NASA Space Program 2014 : FLORIDA SPACE GRANT CONSORTIUM

High School Students from Spain and the United States Participate in STEM Program for High Schoolers

Gainesville, Florida

Fifteen local high school students from Alachua County have been selected to participate in a NASA sponsored program that will allow them to partner and team up with their peers from Spain and participate in a state of the arts space technology project. Because of their interest in STEM related fields (Science, Technology, Engineering and Mathematics) and strong academic backgrounds in each area, they will have the opportunity to collectively design, build and fly scientific and engineering payloads on a weather balloon- making this program the first of its kind in the world.

The second stage of the project is to introduce high school students to the payloads technology for small satellites in three main areas: Physical Sciences (including Physics, Chemistry, Astronomy and Geology) Life Sciences and Engineering.) Students from Eastside High , Gainesville High, Buchholz High, and Santa Fe High School are participants in the program and are in grades 9-12. They are : Jasmyn Bryant (EHS), Brandon Morgan(EHS), Justin Dean(EHS), Nazandria Burney(EHS), La'Shayvia Searcy(EHS), Shantyavia Searcy(EHS), Romario Brown(EHS), Nathaniel Hagley(BHS), Kiara Williams (EHS), Nicholas Simmons(GHS), Jahirah Williams (SFHS), Lynnetta Bryant (EHS), Naomi Wims (EHS) Maria Carsaquilla (EHS) , and Terrell Quaterman (EHS).

While all selected students will have a learning experience of a lifetime, the winning team of six students, together with their teachers from Spain and Florida, will be named NASA Florida Space Ambassadors and invited to build their payloads during the final stage for launching at Cape Canaveral. The winning teams will also participate in a one week summer school at The University of Florida and one week at Kennedy Space Center for Space Education.

Congratulations to our local students and staff who are representing our city and our country and building on their academic skills and international learning experiences. Program staff include:

1.NASA Space Program Instructor: Ms. Pam Minniefield, Eastside High School Teacher *United States

2.NASA Educational Partner and Program Coordinator: Dr. Karen Cole-Smith, Santa Fe College Office of Community Outreach and East Gainesville Instruction

3.Dr. Reyes, Francisco , University of Florida, Department of Astronomy, College Professor

4.Dr. Jaydeep Mukherjee Florida Space Grant Consortium, Program Director

5.Ms. Sreeli Mallick Florida Space Grant Consortium , Program Consultant

6. NASA Space Instructors Orial Sans and Francisco Ocana * Spain

Overview

SPAIN-FLORIDA SPACE EDUCATION INITIATIVE

YOUNG MINDS. BIG IDEAS. SMALL SATELLITES.

SATLANTIS and the NASA Florida Space Grant Consortium (FSGC) propose to organize a space-related education program for high school students (15 to 16 years old) from Spain and Florida that involves designing, building, and flying scientific and engineering payloads. The final stage of this education program will include launching student payloads at an altitude of 100,000 feet using a weather balloon from a location adjacent to the Kennedy Space Center.

ES-FL SPACE EDUCATION INITIATIVE

Our initiative involves a three-stage process that will introduce joint teams of high school students in Spain and Florida and their teachers to the small satellite technology, and will culminate with a prestigious Summer School. The target age of the students is 15 to 16 years old. The main purpose is to grow interest and steer high school students to STEM-related fields (Science, Technology, Engineering, and Mathematics) by implementing an extensive hands-on competitive program based on designing, building and flying scientific and engineering payloads on a weather balloon. Eventually, these payloads will be included in small satellites and launched using sounding rockets. The final stage of this program will allow the winning teams to build their payloads in Florida, and launch them from a location adjacent to the Kennedy Space Center. The cultural exchange of this international program combined with the educational knowledge in state-of-the-art space technology makes this program the first of its kind in the world.

FIRST STAGE: TEACHER TRAINING

The first stage is to train the teachers at each participating high school. Through web-based communications, interested teachers from each high school will be trained on how to implement the design phase in their respective schools and how to assist and mentor the students who will take part in the project during the school term. NASA guest lecturers, design specialists, and instructors from SATLANTIS and FSGC will conduct the training to the teachers online. The training will familiarize the teachers with flying scientific and engineering payloads on a weather balloon or sounding rocket. Design parameters and payload objectives will also be established for the next phase of the program, which will include guiding and supervising students to produce a competitive design. The teachers will also be given the tools needed to accomplish the design phase. All lectures will be offered online support by instructors from SATLANTIS and FSGC on a bi-weekly basis from September to December.

