

High Tech Maui

Maui High Performance Computing Center Creates Access Grid for Project TOUCH



Students and developers interact with Toma, a virtual patient which responds to questions and gives vital signs for accurate, "real-life" diagnoses.

Quality healthcare in rural communities is often challenging due to geographic isolation and cultural barriers, creating a lack of educational opportunities and funding resulting in a shortage of providers.

Long distance learning has been identified as a tool to enable students to get a degree without leaving their hometowns and to encourage them to set up a practice there upon graduation.

In an effort to support these endeavors, Maui High Performance Computing Center (MHPCC) installed and maintains a full Access Grid at the University of Hawaii (UH) and a mini- Access Grid at Maui Community College (MCC) to assist the John A. Burns School of Medicine at UH and the University of New Mexico (UNM) School of Medicine on Project TOUCH

(Telehealth Outreach for Unified Community Health) who have partnered to help deliver better healthcare options to their unique communities.

Project TOUCH recently created and tested a virtual reality problem-based learning (PBL) education-

al system to demonstrate that advanced computing technology can improve medical training in rural areas. During Phase 1, a traumatic brain injury served as the first clinical case for 21 students at UH, two students at MCC, and 21 students at UNM. Participants at each location wear head-mounted displays and four position trackers on their head, lower back and both hands to collaborate in a 3D virtual reality classroom where they see each other as full moving figures.

Participants can manipulate their viewpoints and use voice recognition to speak with and examine a virtual patient and to request information for diagnostic purposes, such as vital signs. The "classroom" meets over the emerging Internet Access Grid, which employs broad bandwidth Next Generation Internet video conferencing to create real-time interactions between multiple participants, applications and sites.

Inspired by the Chinese proverb, "I hear and I forget, I see and I remember, I do and I understand!", Project TOUCH's goal is to help student's better

understand concepts and increase retention while assisting professors to more efficiently and accurately evaluate the student's performance and level of understanding. Immersive virtual reality technology creates "real-life" scenarios that engage students and encourage them to become actively involved in each case study more seriously than if reading about it in a textbook. For example, if the student does not ask the virtual patient the necessary questions to obtain an accurate diagnosis or is too slow in solving the patient's condition, the severity of symptoms increase to the point where the patient may even expire. In

virtual reality, the student can simply start over with the same patient, having learned the necessity of responding quickly and precisely.

In Spring 2002, Phase 2 of Project TOUCH will focus on evaluating the difference between students following an identical clinical case model using these cutting-edge technologies versus students using paper-based tools. Project TOUCH expects to incorporate their virtual reality PBL system into the UH and UNM curriculum by Spring 2004. In the future, Project TOUCH will expand to include more case scenarios and clinical models, PC-versions for increased distribution and opportunities for nursing, pharmacy and other health sciences.

Project TOUCH is a collaboration between the State of Hawaii, the State of New Mexico, MHPCC, the Albuquerque High Performance Computing Center, Sandia National Laboratories, the National Foundation for Functional Brain Imaging, MCC and the Schools of Medicine of UH and UNM. **4119**

Immersive virtual reality technology creates real-life scenarios



1 Symantec recently presented a Security Summit with the National Association of Counties held at the Maui Research & Technology Center. The sessions focused on security solutions to the issue of blended threats that impact our national, corporate and personal security.

2 The annual International Protea Association Conference will be held March 9 - 14, 2002 in Wailea, Maui with scientific seminars and field trips to the farms of Maui, including a visit to the University of Hawaii's Kula Agricultural Experiment Station. The conference timing coincides with the blooming of the newest cultivars and provides a complete scientific update on research being conducted around the world.

3 Economics went on-line for Maui teachers last Fall in a collaboration between Maui Economic Development Board and Maui Community College. The Internet-based "Fundamentals of Economics" covers economic concepts and guidance on conveying them in the classroom.

Recent weather patterns created snow atop Haleakala for the first time in 10 years and 3,000 people made their way to the visitor center in Haleakala National Park. This dramatic vista juxtaposes Maui Space Surveillance Site blanketed in snow to the lush valley and the Pacific Ocean at sea level 10,000 feet below.

