

**The National Space Grant Office requires two annual reports, the Annual Performance Data Report (APD – this document) and the Office of Education Performance Measurement System (OEPM) report. The former is primarily narrative and the latter data intensive. Because the reporting timeline cycles are different, data in the two reports may not necessarily agree at the time of report submission. OEPM data are used for official reporting.**

Alabama Space Grant Consortium  
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Director: Dr. John C. Gregory  
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Consortium URL: [www.uah.edu/ASGC/](http://www.uah.edu/ASGC/)  
Grant Number: NNX10AJ80H

## PROGRAM DESCRIPTION

The National Space Grant College and Fellowship Program consists of 52 state-based, university-led Space Grant Consortia in each of the 50 states plus the District of Columbia and the Commonwealth of Puerto Rico. Annually, each consortium receives funds to develop and implement student fellowships and scholarships programs; interdisciplinary space-related research infrastructure, education, and public service programs, and cooperative initiatives with industry, research laboratories, and state, local, and other governments. Space Grant operates at the intersection of NASA's interest as implemented by alignment with the Mission Directorates and the state's interests. Although it is primarily a higher education program, Space Grant programs encompass the entire length of the education pipeline, including elementary/secondary and informal education. The Alabama Space Grant Consortium is a Designated Consortium funded at a level of \$575,000 for fiscal year 2014.

## PROGRAM GOALS

The Alabama Space Grant Consortium has the following goals for FY2014 in support of the NASA Office of Education goals. The ASGC Strategic Plan, Vision, Mission Goals and SMART Objectives were redefined, approved and implemented by the ASGC Executive Management Committee in January, 2010. **Our Mission is:** *to inspire, enable and educate a diverse group of Alabama students to take up careers in space science, aerospace technology and allied fields; to play our part in assuring U.S. leadership in space exploration and aerospace technology in the future; to inspire the next generation of space explorers; to bring increased realization of the value of space science and technology to the people of Alabama; and to insure that our message and our programs reach all constituencies in the population of Alabama, especially those traditionally under-represented in the science and engineering professions.* **Our Vision is:** *an increased level of appreciation, participation and leadership by all the people of Alabama in the national and international space exploration and aerospace engineering enterprises.*

**Outcome 1 (Employ and Educate):** Programs contributing: Fellowship/Scholarship Programs, Research Infrastructure Programs and Higher Education Programs.

**a). Fellowship/Scholarship Program Goals:** Support and maintain our fellowship/scholarship program with high-caliber students; Recruit F/S at all 7 member Ph.D.-granting institutions; Each fellowship will be matched by another of equal value using local funds (approved and modified in 2013 to funding 1 full fellowship instead of 2 at each university – the ASGC will fund ½ and the university will fund ½); and Actively recruit and support students in STEM fields from traditionally under-represented groups at a rate consistent with NCES for Alabama. The diversity goals of the National program (40% women and 33% under-represented minority students) are in support of the National Center for Education Statistics (NCES) enrollment statistics.

**Fellowship/Scholarship SMART Objectives**

- 1). All 7 member Ph.D.-granting institutions will have recruited a minimum of 3 F/S per university in FY2014.
- 2). In FY2014, each affiliate will continue to match ½ of each fellowship it receives (\$18,500) with the other ½ fellowship to be administered by ASGC at the same value (\$18,500) and will maintain the \$37,000 stipend level to remain competitive with other Federal agencies. (*This brings an additional \$111K of non-Federal funds, not required by NASA, into the ASGC fellowship program.*)
- 3). All recruited fellow and scholar awardees in FY2014 will have a diversity target level of 33% minority (increased from 25% in 2012) and 40% female participants.

**b). Research Infrastructure Development Program Goals:** Support a significant number of motivated students and mentors for a wide range of experiences in internships at NASA centers and collaborating industry; Recruit a diverse cadre of students to work on mentored research projects at our established REU Programs at Alabama universities; Ensure all REU projects funded with NASA funds shall be aerospace science and technology or STEM focused; Support under-represented faculty/faculty from our MSI members at research opportunities at NASA field centers; and Actively recruit and support students and faculty in STEM fields from traditionally under-represented groups at a rate consistent with NCES for Alabama. Alabama diversity goals are 40% women and 33% under-represented minorities consistent with NCES enrollment statistics.

