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An unmanned search and rescue mission

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The Remotely Piloted Aircraft Systems (RPAS) are becoming more and more powerful and innovative and they have an increased interest in civil applications, in particular, after natural hazard phenomena.

The RPAS is useful in search and rescue missions in high mountain where scenarios are unfriendly and the use of helicopters is often not profitable. First, the unmanned configuration is safer because there is no hazards for human life that is not on board. Moreover, it is cheaper due to the use of electric propulsion instead of internal combustion engine and to its small dimensions and weights. Finally, the use of the RPAS is faster while the helicopter is often not available because is involved in other missions or it cannot be used if the search mission is in impervious scenario, such as forests with thick vegetation.

For instance, the RPAS can be used after an avalanche when victims have little time to be saved before the death by hypothermia.
In most conditions, the body maintains a healthy temperature. However, if it is exposed to cold temperatures, especially with a high cooling factor from wind and high humidity, for extended periods, the control mechanisms of the body may not be able to maintain a normal body temperature. When you lose more heat than the body can generate, it takes over hypothermia, defined as a body temperature below 35° C.
Wet clothing, fall into cold water or not adequately cover themselves during the cold season, are all factors that can increase the chances of hypothermia.
Signs and symptoms (tremor, slurred speech, breathing abnormally slow, cold and pale skin, loss of coordination, fatigue, lethargy or apathy, confusion or memory loss) usually develop slowly. People with hypothermia typically experience a gradual loss of mental acuity and physical capacity, and realize that you have need of emergency medical care.
For these reasons, the use of an RPAS could be crucial for the survival of disappeared people in high mountain.

In November 2015, a joined exercise between the Italian Red Cross and the Politecnico of Turin was performed at Exilles (Italy). Medical teams and engineers worked together looking for a victim disappeared in the woods. In particular, a multicopter was used with a thermal camera on board and the victim was found after 15 minutes.
Some problems occurred. First, the camera was not so able to distinguish between the body-temperature (about 12°C) and the tree-temperature (about 11.5°C). In particular, the victim was found only if he was moving while he was not identified if he was still and squatting. Second, the area of searching was reduced because the multicopter has an endurance of 30 minutes that in high mountain is halved due to the low temperature and the reduced efficiency of the batteries.

The use of the RPAS in high mountain could be very efficient but there are some challenges that can be overcome with a collaboration between industries, universities and researching teams.