Tracking Objects In Office Space



John Fletcher,
President of Space Data

About six years ago, John Fletcher seriously began to consider moving the headquarters of his facilities management software company, Space Data, to Hawaii to take advantage of the strategic time zone for launching into the Asian market. John's initial concern that he might not be able to successfully run his business from Hawaii or that he might miss the L.A. lifestyle stalled his move until he decided to test the waters in early 1999 by working from a Maui condo for two months. Without announcing the move to any of his clients or his employees who are located in Seattle, Ohio, and California, John forwarded all of his numbers to Maui to see how long he could pull it off. The slight time difference and Maui's high

bandwidth fooled everyone except a savvy client who noticed the return area code on a fax. "That did it," says John. "I knew that operating my company on Maui would be no different from when I lived in L.A. or in Seattle." After 18 months of successful operation from Maui, John has decided to dissolve his corporation in California and re-incorporate it here in Hawaii to take advantage of Hawaii's bold new high tech tax incentives.

Space Data was launched 12 years ago in Los Angeles and has been managing property, employees, departmental space allocation, telecommunications equipment and fixed assets for large corporations such as Boeing, Blue Cross, World Savings, Disney and Toyota. By using this intuitive software, a facilities department can easily track assets in a particular office, like a computer, by clicking on a graphic image of the office in their building's floor plan, then narrowing it down to click on an icon of the computer to see the original cost and purchase date, the current user, network connections, and installed software and hardware.

Currently, John is preparing to embark upon a new venture by transforming Space Data into an ASP (application service provider) that innovatively combines facilities management, workflow management and interactive collaboration software into a secure online service that will better serve smaller companies in a cost-effective manner. Clients can add, delete, move or edit any asset by simply submitting an online form that immediately updates their company's records. When he officially launches the ASP in March 2002, he expects Maui and Hawaii companies to benefit. Space Data will host the server on Maui with technical support staff spread out across the country to provide 24-hour assistance.

Now that John has been on Maui for more than a year, he has established a routine that starts most workdays at 5 a.m. and ends by 2 p.m., then includes time on the beach. "I am in paradise and running my business. I am very content," beams John. "My motto has always been: I don't want to live where I work. I want to work where I live."

John doesn't see any problems for a company wanting to relocate or expand to Maui while retaining mainland clients. When asked what advice he would offer, John replied, "The Maui Research & Technology Center has been a really good resource. The knowledge and networking available at their workshops has been invaluable." 417B

Head-Mounted Mouse For Ga

Even in these modern times, a growing group of disabled persons have, up until now, missed out on the exploding world of technology because they cannot easily operate a keyboard or mouse. Maui engineer Michael Polosi recognized this dilemma and designed MiracleMouse™, a small, light and comfortable head mounted control device. A slight tilt of the head in any direction can move the mouse, click on an icon or type a letter, depending on how the individual has programmed it to their capabilities.

For serious gamers, a simplified version called Cymouse™ transforms any computer game into a fully 3-D interactive adventure by using head movements to control a character, in addition to the traditional 2-D mouse, keyboard and joystick.

In mid-1999, Polosi began collaboration with long-time Maui businessman James Whitcomb to turn his idea into a marketable product. By spring of 1999, Maui Innovative Peripherals was incorporated and already has attracted serious interest from large distributors, major domestic and international chain stores, the U.S. government, and insurance companies. Once their product begins commercial distribution in early February, Maui



Tracking Man-Made Space Objects

Since the launch of Sputnik in 1957, trackable space objects have increased to more than 9,000 objects. As commercial, government, research, and academic agencies discover new ways to use our Earth's space environment, the number of orbiting satellites and associated debris objects increases as does the importance of protecting manned and unmanned space-based assets.

In a recent mission, a shuttle returned to Earth with a giant crack in its one-foot thick windshield. After 6 months of testing, NASA discovered that a paint chip had caused the damage.

Imagine the destruction an object the size of a baseball in orbit would do if it collided with a satellite. That's why it is imperative to be able to measure, determine and catalog, with high accuracy, the orbits of all objects in the space environment to prevent collisions with the costly satellites that track our weather, entertain us with satellite TV, connect all of us via our cell phones and aid in Department of Defense surveillance. Current technology can track objects larger than the size of a baseball more than 20,000 miles in deep space.

