NASA Space Grant Student Satellite Program: Updates and Tools

2017 Fall National Space Grant Meeting
September 16, 2017

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WHY? Demand for “Small Space”

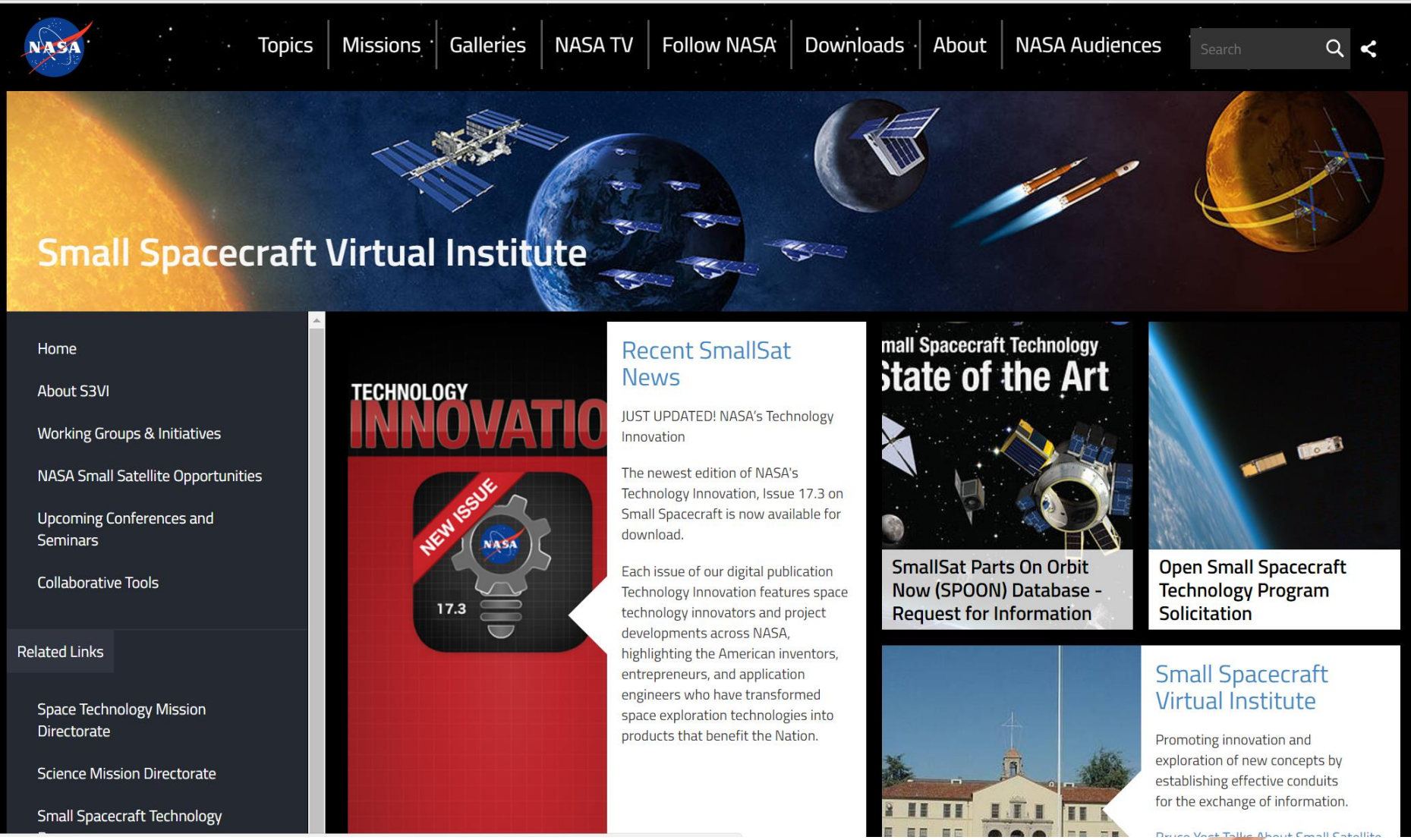
August 26, 2016:
The Economist Technology Quarterly

- ***In less than 60 years of space flight, the world has launched about 6500 satellites to space of which about 1000 are still operating…***
- **Demand for space launch and small sats has shifted from Government to commercial groups.**
- **The Economist (08/26/16): 5,197 small sats in next 5 years!!**
  - OneWeb: 648 microsats for communications
  - SpaceX: 4425 microsats for communications
  - Google: microsats 20 for remote sensing
  - Spire: 44 microsats for observation
  - BlackSky: 60 microsats for remote sensing
- **RocketLab ELECTRON 1st Launch: May 25, 2017**
  - **300 requested launches: $1.5 Billion**
- **2500 attendees to Utah State Small Satellite Conference in Logan, UT**
- ***NSGSSP Objectives***
  - ***Support US aerospace economy.***
  - ***Train the aerospace workforce in small sat design, construction, testing, and operation for NASA, DoD, and much larger commercial need.***

