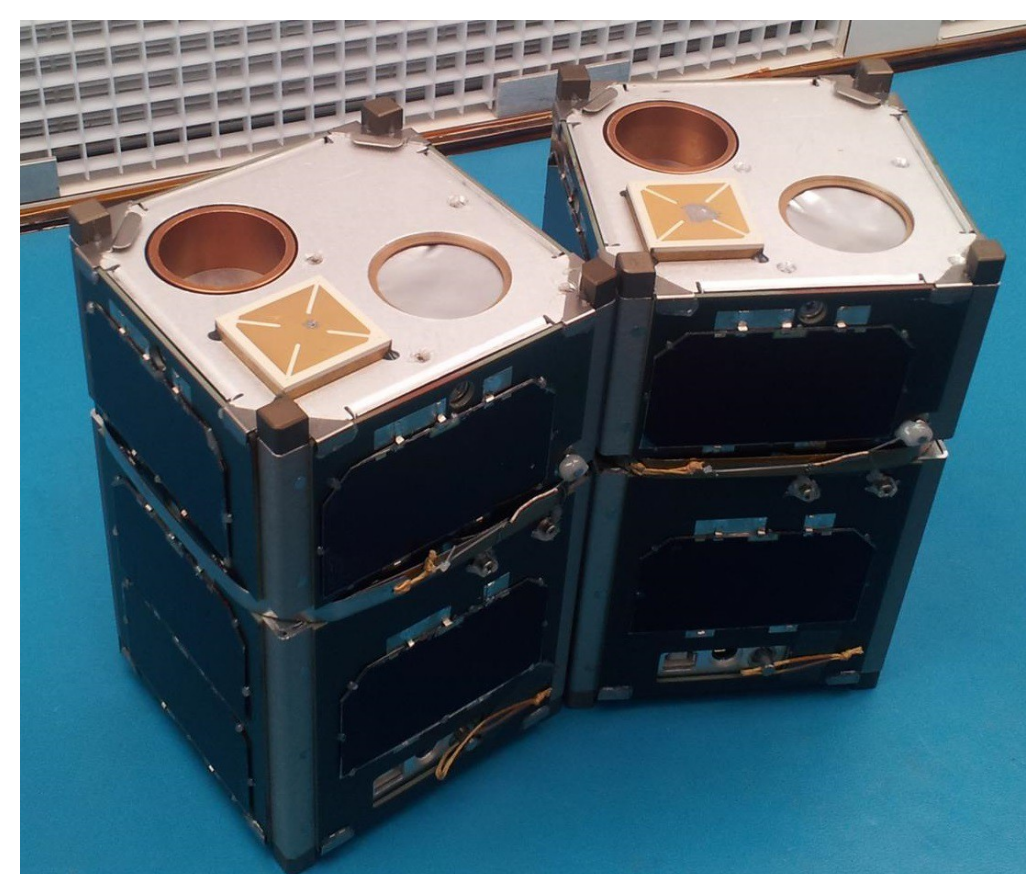
Autodetection of Electron Microbursts in Satellite Data and Distributive Collection of FIREBIRD Beacon Data

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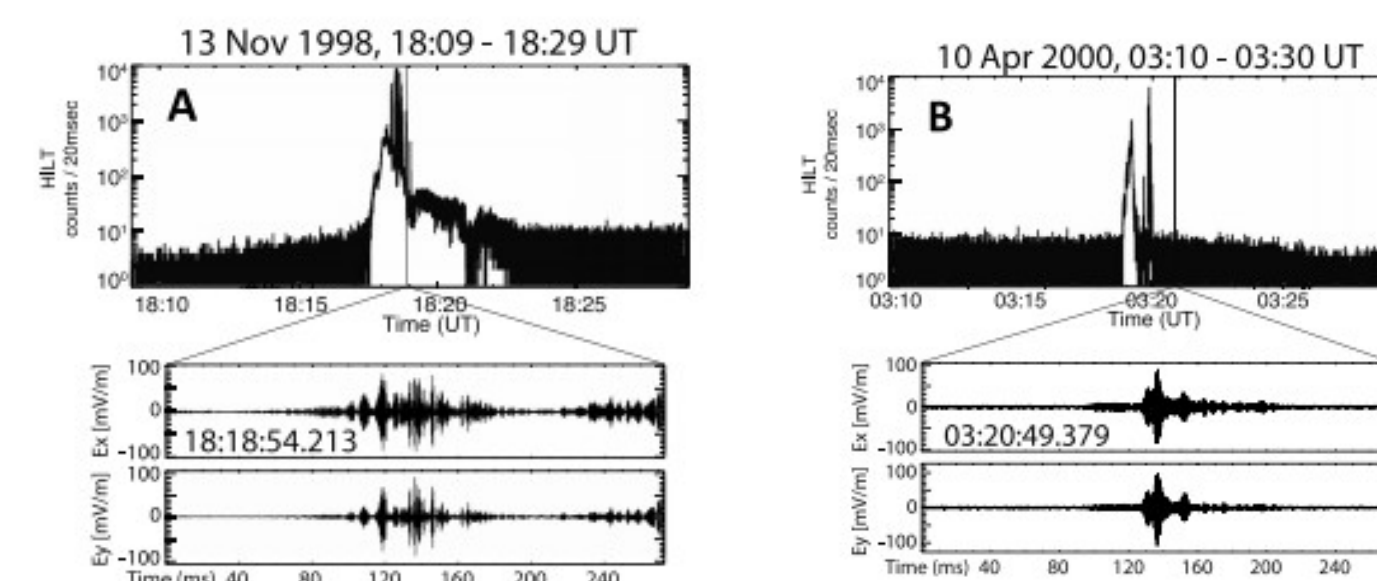
FIREBIRD Mission Background

