Title of Project: Huxley College GPS Equipment

Department/Organization: Huxley College of the Environment

Name(s) of Project Applicant(s)

- Name Troy Abel MS 9085 Phone 6133
- Name Michael Medler MS 9085 Phone 3173
- Name Stefan Freelan MS 9085 Phone 2949

Principal Contact person:

- Name Stefan Freelan Phone 2949

Amount Requested for Project: 10,740.00

Contribution by Requesting Organization: 1,000.00

I. Project Abstract

Give an overview of the existing environment, and summarize the items being requested. Briefly explain how the requested technology will:

- improve student access to technological resources, and/or
- enhance the quality of the student academic experiences through the use of technology,
- increase the integration of technology into the curriculum.

Huxley College’s Spatial Analysis Lab has maintained a collection of GPS (Global Positioning System) equipment for over a decade, enabling students to collect spatial data in the field for use with Geographic Information Systems (GIS) and Remote Sensing applications. Beginning in 1999, an STF award enabled the purchase of 14 high-end GPS receivers for both classroom and field use. As GPS technology has changed and hardware options have become both smaller and less expensive we have shifted to a hybrid system of equipment: in 2005 we purchased 20 relatively inexpensive units for general classroom use and a single high-end receiver for advanced students requiring greater accuracy and precision. In 2007 we purchased 2 mid-level receivers to supplement the equipment available for projects requiring higher-precision data. This hybrid model has allowed us to maintain a full ‘classroom set,’ providing an accessible entry point into the technology, while simultaneously being able to purchase ‘cutting edge’ equipment as it becomes available to support students with higher accuracy data needs. The field of GPS continues to evolve rapidly, and purchasing limited equipment every few years allows us to provide WWU students with access to current technology being used in the field, without having to replace the entire classroom set. Continuing with this model we are requesting funds to purchase 1 high-end, ‘ruggedized’, waterproof unit, 2 mid-level but more portable units and 10 replacements for the inexpensive units we use in the classrooms (which have consequently suffered the most use).
II. Relationship to STF Objectives and Impact on Existing Academic Programs

Describe your proposed project in detail. Tell us how it will provide positive benefits to specific courses or instructional programs.

1. From a student perspective:

   a. How would this project provide additional student access to technological resources?

      The requested GPS receivers fall into two categories: 10 replacement units for our classroom set of inexpensive, easy to use receivers and 3 mid-, higher-end units suitable for more demanding field applications. Maintaining a full classroom set of introductory level receivers has greatly increased the number of students who have been exposed to this technology. At the same time, having higher end units available for projects requiring greater accuracy allows students access to professional grade equipment. All of the proposed GPS equipment (along with the current equipment still in use) will continue to be available for classroom use and student checkout for academic projects seven days a week, year-round. Historically, this equipment has been used by Geography, Environmental Studies, Environmental Science, Environmental Education, Geology, Biology and Anthropology courses and research projects for data collection in conjunction with spatial analysis using GIS and/or Remote Sensing applications. Instructional information for the GPS equipment is provided via classes and/or Huxley’s free GPS workshops (offered quarterly).

   b. How would this project broaden or enhance the quality of the student’s academic experience through the proposed technology?

      The classroom set of 10 inexpensive receivers will replace some of the existing units that are beginning to show the signs of age and frequent use. Having a full set of equipment allows for an entire class or large group to gain experience and instruction simultaneously. The existing units have proved both versatile and accessible for the beginner student. Their ease of use for both data collection and data download has enabled numerous students to incorporate their own field data into their academic projects. While the current generation of receivers (requested) include hardware improvements the user interface remains essentially the same as the units we purchased in 2005, enabling us to replace a sub-set of the entire collection while still maintaining a cohesive classroom set. The higher-end units we are requesting will provide students with experience using current ‘cutting-edge’ technology. The 2 mid-level units include faster processors and more memory than the units we currently have, in addition to a built-in GPS-enabled camera and ‘shirt-pocket’ size. The final GPS receiver we are requesting is a ‘rugged,’ waterproof unit built on a tablet PC with a built-in GPS-enabled camera. This larger format, rugged receiver will allow it to be used in more ‘hostile’ environmental conditions such as ongoing field work in the tropics and damp wintertime/maritime data collection in the Pacific Northwest.
c. How would this project integrate technology into coursework?

