



FY2009 PROGRAM PLAN

May 20, 2009

SOUTH DAKOTA SPACE GRANT CONSORTIUM

www.sd.spacegrant.org

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Vision, Mission and Guiding Principles

The vision of the South Dakota Space Grant Consortium (SDSGC) is to expand opportunities for all South Dakotans through education, research, and public service in the fields of aerospace, earth, and space science. As the link between NASA and the citizens of South Dakota, SDSGC's mission is to instill the spirit of exploration and discovery in students and educators and in the general public, with a special focus on the fields of science, technology, engineering, and mathematics (STEM) that are essential for the development of the nation's workforce.

The SDSGC is committed to excellence in student and faculty research and to promoting STEM education and expanding outreach projects across the state of South Dakota. We specifically seek to include women, Native Americans, and other underrepresented groups in all of the programs and activities supported by the South Dakota Space Grant Consortium. In the case of South Dakota, Native Americans constitute the largest minority, and SDSGC pursues a broad range of strategies to engage this group.

SDSGC's Management Team has developed this FY 2009 proposed Program Plan in alignment with NASA and state priorities focused around SMART (Specific, Measurable, Appropriate, Realistic, Time-specific) goals and objectives provided in the Consortium's Strategic Plan. At the heart of these goals and objectives are SDSGC's Guiding Principles for Improvement and Sustained Quality:

- **Inclusiveness** — The need to deliver a broad and equitable Fellowship/Scholarship program; to engage all affiliates in Consortium programs; to provide broad input into decision-making; and to recruit more Native American students.
- **Focus** — The need to set realistic goals consistent with available resources; to maintain a Strategic Plan with specific short- and long-term objectives; to prioritize activities based on budget level; and to formalize the benefits and expectations of management and affiliates.
- **Alignment** — The need to align the Consortium programs and Strategic Plan with NASA, state, and affiliate priorities; to recognize potential future transformations in NASA direction and make appropriate changes in state programs; and to seek guidance from state and industry representatives.
- **Impact** — The need to maintain accurate and consistent measurements regarding programs and participants; to formalize methods for external and self evaluation; to carry on regular assessment of the Strategic Plan, activities, and outcomes; and to recognize and implement needed adjustments to achieve results.

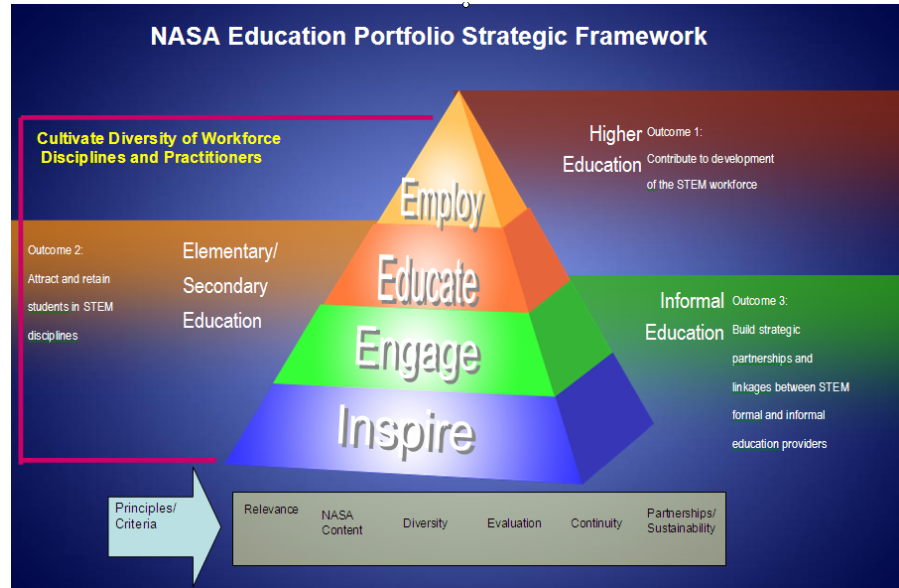
Budget and Associated Documentation

- The enclosed budget clearly identifies our requested FY2009 funding for the work described herein. Specific Statements of Work and Budgets for the following subawardees are included in this budget package: SD State University (SDSU), Augustana College, the SD Discovery Center, and St. Francis Indian School (SFIS). *[Budget note regarding SFIS: Although the attached workplan and budget for SFIS refer to two programs (i.e., Summer of Action Research and STEM Activities) which provide \$35,642 in matching funds, only \$10,000 of this match is included in the overall Consortium budget.]*

- The subcontract budget line item for Project Initiation Grants will be awarded among Consortium affiliates based on competitive proposals for Higher Education, Research Infrastructure, and Precollege programs.
- A fair and balanced distribution of funds to individuals at member universities and educational affiliates will be ensured through SDSGC’s centralized, consortium-wide fellowship/scholarship program. Total undergraduate and graduate student stipends during FY2009 will be \$150,000 of NASA Space Grant funds.

Alignment with NASA Education Framework and Measurable Outcomes

SDSGC’s FY2009 program goals and objectives described below and in the Consortium’s **Strategic Plan** (which includes the respective outcome measures) are closely aligned with NASA’s Education Framework. Consortium goals and objectives reflective of each of NASA’s three main education outcomes are summarized in the table below and described in greater detail in the narrative that follows. In keeping with its status as a Capability



Enhancement Program, emphasis is on NASA Education Outcome 1, especially in the areas of undergraduate and graduate student support, student involvement in interdisciplinary engineering design teams and summer internships, targeted programs at Tribal Colleges, and higher education curriculum enhancement including robotics programs that are integrated with precollege robotics activities. Support of NASA Education Outcomes 2 and 3 includes an internal network of informal education providers across the state, educator professional development in collaboration with NASA’s Aerospace Education Services Program, and targeted teacher and student involvement programs at tribal schools, including three NASA Explorer Schools.

