



National Aeronautics and
Space Administration



TECHNOLOGY SOLUTION

Sensors

High Altitude UAV for Monitoring Meteorological Parameters

Infrasonic acoustics for weather monitoring

Acoustical studies of atmospheric events like convective storms, tornadoes, shear-induced turbulence, microbursts, acoustic gravity waves and hurricanes over the last fifty years have established that these events are strong emitters of infrasound. Current methods to forecast near term weather phenomenon is EM based radar and data from radiosondes. Radar is an active remote sensor which has limited range and there is the possibility that radar beams will overshoot the mesocyclonic circulation. There is also a possibility that mesocyclonic circulation cannot be detected because of the conal region immediately above the radar set.

BENEFITS

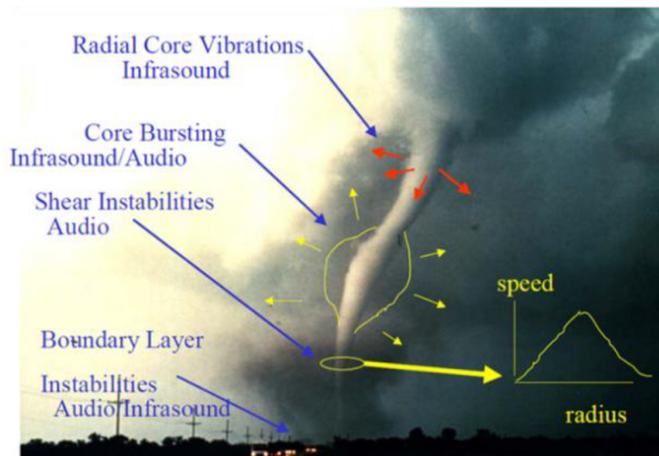
- Less costly than radiosondes
- Storm tracking
- More efficient & more sensitive
- Controllable



THE TECHNOLOGY

Radiosondes are launched twice a day from different locations of the world and meteorological data is collected to plot the STUV diagram and determining CAPE (Cumulative Average Potential Energy) values. Radiosondes are not re-usable and used only at pre-determined locations around the globe. Moreover, a radiosonde can drift up to 125 miles from its release point. About 75,000 radiosondes are used every year.

Given this unmet need, an inventor at NASA has developed an advanced airborne meteorological system which can provide meteorological parameters at any location at any desired time. In addition to routinely used meteorological sensors, an infrasonic sensor is also included to determine wind shear at local and regional levels. The airborne system may also be used in towns and cities to track drones and UAVs in the area. The airborne vehicle (UAV or drone) should be able to track seismic waves, magnetic storms, magneto-hydrodynamic waves, tornadoes, meteor, and lightning, etc. This technology can be use to measure environmental turbulence including wind shear, vortices as well as large and small eddies is an important factor in forecasting local and regional weather. It can also detect infrasound at ranges of many miles from the source and the shape of the acoustic power spectrum can be used to identify type of turbulence in the atmosphere.



Infrasonic sound generation

APPLICATIONS

The technology has several potential applications:

- Monitoring of drone or UAV activity
- Replacement of radiosondes

PUBLICATIONS

Patent No: 10,928,549

More Information

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