Hawk Institute for Space Sciences

A Corporation for Advancement of the Aerospace Industry on the Eastern Shore of Maryland

Corporate Overview

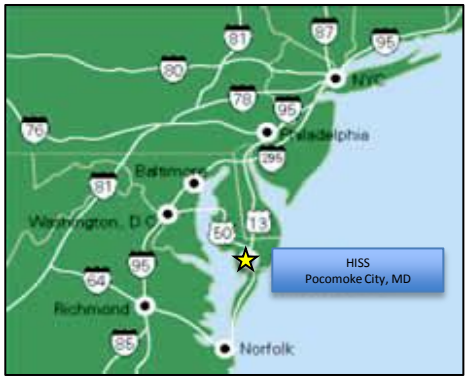
Executive Summary

- Hawk Institute for Space Sciences LLC
  - Small business founded 2006 and headquartered in Pocomoke City, MD (low-income area on Eastern Shore)
  - 52 employees currently and growing; over 75% have technical undergraduate or graduate degrees
  - Hawksat-1, first HISS satellite, launched May 2009
- Providing aerospace engineering services and value-added, integrated aerospace solutions to our customers through "focused diversification" and workforce development
- Strategic partnership with University of Maryland Eastern Shore (HBCU)
  - Training next generation aerospace engineers to increase minority participation in aerospace and defense
- Business plan centered around leveraging the expertise and facilities at Wallops Island Flight Facility in combination with students and under-employed aerospace professionals on the Eastern Shore

HISS develops aerospace systems in an economically-disadvantaged, rural county, and creates new jobs and new technologies in an entrepreneurial way

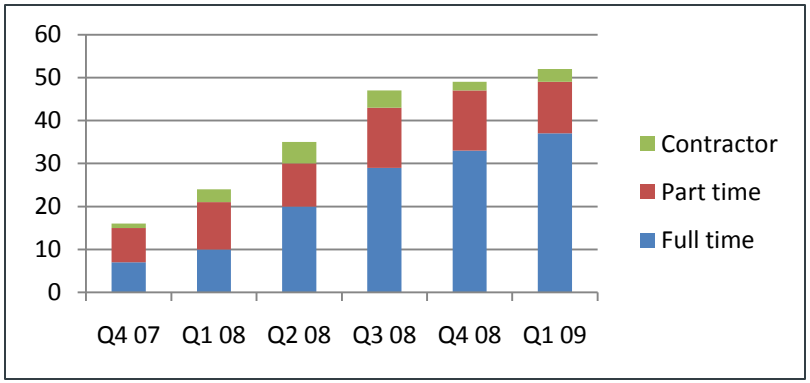
Philosophy and Facilities

- Pursuing a path of “focused diversification”
  - Focused: business centered around providing aerospace engineering subject matter expertise from a Maryland base of operations
  - Diversification: wide customer base (federal, state, and local government, nonprofits, industry primes) across five focus areas
- Vision
  - Contribute to the development of the current and next generation aerospace workforce enabled by delivering cost-effective, value-added engineering services and integrated solutions to our customers
- Facilities
  - Over 10,000 sq. ft. of manufacturing and integration space
  - Class 10k cleanroom
  - Fully equipped machine, welding, and electrical shop
  - Agreement with NASA Wallops for access to thermal vacuum, vibration and acoustic, and EMI testing.

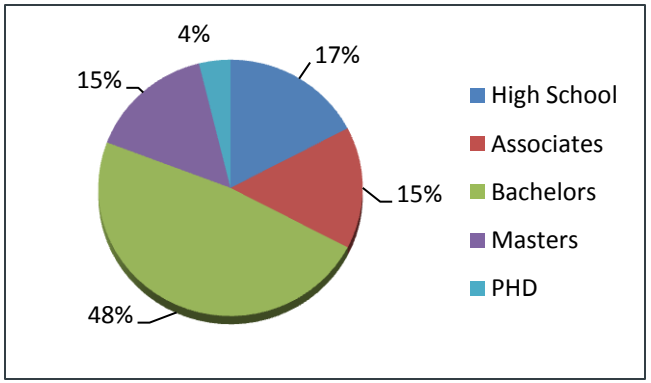


People

- HISS currently employees 52 people
- Pocomoke is located in Worcester County, the county with the highest unemployment rate in Maryland at almost 12%
- Strategically partnered with the University of Maryland Eastern Shore (UMES), a historically black college, to train the next generation of aerospace engineers and help increase minority participation in aerospace
- Developing advanced technologies and systems in a poor, rural county and creating new jobs in a commercial, entrepreneurial way
- Actively participating in programs that provide education for both students and existing workforce