Maintaining a full classroom set of GPS receivers enables us to continue to provide an introduction to GPS for an entire class as well as the opportunity to include GPS in more advanced course lab exercises. Courses such as Huxley’s *Intermediate GIS* (EGEO-450) now depend upon a full compliment of receivers for multiple exercises throughout the quarter. Having a range of equipment of varying sizes and accuracy levels available for student checkout also allows the use of GPS technology for individual class projects. GPS technology is increasingly used by GIS, Remote Sensing, Geography, Planning, Geology, Biology and Anthropology courses and research projects for data collection. As GPS becomes more and more a part of every day life (the incorporation of GPS technology into smart phones for example) we believe that high-end training and equipment will continue to be of value to Western students in many disciplines.

2. From a faculty perspective, explain how this project will enhance your ability to help students meet their educational goals.

The availability of easy to use handheld GPS equipment creates an accessible entry point for students and provides a training platform for those wishing to transition to the more advanced equipment for more demanding applications. Having a full classroom set of GPS receivers enables us to continue to include GPS in a variety of classes as well as our quarterly GPS workshops. This in turn provides students the tools they need to incorporate GPS in their field data collection, including, for those who desire it, access to high-end equipment. Purchasing additional mid- and high-end receivers, especially with the inclusion of the included cameras and rugged waterproof design, will be valuable additions to the equipment we have available for checkout. Being able to provide students with this type of training and equipment helps them to graduate with the skills they will need in the professional workplace.

3. Will other departments be involved with this project? If so, please describe.

The Geology, Biology and Anthropology Departments make frequent use of the existing GPS equipment for courses as well as ongoing research and will continue to do so with the proposed new equipment. In addition, students and faculty from other departments as well as Fairhaven College make use of GPS equipment on an occasional basis. While Geography, Environmental Studies and Environmental Sciences are the most frequent users of the equipment, during the summer months it is not unusual to have almost every GPS receiver we own either checked out or reserved by students from numerous departments and colleges.
4. Has any part of this project previously been funded by STF?

No ☐  Yes ☑  Please describe:

In 1999 the Spatial Analysis Lab received STF funds for the purchase of GPS equipment. This equipment, while still functional, is now out of date for most applications, especially for general purpose navigation and data collection. In 2005 STF funds enabled the purchase of 20, inexpensive GPS receivers (our current ‘classroom set’) and a single high-end receiver. While still very much in use, many of the classroom units are now beginning to show their age and the abuses of frequent field exposure. At this point in time 2 of the units are non-functional while 3 others have significant ‘issues.’ It is expected that we will continue to see a gradual decline in the number of functional units, all of which are now out of warranty. While the high-end unit we purchased in 2005 is still very serviceable, it is not waterproof or otherwise ‘ruggedized’ for harsh field work, nor does it include some of the current hardware enhancements such as a GPS enabled camera or wireless connectivity. Other, mid-level equipment has been purchased with departmental funds.

III. Utilization

1. Please list the anticipated number of times and duration per each use, per quarter, that the proposed technology will be used by students.

In a typical quarter as many as three different courses may use the classroom set for different exercises at different times in addition to the free GPS workshop. Individual receivers are also checked out by students for projects throughout the year, scheduled around the needs of courses. These courses and individual projects vary in the type of equipment they need as well as the duration. It is not usual for any given week of the year to have from 2 to 6 units checked out. Given the nature of field work, the demand for GPS equipment is greater in the summer than during the main academic year. Due to the high demand from multiple departments for GPS equipment over the summer we have found it necessary to solicit reservations in the spring so as to best work out a schedule in advance, especially for our limited supply of mid- and high-end receivers.

To date, our GPS equipment has been used by Western students collecting data from California to Alaska, and as far afield as Costa Rica, Greece and Siberia. The GPS equipment is used by both undergraduate and graduate students alike, and has also been used with High School students (in conjunction with Environmental Education field classes) and with parents and grandparents of WWU students for various family ‘outreach’ events on campus.
### IV. Project Budget

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Item Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Garmin GPSmap60 CSx (waterproof, color screen, micro SD Card slot and base map data)</td>
<td>10</td>
<td>350</td>
<td>3,500</td>
</tr>
<tr>
<td>Trimble JUNO SB (Windows Mobile, 533 MHz processor, 128 MB RAM, Bluetooth and Wireless LAN, built-in 3 megapixel camera)</td>
<td>2</td>
<td>674</td>
<td>1,348</td>
</tr>
<tr>
<td>Trimble YUMA (rugged, waterproof tablet PC, Windows 7, 1.6 GHz processor, 1 GB RAM, 32 GB solid state hard drive, Bluetooth and WiFi, 2 megapixel camera,)</td>
<td>1</td>
<td>3,712</td>
<td>3,712</td>
</tr>
<tr>
<td>Software for 2 Trimble receivers and lab software for downloading and processing data (“academic lab package pricing” including 2 licenses of: TerraSync Professional, Pathfinder Office, GPS Analyst)</td>
<td>1</td>
<td>1,995</td>
<td>1,995</td>
</tr>
<tr>
<td>Software for 3rd Trimble receiver (TerraSync Standard)</td>
<td>1</td>
<td>265</td>
<td>265</td>
</tr>
</tbody>
</table>

