

Arctic News

SATURDAY, OCTOBER 13, 2012

Radio and Laser Frequency and Harmonic Test Ranges for the Lucy and HAARP Experiments and their Application to Atmospheric Methane Destruction

by Malcolm P.R. Light
October 7th, 2012

Introduction

Local PM (ascending) AIRS CH₄ at 400 mb on 2011.12.

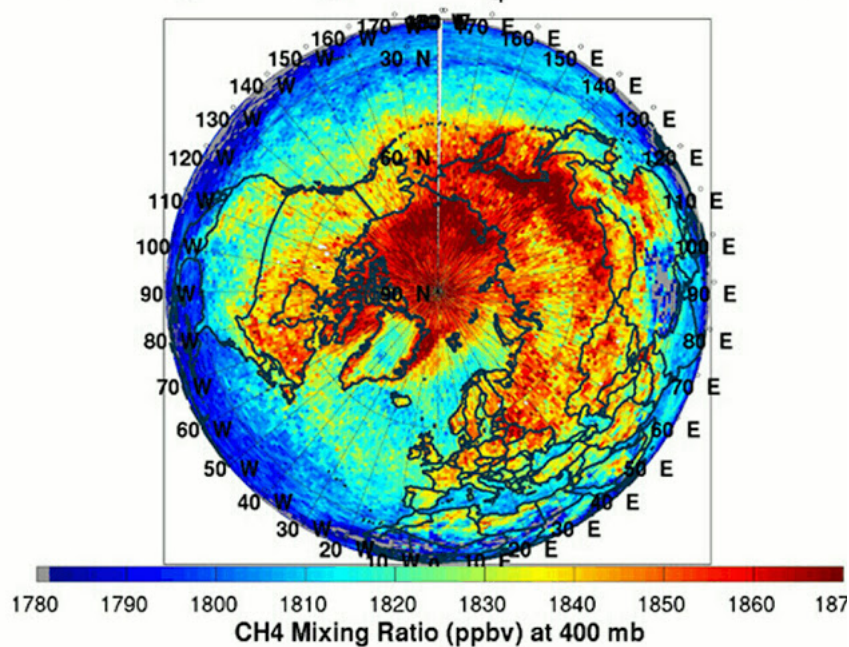


Figure 1. Extremely high Arctic atmospheric methane concentrations at ca 7 km altitude from Yurganov 2012.

Methane is now being expelled into the Arctic atmosphere by the subsea methane hydrates at a fast increasing rate and that this expulsion began in earnest in August 2010 (Figure 1; Arctic atmospheric

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methane concentrations at ca 7 km altitude - Yurganov 2012; Carana 2011 a,b,c; 2012 a,b; Light 2002 a,b; 2011 a,b,c; 2012 a,b,c; Light and Carana 2011). The methane is rising into the stratosphere and mesosphere where some of it is being oxidised to produce larger quantities of noctilucent clouds between 76 and 85 km altitude. These noctilucent clouds were seen north of Norway but are now occurring at much lower latitudes over Colorado. An early figure from NASA indicates that noctilucent clouds were originally confined to the southern polar regions (Figure 2).

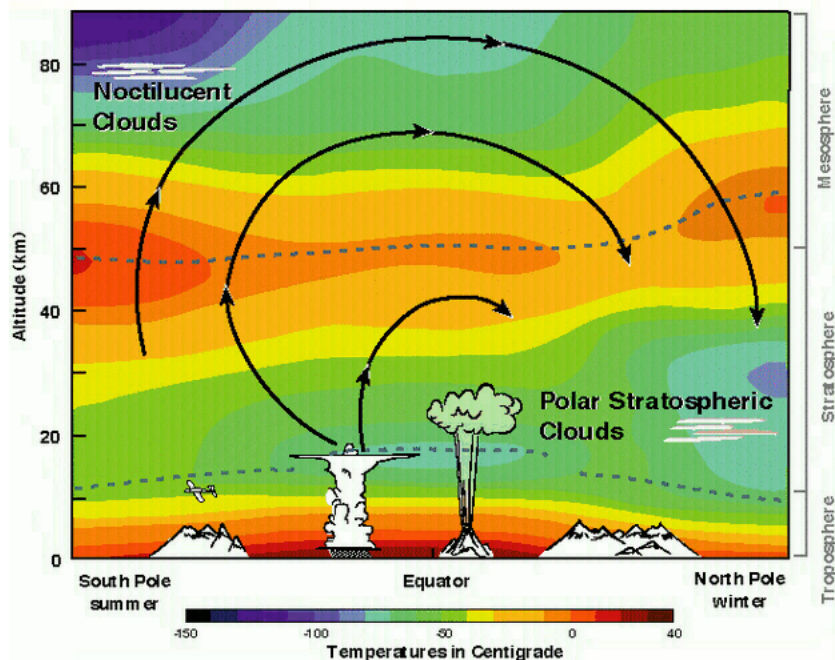


Figure 2. Temperature and transport in Atmosphere from NASA. <http://umpgal.sgfs.nasa.gif> - vliid_AtMCMYK.gif

Prof. James Russel of Hampton University argues that the build up of methane in the atmosphere is the reason for the increase in noctilucent clouds. Prof Russel says that "When methane makes its way into the upper atmosphere it is oxidised by a complex series of reactions to form water vapour. This extra water vapour is then available to grow ice crystals for noctilucent clouds". Therefore if we succeed in breaking down the methane in the stratosphere and mesosphere using the HAARP - IRIS (Ionospheric Research Instrument) using the 13.56 MHz methane destruction frequency it could lead to an increase in noctilucent cloud formation in a circular zone directly above the HAARP transmitters which could be detected by optical cameras or radar. The HAARP tests should be conducted in the summer when the temperatures are at their lowest in Alaska (140o to 160o Kelvin) increasing the chances of noctilucent cloud formation from the radio frequency oxidised methane. The HAARP IRIS transmitters normal frequency range is from 2.8 MHz to 10 MHz (Wales 2012). If for example a 10 MHz carrier wave is modulated by a 3.56 MHz signal it will produce an Upper Side Frequency of 13.56 MHz the required methane destruction frequency and a Lower Side Frequency of 6.44 MHz (see Table 3)(Penguin Dictionary of Physics, 2000)

NASA modelling shows a wide equatorial band of stratospheric methane reaching 1.8 ppmv, much higher than occurs in the troposphere indicating that the methane is rising up into the stratosphere where it is now accumulating and it will soon form a continuous global warming veil causing extreme heating of the Earth's surface by trapping the sun's heat below it (Figure 3)(Light 2011c).

Atmospheric Arctic Methane Heat wave and Surface Firestorm
Arctic Methane Management

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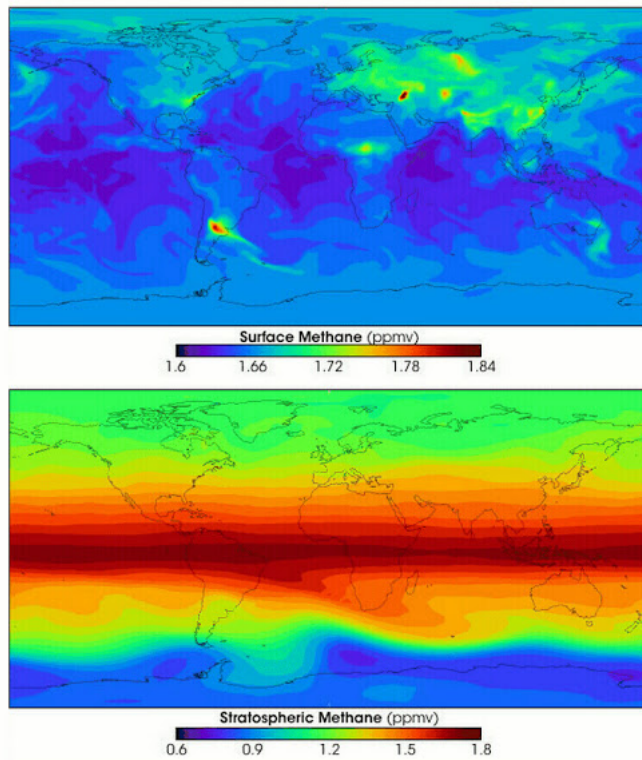


Figure 3. from: www.nasa.gov/centers/goddard/images/content/122450main_methane_chart_lg.jpg

The problem is that the methane being released into the Arctic atmosphere from destabilization of the submarine methane hydrates has an extremely high global warming potential compared to carbon dioxide, close to 100 times for the first 15 years of its life (Wales 2012; Dessuse et al. 2008). Hence a methane concentration of 2 ppmv is approximately equivalent to adding 200 ppmv of carbon dioxide to the atmosphere, i.e. multiplying the present carbon dioxide content by 1.5. But 2 ppmv is only 2 ten thousands of a percent of methane and you need about 15 percent of methane in the air for it to burn (Wales 2012). Therefore you cannot burn these giant clouds of methane erupting into the Arctic atmosphere and they are rising so fast through the troposphere into the stratosphere that they become impossible to deal with without some action at a distance method such as radio waves or laser. We could of course try to get chemicals up there and into the Arctic but that would lead to even more pollution in the long run. Vibrating the ionosphere at the correct methane destruction radio frequency using HAARP may help to oxidise some of the methane throughout the entire stratosphere and troposphere but more localised radio/laser destruction of the rising methane clouds will also be required if we are going to make any dent at all in the volume of methane that is now being released into the atmosphere from the Arctic ocean.

We are dealing with oceanic methane being released in increasing quantities into the atmosphere from destabilised methane hydrates over which we have no control at all and once it is in the air and in the stratosphere we presently have no way to break it down. This Stratospheric methane reservoir is going to increase in density, thickness and extent until it encompasses the entire Earth and will eventually cause catastrophic global warming and the extinction of all life on earth (Light 2011c). Furthermore because the methane remains mostly in the stratosphere, it is not recorded when average atmospheric compositions are determined at Mauna Loa and other locations so we don't know how much is up there yet (Light 2011c). When the German-French Merlin Lidar methane detecting satellite is launched in 2014 we should have a better idea of the methane distribution from the surface to 50 km altitude.

When the Arctic ice cap melts towards the end of 2015 there will be a massive increase in the amount of heat being absorbed by the Arctic ocean from the sun. The Gulf Stream which presently feeds the Arctic with Atlantic water along the west side of Svalbard and through the Barents Sea is normally cooled when it hits the floating ice pack and this will cease to happen bringing even vaster amounts of Atlantic heat via the Gulf Stream into the Arctic. Consequently the Arctic subsea methane hydrates will destabilize at an even faster rate because of the increasing Arctic ocean temperature pouring methane



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into the Arctic atmosphere and stratosphere (Light 2011c, Light 2012a, b).

