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The Ultimate Weapon of Mass Destruction:

"Owning the Weather" for Military Use

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www.globalresearch.ca 27 September 2004

The URL of this article is: <http://globalresearch.ca/articles/CHO409F.html>

This article is follow-up on an earlier study by the author entitled [Washington's New World Order Weapons Have the Ability to Trigger Climate Change](http://www.globalresearch.ca/articles/CHO201A.html), Third World Resurgence, January 2001, <http://www.globalresearch.ca/articles/CHO201A.html>

Environmental warfare is defined as the intentional modification or manipulation of the natural ecology, such as climate and weather, earth systems such as the ionosphere, magnetosphere, tectonic plate system, and/or the triggering of seismic events (earthquakes) to cause intentional physical, economic, and psycho-social, and physical destruction to an intended target geophysical or population location, as part of strategic or tactical war." (Eco News)

What are the underlying causes of extreme weather instability, which has ravaged every major region of the World in the course of the last few years?

Hurricanes and tropical storms have ravaged the Caribbean. Central Asia and the Middle East are afflicted by drought. West Africa is facing the biggest swarm of locusts in more than a decade. Four destructive hurricanes and a tropical rain storm Alex, Ivan, Frances, Charley and Jeanne have occurred in a sequence, within a short period of time. Unprecedented in hurricane history in the Caribbean, the island of Grenada was completely devastated: 37 people died and roughly two-thirds of the island's 100,000 inhabitants have been left homeless; in Haiti, more than two thousand people have died and tens of thousands are homeless. The Dominican Republic, Jamaica, Cuba, the Bahamas and Florida have also been devastated. In the US, the damage in several Southern states including Florida, Alabama, Georgia, Mississippi and the Carolinas is the highest in US history.

A study released in July 2003, by the World Meteorological Organization (WMO) places the blame, without further examination, at the feet of global warming:

"These record extreme events [high temperatures, low temperatures and high rainfall amounts and droughts] all go into calculating the monthly and annual averages which, for temperatures, have been gradually increasing over the past 100 years," the WMO said in its statement (CNN, July 3, 2003, <http://www.cnn.com/2003/WEATHER/07/03/wmo.extremes/>)

While global warming is undoubtedly an important factor, it does not fully account for these extreme and unusual weather patterns.

Weather Warfare

The significant expansion in America's weather warfare arsenal, which is a priority of the Department of Defense is not a matter for debate or discussion. While, environmentalists blame the Bush administration for not having signed the Kyoto protocol, the issue of "weather warfare", namely the manipulation of weather patterns for military use is never mentioned.

The US Air Force has the capability of manipulating climate either for testing purposes or for outright military-intelligence use. These capabilities extend to the triggering of floods, hurricanes, droughts and earthquakes. In recent years, large amounts of money have been allocated by the US Department of Defense to further developing and perfecting these capabilities.

Weather modification will become a part of domestic and international security and could be done unilaterally... It could have offensive and defensive applications and even be used for deterrence purposes. The ability to generate precipitation, fog, and storms on earth or to modify space weather, ... and the production of artificial weather all are a part of an integrated set of technologies which can provide substantial increase in US, or degraded capability in an adversary, to achieve global awareness, reach, and power. (us Air Force, emphasis added. Air University of the US Air Force, AF 2025 Final Report, <http://www.au.af.mil/au/2025/>; emphasis added)

While there is no firm evidence that the US Air Force weather warfare facilities have been deliberately applied to modify weather patterns, one would expect that if these capabilities are being developed for military use, they would at least be the object of routine testing, much in the same way as the testing of new conventional and strategic weapons systems.

Needless to say, the subject matter is a scientific taboo. The possibility of climatic or environmental manipulations as part of a military and intelligence agenda, while tacitly acknowledged, is never considered as relevant. Military analysts are mute on the subject. Meteorologists are not investigating the matter, and environmentalists are strung on global warming and the Kyoto protocol.

Ironically, the Pentagon, while recognizing its ability to modify the World's climate for military use, has joined the global warming consensus. In a major [study \(pdf\)](#), the Pentagon has analyzed in detail the implications of various global warming

scenarios.

[The Pentagon document](#) constitutes a convenient cover-up. Not a word is mentioned about its main weather warfare program: **The High-Frequency Active Auroral Research Program (HAARP)** based in Gokona, Alaska --jointly managed by the US Air Force and the US Navy.

