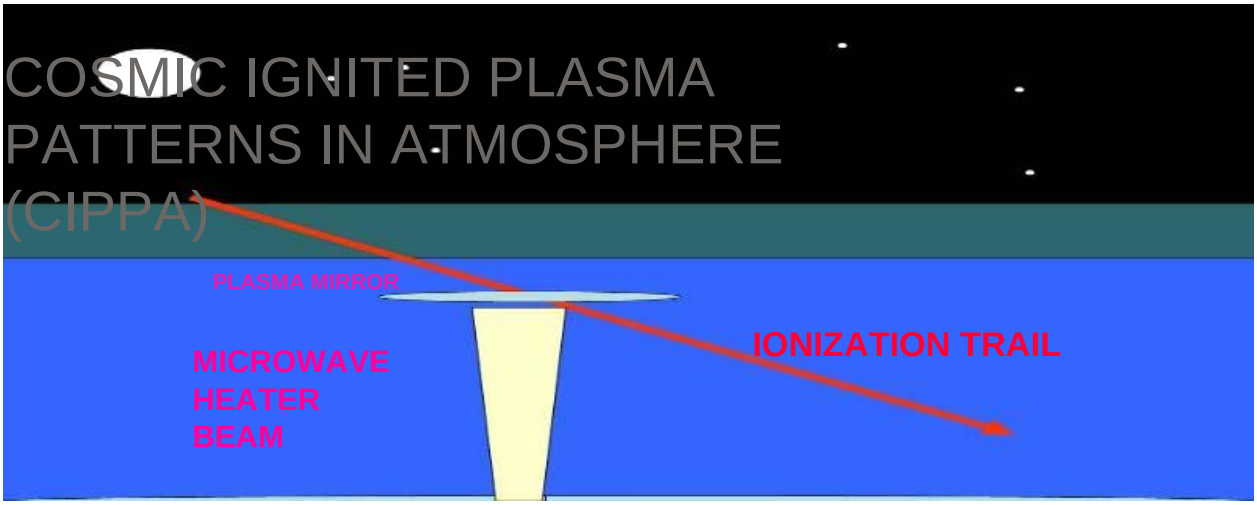

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INTRODUCTION

A new method is being developed and patents are pending in the formation of Cosmic Ignited Plasma Patterns in the Atmosphere (CIPPA). The CIPPA method uses cosmic particle ionization trails to ignite breakdown within the electric field pattern, thus significantly reducing power requirements and costs. The ionized plasma pattern areas reflect a broad range of radio/radar frequencies.

Military applications include quickly deployable communication systems for theater-wide operations, including non line-of-sight UAV communications and specialized intelligence gathering. Civilian applications include city-wide and long-haul, high quality multi-media communications. There are also potential weather applications, such as severe weather control.
The new CIPPA method offers significant benefits compared to previous concepts for formation of artificial ionized regions in the atmosphere. Previous concepts use pulsed beams of electromagnetic radiation and require high electric fields for electrical breakdown in the atmosphere. These previous studies require peak power levels up to 1010 watts and costs in the hundreds of millions of dollars. Because of these extreme power and cost requirements, artificial ionized regions have not been created in the atmosphere using such systems. The CIPPA method takes advantage of cosmic particle ionization trails (cosmic rays for altitudes below 40,000 meters and meteor trails at altitudes over 70,000 meters), which fundamentally change the physics of the breakdown process by providing an ignition source of electrons. The net result of the CIPPA method

Projections indicate this breakthrough for CIPPA could reduce the cost of a system to a few million dollars and reduce the power requirements to less than a megawatt in some cases and significantly below prior methods in other cases. Moreover, the CIPPA innovation could make it possible to create ionized plasma patterns in the atmosphere with low cost microwave oven magnetrons used as radiating elements of a phased array heater. The lifetime of individual radiating elements can be over 6,000 hours. The lower power levels also lead to a safe system; for example, an aircraft could fly through the phased array beam pattern without harm. A patent application regarding the method and apparatus for formation of artificial ionized plasma patterns was filed on September 6, 2005 by Dr. Bernard J. Eastlund.

In the 1980's, Dr. Eastlund was the author of patents assigned to APTI for applications of a large phased array heater on the North Slope of Alaska for ionospheric modification (patent number 4,686,605). One of those applications was the creation of an artificial ionized layer with ECRH heating. Dr. Eastlund played a major role in developing the Artificial

Ionospheric Mirror (AIM) proposal to AFRL in 1987 by APTI (then a wholly-owned subsidiary of ARCO). He is prepared to carry out a proof of concept program for creation of plasma patterns in the atmosphere using cosmic particle ionization trails.

A technical advisory group of experts has been assembled for carrying out the project. This group includes Professors Victor Granatstein and Gennady Milikh, both of the University of Maryland, and Dr. Peter Koert, of MIT. Professor Milikh is one of the pioneers of analysis of artificial ionization layer research and is co-author of an important textbook on the subject. Prof. Granatstein is an expert on microwave power technology and microwave communications. Dr. Koert is an expert on the modeling of ionization layer formation and is the author of a patent on tilting ionization layers.

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