A ClimateViewer News Production

CARBON BLACK DUST & SOOT

The Chemtrail Secret for Weather Warfare, Geoengineering, and Ozone Destruction

CLIMATEVIEWER.COM/CIRRUSCLOUDSMATTER/

CARBON BLACK DUST & SOOT

CRUCIAL FOR ARTIFICIAL CIRRUS CLOUD CREATION

WEATHER WARFARE: U.S. Air Force and Navy FOIA documents and Presentations

GEOENGINEERING: CBD & Soot is a carrier for metals and sulfur into the stratosphere

OZONE: CBD & Soot levitates into stratosphere, METALS AND SULFUR DESTROY OZONE

Is released in exhaust of jet aircraft by burning fuels (soot) or dumped/pumped from military aircraft (carbon black).

CARBON BLACK DUST vs. SOOT

01

Carbon black and soot often have been used interchangeably; however, carbon black is physically and chemically distinct from soot. [1]

02

Carbon black is composed of turbostratic colloidal aggregates which we call **aciniform carbon (AC, grape-like clusters)**. Chimney soots from domestic wood or coal fires contain very little AC, while in **diesel soots the solid particulates are essentially all AC**. [2]

04

Soot is the unwanted by-product of combustion of carbon-based materials for the generation of energy or heat, or for waste disposal. Less than 60% of the total soot particulate mass is carbon. Soot has much greater percentages of ash and solvent extractable organic compounds. [3]

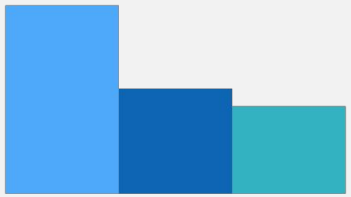
03

Carbon black is manufactured under controlled conditions for commercial use. Greater than 97% of carbon black consists of elemental carbon arranged as acinoform particulate. [3]

CARBON BLACK DUST vs. SOOT

Military Application vs. Commercial Pollution

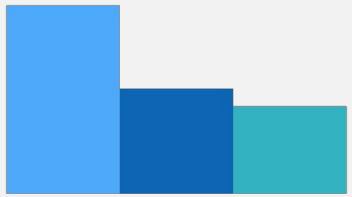
CARBON BLACK



› **Military Use - Weather Warfare:**
- Increase Cirrus Cloud Cover
- Increase/decrease precipitation
- Dissipate Fog

› **Scientific – Weather Modification:**
- Hurricane Modification
- Increase/decrease precipitation
- Increase Cirrus Cloud Cover
- Dissipate Fog

SOOT



› **Commercial Aviation – Weather Modification & Geoengineering**
- Increase Cirrus Cloud Cover
- Alter Rainfall Patterns
- Affects Solar Radiation: cools by day, traps heat by night
- Contains metals, coated in sulfur dioxide and sulfuric acid

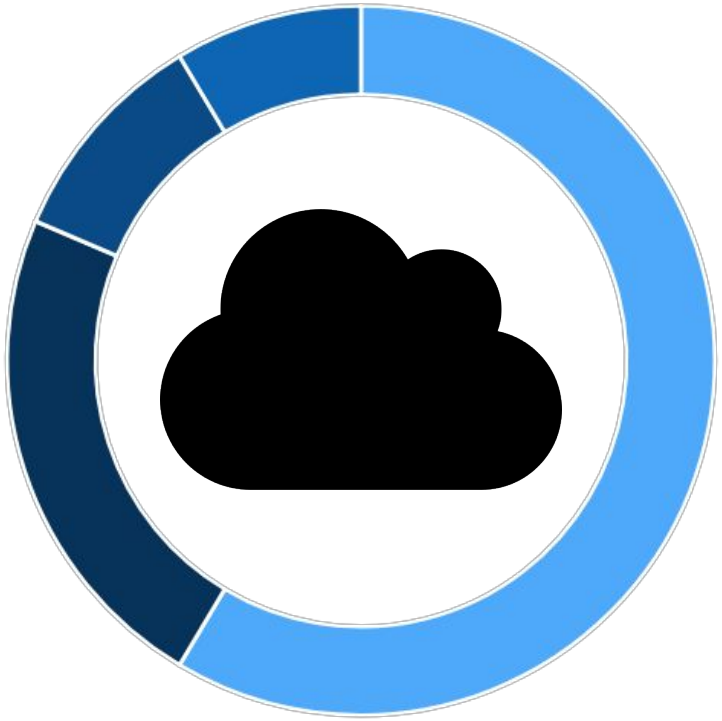
SOOT – CLOUD SEEDING

FILLED WITH METALS, COVERED IN SULFUR

The detected metallic compounds were all internally mixed with the soot particles. The most abundant metals in the exhaust were Chromium, Iron, Molybdenum, Sodium, **Calcium**, and **Aluminum**; (also detected were) Vanadium, **Barium**, Cobalt, Copper, Nickel, **Lead**, Magnesium, Manganese, Silicon, **Titanium**, and Zirconium. "

"Considering that some fraction of soot can effectively act as INP and that a dominant fraction of ice residuals in cirrus clouds contain metal compounds the presented findings support the assumption that **aircraft engine emissions can act as INP** (Ice Nucleating Particle, or Cloud Condensation Nuclei CCN, or Cloud Seed)**"**

Abegglen, Manuel, et al. "**Chemical characterization of freshly emitted particulate matter from aircraft exhaust using single particle mass spectrometry**." *Atmospheric Environment* 134 (2016): 181-197.



Soot is filled with metals that end up in the stratosphere.

Soot is coated in sulfuric acid and sulfur dioxide.

Soot and metals create cirrus clouds.

Soot levitates into the stratosphere through photophoresis.

OZONE DESTRUCTION

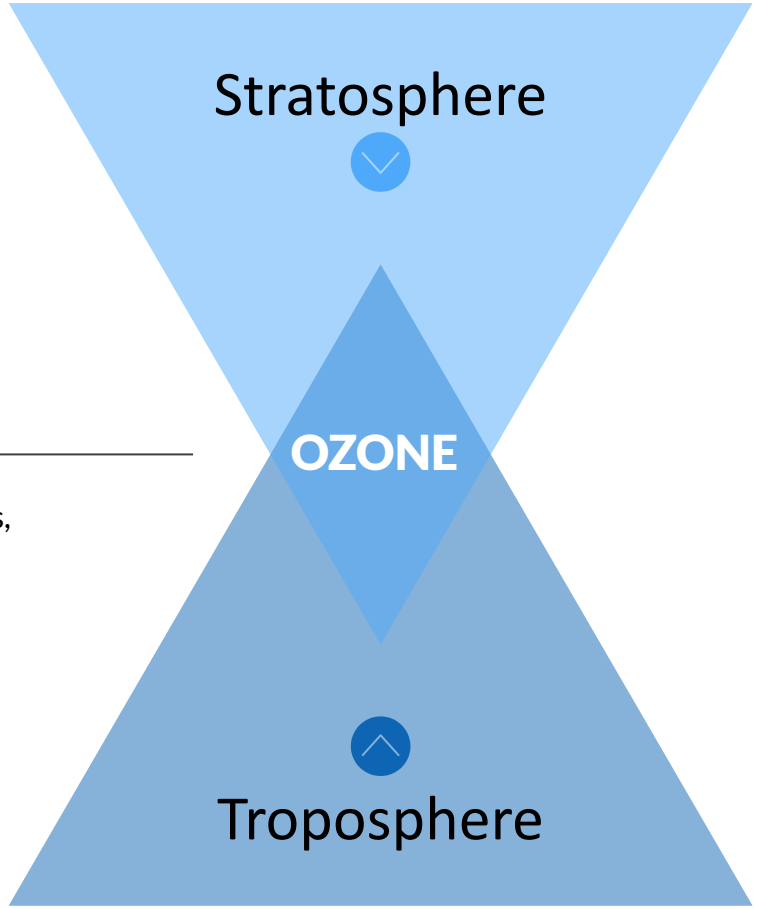
OZONE DESTRUCTION

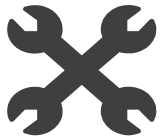
SOOT LEVITATS INTO THE STRATOSPHERE, CARRIES SULFUR & METALS

Though airborne, Black Carbon is known to dissipate and settle down in a few months under the influence of rain and wind and is unlikely to travel upward of 4 km. However, a group of scientists — including from the Indian Institute of Science and ISRO's Vikram Sarabhai Space Centre — say they now have evidence of **such particles existing up to 18 km into the stratosphere** and there are about 10,000 of them in every cubic centimeter.

Given the shape and location of these particles, they argue, it could only derive from **emissions from aviation fuel** and they pose a problem because these black carbon particles can linger long enough to provide a fertile ground for other chemical reactions that can **deplete the ozone layer**.

Govardhan, Gaurav, et al. **"Possible climatic implications of high-altitude black carbon emissions."** *Atmospheric Chemistry and Physics* 17.15 (2017): 9623-9644.





PHOTOPHORETIC LEVITATION

"engineered nanoparticles could exploit photophoretic forces, enabling more control over particle distribution and lifetime than is possible with sulfates, perhaps allowing climate engineering to be accomplished with fewer side effects."

Keith, David W. **"Photophoretic levitation of engineered aerosols for geoengineering."** *Proceedings of the National Academy of Sciences* 107.38 (2010): 16428-16431.

Black Carbon from Aircraft Exhaust is Destroying Ozone, Melting Poles
https://climateviewer.com/2017/10/25/black-carbon-from-aircraft-exhaust-destroying-ozone-melting-poles/

OZONE DESTRUCTION

What happens if we lose our Ozone Layer?

https://www.epa.gov/ozone-layer-protection/health-and-environmental-effects-ozone-layer-depletion

Harmful Ultra-Violet Radiation would kill all plant life on the planet. UVB radiation affects the physiological and developmental processes of plants. Despite mechanisms to reduce or repair these effects and an ability to adapt to increased levels of UVB, plant growth can be directly affected by UVB radiation.

Laboratory and epidemiological studies demonstrate that **UVB causes non-melanoma skin cancer** and plays a major role in **malignant melanoma development**. In addition, UVB has been linked to the **development of cataracts**.

Exposure to solar UVB radiation will kill marine life. Damage to Phytoplankton, early developmental stages of fish, shrimp, crab, amphibians, and other marine animals with implications for the whole marine food chain.

UVB radiation could affect terrestrial and aquatic biogeochemical cycles, thus altering both sources and sinks of greenhouse and chemically important trace gases (e.g., carbon dioxide, carbon monoxide, carbonyl sulfide, ozone, and possibly other gases).

OZONE DESTRUCTION

HARRY WEXLER AND ROCKET EXHAUST - 1961

"Wexler was concerned that inadvertent damage to the ozone layer might occur if increased rocket exhaust polluted the stratosphere."

Inadvertent

1. Increased pollution from rocket exhaust.
2. Near-space experiments could go awry, e.g. unknown risks of Operation Argus (1958), Project West Ford (1961), and Project Highwater (1962).

Purposeful

1. In 1934 S. Chapman proposed making a temporary "hole in the ozone layer" for the benefit of astronomers.
2. Possible military interest in waging geophysical warfare by attacking the ozone layer over a rival nation

"[Climate control] can best be classified as 'interesting hypothetical exercises' until the consequences of tampering with large scale atmospheric events can be assessed in advance. Most such schemes that have been advanced would require colossal engineering feats and contain the inherent risk of irremediable harm to our planet or side effects counterbalancing the possible short-term benefits."

"On the Possibilities of Climate Control" in 1962: Harry Wexler on Geoengineering and Ozone Destruction – PowerPoint Presentation

POLLUTION OF THE UPPER ATMOSPHERE BY ROCKETS

W. W. KELLOGG
*The RAND Corporation, Santa Monica, California**

(Received June 11, 1964)

Abstract. This report estimates the amounts of various constituents that would have to be continually injected by rockets into the upper atmosphere in order to double the worldwide natural concentrations there. Involved in the calculations are: (a) the natural atmospheric abundances of constituents such as H_2O, CO_2, NO, Na, K, Li, H, etc.; (b) the residence times in various regions of the atmosphere, since these determine how rapidly a constituent will be removed; and (c) the chemical or photochemical stability of a substance exposed to the upper atmosphere environment. It is concluded that a doubling of the CO_2, H_2O, or NO content would require per year on the order of 10^3 to 10^5 Saturn-type rockets, each injecting 100 tons of exhaust above 100 km. On the other hand, a few hundred small rockets per year, each containing 10 kg of the chemical, would probably double the Na content; similarly, less than two such rockets per year would be expected to double the Li content. These last conclusions have implications for future tracer experiments using these substances.

1. Introduction

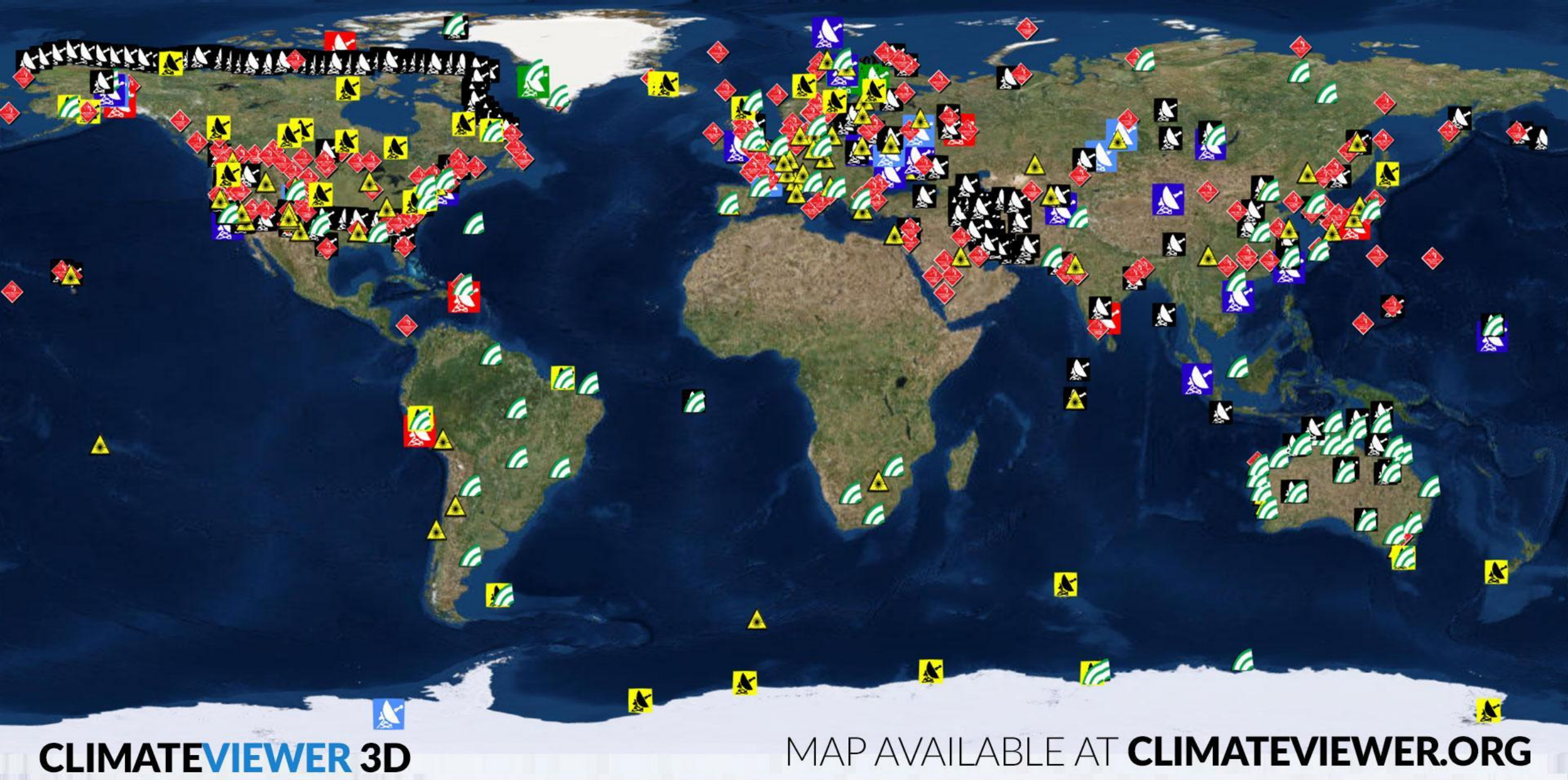
There have been so many deplorable examples of man's pollution of his environment that a conscious effort is being made in many quarters to forestall further cases. At its meeting in Prague in October, 1962, the Executive Council of the International Council of Scientific Unions (ICSU) adopted a resolution (EB-XIV-27) that noted that the large rockets used in connection with satellites and space vehicles could introduce into space and the upper atmosphere matter that could possibly have an adverse effect on future scientific observations and that could possibly change the natural state of the atmosphere. (See Appendix A for text of ICSU Resolution. Appendix B is a second statement from ICSU, dated April 25, 1963.) In March, 1963, ICSU urged that the International Committee on Space Research (COSPAR) request its Consultative Group on Potentially Harmful Effects of Space Experiments to consider this matter.

The COSPAR Consultative Group agreed to study the matter of pollution of the upper atmosphere at its meeting in Warsaw in June, 1963, and decided to go about it by preparing a technical note on the subject that could be distributed to certain qualified scientists for comments, along with any other pertinent material.

