Poster No,1
"Artificial rainmaking by natural lightning Phenomena through high power Laser system" for Demonstrations

***Project Summary*:**

Project on **"Artificial Rainmaking by Natural Lightning Phenomena Using High-Power Laser Systems Which Initiates Endothermic Reactions Similar to Natural Lightning Phenomena, Onboard Aircraft to Create Multiple Lightning Discharges in the Atmosphere at a Large Scale"** – for demonstration purposes

IRRA Scientist Group has developed a challenging research work, "Innovative rainmaking natural technology by Laser system similar to natural lightning phenomena in the atmosphere ". This technology is scientifically & practically proven in Laboratory cloud chambers, as well as in the atmosphere. This includes "Laser-induced condensation and formation of water drops in laboratory cloud chamber as well as in the atmosphere.

1) *Patent*:

National and International Patent Certificates awarded to **S.K. Chopkar** for *Artificial Rainmaking by Natural Technology*.

- **Patent Office, Government of India**, Patent Number: **538082**
- **International Patent**, Government of Australia, IP Australia Certificate of Grant – Innovation Patent Number: 2020101897 (2021)

2) *IRRA Scientists' Aim:*

"Green Revolution in the Whole World for All Human Beings"

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Please visit our YouTube Channel by searching: "Novel Technology for Artificial Rainmaking"
Click here: https://youtu.be/UYfuH9fAmUs

Please search on Google as S.K. Chopkar or "Rain Enhancement by Endothermic Reactions" Or visit our website: http://www.irraindia.org

Poster No.2

"Artificial rainmaking by natural lightning Phenomena through high power Laser system" for Demonstrations

IRRA Scientist Group has developed a challenging research work, "Innovative rainmaking natural technology by Laser system similar to natural lightning phenomena in the atmosphere ". This technology is scientifically & practically proven in Laboratory cloud chambers, as well as in the atmosphere. This includes "Laser-induced condensation and formation of water drops in laboratory cloud chamber as well as in the atmosphere.

IRRA Scientists have developed two research project proposals on Rainmaking Natural Technology as below:

A) Project Proposal from Aircraft:

Artificial rainmaking by using high power terawatt mobile Laser which initiates endothermic reactions, as a similar natural lightning phenomenon, onboard aircraft with multiple lightning in the atmosphere on a large scale.

IRRA Scientist Group proposes laser system of specification: femtosecond mobile laser 10^{12} watt, 800 nm, 500 MJ, 120 fs and 10 Hz for this research project.

It may work for white warm clouds or any type of clouds in the atmosphere. It is converted into black rainy clouds with natural seeding by wind force, causing heavy rainfall in the atmosphere when more than 50% to 65% humidity is present.

It covers approximately 450 km² area... & estimated cost: ₹230 Crore / USD 28.75 million, for three years, for measuring and fixing atmospheric parameters for maximum rainmaking in the atmosphere. It's a one-time investment, usable multiple times, anywhere.

B) Project Proposal from Ground:

Artificial rainmaking by petawatt (10^{15} watt), double-course laser system from ground, initiating endothermic reactions, as similar to natural lightning phenomena in the atmosphere.

IRRA Scientist Group proposes laser system of specification: petawatt laser (10^{15} watt), 800 nm, 500 MJ, 120 fs and 10 Hz for this research project.

It may work for white warm clouds or any type of clouds in the atmosphere. It is converted into black rainy clouds through natural endothermic reactions as a condensation process with natural seeding by wind force, causing heavy rainfall similar to lightning phenomena in the atmosphere when more than 50% to 65% humidity is present. It covers approximately16km² area estimated cost: ₹9.02 Crore USD 0.72 million, for three years, for measuring and fixing atmospheric parameters for maximum rainmaking in the atmosphere.

IRRA Scientists India, Dhanvantri Nager-30, Post: Sewagram -442102, Dist.- Wardha, Maharashtra, India.