Summary of SDSGC FY2009 Goals by NASA Education Outcome

<u>Outcome 1</u>	Consortium Program Areas B.1, B.2, and B.3 (Fellowship/Scholarship, Research Infrastructure, and Higher Education Programs)
1.1 Faculty and Research Support	
<ul style="list-style-type: none"> ■ Continue to coordinate with SD NASA EPSCoR to support research seed grants and travel grants (e.g., \$182,000 awarded by SD NASA EPSCoR in FY2008) ■ Support the new NASA Space Grant Telescope Network Project 	
1.2 Student Support	
<ul style="list-style-type: none"> ■ Continue to place graduate and undergraduate students in internships with NASA, industry, and USGS EROS 	

<ul style="list-style-type: none"> ■ Provide fellowship/scholarship support to students in STEM degree programs 	
<ul style="list-style-type: none"> ■ Provide Space Grant funding to disabled students and to university students to work on engineering design projects that assist people with disabilities. 	
1.3 Student Involvement Higher Education	
<ul style="list-style-type: none"> ■ Continue to support engineering design teams and robotics teams 	
1.4 Course Development	
<ul style="list-style-type: none"> ■ Continue to make funds available to faculty for innovative curriculum development (e.g., new M.S. program in Robotics and Intelligent Autonomous Systems developed in FY2008 at SDSM&T with Space Grant support). 	
1.5 Targeted Institution and Academic Infrastructure	
<ul style="list-style-type: none"> ■ Continue to target SDSGC's three Tribal College affiliates for improvements in research competitiveness and STEM education opportunities 	
Outcome 2	Consortium Program Area D.1 (Precollege Program)
2.1 Educator Professional Development—Short Duration	
<ul style="list-style-type: none"> ■ Continue to facilitate teacher workshops, especially the NASA Teacher Academies in cooperation with the NASA Aerospace Education Services Program focusing on robotics; also E-missions, GEMS, and others 	
2.2 Educator Professional Development—Long Duration	
<ul style="list-style-type: none"> ■ Continue support programs for three NASA Explorer Schools in South Dakota ■ Continue competitive grant program for K-12 math/science teachers (Kelly Lane Earth & Space Science Teacher Grant) ■ Continue targeted STEM improvement program (3-5 year duration) with selected schools or districts (e.g., collaboration with St. Francis Indian School, now in its fourth year, and ongoing collaboration with Flandreau Indian School) 	
2.3 Curricular Support Resources	
<ul style="list-style-type: none"> ■ Continue to support NASA Educator Resource Centers at affiliate institutions ■ Continue to support NASA AESP, Robotics, GEMS, and E-missions teacher training 	
2.4 Student Involvement K-12	
<ul style="list-style-type: none"> ■ Continue support of STEM summer programs such as GEAR-UP, ACE Camp, Space Camps, and high school-college bridge programs (Native American student emphasis) ■ Continue (and expand) support for precollege robotics programs ■ Continue to support student/family participation in Opportunities for Enhancing Diversity in the Geosciences 	
Outcome 3	Consortium Program Area E.1 (Public Service Program)
3.1 Resources	
<ul style="list-style-type: none"> ■ Continue to support activities such as “Space Days” in cooperation with Informal Education Providers (Space Days 2009 to be hosted by SDSM&T and Journey Museum) 	
3.2 Professional Development for Informal Education Providers	
<ul style="list-style-type: none"> ■ Facilitate four NASA Teacher Academies during summer 2009 at SDSGC's Informal Education affiliates 	
3.3 Informal Education Provider Involvement Opportunities	
<ul style="list-style-type: none"> ■ Continue to engage state's Informal Education Providers by representation on Consortium Management Team 	

The following Goals and Objectives are taken from SDSGC’s Strategic Plan. Note that the Objectives presented here are really “sub-goals,” and specific measurable targets are found at the “Strategy” and “Outcome Indicator” level of the SDSGC Strategic Plan. For brevity, the Strategies and Outcome Indicators are not listed here; quantitative Outcome Indicators are shown in Appendix A.

1. ***NASA Education Outcome 1 (Educate and Employ): “Contribute to the development of the STEM workforce in disciplines needed to achieve NASA’s strategic goals”***

-- SDSGC Strategic Plan sections B.1, B.2, B.3, C.2, C.4 (Fellowships, Research Infrastructure, Higher Education, Workforce Development, Minority Serving Institutions)

❖ **Fellowship/Scholarship**

Goal: To administer a fellowship/scholarship program that offers educational and research opportunities to students from diverse backgrounds who are pursuing degrees in fields of science, technology, engineering, and mathematics (STEM) that align with NASA’s mission and those of SDSGC members and affiliates.

- **Objective B.1.1:** (Competitiveness) Ensure the fair distribution of funds to member universities and educational affiliates.
- **Objective B.1.2:** (NASA and EROS ties) Offer hands-on, tangible research experiences to student research fellowship awardees at NASA Centers and EROS.
- **Objective B.1.3:** (Industry ties) Offer hands-on, tangible research experiences to student research fellowship awardees at aerospace and related science and technology industries.
- **Objective B.1.4:** (Mentoring and professional development) Provide mentoring and professional development experiences to student researchers, which will develop skills that contribute to the future workforce.
- **Objective B.1.5:** (Diversity) Ensure funding for fellowships and scholarships to women, underrepresented minorities, and persons with disabilities. (See also C.1.2)

Workforce Development in NASA Outcome 1

- NASA interns
- Industry interns
- USGS/EROS interns
- Engineering design teams
- University-NASA contacts
- Travel to NASA Centers
- Research seed grants
- Engineering design teams

Diversity in NASA Outcome 1

- Support for Native American students including those at Tribal Colleges
- Support remote sensing research with Tribal Colleges
- Seed grants and travel grants offered at three Tribal College affiliates
- STEM support programs for Native American students
- At least one Tribal College representative on Management Team
- NSF Opportunities for Enhancing Diversity project
- Higher Education opportunities offered to all three Tribal College affiliates

- **Objective B.1.6:** (Longitudinal tracking) All students who have received significant fellowship or scholarship assistance from SDSGC will be longitudinally tracked through first employment or beginning of advanced degrees. (See also C.3.1)
- **Objective B.1.7:** (Evaluation) The Consortium will develop methods to document, measure, and assess the impact of the fellowship and scholarship programs in conjunction with its implementation of an overall evaluation strategy (see also A.9).

