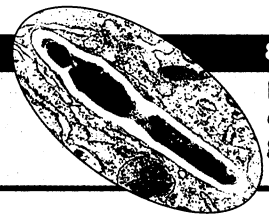


for 17 May at Livermore. In the meantime, the black humor surrounding NIF is getting a bit darker. Noting that the laser is often described as a "stadium-sized" project, some DOE employees have proposed that a more fitting benchmark might be the *Titanic*.

–DAVID MALAKOFF

MILITARY ASSETS

Scientists Gain Access To Sharper GPS Signal

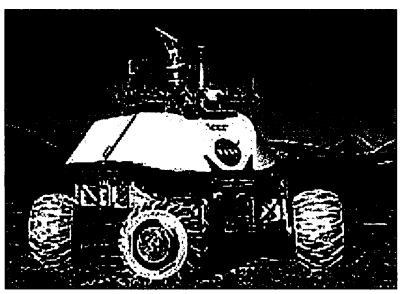
Rarely can the government make thousands of scientists happy by simply flipping a switch. This week, however, U.S. President Bill Clinton did so by ordering his military commanders to turn off a scrambling device on Air Force positioning satellites. The change, effective at midnight on 2 May, provides researchers and commercial users with a 10-fold improvement in their ability to pinpoint the location of receivers on Earth.

Until now, only the U.S. military has had regular access to the high level of precision possible with the constellation of 24 Global Positioning Satellites (GPS). Civilian researchers have had to make do with the scrambled version of the signals, which are based on atomic clocks onboard each spacecraft. "This really opens up the field for scientists," says Charles Challstrom, director of the National Geodetic Survey.

Combining the more exact GPS data with existing maps, for example, will allow scientists in remote territory to plot immediately their locations to within 10 meters, says James Baker, National Oceanic and Atmospheric Administration chief, eliminating time-consuming calculations. Glenda Humiston, Agriculture Department deputy undersecretary of national resources and environment, says that the greater accuracy will allow researchers to probe environmental effects at a much more fine-tuned level; for example, to understand the effects of roads on watersheds.

National security agencies have long resisted any move to improve the precision for civilian and commercial users, arguing that terrorists could make use of GPS signals. And the few civilian researchers temporarily given the codes to receive the more exact signals had to face a process that one Commerce Department official says was "costly and cumbersome." Time-consuming data processing by civilian scientists helped improve the accuracy of scrambled signals, but the quality remained less than that enjoyed by the military.

Eager for benefits ranging from improved car and boat navigation to tracking freight, however, commercial concerns kept up pressure to unscramble the signals. The Administration in 1996 agreed to stop the scrambling within a decade and moved up that timetable after the Defense Department found a way to rescramble the signals in a particular region in case of war, military officials said at a 1 May White House briefing. Now anyone with a GPS receiver anywhere will have access to signals nearly as accurate as those used by the military services.



Keeping track. GPS receivers help Carnegie Mellon University researchers track their NASA-funded robot in Chile's bleak Atacama Desert.

The Administration plans to make GPS even more accurate by adding a second frequency in 2003 that will compensate for disturbances in the ionosphere that interfere with the GPS signals. A third frequency for even greater accuracy is slated for 2006. The government also hopes to improve its ability to estimate the position of each satellite, giving scientists an even better sense of where they are.

–ANDREW LAWLER

ARCHAEOLOGY

Hints of Frequent Pre-Columbian Contacts

Last week's opening of the Smithsonian Institution's exhibition, "Vikings: The North Atlantic Saga," was a glittering black-tie affair, with Scandinavian royals rubbing shoulders with an international scientific crowd. The pomp and ceremony served to popularize the scientific evidence that the first contact between Europeans and Americans was not Columbus's voyage but Viking landfall in Newfoundland, thought to have occurred about A.D. 1000. And at a 2-day symposium, Canadian archaeologist Patricia Sutherland took the Viking story a big step further, presenting stunning new traces of the Norse on northern Baffin Island in the Canadian Arctic, at least 200 years before Columbus. Although not all her colleagues are convinced, Sutherland argues that the evidence shows that in the Arctic, unlike in Newfoundland, the Norse had frequent and prolonged contact with aboriginal peoples—the first sustained close encounter of the Old World with the New. "There was more than just in-and-out trading and 'Goodbye, we won't be back,' " says Sutherland, who suspects that the Norse actually established shore stations on Baffin Island.