Poster No.3

***Project Summary*:**

Project on ***"Artificial Rainmaking by Natural Lightning Phenomena Using High-Power Laser Systems Which Initiates Endothermic Reactions Similar to Natural Lightning Phenomena, Onboard Aircraft to Create Multiple Lightning Discharges in the Atmosphere at a Large Scale"*** – for demonstration purposes

Fig. No. 1 - For Rainmaking by Laser using Aircraft in the atmosphere

Figure No.2: "Inner Deign of Aircraft with Laser system and *Position of Laser system in Aircraft"*

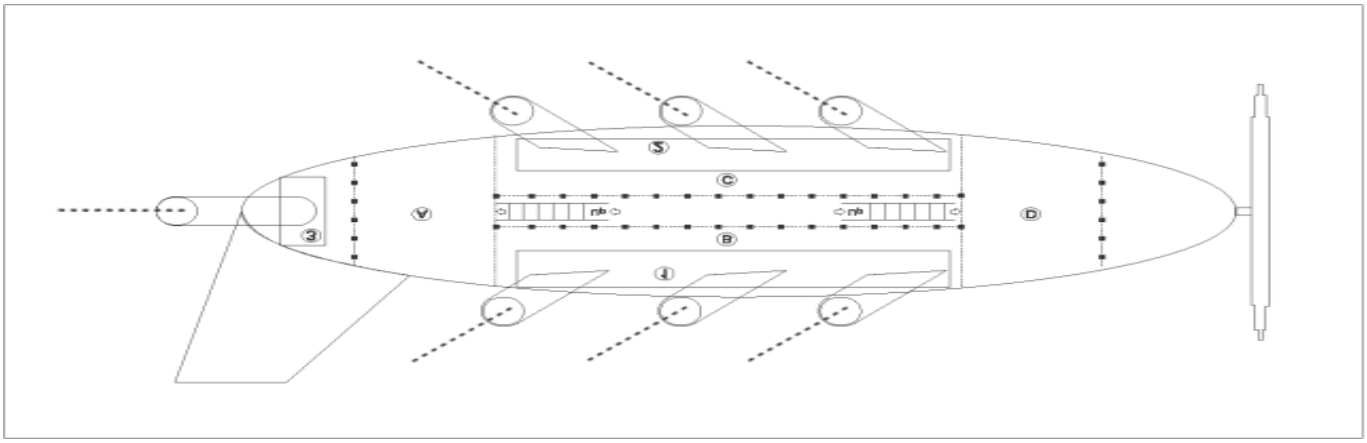

Fig.No.2: "Position of Laser system in Aircraft"

Note:

- ***In Figure No. 2, on the first floor (height 9'), shown parts (1), (2), and (3) are high-power laser release systems which create multiple artificial lightning discharges in the upper atmospheric clouds directly through the laser system.***
- ***In Figure No. 2, on the second floor (height 7' 6"), shown parts (A), (B), (C), and (D) with staircase are high-power generation systems for the high-power laser system, with railing for open space as indicated by square dots***

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PosterNo.4

"Artificial rainmaking by natural lightning Phenomena through high power Laser system" for Demonstrations

Flow Chart:

- *In the atmosphere, after lightning, precipitation is formed and heavy rainfall occurs.*
- *Golde (1977), from a number of radar observations, reported that intense precipitation is not even present in the clouds before the first discharge but develops abruptly in the same region after the discharge, from which the lightning flashes originate.*

↓

This natural lightning phenomenon has been simulated by laser in a laboratory cloud chamber and in the atmosphere.

↓

Results obtained: condensation and water drop formation observed in the laboratory cloud chamber and in the atmosphere up to 75m altitude.

↓

Result: "Laser-induced condensation and water drop formation observed in the laboratory cloud chamber and in the atmosphere up to 75m altitude."

↓

Artificial lightning generated by the laser system creates high temperatures up to 2800K.

