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Chemical, Biological, Radiological and Nuclear Consequence Management Advisory Team

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If y[redacted]m wou[redacted] you will m[redacted]ter and more acc[redacted]s a picture." The U.S. Environmental Protection Agency (EPA) Airborne Spectro Photometric Environmental Collection Technology (ASPECT) Program is striving to make this request a reality with the goal to provide airborne collected chemical, radiological and situational data to first responders in a form compatible with their mission and within minutes from collection.

Providing data rapidly to the end-user is not particularly easy if one considers all of the tasks that must be completed between the collection of the data and the ultimate delivery of the data/products to the decision maker.

Data Collection

ASPECT uses an airborne suite of infrared, gamma ray, and visible (photographic) sensing detectors to rapidly collect information above an incident. Since the system uses the concept of remote sensing, the aircraft and more importantly the flight crew is never placed into a hazardous chemical or radiological environment during the data collection. In addition, since ASPECT is an airborne platform, the system can be and often has been rapidly dispatched to an emergency incident, taking up a patrol over the area once on station. When on station, ASPECT has the flexibility to patrol over the incident and to make remote measurements based on the site conditions (e.g., wind) and the first responder input (e.g., a report on conditions at this location). ASPECT's suite of sensors can identify and quantify chemical vapors and any gamma emitting materials within the survey area.

Data Processing

The raw data generated by these sensors are complex in nature and are not in a form that can be readily or easily used by the first responder. ASPECT uses a set of high level pattern recognition algorithms that permit potentially low levels of chemical or radiological signatures (called signals) to be extracted from a complex environment and processed into a set of image products. When these image products are matched with corresponding and concurrently collected aerial photographs, a set of information layers can be assembled or used individually.

Data Communication

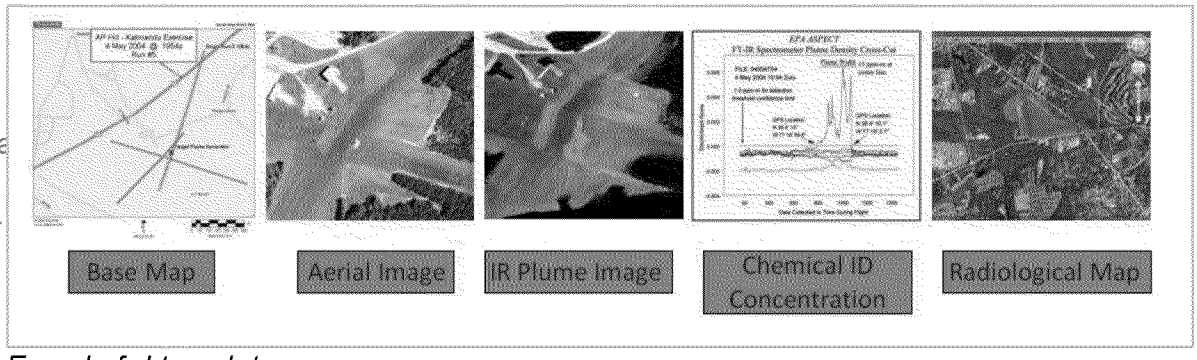
This entire data analysis process is conducted within the aircraft as the data are collected, permitting the generation of imagery products within seconds after the data have been collected. ASPECT accomplishes the transfer of data from the air to the ground using a satellite-based data system. The satellite system can be viewed as the ground connection to the aircraft and the reach back team uses this connection to extract and critically review all data collected.

Quality Control

At this point the data are handed over to the first responder, right? Not exactly. The use of an automated detection process is very efficient and has the ability to generate data products in seconds, but such a method also has the ability to generate both false positive and negative data findings. EPA has a policy that no data be released to the user unless those data have been quality assured. Once the data are extracted from the aircraft, the reach back team examines the data for quality, and then immediately forwards the data to the users. The ASPECT data communication system speeds up the delivery of data because data can be pulled and reviewed directly from the aircraft without it having to land and also because the reach back team can consult with the data user concerning the content and meaning of the data.

How fast can data be provided? ASPECT routinely provides data to the first responder in less than 5 minutes from the time a survey is completed. During the 2013 Tournament of Roses deployment, ASPECT was tasked by the city of Pasadena, California, to conduct a radiological environmental survey of the parade route prior to the event within a window of 1 hour. ASPECT was able to conduct a multi-line survey over the seven mile parade route, analyze the data, quality assure the data and provide scientifically validated results to city and county personnel within 35 minutes of starting the survey.

In summary, ASPECT has been designed and is operated to provide first responders and decision makers with relevant and scientifically validated chemical, radiological and situational data in the shortest time possible. This process truly allows the power of the data to be fully exploited by the first responder.



Example of data products.

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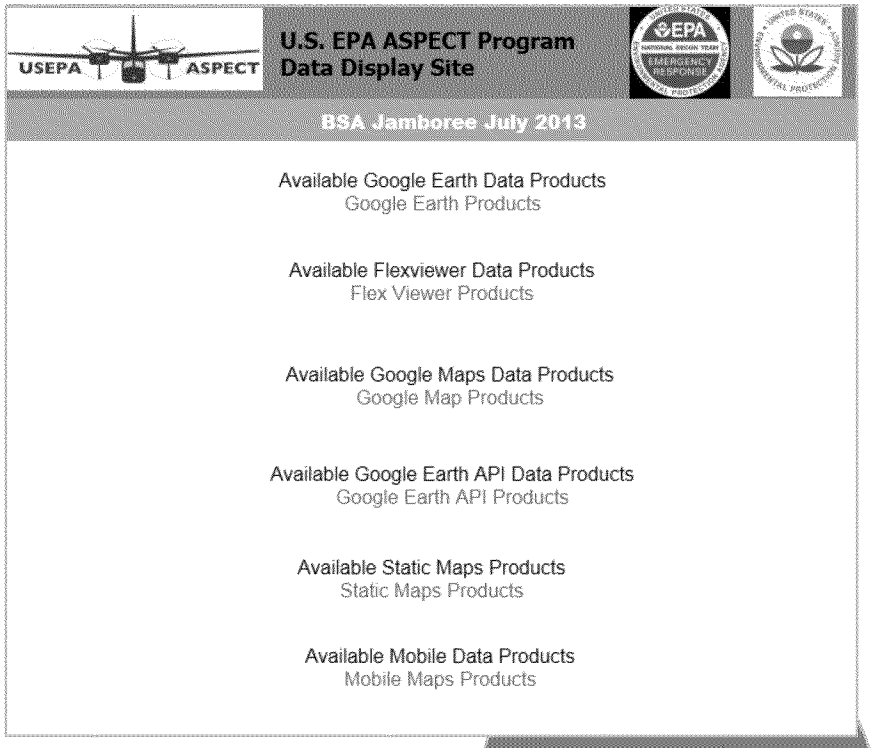
In late October 2012, tropical storm Sandy developed into a hurricane killing more than 50 people in Haiti before moving north along the Eastern Seaboard of the United States. The storm reached Category 2 status with hurricane force winds extending 175 miles out from the eye, making it much larger than most storms of its type. When Hurricane Sandy made landfall on the northeast coast, more than 7.9 million businesses and households were left without electric power. Within 4 days of landfall, the EPA's ASPECT was deployed by Region 2 to provide aerial situational awareness along the entire New Jersey and New York coastlines and to conduct chemical surveys over targeted areas. ASPECT flew four sorties between November 4-9, 2012, collecting more than 3,000 aerial photos and hundreds of oblique photos that were geo-rectified (aerial) or geo-referenced (oblique) and made available to view using a free version of Google™ Earth. This was the largest photo mission ever conducted by the program; it yielded 21 terabytes of data.

As with most deployments, areas for improvement were identified. ASPECT focused on one in particular to strengthen products by making them more accessible in a variety of geographic information system (GIS) platforms. ASPECT unveiled this new capability allowing our products to be viewed in Google™ Earth, Google™ Earth API, Google™ Maps, ESRI ArcGIS™ 10 and Flexview. Many products can also be viewed on mobile devices. This new line of products was developed over a period of several months and was successfully used during the Boy Scout Jamboree deployment in July 2013.

One of the 1000s of aerial photos taken by ASPECT during the Hurricane Sandy Deployment. All photos are available to view via Google™ Earth



ASPECT products are now available in a variety of GIS Platforms to better meets the needs of our customers.

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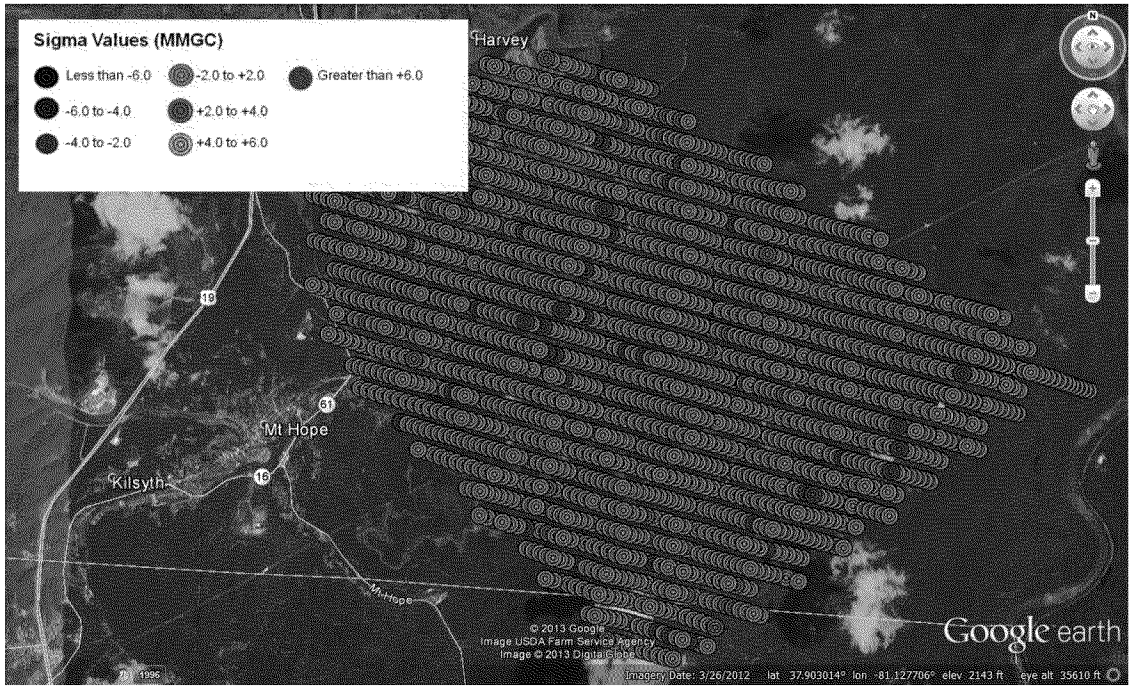
At t[illegible] Natio[illegible]CT Program [illegible]PA Region 3 and t[illegible] Interagency Task Force (JIATF) for activities associated with the 2013 Boy Scout of America Jamboree at the Summit Bechtel Reserve located near Mt. Hope, West Virginia, from July 14, 2013, through July 24, 2013.