This report first appeared in draft form in December, 1963, and was sent to about twenty-five knowledgeable scientists in many parts of the world. Not all of those who responded with comments agreed with everything we said, and a few had reservations


Scientist Warns Space Age
Fuels May Affect World's
Life By Changing Weather
Watch on YouTube Chemtrails From SPACE! Sounding Rockets, Satellite Chemical Releases, and Ionospheric Heaters
& check the references: Aluminum, Barium, and Chemtrails From Space!
CLIMATEVIEWER.COM

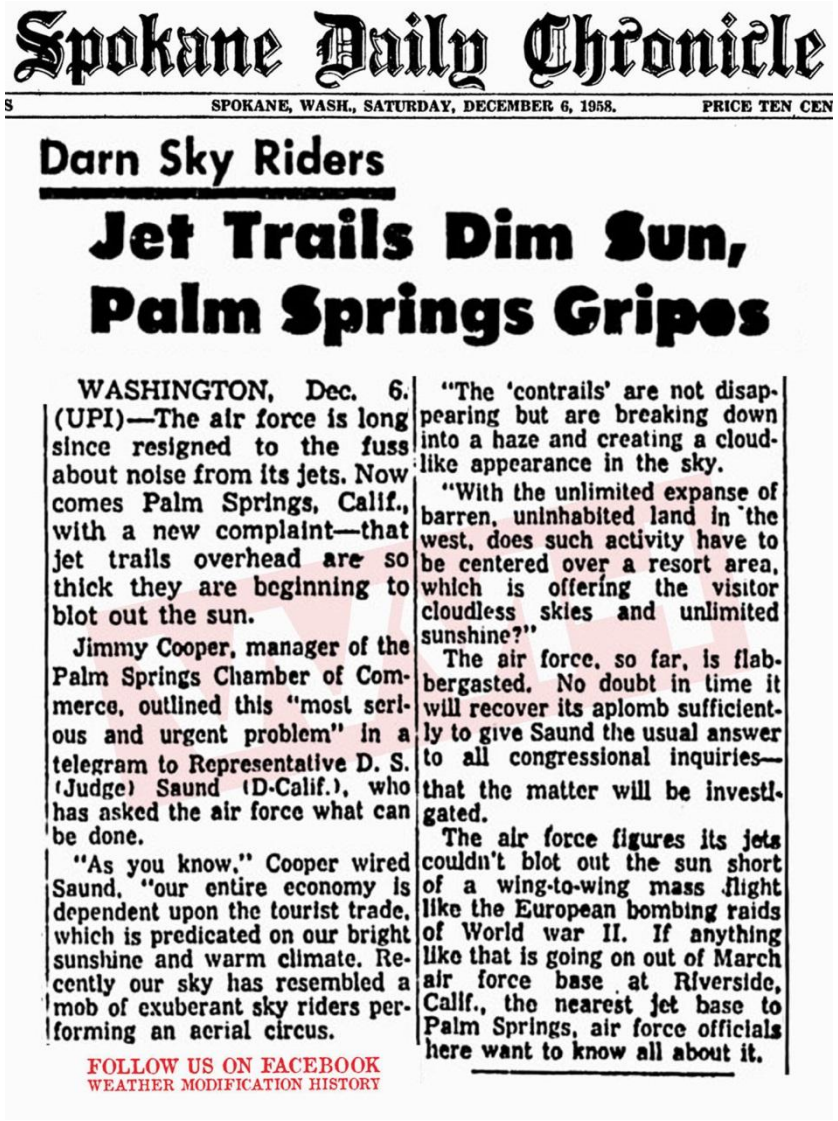

ARTIFICIAL MIRROR/LENS
ARTIFICIAL AURORA
93 Miles
150 Kilometers
53 Miles
85 Kilometers
31 Miles
50 Kilometers
39k Feet
12 Kilometers
THERMOSPHERE
MESOSPHERE
STRATOSPHERE
TROPOSPHERE
SOUNDING ROCKETS (LEFT) & SATELLITES (ABOVE)
Sprays Trimethyl-Aluminum (TMA)
Barium, Lithium, Sulfur-Hexaflouride (SF-6)
93-310 Miles
150-500 Kilometers
56-93 Miles
90-150 Kilometers
37-56 Miles
60-90 Kilometers
F LAYER
E LAYER
D LAYER
IONOSPHERE
WEATHERMODIFICATIONHISTORY.COM
SOOT CARRIES METALS & SULFUR INTO STRATOSPHERE
Creates Cirrus Clouds, Aviation Soot detected at 18km (10,000 per cubic cm)
Soot is filled with: Chromium, Iron, Molybdenum, Sodium, Calcium, and Aluminum, Vanadium, Barium, Cobalt, Copper, Nickel, Lead, Magnesium, Manganese, Silicon, Titanium, and Zirconium.
OZONE LAYER 20-30 Kilometers (12 to 19 miles)
IONOSPHERIC HEATER
HAARP - 2.8-10Mhz
3.6 MILLION WATTS
SEA-BASED X-BAND RADAR (SBX-1)
8.0 to 11.2 GHz, Range 3000 miles (4,800 Kilometers)
90 Thousand Watts (450 kW peak)
ARPA Long-Range Tracking and Instrumentation Radar
ALTAIR - VHF (253-163 MHz) and UHF (414-440 MHz)
Range 70,277 miles (113,100 km)
6.4 MILLION WATTS PEAK
Image by Jim Lee, ClimateViewer.com/haarp/
Radar map available at ClimateViewer.org


CLIMATEVIEWER 3D
MAP AVAILABLE AT CLIMATEVIEWER.ORG
Ionospheric Heater
SuperDARN
EISCAT Incoherent Scatter Radars
Other Incoherent Scatter Radars
Historic Ionospheric Heaters
Missile Defense Radars
Lasers & Directed Energy
Ionosondes
ELF & VLF Transmitters

ARTIFICIAL CLOUD CREATION HISTORY

CARBON BLACK DUST & SOOT

A HISTORY LESSON - 1958



Spokane Daily Chronicle

S SPOKANE, WASH., SATURDAY, DECEMBER 6, 1958. PRICE TEN CEN

Darn Sky Riders

Jet Trails Dim Sun, Palm Springs Gripes

WASHINGTON, Dec. 6. (UPI)—The air force is long since resigned to the fuss about noise from its jets. Now comes Palm Springs, Calif., with a new complaint—that jet trails overhead are so thick they are beginning to blot out the sun.

Jimmy Cooper, manager of the Palm Springs Chamber of Commerce, outlined this "most serious and urgent problem" in a telegram to Representative D. S. (Judge) Saund (D-Calif.), who has asked the air force what can be done.

"As you know," Cooper wired Saund, "our entire economy is dependent upon the tourist trade, which is predicated on our bright sunshine and warm climate. Recently our sky has resembled a mob of exuberant sky riders performing an aerial circus.

"The 'contrails' are not disappearing but are breaking down into a haze and creating a cloud-like appearance in the sky.

"With the unlimited expanse of barren, uninhabited land in the west, does such activity have to be centered over a resort area, which is offering the visitor cloudless skies and unlimited sunshine?"

The air force, so far, is flabbergasted. No doubt in time it will recover its aplomb sufficiently to give Saund the usual answer to all congressional inquiries—that the matter will be investigated.

The air force figures its jets couldn't blot out the sun short of a wing-to-wing mass flight like the European bombing raids of World war II. If anything like that is going on out of March air force base at Riverside, Calif., the nearest jet base to Palm Springs, air force officials here want to know all about it.

FOLLOW US ON FACEBOOK
WEATHER MODIFICATION HISTORY

"Let's face it, men" said a crisp talking, star-studded general, **"you'll either have to live with the vapor trails or move the City of Palm Springs."**

The resort area, it appears, is known as the "Palm Springs Intersection." the freeway interchange of all West Coast aerial traffic.

So, the city officials and civic leaders, in an apparently unanimous, unspoken agreement, decided that a peaceful coexistence with the Air Force was the wisest course.

https://weathermodificationhistory.com/1948-contrail-cirrus-complaints-begin-nationwide/

THIRTY-SECOND YEAR

The Desert Sun

The Desert Empire's Daily Newspaper

FOLLOW US ON FACEBOOK
WEATHER MODIFICATION HISTORY

CXII, No. 138 20 Pages—2 Sections Palm Springs, California, Saturday, January 31, 1959

AF GIVES VILLAGE 2 CHOICES: LIVE WITH TRAILS OR MOVE

CARBON BLACK DUST

A HISTORY LESSON - 1958

TOLEDO BLADE

One Of America's Great Newspapers

123rd Year TOLEDO, OHIO, TUESDAY, SEPTEMBER 23, 1958 ★ ★ ★ ★

Blue Skies Or Stormy Weather

Navy Scientist Creates Clouds, Breaks Them Up

New Technique May Make Rain

WASHINGTON, Sept. 23 (AP)—The navy said today it has created clouds and destroyed others by seeding them with ordinary carbon black.

A woman scientist who discovered the new method said experiments over southern Georgia produced a series of clouds at a cost of 18 cents a cloud.

Much experimentation must be done before the value of the new technique can be determined. It could open the way to cheap and reliable means of making rain, or of breaking up storm clouds, or of dissipating fog.

The technique was developed by Dr. Florence W. Van Straten, who livened up a desk job with the chief of naval operations by theorizing along new lines as to how rain is formed.

Earlier cloud-seeding methods using more expensive dry ice and silver iodine have been confined to super-cooled clouds. The carbon method, Dr. Van Straten said, apparently works with clouds at any temperature.

—Associated Press Wirephoto

DR. FLORENCE VAN STRATEN

Her cloud theory works

In the Georgia experiments, a navy airplane dropped carbon black in both solid and liquid-suspension form into clouds and into clear skies. Additional studies using radar-tracked balloons currently are under way over Chesapeake Bay.

Results indicate that when the carbon is sprayed or sprinkled into a clear sky it causes clouds to form, and when it is introduced into clouds it clears them up. Whether it actually produces rain in this process has not been determined definitely.

"We dropped carbon black, suspended in liquid, over a track a mile long and produced a solid line of clouds one mile long," Dr. Van Straten told a reporter.

"When we dropped 1½-pound dry packages of carbon black, we produced single clouds with each drop."

The navy team seeded seven clouds with carbon, and dissipated each of them in from 2½ to 20 minutes.

"Each cloud turned gray and then rapidly disappeared," Dr. Van Straten said.

"Aside from the cost of the airplanes, we spent less than $5 on the experiments in Georgia."

Carbon black, used in printer's ink and automobile tires, is nothing more than soot. It is available cheaply, in commercial quantities, as a by-product of the burning of natural gas.

The Florence Times

Dedicated To The Interest Of The People Of The Muscle Shoals District

Established 1869 FLORENCE, ALABAMA, TUESDAY AFTERNOON, SEPTEMBER 23, 1958 The Associated Press—N.

Navy Creation, Destroys Clouds

Ordinary Carbon Black Is Used

By VERN HAUGLAND

WASHINGTON (AP)—The Navy said today it has managed to create clouds and destroy others by seeding them with ordinary carbon black.

The woman scientist who discovered the new method said experiments over southern Georgia produced a series of clouds "at a cost of 18 cents a cloud."

Much experimentation must be done before the value of the new technique can be determined. But if it proves successful, it could open the way to cheap and reliable means of making rain, or of breaking up storm clouds, or of dissipating fog.

The new technique was developed by Dr. Florence W. Van Straten, who livened up a desk job with the chief of naval operations by theorizing along new lines as to how rain is formed.

Earlier cloud-seeding methods using more expensive dry ice and silver iodide have been confined to supercooled clouds. The carbon method, Dr. Van Straten said, "apparently works with clouds at any temperature."

In the Georgia experiments, a Navy airplane dropped carbon black in both solid and liquid-suspension form into clouds and into clear skies. Additional studies using radar-tracked balloons currently are under way over Chesapeake Bay.

Results to date indicate that when the carbon is sprayed or sprinkled into a clear sky it causes clouds to form, and when it is introduced into clouds, it clears them up. Whether it actually produces rain in this process has not yet definitely been determined.

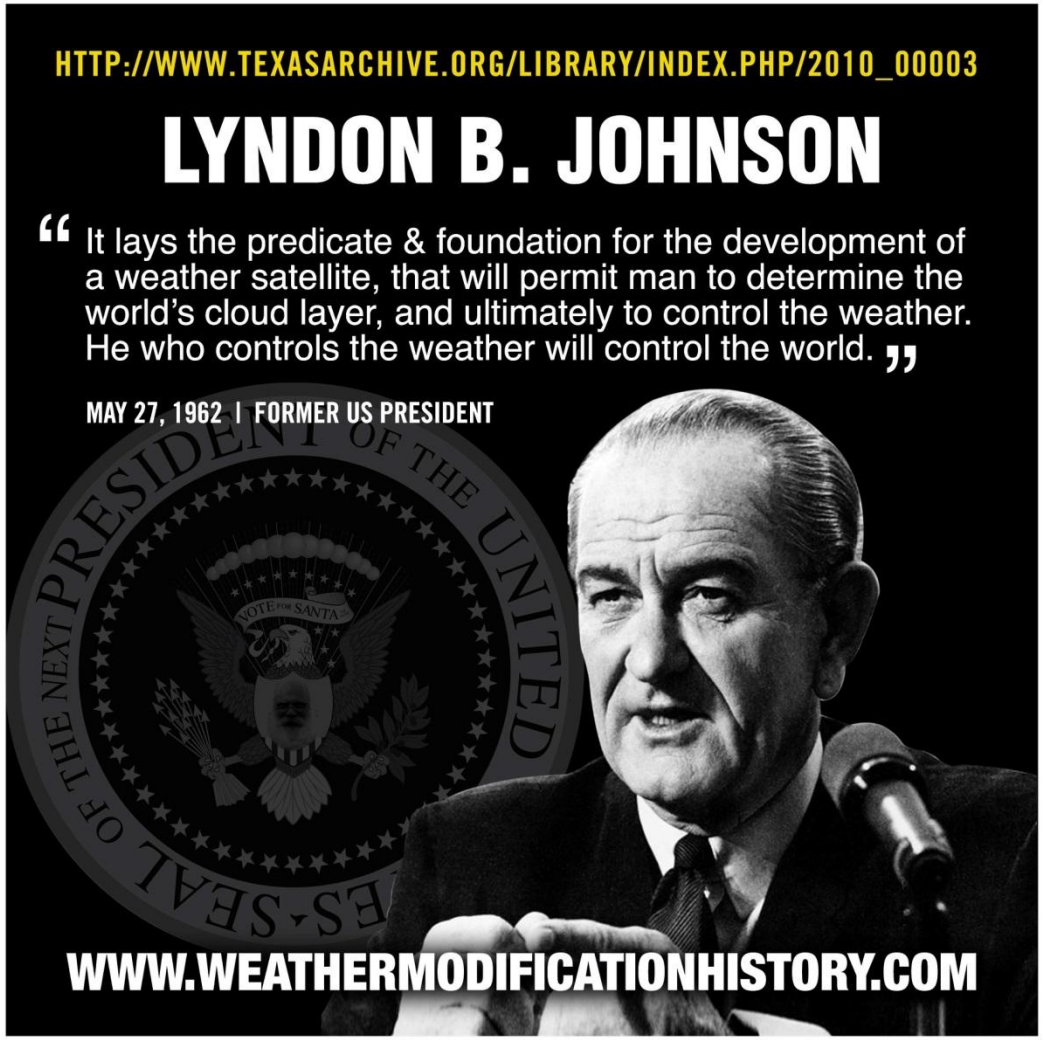

WEATHERMODIFICATIONHISTORY.COM
1800-2017
https://weathermodificationhistory.com/president-kennedy-united-nations-address-weather-modification/
WEATHER WARFARE
"We shall propose further cooperative efforts between all nations in weather prediction and eventually in weather control."
- President John F. Kennedy
Sept. 25, 1961

CARBON BLACK DUST & SOOT

A HISTORY LESSON - 1962

"It lays the predicate and foundation for the development of a weather satellite that will permit man to **determine the world's cloud layer** and ultimately to control the weather; and he who controls the weather will control the world"

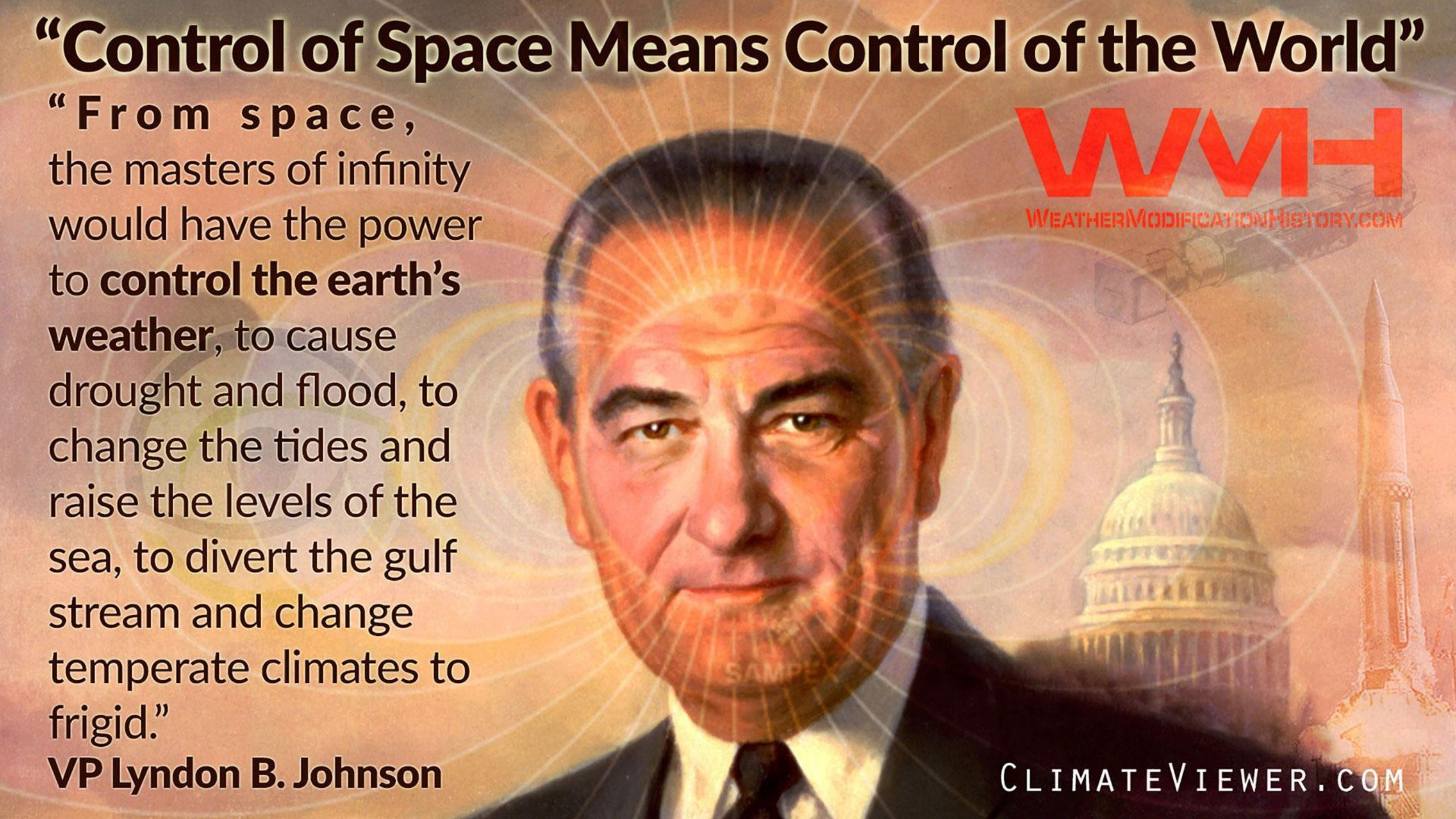
Vice President Johnson at Southwest Texas State University (1962)
https://weathermodificationhistory.com/president-lyndon-johnson-weather-wafare/



"Control of Space Means Control of the World"

"From space, the masters of infinity would have the power to **control the earth's weather**, to cause drought and flood, to change the tides and raise the levels of the sea, to divert the gulf stream and change temperate climates to frigid."

