DOE/NV/25946--1718

Utilization of Local Law Enforcement Aerial Resources in Consequence Management (CM) Response

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Austin, TX

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Abstract

DOE/NV/25946--1655

ABSTRACT

Utilization of Local Law Enforcement Aerial Resources in Consequence Management (CM) Response

Piotr T. Wasiolek, Russell L. Malchow

Aerial Measuring Systems, Remote Sensing Laboratory

During the past decade the U.S. Department of Homeland Security (DHS) was instrumental in enhancing the nation's ability to detect and prevent a radiological or nuclear attack in the highest risk cities. Under the DHS Securing the Cities initiative, nearly 13,000 personnel in the New York City region have been trained in preventive radiological and nuclear detection operations, and nearly 8,500 pieces of radiological detection equipment have been funded. As part of the preventive radiological/nuclear detection (PRND) mission, several cities have received funding to purchase commercial aerial radiation detection systems. In 2008, the U.S. Department of Energy, National Nuclear Security Administration Aerial Measuring System (AMS) program started providing Mobile Aerial Radiological Surveillance (MARS) training to such assets, resulting in over 150 HAZMAT teams' officers and pilots from 10 law enforcement organizations and fire departments being trained in the aerial radiation detection. From the beginning, the MARS training course covered both the PRND and consequence management (CM) missions. Even if the law enforcement main focus is PRND, their aerial assets can be utilized in the collection of initial radiation data for post-event radiological CM response.

Based on over 50 years of AMS operational experience and information collected during MARS training, this presentation will focus on the concepts of CM response using aerial assets as well as utilizing law enforcement/fire department aerial assets in CM. Also discussed will be the need for establishing closer relationships between local jurisdictions' aerial radiation detection capabilities and state and local radiation control program directors, radiological health department managers, etc. During radiological events these individuals may become primary experts/advisers to Incident Commanders for radiological emergency response, especially in the early stages of a response. The knowledge of the existence, specific capabilities, and use of local aerial radiation detection systems would be critical in planning the response, even before federal assets arrive on the scene. The relationship between local and federal aerial assets and the potential role for the further use of the MARS training and expanded AMS Reachback capabilities in facilitating such interactions will be discussed.

This work was done by National Security Technologies, LLC, under Contract No. DE-AC52-06NA25946 with the U.S. Department of Energy.

Players

Preventive **R**adiological and **N**uclear **D**etection (**PRND**) Mission Federal Government driven (U.S. Department of Homeland Security [DHS]/Domestic Nuclear Detection Office [DNDO]) but: *Many state and local law enforcement agencies are already participating in this effort through the use of radiation detection equipment during routine patrol, commercial vehicle inspections, maritime small-craft inspections, and special-events security.*

Consequence **M**anagement (**CM**):

Initially a local problem when dealing with consequences of radiological/nuclear incident

Dual purpose detection equipment – can be used during PRND as well as CM

Example: RadEye
Thermo Electron advanced pocket size radiation instrument for radiation detection, gamma dose rate measurements, and area monitoring.

Incident Commander (IC):

The IC is responsible for all aspects of the response, including developing incident objectives and managing all incident operations. The IC sets priorities and defines the Incident Command System organization for the particular response.

Is he/she aware of what capabilities or assets are available locally, and what they can do especially in regard to rad/nuc detection?

Problem Statement

DHS/DNDO focused on PRND mission

Significant number of PRND detectors distributed to local jurisdictions

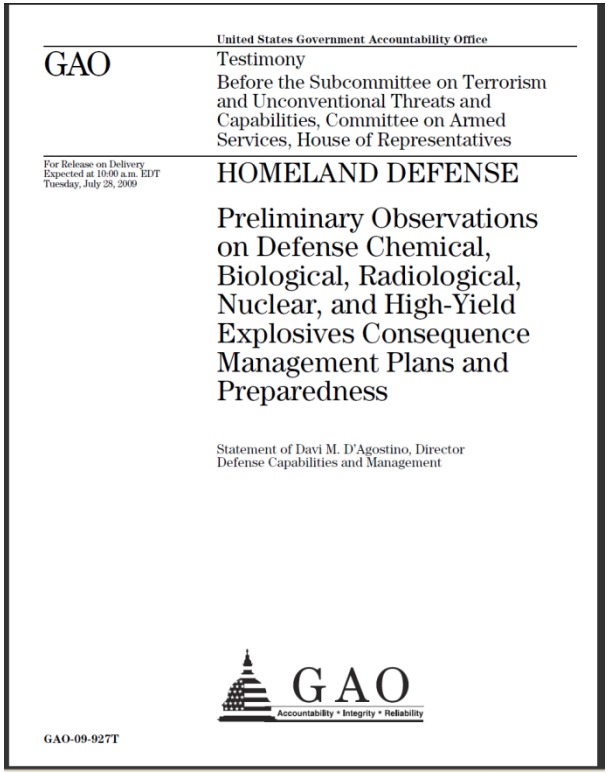
Most PRND detectors are capable of measuring exposure rate/dose or collect spectra useful for CM

With some additional CM training of the first responders, IC has at his/her disposal numerous field monitoring teams

Local jurisdictions: Collect information on existing PRND assets and their CM capabilities and make plans how to use them for CM (CRCPD?)

DNDO was founded on April 15, 2005, with the signing of NSPD 43 /HSPD 14. It is a jointly staffed, national office established to improve the nation's capability to detect and report unauthorized attempts to import, possess, store, develop, or transport nuclear or radiological material for use against the nation, and to further enhance this capability over time.

Quick Reminder (All Emergencies Are Local)



United States Government Accountability Office

GAO

Testimony

Before the Subcommittee on Terrorism and Unconventional Threats and Capabilities, Committee on Armed Services, House of Representatives

For Release on Delivery
Expected at 10:00 a.m. EDT
Tuesday, July 28, 2009

HOMELAND DEFENSE

Preliminary Observations on Defense Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives Consequence Management Plans and Preparedness

Statement of Davi M. D'Agostino, Director
Defense Capabilities and Management

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GAO-09-927T

"…The National Response Framework establishes the principles that guide all response partners in preparing for and providing a unified national response to disasters. (Ref) **Under the Framework, disaster response is tiered; local government and agencies typically respond immediately after an incident.** When additional resources are required, states may provide assistance with their own resources or may request assistance from other states through interstate mutual agreements or the Emergency Management Assistance Compact. Localities and states usually respond within the first several hours of a major incident. The federal government provides assistance to states if they require additional capabilities and request assistance…"

Ref: Department of Homeland Security, *National Response Framework* (Washington, D.C.: Jan. 2008). *The National Response Framework—previously known as the National Response Plan—is the plan that guides how federal, state, local, and tribal governments, along with non-governmental and private sector entities, will collectively respond to and recover from all hazards, including catastrophic disasters, such as Hurricane Katrina.*

Background Info

DNDO Director, before the House Committee on Homeland Security, Subcommittee on Cybersecurity, Infrastructure Protection, and Security Technologies, "The Last Line of Defense: Federal, State, and Local Efforts to Prevent Nuclear and Radiological Terrorism within the United States," July 25, 2011.

