

PEAK PERFORMANCE

Climatologist Douglas Hardy travels to glaciers in the highest places on earth, where his Dell Latitude ATG works every time



SOLUTIONS

- BACKUP/RECOVERY/ARCHIVING
- CLIENT SECURITY

CUSTOMER PROFILE

COUNTRY: United States

INDUSTRY: Education

FOUNDED: 1947

EMPLOYEES: 100

WEB ADDRESS: www.geo.umass.edu

CHALLENGE

Expeditions to glaciers at 19,000 feet and higher on mountains in tropical ranges expose equipment to harsh working conditions that include physical shocks, vibration, dust, moisture, extreme temperatures, and low barometric pressure.

SOLUTION

The Dell™ Latitude™ ATG D630 notebook computer equipped with a 32 GB solid-state drive proves reliable in some of the harshest of environments.

BENEFITS

- Rugged design helps protect thousands of dollars, hundreds of hours invested in expeditions
- Solid-state drive works dependably at altitudes above 10,000 feet
- Bright, durable screen increases productivity
- Usability features extend working day



It is 9:00 A.M. and 15 degrees below zero at 19,000 feet on the largest tropical glacier in the world: Quelccaya Ice Cap in the Peruvian Andes. Climatologist Douglas Hardy and a team of fellow scientists, assistants, and porters have been camped for two days studying the glacier and surrounding mountain range. Up here, halfway through the earth's atmosphere, the frigid temperatures numb fingers and toes. The lack of oxygen makes it difficult to even think clearly.

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Douglas Hardy, Ph.D., research professor, Department of Geosciences, University of Massachusetts Amherst

While the team digs through five feet of recent snow to reach instruments buried within the permanently frozen snow and ice of Quelccaya Ice Cap, one of Hardy's colleagues opens a notebook computer. “At that moment, after months of preparation, a week of really demanding travel, and a difficult climb, it's a crapshoot,” says Hardy. “Do you hear the whirl of a hard drive and the Windows startup chime, or nothing at all?”

STUDYING THE ROOFTOP OF THE WORLD

Hardy is a research professor in the Department of Geosciences at the University of Massachusetts Amherst who studies high-elevation climatology and conducts field research on glaciers at some of the tallest mountain peaks in the world. “We focus on glaciers at high altitudes because that's where the most dramatic changes in climate are taking place,” says Hardy. The primary goal of the high-altitude expeditions is to collect core samples of the glacier, drilling anywhere from 300 to 500 feet to extract a cylinder of ice for later study. “We can analyze the ice cores and develop a record of past climates,” says Hardy. The field research that

Hardy and his colleagues perform provides crucial, tangible data about how the earth's climate has changed in the past, and what direction it may take in the future.

Although the first scientists to study high-altitude glaciers used nothing more than a pencil and paper to record their observations, Hardy and his colleagues make extensive use of electronics. The team downloads data from weather stations planted on previous trips, and they use digital cameras, GPS devices, and other instruments to record site conditions. The researchers also use notebook computers to review and perform preliminary analysis on the data as it is collected.

It's critical that the notebook computers function reliably so that the researchers can make on-the-spot adjustments and repairs to instruments. The extreme environmental conditions on high-altitude glaciers limit the time that the team can stay on-site, and the remote locations may mean that a year or more passes before a return visit is possible. “In the worst-case scenario, we can capture data on-site and bring it back home

HOW IT WORKS

HARDWARE:

- Dell™ Latitude™ ATG D630 notebook

SOFTWARE:

- Microsoft® Windows® XP OS

without looking at it," says Hardy. "But it's almost impossible to make adjustments to the weather station instruments without being able to quickly graph the data. Without the notebook, I can't confirm my pictures or GPS readings to see if there's something that doesn't look right, or something worth investigating further."

WHERE NOTEBOOK COMPUTERS GO TO DIE

Hardy has been using Dell notebook computers at high altitudes (19,000 feet and above) for more than 10 years, and in very cold locations for almost 20 years. In early 2007, Hardy realized that he needed to replace his current notebook computer. Upgrades to several essential applications required the Microsoft® Windows® XP OS, which his current notebook could not run. Given the rigors of his work, Hardy decided to investigate ruggedized notebooks like the Dell Latitude ATG D630.

