# NASA South Dakota Space Grant Consortium

# Strategic Plan

**(*Updated for 2010*)**

*Reorganized in August 2008 and updated on May 15, 2009 and January 22, 2010 to align with the 2006 NASA Education Strategic Coordination Framework, National Space Grant Program Elements, and National Space Grant Program Emphases*

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# NASA South Dakota Space Grant Program

## Vision

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 science, and supporting STEM disciplines.

## Mission

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.

## Values

The NASA South Dakota Space Grant Consortium is committed to excellence in student and faculty research and to promoting STEM education and expanding 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 SDSGC.

## Time Frame

The specific goals and objectives listed under each of the program areas are long-term and apply to the current five-year Space Grant cycle (2005-2009). The strategies and outcome indicators to achieve those goals apply to the current year, with the understanding that they will be evaluated quarterly and updated as needed at the Consortium's annual performance audit meeting described under the Management section.

## A. Consortium Management

**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.

***Outcome indicator:*** *All reports will be submitted on time and in accordance with NASA guidelines.*

**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.

**Strategy A.2.1:** Maintain and expand relationships with NASA Centers and EROS through faculty visits and student internships.

***Outcome indicator:*** *At least two faculty will visit NASA Centers or EROS each year to promote collaborative research, and at least three students will participate in internship programs at NASA Centers. Through assistance from Space Grant, 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.*

**Strategy A.2.2:** The Management Team and other representatives of the Consortium will continue to play an active role in the national Space Grant network.
***Outcome indicator:*** *Representatives of the Management Team will be present at biannual national meetings and the Western Region Space Grant Meeting.*
**Strategy A.2.3:** Provide effective coordination between the state Space Grant and NASA EPSCoR programs.
***Outcome indicator:*** *Members of the Management Team also hold positions on the Technical Advisory Committee [REACH Committee] and the Steering Committee of the state NASA EPSCoR Program.* (See also B.2.3.1.)

**Objective A.3:** (Consortium network) The Management Team will faithfully represent the diverse interests and resources of the Consortium member institutions and affiliates.
**Strategy A.3.1:** Establish two rotating positions on the Management Team, for a period of two years each, which will be filled by representatives of member institutions and affiliates.
***Outcome indicator****: 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).*
**Strategy A.3.2:** Maintain effective communication with Consortium member institutions and affiliates through electronic communication and affiliate surveys.
***Outcome indicator:*** *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.*

**Objective A.4:** (State government) The Management Team will ensure that Consortium programs are aligned with state priorities.
**Strategy A.4.1:** Provide annual briefing to representatives of state government on Consortium activities.
***Outcome indicator:*** *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.
**Strategy A.4.2:** Maintain representatives of state government to participate on the Management Team.
***Outcome indicator:*** *At least one representative of state government will serve as an ex-officio member of the Management Team.*

**Objective A.5:** (State industry) The Management Team will foster interaction between the Consortium and state industries involved in aerospace and related technologies.
**Strategy A.5.1:** Appoint additional industry representatives to advisory board.
***Outcome indicator:*** *At least one representative of state industry will be maintained on the advisory board.*

**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.

**Strategy A.6.1:** Develop and maintain electronic databases and mailing lists of contacts in formal and informal education, media, state and local government, non-profit organizations, clubs, and individual citizens.
***Outcome indicator:*** *Electronic databases maintained and updated/reviewed as necessary.*
**Strategy A.6.2:** Maintain Consortium website at http://sd.spacegrant.org to provide effective dissemination of information about NASA, the state Consortium, and research and educational opportunities in STEM-related fields.
***Outcome indicator:*** *Update Consortium website at least monthly.*

**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.

**Strategy A.7.1:** Identify opportunities to increase funding, staffing, and matching funds for the state program.
***Outcome indicator:*** *Consortium Management Team continually investigates and secures sources of outside funding and match as opportunities arise.*
**Strategy A.7.2:** Serve as a clearinghouse for information on funding opportunities from NASA and other agencies that support STEM-related research and education, especially in areas of aerospace and earth science.
***Outcome indicator:*** *At least 20 targeted announcements of opportunity will be disseminated through electronic mailings and website each year.*
**Strategy A.7.3:** Coordinate submission of proposals to NASA and other agencies on projects in STEM research and education.
***Outcome indicator:*** *Facilitate at least one multi-partner proposal each year to NASA or other agencies.* (See also B.2.1.2.)

