Motivation
- Fast reconnaissance of major damage and disasterous situations
- Prevention of human contact to hazardous materials from intended and accidental output from CBE hazardous material

Overall concept
- Fast reconnaissance of extensive areas with UAV system “MACS alpha” (1)
  - automatic flight to operation area
  - acquisition of geo-referenced aerial pictures in real time
  - assessment of the situation and determining the hazardous areas

Characterization and identification of the leaked hazardous materials with the UAV system “LUCS” (2)
- automatic flight to points of interest
- laser based stand-off detection from a safe distance
- identification of the released substance in real time

Prompt for appropriate countermeasure based on the acquired information

LUCS – UAV based stand-off detection system
- Based on laser-induced fluorescence spectroscopy
  - detection from safe distances
  - suited for identification of chemical and biological warfare agents
- Framework / Requirements
  - eye safe system operation
  - high sensitivity for long range detection
  - automated classification of detected hazardous substances
  - low false alarm rate
- Advantages of LUCS
  - discreet detection system
  - prevention of human contact to hazardous CBE materials

Experimental results
- Feasibility study of LUCS system
- Measurement and identification of white powders with LUCS under realistic conditions
  - detection distance: 10 m
  - measurement time: 100 ms
  - ambient light conditions
- Derivation of the scalability
- Measurements confirm the feasibility of a sensitive UAV based CBE stand-off detection system

Future tasks
- Further compaction of system
- Enhancement of sensitivity
- Extension by a laser based hyperspectral imaging system
- Implementation of gas detection

LUCS detection system
UAV based detection and identification of CBE warfare agents
- Technique: laser spectroscopy
- Working distance: 10 – 50 m
- Detection rate: 1 kHz
- Dimensions: 17 x 25 x 46 cm³
- Weight: 6.5 kg

Powder 1
Powder 2
Powder 3

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