ASPECT was requested to assist with airborne chemical, radiological and situational data collection during the entire 10-day event. Why ASPECT? The Jamboree was located on a large reserve near the city of Mt. Hope, West Virginia and hosted over 40,000 Scouts and support personnel. The campgrounds and associated facilities cover an area of about 8 square miles. Scouts also conducted community service activities over a 5-day period that encompassed a nine-county region. Not only the Boy Scout reserve, but the entire nine- county area is traversed by steep valleys and limited road access. A number of high profile visitors attended the event, including the King of Sweden, members of Congress, and members of the Cabinet. With such a large group of participants scattered over a broad geographical area, the safety of the Scouts and visitors was a top priority. Providing this safety required an immense amount of planning and included the need to provide early detection of hazardous chemical, radiological or other hazards during all phases of the Jamboree. ASPECT was a logical choice to provide this service since it is the nation's only airborne chemical and radiological detection, infrared and photographic imagery system. With the entire system mounted in an aircraft and through the use of automated software and satellite data conductivity, ASPECT was able to rapidly transit the nine-county area and provide chemical and radiological results to the EPA on-scene coordinator (OSC) and state officials within minutes of the request.

From the time of arrival on the July 14 until the end of the Jamboree on July 24, ASPECT flew nine missions consisting of a radiological survey of the campground area, numerous chemical surveys over the campground and nine-county area and the collection of 1,300 aerial photographs and infrared images of event areas. Fortunately, ASPECT did not detect any abnormal chemical or radiological findings during any of these flights. Products that were heavily used by the event staff and JIATF included geo-rectified aerial photographs and geo-positioned oblique photographs. These photographic products assisted in road hazard planning and other planning events that can only be efficiently accomplished from the vantage point of an aircraft and with imagery data that can be viewed within the context of a geographical information system.

The JIATF included, EPA, 35th West Virginia Weapons of Mass Destruction Civil Support Team (WMD-CST), West Virginia Department of Environmental Protection, the Federal Emergency Management Agency (FEMA), the Federal Bureau of Investigation (FBI), Secret Service, National Guard Combined Intelligence Operations Center, Task Force Keystone [(Pennsylvania National Guard Unit specializing in Chemical, Biological, Radiological and Nuclear (CBRN)], Boy Scouts of America, Mount Hope Police Department, and the West Virginia Department of Homeland Security and Emergency Management.



Sigma value plot overlay on Google ™ Earth.

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During a search for a lost neutron well logging source in the early fall of 2012, EPA assistance was requested.

A 15 curie americium-beryllium (AmBe) source had been used during well logging earlier in the day near Pecos, Texas. It was noticed missing when the crew had arrived at its next destination near Odessa, some 130 miles away. Licensee personnel immediately searched the Pecos well area to no avail and additional personnel searched the route between the two well sites, also without success.

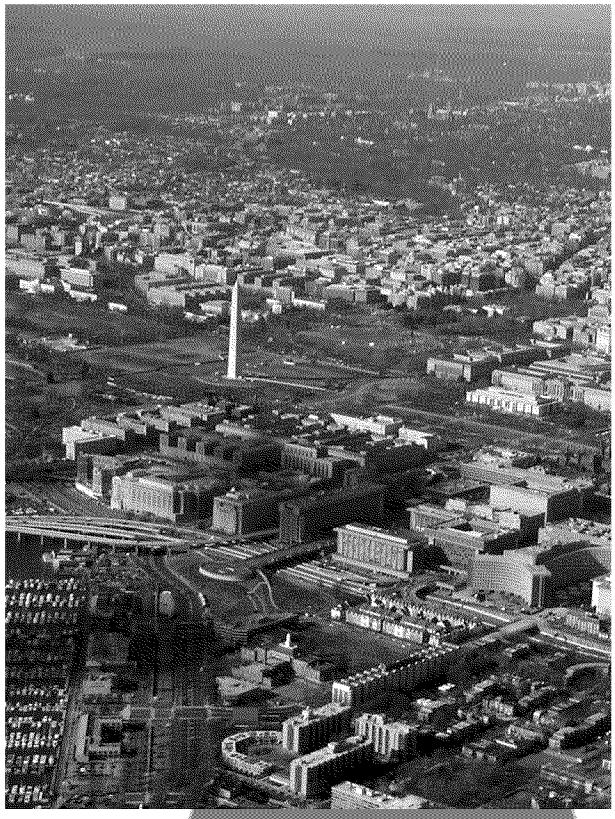
The search for this lost neutron source allowed an opportunity to prove the additional capabilities of the ASPECT aircraft with the addition of the neutron detectors.

The AmBe source in question is considered by the International Atomic Energy Agency (IAEA) to be a Class 3 source, meaning it could cause permanent injury to someone who remained in close contact for a period of hours. The location of the missing source was given high priority and EPA Region 6 personnel, having received a Texas press release concerning the lost sources, offered assistance and requested ASPECT support for the search efforts. Region 6, state regulators, ASPECT team members and licensee personnel convened to develop a search strategy. The licensee provided the ASPECT team access to a source identical to the lost source in order to help establish the aircraft's ability to detect neutron sources. ASPECT personnel used that source to optimize a newly acquired neutron detector. The aircraft detectors were assessed for optimal flight altitude and line spacing using both gamma ray and neutron detector capabilities.

A few days after the source was lost, support personnel from the state and a Civil Support Team (CST) searched the route from Pecos to Odessa. They employed both gamma and neutron detectors. Additionally, the ASPECT aircraft, recently outfitted with sensitive neutron detectors, surveyed the route and some local landfills identified by the planning team. The ASPECT survey covered 220 linear miles and was completed in about three hours. None of the surveys were able to locate the lost source. However, the ASPECT aircraft was able to identify the location of a similar source placed by the licensee in an unknown (to ASPECT) location along the route. The ASPECT aircraft was able to estimate the location to within a few hundred feet using operating protocols developed just days prior. This proof of operation provided a level of assurance that the source was not located along the route.

Redoubled media efforts requesting the public's assistance resulted in finding the lost source some eight miles to the west of the original site, in the direction opposite of the well logging team's travel and subsequent search efforts. It is unknown how the source got there, but the incident did highlight the ability of a licensee, a state regulator, a Civil Support Team and regional and national EPA resources to work together in a timely, organized fashion. It also proved the additional capabilities of the ASPECT aircraft with the addition of the neutron detectors.

ASPECT is scheduled to fly the second part of a multi-state/county survey of the greater Washington, D.C. region. The FBI Washington Field Office requested ASPECT to conduct a holistic chemical and a radiological "background" assessment of the National Capital Area. Data from this survey will provide emergency response managers with a baseline related to atmospheric chemicals and the radiological background present in the D.C. area. The chemical portion of the survey was completed in January 2013 and the radiological portion is scheduled for later in 2013.



Washington Monument from the ASPECT plane during deployment for the 2006 State of the Union Address

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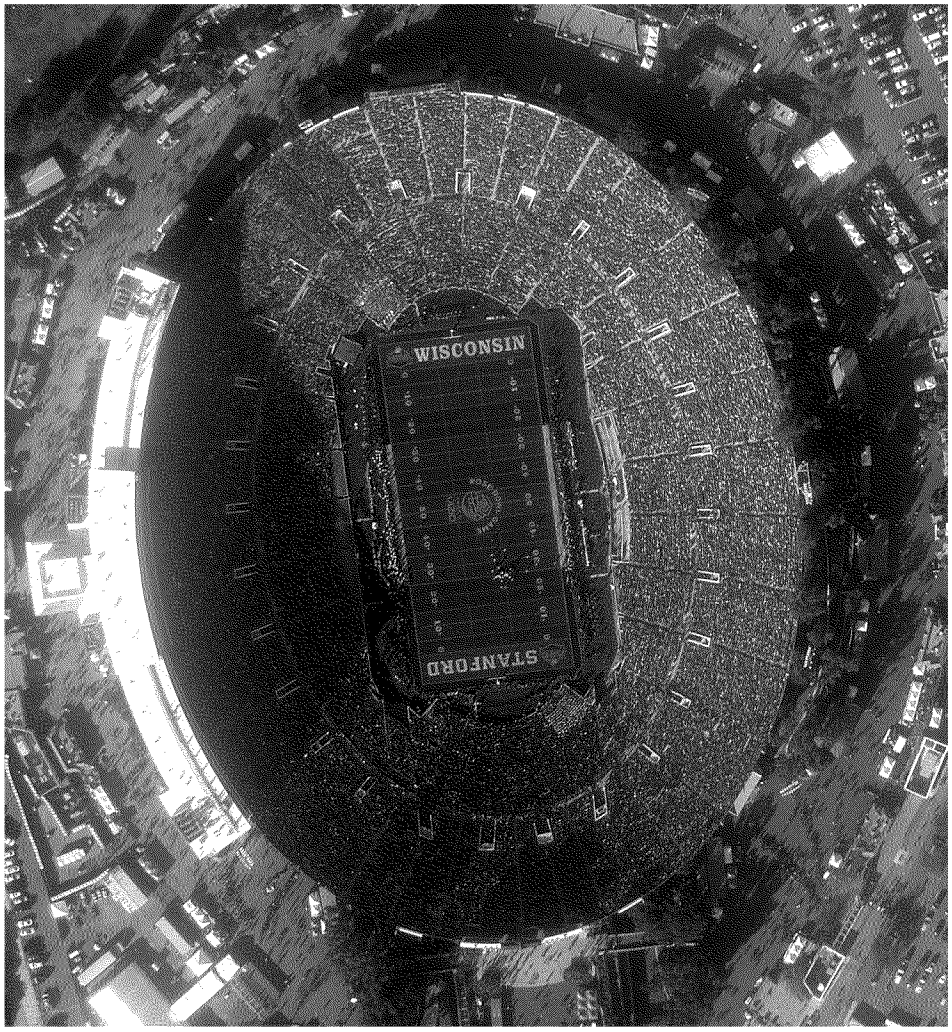
Events [redacted] oses Parade, R[redacted] Super Bowl attract worldwide attention and tens of thousands of fans. For example, the 2013 Tournament of Roses parade had over 750,000 people along the 7-mile parade route. Keeping people safe is the number one priority of all public officials and providing safety to such large numbers of people gathered in a concentrated area is a great challenge. Public safety involves several components including medical, fire and protection from hazardous materials, requiring expertise from the local, state and federal levels.

All of these safety components must be satisfied for a large public event. Hazardous material protection is one of the most difficult to accomplish. If a chemical is released into or upwind of an event, the identification, quantity and movement of the vapors must be quickly established by emergency personnel to safeguard the public. The same is true of a radiological material. With this requirement in mind, the emergency manager must design a strategy that permits both chemical and radiological measurements to be conducted over a wide aerial extent by the fastest means possible. This requirement is ideally suited for an airborne detection system.

For the past six years, the city of Pasadena, California, has requested that ASPECT assist with the Tournament of Roses Parade and Rose Bowl Game events. ASPECT collects pre-event chemical and radiological background data (conducted one day to one hour in advance of the events) and data collected during the active events. In general, the aircraft follows a circular flight pattern and traverses the parade route or the Rose Bowl Stadium about once every 20 minutes within a controlled region of airspace called a Temporary Flight Restricted Area (TFR). All data are processed in the aircraft. A scientific "reach back" team, which is co-located in the Pasadena Emergency Command Post with other local, state and federal emergency response personnel, retrieves data from the aircraft, conducts both quality assurance and interpretation of the results, and then forwards this information to the city officials (the decision makers).