**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.)

**Strategy A.8.1:** The Management Team will emphasize diversity in selection of participating organizations, programs, fellowships and scholarships, faculty awards, and Management Team members.
***Outcome indicator:*** *Diversity will be modeled in all aspects of the Consortium and participation by underrepresented groups will meet the current diversity targets.*
**Strategy A.8.2:** The Management Team will conduct discussions with the Directors or staff of the Black Hills Workshop, ADVANCE in Brookings, the South Dakota School for the Deaf, and/or the South Dakota School for the Blind and Visually Impaired with the purpose of increasing NASA and STEM opportunities for the disabled and providing Space Grant funding to university students to work on engineering design projects that assist people with disabilities. (See also C.1.1.2)
***Outcome indicator:*** *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.*

**Objective A.9:** (Evaluation) The Management Team will continually monitor and seek to improve the quality and effectiveness of the state program.

**Strategy A.9.1:** Maintain the services of an external Program Evaluator ~~during the 2005 program year~~ to provide assessment of the Consortium's strategic plan, activities, and outcomes, and to establish a long-term strategy for continuing evaluation.
***Outcome indicator:*** *Program evaluator will participate in all monthly and quarterly meetings.*

**Strategy A.9.2:** Institute long-term evaluation procedures that are consistent with the recommendations of the Program Evaluator and with available resources.
***Outcome indicator:*** *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.*

**Strategy A.9.3:** Consortium's Program Evaluator and SDSGC's NSGF Longitudinal Tracking system collect and compile data on Consortium programs through online and mailed surveys for analysis by the Management Team.
***Outcome indicator:*** *Management Team annually reviews NSGF Longitudinal Tracking report and evaluation data provided by Program Evaluator to assess effectiveness of state programs.*

**Strategy A.9.4:** Perform quarterly reviews of the Strategic Plan and issue annual updates.
***Outcome indicator:*** *Strategic Plan and Roles and Responsibilities document (appendix of Strategic Plan) updated at an annual performance audit meeting.*

**Strategy A.9.5:** In addition to the SDSGC Management Team, which will assess program quality on a continual basis, solicit input from an independent advisory board consisting of the South Dakota REACH Committee in order to promote better alignment with NASA, industry, and state priorities.
***Outcome indicator:*** *The advisory board will be convened annually.*

## B. NASA Education Outcome 1:

**Higher Education – Employ and Educate**: Contribute to the development of the STEM (Science, Technology, Engineering, Mathematics) workforce in disciplines needed to achieve NASA's strategic goals, through a portfolio of investments.

### B.1. Consortium Programs (Outcome 1): 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.

**Strategy B.1.1.1:** A centralized, Consortium-wide annual Call for Fellowship/ Scholarship Applications is made available to all of the Consortium's higher education members and affiliates via e-mail and SDSGC website.

***Outcome indicator:*** *Annual Call for Fellowship/Scholarship Applications at all higher education members and affiliates, competitive review, and selection of awardees.*

**Strategy B.1.1.2:** Utilize the Consortium Management Team to ensure consensus on the distribution of fellowship/scholarship awards each year, with emphasis on increasing participation of Tribal Colleges.

***Outcome indicator:*** *Annually, awards will be made to students attending 50% of SDSGC's institutions of higher education including at least one Tribal-college affiliate.*

**Objective B.1.2:** (NASA and EROS ties) Offer hands-on, tangible research experiences to student research fellowship awardees at NASA Centers and EROS.

**Strategy B.1.2.1**: Offer internships that integrate training with interdisciplinary research at NASA Centers and EROS-SAIC.

***Outcome indicator:*** *At least three interns will be placed at NASA Centers and at least five student interns will be placed at EROS-SAIC.*

***Outcome indicator:*** *Augustana College will provide opportunities for three students for research projects at EROS.*

**Strategy B.1.2.2:** Support student research opportunities through SD NASA EPSCoR collaborative research projects.

***Outcome indicator:*** *At least two SD Space Grant Fellows will participate in SD NASA EPSCoR research projects annually.*

**Strategy B.1.2.3:** 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.).

***Outcome indicator:*** *At least three fellowships offered each year in these or related areas.*

**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.

**Strategy B.1.3.1**: Support internships that provide students with hands-on experience in the aerospace and related industries. (See also B.1.2.1.)

