

FUTURE SHOCKS

# The Next Next Things

With its power to send knowledge around the globe at lightning speed, information technology has vastly changed our world — unleashing the Internet along with a global economy of knowledge workers and even, some would say, sparking the fall of communism and the rise of terrorism. Computer power has increased exponentially since 1980, when machines less sophisticated than your cellphone filled entire rooms. And we can expect similar mind-

boggling advances in the coming decades. For a sense of what's in store, take a look at the breakthroughs on this page. Some of them may seem like the stuff of science fiction, but they're closer to reality than you may think. And they're just a small sample of the countless innovations bursting onto the scene as scientists, engineers and entrepreneurs work together to transform business, society and even what it means to be human.

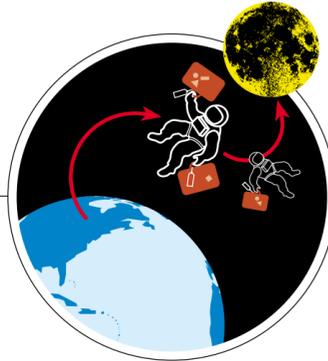
These forecasts are taken from the TechCast Project, an online database where 100 experts predict the technological and scientific breakthroughs to come. To learn more, visit [www.techcast.org](http://www.techcast.org).

— William E. Halal, author of "Technology's Promise," professor emeritus at George Washington University and president of TechCast LLC

**Space Tourism**  
2012 +/- 2 years

Richard Branson is steadily moving toward the first flight of his Virgin Galactic tourist spaceships, and competitors are rushing to realize their own plans for trips to the moon and to space hotels. Just a few years ago, the very idea of space tourism seemed laughable, but now it looks ready to launch. Will it unleash a wave of pioneers like those who tamed the Wild West? Or will our neighbors' extraterrestrial vacation photos make us yawn just as their snapshots of sand castles and sunny beaches do?

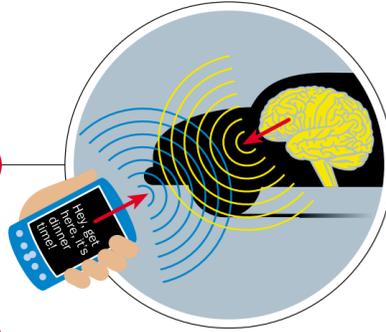
2012



**Intelligent Cars**  
2014 +/- 4 years

Imagine calling your car and instructing it to pick you up at a precise location and then take you somewhere else, like a chauffeur. This car wouldn't just drive itself; it would also navigate traffic, pay tolls, avoid collisions and park itself. Unfortunately, you'd still be the one to pay any speeding tickets.

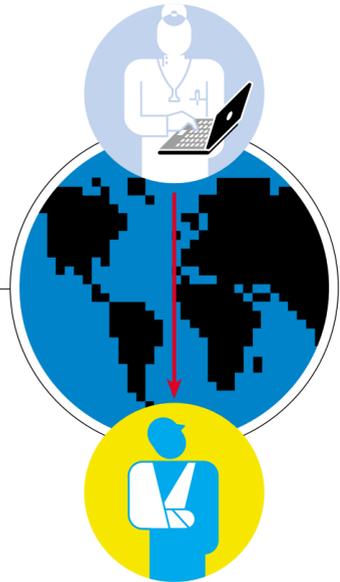
2014



**Telemedicine**  
2015 +/- 4 years

Electronic medical records, video conferences with your doctor, computerized diagnoses and even telesurgery promise to improve health care and relieve us of all that maddening insurance paperwork. In 2001, surgeons guiding a robot remotely from an office in New York City removed the gall bladder of a woman in a French hospital. Telemedicine could reduce the billions of dollars Americans spend on health care every year, but the real gain may be in comfort. Even that most dreaded procedure — a colonoscopy — may soon consist of nothing more than waving a scanner over your stomach.