ASPECT aerial photo of the 2013 Rose Bowl.

Rapid delivery of data to the decision makers is a foundation of the ASPECT Program and the numerous deployments to the Rose Bowl events have permitted the team to refine how data are delivered. During the 2013 deployment, ASPECT routinely delivered data products to the end user in less than five minutes from collection. In addition, ASPECT was tasked with providing a pre-parade environmental radiological survey of the parade route, float assembly area and float parking area with the results delivered prior to the start of the event. This area covers about seven linear miles; ASPECT was able

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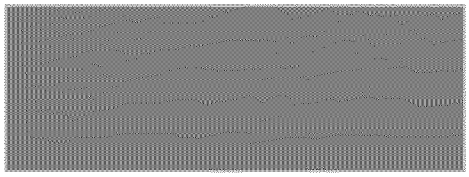
to conduct a multi-line aerial survey, process the data and provide the results to the city of Pasadena 35 minutes after collection, well ahead of the timeline required by the event officials.

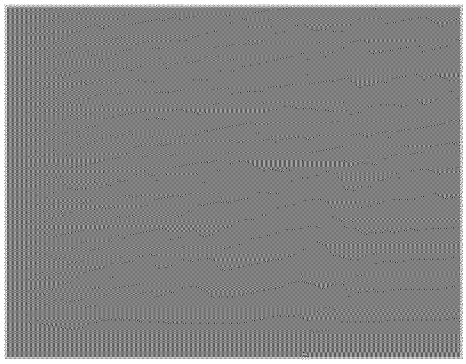
ASPECT has never found chemical or radiological compounds that were of a hazardous nature at the Rose Bowl events, but in 2010 ASPECT did detect ethylene at trace levels being emitted from the parade float assembly area. Why ethylene? Ethylene is a common gas emitted by plants. With a large concentration of plants and flowers on Rose Parade floats, the system was able to detect the "flower emission" released from the setting. More importantly, ASPECT determined that the source of the ethylene detected was the flowers and not a threat.

ASPECT was also requested by EPA Region 6 to provide monitoring assistance as part of the Region's deployment to the 2013 Super Bowl in New Orleans, Louisiana. While this deployment had similar expectations as the earlier work at the Rose Bowl, the primary difference was that the federal coordination of the event was under the command of the FBI. As part of the work with the FBI, ASPECT flew a number of monitoring sorties prior to the event including a low level radiological environmental survey of the downtown New Orleans area. Products including a manmade gamma sigma analysis plot and a gamma exposure plot were generated and provided to the OSCs who in turn provided this information to the FBI. Based on this exchange of information, the FBI requested that ASPECT fly an environmental survey of the Mississippi River from New Orleans to the mouth of the delta. This mission was accomplished on the day prior to the game and consisted of a low level (300 feet above ground) pass along each side of the river to gather radiological data and a high level pass (2,800 feet above ground) along the center line of the river to gather chemical background data, all of which were passed to the FBI through the regional OSC. No abnormal findings were noted on either survey.

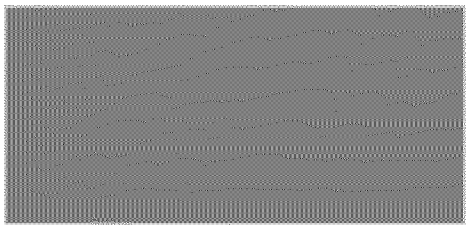
In addition to the chemical and radiological monitoring capabilities, the ASPECT aircraft is outfitted with a high resolution digital camera to take aerial imagery of the incident area. This capability of matching the hazard and image provides first responders and decision makers with updated situational awareness they typically would not have.



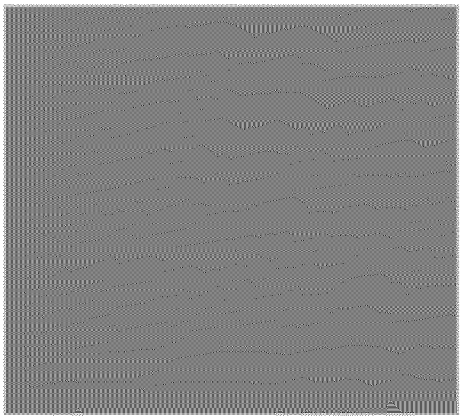
A joint exercise (EPA ASPECT and the 64th Civil Support Team - New Mexico) was conducted to develop a set of standard operating procedures (SOPs) on integrating ASPECT data into the overall CST response structure. The exercise consisted of a simulated chemical accident and the recovery of lost industrial radiological sources and included a number of state and local first responders. The development of an SOP will greatly assist with ASPECT's interaction and sharing of data with the New Mexico CST program and local first responders.



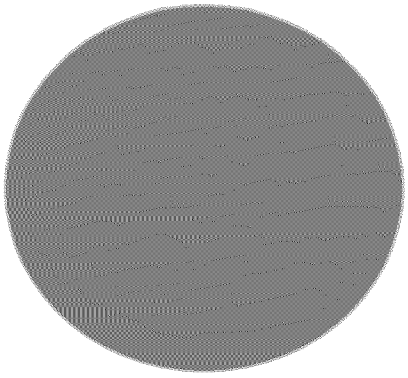
A survey is being conducted per a request from the National Park Service (NPS) to investigate possible uranium mine drainage into the Grand Canyon. NPS is interested in addressing any potential impacts to the public and environment from these potential discharges. The project will use a subset of ASPECT equipment that will be installed and flown on an NPS helicopter.



The ASPECT program initiated a process to draft a Nuclear Regulatory Commission (NRC) License Application. The reasons ASPECT is pursuing a Nuclear Regulatory Commission (NRC) License are (1) to conduct calibration flights, (2) use sources in training, and (3) participate in and support exercises with other regions and organizations. Once the license is approved, the sources will be stowed at the warehouse facility near Cincinnati, Ohio.



A volunteer from Xavier University worked with the ASPECT program during the summer to receive research credit in pursuit of a bachelor's degree. The student characterized a new configuration of the radiation detectors used on the ASPECT aircraft to support a future survey in the Grand Canyon.



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filtration were used to determine the presence, magnitude, and spatial extent of contamination. However, sample collection and analysis remains a significant bottleneck for response to a large-scale biological contamination incident, requiring thousands of samples using the current sampling techniques.

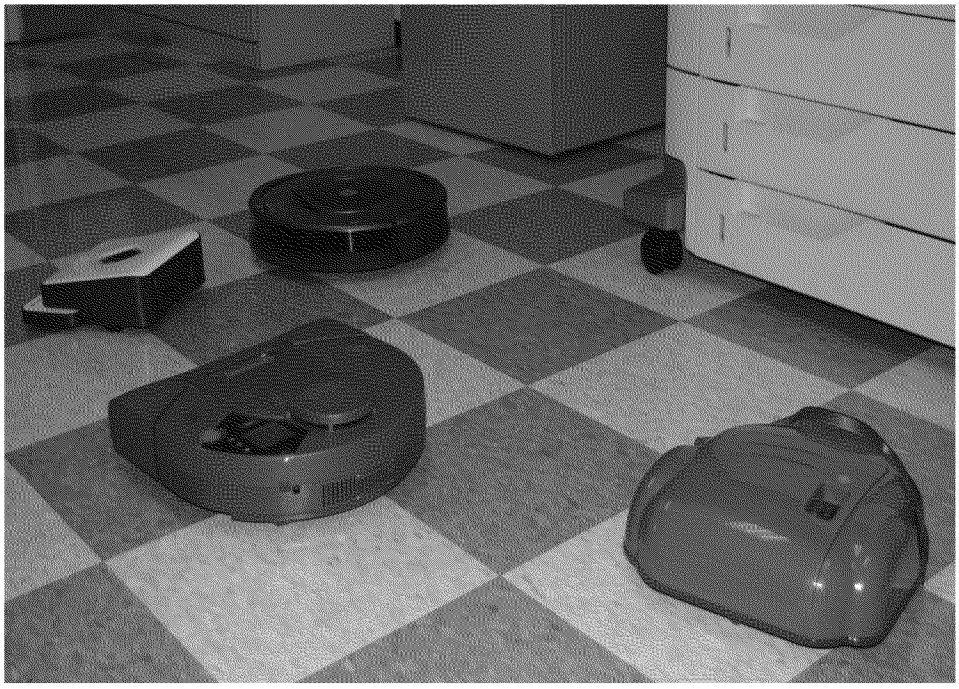
The Chemical, Biological, Radiological, and Nuclear (CBRN) Consequence Management Advisory Team (CMAT) assisted the National Homeland Security Research Center (NHSRC) in their evaluation of the use of cleaning robots as spore samplers. CMAT assisted with planning the research, analysis and evaluation of results; writing and reviewing reports; co-authoring a publication entitled "Scenario-based Evaluation of Commercially-available Cleaning Robots for Collection of Bacillus Spores from Environmental Surfaces."; and presenting findings outside the U.S. Environmental Protection Agency (EPA).

The utility of commercially-available robotic floor cleaning devices for collection of *B. anthracis* spores was investigated. Three commercially-available autonomous (robotic) vacuum-based cleaning robots and two "wipe and wet" vacuum-based robots were evaluated for sampling efficiency on non-porous surfaces (laminate and tile). The three vacuum-based robots were also evaluated on a porous surface (carpet).

The sampling efficiencies of these robots were assessed by comparing their recoveries to recoveries obtained by currently-recommended surface sampling methods. The overall results show that sampling via robots is a viable alternative to these traditional sampling methods, and can be used to great advantage in a field response. Some cleaning robots for porous and non-porous materials were as efficacious as the respective surface sampling methods currently recommended.

The robot sampling comparative recovery (CR) results for a laminate surface were higher for the wet wipe and wet vacuum-based robots (up to 62% and 32%, respectively) than for the tested vacuum-based robots (CR less than 10%). The sampling process of the wet wipe-based robot is similar to the well-established wet wipe surface sampling method since both methods use a phosphate buffered saline tween (PBST)-wetted cloth in conjunction with a rubbing action on the surface. Low CRs from vacuum units were expected since previous sampling studies have shown that the comparative surface sampling wet wipe or the sponge wipe method on nonporous surfaces has higher recovery efficiency than comparative vacuum-based surface methods.

Recovery efficiencies for porous material (carpet) sampling were determined by comparison of three vacuum-based cleaning robots' recoveries to that of the vacuum sock sampling method. The test results showed CR values on the same order or greater (in some cases up to 161%) than the current vacuum sampling method. The differences in recoveries among the three vacuum robots may be related to the unique design of each robot and operating conditions.



Robotic floor cleaning devices were investigated for their efficiences.