2017 Notes on Small Space

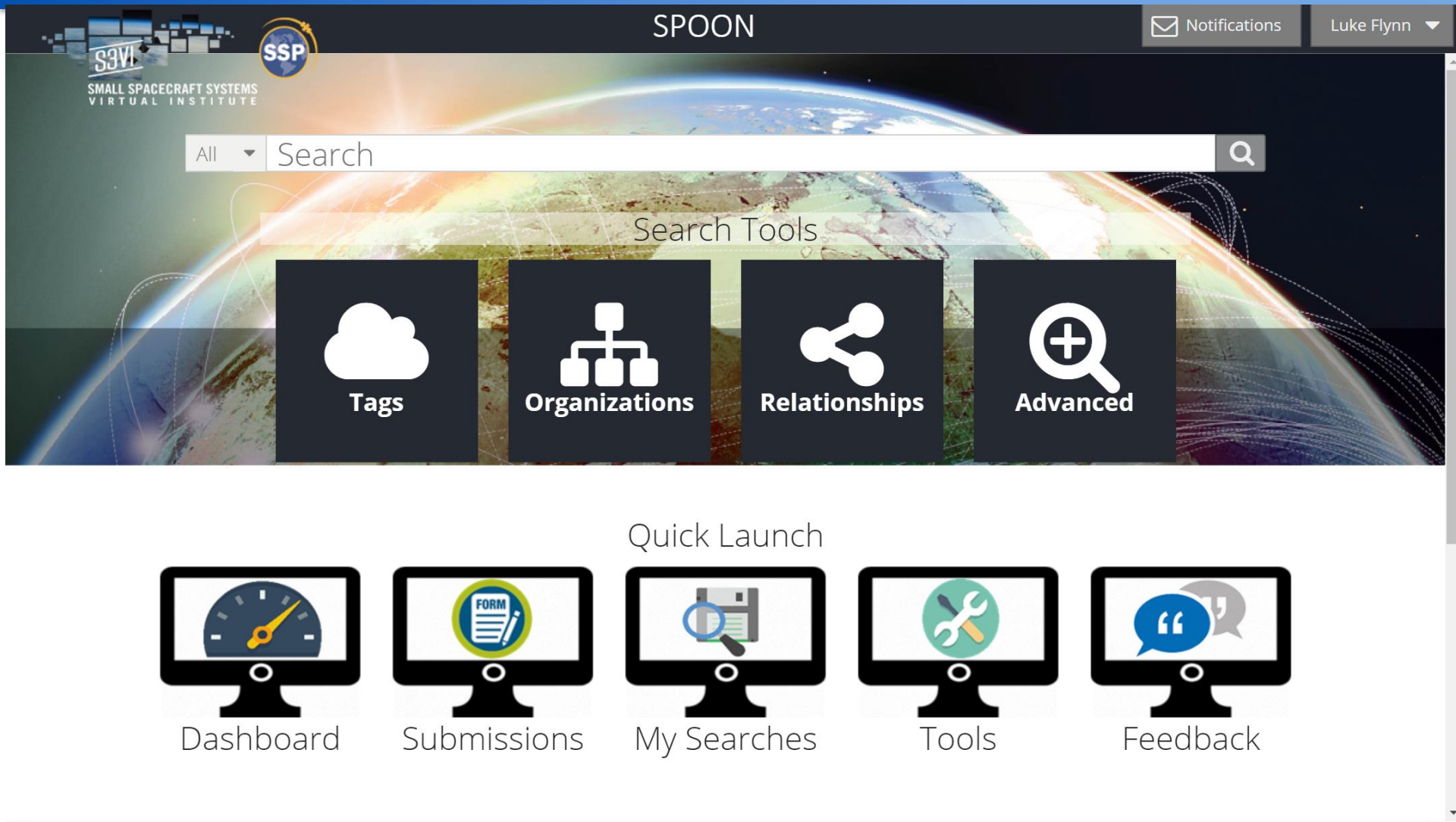
- The US and International "Small Space" economies are growing exponentially!
  - RocketLab launch success in May 2017
    - 300 launch back-log that will take 6-8 years.
    - Lunar mission for very small payload at $5M+ for launch costs.
  - Small sat back-log
    - Blue Canyon Technologies reports 18-24 month lag for 6-U CubeSat bus.
  - COTS parts
    - Basis for many University CubeSats.
    - Buyer beware: Rush to market, high volume of orders and insufficient testing.
    - Through SBIRs and STTRs, Universities can help!
- ***Space Grant needs to train/educate this workforce!!***
  - University CubeSat performance: NASA Goddard study shows high incidence of failures on first launch.
  - University role should be training/research for students = higher risk posture.
  - NASA versus commercial: Class A versus technology
  - Persistent myths: the $10K CubeSat!

