



Sun, Surf, and Satellites at the University of Hawaii

Wayne Shiroma, Jason Akagi, Byron Wolfe, and
Justin Akagi

University of Hawaii

CubeSat Developers' Workshop
April 2008





UH CubeSat Program

2002

2003

2004

2005

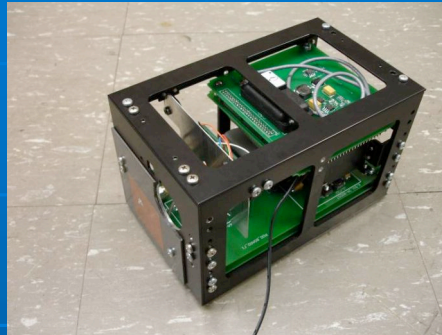
2006

2007

2008



Mea Huaka'i (Voyager)



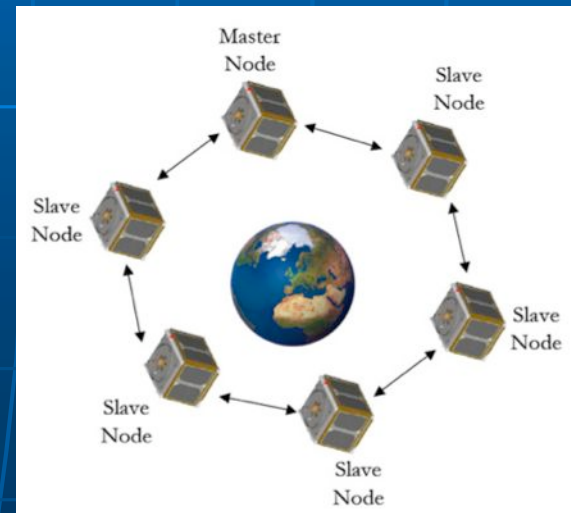
Ho'okele (Way Finder)



Kumu a'o
(Source of Learning)



Hokulua (Twin Stars)



Ho'okia'i (Watchman)



Student Outcomes

- 150 students trained since 2002
- 8 in PhD programs, > 20 in MS programs
- Three of our students recognized as *Most Outstanding EE Student in the Nation* (EE National Honor Society Award) in 2001, 2003, 2005. Honorable mention in 2007.
- 1 patent awarded
- \$500,000 in funding, including student-solicited proposals
- > 20 undergraduate publications
- Northrop Grumman, Boeing, Raytheon, Lockheed Martin



The University of Hawai'i at Mānoa Centennial Spotlight



Celebrating a
Century of Excellence

Leadership

Excellence

Innovation

Hawai'i Space Flight Laboratory

On the Leading Edge of Space Exploration and Research

Designed as a multidisciplinary research and education activity bringing together individuals from diverse areas to explore, study and advance the understanding of the space environment, the Hawai'i Space Flight Laboratory positions UH Mānoa to become the first university in the world with the capability to design, fabricate, launch and control its own satellites. For information about HSFL, its programs or the many educational opportunities provided for students interested in the areas of research, development and engineering, visit

www.hsfl.hawaii.edu

Reliable, Low-Cost Access to Space • Space Exploration
Microsatellite Design, Fabrication and Launch • Payload Design and Integration
Ground Systems and Operations Support • Workforce Development



Hawai'i Business
A Centennial Sponsor

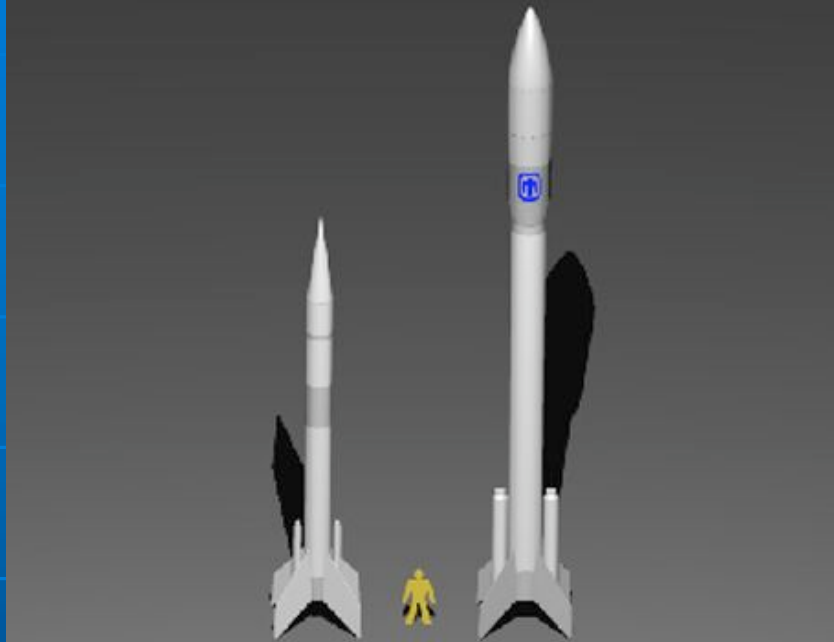


The mission of HSFL is to:

- *promote innovative engineering and science research for terrestrial and planetary space missions*
- *develop, launch, and operate small spacecraft from the Hawaiian Islands to accelerate the validation of new space technologies*
- *provide workforce training in all aspects of unmanned space missions*
- *promote synergistic collaborations between educational, governmental, and corporate institutions interested in space exploration*



Launch Vehicle



Reliable, Low-Cost, Rapid-Response Launch System

~250 kg to 400-km LEO

Low-cost lift for small satellites

The proposed Super Strypti rocket, a modification of Sandia National Laboratories' Strypti rocket, could carry small satellites (up to 300 pounds) into a low polar orbit for about \$5 million – or \$10 million cheaper than NASA and other available alternatives.

