

# You wouldn't believe the things we do.

[An Introduction to Mitsubishi Electric Key Technologies]



# You wouldn't believe the things we do.






Mitsubishi Electric is a recognized leading manufacturer of electrical and electronic equipment used in a broad range of fields. From consumer electronics to industrial applications and satellite communications, Mitsubishi Electric applies its ingenuity to cutting-edge products and technologies that underpin the very foundations of society.

To showcase a selection of these original technologies, we created an advertising series in Japan, and provide further information on an animated "Key Technologies" website. We are pleased to now introduce a few of these technologies in this booklet to offer a glance at how Mitsubishi Electric's innovations are touching lives in ways you may not have known previously.




We hope you will enjoy this brief introduction to some of our breakthrough key technologies that are making a big difference all around the world. You wouldn't believe the things we do...

<http://www.MitsubishiElectric.com/believe/>

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## The tallest building in China will have the fastest elevators in the world



The World's Fastest Elevators

When completed in 2015 the Shanghai Tower (above, left) will be the tallest building in China. And it will have the fastest\* elevators in the world. These radically shaped, aerodynamic lifts, made by Mitsubishi Electric, will travel at more than 1 kilometer a minute (60 km/h)!—rocketing from the basement to the 119th floor in 55 seconds. And thanks to such features as our sway damping Active Roller Guide system, the ride won't just be fast; it will be smooth, safe and comfortable.

\* At the time of its completion.

**You wouldn't believe the things we do.**



## There is only one company in the entire world that makes spiral escalators



Spiral Escalators

In 1985 Mitsubishi Electric succeeded in manufacturing the first spiral escalator. And more than 25 years later we're still the only company on earth that offers them. The secret is our "Center Shift Method," a complex technology we invented where the center of the circle around which the escalator rotates is shifted in response to the degree of gradient—thereby achieving smooth rotational movement and harmonizing vertical movement. We have installed these astonishing escalators throughout the world.

**You wouldn't believe the things we do.**





## Even at top speed, our fastest elevators will keep a coin standing on edge



**You wouldn't believe the things we do.**

### High-Speed High-Comfort Elevators

The greatest problem with high-speed elevators is lateral motion, or sway. That is why Mitsubishi Electric developed the Active Roller Guide system, which detects sway and counters it by generating damping sway in the opposite direction. We have also developed large-capacity winches that use permanent magnets for smoother rotation, and streamlined elevator cars for greater comfort. These technologies reduce vibration and sway to almost imperceptible levels—making the ride so smooth that a coin set on its edge will not topple.



## Imagine building a skyscraper just for a place to try your elevators



### SOLAÉ Elevator Testing Tower

**You wouldn't believe the things we do.**

To meet the need for larger high-speed elevators in ever-higher buildings, we've built this tower—the equivalent of 40 stories high—in Inazawa, Japan. This is where we test our latest high-speed, high-rise models. All tests we can't do by computer we carry out here, including emergency stopping, safety and comfort tests. And we use the data we gather for future elevator development. At 173 meters, this structure is among the world's highest class of elevator testing towers.





## Ever tried drying your hands with a tornado?



"Jet Towel" Hand Dryer

A big new idea developed by Mitsubishi Electric, the "Jet Towel" hand dryer dries hands with air blasts of up to 396 km/h\*—the wind speed of a large tornado. High-velocity wind removes water from hands much faster than the warm air of conventional hand dryers, drying hands completely in a matter of seconds, and with less energy. The Jet Towel is also sanitary because it doesn't require users to touch it, and it doesn't create paper waste. That's why these units are becoming popular in restaurants and restrooms around the world.

\* Maximum speed at nozzles of double-sided jet type (high-power type, available only in Japan).

**You wouldn't believe the things we do.**

## What if you could heat your home with freezing outside air?



Heat Pump Technology for Cold Climates

Even the coldest air contains some heat, and heat pump technology captures it and transfers it indoors by means of a circulating refrigerant that is alternately expanded and compressed. But to keep this process going when the temperature falls below freezing, Mitsubishi Electric developed an original dual refrigerant circulation system called a Flash Injection Circuit. It ensures more refrigerant is flowing, even in below-freezing temperatures, making highly energy-efficient heat pumps an option in the world's colder regions.