"DNDO has also made radiological and nuclear detection training available to over 15,000 state and local officers and first responders.

*The FY 2012 budget includes **$20 million to procure human portable radiation detection equipment** including next-generation devices that provide enhanced detection capability."*

DHS DNDO Policy Statements

Department of Homeland Security, Office of Inspector General: "DHS' Domestic Nuclear Detection Office Progress in Integrating Detection Capabilities and Response Protocols," OIG-08-19, December 2007:

*"**The Domestic, State, and Local** Integrated Product Team is responsible for implementing efforts to reduce the risk to densely populated urban areas by developing, demonstrating, procuring, and supporting the deployment of radiological and nuclear detection equipment, and reporting systems for the interior layer of the Global Nuclear Detection Architecture."*

DHS Securing the Cities (STC) Program

Official website of the Department of Homeland Security

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DHS Announces the Expansion of the Securing the Cities Program to Los Angeles/Long Beach Area

Release Date: October 15, 2012

For Immediate Release
DHS Press Office
Contact: 202-282-8010

WASHINGTON—The Department of Homeland Security (DHS) today announced the expansion of the Domestic Nuclear Detection Office's (DNDO) Securing the Cities (STC) program to the Los Angeles/Long Beach area. The STC program is designed to enhance the nation's ability to detect and prevent a radiological or nuclear attack in cities facing the highest risk.

"Countering chemical, biological, radiological and nuclear threats requires a coordinated, whole-of-government approach," said Secretary of Homeland Security Janet Napolitano. "The Securing the Cities program is a key component of the Department's efforts to protect our nation by enhancing our ability to detect and interdict illicit radiological and nuclear weapons or materials in major metropolitan areas."

As part of the STC program, the Los Angeles/Long Beach area will receive a direct grant of $1 million and an additional $500,000 in training support, and will be eligible to receive additional funding pending Congressional appropriations to build a region-wide, robust nuclear detection capability.

Under the Securing the Cities program, DNDO will partner with the City of Los Angeles Mayor's office to develop a regional structure of law enforcement and first responder organizations to identify, prevent and respond to potential nuclear or radiological threats. DNDO will also assist regional partners in conducting training and exercises to further their nuclear detection capabilities and coordinate these with federal operations. Initial efforts in the Los Angeles/Long Beach area will focus on meeting the immediate needs of state and local agencies to develop baseline nuclear detection and reporting capabilities, including equipment and training.

The effort in the Los Angeles/Long Beach area is the first expansion of the STC effort since the program's inception. Securing the Cities began in 2006 as a pilot project for the New York City region, providing equipment, tools and training through cooperative agreements to the New York Police Department, which in turn distributes grant money to other participating agencies. STC has provided more than 8,500 pieces of detection equipment, trained nearly 13,000 personnel, and conducted more than a hundred drills.

For more information, visit www.dhs.gov.

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Review Date: October 15, 2012

TOPICS: Border Security; Citizenship and Immigration Services; Civil Rights and Civil Liberties; Cybersecurity; Disasters; Economic Security; Homeland Security Enterprise; Homeland Security Jobs; Human Trafficking; Immigration and Enforcement; International Engagement; Law Enforcement Partnerships; Preventing Terrorism

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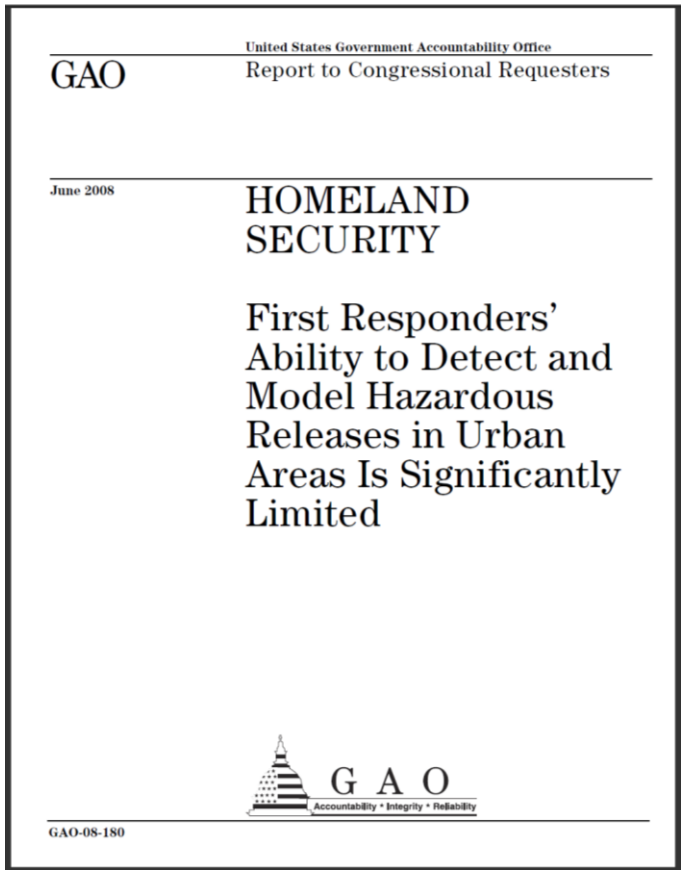
"STC has provided more than 8,500 pieces of detection equipment, trained nearly 13,000 personnel, and conducted more than a hundred drills."

Who is first on the scene?



