

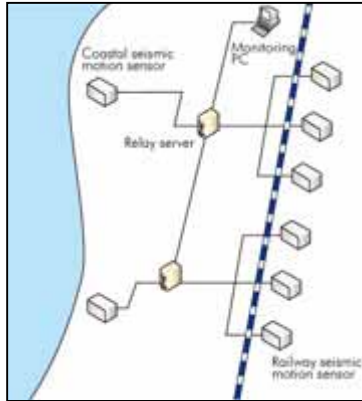
Trends in Japan

Sci-tech

Japan is synonymous with groundbreaking inventions and scientific breakthroughs. From trains to robotics to fabrics to the increasingly important field of environmental technology, Japan leads the world. Be the first to discover the future of science and technology.

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Save Structures from Damage

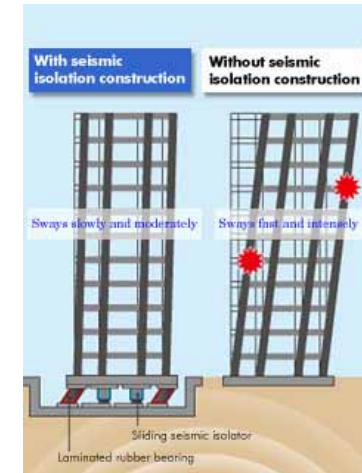


Left: Illustration of the Urgent Earthquake Detection and Alarm System (UrEDAS) for Shinkansen lines



Right: The Tohoku Shinkansen: No accidents during the Great East Japan Earthquake. All lines restored and running by end of April. (Photo: Railman Photo Office)

An array of technologies are continually developed in Japan in response to natural disasters.



Apple Towers Sendai (photo: APA Group) proved the effectiveness of seismic isolation construction (illustration).



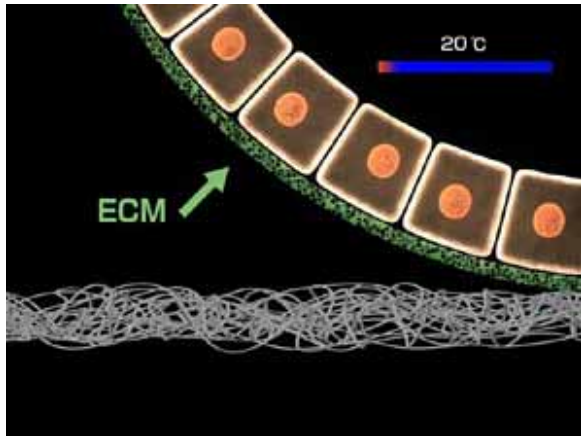
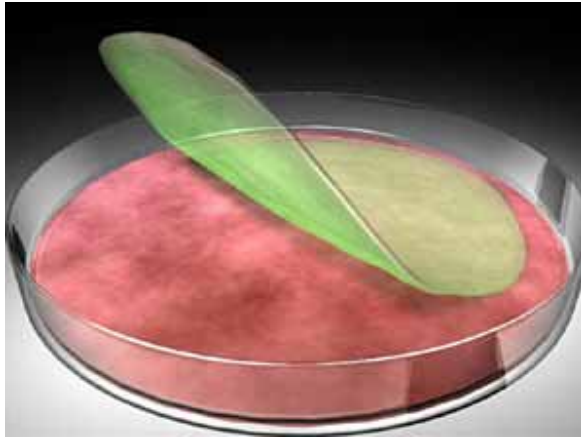
The measurement equipment shows that the building experienced as much as 23cm of horizontal displacement. (Photo: Mori Trust Co., Ltd.)

Sendai MT Building remained undamaged during the Great East Japan Earthquake.



The laminated rubber bearing (left) and sliding seismic isolator (right) are key structural elements to seismic isolation construction.

Revolutionary Regenerative Medicine Using Patients' Cells



Above: Cell sheet on culture media (artist's rendition)
Below: Structure of a cell sheet, consisting of proliferated cells and extracellular matrix (ECM)

Technology for creating cell sheets from a patient's cells or tissue is becoming an effective alternative to organ transplantation in the treatment of serious illnesses.



Professor Okano Teruo



Cell sheet transplantation for the cornea



Automated cell sheet culture apparatus



Japan's K Supercomputer

The Fastest Computer in the World

Japan's K supercomputer is now the world's fastest, carrying out calculations at over 10 petaflops and opening up many new possibilities for advanced research and simulations.

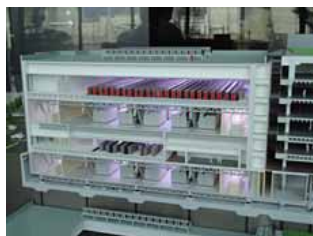


Left: The K supercomputer is comprised of 864 cabinets that house the hardware.