**You wouldn't believe the things we do.**



## A simple piece of paper gave us a fresh new idea for energy-saving ventilation



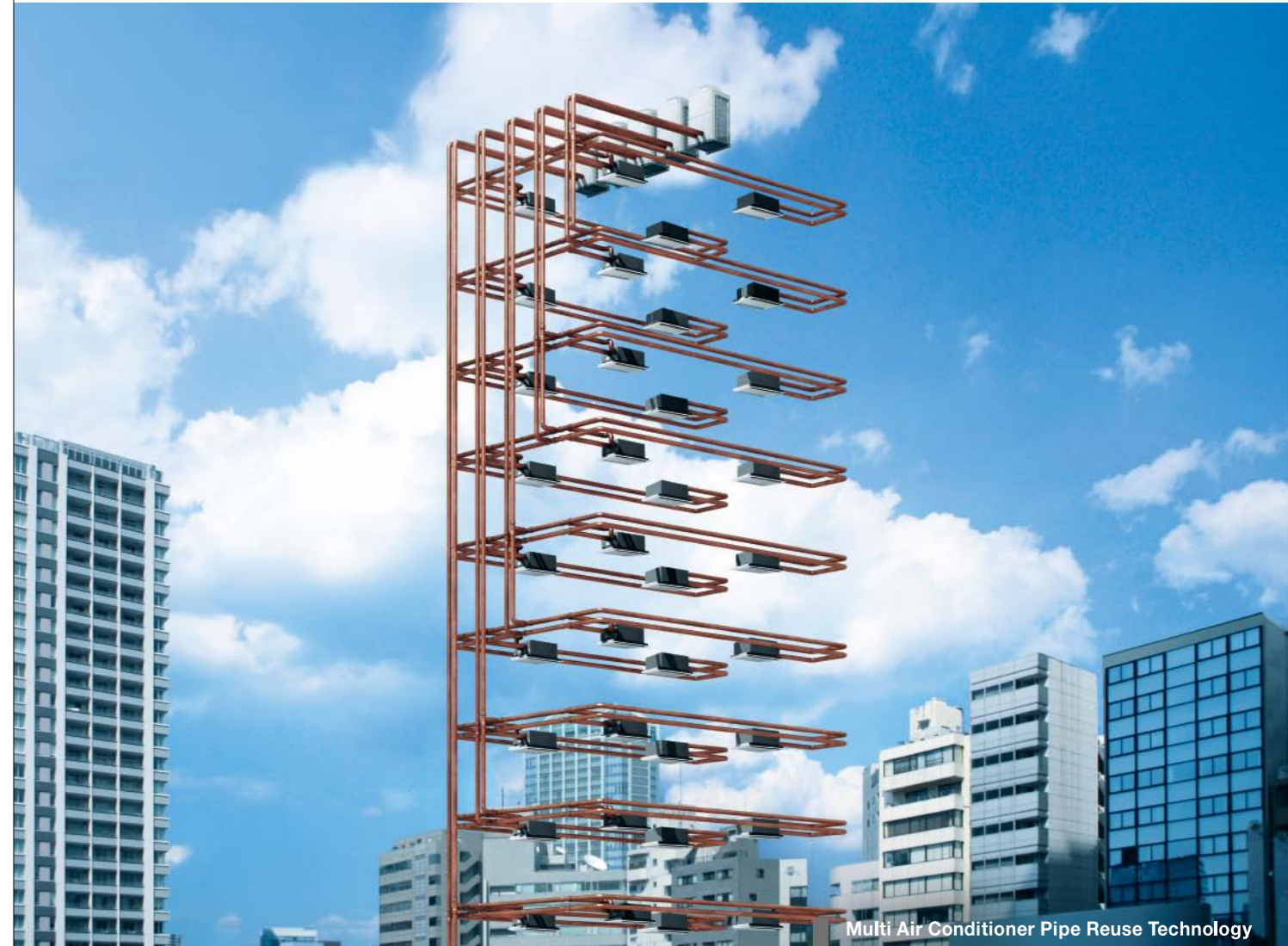
Lossnay Energy Recovery Ventilator

**You wouldn't believe the things we do.**

Blow into a tube of paper, and the heat is transferred to your hands. This is the principle behind Mitsubishi Electric's Lossnay Energy Recovery Ventilation System. Lossnay incorporates a unique heat exchange filter made of a specially processed paper material that transfers the room's temperature to the incoming air—allowing ventilation of the room without largely affecting temperature and humidity. This revolutionary capability minimizes energy loss from ventilation. Lossnay systems are now helping conserve energy around the world.



## Think of it! Useless old air conditioning piping used to go to waste



Multi Air Conditioner Pipe Reuse Technology

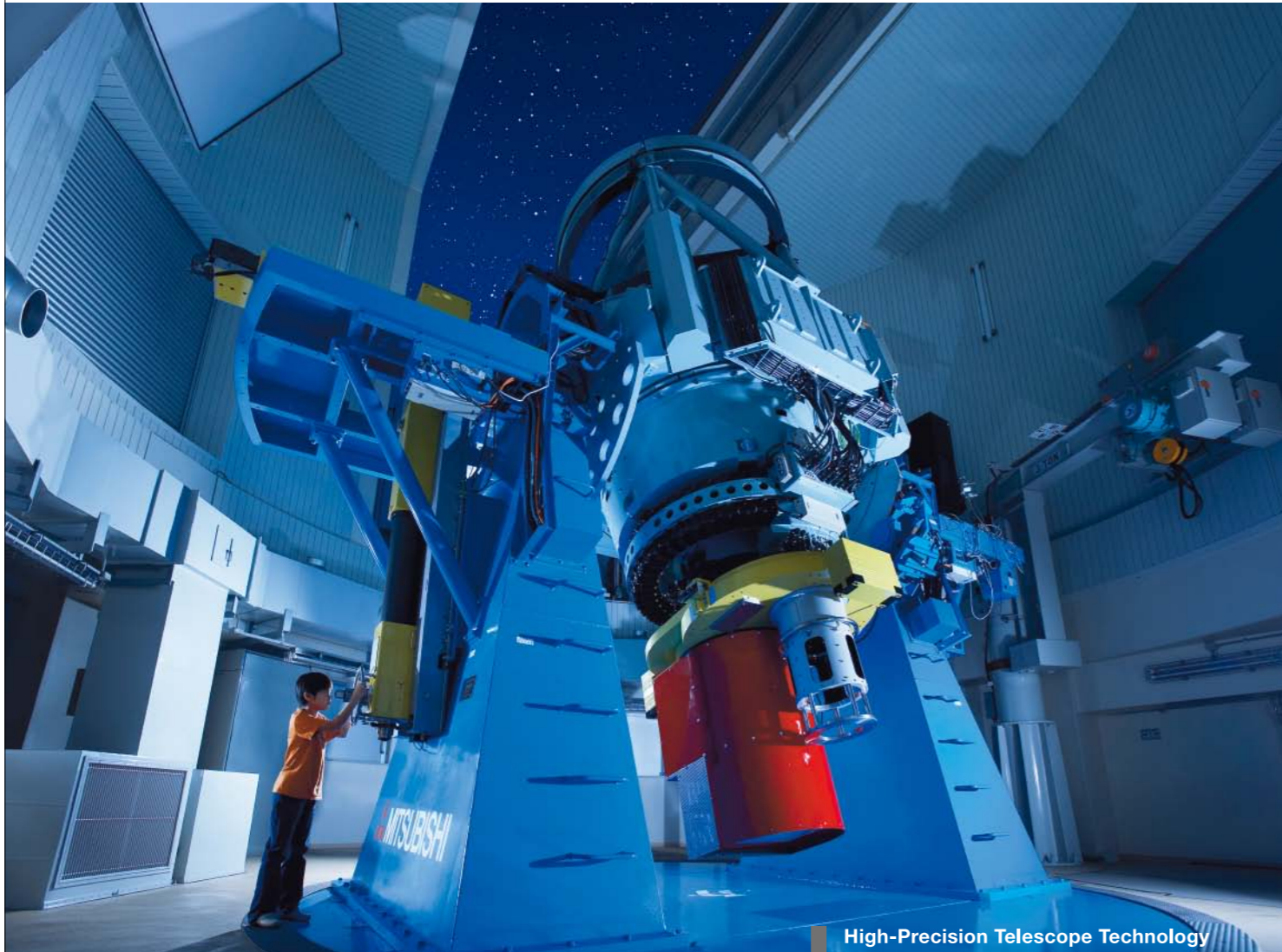
**You wouldn't believe the things we do.**

Replacing building air conditioning units used to mean replacing all the air conditioner piping as well. But now Mitsubishi Electric has developed a remarkable gas-liquid 2-phase refrigerant that cleans out leftover refrigerant oil from existing air conditioner piping, allowing the piping to be re-used. This pipe reuse technology delivers huge time and cost savings, prevents waste, and reduces the need for copper. Upgrading air conditioning units to more energy-efficient models makes more sense now than ever before.





## The best place to find a star 10 billion light years away is right here



High-Precision Telescope Technology

The giant Nayuta telescope at the Nishi-Harima Astronomical Observatory is the largest optical telescope in Japan. Its primary mirror with a two-meter aperture was polished to an astonishing precision of 40 nanometers, allowing visual observation of objects 10 billion light years away! And its automatic tracking system with advanced drive control lets it track celestial objects with extreme precision to within 0.00014 degrees. Nayuta was designed and built by Mitsubishi Electric, a leading force in telescope technology worldwide.

**You wouldn't believe the things we do.**

## And now... A driverless spacecraft that can think for itself



Photo courtesy of JAXA

Autonomous Control Technology for Spacecraft

The HTV is the first Japan-made unmanned, automated vehicle for delivering supplies to the International Space Station (ISS). The HTV must rendezvous and dock with the ISS, going through a complex navigational ballet during which it continuously executes precise self-correcting maneuvers. The onboard 'brain' powering this autonomous control system is the HTV's avionics module. This module, developed by Mitsubishi Electric, incorporates advanced guidance, communications, data processing, and power supply technologies that allow the HTV to automatically pilot itself into place.