Sending up a satellite

Deploying the 61 ft. 6 in. Super Strypti rocket:

1 Spin stabilization

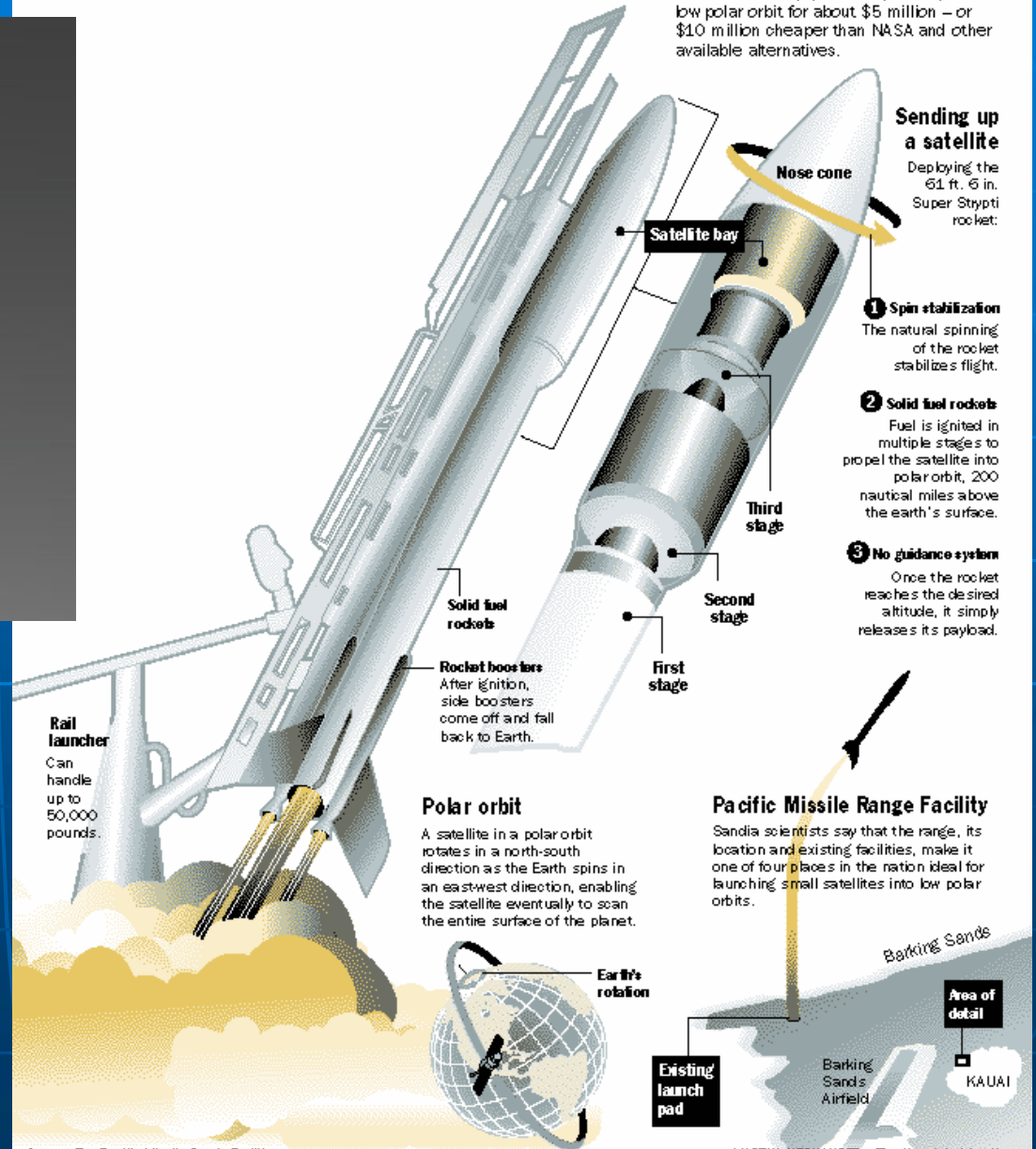
The natural spinning of the rocket stabilizes flight.

2 Solid fuel rockets

Fuel is ignited in multiple stages to propel the satellite into polar orbit, 200 nautical miles above the earth's surface.

3 No guidance system

Once the rocket reaches the desired altitude, it simply releases its payload.