**Research Infrastructure Development SMART Objectives**

- 1). A diverse group of 8 students from Alabama Universities will be placed as interns at NASA centers and collaborating industry in FY2014.
- 2). A diverse group of 24 students will be recruited to work on mentored research projects at 3-4 Alabama universities via our REU Programs in FY2014.
- 3). 1 under-represented faculty or 1 faculty from our MSI members will be placed at a research opportunity at a NASA field center in FY2014.
- 4). All recruited research infrastructure development participants in FY2014 will have a diversity target level of 33% minority (was 25% in 2012) and 40% female participants.

**c). Higher Education Program Goals:** Support special courses in Space Hardware Building and Project Management; Maintain and grow student *Building Space Hardware* programs throughout the State of Alabama; and Actively recruit and support students in STEM fields from traditionally under-represented groups at a rate consistent with NCES for Alabama (40% women and 33% underrepresented minority students).

**Higher Education SMART Objectives**

- 1). Initiate or continue 3 special courses in Space Hardware Building and Project-Management at 3 Alabama universities in FY2014.
- 2). Maintain 15 student building space hardware programs at 6 universities in FY2014, including 4 programs at 2 HBCU's.
- 3). Initiate 1 new student space hardware program at 1 university or CC in FY2014.
- 4). All recruited higher education participants in FY2014 will have a diversity target level of 33% minority (increased from 25% in 2012) and 40% female participants.

**Outcome 2 (Educate and Engage): Precollege Education Program Goals:** Support a select set of projects and events that emphasize the development of K-12 teachers, particularly in pre-service and in-service program areas, which encourage young students to prepare for STEM careers; Leverage funds with larger contributions from other sources; Focus on in-service and/or pre-service teacher training that results in deeper content understanding and/or competence and confidence in teaching STEM disciplines; Support science education needs in underserved schools; Support NASA Education programs; Evaluate programs to insure continuous improvement; and Direct programs to under-represented and underserved populations.

**Precollege Education SMART Objectives**

- 1). 3 in-service and/or pre-service teacher educators will attend teacher educator workshops in FY2014.
- 2). In FY2014, 2 state Regional Science Olympiad and Science Fairs that are supported by the ASGC and held annually at the lead-institution will have over 1,500 participants.

**Outcome 3 (Engage and Inspire): Informal Education Program Goals:** Actively engage members of the public from traditionally underrepresented groups; Bridge the gap between Land and Earth Grant research and geospatial technology and societal needs in Alabama; Leverage funding; Engage college students in informal education initiatives; and Track impacts and evaluate programs success via quantitative and qualitative methods to insure continuous process improvement.

**Informal Education SMART Objectives**

- 1). 1 training workshop on satellite remote sensing and Geographic Information Systems (GIS) technology will be offered in FY2014 by 1 Alabama University.
- 2). In FY2014, support 1 Alabama science center/museum with outreach and teacher education projects.
- 3). Require each group that receives ASGC funding to provide a plan to deliver outreach activities in FY2014.

**PROGRAM/PROJECT BENEFIT TO OUTCOME (1,2, and 3)**

- 1). **Aligns to Outcome 1 & 2:** *“While my career in the Air Force has been put on hold, I have found the opportunity of a lifetime to work at Firefly Space Systems, a start-up company building low cost rockets to LEO and dramatically changing the launch landscape.”* (Scott Carnahan, 2013-14 Space Grant Scholar, Auburn University).
- 2). **Aligns to Outcome 1 & 2:** *“My participation in the Alabama Space Grant has provided me with an invaluable glimpse inside of NASA and an extremely rare and unique opportunity to experience 'weightlessness' and understand the benefits the lack of gravity can play in the scientific field.”* (Antoine Smith, 2013 & 2014 Tuskegee University Microgravity Program in partnership with NASA JSC).
- 3). **Aligns to Outcome 3:** *“Since graduation I have not played a role directly in the aerospace industry, but I am teaching high school students about math and working to*

*develop a love and appreciation for the math that was used to create so many of the technologies we enjoy today. I hope to fill them with appreciation for math and the sciences and to develop a love to become personally invested in the creation of new technologies through the math and science fields.”* (Katelynn Hanna, 2014 Space Grant Teacher Education Scholar, Auburn University).