**You wouldn't believe the things we do.**



## From here in Hawaii, the wonders of the universe have never been clearer



Photo: The Pleiades star cluster (Subaru) and Jupiter above Subaru Telescope's dome/©NAOJ

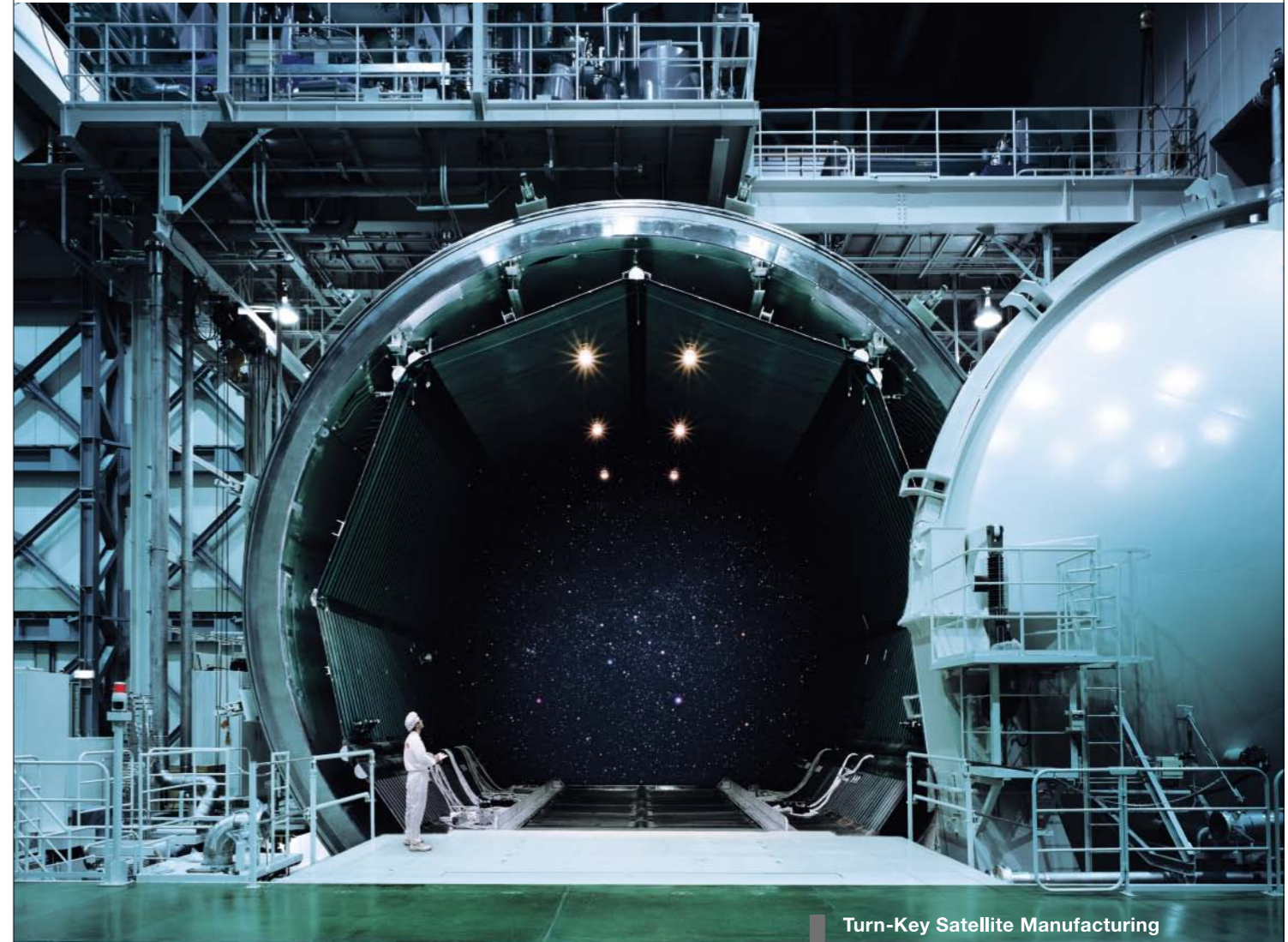
### High-Definition Astronomical Telescope Technology

The Subaru astronomical telescope on the Big Island of Hawaii is one of the largest monolithic primary mirror telescopes in the world. For over 15 years it has observed stars and inspired dreams, relying on some of the most advanced telescope technology on the planet—from Mitsubishi Electric. In 2013 we installed new observation equipment, the 'Hyper Suprime-Cam,' giving Subaru a sevenfold increase in field of view, and much higher resolution. Our cutting-edge, endlessly improving telescope technology will never stop revealing the wonders of the universe.

**You wouldn't believe the things we do.**



## What if you could bring outer space down to Earth?



### Turn-Key Satellite Manufacturing

Mitsubishi Electric is the Japanese company that can design and manufacture satellites from start to finish. In the business since 1968, to date we have been involved in producing over 300 satellites. To test our products we've built a space chamber where we replicate the harsh environment of outer space, including an intense vacuum and radical temperature variations from +200°C to -150°C. Other facilities allow us to conduct vibration, shock, sonic, and other tests.

**You wouldn't believe the things we do.**





# We're helping build an array of antennas to act as a giant telescope 18 km wide



Super High-Precision Antenna Technology

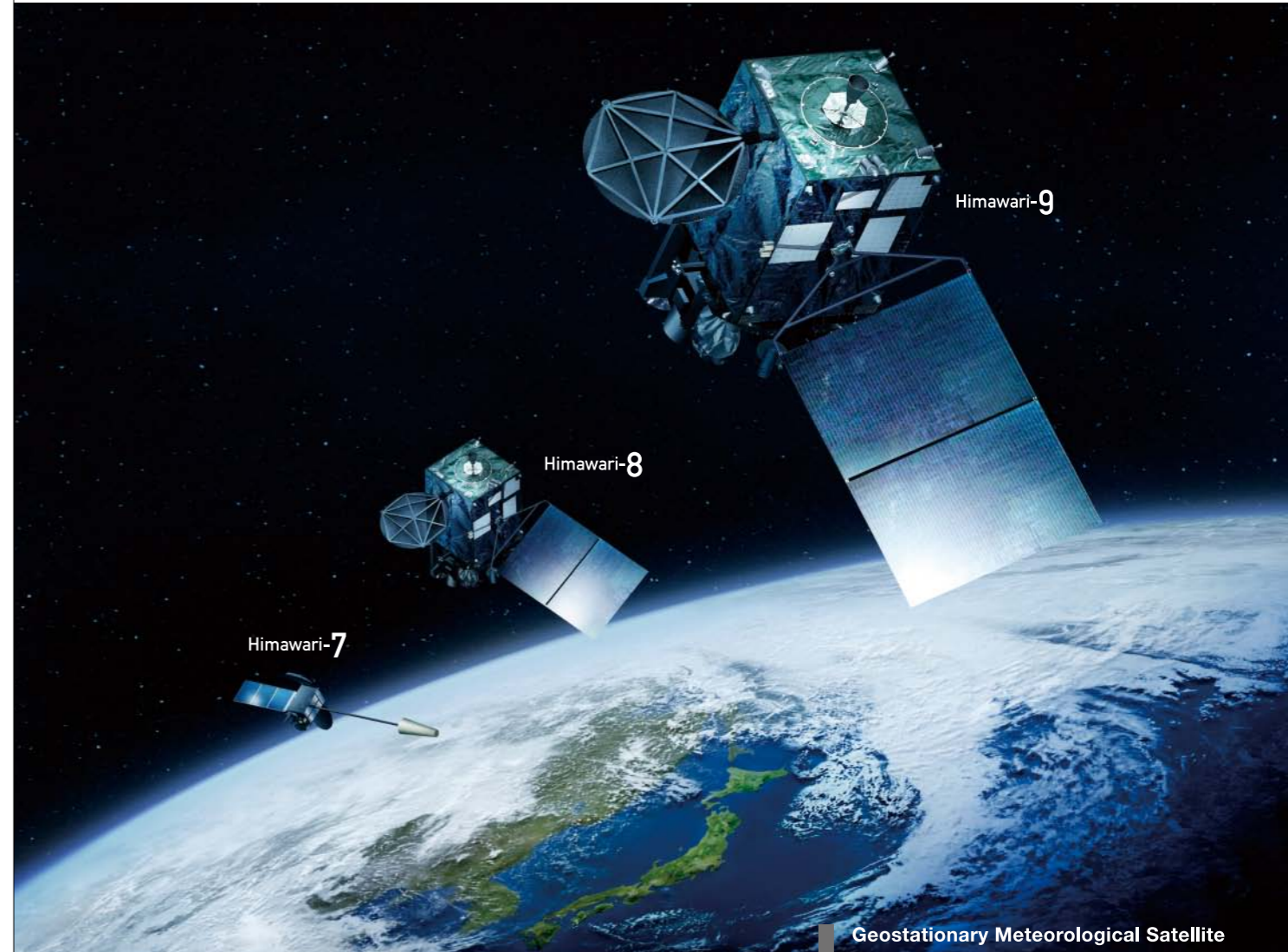
In the ALMA<sup>1</sup> Project in the Chilean Andes, 19 countries are constructing a radio telescope array of at least 66 parabolic antennas. The array will function as a single giant telescope with resolution equivalent to an antenna 18 km across, and use millimeter/sub-millimeter waves to observe interstellar matter not observable with visible or infrared light. Japan's role is to provide the ACA<sup>2</sup>, 16 high-precision antennas vital for high imaging resolution. These 16 antennas are being designed and manufactured by Mitsubishi Electric.

