Novel lightning threat indicator

CUTTING EDGE TECHNOLOGY

- Technology taking advantage of information about the increase of electric charge of water droplets in a cloud, which is obtained by measuring the characteristics of electromagnetic (EM) radiation backscattered by a cloud at two wavelengths.
- Technology of electric charge monitoring uses a simple principle in which electrically charged particles with dimensions of at least 100 times smaller than the wavelength of radar signal scatter electromagnetic waves with altered efficiency.

STAGE OF PROTECTION AND DEVELOPMENT

- Granted European patent (EP3105614 (B1)) validated in Germany and France; granted Slovak patent (No. 288616); granted US patent (US10859694 (B2)).
- TRL 2 - technology concept and/or application formulated.

APPLICATIONS

- Applied meteorology, mainly the use of information about the state of electric charge of water droplets to indicate the lightning threat for various applications (e.g. in operation of airports).

COMPETITIVE TECHNOLOGY

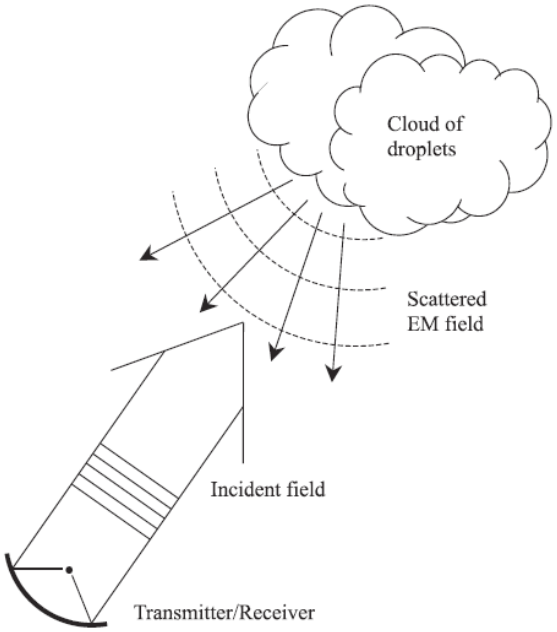
- Prediction capability independent of droplet morphology (the novel technology is based on optical properties).
- Prediction capability independent of external factors such as wind shear.

THE INVENTORS ARE LOOKING FOR AN INDUSTRIAL PARTNER FOR FURTHER DEVELOPMENT AND/OR FOR LICENSING THE TECHNOLOGY

TECHNICAL DETAILS

Principle of function:

- Configuration of the novel invention: a source produces EM radiation of two frequencies that is directed toward a cloud of water droplets. The backscattered light from these droplets is collected by the receiver. The individual intensity components of the two wavelengths are separated in software or within the electronics. The ratio of these two intensities can be monitored.



- By measuring the backscatter signals of EM radiation at two wavelengths (λ_1, λ_2), it is found that the ratio of these two signals remains constant in the case of a conventional aqueous cloud, regardless of size or number of droplets. However, from the moment at which the charging of droplets starts to occur to the moment at which there is a potential threat of lightning, the ratio of signals of scattered radiation will increase proportionally to the factor $A(\lambda_1 : \lambda_2)$.

FOR MORE INFORMATION PLEASE CONTACT

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The inventors use services of the Technology Transfer Office of Slovak Academy of Sciences to market their invention.