***Outcome indicator:*** *At least five interns will be placed in aerospace industry which can include placement at EROS.*

**Strategy B.1.3.2**: Collaborate with the state's Director of Commercialization (SD Department of Tourism and State Development) to place students in internship positions with state industries if their business interests are aligned with NASA and SDSGC. (See also B.3.3.2.)

***Outcome indicator:*** *At least two students are placed in state industry internships as a result of SDSGC collaboration with the SD Department of Tourism and State Development.*

**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.

**Strategy B.1.4.2:** Professional development training will be provided by faculty in the field of technical communication to SDSGC student fellows to better equip them to present themselves and their work to future employers.

***Outcome indicator:*** *Opportunities will be offered to 100% of SDSGC student fellows to take advantage of professional development training.*

**Objective B.1.5:** (Diversity) Ensure funding for fellowships and scholarships to women, underrepresented minorities, and persons with disabilities. (See also C.1.2.)

**Strategy B.1.5.1:** Utilize intensive marketing techniques (personal visits, direct faculty contacts, email) to encourage women and minority students to apply to the Fellowship/Scholarship program.

***Outcome indicator:*** *Awards to women and minorities equal or exceed 10% to minorities and 40% to females.*

**Strategy B.1.5.2:** Offer fellowships to qualified Native American students at Tribal College affiliates.

***Outcome indicator:*** *At least three fellowships awarded annually to students at Tribal Colleges or to Tribal College students seeking to transfer to another SDSGC university.*

**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.)

**Strategy B.1.6.1:** Continue to participate in the National Space Grant Foundation's longitudinal tracking system so that all students provided with "significant support" from SDSGC (defined as over $1,000 in a single award) will be tracked in accordance with NASA's longitudinal tracking requirements.

***Outcome indicator:*** *Annually, 75% of funded students will reply to longitudinal tracking survey.*

**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.)

**Strategy B.1.7.1:** Develop and administer simple follow-up surveys of students' knowledge and attitudes about the Consortium, NASA, and STEM careers.

***Outcome indicator:*** *Annually, 75% of funded students will reply to evaluative survey which is part of the longitudinal tracking survey.*

## B.2. Consortium Programs (Outcome 1): Research Infrastructure

**Goal:** *To promote the improvement of research programs and capabilities of Consortium 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.

**Strategy B.2.1.1:** Distribute announcements of research opportunities in NASA related fields to faculty at member institutions.

***Outcome indicator:*** *At least ten research announcements are distributed among appropriate SDSGC institutions each year.*

**Strategy B.2.1.2:** Coordinate the development of research proposals among faculty at member institutions, especially proposals that involve multiple disciplines and institutions.
***Outcome indicator:*** *At least one NASA-related research proposal is submitted each year as a result of SDSGC coordination.* (See also A.7.3.)

**Objective B.2.2:** (Research support) Support new and developing research, especially multidisciplinary and collaborative projects, in fields aligned with NASA's mission.
**Strategy B.2.2.1:** Support new research initiatives through competitively awarded seed grants.
***Outcome indicator:*** *At least five Program Initiation Grants are supported each year from SDSGC and/or state NASA EPSCoR funds.*
**Strategy B.2.2.2:** Support faculty and student travel to NASA Centers, EROS, and other institutions or events for the purpose of developing new research projects.
***Outcome indicator:*** *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.)
**Strategy B.2.2.3:** Support graduate and undergraduate student research that is aligned with NASA's mission.
***Outcome indicator:*** *At least two SDSGC fellowships or scholarships are awarded each year for students to work on NASA EPSCoR or other NASA-related research projects.*