1: Atacama Large Millimeter/sub-millimeter Array 2: Atacama Compact Array

**You wouldn't believe the things we do.**



# Ever-changing weather meets never-changing reliability; our ongoing mission



Geostationary Meteorological Satellite

Weather is so unpredictable that predicting it is an enormous challenge. For decades Japan's weather forecast has been based on data from the highly reliable 'Himawari' family of meteorological satellites. Himawari-7, currently in operation, was developed by Mitsubishi Electric. We've also completed Himawari-8, and are already developing Himawari-9. The two newer models boast advanced weather-monitoring sensors, higher resolution, and more observation channels\*. These advances will provide ever more detailed and comprehensive information, which Japan shares with the Asia-Pacific region to contribute to disaster prevention.

\* Including visible, near-infrared and infrared

**You wouldn't believe the things we do.**





## The worse we treat our electrical substation equipment, the better it gets



Development Technology for Electrical Substation Equipment

**You wouldn't believe the things we do.**

Famed around the world for its remarkable reliability, our electrical substation equipment must supply stable electrical power through all climatic extremes, earthquakes and other disasters. So before sending it out into the world we put this equipment through its paces, testing it mercilessly in our testing laboratories, which can simulate the harshest climates and temperature fluctuations, as well as rain, snowfall, lightning, and earthquakes. The equipment never leaves our hands until we know it's ready for anything.

## How can you stop electricity without turning it off?



Gas Insulated Switchgear

**You wouldn't believe the things we do.**

To prevent widespread damage when a large fault current surges through power lines, Mitsubishi Electric developed a special gas insulated switchgear with a unique extinguishing chamber that instantly injects insulating gas precisely at the zero point. It terminates electricity flow between the contacts within 0.03 to 0.04 seconds, then restores normal power flow within 0.3 seconds to avoid an outage. With such breakthrough technology, Mitsubishi Electric is contributing to a stable electricity supply around the world.



# Why not use the power of the Sun to water the Earth?

Bolthouse Farms, Lancaster, California, USA. System size: 1.9 MW



Photovoltaic Power Generation

**You wouldn't believe the things we do.**

At this large carrot farm in California a Mitsubishi Electric photovoltaic (PV) installation powers the pumps and sprinkler systems to water the fields. Mitsubishi Electric is a leader in solar power systems. Our latest accomplishment: development of ultra-fine honeycomb-surfaced PV cells that in tests achieved the world's highest<sup>1</sup> energy-electricity conversion efficiency (19.3%<sup>2</sup>). All our PV modules also feature lead-free solder. It's just one more reason why our photovoltaic power generation systems are in demand at homes, offices, factories — and farms — worldwide.

1: As of Feb 16, 2010; As measured by the National Institute of Advanced Industrial Science and Technology (AIST).  
2: Using a 150mm polycrystalline silicon PV cell.



# You should see how we can boost your profits by making energy usage visible



e&eco-F@ctory

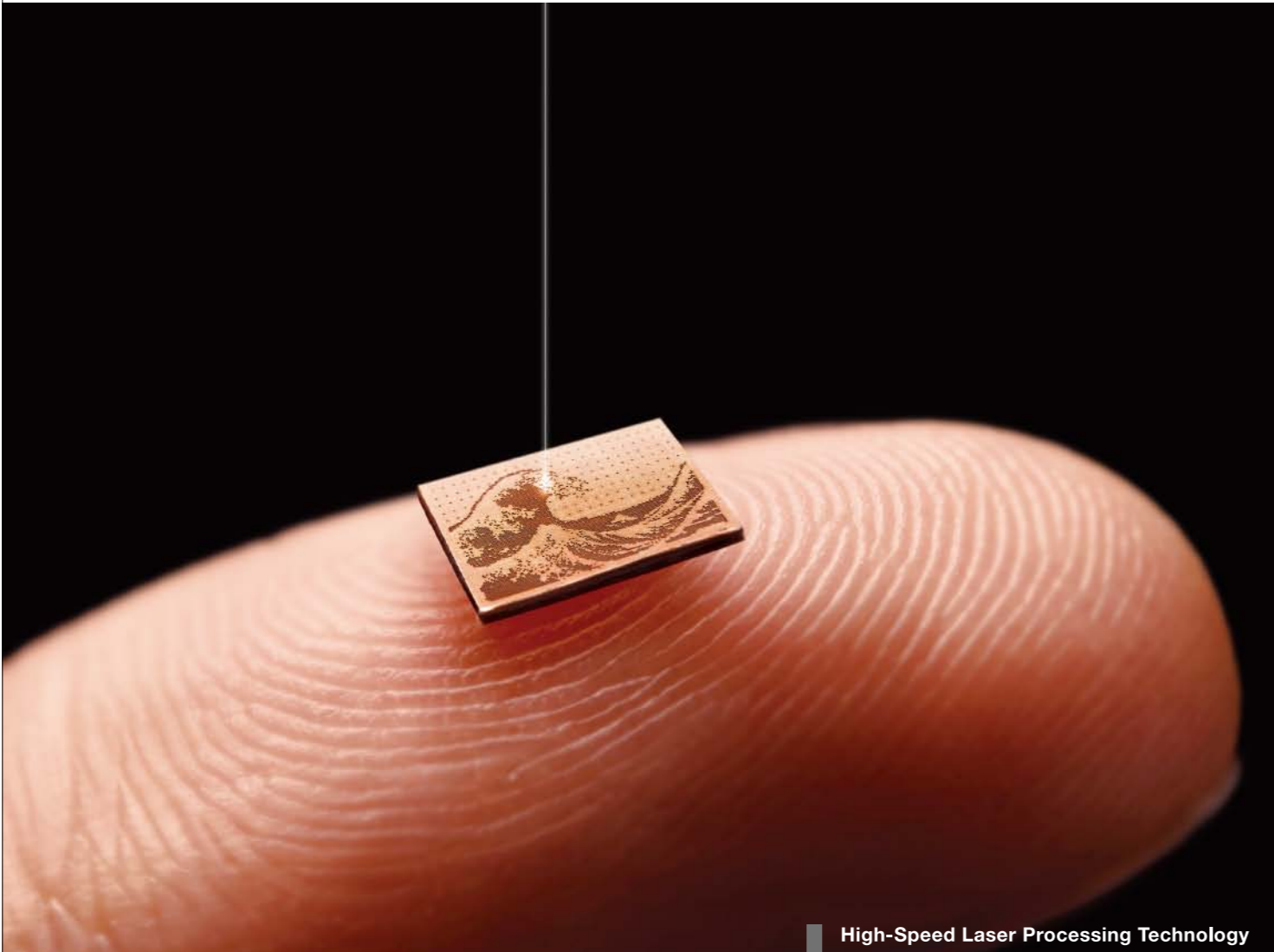
**You wouldn't believe the things we do.**

Mitsubishi Electric's Fukuyama Works in western Japan is where we manufacture energy-saving products. The plant has been thoroughly optimized with our "e&eco-F@ctory" solution, which includes an EcoWebServer III that controls the use of energy. The EcoWebServer III measures electricity use against production volume and, employing our original analysis and display software, quantifies the results in an easy-to-read electricity-to-production ratio. In this way it makes energy instantly "visible," drawing attention to any areas of waste. Through saving energy it can boost production efficiency.