TABLE 1: Unusual Weather Patterns (2003-2004)

Alex, Ivan, Frances, Charley and Jeanne (August-September 2004): Four destructive hurricanes and a tropical rain storm occur in a sequence, within a short period of time. Unprecedented in hurricane history in the Caribbean, the island of Grenada is completely devastated: 37 people died and roughly two-thirds of the island's 100,000 inhabitants have been left homeless, in Haiti, more than two thousand people have died and tens of thousands have been made homeless. The Dominican Republic, Jamaica, Cuba and the Bahamas have also been devastated.

In the US, the damage hitting several Southern states including Florida, Alabama, Georgia, Mississippi and the Carolinas is the highest in US history.

Brazil March 2004: The first-ever hurricane formed in the South Atlantic, striking Brazil with 90 mph winds and causing up to a dozen deaths. "Meteorologists were left scratching their heads in bewilderment as the familiar swirl of clouds, complete with a well-defined eye, appeared in an oceanic basin where none had been spotted before." (WP, 19 September 2004, See also http://www.climate.org/topics/climate/brazil_hurricane.shtml)

Japan, China and the Korean Peninsula: "Japan has suffered its highest number of typhoon strikes on record, and the storms -- which hit at the rate of one a week for much of the summer -- wreaked havoc in Taiwan, China and the Korean Peninsula." (Ibid)

China (August 2004): Typhoon Ranim, the worst in 48 years, has killed at least 164 people and injured more than 1800 in China's Zhejiang province. Ranim is confirmed by China's meteorological authorities to be the strongest to hit the Chinese mainland since 1956. It is estimated to have disrupted the life of some 13 million people, <http://www.cma.gov.cn/ywyz/englishread.php?recid=39616>

United States May 2003 : 562 tornadoes hit the United States, the highest in recorded history, far exceeding the previous monthly peak of 399 in June 1992.(CNN, July 3, 2003, <http://www.cnn.com/2003/WEATHER/07/03/wmo.extremes/>)

India, early 2003: a pre-monsoon heat wave caused peak temperatures of between 45 and 49 degrees Celsius (113 to 120 degrees Fahrenheit), killing more than 1400 people. (Ibid)

Sri Lanka, "heavy rainfalls from Tropical Cyclone 01B exacerbated already wet conditions, causing flooding and landslides and more than 300 fatalities." (Ibid)

Western Europe Summer 2003: experienced extremely high Summer temperatures. "Switzerland experienced its hottest June [2003] in at least 250 years while in the south of France average temperatures were between 5 and 7 degrees Celsius (9 to 13 degrees Fahrenheit) warmer than the long term average. England and Wales also experienced their hottest month since 1976." (Ibid)

There are several mainstream explanations on weather and climate change, none of which fully explains, within their respective terms of reference, the highly unusual and erratic weather occurrences, not to mention the human toll and devastation, which have led to the destabilization of entire agricultural and eco-systems. Needless to say these explanations never address the issue of climate manipulation for military use.

Climatic Manipulation by the US Military: The HAARP Program

The High-Frequency Active Auroral Research Program (HAARP) based in Gokona, Alaska, has been in existence since 1992. It is part of a new generation of sophisticated weaponry under the US Strategic Defense Initiative (SDI). Operated by the Air Force Research Laboratory's Space Vehicles Directorate, HAARP constitutes a system of powerful antennas capable of creating "controlled local modifications of the ionosphere" [upper layer of the atmosphere]:

"[HAARP will be used] to induce a small, localized change in ionospheric temperature so that resulting physical reactions can be studied by other instruments located either at or close to the HAARP site". (HAARP website)

Nicholas Begich --actively involved in the public campaign against HAARP-- describes HAARP as:

"A super-powerful radiowave-beaming technology that lifts areas of the ionosphere by focusing a beam and heating those areas. Electromagnetic waves then bounce back onto earth and penetrate everything -- living and dead." (for further details see Michel Chossudovsky, <http://www.globalresearch.ca/articles/CHO201A.html>)

World renowned scientist Dr. Rosalie Bertell depicts HAARP as "a gigantic heater that can cause major disruptions in the ionosphere, creating not just holes, but long incisions in the protective layer that keeps deadly radiation from bombarding the planet." (quoted in Chossudovsky, op cit.)