**Objective B.2.3:** (Collaborations) Build research collaborations both within and outside the state.
**Strategy B.2.3.1:** Coordinate SDSGC research programs with the state's NASA EPSCoR program and other NASA research programs having similar objectives.
***Outcome indicator:*** *Members of the Management Team also hold positions on the Technical Advisory Committee [REACH Committee] and the Steering Committee of the state NASA EPSCoR Program.* (See also A.2.3.)
**Strategy B.2.3.2:** Develop mutually beneficial research collaborations with NASA Centers and EROS.
***Outcome indicator:*** *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.)
**Strategy B.2.3.3:** Promote research collaboration among the state's academic institutions with an emphasis on programs that link faculty at research-intensive institutions with faculty at institutions with limited research infrastructure, especially Tribal Colleges.
***Outcome indicator:*** *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.* (See also C.4.3.3.)
**Strategy B.2.3.4:** Encourage research partnerships between the state's academic institutions and private industry.
***Outcome indicator:*** *At least one state industry will participate in a research collaboration with SDSGC annually through Program Initiation Grants, SD NASA EPSCoR, or similar initiatives.*
**Strategy B.2.3.5:** Facilitate research partnerships between the state's academic institutions and state and federal government agencies.

***Outcome indicator:*** *At least five announcements of research opportunities at state and federal agencies are distributed annually to faculty at SDSGC academic institutions.*

**Objective B.2.4:** (Facilities) Promote acquisition of new facilities and shared use of existing resources.

**Strategy B.2.4.1:** In conjunction with SD NASA EPSCoR, provide funding for new equipment and facilities that support NASA-related research, especially if the equipment can be shared among SDSGC institutions.

***Outcome indicator:*** *Full or partial funding for new equipment and facilities is awarded to SDSGC institutions through SD NASA EPSCoR or SDSGC.*

**Strategy B.2.4.2:** Develop and maintain remote-sensing test sites that promote long-term interdisciplinary research and training collaborations among SDSGC institutions and attract collaborations from external partners. (See also C.4.3.2.)

***Outcome indicator:*** *SDSGC institutions acquire new remote sensing data or collaborate on use of existing data.*

**Strategy B.2.4.3:** Promote access to existing research facilities and resources in the state by SDSGC institutions.

***Outcome indicator:*** *A physical or electronic catalog of the remote sensing library holdings at EROS is maintained for distribution to SDSGC institutions and other interested parties.*

***Outcome indicator:*** *SDSGC members receive information on satellite imagery available through SDView.*

**Objective B.2.5:** (Integrate research and education) Foster research groups and engineering design teams that integrate education, research, and development.

**Strategy B.2.5.1:** Provide funding to college and pre-college research and design teams.

***Outcome indicator:*** *At least two college or pre-college research or design teams receive SDSGC funds each year.*

**Strategy B.2.5.2:** Encourage public and private partnerships to sponsor pre-college engineering design teams such as robotics teams.

***Outcome indicator:*** *SDSGC industrial and state government affiliates will be contacted regarding the needs and benefits of pre-college engineering design programs.*

**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 also C.1.3.)

**Strategy B.2.6.1:** Work with admissions officers at SDSGC academic affiliates and with SDSGC's network of K-12 and informal education contacts to improve recruitment of qualified female students and students from underrepresented groups.

***Outcome indicator:*** *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.*

**Strategy B.2.6.2:** Assist in the placement of students from underrepresented groups in projects that provide hands-on research or design experience.

***Outcome indicator:*** *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.*

**Strategy B.2.6.3:** Longitudinally track progress of students from underrepresented groups in academic performance and research activities through first employment.

***Outcome indicator:*** *Annually use NSGF longitudinal tracking system to track SDSGC scholars and fellows.* (See also C.3.1.)

**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 also A.9.)

**Strategy B.2.7.1:** Develop and administer simple before-and-after surveys of faculty and students involved in research infrastructure activities to assess their knowledge and attitudes about the Consortium, NASA, and STEM careers.

***Outcome indicator:*** *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

**Goal:** *To build interdisciplinary programs related to NASA's Education Outcome 1 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.

**Strategy B.3.1.1**: SDSGC webpage provides links to SDSGC student funding opportunities, NASA educational resources and successful education programs, as well as links to data, imagery, and general curriculum development guidance.