SECOND STAGE: COMPETITIVE DESIGN

The second stage is to introduce high school students to the payloads technology for small satellites in three main areas: Physical Sciences (including Physics, Chemistry, Astronomy, and Geology), Life Sciences, and Engineering. The program will be carried out by the teachers who completed the first phase with weekly online support from the instructors at SATLANTIS and FSGC. Teachers will be in charge of mentoring, instructing, and supervising the proposals for payloads to be carried out by joint FL-ES teams of six students each (three students from Florida

and three students from Spain). Students will regularly interact through web based methods (e.g., chat, video chat, shared cloud folders, etc.) to discuss the projects at their respective schools. In addition to the design proposal, students will be asked to provide educational engagement in their local community (e.g., presenting their ideas to younger students, giving public talks, etc.). This phase will span from January to April. At the end of the spring term, the instructors from SATLANTIS and FSGC will review all proposals and select the top three designs (ideally, in each of the three areas) to move on to the next stage of the competition. The three teams of six students, together with their teachers (one from Spain and one from Florida per team) will be named Florida Space Ambassadors, and invited to build their payloads during the final stage.

THIRD STAGE: SUMMER SCHOOL

The final phase is a two-week Summer School organized by FSGC for the winning joint teams of students and their teachers (eighteen students and six teachers). It will be conducted at the Space Life Sciences Building in the Exploration Park, adjacent to NASA Kennedy Space Center, where the students will build and assemble their payloads that will be flown on a weather balloon on the last day of the workshop. The Space Life Sciences Laboratory houses scientists and engineers from NASA Kennedy Space Center, Dynamacs, Bionetics and the University of Florida. The students will have the opportunity to meet these scientists. The students and their teachers will be housed in Cocoa Beach, and will be bussed to the workshop every day. Personnel from Atlantis Educational Services, based at the Kennedy Space Center Visitor Complex, will run the workshop. They will be assisted by Mr. Harold Donald who has over 20 years experience with the Airforce. In addition, guest lecturers from the Kennedy Space Center, space industry and Florida universities will update the students on the space program at NASA and the US. Various career and educational opportunities available in STEM-related fields will also be explored. The students will get a chance to tour the Kennedy Space Center, the Cape Canaveral Air force Station, and possibly the Space X launch pad.

PILOT PROGRAM

The initial stage of this education initiative will be a pilot program that will involve five teams from one high school in Florida and Talentum Schools programs in Barcelona and Madrid. Each of the teams will consist of six students (three each from Florida and Spain) and two teachers (one each from Florida and Spain).

Once all the materials and website are ready, teacher training will begin by mid-January. This gives the coordinators about 8 weeks to train the six teachers (two from Florida and four from Spain) through a series of online video interactions. The online interactions will include use of the following free video conferencing programs: (i) Skype, (ii) Google Hangout, and (iii) Oovoo (free video chat for up to 12 participants). We anticipate meeting on a bi-weekly basis for the teacher training component of the project.

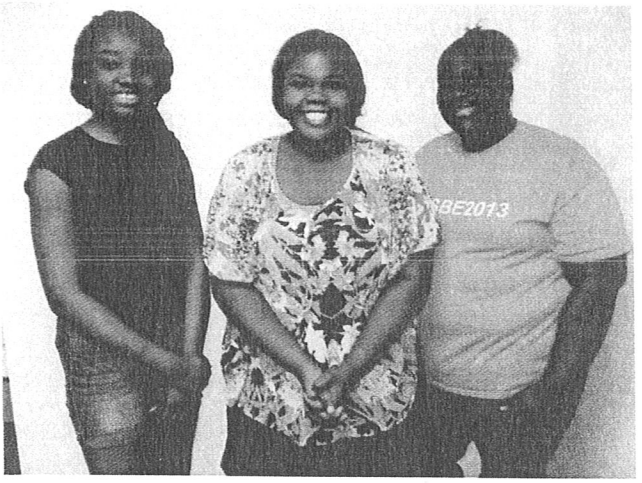
During the second stage of the program, we will introduce high school students to the payloads technology for small satellites in three main areas: Physical Sciences (including Physics, Chemistry, Astronomy, and Geology), Life Sciences, and Engineering. The program will be carried out by the teachers who completed the first phase with weekly online support from instructors at FSGC. Teachers will be in charge of mentoring, instructing, and supervising the

