

Statement of Task

Agile Responses to Short-Notice Rideshare Opportunities for the NASA Heliophysics Division

The decadal survey *Solar and Space Physics: A Science for a Technological Society* recommended the DRIVE initiative (DRIVE - Diversify, Realize, Integrate, Venture, Educate) to develop more fully and employ more effectively the many available experimental and theoretical assets. Under 'Diversify,' the survey explained that "exploration of the complex heliospheric system... requires the strategic use of diverse assets that range from large missions and facilities, through Explorers and mid-sized projects, down to small CubeSats and suborbital flights... The field is entering an era of opportunities for multipoint and multiscale measurements with an increasingly diverse set of platforms and technologies..."¹

NASA's Science Mission Directorate recently embraced as a standard practice the concept of exploiting opportunities for secondary science payloads on launches with excess mass capacity. In particular, SMD stated they would be adding Evolved Expendable Launch Vehicle (EELV) Secondary Payload Adapter (called the "ESPA ring") capability on future missions. Examples are the recent calls for such "rideshares" on the ESPA ring associated with the NASA Heliophysics Interstellar Mapping and Acceleration Probe (IMAP) mission. NASA expects such missions of opportunity (MOOs) will continue and expand with new commercial capacity.

The NASA Heliophysics Division (HPD) announced the IMAP opportunities well in advance of the launch. However, HPD also wants to take advantage of opportunities that arise on much shorter notice (e.g., months). Rideshare openings are likely to be heterogeneous in size, in the nature of the payloads that might be hosted, and in the locations where they might be deployed. Payloads ranging from individual instruments to autonomous small satellites or constellations of small satellites are candidates for ridesharing. Locations from near-Earth to lunar and beyond are potential destinations.

To guide HPD, the Committee on Solar and Space Physics will write a short report about the elements of a program that has the flexibility and agility to respond to the emergent rideshare opportunities described above.

The short report will include, but not be limited to, discussion of the:

1. Kinds of solar and space physics science that would be enabled by an agile response to rideshare opportunities, at locations that would provide global perspectives, unique views, or continuous coverage, among others;
2. Types of payloads that are suited to rideshare opportunities, because they are scientifically valuable in single or multiple locations and rapidly deployable with short development times or that can be shelved until a launch becomes available;
3. Considerations for the development and implementation of a new HPD program that would allow agile responses to future short-notice rideshare opportunities.

¹ National Research Council. 2013. *Solar and Space Physics: A Science for a Technological Society*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/13060>. p. 79.