NASA Ames Small Spacecraft Systems Virtual Institute



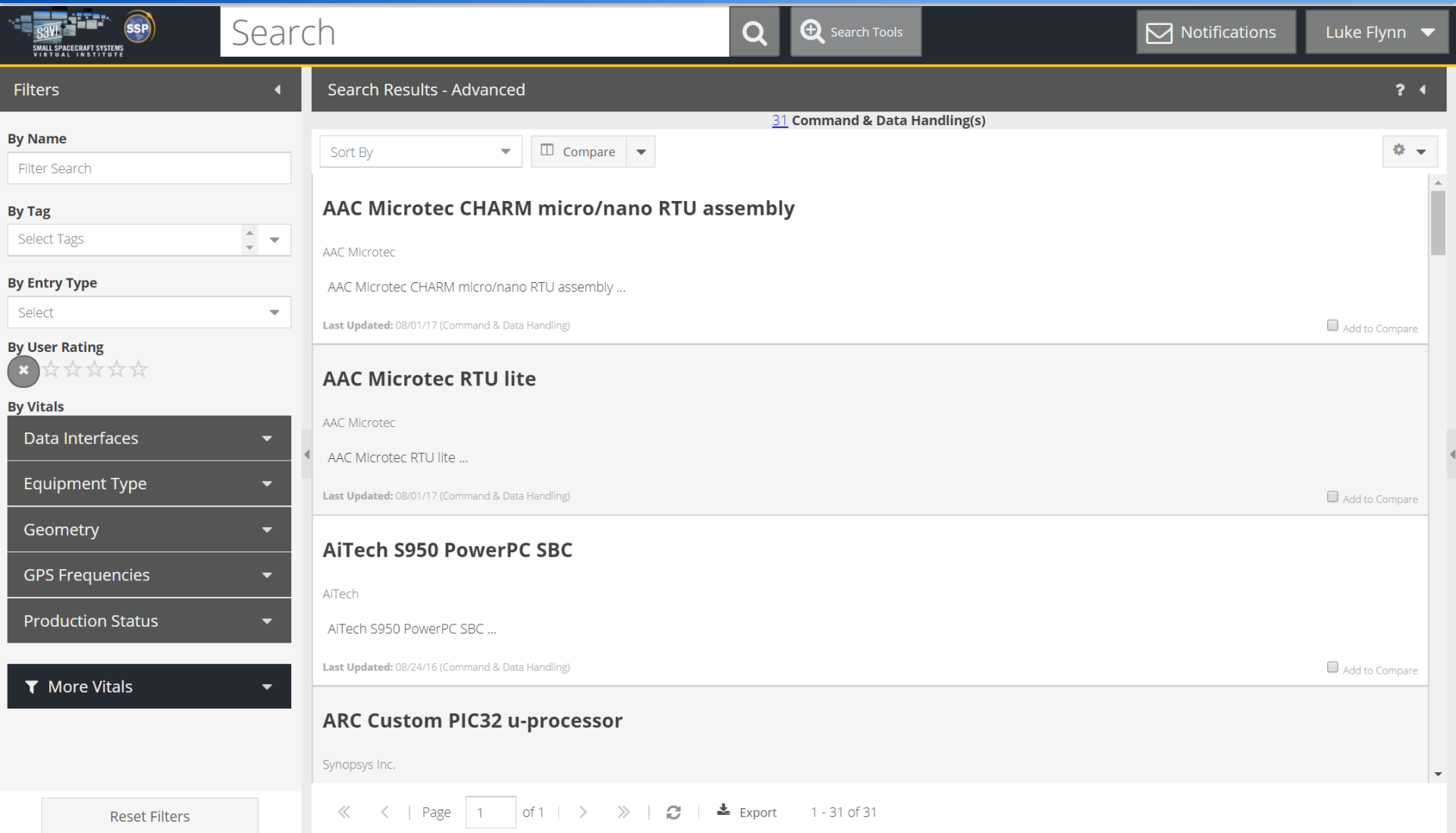
https://www.nasa.gov/smallsat-institute

Small Sat Parts On Orbit Now (SPOON)



https://spoonsite.com

SPOON Database (Computers)



Sortable parts descriptions and reviews

SPOON Database

Search | Search Tools | Notifications | Luke Flynn

Filters

Search Results - "Maryland Aerospace, MAI-400 A...