VP Lyndon B. Johnson



WeatherModificationHistory.com

ClimateViewer.com

CARBON BLACK DUST & SOOT

A HISTORY LESSON - 1970

TWO STATES SUE OVER "BLACK BELCH" AND CIRRUS CLOUDS

"The government will tell the nation's 43 commercial airlines Tuesday that **they must end pollution of the skies with jet engine smoke** by 1972 or face punitive legislation from Congress. Mainly at issue is the installation of a redesigned combuster – or burner can – on 3,000 existing commercial jet engines of one maker that reportedly account for 70 percent of all smoke pollution from airliners.

There will be a marked aesthetic improvement, since the so-called **burner cans cut out something like 70 percent of the visible pollution** and thus the familiar "black belch" will be seen no more."

https://weathermodificationhistory.com/states-sue-airlines-over-smoke-pollution-of-the-skies/

St. Petersburg Times

FOLLOW US ON FACEBOOK
WEATHER MODIFICATION HISTORY

Florida's Best Newspaper

ST. PETERSBURG, FLORIDA, MONDAY, JANUARY 19, 1970

12-A St. Petersburg Times, Monday, January 19, 1970

U.S. To Clamp Down On Jet Pollution

WASHINGTON (AP) — The government will tell the nation's 43 commercial airlines Tuesday that they must end pollution of the skies with jet-engine smoke by 1972 or face punitive legislation from Congress.

Top airline executives will get the blunt message of quick voluntary cleanup or else at a meeting called by Secretary of Health, Education and Welfare (HEW) Robert H. Finch and Secretary of Transporation John A. Volpe.

The executives will be told of the Administration's intention to push tough legislation already nearing passage unless they seize this final opportunity of doing the job themselves, HEW pollution fighters said.

MAINLY AT issue is the installation of a redesigned combuster — or burner can — on 3,000 existing commercial jet engines of one maker that reportedly account for 70 per cent of all smoke pollution from airliners.

The government estimates all existing Boeing 727, Boeing 737 and Douglas DC9 jetliners with the Pratt and Whitney JT8B engines can be converted to smoke-free operation by the end of 1972 at a cost of $13.5-million.

The airline industry has told the Federal Aviation Administration it can do the job by the end of 1974, but only then at a cost of $30-million.

THE SMOKE that pours from jet engines is caused by incomplete fuel burning in the standard combuster. The redesigned combuster eliminates smoke plumes almost completely, federal specialists say.

The government is limited to persuasion about jet pollution at present because it lacks specific congressional authorization to attack the problem.

California already has laid down a Jan. 1, 1971, deadline for ending jet pollution in that state. Additionally, Illinois and New Jersey have filed suits to force a quick cleanup.

JOHN A. VOLPE
. . . calls Tuesday meeting.

CARBON BLACK DUST & SOOT

A HISTORY LESSON - 1970

UDC 551.509.68:551.576.1:629.135.2(798)

ON THE POSSIBILITY OF WEATHER MODIFICATION BY AIRCRAFT CONTRAILS

WALLACE B. MURCRAY

Geophysical Institute, University of Alaska, College, Alaska

ABSTRACT

The possible effect of contrails in modifying the weather is reconsidered in the light of information obtained from ground-level contrails in Alaska. It appears likely that inadvertent cloud seeding by jet aircraft may be of the same order of magnitude as that attained in commercial cloud seeding operations. Further investigation is needed; but in the meantime, the possibility of contrail contamination should be kept in mind when evaluating the results of seeding operations.

“likely contrails are affecting precipitation to a much greater extent than are present deliberate seeding operations.”

Murcray, Wallace B. **"On the possibility of weather modification by aircraft contrails."** *Mon. Wea. Rev* 98.10 (1970): 745-748.

CARBON BLACK DUST & SOOT

A HISTORY LESSON - 1974

"Growing global population pressures and predicted future food shortages dictate that man fully explore his potential use of solar energy. ... Interest is concentrated on the feasibility of mesoscale (~ 100-300 km) weather modification through solar energy absorption by **carbon aerosol particles** of the size ~ 0.1 μm [micrometer, 100 nanometer] or less"

Gray, William M., et al. **"Weather modification by carbon dust absorption of solar energy."** *Journal of Applied Meteorology*15.4 (1976): 355-386.

Weather Modification by Carbon Dust Absorption of Solar Energy

Gray, William M., William M. Frank, Myron L. Corrin, Charles A. Stokes, 1976

doi: http://dx.doi.org/10.1175/1520-0450(1976)015<0355:WMBCDA>2.0.CO;2

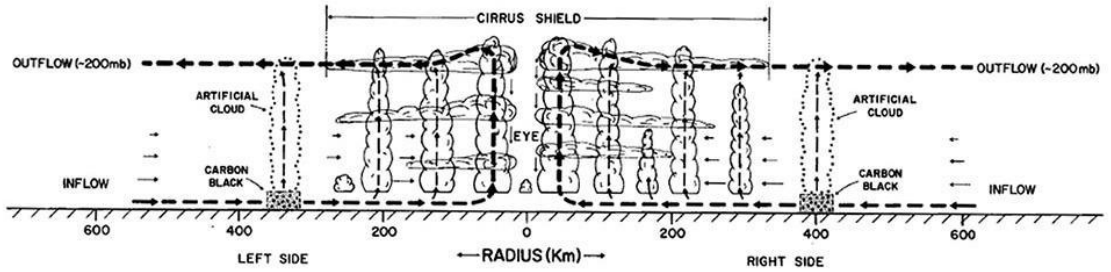


Fig. 7. Idealized portrayal of typical hurricane radial circulation and how carbon black dust seeding of the boundary layer just beyond the cirrus shield might lead to enhanced cumulus convection and reduction of low level inflow which penetrates to the eye-wall cloud.

Fig. 3. Illustration of how carbon dust would be generated and dispensed from a jet aircraft.

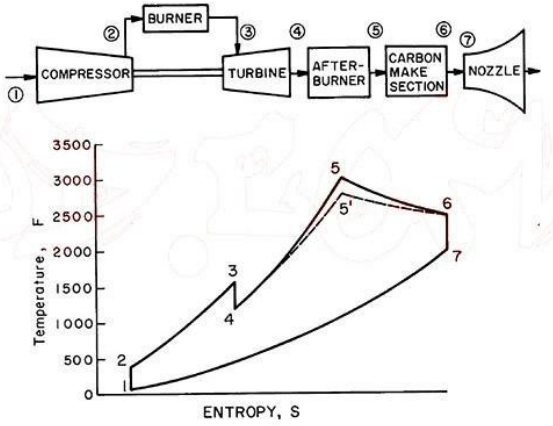


Fig. A. Thermodynamics of proposed engine modifications.

IMAGE BY JIM LEE OF CLIMATEVIEWER.COM

CARBON BLACK DUST & SOOT

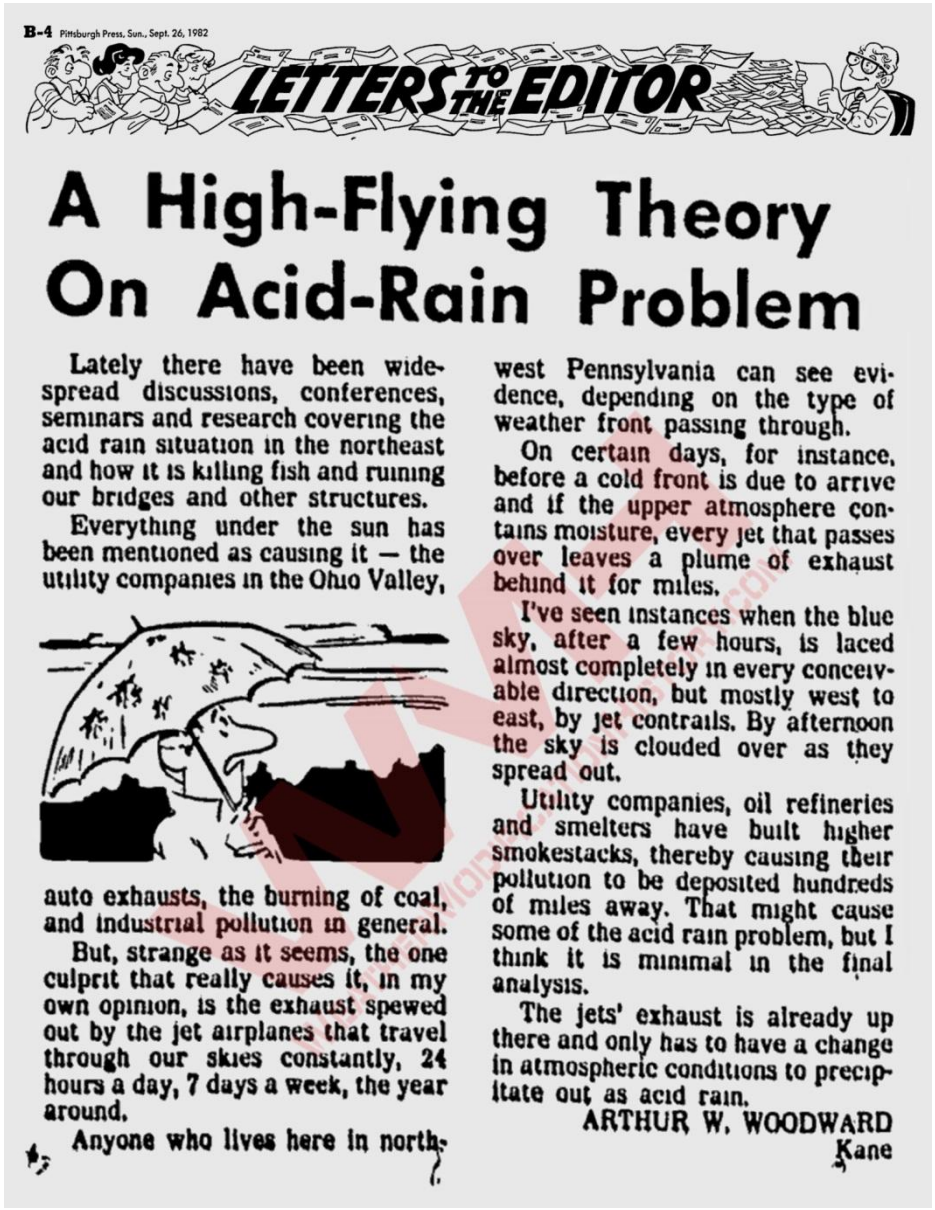
A HISTORY LESSON - 1982

"...the one culprit that really causes it, in my own opinion, is the exhaust spewed out by the jet airplanes that travel through our skies constantly...

I've seen instances when the blue sky, after a few hours, is laced almost completely in every conceivable direction, but mostly west to east, by jet contrails. By afternoon the sky is clouded over as they spread out.

The jets' exhaust is already up there and only has to have a change in atmospheric conditions to precipitate out as acid rain."

https://news.google.com/newspapers?nid=1144&dat=19820925&id=ZeEhAAAAIBAJ&sjid=-V4EAAAAIBAJ&pg=1968%2C4220475&hl=en



B-4 Pittsburgh Press, Sun., Sept. 26, 1982

LETTERS TO THE EDITOR

A High-Flying Theory On Acid-Rain Problem

Lately there have been widespread discussions, conferences, seminars and research covering the acid rain situation in the northeast and how it is killing fish and ruining our bridges and other structures.

Everything under the sun has been mentioned as causing it — the utility companies in the Ohio Valley,

auto exhausts, the burning of coal, and industrial pollution in general.

But, strange as it seems, the one culprit that really causes it, in my own opinion, is the exhaust spewed out by the jet airplanes that travel through our skies constantly, 24 hours a day, 7 days a week, the year around.

Anyone who lives here in northwest Pennsylvania can see evidence, depending on the type of weather front passing through.

On certain days, for instance, before a cold front is due to arrive and if the upper atmosphere contains moisture, every jet that passes over leaves a plume of exhaust behind it for miles.

I've seen instances when the blue sky, after a few hours, is laced almost completely in every conceivable direction, but mostly west to east, by jet contrails. By afternoon the sky is clouded over as they spread out.

Utility companies, oil refineries and smelters have built higher smokestacks, thereby causing their pollution to be deposited hundreds of miles away. That might cause some of the acid rain problem, but I think it is minimal in the final analysis.

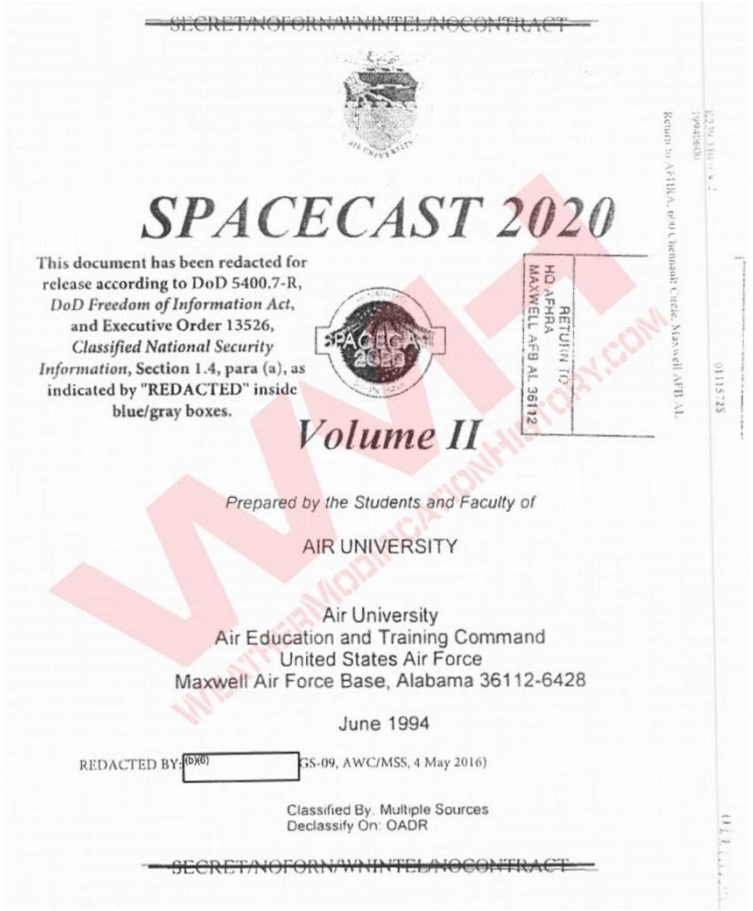
The jets' exhaust is already up there and only has to have a change in atmospheric conditions to precipitate out as acid rain.

ARTHUR W. WOODWARD
Kane

WEATHER WARFARE

CARBON BLACK DUST

A HISTORY LESSON - 1994



~~SECRET/NOFORN/WNINTEL/NOCONTRACT~~

SPACECAST 2020

This document has been redacted for release according to DoD 5400.7-R, *DoD Freedom of Information Act*, and Executive Order 13526, *Classified National Security Information*, Section 1.4, para (a), as indicated by "REDACTED" inside blue/gray boxes.

RETURN TO: HQ AFHRA MAXWELL AFB AL 36112

Volume II

Prepared by the Students and Faculty of

AIR UNIVERSITY

Air University
Air Education and Training Command
United States Air Force
Maxwell Air Force Base, Alabama 36112-6428

June 1994

REDACTED BY: (b)(6) GS-09, AWC/MSS, 4 May 2016)

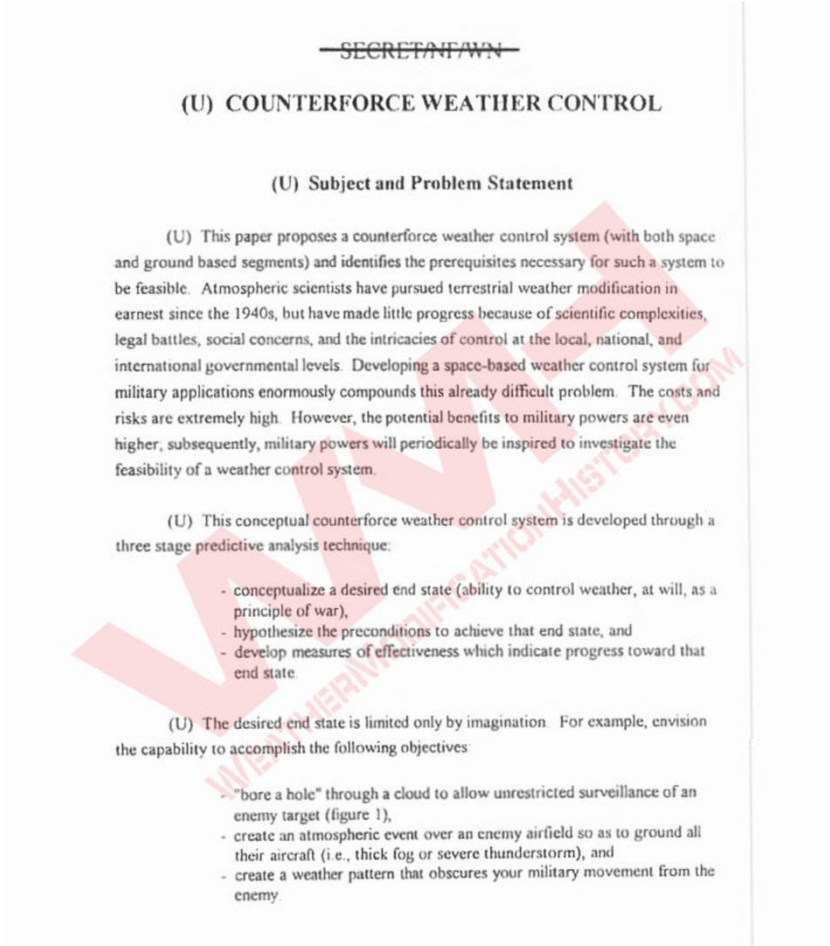
Classified By: Multiple Sources
Declassify On: OADR

~~SECRET/NOFORN/WNINTEL/NOCONTRACT~~

(U) Previous USSR Weather Modification Efforts

- REDACTED -

"This demonstrated an ability to **generate infrared-defeating clouds**, effectively denying overhead surveillance."



~~SECRET/NOFORN~~

(U) COUNTERFORCE WEATHER CONTROL

(U) Subject and Problem Statement

(U) This paper proposes a counterforce weather control system (with both space and ground based segments) and identifies the prerequisites necessary for such a system to be feasible. Atmospheric scientists have pursued terrestrial weather modification in earnest since the 1940s, but have made little progress because of scientific complexities, legal battles, social concerns, and the intricacies of control at the local, national, and international governmental levels. Developing a space-based weather control system for military applications enormously compounds this already difficult problem. The costs and risks are extremely high. However, the potential benefits to military powers are even higher; subsequently, military powers will periodically be inspired to investigate the feasibility of a weather control system.