The extreme weather events in the United States this year which included record heating and drought conditions, massive loss of food crops with farmers going bankrupt, more hurricane flooding in New Orleans and tornadoes in New York is just a small sample of what will come in the next four or five summers as the Arctic ice finally melts. The Arctic ice cap works like the Earth's air conditioner because of the latent heat of melting and freezing of the floating ice and its effect on moderating atmospheric temperatures.

An extensive stratospheric methane warming veil is spreading over the United States and is undoubtedly the reason for the extreme weather events and very high temperatures. The livelihoods of all the American people are going to be totally compromised in the next few years unless we develop a system of destroying the atmospheric methane that is erupting in the Arctic from the destabilization of submarine methane hydrates and is accumulating as a global warming veil in the stratosphere and mesosphere

We are facing impossible odds with regard to the Arctic ocean methane release and in the same way that Colonel Travis drew a line at the Alamo to ask for volunteers to help him defend the mission against Santa Ana's massive Mexican army, I am drawing a virtual line through the snow on the top of the Arctic ice pack to ask for volunteers to defend the American people from the fast gathering Arctic methane global firestorm. We desperately need dedicated scientists and engineers to volunteer to develop an effective "action at a distance" method of destroying the Arctic oceanic methane clouds as they are erupting from the sea surface and entering the stratosphere and mesosphere. If the United States can land giant rovers on the Mars with a sky crane, surely American engineers and scientists are up to this challenge. We need to get rid of as much of this atmospheric methane as we can to drop the polar temperatures to reasonable levels. This will of course have to go hand in hand with a massive cut back in carbon dioxide emissions from all developed and developing countries.

The Technology

Methane in the air may be decomposed between two radio transmitters where the two radio beams intersect one another at right angles within the atmospheric methane cloud such as in Figure 4 (Table 3). In this system one of the frequencies of the two transmissions is 10 MHz and the other 23.56 MHz which generates a beat frequency of 13.56 MHz, the required frequency to break down the first C-H bond in the methane molecule.

If the ratios of the transmitted frequencies are 1:2, 1:3, 2:3 or 3:4, planar cross shaped harmonics are generated in the interference pattern (Ashton 2001) generated by the two transmitters which are at right angles and this should lead to increased destruction of the methane molecule because its four hydrogen bonds can be viewed as forming a cross (Figure 4).



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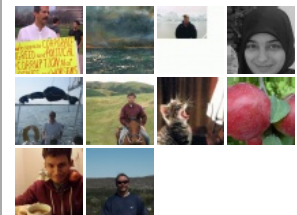
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The Technology

Methane in the air is decomposed in between radio transmitters that each use slightly different radio frequencies.

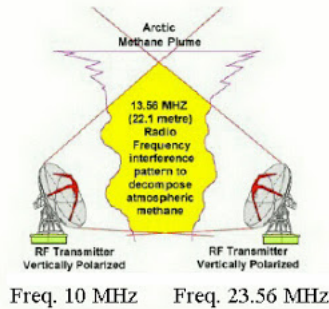


Figure 4. Schematic representation of two beamed parabolic radio transmitters using slightly different frequencies, the radio interference pattern of which is designed to decompose methane in a plume rising into the Arctic atmosphere from unstable surface and submarine methane hydrates

Another method of destroying the atmospheric methane clouds is for three transmitters to be situated on the corners of an equilateral triangle and the correct distance apart so that their three transmission beams intersect exactly at right angles in space within the methane cloud we are wanting to decompose (Figure 5). These three transmitters set up an interference pattern which is a cube of the original linear transmission beams (Figure 5). Accordingly, the three transmitters and the intersection point form a three dimensional interference figure (Figure 5).

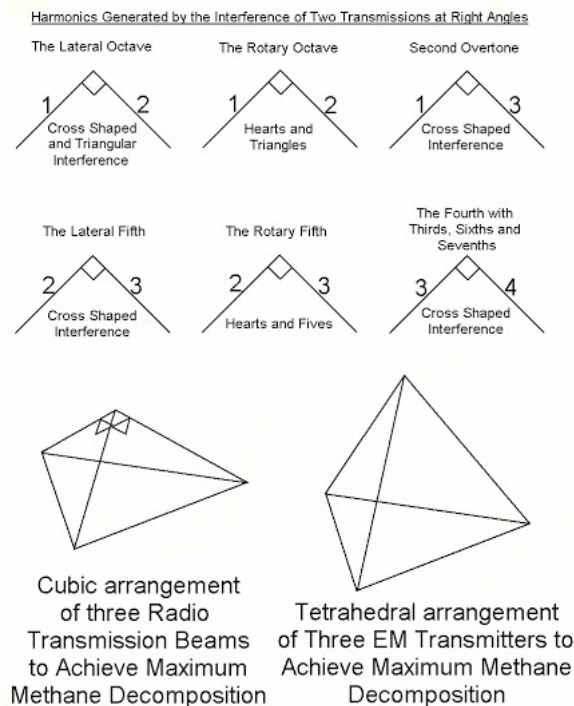


Figure 5. Harmonic patterns generated in a plane interference zone by two radio transmission beams at right angles. Cubic arrangement of three radio transmitters and tetrahedral arrangement of three EM transmitters to achieve maximum methane decomposition. Harmonics from Ashton 2001.

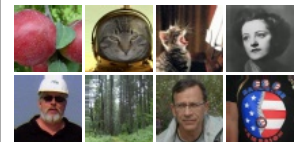
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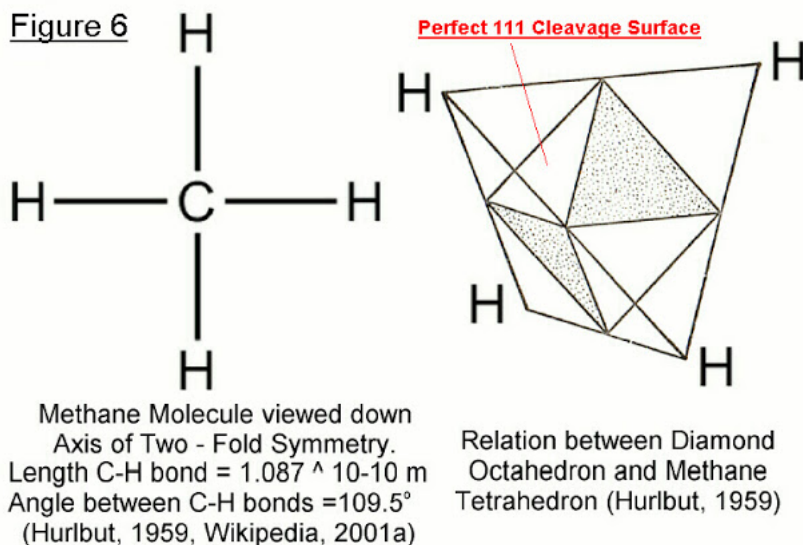
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Each 27.12 MHz beam has energy some 5.77 times as much and a 54.24 MHz beam has energy some 11.54 times as much as the amount of energy required to break the first C-H bond in the methane molecule.

The resonance of the fundamental Degenerate Deformation (e)/ (3 power 10) vibration on the C - H bond with the 13.56 MHz harmonic in concert with the compression and extension of the methane H - H separation by the fundamental Synthetic Stretching resonance/ (3 power 9) will grow until one of the methane C - H bonds breaks eliminating the methane molecule from the global warming equation. This process will be enhanced by the generation of a three dimensional cross - shaped radio frequency (4:2, 3:2, 3:1,2:1) interference pattern in the methane clouds by using three transmitters separated such, that the three radio beams intersect one another exactly at right angles (Figures 5 and 6).



Because of the direct relationship between the methane CH₄ tetrahedron and an enclosed (diamond) octahedron, methane can be looked at as representing a hydrated diamond at its smallest state.

Project Lucy aims to design, build and test a microwave and laser transmission system targeting low-altitude methane clouds, while the HAARP experiment will target stratospheric methane clouds with the aim of breaking down the first C - H bond as soon as the methane erupts from the Arctic ocean into the atmosphere (Light and Carana, 2012) (Figure 7). Methyl group gases and oxygen and ionized hydrogen are released from the methane and water and the hydrogen will rise into the troposphere and stratosphere and combine to form H₂.

One of the more complex radio and laser frequency methane destruction systems can be set up by three transmitters arranged in an equilateral triangle so that they set up a cubic interference pattern within the rising methane cloud (Figure 7). The transmitters can be mounted on submarines, planes and after 2015 on boats and drilling rigs when the Arctic ice cap has completely melted (Arctic News, 2012).

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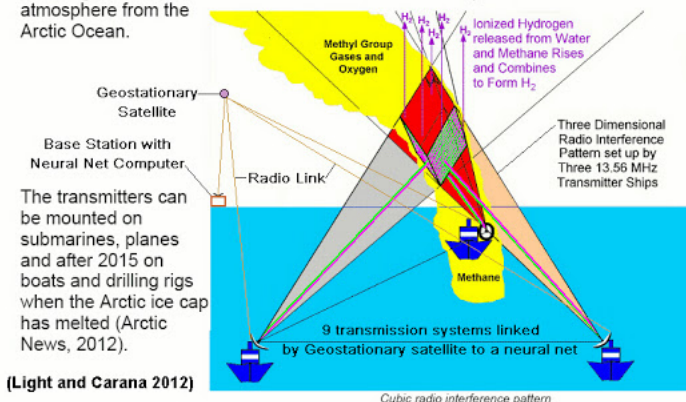
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Figure 7. Project Lucy Radio and Laser Atmospheric Methane Cloud Detection, Energisation and Methane Destruction

Project Lucy therefore aims to design, build and test a microwave transmission system targeting low-altitude methane clouds with the aim of breaking the first C-H bond as soon as the methane erupts into the atmosphere from the Arctic Ocean.



(Light and Carana 2012)

Geostationary satellite links 9 transmission systems to a neural net which continuously monitors the methane content in the cloud & automatically adjusts the frequency, polarization, phase shifts and beam directions of all three separate transmitter arrays to achieve maximum methane destruction

Three Dimensional radio interference pattern set up by three 13.56 MHz transmitter ships with attached LIDAR and Methane heating lasers with the ability to scan the 3D radio interference pattern in the methane cloud subparallel to the 13.56 MHz radio transmission beam

LIDAR methane detection laser with 50 km effective range continuously scanning 3D radio interference pattern ahead of the Methane heating laser (Ehret, 2012)

Methane heating laser continuously scanning 3D radio interference pattern and following behind LIDAR laser (Sternowski, 2012)

In this system each of the three radio transmitters will have a linked Lidar atmospheric methane detection laser with a 50 km effective range continuously scanning the 3D radio interference pattern ahead of a methane heating laser similar to the laser system designed for the Merlin satellite (see Ehret 2012 and Lidar lasers in this article). The leading methane detection laser (Ehret 2012) and lagging methane heating laser (Sternowski 2012) will be aimed subparallel to the (13.56 MHz; 27.12 MHz; 40.68 MHz or 54.24 MHz) radio transmission beam and they will scan the entire face of the cubic interference pattern in a repetitive sequence similar to an electron gun on a TV screen. The methane heating laser which will be tuned to the fundamental and degenerate methane bending and stretching frequencies (V1 - V4) (Boudon 2012; Sternowski, 2012) and will be oriented subparallel to the atmospheric methane detection laser but will scan slightly behind it.