**It took Hokusai days to  
create his masterpiece.  
Ours took less than a second**



High-Speed Laser Processing Technology

**You wouldn't believe the things we do.**

It's a copy of Hokusai's famous woodblock print of ocean waves. We drilled it into this tiny circuit board by laser processing machine, boring exactly 4,091 micro-holes—in 0.6 seconds! Ever higher speeds in laser drilling are what's driving the exponential evolution of smartphones, shrinking their size while multiplying their functions by enabling mushrooming connections between components. Mitsubishi Electric is a world leader in laser processing technology, offering cutting-edge systems that can drill, with ultra-high precision, 4,500 holes per second.



**If you could connect the  
entire factory to your desktop,  
think of what you'd see**



e-F@ctory—Factory Visualization Technology

**You wouldn't believe the things we do.**

If the operational status of factory equipment and the production status of every product in process could easily be quantified and monitored in real time, then an entire factory could be visualized and controlled from one central location. That's the idea behind Mitsubishi Electric's revolutionary e-F@ctory solution and iQ Platform, which optimize operations by connecting factory equipment with process management, quality control and other upstream information systems. e-F@ctory is the manufacturing solution of the future.





## Let's raise a glass to unprecedented precision in manufacturing



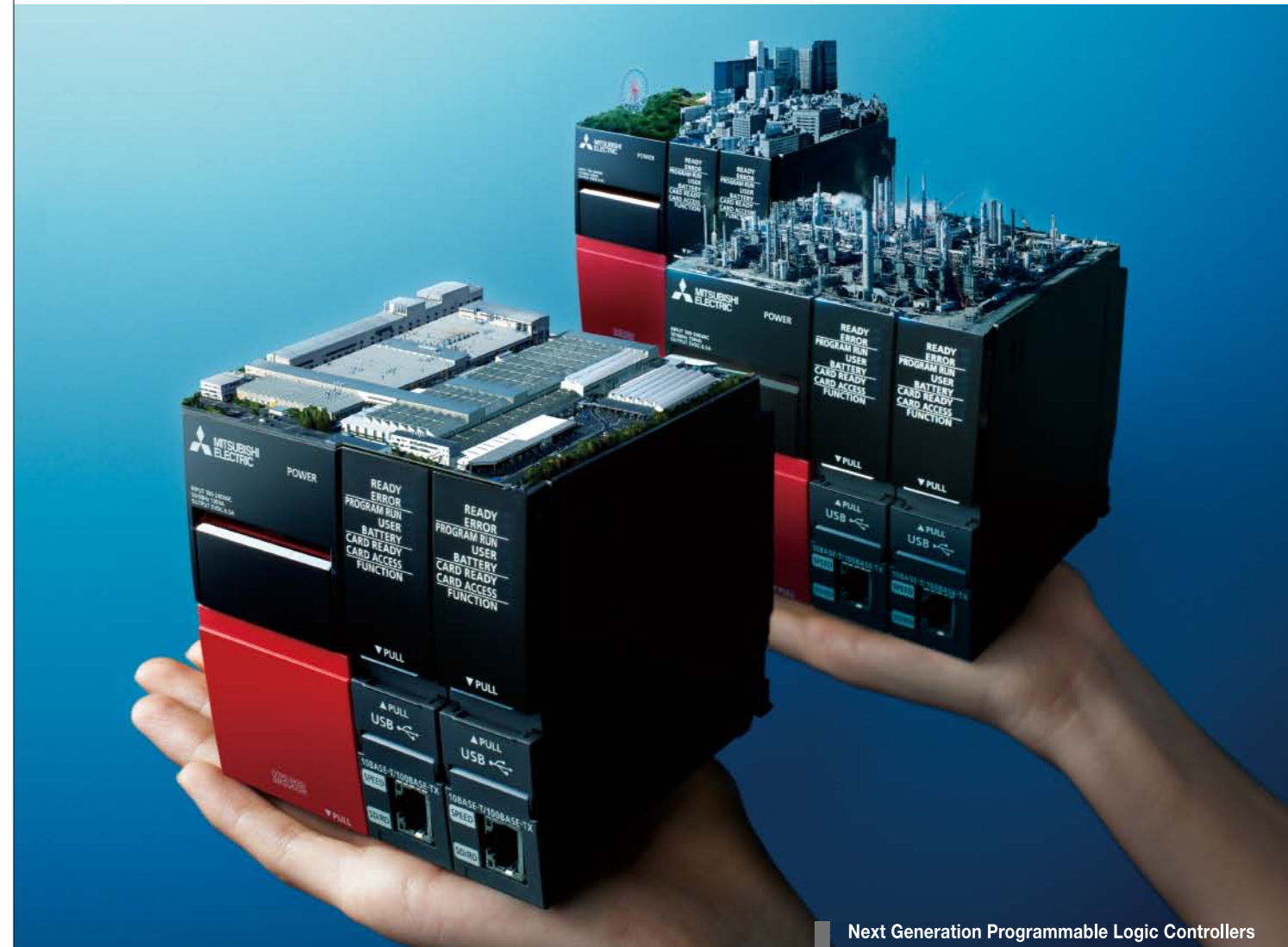
Advanced Robot Systems

**You wouldn't believe the things we do.**

Factory robots, which have become an essential part of modern industry, are growing ever more sophisticated and sensitive. Mitsubishi Electric has developed a robot incorporating vision and tactile force sensors so advanced that it can 'see' separate parts spread out randomly, and 'feel' them as it picks them up with just the right amount of strength and puts them together with unerring balance, precision and delicacy. Robots like this are revolutionizing the factory floor, performing increasingly complex tasks and creating new possibilities in manufacturing.



## Society is supported by factories that rely on PLCs from Mitsubishi Electric



Next Generation Programmable Logic Controllers

**You wouldn't believe the things we do.**

To manufacture the things that underpin modern society, each piece of equipment on a factory production line must perform its task in a carefully coordinated way. Programmable logic controllers (PLCs) are the command centers that keep everything moving in synch. As a global leader in the design and manufacture of PLCs, Mitsubishi Electric continues to extend the boundaries of what is possible with this technology. We are creating new ways to apply PLCs as the 'brain' of today's efficient factories—and discovering new roles for them at the heart of tomorrow's world.