Related objectives from Workforce Development section of Strategic Plan:

- **Objective C.2.2:** (Fellowships and Scholarships) Encourage students to enter the NASA pipeline and the STEM workforce through the SDSGC Fellowships/Scholarships Program.
- **Objective C.2.3:** (NASA placement) Offer hands-on, tangible research experiences at NASA Centers to SDSGC student fellows.
- **Objective C.2.4:** (Industry placement) Increase industry participation in the SDSGC student programs and increase internships and job placement.

Related objective from Minority Serving Institutions section of Strategic Plan

- **Objective C.4.2:** (Fellowships and Scholarships) The Management Team will ensure a broad distribution of fellowship and scholarship awards, with an emphasis on awards to qualified students at Tribal Colleges. (See also B.1.5)

Longitudinal Tracking: In order to track the next step that students take after Space Grant funding in terms of workforce or advanced education, SDSGC will continue to secure the services of the National Space Grant Foundation throughout FY2009 and beyond to provide longitudinal tracking of all students who receive significant support from Space Grant. In South Dakota, students receiving \$1,000 or more in a single award will be included in our longitudinal tracking surveys and respective database.

❖ **Research Infrastructure**

Goal: To promote the improvement of research programs and capabilities of institutional and affiliate members with an emphasis on the fields of aerospace, earth science, and supporting STEM disciplines.

- **Objective B.2.1:** (Research proposals) Increase the number of research proposals submitted by SDSGC institutions in fields aligned with NASA's mission.
- **Objective B.2.2:** (Research support) Support new and developing research, especially multidisciplinary and collaborative projects, in fields aligned with NASA's mission.
- **Objective B.2.3:** (Collaborations) Build research collaborations both within and outside the state.
- **Objective B.2.4:** (Facilities) Promote acquisition of new facilities and shared use of existing resources.
- **Objective B.2.5:** (Integrate research and education) Foster research groups and engineering design teams that integrate education, research, and development.

- **Objective B.2.6:** (Diversity) Increase the participation of women and underrepresented groups in statewide research programs and facilitate their subsequent entry into STEM careers. (See C.1.3)
- **Objective B.2.7:** (Evaluation) The Consortium will develop methods to document, measure, and assess the impact of the research infrastructure programs in conjunction with its implementation of an overall evaluation strategy (see A.9).

Related objective from Minority Serving Institutions section of Strategic Plan

- **Objective C.4.3:** (Research Infrastructure) SDSGC will promote research opportunities and collaborations targeting Tribal College affiliates. (See also B.2.6)

❖ **Higher Education**

Goal: To build interdisciplinary programs related to NASA's mission and goals at the state's institutions of higher education and to support related programs that serve to strengthen STEM education in South Dakota.

- **Objective B.3.1:** (Curriculum and NASA content) Contribute aerospace and earth science materials to the higher education community in South Dakota.
- **Objective B.3.2:** (NASA and EROS ties) Enhance faculty and undergraduate/graduate student development through planning visits, internships, and fellowships at NASA Centers and EROS.
- **Objective B.3.3:** (State government) Establish and maintain linkages between SDSGC and higher education and state government.
- **Objective B.3.4:** (Industry involvement) Establish and maintain linkages between SDSGC and higher education and industry in South Dakota.
- **Objective B.3.5:** (Diversity) Increase the participation of women and underrepresented groups in all aspects of SDSGC's higher education program and facilitate their subsequent entry into STEM careers. (See also C.1.4)
- **Objective B.3.6:** (Evaluation) The Consortium will develop methods to document, measure, and assess the impact of the higher education programs in conjunction with its implementation of an overall evaluation strategy (see also A.9).

Related objective from Diversity section of Strategic Plan:

- **Objective C.1.4:** (Diversity in Higher Education) Increase the participation of women and underrepresented groups in all aspects of SDSGC's higher education program and facilitate their subsequent entry into STEM careers. (See also B.3.5.)

Related objective from Minority Serving Institutions section of Strategic Plan

- **Objective C.4.4:** (Higher Education) Support Higher Education programs that strengthen STEM education at Tribal College affiliates. (See also B.3.5.)

2. ***NASA Education Outcome 2 (Educate and Engage): “Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty”***

-- SDSGC Strategic Plan section D.1 (Precollege)

❖ **Precollege**

Goal: To increase student awareness and access to education and career opportunities in aerospace, earth science, and supporting STEM disciplines.

- **Objective D.1.1:** (NASA dissemination) Disseminate information on NASA and SDSGC precollege activities and opportunities to teachers and students statewide.
- **Objective D.1.2:** (Partnerships) Facilitate partnerships for grant applications that aim to strengthen precollege STEM education.
- **Objective D.1.3:** (In-service teacher training) Increase teacher capacity to effectively incorporate aerospace and earth science into the curriculum.
- **Objective D.1.4:** (Science and education events) Support programs that expose K-12 students to hands-on experiences and to educational and career opportunities in the fields of aerospace, earth science and technology.
- **Objective D.1.5:** (State standards) SDSGC will promote and support programs that align with state and national education standards.
- **Objective D.1.6:** (Diversity) Inspire and motivate women, underrepresented minorities, and persons with disabilities to pursue STEM careers.
- **Objective D.1.7:** (Evaluation) The Consortium will develop methods to document, measure, and assess the impact of the precollege education programs in conjunction with its implementation of an overall evaluation strategy (see also A.9).

