



Meteoroid Environment Office

The NASA Fireball Network

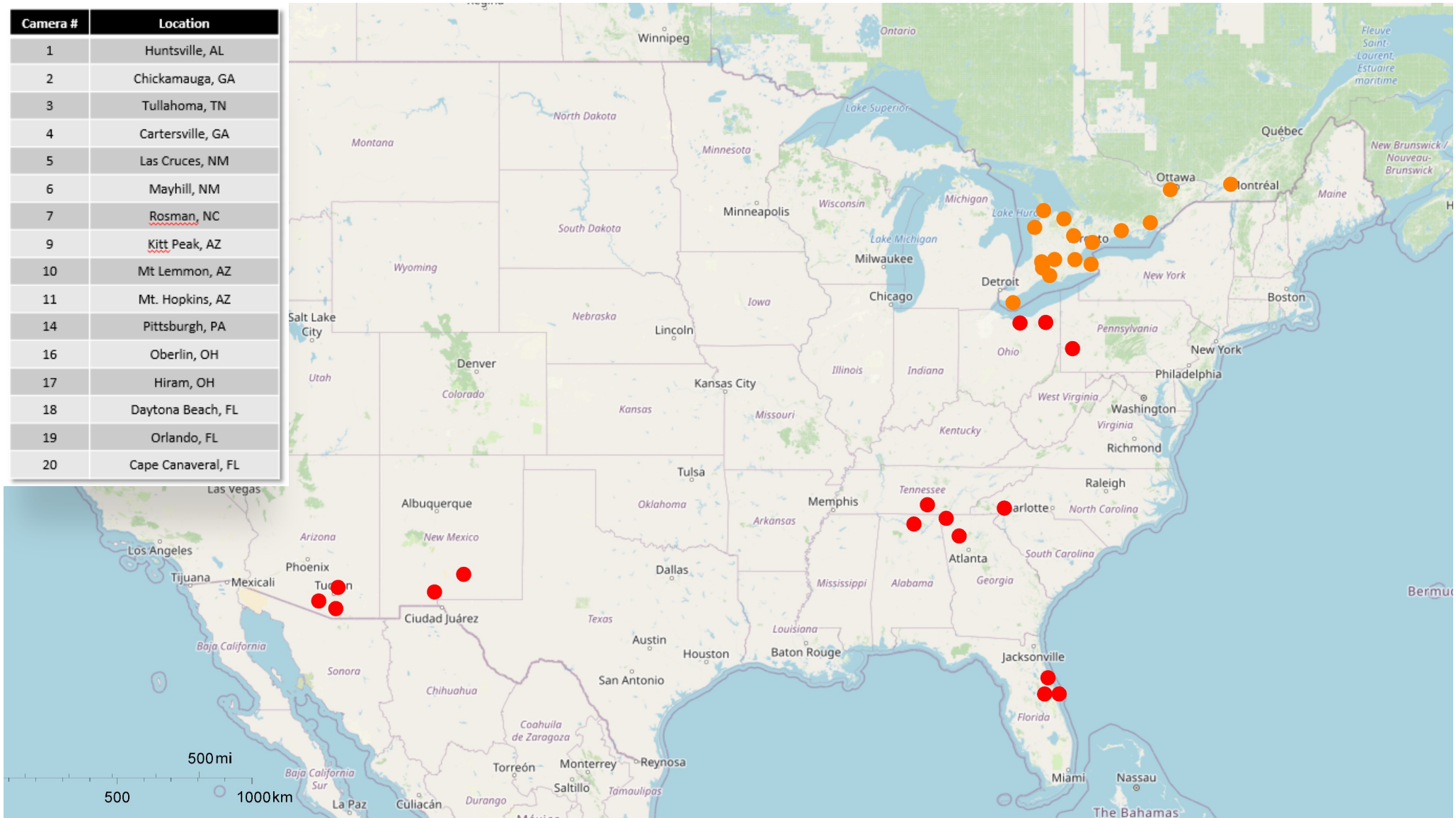
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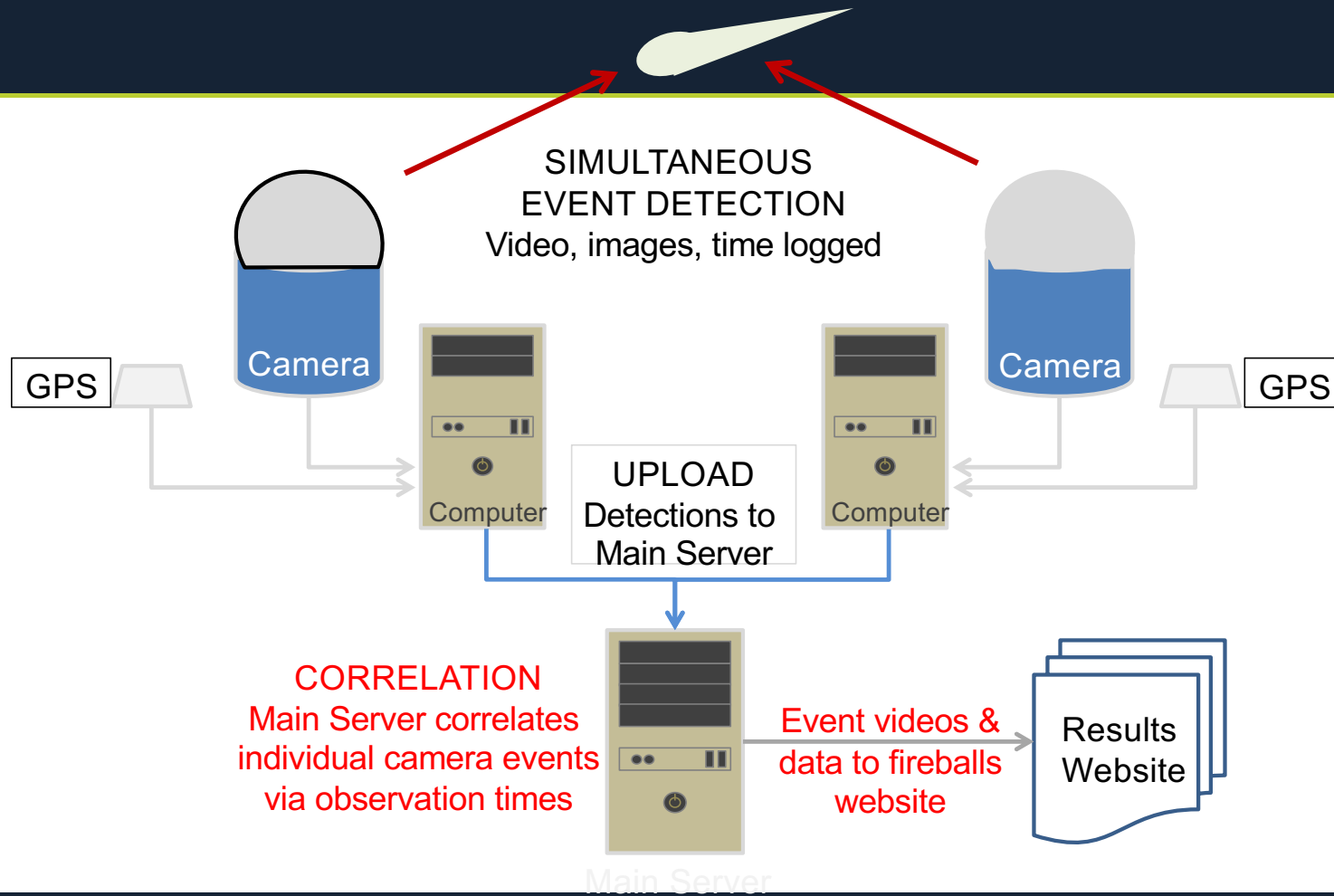
Goals of the NASA Fireball Network



