ness are less pertinent than whether the quake proves the need to consider revisions to the latest editions of building codes. Although it will be months before the pattern of damage in Kobe is fully assessed, preliminary data, combined with data from other recent earthquakes, suggest the forces transmitted through the ground during earthquakes may be much larger than previously thought at sites close to faults (*Science*, 13 January, p. 176). Several seismologists report that data not yet publicly released will show ground accelerations in Kobe exceeding 0.8 times the force of gravity, or 0.8*g*. Hiroyuki Kameda, a structural engineer and professor-in-charge of Kyoto University's Urban Earthquake Hazard Research Center, notes that the quake tossed railway cars off tracks throughout the area. "That can occur only when the acceleration is in the range of 1*g*," he says. The highest ground forces ever recorded during an earthquake were last year at Northridge, where ground accelerations reached about 1.8*g*.

Current codes do not allow for forces of that magnitude. And if that is true in Japan, it will also be true in the United States. "The design codes are fairly comparable," says Charles Scawthorn, who earned his doctorate in structural engineering at Kyoto University and is now vice president of the consulting firm EQE International in San Francisco.

For some experts, however, last week's earthquake demonstrated that current codes are adequate. Hirokazu Iemura, professor of civil engineering at Kyoto University, says that structures in the Kobe area may have been subjected to as much as three times the shaking they were theoretically designed for, yet they did not collapse. "I do not see any evidence that the current building standard law should be changed," says the University of Tokyo's Otani.

Charles Kircher, a consulting engineer from Mountain View, California, believes that the earthquake will provide further support for moves in the United States to stiffen lateral load requirements for buildings very close to faults. He says the Seismology Committee of the Structural Engineers Association of California, of which he is a member, is considering recommending that the design earthquake load for structures very close to fault lines be doubled.

The next step for the community is to review data now being collected. The local chapter of the Architectural Institute of Japan was organizing a task force this week to catalog the damage to buildings and to determine just how old they are. That information should tell engineers whether the southern Hyogo earthquake confirms what they already knew or serves as a call for new ways to mitigate loss of life and property when nature unleashes its awesome power.

–Dennis Normile

ENERGY LABORATORIES

Report to Stress Research Over Close Ties to Industry

A blue-ribbon panel appointed by Energy Secretary Hazel O'Leary has concluded that the Department of Energy's (DOE's) 10 major laboratories should focus more on basic research than on directly serving industry. The report, to be issued on 1 February by a 19-member commission headed by Motorola Chairman Robert Galvin, will not call for closing any labs, *Science* has learned, nor will it provide O'Leary with much help in reaching her goal of trimming $10.6 billion from DOE's budget over the next 5 years.

The panel's cautionary tone on pushing the labs into bed with industry contrasts sharply with that of the Clinton Administration, which has made strengthening the nation's economy a major mission for the labs. "There was a consensus that competitiveness should not be a primary mission," says Braden Allenby, a panel member and AT&T vice president. "The uniform view is that the labs are not in the business of helping industry," adds political scientist Harvey Sapolsky, one of four Massachusetts Institute of Technology professors on the panel.

The high-profile report is the first salvo in what is expected to be a pitched battle over the fate of the $6 billion DOE lab complex that stretches from New York state to the Pacific Northwest (see table). It's not the first time the labs' future has been debated, but DOE officials say the discussions have acquired new urgency thanks to pledges by the new Republican Congress to reduce government bureaucracy and curb spending, combined with O'Leary's promise last month to shrink DOE as part of a general restructuring of the 18-year-old agency. Moreover, the White House will add the commission's recommendations to the results of one large study, expected to be completed in April, that focuses on the laboratories and centers run by DOE, the Department of Defense, and the National Aeronautics and Space Administration. That combination of forces suggests the Galvin report will not gather dust. "I've seen reports come and go, but this one is going to be different," says Nicholas Samios, director of Brookhaven National Laboratory.

Last February, when O'Leary named industry executives, military leaders, and academics to the commission, she asked it to identify a role for the labs in the post–Cold War era—particularly the three that design and build nuclear weapons. After several public hearings and months of private discussions, its members have concluded that the 10 multipurpose labs—DOE supports others, like the Fermi National Accelerator Laboratory in Illinois, that concentrate on a single

DOE'S MULTIPURPOSE LABORATORIES

Name	Budget	# Staff	Research Focus
Argonne (IL) National Laboratory	$462 million	4502	Electron microscopy, neutron-scattering
Brookhaven (NY) National Laboratory	$275 million	3437	High-energy, nuclear physics; nuclear medicine
Idaho National Engineering Laboratory	$613 million	6586	Biotechnology, engineering sciences; instrumentation
Lawrence Berkeley Laboratory (CA)	$226 million	2408	Electron microscopy, heavy-ion physics; human genome
Lawrence Livermore Laboratory (CA)	$869 million	6009	Nuclear weapons, lasers, applied physics and chemistry, atmospheric sciences
Los Alamos (NM) National Laboratory	$1.07 billion	7024	Nuclear weapons, environmental technologies, neutron-scattering
Oak Ridge (TN) National Laboratory	$547 million	4690	Nuclear physics, ion-beam, neutron scattering
Pacific Northwest Laboratory (WA)	$479 million	4383	Environmental, molecular sciences
Sandia National Laboratories (NM & CA)	$1.16 billion	8458	Nuclear weapons engineering and manufacturing, radiation, and combustion
National Renewable Energy Laboratory (CO)	$214 million	913	Energy research on sun, wind, water, plants, and waste technology

activity—should not tie their future to short-term industrial research and development. Panel members say labs are not well equipped for that role, which could put them in competition with the private sector; some also worry that such an emphasis is more of a fad than a sustainable mission. Instead, they say, the labs should focus on longer term research that would benefit industry: Allenby suggests exploring environmental technologies, while other members cite alternative energy and health research. "They are bullish on the traditional sciences," says one Administration official.

