



Use of UAV to monitor and manage the territory during geo-hydrological hazards

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In the last decades, the people and the societies are becoming more vulnerable; although the frequency of natural events may be constant, human activities contribute to their increased intensity. The demographic pressures and territory management have also largely contributed to an increase in natural disasters and environmental emergencies to society. Every year, millions of people are affected by natural disasters globally and more than 80% of all disaster-related deaths were caused by natural hazards. The use remote sensing has become a standard practice to monitor and analyze the evolution of the territory, mainly due to the wide development and availability of several sensors, which can operate on ground-based, airborne and space-borne platforms. In this context, Unmanned Aerial Vehicles (UAVs) have been increasingly considered also for remote sensing operations in civilian contexts and they play an important role in emergency management since they are capable of gathering valuable image information from low altitude for emergency management.

In this work, we aim at detecting and simulating a relevant framework related to geo-hydrological risks, based on both real operational scenarios and on research and development in progress. In addition, we define strategies depending on UAV types (category, size, fixed or mobile wing) as well different sensors (Lidar, Radar, Hyperspectral, Digital Camera, Near Infrared) applied in different scenarios and area of investigation. We focus on the use of UAVs during geohazard emergencies, such as earthquake events, floods, and landslides. In particular, we present the results of theoretical context are applied to a real case, the "Cinque Terre" flood event (25 October 2011). We simulate the potential use of UAV platform in a real operating scenario, by using as reference the Cinque Terre Flood data and information. For this event we discuss and consider the main aspects relevant, highlighting the advantages and disadvantages that emerged using the UAVs.