



## **MATISSE: a meteorological aviation supporting system developed in a GIS environment**

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Awareness of weather conditions plays an increasing role in different societal and economic sectors, in particular the aviation one which is very sensitive to the meteorological conditions. In fact, adverse meteorological conditions are among the most important causes of accidents causing human and economic losses. For these reasons it is crucial to monitor and nowcast such events and avoid risks during all the flight phases. In this framework CIRA (Italian Aerospace Research Center) has implemented MATISSE (Meteorological AviaTion Supporting SystEm), an ArcGIS Desktop Plug in, in order to detect and forecast meteorological aviation hazards over the main European airports, by using different sources of meteorological data (synoptic information, satellite data, numerical weather prediction models outputs). Such functionalities are realized after a preprocessing of raw data achieving more complex information, useful for the detection and the forecast of aviation hazards. After that, the data are stored in a database used by ArcGIS and further processed in order to provide maps, graphs and statistics. MATISSE presents a dockable toolbar in a GIS environment, allowing the user to easily select and visualize the desired information. In particular, the user can access to real time functionalities and visualize, on a map, the chosen meteorological hazard or variable (such as visibility conditions, cumulonimbi, wind speeds and directions, present weather, pressure, relative humidity, past weather, cloud cover, height of base of clouds, cloud type, geopotential, altimeter settings, three hour pressure change) over an airport or an area of interest (Europe, Italy). Such variables are represented in a user friendly way, by using simple icons easy to understand and reporting the risk level for aviation in order to provide pilots information about the meteorological conditions during the flight and the following hours. MATISSE, in fact, is able to handle the output of COSMO LM model (NetCDF files) and visualize such information. Moreover it is interfaced to an innovative tool based on MSG-2 satellite data, able to forecast the evolution of cumulonimbi, clouds responsible of thunderstorms, wind shear, icing and turbulence phenomena. MATISSE includes also tool for the statistical characterization of the typical weather bad conditions on the airport of interest, for example percentage of fog events on particular time windows.