According to Richard Williams, a physicist and consultant to the David Sarnoff laboratory in Princeton

***HAARP constitutes "an irresponsible act of global vandalism."** He and others fear a secret second stage where HAARP would "beam much more energy into the ionosphere. That could produce a severe disruption of the upper atmosphere at one location that may produce effects that spread rapidly around the Earth for years."* (Quoted in Scott Gilbert, *Environmental Warfare and US Foreign Policy: The Ultimate Weapon of Mass Destruction*, <http://www.globalresearch.ca/articles/GIL401A.html>)

HAARP has been presented to public opinion as a program of scientific and academic research. US military documents seem to suggest, however, that HAARP's main objective is to "exploit the ionosphere for Department of Defense purposes." (quoted in Chossudovsky, op cit).

Without explicitly referring to the HAARP program, a US Air Force study points to the use of "induced ionospheric modifications" as a means of altering weather patterns as well as disrupting enemy communications and radar. (ibid)

HAARP also has the ability of triggering blackouts and disrupting the electricity power system of entire regions.

An analysis of statements emanating from the US Air Force points to the unthinkable: the covert manipulation of weather patterns, communications systems and electric power as a weapon of global warfare, enabling the US to disrupt and dominate entire regions of the World.

Weather Warfare: A Corporate Bonanza

HAARP has been operational since the early 1990s. Its system of antennas at Gakona, Alaska, was initially based on a technology patented by Advanced Power Technologies Inc. (APTI), a subsidiary of Atlantic Ritchfield Corporation (ARCO). The first phase of the HAARP **Ionospheric Research Instrument (IRI)** was completed by APTI. The IRI system of antennas was first installed in 1992 by a subsidiary of British Aerospace Systems (BAES) using the APTI patent. The antennas beam into the outer-atmosphere using a set of wireless high frequency transmitters.

In 1994, ARCO sold its APTI subsidiary, including the patents and the second phase construction contract to E-Systems, a secretive high tech military outfit with links to the CIA (<http://www.crystalinks.com/haarp.html>).

E-Systems specializes in the production of electronic warfare equipment, navigation and reconnaissance machinery, including "highly sophisticated spying devices":

"[E-Systems] is one of the biggest intelligence contractors in the world, doing work for the CIA, defense intelligence organizations, and others. US\$1.8 billion of their annual sales are to these organizations, with \$800 million for black projects-projects so secret that even the United States Congress isn't told how the money is being spent. (<http://www.earthpulse.com/haarp/vandalism.html>)

"The company has outfitted such military projects as the Doomsday Plan (the system that allows the President to manage a nuclear war) and Operation Desert Storm." (Princeton Review, <http://www.princetonreview.com/cte/profiles/internshipGenInfo.asp?internshipID=998>)

With the purchase of APTI, E-Systems acquired the strategic weather warfare technology and patent rights, including Bernard J. Eastlund's US Patent No: 4,686,605 entitled "*Method and Apparatus for Altering a Region in the Earth's Atmosphere, Ionosphere and/or Magnetosphere*".

It is worth mentioning that the Eastlund /APTI patents were based on the research of Yugoslav scientist Nicola Tesla (many of whose ideas were stolen by US corporations). (See Scott Gilbert, *Environmental Warfare and US Foreign Policy: The Ultimate Weapon of Mass Destruction*, <http://www.globalresearch.ca/articles/GIL401A.html>)

Eastlund described this deadly technology as capable of:

"causing...total disruption of communications over a very large portion of the Earth...missile or aircraft destruction, deflection or confusion... weather modification..." (<http://www.wealth4freedom.com/truth/12/HAARP.htm>).

Not surprisingly, the patent had previously been sealed under a government secrecy order.

Barely a year following the E-Systems purchase of APTI's weather warfare technology, E-Systems was bought out by Raytheon, the fourth largest US military contractor. Through this money-spinning acquisition, Raytheon became the largest "defense electronics" firm in the World.

Meanwhile, ARCO which had sold APTI to E-Systems, had itself been acquired by the BP-AMOCO oil consortium, thereby integrating the largest oil company in the World (BP).

Raytheon through its E-Systems subsidiary now owns the patents used to develop the HAARP weather warfare facility at Gakona Alaska. Raytheon is also involved in other areas of weather research for military use, including the activities of its subsidiary in Antarctica, Raytheon Polar Services.

"Owning the Weather": Towards the Expanded Final Stage

The HAARP antenna array and transmitters were slated to be built in several distinct phases <http://www.haarp.alaska.edu/haarp/phases.html>

- Developmental Prototype (DP) (See <http://www.haarp.alaska.edu/haarp/dp.html>)
- Filled DP (FDP),
- Limited IRI (LIRI)
- Full size or final IRI (FIRI).