**subtotal**  
10,820

**Shipping (taxable)**

**Tax (8.5%)**  
920

**Total**  
11,740

**Departmental contribution 1,000**  
1,000

**Total requested (STF)**  
10,740

We recognize your proposed budget as an estimate. Final funding for successful projects will be established after thorough technical review; some costs may need adjusting due to price changes. The STF Committee may impose special conditions on a project; see the STF Program Description.

1. What funding is available from your department or other sources?

   **Huxley College and the Spatial Analysis Lab will contribute $1,000 of the total cost for the purchase of this equipment.**

2. Could this project be divided into discrete elements that could be funded separately?

   **No ☐ Yes ☒** Please summarize and prioritize project segments with cost estimate for each segment.

   The proposal could be divided into three segments (Huxley to fund 10% of each):  
   1) 10 replacement units (Garmin GPSmap 60 CSx) for the current classroom set (top priority, estimated cost of $ 3,800.00)
2) Single rugged, high-end receiver (YUMA) and single mid-level receiver (JUNO) and software (second highest priority, estimated cost $6,930)
3) Second JUNO receiver and software (estimated cost $1,020)

At this point we feel that maintaining a full classroom set of GPS receivers is our highest priority. At the same time we feel that continuing to invest in new technology as it comes available is essential in providing Western students access to the current industry equipment being used by professionals in the field. Over the past few years we have seen the benefits of having a ‘hybrid’ system (introductory, mid- and high-end level equipment) available for student use. For the continued success of this strategy it is important that we maintain a range of current generation equipment.

3. Are lab fees charged for any of the courses that will use this equipment?

Yes ❑ No ❑  If yes, please note: The total funding requested from the STF must reflect the amount collected from course fees for equipment replacement and/or equipment acquisition. All proposals asking for course fees will be reviewed by the Academic Budget Office.

While many of the classes making use of GPS equipment (GIS and Remote Sensing courses, for example) have existing lab fees, these fees are first and foremost for the purchase of lab consumables (paper, ink, projector bulbs, etc.). Secondarily, these fees may be used for software purchases and/or hardware repairs and maintenance as necessary. These funds, however, are not intended or adequate for the purchase of new equipment. There are no course fees for equipment acquisition.

V. Impact on Existing Resources

The proposal should address your project’s potential impact on existing resources. Special attention should be given to impact on data transmission networks (e.g., sources accessed, networking equipment, etc.), and personnel (e.g., staffing, administrative support, faculty support, etc.).

Any proposal that includes the replacement of computers should specifically address the feasibility and cost effectiveness of upgrading the computers rather than replacing the computers.

1. Describe how existing equipment is used. Contrast this to projected use if your project was funded.

Existing GPS equipment is used by various classes and for individual student checkout (primarily for academic projects, but secondarily for recreational and safety navigation purposes). Equipment may be reserved and checked out year-round. Student demand for GPS equipment has steadily grown since we first purchased our receivers in 1999 and we expect this trend to continue as the fields of GIS and Remote Sensing are increasingly employed for a wide variety of academic research. Purchasing this new equipment will allow us to continue to maintain a full classroom set and to expand our selection of higher-end equipment (historically the most in demand due to limited supply).
2. Is similar equipment or technology available elsewhere on campus—such as the Student Technology Center, Classroom Services, Video Services, Western Libraries, a college lab? If so, please describe why the existing equipment does not meet the needs outlined in this proposal.

Shannon Point Marine Center has a few marine GPS receivers installed onboard some of their boats. A few faculty from various departments (e.g., Geology and Biology in addition to Huxley) have limited equipment purchased for specific projects (often in association with a grant), not available to other faculty or for student checkout. Neither the Outdoor Center nor the Student Technology Center on campus have GPS equipment at this point in time.

3. If this project involves the replacement of equipment:
   a. Describe the “before and after” configuration changes. A spreadsheet reflecting these changes may be attached.