Workforce Development in NASA Outcome 2

- NASA teacher training with NASA AESP staff
- Precollege Robotics
- Aerospace Career and Education Camp
- Space Camp
- Engineers’ Week

Diversity in NASA Outcome 2

- Targeted STEM programs at St. Francis Indian School and Flandreau Indian School
- Three NASA Explorer Schools with very high Native American enrollment
- Gear-Up program for precollege Native American students
- Women in Science and Engineering

NASA Explorer Schools (NES): Three NES schools are located in South Dakota, two Tribal Schools on the Rosebud Indian Reservation which have near 100% Native American student population and one school with over 50% Native American population. SDSGC will continue supporting these NES schools during FY2008 by augmenting NES program resources with Space Grant support staff, teacher-training coordination through AESP, and other NASA informal education resources.

3. **NASA Education Outcome 3 (Engage and Inspire): “Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA’s mission”**

-- SDSGC Strategic Plan section E.1 (Public Service)

❖ **Public Service**

Goal: To enhance public scientific literacy in aerospace and earth science; to complement community efforts in STEM education; and to inspire citizens of diverse backgrounds through the excitement of scientific exploration and

discovery.

- **Objective E.1.1:** (NASA dissemination) The SDSGC will increase public awareness of the Space Grant program and its activities and engage the public in the excitement of NASA missions.
- **Objective E.1.2:** (Science and education events) The SDSGC will support activities of scientific discovery across the state (e.g., SD Space Days 2009)
- **Objective E.1.3:** (Diversity) SDSGC will seek to inspire and motivate women, underrepresented minorities, and persons with disabilities through the excitement of NASA missions.
- **Objective E.1.4:** (Evaluation) The Consortium will develop methods to document, measure, and assess the impact of the public service program in conjunction with its implementation of an overall evaluation strategy (see also A.9)

Workforce Development in Public Service Program

- SD Space Days 2008
- NASA content at three Informal Education affiliates

Diversity in Public Service Program

- Engage members of underrepresented groups in activities such as Space Day

Consortium Management (Administration)

Goal: To ensure quality and fairness in all Consortium programs and alignment with the needs of NASA, the member and affiliate organizations, and the state of South Dakota.

- **Objective A.1:** (Reporting) The Management Team will provide timely reporting and responses to NASA Headquarters regarding Consortium operations and finances.
- **Objective A.2:** (National network) The Management Team will work to strengthen relationships with NASA Centers and the USGS Center for Earth Resource Observation and Science (EROS), the national Space Grant network, and the state’s NASA EPSCoR Program.
- **Objective A.3:** (Consortium network) The Management Team will faithfully represent the diverse interests and resources of the Consortium member institutions and affiliates.
- **Objective A.4:** (State government) The Management Team will ensure that Consortium programs are aligned with state priorities.
- **Objective A.5:** (State industry) The Management Team will foster interaction between the Consortium and state industries involved in aerospace and related technologies.

- **Objective A.6:** (Link to public) The Management Team will seek to maintain and improve the effectiveness of the Consortium as the link between the public and NASA in the state.
- **Objective A.7:** (Increase resources) The Management Team will pursue opportunities to increase the resources available to the Consortium, to broaden participation within the state, to collaborate with other state Consortia in areas of mutual interest and capability, and to assure long-term sustainability.
- **Objective A.8:** (Diversity) The Management Team will ensure diversity in all Consortium programs and activities by seeking to include women, underrepresented minorities, and persons with disabilities. (See also C.1.1, C.4)
- **Objective A.9:** (Evaluation) The Management Team will continually monitor and seek to improve the quality and effectiveness of the state program.

Related objective from Minority Serving Institutions section of Strategic Plan

- **Objective C.4.1:** (Management) SDSGC will actively seek representation from Tribal College faculty and staff on the Management Team. (See also A.8.)

Management Team Structure

During FY2009, the Consortium's Management Team will continue to consist of the following permanent representatives from the SD School of Mines & Technology (SDSM&T), SD State University (SDSU), Augustana College, the USGS Center for Earth Resource Observation and Science (EROS), the SD Discovery Center and Aquarium, two additional rotating positions filled by affiliate members for a period of two years, and an ex-officio non-voting member consisting of the System Vice President of Research for the SD Board of Regents. During FY2008 there were actually be three people in rotating positions held by representatives from the Kirby Science Discovery Center, Sinte Gleska University, and the Journey Museum.

Current Management Team members include:

- Dr. Edward Duke, Director
- Mr. Thomas Durkin, Deputy Director
- Dr. Daniel Swets, Associate Director at Augustana College
- Ms. Kristie Maher, Exec. Dir., SD Discover Center & Aquarium
- Mr. Kevin Dalsted, Associate Director at SD State University
- Mr. Gregg Johnson, Senior Scientist at EROS
- ◆ Mr. James Rattling Leaf, *Sinte Gleska University (through 5/14/10)
- ◆ Ms. Diane Melvin, The Journey Museum (through 5/14/10)
- ◆ Mr. Chris Rossing, Kirby Science Discovery Center (through 5/14/10)
- √ Dr. Gary Johnson, System Vice President of Research: SD Board of Regents
 - * - *Minority Serving Institution*
 - ◆ - *Rotating position*
 - √ - *Ex-officio, non-voting member added during FY2008*

SDSGC Director Ed Duke will serve as Secretary of the National Council of Space Grant Directors' Executive Committee during FY2009.

Diversity and Engaging Minority Serving Institutions and Minorities

SDSGC's Strategic goal for Diversity is "To model diversity in all Consortium programs and activities, with an emphasis on Native Americans, which make up the state's largest minority group." The goal for Minority Serving Institutions is "To ensure that Minority-Serving Institutions in South Dakota, which are exclusively Tribal Colleges and Universities, are represented in the planning and implementation of all Consortium programs." Specific objectives, strategies and outcome indicators for these goals are provided in the Consortium's Strategic Plan.