- The FIREBIRD Mission consists of two satellites operating simultaneously to answer the following:
 - What is the spatial scale size of an individual microburst?
 - What is the energy dependence of an individual microburst?
 - How much total electron loss from the radiation belts do microbursts produce globally?
- Satellites launched into same orbit with slowly varying separation distance (~3-6 cm/s)
- 2 SSD Detectors with 6 energy levels ranging from 2.2 KeV-1.1MeV per satellite
 - One Detector is recessed into the satellite, the other is not



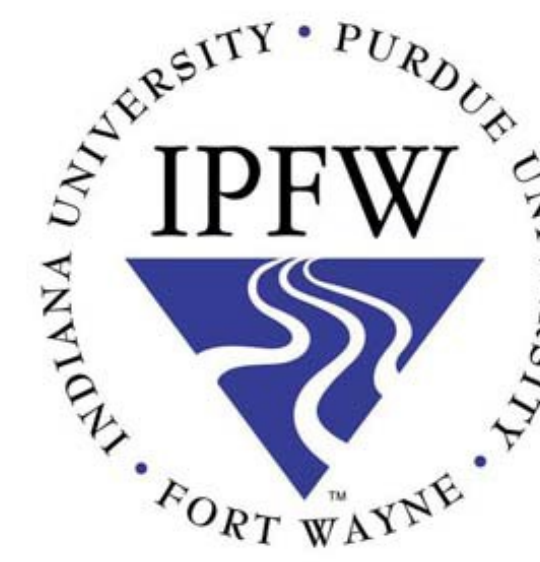
Electron Microbursts Background

- Bursty energetic particle precipitation to the ionosphere
 - Believed to be correlated with Whistler Mode Chorus Waves in Magnetosphere
 - FIREBIRD Data in conjunction with Van Allen Belt Probes will investigate this correlation



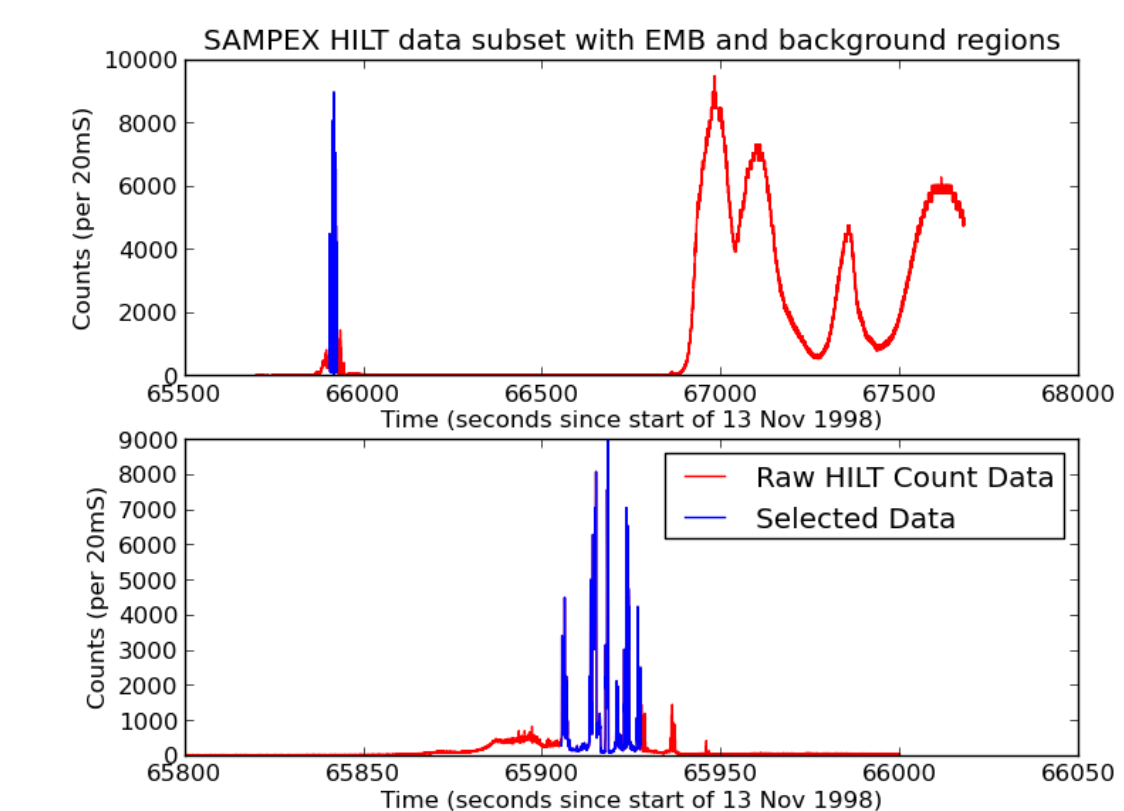
Solar Physics REU Goals

- Automatically report “interesting” regions in particle count-rate data
- Develop software for HAM radio operators that identifies FIREBIRD Beacon Data and forwards to SSEL at Montana State University