The Norse artifacts, including spun and plied yarn, characteristic woodworking, and even carvings with European-like faces, come from sites of arctic hunter-gatherers known as the Dorset. Although archaeologists had suspected that the Norse had traveled the eastern arctic coasts, until recently no one had searched Dorset sites for clues. Researchers had thought that the Dorset had vanished from most of the Arctic by the time the Vikings crossed the Atlantic, although a fragment of a Norse pot did turn up in a Dorset site in Greenland a few years ago. "But that was just a single find," says Bjarne Grønnow, an archaeologist and director of The Greenland Research Centre in Copenhagen, who heard Sutherland present her work at a recent conference in Denmark. "When Pat presented her finds, we all said, 'Wow, it's not just a coincidence. It's really something.' "

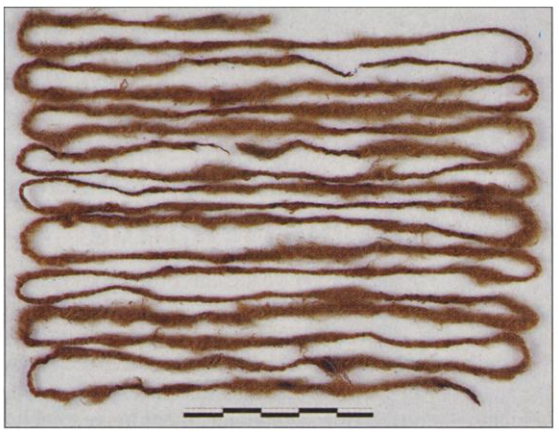
Sutherland, who works at the Canadian Museum of Civilization in Hull, first came across the Norse objects while examining the museum's artifacts from Nunguvik, a Dorset site on northern Baffin Island excavated in the 1970s and 1980s. Among trays of distinctive Dorset harpoons and carvings, she pulled out two strands of soft yarn, one 3 meters in length. Neither the Dorset nor other native northern groups were

Face to face. Dorset carving shows Norse and Dorset faces.

CREDITS: (TOP) CARNEGIE MELLON UNIVERSITY; (BOTTOM) CANADIAN MUSEUM OF CIVILIZATION

known to have spun fibers for cloth. Moreover, the specimens closely resembled yarns Sutherland had seen while helping to excavate a well-known Norse site, Gården Under Sandet (GUS), in Greenland.

Intrigued, Sutherland sent samples to Penelope Walton Rogers of Textile Research in Archaeology, an independent consulting firm in York, U.K.; Walton Rogers has analyzed many of the Greenlandic Norse textiles, including those from GUS, some of which were made of arctic hare fur and goat hair. She concluded that both Nunguvik samples had also been spun from arctic hare fur, and one had probable goat hairs attached, closely resembling GUS's 13th and 14th century textiles.



Yarn tells the tale. The Dorset didn't spin fiber, but yarn like that used by the Norse turned up in a Dorset site.

As Sutherland continued to pore through the Nunguvik collection, she found other Norse items. Several pieces of wood revealed European carpentry techniques, such as iron-stained holes apparently made by square nails and special kinds of fitted joints called mortise-tenon and scarfing. She also found small, Dorset-style carvings of European-looking faces.

Three other Dorset sites on Baffin Island yielded even more Norse traces. All three sites had produced specimens that the original excavators had described as musk-oxen cordage, but Walton Rogers pronounced two samples to be yarn made from arctic hare fur. One piece was infused with oil and pigment, suggesting a form of oilcloth. All three sites also yielded unusually worked wood similar to that from Nunguvik. One piece with a cut Norse-style design has been identified by conservator Greg Young of the Canadian Conservation Institute in Ottawa as fir, a southern tree rarely if ever found in arctic driftwood.