The 9 radio and laser transmission systems will be linked via a geostationary satellite to a neural net computer system at a base station which will continuously monitor the methane content in the cloud (as well as wind direction and speed?) and automatically adjust the frequencies, polarizations, phase shifts and beam directions of all three separate transmitter arrays to achieve maximum methane destruction at all times.

We can imagine that the methane molecules will be spinning in the rising Arctic atmospheric methane cloud and at some moment in time, a portion of them will have one of their four hydrogen protons located at the top as shown in Figure 8. If we then imagine three in phase electromagnetic (EM) transmissions advancing parallel to the upper three sides of the methane tetrahedron with a relative wavelength equal to about 1.7751 Angstroms (10⁻¹⁰ meters) and that these three waves sum at the crest of the spinning methane molecule, they should eject the positive methane proton from repulsion when they synchronously pulse positive. This process should work to a lesser degree for any larger wavelength harmonics of the H - H spacing EM wavelength assumed in this example so long as the three transmissions are exactly in phase and help break the "Perfect Diamond Cleavage Surface" zone of weakness in the methane molecule which is situated at half the H - H spacing (see Figures 6 and 8). For this system to be most effective the three transmission systems should be located at the lower three corners of an equilateral triangle of a tetrahedron as shown in Figures 5 and 8.

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Methane Hydrogen Proton Ejected by Synchronous (in Phase) Positive EM Pulse

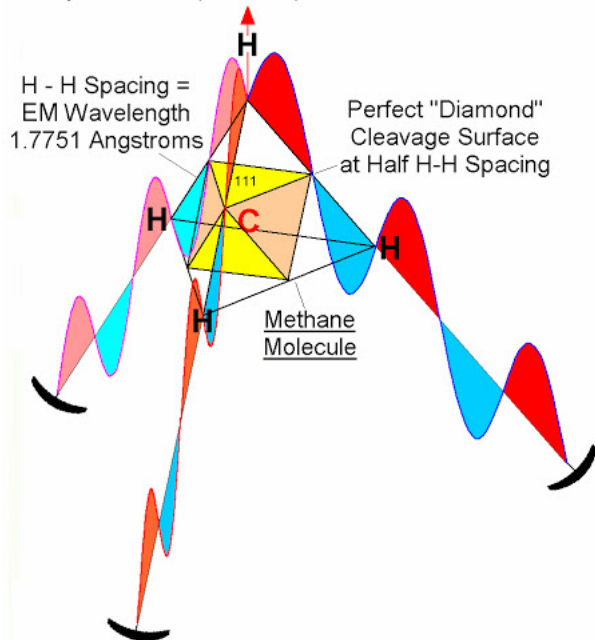


Figure 8. Three in phase EM transmissions with a wavelength of 1.7751 Angstroms (10^{-10} metres) sum at the crest of spinning methane molecules to eject the hydrogen protons when they synchronously pulse positive.

Yet another way of destabilizing the upper hydrogen proton in a spinning methane molecule is by circular polarization of one of the three in phase EM transmissions (Figure 9). When these three EM transmissions sum at the top of the spinning methane molecule they will eject the upper hydrogen proton as they synchronously pulse positive assisted by a circular polarization torque on the proton which will try to rotate it toward the adjacent positive proton field (Figure 9). Circular polarization of the EM transmissions could also increase the rate of spin of the methane molecules thus increasing the centrifugal force and making the C - H bonds weaker.

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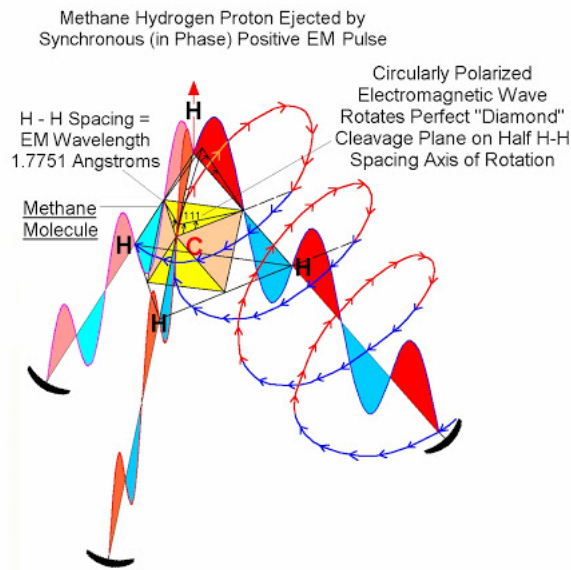


Figure 9. Three in phase electromagnetic transmissions one of which is circularly polarized with a wavelength of 1.7751 Angstroms (10^{-10} metres) sum at the crest of a spinning methane molecule to eject the upper hydrogen proton when they synchronously pulse positive. The circular polarization may also exert a torque on the proton and rotate it toward the other adjacent protons which will assist in ejecting it. Circular polarization of the EM waves could also increase the rate of spin of the methane molecules increasing the centrifugal force making the hydrogen bonds weaker. A vertically polarized electromagnetic transmission is shown in the circularly polarized transmission so that the direction of motion of the circular polarization can be clearly seen .

Effective Radiated Power (ERP) of electromagnetic (EM) systems is a standard theoretical measurement of radio frequency (RF) energy and is determined by subtracting system losses and adding system gains (Wales, 2012). Additional energy will be required for the third circularly polarized transmitter because circular polarization reduces the strength of the Effective Radiated Power (ERP) by about a half (Wales, 2012). The same applies to transmissions where there is an equal split between horizontal and vertical polarization which cuts the reported Effective Radiated Power (ERP) in half (Wales, 2012).

An additional laser system could be connected to the Lidar - laser atmospheric methane detection and methane heating lasers to also detect wind motion and direction within the methane cloud using a doppler (frequency shift) system (Ehret, 2012). This wind speed and direction detection system could be used to adjust the strength and direction of the radio and laser transmission network to compensate for increases or decreases in the methane input due to wind velocity changes.

In this case the complete transmission system would involve three radio transmitters, three wind speed/direction lasers, three Lidar atmospheric methane detection lasers and three methane heating lasers which will energise the fundamental and degenerate bending and stretching modes of the methane molecule, 12 transmitters in all.

Side Frequencies

When a carrier wave of frequency f_n is modulated by a sinusoidal frequency f_m (where f_m is very much smaller than f_n), the composite wave consists of three separate components which have the following frequencies:-

- 1..... f_n
- 2..... $f_n + f_m$ (The Upper Side Frequency)
- 3..... $f_n - f_m$ (The Lower Side Frequency)

$f_n - f_m$ is equivalent to a beat frequency or to a difference tone when it exceeds 20 beats per second (Penguin Dictionary of Physics, 2000).

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Laboratory methane destruction experiments have shown that a frequency of 27.12 MHz gives a higher rate of methane conversion than the 13.56 MHz frequency which is normally used (Shiryayev et al. 2006).

If the Upper Side frequency ($f_n + f_m$) is twice the value of the Lower side frequency ($f_n - f_m$) then we can let:-

$$(f_n + f_m) = 2(f_n - f_m) = 2f_n - 2f_m$$

$$\text{Therefore } f_n = 3f_m$$

$$\text{If we let } f_n = 20.34 \text{ MHz}$$

$$f_m = f_n/3 = 6.78 \text{ MHz}$$

$$\text{Then } (f_n + f_m) = (20.34 + 6.78) \text{ MHz} = 27.12 \text{ MHz}$$

$$= 2 \times 13.56 \text{ MHz}$$

$$\text{and } (f_n - f_m) = (20.34 - 6.78) \text{ MHz} = 13.56 \text{ MHz}$$

Methane Fundamental Vibration Levels

Methane shows four normal modes of molecular vibration (Figure 10; Boudon 2012; Lide and Frederickse, 1995)

$\nu_1 = \nu_3 = 2\nu_2 = 2\nu_4$ From Boudon 2012

ν_1	ν_2	ν_3	ν_4
A_1	E	F_2	F_2
Stretching	Bending	Stretching	Bending
Raman	Raman	IR	IR
2916 cm^{-1}	1533 cm^{-1}	3019 cm^{-1}	1311 cm^{-1}

Figure 10. The four normal modes (fundamental vibrational frequencies - three being degenerate oscillators) of methane forming vibrational levels

The primary fundamental vibration frequency is ν_1 (A_1), a symmetrical stretching of the C - H bonds in the methane molecule which has a wavenumber of 2916 cm^{-1} (wavelength of 3.4294 microns)(Boudon 2012). The wavenumber of ν_1 was estimated earlier at 2917 cm^{-1} (Lide and Frederickse, 1995).

The ν_2 (E, e) vibration frequency is a bending frequency of the C - H bonds in the methane molecule and forms a degenerate oscillator with a wavenumber of 1533 cm^{-1} (wavelength 6.5232 microns) (Boudon, 2012). A previous estimate of the ν_2 wavenumber was 1534 cm^{-1} (Lide and Frederickse, 1995).

The third fundamental frequency ν_3 (F_2, f) is a degenerate stretching oscillation of the methane C - H bonds with a wavenumber of 3019 cm^{-1} (Boudon, 2012; Lide and Frederickse, 1995).

The fourth fundamental frequency ν_4 (F_2, f) is a bending frequency of the methane C- H bonds which also forms a degenerate oscillator with a wavenumber of 1311 cm^{-1} (wavelength 7.6277 microns) (Boudon 2012). Earlier estimates fixed ν_4 at a wavenumber of 1306 cm^{-1} (Lide and Frederickse, 1995).

