Maryland Space Grant Consortium
Lead Institution: The Johns Hopkins University
Director: Dr. Richard C. Henry (410-516-7350)
http://www.mdspacegrant.org

Affiliate members: Johns Hopkins University (JHU), Hagerstown Community College (HCC), Johns Hopkins University Applied Physics Laboratory (APL), Morgan State University (MSU), Space Telescope Science Institute (STScI), Towson University (TU), United States Naval Academy (USNA), University of Maryland Center for Environmental Science (UMCES), University of Maryland College Park (UMCP). University of Maryland Eastern Shore (UMES)

Program Description: The National Space Grant College and Fellowship Program consists of state-based, university-led Space Grant Consortia in each of the 50 states plus the District of Columbia and the Commonwealth of Puerto Rico. Annually, each consortium receives funds to develop and implement student fellowships and scholarship programs; interdisciplinary space-related research infrastructure, education, and public service programs; and cooperative initiatives with industry, research laboratories, and state, local, and other governments. Space Grant operates at the intersection of NASA's interest as implemented by alignment with the Mission Directorates and the state's interests. Although it is primarily a higher education program, Space Grant programs encompass the entire length of the education pipeline, including elementary/secondary and informal education. The Maryland Space Grant Consortium is a Designated Consortium funded at a level of $590,000 for fiscal year 2007.

Program Relevance to NASA: Space Grant consortia build human capital and research expertise to support NASA programs and missions, expand NASA's expertise and educational networks, and bring knowledge and awareness of space to a broad range of constituents in every state. MDSGC brings together some of the most significant participants in the aerospace community, including the home of the Hubble Space Telescope and James Webb Space Telescope (STScI), the home of the New Horizons mission to Pluto, NEAR, MERCURY and other major missions (APL), the operations center of the recently ended FUSE mission (JHU), and the academic institution of the PI of the Deep Impact mission (UMCP). These institutions work together to reach students in Maryland and to feed a pipeline of potential employees for the aerospace community in general, and NASA in particular. MDSGC is especially aware of the need to provide a suite of programs that attracts students to aerospace-related interests early, and nurtures that interest through their entry into the workforce. MDSGC works very closely with NASA GSFC on many education programs that augment the ability of each organization to reach its respective goals.

Program Benefits to the State: Maryland is a state with a wealth of NASA-related research and development activities supported by a plethora of institutions. Accordingly, MDSGC has not placed strong emphasis on research infrastructure support unless it is directly related to supporting students, since this was not a compelling need in the state. We have chosen to implement programs that support a pipeline of involvement in NASA-related activities that engage student interest and enhance their knowledge and skills so that they may eventually enter the aerospace workforce. Maryland is heavily involved in space-related work and has a high demand for a skilled and motivated workforce. One area of concentration for MDSGC has therefore been funding scholarships, internships, and fellowships for college students. We work closely with Goddard Space Flight Center in many of our activities, including summer internships. The Summer Aerospace Workforce Development Research Internship Program (SAWDRIP) was first conceived by MDSGC and we still continue to provide extensive support for this program, which places interns with local aerospace companies. This provides students with the opportunity to experience working at government labs such as GSFC; academic labs such as the Applied Physics Lab or Space Science Lab; or in the private sector. MDSGC has focused on workforce development in Maryland for many years and currently works with the Maryland Governor's Workforce Investment Board.

Program Goals:

- Provide higher education students with opportunities to enhance their education in STEM areas and to promote their entry into aerospace related disciplines.
- To offer financial support to those undergraduate and graduate students enrolled in Maryland institutions, who otherwise might not be able to attend college and who wish to pursue a career in STEM or other aerospace-related fields.
- Provide programmatic support to produce programs that provide substantive training to teachers that allows them to incorporate the NASA-related content into effective teaching strategies.
- **P**rovide pre-college students with opportunities to enhance their education in STEM areas and to promote their entry into aerospace related higher education studies.
- Support projects that provide opportunities for students to participate in aerospace-related research.
- To foster outreach programs that bring NASA STEM activities and results to the general public.
- To extend the network of Consortium membership, sponsors, and partners to generate a wider impact for MDSGC programs and activities.

These goals are supported in our strategic plan by a series of specific objectives. The implementation plan includes specific strategies for achieving each objective and metrics to establish the success or failure of achieving these objectives.

Program Accomplishments:

MDSGC conducted several meetings to develop a new strategic plan and an implementation plan that will meet the needs of Maryland and NASA Education for the next five years.

A new member was added to the consortium in 2007. The University of Maryland Eastern Shore has been receiving funding from MDSGC for several excellent programs that have benefited students working in research projects that were directly related to NASA efforts. UMES is an HBCU and has a growing engineering capability. UMES also provides us with a member in a key geographic location, the Eastern Shore of Maryland, and can anchor our programmatic efforts in this somewhat isolated region of the state. Scholarships for UMES students, similar to our current programs at other degree-granting members, will begin in the fall of 2008.

MDSGC continued to work closely with GSFC to provide summer internships for college students. MDSGC has provided funds for SAWDRIP to hire a coordinator and for several events such as trips to local aerospace companies to talk with senior engineers about careers and to see the facilities. In 2007 there was a record number (13) of SAWDRIP students. MDSGC leveraged funds provided by ESMD to directly fund six students as well.

Our Balloon Payload Program continues to thrive. Plans are underway at the University of Maryland College Park to make the construction and launch of payloads an integral part of the freshman aerospace engineering curriculum. A student manager was hired for the program this year, using, in part, funds provided by the Maryland Space Business Roundtable.

Student Accomplishments:

A senior aerospace engineering major at UMCP, who has participated in our Balloon Payload Project throughout his college career, was the principal author of a successful proposal for an experiment on NASA's High Altitude Student Platform long duration balloon flight.

Here is a typical quote from a student intern in 2007:

"During the summer I worked on a lunar dust mitigation vehicle with Dr. Eric Cardiff. The purpose of the project was to demonstrate that lunar dust can be sintered (fused) together using only the native solar flux present on the Moon. In essence, we were attempting to pave the surface of the moon. To accomplish this, a large Fresnel lens was mounted on a chassis. Both the vehicle and the articulation of the lens were controlled via remote control. This project allowed me to not only apply the engineering principles that I have learned at the University of Maryland, but to also gain experience machining various parts. I can't stress how much I learned from this internship experience. At the end of the summer, I was asked to come back on a part-time basis in order to continue my research. We are now planning to run tests with regolith simulant in a custom-manufactured vacuum chamber and to improve the optics system that is mounted on the vehicle. If you would like to learn more about my research, it is featured in the Fall 2007 issue of *Goddard Tech Trends*. I can't praise my mentor, Dr. Eric Cardiff, enough; he made his interns feel welcomed and was readily available. The Maryland Space Grant provided me with one of the most educational experiences of my college career."