***Outcome indicator:*** *The "Educational Opportunities (Higher Education)" section of SDSGC website is kept current and maintained as a user friendly webpage.*

**Strategy B.3.1.2:** Distribute announcements of opportunities for education and curriculum enhancement in NASA-related fields to faculty at member institutions.

***Outcome indicator:*** *At least 10 NASA education announcements are distributed among appropriate SDSGC institutions each year.*

**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.

**Strategy B.3.2.1:** SDSGC higher education affiliates will continue to promote NASA leadership and educational opportunities made available through NASA Academy, USRP, GSRP, Microgravity University, and other NASA programs that integrate training with interdisciplinary research.

***Outcome indicators:*** *At least two faculty or students from SDSGC affiliates will participate in NASA educational programs each year.*

**Objective B.3.3:** (State government) Establish and maintain linkages between SDSGC and higher education and state government.

**Strategy B.3.3.1:** Develop strong collaborations with State 2010 Research Centers and new Ph.D. programs (in areas related to NASA's mission).

***Outcome indicators:*** *Directors of new research centers and new Ph.D. programs are informed of SDSGC fellowship/scholarship and other programs.*

**Strategy B.3.3.2:** Collaborate with the state's Director of Commercialization (SD Department of Tourism and State Development) to place students in internship positions with state industries if their research and training interests are aligned with NASA and SDSGC. (See also B.1.3.2.)

***Outcome indicator:*** *At least two students are placed in state industry internships as a result of SDSGC collaboration with the SD Department of Tourism and State Development.*

**Objective B.3.4:** (Industry involvement) Establish and maintain linkages between SDSGC and higher education and industry in South Dakota.

**Strategy B.3.4.1:** Encourage educational partnerships between the state's academic institutions and private industry through "Dakota Seeds" internships.

***Outcome indicator:*** *At least two SDSGC fellows are placed in internships through the "Dakota Seeds" program each year.* (See also C.2.4.2.)

**Strategy B.3.4.2:** Participate in the state's annual GIS user's conference.

***Outcome indicator:*** *At least one representative of SDSGC will attend the conference and promote partnerships between industry and academic affiliates.*

**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.)

**Strategy B.3.5.1:** Engage women and members of underrepresented groups in all aspects of the SDSGC higher education programs; advertise that fellowships encourage minority and women applicants.

***Outcome indicator:*** *Participation by women and minorities will equal or exceed 10% to minorities and 40% to females.* (See also C.1.4.1.)

**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.)

**Strategy B.3.6.1:** Develop and administer simple before-and-after surveys for faculty and students to assess their knowledge and attitudes about the Consortium, NASA, and STEM careers.

***Outcome indicator:*** *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

**Goal:** *To model diversity in all Consortium programs and activities, with an emphasis on Native Americans, which make up the state's largest minority group.*

**Objective C.1.1:** (Diversity in Management) 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 A.8.)

**Strategy C.1.1.1:** The Management Team will emphasize diversity in selection of participating organizations, programs, fellowships and scholarships, faculty awards, and future Management Team members.

***Outcome indicator:*** *Diversity will be modeled in all aspects of the Consortium and participation by underrepresented groups will meet or exceed the current diversity targets for women and minorities.*

**Strategy C.1.1.2:** The Management Team will conduct discussions with the Directors or staff of the Black Hills Workshop, ADVANCE in Brookings, the South Dakota School for the Deaf, and/or the South Dakota School for the Blind and Visually Impaired with the purpose of increasing NASA and STEM opportunities for the disabled and providing Space Grant funding to university students to work on engineering design projects that assist people with disabilities. (See also A.8.2)

***Outcome indicator:*** *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.*

**Objective C.1.2:** (Diversity in Fellowships and Scholarships) Ensure funding for fellowships and scholarships to women, underrepresented minorities, and persons with disabilities. (See also B.1.5.)

**Strategy C.1.2.1:** Utilize intensive marketing techniques (personal visits, direct faculty contacts, email) to encourage women and minority students to apply for funding.

***Outcome indicator:*** *Awards to women and minorities equal or exceed 10% to minorities and 40% to females.*

**Strategy C.1.2.2:** Offer fellowships to qualified Native American students at Tribal College affiliates.

***Outcome indicator:*** *At least three fellowships awarded annually to students at Tribal Colleges or to Tribal College students seeking to transfer to another SDSGC university.*

**Objective C.1.3:** (Diversity in Research Infrastructure) Increase the participation of women and underrepresented groups in statewide research programs and facilitate their subsequent entry into STEM careers. (See also B.2.6.)