Expeditions like the ones that Hardy and his colleagues make are notoriously hard on electronics: expedition equipment must survive dust, dirt, physical abuse, and extremes of both temperature and atmospheric pressure. "Even before we start climbing, the approaches to base camps require long treks via 4x4 vehicle, animal, or both," says Hardy. "Everything and everyone gets bounced around and completely coated with dust; we feel the dust between our teeth, and pull it out of our ears for days afterward."

During the journey, expedition teams also endure tropical heat, subzero cold, and sudden temperature changes, all of which can damage electronic equipment. "The glaciers that we study are on mountains in the tropics, and even over the course of a single day there's tremendous temperature variation at any altitude," says Hardy. "It's summer every day, and winter every night."

As the expedition nears its high-altitude destination, the lack of oxygen makes it difficult to breathe. The thinning atmosphere can also make it difficult or impossible for Hardy and his colleagues to use their notebook computers. First, the low pressure can knock out the hard drives, as most are only



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rated to work below 10,000 feet. Above that, the drives often can't maintain the cushion of air that the read/write head uses to float above the rapidly spinning disks. “Sometimes the drives work, sometimes they don't,” says Hardy. “I've never had a drive fail, but I've watched it happen on expeditions quite a few times.”

The thin air at high altitudes also lets through practically all of the sun's radiation, making it very bright during the daytime and almost impossible to see a notebook computer's LCD screen. “The air is so thin that it doesn't attenuate the sunlight at all, and the snow reflects 80 or 90 percent of the light right back up at you,” says Hardy. In order to use his notebook, Hardy would pile jackets over his head and computer until it was dark enough to see the screen, a time-consuming and annoying exercise. “It sounds funny, but at 20,000 feet it's not amusing at all,” says Hardy. “At that altitude, any physical exertion just drains you.”

RESEARCH ON RUGGED COMPUTERS POINTS TO DELL

Hardy spent several months researching notebook computers designed for harsh environments, including the Itronic GoBook XR1, the Panasonic Toughbook, and the Dell Latitude ATG D630. Hardy ultimately chose the Latitude ATG because it could not only survive the physical challenges of an expedition but also help him compensate for unusual environmental conditions. The Latitude ATG would reduce the time that he spent finding ways to work around the limits of his IT equipment, streamlining and simplifying his work process while in the field and freeing him to concentrate on his research.

The Latitude ATG meets military standards (MIL-STD 810F¹) for durability and is designed to withstand vibration, humidity, and dust, providing the protection that it would need to withstand the rigors of a scientific expedition. Despite these

rugged features, Hardy valued the fact that the Latitude ATG wasn't so bulky that it was awkward to carry or use. “I don't want a computer that's built like a Humvee,” says Hardy. “I have to put it in my backpack, lug it up the mountain, and actually do work on it.”

Hardy found two other features of the Latitude ATG especially attractive. First, Dell offered a 32 GB solid-state drive as a configuration option. Based on flash RAM, the solid-state drive has no moving parts and can be relied on to work at altitudes well beyond the recommended limits of traditional hard disk drives. “I also liked the fact that the solid-state drive would boot up faster than a conventional hard drive,” says Hardy.

Second, the Latitude ATG features a super-bright, 500-nit² LCD display with an antireflective coating. The display is specifically designed for outdoor viewing. The Latitude ATG also features a sensor that constantly monitors ambient light conditions and adjusts the display brightness to maintain visibility while optimizing battery life.

DELL LATITUDE ATG HELPS PROTECT TIME AND RESOURCE INVESTMENTS

The reliability of the Dell Latitude ATG helps Hardy protect the thousands of dollars and months of work invested in field expeditions. The rugged design and solid-state drive dramatically improve the notebook's reliability, especially at high altitudes, making it less likely that Hardy will miss an opportunity to collect valuable data.

