Payloads for Rideshare Opportunities: What's ready or would/should be ready to go?

- Miniature Coronagraph – off limb studies of the white light and UV corona
- compact Heliospheric Imager – simplified version of the HI instrumentation currently on orbiter and probe.
- compact UV spectrograph - for off limb and irradiance studies, some imaging spectroscopy
- Compact magnetograph – LOS and possibly vector
- near earth remote sensing/particles and fields as well as debris sensing
- Utility: demonstrate new technology detectors and optics. demonstration of utility of data sets for inputs into modelling, progressive demonstration of constellation measurements, space environment characterization including debris as well as more resolved measurements in near earth space.

Designs need a vehicle for funding instrumentation development (3 year window) as well as a standardized spacecraft interfaces. Standardizing the interfaces was critical to cubesat success, instrument development would also benefit from this approach. Most scientifically viable instruments will be >6U perhaps up to 12U.

Special considerations: pointing, orbit, 3 year development for highest payoff instrumentation.

Types of instrumentation/platforms: What should be the priorities for instrument/platform development?

- Standardize interfaces (mechanical, volume, thermal, power, commanding, available CPU resources). Technology demonstration of components can occur as a scaled prototype.
- Consider focus on microsats rather than cubesats. Each microsat could then have a variety of instruments (three or four, see above). Instruments need not be operated at the same time either. A good example is the orbiting solar observatories during the 1970s. See also the orbiting geophysical observatories. These were extremely important during this time period with extraordinary discovery science. First observation of flares, "halo" CMEs, etc., etc..
- Have a standard bus library perhaps developed at WFF to support these opportunities similar to the present sounding rockets. NASA hardware used mission to mission should be well tested and robust.
- Keep missions short 3-6 months is adequate for most demonstration projects. Reduces cost and forces technology turnaround.
- High payoff to develop routine and cheaper access to interplanetary or cislunar space. "String of pearls" concept. Consider propulsion system development as well.

Success factors: What are the key considerations needed to establish an instrument/payload program?

- Establishment of a funded sounding rocket style program for instrument development following a standardized interface and launch opportunities.
- Three year instrument technology development timeline can then be somewhat decoupled from the routine satellite build. Reviews similar to the current LCAS could be used. If the instrumentation doesn't fit on this one, the instrument can go on the next launch.
- Ground system, commanding and bus interfaces also benefit from standardization and constant use.
- Hosted payload opportunities are presently available (DoD as well as NASA). These are not fully exploitable because of non-standard interfaces, schedule and funding incompatibility, orbit and ACS issues, commanding/telemetry issues, etc.. Cost for a small, orbiting, Class D instrument exceeds current LCAS individual program.