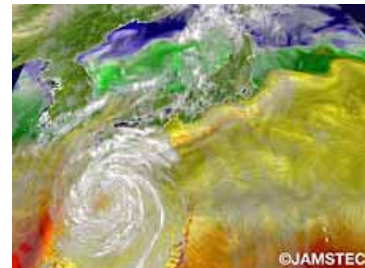
Right: A cabinet is 2.6 meters in height, 79.6 centimeters in width, and 75 centimeters in depth.

TOP 10 Systems - 11/2011	
1 K computer, SPARC64 ViiiX 2.0GHz, Tofu interconnect	6 Cray XE6, Opteron 6135 8C 2.40GHz, Custom
2 FUJITSU YH MPP, Xeon X5670 3.06GHz, NVIDIA 2050	7 SGI Altix ICE 8200EX/8400EX, Xeon HT QC 3.0/Xeon 5570/5670 2.93 GHz, Infiniband
3 Cray XT5-HE, Opteron 6-core 2.6 GHz	8 Cray XE6, Opteron 6172 12C 2.10GHz, Custom
4 Dawning TC3600 Blade, intel X5650, NVIDIA Tesla C2050 GPU	9 Bull built super-node SP910/S9030
5 HP ProLiant SL390s G7 Xeon 6C X5670, NVIDIA GPU, Linux/Windows	10 BladeCenter Q522L/S21 Cluster, PowerPC Cell 8i 3.2 GHz / Opteron DC 1.8 GHz, Voltaire Infiniband

The K computer tops the TOP500 supercomputer rankings (as of November 2011)



Cross-sectional scale model of the building that houses the K supercomputer. K is cooled by water, requiring coolant to be circulated constantly throughout the building. (Photo: RIKEN Advanced Institute for Computational Science)

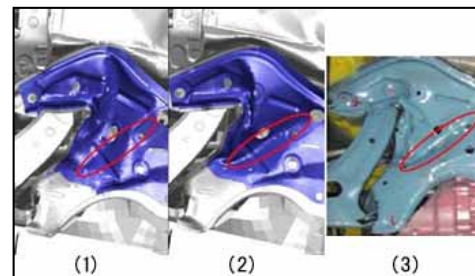
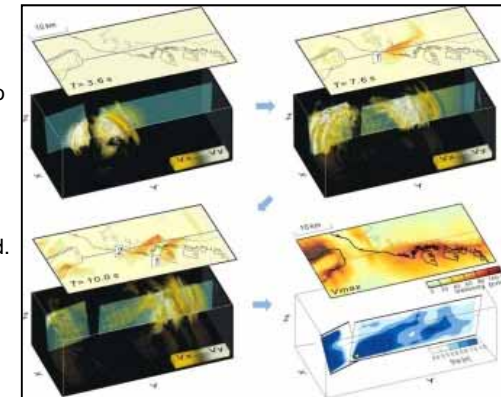


Supercomputers play an active role in scientific and technological simulations. The figure above shows a typhoon simulation using the Earth Simulator to depict the 1998 Typhoon No. 15 nearing the Japanese archipelago. It shows the difference in the sea temperature: red indicates high and yellow low temperatures. The sea temperature drops as the surface water is stirred by strong winds. Storm surge forecasting is also possible when the local details such as levee height are available.

©JAMSTEC

An example of a supercomputer simulation. The Earth Simulator analyzes seismic data at various locations in the southern part of Hyogo Prefecture (where the Hanshin-Awaji Earthquake struck) to produce planar and vertical images of how seismic waves travel. It enabled the main causes of collapsing buildings and other types of damage to be examined.

©Furumura, University of Tokyo



Crumple simulation of automobile chassis floor in a collision (see red circled sections) using super computers. Compared to a simulation with conventional supercomputer (1), the result from a high-performance supercomputer capable of processing more than 10 times more data such as those on the chassis material and structure and speed of the car (2) is more consistent with the deformation seen in actual collision testing (3). This makes it possible to significantly reduce the number of collision tests using real vehicles. ©Japan Automobile Manufacturers Association, Inc.

Instant Phone Translation

No Longer a Dream

Japanese cell phone and smartphone users will soon be able to talk freely with people who don't speak a word of Japanese. The new phones use amazing new technologies to translate spoken conversations in real time. Good bye, language barrier!



Demonstration of the Phone Translation Service by NTT DOCOMO. The representative on the right speaks in Japanese, while the representative on the left speaks in English.



Screen shots of chats using ChaTra, a translation application developed by NICT. © NICT



A user can view his or her spoken words and their translation on a tablet (left) or smartphone (right).



How the Phone Translation Service works: Via the cloud, speech is recorded and processed using voice recognition, machine translation and speech synthesis technology. The translation is then heard on both phones.

Sample screen shot. The words a speaker says are displayed as text, translated, and then transmitted to the listener in his or her own spoken language.