Next steps:

The current test method focused only on the sampling mechanism of the individual robots by limiting sampling surface area. Although not part of this study, varying the area cleaning logics or algorithms of individual robots could be a way to increase collection efficiency

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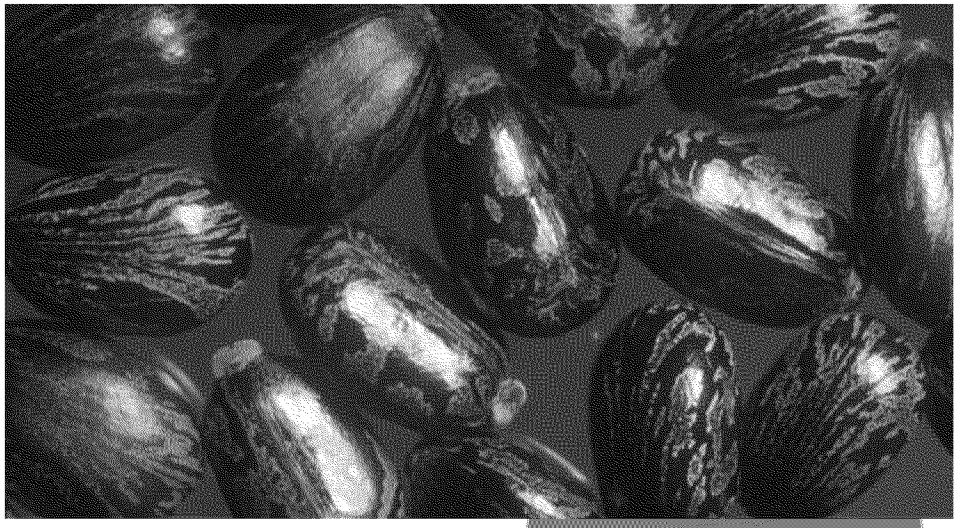
of these robots when sampling a wide area. Currently-available cleaning robots have various convenient functions such as self-recharging, mapping, navigation, etc. These functions will allow large contaminated areas to be sampled systematically. Two obvious benefits of using cleaning robots for wide area sampling include (1) fewer samples, because one sample is generated per deployment, and (2) less risk of personnel exposure to *B. anthracis* spores. In addition to wide area sampling, these cleaning robots could be deployed to areas where human sampling is difficult, such as inside HVAC ductwork and in highly contaminated areas (hot zones). However, for real world application, these robots need further evaluation with various surfaces, deposition types, surface loadings and environmental conditions (relative humidity variation, exposure duration, etc.).

CMAT has been working with the Department of Homeland Security (DHS) Science and Technology (S&T) to reinitialize the Underground Transport Restoration (UTR) project after it was questioned by DHS leadership for budgetary reasons. Prior to the start of the UTR, EPA on-scene coordinators (OSCs) had identified gaps in the response to a release of a biological agent in a subway system. Additionally, state and local partners have indicated a strong need for assistance in planning for this type of scenario. Using existing data from actual response, research efforts, and exercises, CMAT is helping DHS identify the specific ways that the UTR project could address research gaps and improve the level of preparedness, thereby improving response and recovery timelines.

CMAT has begun work to develop self-decontamination guidance for use by the public in a biological release scenario. Currently no available guidance for the public on self decontamination or protective measures exists. Eventually, a video will be developed that will be available to the public. Evaluating existing data from related research projects, CMAT will work with NHSRC to identify additional research areas. This project may also be expanded to focus on chemical or radiological scenarios.

CMAT developed a two day course to provide training on ricin. The training includes current sampling media, sampling techniques, and a detailed description on the complexities of analyzing ricin samples. The course includes a description of current laboratory capabilities for analyzing samples potentially contaminated with ricin in the D.C., Maryland, and Virginia area. The local U.S. Department of Defense (DoD) Weapons of Mass Destruction Civil Support Team (WMD-CST) provided information on analytical capabilities and other resources. Edgewood Chemical Biological Center (ECBC) participated in this course and provided information on their agency's capabilities and resources. At the end of the course, there was a hands-on demonstration of surface sampling techniques. The course has been given twice in the D.C. area and is being evaluated to expand to a broader biological sampling training course for the nation.

CMAT and NHSRC Decontamination and Consequence Management Division (DCMD) provided support to assist Region 3 OSC, Charlie Fitzsimmons, with the April/May 2013 ricin incident. CMAT provided guidance on sampling media, techniques, and strategies for ricin. Information was provided regarding the decontamination of ricin-contaminated areas that included sensitive equipment. CMAT provided decontamination details on current and past research results from various decontaminants, and information from a previous incident.



Ricin, a deadly toxin, can be easily extracted from castor beans.

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2001 intentio racis spore contamination incident in the United States. However, AAS was not used as a primary method for sampling due to a lack of a systematic and rigorous evaluation of this technique. The CBRN CMAT assisted the NHSRC in their empirical evaluation of the AAS method for sampling *B. anthracis* surrogate spores. CMAT assisted with planning the research, analysis, and evaluation of results; writing and reviewing reports; and presenting findings outside the U.S. Environmental Protection Agency (EPA).

Unlike traditional surface sampling methods, AAS indicates potential airborne concentrations of respirable-size particles from resuspension, which might be used to assess risk of anthrax inhalation exposure. AAS is currently used for asbestos clearance sampling. For asbestos, the inhalational route of exposure produces the most severe and frequent negative health outcomes. Therefore, AAS is preferred over surface sampling to assess the inhalation risk. Similar to asbestos, the route of *B. anthracis* exposure that produces the most severe outcomes is inhalation. Surface sampling does not differentiate particle size nor does it allow for determining the particles that could become re-aerosolized. Therefore, AAS is a logical choice for sampling an enclosed area for B. anthracis; with the ultimate objective of estimating inhalational risk under the certain circumstances.

Accurate measurements of residual contamination are needed to inform decisions on re-entry and reoccupation of spaces following site decontamination. For a contamination incident affecting a wide area, traditional surface sampling methods (i.e., wipe, swab, and vacuum sock) used for clearance sampling may also require an extensive number of samples. Use of these methods may be time and labor intensive in order to achieve a reasonable confidence.

AAS sampling exercise.

Innovative techniques such as AAS may prove useful as an additional tool to augment currently-used surface sampling methods and, with additional research, may be used as an alternative method in certain situations (e.g., detection of spore presence from unknown hot spots, wide-spread contamination with a concentration close to the detection limit for surface sampling methods, etc.). AAS has the potential to effectively shorten the timeline to recovery, reduce the sampling burden during a response, and ultimately result in a decrease in overall cleanup costs.

The AAS method was evaluated using *Bacillus atrophaeus* (*B. atrophaeus*) spores (a surrogate for *B. anthracis* spores) on carpet, laminate, and painted drywall to determine whether this technique may be effective for *B. anthracis* spore sampling from common surfaces. The AAS Standard Operating Procedure (SOP) used during the Bioresponse Operational Testing and Evaluation (BOTE) Phase I project was used as the starting point for this study. The currently-recommended *B. anthracis* spore surface sampling methods (i.e., vacuum socks or sponge wipes) were used to quantify the spore abundance on additional replicates of the test surfaces. These recoveries were then compared to AAS recoveries. This evaluation identified the relative sampling efficacy of the AAS method for spore

AAS has the potential to effectively shorten the timeline to recovery, reduce the sampling burden during a response, and ultimately result in a decrease in overall cleanup costs.

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sampling as a function of surface type and spore surface loading.

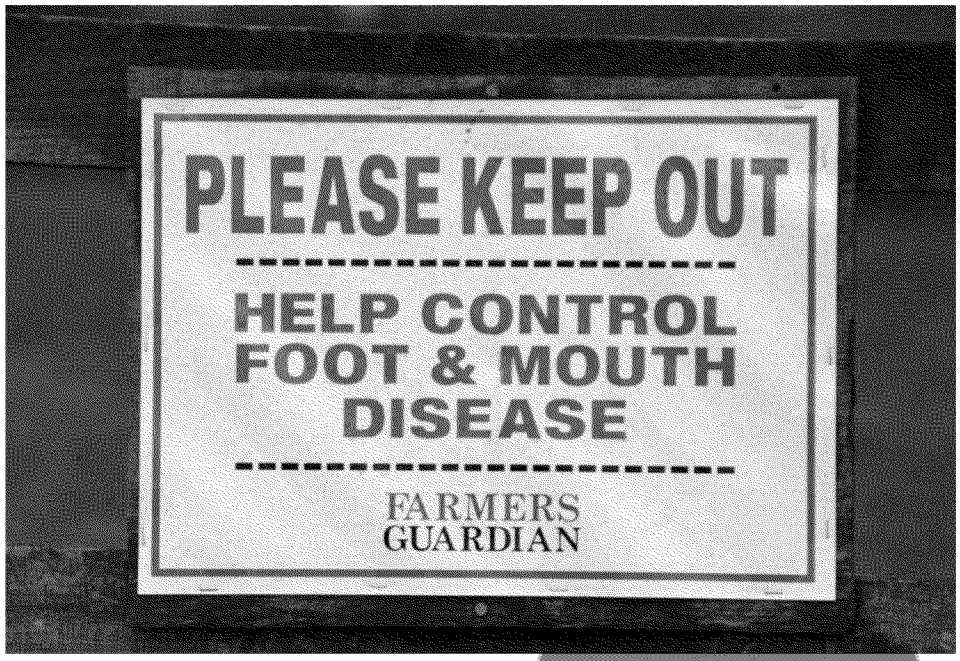
High volume (Hi-Vol) samplers (High Volume Air Sampler VFC-PM10 for FRM RFPS-1287-063, Thermo Fisher Scientific Inc., Pittsburgh, Pennsylvania) were used to collect aerosols. Particle resuspension was maintained with turbulent air created by the operation of a stainless steel mixing fan. The resuspension process was performed using a leaf blower operated at the highest speed [approximately 260 kilometers (km) per hour (160 miles per hour)]. The operating conditions of the leaf blower were repeated for all the tests and set at an angle of 45 degrees, a distance of less than 30 centimeters (cm) from the target coupon, and with a forced aerosolization time of 1 min per coupon of 36 cm x 36 cm area. The leaf blower operator moved the tip of the blower back and forth across the coupon(s) at approximately 1 meter per second for the total operation time. The exhaust of the Hi-Vol samplers was recycled within the test chamber.

Data are reported as the number of colony forming units (CFUs) recovered (aggregate of all three air samplers) from AAS and normalized by the surface area agitated by a leaf blower. The laboratory results showed that the average CFUs from AAS were 1.1, 3.1, and 0.8% recovered from currently used surface sampling methods for carpet, laminate, and painted wallboard, respectively. The relative comparison was normalized by surface area. However, the application of AAS would be over a much larger area than conventional sampling, which may support the use of AAS in such situations.

The next steps are to evaluate AAS for hot spot detection and low-level uniform deposition detection compared to currently used methods, followed by field operational evaluations and tactical principles for using this method as a tool during response.

