

Weather Engineering in China

How the Chinese plan to modify the weather in Beijing during the Olympics, using supercomputers and artillery.

By [Mark Williams](#) on March 25, 2008

To prevent rain over the roofless 91,000-seat Olympic stadium that Beijing natives have nicknamed the Bird's Nest, the city's branch of the national Weather Modification Office—itsself a department of the larger [China Meteorological Administration](#)—has prepared a three-stage program for the 2008 Olympics this August.

First, Beijing's Weather Modification Office will track the region's weather via satellites, planes, radar, and an [IBM p575 supercomputer](#), purchased from Big Blue last year, that executes 9.8 trillion floating point operations per second. It models an area of 44,000 square kilometers (17,000 square miles) accurately enough to generate hourly forecasts for each kilometer.

Then, using their two aircraft and an array of twenty artillery and rocket-launch sites around Beijing, the city's weather engineers will shoot and spray silver iodide and dry ice into incoming clouds that are still far enough away that their rain can be flushed out before they reach the stadium.

Finally, any rain-heavy clouds that near the Bird's Nest will be seeded with chemicals to shrink droplets so that rain won't fall until those clouds have passed over. Zhang Qian, head of Beijing's Weather Modification Office, explains, "We use a coolant made from liquid nitrogen to increase the number of droplets while decreasing their average size. As a result, the smaller droplets are less likely to fall, and precipitation can be reduced." August is part of Northeast Asia's rainy season; chances of precipitation over Beijing on any day that month will approach 50 percent. Still, while tests with clouds bearing heavy rain loads haven't always been successful, Qian claims that "the results with light rain have been satisfactory."

Modifying the weather may seem a hubristic exercise. But arguably, given what else the Chinese have already invested to make this year's Olympics a showcase for China's emergence as a 21st-century superpower, it's almost the least they could do. Following the announcement in 2001 that the 2008 Games had been awarded to Beijing, the government of the People's Republic initiated \$40 billion of new construction there, bringing 120,000 Chinese migrant workers into the city (at about \$130 each a month) and triggering a five-year steel shortage worldwide. Today, Beijing boasts, alongside the vast Bird's Nest, megastructures like a [new airport terminal](#) that on its own is bigger than any airport

elsewhere in the world. One measure of the city's transformation is that today 300 or so new towers, some designed by the most avant-garde architects on the planet, rise where a few short years ago there were only *siheyuans* (traditional Chinese courtyard residences) interspersed with bland 1950s-era boxes in the Sino-Soviet style.

Equally, though, the Geneva-based Centre on Housing Rights and Evictions estimates that 1.5 million of Beijing's natives will have been displaced from their homes by government edict when the Olympics finally begins. This preemptory modernization is of a piece with China's scale, its 1.32 billion population, and the authoritarian control exerted by its Communist central government, which nowadays is dominated by technocrats and engineers who favor mega-projects like the world's largest dam (the Three Gorges dam over the Yangtze River), its highest railway (the Qinghai-Tibet line), and even its biggest Ferris wheel (in Beijing, opening in 2009). Unsurprisingly, therefore, China's national weather-engineering program is also the world's largest, with approximately 1,500 weather modification professionals directing 30 aircraft and their crews, as well as 37,000 part-time workers—mostly peasant farmers—who are on call to blast away at clouds with 7,113 anti-aircraft guns and 4,991 rocket launchers.

Credit: Xinhua

Tagged: Computing, forecasting, meterology, weather engineering

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