



MAINE SPACE GRANT CONSORTIUM

www.msgc.org

Maine Student High Altitude Platform Initiative

National Space Grant Directors Meeting

September 21, 2011

Green Bay, WI

To understand and protect our home planet

To explore the universe and search for life

To inspire the next generation of explorers

...as only NASA can.



www.nasa.gov



MeSHAP

Maine Student High Altitude Platform Program

- Our vision is to develop Maine's K-16 capacity and an integrated network of resources to support low cost high altitude missions in order to:
 - Expose students to exciting STEM activities and aspire them to consider STEM careers.
 - Help in recruiting undergraduate engineering students and increase their involvement in NASA missions
- Our target populations are K-12 students, teachers, undergraduate students and faculty.



How are We Doing it?

- Consortium Development Award to focus on the undergraduate level
 - University of Maine (UMaine)
 - University of Southern Maine (USM)
 - Maine Maritime Academy (MMA)
- NASA K-12 CAN Award to focus on the high school level
 - Westbrook High School
 - Winthrop High School
 - Mt Blue High School



Key Partners

- Louisiana Space Grant Program – John Wefel, Greg Guzik and their HASP team
- Ames Research Center - Dr. Lynn Rothschild, Senior Scientist, and Chief Scientist, Synthetic Biology
- Maine Department of Education
- A small group of faculty and teachers with passion



K-12 Program

- Pilot Astrobiology- Scientific Ballooning Model (ASB) for Career Development
- Combines the core elements of Astrobiology in astronomy and biology with the engineering and mathematics of Scientific Ballooning using materials that align with Maine's standards, the Maine Learning Results, and the National Research Council's A Framework for Science Education.



Educational Rationale

- The ASB model offers a hands-on approach to augmenting basic science education via the discussion of topics such as atmospheric properties, weather, phases of matter, plotting skills, and communications in the context of a high-altitude balloon flight.
- Further it allows participation in a flight mission, from the conception of a project, preparation of payload and engineering to launch and data and platform recovery and an analysis.
- By connecting engineering to astrobiology, scientific ballooning and field and laboratory research studies students would have first hand experiences about how exploration drives technology and engineers and scientists together drive exploration in this combined design and research mission



Project Objectives

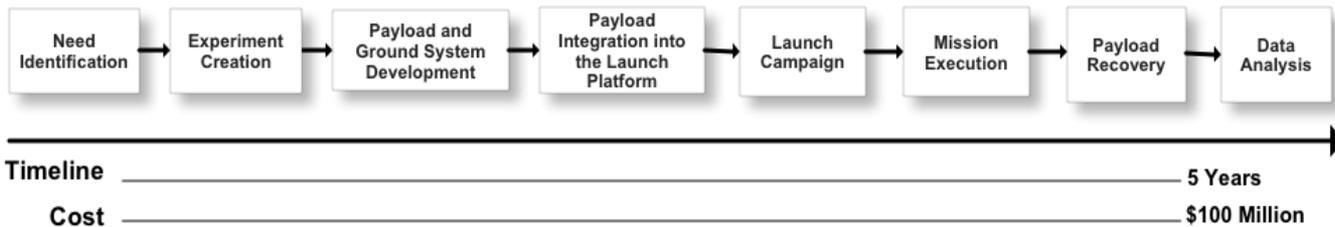
- Provide opportunities for high school teachers to build their scientific skills, including data collection and analytical thinking, and their ability to lead students in passionate inquiry related to NASA science mission goals, through engaging professional development activities and ongoing support.
- Increase student interest in STEM careers by: (a) informing students about STEM career options, and (b) exposing students to engaging and authentic scientific research experiences integrated with the engineering design challenges of a scientific mission.



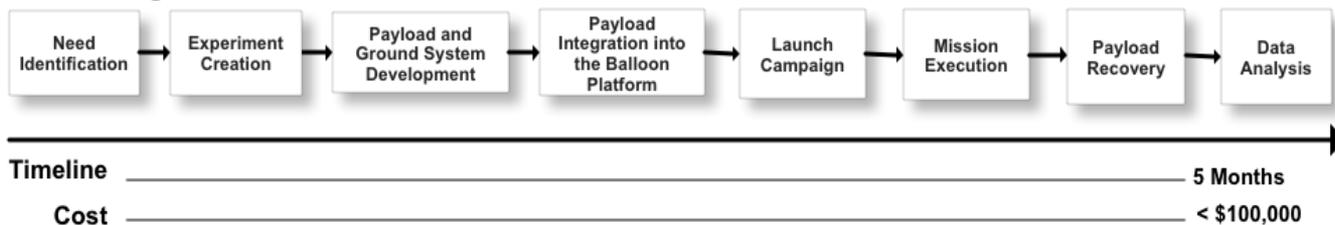
A Space Program on a Small Budget

- The Astrobiology Scientific Ballooning model is, in reality, *a space program on a small and realistic budget that has obvious and measurable traceability to our goal of increasing student aspirations for STEM careers.*

Space Process



Ballooning Process





Project Status

- Three 10th Grade Biology Teachers recruited
- Seven classes of 10th graders, 80 students
- July, one week training in Palestine, TX in a new program developed by Wallops (Joyce Witherton and LSU specifically for high school teachers.
- Three day workshop on Astrobiology and how to integrate topics into existing science courses. Assisted by Dr. Lynn Rothschild
- Lesson Plans developed
- Pre-testing completed
- Tethered Balloon launches scheduled in October
- Mission planning under way using student and teacher team approach
- Major launches in Spring 2012 and Capstone event in 2012
- Post-testing



Undergraduate Component

- Goal is to spark interest in hands-on scientific ballooning and sounding rocket as an educational and research activity in Maine universities especially after establishing the state's first Aerospace Engineering Concentration at the University of Maine
- Good for recruitment
- Pilot Schools
 - University of Maine College of Engineering
 - University of Southern Maine Center for Environmental Toxicology and the College of Education
 - Maine Maritime Academy



Project Status

- Nine faculty and students received one-week training at LSU in early January 2011
- Two student (10) teams at UMaine (one ballooning, one sounding rocket)
- Two student (12) teams at USM
- One student (20) team at Maine Maritime Academy

- Three successful launches and recovery in May (joint effort between UMaine and USM)
- MMA's launch at sea was unsuccessful; they will try next year but this time tethering the balloon

- One credit course for Honors STEM Students at USM
- Design Challenge Program at UMaine



Project Cost

- Undergraduate component
 - Initial investment: \$1,500 for balloon kit (1,500 grams) and includes accessories and supplies)
 - \$10,000 per student project team includes cost of balloon kit.
- K-12 Program
 - Initial investment: \$500-\$800 for tethered balloon kits (800 grams) + \$100 for payload supplies
 - Large balloon cost same as undergraduate program
- Undergraduate program is now part of our space grant base budget.
- Meeting in November to determine how best to develop a seamless program by leveraging current instate “expertise” and passion.