This heightened awareness of the space environment led Detachment 15 of the Air Force Research Laboratory's Directed Energy Directorate to initiate a project to develop and integrate a suite of sensor systems with fields of view greater than one degree. The Phoenix Sensor system, being developed and integrated at the Remote Maui Experimental (RME) site located at the Maui Research and Technology Park, is based on the original Baker-Nunn camera

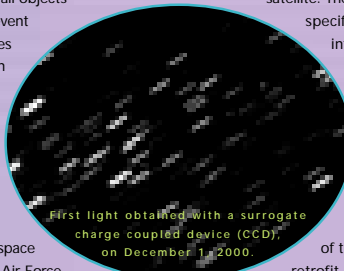
system. Though the Phoenix Sensor was once retired, it is back on Maui and will be one of AMOS' widest field-of-view optical sensor systems.

The original Baker-Nunn system was implemented in 1957 by the Smithsonian Institute as a global network of 12 telescope/camera systems dedicated to tracking the Vanguard satellite. These large telescopic cameras were designed specifically to provide space object tracking information on satellites. Haleakala was one of the 12 global sites. The current Ground-based Electro-Optical Deep Space Surveillance (GEODSS) System replaced the original Baker-Nunn system in the early 1980s.

The Baker-Nunn telescopes were stored for almost two decades. It was decided this past year to resurrect one of the original Baker-Nunn telescopes and to retrofit it with a state-of-the-art charge coupled device (CCD). Since the original Baker-Nunn camera was based on curved photographic plates, retrofitting it with a flat-faced CCD was not trivial. The new CCD allows for digital imagery with very high sensitivity (~90% quantum efficiency). The Lockheed-manufactured CCD will have 4096 x 4096 x 15 µ pixels and will provide a field of view of approximately six degrees. 417B



The original Baker-Nunn telescope retrofitted with a new charge coupled device which allows for digital imagery with very high sensitivity.



Games And The Disabled

Innovative Peripherals will run a global advertising campaign in gaming magazines.

Unlike existing head trackers and head pointers, MiracleMouse™, is completely safe, extremely responsive, and plug-n-play simple. 3-D graphics professionals, motion picture computer-aided designers, MRI operators, and traditional office employees will work faster and more efficiently while multi-tasking. Even medical treatment will benefit. For example, a brain surgeon would be able to simply tilt her head slightly to view a different MRI angle rather than having a technical assistant manually maneuver the equipment.

Maui Innovative Peripherals has been featured on *CNN Moneyline*, *Technology Today TV* and the front page of *Electronic Entertainment Expo* magazine. Interestingly, the upcoming *World Cyber Games* in Korea has declined their application to compete, expressing the concern that Cymouse™ would be an unfair competitive advantage over opponents limited by traditional peripherals. **ET10**



Miracle Mouse, a head-mounted peripheral, eliminates the need for a traditional mouse, increasing efficiency and reducing carpal tunnel syndrome. It is especially useful for persons with disabilities as it can also replace the keyboard. **ET10**

Dissolving Language Barriers

In 1996, Canadian-born entrepreneur Chelsea Hill became clear that she wanted to be involved with high tech while continuing to live on Maui and to employ her skills translating and interpreting French and Italian. "At a workshop sponsored by the University of Hawaii Small Business Development Center," explains Hill, "I decided to turn my consulting job into a business." In 1998, Hill decided to go global with her skills and network, forming the full-service translation company, Origin - The Language Agency.

Taking full advantage of present-day high tech facilities, Hill is able to conduct business worldwide from her pastoral home office in Makawao, Maui where banana trees and rainbows abound. Maui's airport is close by and speedy Internet service with high bandwidth makes running her business a breeze.



Chelsea Hill, President of Origin - The Language Agency, at her pastoral office in upcountry, Maui. **ET10**

Headquartered in Maui, with offices in Seattle, Canada, and the UK, and 450 professional contractors translating and interpreting 85 languages in over 30 countries, Hill's business continues to grow despite today's troubled economy.

