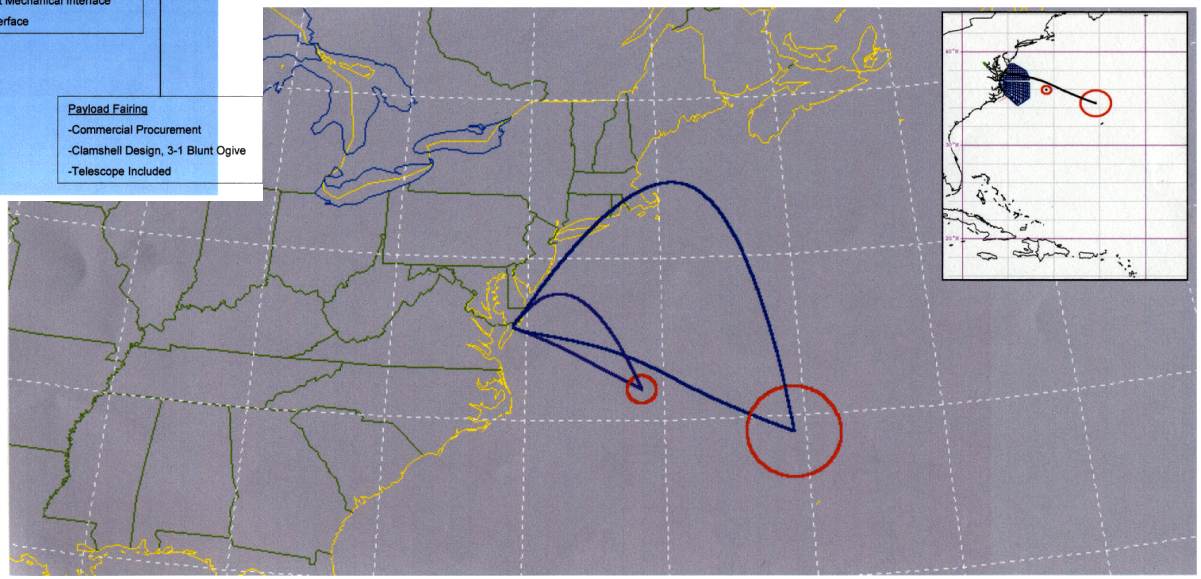
High Altitude Sounding Rocket

- 1000 lbs. to 3000 km
- 40 min. observing time
- 40-50 inch diameter
- Recovery capability to be included
- High re-entry velocities (~ 7 km/s)



Goal: $5M including rocket, nose cone, payload sub-systems, operations

High Altitude Sounding Rocket
Astronomy / Planetary / Solar

- Increased "hang time" of 40 minutes and larger diameter (~ 1 m) telescopes will provide greater sensitivity (e.g., observing extra-galactic and other faint objects become feasible) and higher angular resolution.
- Longer observing times introduce:
  - new class of experiments (e.g. IR Payloads that need to cool down)
  - ability to track temporal evolution of solar phenomena
  - larger number of targets to be observed on a given flight
- Provides competitive observational capabilities not available on Hubble (e.g., rockets can carry out "diffuse" experiments, observe objects near the sun, such as Venus, Mercury, comets)

High Altitude Sounding Rocket
Geophysics
(Magnetosphere/Ionosphere/Thermosphere/Mesosphere)

- Ability to penetrate the aurora and cusp acceleration regions (> 2500 km), and linger within these regions at low velocities
- Provides ability to observe high altitude regions with constellations of well-instrumented sub-payloads
- Observe magnetosphere-ionosphere coupling resonances and wave interactions with periods of 10's of minutes
- Study inner radiation belt and slot region from Wallops
- Observe evolution and impact of magnetic storms on mid-latitude geospace for considerably longer times
- Instrumentation testing (e.g., high velocity environment during re-entry in lower ionosphere provides for GEC prototype tests).

High Altitude Sounding Rocket
Other Mission Types

- Microgravity Experiments
  - 40 minutes of “ideal” micro-gravity environment (without vibrations common on human-tendered platforms such as ISS and Shuttle)
  - Provides for considerably larger and longer combustion experiments

- Planetary Probe Development and Engineering

  (Re-entry testing, Aerobraking, Smart Landers, Aero-capture, etc.)

  - All benefit from much higher “re-entry” velocity (near 8 km/sec) achieved on ascent/descent when apogee is significantly increased.