The wavenumbers of the symmetrical stretching ν_1 and the degenerate stretching ν_3 are about the same and are approximately twice the values of the ν_2 and ν_4 degenerate deformational bending of the C - H bonds in the methane molecule (Figure 10; Boudon 2012). ν_1 and ν_2 are in the Raman range and ν_3 and ν_4 in the Infra Red range (Boudon 2012). These four vibration frequencies form a vibration structure with many vibration levels which are grouped into polyads (Figure 11; Boudon 2012).

extract (1)
 extraction (2)
 extreme (3)
 extreme warming (1)
 extreme weather (6)
 famine (2)
 FAO (1)
 farm (1)
 fast (1)
 fault (3)
 fault line (5)
 feebates (3)
 feedback (13)
 feedbacks (4)
 fire (6)
 firestorm (1)
 fish (1)
 flooding (2)
 flow (1)
 food (8)
 fossil fuel (3)
 fracture (1)
 Franz Josef Land (3)
 Fukushima (1)
 Gail Whiteman (1)
 Gakkel Ridge (6)
 Gary Houser (6)
 gases (4)
 Gavin Schmidt (1)
 geo-engineering (9)
 geoengineering (5)
 geology (1)
 Giovanni (2)
 glaciers (1)
 global (11)
 global warming (10)
 global warming potential (1)
 gompertz (1)
 greenhouse (6)
 greenhouse effect (1)
 greenhouse gases (1)
 Greenland (13)
 Greenpeace (2)
 group (1)
 growth (1)
 Gulf Stream (4)
 Guy McPherson (1)
 GWP (2)
 HAARP (1)
 habitability (1)
 habitable zone (1)
 habitat (1)
 Hansen (1)
 harmonic (1)



Figure 11. The four fundamental vibration frequencies of methane (three being degenerate oscillators with $\nu_1 = \nu_3 = 2\nu_2 = 2\nu_4$) form a vibrational structure with vibration levels grouped into polyads

All four of the fundamental vibration frequencies can be energised in methane molecule by lasers. These fundamental frequencies are:-

Wavenumbers	Wavelengths
V1 2916 cm ⁻¹ 291600 m ⁻¹	3.429μ 3429 nm
V2 1533 cm ⁻¹ 153300 m ⁻¹	6.523μ 6523 nm
V3 3019 cm ⁻¹ 301900 m ⁻¹	3.312μ 3312 nm
V4 1311 cm ⁻¹ 131100 m ⁻¹	7.628μ 7628 nm

The methane symmetrical and degenerate C- H bond stretching vibration frequencies V1 and V3 can be excited by tunable semiconductor lasers (Cd(1-x) Hg(x) Te and In As(1-x) Sb(x)), color center lasers (Rb Cl:Li) and possibly Neon lasers (Figures 12 and 13; Krupke in Lide and Frederikse, 1995).

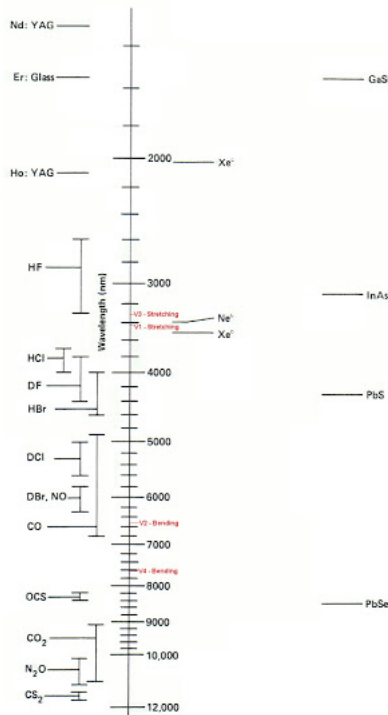


Figure 12. Wavelength of lasers operating in the 1300 to 12,000 nm spectral region from Krupke W. F. in Lide and Frederickse 1995.

The methane degenerate C- H bond bending deformations V2 and V4 can be excited by tunable

- Harold Hensel (4)
- Healy (1)
- heat (4)
- heatwave (3)
- high altitude (1)
- high-level panel (1)
- Himalaya (1)
- Himalayan Plateau (1)
- Hippo (1)
- Hiroshima (1)
- historic (1)
- history (2)
- hoax (1)
- hole (1)
- Holly Moeller (1)
- hurricane (5)
- hurricanes (1)
- hydrate (4)
- hydrates (36)
- hydroxyl (3)
- IASI (13)
- ice (8)
- ice age (1)
- ice core (1)
- ice loss (2)
- ice-free (3)
- icebreaker (1)
- idea whose time has come (1)
- Igor Semiletov (2)
- impact (1)
- in-situ (1)
- inauguration (1)
- increase (1)
- infrared (1)
- insolation (1)
- instant (1)
- integrity (1)
- interview (2)
- interviews (1)
- IPCC (8)
- Ira Liefer (1)
- James (1)
- James Elsner (1)
- James Hansen (7)
- James Overland (2)
- James Russel (1)
- Jan Mayen Island (1)
- Japan (1)
- Jason Box (2)
- Jennifer Francis (5)
- jet stream (10)
- Jim Pettit (1)
- Jiping Liu (1)
- John B. Davies (1)

carbon monoxide molecular lasers and semiconductor lasers ($\text{Cd}_{1-x}\text{Hg}_x\text{Te}$ and $\text{PbS}_{1-x}\text{Se}_x$) (Figures 12 and 13; Krupke in Lide and Frederikse, 1995). The $\text{Cd}_{1-x}\text{Hg}_x\text{Te}$ semiconductor laser can be tuned to all four methane fundamental vibration wavelengths while the bending vibrations are also well covered by tunable carbon monoxide lasers (Figure 13; Krupke in Lide and Frederikse, 1995).

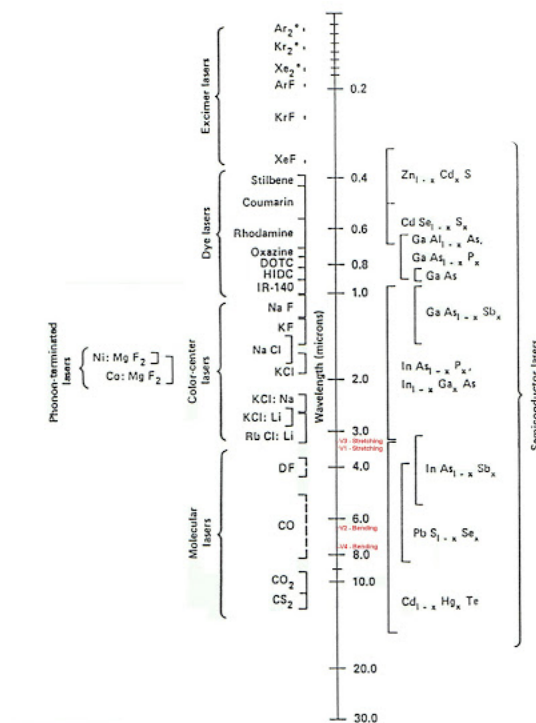


Figure 13. Spectral tuning ranges of various types of tunable lasers from Krupke, W. F. in Lide and Frederickse 1995.

Atmospheric Methane Detection and Wind Speed/Direction Lasers

The methane detection Lidar laser system to be used in the Lucy Project will need to incorporate the abilities of the Merlin Satellite Lidar methane detection system described by Ehret (2010) and Millet and Alpers (2010). This will include an ability to detect atmospheric methane concentrations over a distance of some 50 km in the Earth's atmosphere and possibly simultaneously develop a wind profile from the measurement of frequency changes (Ehret, 2000). The wind laser systems send intense laser pulses through the atmosphere which are scattered back from distant particles and molecules, analysed as a function of time and frequency and the wind direction and speed are determined from the doppler frequency shift (Ehret 2010).

The atmospheric methane detecting and wind speed/direction lasers in the Lucy Project will scan the methane cloud ahead of the methane fundamental vibration excitation lasers and will be linked in real time via a geostationary satellite to a controlling base station with a computer neural network (Figure 7). The base station computer will thus be able to monitor and predict changes in the atmospheric methane concentration and adjust the direction, strength, frequency, phase shifts and polarizations of the radio and laser transmitter systems to achieve maximum methane destruction (Figure 7).

The email addresses of staff who could be contacted about the details of the Lasers and work at the Merlin Satellite and the LIDAR methane detection system at the **Deutsches Zentrum für Luft - und - Raumfahrt (DLR), Institut für Physik der Atmosphäre** are listed below:-

Prof. Dr. Martin Dameris - Martin.Dameris@dlr.de
 PD. Dr. rer.nat. Veronika Eyring - http://www.dlr.de/pa
 Dr. rer. nat. habil. Dietrich Heimann - d.heimann@dlr.de

- [John Davies](#) (3)
- [John Latham](#) (1)
- [John Nissen](#) (6)
- [Joshuah Stolaroff](#) (1)
- [Julia Slingo](#) (4)
- [Julienne Stroeve](#) (2)
- [jump](#) (1)
- [Kara Sea](#) (8)
- [Kevin Trenberth](#) (1)
- [kiln](#) (1)
- [Lac-Mégantic](#) (1)
- [Lac-Mégantic](#) (1)
- [landslide](#) (1)
- [landslides](#) (2)
- [Laptev Sea](#) (9)
- [Laptev Sea Rift](#) (2)
- [laser](#) (1)
- [Last Hours](#) (1)
- [Lawrence Livermore National Laboratory](#) (2)
- [lead](#) (1)
- [legacy](#) (1)
- [Leonid Yurganov](#) (11)
- [letter](#) (1)
- [level](#) (2)
- [levels](#) (6)
- [linearity](#) (1)
- [LNG](#) (1)
- [local warming](#) (1)
- [local warming potential](#) (1)
- [Locations](#) (1)
- [London](#) (1)
- [loss](#) (7)
- [Lucy](#) (2)
- [LWP](#) (1)
- [Mackenzie River](#) (1)
- [Malcolm Light](#) (13)
- [management](#) (1)
- [Manvendra Dubey](#) (1)
- [Marcel Nicolaus](#) (1)
- [March 2013](#) (1)
- [marine cloud brightening](#) (1)
- [Mark Flanner](#) (1)
- [Mark Jacobson](#) (1)
- [Markus Buehler](#) (1)
- [Martin Luther King](#) (1)
- [masking](#) (1)
- [Matthew Hornbach](#) (1)
- [MBARI](#) (1)
- [mean](#) (2)
- [measurements](#) (1)
- [megaprojects](#) (1)
- [melt](#) (3)
- [melting](#) (3)

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DLR: Dr Matthias Alpers - matthias.alpers@dlr.de
CNES: Bruno Millet - bron.millet@cnes.fr

The following section is taken directly from a description by Millet and Alpers (2010) and Ehret (2010) on the characteristics of the atmospheric methane detection lasers to be mounted on the MERLIN satellite (Doc.Ref.No. MLN-SYS-MEMO-10015-DLR CNES - De l'espace pour la Terre. DLR).