- Establish the speed distribution of cm size meteoroids
- Determine which sporadic sources produce large particles
- Determine (low precision) orbits for bright meteors
- Attempt to discover the size at which showers begin to dominate the meteoroid flux
- Monitor the activity of major meteor showers
- Assist in the location of meteorite falls

Camera #	Location
1	Huntsville, AL
2	Chickamauga, GA
3	Tullahoma, TN
4	Cartersville, GA
5	Las Cruces, NM
6	Mayhill, NM
7	<u>Rosman, NC</u>
9	<u>Kitt Peak, AZ</u>
10	Mt Lemmon, AZ
11	Mt. Hopkins, AZ
14	Pittsburgh, PA
16	Oberlin, OH
17	Hiram, OH
18	Daytona Beach, FL
19	Orlando, FL
20	Cape Canaveral, FL







- Wattec 902-H2 Ultimate or Sony HiCam HB-710E
 - monochrome 8bit CCD video cameras
 - 1/2" CCD chip, effectively 768x494 px
 - Interleaved 30 fps video
- F1.4, 1.6-3.4mm Rainbow L163VDC4P fisheye lens
- Weatherproof PVC enclosure with twilight sensor, thermostat, heater, fan
- Flat-roof or pole mounted



- Standard desktop computer running Debian Linux
 - Frame-grabber card
 - Large disk storage for streaming video buffer
 - ASGARD (All Sky and Guided Automatic Real-time Detection) software for meteor detection, correlation, analysis, and storage
 - USB GPS for time synchronization
- Network link

