



Mesospheric Rocket Requirements Solicitation



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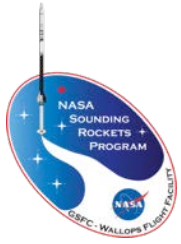
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Agenda



- What are NASA Sounding Rockets?
- How we enable the collection of science and areas we facilitate.
- Why we're here – rekindle mesospheric rocket efforts.



Who is the SRPO?



Sounding Rockets Program Office

Characteristics

- Low cost - Part of the NASA Low Cost Access to Space (LCAS) program
- Quick turn around
- Rely on military surplus rocket motors as much as possible to reduce cost
- Acceptance of higher technical risk
- Highly flexible and agile
- World-wide mobile operations

Highly successful for NASA Science Mission Directorate

- Cutting edge science is being conducted
- Enables instrument development that ports into future orbital missions
- Scientist development



**A happy Principal Investigator and her team
Dr. Amy Winebarger (right)
at dinner reviewing data from the
HI-C mission that flew earlier that same day**

World-Wide Operations

Alaska (Poker)

Wallops

White Sands

Kwajalein

Peru

Svalbard (Norway)

Norway

Sweden

Australia

www.theodora.com/maps

The Sounding Rocket Program "goes to where the science is..."





Types of Missions

Geospace (Plasma Physics)

Solar Telescopes

Astronomical Telescopes

High Speed Aerodynamics and Propulsion

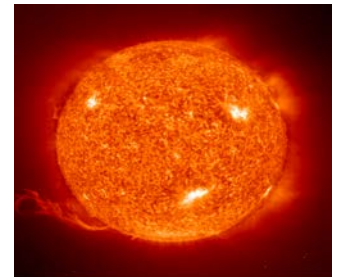
Reentry and Descent

Technology Development

Educational

Approx. 40 payloads/missions active at any given time

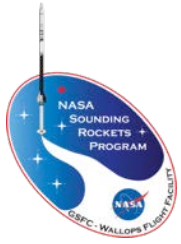
Approx. 18 flights/year





Enabling science collection

- Flexible with launching at the right location into the right conditions.
- Maintain a wide range of standardized and customizable sub-systems to meet science goals: telemetry, power, attitude control, recovery and innovate amongst the flurry of normal ops!
- Diverse vehicle stable to support a range of altitude and payload sizes
 - Payload architecture also size also very diverse – from un-instrumented falling spheres to ~1,300# telescopes over 20” in diameter.
 - Vehicle stacks range from 1 – 4 stages, achieving altitudes 60-1,000km depending on payload mass/length.
- Hallmark of the program is our flexibility – go where the science is, launch into the right conditions.



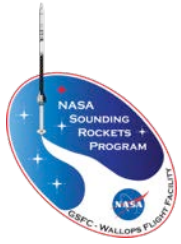
Enabling science collection

- Technologies/experiments flown most germane to your interests:
 - In-situ measurements – E-field, magnetometer, ion gauges, Langmuir probes, impedance probe
 - Sub-payload deployments – instrumented and chemical detonations
 - Chemical releases – TMA, Lithium (typically augmented with radars, ground based cameras and/or airborne optical platform)
- Examples of SRPO at CEDAR:
 - Auroral Jets – Salvo rocket launch – TMA + in-situ suite
 - SuperSoaker – 50 gal. water release, lithium release and track. UAF, Clemson
 - CREX – Barium, Strontium releases from Norway via 24 ejected ampules



Mesospheric Rockets

- Serving the 60-125 km altitude region is something the SRPO has done in the past, but through perhaps lack of interest or re-focused priorities, it has gone to the way side.
- There's a interest amongst the Sounding Rocket science community to re-invigorate the SRPO's support of this regime of science.
- What we want to do –
 - 1 - Solicit requirements from science community.
 - Link posted on the CEDAR website (PDF). Fillable form will be emailed after this workshop.
 - 2-Develop approach that most substantially addresses science community interest.



Requirements – In a Nutshell



- Payload description
 - Required support systems – telemetry, power, recovery, pointing
 - Physical characteristics – dimensions, mass
- Trajectory / apogee
- Launch location
- Cadence



Closing

- SRPO's anticipation – attempting to group responses from requirements solicitation into “bins”:
 - 1-Low hanging fruit of falling sphere genre payload
 - 2-Insturmented mesospheric rocket harnessing parallel miniaturization efforts in the program.
- Links:
 - https://www.nasa.gov/mission_pages/sounding-rockets/index.html
 - <https://www.facebook.com/NASAWFF>
- Questions?