↓

At 2800K temperature, the bonds of N_2 and O_2 in the atmosphere break, forming excited N and excited O as follows:

N_2: $N{\equiv}N \rightarrow N + N$

O_2: $O{=}O \rightarrow O + O$

↓

These excited N and O species are very unstable and immediately undergo the following reactions:

$N^* + O_2 \rightarrow NO + O \quad -\Delta H$ (ΔH = 43.2 kcal/mol)

$O^* + O_2 + M \rightarrow O_3 + M \quad -\Delta H$ (ΔH = 67.7 kcal/mol)

↓

The above reactions are endothermic and thus absorb heat (as noted in brackets) from the surrounding atmospheric clouds.

↓

As a result, the temperature drops, condensation occurs, natural seeds are formed, and rainfall ensues—analogous to the process of natural lightning-induced rain.

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↓

Formation of NO and O_3 in the above two endothermic reactions has been observed in the laboratory cloud chamber during laser experiments.

↓

An increase in the density of NO and O_3 has also been measured in the atmosphere after lightning, which also acts as a seeding mechanism for rainfall.

↓

NO and O_3 may undergo various reactions to form HNO_3, $NO_3 \cdot (H_2O)$, $H \cdot (H_2O)$, etc., compounds that bind water molecules (where n may be as large as 100).

↓

Carls and Brock conducted an experiment where the atmosphere was heated up to 1600–2800K. They observed water droplet formation and bond dissociation of N_2 and O_2 in this temperature range.

↓

The IRRA Scientist Group proposes a laser system with the following specifications to initiate endothermic reactions in the atmosphere for artificial rain:
Power: 10^{15} watts, Wavelength: 800nm, Energy: 500mJ, Pulse Duration: 120fs, Repetition Rate: 10Hz.

↓

This method is economical, natural, harmless, and eco-friendly. It can be deployed at any place and at any time.

↓

In the atmosphere, after lightning, precipitation is formed and heavy rainfall occurs.

↓

This natural lightning phenomenon has been simulated by laser in a laboratory cloud chamber and in the atmosphere.

↓

Results obtained: condensation and water drop formation observed in the laboratory cloud chamber and in the atmosphere up to 75m altitude.

↓

Result: Laser-induced condensation and water drop formation in the laboratory cloud chamber and in the atmosphere up to 75m altitude.

↓

This process includes:

A) *Artificial lightning by a high-power laser system*
B) *Condensation via endothermic reactions*
C) *Water droplet formation through natural seeding by wind force*
D) *Heavy rainfall analogous to natural lightning-induced rain*

↓

**This method is economical, natural, harmless, and eco-friendly. It can be deployed at any place and at any time.*

↓

**This process can be applied to warm white clouds or other clouds in the atmosphere, which must be converted into black rainy clouds for artificial rainmaking through condensation.*

↓

**Our findings could be utilized by scientists and engineers to develop artificial rain as a novel method. The results may offer immense benefits to humanity while being eco-friendly and cost-effective, which is essential in current times.*

↓

**Artificial rainmaking methods contribute to increased greenery and oxygen levels while reducing pollution. Thus, these processes play a major role in mitigating drought and enhancing the availability of drinking water in the future.*