proposals for payloads to be carried out by joint FL-ES teams of six students each (three students from Florida and three students from Spain). Students will regularly interact through web-based methods (e.g., chat, video chat, shared cloud folders, etc.) to discuss the projects at their respective schools. In addition to the design proposal, students will be asked to provide educational engagement in their local community (e.g., presenting their ideas to younger students, giving public talks, etc.). This phase will span from March to May. At the end of the spring term, the two coordinators will review all proposals and select the top design to move on to the next stage of the competition. The winning team (three students from Spain and Florida) along with the two teachers will be invited to build the final payload during a two week workshop in Florida.

The first week of the two-week workshop will be held at the University of Florida in Gainesville and involves building the payload based on the winning design. During the second week, the team will relocate to the NASA Kennedy Space Center area where they will integrate their payload on the weather balloon for launch and subsequent data analysis. This workshop will be held at the Space Life Sciences Lab (SLSL). The Space Life Sciences Lab serves as the primary gateway for payloads bound for the International Space Station. The facility also accommodates a number of commercial entities pursuing innovative research activities. A wide range of aerospace firms operate at the SLSL, including the Center for the Advancement of Science in Space (CASIS), NASA, Dynamac Corporation, Molecular Power Systems, Cella Energy, Innovative Health Applications, Bionetics, QinetiQ North America, Kentucky Space and Space Florida. During the stay at the Kennedy Space Center area (Cocoa Beach) we plan an educational visit to KSC operating labs and a tour of the Visitor Complex.

Alpha TEAM

Elena López-Contreras, Pau Villa, Laia Villacorta, Lashayvia Searcy, Kiara Williams, Nazandria Burney



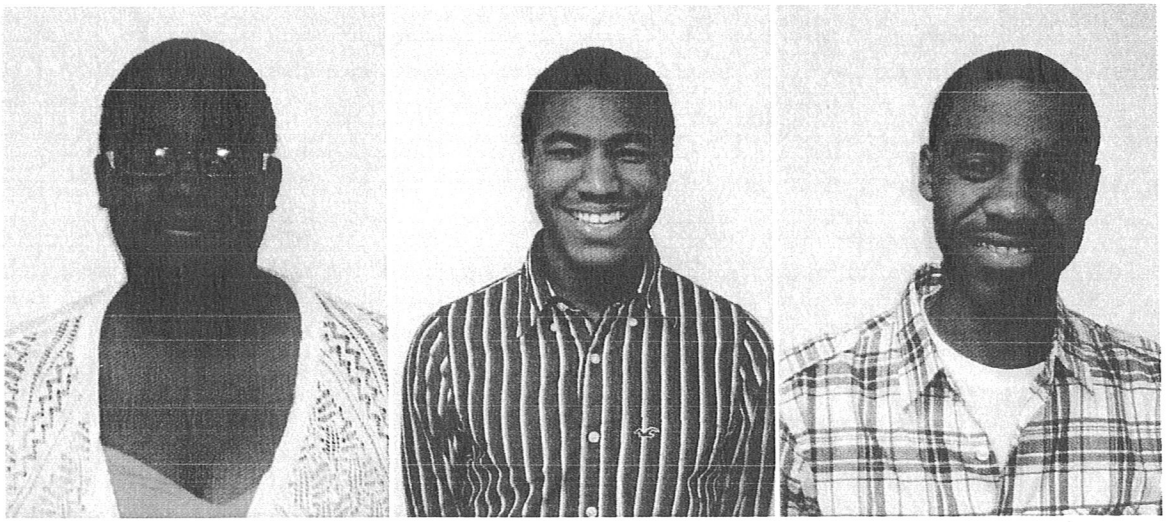
Kiara Willams, Nazandria Burney, Lashayvia Searcy created a proposal with teammates from Spain to find the differences in cancer cell viability when they are in microgravity conditions and also to see the effects of a drug. The team will conduct an experiment using a weather balloon by applying microgravity directly into a tumor and testing the effects of a drug in microgravity to see the cellular structure. The importance of the research is to help researchers find a way to fight against cancer, by finding an alternative way to defeat cancer. The exploration of cancer cells in microgravity is an unexplored scientific field, so the project will lead other researchers to use microgravity in cancer treatment.

