A general observation:

- The term rideshare could describe both payloads (or instruments) permanently attached to a “host carrier”, and also to describe free flyers launched by and deployed from a “host vehicle”. **Recommend** the report clarify the scope of the action particularly wrt the use of the term “host platform” . If both types of rideshares are being considered in the report treat them as distinctly unique situations.

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

INSTRUMENTATION PANEL

- Most Heliophysics payload types are able to be accommodated on launcher rideshares given broad range of capabilities encompassed by:
  - e.g. the multiple variants of CubeSat dispensers (1U to 12U in various configurations), small launch vehicles, ISS resupply missions, ESPA-class carriers, and EELV-class launchers with secondary capability
  - Exceptions include, for example: long focal length; large aperture telescopes; s/c mass exceeding ~260 kg (Standard ESPA)
- Some payload types less amenable to attached payload rideshares:
  - Those employing deployables; e.g. booms, antennas
  - Those imposing cleanliness constraints on carrier; e.g. high magnetic cleanliness, strict control of CVCMs
  - Those requiring: pointing to a prescribed target; highly accurate attitude knowledge and/or control; requirement for a specific orbit
- How would you define 1) "rapidly deployable" and 2) "short" development times:

  1) Already developed and full space flight qualification done. Development team is intact and in-house. FCC licensing is in-hand.

  2) Minor or no alteration of an existing instrument/payload (TRL 7-9)
     - on-the-shelf flight spare or build-to-print

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

INSTRUMENTATION PANEL

- For hosted (attached) rideshares: Development of standardized interfaces (power, data, command, mechanical) across multiple carriers
- For deployers: Standardization at the CubeSat and lightband levels already in hand. But there are multiple “standards” somewhat deployer dependent.
- While awaiting space transport: need access to payload/free-flyer for checkout and battery charging after integration with carrier
  - Some payloads will require inert gas purge

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

INSTRUMENTATION PANEL

RAPID RESPONSE:

- Continuity of support; regular cadence for payload/free-flyer development opportunities
- Development team should retain instrument/payload in house (e.g. for maintenance) while awaiting ride. Requires $upport during wait
  - In the absence of wait $upport; protracted waits favor large institutions; reassignment of staff to other ongoing projects. Attrition of technical team for small developers
- Enhance the ITD program – bringing instruments to a more mature state of development (near flight-ready), and where applicable requiring instrument to conform to one of the standards, for CubeSat based targets.
- Success examples:
  - DoD Space Test Program: clearing house for DoD payloads; maintains payload-ready list and matches payloads to rideshare opportunities
  - NSF CubeSat program: Supports development of missions without pre-identification of launch opportunity (mostly dependent on CSLI for launches)
  - NASA's CSLI/ELaNa flight matching program

THOUGHTS ON OTHER PANEL TOPICS

Host platform concerns: What are the most common requirements, concerns, and interface characteristics of hosted platforms?

IMPLEMENTATION PANEL

LAUNCHERS

- ‘Do no harm’ is universal. Beyond that each launch vehicle class has a subset of unique requirements that may include: man-rating, different numbers of, and implementation requirements for independent inhibits; limitations on battery types and battery test requirements
- ODAR: FCC requirements more stringent than NASA requirements; FCC is in control.

Program Design: If you were designing a hosted payload program, what aspects should be focussed on and what are the major obstacles (with solution ideas if possible)?

IMPLEMENTATION PANEL

- Communication licensing is a big obstacle to rapid response
  - Issues: Long lead time; constantly changing regulatory environment.
  - Possible solutions:
    - 1) International allocation of RF spectral bands for scientific satellite communications
    - 2) Permit NTIA comm licensing for non-government-owned, but government-sponsored satellites
    - 3) Move from RF to Laser Communications