## **PROGRAM ACCOMPLISHMENTS**

***Outcome 1: Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals: (Employ and Educate).*** ASGC funded 109 "significant" student awards: 53 F/S, 48 REU students and 6 student interns at NASA Centers; and 2 HE student participants. Of the 109 awards, 49 were made to under-represented, minority students (44.95%) which exceeds the 33% ASGC target, and an increase of 11.65% from FY2013; 48 awards to females (44%) which exceeded our 40% target. ASGC's Fellowship (Master's/Doctoral) and Scholarship (Junior/Senior/Teacher Educator) Programs provides financial support to students pursuing STEM degrees. Pre-service teacher educator scholarships are given to students pursuing licensure in STEM. These programs engaged students in hands-on, aerospace-related research projects and activities, and facilitated the development of mentor relationships between students, faculty and the NASA community.

**Fellowship & Scholarship (F/S):** A total of 53 "significant" F/S were awarded and longitudinally tracked. 6 Fellowships for Graduate Students (5 Doctoral; 1 Masters). 42 Undergraduate Scholarships (25 Sr.; 17 Jr.). 5 Scholarships for Pre-Service Teachers in STEM (4 Sr.; 1 Jr.). All 7 member Ph.D.-granting institutions recruited and awarded fellows/scholars in FY2014 (AAMU, 2 students, AU, 9, UA, 9, UAB, 4, UAH, 10, USA, 8 & TU, 11 students). Each member matched ½ of each fellowship it received, bringing an additional \$111K of non-Federal funds into this program. Of the 53 F/S awards, 22 were to under-represented students (41.5%), and 25 were made to female students (47%).

**Higher Education (HE):** Provided support for 2 "significant" participants and 675 other students in HE programs. HE programs are innovative student-led, hands-on student experiences in STEM disciplines at Alabama universities including space hardware building special courses, Sr. Design courses and project management. Provided continued support for 3 revised special courses in Space Hardware Building and Project Management. Provided support for **25 Students Building Space Hardware Programs, or SSP's**. These SSP's were in the following areas: BalloonSat, CanSat, CubeSat, Design/Build/Fly, Hovercraft, KSC Robotic Mining, MSFC Rover Challenge, and MSFC Student Launch (rockets) at 6 universities (AAMU, AU, UA, UAH, USA, and TU) and 3 CC's (Bevill, Gadsden, and Shelton State). This included 4 programs at 4 HBCU's (Human Rover, BalloonSat and Student Launch at AAMU, CubeSat and Microgravity at TU, Microgravity at Gadsden State and Robotic Mining at Shelton State). ASGC supports SSP's at CC's: Bevill, Gadsden, and Shelton State all have SSP's. We established new HBCU CC partnerships with Bishop and J.F. Drake State in FY2014. ASGC supports a Bridge Program at Shelton State CC with UA's Robotic Mining team.

**Research Infrastructure (RI):** Provided support for a diverse group of 48 "significant" longitudinally tracked participants and 14 other student participants in RI programs such as the Research Experiences for Undergraduates programs (REU's) and student research internship programs. Students were directly funded on mentored research projects at 3

Alabama universities (UAB, UAH & USA) via our REU Programs. 23 under-represented (48%) and 20 females (41.6%) were included. We supported 6 HE students as interns (2 female, 4 male, 4 under-represented minorities) in the summer of 2014 at NASA Centers. We missed our target objective (by 2) of 8 student interns.