**Strategy C.1.3.1:** Work with admissions officers at SDSGC academic affiliates and with SDSGC's network of K-12 and informal education contacts to improve recruitment of qualified female students and students from underrepresented groups.

***Outcome indicator:*** *SDSGC will sponsor at least 10 activities annually that encourage women and students from underrepresented groups to enter STEM careers, such as five*

*Women in Science Conferences, Flandreau Indian School Success Academy, NASA Explorer Schools, and Space Day.*

**Strategy C.1.3.2:** Assist in the placement of students from underrepresented groups in projects that provide hands-on research or design experience.

***Outcome indicator:*** *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.*

**Strategy C.1.3.3:** Longitudinally track progress of students from underrepresented groups in academic performance and research activities through first employment.

***Outcome indicator:*** *Annually use NSGF longitudinal tracking system to track 100% of SDSGC scholars and fellows.* (See also C.3.1.1.)

**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.)

**Strategy C.1.4.1:** Engage women and members of underrepresented groups in all aspects of the SDSGC higher education programs; advertise that fellowships encourage minority and women applicants.

***Outcome indicator:*** *Participation by women and minorities will equal or exceed 10% to minorities and 40% to females.* (See also B.3.5.1.)

**Strategy C.1.4.2:** Expand participation and support of geospatial and geoscience workshops, training, and related projects at Tribal Colleges.

***Outcome indicator****: Co-sponsor at least one Tribal College geospatial and geoscience initiative annually.*

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

**Goal:** *To use the Consortium's statewide network of scientists, engineers, and educators to provide talented students with a pathway to careers that will contribute to a highly-trained and diverse workforce for NASA and expand the nation's research and development capacity.*

**Objective C.2.1:** (Recruitment) Increase participation in SDSGC and the STEM workforce.

**Strategy C.2.1.1:** Support NASA and SDSGC educational outreach programs and workshops across the state.

***Outcome indicator****: Co-sponsor at least five precollege programs that encourage entry into the STEM workforce and participation in NASA and SDSGC.*

**Strategy C.2.1.2:** Promote participation in the STEM workforce through existing programs that target Native American college and precollege students such as the South Dakota GEAR UP Program, Flandreau Indian School Success Academy, and NASA Explorer Schools on Indian Reservations. (See also C.4.4.1.)

***Outcome indicator:*** *At least 200 Native American college and precollege students each year are informed of STEM workforce opportunities in NASA and SDSGC.*

**Objective C.2.2:** (Fellowships and Scholarships) Encourage students to enter the NASA pipeline and the STEM workforce through the SDSGC Fellowships/Scholarships Program.

**Strategy C.2.2.1:** Award fellowships and scholarships, in part, based on students' demonstrated interest in entering a NASA career or the STEM workforce.
***Outcome indicator:*** *One hundred percent (100%) of fellowship and scholarship awardees will be students planning to enter the STEM workforce or STEM education.*

**Objective C.2.3:** (NASA placement) Offer hands-on, tangible research experiences at NASA Centers to SDSGC student fellows.

**Strategy C.2.3.1:** Provide all SDSGC student fellowship applicants with information on NASA internships and coop programs and provide NASA Center Personnel Officers and University Affairs Officers with information on SDSGC student fellows.
***Outcome indicator:*** *At least two SDSGC student fellows will be placed in internships at NASA Centers each year.*

**Objective C.2.4:** (Industry placement) Increase industry participation in the SDSGC student programs and increase internships and job placement.

**Strategy C.2.4.1:** Provide SDSGC industry affiliates (including EROS-SAIC) and other aerospace industry contacts with information on SDSGC student fellows to promote internships or job placement.
***Outcome indicator:*** *At least two SDSGC student fellows will be placed in industry internships or jobs each year.*
**Strategy C.2.4.2:** Coordinate with the Governor's Office of Economic Development to place SDSGC student fellows in state industry internships through "Dakota Seeds" program. (B.1.3.2, B.3.3.2, B.3.4.1)
***Outcome indicator:*** *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.)