DHS S&T, through its Integrated Consortium of Laboratory Networks (ICLN), sponsored a 1-day vignette to examine federal agencies' response to a U.S. outbreak of foot-and-mouth disease. Representatives from the U.S. Department of Health and Human Services (HHS) Centers for Disease Control (CDC) Laboratory Response Network (LRN); U.S. Food and Drug Administration (FDA) Headquarters; FDA Veterinary Laboratory Investigation and Response Network (Vet-LRN); U.S. Department of Agriculture (USDA) National Animal Health Laboratory Network (NAHLN); USDA Food Safety and Inspection Service (FSIS); and EPA Environmental Response Laboratory Network (ERLN) and NHSRC were participants. Designed as an exercise on reporting of Preparedness and Situation Reports through an ICLN IT portal, it tested information sharing processes between the various agencies.

To assist the New York City (NYC) Department of Health, CMAT presented a biological incident environmental sampling plan workshop. The workshop included sampling kit preparation instructions; provided detailed descriptions of sampling methods and sampler training information; and ways to minimize cross-contamination. CMAT addressed additional questions from NYC regarding the Biological Incident Environmental Sampling Plan Document which included operations, sample team preparation, and deployment.



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Du
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CMAT Annua oduced work
related to the Rapid Viability Polymerase Chain Reaction (RV-PCR) method. The article explained that RV-PCR is a laboratory method geared at identifying viable organisms, such as *B. anthracis*, *Francisella tularensis* and *Yersinia pestis* from environmental samples more quickly than traditional culture methods. The RV-PCR method provides shorter turn-around time for laboratory analysis, has the ability for higher throughput, and generates less waste than traditional culture methods. The RV-PCR method also uses the whole sample, whereas traditional culture only uses a small fraction of a sample, making RV-PCR more sensitive. Researchers at the EPA Office of Research and Development's NHSRC are continuing to develop ways to make the method even faster and more user-friendly.

The EPA Office of Emergency Management (OEM) and CMAT have been working with EPA's Office of Chemical Safety and Pollution Prevention's Microbiology Laboratory Branch (MLB), located in Ft. Meade, Maryland to establish it as the agency hub for the RV-PCR method. If an incident happened tomorrow, OEM plans to rely on this lab for internal biological capacity for PCR and RV-PCR. Here, two EPA scientists have become proficient with the method. Two scientists from the Department of the Army's Edgewood Chemical and Biological Center have also been trained. In the coming months MLB plans to change to a proficiency testing schedule of once every three months, scaling back from the current once-a-month practice schedule. OEM expects to take a larger hands-on role as one OEM scientist will be included in the proficiency tests.

Progress continues with the implementation of the National Enforcement Investigation Center's laboratory in Lakewood, Colorado. OEM has hired a contractor to make this lab operational. Services have been procured to commission the laboratory and certify all of the equipment. Development of a biological safety plan is currently underway, and a Quality Assurance Project Plan is being established. OEM anticipates the laboratory will be operational in FY14 and the RV-PCR method will be implemented.

Office of Emergency Management Lab housed in the National Enforcement Investigation Center in Lakewood, Colorado.

The NYC Department of Health and Mental Hygiene (DOHMH) will work closely with the EPA to oversee biological remediation, clearance and re-occupancy. NYC is requesting assistance to help develop a remediation framework for NYC that provides guidance for all phases of consequence management. Under the NYC Citywide Incident Management System (CIMS,) the DOHMH is designated core competency for environmental mitigation, clearance and re-occupancy following a biological incident. Currently, DOHMH has a draft plan for environmental sampling after detection of a biological agent, should it occur through BioWatch or traditional detection systems such as syndromic surveillance. DOHMH recently held a multiagency workshop to vet their plan with key partners that included EPA, the Federal Bureau of Investigation (FBI), DHS, Sandia National Lab, Argonne National Lab and Los Alamos National Lab. The workshop assisted DOHMH with finalizing the sampling plan and they are now ready to transition to another major planning and response gap, which is lack of a plan to address biological remediation, clearance and re-occupancy.

As a result, DOHMH has partnered with CMAT to develop a Biological Remediation and Re-occupancy framework that will assist the DOHMH, the city of New York and its various federal and state partners with overseeing and/or directing the remediation and re-occupancy of a diverse urban environment that includes residential space, commercial space, large indoor and outdoor common spaces, building facades and roofs, sidewalks, streets, roads and air handling systems. Additionally, this project will include roll-out of the framework by training internal and external stakeholders and partners on the contents of the framework, as well as coordinating and facilitating a workshop to evaluate and gain feedback on the framework. CMAT has engaged a diverse project team to assist with this project that includes representatives from EPA's Region 2 and 5, NHSRC, Emergency Response Team (ERT), and the Office of Resource and Recovery (ORCR). The project is expected to be completed in summer of 2014.

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CMAT provides 24/7 scientific and technical expertise to the OSC or response customer for all phases of consequence management, including sampling, decontamination, and clearance of radiological, biological, or chemical contaminants. With a focus on operational preparedness, CMAT facilitates the transition of the latest science and technology to the field response community in order to provide tactical options in the event of an incident involving releases of radiological, biological, or chemical contaminants.

Currently, some fumigants and liquid sporicides are available to address limited CBRN incidents. However, if there were a significant *B. anthracis* or other biological agent release at a major economic or political target, a timely and adequate response may be lacking. The capacity of currently available technologies and personnel to run them is inadequate. There is the potential, however, to leverage the fumigation pest-control industry to address this current gap in capacity. Using its unique skills, the pest-control industry could participate in response to a national anthrax emergency with methyl bromide fumigation. Adding methyl bromide fumigation to current response capabilities would significantly increase the capacity and timeliness of response, improving national resilience.

Issues associated with the majority of current alternative remediation technologies, in addition to the inadequate capacity, include corrosion and collateral damage. Even if the capacity of several current alternative technologies were increased, the collateral damage they cause during fumigation or liquid application would significantly increase the volume of the waste streams, and increase the total time and cost of the remediation. In the case of sensitive or historic infrastructure, corrosive remediation techniques may not be an option even if the capacity existed.

On the other hand, methyl bromide does little to no damage to the structure or its contents during fumigation. Methyl bromide reduces waste, time, and the total cost of remediation, and may be the only alternative for sensitive or historic infrastructure.

In addition to the added capacity, the overall reduced cost, and the application for sensitive infrastructure, methyl bromide is effective. Methyl bromide is competent to penetrate into all spaces, as a true gas would. It is competent to inactivate *B. anthracis* with a reasonable concentration-time dose. And methyl bromide, when the fumigation is complete, can be effectively captured on activated carbon, reducing any potential detrimental environmental effects.

CMAT is teaming with NHSRC and collaborating with the University of Florida in planning an operational methyl bromide fumigation study scheduled for December 2013. The study will yield operational data and increase EPA's experience using methyl bromide to timely, effectively, and environmentally respond to a *B. anthracis* incident, making the nation more resilient to terrorist attacks.

The operational study will include total enclosure with:

- tarpaulins covering a 51,000 cubic feet structure;
- heaters, circulation fans, temperature and relative humidity monitoring;
- methyl bromide concentration monitoring inside and outside the enclosure; and
- activated carbon scrubbing during aeration.

Laboratory fumigation parameters obtained by NHSRC researchers will be evaluated in this operational study. Surrogate *B. anthracis* spores will be placed on structural materials and used to evaluate efficacy of the fumigation. Remedial action plans, health and safety plans, and ambient air monitoring plans are being created for use at this site as well as to be available as templates for real-world emergencies in the future.

Using methyl bromide reduces waste, time, and the total cost of remediation, and may be the only alternative for sensitive or historic infrastructure.

An example of a whole-house fumigation.

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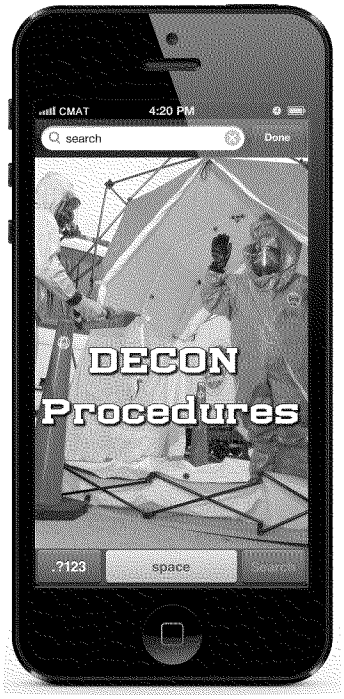
There's an App for That — CMAT/NHSRC to Develop Decon App

The National Homeland Security Research Center (NHSRC) is entering into an Interagency Agreement with the Department of Homeland Security (DHS) Science & Technology (S&T) to conduct a variety of tasks. One of the tasks is to develop a decontamination application for emergency responders with an emphasis on the emergency phase to a radiological event. The Consequence Management Advisory Team (CMAT) will lead this effort in partnership with NHSRC. Preliminary meetings are being held to organize the contract support and set the strategies for completing the task.



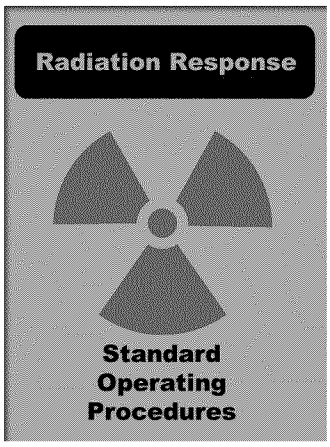
Radiation Response Readiness Forum

CMAT initiated a forum for OSCs and other U.S. Environmental Protection Agency (EPA) staff to discuss needs, ideas and efforts related to radiation response and readiness. On-scene coordinators (OSCs) from all 10 Regions were invited, as well as health physicists from the Office of Radiation and Indoor Air (ORIA), Environmental Response Team (ERT)and Radiological Emergency Response Team (RERT). The group developed a list of important issues that the membership then prioritized. The issues that were highly ranked included:

- Establish objective evaluation criteria for recommending safe return to residences and commercial establishments, and the final clearance of all contaminants from individual properties. These criteria would be used by state and local governments.
- Develop an agency-wide organizational chart identifying staff (name, office/division) with radiation expertise. This could be expanded to include radiation workgroups in which agency staff participate.
- Develop debris management parameters that can be used in choosing appropriate repository location. This could possibly involve the U.S. Army Corps of Engineers (USACE) under an Interagency agreement.
- Develop an operations plan for DHS to cover the first 72 hours of an improvised nuclear device (IND) incident. Key issues that need to be addressed include the response timelines for responsible agencies; the roles of the responsible agencies; the expectations for EPA's response; and the coordination of resources.
- Develop information on the standard operating procedures (SOPs) in support of the Core National Approach to Response (NAR) Chemical, Biological, Radiological and Nuclear (CBRN) list (National Tactical Guide to Address Radiological Incidents)
- Begin the planning process for developing and conducting field decontamination trials.

Developing Radiation Response SOPs

Working with a select team of health physicists from the EPA Regions and special teams, CMAT began developing radiation response (RR) SOPs that could be used across the special teams and the regions. An initial list of desirable RRSOPs had been started for the Liberty RadEx event. Coordinating with the Office of Radiation and Indoor Air (ORIA), a template was developed and a tentative approval path was agreed to. To date, the workgroup has written, reviewed and prepared final drafts of four RRSOPs, and have six more in the review stage, with one additional RRSOP in the development stage. The goal for the workgroup is to have these 11 RRSOPs in final draft form by the end of Fiscal Year 2013.