Based on latest data from the National Center of Education Statistics Digest, South Dakota's minority enrollment in degree-granting institutions is *10.1% (8.9% as adjusted for Asian students) of which *6.6% are Native American. With regard to student awards through SDSGC's Fellowship/Scholarship, Higher Education, and Research Infrastructure programs, awards to minorities and women will equal or exceed 10% to minorities and 40% to females.
* http://nces.ed.gov/programs/digest/d06/tables/dt06_212.asp

In FY2008, SDSGC exceeded its targeted goal of 10% of awards to minorities in that 21% of student awardees were minorities (all Native American) and 16% of the \$135,000 in FY2008 Space Grant fellowship funds was provided to minorities. Sixty-seven percent (67%) of the nine minority students funded in FY2008 attend a minority-serving institution (Tribal College).

SDSGC will continue with the newly (FY2008) established scholarship titled "**NASA Native Engineer/Scientist Scholarship**" in which a \$7,000 scholarship is awarded to a Native American student (preferably female) to recruit and retain minority students in STEM disciplines.

Two Consortium members are MSI Tribal Colleges and one is a minority-focused Tribal College. James Rattling Leaf of Tribal College affiliate Sinte Gleska University remained on the SDSGC Management Team throughout FY2008 and will continue in FY2009. In a successful attempt to further strengthen STEM feeder programs at Oglala Lakota College (OLC), SDSGC will continue with its Consortium Development Competition project. This multi-institution project to "*Increase Minority Participation in Higher Education in STEM Disciplines Responsive to NASA Needs*" provides an opportunity to reinforce the Consortium's partnership with OLC.

In an effort to recruit qualified minority students from SDSGC's Tribal College affiliates to apply to the FY2008 fellowship/scholarship program, SDSGC designated a new Space Grant representative at OLC and Deputy Director Tom Durkin presented the fellowship program to 35 students enrolled in OLC's Science Engineering and Math program. These efforts resulted in a record number of 12 applications from OLC students, four times higher than any previous annual call for student applications. Nine (9) of the 43 students selected for funding (21%) were Native American, more than double the Consortium's target of 10% of awards to minority students. Six (6) of those nine Native American student awardees attend OLC, a minority-serving institution. Overall, 18 of the 60 student applicants to the Consortium's fellowship/scholarship stipend program (30%) were Native American, two-thirds of whom attend OLC. Of the 18 Native

American applicants, nine were funded representing 21% of all student awardees as mentioned above.

These are meaningful engagements of minorities and minority-serving institutions by the Consortium which will continue to be pursued during FY2009.

Outcome Completion

The specific program areas, strategies and measurable outcome indicators used to guide the Consortium and track accomplishments are described in the Consortium's Strategic Plan. Appendix A of this Program Plan includes "Quantitative Outcome Measures Matrix Tables" for each program area. Those tables clearly indicate whether the outcome indicators for the various program areas were completed, partially completed, or not completed during FY2008. Unless otherwise indicated, the outcomes completed in FY2008 will be continued in FY2009. In the cases where an outcome indicator was partially or not completed last year, we indicate below for each of the six program areas 1) how and when the outcome will be achieved during FY2009, or 2) whether there has been a change to the desired outcome.

1) **Management Outcomes Incompleted in FY'08 to be Completed in FY'09**

Twenty-two (96%) of the 23 Management outcomes identified in SDSGC's Strategic Plan were completed in FY2008 (see Management "Quantitative Outcome Measures Matrix Table" in Appendix A). Those outcomes will continue to be met in FY2009. The following outcome was incomplete in FY2008 will continue to be pursued during FY2009.

- Part of **Strategy/Outcome A.2.1** is to maintain and expand relationships with USGS EROS through student internships. SDSGC strives to assist with the placement of at least five student interns at EROS, but with a change in the EROS main contractor during FY2008, student internships did not occur due to natural start up issues. SDSGC envisions that as the new contractor establishes hiring and internship policy, the practice of student internships will resume during FY2009.

2) **Fellowship Outcomes Partially Completed or Incomplete in FY'08 to be Pursued or Revised in FY'09**

Eleven (79%) of the 14 Fellowship outcomes identified in SDSGC's Strategic Plan were completed in FY2008 (see Fellowship "Quantitative Outcome Measures Matrix Table" in Appendix A). Those outcomes will continue to be met in FY2009. The following outcomes were partially completed in FY2008 will be revised in FY2009.

- Per **Strategies/Outcomes B.1.4.1 and B.1.4.2**, 100% of student researchers funded through SDSGC are to present the result of their work and 100% of student fellows are to be offered professional development training. While a large percentage of student researchers present their work, SDSGC management has determined that the target of 100% is not critical for success. While many Space Grant fellows receive professional development training as part of their college coursework, SDSGC provides Space Grant funded professional development to Native American and Tribal College students enrolled in summer research programs supported by SDSGC. SDSGC management has determined that the

latter support is the most efficient use of Consortium professional development training, so the previous target of 100% of funded students will be reduced in FY2009.