Methane Integrated Path Differential Absorption (IPDA) LIDAR (Light Detecting and Ranging) Atmospheric Methane Detecting Laser

The Methane LIDAR instrument (Light Detection and Ranging, sometime referred to as 'light radar') transmits pulses of light towards Earth, and then receives the radiation that is reflected back from Earth's surface, again in pulse form. Whenever one of these pulses encounters Methane, its signal strength is reduced and the instrument detects this reduction. The instrument send its laser beam to and from the Earth 24 times a second. With the measured values, a world map showing atmospheric Methane concentrations can be produced and also regional differences can be highlighted.

Global information on atmospheric Methane concentration (Methane column density) with an accuracy better than 2% and with a spatial resolution of 50 km along track also under cloudy and variable sun illumination conditions.

Differential absorption of gaseous methane at two laser wavelengths reflected from Earth surface or dense clouds.

Observation Method:

Differential absorption of gaseous methane at two laser wavelengths reflected from Earth surface or dense clouds.

LIDAR (Light Detecting and Ranging):

"Active" optical remote sensing instrument for atmospheric parameters or trace gases. Main components are (1) two pulsed high power laser emitters, (2) a telescope to receive the laser light backscattered from atmosphere or Earth surface, (3) a sensitive photon detector.

IPDA (Integrated Path Differential Absorption):

Determination of total Methane column density between satellite and Earth surface or cloud top height. The Methane amount is calculated from different absorption at two laser wavelengths (on-line (λ_{on}) and off-line (λ_{off})), reflected on Earth surface or cloud top. Earth surface or cloud top reflected laser light is used because this is much more intense than backscattered light from aerosol particles in the atmosphere. The attenuation due to atmospheric Methane absorption is strong at the on-line wavelength. The off-line "reference" wavelength is selected to be only marginally affected by Methane absorption.

Instrument Concept

Type: Integrated Path Differential Absorption LIDAR (D)
Pointing: 1- 2o off nadir, across track
Emitter: pulsed high power laser with about 24 Hz. rep.rate
(12 Hz double pulse, λ_{on} & λ_{off} each), approx. 9 mJ pulse energy, mean wavelength 1,645 μ m
Receiver: Telescope o690 mm, APD detector
IPDA Lidar instrument power consumption: approx 111 w.

Communication:

S-Band Downlink for housekeeping data and S-Band Uplink for commanding to CNES-ground station network.
X-Band Downlink for scientific data to CNES-ground station network.

message (2)
Met Office (1)
meteorology (1)
methane (144)
methane catastrophe (1)
methane jump (1)
methanetracker.org (2)
methane (1)
mile-deep (1)
minimum (4)
mixing (1)
model (1)
models (1)
monster (1)
Moore (1)
motion (1)
movement (1)
nano diamonds (1)
NASA (7)
Natalia Shakhova (3)
Nathan Currier (5)
natural gas (5)
Neven Acropolis (3)
news release (1)
Nick Breeze (1)
NOAA (7)
NOAA Polar Orbiter (1)
Noah Diffenbaugh (2)
Noctilucent clouds (1)
non-linearity (1)
norm (1)
North Hole (1)
North Pole (6)
Norwegian Sea (2)
Novaya Zemlya (2)
NSIDC (6)
nuclear (1)
Obama (3)
Oceam (1)
ocean (22)
OH (1)
oil (2)
Oklahoma (1)
omission (1)
open letter (1)
open water (2)
origin (1)
pamphlet (1)
parts per billion (2)
patent (1)
Patrick McNulty (1)
Paul Beckwith (32)
Paul Wignall (1)
peak (3)

The Merlin Lidar methane satellite is only to be launched in 2014. The widespread atmospheric methane eruptions in the Arctic from destabilized methane hydrates shows that by 2014/2015, major global warming induced sea level rise will have begun in earnest and we will have lost our chance to take remedial action. We need to know right now how serious the methane build up in the upper stratosphere is so that governments and oil companies can react to any perceived emergency.

It is recommended as a an emergency stop gap, that a Lidar methane detection device from DLR be mounted on the International Space Station to give early warning data on the build up of methane in the upper stratosphere and Arctic. This project should be promoted as a vital necessity because of the extreme gravity of the methane eruption problem in the Arctic. A German (Lidar trained) astronaut could be launched to the International Space Station as soon as feasibly possible to mount and run the device. This will also give another calibration of the Lidar methane device at shallower orbital altitudes which will assist the Merlin project. The DLR will need to immediately train a German astronaut on how to mount and run a Lidar methane detecting instrument on the International Space Station.

HAARP

The main instrument at HAARP Station is the Ionospheric Research Instrument (IRI). This is a high power, high-frequency **phased array** radio **transmitter** with a set of 180 **antennas**, disposed in an array of 12x15 units that occupy a rectangle of about 33 acres (13 hectares). The IRI is used to temporarily energize a small portion of the **ionosphere**. The study of these disturbed volumes yields important information for understanding natural ionospheric processes."

http://en.wikipedia.org/wiki/High_Frequency_Active_Auroral_Research_Program

The main MHz frequency range (High Frequency Band 3 - 30 MHz) of the powerful IRI transmitter is slightly different from the 13.56 MHz needed to break down the methane. However it is very powerful with a 5.1 Giga watt effective radial power at maximum output. The Ionospheric Research Instrument (IRI) at HAARP transmits over the range 2.8 MHz to 10 MHz slightly less than the 13.56 MHz used to break down methane but as mentioned previously if the IRI transmitted a 10 MHz carrier waves modulated by a 3.56 MHz signal it will generate an Upper Side Frequency of 13.56 MHz which is the methane destruction frequency (Penguin Dictionary of Physics 2000).

Noctilucent clouds which are common in the Arctic form from water condensing around meteorite dust in the mesosphere above 50 km altitude and are becoming more and more abundant and are being seen at much lower latitudes. The increase in the methane concentration in the stratosphere and its oxidation in the mesosphere is resulting in more water at these high altitudes and an increase in the noctilucent clouds. The noctilucent clouds help reflect the suns heat back into space so if we can break down more methane with the HAARP or Lucy transmitters we should generate more clouds and thus help reverse global warming by:-

a) Getting rid of the high global warming potential methane at low altitudes and in the stratospheric global warming veil.

b) Generating sunshine reflecting noctilucent clouds in increasing amounts in the mesosphere which will reflect the suns energy back into space.

The HAARP facility has discovered what they call Polar Mesosphere Summer Echoes which are elusive phenomena which may be due to a thicker development of noctilucent clouds in the Arctic summer due to the increasing methane build up. These echoes are detected with the IRI transmitter when it is used as a radar with one 28 MHz radar and two other VHF radars of 49 MHz and 139 MHz. If we could transmit 13.56 MHz on the IRI transmitter and use the other radars and optical cameras to look for reflections from noctilucent clouds formed from the breakdown of methane in a circular zone above the HAARP transmitter we should be able to effectively test the system. There ought to be a buildup of the noctilucent clouds in the area where the HAARP transmissions are focused on the ionosphere. If it works there are 4 other similar facilities in the world (Hipas, Alaska; Arecibo, Puerto Rico, EISCAT, Norway and Sura, Russia) where they could immediately attack the atmospheric methane as well.

HAARP Contacts, 2012.

permafrost (7)
Permian (1)
Peter Carter (6)
Peter Sinclair (1)
Peter Wadhams (20)
pingo (1)
PIOMAS (14)
pipeline (1)
plan (6)
planet (2)
Planet B (1)
Planet under Pressure (1)
plate (1)
Pliocene (1)
plume (1)
Polar (3)
Polar jet stream (1)
Polar vortex (2)
policies (1)
policy (2)
polynomial (1)
poster (4)
ppb (2)
precipitation (1)
prediction (1)
presentation (2)
President (1)
President Obama (4)
pressure (2)
price (1)
price of Earth (1)
product (1)
projection (3)
projections (1)
protocol (1)
pyrolysis (2)
Quebec (1)
quotes (1)
radiative forcing (2)
radio (2)
Radio Ecoshock (2)
radio frequencies (1)
rain (1)
rapid (2)
Ravi Kopparapu (1)
readings (1)
record (6)
reduction (1)
reflectance (1)
reflectivity (2)
release (7)
report (1)
rerouting (1)
responsibility (1)

377th Airforce Base Wing Public Affairs, 2000 Wyoming Blvd SE, Suite A1, Kirkland Air Force base, NM, 87117

Comparison of the Molecular Structures of Methane and Diamond

A detailed study was made of the molecular distances in methane and diamond molecules and their similarities and differences in order to determine what radio wavelengths would effectively operate on the destruction of the first C - H bond in the methane molecule and where the weakest zone exists within the structure of the methane molecule (see Table 1 and Figures 14 to 24). In addition, the relationship to the fundamental methane stretching and bending vibrations and methane destruction radio frequencies was also determined. The different molecular distances are numbered in Table 1 and can be directly found with the same number on the Figures 14 to 24.

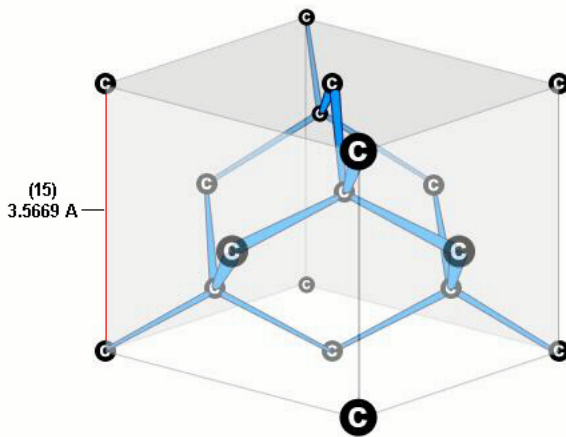


Figure 14. Diamond Unit Cell of height = 3.5669 A

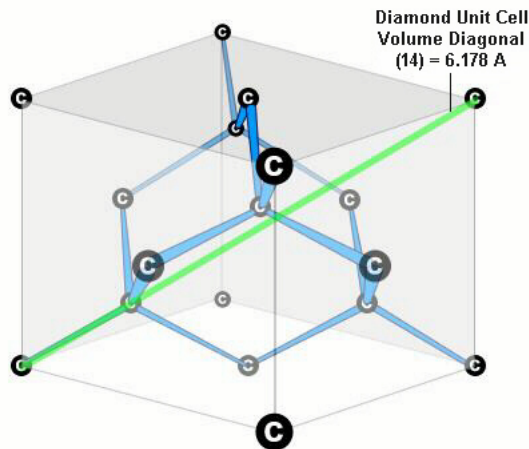


Figure 15. Diamond Unit Cell consisting of four interlinked Tetrahedrons of five Carbon atoms.
Volume of Unit Cell = $45.385 \cdot 10^{-24}$ cubic cm
Density of Unit Cell = 3515.5 kg/cubic m
Diamond Unit Cell Volume Diagonal = 6.178 A

retreat (2)
rise (5)
risk (1)
risk assessment (1)
river (1)
rivers (1)
runaway (9)
runaway global warming (6)
Russia (2)
salinity (2)
salt (1)
sam carana (7)
Sandy (6)
satellite (3)
science (1)
sea (3)
sea ice (81)
sea surface temperature (2)
sea surface temperatures (2)
sea water (1)
seabed (4)
seafloor (1)
security (1)
sediment (2)
sediments (1)
seeds (1)
seismic (4)
seismic activity (3)
Semiletov (4)
September (3)
sequestration (3)
Seymour Laxon (2)
Shakhova (4)
shale (1)
shockwaves (2)
shortages (2)
shrank (1)
Siberia (5)
side-effects (1)
sigmoid (1)
skepticalscience (1)
snow (9)
snow cover (2)
social tipping point (1)
soils (1)
solar radiation (1)
Solar Radiation Management (2)
Solstice (1)
solutions (1)
soot (11)
source (2)
sources (2)
special (1)
species (1)