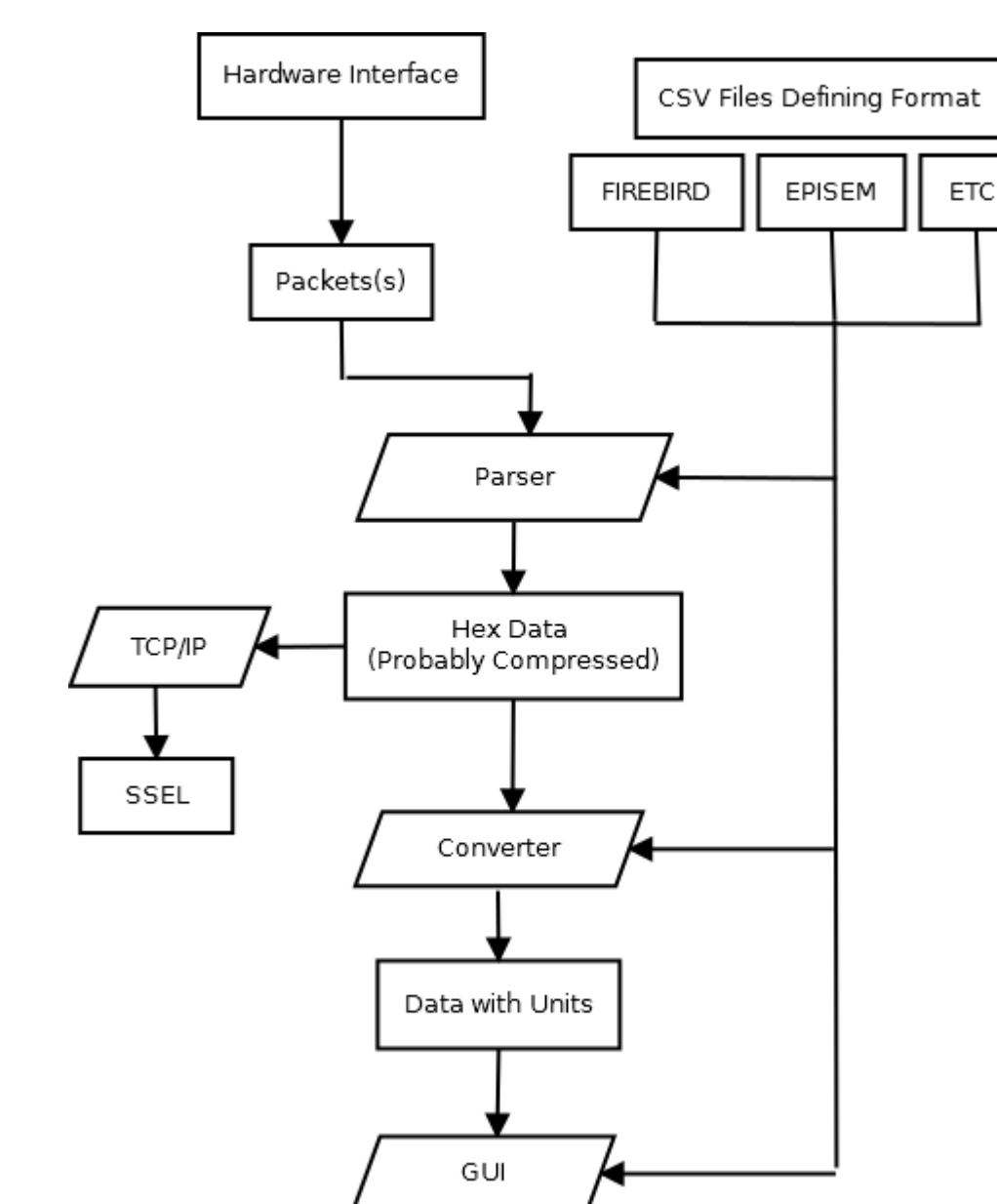


Current Progress

- Learning Python for program and software development
- Completed preliminary program for autodetection of microbursts in SAMPEX Data from HILT Detector



- Research into structure of beacon packets is ongoing
- Program structure has been flowcharted



References

- Kersten, K., C. A. Cattell, A. Breneman, K. Goetz, P. J. Kellogg, J. R. Wygant, L. B. Wilson III, J. B. Blake, M. D. Looper, and I. Roth (2011), Observation of relativistic electron microbursts in conjunction with intense radiation belt whistler-mode waves, Geophys. Res. Lett., 38, L08107, doi:10.1029/2011GL046810.
- (2009) FIREBIRD Proposal Text
- Personal Communication with Mosleh E. and Mashburn K.