Future Weather Technology

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Cloud seeding is probably the best known technology for changing weather, and is used often to cause rainfall, notoriously in the recent Olympics to help wash pollutants out of the atmosphere. It works by spreading particles that act as centres for condensation, often using silver iodide or CO2. But many other approaches for weather modification are being considered. My favourite suggestion (credited to Ross Hofmann) is that tornadoes could be diffused or at least calmed somewhat by heating up the local air using microwave beams. The microwaves could come either from ground or space based masers. Similar techniques might work with hurricanes. Ionospheric heating is another approach, where regions of ionosphere are heated by masers from the ground. The HAARP project (check it out!) makes for fun reading. Although intended for research and possible communications purposes, and only uses low power (3.6MW) beams, the principle could possibly be scaled up to create reflective regions that could deflect part of the incoming solar wind, and under computer control, this power could be harnessed to create further regions, and hence a cascade. Coupled with the storm

modification technology, it could make either a more powerful weather tool, or even a weapon.

Another class of approaches relies on darkening the atmosphere or directly blocking out sunlight. Space based umbrellas could obviously do that, but of course they would need to be extremely large and therefore heavy and expensive. Much more likely, synthetic biology might be able to make synthetic organisms to replicate in large quantities to absorb sunlight. This is much more fun to consider. We are only a couple of years at most from seeing the first artificial bacteria. In a couple of decades, we should be able to make bacteria and other simple organisms with a wide range of specifications. One of the options will be to include electronic circuits, manufactured by the bacterium's own cellular processes, and that would allow them to communicate, self organise, or be centrally controlled. If we combine the ability either to change shape or colour, or even both, then we would have a perfect weather control technology. The bacteria could be spread throughout the lower atmosphere, and be controlled at will to change the amount of shade. They could also be used in cloud formation and seeding. All this might well be feasible by 2030.

Much safer are small scale techniques for microclimate control. In deserts, artificial plants can help increase humidity and provide shelter, encouraging growth of real plants, and over time changing the local climate dramatically. Approaches such as this seem to offer much safer solutions too, since they only have a significant effect on local weather. Snow machines must also have some local weather effects too since snow reflects sunlight of course, and water sprays are used all over the world to control humidity and temperature. These technologies will become more sophisticated over the years too.

So with a range of local devices, some global ones, and some that are in the category of doomsday machines, we can look forward to some interesting debates on how far we should go, and how we can

prevent rogue states using weather control against us. Welcome to the future.

Biography

Ian Pearson is a futurologist, tracking and predicting new developments throughout information technology, considering both technological and social implications. He works for Futurizon, a startup futures institute. He is a Chartered Fellow of the British Computer Society, the World Academy of Art and Science, the Royal Society of Arts, the Institute of Nanotechnology and the World Innovation Foundation.