The team will make a simulation of the hit of a box with petri cases inside the floor, protecting the flasks inside the satellite, using GPS systems to collect the data retrieved. The results will be shared with the scientific community to lead to further experiments and cancer research in the field.

http://alphasatlab.blogspot.com/

Bravo TEAM

Ramorio Brown, Gabriel Echenique, Nicolás Gómez , Nathaniel Hagley, Rocío Jado, Shantayvia Searcy



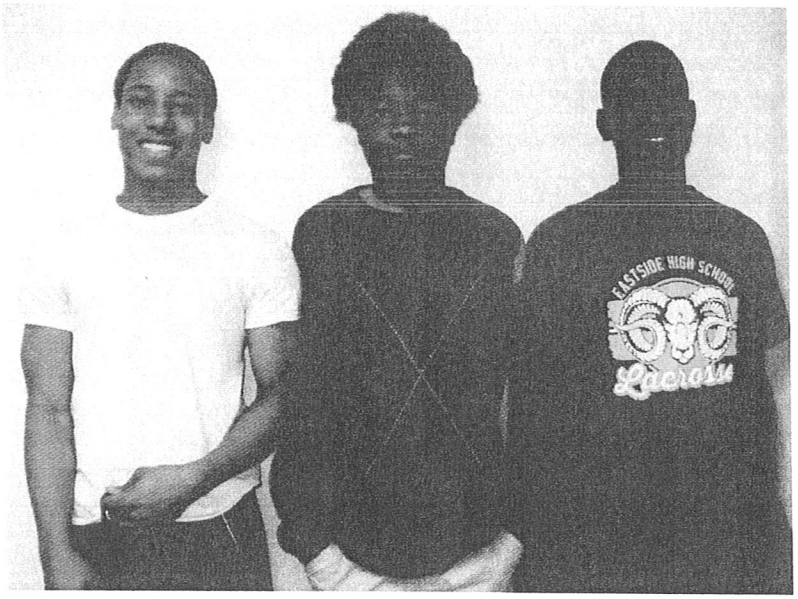
Shantayvia Searcy, Nathaniel Hagley, Romario Brown created a proposal with teammates from Spain to determine the number of stars in the sky. They proposed to use the stars as a reference system therefore not minding the brightness emitted through each of the stars. They looked at how many stars emit enough photons to be perceived by a camera with an exposure time determined. The team will ask the questions of " What is the distance that separates us from the stars?" When the altitude increases, does the number of stars you observe increase linear, exponential or in a random way? Can we contribute the composition of the atmosphere on the number of stars using temperature, density or pressure? Will the pollution be uniformly distributed?

The team will create an experiment which will consist of photographing the stars at different heights while the meteorological balloon will go up and make a count of the number of stars that appear in the photo and analyze the results. The team hopes to serve as an awareness campaign and use the experiment for the future concerning pollution and detecting other contaminates--seeking a relationship between distance and number of stars. The team will collect data from an Arduino, a computer and 3 cameras accompanied by a stabilization system and publish the information on a blog.

http://bravosatlab.blogspot.com/2014/05/satlab-bravo-team.html

Charlie TEAM

Gabriel Echenique, Nicolás Gómez, Rocío Jado, Terrell Quarterman, Nicholas Simmons
Jahirah Williams



Nicholas Simmons, Jahirah Williams, Terrell Quaterman created a proposal with teammates from Spain to answer the question, " How does the environment affect the power generation by solar cells in the space and other planets?" The team will conduct an experiment using several photovoltaic cells in which they will introduce them in the payload of a weather balloon and their electricity production will be measured. This will be covered with different colored filters so that only certain wavelengths are absorbed. After the information is collected, they will be used for sketching a spectrograph creating different graphs answering the initial questions. Solar cells are widely used for powering satellites and other aircraft. This technology is under investigation. The stratosphere is even possible to simulate the conditions of other planets in order to observe how their performance can be affected by environmental conditions.