United States Government Accountability Office

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Report to Congressional Requesters

June 2008

HOMELAND SECURITY

First Responders' Ability to Detect and Model Hazardous Releases in Urban Areas Is Significantly Limited

GAO

Accountability • Integrity • Reliability

GAO-08-180

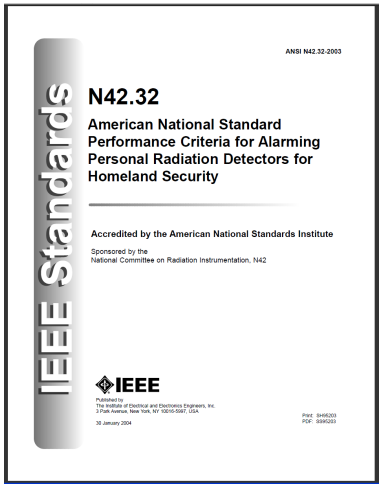
"State and Local Responsibilities

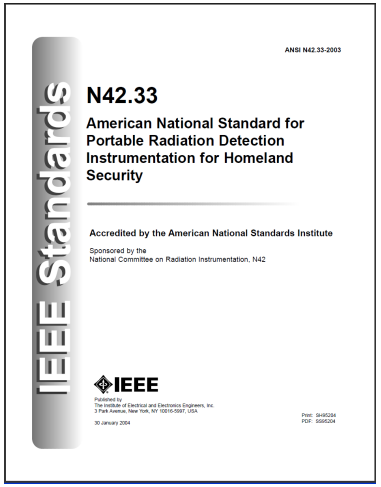
- *State and local responders share in the responsibility for responding to CBRN events, but local first responders play the key role because they are the first to respond.* ***The first line of defense in any terrorist attack on the United States is its first responder community—police officers, firefighters, emergency medical providers, public works personnel, and emergency management officials****. Their role is to protect against, respond to, and assist in recovery from emergency events. Traditionally, first responders have been trained and equipped to arrive at the scene of a natural or accidental emergency and take immediate action."*

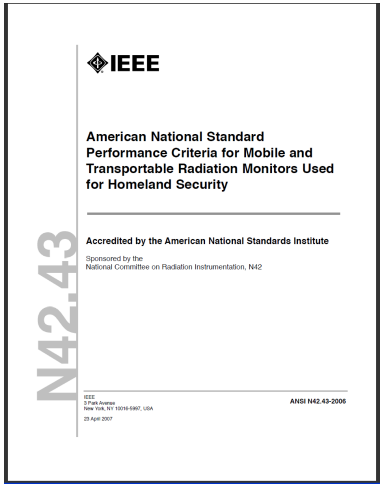
Dual Use Specifications

According to ANSI standards, all PRND instruments should serve two functions:

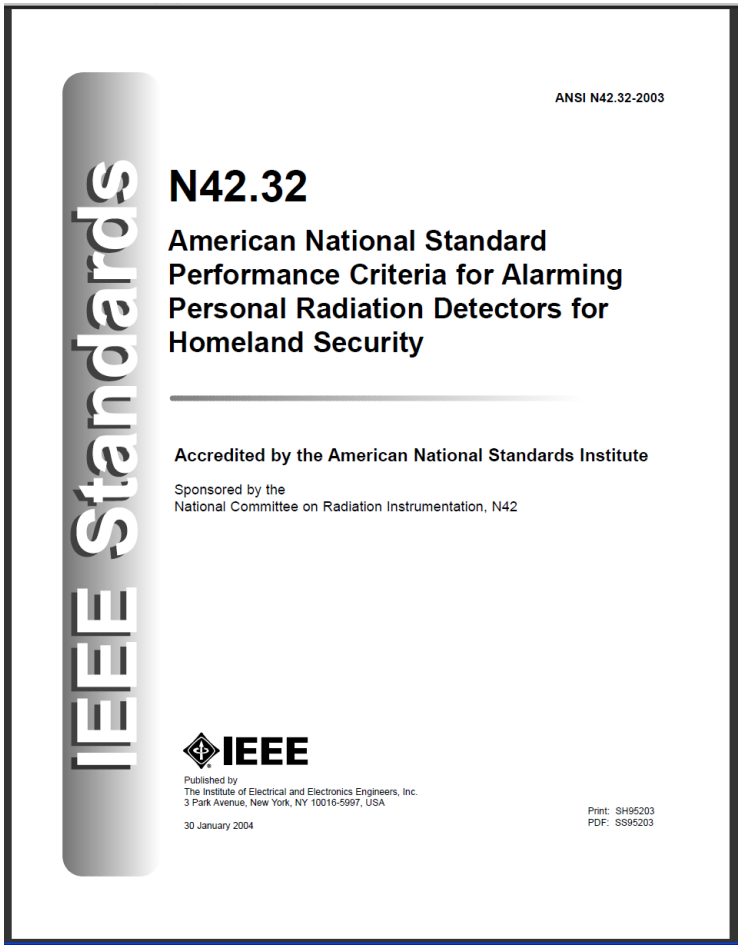
- Radioactive anomaly detection
- Dose rate measurement







ANSI Standard for PRD Instruments (Rad Pagers)



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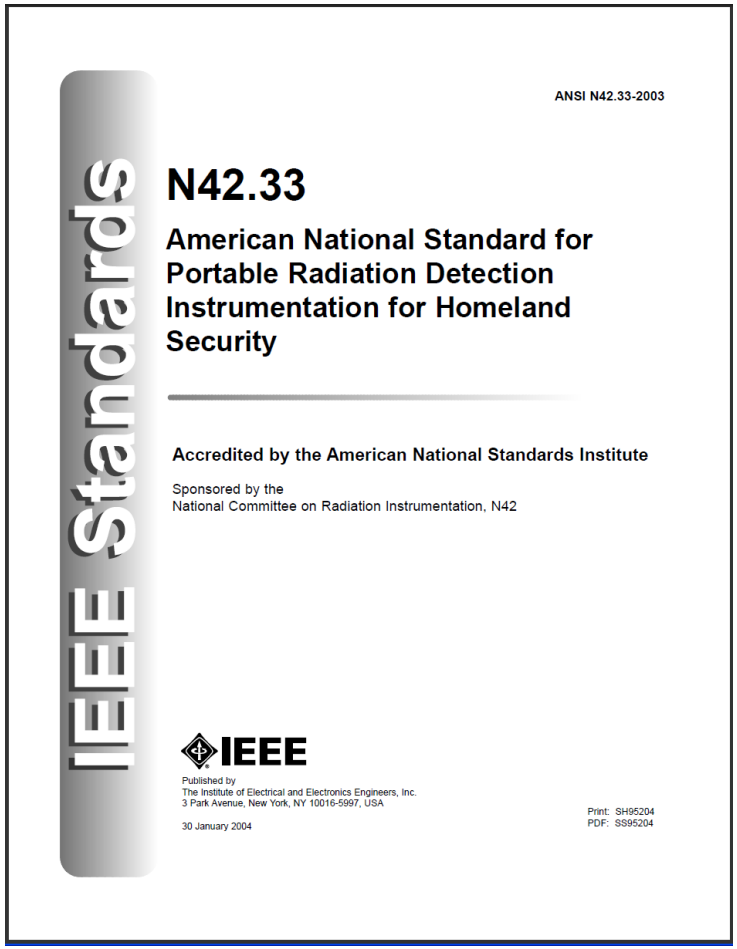
5. Performance requirements

5.1 General requirements

Instruments addressed by this standard are carried on the body and are used to detect and indicate the presence and magnitude of ionizing radiation. **These devices are not primarily intended to provide a measurement of dose equivalent rate. However, their indication can provide an approximate value of exposure rate that should be reasonably accurate.** Health physics instruments that are primarily intended to provide a measurement of dose equivalent, or dose equivalent rate, should be tested using ANSI N42.17A-1989 [B16] and ANSI N42.20-2003 [B19].