1 Guidance, Navigation and Control(s)

Sort By | Compare

Maryland Aerospace, MAI-400 ADCS Board (sub-component of Integrated Unit)

Maryland Aerospace

Maryland Aerospace, MAI-400 ADCS Board (sub-component of Integrated Unit) MAI-400 ADACS Components Star Tracker Star Sextant 0.013°/54 arcsec accuracy 4.23 x 4.71 x 4.95 cm 91 g 1 W @ 3.3 V I2C or UART TTL interface Datasheet IR Earth Horizon Sensors IR-EHS 1°/60 arcminute accuracy 4.33 ...

Last Updated: 08/02/17 (Guidance, Navigation and Control) Add to Compare

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Details

Maryland Aerospace, MAI-400 ADCS Board (sub-component of Integrated Unit)

(Guidance, Navigation and Control)

Organization: Maryland Aerospace

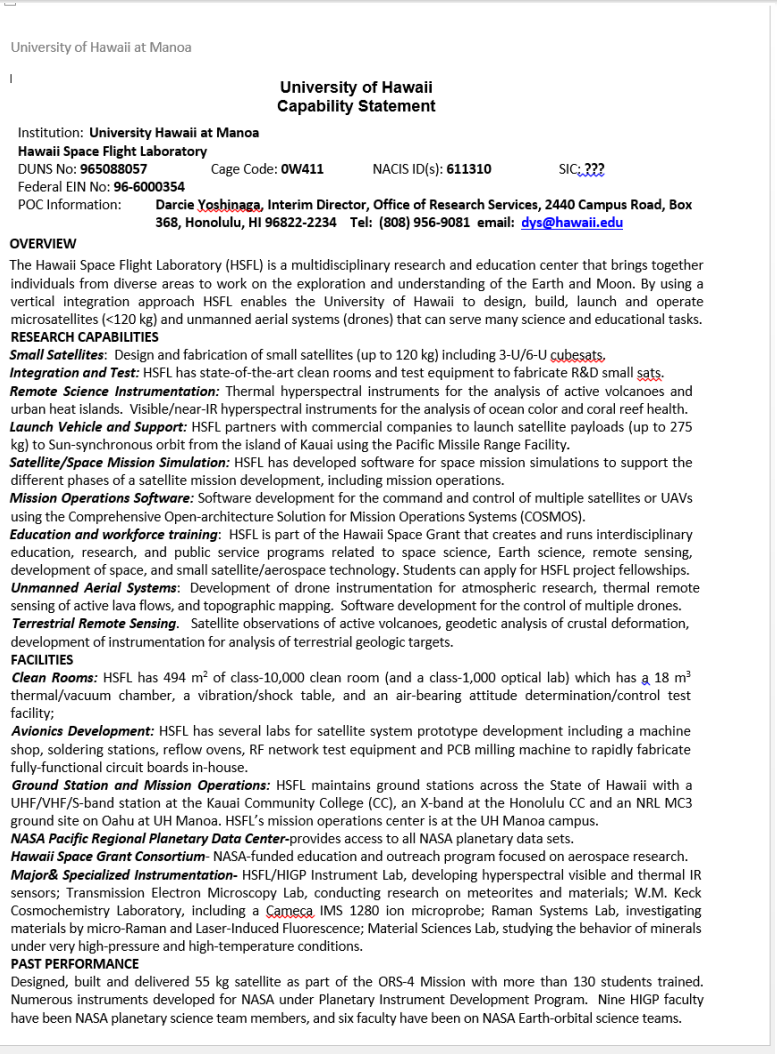
Updated: 08/02/17 04:38:17

Details | Reviews | Questions & Answers

NASA Office of Small Business

- 2018 NASA OSB Technology Infusion Road Tour
  - Hosted at University of Hawaii at Manoa or Hawaii Convention Center
  - MUREP Partner
  - Minority Serving Institution
  - All 10 Chief Technologists from Centers
  - 30 US aerospace companies
- August 14-15,2018 (tentative)
  - NASA presents contracting support and strategies
  - MSI's present Statement of Capability
  - NASA, DoD, and Aerospace primes present research opportunities
  - Interactive session(s) between HBCU/MSI's and partners
- No registration fees – limited participation

