Name of the Program: Hawaii Institute of Geophysics and Planetology - Geophysics

Program as used in this prioritization process can be a specialization, section, division, field of study, center, degree program, etc. Unit head, in collaboration with others as appropriate, must determine the level of analysis required.

How long has the program existed: 51 years (since 1958)

The program would fall under which of the following Vice Chancellor’s offices?

- [ ] Academic Affairs
- [ ] Student Services
- [XX] Organized Research
- [ ] Administration, Finance and Operations

How does the program fit into the larger administrative unit? (Describe in two or three sentences.)
The Hawaii Institute of Geophysics and Planetology (HIGP) is a multi-disciplinary research institute engaged in advanced research, workforce training, and service in cutting-edge oceanographic, geological, geophysical, planetary, and atmospheric sciences. HIGP is research institute within the School of Ocean and Earth Science and Technology. The Geophysics sub-unit of HIGP has 12 tenured faculty and 11 soft money research faculty.

Briefly describe the program (no more than half a page):
There is a very broad range of research fields within the geophysics component of HIGP, including (a) geophysical instrument development, (b) infrasound, (c) GPS, geodesy, and geophysics, (d) high pressure mineral physics, (e) seismology, (f) marine remote sensing and seafloor mapping, (g) climate change studies, (h) and paleo-magnetism and marine geophysics. The Institute serves society and the State of Hawaii by acquiring and disseminating new knowledge about the Earth and other planetary bodies, and developing and introducing leading edge technologies and a highly trained workforce to the State economy. HIGP raised $7.743M (2006), $11.311M (2007), and $10.081M (2008) in external funding, which contrasts with $3.582M it received in G-fund support (2008); typically, there is a >3:1 multiplier for any dollar spent by the State when considering the funds raised by HIGP. The Geophysics/HIGP maintains several facilities of international stature, including the Pacific Infrasound Laboratory, the Hawaii Mapping Research Group, the Petrofabrics and Paleomagnetism Laboratory, the Pacific GPS Facility, and a Raman Spectroscopy Laboratory. The Director of the new DHS Center of Excellence in Maritime Domain Awareness is a Geophysics/HIGP faculty member. Major funding comes from NSF, DoD, NASA, DHS, and NOAA.
### RESEARCH - Program Name: HIGP - Geophysics

#### CENTRALITY AND ALIGNMENT: Max Score = 28

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<thead>
<tr>
<th>Score</th>
<th>% Total</th>
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**UHM Vision/WASC Alignment**
- UHM vision: 4
- Strengthen global leadership: 4
- Advancing area of strength: 4

**Land-Sea-Space Grant**
- Addressing an area expected in a land/sea/space institution: 4

**Statute or Regulation**
- Meets statutory or government regulations: 4
- State Needs:
  - Addressing needs identified as high priority in the state: 4
  - Engages stakeholders that are a priority to UHM: 4

**EXTERNAL DEMAND: Continued**

**Partnerships**
- Partnerships with key external stakeholders: 4
- Partnerships with native Hawaiian communities: 2
- Work used by corporate/business interests: 3
- Work used by government interests: 4

**INTERNAL DEMAND: Max Score = 28**

**Reliance of Others**
- Collaboration with faculty/staff from other units: 4
- Symposia/workshops/seminars value/attendance: 4
- Experiential Learning/research opportunities for students: 4

**Facilities and Services**
- Use of facilities, tools/labs by other units: 3
- Enhance Research:
  - Opportunities for faculty/staff in other units: 4
  - Supports graduate students and postdocs: 4
  - New areas of academic expertise: 4

**QUALITY/INTEGRITY: Max Score = 44**

**Quality Activities**
- Training and public service work: 3
- Accountability metrics and routinely uses them: 3

**Quality Facilities**
- Good plan for adequate investment in facilities: 4
- Facilities and equipment availability and condition: 4

**Quality Research**
- Obtaining highly competitive contracts/grants: 4
- Research with prestigious natl/intn universities: 4
- Positive impact on UHM research reputation: 4

**Quality Faculty/Staff**
- Awarded external academic recognition: 4
- Jointly authored publications: 4
- Faculty/staff publish high number of reviewed papers: 4
- Steady increase in number of citations: 4

**COST/REVENUE GENERATION (PRODUCTIVITY): Max Score = 36**

**Revenue Generation**
- Generates more revenue vs. expenses: 4
- Leveraging substantial external funding: 4

**Operating Expenses**
- Favorable operating expense/costs: 4

**Administrative Costs**
- ORU typically funded by agencies with higher indirect costs: 4

**Efficiency/Productivity**
- Research/scholarship as compared to other units: 4
- Participation in educational and public service: 3
- Support of Graduate students on external funds: 4

**SPECIALIZED NICHE/COMPETITIVE ADVANTAGE: Max Score = 20**

**Uniqueness/Signature**
- Uniqueness in state/nation: 4
- Area of excellence or emerging area of excellence: 4
- Record in meeting needs of Hawaii and indigenous people: 3

**Reputation/Peers**
- National or international recognition: 4

**Competitive Advantage**
- Scholarship level as compared to similar programs: 4

**CRITICAL MASS: Max Score = 16**

**Peer Comparisons**
- National/international recognition/visibility: 4

**Fundamental Trends**
- Award amounts and number of contracts/grants: 4
- Number of staff associated with ORU: 3

**Ability to Deliver**
- Staff expertise adequate to meet program needs: 3

**EXTERNAL DEMAND: Max Score = 48**

**Needs/Trends**
- Current trends show demand for research: 4
- Call on staff to provide expert opinions in past 3 yrs: 3
- Policy impact on state/nation: 4
- Increase in economic well-being of state/nation: 4
- Enriching training and public service: 3
- Responding to scientific needs of state/nation: 4
- Work has resulted in products with external demand: 3
- Work resulting in technology commercialization/patents: 3

**Grand Total Score (%) = 93.636**
Geophysics/HIGP: Summary Narrative and Overall Rationale for Prioritization

Centrality and Alignment

Vision/WASC Alignment: This is the premier research group for geophysical research, including the Hawaii Marine Research Group, the DHS Center of Excellence, The Infrasound Lab, High Pressure Mineral Physics Lab, and Pacific Geodesy Lab.

