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UNMANNED AERIAL VEHICLE EQUIPPED WITH CBRN DIM CAPABILITY TO ENHANCE... (2016)

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Title	Unmanned aerial vehicle equipped with CBRN DIM capability to enhance the chemical awareness
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Abstract	The awareness of the possible presence of toxic chemical compounds at and around military compounds and other critical infra structures is crucial and normally monitored by point detectors. The disadvantage of these type of detectors is that large quantities (organized in a network) are needed when a large area is to be controlled. Secondly point detectors cannot be placed in areas that are not controlled by own forces. Therefore there is a need for a DIM capability that is able to scan larger areas and is able to measure in areas that cannot easily be reached. Such systems that can determine "out of the fence" of a compound or safe area will ensure additional early warning time to take the appropriate countermeasures for protection. Standoff detectors can be placed on the border of the safe area or effected area and monitor the surrounding. Passive standoff detectors can determine the presence of chemicals based on their IR spectrum. However the technique suffers from influences by weather conditions and other interferents. Moreover it is questionable whether reaching orders will be given guided by just one detection technique. Therefore there is a strong need for a second technique that is a capable to determine the chemical awareness on longer distance. An unmanned aerial vehicle (UAV) equipped with DIM capabilities (CBRN-drone) could fill this gap. In a National Technology Project (NTP) the Dutch Ministry of Defence sponsored a joint project between small company Delft Dynamics, manufacturer of UAV's, and research organization TNO, to develop a prototype of a CBRN-drone. This presentation gives an overview on the Concept of

Operation of such a CBRN-drone, the design and first experiments with integrated sensors and sampling systems. Given the limited payload of the drone (typically 1-2 kg) the UAV can only be equipped with small systems. Additionally the flight time of electrically driven systems is also limited. Taken this together the utility of a CBRN-drone is limited and restricted to a target directed use, rather than in a monitoring mode. The CBRN-drone, under construction, is equipped with a smart sampling system. The sampler itself consists of a vacuum canister or helium diffusion sampler that is activated manually or triggered by onboard generic detection systems. Crucial in that respect is the location of sampling and detection systems to avoid the interference by downwash caused by the rotor blades of the helicopter. Results of experiments showing the impact of downwash will be shown. A study-model of the CBRN-drone is shown at the TNO booth. Finally an outlook will be given on our thoughts on future developments for CERN-drones.

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