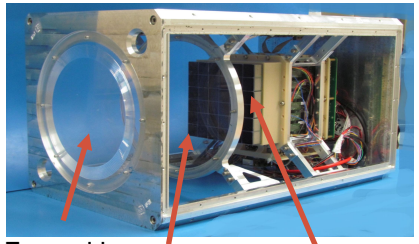
# Description and performance results of the trigger logic of TUS and Mini-EUSO to search for Ultra-High Energy Cosmic Rays from space

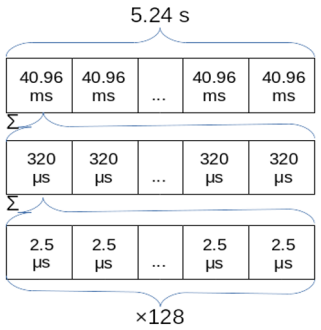
M. Bertaina for the JEM-EUSO Collaboration
Department of Physics, University of Torino & INFN Torino - Italy

## Mini-EUSO (ISS 2019-)



Fresnel lenses 36 MAPMTs (64ch)

### Data acquisition system

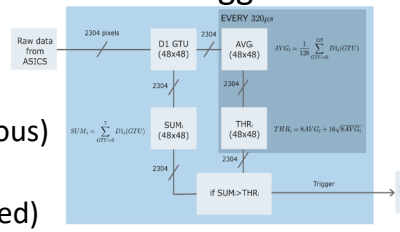



D3 (Continous)

