



## **Complex weather support system for Unmanned Aerial Vehicle (UAV) mission planning and execution**

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The potential losses of property and lives due to weather impacts have higher chance in aviation than in other fields of transport. In case of Unmanned Aerial Vehicles (UAVs) the loss means the damage of the vehicle during the flight or complete loss of the UAV due to a loss-of-control situation. Furthermore the UAVs are more sensitive to weather conditions because of their different characteristics. To avoid losses we need to reduce weather risk by a more accurate and sophisticated meteorological support of flight mission planning and execution. That was the reason of the development of a complex meteorological support system, which is able to effectively reduce the potential risk based on weather impacts of aviation. The system includes a dataset-based mission planning part, a numerical weather prediction section and an ultra-short term fuzzy logic based analog forecasting subsystem. The first part based on a special aviation climatological database or a dataset of a long-term weather forecast. It helps to find the most appropriate time for mission execution considering the weather impacts and the user's needs. This part uses fuzzy logic in searching process and Analytic Hierarchy Process (AHP) in weighting the chosen meteorological parameters. The second part uses WRF numerical weather prediction model, whose outputs are optimized for such kind of aviation tasks. The fuzzy logic based analog forecasting subsystem find the most similar situations to the actual weather situation and it helps to give an ultra-short term forecast for the most relevant meteorological parameters. The preliminary results of the verification are convincing and help to optimize the system before operational use.