The number of Norse objects suggests that the Norse were frequent visitors to Canada's far north, argues Sutherland. "The contact was possibly sufficient to have influenced local technology. Some of the stuff might clearly be identified as Norse. Some might be the Norse stuff modified by the Dorset, and some might be a combination of the two technologies," she says.

Other researchers, although they agree there was some kind of contact, aren't yet sure how extensive it was. "Is this just the tip of the iceberg?" wonders William Fitzhugh, an archaeologist at the Smithsonian's Arctic Studies Center and the curator of the Viking show. "Or are we finding just a few things from a few chance encounters?"

Conclusively dating the artifacts, moreover, is proving difficult. At the moment, Sutherland believes the evidence points to the late 13th and early 14th centuries, as indicated by radiocarbon dates she obtained on one of the nail-pierced wood pieces from Nunguvik. But other radiocarbon dates, including on the Nunguvik yarn, are as early as the 7th and 8th centuries, and those dates fit the original excavators' estimates of the age of the Dorset sites.

But such early dates—more than a century before the great sea voyages were thought to have begun—would rewrite Viking history. Thus most archaeologists favor the medieval dates. "My qualified guess is that the yarn tells us about early Norse contacts with the people of the Late Dorset culture, between A.D. 1000 and 1300," says Hans Christian Gullov, an archaeologist at the Danish National Museum. Fitzhugh agrees, noting that bad times in the 13th century may have led the Norse to try their hand at trading walrus ivory, which was much coveted in Europe. That might spur a journey to the high Arctic and contact with the walrus-hunting Dorset.

All the same, Sutherland is not ready to rule out the early dates entirely. Crossing the Atlantic may not have been beyond the capabilities of Europeans at that time. "So we shouldn't be unwilling to consider something earlier." –HEATHER PRINGLE

Heather Pringle is the author of *In Search of Ancient North America.*

CREDIT: CANADIAN MUSEUM OF CIVILIZATION

ECOLOGY

Does Biodiversity Help Fend Off Invaders?

As nonnative species such as cheatgrass in the western United States and rosy wolf snails in Hawaii have swept over native ecosystems, ecologists have wondered why some ecosystems are more vulnerable to invasions than others. Theory suggests that an ecosystem rich in biological diversity should be better able to resist invasions, but contradictory studies have led to a heated debate

ScienceScope

English Seoul Mates Seoul National University (SNU), South Korea's finest, is hoping to lure talented students from beyond the Korean Peninsula with a new policy that encourages professors to teach as many classes as possible in English. Officials hope to triple the percentage of foreign undergrads, to 6%, over 3 years, and hike the share of foreign graduate students to 30%. Exchange students won't consider attending SNU until at least 20% of its classes are conducted in English, says one administrator. The recent repeal of a law against hiring foreigners has opened the door for English-speaking faculty at SNU and other state institutions.

Students are "excited and worried" about the change, says Kim Ha Seok, a professor of electrochemistry who has already started lecturing in English. Whereas Kim finds the shift to English has meant more time spent preparing lessons and greater use of visual tools, other scientists say they are able to cover more material and avoid awkward translations of technical terms. Says microbiologist Yim Jeong Bin: "It's a step in the right direction."

Prion Hunting Many Britons are breathing easier now that a preliminary study has cast doubt on predictions of a deadly epidemic. In early April, *The Sunday Times* of London reported findings showing that variant Creutzfeldt-Jakob disease (vCJD), a brain-wasting disorder that is the human form of mad cow disease, might spread to hundreds of thousands of people. But the British Department of Health said last week that the first spurt of data from a survey of 18,000 tonsils and appendices showed no sign of vCJD's hallmark: an abnormally folded protein known as a prion.

The early finding—from 3000 tissue samples warehoused since the late 1980s—is "welcome news," said Liam Donaldson, the government's chief medical officer. But the "results should not be taken as an indication of an 'all clear,' " he warns. There are still 15,000 samples to go, he noted, and researchers couldn't use the most sensitive techniques on archived tissue, leaving a chance of undetected prions.

Future studies, however, should help shed light on the prevalence of vCJD, which is already blamed for 55 deaths in the U.K. Results from a study of 2000 freshly removed tonsils, along with final numbers from the bigger study, could be ready by the end of the year.