Staffing by quarter



% of Staff by Education Level

Currently 52 employees and growing; 70% of growth in Pocomoke City

Five Focus Areas

HAWK INSTITUTE FOR SPACE SCIENCES

- Aerospace Engineering Services
  - Providing subject matter experts and conducting research in the functional disciplines associated with spacecraft development and space-based missions (scientific and national security)
- Launch Services
  - Focused on providing launch opportunities for satellites under 250kg, particularly providing launches out of NASA Wallops Island Flight Facility
- Small Satellite Development
  - Developing a modular spacecraft architecture applicable for Cubesats and Microsats (<200kg) serving the civil and national security communities
- Unmanned Air Systems
  - Developing UAS-based capability solutions to satisfy challenging military, homeland security, and first responder needs
  - Conducting domestic range operations, training, and airspace development
- Education & Community Development
  - Developing opportunities for student internships and training through partnerships with University of Maryland Eastern Shore and the Maryland Hawk Institute
  - Planning to facilitate integrated STEM education, research, and acquisition training programs

Aerospace Engineering Services

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- Leverage a talented pool of engineers and scientists to provide cost-effective technical support to NASA, NOAA, and DoD
- NASA Wallops Island Flight Facility (WFF)
  - Team member with CSC
  - CREAM Instrument: engineering and technician support
  - Max Launch Abort System (MLAS): systems engineering support
  - Autonomous Flight Safety System (AFSS): systems engineering support
  - Global Precipitation Program (GPM): mechanical and systems engineering support
  - P3 Aircraft: engineering support
- NASA Goddard Space Flight Center (GSFC)
  - Team member with Bastion and Raytheon
  - Lunar Reconnaissance Orbiter & Hubble Repair Mission: MLI blankets
  - Tracking and Data Relay Satellite (TDRSS): thermal engineering support
  - Multi Mission Spacecraft (MMS): thermal engineering support
  - General computer programming support
- NOAA
  - NPOESS: mission and spacecraft systems engineering support
- NASA Langley Research Center (LaRC)
  - CLARREO Mission: program review support
- Office of Secretary of Defense
  - Classified Support: program management, architecture and systems engineering support

Launch Services

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- Low cost launch services from NASA Wallops Island Flight Facility
- All required adapter hardware, launch vehicle, and payload operations control center are available
  - Successful Falcon 1 launch from Kwajelin
  - Wallops has the infrastructure to support payload testing
  - HISS has the integration and payload operations control center facilities

- Space X Falcon 1 rocket
  - First launch from Kwajelin (Goal of 2011)
  - Follow-on launches every 12 months from NASA Wallops facilities in Virginia

- Utilizing Existing Hawk Multiple Payload Ejector (MPE)
  - Multiple satellites launched from a single rocket
  - Cost effective solution for each small satellite (<$6M for 200lb and <$3M for 100lb)

Multi-Payload Ejector

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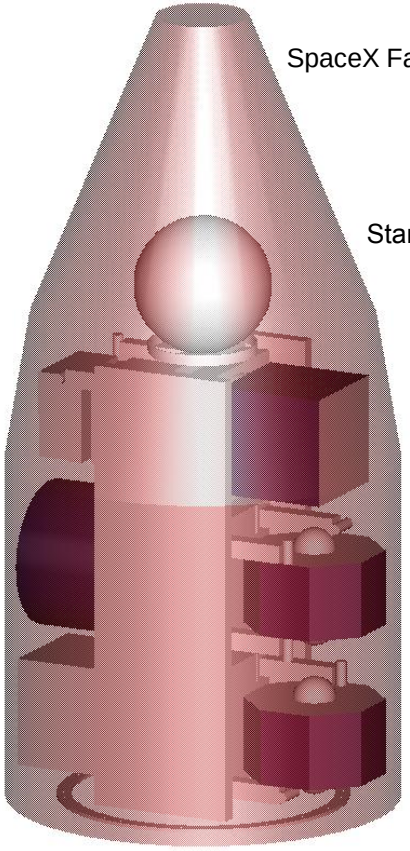