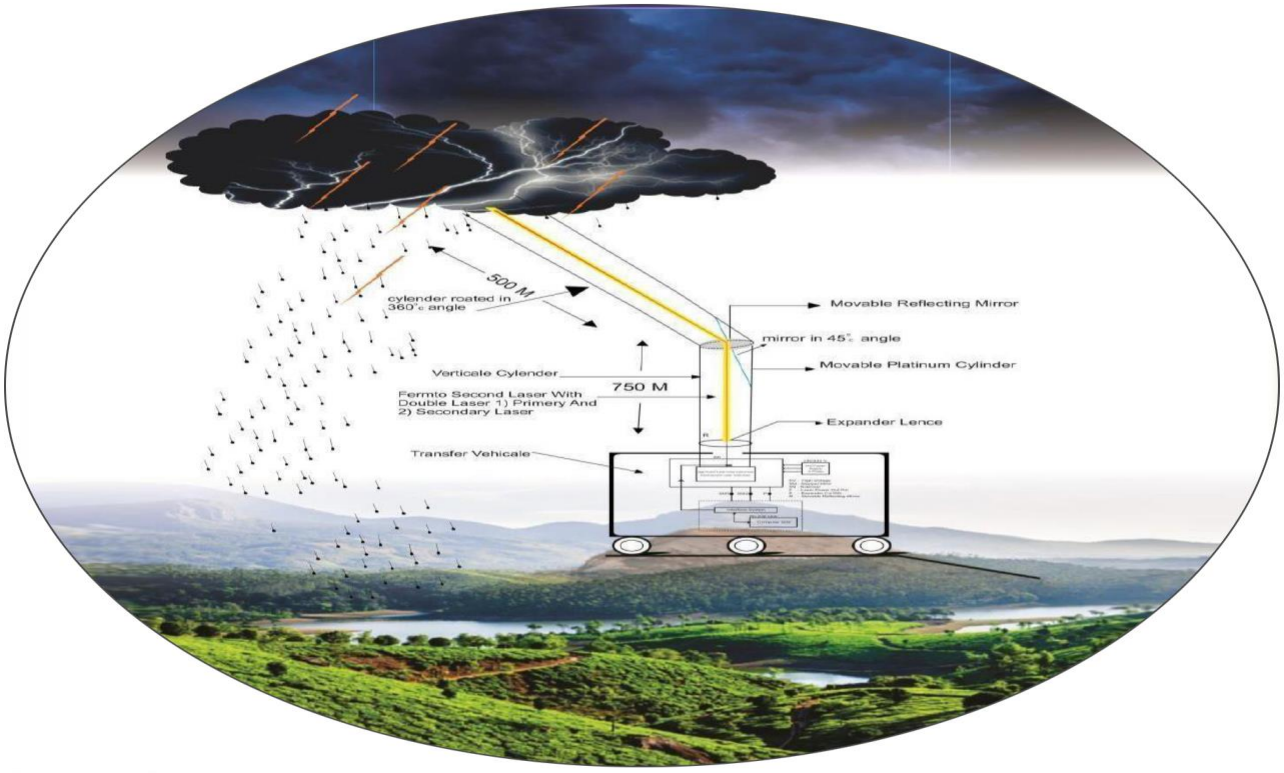
IRRA Scientist's Aim:

"Green Revolution in the whole world for all human beings"
By
IRRA Scientists India

Poster No.5

***Project Summary*:**

Project on ***"Artificial Rainmaking by Natural Lightning Phenomena Using High-Power Laser, in double coarse Laser Systems by Peta Watt (10^{15}watt), Which Initiates Endothermic Reactions Similar to Natural Lightning Phenomena, from Ground in the Atmosphere"*** – for demonstration purposes



Artificial Rainmaking By Laser System From Ground Level Fig : 1

Project Proposal from Ground:

Artificial rainmaking by petawatt (10^{15} watt), double-course laser system from ground, initiating endothermic reactions, as similar to natural lightning phenomena in the atmosphere.

IRRA Scientist Group proposes laser system of specification: petawatt laser (10^{15} watt), 800 nm, 500 MJ, 120 fs and 10 Hz for this research project.

It may work for white warm clouds or any type of clouds in the atmosphere. It is converted into black rainy clouds through natural endothermic reactions as a condensation process with natural seeding by wind force, causing heavy rainfall similar to lightning phenomena in the atmosphere when more than 50% to 65% humidity is present. It covers approximately16km² area estimated cost: ₹9.02 Crore USD 0.72 million, for three years, for measuring and fixing atmospheric parameters for maximum rainmaking in the atmosphere.