- Per **Strategy/Outcome B.1.2.1**, Augustana College is to provide opportunities for three students for research projects at EROS. Due to reasons explained under Management above regarding the FY2008 change in EROS main contractor, that outcome was incomplete, but will be achieved in FY2009.
- 3) **Research Infrastructure Outcomes Completed in FY'08 to be Continued in FY'09**
Twenty (100%) of the 20 Research Infrastructure outcomes identified in SDSGC's Strategic Plan were completed in FY 2008 (see Research Infrastructure "Quantitative Outcome Measures Matrix Table" in Appendix A). Those outcomes will continue to be met in FY2009.
 - 4) **Higher Education Outcomes Incompleted in FY'08 to be Completed in FY'09**
Eight (89%) of the nine Higher Education outcomes identified in SDSGC's Strategic Plan were completed in FY 2008 (see Higher Education "Quantitative Outcome Measures Matrix Table" in Appendix A). Those outcomes will continue to be met in FY2009. The following outcome was incomplete in FY2008 will be completed in FY2009.
 - Per **Strategy/Outcome B.3.4.1**, SDSGC encourages educational partnerships between the state's academic institutions and private industry and at least two SDSGC fellows are targeted to be placed in internships through the State of South Dakota's "Dakota Seeds" program each year. Although the Dakota Seeds internships were advertised alongside NASA internships in SDSGC's fellowship funding announcement, none of the SDSGC student fellows obtained such internships. As this program is further developed during FY2009, SDSGC management expects that the target number can be achieved.
 - 5) **Precollege Outcome Partially Completed in FY'08 to be Continued in FY'09**
Ten (100%) of the 10 Precollege outcomes identified in SDSGC's Strategic Plan were completed in FY 2008 (see Precollege "Quantitative Outcome Measures Matrix Table" in Appendix A). Those outcomes will continue to be met in FY2009.
 - 6) **General Public Outcomes Completed in FY'08 to be Continued in FY'09**
Seven (100%) of the seven General Public outcomes identified in SDSGC's Strategic Plan were completed in FY 2008 (see General Public "Quantitative Outcome Measures Matrix Table" in Appendix A). Those outcomes will continue to be met in FY2009.

As can be seen Appendix A, all of the Consortium's outcomes for the four National Program Emphases (Diversity of Participants, Workforce Development, Longitudinal Tracking, and Minority Serving Institutions) were met with the exception of one under Workforce Development (i.e., Strategy/Outcome C.2.4.2 in which two student fellows are targeted to be placed in "Dakota Seeds" internships as described above under Higher Education Outcomes.

Appendix A: FY2008 Quantitative Outcome Measures Matrix

Completed
Partially Completed
Incomplete

A. Consortium Management

Quantitative Outcome Measures Matrix (A. Consortium Management)

Objective	Outcome indicator(s)			
A.1	All reports will be submitted on time and in accordance with NASA guidelines.	√		
A.2	At least two faculty will visit NASA Centers or EROS each year to promote collaborative research	√		
	At least three students will participate in internship programs at NASA Centers.	√		
	At least five student interns will be placed at EROS (SAIC), although the funding for those internships will not necessarily be provided solely through Space Grant.			√
	Representatives of the Management Team will be present at biannual national meetings and the Western Region Space Grant Meeting.	√		
	Members of the Management Team also hold positions on the Technical Advisory Committee and the Steering Committee of the state NASA EPSCoR Program	√		
A.3	Announce one position (one of two rotating 2-year positions) on Management Team to all Consortium members and affiliates and select one member by the start of the program year (May 15, 2009)	√		
	Relevant electronic communication sent to all member institutions, affiliates, teachers, and interested parties, as appropriate, and an additional affiliate survey will be available on-line and conducted as part of NASA's 20 th Year Evaluation in 2008.	√		
A.4	Members of the Management Team meet once per year with representatives of state government to discuss alignment with state priorities, such as the Governor's 2010 Initiative.	√		
	At least one additional representative of state government will be maintained on the advisory board.	√		
A.5	At least one or more representatives of state industry will be maintained on the advisory board.	√		
A.6	Electronic databases maintained and updated/reviewed as necessary thereafter.	√		
	Update Consortium website at least monthly	√		
A.7	Consortium Management Team continually investigates and secures sources of outside funding and match as opportunities arise.	√		
	At least 20 targeted announcements of opportunity will be disseminated through electronic newsletter and website each year	√		
	Facilitate at least one multi-partner proposal each year to NASA or other agencies	√		
A.8	Diversity will be modeled in all aspects of the Consortium and participation by underrepresented groups will increase	√		

	At least two Space Grant student stipends awarded for engineering projects that assist people with disabilities at Black Hills Workshop or ADVANCE, and/or SDSGC funds are used to support activities such as the National Federation of the Blind's summer Youth Slam.	√		
A.9	Program evaluator will continue to participate in quarterly meetings	√		
	In consultation with the Program Evaluator, the Management Team will continue to determine appropriate data collection and evaluation procedures that are consistent with available resources.	√		
	Mgmt. Team annually reviews NSGF Longitudinal Tracking report and evaluation data provided by Consortium Evaluator to assess effectiveness of state programs.	√		
	Strategic Plan and Roles and Responsibilities document (appendix of Strategic Plan) updated at an annual performance audit meeting.	√		
	The advisory board (SD REACH Committee) will be convened annually.	√		

B.1. Consortium Programs (Outcome 1):

Fellowship/Scholarship

Quantitative Outcome Measures Matrix (Fellowship/Scholarship)

Completed
Partially Completed
Incomplete

Objective	Outcome Indicator			
B.1.1	Annual Call for Fellowship/Scholarship Applications at all higher education members and affiliates, competitive review, and selection of awardees.	√		
	Awards reflect the diversity of the Consortium's membership and statewide balance	√		
B.1.2	At least three interns will be placed at NASA Centers and at least five student interns will be placed at EROS-SAIC.	√		
	Augustana College will provide opportunities for three students for research projects at EROS.			√
	At least two SD Space Grant Fellows will participate in SD NASA EPSCoR research projects annually.	√		
	At least three fellowships offered each year. (re: Strategy B.1.1.2 Offer research fellowships that support SDSGC initiatives (Badlands Observatory astronomical research or "Dark Skies, Bright Minds" program, robotics, NASA's "Microgravity University: Reduced Gravity Student Flight Opportunity Program, SDSM&T Aero Team, SDSU ACE Camp, etc.)	√		
B.1.3	At least five interns will be placed in aerospace industry which can include placement at EROS.	√		
	Students are placed in state industry internships as a result of SDSGC collaboration with the SD Department of Tourism and State Development.	√		