SpaceX Falcon Dynamic Envelope

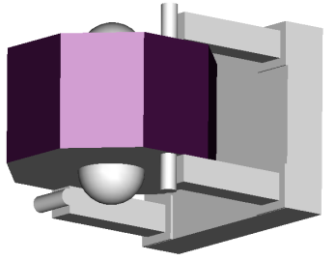
Starshine w/ 15” Lightband

Primary Spacecraft:
Max 200 lbs in 45” diameter by 45” high conic payload volume.
Lightband (Planetary Systems)

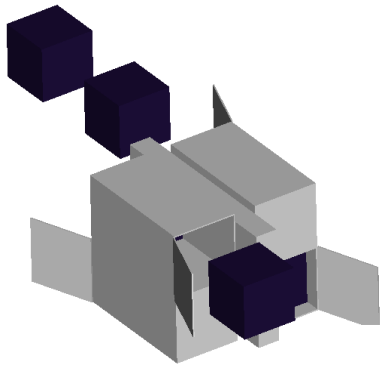
Secondary Spacecraft:
3 stacks high, 2 sided
Up to six 100 lbs in 20” x 20” x 18” payload volume. Lightband or ST5-like (spinner) ejection (50 lbs max)

Tertiary Spacecraft:
Mount Cube sat P-Pods to sides of backbone.

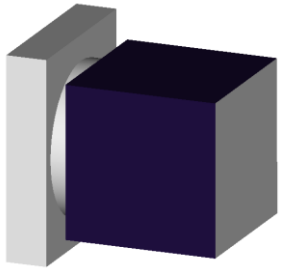
Sample payloads

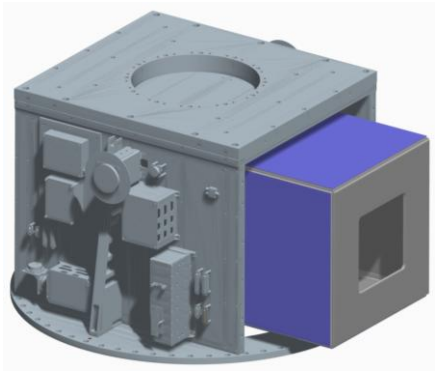


ST-5 (spinner)



Cube sat P-Pods





Payload capability ~ 950 pounds; MPE weight ~ 200 pounds

MPE is built, qualified, and ready for launch on Falcon 1 today.

Small Satellite Development

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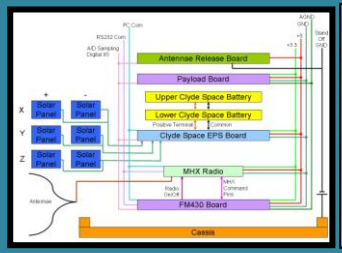
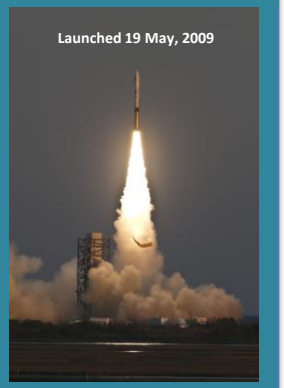
- HISS has the capability to develop and deploy small satellites quickly and efficiently
  - Educational and commercial practices provide the necessary culture and expertise
- HISS is focusing on nano to micro-satellites (< 100kg)
  - Both are under-served area within the satellite development community

Heritage Bus – HawkSat-1



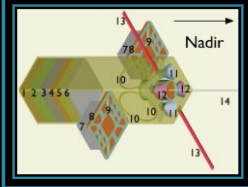


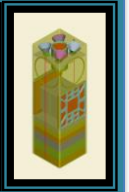
Hawksat-1 Technical Parameters			
	Bus	Payload	Payload / Total
Size (cm)	10 x 10 x 8.9	10 x 10 x 1.1	10 x 10 x 10
Weight (g)	840	160	1000
Power (W)	0.47	0.43	0.9

HISS Satellites are Compatible with a Wide Variety of Secondary and Multiple Manifest Launch Opportunities

FireFly – Launches 8/2010

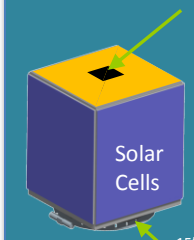
1. FM430 Flight Computer
2. Clyde Space EPS
3. Communications Antenna (x2)
4. Experiment Controller
5. VP Analog Board
6. GRD Front End Board
7. Experiment Power Regulator
8. Burle Planacon MCP (x2)
9. BGO Scintillator (x2)
10. Hinged Deployable Door (x2)
11. VLF Loop Antenna (x3)
12. WL Optical Photometer (x2)
13. Red Optical Photometer (x2)
14. Gravity Gradient Tether