Such an approach runs counter to O'Leary's campaign to have the labs work more closely with industry. Since 1989, the three weapons labs alone have signed more than 300 Cooperative Research and Development Agreements with industry to conduct cost-shared collaborative research, and lab directors say they wouldn't want to abandon such ties. "The labs must have a core government mission," says Sig Hecker, director of Los Alamos National Laboratory. "But if we don't stay in touch with industry, we run the danger of becoming obsolete. I hope [the Galvin panel] doesn't throw out that crucial part."

Despite its emphasis on basic research, the report stops short of recommending that individual labs be leaders in particular fields. "It was extremely unlikely we would come out with specific job assignments for specific labs," says Victoria Tschinkel, panel member and a senior consultant with Landers & Parsons in Tallahassee, Florida. "The report turned out as more of a series of guideposts—it doesn't say close lab X." Among the three weapons labs, however, Lawrence Livermore National Laboratory appears to be facing the most difficult transition. "In the short term, Livermore is not that threatened," Sapolsky says. But panel members say Livermore must spell out a clear mission to remain viable in the long run.

"The labs are not in the business of helping industry."

—Harvey Sapolsky

The most detailed recommendations in the report concern management practices, and the consensus is that the department must streamline its operations. "That may be the only thing that the entire task force agreed on," says Allenby. Panel members are especially critical of the system DOE uses to monitor the labs, which are operated by private contractors who, in turn, are overseen by DOE field offices. But the savings from these changes would be modest, says Tschinkel: "We're not talking about hundreds of millions of dollars."

Maybe not, but savings of that magnitude and larger are exactly what some members of Congress are contemplating. Representative Roscoe Bartlett (R–MD), for example, has reintroduced a bill (HR 87) to create an independent commission that would examine the DOE labs and make recommendations in a process similar to what was followed to close military bases. "We've had four lab studies since 1986, and nothing has happened," he told *Science*. "Everybody is protecting their turf."

Bartlett's bill, which stalled last year, has garnered little support in the House Science Committee and faces opposition even within his own party. "A lot of labs and field offices are in Republican districts," one staffer says. One notable example is New Mexico, where Representative Steve Schiff (R–NM), the new chair of the basic research subcommittee that would take up the bill, represents a district that contains Sandia and is adjacent to Los Alamos. But Administration officials and congressional staffers admit privately that Bartlett could win converts if the House is asked later this year to make large cuts in DOE's budget.

Galvin himself declined comment on the details of the report until it is released, noting only that "I don't think the political changes affect the thrust or essence of the report." Nevertheless, it is clear his report will set the tone for a heated political battle over the future of the DOE labs.

–Andrew Lawler

SPACE SCIENCE

Joint Japanese-German Mission Misfires

TOKYO—Last week Japan and Germany failed on their first attempt to join an elite club of nations with the ability to retrieve a capsule from orbit. But officials from the two countries say the loss of the 750-kg EXPRESS (Experimental Reentry Space Vehicle) on 16 January, due to a malfunctioning by a Japanese-built rocket with a proven track record, is only a temporary setback to their plans to increase activities in space.

EXPRESS was planned as a 5-day mission to grow crystals in microgravity as well as to test a better heat shield and conduct other experiments for developing future re-entry vehicles. The $160 million mission was a showcase of international cooperation: In addition to the joint scientific projects, Japan supplied the rocket, Germany contracted with Russia for the capsule, and Australia provided the landing site. The critical point was supposed to come when the capsule was scheduled to re-enter Earth's atmosphere and parachute to a landing. But the mishap occurred at the beginning of the mission, when the capsule was boosted into an unplanned, higher orbit. Contact was lost a few hours later, and the capsule is believed to have crashed as it headed across the Pacific.

For Japan's Institute for Space and Aeronautical Science (ISAS)—a small agency that runs most of the science part of Japan's space program and which handled the launch—the mission was a key step in its plans to develop an independent capacity to recover scientific payloads. One application would be a proposal now under review for an asteroid landing early in the next decade that would collect samples and return them to Earth for analysis. Another possible mission is a probe of Mars. Without that capability, ISAS must rely on agreements with other space powers; for example, its Space Flyer Unit, a reusable platform for space-based observations and experiments to be launched next month, will be recovered by the U.S. space shuttle.

For Germany, EXPRESS offered an opportunity not only to share data in the crystal research but also to test a silicon-carbide nose cone material that the German Space Agency (DARA) hopes will be adopted by the European Space Agency on future missions. The material can function as both structure and heat shield, explains Hermann Hald of the quasi-governmental German Aerospace Research Establishment. That would be an improvement over the current design of the U.S. shuttle, in which an insulating material covers structural elements.

The failure of the M3-S2 rocket, designed to boost small payloads into low Earth orbit, breaks ISAS's 19-year streak of successful scientific launches. But it is the second major setback for Japan's space program in the last 6 months. In August a motor on a $415 million experimental communications satellite built and launched by the National Space Development Agency—Japan's main space agency—failed to place the satellite into the proper orbit.

However, these mishaps are not expected to undermine public support for the space program, which has been fanned by the presence of Japanese astronauts on the U.S. space shuttle. That support has been translated into steadily rising budgets for the two agencies. Indeed, ISAS officials hope the loss of EXPRESS ultimately will mean little more than a longer wait for samples of asteroid rock.

–Dennis Normile