(U) This conceptual counterforce weather control system is developed through a three stage predictive analysis technique:

- conceptualize a desired end state (ability to control weather, at will, as a principle of war),
- hypothesize the preconditions to achieve that end state, and
- develop measures of effectiveness which indicate progress toward that end state.

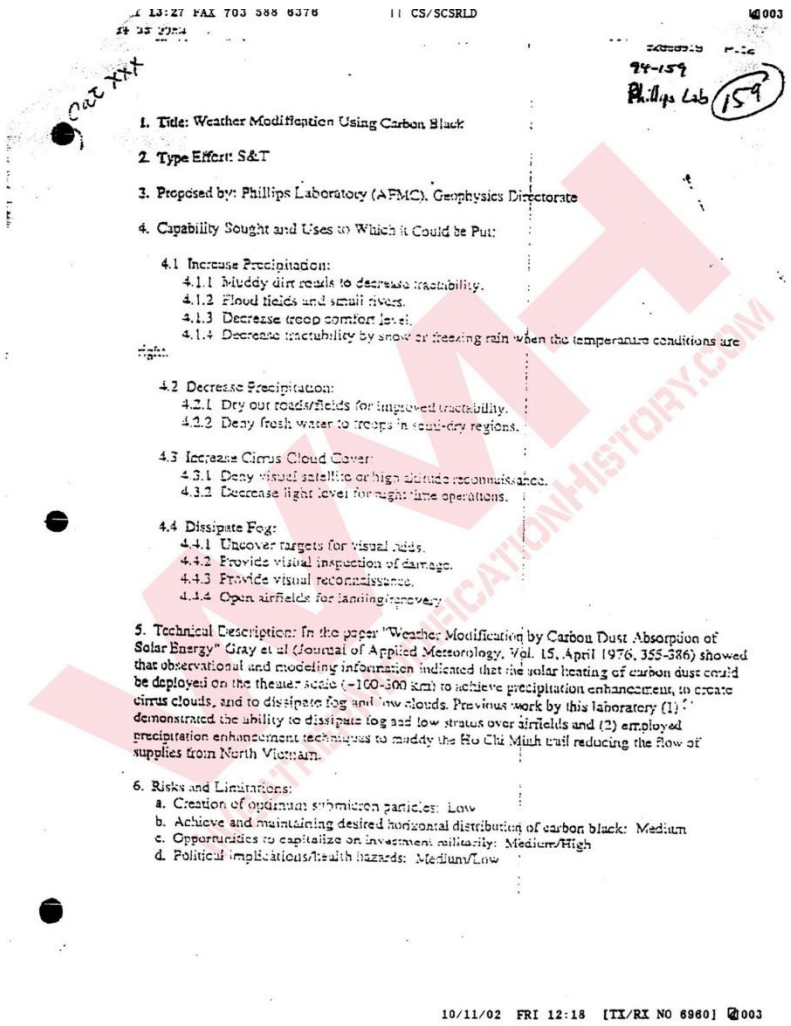
(U) The desired end state is limited only by imagination. For example, envision the capability to accomplish the following objectives:

- "bore a hole" through a cloud to allow unrestricted surveillance of an enemy target (figure 1),
- create an atmospheric event over an enemy airfield so as to ground all their aircraft (i.e., thick fog or severe thunderstorm), and
- create a weather pattern that obscures your military movement from the enemy

https://weathermodificationhistory.com/foia-reveals-usaf-paper-counterforce-weather-control-spacecast-2020/

CARBON BLACK DUST

A HISTORY LESSON - 1994



1. Title: Weather Modification Using Carbon Black

2. Type Effort: S&T

3. Proposed by: Phillips Laboratory (AFMC), Geophysics Directorate

4. Capability Sought and Uses to Which it Could be Put:

4.1 Increase Precipitation:
4.1.1 Muddy dirt roads to decrease tractability.
4.1.2 Flood fields and small rivers.
4.1.3 Decrease troop comfort level.
4.1.4 Decrease tractability by snow or freezing rain when the temperature conditions are right.

4.2 Decrease Precipitation:
4.2.1 Dry out roads/fields for improved tractability.
4.2.2 Deny fresh water to troops in semi-dry regions.

4.3 Increase Cirrus Cloud Cover:
4.3.1 Deny visual satellite or high altitude reconnaissance.
4.3.2 Decrease light level for night time operations.

4.4 Dissipate Fog:
4.4.1 Uncover targets for visual aids.
4.4.2 Provide visual inspection of damage.
4.4.3 Provide visual reconnaissance.
4.4.4 Open airfields for landing/recovery.

5. Technical Description: In the paper "Weather Modification by Carbon Dust Absorption of Solar Energy" Gray et al (Journal of Applied Meteorology, Vol. 15, April 1976, 355-386) showed that observational and modeling information indicated that the solar heating of carbon dust could be deployed on the theater scale (~100-300 km) to achieve precipitation enhancement, to create cirrus clouds, and to dissipate fog and low clouds. Previous work by this laboratory (1) demonstrated the ability to dissipate fog and low stratus over airfields and (2) employed precipitation enhancement techniques to muddy the Ho Chi Minh trail reducing the flow of supplies from North Vietnam.

6. Risks and Limitations:
a. Creation of optimum submicron particles: Low
b. Achieve and maintaining desired horizontal distribution of carbon black: Medium
c. Opportunities to capitalize on investment militarily: Medium/High
d. Political implications/health hazards: Medium/Low

10/11/02 FRI 12:18 [TX/RX NO 6960] 003

US Air Force Freedom of Information Act (FOIA) Document:

TITLE: Weather Modification Using Carbon Black

PROPOSED BY: Phillips Laboratory (AFMC), Geophysics Directorate Technical

Description: In the paper "Weather Modification by Carbon Dust Absorption of Solar Energy" Gray el al (Journal of Applied Meteorology, Vol 15, April 1976, 355-386) showed that observational and modeling information indicated that the **solar heating of carbon dust could be deployed on the theatre scaled (~100-300km) to achieve precipitation enhancement, to create cirrus clouds, and to dissipate fog and low clouds.** Previous work by this laboratory:

(1) demonstrated the ability to dissipate fog and low stratus over airfields and

(2) employed precipitation enhancement techniques to **muddy the Ho Chi Minh trail reducing the flow of supplies from North Vietnam**. Risks and Limitations:
a. Creation of optimum submicron particles: Low
b. Achieve and maintaining desired horizontal distribution of carbon black: Medium
c. Opportunities to capitalize on investment militarily: Medium/High
d. Political implications/health hazards: Medium/Low

(3) Project Plan - Major Milestones
a. Numerical model studies completed 1996
b. Engineering design of test engine mod. 1997
c. Ground-based field trials completed. 1999
d. Airborne test and evaluation of prototypes completed 2001
e. Engineering design for airborne carbon black delivery system completed 2003
f. Operational capability 2004 Rough estimate of the total cost to operational capability: $23.5 million. Life cycle costs have not been estimated.

https://weathermodificationhistory.com/foia-reveals-us-air-force-geophysics-directorate-weather-modification-intentions/

CARBON BLACK DUST

A HISTORY LESSON - 1994

(12) 3
053

NON LETHAL WARFARE PROPOSAL

TITLE: WEATHER MODIFICATION

TYPE OF EFFORT: S&T

PROPOSED BY: Code C2741 (Warhead Development Branch) NAWCWPNS, China Lake, CA 93555-6001

CAPABILITY & USES: (1) To impede or deny the movement of personnel and material because of rains-floods, snow-blizzards, etc.
(2) To disrupt economy due to the effect of floods, droughts, etc.

TECHNICAL DESCRIPTION: By way of background, weather modification was used successfully in Viet Nam to (among other things) hinder and impede the movement of personnel and material from North Viet Nam to South Viet Nam. Since that time military research on Weather Modification has dwindled in the United States but not necessarily in the Soviet Union (Russia). Commercial weather modification is an active industry.

The approach of this proposal is to (1) determine the current state-of-the-art technology in weather modification; (2) determine the applicability of current weather modification techniques and devices to military application and utilization; and (3) generate a E&MD Program Plan(s) to modify (or develop as necessary) weather modification techniques and devices suitable for military application. Current industrial techniques and devices are not likely to be suitable for military application or meet military requirements.

The successful completion of the proposed effort and the follow-on E&MD program(s) will give the U.S. military a viable, state-of-the-art weather modification capability again.

RISK & LIMITATIONS: The risk is low in that this initial proposed study effort/investigation and its assumed E&MD follow-on involve the modification of commercial techniques and devices to meet military applications and not the development of new technology.

The application of weather modification requires suitable meteorological conditions and, therefor, has that operational limitation.

I know of no countermeasures.

PROJECT PLAN:

ACTIVITY/FY	FY-1	FY-2
Determine State-of-Art	1/2 man-year/$65K	
Investigate Applicability to Military Utilization	3/4 man-year/$100K	3/4 man-year/$105K
Generate Follow-on Proposals [E&MD(s)]		1/2 man-year/$70K
TOTALS	1 1/4 man-year $165K	1 1/4 man-year $175K

US Navy Freedom of Information Act (FOIA) Document:

TITLE: NON-LETHAL WARFARE PROPOSAL, WEATHER MODIFICATION

PROPOSED BY: Code C2741 (Warhead Development Branch) NAWCWPNS, China Lake CA 93555-6001

CAPABILITY & USES:

(1) To impede or deny the movement of personnel and material because of rains-floods, snow-blizzards, etc.

(2) To disrupt economy due to the effect of floods, droughts, etc.

"successful completion of the proposed effort and the follow-on E&MD program(s) will give the U.S. military a viable, state-of-the-art weather modification capability again. ...
I know of no countermeasures."

Cold Cloud Modification System bombs developed by US. Navy China Lake Weapons Branch for use in Vietnam's **"Operation Popeye"**

https://weathermodificationhistory.com/foia-reveals-us-navy-weather-modification-program-still-active-china-lake/

CARBON BLACK DUST

A HISTORY LESSON – 1995-1996

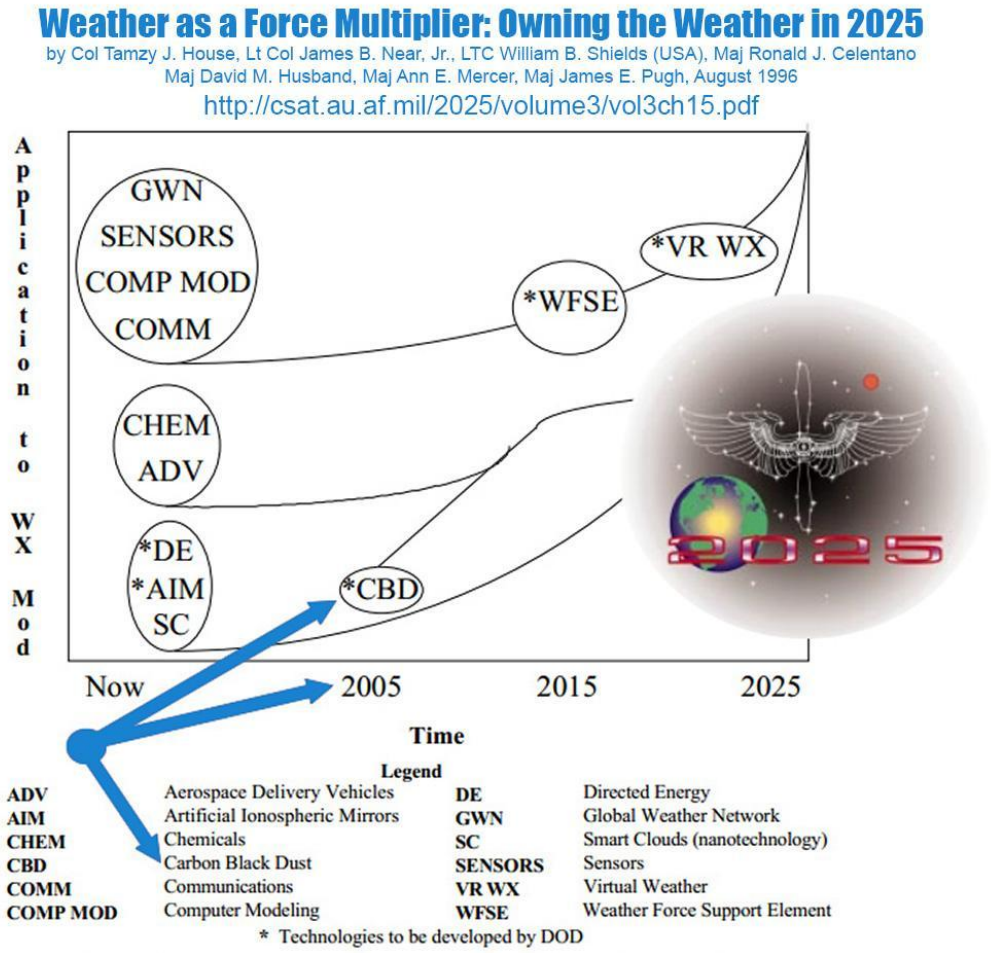


Figure 5-2. A Systems Development Road Map to Weather Modification in 2025.

TITLE: Weather as a Force Multiplier: Owning the Weather in 2025

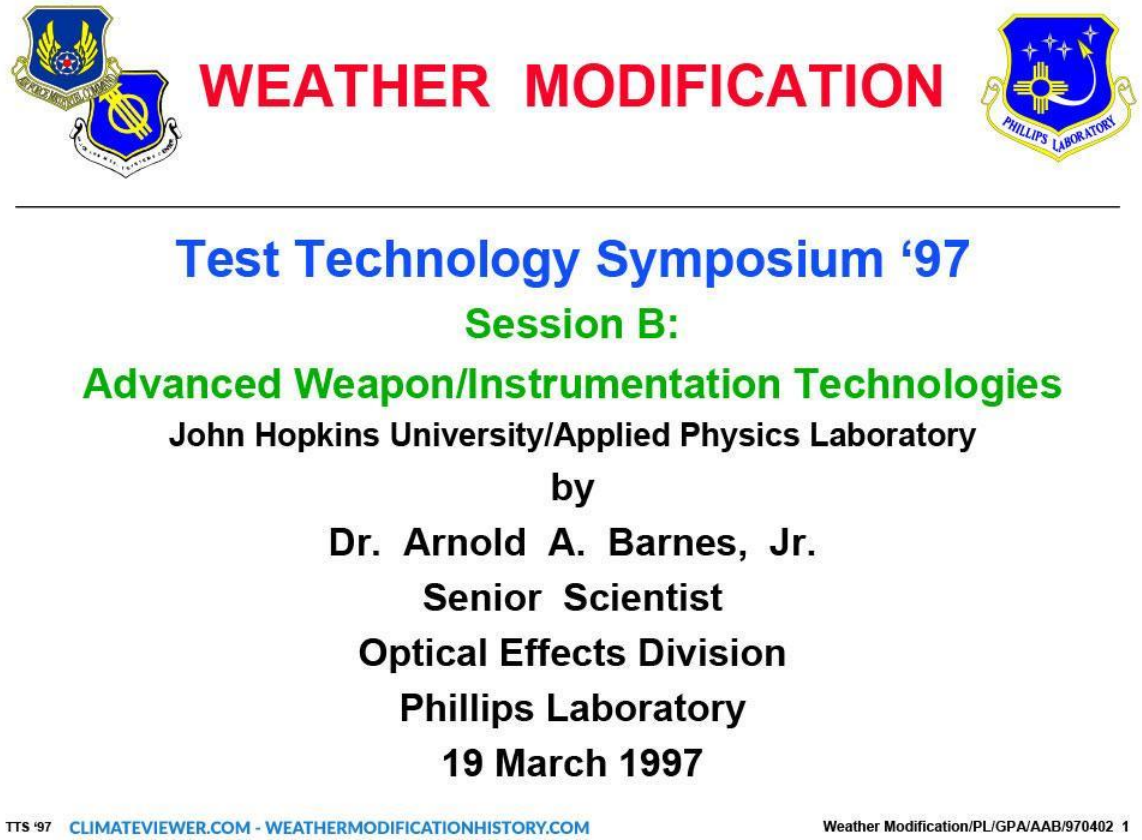
Carbon Black Dust (2005) to be developed by Department of Defense

To achieve the core capabilities depicted in figure 5-1, the necessary technologies and systems might be developed according to the process depicted in figure 5-2. **This figure illustrates the systems development timing and sequence necessary to realize a weather-modification capability for the battlespace by 2025**. The horizontal axis represents time. The vertical axis indicates the degree to which a given technology will be applied toward weather-modification. As the primary users, the military will be the main developer for the technologies designated with an asterisk. The civil sector will be the main source for the remaining technologies.

https://weathermodificationhistory.com/weather-as-force-multiplier-owning-the-weather-in-2025/