B.1.4	100% of all student researchers funded through NASA South Dakota Space Grant will present results each year.		√	
	Opportunities will be offered to 100% of SDSGC student fellows to take advantage of professional development training.		√	
B.1.5	Awards to women/minorities equal or exceed 10% to minorities and 40% to females	√		
	At least three fellowships awarded annually to a student at a Tribal College or to a Tribal College student seeking to transfer to another SDSGC university	√		
B.1.6	Use of a web-based system will improve SDSGC's ability to assess the impact of its student programs and to maintain better contact with graduates of the program	√		
B.1.7	Adjustments are made to the fellowship and scholarship program to strengthen activities that are working and drop or correct activities that are not having the intended impact.	√		

B.2. Consortium Programs (Outcome 1):

Research Infrastructure

Quantitative Outcome Measures Matrix (Research Infrastructure)

Completed
Partially Completed
Incomplete

Objective	Outcome indicators			
B.2.1	At least ten research announcements are distributed among appropriate SDSGC institutions each year	√		
	At least one NASA-related research proposal is submitted each year as a result of SDSGC coordination (see also A.7.3)	√		
B.2.2	At least five Program Initiation grants are supported each year from SDSGC and/or state NASA EPSCoR funds	√		
	At least five travel grants for research development are awarded each year from SDSGC and/or state NASA EPSCoR funds (see also B.2.3.2)	√		
	At least two SDSGC fellowships or scholarships are awarded each year for students to work on NASA EPSCoR or other NASA-related research projects	√		
B.2.3	Members of Management Team also hold positions on Technical Advisory Committee [REACH Committee] and Steering Committee of the state NASA EPSCoR Program (see also A.2.3)	√		
	At least five planning trips to NASA Centers or EROS are supported each year from SDSGC and/or state NASA EPSCoR funds (see also B.2.2.2)	√		
	An initial research needs and capabilities assessment of SDSGC academic institutions is completed during first Tribal College Research and Education Roundtable in 2008 resulting in a Consortium Development Grant proposal with SDSGC Minority Serving Institution.	√		

	At least one state industry will participate in a research collaboration with SDSGC annually through Program Initiation Grants, SD NASA EPSCoR, or similar initiatives.	√		
	At least five announcements of research opportunities at state and federal agencies are distributed annually to faculty at SDSGC academic institutions.	√		
B.2.4	Full or partial funding for new equipment and facilities is awarded to SDSGC institutions through SD NASA EPSCoR or SDSGC	√		
	SDSGC institutes acquire new remote sensing data or collaborate on use of existing data.	√		
	A physical or electronic catalog of the remote sensing library holdings at EROS is maintained for distribution to SDSGC institutions and other interested parties.	√		
	SDSGC members receive information on satellite imagery available through SDView	√		
B.2.5	At least two college or pre-college research or design teams receive SDSGC funds each year	√		
	SDSGC industrial and state government affiliates will be contacted regarding the needs and benefits of pre-college engineering design programs (e.g., robotics teams)	√		
B.2.6	SDSGC will sponsor activities that encourage women and students from underrepresented groups to enter STEM careers, including Women in Science Conferences, Flandreau Indian School Success Academy, NASA Explorer Schools, and Space Day.	√		
	SDSGC fellowship/scholarship funds for research or design experiences at SDSGC academic institutions, EROS, and NASA Centers will equal or exceed 10% to minorities and 40% to females	√		
	Annually use NSGF longitudinal tracking system to track SDSGC scholars and fellows. (See also C.3.1.)	√		
B.2.7	Adjustments are made to the research infrastructure program to strengthen activities that are working and drop or improve activities that are not having the intended impact	√		

**B.3. Consortium Programs (Outcome 1):
Higher Education**

Quantitative Outcome Measures Matrix (Program Area 4: Higher Education)

Objective	Outcome Indicators			
B.3.1	The “Educational Opportunities (Higher Education)” section of SDSGC website is kept current and maintained as a user friendly webpage with a simple feedback capability.	√		
	At least ten NASA education announcements are distributed among appropriate SDSGC institutions each year	√		

Completed
Partially Completed
Incomplete

B.3.2	At least two faculty or students from SDSGC affiliates will participate in NASA education programs each year	√		
B.3.3	Directors of new research centers and new Ph.D. programs are informed of SDSGC fellowship/scholarship and other programs	√		
	Students are placed in state industry internships as a result of SDSGC collaboration with the SD Department of Tourism and State Development.	√		
B.3.4	At least two SDSGC fellows are placed in internships through the “Dakota Seeds” program each year. (See also C.2.4.2.)			√
	At least one representative of SDSGC will attend the conference (state’s annual GIS user’s conference) and promote partnerships between industry and academic affiliates.	√		
B.3.5	Participation by women and minorities will equal or exceed 10% to minorities and 40% to females (see also C.1.4.1.)	√		
B.3.6	Adjustments are made to the higher education program to strengthen activities that are working and drop or improve activities that are not having the intended impact	√		

C.1. National Program Emphases (Outcome 1):

Diversity of Participants

Quantitative Outcome Measures Matrix (Diversity)

Completed
Partially Completed
Incomplete

Objective	Outcome Indicators			
C.1.1	Diversity will be modeled in all aspects of the Consortium and participation by underrepresented groups will increase.	√		
	At least two Space Grant student stipends awarded for engineering projects that assist people with disabilities at Black Hills Workshop or ADVANCE, and/or SDSGC funds are used to support activities such as the National Federation of the Blind’s summer Youth Slam.	√		
C.1.2	Awards to women and minorities equal or exceed 10% to minorities and 40% to females.	√		
	At least three fellowships awarded annually to a student at a Tribal College or to a Tribal College student seeking to transfer to another SDSGC university.	√		
C.1.3	SDSGC will sponsor activities that encourage women and students from underrepresented groups to enter STEM careers, including Women in Science Conferences, Flandreau Indian School Success Academy, NASA Explorer Schools, and Space Day.	√		
	SDSGC fellowship/scholarship funds for research or design experiences at SDSGC academic institutions, EROS, and NASA Centers will equal or exceed 10% to minorities and 40% to females.	√		
	A uniform system for longitudinal tracking SDSGC scholars and fellows will be in place by December 2006. (See also C.3.1.1.)	√		