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Invaluable Experience Gained from RDD Exercise

The state of Vermont hosted a full-scale exercise in October, 2012 to test its ability to respond to a no-notice detonation of a radiological dispersion device (RDD). The exercise was designed by the state radiological health agency to test their first response capabilities, their communications systems, and how well the state health agency could answer the concerns of their citizens. The exercise involved three primary venues, separated by up to 60 miles, including the state's fire academy and its radiological health agency building. Participants in the exercise included fire, police, hazmat and other responders. EPA participants were an OSC and three health physicists. CMAT was invited by EPA Region 1 to participate in the exercise and sent one health physicist to the event. CMAT's participant was part of the simulation cell and had direct input to the pace, tenor and realism of the exercise.

During the 10-hour exercise, several dozen injects guided the exercise, which started with the premise that a burned car had been discovered to have significantly elevated radiation readings. The first responders informed the state radiological health agency of the possible radiological event. The state agency was then required to follow up and was timed to completion. As the response grew (radiation readings and rumors indicated a significant plume of material had left the burned car or its vicinity), the exercise focused less on the responders (who continued to role play their actual response for the duration of the exercise), and more on providing guidance and information to the state's citizens. As in many real life events, an unexpected amount of time and manpower was spent correcting many faulty media reports (some intentional) and their ramifications, as participants role-playing as panicked citizens swamped the state radiological and health agencies with concerns.

An after action report found the exercise very useful, an invaluable experience for the individuals manning the radiological and health agencies, and highlighted the value of significant "cross fertilization" that comes with a full-scale exercise involving most of the actual players in a possible RDD event.

30 RTFLs: Deployment Ready for Radiation Response

Completing its fifth year, the Radiation Task Force Leaders (RTFL) program with its support from CMAT, now has thirty RTFLs ready for deployment. Due to budget uncertainties and travel restrictions in 2013, the RTFL training team chose to repeat the refresher training by webinar, offering mostly new material and some homework to keep the RTFL knowledge fresh. Three 2-hour webinars authored and delivered by the training team were held during May and June 2013 each held two times to assist in attendance. Thirty RTFLs participated in the webinars and completed assignments addressing contaminated vehicles, contaminated workers, sampling packaging and emergencies in a hot zone. In light of the Fukishima Daiichi disaster, the participants also got extra information about nuclear power plants, how they operate, and their expected problems, Currently 30 of 38 participating RTFLs have met all their required refresher training and are ready for possible deployment to a radiation response. CMAT delivered a plenary presentation during the National Remedial Progect Manager (NRPM) conference in Las Vegas, Nevada, in November 2012. The presentation provided information about the RTFL program to the remedial project managers (RPMs) and extended an invitation to get involved in the Response Support Corps by becoming an RTFL. Since the conference, approximately 10 people have shown interest or requested more information. Also in July 2013, Colleen Petullo retired from EPA and her role as the RTFL training team lead. The RTFL training team leadership is now being provided by CMAT staff. In October 2013, EPA's ERT, in Edison, New Jersey, will host a 2-week initial RTFL training "boot camp" focused on meeting Region 1, 2, and 3 interests in the program.

Quick Response Guides for RDDs and INDs

Quick Response Guides (QRG) describe the most significant information for a stand-alone responder to know when confronted with organizing a response for an RDD or IND event. CMAT participated in the development of both the RDD and IND QRGs, The RDD QRG provides brief but detailed information about what to expect, how to stay safe, what personal protective equipment (PPE) to use, what doses are allowed, and information on detection, sampling and waste handling. The IND QRG describes most of the same information, but due to the vastly larger expected impact of an IND in an urban setting, the IND QRG limits its suggested courses of action to supporting initial response efforts (e.g., life-saving, avoiding fallout the first few days). The QRGs are in review and may be available early in Fiscal Year 2014.

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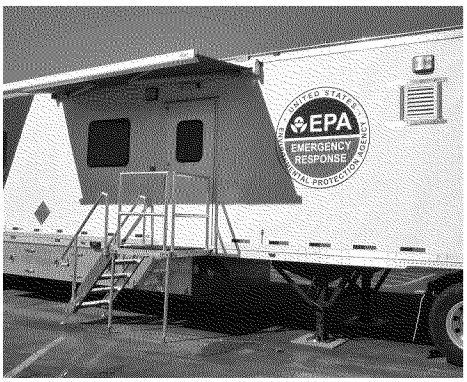
CWA Sampling & Analysis Coordination

In the fall of 2012, the Chemical, Biological, Radiological, and Nuclear (CBRN) Consequence Management Advisory Team (CMAT) deployed field asset, the Portable High Throughput Integrated Laboratory Identification System (PHILIS), mobile staff and

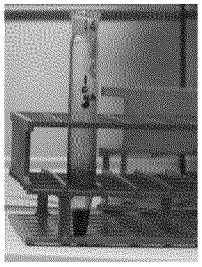


PHILIS trailer.

equipment to Region 1's New England (NE) Laboratory facilities in Chelmsford, Massachusetts. PHILIS participated in a full-scale chemical warfare agent (CWA) response exercise using a "live" CWA.

The goal of the exercise was to determine the best way to coordinate federal, state, and National Guard responses to a CWA attack with regard to each agency's sampling and analytical assets. Region 1's NE Laboratory is one of the EPA's Environmental Response Laboratory Network (ERLN)-approved ultra dilute agent (UDA) laboratories, which are set up to analyze CWA-contaminated environmental samples. PHILIS mobile units prepared and analyzed CWA-spiked samples at the Region 1 facility.

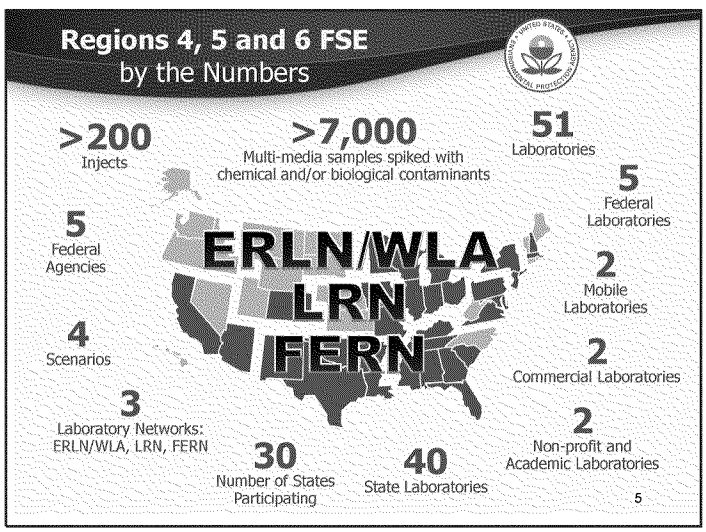
In addition to the Region 1 and PHILIS laboratory assets, several National Guard Civil Support Teams (CST) participated in the exercise by screening spiked samples for CWAs using their field protocols. A total of five CST units participated (1st CST-Massachusetts, 11th CST-Maine, 12th CST-New Hampshire, 13th CST-Rhode Island, 14th CST-Connecticut and 15th CST-Vermont), along with the Massachusetts Department of Environmental Protection (DEP) and Massachusetts Institute of Technology's (MIT's) Lincoln Labs. The exercise tested the coordination between federal, state, and local assets to merge and leverage the various sampling and analysis protocols of each of the participants to support the overall CWA response.



Spike sample.

Preparing for a WMD Attack: PHILIS Integrates into Multi-Regional & Multi-Agency Exercise

During the winter of 2012/2013, Region 6 sponsored a large, inter-agency, weapons of mass destruction (WMD) full-scale response exercise (FSE). CMAT and EPA Regions 4, 5, and 6, along with the Centers for Disease Control (CDC), Food and Drug Administration (FDA), U.S. Department of Agriculture (USDA), and numerous state, local, academic, and commercial entities participated. A total of 51 laboratories (five federal, two mobile (PHILIS), two academic, two commercial, and 40 state) covered 30 individual states and three laboratory networks (EPA's ERLN and the Water Laboratory Alliance (WLA), CDC's Laboratory Response Network (LRN) and USDA's Food Emergency Response Network (FERN)). The goal of the FSE was to test the various laboratory networks in the aftermath of an event, in this case a hurricane, where several chemical and biological releases occur simultaneously over a large geographic area. The robustness of the network would be challenged, and the ability to collect and share analytical data across federal, state, and local platforms would be tested. A toxic chemical (alicarb), a chemical warfare agent (sarin) and two biological releases (botulinum toxin and cholera) were part of the Region 4, 5, and 6 FSE. PHILIS analyzed spiked environmental samples for sarin, sarin breakdown products and aldicarb using state of the art gas chromatography/mass spectrometry (GC/MS) and liquid chromatography-tandem mass spectrometry (LC/MS/MS) methodologies. Data from the 51 laboratories were compiled, processed and validated via EPA's automated data validation software (WebEDR).



EPA Regions 4, 5 and 6 full scale response capabilities.

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Food Contamination Scenario Tests Interoperability of Lab Network

PHILIS supported the Integrated Consortium of Laboratory Networks (ICLN) Confidence Building Competency Testing Exercise for testing the interoperability of the different ICLN laboratories supporting each other in the event of a large intentional food contamination scenario. The scenario was a liquid food source (beer) contaminated with a toxic industrial chemical, in this exercise tetramine, which may have been distributed nationwide. The seven labs that are part of the ICLN modified their daily standard laboratory procedures and quickly adapted to the methods and protocols needed to analyze a large number of samples for tetramine in beer. The ability to adapt existing national laboratory assets to a single contaminant would be necessary to restore the nation's confidence in the food supply in the event of an intentional poisoning incident.

Liquid chromotography-tandem mass spectrometry workstation.

ASPECT Plume Detection and Tracking at West, Texas Explosion

On Wednesday, April 17, a massive explosion occurred at the West Fertilizer Company plant in the small Texas town of West, 18 miles north of Waco. The explosion occurred at about 8:00 p.m. with a school and a nursing home among the buildings near the plant. The explosion shook houses 50 miles away and measured as a 2.1-magnitude seismic event. It left 15 people dead, sent dozens more to hospitals for medical attention, leveled homes and businesses in every direction across the town, and prompted a wide-scale evacuation in the community of about 2,600 people because of concern that another fertilizer tank at the facility might explode. The material of concern was anhydrous ammonia, a gas with suffocating fumes that is used as a fertilizer. When exposed to humans, it can cause serious health problems.

The Region 6 on-scene coordinator (OSC) requested that the Airborne Spectral Photometric Environmental Collection Technology (ASPECT) System mobilize to provide chemical screening and aerial reconnaissance support to the ongoing response. The ASPECT plane subsequently made several flyovers beginning on the evening of the explosion. ASPECT was able to detect the ammonia plume resulting from the explosion, and subsequently tracked the plume northward as it migrated from the explosion site and eventually dissipated into the atmosphere. Numerous aerial photographs of the explosion site and surrounding area were taken and provided to the OSC and on-site response teams. The cause of the explosion is still under investigation.

Photo taken a day after the explosion. The ASPECT plane photos the direction and extent of the plume.