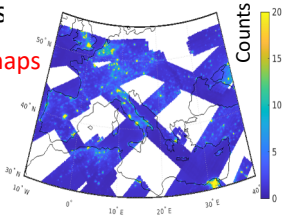
D2 (Triggered)
1 packet = 40.96 ms

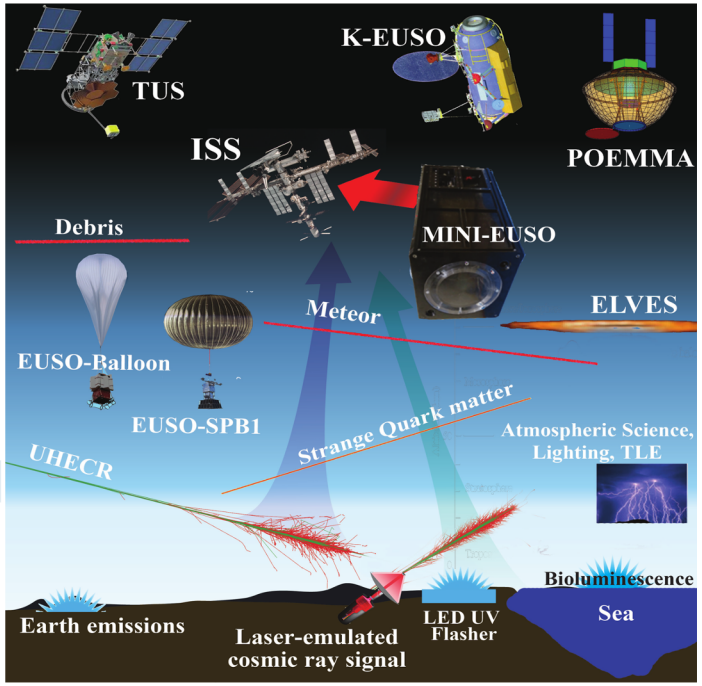
D1 (Triggered)
1 packet = 320 $\mu s$

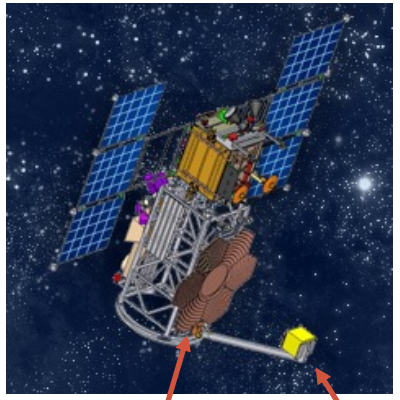
### L1 trigger




UV maps



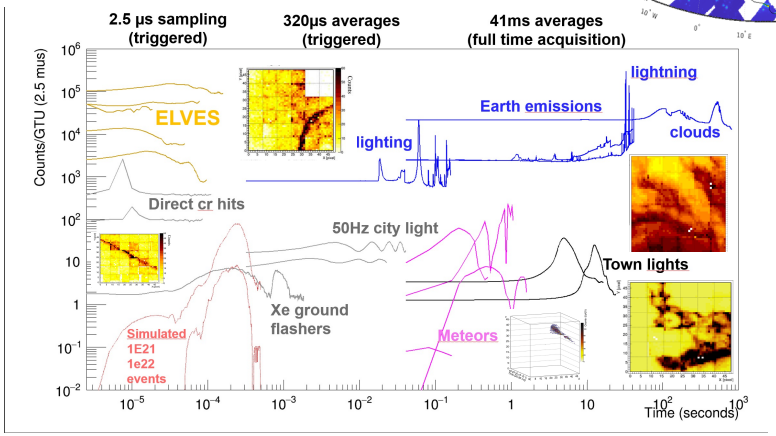
Fresnel mirror

Focal surface (16 x 16 PMTs)

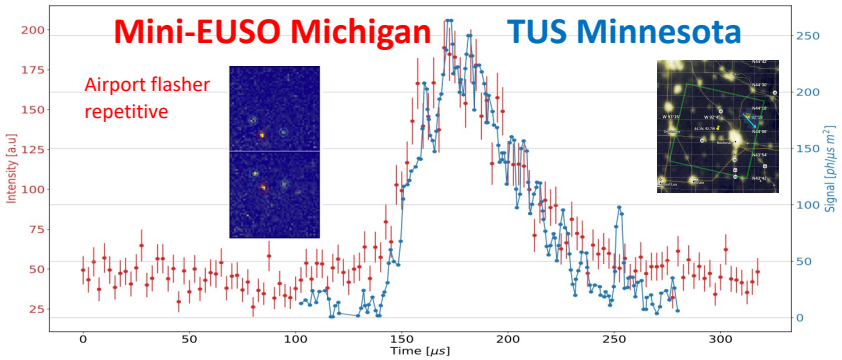
## TUS (Lomonosov sat. 2016-17)

### Data acquisition system

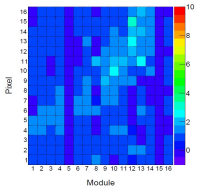
| Phenomena | Time sample | Integration time | Oscillogram length |
|---|---|---|---|
| EAS (D1) | $\tau = \tau_0 =$ 0.8 µs | $t = 2^4\tau =$ 12.8 µs | $\Delta T = 256\tau =$ 205 µs |
| Short TLEs (D2a) | $\tau = 2^5\tau_0 =$ 25.6 µs | $t = 2^3\tau =$ 0.2 ms | $\Delta T = 256\tau =$ 6.6 ms |
| Long TLEs (D2b) | $\tau = 2^9\tau_0 =$ 0.4 ms | $t = \tau =$ 0.4 ms | $\Delta T = 256\tau =$ 105 ms |
| Micro-meteor (D3) | $\tau = 2^{13}\tau_0 =$ 6.6 ms | $t = 2^4\tau =$ 105 ms | $\Delta T = 256\tau =$ 1.7 s |

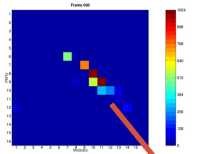



## EAS-like events (D1 triggers)

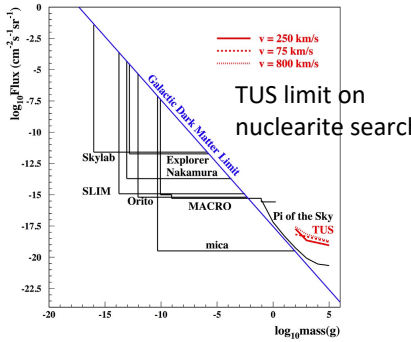



elve



Distribution of direct cosmic ray hits




TUS limit on nuclearite search

Fraction of active time