C.1.4	Participation by women and minorities will equal or exceed 10% to minorities and 40% to females. (See also B.3.5.1.)	√		
	Co-sponsor at least one Tribal College geospatial and geoscience initiative.	√		

Completed
Partially Completed
Incomplete

**C.2. National Program Emphases (Outcome 1):
Workforce Development**

Quantitative Outcome Measures Matrix (Workforce Development)

Objective	Outcome Indicators			
C.2.1	Co-sponsor at least five precollege programs that encourage entry into the STEM workforce and participation in NASA and SDSGC.	√		
	At least 200 Native American college and precollege students each year are informed of STEM workforce opportunities in NASA and SDSGC.	√		
C.2.2	One hundred percent (100%) of fellowship and scholarship awardees will be students planning to enter the STEM workforce or STEM education.	√		
C.2.3	At least two SDSGC student fellows will be placed in internships at NASA Centers each year.	√		
C.2.4	At least two SDSGC Workforce Development student fellows will be placed in industry internships or jobs each year.	√		
	At least two SDSGC student fellows will be placed in industry internships or jobs each year through “Dakota Seeds.” (See also B.3.4.1.)			√

Completed
Partially Completed
Incomplete

**C.3. National Program Emphases (Outcome 1):
Longitudinal Tracking**

Quantitative Outcome Measures Matrix (Longitudinal Tracking)

Objective	Outcome Indicators			
C.3.1	Use of a web-based system will improve SDSGC’s ability to assess the impact of its student programs and to maintain better contact with graduates of the program.	√		
C.3.2	Use of a consistent reporting tool for faculty awards will facilitate compilation of participant data, scientific and educational products, new collaborations, and new funding that result from the program.	√		

**C.4. National Program Emphases (Outcome 1):
Minority Serving Institutions**

Quantitative Outcome Measures Matrix (Minority Service Institutions)

Completed
Partially Completed
Incomplete

Objective	Outcome Indicators			
C.4.1	Tribal College needs and priorities will be more effectively served by SDSGC programs.	√		
C.4.2	Students at Minority-Serving Institutions are aware of the goals and priorities of the Fellowship/Scholarship program and submit competitive applications.	√		
C.4.3	Increase in number of research and education proposals submitted by Tribal College affiliates or in collaboration with Tribal College affiliates.	√		
	SDSGC institutes acquire new remote sensing data or collaborate on use of existing data.	√		
	A Tribal College Research and Education Roundtable is held each year, and the recommendations are disseminated to state academic, government, and industry representatives through the state REACH Committee.	√		
C.4.4	STEM programs in at least two to three Tribal College affiliates and tribal K-12 schools that provide college preparatory programs receive SDSGC support (e.g., St. Francis Indian School, SDSU/Flandreau Indian School Success Academy, SD GEAR UP Honors Program, Consortium Development Grant with Minority Institutions, etc.)	√		
	At least one Tribal College student is placed in a STEM internship or similar program each year.	√		
	Six Tribal College undergraduates will participate in hands-on STEM projects and two Tribal College students will enter STEM master's programs by the end of the project in May 2010.	√		

**D. NASA Education Outcome 2:
D.1. Precollege Education**

Quantitative Outcome Measures Matrix (Precollege Education)

Completed
Partially Completed
Incomplete

Objective	Outcome indicator(s)			
D.1.1	Electronic databases of pre-college contacts available updated as necessary	√		
D.1.2	SDSGC members will participate in at least one pre-college education proposal.	√		
D.1.3	At least 100 teachers will participate in workshops facilitated by SDSGC such as NASA AESP training, GIS/GPS training, E-missions, GEMS, StarLab Planetarium astronomy training, UMAC's Earth Science Tools for Educators workshop, and NASA Speaker's Bureau	√		

	Website is updated at least monthly. (See also A.6.1 and A.9.3.)	√		
	At least one South Dakota schools (preferably a Tribal school) applies for the NASA Explorer Schools Program.	√		
D.1.4	At least 2,000 people will attend “NASA South Dakota Space Days”.	√		
	Over 3,000 students each year participate through Women in Science Conferences, K-12 science fairs, Aerospace Career and Education Camp, Flandreau Indian School Success Academy, Badlands Observatory's "Dark Skies, Bright Minds" educational program, and related programs	√		
D.1.5	These teacher-training programs embrace state education standards in math, science, and language arts and will introduce ≥50 teachers to NASA / space science curricula	√		
D.1.6	Over 1,000 females and students from underrepresented groups participate each year through Women in Science Conferences, K-12 science fairs, Aerospace Career and Education Camp, Flandreau Indian School Success Academy, Badlands Observatory's "Dark Skies, Bright Minds" educational program, and related programs	√		
D.1.7	Adjustments are made to the pre-college education program to strengthen activities that are working and drop or improve activities that are not having the intended impact	√		

E. NASA Education Outcome 3:

E.1. Public Service: General Public & External Relations

Quantitative Outcome Measures Matrix (General Public)

Completed
Partially Completed
Incomplete

Objective	Outcome indicator(s)			
E.1.1	Website is updated at least monthly.	√		
	NASA and SDSGC will be featured daily during the work week in space/science education broadcasts	√		
E.1.2	SDSGC staff will produce and give formal and informal presentations to various civic and other public groups, and will generate press releases about Consortium activities	√		
	At least 2,000 people will attend “NASA South Dakota Space Days”.	√		
	Approximately 2,500 middle and high school students across the state will have been engaged with hands-on science activities and SDSGC will support all three major science fairs in South Dakota.	√		
E.1.3	Participants in South Dakota Space Days and science fairs will include at least 10% Native Americans and 40% females	√		
E.1.4	Adjustments are made to the public service program to strengthen activities that are working and drop or improve activities that are not having the intended impact	√		