As a result, Hardy is able to download and review weather station data, and make operational adjustments as necessary. He can also confirm the quality and subject of his photographs, and take more accurate GPS readings. “An average trip runs US\$14,000 in expenses, plus a month of planning,”

says Hardy. “If I can't use my computer when we get to the glacier, it seriously compromises the value of the trip—the Latitude ATG can all but eliminate that risk.”

BRIGHT, DURABLE DISPLAY INCREASES EFFICIENCY, PRODUCTIVITY

The ability to work in the searing brilliance of a snowy glacier makes Hardy more efficient and productive during his limited time on-site. “The display on the Latitude ATG is really bright. I can use it in full sun at the top of a 20,000-foot mountain,” says Hardy. “It has a tough cover, so I can point to it with snowy mittens without scratching the screen.”

The bright display also enables Hardy to save time and effort in the thin atmosphere at high altitudes. “For starters, not being under a parka means that I can talk to my colleagues while I'm working,” laughs Hardy. “At this altitude, there isn't enough oxygen to function normally, and anything that I can do to conserve energy helps me think more clearly and work for longer stretches of time.”

RUGGED DELL NOTEBOOK DESIGN HELPS PROTECT GEAR, MINIMIZES WEIGHT AND BULK

“The Latitude ATG strikes the perfect balance between being rugged and being usable,” says Hardy, who appreciates that while the Latitude ATG tolerates rough treatment, it's still comfortable to carry and use. The high-altitude climatology expeditions require plenty of gear—including large, insulated boxes that protect the ice samples—just to safeguard success and survival. The lightweight and slim profile of the Latitude ATG saves space and effort at every stage of a trip. “We use porters, pack animals, and four-wheel-drive trucks, but we still need to minimize the weight of our gear,” says Hardy.

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USABILITY FEATURES EXTEND WORKING DAY, SIMPLIFY CHARGING

The design details for the Dell Latitude ATG help Hardy work quickly and efficiently during the entire expedition. “The Latitude ATG is a great computer for ordinary travel, and on top of that Dell has obviously thought through what someone working outdoors needs,” says Hardy. For example, the port covers keep out dust and dirt, but can still be opened quickly so that Hardy can plug in cables and connect the notebook computer to weather stations. “On some expeditions, I stop at several stations to collect data, so not having to fight with the port covers every time that I need to connect makes my job simpler,” says Hardy.

The Latitude ATG provides supplemental lighting that enables Hardy to work effectively at night or in dim conditions, enabling him to complete tasks more quickly and efficiently. “If I can work outside or inside my tent, from within my sleeping bag, at night, I can accomplish other tasks during the day-light, which saves me valuable time,” says Hardy.

The Latitude ATG auto/air charger makes it easy for Hardy to quickly charge his notebook in a variety of environments. “The auto/air charger

is also tremendously convenient because it works with both AC and DC power sources,” says Hardy. “I use a solar panel on trips that puts out DC power and I can plug it right into the Latitude charger without a converter or adapter, which is one less gadget that I need to carry.”

WORKING TOWARD BETTER SCIENCE

By designing the Latitude ATG to address the challenges of working in extreme environments, Dell helps Hardy find solutions to his IT needs, enabling him to focus on his research. “Technology improves our ability to record and analyze data, but wondering if your gear is going to work can come between you and the essential scientific activity: making observations,” says Hardy. “The Latitude ATG is a huge leap forward because I can spend time observing, thinking, and talking with my colleagues instead of messing around with my gear with numb fingers on top of a 19,000-foot mountain. The net result is improved science.”

For more information on this case study or to read additional case studies, go to DELL.COM/CaseStudies.

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¹ In independent third-party testing, the Dell Latitude ATG met MIL-STD 810F standards for vibration (Method 514, Proc. I, Cat. 20 & 24), humidity (Method 507.4), and altitude (Method 500.4 Low Pressure, Proc. I). Operational up to 10,000 feet. For dust, the Latitude ATG met MIL-STD 810F standards (Method 510.4, Proc. II) for all D-module options (second hard disk drive, second battery, air bay) except optical drives.
² 1 nit = 1 candela per square meter (cd/m²).
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