

Interpretation of flight data from a fixed-wing UAV system dedicated to flying over high voltage lines

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Abstract: *This paper analyzes and presents an interpretation of the flight data resulting from a flight of a fixed-wing UAV system that was designed from the beginning to perform support missions in order to monitor losses on critical infrastructure in Romania; in this particular case it monitors the losses on the high voltage powerlines in order to detect Corona discharge. Also, for the safety of the flight, in order to design the flight route, aspects regarding the altitude, the relief and the possible obstacles that may appear on the flight route were analyzed. After designing the flight route in accordance with the path of a 400 kV high voltage overhead powerlines, the flight was performed and the flight parameters were analyzed in order to validate the system. In conclusion, from the analysis of UAV parameters and its behavior in case of a real flight on high voltage lines it can be stated that UAV systems with fixed wing are recommended for flight on overhead powerlines, behave stably, sensors on board are not influenced by electromagnetic field of the powerline, so that this type of UAV system does not endanger the physical integrity of the overhead powerlines or the system operation.*

Key Words: *UAV, flight parameter, high voltage powerlines, flight route*

1. INTRODUCTION

The energy strategy has important implications for the national security of any country, so a country without its own energy resources is vulnerable to armed conflict, and dependence on another energy power forces it to enter into unfavorable transactions in order to maintain the security of its citizens.

Both the diversification of sources and supply routes, as well as the limitation of the dependence on imported energy resources, in the future, represents a priority for any country wishing to improve its energy efficiency. This can be achieved by reducing losses which are quite high, especially on high voltage networks. Thus, a large part of the losses on the overhead power lines are caused by the Corona discharge, and to annihilate this phenomenon two steps are necessarily: the first one is to detect Corona discharge over the powerlines and the second one is the replacement of damaged components (insulators, conductors etc.) so that Corona discharge is eliminated.