First Research Recommendation [R1.0] for NASA, NSF, and Other Agencies—Implement the DRIVE Initiative

The survey committee recommends implementation of a new, integrated, multiagency initiative (DRIVE—Diversify, Realize, Integrate, Venture, Educate) that will develop more fully and employ more effectively the many experimental and theoretical assets at NASA, NSF, and other agencies.

Diversify: Diversify Observing Platforms with Microsatellites and Mid-Scale Ground-Based Assets

Recommendation: The National Science Foundation should create a new competitively selected mid-scale project funding line in order to enable mid-scale projects and instrumentation for large projects.

Recommendation: NSF's CubeSat program should be augmented to enable at least two new starts per year. Detailed metrics should be maintained, documenting the accomplishments of the programs in terms of training, research, technology development, and contributions to space weather forecasting.

Recommendation: A NASA tiny-satellite grants program should be implemented, augmenting the current Low-Cost Access to Space (LCAS) program, to enable a broadened set of observations, technology development, and student training. Sounding rocket, balloon, and tiny-satellite experiments should be managed and funded at a level to enable a combined new-start rate of at least six per year, requiring the addition of $9 million per year (plus an increase for inflation) to the current LCAS new-start budget of $4 million per year for all of solar and space physics.

Realize: Realize Scientific Potential by Sufficiently Funding Operations and Data Analysis

Recommendation: NSF should provide funding sufficient for essential synoptic observations and for efficient and scientifically productive operation of the Advanced Technology Solar Telescope (ATST), which provides a revolutionary new window on the solar magnetic atmosphere.

Recommendation: NASA should permanently augment MO&DA support by $10 million per year plus annual increases for inflation, in order to take advantage of new opportunities yielded by the increasingly rich Heliophysics Systems Observatory assets and data.

Recommendation: A directed guest investigator program, set at a percentage (~2 percent) of the total future NASA mission cost, should be established in order to maximize scientific return. Further, just as an instrument de-scoping would require an evaluation of impact on mission science goals, so, too, should the consequences of a reduction in mission-specific GI programs and Phase-E funding merit an equally stringent evaluation.

Integrate: Integrate Observing Platforms and Strengthen Ties Between Agency Disciplines

Recommendation: NASA should join with NSF and DOE in a multi-agency program on laboratory plasma astrophysics and spectroscopy, with an expected NASA contribution ramping from $2 million per year (plus increases for inflation), in order to obtain unique insights into fundamental physical processes

Recommendation: NSF should ensure that funding is available for basic research in subjects that fall between sections, divisions, and directorates, such as planetary magnetospheres and ionospheres, the Sun as a star, and the outer heliosphere. In particular, outer-heliospheric research should be included explicitly in the scope of research supported by the AGS section at the NSF.

Recommendation: NASA, NSF, and other agencies should coordinate ground- and space-based solar-terrestrial observational and technology programs and expand efforts to take advantage of the synergy gained by multiscale observations.

Venture: Venture Forward with Science Centers and Instrument and Technology Development

Recommendation: NASA and NSF together should create heliophysics science centers (HSCs) to tackle the key science problems of solar and space physics that require multidisciplinary teams of theorists, observers, modelers, and computer scientists, with annual funding in the range of $1 million to $3 million for each center for 6 years, requiring NASA funds ramping to $8 million per year (plus increases for inflation).

Recommendation: NASA should consolidate technology funding now in SR&T, LWS, and LCAS into a single Heliophysics Instrument and Technology Development Program (HITDP) and increase current annual funding levels, ramping to $4 million per year (plus increases for inflation) in order to facilitate urgently needed innovations required for future heliophysics mission implementation. Further, issues pertaining to constellation mission implementation (e.g., communications, operations, propulsion, and launch mechanisms) should be explicitly addressed.

Educate: Educate, Empower, and Inspire the Next Generation of Space Researchers

Recommendation: NSF Faculty Development in Space Sciences (FDSS) program should be continued and be considered open to applications from 4-year as well as PhD-granting institutions as a means to broaden and diversify the field. NSF should also support a curriculum development program to complement the FDSS program and support its faculty.

Recommendation: A suitable replacement for the NSF CISM Summer School should be competitively selected, and NSF should enable opportunities for focused community workshops that directly address professional development skills for graduate students.

Recommendation: To further enhance the visibility of the field, NSF should recognize solar and space physics as a specifically named subdiscipline of physics and astronomy by adding it to the list of dissertation research areas in NSF's Annual Survey of Earned Doctorates.