Humanitarian Demining - UAV-Based Detection of Land Mines

Reinhard Gottwald (Switzerland), Winfried Mayer (Germany) and Nando Docci (Switzerland)

Key words: Engineering survey; Low cost technology; Positioning

SUMMARY

Humanitarian Demining - UAV-based detection of land mines

The humanitarian clearance of land mines is still a huge challenge:

• According to UN-requirements at least 99.6% of all mines must be cleared up to a depth of 13 cm,

• There are different types of mines (metal, minimum metal, nonmetal)

• Mines in different environments (city, jungle, desert) were placed regularly or ir-regularly and can be redistributed by erosion and surface movements.

In 2015 a feasibility study proved the possibilities of a UAV-based mine detection system for the automatic detection of landmines. In a cooperation of 3 Swiss and German Universities since early 2016 a UAV-based system for mine detection is developed, which will be first used for the process of land release (a very important part of mine action). The system consist of a 5kg payload drone, a low cost RTK-GNSS-System, cameras for a photogrammetric production of a DTM, microwave sensors for mine detection and an anti-collision system. One of the key problems is the required high position- and orientation-accuracy of the drone to operate the microwave mine detection sensors (SAR / GPR) properly. The whole system will be designed for an easy use by minimum trained operators.

This paper is focussing on the actual state of the project and on future perspectives and

challenges.

The project is supported by the Geneva International Centre for Humanitarian Demining (GIHCD) and is financed by the Swiss 'Foundation Urs Endress'