See <http://www.haarp.alaska.edu/haarp/fdp.html>

During the Clinton administration, the "Filled Developmental Prototype" (FDP), namely a system composed of an array of 48 active antenna elements with connected wireless transmitters, was installed and completed at the HAARP facility in 1994. (See Figure 1 below) Under the initial Developmental Prototype (DP), only 18 of the 48 transmitters were connected.

Bernard Eastlund in a 1997 interview described this antenna array in its Filled DP stage as the "*the largest ionospheric heater ever built*".

This system of 48 antennas, however, while fully operational, was not according to Eastlund, powerful enough (in 1997) "to bring the ideas in his patents to fruition":

. "But they're getting up there", he said. "This is a very powerful device. Especially if they go to the expanded

stage." (quoted in Scott Gilbert, *op cit*, see also http://www.emagazine.com/january-february_1997/0197currhaarp.html)

This 'final expanded stage' envisioned by Eastlund, which will provide maximum capability to manipulate the World's weather patterns, has now been reached.

Under the Bush administration, the main partner of Raytheon (which owns the patents) in the construction and development stage of the HAARP antenna array, is British Aerospace Systems (BAES), which had been involved in the initial installation of the antenna array in the early 1990s.

The multimillion dollar contract was granted by The Office of Naval Research to BAES in 2003, through its US subsidiary BAE Systems Advanced Technologies Inc. The contract was signed barely two months before the Anglo-American invasion of Iraq.

Using Raytheon's technology, BAES was to develop the HAARP **Ionospheric Research Instrument (IRI)** to its maximum capabilities of "Full size or final IRI (FIRI)".

In April 2003, BAE Systems Advanced Technologies outsourced the production and installation of the antennas to Phazar Corp (<http://www.phazar.com/>), a company specializing in advanced wireless antennas for military use. (Phazar owns Antenna Products Corporation of Mineral Wells, Texas <http://www.antennaproducts.com/>). Phazar was entrusted with producing and installing 132 crossed dipole antennas items for the HAARP facility. (<http://www.antennaproducts.com/News%20Release%2004-18-03.pdf>)

A year later, in April 2004, the final phase in the expansion of the HAARP facility was launched. (Dept of Defense, 19 April 2004). This phase consisted in equipping all the 180 antennas with high frequency transmitters. BAE Systems was awarded another lucrative contract, this time for \$35 million.

In July 2004, Phazar had delivered and installed the 132 crossed dipole antennas including the antenna support structures and ground screen items at the HAARP facility, bringing the number of antennas from 48 under the FDP stage to 180. (see Table 2).

Meanwhile, BAE Systems had contracted with Jersey based defense electronics firm [DRS Technologies, Inc](#) in an \$11.5 million outsourcing arrangement, the production and installation of the high-frequency (HF) radio transmitters for the HAARP antenna array. (See http://www.drs.com/press/archivelist.cfm?PRESS_RELEASE_ID=1529&preview=1 and Business Wire, 15 June 2004). DRS specializes in a variety of leading edge products for the U.S. military and intelligence agencies. (<http://www.drs.com/corporateinfo/index.cfm>).

Under its contract with BAE Systems Information and Electronic Warfare Systems in Washington, D.C., DRS is to manufacture and install "more than 60 Model D616G 10-Kilowatt Dual Transmitters" to be used with the HAARP system of antennas. (It is unclear from the company statements whether all the 180 antennas will be equipped with a transmitter, bringing the system up to full IRI capabilities).

Deliveries and installation are to be completed by July 2006. While HAARP is described as a "research project", the production of the transmitters was entrusted to DRS' C41 "Command, Control, Communications, Computers and Intelligence (C4I) Group"

The diagram and images below describe the HAARP Alaska Facility in 1997.

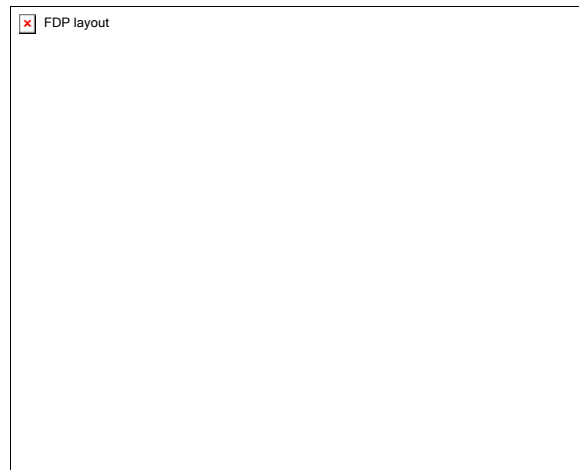


Figure 1: The Array of 48 Antenna Elements with the Transmitter Shelters (FDP stage)