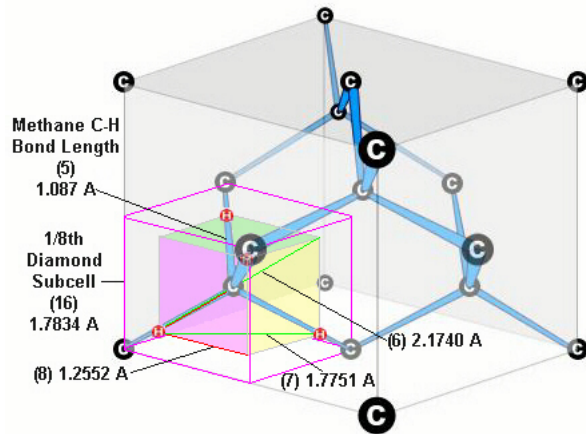


Figure 16. Methane Unit Cell
 C - H Bond Length = 1.087 A; Unit Cell Side = 1.2552 A
 Unit Cell Side Diagonal = 1.7751 A = Methane Tetrahedron Side
 Unit Cell Volume Diagonal = 2.1740 A

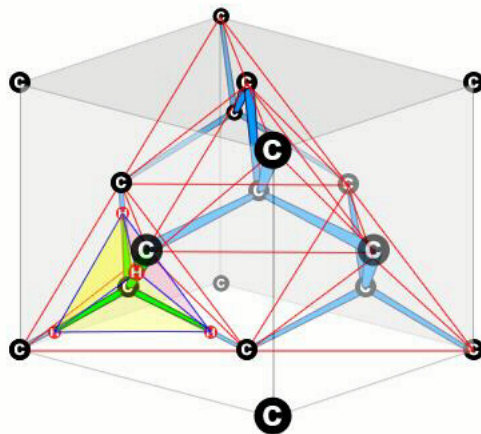
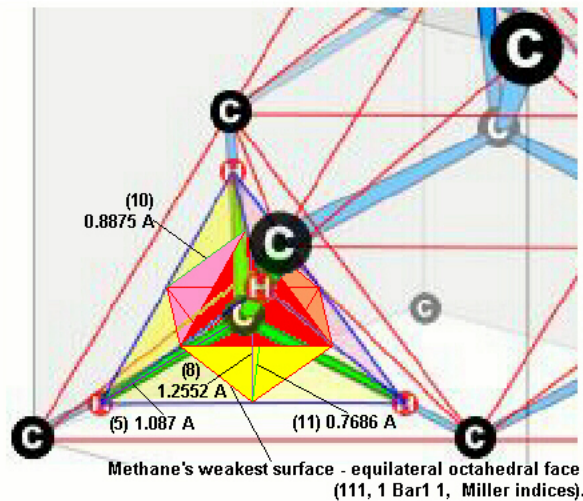
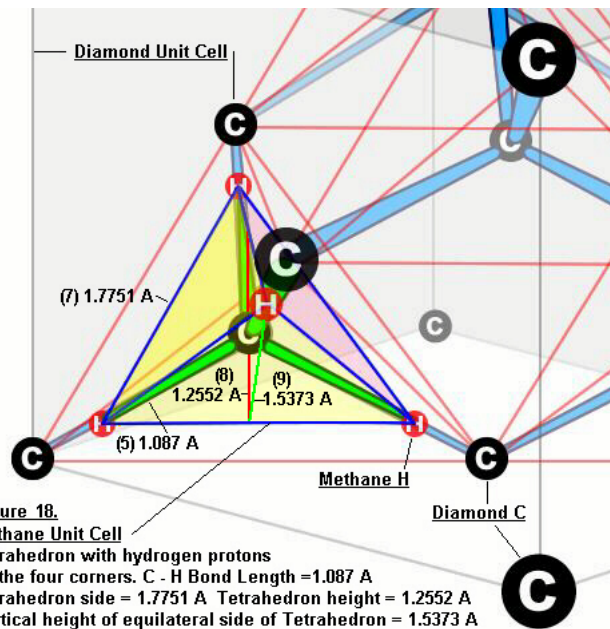


Figure 17. A Methane Unit Tetrahedron situated within one of the four Diamond Subcell Tetrahedra that make up the Diamond Unit Cell

- speed (6)
- speed and drift (3)
- spread (1)
- SRM (2)
- SST (5)
- statement (2)
- Stephen Salter (1)
- Steve Coulter (1)
- Steve Vavros (1)
- stop (1)
- storage (2)
- stores (1)
- storm (12)
- storms (3)
- Strategic Plan (1)
- stratosphere (1)
- sulfur (3)
- superstorm (2)
- surface (1)
- surge (1)
- survey (1)
- survival (1)
- survive (1)
- survivors (1)
- sustainability (1)
- sustainable energy (1)
- Svalbard (7)
- Swarup China (1)
- tar (1)
- tar balls (1)
- tectonic (1)
- tectonic plates (1)
- Ted Scambos (1)
- temperature (31)
- temperature anomalies (1)
- temperatures (3)
- terraforming (1)
- test (1)
- The Cryosphere Today (2)
- the Plan (1)
- thermal (2)
- thickness (13)
- thin (1)
- thin spots (1)
- Thomas Reichler (1)
- threat (1)
- threshold (1)
- tickness (2)
- Tim Lenton (1)
- tipping point (4)
- tipping points (1)
- tornado (2)
- train (1)
- transmissions (1)



- trap (1)
- tremor (1)
- trend (2)
- trendline (2)
- trends (1)
- Triassic (1)
- trigger (1)
- tundra (2)
- tunnel (1)
- UC Berkeley (1)
- upper atmosphere (1)
- Veli Albert Kallio (5)
- venting (3)
- Venus syndrome (1)
- vessels (1)
- vicious cycle (1)
- Victor Hugo (1)
- video (5)
- Viktor Buinitsky (2)
- Voice of Russia (1)
- volcanic (2)
- volcanoes (1)
- volume (20)
- vortex (1)
- Vostok (1)
- vulcanoes (1)
- warm (2)
- warming (23)
- warning (2)
- water (6)
- water vapor (1)
- We will respond to the Threat of Climate Change (1)
- weakening (1)
- weather (2)
- Wieslaw Maslowski (1)
- wildfire (6)
- wildfires (7)
- wind (7)
- wipe-out (1)
- Wipneus (1)
- Xiaozhen Xiong (1)
- Xin He (1)
- Yadong Sun (1)
- years (1)
- zeolite (1)
- Zhao Qin (1)
- zones (1)

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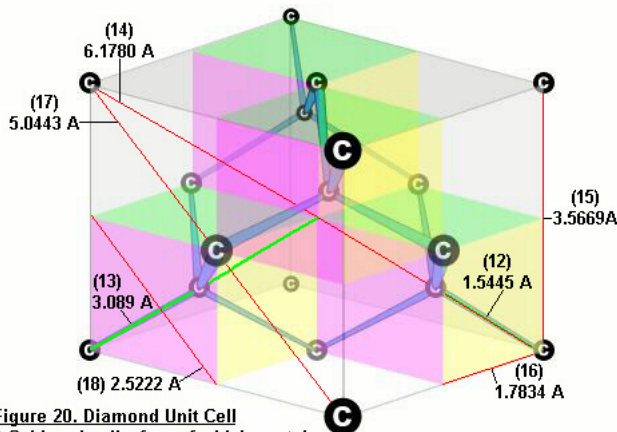


Figure 20. Diamond Unit Cell
 8 Cubic subcells four of which contain Tetrahedra. C - C Bond length = 1.5445 A
 Diamond Unit Cell Height = 3.5669 A
 Diamond Unit Cell Face Diagonal = 5.0443 A
 Diamond Unit Cell Cube Diagonal = 6.1780 A; Cube Diagonal/2 = 3.0890 A
 Diamond Subcell height = 1.7834 A; Subcell Face Diagonal = 2.5222 A

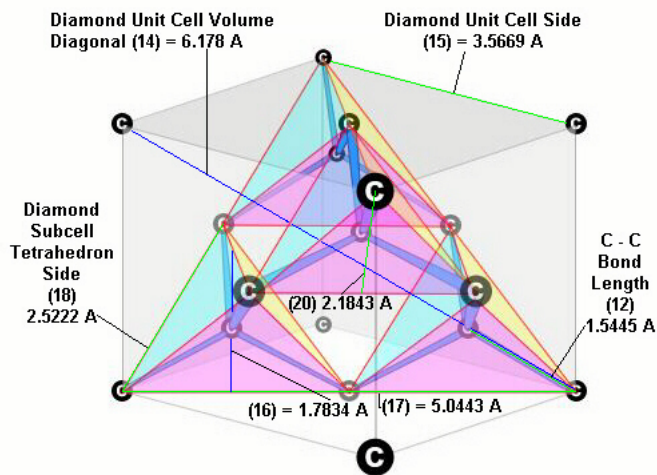


Figure 21. Four Diamond Subcell Tetrahedrons organized into a single Diamond Unit Cell Tetrahedron. C - C Bond Length = 1.5445 A
 Diamond Unit Cell Side = 3.5669 A; Unit Cell Volume Diagonal = 6.178 A
 Four Diamond Subcell Tetrahedron Side = 5.0443 A; Single Tetrahedron Side = 2.5222 A. Diamond Subcell Tetrahedron Height = 1.7834 A.
 Diamond Subcell Height of Equilateral Face of Tetrahedron = 2.1843 A

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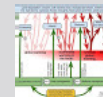
Methane hydrates



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in September 2013, extremely high methane readings were recorded over the heights of Antarctica, as illustrated by the image below. These high metha...
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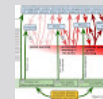
Global Warming Action Plan



Action Plan -
 Analysis of a Diagram At the top half of the above diagram,

the threat of extinction is pictured, i.e. global warming escalating into runaway global warm...
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Feebates



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 FEEBATES As discussed at the post An Effective and Comprehensive Climate

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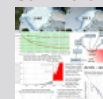
Arctic Methane Emergency Group (AMEG)



AMEG Strategic Plan -
 2012-12-04
 AMEG Strategic Plan *This

strategic plan was prepared by the independent policy group, AMEG (the Arctic Me...
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Sam Carana



Arctic - red alert!