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

**Precollege:** Provided support for a 1-week summer program that targeted under-represented, underserved female H.S. students (32 students) from the greater Mobile area through an outreach program involving Bioengineering and Chemical Engineering (BEACHES) at USA. Supported a yearlong program using problem-solving using The Mobile Mathematics Circle specifically targeted under-represented, underserved middle and H.S. students from Mobile County (128 students from 16 schools). This program also organized a Mobile Math Olympiad. Supported 456 middle/high school students in the 2015 N. Alabama Science Olympiad held on February 28 at UAH. Supported 354 K-12 student projects from schools in 9 counties in N. Alabama to compete in the N. Alabama Regional Sci. and Eng. Fair (NARSEF) on March 11-12, 2015 at UAH. Provided support for 232 student projects in various categories of science and engineering projects from middle/high schools from all 67 counties from the state of AL to participate in the 2015 Alabama Science and Engineering Fair (ASEF) on April 2-4, 2015 at UAH. We shall support 3 middle/high school in-service teachers to attend the LiftOff 2015 Summer Institute in Houston, TX managed by the Texas Space Grant Consortium in collaboration with NASA JSC on June 28-July 2, 2015. All ASGC-funded team projects such as NASA Student Launch Competition and our ASGC F/S programs require outreach components. All ASGC outreach programs target under-represented and underserved K-12 students and educators from the state.

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

**Informal Education:** ASGC provided funding for attendees to participate in the NDIA/AIA/BHEF Huntsville STEM Call-to-Action Forum. The purpose was to foster regional and statewide communication and to develop operational concepts for collaboration to enhance and expand the future STEM workforce and to provide guidance and resources for other states looking to establish or grow a STEM network. 1 training workshop on Geosciences and Remote Sensing was hosted by AAMU with 74 participants in attendance from AL, TN, LA and MS. 1 workshop on Sustainable Fuels: Production and Combustion was supported at UA's Institute for Sustainable Energy on July 24, 2014. Supported community outreach project called "2015 Rocket City WeatherFest" at UAH. Supported Von Braun Astronomical Society's "Astronomy Day" as a public outreach event on October 4, 2014. Participated in the AL/LA/MS/SC "Grad Lab" event on September 12-12, 2014 at UAH.

## PROGRAM CONTRIBUTIONS TO NASA EDUCATION PERFORMANCE MEASURES

•**Diversity:** ASGC's Associate Director, Dr. Teresa M. Orok (under-represented female), is from AAMU along with our Campus Director, Dr. V. Trent Montgomery (under-represented). Our Campus Director, Dr. Gregory Murphy (under-represented), represents

TU. The Campus Director for Bishop State CC is Dr. Latitia McCane (under-represented, female), the Campus Director for Gadsden State CC is Ms. Audrey Webb (female), the Campus Director for J.F. Drake State is Mr. Karl Henry (under-represented) and the Campus Director for Shelton State CC is Ms. Renea Randle (female). Both AAMU and TU have members on the ASGC's Policy Advisory Council.

**•Minority-Serving Institution Collaborations:** In ASGC 2 of the Full Members are HBCU's and several CC affiliates are MSI's. AAMU and TU propose students for F/S just as UA and AU do. All members and affiliates, whether MSI's or not, must submit competitive proposals to be eligible for funding for any of our programs, such as MSFC SL (rockets), Rover Challenge, BalloonSat, etc. The record shows that they have consistently and successfully participated in these competitive programs. Another way we reach out to MSI's is through workshops. For example on January 29<sup>th</sup> – February 1<sup>st</sup>, 2015 we helped NASA MSFC Education Office in supporting 87 participants at the NASA BalloonSat Workshop for MSI CC STEM majors within a 5-state region (SE).

***Our MSI member universities are:*** Alabama A&M University and Tuskegee University.

***Our MSI affiliate Community and Technical Colleges are:*** Bishop State, Gadsden State, J.F. Drake State and Shelton State. ASGC's collaborative interactions and programs with MSI's include:

- F/S programs at AAMU (2 students-1 fellow, 1 scholar) and TU (11 students–11 scholars). Of the 53 F/S awards distributed, 22 awards were made to under-represented minorities (41.5%), and 25 awards were made to females (47.16%).
- BalloonSat program at AAMU, Drs. Trent Montgomery/Monday Mbila.
- NASA Rover Challenge Program at AAMU, Dr. Aaron Adams.
- High powered rocketry program (NASA Student Launch) at AAMU, Dr. Wing Chen.
- Geoscience and remote sensing workshop at AAMU, Dr. Kaveh Heidary.
- Microgravity and CubeSat Programs at TU, Dr. Javed Khan.
- Bridge Program to place students on the UA Robotic Mining team at SSCC, Ms. Renea Randle, Shelton State/Dr. John Baker, UA.
- Engineering Day at Shelton State CC (April 16, 2015), Ms. Renea Randle organizes a half-day seminar at the end of the spring semester where the students will give presentations detailing their experiences at UA.
- STEM Day at AAMU (April 11, 2014). AAMU hosts a poster session, panel discussion on STEM, STEAM and STEMAH as well as MSFC Rover Challenge, MSFC Student Launch and BalloonSat demonstrations.
- 5 years ago, ASGC began a program to systematically add CC's as active affiliates. We have Student Space Hardware programs now at Gadsden, Shelton and Beville State CC's. In 2014, we added a 3 new active affiliates, Faulkner, Bishop and Drake State (2 of these are MSI's). Alabama's CC System enrolls half of all freshmen and sophomores in the state, and 36% of those are minority students and 60% women. These new affiliate CC's will be collaborating on a program that will help us improve the participation of women and minorities in the STEM workforce.
- Various competitions such as the MSFC Student Launch Competition and our ASGC F/S programs require outreach components. All ASGC outreach programs target under-represented elementary, middle and HS students and educators in the state.

**•NASA Education Priorities:**

- *Authentic, hands-on student experiences in science and engineering disciplines* – Student experiences include: *Hands-on student experiences Students building Space Hardware Programs, or SSP's, are a major emphasis of the ASGC program. In 2014 we had 25 such programs at 8 campuses (3 of which are MSI's) plus 3 REU programs and the NASA Internship program. All these REU programs and SSP's are authentic hands-on student experiences in STEM fields.* ASGC provided support to 6 interns as participants in a hands-on experience at NASA Centers and 50 student REU program experiences at state universities in FY2014.
- *Engage middle school teachers in hands-on curriculum* – On May 7, 2014, 400 K-12 STEM educators attended a workshop at UAH. We plan to send 1 middle school educator to the “Liftoff Summer Institute” in Houston, TX on June 28-July 3, 2015 which is managed by the Texas Space Grant Consortium with NASA JSC.
- *Summer opportunities for secondary students on college campuses* – Supported 48 girls at UAH’s “Tech Trek” which is a week-long residential camp to promote interest in STEM fields and careers among rising eighth-grade girls.
- *Community Colleges* – 5 years ago, ASGC began a program to systematically add CC’s as active affiliates. We have Student Space Hardware programs now at Gadsden, Shelton and Beville State CC’s. In 2014, we added a 3 new active affiliates, Faulkner, Bishop and Drake State (2 of these are MSI’s).
- *Aeronautics research* – Supported 2 students (1 female/UAH and 1 male/UA) to attend the 2014 Aircraft Readiness Wkshp. in Havelock, NC Fleet Readiness Center.
- *Environmental Science and Global Climate Change* – Supported a community outreach project called “2015 Rocket City WeatherFest” at UAH. Attendees saw weather research vehicles and listened to the AL State Climatologist, Dr. J.Christy.
- *Enhance the capacity of institutions to support innovative research infrastructure activities* – Our Alabama NASA EPSCoR program provides the bulk of seed funding for junior faculty throughout the state.

## IMPROVEMENTS MADE IN THE PAST YEAR

- *Distinguished Public Service Medal* – ASGC Director was awarded NASA’s highest form of recognition that is bestowed to individuals whose distinguished service, ability, or vision has personally contributed to NASA’s advancement in the U.S.’ interests. He received this award mainly due to his service with the Space Grant Program.
- *Community/Technical College Transfer Program* - ASGC was awarded funding for “**ASCENT: Alabama Space grant Community-college Engineering Transfer Program**”.
- *Improvement Plan* – ASGC submitted a Consortium Improvement Plan to NASA in December 2013. This included Goals, SMART Objectives, and a timeline consistent with the goals stated in our previous proposal to accomplish this. We submitted a follow-up plan in February 2015.
- *Continued Space Grant Leadership Role* – ASGC Director was elected Vice Chair of the National SG Alliance in FY2011 and then Chair 2012-2015.

## PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

### Affiliate and Management Council/Team Members (7)

- **The University of Alabama in Huntsville (UAH)** – (Public, research, Ph.D. degree

granting university). Drs. Gerald Karr and Francis Wessling, Professor Emeritus and Professor, Dept. of Mechanical and Aerospace Engineering serve as the Co-Campus Directors/Members of the Management Council. UAH is also the **lead institution**

•**Alabama A&M University (AAMU)** – (Public, research, HBCU, minority serving, Ph.D. degree-granting university). Dr. V. Trent Montgomery, Professor, Dept. of Electrical Engineering, is Campus Director/Member of the Management Council.

•**Auburn University (AU)** – (Public, research, Ph.D. degree-granting university). Dr. David Beale, Professor, Dept. of Mechanical Engineering is Campus Director

•**The University of Alabama (UA)**. (Public, research, Ph.D. degree-granting university). Dr. John Baker, Professor and Dept. Head, Dept. of Aerospace Engineering and Mechanics serves as the Campus Director/Member of the Management Council.

•**The University of Alabama at Birmingham (UAB)**. (Public, research, Ph.D. degree-granting university). Dr. Yogesh Vohra, Professor and University Scholar, Dept. of Physics and Associate Dean of the College of Arts/Sciences serves as the Campus Director/Member of the Management Council.

•**University of South Alabama (USA)**. (Public, research, Ph.D. degree-granting university). Dr. John Steadman, Professor and Dean, College of Engineering, serves as the Campus Director/Member of the Management Council.

•**Tuskegee University (TU)**. (Private, research, HBCU, minority serving, Ph.D. degree-granting university). Dr. Gregory Murphy, Professor and Dept. Head, Electrical and Computer Engineering, is Campus Director/member of the Management Council.

#### **Minority Serving Institutions (6)**

•**Alabama A&M University, Tuskegee University, Bishop State Community College, Gadsden State, J.F. Drake State Community & Technical College and Shelton State Community College** are MSI's (as well as HBCU's).

#### **Community Colleges (CC) (6)**

•**Bevill State Community College**. (Public, 2-year, associate degree-granting CC). Ms. Maurice Ingle, Instructor, Drafting Design Engineering Tech. Dept., Campus Director.

•**Bishop State Community College**. (Public, 2-year, associate degree-granting, HBCU). Dr. Latitia McCane, Dean of Instructional Services, Education Div., Campus Director.

•**Faulkner State Community College**. (Public, 2-year, associate degree-granting CC). Mr. Tremaine Pimperl, Division Chair, Math and Pre-Engineering, Campus Director.

•**Gadsden State Community College**. (Public, 2-year, associate degree-granting CC, MSI). Ms. Audrey Webb, Advisor/Instructor, Electronics Division, Campus Director.

•**J.F. Drake State Community & Technical College**. (Public, 2-year, associate degree-granting community and technical college, MSI). Mr. Karl Henry, Division Chair for Engineering Technologies/Electrical Engineering Tech. Instructor, Campus Director.

•**Shelton State Community College**. (Public, 2-year, associate degree-granting CC, MSI). Ms. Renea Randle, Instructor, Mathematics Dept., serves as Campus Director.

**Government Affiliates:** include the NASA MSFC, the Alabama Mathematics, Science, Technology and Engineering Coalition for Education (AMSTEC). We partner with them on various projects and programs such as running Advanced Rocketry and BalloonSat Workshops and managing the NASA Academy, NASA Propulsion Academy and NASA Robotics Academies during the summer for MSFC. Our contact at MSFC is Dr. Frank Six, University Affairs Officer. Alabama Mathematics, Science, Technology and Engineering Coalition for Education (AMSTEC). **Non-Profit/State:** AMSTEC works

closely with the State Dept. of Education to improve math/science teaching statewide and systematic change of STEM education. **Industrial partnerships**: include The Boeing Company, Dynetics, Inc., National Technical Systems (formerly Wyle Laboratories), STI Electronics, Inc., ADTRAN, Teledyne Brown Engineering and ATK Aerospace Group. **Outreach partnerships**: include the U.S. Space and Rocket Center and Sci-Quest Hands-on Science Center. We partner with the USSRC and Sci-Quest on various K-12 teacher training and informal education projects.

*Note: This information may be revised when additional reporting data is collected/ reported into the OEPM system.*