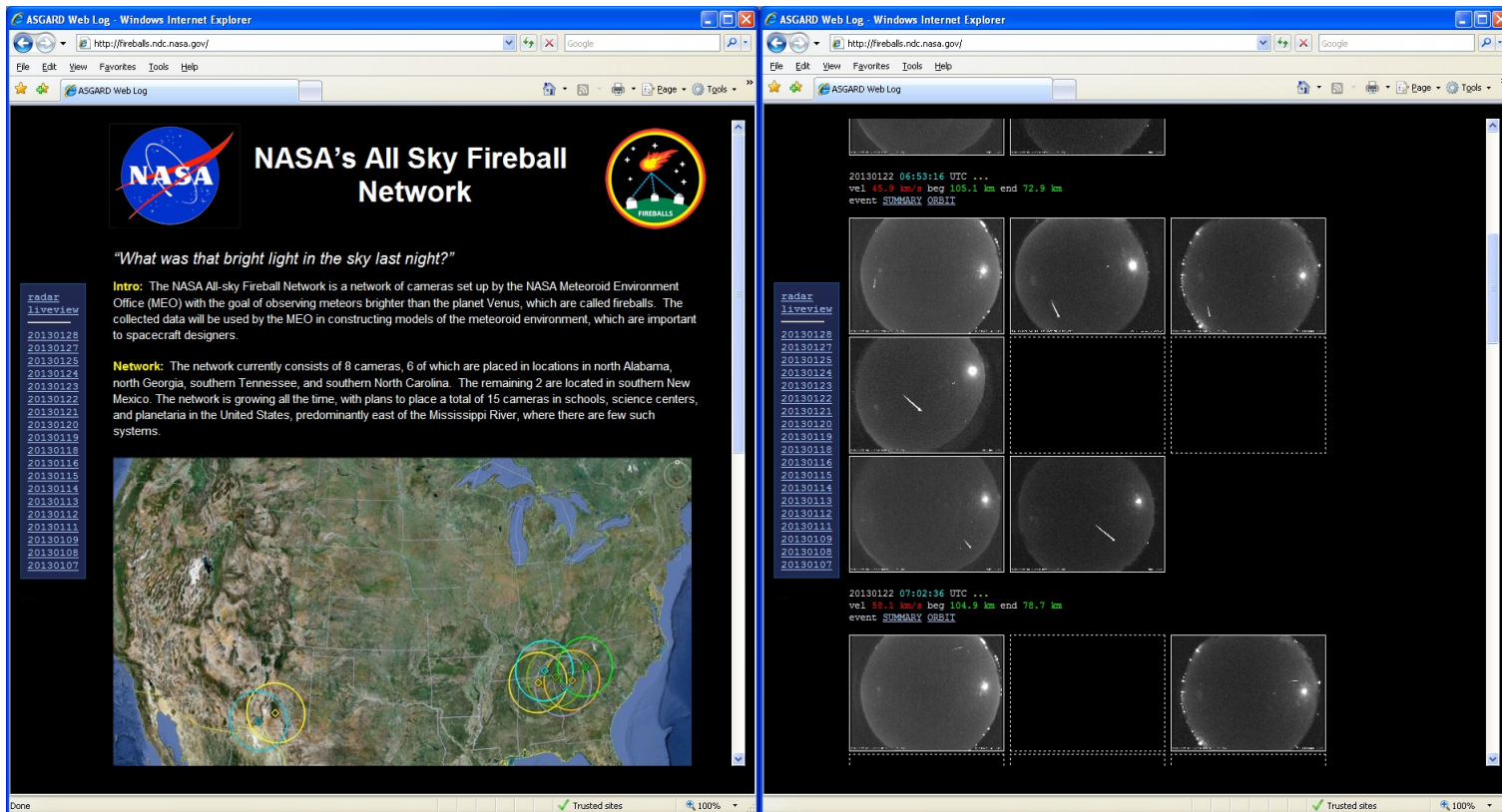
FOV and Detections



sma.nasa.gov

OSMA
OFFICE OF SAFETY & MISSION ASSURANCE

Website - <https://fireballs.ndc.nasa.gov>