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Sustainable Economy

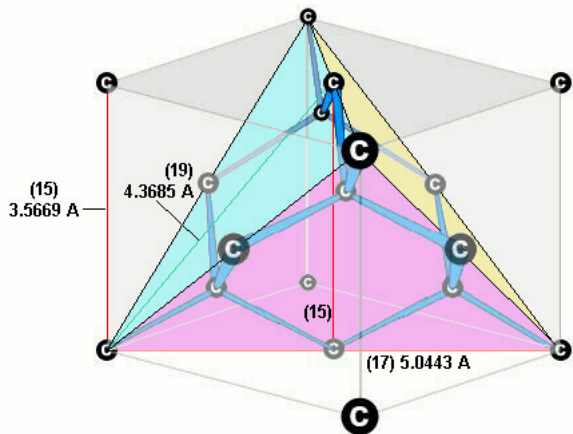


Figure 22. Diamond Unit Cell with a Single Unit Cell C Tetrahedron
 Diamond Unit Cell Tetrahedron Equilateral Face Side = 5.0443 Å
 Diamond Unit Cell Tetrahedron Equilateral Face Height = 4.3685 Å
 Diamond Unit Cell Height = Unit Cell Tetrahedron Height = 3.5669 Å

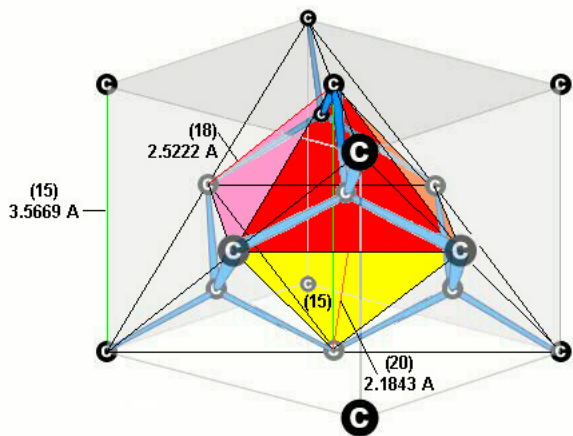


Figure 23. Diamond Unit Cell with a Single Unit Cell C Octahedron
 Diamond Unit Cell Height = Unit Cell Octahedron Height = 3.5669 Å
 Diamond Unit Cell Equilateral Face Side of Octahedron = 2.5222 Å
 Diamond Unit Cell Equilateral Face Height of Octahedron = 2.1843 Å



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Runaway Global Warming
 Runaway Global Warming - *1. Methane releases in the Arctic* On June 15, 2011, the research vessel Polarstern (photo right) of the Alfred Wegener Institute for Polar and Marine Res...
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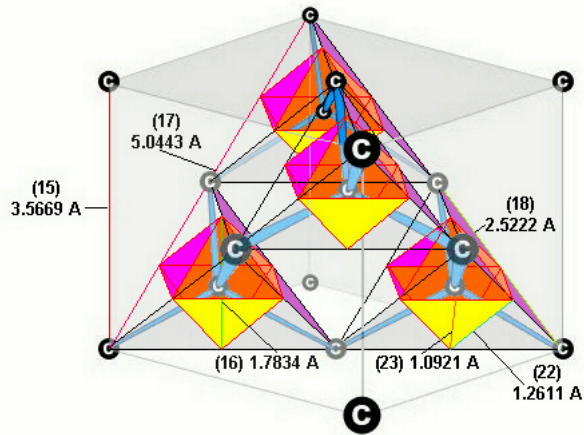


Figure 24. Four Diamond Subcell Octahedrons with Four Subcell Tetrahedrons Organized in a Single Unit Cell C Tetrahedron of Height = 3.5669 A

Table 1.

	RFT Wavelength ³ (2 ³⁶) = RFT/A	1.07240767820052E-10 metres	
	Wavelength metres	Ratio of (RFT/A) to Molecular Bond Length	
METHANE Molecular Vibration			
1	3.42817963661296E-06	3.12821319731093E-05	
2	6.51890482398957E-06	1.64507337835960E-05	
3	3.31235508446505E-06	3.23759878048738E-05	
4	7.65696784073507E-06	1.40056442772988E-05	
METHANE			
5	1.08700000000000E-10	9.88575600920445E-01	0.9857560092045 *1
6	2.17400000000000E-10	4.93287800460222E-01	0.9857560092045 *2
7	1.77506356693688E-10	6.04151703733695E-01	0.9857560092045 *2*SQRT(2/3)
8	1.25515948521825E-10	8.54399633151003E-01	0.9857560092045 *SQRT2*SQRT(2/3)
9	1.53726014229959E-10	6.97614297594040E-01	0.9857560092045 *SQRT2
10	8.87531783468438E-11	1.20830340746739E+00	0.9857560092045 *SQRT(2/3) Weakest Surface in Methane = Diamond Cleavage
11	7.69625071149777E-11	1.39522859512808E+00	0.9857560092045 *1/SQRT2
DIAMOND			
12	1.54450000000000E-10	6.94339707478487E-01	0.98194463121024 *SQRT2
13	3.08900000000000E-10	3.47169853739244E-01	0.98194463121024 *2*SQRT2
14	6.17800000000000E-10	1.73584926869622E-01	0.98194463121024 *2*2*SQRT2
15	3.96869696305351E-10	3.00657912766313E-01	0.98194463121024 *2*2*SQRT(2/3)
16	1.78343498152678E-10	6.01315825532626E-01	0.98194463121024 *2*SQRT(2/3)
17	5.04431587897149E-10	2.12597248934453E-01	0.98194463121024 *2*2*SQRT(2)*SQRT(2/3)
18	2.62215793848575E-10	4.25194497868907E-01	0.98194463121024 *2*SQRT(2)*SQRT(2/3)
19	4.36850569417049E-10	2.45498157802561E-01	0.98194463121024 *2*2
20	2.18425284708525E-10	4.90972315605122E-01	0.98194463121024 *2
21	2.18425284708525E-10	4.90972315605122E-01	0.98194463121024 *2
22	1.26107896924287E-10	6.50388995737813E-01	0.98194463121024 *SQRT(2)*SQRT(2/3)
23	1.09212642354262E-10	9.81944631210244E-01	0.98194463121024 *1

Wavelength Multiplier for Unity

Because of a perfect relationship between the diamond octahedron and the methane tetrahedron (Hurlbut, 1959), the methane can be looked upon as representing a hydrated diamond at its smallest state (Figure 6). Diamond has only one perfect 111 (and 1, bar1, 1) cleavage surface along which it preferentially breaks (Figure 6). Because the methane tetrahedron encloses a diamond shaped octahedron whose vertices intersect the H - H spacing exactly at the centre, a perfect 111 equilateral triangular cleavage surface exists beneath each of the hydrogen protons at a half H - H spacing. This perfect 111 cleavage surface must represent a zone of weakness in the methane molecule which will allow the hydrogen protons to be dislodged from the methane molecule by stretching or bending the C - H bond or applying a torque to it due to the effects of radio and laser electromagnetic waves (Figure 6).

A methane destruction frequency (RFT) of 13.56 MHz has a wavelength of 22.1085 meters. The methane destruction (RFT) wavelength divided by (3²*36) is 1.0724 Angstroms (10⁻¹⁰ meters) (RFT/A) and has been compared to the various molecular distances in the methane and diamond molecules. RFT/A is very similar to the methane C - H bond length of 1.087 Angstroms (10 power -10 meters) in the methane molecule (approximately 0.9865 of the value) (number 5 on Table 1). RFT/A is approximately 0.9819 of the value of the height of the 111 equilateral face side of the diamond 1/8 subcell = 1.0922 Angstroms (10 power -10 meters) (number 23 on Table 1).

The frequency calculated from the height of the methane tetrahedron (number 8. - 1.25516*10 power -10 m) is closely related to the V2 bending degenerate deformation (wavenumber 1533 cm⁻¹) and the

27.12 MHz methane destruction frequency. The ratio of the V2 bending frequency to the methane tetrahedron height frequency*3/(2 power 22) is 26.9192 which is very close to one millionth of the 27.12 MHz methane destruction frequency (approximately 0.9926 of the value).

Excel Table 2, Sheet 1 of Excel Table 2,3 and 4

Excel Table 2 shows the various harmonics of the 3 to 300 THz Electromagnetic Band (part μ m waves, part infra red) which includes the four methane fundamental stretching and bending frequencies. Table 2 is found as Sheet 1 of Excel Table 2,3 and 4.

TABLE 2					
ELECTROMAGNETIC BAND WHICH INCLUDES METHANE STRETCHING AND BENDING FREQUENCIES					
FREQUENCY	3×10^{13} - 3×10^{14} Hz	30 - 300 THz	Part μ m Waves - Part Infrared		
WAVELENGTH	10^{-5} - 10^{-6} metres	10 - 1 μ m	100,000 - 10,000 Angstroms		
WAVENUMBER	10^5 - 10^6 metres ⁻¹	100mm ⁻¹ - 1pm ⁻¹			
ENERGY	0.124 - 1.24 electronvolts				
TEMPERATURE	1.44×10^3 - 1.44×10^4	Kelvin	C		
Case 1. Transmission of a Single Laser Frequency from Each of the Three Transmission Stations					
Individual Transmission Frequencies	PERFECT RESONANCE WITH 13.56 MHz V2(E) Bending V3(F) Stretching V4(F) Bending		INTERFERENCE PATTERN PERFECT RESONANCE WITH 13.56 MHz V3-V2 V3-V2		IMPERFECT RESONANCE WITH 13.56 MHz V2+V4 V2-V4 V3+V4 V3-V4
Case 2. Transmission of a Carrier Wave and Signal Modulated Laser Frequency from Each of the Three Transmission Stations					
Carrier Signal	PERFECT V3(F) Stretching V2(E) Bending		GOOD V1 (A1) Stretching V2(E) Bending	GOOD V3(F) Stretching V1 (A1) Stretching	INTERFERENCE PATTERN PERFECT RESONANCE WITH 13.56 MHz V3+V2 V3-V2 V1+V2 V1-V2 V3+V1 V3-V1
Upper Side Frequencies	PERFECT V3+V2	PERFECT V1+V2	PERFECT V3+V1		REFERENCES
Lower Side Frequencies	V3-V2	V1-V2	V3-V1		Ashton, 2001, Harmonograph Lide and Frederickse, 1995, Handbook of Chemistry Penguin Dictionary of Physics, 2000

The four methane molecular vibrations, V1(A1) - symmetrical stretching (wavenumber 2916 cm⁻¹), V2 (E,e) degenerate bending deformation (wavenumber 1533 cm⁻¹), V3(F2,f), degenerate stretching (wavenumber 3019 cm⁻¹) and V4 (F2,f) degenerate bending deformation (wavenumber 1311 cm⁻¹) are taken from Boudon (2012). Boudon (2012) states that V1 and V3 have similar values and they are almost twice the values of V2 and V4. Lide and Frederickse (1995) give slightly different, earlier derived wavenumbers for V1 (2917 cm⁻¹), V2 (1534 cm⁻¹), V3 (3019 cm⁻¹) and V4 (1306 cm⁻¹).