# Here's another little way we're making a big difference in energy conservation



Power Semiconductor Module

**You wouldn't believe the things we do.**

Mitsubishi Electric developed its revolutionary DIPIPM™ power semiconductor module to carefully control power flow in inverter-based air conditioners and other appliances, for enormous energy savings. In 2007, these devices saved about 28 billion kWh\* of electricity worldwide—enough to power all 6 million households in the city of Tokyo for more than a year! Now the DIPIPM is conserving electricity not just in air conditioners, but in home appliances, industrial robots, and low power industrial motor drives.

\* Mitsubishi Electric estimate of energy savings, based on number of DIPIPM-equipped air conditioning units in operation.



# Commuting to work has never been so entertaining



Train Vision

**You wouldn't believe the things we do.**

These two screens are part of Mitsubishi Electric's remarkable Train Vision visual information system, which provides passengers with timely, location-based information as the train advances. Content is sent via high-speed wireless, and includes destination and travel information, news, weather, entertainment, and more. First adopted on JR East's Yamanote Line in Tokyo in 2002, Train Vision is now used on a number of train lines, and continues to evolve. Mitsubishi Electric has a long history of developing advanced onboard train information systems.





**We're helping to power trains that use almost 40% less energy!**



**SiC Train Circuit System**

On some of its trains, Tokyo Metro's famous Ginza Line (shown here) uses Mitsubishi Electric's SiC (silicon carbide) traction inverters and regenerative braking technology. Compared to conventional systems, these systems working together have achieved an astounding, world's-first\* total electricity savings of 38.6%. As a long-time leader in energy-saving breakthroughs and control technology for railcars, stations, rail yards and train operations, Mitsubishi Electric offers very high-capacity, low-loss, compact, lightweight inverters and other technologies that are helping to usher in the 'greener' rail infrastructure of the future.

\* As of September 2012, in a commercially operating railcar.

**You wouldn't believe the things we do.**



**Our advanced control technologies are helping to make cars greener**



**Car Electronics**

Automakers worldwide are working relentlessly to make cars more environmentally compatible. Which is why many of them come to Mitsubishi Electric for sophisticated car electronics technologies, such as electronic engine management systems, electric power steering systems, car navigation systems, vehicle exhaust emission control systems, and much more. Our cutting-edge control technologies and wide-ranging car electronics products are helping to make automobiles greener. And thus helping to ensure a brighter future for people, vehicles, and the Earth.

**You wouldn't believe the things we do.**





## Making these turns easy used to be harder on the Earth



EPS Motor Controller

Originally power steering systems were hydraulic, requiring constant power from the engine. But in 1988 Mitsubishi Electric became the first in the world to succeed at the mass production of electric power steering (EPS) motors and controllers. These devices activate the EPS motor only when necessary, using much less energy from the engine, thereby greatly improving fuel efficiency. Mitsubishi Electric's advanced current control, electromagnetic design and precision motor control technologies are making driving both safer and a little easier on the Earth.

**You wouldn't believe the things we do.**



## Now you can draw a 3D map at 80 kilometers per hour



Mobile Mapping System (MMS)

Mitsubishi Electric's Mobile Mapping System (MMS) is a cartographic wonder: a vehicle-mounted system that can create the data for a precise 3D map of an area as it races through at 80 km/h. The MMS, comprising a GPS antenna, four laser scanners, and six rooftop-mounted, radially oriented video cameras, captures the road shape and road signs, as well as contiguous objects and buildings, digitally recording the data in 3D form. The system is presently used primarily to update road and map data for public authorities.

**You wouldn't believe the things we do.**





## A disaster in real life requires data in real time



Helicopter Satellite Communications System

**You wouldn't believe the things we do.**

When disaster strikes, access to real-time video can save lives. Helicopters dispatched to the scene send video data to authorities via ground relay stations. But data streams are easily blocked by mountains or high-rise buildings, which is why Mitsubishi Electric developed its cutting-edge helicopter satellite communications system. This system can relay an uninterrupted data stream to anywhere in Japan—using its burst modem to beam data between the spinning rotor blades to a satellite, which transmits it back to the ground where it's needed.



## Across both of the world's greatest oceans our optical systems are really speeding things up



Optical Submarine Cables

**You wouldn't believe the things we do.**

The transpacific and transatlantic optical undersea cables are major arteries through which courses the lifeblood of the world: digital information. The cables were laid years ago, but to keep information flowing ever faster, the terminal equipment must be periodically upgraded. Recently Mitsubishi Electric was chosen to upgrade both transpacific and transatlantic cables with our ultra high-speed, large-capacity 40 Gbps high-sensitivity phase-modulation terminal equipment. This is the first time\* that any transmission technology supplier has been chosen to upgrade submarine systems in both oceans.

\* As of March 31, 2012, for 40 Gbps optical submarine cable transmission; Mitsubishi Electric survey.