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

**Goal:** *To acquire and maintain accurate longitudinal data on all students and faculty who have received significant support from SDSGC in order to assess the impact of the support on the their education, career, and professional development.*

**Objective C.3.1:** (Longitudinal tracking – students) 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 B.1.6, C.1.3.3.)

**Strategy C.3.1.1:** Continue to participate in the National Space Grant Foundation's longitudinal tracking system so that all students provided with "significant support" from SDSGC (defined as over $1,000 in a single award) will be tracked in accordance with NASA's longitudinal tracking requirements.
***Outcome indicator:*** *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.*

**Objective C.3.2:** (Longitudinal tracking – faculty) All faculty who have received significant research, curriculum development, or travel assistance from SDSGC will be required to

submit reports on the impact of the award on research capacity, education, economic development, and professional development.

**Strategy C.3.2.1:** Develop and implement a simple, electronic reporting tool for gathering consistent data from faculty on funded activities and the impact of the activities.

***Outcome indicator:*** *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

**Goal:** *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.*

**Objective C.4.1:** (Management) Tribal College needs and priorities will be more effectively served by SDSGC programs.

**Strategy C.4.1.1:** SDSGC will actively seek representation from Tribal College faculty and staff on the Management Team. (See also A.8.)

***Outcome indicator:*** *At least one permanent or rotating member of the Management Team will be a representative of a Tribal College.*

**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.)

**Strategy C.4.2.1.:** Members of the Management Team will provide assistance to Tribal College students and advisors to help them develop competitive proposals for fellowships and scholarships.

***Outcome indicator:*** *Management Team staff will present fellowship/scholarship funding opportunities in the fall of each year to 100% of the STEM degree seeking students at Oglala Lakota College and Sinte Gleska University.*

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

**Strategy C.4.3.1:** Distribute NASA, SDSGC, and SD NASA EPSCoR research and education opportunities to SDSGC contacts at Tribal Colleges.

***Outcome indicator:*** *At least one research and education proposal submitted by Tribal College affiliates or in collaboration with Tribal College affiliates.*

**Strategy C.4.3.2:** Develop and maintain remote-sensing test sites that promote long-term interdisciplinary research and training collaborations among SDSGC institutions, Tribal College affiliates, and external partners. (See also B.2.4.2.)

***Outcome indicator:*** *SDSGC institutions acquire new remote sensing data or collaborate on use of existing data.*

**Strategy C.4.3.3:** Convene an annual Tribal College Research and Education Roundtable in cooperation with the state NASA EPSCoR Program and similar statewide programs. (See also B.2.3.3.)
***Outcome indicator:*** *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.*

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

**Strategy C.4.4.1:** Support programs that help prepare Native American students for Tribal College (or other post-secondary education) and programs that help students at Tribal Colleges to make a successful transition to advanced undergraduate and graduate STEM programs at other SDSGC affiliates. (See also C.2.1.2.)
***Outcome indicator:*** *Annually, SDSGC provides support for STEM programs in at least three Tribal College affiliates and tribal K-12 schools that provide college preparatory programs (e.g., St. Francis Indian School, SDSU/Flandreau Indian School Success Academy, SD GEAR UP, Consortium Development Grant with Minority Institutions, etc.).*
**Strategy C.4.4.2:** Promote NASA and industry student opportunities, such as internships, to students and advisors at Tribal College affiliates.
***Outcome indicator:*** *At least one Tribal College student is placed in a STEM internship or similar program each year.*
**Strategy C.4.4.3:** Support SDSGC's 2007 Consortium Development Competition project with Oglala Lakota College, which focuses on a "Badlands Rover" robotics project and preparing Tribal College students for entry into STEM master's-degree programs.
***Outcome indicator:*** *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:

**Elementary and Secondary Education – Educate and Engage**: Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers and faculty.

### D.1. Precollege Education

**Goal:** *To increase student awareness and access to educational 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.

**Strategy D.1.1.1:** Develop and maintain electronic databases and mailing lists of contacts in precollege educators in STEM fields. (See also A.6.1.)
***Outcome indicator:*** *Electronic databases of pre-college contacts updated as necessary.*

**Objective D.1.2**: (Partnerships) Facilitate partnerships for grant applications that aim to strengthen precollege STEM education.

