Homeland Defense & Security
Information Analysis Center

Technical Inquiry 2018-4319

Developed by:
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HDIAC Contract Number:
FA8075-13-D-0001

Distribution A: Distribution unlimited: Approved for public release

Overview

A Department of Defense Information Analysis Center (DoDIAC) representative to the United States Special Operations Command (USSOCOM) requested information regarding unmanned aerial vehicle (UAV)-compatible CBRN detectors.

Findings

HDIAC identified several CBRN sensors capable of operating on a UAV platform for agent detection in an operational environment. Table 1 lists relevant technologies, their sensing capabilities, contact information for industry developers, and salient details concerning operational usage. For relevant sensor images, see Table 2.

Sensor	Company Information	Sensor Type	Contact Info	Size and Weight	Details
FLIR IBAC 1 [1]	FLIR Systems, Inc. (https://www.flir.com/products/ibac-1/)	Biological	877-692-2120 detection@flir.com	Approx. size of a toaster: 2.7 kg	Designed for UAV mounting and robotic integration for bio-aerosol capture and analysis.
ViriChip System [2]	Bioforce Nanosciences (http://www.bioforcenano.com/)	Biological	Kerry Frey 515-233-8333 kfrey@bioforcenano.com	Approx. size of a toaster: 5-25 kg	Designed for UAV platform to perform non-automated standoff detection. Highly functional for field use, as well as mobile, diagnostic, and analytical laboratory scenarios.
Morphix ChemBio Detector [2]	Morphix Technologies (https://www.wmddetectorselector.army.mil/detectorPages/195.aspx)	Chemical/ Biological	Kim Chapman 800-808-2234	Approx. size of soda can: <1 kg	Adaptable to UAV platform for non-automated standoff detection. Functional for field use, but less suitable for mobile, diagnostic, and analytical laboratories.
Rapid Plus Standoff Chemical Detector [2]	Bruker Detection Corporation (https://www.bruker.com/products/cbrne-detection/ft-ir/rapidplus-rapidplus-control-20-vom/overview.html)	Chemical	Frank Thibodeau 978-663-3660 x1308 fnt@bdal.com	Approx. size of carry-on luggage suitcase: 25-50 kg	Designed for use on helicopters to perform automatic standoff detection. Smaller variations of this sensor may be adaptable to larger, fixed wing UAVs. Functional in field use and mobile laboratories. Not suited for diagnostic and analytical laboratories.
Lightweight Chemical Detector (LCD) 3.2e [2]	Smiths Detection (https://www.smithsdetection.com)	Chemical	+44-1923-658447 gmer.emea@smithsdetection.com	Approx. size of soda can: <1 kg	Designed for use on fixed and mobile platforms (including UAVs) to perform automatic, instantaneous detection. Highly functional for field use, as well as mobile, diagnostic, and analytical laboratory scenarios.
Mobile Radiation Detection & Monitoring System [2, 3]	Radiation Solutions, Inc. (http://www.radiationsolutions.ca/airborne/)	Radiation	+1-905-890-1111 service@radiationsolutions.ca	Approx. size of carry-on luggage suitcase: 5-25 kg	Designed for use on helicopters and other vehicles to perform automatic standoff radiation detection. Smaller variations of this sensor may be adaptable to UAVs.

Table 1: CBRN sensors adaptable for UAV use

		
FLIR *IBAC 1 [1]*	ViriChip System [2]	Morphix ChemBio Detector [2]
		
Rapid Plus Standoff Chemical Detector [2]	Lightweight Chemical Detector (LCD) 3.2e [2]	Mobile Radiation Detection & Monitoring System [3]

Table 2: CBRN sensor images

Conclusion

The sensors identified in this report are readily adaptable for detecting CBRN agents in an operational, field usage environment. A more comprehensive analysis of CBRN sensors suitable for deployment on UAV platforms for operational use is available through an HDIAC Core Analysis Task (CAT). Such a task would assess state of the art CBRN sensors and address principle size, weight, and power (SWaP) constraints associated with mobile sensors achieving high accuracy detection at standoff ranges.

We request your feedback on this Inquiry: https://www.hdiac.org/new-inquiry-assessment-form/

References

1. FLIR (2017, January). FLIRIBAC™ OEM Kit Instantaneous Biological Analyzer and Collector. Retrieved from https://www.flir.com/globalassets/imported-assets/document/datasheet-ibac-oem-en.pdf
2. Caples, M. (2017, October). Global CBRN Detector Market Survey (ECBC-TR-1483). Edgewood Chemical and Biological Center (ECBC), Aberdeen Proving Ground, Maryland. Retrieved from https://apps.dtic.mil/docs/citations/AD1040693
3. Radiation Solutions (2018) Radiation Detection & Monitoring Technologies: Airborne. Retrieved from http://www.radiationsolutions.ca/airborne/