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Reducing Disaster Impact Through Remote Sensing Technology

The Subcommittee on Disaster Reduction (SDR) is an element of the President's National Science and Technology Council (NSTC) and facilitates national strategies for reducing disaster risks and losses. Strategies are based on effective use of science and technology. The ASPECT System is a prime asset that can be leveraged by the nation during disasters to help reduce the environmental, health, and economic impact by providing rapid response using remote sensing technology. CBRN CMAT has been assigned the lead on the SDR geospatial and remote sensing data interoperability workgroup during disaster responses.

Response Guides and CWA Playbooks Updated to Maintain Readiness

The National Response Team (NRT) Quick Reference Guide (QRG) inter-agency work group continues to develop updates for all existing QRGs that are more than two years old. The CWA Core National Approach to Response (NAR) National Preparedness work group also continues to address EPA's CWA Core NAR issues. Five sections of the CWA Playbook have been revised and updated and are under review by the OSCs and work group members. Monthly conference calls will continue.

Quick Response Guides being updated.

Remote Sensing: Oil burn-off during ASPECT's Gulf Oil Spill deployment.

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PHILIS: Seeking to Continuously Improve

The PHILIS units continue the following analytical methods of development on CWAs:

- liquid chromatography-tandem mass spectrometry (LC/MS/MS);
- gas chromatography with mass selective detector (GC/MSD); and
- gas chromatography/time-of-flight mass spectrometry (GC/TOF-MS).

A rapid LC MS/MS method for organophosphate pesticides is also under development. The results will be shared with the CWA Sampling Analysis Plan (SAP) work group as a prototype of rapid methods for selected CWAs. Quality Assurance Technical Services (QATS) contractor laboratory audits are being planned.

Reaching Out To Support Regions 1, 2 & 3

CMAT continues liaison support of EPA Region 1 and 2's CBRN preparedness efforts. CMAT works to keep Region 1 and 2 OSCs involved with the Integrated Detection and Decontamination Demonstration (IDDD) project and non-traditional threat agents (NTA) issues. This is a CMAT-coordinated and Department of Homeland Security (DHS)-sponsored event. Training on new modules for the Visual Sampling Plan software will be held at Region 2 in July 2013. EPA's Environmental Response Team (ERT), Region 1 and 3, along with the New York City (NYC) Department of Health and Mental Hygiene have been invited.

Live Demo of DHS IDDD Technologies Scheduled

Support to the DHS-sponsored Integrated Detection and Decontamination Demonstration (IDDD) project continued with a site visit to the New York City (NYC) Mass Transit Authority (MTA) on June 11, 2013. The "live demo" of IDDD technologies has been scheduled for fall 2013, at the NYC MTA's Bowery subway station. The U.S. Environmental Protection Agency (EPA) will participate and will likely co-chair sessions at the IDDD demo.

CMAT's PHILIS trailers deployed for a demonstration.

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U.S. and Canada Working Together to Protect North America

The Emergency Management Consultative Group (EMCG) was formed by an agreement between the U.S. and the government of Canada to address emergency management cooperation. The EMCG is comprised of working groups that focus on tasks from the December 2011 United States-Canada Beyond the Border (BTB) Action Plan. During meetings of the EMCG, updates from all of the working groups for the tasks of the BTB Action Plan are provided. Working groups focus on topics including federal-to-federal mutual assistance, movement of goods and people across the border during and following emergencies, joint exercises/training, critical infrastructure, and cybersecurity.

In addition to the U.S. Environmental Protection Agency (EPA) Office of Emergency Management (OEM) Consequence Management Advisory Team (CMAT) the Department of Homeland Security (DHS), Department of Defense (DoD), Department of State (DOS), and Department of Transportation (DOT) send representatives to these meetings. The Canadian delegation includes representatives from Public Safety Canada, the Canadian Embassy, Border Services Agency, Department of Foreign Affairs and International Trade, Transport Canada, and the Department of National Defense.

OEM has been an ongoing participant on the BTB Task 7A Canada-United States Chemical, Biological, Radiological, Nuclear and Explosives (CBRNE) Working Group. Led by the CBRNE Branch of the Federal Emergency Management Agency (FEMA), this working group consists of participants from the U.S. EPA, DHS, Department of Health and Human Services (HHS), Northern Command (NORTHCOM), and Department of Energy (DOE), and Canadian agencies and is working to develop a cooperative CBRNE Response Work Plan between the U.S. and Canada.

CMAT participated in the meetings of the EMCG CBRNE Working Group to provide input on the final work plan and terms of reference. CMAT has also offered leadership assistance for the subgroup areas of clearance criteria for CBRN and environmental response. CMAT will continue to provide support to other areas of coordination, as needed.

Partnering with Poland for Biological Resiliency Demonstration

The goal of the Transatlantic Collaborative Biological Resiliency Demonstration (TaCBRD) is to develop and demonstrate a capability for resilience in countering a wide-area biological incident that affects U.S. and partner nations. It is led by the Defense Threat Reduction Agency with its key partner, the Department of State's Foreign Consequence Management office, and with the primary partner nation, Poland.

Along with developing biological sampling training for the Civil Support Teams (CST) stationed in Germany and Polish responders, CMAT has supported the TACBRD International Recovery Assistance workshops. The goal of that workshop was to examine the roles and participation of U.S. agencies that would assist in a large scale biological incident in Poland and existing frameworks for international biological incident assistance so TaCBRD could plan future events with the appropriate stakeholders. During this workshop, CMAT also provided a briefing on EPA's response to Japan following the Fukushima Daiichi Nuclear Disaster. Other participants in this workshop were from DHS, DoD, DOS, the Federal Bureau of Investigation (FBI), HHS and U.S. Department of Agriculture (USDA).

CMAT has also participated in meetings detailing some of the software products being developed by TaCBRD and how they would function to support an international or large-scale response to a biological agent. EPA [National Homeland Security Research Center (NHSRC) and CMAT] have been in contact with the developers of the products that could be used by the EPA to provide input on what gaps exist for these products and how EPA would use them. As these products are further developed, CMAT and NHSRC will also provide assistance in evaluating their use.

Soldiers from Poland and the Illinois National Guard treat a simulated casualty during an exercise in Warsaw, Poland.

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Improving CBRN Capabilities Through Knowledge Exchange with United Kingdom

CMAT and the EPA Office of Research and Development's (ORD's) NHSRC met with representatives from the United Kingdom's Government Decontamination Service (GDS) to identify areas for operational and scientific exchange. The representatives were from the GDS Emergency Response and Recovery program and CBRN Capabilities Office. This cooperative effort falls under the agreement between the U.S. government and the government of the United Kingdom (U.K.) of Great Britain and Northern Ireland on Cooperation in Science and Technology for Critical Infrastructure Protection and Other Homeland/Civil Security Matters and a representative from the U.K. Embassy also attended this meeting to clarify the rules of international engagement.

A Communication Plan is being developed using the above mentioned agreement, with input from the U.K. Embassy and EPA's Office of Homeland Security. NHSRC leads this overall effort, with CMAT taking the lead for all operational topics. CMAT will continue to meet via teleconference with the GDS head of CBRN Capabilities to discuss and prioritize the operational areas for collaboration and cooperation.

UK Government Decontamination Service

Preparedness and Response Community Strengthens Relationship with the European Union

European Cooperation in Science and Technology (COST) invited CMAT to present at its Second International Open Workshop on Local-Scale Airborne Hazards Modeling and Emergency Response in Paris, France, on June 13, 2013. First responders and emergency response authorities face a large spectrum of potential threats due to the release of hazardous substances in built environments. Due to the complexity of the wind field in built areas, adequate flow and dispersion modeling and health impact assessment tools are required to predict the dispersion of hazardous materials with sufficient accuracy within a very short time. This workshop was an opportunity for stakeholders, decision makers, practitioners and scientists active in the field of development and use of local-scale airborne hazards modeling to collect information and discuss the latest issues and state of the art developments.

CMAT briefed the work group on the Airborne Spectral Photometric Environmental Collection Technology (ASPECT) Program. Models provide first responders a best guess based on various inputs. ASPECT collects actual chemical and/or radiological data at an event and transmits scientifically validated situational awareness, near real-time, to the first response community. ASPECT's data can even provide input to models, ultimately strengthening a model's prediction. The briefing addressed how responders have assets available for use other than models, which can be misleading, and showed how models can use near real-time data collected by assets like ASPECT to make future predictions more accurate during events.

COST EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

CMAT's participation strengthened their relationship with the preparedness and response community in the European Union. Their collaboration and cooperation will enable the United States and European Union to improve their response capabilities, increase efficiencies and reduce costs.

CMAT Leads Meeting with French Delegation

A delegation from the French Ministry of Ecology, Sustainable Development, and Energy met with CMAT and NHSRC from January 14-18, 2013 in Washington D.C. and Research Triangle Park, North Carolina. Both the EPA and the French delegation shared information on organization and statutory authority, lessons learned from CBRN responses, advances in tools and technologies, laboratory development, and training and exercises. All participants identified the need to develop a mutually beneficial partnership as each country is investing resources into the development of guidance and tools beneficial to all involved parties. As such, the French have invited and funded two trips for EPA participants to travel to France and learn more about the operational planning and technologies under development there. Further, the French are returning to the U.S. for the upcoming Decontamination Conference in November 2013. At that time, a study will be launched to jointly evaluate the use and efficacy of a French developed decon foam and gel.

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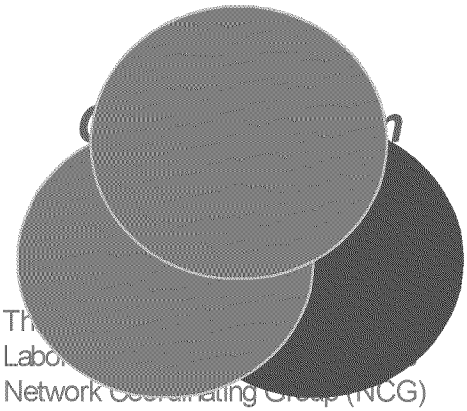

ICLN Continues to Develop New Tools

Th[illegible] Labo[illegible] Network Coordinating Group (NCG) continue to develop tools and guidance for the seven member federal agency laboratory network. The goal is to ensure coordination between network labs for issues involving laboratory capability and capacity, sampling and analytical method development and validation, quality assurance, data reporting and sharing, and performance testing. In 2013, the ICLN developed an online "Methods Registry" detailing network labs' capabilities, testing protocols, and point-of-contact for specific priority chemicals, radiochemical agents and biological agents and toxins. Work is currently in progress to link accreditation-required "Performance Test" results to each analyte in the Methods Registry. The ICLN has completed the development of the ICLN Portal which allows individual lab networks to (1) provide notice and situational awareness of incidents that may involve multiple network laboratory capabilities and capacity and (2) provide a means to export laboratory generated testing results to a pre-defined database populated with Minimum Data Elements (MDE) for the purpose of confidentially sharing lab results with other ICLN members. In order to test the capabilities of the portal and the processes by which the individual networks coordinate communication, a vignette format tabletop exercise was conducted in 2013. The vignette centered around an incident involving an outbreak of foot and mouth disease (FMD) in the U.S. milk supply and consisted of representatives from EPA's Environmental Response Laboratory Network (ERLN); HHS Centers for Disease Control (CDC) Laboratory Response Network (LRN); Food and Drug Administration (FDA) Headquarters; FDA Veterinary Laboratory Investigation and Response Network (Vet-LRN); USDA National Animal Health Laboratory Network (NAHLN); and USDA Food Safety and Inspection Service (FSIS). The vignette was not designed to exercise the full range of federal agency response authorities or actual field response, but only to exercise reporting of Preparedness and Situation Reports through the ICLN Portal to test information sharing processes between the various agencies. Information sharing consisted of the lead agency providing a detailed description of the incident, a description of available laboratory capacity to handle the lead agency's response activities, and detailed information from other agencies detailing any potential surge capacity the non-lead agencies may be able to provide for support.