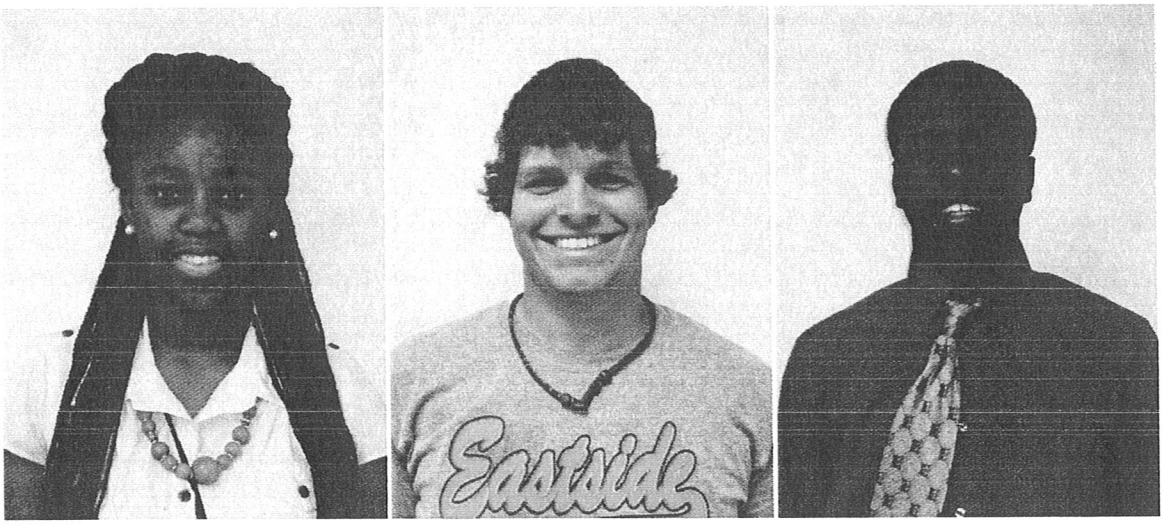
The team will use a microcontroller, filters, spectrogram, cameras and GPS system to retrieve data and share this data with others via internet and video.

https://sites.google.com/site/charlieteamsatlab/

http://satlabteams.blogspot.com.es/

Delta TEAM

María Alcerreca, Jasmyn Bryant, Justin Dean, Adrián Mora, Brandon Morgan
Ignacio Sánchez



Jasmyn Bryant, Justin Dean, Brandon Morgan and teammates from Spain created a proposal testing if the stratosphere is still a challenge for humans. They proposed the following questions, "How is the Stratosphere?" "What can we learn from it?" "Is the stratosphere a good place to simulate other planets conditions for life (e.g. Mars)?" These questions will be answered exposing life (seeds) to the stratosphere, measuring the pollution and how it is related to life in the stratosphere. (e.g. does it play any role in the climate change?

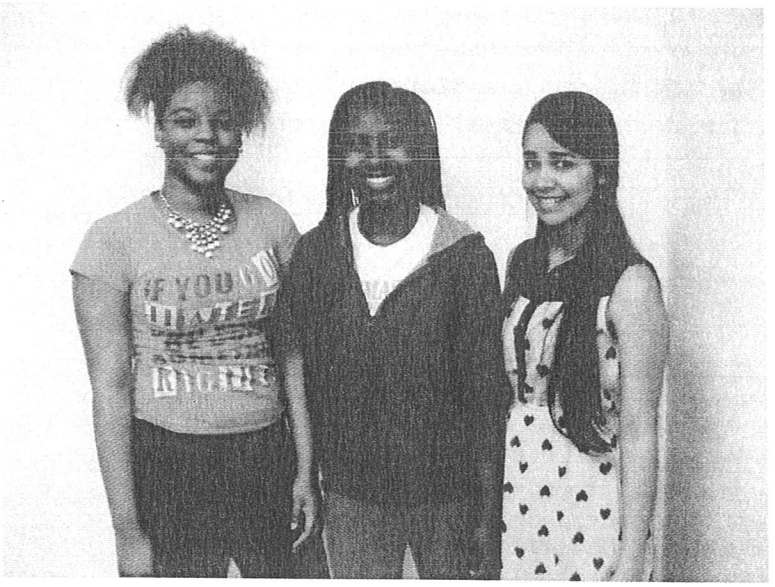
The experiment will consist of a full suite of sensors to measure pollination, gases, temperature, humidity, aerosols, UV radiation and many other parameters related to the environment its impact on life. The payload will carry some seeds and the team will check how the flight affected them. The data will be broadcast live, using camera, sensors, and GPS tracking systems.

https://sites.google.com/site/deltateamsatlab/

http://satlabteams.blogspot.com.es/

Echo TEAM

Lynnetta Bryant , María Carrasquilla, María del Mar Gómez-Jordana, Alberto González
Daniel del Pozo, Naomi Wims