**Strategy D.1.2.1:** Participate in preparation of proposals to NASA or other organizations that support precollege STEM education.
***Outcome indicator:*** *Annually, SDSGC members will participate in at least one precollege education proposal.*

**Objective D.1.3:** (In-service teacher training) Increase teacher capacity to effectively incorporate aerospace and earth science into the curriculum.

**Strategy D.1.3.1:** Provide professional development workshops for educators on topics related to aerospace and earth science.
***Outcome indicator:*** *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.*
**Strategy D.1.3.2:** Maintain "K-12 Educational Opportunities" section of the SDSGC website as a teacher resource directory.
***Outcome indicator:*** *Website is updated at least monthly.* (See also A.6.1)
**Strategy D.1.3.3:** Participate in NASA Explorer Schools Program.
***Outcome indicator:*** *Annually, at least one South Dakota school (preferably a Tribal school) applies for the NASA Explorer Schools Program.*

**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.

**Strategy D.1.4.1:** Present annual South Dakota Space Days event. (See also E.1.2.2.)
***Outcome indicator:*** *At least 2,000 people will attend "NASA South Dakota Space Days".*
**Strategy D.1.4.2:** Support organizations that provide K-12 students with educational and career opportunities in the fields of aerospace, earth science, and technology.
***Outcome indicator:*** *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.*

**Objective D.1.5:** (State standards) SDSGC will promote and support programs that align with state and national education standards.

**Strategy D.1.5.1:** Provide support for the "E-missions" Program, GEMS (Great Explorations in Math & Science) Program, and similar curriculum enhancement projects.
***Outcome indicator:*** *These teacher-training programs embrace state education standards in math, science, and language arts and will introduce at least 50 teachers to NASA and space science curricula annually.*

**Objective D.1.6:** (Diversity) Inspire and motivate women, underrepresented minorities, and persons with disabilities into STEM careers.

**Strategy D.1.6.1:** Support programs that inform, inspire, and motivate students from underrepresented groups about educational and career opportunities in the fields of aerospace, earth science, and supporting STEM disciplines.

***Outcome indicator:*** *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, SD GEAR UP, and related programs.*

**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.)

**Strategy D.1.7.1:** Develop and administer simple before-and-after surveys of participants' knowledge and attitudes about the Consortium, NASA, and STEM careers.
***Outcome indicator:*** *Adjustments are made to the precollege 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:

**Informal Education – Engage and Inspire**: Build strategic linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA's mission.

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

**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.

**Strategy E.1.1.1**: Maintain SDSGC webpage to provide the public easier access to the latest information about NASA and SDSGC activities.
***Outcome indicator:*** *Website is updated at least monthly.*
**Strategy E.1.1.2:** SDSGC will sponsor *StarDate* on South Dakota Public Radio with non-NASA funds.
***Outcome indicator:*** *NASA and SDSGC will be featured twice daily during the work week in space/science education broadcasts.*

**Objective E.1.2:** (Science and education events) The SDSGC will support activities of scientific discovery across the state.

**Strategy E.1.2.1:** SDSGC will support NASA's commitment to renewing a spirit of exploration and discovery and will use the excitement of space exploration to promote this policy to the general public.
***Outcome indicator:*** *Annually, SDSGC staff will produce and give at least five presentations to various public groups, and will generate press releases about Consortium activities.*
**Strategy E.1.2.2:** Present annual South Dakota Space Days event. (See also D.1.4.1.)
***Outcome indicator:*** *At least 2,000 people will attend "NASA South Dakota Space Days".*

**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.

**Strategy E.1.3.1:** Support programs that inform, inspire, and motivate members of underrepresented groups about the excitement of NASA missions.
***Outcome indicator:*** *Participants in South Dakota Space Days and science fairs will include at least 10% Native Americans and 40% females.*

**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.)

**Strategy E.1.4.1:** Develop and administer simple before-and-after surveys of participants' knowledge and attitudes about the Consortium, NASA, and STEM careers.
***Outcome indicator:*** *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.*