ANSI Standard for Handheld Instruments



Page 1:

1.2 Scope

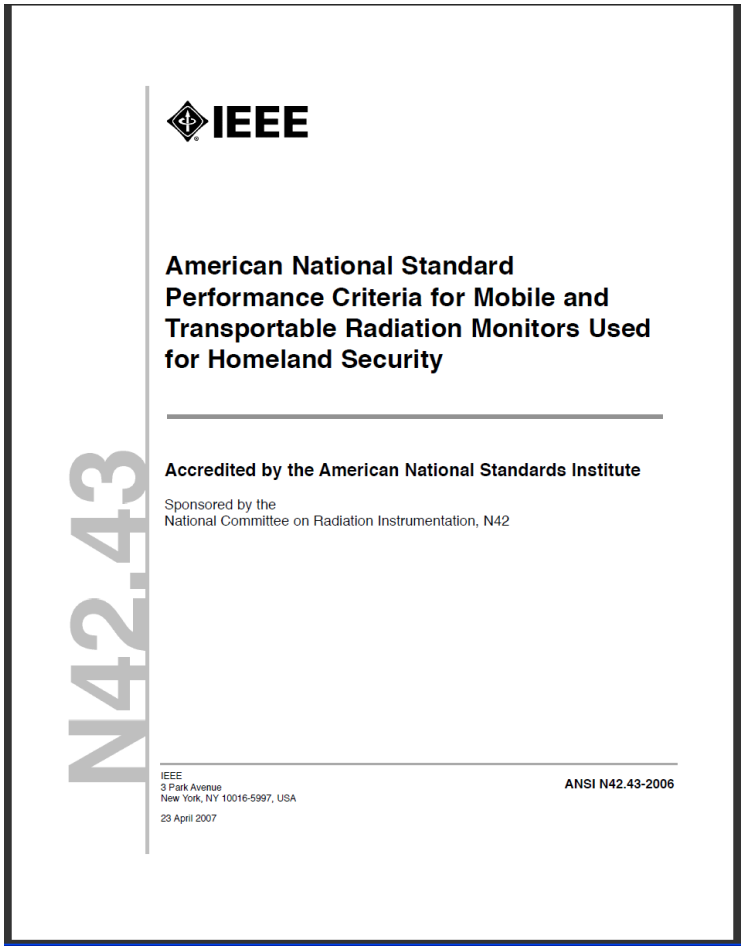
This standard establishes design and performance criteria, test and calibration requirements, and operating instruction requirements for portable radiation detection instruments. These instruments are used for detection and measurement of photon emitting radioactive substances for the purposes of detection and interdiction and hazard assessment. The informative annexes of this standard provide reference information.

The standard covers portable instruments used for:

- Detection of radioactive substances on or in people, containers, and vehicles, including:
- Photon (gamma- and x-ray) emitting radionuclides.
- Other types of radiation and radionuclides will be considered in other standards.
- **Determination of exposure rate with alarming capability for Homeland Security personnel including:**

— Fire fighters,
— Police,
— Customs and border officials,
— Additional emergency personnel

ANSI Standard for Mobile Instruments



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5.3 Data storage

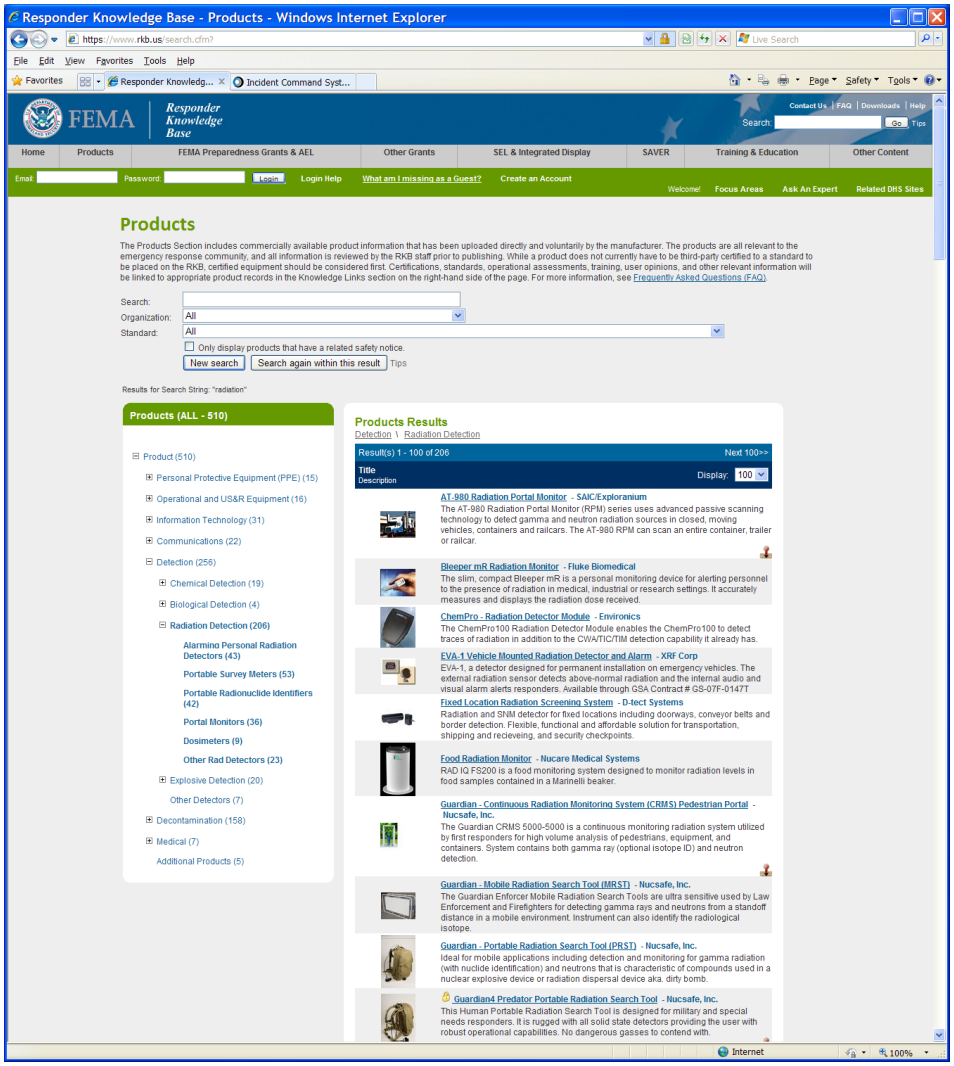
The following list details monitor information for data storage:

The monitor shall have the ability to internally store at least 1000 complete occupancy data sets if the monitor uses occupancy sensors. For monitors that do not use occupancy sensors, the monitor shall have the ability to store at least 3 h of continuous measurement data.

Each occupancy data set shall contain collection results information including:

1. Time and date in GMT format and local offset
2. Occupancy time (if applicable)
3. Monitor identification
4. Monitor location (GPS for mobile systems)
5. Monitor speed (when applicable)
6. Alarm type (gamma-ray and/or neutron) and level (if applicable)
7. **Background (gamma and neutron) count rate**
8. **Radionuclide identification results (when applicable)**
9. **Radionuclide spectra (when applicable)**
10. **Gamma-ray count rate (for individual detectors)**
11. **Neutron count rate (for individual detectors if applicable)**
12. Monitors shall be able to store measurement data listed in item b), including background radiation levels and gamma-ray and neutron count rate time-history data locally, and shall have the ability to transfer user-selected portions of that data to a periphery device or location either through manual interface or remotely as required by the user and provided by the manufacturer.
13. Monitors shall provide controlled access to real-time response data.
14. Monitors shall have the ability to perform measurements with an object stationary in the detection zone or with the object moving through the detection zone either on its own, or with the object stationary and the monitor moving.

Instruments for PRND



- The Federal Emergency Management Agency (FEMA) Responder Knowledge Base web page lists 206 radiation detectors.
- The majority of PRND instruments are capable of measuring exposure rate, dose, spectra, etc., as required by ANSI standards. Such measurements are critical in making informed decisions regarding public protection.

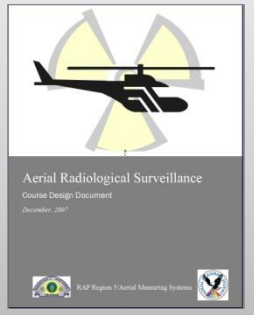
What about really expensive equipment?

Aerial Radiation Detection Assets

Helicopter

Radiation Detection Equipment

Relevant Training



Aerial Radiation Detection Asset

Aerial Measuring System (AMS)

A U.S. Department of Energy, National Nuclear Security Administration (NNSA) asset providing aerial radiation measurements using dedicated rotary and fixed wing aircraft.

- AMS provides responsive aerial measurements to detect, analyze, and track radioactive material before and during emergencies
- This includes Mission Planning, Acquisition, Post-Analysis, and Reporting
- Established in 1967
- Originally supported the Nuclear Test Program
- Expanded Mission
  - Provide initial data to RAP Teams and FRMAC
  - Confirm NARAC predictive computer models
  - Give initial assessment of ground deposition
  - Search for lost radioactive sources or scattered fragments

MARS Training Initiation
Chicago Meeting September 2007

Domestic Nuclear Detection Office (DNDO)

Assisting Domestic Law Enforcement Communities with Aerial Detection Expertise

Federal Community Brief To
Chicago Police Department
September 18, 2007

Homeland Security

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1

Mobile/Aerial Radiological Surveillance (MARS) Course

Scope

The course is designed to prepare flight crews to set up, operate, plan, and execute an aerial surveillance mission using their mobile radiation detection system mounted to law enforcement agency helicopter.

Target Audience

- Law enforcement officers
- Pilots
- Law enforcement supervisors
- Public safety officers
- Public safety supervisors
- Other skilled personnel that provide immediate support services during prevention and deterrence of radiological/nuclear detection and interdiction operations

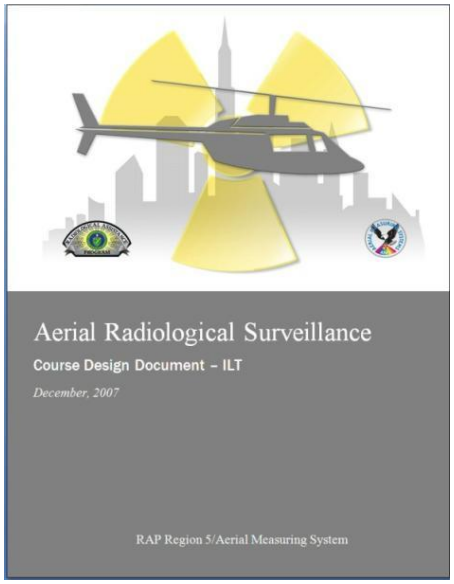
Prerequisites

There are no specific prerequisites for this course.

Course Length

Flexible but typically 24 hours (three 8-hour days) (3rd day if source over-flying can be arranged)

Mobile/Aerial Radiological Surveillance (MARS) Training



Scope

The scope of the training is to prepare law enforcement officers to:

- **Set up and operate the commercial radiation data acquisition system they own.**
- **Plan and execute aerial surveillance mission using their aerial assets.**
- **Respond to real-time alarms using radioactive sealed sources deployed in a secure area.**
- **Carry rudimentary radiation mapping mission (CM).**

City	Chicago PD, IL	New York NYPD, NY	Washington, PD, DC	Los Angeles, PD/LASD,CA	Las Vegas, METRO,NV	Newburg, NYPDEP,NY	Chicago FD, IL	Tallahassee FWC/FHP, FL	Suffolk County PD
#Students	11	11	7	15	18	11	33	20	16

AMS and RAP personnel deliver the training

MARS Participants

~150 law enforcement officers (operators and pilots) from:

- Chicago Fire Department
- Chicago Police Department
- Florida Highway Patrol
- Hillsborough County Sheriffs' Department
- Florida Wildlife Conservation Division of Law Enforcement
- Suffolk County Police Department
- Civil Support Team
- Los Angeles County Sheriffs' Department
- Los Angeles police Department
- Las Vegas Metropolitan Police Department
- Philadelphia Police Department
- New York City Police Department
- New York Environmental Conservation Police
- Washington DC Police

Aerial Systems in Local Jurisdictions

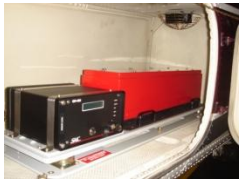
Mirion Technologies SPIR-IDENT MOBILE

- Two glass fiber double detector cases containing 4" x 4" x 16" NaI(Tl) crystals with total volume of 16 liters and Interface Box and GPS antenna.
- The system collects 1024-channel spectral data every second, displays the map with the trajectory, and performs identification of up to four isotopes mixed (in addition of background), with confidence level and quantification indication, and has user selectable alarm criteria.