CARBON BLACK DUST

A HISTORY LESSON – 1997



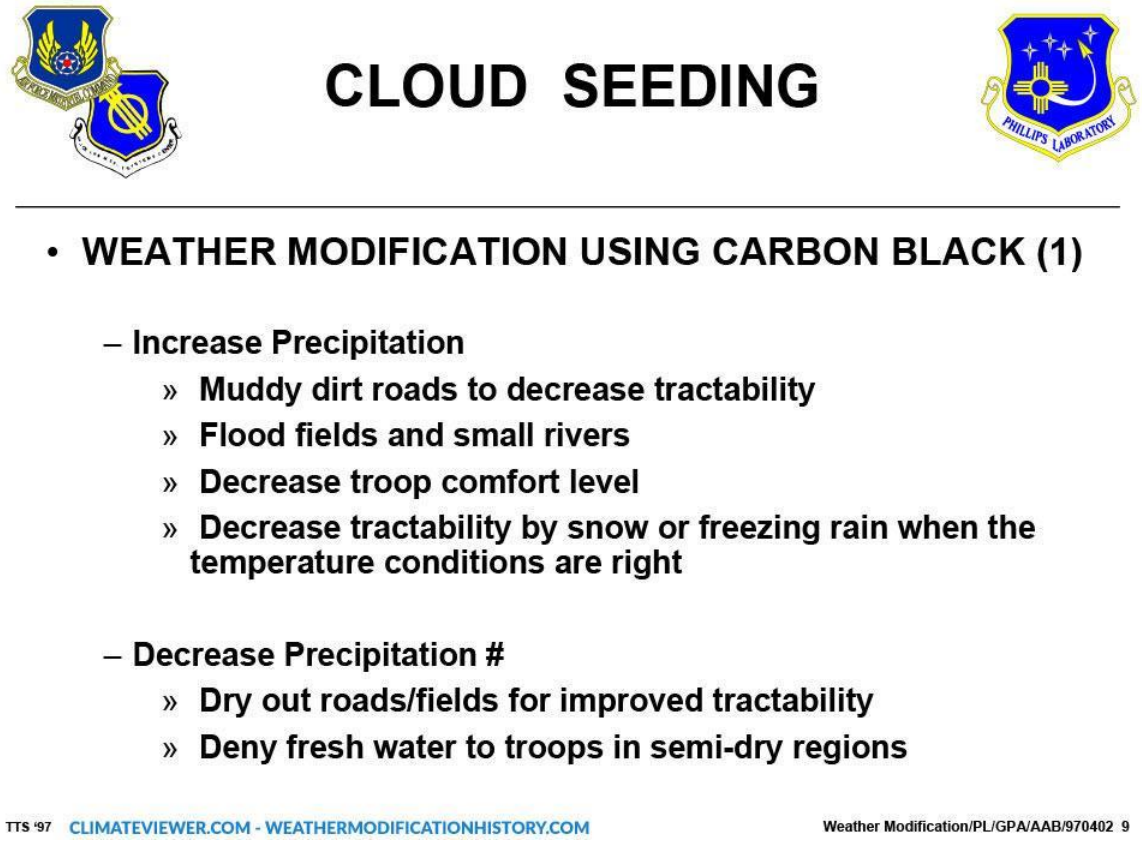
TEST TECHNOLOGY SYMPOSIUM '97
"THE ARMY AFTER NEXT, HOW WILL WE TEST?"
WEATHER MODIFICATION
Dr. Arnold Barnes, Jr.
Phillips Lab/GPO, Hanscom Air Force Base, MA

"The difficulty, cost, and risk of developing a weather control system for military applications are extremely high. However, the potential benefits for national security could be even higher. Enemy weather modification weapons are possibilities which, like it or not, may be possible and must be considered," **Spacecast 2020**. This paper considers such concepts as hole boring for surveillance; the use of space mirrors for night battlefield illumination, modifying the environment, enforcement of curfews and similar civil control measures; **use of carbon black to retarget precipitation; fog dissipation; and cirrus enhancement.**

https://climateviewer.com/2013/11/16/us-military-discusses-future-of-weather-warfare-despite-enmod-ban/

CARBON BLACK DUST

A HISTORY LESSON – 1997



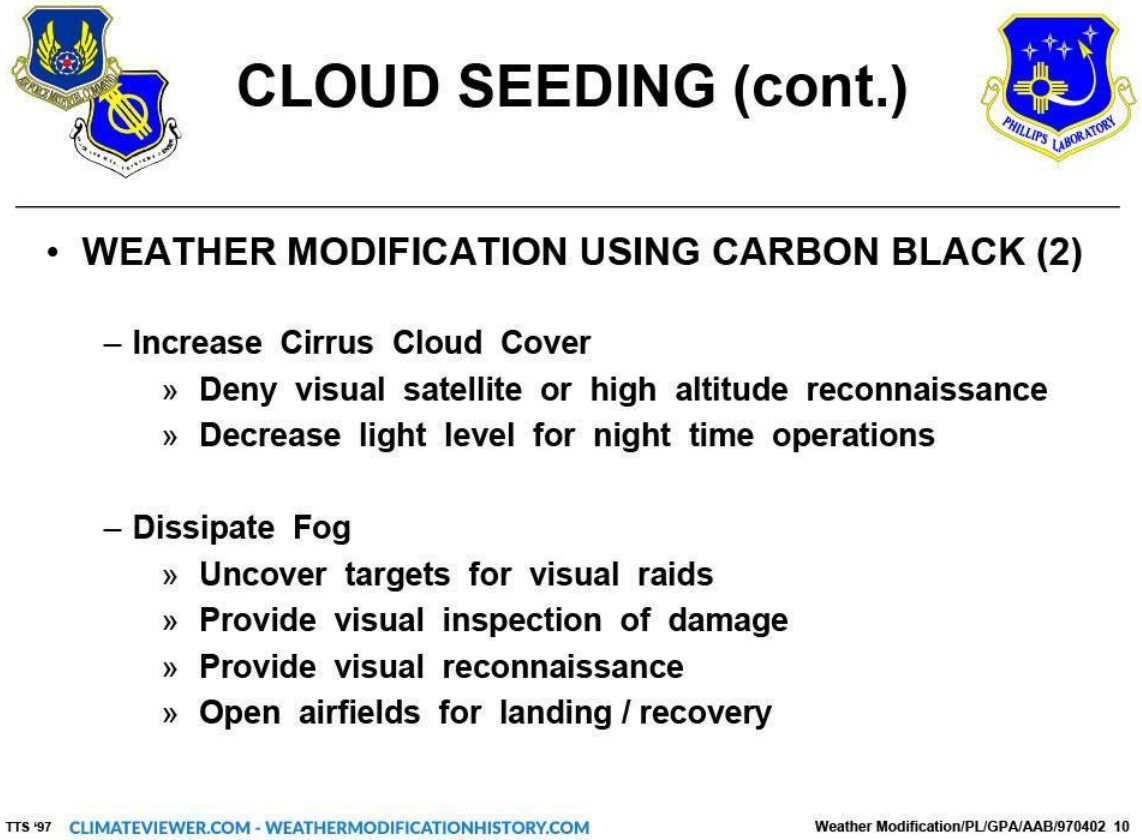
WEATHER MODIFICATION USING CARBON BLACK (1) - Increase Precipitation
- Muddy dirt roads to decrease tractability
- Flood fields and small rivers
- Decrease troop comfort level
- Decrease tractability by snow or freezing rain when the temperature conditions are right
- Decrease Precipitation #
- Dry out roads/fields for improved tractability
- Deny fresh water to troops in semi-dry regions

Notes: The following is an example of the use of one particular seeding agent* to modify the weather. This information was provided to the Office of the Under Secretary of Defense (A&T) on a request for ideas for Non-Lethal Technologies and Weapons which "avoided or minimized the loss of life and associated damage."

https://climateviewer.com/2013/11/16/us-military-discusses-future-of-weather-warfare-despite-enmod-ban/

CARBON BLACK DUST

A HISTORY LESSON – 1997



CLOUD SEEDING (cont.) WEATHER MODIFICATION USING CARBON BLACK (2)

Increase Cirrus Cloud Cover

- Deny visual satellite or high altitude reconnaissance
- Decrease light level for night time operations

Dissipate Fog

- Uncover targets for visual raids
- Provide visual inspection of damage
- Provide visual reconnaissance
- Open airfields for landing / recovery

Notes: Project Plan: MAJOR MILESTONES not funded

- Numerical model studies completed 1997
- Engineering design of test engine model 1998
- Ground-based field trials completed 2000
- Airborne T&E of prototype completed 2002
- Engineering design for **airborne carbon black delivery system** completed 2004

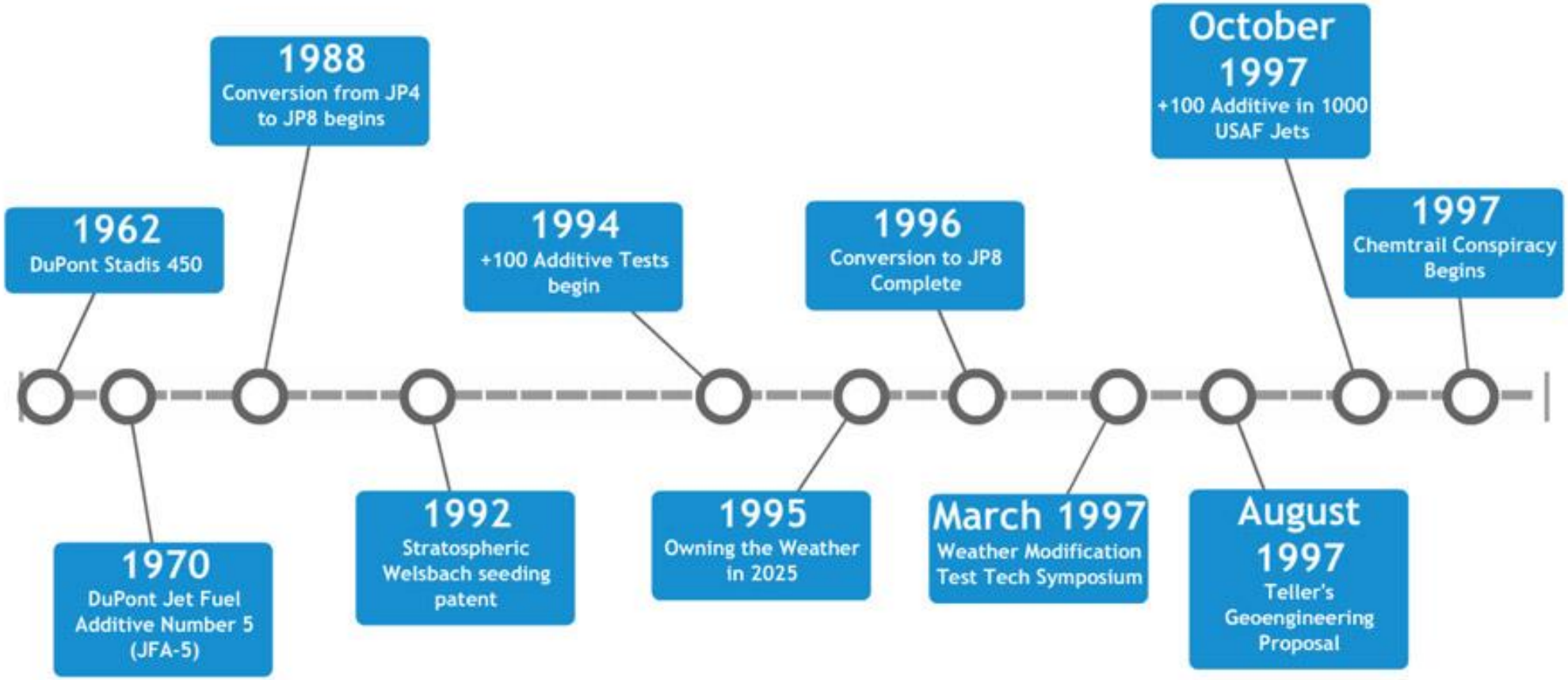
Build upon (1) NOAA's "Atmospheric Modification Program" (AMP), a joint NOAA/States effort written into NOAA's budget every year by Congress, (2) the Illinois State Water Survey studies of inadvertent weather modification, and (3) articles in the Journal of Weather Modification.

https://climateviewer.com/2013/11/16/us-military-discusses-future-of-weather-warfare-despite-enmod-ban/

NATO "SINGLE FUEL CONCEPT"

A HISTORY LESSON – 1988-1997

https://climateviewer.com/2014/11/05/contrails-geoengineering-single-fuel-concept/



http://climateviewer.com/geoengineering/

NATO “SINGLE FUEL CONCEPT”

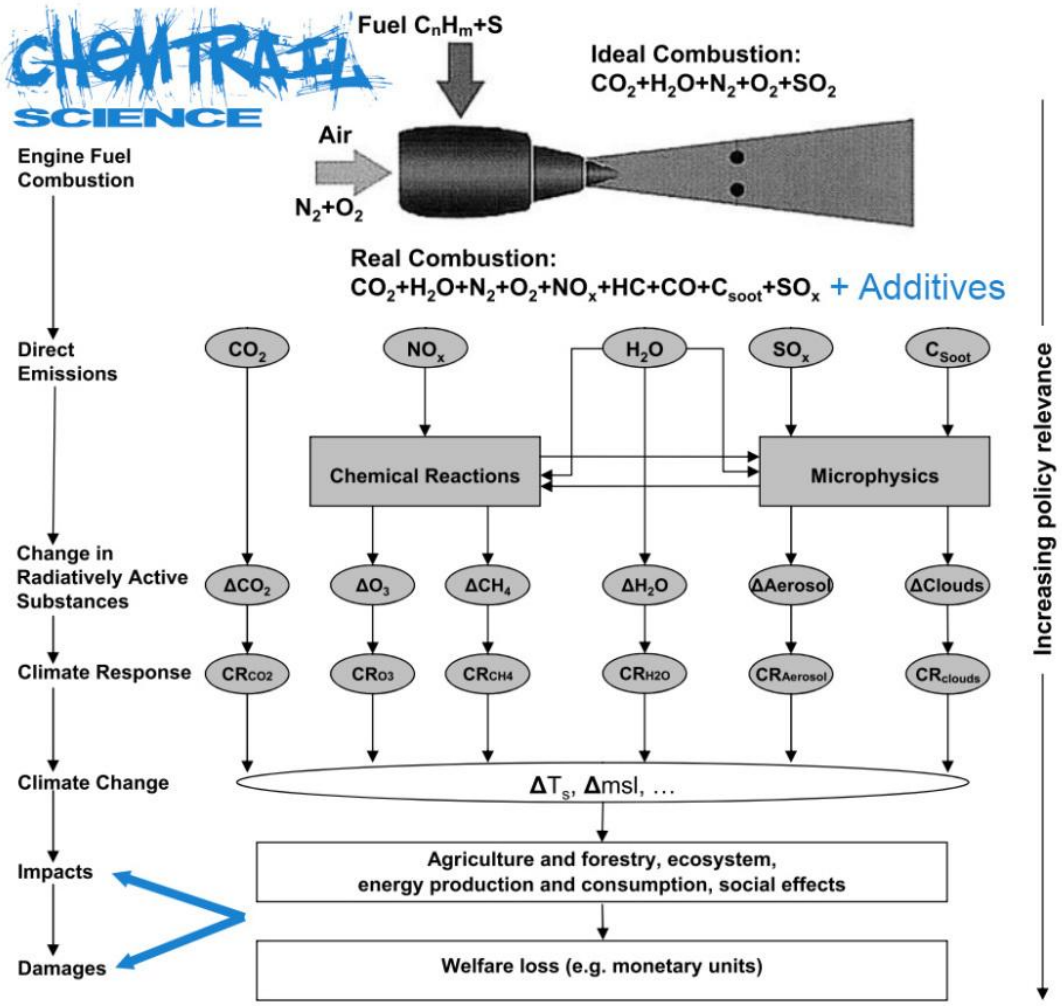


Fig. 1. Schematic of emissions released during aircraft fuel combustion and their resulting potential impacts on climate change and welfare loss.

IMAGE CREATED BY JIM LEE OF CLIMATEVIEWER.COM

Table ES-1. Elements detected in jet fuel.

Element	Jet A (ppb)	JP5* (ppb)	JP8 (ppb)
Aluminum	ND	2144	9360
Barium	3	9	38
Calcium	555	5256	31120
Chromium	26	9	18
Copper	5	82	6
Iron	210	210	1144
Lead	11	5	10
Magnesium	ND	1056	5840
Manganese	6	10	25
Nickel	ND	6	6
Niobium	ND	ND	2
Potassium	ND	118	207
Scandium	11	12	11
Selenium	ND	ND	21
Strontium	12	70	351
Sulfur	1220	450	1690
Tin	10	48	102
Titanium	100	35	1056
Vanadium	ND	3	18
Zirconium	16	14	39

*JP5 values shown are the higher of two JP5 sample values.
ND = No Detect

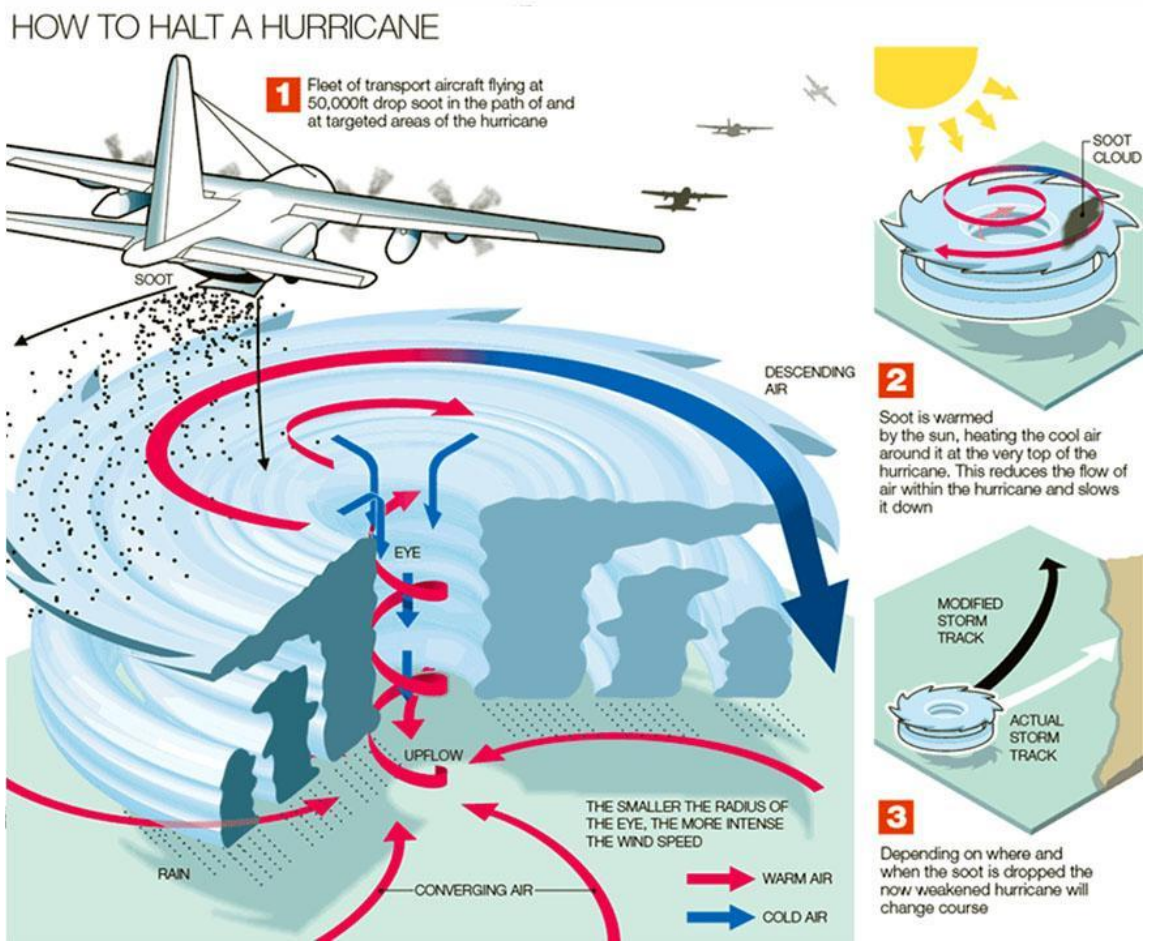
CARBON BLACK DUST & SOOT

A HISTORY LESSON - 2008

Collaborative Research: On Hurricane Modification by Carbon Black Dispersion: Methods, Risk Mitigation, and Risk Communication – Dr. Moshe Alamaro

This presentation focused on the use of **carbon black aerosol (CBA)** to selectively heat parts of the atmosphere by **dispersion of CBA above a hurricane**. This scenario is motivated by the fact that the energy cycle of a hurricane may be represented as a Carnot heat engine, and reducing the contrast between "hot and cold reservoirs" should reduce the power of a hurricane and the CBA will absorb incident solar radiation to warm the "cold reservoir."