The 48 antenna array is supported by transmitter shelters, each of which contains 6 transmitter cabinets. (See image of shelter below)

Each cabinet contains two transmitters. (image of cabinet below)

The newly installed 132 dipole antennas supplied by Phazar vastly increase the size of the HAARP Alaska facility; the new transmitters are supplied and installed by DRS

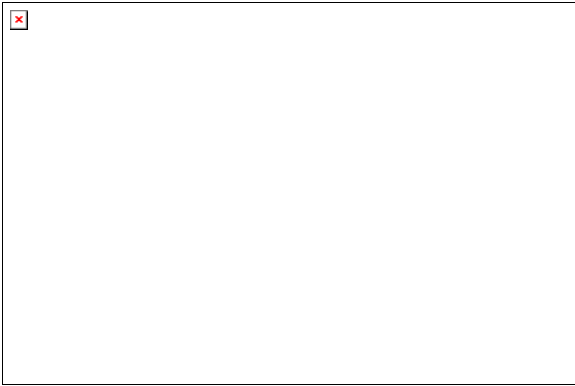


Image 1: Aerial Photo of the HAARP Alaska Site

Source: <http://www.haarp.alaska.edu/haarp/ohd.html>

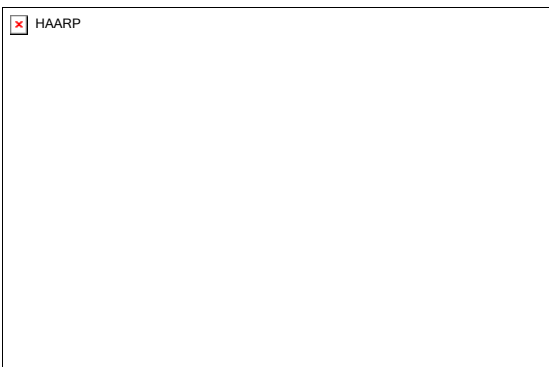


Image 2: HAARP Antenna Array

Source: <http://www.haarp.alaska.edu/haarp/HaarpSite.html>

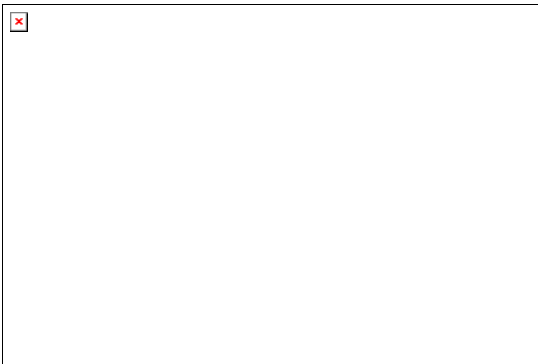


Image 3 Transmitter Shelter

<http://www.haarp.alaska.edu/haarp/images/trans/transr.jpg>

Transmitter Shelter containing Six Transmitter Cabinets. Each Cabinet contains two transmitters

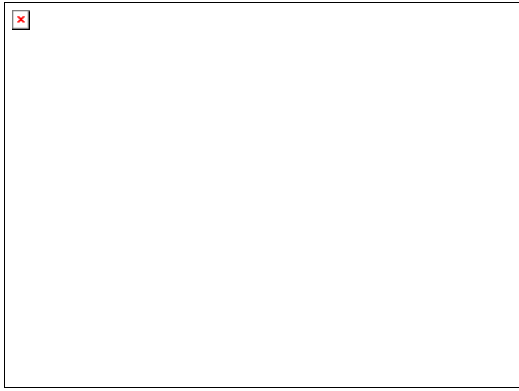


Image 4: Inside the Transmitter Shelter

<http://www.haarp.alaska.edu/haarp/images/trans/shelter.jpg>



Image 5: Two Transmitters making up a Transmitter Cabinet

<http://www.haarp.alaska.edu/haarp/images/trans/trans2.jpg>

Testing of HAARP Equipment (2003- 2004)

It is worth noting that the expansion of the antenna array (e.g. during 2003-2004) required, as part of the contracts reached with BAE Systems and its various subcontractors, the routine testing of the installed weather warfare equipment. An intermediate stage Limited IRI (LIRI), could be in operation by 2004, following the completion of the 180 antenna array under the Phazar contract and pending the final delivery of the remaining HF radio transmitters.

