## Contributions to the Development of the Romanian Anti-Hail System

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Abstract—The method used in Romania for combating hail is the sowing of the clouds method, with missiles launched from the ground. This paper presents contributions of the University of Craiova, Center for Innovation and Technology Transfer in the development Hail Suppression System.

Keywords—anti-hail; suppression missile; photovoltaic (PV) panel; energy management; launch ramp; positioning system.

## REFERENCES

- [1] L. Alboteanu, Gh. Manolea, "Monitoring and Management of Energy in a Stand Alone Photovoltaic System", Advances in Environment Technologies, Agriculture, Food and Animal Science Proceedings of the 2nd International Conference on Energy and Environment Technologies and Equipment (EEETE '13), 2013, pp. 107-111.
- [2] L. Alboteanu, Al. Novac, Gh. Manolea, C. Nedelcut, "System for monitoring the movement of energy from solar panels to consumers ranked priority", Patent no.126005 B1, published in BOPI no. 6/2012.
- [3] Gh. Manolea, S. Ivanov, L. Alboteanu, C. Şulea, M. Nicolaie "Design and Control of the Electric Drive of the Anti-Hail Launching System" Anals of 'Eftimie Murgu' university Resita. Engineering series, Year XXI, no. 2, 2015, pp. 385-392.
- [4] L. Alboteanu, Gh. Manolea, C. Şulea, "Results regarding monitoring of the risks in the Romania-Bulgaria Cross-Border Area", AGIR Buletin, supplement no.1/2015, pp. 109-116.
- [5] E. Koutroulis, K. Kalaitzakis, "Development of an integrated dataacquisition system for renewable energy sources systems monitoring", Renewable Energy 28 (2003), p.139–152.
- [6] M. Kim, E. Hwang, "Monitoring the battery status for photovoltaic systems", J. Power Sources 64 (1997), p. 193-196.
- [7] D. Păsculescu, "Ensuring continuity in electricity supply to consumers by power reserve automatic connection". Annals of University of Petroşani. Electrical Engineering Series Vol.3. UNIVERSITAS Editure. ISBN 73-8260-69-8. Pp.56-59.
- [8] Zoller C., Dobra Remus, Microcontroller Implementation In The Electrical Networks For The Hazardous Areas, microCAD 2008, International Scientific Conference, University of Miskolc, Hungary, 2008.
- [9] C. Zoller, M. Cernat, R. Dobra, "Power Network Current Protection based on a Predictive Algorithm", Optimization of Electrical and Electronic Equipment OPTIM'08, IEEE Xplore INSPEC, DOI: 10.1109/OPTIM.2008. 4602327, 22-24 May Brasov, Romania, 2008. [10] xxx Romania-Bulgaria Cross-Border Cooperation Programme 2007- 2013. Joint Risk Monitoring during Emergencies in the Danube Area Border MIS-ETC Code: 166. Application number: 2S-2.2-1