Hill explains, "We noticed in August 2001 that some larger clients were beginning to tighten their belts, streamlining their internal process by eliminating positions and increasing outsourcing. This resulted in additional business because they turned to us as their turn-key vendor."

Origin currently provides an international clientele with services such as web site localization, document translation, subtitling, simultaneous interpreting for conferences and seminars, voice-overs and dubbing,

audio tape narration, on-call interpreting for emergency situations, and registering multi-lingual domain names anywhere on the planet. Recently, the majority of Origin's sales have been in the translation of corporate internal documents into the native languages of affiliates or foreign corporate branches. Origin receives daily requests for many different languages, and has been working a great deal lately in Russian and Chinese. Although Origin partners with vendors worldwide, Hill says that they are especially pleased to work their Maui-based resources, which include Japanese, Hawaiian, French, Tagalog, and Ilocano translators; digital and video producers; a bookkeeper; an attorney; and technical and business advisors. Continuous recruiting of translators relies on the Internet, American and European associations, and personal referrals.

Translating language entails more than just deciphering words, as it requires cultural sensitivity and a broad understanding of a region's particular perspectives. According to Hill, "There are no borders anymore. Political barriers are dissolving, especially due to recent events. Technology has dissolved all geographic obstacles, but language and culture can still be barriers." That's where Origin excels. **ET10**



Second Annual Meeting Visions

Emerging Technology And The Meeting Planning Industry

The second annual Meetings Visions: Emerging Technology And The Meeting Planning Industry conference, held December 6 - 10 in Wailea, Maui, convened senior meeting and event planners and industry and technology experts for an interactive dialogue on the role of technology in the meeting planning industry today and tomorrow. Included in the program were roundtable presentations on topics including Internet, Data Management, Wireless/Wireline Communications, and Smart Facilities led by international technology experts such as Corbin Ball, CMP of Corbin Ball & Associates, David Longacre of International Language Services, David Erickson of *Technology Meetings* magazine and Jeff Rasco of JRDaggett & Assoc.

In response to the industry changes created in the aftermath of the terrorist attacks on September 11, conference organizers added plenaries on security issues and virtual conferencing with panelists from the supplier and the meeting planning sides of the issues.

The keynote speech by Stewart Cheifet, executive producer of PBS's long-running *Computer Chronicles* series, entitled "Maintaining A Healthy Conference In Challenging Times: The Crisis in Meetings" detailed the influences that are affecting which conferences thrive and which conference don't survive. Cheifet cited globalization, changes in economy and technology, corporate communication, and

team building as trends that are increasing the need for meetings, whether face-to-face or virtual.

David Erickson, *Technology Meetings* Editor-At-Large, sums it up: "Meeting Visions 2001 proved to be a rich resource for meeting planners looking for the very latest in meeting management and meeting presentation technology. The bottom line: Virtual meetings - whether via video or the Web - are getting a major push after the attacks of September 11; meeting management software is finally coming into its own; and wireless technologies will certainly have an impact on the way planners do business - but not for a couple years yet." **ET10**

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Are you interested in the incubation/phase-in program at Maui Research & Technology Center, a project of the State's High Technology Development Corporation? Contact Steve Perkins, Program Manager, at steve@mrtc.org or (808) 875-2432.

For more information, visit the High Tech Maui web site at:

<http://www.hightechmaui.com>

Kahoolawe Island Reserve Commission Begins Clean Up



Kahoolawe is an ideal location to test advanced technologies, such as this metal detector that can discriminate between different sized metals at different depths in the same spot. Currently, a site needs to be excavated to discover the size and depth of each item.

If visitors, residents or other civilians were given access to visit Kahoolawe, a 45-square mile island just off the coast of Maui, they would be greeted by a sign that says, "WARNING! Unexploded Ordnance (UXO) on Kahoolawe and its surrounding waters is an extreme safety threat. The possibility of unintentionally exploding these unstable, aging UXO is very real."

Though currently uninhabitable, Hawaiians began to settle on Kahoolawe over a thousand years ago where they farmed and trained *kahuna* (priests) and navigators from all seven islands. By the late 1800s, most of the forests and natural vegetation was devastated by feral goats, leaving a legacy of dry, barren soil eroding into the surrounding ocean reefs.