- Objectives of this study are to demonstrate direct control of the intensity or track of simulated hurricanes;
- to quantify amounts of CBA needed; to enhance understanding of the web of physical processes that power hurricanes in relation to the overall thermodynamics of hurricanes;
- to determine optimal dispersion scenarios;
- to enhance understanding of the radiative and flow properties of CBA;
- to establish causes, effects, and outcomes of CBA dispersion;
- and to develop methods to **communicate risk to the public of large-scale weather modification efforts**.



https://climateviewer.com/2013/11/08/hurricane-hacking-the-department-of-homeland-security-enters-the-weather-modification-business/

CONTRAIL CONTROL


COCKTAIL GEOENGINEERING
How 9-11 Changed the Sky Forever

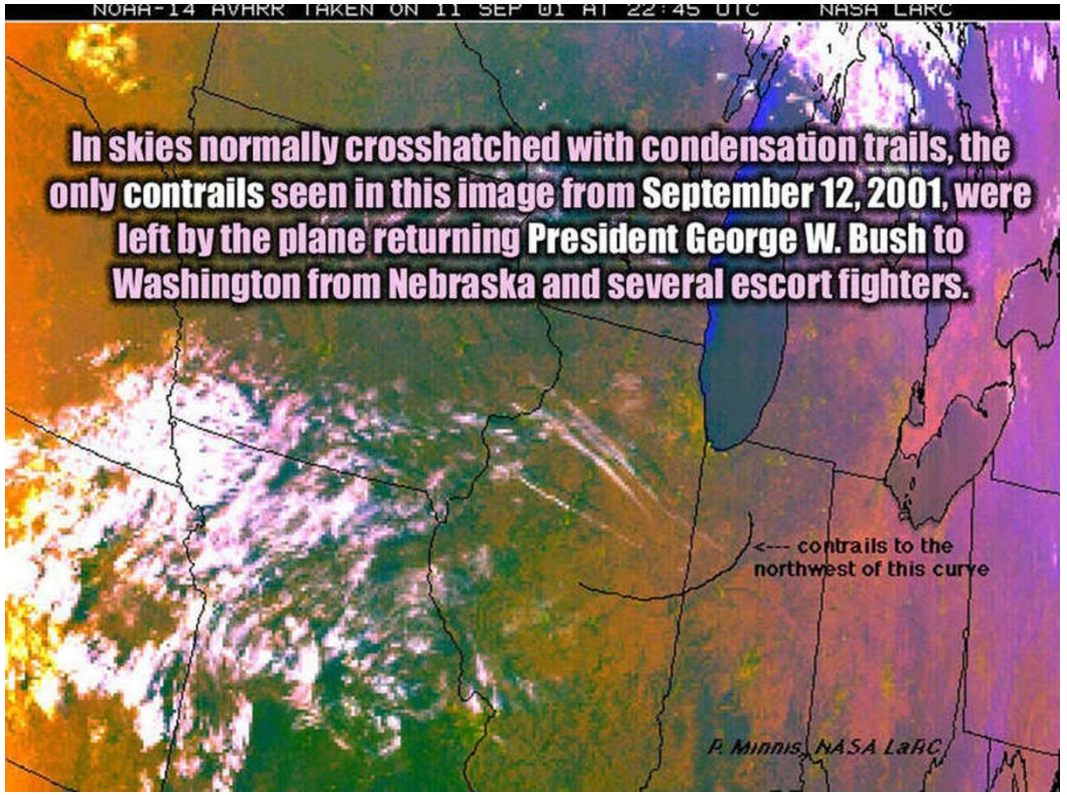
CARBON BLACK DUST & SOOT

A HISTORY LESSON - 2001

All flights were grounded after the September 11, 2001 attacks on the twin towers. A team of NASA scientists noticed that it got much colder that night than usual. They came to the conclusion that cirrus clouds generated by aircraft contrails were trapping heat at night. This study changed world and sent the airline industry into a tail spin trying to figure out how to deal with their contrail conundrum. It is possible that aircraft contrail induced cirrus clouds are trapping more heat than their CO2 emissions meaning the airline industry could incur hefty carbon tax charges if they don't create "less warming and more cooling clouds."

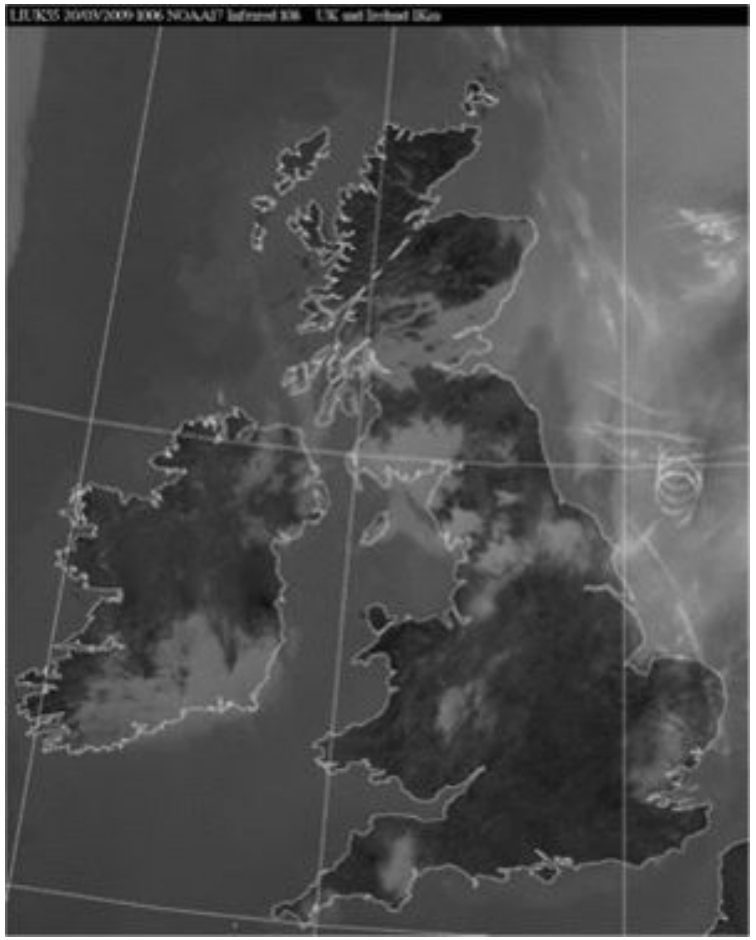
Before 9/11/2001, one could make the argument that contrails creating clouds was just pollution. After this monumental study, scientists and geoengineers have been trying to figure out how to alter jet fuel> to create clouds that ONLY cool the planet and have no intention on stopping the creation of artificial clouds or removing these clouds all together.
https://weathermodificationhistory.com/september-11-2001-airline-groundings-contrails-affect-daily-temperature-range/

Travis, David J., Andrew M. Carleton, and Ryan G. Lauritsen. **"Regional variations in US diurnal temperature range for the 11–14 September 2001 aircraft groundings: Evidence of jet contrail influence on climate."** *Journal of climate* 17.5 (2004): 1123-1134.



CARBON BLACK DUST & SOOT

A HISTORY LESSON - 2009



Volcanic Eruption Highlights Contrail Conundrum

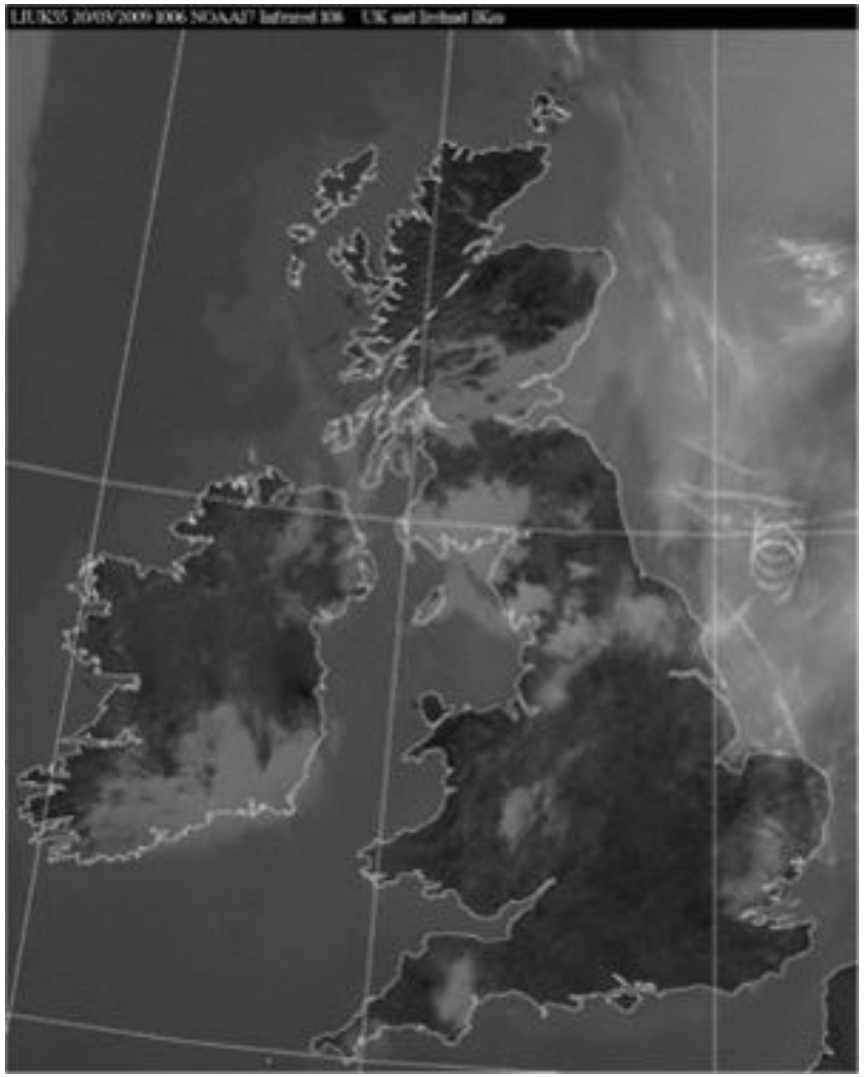
"A single aircraft operating in conditions favorable for persistent contrail formation appears to exert a contrail-induced radiative forcing some 5000 times greater (in W m−2 km−1) than recent estimates of the average persistent contrail radiative forcing from the entire civil aviation fleet."

Haywood, J. M., R. P. Allan, J. Bornemann, P. Forster, P. N. Francis, S. Milton, G. Rädel, A. Rap, K. P. Shine, and R. Thorpe (2009), A case study of the radiative forcing of persistent contrails evolving into contrail-induced cirrus, J. Geophys. Res., 114, D24201, doi:10.1029/2009JD012650.

https://weathermodificationhistory.com/volcanic-eruption-highlights-contrail-conundrum/

CARBON BLACK DUST & SOOT

A HISTORY LESSON - 2011



Cirrus Clouds > Greenhouse Gases

"Contrails formed by aircraft can evolve into cirrus clouds indistinguishable from those formed naturally. These **'spreading contrails' may be causing more climate warming today than all the carbon dioxide emitted by aircraft since the start of aviation.**"

Both ground- and satellite-based cloud observations have suggested a small but noticeable increase in cirrus cloud cover in regions of high air-traffic density relative to adjacent regions. However, contrail spreading is not the only mechanism that could explain this increase. It has also been suggested that aircraft-emitted aerosols could serve as ice nuclei and facilitate the formation of cirrus cloud. To understand the impact of aviation on climate, it is necessary to quantify the importance of these two mechanisms.

Boucher, Olivier. "Atmospheric science: Seeing through contrails." *Nature Climate Change* 1.1 (2011): 24. - PDF

BY PETE DANKO / BIOFUELS, RENEWABLE ENERGY, TRANSPORTATION / MARCH 5, 2013

JET BIOFUEL ENLISTED FOR CONTRAIL CONTROL

Contrails might be a punch line in the culture these days, thanks to the imaginative folks who have rechristened them "chemtrails" and embroidered them with elaborate theories involving government and corporate misdeed.

But contrails are pretty serious business for a less conspiratorial reason: scientists believe these ice clouds generated by water exhaust gases from aircraft engines could have a real impact on the climate, perhaps by cooling temperatures during the day and warming them at night.

Contrails over Lisbon, Portugal (image via NASA/JPL/UCSD/JSC)

That's where a new phase in an ongoing NASA study comes into play: The space agency recently began doing flights over the Southern California desert in which a DC-8 "flying laboratory" is testing the contrail consequences of using standard JP-8 jet fuel versus a 50-50 blend of JP-8 and a biofuel made from camelina plants.

https://weathermodificationhistory.com/jet-biofuel-enlisted-for-contrail-control/

BIOFUELS FOR CONTRAIL CONTROL

ADDING ALUMINUM NANO-PARTICLES TO JET FUEL

Why add nanoparticles? The idea, says lead author R. B. Anand, an associate professor of mechanical engineering at the National Institute of Technology in Tiruchirappalli, India, is that because of their high surface-to-volume ratio, the nanoparticles—which, in the study, had an average diameter of 51 billionths of a meter—have more reactive surfaces, allowing them to act as more efficient chemical catalysts, thus increasing fuel combustion. The presence of the particles also increases fuel–air mixing in the fuel, which leads to more complete burning. In the study, Anand and co-author J. Sadhik Basha first used a mechanical agitator to create an emulsion consisting of **jatropha biodiesel (a fuel derived from the crushed seeds of the jatropha plant), water, and a surfactant, then blended in different proportions of alumina nanoparticles.**

In addition to outperforming regular biofuel, the nanoparticle-spiked fuels produced significantly lower quantities of nitrogen oxide and carbon monoxide gases, and created less smoke. The researchers are now testing other types of nanoparticles, including hollow carbon nanotubes, and investigating the effects of nano-additives to engine lubrication and cooling systems. One obstacle to the application of this kind of nanotechnology is the high cost of nanoparticle production, says Anand—who also cautions that **nanoparticles "should be used judiciously," because they tend to "entrain into human bodies."**

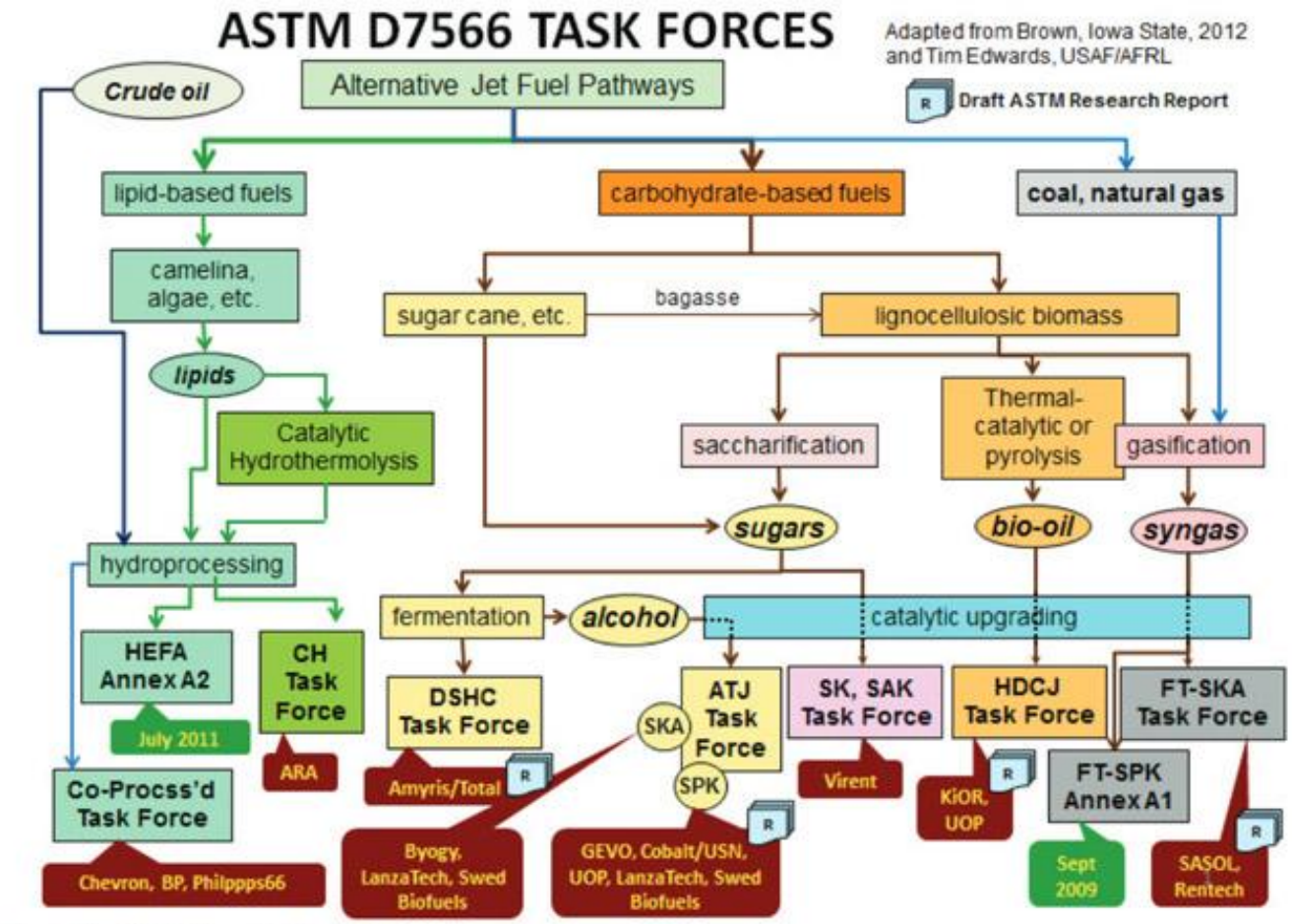


Figure 13 – ASTM Alternative Fuel Task Forces

Sadhik Basha, J., and R. B. Anand. **"Role of nanoadditive blended biodiesel emulsion fuel on the working characteristics of a diesel engine."** *Journal of Renewable and Sustainable energy* 3.2 (2011): 023106.