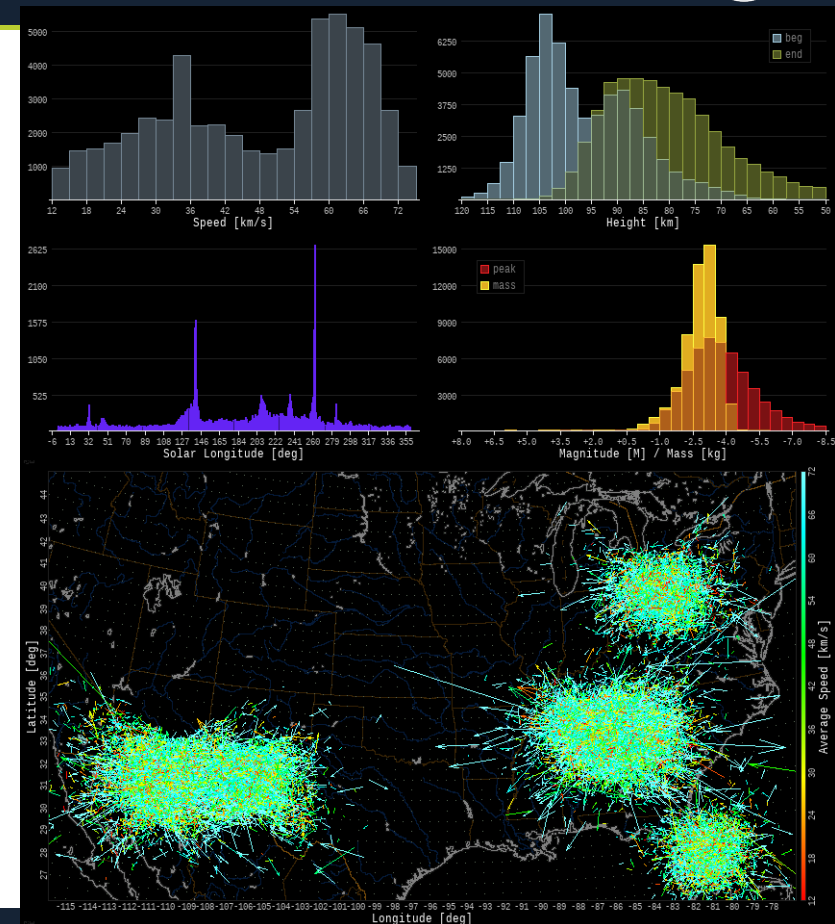


Images, movies sorted by date

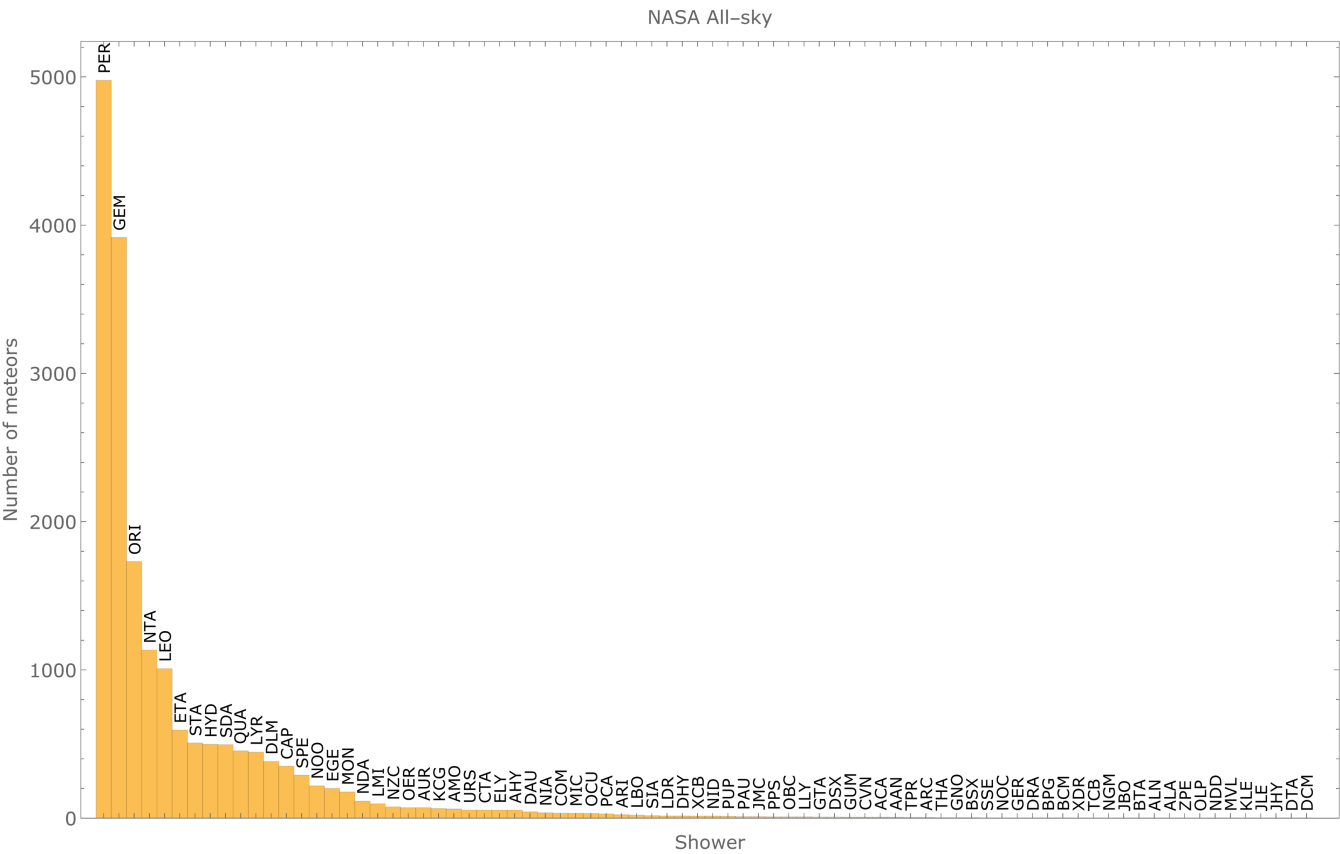
Meteor speed, trajectory, orbit, brightness, mass