Seven months before the attack on Pearl Harbor, the US Military negotiated an agreement to use part of the island for target practice and to test new weapons. After December 7th, 1941, the US Military declared martial law and seized the entire island to use it as a live ordnance range. For the next fifty years, the US Military tested every major kind of ordnance (bombs, missiles, and explosives) on the island, except for nuclear, biological and chemical weapons.

After decades of Native Hawaiian activism and an end to the Cold War, Congress stopped all US military training and testing on Kahoolawe in 1993 and returned title to the State of Hawaii for cultural, spiritual and subsistence purposes.

Since then, Congress has allocated \$400 million for the cleanup and restoration of Kahoolawe. During the first ten year period, the Navy is responsible for removing all UXO, which are aging, volatile weapons, according to the Kahoolawe Reserve Commission's land use plan.

The Kahoolawe Cleanup is serving as a model for the cleanup of toxic wastes on indigenous lands as it requires interagency teamwork, innovative technology, the hiring of indigenous people and incorporating cultural protocol into the process. Though areas in Oklahoma, Texas, and Alaska are currently being cleared of UXO, Kahoolawe has received special attention for testing new equipment due to its larger size, harsh environment and iron-rich soil, which makes it impossible to tell the difference between UXO metal and geological minerals via standard magnetic techniques. Currently, efforts are focused on researching and developing equipment, software and procedures that can determine the difference between live UXO, fragments, and non-UXO related metals in mineral-rich soils.

Side View of Detected Anomalies: This particular 100m grid, in a heavily-used target area near the center of Kahoolawe Island, produced 733 anomalies which were mostly UXO fragments or remnants.



Onsite, field detection personnel mark off 100m grids to locate UXO with metal detectors that use electro-magnetic induction to detect metals beneath the surface. The battery-powered equipment penetrates the ground with an electro-magnetic field that produces electrical currents around metals up to 4-feet deep. The electromagnetic response measured at the surface is called an anomaly. The technician wears a special backpack that digitally records the GPS location and electronic response of each anomaly, which is processed the following day on Maui by Subsurface Detection Personnel.

"Due to Kahoolawe's unusual soil, every reported anomaly must be excavated in case it is UXO-related, because a geological response reading from a particularly iron-rich area of the island can look the same as a reading from a 100 lb Bomb," explains Geophysicist Lloyd Grearson of Parsons - UXB. As of November 2001, 61,261 anomalies were excavated, 16,501 (26.9%) of which were simply geological responses, also called "false positives." 1,675 (2.7%) were live ordnance ranging from 20mm projectiles to 2.75" Rocket Warheads and 2000 lb MK Bombs. UXO-related remnants, such as fragments from bombs and rocket warheads, made up 63.3%, which are still dangerous due to sharp edges and high explosive residue. Target vehicle scraps, tin cans and other non-UXO related metals made up the remaining 4,290 (7.0%) excavations. All UXO-related fragments are placed in a thermal furnace, which burns off any high explosive residue, then removed from the island.

"In OBOD - Open Burn, Open Detonation - areas of the island," explains Andy Gascho, Geophysicist's Assistant, also with Parsons - UXB, "you can still see large targets drawn in the ground for airplanes flying overhead during target practice. A 100m grid in an OBOD area might produce 1000 anomalies, 90% of which are metal, while lesser used areas may uncover only 2 to 5 UXO-related items."

Once a live UXO is located, the Demolition Team moves in to cautiously detonate the bomb in its current location or move it to another area to explode, depending if it is in a geologically or culturally sensitive area. As most of the UXO is aging, eroded, and often partially detonated, they usually cannot be moved and almost always must be detonated, rather than diffused. On some days, an exploding 2000 lb MK Bomb can be seen and heard from Maui's south shore.

After the Navy's contract ends in November 2003, full title will be returned to the State of Hawaii. The Kahoolawe Island Reserve Commission will continue its work at returning the island to its natural state and creating an environment for Hawaiians to preserve their culture. HTM

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