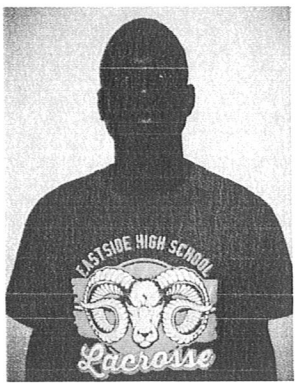


Lynnetta Bryant, Naomi Wims, Maria Carrasquilla created a proposal to acquire information about the world around us and then put into practice, asking the question "Which benefits can the observation of earth from space bring?" Their project will consist of seeing "invisible" things. In this experiment they will see the healthfulness of vegetation by analyzing its refractive index using different surfaces to reflect different types of light photosynthetically which is the process of photosynthesis. Since active vegetation absorbs most of the red light that reflects much of the near infrared light, the experiment was to test the vegetation and see if it will reflect more red light and less infrared light. This test of vegetation will be tested using cameras, sensors, computer board, GPS, and an accelerometer. Based on the vegetation data we will be able to track whether the infrared reflects more or less light. The weather balloon will be tracked using Google earth. Information will be shared with environmentalists and farmers.

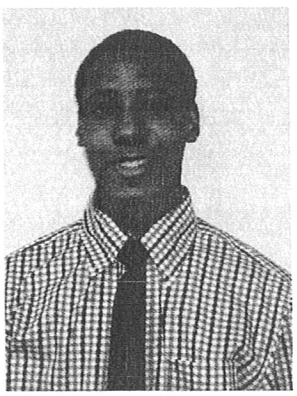
Information will be shared with anyone around the world using the Echo website:

http://echoteam.wikia.com/wiki/Echo_team_Wiki
http://satlabteams.blogspot.com.es/

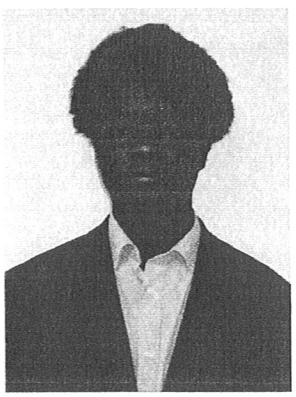
The winning Team will advance to the final phase of the program and participate in a two-week Summer School organized by FSGC for the winning joint teams of students and their teachers (eighteen students and six teachers).It will be conducted at the Space Life Sciences Building in the Exploration Park, adjacent to NASA Kennedy Space Center, where the students will build and assemble their payloads that will be flown on a weather balloon on the last day of the workshop. Congratulations Charlie Team. Gabriel Echenique , Nicolás Gómez, Rocío Jado ,Terrell Quarterman, Nicholas Simmons, Jahirah Williams.



Terrell Quarterman is a 10th grade student who attends Eastside High School. He is currently involved in NJROTC. He holds the second highest position in his unit. He is also in involved in ACE mentoring program, which explores, Architectural, Construction and Engineering fields. When he graduates he plans on studying Robotic Engineering and Watercraft engineering. After he graduates from college, he plans on joining the United States Air force or Marines.



Nicholas Simmons intends on pursuing a career in Engineering. He has always enjoyed figuring out how things work. He believes that this particular career will satisfy both of his interests. He hopes to attend college and maybe attend Florida State University, Embry Riddle, The University of Florida, The University of South Florida or The University of Central Florida. He enjoys the typical hobbies of a teenager; playing basketball, hanging out, playing video games and listening to music. He volunteers at the community center in his neighborhood during the summer and he performs free services for them whenever he has spare time. He wants to be a part of this project because he enjoys the interesting topics of Engineering and being able to cooperate with others overseas for this project is amazing. His Motto is "Do more for others".



Jahirah Williams is a sophomore at Santa Fe High School who enjoys Math and Writing. When he is not participating in the Marching and Symphonic bands, he enjoys tinkering with electronics. This hobby should help him with his plans to pursue a Computer Science or Computer Graphics Design degree at the University of Central Florida, University of Florida, or Full Sail University. He is pursuing this occupation because he believes if you choose a job you love, and you will never have to work a day in your life. This international project will give him a start in his career pursuit by allowing him to express his ideas and collaborate with others in solving technical problems.