Thermo Scientific Mobile Detection System (MDS) (external and internal)

- 5-liter organic plastic scintillator detector, coupled to a global positioning based movable mapping system that automatically tracks both the position and corresponding radiation measurement of the local background.
- Thermo Natural Background Rejection (NBR) technology enables the detection system to discriminate between naturally occurring radioactivity and nuclear materials of real concern.

Exploranium GR-460



- The GR-460 mobile radiation detection system is used for measuring and mapping radiation in urban and rural environments – for cargo and facility security, emergency response, nuclear surveillance, and military force protection.
- NaI detector 4 L volume 4" x 4" x 16" log connected to DR-320 spectrometer.

Radiation Solutions Inc. RS-700 (internal)

- The configuration used for state and local jurisdictions week consisted of RSX-3 carbon fiber detector case with three 2" x 4" x 16" NaI(Tl) crystals (RSX-3) with a total volume of 2 liters.
- RadAssist survey software program for user control, monitoring, and recording of data.
- RS-701 collects 1024-channel spectra every second that are linearized stabilized.

Radiation Solutions Inc. RS-700 (external)

- The Los Angeles Sheriff's Department configuration consisted of two carbon fiber detector cases with one 4" x 4" x 16" NaI(Tl) crystal each (RSX-1) with a total volume of 2 liters.
- RadAssist survey software program for user control, monitoring, and recording of data.
- RS-701 collects 1024-channel spectra every second that are linearized stabilized.

Possibly Others

Aircrafts in Local Jurisdictions

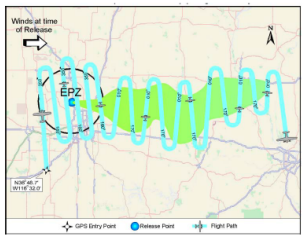
Bell 412 helicopter	**Cessna 182**	**Bell 206**
		
DOE Remote Sensing Laboratory Bell 412 Helicopter	**AS350 Eurocopter**	**Many Others**
		

CM Flight Patterns Practice During MARS

NATIONAL SECURITY TECHNOLOGIES ORGANIZATION PROCEDURE			
Document Number: **OP-2200.287**	Rev. **0**	Effective Date: **July 24, 2012**	
Document Title: **Aerial Measuring System (AMS) Mission and Survey**			Page **13** of **22**

maneuver will employ up to the maximum authorized angle of bank and maximum climb/descent rates, as dictated by the aircraft and environmental conditions.

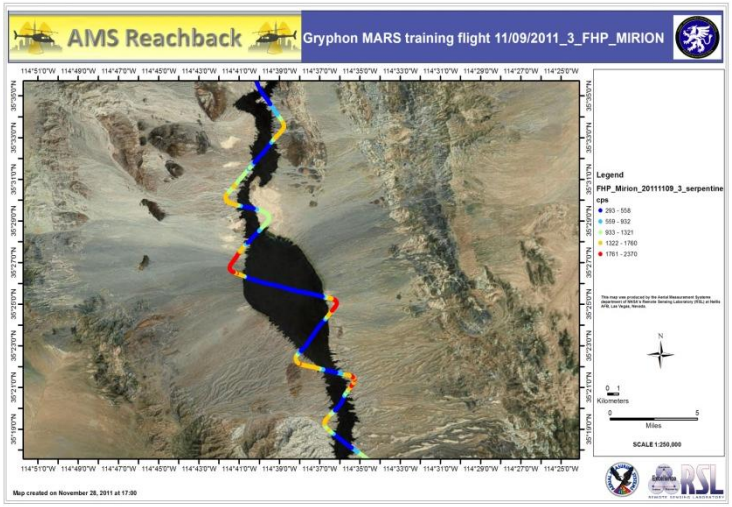
4.10 Ground Deposition Mapping

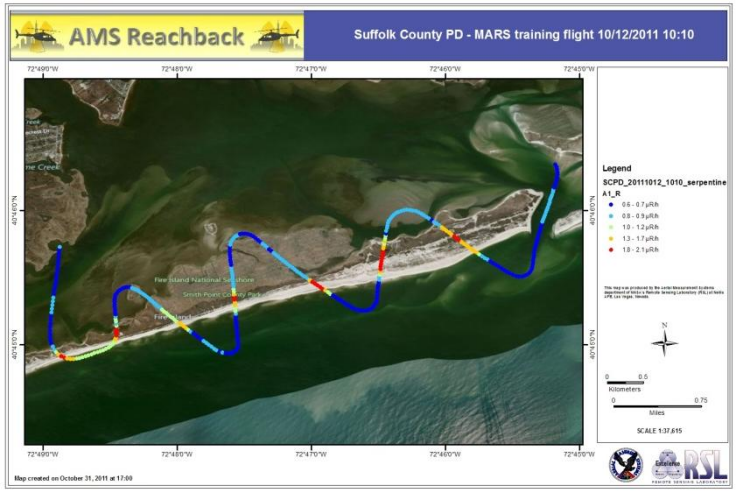


4.10.1 The primary mission objective is to rapidly, but coarsely, map the residual deposition pattern and intensity of any contaminated debris or material that may have been deposited.