ACTIVISTS FIGHT BACK

A HISTORY LESSON – 2015 - VIDEO

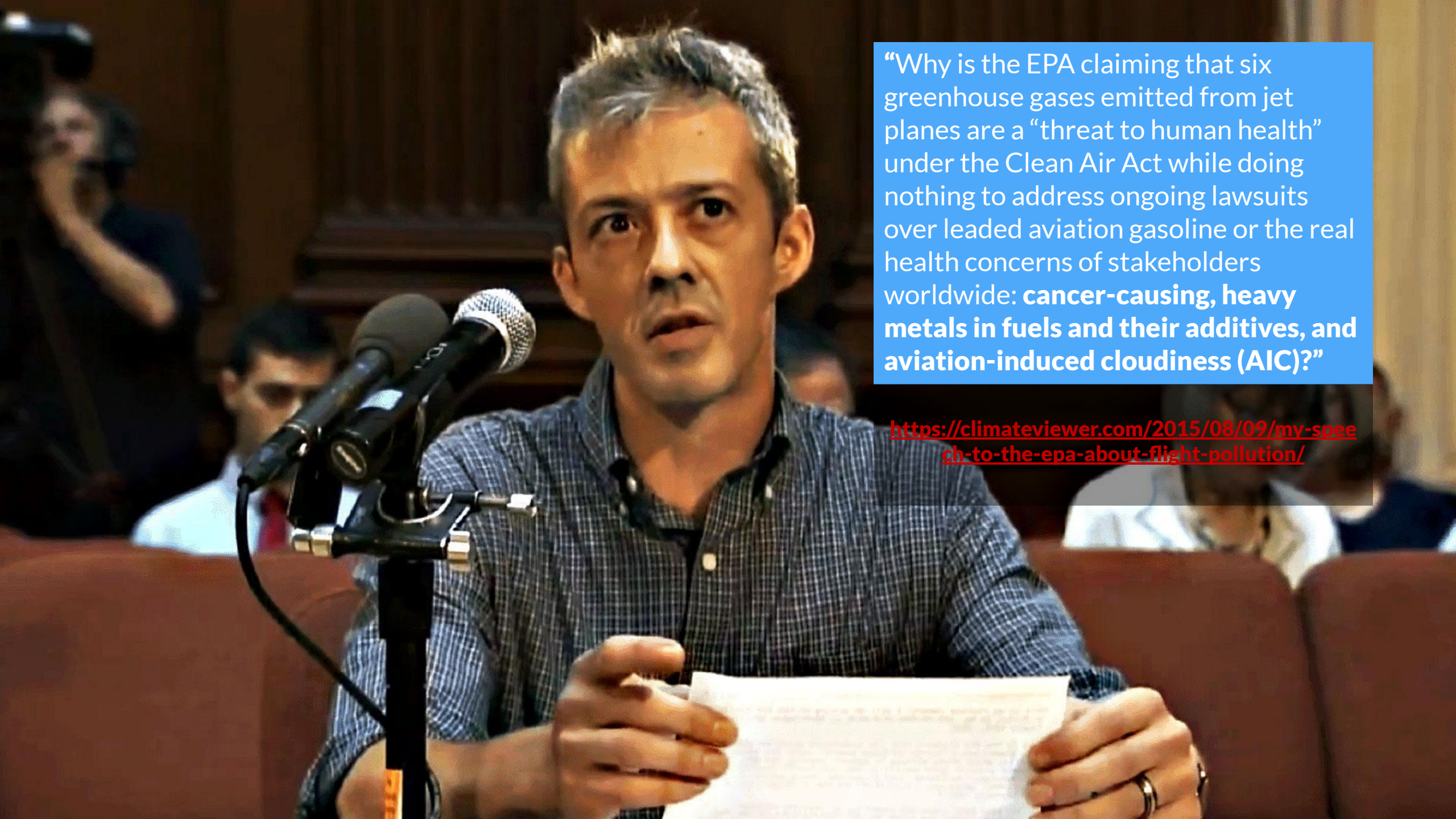
August 11, 2015 – EPA Hearing on Commercial Aircraft Emissions

Jim Lee, Max Bliss, Patrick Roddie, Michael Saraceno, and Amanda Baise speak at the world's first EPA hearing on flight pollution. The Environmental Protection Agency held a public hearing its Washington, D.C., headquarters to hear from environmental groups, aircraft industry representatives, private citizens and others on their reactions to the agency's newly-released carbon emissions standards for commercial aircraft.

https://climateviewer.com/2015/08/09/my-speech-to-the-epa-about-flight-pollution/

Did the EPA listen to our warnings? You betcha. So did the Obama administration, the ICAO, and the rest of the world. Working overtime during an extremely contentious election, the Powers that Be gathered, wrote an agreement to use biofuels for contrail control and dropped the EPA lawsuit. Once again, the airline industry skirted the law:

- **July 25, 2016 – BREAKING: EPA To Limit Greenhouse Gases From Airplanes**
- **July 31, 2016 – White House releases "Federal Alternative Jet Fuel Research and Development Strategy"**
- **September 3, 2016 – China, U.S. and Europe pledge support for global aviation emissions pact**
- **September 12, 2016 – Greens move to dismiss EPA lawsuit over airplane emissions**
- **October 10, 2017 – NGOs slam UN aviation agency plan for biofuels**



"Why is the EPA claiming that six greenhouse gases emitted from jet planes are a "threat to human health" under the Clean Air Act while doing nothing to address ongoing lawsuits over leaded aviation gasoline or the real health concerns of stakeholders worldwide: **cancer-causing, heavy metals in fuels and their additives, and aviation-induced cloudiness (AIC)?"**

https://climateviewer.com/2015/08/09/my-speech-to-the-epa-about-flight-pollution/

ARTIFICIAL CLOUDS

Technocrats have decided to replace natural cloud formation with technological fixes dubbed **“Accidental Geoengineering”: Ship Tracks and Aircraft Contrail-Induced Cirrus Clouds.**

MIT Technology Review

Topics+ The Download Magazine Events More+

NASA

Sustainable Energy

We’re about to kill a massive, accidental experiment in reducing global warming

Airplane Contrails May Be Creating Accidental Geoengineering

Dissipating haze from plane exhaust alters how sunlight reaches the Earth and may be unintentionally affecting our climate

https://climateviewer.com/2018/04/01/accidental-geoengineering-with-ship-tracks-contrails/

GEOENGINEERING

[SUNSHADE #1: THE VOLCANO EFFECT]

DOPED JET FUEL GEOENGINEERING

Sulfur in the Stratosphere

Past volcanic eruptions have cooled the earth substantially by injecting sulfur dioxide (SO_2) gas into the upper atmosphere. Atmospheric scientists have proposed that SO_2—already emitted in vast quantities into the lower atmosphere by burning fossil fuels—could have the same cooling effect if it were lofted into the stratosphere.

Light is scattered by clouds of sulfate droplets

DEPLOYMENT BY BALLOON

Lighter-than-air craft would require very little energy to raise a cargo of SO_2 at least six miles high.

DEPLOYMENT BY PLANE

Running on "dirty," high-sulfur fuel at cruising altitudes, airplanes could add plenty of SO_2 to the stratosphere.

ClimateViewer.com/cirruscloudsmatter/

DOPED JET FUEL GEOENGINEERING

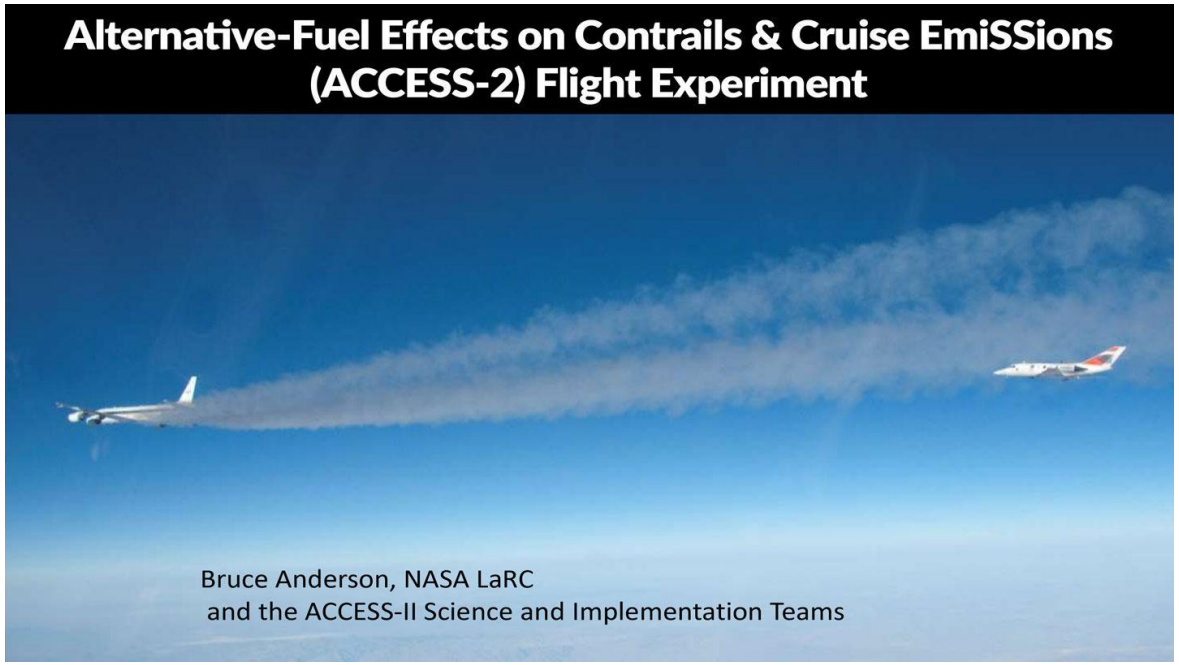
- "The particles may be seeded by dispersal from seeding aircraft; **one exemplary technique may be via the jet fuel as suggested by prior work regarding the metallic particles**. Once the tiny particles have been dispersed into the atmosphere, the particles may remain in suspension for up to one year."
  Chang, David B., and I-Fu Shih. "Stratospheric welsbach seeding for reduction of global warming." U.S. Patent No. 5,003,186. 26 Mar. 1991.
- **"Use commuter aircraft fuels doped with aerosol generators"** The only approach that might be feasible is to perform **wide-area seeding with soot or carbonaceous aerosols (Carbon Black Dust)** which would absorb solar radiation and warm cirrus layers enough to perhaps dissipate cirrus clouds (a semi-direct effect). This strategy would be similar to that proposed by Watts (1997) and Crutzen (2006) for implementation in the stratosphere. As noted by Crutzen (2006) **only 1.7% of the mass of sulfur** is needed to produce a similar magnitude of surface cooling.
  Cotton, WR. "Weather and Climate Engineering." · 17th Conference on Planned and Inadvertent Weather Modification. (2008) VIDEO
- **A potential delivery mechanism for the seeding material is already in place: the airline industry.** Since seeding aerosol residence times in the troposphere are relatively short, the climate might return to its normal state within months after stopping the geoengineering experiment. The main known drawback to this approach is that it would not stop ocean acidification. It does not have many of the drawbacks that **stratospheric injection of sulfur species** has. "**dissolved or suspended in their jet fuel and later burned with the fuel** to create seeding aerosol, or **injected into the hot engine exhaust**, which should vaporize the seeding material, allowing it to condense as aerosol in the jet contrail"
  Mitchell, David L., and William Finnegan. "Modification of cirrus clouds to reduce global warming." Environmental Research Letters 4.4 (2009): 045102.
- "Options for dispersing gases from planes include the **addition of sulfur to the fuel,** which would **release the aerosol through the exhaust system of the plane**, or the attachment of a nozzle to release the sulfur from its own tank within the plane, which would be the better option."
  Robock, Alan, et al. "Benefits, risks, and costs of stratospheric geoengineering." Geophysical Research Letters 36.19 (2009).
- Here we describe an alternate method in which aerosol is formed rapidly in the plume following **injection of H2SO4 (sulfuric acid)**, a condensable vapor, **from an aircraft**.
  Pierce, Jeffrey R., et al. "Efficient formation of stratospheric aerosol for climate engineering by emission of condensible vapor from aircraft."Geophysical Research Letters 37.18 (2010).
- "Another technique examined was the use of commercial passenger aircraft flying at high altitudes to **inject sulphate aerosols, emitted by aviation fuel,** into the stratosphere."
  Partanen, Antti-Ilari, et al. "Studying geoengineering with a climate model, COOL Project." · Academy of Finland, Article (2014)
- "**Applying high FSCs (Fuel Sulfur Content) at aviation cruise altitudes** combined with **ULSJ fuel (Ultra-low Sulfur Jet, Biofuel) at lower altitudes** results in reduced aviation-induced mortality and increased negative RE compared to the baseline aviation scenario"
  Kapadia, Z. Z., Spracklen, D. V., Arnold, S. R., Borman, D. J., Mann, G. W., Pringle, K. J., Monks, S. A., Reddington, C. L., Benduhn, F., Rap, A., Scott, C. E., Butt, E. W., and Yoshioka, M.: Impacts of aviation fuel sulfur content on climate and human health, Atmos. Chem. Phys. Discuss., 15, 18921-18961, doi:10.5194/acpd-15-18921-2015, (2015).

DOPED JET FUEL GEOENGINEERING

BIOFUELS FOR CONTRAIL CONTROL – 2013-Present

Three different fuel types are discussed: a low-sulfur JP-8 fuel, a 50:50 blend of JP-8 and a camelina-based HEFA fuel (BIOFUEL), and the **JP-8 fuel doped with sulfur.**

Moore, Richard H. et al. "In-Situ Measurements of Contrail Properties Measured During the 2013-2014 ACCESS Project." 14th Conference on Cloud Physics. (2014)



https://weathermodificationhistory.com/jet-biofuel-enlisted-for-contrail-control/

https://weathermodificationhistory.com/multidisciplinary-airborne-experiments-emission-climate-impact-alternative-jet-fuel-nd-max-eclif-2/

SUN

"If the time and place of seeding is selected with care, the climate effect of cirrus thinning can be enhanced. For that, only the long-wave warming effect of cirrus clouds should be targeted, and their solar effect should be avoided. This can be achieved if seeding is limited to high-latitude winters or to nighttime seeding."
Climate Change and Geoengineering: Artificially Cooling Planet Earth by Thinning Cirrus Clouds

Solar Radiation Management

SRM

INCOMING SOLAR RADIATION

Soot is a cloud seed that self-levitates
Soot transports Sulfur into Stratosphere
Sulfur and Soot destroy the Ozone Layer
Metals in soot make cirrus clouds
Cirrus clouds cool during daytime (SRM)
Cirrus clouds trap heat at night (ERM)

31 Miles
50 Kilometers

OZONE LAYER

Carbon Black Dust (Soot)

STRATOSPHERIC AEROSOL INJECTION (SAI)

39k Feet
12 Kilometers

EARTH RADIATION MANAGEMENT

ERM

OUTGOING SOLAR RADIATION

"We would like to have MORE Contrail-induced Cirrus Clouds during day and NONE during night"
- Dr. Rangasayi Halthore
FAA Aviation Climate Change Research Initiative (ACCRI)

"Less Warming and More Cooling Contrails: Predictable for Operational Planning"
- Dr. Ulrich Schumann, German Aerospace Center,
Recent research results on the climate impact of contrail cirrus and mitigation options,
ICAO Colloquium on Aviation and Climate Change 2010

CLIMATEVIEWER.COM/CIRRUSCLOUDSMATTER/

DOPED JET FUEL GEOENGINEERING

COMPUTER MODELS DETERMINE WHEN AND WHERE TO INJECT SULFUR

Stratospheric sulfate injections with commercial aircraft

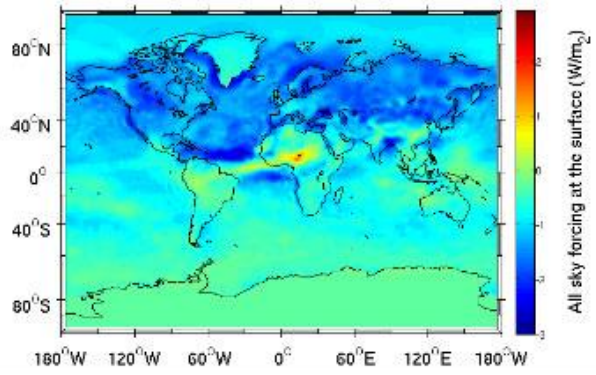


Figure 2. . Global mean of all-sky aerosol forcing at the surface when intercontinental flight routes are in the lower stratosphere and the sulfur content of the fuel is 50 times the current level. [3]

- Commercial aircraft could be used to deliever sulfate into stratosphere by increasing fuel sulfur content and the flight altitude of inter-continental flights
- The sulfur content of the fuel should be increased to about 50 times the current level to have a significant cooling effect
- The cooling effect would be confined to the Northern Hemisphere

A new model
Contrail Cirrus Simulation and Prediction (CoCiP)

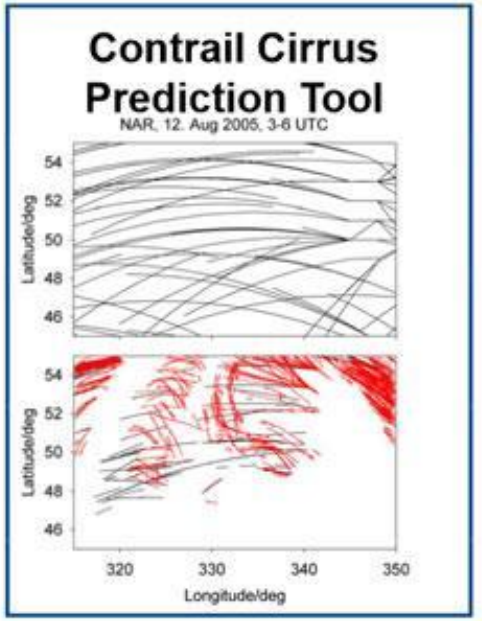
Input:

Aircraft
(BADA)

Movements
(Eurocontrol, OAD, DFS)

Meteorology
(NWP results, ECMWF, DWD)

Contrail Cirrus Prediction Tool



- From regional to global
- Comparable to observations

Output:

Contrail,
life cycle, cover, radiation

Cirrus

Simulation
insitu, Lidar, Satellite

Sensitivity studies

Prediction
Climate impact

Deutsches Zentrum für Luft- und Raumfahrt e.V.