   **Current:**
   - 9 Trimble Geo-3 (originally purchased 14 units in 1999)
   - 1 Trimble Geo-XT (purchased in 2005, high-end handheld, still in regular use)
   - 2 Trimble JUNO (purchased in 2007 with non-STF funds, small, first generation of mid-level receiver, no camera and relatively small processor, still very much in use and demand)
   - 18 Garmin GPSmap60 (originally purchased 20 units in 2005 for our ‘classroom set’ of GPS receivers, 3 other units show significant signs of wear)

   **Proposed, as above plus:**
   - 10 additional Garmin GPSmap60 (maintaining a full classroom set, with a few ‘spares,’ at least in the short run)
   - 2 Trimble JUNO receivers (small, mid-level receiver, with camera, wireless connectivity and faster processor than existing units)
   - 1 Trimble YUMA (a high-end, waterproof, ruggedized receiver with a camera, wireless connectivity and built upon a full tablet PC)

   b. Describe the costs and benefits of replacing vs. upgrading (if applicable).

   Upgrading old equipment to new standards is not an option. Existing equipment is currently out of warranty.

4. Will this equipment be available to students outside your department?

   No ☐ Yes ☑ If the proposed technology will be used by students outside of your department, please describe how they would gain access, how the availability of the equipment will be publicized, the hours/week when the equipment will be available, and any costs that would apply.

   Students can reserve and check our units thru Huxley College’s Spatial Analysis Lab. Classroom uses have first priority, followed by group and individual academic projects. Students are encouraged to attend one of Huxley’s free GPS Workshops, offered each quarter, to become familiar with the equipment prior to checking it out.
5. Does this project involve the check-out of equipment to students?

No ☐ Yes ☒ If yes, please discuss whether or not the Student Technology Center could be assigned this task.

Given the specialized nature of the equipment use (including training, recommendations for different equipment for specific tasks, and the different requirements for downloading data into appropriate data formats for use with GIS and/or Remote Sensing software packages) it is unlikely that the Student Technology Center would have the desire or expertise to be able to provide students with the information they would need to successfully use this equipment.

6. Does the department have adequate operating funds to provide ongoing maintenance and support?

No ☐ Yes ☒ Please describe.

Courses using Huxley’s Spatial Analysis Lab have a required Lab Fee that is intended for lab consumables (paper, ink, etc.) and for maintenance of lab equipment, including our GPS receivers.

7. Does the department have adequate personnel funds to provide ongoing staff support for this project?

No ☐ Yes ☒ Please describe.

Existing Huxley College staff (GIS Specialist and Spatial Analysis Lab Manager) provide training and check-out for GPS equipment. New equipment will be stored and checked out in the same manner as has been used to date (reservations for classroom and/or individual student projects). Existing classroom presentations and GPS workshops on the topic will be adapted to include the new equipment.

VI. Space and Site Information

This section addresses any space alteration or site preparation necessary for the proposed project. Site alterations include painting, holes in walls, security systems, carpeting, construction, lighting changes, or conversion of a lab or office.

1. Location for installation of equipment or technology.

    Stored in a locked closet in AH-24 (adjacent to Huxley’s Spatial Analysis Lab).

2. Is site modification required?

    No ☐ Yes ☒ If yes, please describe (electrical, security, network access, etc.).

    None needed.

3. Will this project use space not currently assigned to your department or area?

    No ☐ Yes ☒ Please describe.

    Stored with existing equipment.
VII. Project Schedule

This section describes your overall implementation schedule. Project awards will be announced by the end of spring quarter. It is anticipated that projects would be substantially completed by the end of the calendar year. If there is any site preparation involved, please align your project schedule with the schedule provided by Space Administration and Facilities Management.

If at all possible we would hope to be able to purchase the Trimble equipment in time for 2010 summer field work. No site preparation needed.

VIII. Constraints

This section should list any external or internal factors that could affect your project schedule, project objectives, or the project budget (e.g., if external approval is required for curricular changes, or if funding must be received by a certain date).

1. Please describe any constraints to this project.

None.

IX. External Funding

This section must be completed for any projects over $100,000. For project budgets of this scale, the applicant should investigate opportunities for obtaining external funding for all or part of the proposed project.

1. Describe the external organization(s) able to provide funding in support of this project.

N/A

2. Describe the funding cycle for these requests (submission dates, projected award dates).

N/A

3. Indicate the amount of external funding that would be requested.

N/A

4. In cases where joint funding is requested, what will happen if the STF award is made and the external grant is not awarded?

N/A

5. Has a grant proposal already been submitted for all or part of the proposed STF project?

N/A