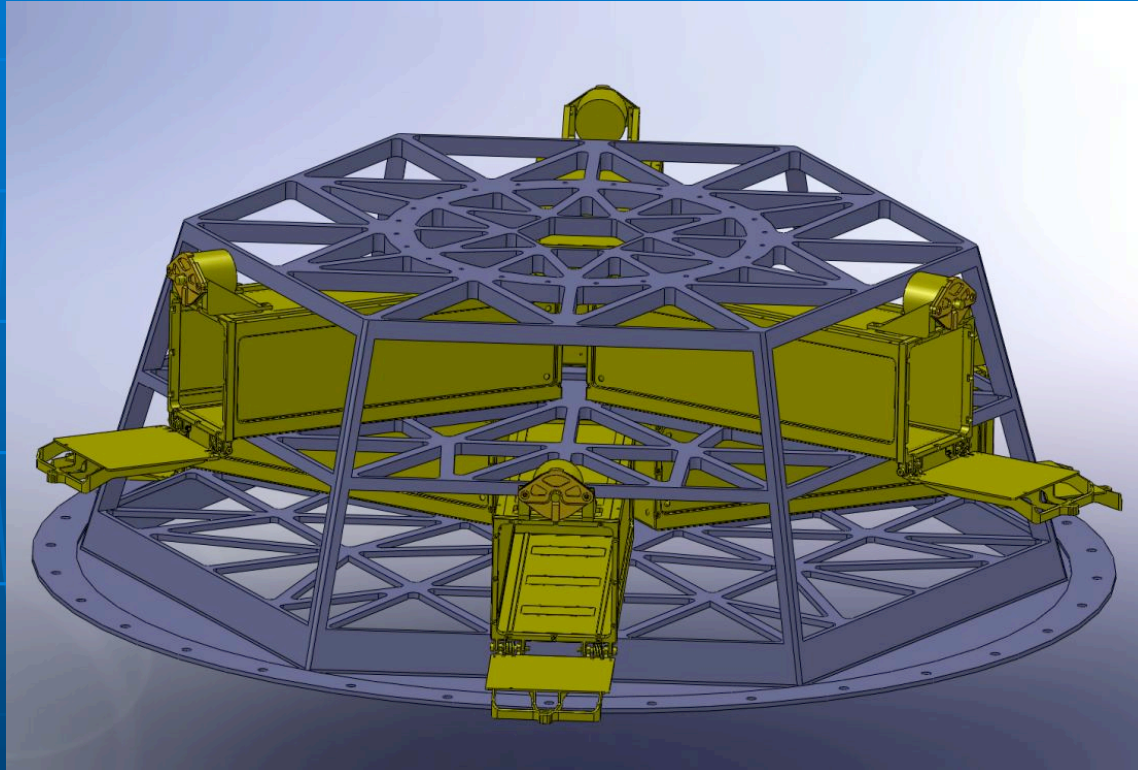


Source: The Pacific Missile Range Facility

MARTHA HERNANDEZ • The Honolulu Advertiser



Conceptual P-POD Accommodations



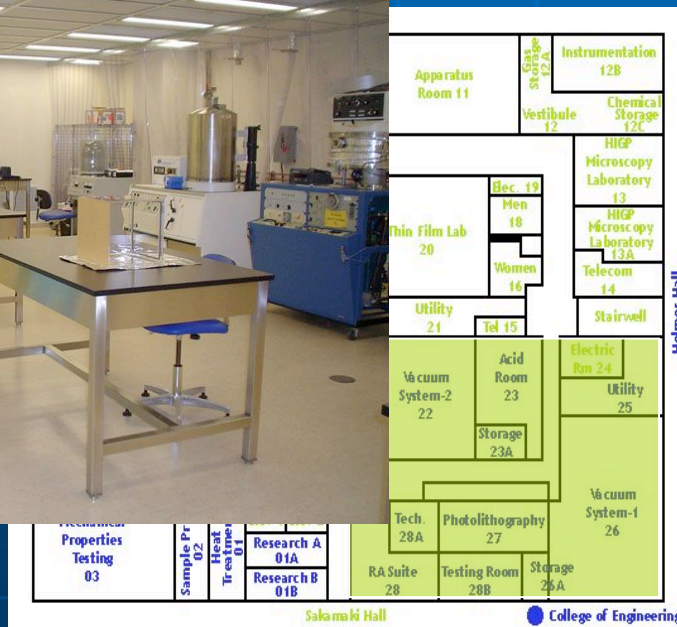
6 P-PODs



Integration and Test Facility

6500 SF Clean Room (Class 10,000)

- Systems integration
- Thermo-vac testing
- Vibration testing
- Electronics testing for launch vehicle component integration





Sun, Surf, and Satellites

A vision of becoming the world's first university to do end-to-end design, fabrication, test, launch, and control of small satellites

- Satellite development (1 kg - 50 kg)
- Integration and test
- Primary small-satellite launches
- Ground station and operations

Opportunities available for undergraduate and graduate students and faculty



Mahalo!

Wayne.Shiroma@hsfl.hawaii.edu
Jason.Akagi@hsfl.hawaii.edu
Byron.Wolfe@hsfl.hawaii.edu
Justin.Akagi@gmail.com