# Our surveillance cameras help you see the slightest movement in the dark



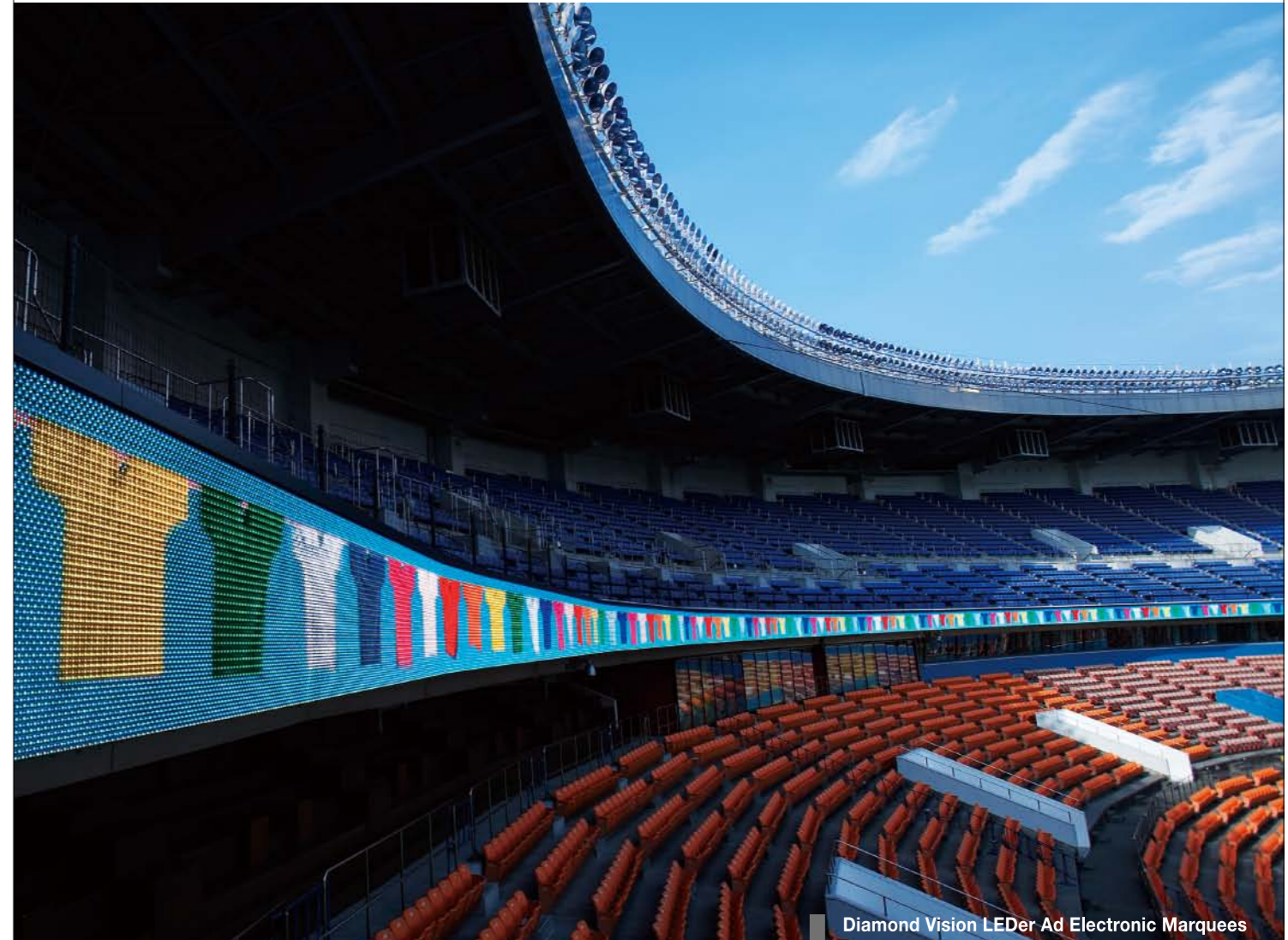
Digital Surveillance Camera

**You wouldn't believe the things we do.**

The role of surveillance cameras in providing security and peace of mind throughout modern society continues to grow. And as it does, the cameras continue to get better and better. Among the best are those from Mitsubishi Electric: cutting-edge digital surveillance cameras with digital sensitizing technology that dramatically reduces blur and residual images, and digital noise reduction technology that makes the images crisper and noise-free. The result is amazingly high picture quality—even when capturing moving objects in the dark.



# How many T-shirts does it take to surround a stadium\*?



Diamond Vision LEDer Ad Electronic Marquee

**You wouldn't believe the things we do.**

The Mitsubishi Electric "LEDerAd" at Chiba Marine Stadium (shown here) is one of the largest in Asia—about one meter tall and almost 300 meters long. Widely recognized as the future of large-scale entertainment media, our LEDerAd electronic marquees are dramatic horizontal LED ribbon boards that can display a vast range of content from a standard PC, with seamless resolution. Photographs, illustrations, announcements, advertisements; put them all up on the screen with a few keyboard strokes. And watch the crowds respond.

\* Answer: on this screen, about 300!





## Now you can watch the game on a 1,275-inch high-definition TV



Large-Scale Display Technology

**You wouldn't believe the things we do.**

This Mitsubishi Electric Diamond Vision screen at Turner Field in Atlanta, Georgia, U.S.A., home to the Atlanta Braves, is 21.76 meters tall and 24 meters wide—equivalent to a 1,275-inch TV—making it the largest high-definition screen in the world.\* Three separate displays of information (e.g. live action, replays and player data) can be shown simultaneously, and all 5,200,000 of its LEDs can be individually controlled, producing stunning HD images. Mitsubishi Electric has installed its giant screens around the world.

\* As of March 2005; based on Mitsubishi Electric survey.



## We make LED screens so big you can measure them in wingspans



Diamond Vision

**You wouldn't believe the things we do.**

This Diamond Vision LED screen which we built for the Sha-Tin racecourse in Hong Kong is 70.4 meters long, wider than the wingspan of a Boeing 747-400 jet. It features a flexible multi-display capability and Mitsubishi Electric's advanced synchronized screen-controller technology, which ensures that all of its 5.6 million LEDs display simultaneously for seamless high resolution images. At the time of its installation (August, 2004) this screen was the widest LED screen in the world.





## A glass of urban river water has never tasted so good



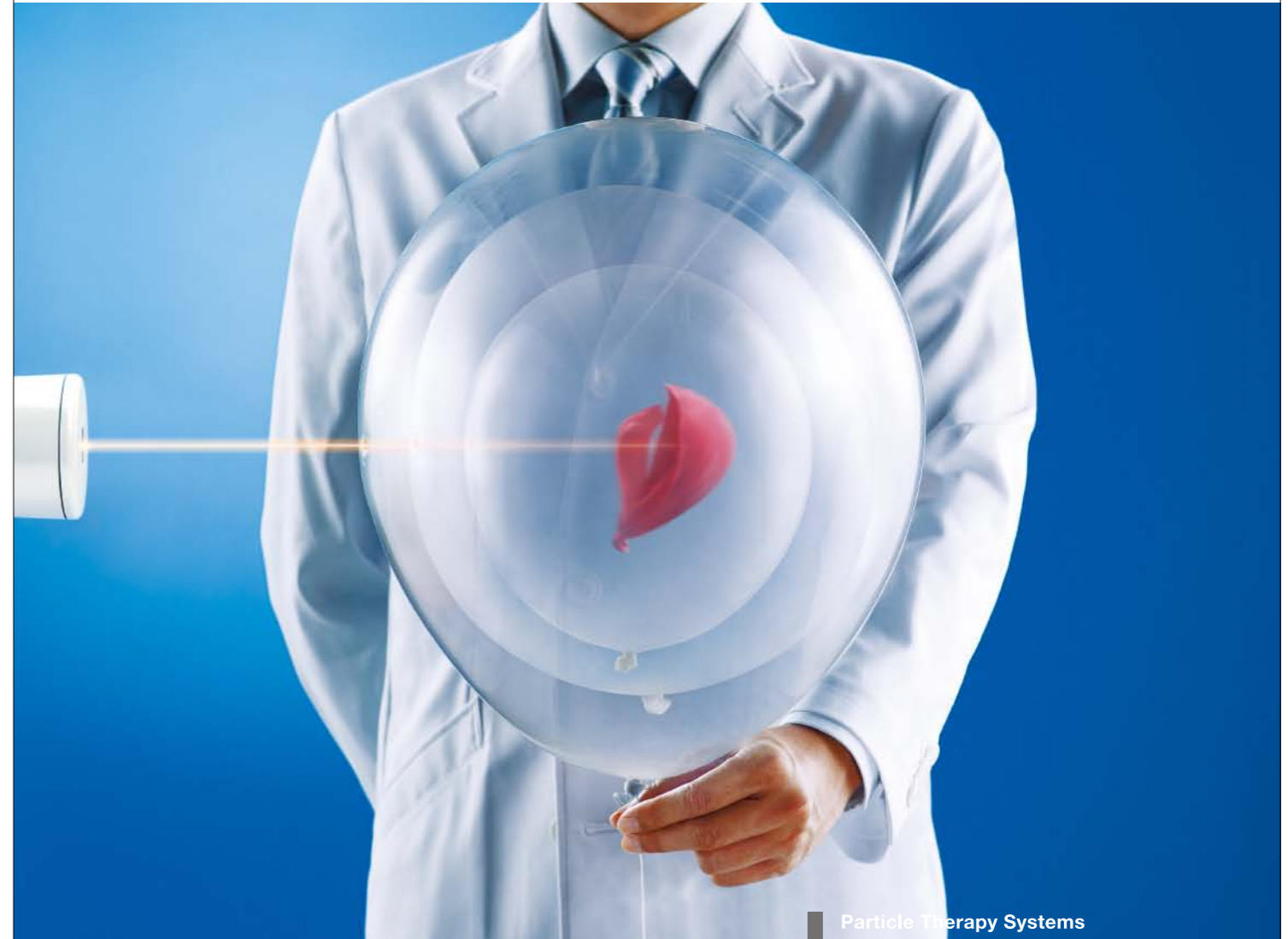
### Ozone Generation Technology

Mitsubishi Electric has developed a unique high-concentration ozone generation technology for advanced water purification. An improvement on the typical electrical discharge process, it produces a much higher volume of ozone while using less electricity. This breakthrough energy- and space-saving technology, which won an industry award in 2006, is helping water treatment facilities more efficiently use advanced ozone purification to remove odors, bacteria and microbes, for higher quality drinking water. It's also expanding possibilities in wastewater recycling.