Disseminating Information on Emerging Threat Agents

The White House Chemical Sub-Interagency Policy Committee (IPC) Workgroup met on a regular monthly basis throughout 2013. The primary theme for the year centered on federal policy issues pertaining to dissemination of classified information related to emerging threat agents. Discussion mainly pertained to what information about these agents can be released to federal, state and local emergency first responders and to the public at various timeframes, including prior to any incident involving a release of these agents (pre-incident planning), during the early stages of the incident (first response activities involving mass casualties), and for post-incident activities (remediation, clearance and monitoring activities). The workgroup conducted a tabletop exercise detailing the federal response activities to a release of one of these agents. CMAT coordinated with EPA OHS to present the EPA response activities at the exercise. Other workgroup activities included participation in briefings with DHS concerning the Chemical Terrorism Risk Assessment (CTRA) for chemical threat prioritization.

Tornado Terminate Arctic Sentry Exercise

CMAT prepared summary information on ASPECT, the Portable High Throughput Integrated Laboratory Identification Systems (PHILIS), and Trace Atmospheric Gas Analyzers (TAGA) assets to support the Arctic Sentry Exercise. This exercise was conducted from May 17 to 21, 2013, but was terminated early due to the tornado in Moore, Oklahoma.

Tornado as it passed Moore, Oklahoma.

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DHS Transitions WARRP to EPA

On May 16, 2013, DHS officially transferred the products developed under the Wide Area Resiliency and Recovery Program (WARRP) to EPA. The purpose of WARRP is to develop and demonstrate solutions (i.e., frameworks, operational capabilities and interagency coordination) that would enable a timely return to functionality, restore basic services and re-establish social and economic order following a catastrophic event. WARRP focused on a coordinated systems approach to the recovery and resiliency of wide urban areas, including all types of critical infrastructure, key resources (both civilian and military) and high traffic areas following a Chemical Biological Radiological and Nuclear (CBRN) incident.

EPA - DoD Partnership

Conference calls were held between the DoD Chemical Materials Agency (CMA) group at the Edgewood Chemical and Biological Center (ECBC), and DHS, CDC National Center for Environmental Health (NCEH) and EPA (CMAT, Regions 1 & 2 and NHSRC) on decontamination, cost tracking, waste management and other CWA issues and to discuss future partnerships. The scope of this partnership is under development.

Collaboration with USDA to Protect Food Products

CMAT, Office of Homeland Security (OHS), and NHSRC began a collaborative effort with the USDA to provide assistance regarding the USDA's requirement to protect food products from intentional contamination using emerging threat agents. EPA has provided review and comment on a laboratory method being developed for USDA by the ECBC. The method will define how to perform analysis for these contaminants in a variety of foods. CMAT is considering developing a similar testing method for environmental samples. If development of these methods is successful, EPA may be able to offer additional lab testing capacity to USDA for food. CMAT and NHSRC will also be working to develop decontamination guidance for contaminated food for USDA.

EPA-CDC Joint Clearance Work Group

The joint EPA-CDC work group to address clearance and toxicity issues on unknown threat agents has the final draft document under review. Conference calls were held between the DOD Chemical Materials Agency group at ECBC, DHS, CDC-NCEH and the EPA (CMAT, Regions1 & 2 and NHSRC) on decontamination, cost tracking, waste management and other CWA issues and to discuss future partnerships. The scope of this partnership is under development.

Mr. Russell (DHS) and Ms. Canzler (EPA) signing one of the first WARRP transition agreements.

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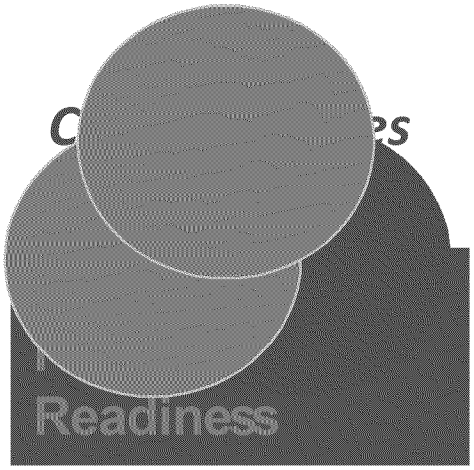

The Consequence Management Advisory Team (CMAT) and the National Counterterrorism Evidence Response Team (NCERT) conducted team training in the Research Triangle Park (RTP) facility between April 29 and May 3, 2013. The training included an 8-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) refresher; radiation, chemical and biological training; and a Level-A exercise. Chemical, Biological, Radiological and Nuclear (CBRN) wipe sampling and personnel decontamination were exercised. The National Homeland Security Center (NHSRC) also participated and collaborated with the exercise part of the training.

CMAT's Core NAR Evaluation Shows Improvement

On May 14, 2013, CMAT emergency response preparedness was evaluated as part of the annual Core National Approach to Response (NAR) process. CMAT has responsibility for criteria under the Headquarters, Special Teams and CBRN evaluations and has shown improvements. CMAT continues to help develop the preparedness of the agency to respond to a CBRN event by supporting the Regions in all areas of response and preparedness. These include leading the development of CBRN national response guides, developing laboratory capacity, and collaborating with international, national, state and local partners on issues related to a CBRN response.

CMAT in the News

Interested in more articles about CMAT? Additional articles published about CMAT can be found at:

- CBRNe WORLD, Aspects of Chem – An interview with CMAT's Director discussing the Team's capabilities projects and response assets. February 2013

  http://www.cbrneworld.com/_uploads/download_magazines/Aspects_of_Chem.pdf

- DomesticPreparedness.com - EPA's Role in Domestic Preparednessby Erica Canzler, Director of the CBRN Consequence Management Advisory Team, September 12, 2012

  http://www.domesticpreparedness.com/Commentary/Viewpoint/EPA%60s_Role_in_Domestic_Preparedness/

- It All Starts with Science, EPA's Mobile Lab Helps Clean Up Vermont Community - By Larry Kaelin with Mike Nalipinski. A description of PHILIS' role in the cleanup of Albans, Vermont after Hurricane Irene. August 27, 2012

  http://blog.epa.gov/science/2012/08/epa%E2%80%99s-mobile-lab-helps-clean-up-vermont-community/

- KMOV.com, EPA plane detects radiation at West Lake landfill, will release findings. CMAT's ASPECT plane investigates a Missouri landfill. March 11, 2013

  http://www.kmov.com/news/local/EPA-plane-detects-radiation-at-Bridgeton-Landfill-197213011.html

- Washington Times, Mapping a picture of Earth's minute particles from the sky. CMAT's ASPECT plane provides surveillance for President Obama's second inauguration. January 21, 2013

  http://p.washingtontimes.com/news/2013/jan/21/mapping-a-picture-of-earths-minute-particles-from-/

- West Virginia Public Radio, EPA teams up with National Guard to keep Jamboree safe. CMAT's ASPECT plane provides surveillance for the 2013 National Scout Jamboree. July 24, 2013

  http://www.wvpubcast.org/newsarticle.aspx?id=30948

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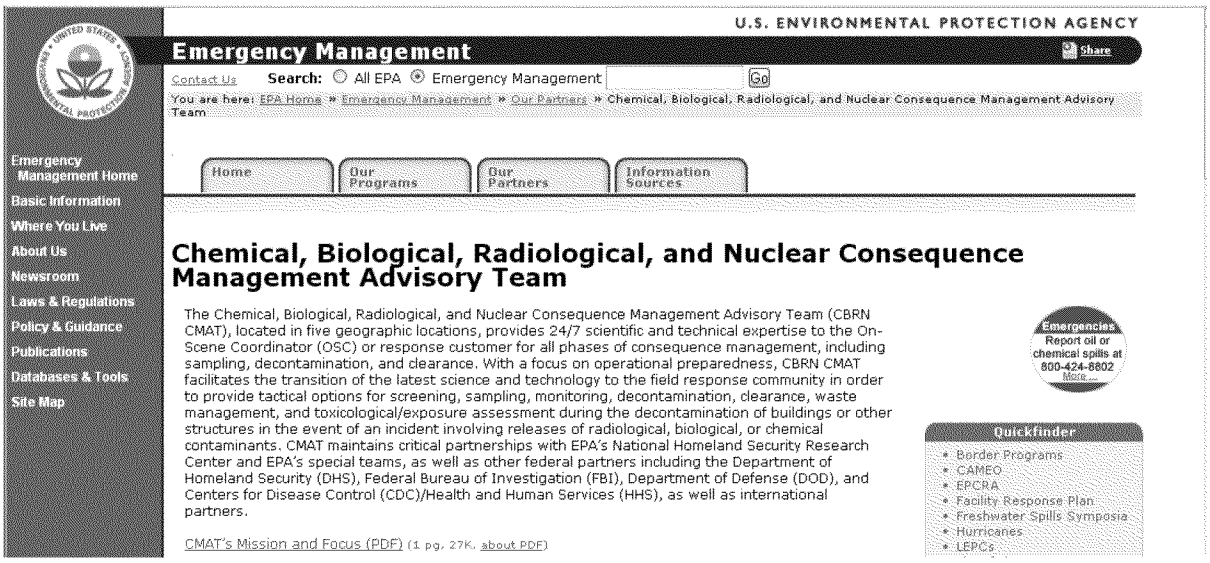
Information for OSCs on CMAT Web Page

CMAT is developing a series of summary documents for chemical and biological agents. Each summary includes: background information, exposure guidance, expected heath effects after exposure, personal protective equipment (PPE) recommendations, hazard reduction and cleanup information. The summaries have incorporated recent findings of ORD / NHSRC when applicable. The information is concise and comprehensive to assist OSCs during a response. The summary documents should be posted to CMATs website in FY14.

CMAT Web Page:
http: / / www.epa.gov / osweroe1 / content / partners / cbrncmat.htm



October 2013: Albuquerque Balloon Fiesta

The State of New Mexico has requested that EPA Airborne Spectrophotometric Environmental Collection Technology (ASPECT) assist with airborne chemical and radiological monitoring as part of the 2013 Albuquerque International Balloon Fiesta. This event typically draws a crowd of over 500,000 spectators. ASPECT has assisted the state for the past four years and provides daily chemical / radiological sweeps in addition to a heightened state of emergency response readiness in the event of an accident.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Chemical, Biological, Radiological and Nuclear Consequence Management Advisory Team