Spacecraft Mass: 4.47 kg
Dimensions: 10 x 10 x 34 cm
Orbit-averaged power: 2 W

WallopsSat – Delivery 5/2010



-100lbm (Space Vehicle).
- 40 lbm payload
-Power-positive in ALL attitudes
-Able to command in all attitudes
-Gravity Gradient Attitude Control
-Nadir pointing +/- 5, rotation rate .2 deg/min
-Up gradable to 3-axis attitude controlled .2 arc sec
TCP-IP communications
-Single-string design
-Design lifetime of 1 year
-Body mounted solar panels
-COTS parts; boards with extra Cu for thermal on 'hot' boards; use modern low-power devices

Unmanned Air Systems

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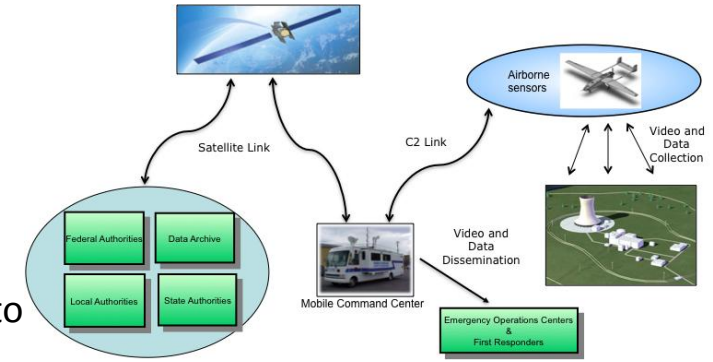
- Advanced UAS Training
  - Provide flight and support services to private and government agencies for National Air Space flight training and certification of pilots (Distance Learning)
  - Operational training of ground support staff
  - Training focuses on FAA flight certification and Mission Specific Operations meeting the FAA COA requirements for UAS Pilots/Operators as well as Observers operating in the US
- COA Development
  - Certificate of Authorization (COA) permits commercial organizations to operate a specific UAV, for a specific purpose, in a defined area within the National Air Space (NAS)
  - Provide the services necessary to help both public and private agencies to navigate the regulatory COA process to achieve flight space approval
- Remote Wide-Area Radiological Monitor (RWRM)
  - Developing system architecture and technology for UAS-based detection of radiological material released through accidental or intentional means
  - UAV is outfitted with mission-specific detection payload to collect live data and stream it to First Responders and Government Agencies in real-time via secure internet and thin-client geospatial analysis system



Education & Community Development

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- 1st Robotics
  - A national Robotics Competition
  - Provide facilities and mentors
  - Teamed with the NAVY
- Introduction to Space Course /High Altitude Student Payload
  - UMES Introductory Engineering Course culminating in a payload integrated into a NASA balloon
  - Provide the course instructor, facilities, and funding
  - Teamed with UMES and NASA
- Step Up Program
  - Locally funded summer intern program
  - Provide mentors and space
  - Teamed with NASA, Worcester County and UMES

- Reach for the Stars Space Camp
  - Innovative two week camp that teams gifted, educationally at risk, and disabled students on a two week project
  - Provide mentors, facilities and funding
  - Teamed with NASA, Worcester County and UMES
- Student Interns
  - We host a minimum of two UMES student interns yearly; Wor-Wic Community College
  - Provide student funding
- Workforce Development
  - Partnered with Lower Shore Workforce Alliance on labor-related unemployment grants to re-train unemployed people for aerospace technician careers
  - Developing a Veterans program for undergraduate education and research

Summary

HAWK INSTITUTE FOR SPACE SCIENCES

- Small aerospace manufacturing business located in low-income area on Lower Eastern Shore of Maryland
- Maintain strategic partnerships with local community, payload providers, mission integrators
- Capable of full life-cycle manufacturing, assembly, testing, and demonstration using HISS and NASA Wallops facilities
- Five Focus Areas
  - Deliver technical engineering expertise to government agencies and other companies
  - Provide small satellite launch opportunities through commercially-financed, multiple payload launches
  - Design missions and build satellites less than 100kg leveraging commercial manufacturing practices and the academic community
  - Integrate, train, operate, and maintain unmanned air systems for homeland security and first responder missions within the US
  - Support the Eastern Shore of Maryland through education and workforce development programs and partnerships
- Relatively new but proven track record of success with providing customers high-caliber services and cost effective hardware