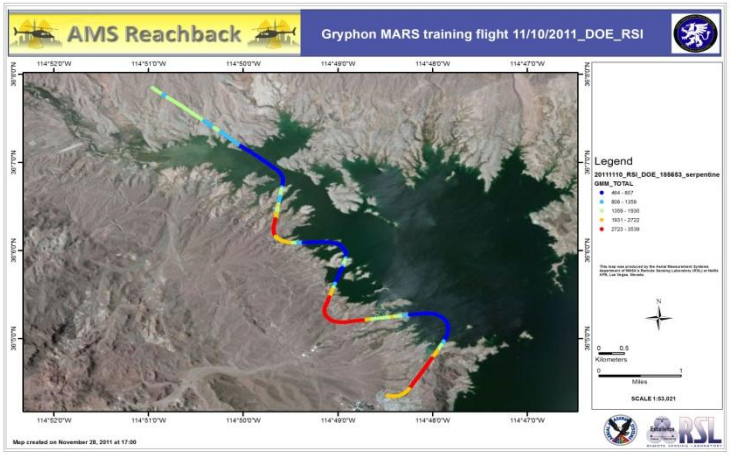
A. This mission will be flown after a radioactive release has occurred and any resulting airborne plume has dissipated.

CM mission flown by FHP Cessna with Mirion system on board

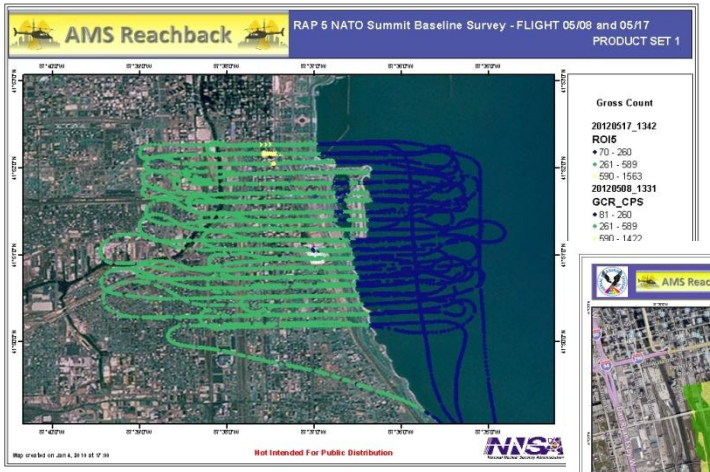




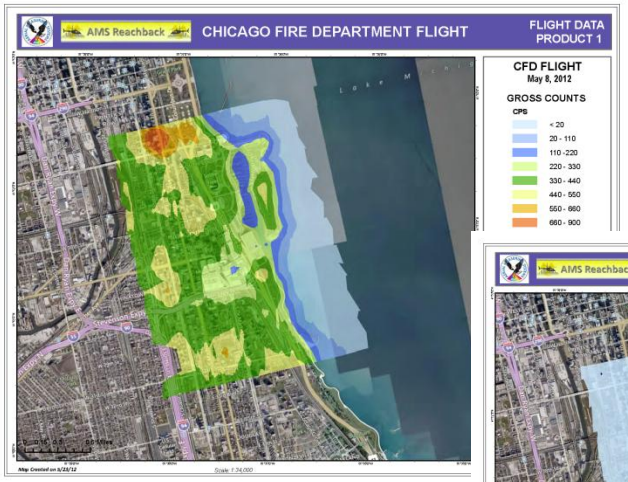
CM mission flown by RSL helicopter with RSI system on board

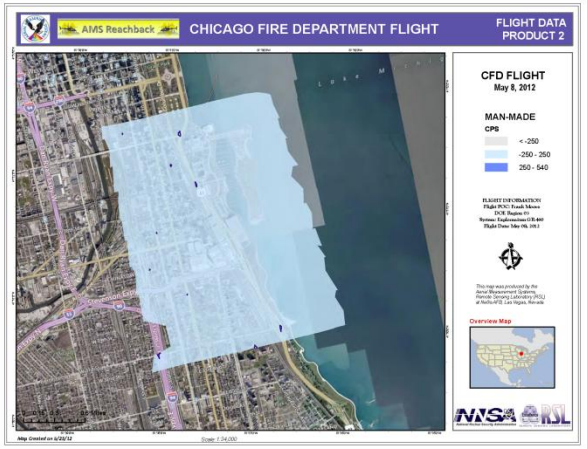


Response Example



Chicago Fire Department and RAP survey, May 2012



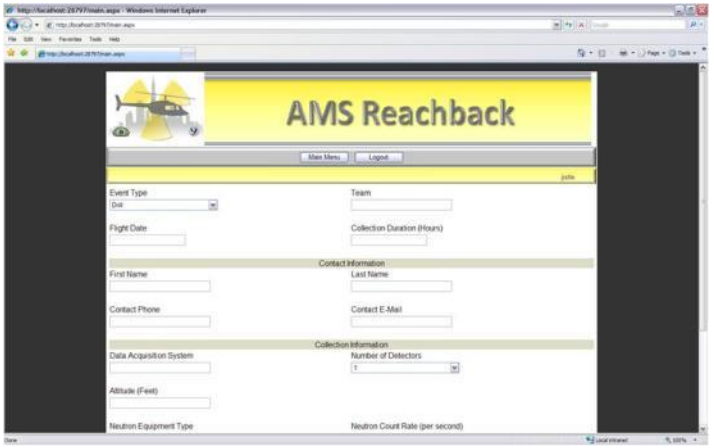


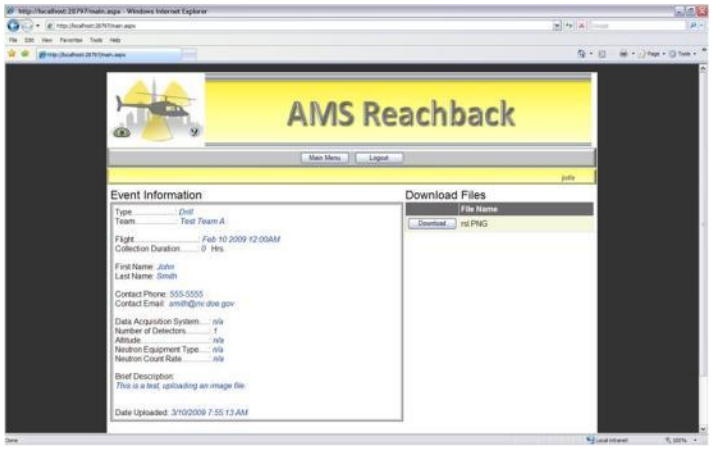
Q: What to do with the data?