2015



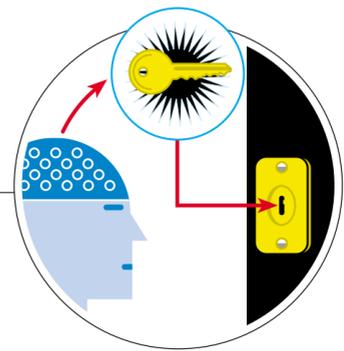
In 1980, machines less sophisticated than your cellphone filled entire rooms. We can expect similar mind-boggling advances in the coming decades.

**Thought Power**  
2020 +/- 9 years

Electronic skull caps can capture brain signals, which are then used to control computers and communicate with other people. One company has developed a computerized system called BrainGate that allows paralyzed people to use thoughts to control telephones, lights and other devices. Other systems allow people to type up to 15 words a minute simply by focusing on a computer cursor. Because everyone's brain waves are unique, our thoughts may one day be used as passwords to buildings and financial accounts. And how about controlling your TV by concentrating on the channel you want to watch? Or having a silent conversation with someone on the other side of the globe? One day you'll be able to do it.

2017

2018



**Artificial Intelligence**  
2021 +/- 7 years

Today's computers can beat chess masters, chat with humans and guide robots, and many scientists believe that machines could one day replace people altogether. This automation of thought raises one of the most crucial questions of our time: Is there a fundamental difference between machine intelligence and human intelligence? Most people are convinced that the mind is far more than sheer information, but could we all be wrong? On the other hand, could computers' limitations force us to accept human consciousness as a distinct and powerful force governing life? Stay tuned.

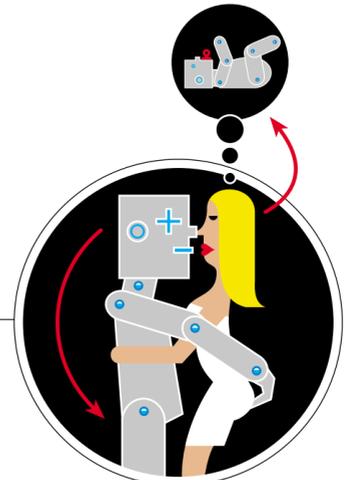
2019

2020

**Smart Robots**  
2022 +/- 7 years

A Japanese robot named Asimo can climb stairs, run and dance. He and his kin are finding work as office receptionists, waiters and security guards. Faced with a dearth of young people and a growing elderly population, the Japanese and Koreans plan to have robots fill important roles in offices, home services and health care by 2010. People can easily become attached to robots — just ask the owners of Roomba robotic vacuum cleaners — so it's not hard to picture a rising generation of R2-D2s coming into most of our lives.

2021

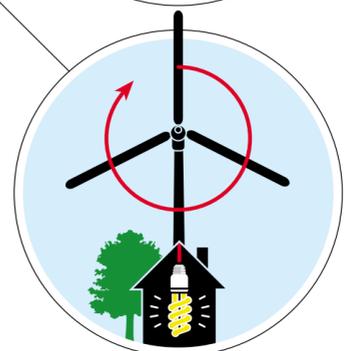


**Alternative Energy**  
2022 +/- 9 years

Oil production is peaking just as developing nations' energy needs are rising and concern over the environment is growing — a combination that may finally put an end to the long era of carbon-fuel dependency. The price of wind power is competitive with that of conventional electricity, and solar power is expected to get there by about 2015. Our experts forecast that alternatives will provide 30 percent of the world's energy by 2022. A Virginia man recently installed a windmill at his home, and we may soon be roofing with solar cells.

2022

2023



**Cancer Cure**  
2024 +/- 8 years

After decades of little progress, sophisticated cancer treatments now promise to extend and improve the lives of thousands suffering from a disease that used to be considered a death sentence. There were only 10 cancer drugs in 1995, but there are now more than 400 in testing. Scientists are designing cancer-destroying bacteria and using nanotechnology to create microscopic devices that seek out, enter and destroy cancer cells. Our experts believe that cancer deaths could be eliminated by 2024.

2024