Land-Sea-Space Grant: Provides mentors for Space Grant students and supports Sea Grant research initiatives.

Statute or Regulation: Infrasound research is a critical component of Global Nuclear Test Ban Verification Treaty. We provide support to USGS on earthquake and volcanic risks, volcano deformation. We are taking the lead role in the Hawaii Undersea Military Munitions Assessment program to characterize WWII munitions dumped off-shore.

State Needs: Provides geophysical advice to the State, with a focus on earthquake risk, volcanic hazards and other geophysical phenomena. HIGP is a key player in the ocean observing system, which will provide the State and general public with timely information about our coastal environment. Faculty have been asked to provided oral and written testimony to Hawaii State House-Senate informational briefing on the Kiholo Bay earthquake and Hawaii natural disasters. Numerous newspapers and TV interviews.

Quality/Integrity

Quality Activities: Geophysics at UHM has been recently recognized as the 7th ranked program in the U.S. (http://www.hawaii.edu/cgi-bin/uhnews?20080414092407). The Center for the Study Active Volcanoes provides professional training in volcano hazards monitoring to international scientists and technicians. 5-Year Strategic Plan is in place.

Quality Facilities: We operate several facilities of national/international stature, including the Infrasound Network, the Pacific GPS/Geodesy Lab, a high pressure mineral physics lab, laser Raman spectroscopy lab, and a rock magnetism lab.

Quality Research: 26 papers in 2007; 33 papers in 2006. Faculty have received prestigious international fellowship (Alexander von Humboldt Fellowship), and are invited to work at foreign universities and at national Federal laboratories.


Critical Mass

Peer Comparisons: National leader in laser Raman research, geodesy, high pressure mineral physics, ocean floor mapping, and infrasound.

Funding Trends: Sustaining 3:1 level of grants to State support.

Ability to Deliver: Imaging sonar group below critical number, geodesy is also understaffed to meet growing demand for State-wide projects. High pressure mineral physics will have problems when expected retirements take place soon.

External Demand

Needs/Trends: Nuclear regulations require our infrasound work. We provide State with experts in earthquake and volcano risk. Faculty members are the Chair of the Research
Advisory Committee of the NELHA; have served on the committee and the Board of Directors of NELHA since 1991; Chair the Hawaii State Earthquake Advisory Board (to State Civil Defense); served as a member since 2001. Member of the Hazards Forum (review and evaluation committee for hazards funding for State Civil Defense) since 2004. Also Working with Hawaii County Office of Civil Defense on updating County Multi-Hazards Mitigation Plan (required for County to be eligible for certain types of disaster mitigation funding from FEMA).

**Partnerships:** Almost all the faculty collaborate with national and/or international external partners. Strong collaborations with US Geological Survey’s Hawaiian Volcano Observatory. We work with the South Pacific nations through SOPAC, and those involved with the international regional ocean observing system, with a focus on the vulnerability of S. Pacific islands to climate change. Some faculty have been partially supported by industry in support of their research.

**Internal Demand**

**Facilities and Services:** Geophysics/HIGP has been an important partner in the development of a UHM cooperative agreement with the Hawaii Volcano Observatory.

**Enhanced Research:** Geophysics/HIGP has a central role in the School’s Ocean Observing System program. This includes climate change and the monitoring of sea-level rise, as well as the integration of multiple geophysical data sets. Faculty members have been and are collaborating with the Faculty in the College of Natural Science (Physics and Chemistry) and College of Engineering (Electrical Engineering). Currently the HIG faculty have collaborative extramural funded project with the Faculty in the John A. Burns School of Medicine and Cancer Research Center of Hawaii as well as participating in UH Astrobiology Institute.

**Costs/Revenue Generation (Productivity)**

**Revenue Generation/Operating Expenses/Administrative Costs:** Total HIGP generates >$3 for every $1 provided by State.

**Efficiency/Productivity:** Support some graduate students and many post-docs on grants. Many of these students come from other departments outside of SOEST.

**Specialized Niche/Competitive Advantage**

**Uniqueness/signature:** Very highly rated infrasound, imaging sonar, geophysics, laser and Homeland Security programs. The CSAV International Training Program is longest running, and often the only, field school for professional volcano hazards training.

**Reputation/Peers:** Internationally recognized programs – infrasound, geodesy, marine mapping, high pressure mineral physics, and laser Raman technology.

**Competitive Advantage:** Infrasound laboratory benefits from its critical location in the Pacific, and provides data to Regulatory Commission for significant part of their area of interest. Marine Mapping Group has unique benefit of being based in the middle of Pacific, making us highly competitive for access to important marine geology/geophysics sites. Climate change studies, and the role of geodesy in monitoring climate change, facilitated by our location on island in middle of Pacific.