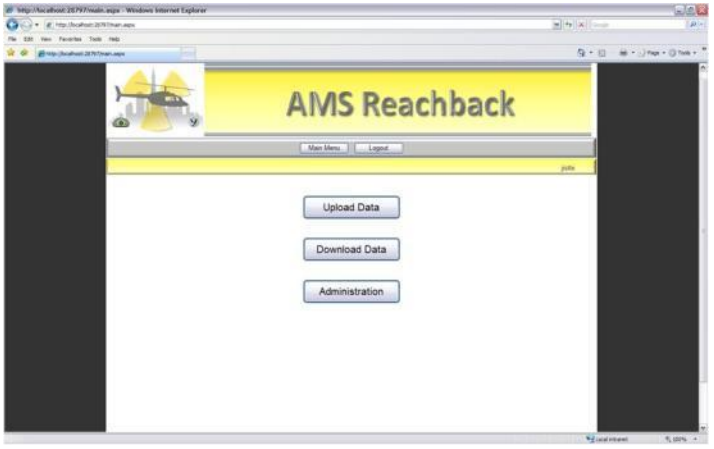
AMS National Reachback

- Asset created as help to local jurisdictions in executing aerial surveillance mission and acting as technical reachback for other aerial radiological measurements
- 24/7 Reachback Duty Team to provide technical assistance and data analysis
- Web Page for data transfer

AMS Reachback Web Page

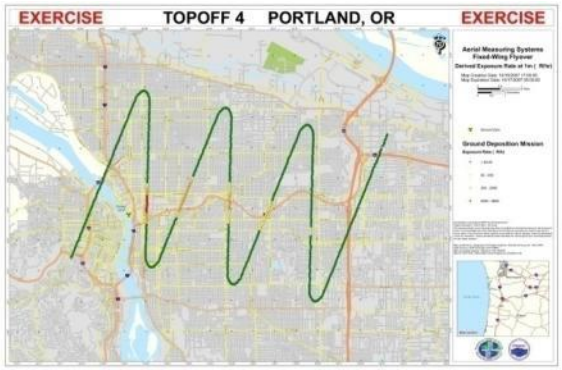


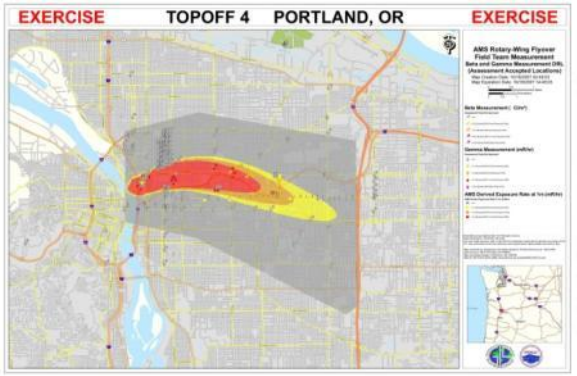




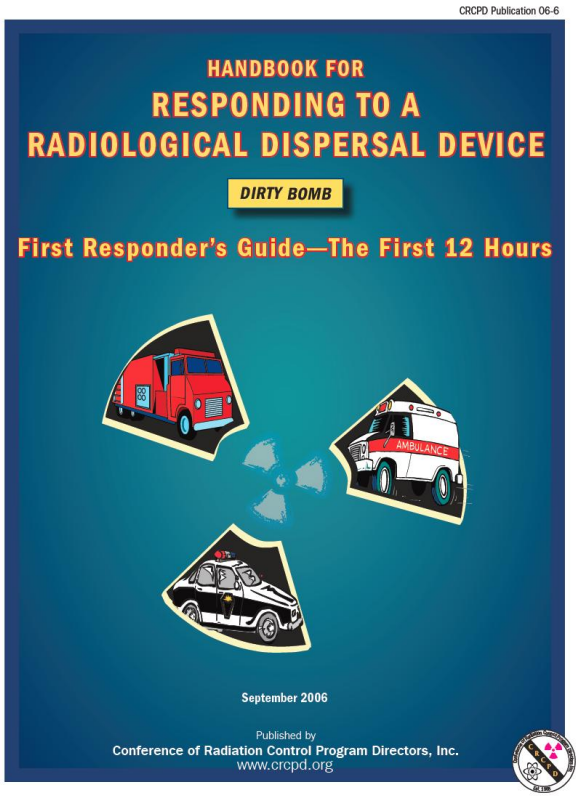
AMS Reachback Roles
during Aerial Consequence Management Response to a Nuclear/Radiological Incident/Accident

- When requested, initiates ARAC model predictions, downloads them, and create a simplified map product for downloading by the regional assets.
- Assists in recommending the mission dependent optimum flight pattern; creates maps.
- Analyzes and assess the received data.
- Creates a map data product as “breadcrumbs” or contour plots.
- Advises in any aspect of aerial radiological emergency response before, during, and after a radiological event.





Role of Local Radiation Control Program Staff



ESTABLISH INCIDENT COMMAND

Incident command unifies all emergency responders under a single command hierarchy. In the years following the development of the incident command concept, its acceptance had become widespread; state and local officials are now expected to integrate their resources into the Incident Command Structure (ICS), consistent with the National Incident Management System (NIMS) when responding to emergencies, whether natural or man-made in origin. ICS training is required for first responders and this document assumes that an ICS will be established following an RDD detonation.

A staff member of the radiation control program should function as the Radiation Safety Officer in the Incident Command upon arrival at the scene.

If feasible, establish the Incident Command Post at a location upwind with background radiation levels. If this is not feasible, use an area of less than 2 mR/hr and contamination levels less than 1,000 cpm measured 1-2 inches from the ground with a pancake probe. Check with local/state radiation control personnel if it appears necessary to establish the Incident Command Post in a higher radiation/contamination area.

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***Author's opinion*:**

This is an important but rather limiting role for the staff member of the radiation control program.

Being potentially the first radiation expert(s) on the scene, such person should have knowledge of the local assets and be the IC advisor on their capabilities and deployment.

Examples of State Involvement in MARS Training

Bureau of Radiation Control

Mobile/Aerial Radiological Surveillance (MARS) Training
FWC Aviation Facility, Tallahassee, FL
April 29–May 3, 2012

Radiation Control Program

"Gryphon" State and Local MARS Training
Las Vegas, NV
November 7–10, 2011

Conclusion

Experience shows that there is data starvation in any radiological incident during early phases.

However:

- There is a lot of equipment up there.
- There are a lot of trained responders up there.
- There is local radiation expertise (CRCPD).
- We should make sure all the resources are known and utilized correctly.

"Wow. I did not realize I had such sophisticated CM capability in my own area or maybe available via mutual aid/EMAC from neighboring jurisdictions. I should make sure I write this in my response plans."