Results

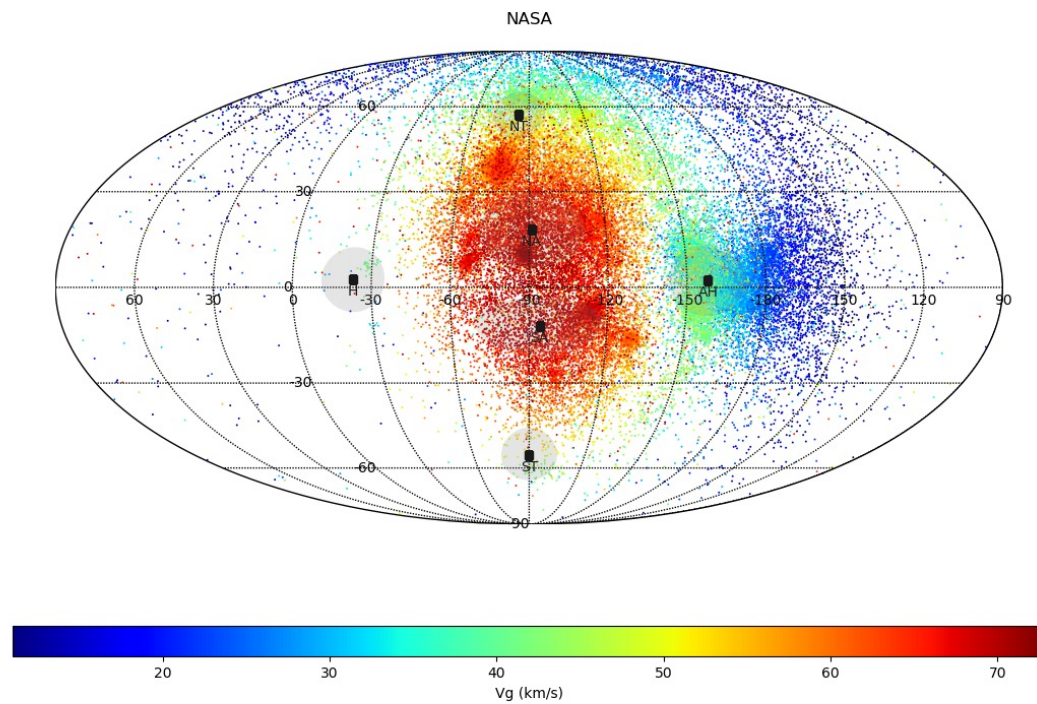
- Time period: late 2008 to present
- # meteors: 56,754 multi-station as of April 24
 - 38,106 sporadics
 - 18,648 shower
- Limiting meteor mag: -2.0 (Jupiter)
- # meteorite falls: 2



Shower numbers



Radiant distribution



The Future



- Need to replace obsolete 1990's camera technology
- Difficult to match sensitivity of Sony HAD-EX chip
- Current NASA financial and property guidelines constrain remote station cost to less than <\$3000
- Must be robust and as maintenance-free as possible
- Western is currently testing a possible replacement – Blackfly S GigE
 - 35 fps
 - 3.2 megapixels
 - Sony IMX265 chip
- Anticipate 1st systems in 2024