Sample Statement of Capability



University of Hawaii at Manoa

University of Hawaii
Capability Statement

Institution: **University Hawaii at Manoa**
Hawaii Space Flight Laboratory
DUNS No: **965088057** Cage Code: **0W411** NACIS ID(s): **611310** SIC: **???**
Federal EIN No: **96-6000354**
POC Information: **Darcie Yoshinaga, Interim Director, Office of Research Services, 2440 Campus Road, Box 368, Honolulu, HI 96822-2234 Tel: (808) 956-9081 email: dys@hawaii.edu**

OVERVIEW

The Hawaii Space Flight Laboratory (HSFL) is a multidisciplinary research and education center that brings together individuals from diverse areas to work on the exploration and understanding of the Earth and Moon. By using a vertical integration approach HSFL enables the University of Hawaii to design, build, launch and operate microsatellites (<120 kg) and unmanned aerial systems (drones) that can serve many science and educational tasks.

RESEARCH CAPABILITIES

Small Satellites: Design and fabrication of small satellites (up to 120 kg) including 3-U/6-U cubesats.
Integration and Test: HSFL has state-of-the-art clean rooms and test equipment to fabricate R&D small sats.
Remote Science Instrumentation: Thermal hyperspectral instruments for the analysis of active volcanoes and urban heat islands. Visible/near-IR hyperspectral instruments for the analysis of ocean color and coral reef health.
Launch Vehicle and Support: HSFL partners with commercial companies to launch satellite payloads (up to 275 kg) to Sun-synchronous orbit from the island of Kauai using the Pacific Missile Range Facility.
Satellite/Space Mission Simulation: HSFL has developed software for space mission simulations to support the different phases of a satellite mission development, including mission operations.
Mission Operations Software: Software development for the command and control of multiple satellites or UAVs using the Comprehensive Open-architecture Solution for Mission Operations Systems (COSMOS).
Education and workforce training: HSFL is part of the Hawaii Space Grant that creates and runs interdisciplinary education, research, and public service programs related to space science, Earth science, remote sensing, development of space, and small satellite/aerospace technology. Students can apply for HSFL project fellowships.
Unmanned Aerial Systems: Development of drone instrumentation for atmospheric research, thermal remote sensing of active lava flows, and topographic mapping. Software development for the control of multiple drones.
Terrestrial Remote Sensing. Satellite observations of active volcanoes, geodetic analysis of crustal deformation, development of instrumentation for analysis of terrestrial geologic targets.

FACILITIES

Clean Rooms: HSFL has 494 m^2 of class-10,000 clean room (and a class-1,000 optical lab) which has a 18 m^3 thermal/vacuum chamber, a vibration/shock table, and an air-bearing attitude determination/control test facility;
Avionics Development: HSFL has several labs for satellite system prototype development including a machine shop, soldering stations, reflow ovens, RF network test equipment and PCB milling machine to rapidly fabricate fully-functional circuit boards in-house.
Ground Station and Mission Operations: HSFL maintains ground stations across the State of Hawaii with a UHF/VHF/S-band station at the Kauai Community College (CC), an X-band at the Honolulu CC and an NRL MC3 ground site on Oahu at UH Manoa. HSFL's mission operations center is at the UH Manoa campus.
NASA Pacific Regional Planetary Data Center-provides access to all NASA planetary data sets.
Hawaii Space Grant Consortium- NASA-funded education and outreach program focused on aerospace research.
Major& Specialized Instrumentation- HSFL/HIGP Instrument Lab, developing hyperspectral visible and thermal IR sensors; Transmission Electron Microscopy Lab, conducting research on meteorites and materials; W.M. Keck Cosmochemistry Laboratory, including a Cameca IMS 1280 ion microprobe; Raman Systems Lab, investigating materials by micro-Raman and Laser-Induced Fluorescence; Material Sciences Lab, studying the behavior of minerals under very high-pressure and high-temperature conditions.

PAST PERFORMANCE

Designed, built and delivered 55 kg satellite as part of the ORS-4 Mission with more than 130 students trained. Numerous instruments developed for NASA under Planetary Instrument Development Program. Nine HIGP faculty have been NASA planetary science team members, and six faculty have been on NASA Earth-orbital science teams.

- Single Page
- Contact Information for Contracting Office
- Overview
- Research Capabilities
- Past Performance
- 10-minute powerpoint

Mahalo!!! Questions??