The frequencies of the V2, V3 and V4 methane fundamental vibrations are found to be exact harmonics of the 13.56 MHz methane destruction frequency while the relative harmonic error between V1 and the 13.56 MHz frequency is 1.85×10^{-7} (Table 2).

Various combinations of V1, V2 and V3 as carrier waves and V1, V2 and V4 as modulation signals with the corresponding Upper and Lower Side Frequencies are shown in Table 2.

The energy necessary to break the first C - H bond in one methane molecule is 7.35×10^{-24} electronvolts. The minimum energy of 0.16 electronvolts is shown by the V4(F2) bending molecular vibration which is 2.2×10^{22} more than the energy that is necessary to break of the first C - H bond in the methane molecule (Table 2). The V3 (F2) stretching vibration has a higher energy of 0.37 electron volts which is 5×10^{22} times the energy that is necessary to break the first C - H bond in the methane molecule (Table 2). The highest energy of 0.73 electronvolts is shown by the Upper Side frequency (V3 + V1) which is 1×10^{23} times as large as the energy necessary to break the first C - H bond in the methane molecule (Table 2).

The results of a number of possible transmission combinations are shown in Table 2. In the first case, if we have transmission of a single laser frequency such as V2, V3 and V4 from each of the three transmission stations there is a perfect resonance with the 13.56 MHz methane destruction frequency (Table 2). Furthermore the (V3 + V2) Upper Side Frequency and the (V3 - V2) Lower Side frequency also show perfect resonance with the 13.56 MHz interference pattern (Table 2). However there is slight dissonance between the (V2 and V4) and (V3 + V4) Upper Side Frequencies and the (V2 - V4) and (V3 - V4) Lower Side Frequencies with the 13.56 MHz transmission (Table 2).

A second case can be considered where we have transmissions of a carrier wave and a modulation signal laser frequency from each of the transmission stations (Table 2). In the first transmitter the V3 carrier, V2 signal, Upper Side Frequency (V3 + V2) and Lower Side frequency (V3 - V2) give perfect resonance with the 13.56 MHz methane destruction frequency (Table 2). In the second transmitter the V1 carrier has good resonance with 13.56 MHz radio frequency while the V2 modulation, The Upper Side Frequency (V1 + V2) and the Lower Side Frequency (V1 - V2) are in perfect resonance with the 13.56 methane destruction frequency (Table 2). The same situation also applies to the third transmitter where the V1 modulation signal has a good resonance with the 13.56 MHz radio frequency while the

V3 carrier, (V3 + V1) Upper Side Frequency and (V3 - V1) Lower Side frequency are in perfect resonance with the 13.56 MHz methane destruction frequency (Table 2). In these three calculations of the transmissions there is perfect resonance between the 13.56 MHz interference pattern and all the Upper Side Frequencies ((V3 + V2), (V1 + V2), (V3 +V1)) and the Lower Side Frequencies ((V3 -V2), (V1 - V2), (V3 - V1)(Table 2).

Electromagnetic Buckling of the Methane C - H Bond

The curvature of a fold or buckle in the methane molecular structure is the reciprocal of the mean radius of curvature of the buckle or fold (Ramsay, 1967). We can look on the wavenumber of V4 bending = $1310.8 \text{ cm}^{-1} = 131080 \text{ m}^{-1}$ as a function of the curvature of the methane molecule and its reciprocal, the wavelength of V4 bending (7.6289×10^{-6} meters) as a function of the radius of curvature of the bending. Therefore the relative curvature of the methane molecule due to V4 bending = $131080 \text{ m}^{-1} = 9 \frac{2}{3} \times 13.56 \text{ MHz}/1000 = 9 \frac{2}{3} \times 13.56 \text{ KHz}$.

This means that by increasing the frequency of the exciting EM and radio waves harmonically, we are going to increase the curvature of the methane molecule until such time as a fracture will precipitate along one of the "Perfect Diamond" 111 cleavage surfaces and one of the methane hydrogen protons will be ejected (Figure 5). This will destroy the methane molecule and eliminate it from the global warming equation.

Excel Table 3, Sheet 2, Excel Table 2,3 and 4

Excel Table 3 shows the various harmonics in the High Frequency (HF), ITU, Band No.7 (decimeter waves) which include the methane destruction frequencies (13.56 and 27.12 MHz), the octave (2:1), second overtone (3:1), lateral fifth (3:2) and the fourth (4:3). Table 3 is found as Sheet 2, Excel Table 2,3 and 4.

The energy required to break the first C - H bond in the methane molecule = 7.34896×10^{-24} electronvolts (Table 3). The energy of the HF frequencies ranges from 5.6×10^{-8} to 3.4×10^{-7} electronvolts which is some 7.63×10^{15} to 4.5×10^{16} times the required energy to break the first C - H bond in the methane molecule (Table 3).

Radio frequencies have also been calculated for another set of carrier and modulation frequencies from each transmission antennae with Upper and Lower Side frequencies (Table 3). For the HAARP Ionospheric Research Instrument (IRI) Frequency range (2.8 to 10 MHz), a carrier wave of 10 MHz modulated by a 3.56 MHz signal will generate a 13.56 MHz Upper Side Frequency (the methane destruction frequency) and a Lower Side Frequency of 6.44 MHz (Table 3). The Upper Side methane destruction radio frequency of 13.56 MHz has an energy of 5.6×10^{-8} electron volts which is 7.63×10^{15} times the required energy necessary to break the first C - H bond in the methane molecule (Table 3). The 3.56 MHz modulation signal on the 10 MHz carrier has an energy of 2×10^{15} times the energy necessary to break the first C - H bond on the methane molecule (Table 3).

Table 3 also shows the calculations for various other frequencies out of the HAARP IRI frequency range which extends from 13.56 MHz to 81.36 MHz ($= 6 \times 13.56$). The highest energy ratio realized is 3.66×10^{17} between an Upper Side Frequency of 650.88 MHz and the energy necessary to break the first C - H bond in the methane molecule (Table 3). The Upper Side Frequency is generated by a carrier wave of 433.92 MHz with a modulation signal of 216.96 MHz (Table 3).

Excel Table 4, Sheet 3, Excel Table 2,3 and 4.

Excel Table 4 shows the various harmonic ratios which include octaves, fifths, cubes and squares that the 13.56 MHz and 27.12 MHz methane destruction radio frequencies can be raised to, to test for the highest degree of methane destruction within a rising methane cloud either at HAARP or in a separate Lucy test facility. Table 4 can be found as Sheet 3, Excel Table 2,3 and 4.

The harmonic multipliers have been derived from the triangular harmonic Lambdoma (Table 4)(Ashton, 2001). The square side of the harmonic Lambdoma extends from 1 to 32 and is important because it includes all the numbers and their sums that are intrinsic in the structure of molecular electron clouds and in the numbers of basic charged particles (Table 4) (Lide and Frederick 1995). The cubic side of the harmonic Lambdoma which extends from 1 to 243 gives all the likely cubic multiples that will be generated by three transmission beams intersecting at right angles in an interference pattern within a rising methane cloud (Table 4). This interference pattern will contain cross shaped interference

patterns putting the hydrogen protons under stress in the methane molecule and helping to the destroy the first C - H bond (Table 4).

Various combinations of the octaves, fifths, cubes and squares should be tested in a single transmitter, in two transmitters with an intersecting interference field and in three transmissions intersecting at 90 degrees as well as three transmissions along the edges of a tetrahedron intersecting at 60 degrees to determine what combination of transmitters, orientations and frequencies gives the greatest degree of methane destruction (Table 4).

HARMONIC LAMBDOMA FOR RATIOS OF 1, 2 and 3									
Includes Octaves, Fifths, Cubes and Squares									
					1				
				2		3			
		4		6		9			
	8		12		18		27		
16		24		36		54		81	
32	48		72		108		162		243
Harmonic Lambdoma for Common Methane Destruction Frequency of 13.56 MHz									
Megahertz (MHz)									
				27.12		40.68			
		54.24		81.36		122.04			
	108.48		162.72		244.08		366.12		
216.96		325.44		488.16		732.24		1098.36	
433.92	650.88		976.32		1464.48		2196.72		3295.08
Harmonic Lambdoma for Increased Methane Destruction Frequency of 27.12 MHz									
Megahertz (MHz)									
				27.12					
			54.24		81.36				
		108.48		162.72		244.08			
	216.96		325.44		488.16		732.24		
433.92		650.88		976.32		1464.48		2196.72	
867.84	1301.76		1952.64		2928.96		4393.44		6590.16

View the full spreadsheet in the window below, or go directly to:

<https://docs.google.com/spreadsheet/ccc?key=0ArjFQnAaMpkXdHBjMDE2OXIMU0xad3VhS2JIOW5nVHc>

Conclusions

The UN/US must immediately declare an international emergency of the most extreme kind and call for a conference of world governments and oil companies to select the fastest and most efficient way to deal with the Arctic methane eruption threat. The Lucy Project and suggested HAARP experiments are methods of destroying the Arctic atmospheric methane clouds at a distance and will be our first line of defence against the extreme global warming potential of the fast increasing concentration of methane in the atmosphere. The Angels proposal aims to depressurize the Arctic sub seafloor methane in - situ and shut down the methane eruption centres, but it will require massive cooperation between governments and oil companies to achieve its objectives (Light, 2012c). We are already two years past the tipping point in August 2010 when massive subsea atmospheric methane eruptions started in earnest in the Arctic. The next three years are all we have left to try to put a break on the Arctic methane emissions before the heating effects and sea level rise due to loss of Arctic sea ice and Arctic methane induced global warming will be completely unstoppable and humanity will be facing total extinction before the middle of this Century (2050).

I cannot emphasise more how serious the Arctic ocean methane eruption problem is and how little time we have left before its effects on global warming become catastrophic. We need to act now before it is too late.

References

Ashton, A. 2001. Harmonograph. A visual guide to the mathematics of music. Wooden Books, Glastonbury. 58 pp.