In this regard, a report published by the Russian parliament (Duma) in 2002, suggests that the US Military had plans to test its weather modification techniques at its Alaska facility, as well as at two other sites:

"The committees reported that the USA is planning to test three facilities of this kind. One of them is located on the military testing ground in Alaska and its full-scale tests are to begin in early 2003. The second one is in Greenland and the third one in Norway.

"When these facilities are launched into space from Norway, Alaska and Greenland, a closed contour will be created with a truly fantastic integral potential for influencing the near-Earth medium," the State Duma said.

*The USA plans to carry out large-scale scientific experiments under the HAARP program, and not controlled by the global community, **will create weapons capable of breaking radio communication lines and equipment installed on spaceships and rockets, provoke serious accidents in electricity networks and in oil and gas pipelines and have a negative impact on the mental health of people populating entire regions,** the deputies said. (Interfax News Agency, original Russian, BBC Monitoring, 8 August 2002, emphasis added)*

Whether this report by the Russian Duma on testing "starting in early 2003" is correct or not, the US administration must be confronted nationally and internationally, at the political and diplomatic levels, at the UN and the US Congress, by the international scientific community, by environmentalists and the antiwar movement. The future of humanity is threatened by the use of weather modification techniques.

Moreover, to wage an effective campaign, it is essential that corroborating scientific investigation of the unusual weather occurrences observed in recent years (and particularly since early 2003) be undertaken. This investigation should be far-reaching, collecting relevant data, correlating specific weather occurrences to recorded antenna activity at the Alaska site as well as at the two other sites, etc.

The Full Size Ionospheric Research Instrument FIRI stage, described as "a maximum size of 180 antenna elements, arranged in 15 columns by 12 rows" is scheduled to be completed by mid-2006 (assuming the installation of the remaining dual transmitters), at which time the HAARP program will have reached its maximum FIRI capacity, meaning the ability to selectively modify, for military use, weather patterns anywhere in the World.

"The IRI is currently [June 2004] composed of 48 antenna elements and has a power capacity of 960,000 watts. When installed, the additional 132 transmitters will give HAARP a 3.6 mega-watt capacity [see Table 2 below]. The HAARP build-out is jointly funded by the U.S. Air Force, the U.S. Navy and the Defense Advanced Research Projects Agency (DARPA). (Business Wire, 10 June 2004)

Table 2: Comparison of IRI Phases

	DP	FDP	LIRI	FIRI
Number of Active Antenna Elements	18	48	108	180
Total Transmitter Power (kW)	360	960	2160	3600
Maximum Antenna Gain (dB)	19	24	29	31
Max Effective Radiated Pwr (dBW)	74	84	92	96
Min Antenna Pattern Width (degrees)		9	8	5
Frequency Range	2.8 to 10 MHz			
Modulation Types	CW/AM/FM/PM			

Source <http://www.haarp.alaska.edu/haarp/phases.html>

This advanced stage of full capacity (FIRI) corresponds to what the US Air Force has called "Owning the Weather":

*US aerospace forces [will] 'own the weather' by capitalizing on emerging technologies and focusing development of those technologies to war-fighting applications... From enhancing friendly operations or disrupting those of the enemy via small-scale tailoring of natural weather patterns to complete dominance of global communications and counterspace control, **weather-modification offers the war fighter a wide-range of possible options to defeat or coerce an adversary...** In the United States, weather-modification will likely become a part of national security policy with both domestic and international applications. Our government will pursue such a policy, depending on its interests, at various levels. (US Air Force, emphasis added, Air University of the US Air Force, AF 2025 Final Report, <http://www.au.af.mil/au/2025/>)*

Weather Warfare against "Rogue States"

The unusual climatic occurrences in the US and Western Europe have been extensively documented.

However, what the news media has failed to underscore is that a number of unusual and dramatic climatic changes have occurred in recent years in countries which are identified as possible targets under the US Administration's pre-emptive war doctrine.

Weather patterns in North Korea, for instance, have been marked since the mid-1990s by a succession of droughts, followed by floods. The result has been the destruction of an entire agricultural system. In Cuba, the pattern is very similar to that observed in North Korea. (see Table 3)

In Iraq, Iran and Syria, a devastating drought occurred in 1999. In Afghanistan, four years of drought in the years preceding the US led invasion in 2001, have led to the destruction of the peasant economy, leading to widespread famine.