**You wouldn't believe the things we do.**



## Now there's a pinpoint technology to reach tumors without harming surrounding tissue



### Particle Therapy Systems

The most advanced form of radiation therapy today uses particle beams to treat tumors. Particle therapy requires no scalpel, is delivered in minutes, and contributes to patient quality of life. Mitsubishi Electric is an industry leader in particle therapy systems for medical facilities. Our systems accelerate hydrogen or carbon ions to more than 70% of the speed of light and target them with pinpoint precision to release maximum energy at the point of the tumor, while leaving surrounding normal tissue unaffected. It's the next generation in medical treatment.

(This product requires country-specific regulatory clearance prior to first patient use).

**You wouldn't believe the things we do.**





# Another speaker breakthrough? Things are sounding better all the time



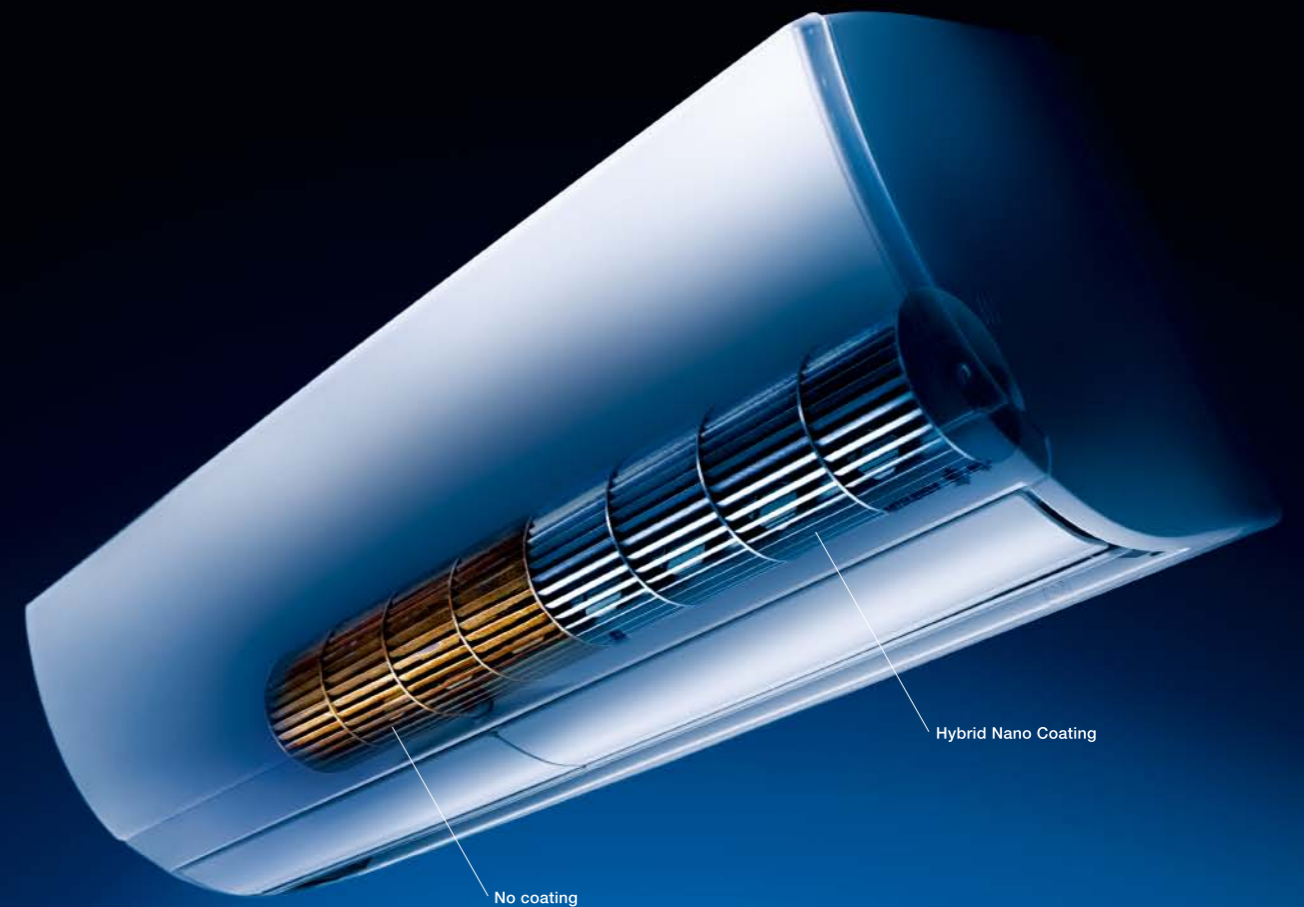
### NCV Audio Speaker Technology

The sound quality of an audio speaker depends on its diaphragm. So for almost 70 years Mitsubishi Electric has been making increasingly advanced diaphragms out of a variety of innovative materials. Now we've developed our most sophisticated diaphragm yet: the 'NCV' (Nano Carbonized high Velocity) diaphragm, made out of resin and carbon nano-tubules. NCV balances high propagation velocity with appropriate internal loss, suppressing unnecessary resonance while delivering across a wide frequency range—for the most natural sound that you have ever heard.

**You wouldn't believe the things we do.**



# Here's a new way to keep clean, save energy and stay cool



### Hybrid Nano Coating

Conventional anti-fouling technologies protect against either hydrophilic (dust) or hydrophobic (oil and soot) grime—not both. So Mitsubishi Electric developed the world's first\* nano-scale technology that protects electronic parts from both types of fouling. Our revolutionary Hybrid Nano Coating can be used on a variety of materials, from metals to plastics. We use it on certain parts in some of our air conditioners, including heat exchangers, fans, and ventilation flues. Cleaner parts mean better efficiency and lower electricity costs. Which means you can breathe a little easier.

\* As of September 2008; Mitsubishi Electric data.

**You wouldn't believe the things we do.**





## Now there's a way to enjoy steamed rice—without the steam!



### IH Rice Cookers

Rice cookers release a lot of steam into a room, creating heat and odor, and sometimes taking a toll on walls and furniture. So Mitsubishi Electric developed something completely new: the world's first rice cooker that doesn't steam.\* The secret? A unique water-cooled steam collecting system in which a cartridge under the lid collects the steam and funnels it to a cooling water tank that re-liquefies it. Because the "steam-less" rice cooker continuously maintains the heat at a high level, and separates the flavor compounds from the steam, it also produces better-tasting rice.

\* As of February 2009. Cuts steam released by approximately 95%; based on Mitsubishi Electric survey

**You wouldn't believe the things we do.**



## Who would have thought that recycling technology would work in a vacuum cleaner?



### Cyclone Vacuum Cleaner

Cyclone-type vacuum cleaners use a spinning force to separate dust and dirt particles from air. However, most standard household cyclone-type vacuum cleaners cannot separate the two thoroughly, and so they require a filter. But filters get clogged, reducing the vacuum's power. And that gave us the idea to develop a revolutionary new cyclone vacuum cleaner incorporating the advanced wind-driven plastic separation technology used at Mitsubishi Electric's home appliance recycling factory. This technology gave birth to the first household cyclone vacuum cleaner in Japan that doesn't need a filter in the cyclone box.

**You wouldn't believe the things we do.**





# MITSUBISHI ELECTRIC CORPORATION

<http://www.MitsubishiElectric.com>



**for a greener tomorrow**

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.