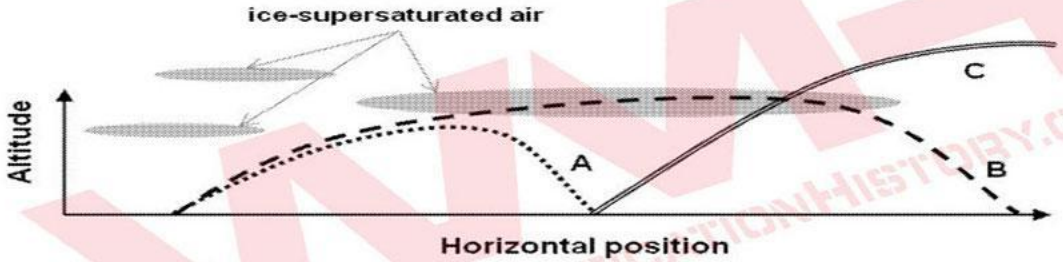
(Schumann, 2009)

ACT GLOBAL | ICAO Colloquium on Aviation and Climate Change

Message

- Contrail cirrus contributes a large fraction to the aviation induced climate impact (comparable to 50 years of aviation CO_2)
- Satellite data analyses suggest observable impact of aviation on cirrus cover and radiation fluxes
- The climate impact of aviation induced contrail cirrus depends on aircraft properties (e.g. soot emissions) and routing (avoid cirrus forming regions)
- Both aspects offer the potential for aviation to reduce the climate impact of aviation (less soot emissions, less warming and more cooling contrails; predictable for operational planning)

U.S. Patent Application 20130340834

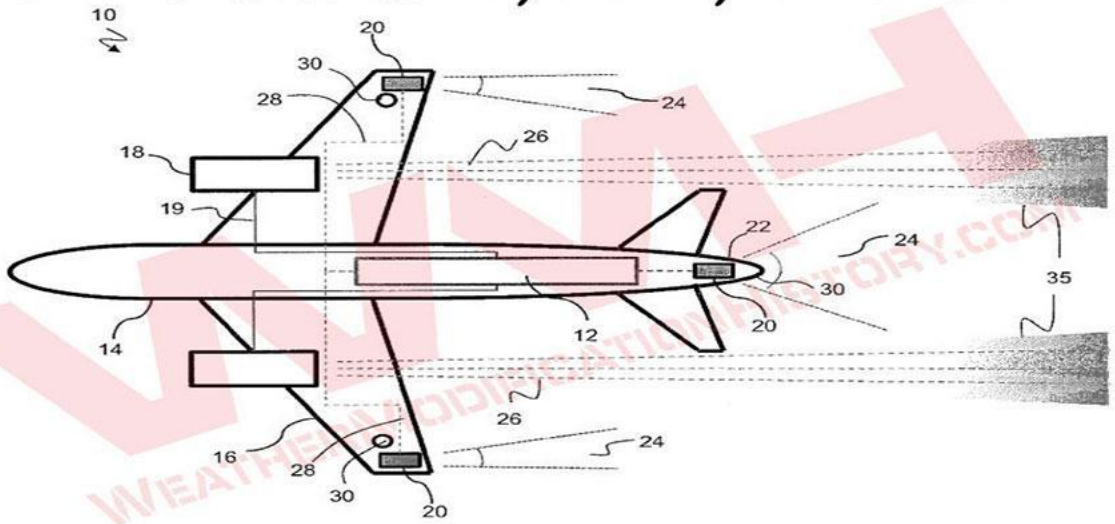


FUEL DELIVERY SYSTEM

two jet fuels + one fuel tank = contrail control

Deutsches Zentrum für Luft- und Raumfahrt e.V.

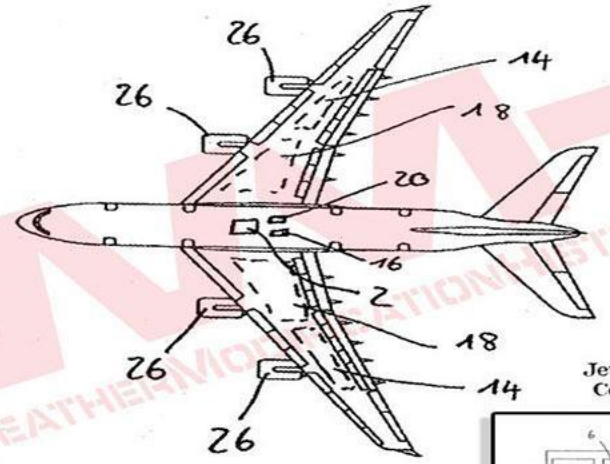
US Patent 9,518,965 B2



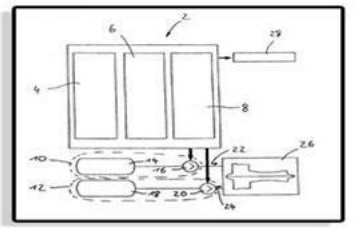
Fuel System for Vapor Trail Control

Figure 1

CONTROLLING THE SUPPLY OF A VEHICLE WITH MULTIPLE FUELS



Jet Fuel Electronic Control Unit (ECU)

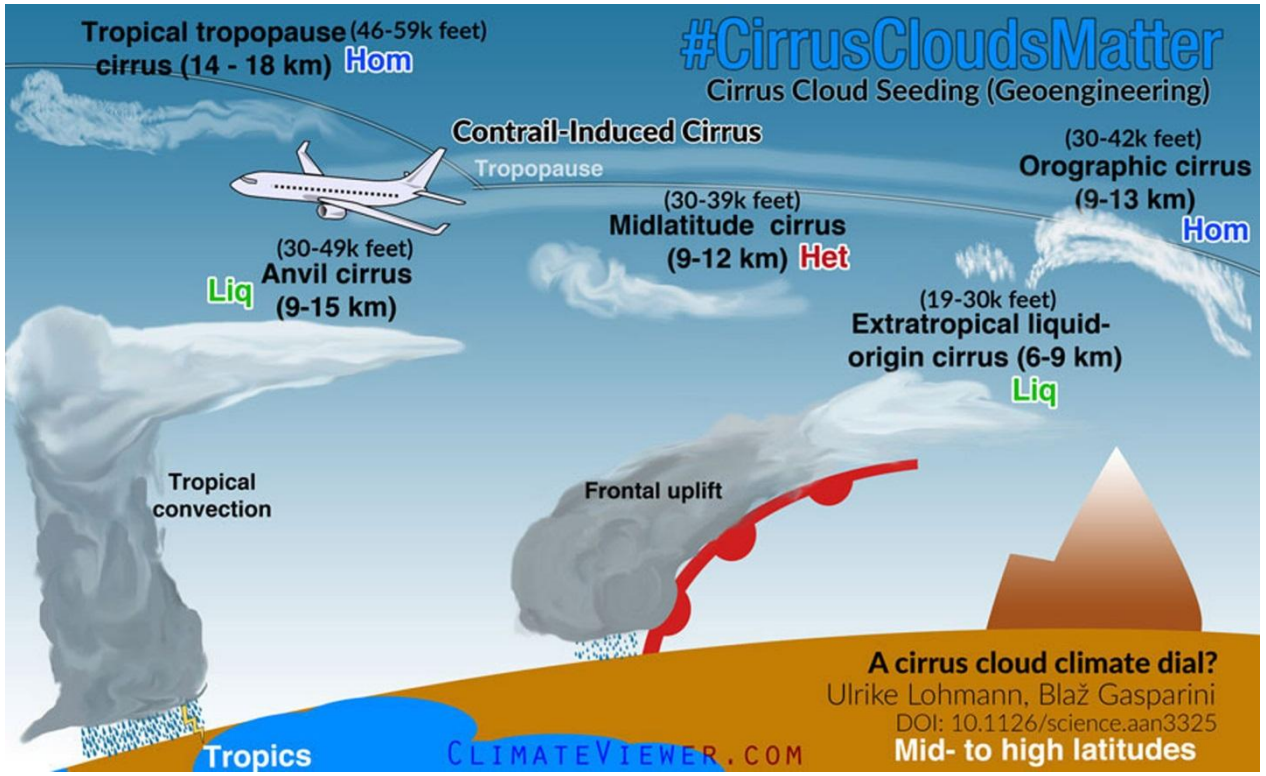


U.S. Patent Application

20110101166

CIRRUS CLOUD THINNING

Seeding cirrus clouds to destroy them or thin them out at night - **VIDEO**



UiO : Department of Geosciences
University of Oslo

Cirrus cloud seeding

- Suggested seeding material:
  - Bismuth tri-iodide, BiI_3
  - Cheap'ish and non-toxic.
- Seeding via commercial airliners?
- Advantage: seeding aerosol residence time is relatively short in the troposphere.
- Drawback: does not address ocean acidification issue.

"sedimenting ice crystals remove water vapor, the most important natural greenhouse gas, from the upper troposphere. **If cirrus thinning works, it should be preferred over methods that target changes in solar radiation, such as stratospheric aerosol injections**, because cirrus thinning would counteract greenhouse gas warming more directly."

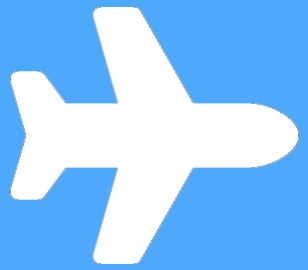
SOLUTIONS

CARBON BLACK DUST & SOOT

HOW TO DEAL WITH THE PROBLEM OF SECRET WEATHER MODIFICATION

https://climateviewer.com/enmod/

COMMERCIAL



DON'T FLY

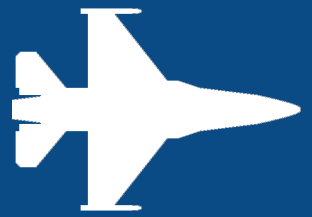
- Tell the airline industry **"You're #GROUNDED!"**
- Demand the ICAO, FAA, NASA, and the DLR pursue options to stop creating cirrus clouds.

SCIENTIFIC

Support The Environmental Modification Accountability Act.

- Demand Transparency: a worldwide requirement to give prior notification before experimenting in the sky.
- Build a sensor network to detect illegal weather modification & geoengineering activity.

MILITARY



Support The Environmental Modification Accountability Act.

- Give the Weather Warfare ban of 1978 teeth.
- Build a sensor network to detect illegal weather warfare activity.
- Pursue a complete ban on Space Weather Modification (Ionospheric Heaters, Rockets)

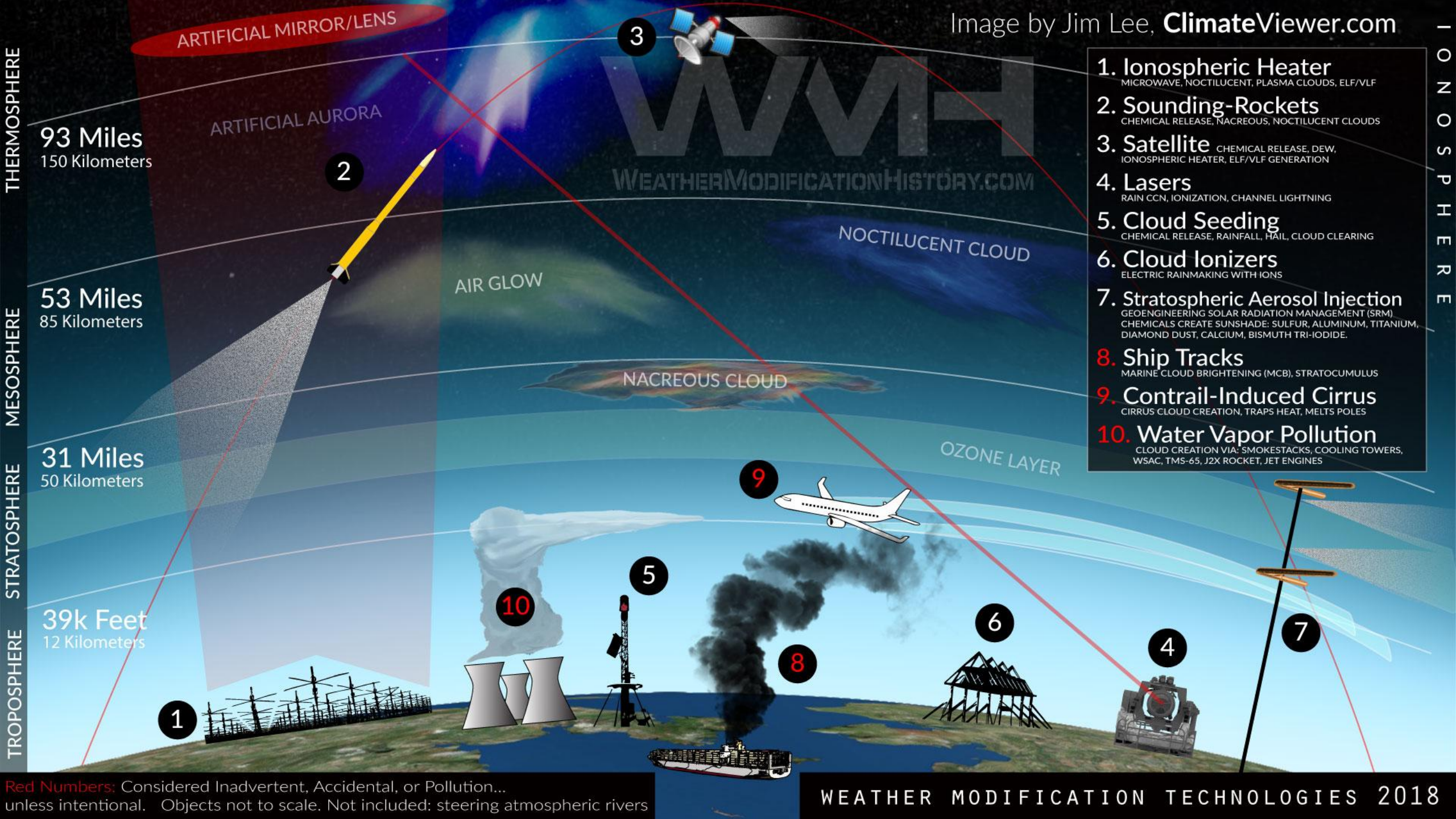


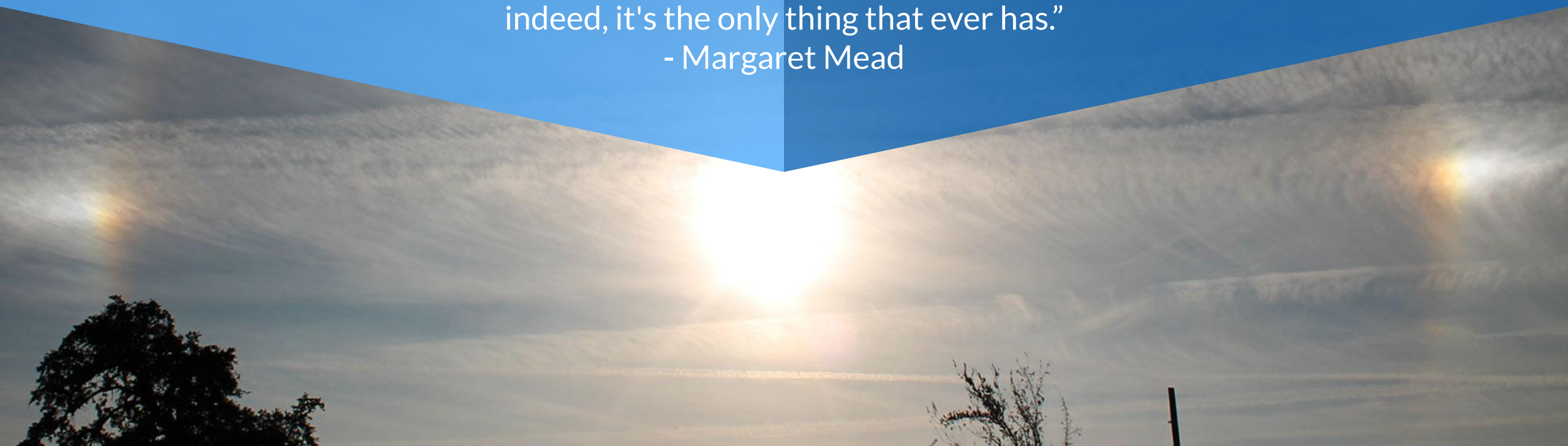
Image by Jim Lee, ClimateViewer.com
WeatherModificationHistory.com
ARTIFICIAL MIRROR/LENS
ARTIFICIAL AURORA
AIR GLOW
NOCTILUCENT CLOUD
NACREOUS CLOUD
OZONE LAYER
THERMOSPHERE
MESOSPHERE
STRATOSPHERE
TROPOSPHERE
IONOSPHERE
93 Miles
150 Kilometers
53 Miles
85 Kilometers
31 Miles
50 Kilometers
39k Feet
12 Kilometers
1. Ionospheric Heater
MICROWAVE, NOCTILUCENT, PLASMA CLOUDS, ELF/VLF
2. Sounding-Rockets
CHEMICAL RELEASE, NACREOUS, NOCTILUCENT CLOUDS
3. Satellite
CHEMICAL RELEASE, DEW, IONOSPHERIC HEATER, ELF/VLF GENERATION
4. Lasers
RAIN CCN, IONIZATION, CHANNEL LIGHTNING
5. Cloud Seeding
CHEMICAL RELEASE, RAINFALL, HAIL, CLOUD CLEARING
6. Cloud Ionizers
ELECTRIC RAINMAKING WITH IONS
7. Stratospheric Aerosol Injection
GEOENGINEERING SOLAR RADIATION MANAGEMENT (SRM)
CHEMICALS CREATE SUNSHADE: SULFUR, ALUMINUM, TITANIUM, DIAMOND DUST, CALCIUM, BISMUTH TRI-IODIDE.
8. Ship Tracks
MARINE CLOUD BRIGHTENING (MCB), STRATOCUMULUS
9. Contrail-Induced Cirrus
CIRRUS CLOUD CREATION, TRAPS HEAT, MELTS POLES
10. Water Vapor Pollution
CLOUD CREATION VIA: SMOKESTACKS, COOLING TOWERS, WSAC, TMS-65, J2X ROCKET, JET ENGINES
Red Numbers: Considered Inadvertent, Accidental, or Pollution...
unless intentional. Objects not to scale. Not included: steering atmospheric rivers
WEATHER MODIFICATION TECHNOLOGIES 2018

The Environmental Modification Accountability Act

ClimateViewer.com/enmod/

THANK YOU

“Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it's the only thing that ever has.”
- Margaret Mead



James Franklin Lee Jr.
ClimateViewer News, LLC
1637 North Main St.
Sumter, South Carolina
29153

+1 (803) 450-4305
jim@climateviewer.com
Skype: rezn8d

climateviewer.com
climateviewer.org
weathermodificationhistory.com

Support My Work

- **Patreon**
- **Paypal**
- **GoFundMe**