While there is no proof that these weather occurrences are the result of climatic warfare, Phillips Geophysics Lab, which is a partner in the HAARP project provides a course for military personnel at the Hanscom Air Force Base in Maryland, on "Weather Modification Techniques". The course outline explicitly contemplates the triggering of storms, hurricanes, etc. for military use. (See his slide show at <http://www.dtc.army.mil/tts/1997/proceed/abarnes/> open PowerPoint presentation at <http://www.dtc.army.mil/tts/tts97/abarnes.zip>)

Weather manipulation is the pre-emptive weapon par excellence. It can be directed against enemy countries or even "friendly nations", without their knowledge. Weather warfare constitutes a covert form of pre-emptive war. The manipulation of climate can be used to destabilize an enemy's economy, ecosystem and agriculture (e.g. North Korea or Cuba). Needless to say it can trigger havoc in financial and commodity markets and can potentially be used as an instrument of "insider trade" for financial gain. It has the ability of destabilizing a country's institutions. Concurrently, the disruption in agriculture creates a greater dependency on food aid and imported grain staples from the US and other Western countries.

The Bush administration has stated that it reserves the right to attack these countries preemptively, with a view to ensuring the security of the American homeland.

Washington --as part of its nuclear posture review-- has threatened several countries including China and Russia with pre-emptive nuclear strikes. One would assume that the same targeting of rogue states exists with regard to the use of weather modification techniques".

While there is no evidence of the use of weather warfare against rogue states, the policy guidelines on "weather intervention techniques" have already been established and the technology is fully operational.

Table 3: Unusual Weather Occurrences: North Korea, Cuba, Afghanistan and Iraq

North Korea

Recurrent flooding and drought often in the same year has hit North Korea since 1995, 220,000 people died in the ensuing famine, according to Pyongyang's own figures. U.S. figures place the number of deaths resulting from famine at 2 million.

The first major flooding occurred in 1995.

There were floods and drought in 1999. The serious water shortage resulting from the 1999 drought was conducive to the destruction of crops.

"The temperature of water in rice fields goes beyond 40 degrees and the tall rice plants fresh from the rice seedling beds are withering. In particular, nearly all after-crop maize seedlings and seeds are perishing," it added.

In 2001, in June there was an extensive drought with rainfall just 10% of normal levels, which served to undermine agricultural crops. And then a few months later, in October, there were extensive floodings leading to the further destruction of rice harvests and a crisis situation in food distribution.

"Officials in Kangwon province - an area which already suffers food shortages - say the impact of the torrential rain and flooding has been devastating. The normal recorded rainfall for October should be around 20mm. But in the worst-affected areas 400mm (18 inches) of rain fell in just 12 hours. "It was the worst flooding we've had since records began in 1910," said Kim Song Hwan, head of the government's Flood Damage Rehabilitation Committee for the region. (BBC, 23 Oct 2001, <http://news.bbc.co.uk/1/hi/world/asia-pacific/1614981.stm>)

Cuba

For several years Cuba has been affected by recurrent droughts. In 1998, rainfall in Eastern Cuba was at its lowest level since 1941.

A United Nations team estimated 539,000 people, 280,000 of them farmers, were directly affected by reduced availability of food or reduced income through production losses. Some reported effects are: hunger in areas; a loss of up to 14% of the sugar cane crop planted last year and a reduction in this spring's planted crops, since rains were not sufficient for some seeds to germinate (which will reduce next year's crop); as much as 42% losses in food staples such as root vegetables, beans, bananas, and rice in the five eastern provinces; and livestock, poultry, and egg production losses

(UN Relief, <http://www.reliefweb.int/w/rwb.nsf/0/2975570e60ff2a7685256680005a8e2d?OpenDocument>)

In 2003, a devastating drought hit the Western part of Cuba

In 2004 May-June, the country is hit by the worst drought in its history:

"A severe drought enveloping eastern Cuba has eroded 40 percent of the farmland, starved thousands of heads of cattle and has close to 4 million people counting every drop of water they consume." The drought is described as the worst in 40 years.

"The drought has robbed underground water levels of some 10 feet over the past 10 years, leaving over 5,000 wells across the province dry," said Leandro Bermudez, a geologist and the second man at Cuba's National Institute of Hydraulic Resources. (MSNBC, 21 June 2004 <http://msnbc.msn.com/id/5262324>

The cities are running out of water. According to the Independent, "Drought is bringing Cuba to its knees

Unnoticed by the world, the longest dry period for decades has brought much of Cuba to its knees. Could this be the crisis that finally destroys Fidel's revolution?

"All across central and eastern Cuba, farmers, ranchers, city dwellers and government officials are scrambling to deal with a punishing drought that began a decade ago and intensified in the last two years.

Although traditionally arid, the provinces of Holguin, Camaguey and Las Tunas hold some of Cuba's finest pasture and farmland and have long been crucial to this communist nation's dairy, beef and agricultural industries.

More than 12,500 cattle have died in Holguin alone in 2004 and milk production has fallen 20 percent. The price of beans, plantains, sweet potatoes and other staples has soared in private markets.

The drought has caused millions of dollars in losses and officials are spending millions more digging wells, building a water pipeline and taking other measures to try to ease the crisis - huge sums in an impoverished nation struggling through tough economic times and a battle with the United States.

Officials also have moved thousands of cattle to more fertile areas and are working furiously to finish a 32-mile pipeline that will draw water to Holguin city from Cuba's largest river, the Cauto. The \$5 million pipeline could be completed next month. (Chicago Tribune, July 29, 2004, <http://www.thesstate.com/mld/thesstate/news/world/9271316.htm>)

The above report date to September 2004, it was published before, the hurricanes hit the Cuban coastline followed by torrential rains.

Afghanistan and The former Soviet Republics of Central Asia

The worst drought in Afghanistan history occurred in the three consecutive years prior to the onslaught of the US led invasion, from 1999 to 2001. The agricultural recovery of the 1990s, in the wake of the Soviet-Afghan war was brought to a standstill.

In the wake of the US led 2001 invasion, the United States supplied Afghanistan with genetically modified wheat and appropriate types of fertilizer to be used with the GM wheat, which was said to be high yield drought resistant. The donation of GM wheat, however, also led to destabilizing the small peasant economy because the GM wheat varieties could not reproduced locally. In 2002, famines which were barely reported by the media, swept the country.

Similar although less severe conditions prevailed in the former Soviet republics of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan.

Like Afghanistan, Tajikistan has had its infrastructure ruined by prolonged civil war with Muslim fundamentalists. Since then, the worst regional drought in 74 years has destroyed food crops over a large part of the nation, rendering almost half of the 6.2 million people in the country vulnerable to the threat of famine and disease, up from 3 million last year. About the only portion of the economy that has been unaffected is the drug trade. Tajikistan is the transit route for 65 to 85 percent of heroin smuggled out of Afghanistan, the world's largest producer. (http://www.americanfreepress.net/Mideast/Drought_Desperation_Breed_Vio/drought_desperation_breed_vio.html]

Triggered by the lowest rainfall (2001) in living memory, vast tracts of Iran, Uzbekistan, Pakistan and Tajikistan are being reduced to desert as the water table sinks, long-established wells dry up and herds of livestock perish.

The crisis appears to fulfill alarming climate change predictions suggesting that states along the old Silk Road will experience steeper rises in temperature than any other region on earth. By the end of the century it will be 5C hotter in an area which regularly sees the thermometer soar above 40C.

The study, published last year by the Tyndall Centre for Climate Change Research at the University of East Anglia, predicted that Asian countries from Kazakhstan to Saudi Arabia will warm up more than twice as much as others. "Several states," the report added, "including Uzbekistan, Tajikistan, Afghanistan and Iran, [are facing] famine."

In Tajikistan, the United Nations appealed for aid to avert disaster. "Substantial foreign aid is needed or else there will be a large-scale famine," said Matthew Kahane, the UN's humanitarian aid coordinator, speaking from the capital, Dushanbe.

"The country has had its lowest rainfall for 75 years. Families who survived last year by selling their cows and chickens now have no other means of coping. Some households have sold the glass out of their windows and the wooden beams from their roofs to raise money for food."

(The Guardian, Oct 30, 2001, <http://www.guardian.co.uk/famine/story/0,12128,736902,00.html>)

Iraq

In 1999, Iraq suffered its worst drought of the century, with the effect of triggering an even greater dependence on imported grain under the oil for food program. There was a drop of up to 70 percent in domestic yields of wheat, barley and other cereals, which served to further weaken the country's economy, crippled by economic sanctions and the routine bombing by allied aircraft in the no-fly zones.

A similar (although less serious) situation prevailed in Syria and Iran, marked by significant declines in agricultural output.

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